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INTERNATIONAL  
STANDARD

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IEC

60191-2Y

Première édition  
First edition  
1966

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Vingt-troisième complément à la  
Publication 60191-2 (1966)

**Normalisation mécanique des dispositifs  
à semiconducteurs –**

**Partie 2:  
Dimensions**

Twenty-third supplement to Publication 60191-2 (1966)

**Mechanical standardization of semiconductor  
devices –**

**Part 2:  
Dimensions**

*Les feuilles de ce complément sont à insérer dans la  
Publication 60191-2*

*The sheets contained in this supplement are to be  
inserted in Publication 60191-2*



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For price, see current catalogue*



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Remplacer la page de titre existante par la nouvelle page de titre.

Retirer la page 60191 IEC I existante contenant la préface et la remplacer par la nouvelle page 60191 IEC I contenant la préface au vingt-troisième complément.

Chapitre I:

Ajouter les nouvelles feuilles suivantes:

60191 IEC I-136E - a/b/c/d/e/f/g/h/i/j/k/l  
60191 IEC I-137E - a/b/c/d/e/f/g/h/i/j/k/l

Retirer les feuilles suivantes:

60191 IEC I-133E - a/b/c/d/e  
60191 IEC I-134E - a/b/c/d  
60191 IEC I-135E - a/b/c/d/e

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60191 IEC I-133E - a/b/c/d/e  
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## INSTRUCTIONS FOR THE INSERTION OF NEW PAGES IN IEC 60191-2

Replace the existing title page with the new title page.

Remove the existing page 60191 IEC I containing the preface and insert in its place the new page 60191 IEC I containing the preface to the twenty-third supplement.

Chapter I:

Add the following new sheets:

60191 IEC I-136E - a/b/c/d/e/f/g/h/i/j/k/l  
60191 IEC I-137E - a/b/c/d/e/f/g/h/i/j/k/l

Remove the following sheets:

60191 IEC I-133E - a/b/c/d/e  
60191 IEC I-134E - a/b/c/d  
60191 IEC I-135E - a/b/c/d/e

and substitute them by the following sheets:

60191 IEC I-133E - a/b/c/d/e  
60191 IEC I-134E - a/b/c/d/e/f  
60191 IEC I-135E - a/b/c/d/e/f/g



NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC  
**60191-2**  
Première édition  
First edition  
1966

Modifiée selon les Compléments:  
Amended in accordance with Supplement:  
A (1967), B (1969), C (1970), D (1971), E (1974), F (1976),  
G (1978), H (1978), J (1980), K (1981), L (1982), M (1983),  
N (1987), P (1988), Q (1990), R (1995), S (1995), T(1995),  
U(1997), V(1998), W(1999), X(1999), et/and Y(2000)

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**Partie 2:  
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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия



COMMISSION ÉLECTROTECHNIQUE  
INTERNATIONALE

PUBLICATION 191-2

**NORMALISATION MÉCANIQUE  
DES DISPOSITIFS À  
SEMICONDUCTEURS**

**DEUXIÈME PARTIE: DIMENSIONS**

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INTERNATIONAL  
ELECTROTECHNICAL COMMISSION

PUBLICATION 191-2

**MECHANICAL STANDARDIZATION  
OF SEMICONDUCTOR  
DEVICES**

**PART 2: DIMENSIONS**

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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

Vingt-troisième complément à la CEI 60191-2 (1966)

**NORMALISATION MÉCANIQUE DES DISPOSITIFS  
À SEMICONDUCTEURS –****Partie 2: Dimensions**

## AVANT-PROPOS

- 1) La CEI (Commission Électrotechnique Internationale) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de la CEI). La CEI a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, la CEI, entre autres activités, publie des Normes internationales. Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec la CEI, participent également aux travaux. La CEI collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de la CEI concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux intéressés sont représentés dans chaque comité d'études.
- 3) Les documents produits se présentent sous la forme de recommandations internationales. Ils sont publiés comme normes, spécifications techniques, rapports techniques ou guides et agréés comme tels par les Comités nationaux.
- 4) Dans le but d'encourager l'unification internationale, les Comités nationaux de la CEI s'engagent à appliquer de façon transparente, dans toute la mesure possible, les Normes internationales de la CEI dans leurs normes nationales et régionales. Toute divergence entre la norme de la CEI et la norme nationale ou régionale correspondante doit être indiquée en termes clairs dans cette dernière.
- 5) La CEI n'a fixé aucune procédure concernant le marquage comme indication d'approbation et sa responsabilité n'est pas engagée quand un matériel est déclaré conforme à l'une de ses normes.
- 6) L'attention est attirée sur le fait que certains des éléments de la présente Norme internationale peuvent faire l'objet de droits de propriété intellectuelle ou de droits analogues. La CEI ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de propriété et de ne pas avoir signalé leur existence.

## PRÉFACE AU VINGT-TROISIÈME COMPLÉMENT

La présente norme a été établie par le sous-comité 47D: Normalisation mécanique des dispositifs à semiconducteurs, et par le comité d'études 47 de la CEI: Dispositifs à semiconducteurs.

Elle constitue le vingt-troisième complément à la CEI 60191-2.

Le texte de cette norme est issu des documents suivants:

| FDIS             | Rapport de vote |
|------------------|-----------------|
| 47D/341+342/FDIS | 47D/356+357/RVD |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

Twenty-third supplement to IEC 60191-2 (1966)

**MECHANICAL STANDARDIZATION OF  
SEMICONDUCTOR DEVICES –****Part 2: Dimensions**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

## PREFACE TO THE TWENTY-THIRD SUPPLEMENT

This standard has been prepared by subcommittee 47D: Mechanical standardization of semiconductor devices, and by IEC technical committee 47: Semiconductor devices.

It forms the twenty-third supplement to IEC 60191-2.

The text of this standard is based on the following documents:

| FDIS             | Report on voting |
|------------------|------------------|
| 47D/341+342/FDIS | 47D/356+357/RVD  |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

## CHAPITRE 00 – CONCEPTION DE LA NORMALISATION MÉCANIQUE

### 1. Règles fondamentales

Lors de la réunion tenue à Montreux (juin 1981), le Comité d'Etudes n° 47 adopta les règles fondamentales suivantes qui remplacent celles adoptées à Copenhague en octobre 1962:

- A. Toute proposition nouvelle devra être soumise à l'étude préliminaire d'un groupe de travail convenablement qualifié (note 1) avant circulation dans un document Secrétariat.
- B. Le groupe de travail qualifié devra étudier les nouvelles propositions avec les objectifs suivants:
  - 1. Aboutir à une normalisation active en n'acceptant que les boîtiers qui sont soutenus internationalement.
  - 2. Spécifier de façon précise les dimensions en vue d'assurer l'interchangeabilité et de faciliter les manipulations automatiques.
  - 3. Reconsidérer continuellement les dessins existants et proposer la suppression de ceux qui ne sont plus soutenus.
- C. Il ne sera procédé à la discussion d'un dessin de boîtier que s'il a le soutien préalable d'au moins trois pays.
- D. Un dessin ne sera introduit dans la Publication 191-2 de la CEI que si au moins trois des pays qui le soutiennent ont fourni leur numéro de code national (ou exprimé un soutien formel s'ils ne possèdent pas de numéro de code).

*Notes* 1. – Lors de la réunion du Comité d'Etudes n° 47 à Orlando (février 1980), il a été admis d'étendre le domaine d'activité du GT7 de façon qu'il couvre aussi bien la normalisation mécanique des semiconducteurs discrets que celle des circuits intégrés.

Il a été également admis que, compte tenu de l'élargissement de son domaine d'activité, le GT7 serait le groupe de travail qualifié mentionné dans le paragraphe A.

En vue d'éviter que l'introduction du GT7 dans le processus suivi par le Comité d'Etudes n° 47 pour préparer des documents secrétariat sur la normalisation mécanique provoque des délais supplémentaires, le GT7 a été autorisé à obtenir de la part des trois pays concernés, ou plus, la confirmation directe du maintien de leur appui pour ces propositions.

- 2. – Lors de la réunion du Comité d'Etudes n° 47 à Montreux (juin 1981), il a été admis que les réunions du GT7 s'intégreraient dans les réunions du Comité d'Etudes n° 47.

Cependant, certaines propositions peuvent nécessiter un temps d'études dépassant la durée d'une réunion du Comité d'Etudes n° 47 et en conséquence requérir une ou plusieurs réunions du GT7 entre deux réunions consécutives du Comité d'Etudes n° 47.

Lors de la réunion tenue à Moscou (juin 1977), le Comité d'Etudes n° 47 adopta la règle suivante:

Lorsqu'un dessin de la Publication 191-2 de la CEI vient à ne plus être soutenu que par un seul pays, il sera retiré de la publication principale et transféré dans une section séparée intitulée «Dessins obsolètes» avec l'indication de la date de transfert sur la feuille particulière correspondante.

Un avertissement au début de la section dévolue aux dessins obsolètes stipulera qu'à l'expiration d'une période de deux ans à compter de sa date de transfert, le dessin sera supprimé, sauf s'il est soutenu par un autre pays dans l'intervalle.

## CHAPITRE I – DESSINS D'ENCOMBREMENTS

| Liste de dessins (suite)                                                                                                                            |                                                                                                                                                |                        |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------|
| Numéro de code CEI                                                                                                                                  | Code du pays d'origine                                                                                                                         | Numéro de page et date |      |
| 105B07<br>105B08<br>105B09                                                                                                                          | 105B07<br>105B08<br>105B09                                                                                                                     | I-105B                 | 1988 |
| 106B01<br>105B02                                                                                                                                    | 106B01<br>SC-68                                                                                                                                |                        |      |
| 107B01<br>107B02                                                                                                                                    | 107B01<br>SC-69                                                                                                                                |                        |      |
| Forme C<br>100C01<br>100C02                                                                                                                         | KD10                                                                                                                                           | I-100C                 | 1990 |
| Forme E<br>046E01A<br>046E01B                                                                                                                       | NT23/3A<br>NT233B                                                                                                                              | I-46E1                 | 1988 |
| 046E02A<br>046E02B                                                                                                                                  | NT143A<br>NT143B                                                                                                                               | I-46E2                 | 1988 |
| 075E01<br>075E02<br>075E03<br>075E04<br>075E05<br>075E06                                                                                            | SO192E<br>SO192F<br>NT162<br>NT163<br>NT137<br>NT136                                                                                           | I-075E                 | 1990 |
| 076E01S<br>076E01L<br>076E02S<br>076E02L<br>076E03S<br>076E03L<br>076E04S<br>076E04L<br>076E05S<br>076E05L<br>076E06S<br>076E07S<br>076E07L<br>099E | FT174A<br>FT174<br>FT175A<br>FT175<br>FT176A<br>FT176<br>FT177A<br>FT177<br>FT178A<br>FT178<br>FT179A<br>FT179<br>FT180                        |                        |      |
| 100E                                                                                                                                                | NT323<br>SC-70                                                                                                                                 | I-100E                 | 1996 |
| 102E02<br>102E03<br>102E04<br>102E05<br>102E06<br>102E07                                                                                            | MS004-CB<br>MS004-CC<br>MS004-CD<br>MS004-CE<br>MS004-CF<br>MS004-CG                                                                           | I-102E                 | 1990 |
| 112E01<br>112E02<br>112E03<br>112E04<br>112E05<br>112E06<br>112E07<br>112E08<br>112E09<br>112E10<br>112E11<br>112E12<br>112E13<br>112E14<br>112E15  | B1A<br>(Allemagne)<br>B1C<br>SO195A<br>B1D<br>(Allemagne)<br>B1E<br>SO195B<br>B1G<br>NT185<br>SO195D<br>NT188<br>NT189<br>MO-047AG<br>MO-047AH |                        |      |
| 114E01                                                                                                                                              | NT89                                                                                                                                           | I-114E                 | 1988 |
| 115E01<br>115E02<br>115E03<br>115E04                                                                                                                | SC-527-8AA<br>SC-528-10AA<br>SC-529-14AA<br>SC-530-16AA                                                                                        | I-115E                 | 1988 |

## CHAPTER I – DEVICE OUTLINE DRAWINGS

| List of drawings (continued)                                                                                                                        |                                                                                                                                            |                      |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|
| IEC code number                                                                                                                                     | Code of country of origin                                                                                                                  | Page number and date |      |
| 105B07<br>105B08<br>105B09                                                                                                                          | 105B07<br>105B08<br>105B09                                                                                                                 | I-105B               | 1988 |
| 106B01<br>105B02                                                                                                                                    | 106B01<br>SC-68                                                                                                                            |                      |      |
| 107B01<br>107B02                                                                                                                                    | 107B01<br>SC-69                                                                                                                            |                      |      |
| Form C<br>100C01<br>100C02                                                                                                                          | KD10                                                                                                                                       | I-100C               | 1990 |
| Form E<br>046E01A<br>046E01B                                                                                                                        | NT23/3A<br>NT233B                                                                                                                          | I-46E1               | 1988 |
| 046E02A<br>046E02B                                                                                                                                  | NT143A<br>NT143B                                                                                                                           | I-46E2               | 1988 |
| 075E01<br>075E02<br>075E03<br>075E04<br>075E05<br>075E06                                                                                            | SO192E<br>SO192F<br>NT162<br>NT163<br>NT137<br>NT136                                                                                       | I-075E               | 1990 |
| 076E01S<br>076E01L<br>076E02S<br>076E02L<br>076E03S<br>076E03L<br>076E04S<br>076E04L<br>076E05S<br>076E05L<br>076E06S<br>076E07S<br>076E07L<br>099E | FT174A<br>FT174<br>FT175A<br>FT175<br>FT176A<br>FT176<br>FT177A<br>FT177<br>FT178A<br>FT178<br>FT179A<br>FT179<br>FT180                    |                      |      |
| 100E                                                                                                                                                | NT323<br>SC-70                                                                                                                             | I-100E               | 1996 |
| 102E02<br>102E03<br>102E04<br>102E05<br>102E06<br>102E07                                                                                            | MS004-CB<br>MS004-CC<br>MS004-CD<br>MS004-CE<br>MS004-CF<br>MS004-CG                                                                       | I-102E               | 1990 |
| 112E01<br>112E02<br>112E03<br>112E04<br>112E05<br>112E06<br>112E07<br>112E08<br>112E09<br>112E10<br>112E11<br>112E12<br>112E13<br>112E14<br>112E15  | B1A<br>(Germany)<br>B1C<br>SO195A<br>B1D<br>(Germany)<br>B1E<br>SO195B<br>B1G<br>NT185<br>SO195D<br>NT188<br>NT189<br>MO-047AG<br>MO-047AH |                      |      |
| 114E01                                                                                                                                              | NT89                                                                                                                                       | I-114E               | 1988 |
| 115E01<br>115E02<br>115E03<br>115E04                                                                                                                | SC-527-8AA<br>SC-528-10AA<br>SC-529-14AA<br>SC-530-16AA                                                                                    | I-115E               | 1988 |

## CHAPITRE I – DESSINS D'ENCOMBREMENTS

| Liste de dessins (suite) |                        |                        |      |
|--------------------------|------------------------|------------------------|------|
| Numéro de code CEI       | Code du pays d'origine | Numéro de page et date |      |
| 116E01                   | SC-529-14BA            | I-116E                 | 1988 |
| 116E02                   | SC-530-16CA            |                        |      |
| 116E03                   | SC-531-20AA            |                        |      |
| 117E01                   | SC-530-16BA            | I-117E                 | 1988 |
| 117E02                   | SC-531-20BA            |                        |      |
| 117E03                   | SC-532-24AA            |                        |      |
| 117E04                   | SC-533-28AA            |                        |      |
| 117E05                   | SC-533-28BA            |                        |      |
| 118E01                   | SC-532-24BA            | I-118E                 | 1988 |
| 118E02                   | SC-533-28CA            |                        |      |
| 119E02                   | (Etats-Unis)           | I-119E                 | 1990 |
| 119E03                   |                        |                        |      |
| 120E                     | NT194                  | I-120E                 | 1990 |
| 121E                     | NT213                  | I-121E                 | 1994 |
| 122E                     | NT221                  | I-122E                 | 1994 |
| 123E                     |                        | I-123E                 | 1997 |
| 129E                     | NT223                  | I-129E                 | 1994 |
| 133E                     |                        | I-133E                 | 2000 |
| 134E                     |                        | I-134E                 | 2000 |
| 135E                     |                        | I-135E                 | 2000 |
| 136E                     |                        | I-136E                 | 2000 |
| 137E                     |                        | I-137E                 | 2000 |
| 138E                     |                        | I-138E                 |      |
| 139E                     |                        | I-139E                 |      |
| 140E                     |                        | I-140E                 | 1999 |
| 141E                     |                        | I-141E                 | 1999 |
| 142E                     |                        | I-142E                 | 1998 |
| 143E                     |                        | I-143E                 | 1998 |
| 144E                     |                        | I-144E                 | 1999 |
| 147E                     |                        | I-147E                 | 1999 |
| 148E                     |                        | I-148E                 | 1999 |
| 149E                     |                        | I-149E                 | 2000 |
| Forme F                  |                        |                        |      |
| 084F                     |                        | I-084F                 | 1996 |
| 100F                     |                        | I-100F                 | 1990 |
| 101F01                   | 101F01                 | I-101F                 | 1998 |
| 101F01                   | 101F01                 |                        |      |
| 102F                     |                        | I-102F                 | 1998 |
| 102F0                    | 102F01                 |                        |      |
| 102F02                   | 102F02                 |                        |      |
| 102F033                  | 102F03                 |                        |      |

## CHAPTER I – DEVICE OUTLINE DRAWINGS

| List of drawings (continued) |                           |                      |      |
|------------------------------|---------------------------|----------------------|------|
| IEC code number              | Code of country of origin | Page number and date |      |
| 116E01                       | SC-529-14BA               | I-116E               | 1988 |
| 116E02                       | SC-530-16CA               |                      |      |
| 116E03                       | SC-531-20AA               |                      |      |
| 117E01                       | SC-530-16BA               | I-117E               | 1988 |
| 117E02                       | SC-531-20BA               |                      |      |
| 117E03                       | SC-532-24AA               |                      |      |
| 117E04                       | SC-533-28AA               |                      |      |
| 117E05                       | SC-533-28BA               |                      |      |
| 118E01                       | SC-532-24BA               | I-118E               | 1988 |
| 118E02                       | SC-533-28CA               |                      |      |
| 119E02                       | (USA)                     | I-119E               | 1990 |
| 119E03                       |                           |                      |      |
| 120E                         | NT194                     | I-120E               | 1990 |
| 121E                         | NT213                     | I-121E               | 1994 |
| 122E                         | NT221                     | I-122E               | 1994 |
| 123E                         |                           | I-123E               | 1997 |
| 129E                         | NT223                     | I-129E               | 1994 |
| 133E                         |                           | I-133E               | 2000 |
| 134E                         |                           | I-134E               | 2000 |
| 135E                         |                           | I-135E               | 2000 |
| 136E                         |                           | I-136E               | 2000 |
| 137E                         |                           | I-137E               | 2000 |
| 138E                         |                           | I-138E               |      |
| 139E                         |                           | I-139E               |      |
| 140E                         |                           | I-140E               | 1999 |
| 141E                         |                           | I-141E               | 1999 |
| 142E                         |                           | I-142E               | 1998 |
| 143E                         |                           | I-143E               | 1998 |
| 144E                         |                           | I-144E               | 1999 |
| 147E                         |                           | I-147E               | 1999 |
| 148E                         |                           | I-148E               | 1999 |
| 149E                         |                           | I-149E               | 2000 |
| Form F                       |                           |                      |      |
| 084F                         |                           | I-084F               | 1996 |
| 100F                         |                           | I-100F               | 1990 |
| 101F01                       | 101F01                    | I-101F               | 1998 |
| 101F01                       | 101F01                    |                      |      |
| 102F                         |                           | I-102F               | 1998 |
| 102F0                        | 102F01                    |                      |      |
| 102F02                       | 102F02                    |                      |      |
| 102F033                      | 102F03                    |                      |      |

## CHAPITRE I – DESSINS D'ENCOMBREMENTS

Liste de dessins *(suite)*

| Numéro de code CEI | Code du pays d'origine | Numéro de page et date |
|--------------------|------------------------|------------------------|
| Forme G            |                        |                        |
| 050G01             | SO5-87D                | I-50a/b/c/d 1985       |
| 050G02             | SO-188D                |                        |
| 050G03             | SO-87A                 |                        |
| 050G04             | SO-87B                 |                        |
| 050G05             | SO-188A                |                        |
| 050G06             | SO-188B                |                        |
| 050G07             | SO-188F                |                        |
| 050G08             | SO-87C                 |                        |
| 050G10             | SO-188C                |                        |
| 050G11             | SO505-18A              |                        |
| 050G12             | SO-87G                 |                        |
| 050G13             | SO-188E                |                        |
| 050G14             | (Suède)                |                        |
| 050G16             | A1AA                   | I-50e 1990             |
| 050G17             | A1AB                   |                        |
| 050G18             | A1BA                   |                        |
| 050G19             | A1BB                   |                        |
| 050G20             | A1CB                   |                        |

## CHAPTER I – DEVICE OUTLINE DRAWINGS

List of drawings *(continued)*

| IEC code number | Code of country of origin | Page number and date |
|-----------------|---------------------------|----------------------|
| Form G          |                           |                      |
| 050G01          | SO5-87D                   | I-50a/b/c/d 1985     |
| 050G02          | SO-188D                   |                      |
| 050G03          | SO-87A                    |                      |
| 050G04          | SO-87B                    |                      |
| 050G05          | SO-188A                   |                      |
| 050G06          | SO-188B                   |                      |
| 050G07          | SO-188F                   |                      |
| 050G08          | SO-87C                    |                      |
| 050G10          | SO-188C                   |                      |
| 050G11          | SO505-18A                 |                      |
| 050G12          | SO-87G                    |                      |
| 050G13          | SO-188E                   |                      |
| 050G14          | (Sweden)                  |                      |
| 050G16          | A1AA                      | I-50e 1990           |
| 050G17          | A1AB                      |                      |
| 050G18          | A1BA                      |                      |
| 050G19          | A1BB                      |                      |
| 050G20          | A1CB                      |                      |

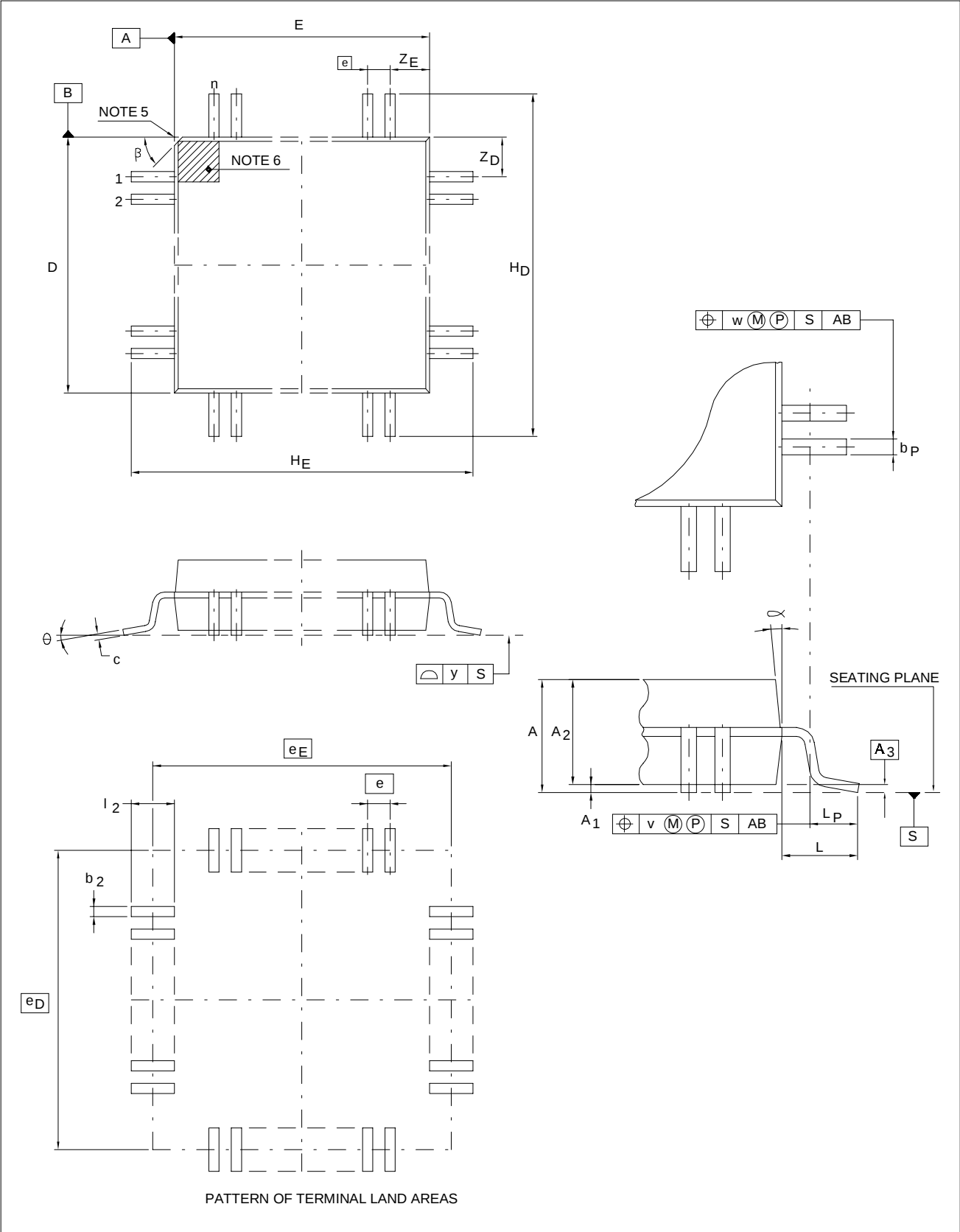


Types de dispositifs à semiconducteurs  
généralement montés dans les boîtiers  
du chapitre I de la CEI 60191-2

Types of semiconductor devices  
generally mounted in the packages  
of chapter I of IEC 60191-2

| Type de dispositif<br>Type of device                                                               | Numéro de code CEI du dessin du boîtier<br>IEC code number of package drawing                                                                                                                                       |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diodes de signal et diodes Zener de faible puissance<br>Signal diodes and small-power Zener diodes | A1, A20, A24, A32, A54, A55, A58, A67, A69, A70, A71, 098H, 100H                                                                                                                                                    |
| Diodes hyperfréquences<br>Microwave diodes                                                         | A18                                                                                                                                                                                                                 |
| Diodes de redressement de faible et moyenne puissance<br>Rectifier diodes, small and medium power  | A2, A3, A4, A6, A7, A19, A37, A44, A74, 077B, 100B                                                                                                                                                                  |
| Diodes de redressement de forte puissance<br>High-power rectifier diodes                           | A8, A9, A10, A15, A16, A17, A21, A22, A35, 083B, 103B                                                                                                                                                               |
| Thyristors de faible et moyenne puissance<br>Thyristors, small and medium power                    | A11, A13, A14, A38, A43                                                                                                                                                                                             |
| Thyristors de forte puissance<br>High-power thyristors                                             | A12, A27, A28, A29, A34, A39, A47, 104B, 105B                                                                                                                                                                       |
| Transistors de signal<br>Signal transistors                                                        | A36, A40, A41, 068A, 046E, 114E                                                                                                                                                                                     |
| Transistors de puissance<br>Power transistors                                                      | A23, A30, A31, A43, A48, A56, A57, A45, A73, 080B, 081B, 082B, 101B, 102B, 102F, 120E, 084F, P100F                                                                                                                  |
| Transistors hyperfréquences<br>Microwave transistors                                               | A26, A42, A43, A59, A66, A72, 100C                                                                                                                                                                                  |
| Dispositifs optoélectroniques<br>Optoelectronic devices                                            | A62, A64, A65, A63A, 100A, 101A, 106B, 107B                                                                                                                                                                         |
| Circuits intégrés<br>Integrated circuits                                                           | A52, A53, A61, 075E, 076E, 099E, 100E, 102E, 112E, 115E, 116E, 117E, 118E, 119E, 121E, 122E, 123E, 129E, 133E, 134E, 135E, 136E, 137E, 138E, 139E, 140E, 141E, 144E, 147E, 148E, 149E, 050G, 051G, 060G, 100G, 101G |





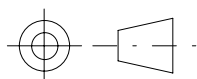
|  |                                                                                       |                       |
|--|---------------------------------------------------------------------------------------|-----------------------|
|  | PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)<br>OUTLINE FAMILY, 1.0 mm PITCH, PQFP-G, 133E | 1998                  |
|  | 60191 IEC I-133E-a                                                                    | Publication IEC 60191 |

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 133E 01 |         |      | 133E 02 |         |      | 133E 03 |         |      | 133E 04 |         |       | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX   |         |       |
| n              | -       | 44      | -    | -       | 64      | -    | -       | 64      | -    | -       | 36      | -     |         | 1     |
| $\eta_D$       | -       | 11      | -    | -       | 19      | -    | -       | 19      | -    | -       | 9       | -     |         | 2, 4  |
| $\eta_E$       | -       | 11      | -    | -       | 13      | -    | -       | 13      | -    | -       | 9       | -     |         | 2, 4  |
| A              | -       | -       | 2.6  | -       | -       | 3.2  | -       | -       | 3.2  | -       | -       | 2.45  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.25  |         |       |
| A <sub>2</sub> | 2.0     | -       | -    | 2.6     | -       | -    | 1.4     | -       | -    | 1.80    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.30    | -       | 0.50 | 0.30    | -       | 0.50 | 0.30    | -       | 0.50 | 0.30    | -       | 0.50  |         | 3     |
| D              | -       | 14.0    | -    | -       | 20.0    | -    | -       | 20.0    | -    | -       | 10.0    | -     |         |       |
| E              | -       | 14.0    | -    | -       | 14.0    | -    | -       | 14.0    | -    | -       | 10.0    | -     |         |       |
| e              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -     |         | 3     |
| H <sub>D</sub> | 18.2    | -       | 19.2 | 24.2    | -       | 25.2 | 24.2    | -       | 25.4 | 12.95   | -       | 13.45 |         |       |
| H <sub>E</sub> | 18.2    | -       | 19.2 | 18.2    | -       | 19.2 | 18.2    | -       | 19.4 | 12.95   | -       | 13.45 |         |       |
| L              | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | -       | 1.60(*) | -     |         |       |
| L <sub>P</sub> | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.3  | -       | -       | 0.3  | -       | -       | 0.3  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.2  | -       | -       | 0.2  | -       | -       | 0.2  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.2  | -       | -       | 0.2  | -       | -       | 0.2  | -       | -       | 0.10  |         | 5     |
| $\theta$       | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -     | 0-8     |       |

| REF.           | 133E 05 |         |       | 133E 06 |         |       | 133E 07 |         |       | 133E 08 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 52      | -     | -       | 52      | -     | -       | 76      | -     | -       | 76      | -     |         |       |
| $\eta_D$       | -       | 13      | -     | -       | 13      | -     | -       | 19      | -     | -       | 19      | -     |         |       |
| $\eta_E$       | -       | 13      | -     | -       | 13      | -     | -       | 19      | -     | -       | 19      | -     |         |       |
| A              | -       | -       | 2.45  | -       | -       | 3.15  | -       | -       | 3.15  | -       | -       | 3.40  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |         |       |
| A <sub>2</sub> | 1.80    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.30    | -       | -     | 0.30    | -       | 0.50  | 0.30    | -       | 0.50  | 0.30    | -       | 0.50  |         | 3     |
| D              | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |         |       |
| E              | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |         |       |
| e              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         | 3     |
| H <sub>D</sub> | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |         |       |
| H <sub>E</sub> | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         | 5     |
| $\theta$       | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 1.0 mm PITCH, PQFP-G, 133E

1998

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 133E 09 |         |       | 133E 10 |         |       |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |  |  |  |  |  |  |         |       |
| n              | -       | 64      | -     | -       | 64      | -     |  |  |  |  |  |  |         | 1     |
| n <sub>D</sub> | -       | 16      | -     | -       | 16      | -     |  |  |  |  |  |  |         | 2, 4  |
| n <sub>E</sub> | -       | 16      | -     | -       | 16      | -     |  |  |  |  |  |  |         | 2, 4  |
| A              | -       | -       | 3.15  | -       | -       | 3.40  |  |  |  |  |  |  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |  |  |  |  |  |  |         |       |
| A <sub>2</sub> | 2.50    | -       | -     | 2.50    | -       | -     |  |  |  |  |  |  |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     |  |  |  |  |  |  |         |       |
| b <sub>P</sub> | 0.30    | -       | 0.50  | 0.30    | -       | 0.50  |  |  |  |  |  |  |         | 3     |
| D              | -       | 20.0    | -     | -       | 20.0    | -     |  |  |  |  |  |  |         |       |
| E              | -       | 20.0    | -     | -       | 20.0    | -     |  |  |  |  |  |  |         |       |
| e              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |  |  |  |  |  |  |         | 3     |
| H <sub>D</sub> | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |  |  |  |  |  |  |         |       |
| H <sub>E</sub> | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |  |  |  |  |  |  |         |       |
| L              |         | 1.6(*)  |       |         | 1.6(*)  |       |  |  |  |  |  |  |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |  |  |  |  |  |  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  |  |  |  |  |  |  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.20  |  |  |  |  |  |  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  |  |  |  |  |  |  |         | 5     |
| θ              | -       | -       | -     | -       | -       | -     |  |  |  |  |  |  | 0-8     |       |

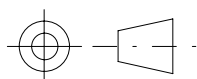
## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.           | 133E 01 |         |     | 133E 02 |         |     | 133E 03 |         |     | 133E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|-----|---------|---------|-----|---------|---------|-----|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX | MIN     | NOM     | MAX | MIN     | NOM     | MAX | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.7 | -       | -       | 0.7 | -       | -       | 0.7 | -       | -       | 0.7  |         | 3     |
| e              | -       | 1.0(*)  | -   | -       | 1.0(*)  | -   | -       | 1.0(*)  | -   | -       | 1.0(*)  | -    |         | 3     |
| e <sub>D</sub> | -       | 17.3(*) | -   | -       | 23.3(*) | -   | -       | 23.3(*) | -   | -       | 13.2(*) | -    |         | 3     |
| e <sub>E</sub> | -       | 17.3(*) | -   | -       | 17.3(*) | -   | -       | 17.3(*) | -   | -       | 13.2(*) | -    |         | 3     |
| l <sub>2</sub> | -       |         | 2.2 | -       |         | 2.2 | -       |         | 2.2 | -       |         | 1.28 |         | 3     |

| REF.           | 133E 05 |         |      | 133E 06 |         |      | 133E 07 |         |      | 133E 08 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.7  | -       | -       | 0.7  | -       | -       | 0.7  | -       | -       | 0.7  |         | 3     |
| e              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |         | 3     |
| e <sub>D</sub> | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |         | 3     |
| e <sub>E</sub> | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |         | 3     |
| l <sub>2</sub> | -       |         | 1.28 | -       |         | 1.28 | -       |         | 1.28 | -       |         | 1.28 |         | 3     |

| REF.           | 133E 09 |         |      | 133E 10 |         |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |  |  |  |  |  |  |         |       |
| b <sub>2</sub> | -       | -       | 0.7  | -       | -       | 0.7  |  |  |  |  |  |  |         | 3     |
| e              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |  |  |  |  |  |  |         | 3     |
| e <sub>D</sub> | -       | 23.2(*) | -    | -       | 23.2(*) | -    |  |  |  |  |  |  |         | 3     |
| e <sub>E</sub> | -       | 23.2(*) | -    | -       | 23.2(*) | -    |  |  |  |  |  |  |         | 3     |
| l <sub>2</sub> | -       |         | 1.28 | -       |         | 1.28 |  |  |  |  |  |  |         | 3     |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 1.0 mm PITCH, PQFP-G, 133E

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## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.           | 133E 01 |     |      | 133E 02 |     |      | 133E 03 |     |      | 133E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 2.0     | -   | -    | 2.6     | -   | -    | 1.4     | -   | -    | 1.8     | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 9.8     | -   | 10.2 |         |       |
| E              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 9.8     | -   | 10.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 133E 05 |     |      | 133E 06 |     |      | 133E 07 |     |      | 133E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.8     | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    | 2.50    | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 133E 09 |     |      | 133E 10 |     |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  |  |  |  |  |  |  |         |       |
| A <sub>2</sub> | 2.50    | -   | -    | 2.50    | -   | -    |  |  |  |  |  |  |         |       |
| D              | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |  |  |  |  |  |  |         |       |
| E              | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |  |  |  |  |  |  |         |       |
| β              | -       | -   | -    | -       | -   | -    |  |  |  |  |  |  | 45      |       |

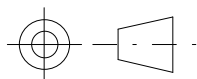
## GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

MILLIMETRES

| REF.           | 133E 01 |     |      | 133E 02 |     |      | 133E 03 |     |      | 133E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.12    | -   | 0.25 | 0.12    | -   | 0.25 | 0.12    | -   | 0.30 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 2.4  | -       | -   | 1.2  | -       | -   | 1.2  | -       | -   | 1.6  |         |       |
| Z <sub>E</sub> | -       | -   | 2.4  | -       | -   | 1.2  | -       | -   | 1.2  | -       | -   | 1.6  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 133E 05 |     |      | 133E 06 |     |      | 133E 07 |     |      | 133E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  |         |       |
| Z <sub>E</sub> | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 133E 09 |     |      | 133E 10 |     |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  |  |  |  |  |  |  |         |       |
| c              | 0.11    | -   | 0.23 | 0.12    | -   | 0.23 |  |  |  |  |  |  |         |       |
| Z <sub>D</sub> | -       | -   | 2.6  | -       | -   | 2.6  |  |  |  |  |  |  |         |       |
| Z <sub>E</sub> | -       | -   | 2.6  | -       | -   | 2.6  |  |  |  |  |  |  |         |       |
| α              | -       | -   | -    | -       | -   | -    |  |  |  |  |  |  | 5-16    |       |

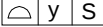


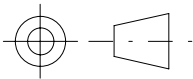
PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 1.0 mm PITCH, PQFP-G, 133E

1998

1.  $n$  REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
2.  $n_D$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION D.  
  
 $n_E$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION E.
3. CHECK OF THE DIMENSIONS AND POSITIONS OF PACKAGE TERMINALS IS VALIDLY PERFORMED WHEN IT IS ENSURED THAT THESE TERMINALS FIT WITH THE PATTERN OF TERMINAL LAND AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
4. INDIVIDUAL TERMINALS CAN BE OMITTED

(\*) MEANS TRUE GEOMETRIC POSITION.  
[ ] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.

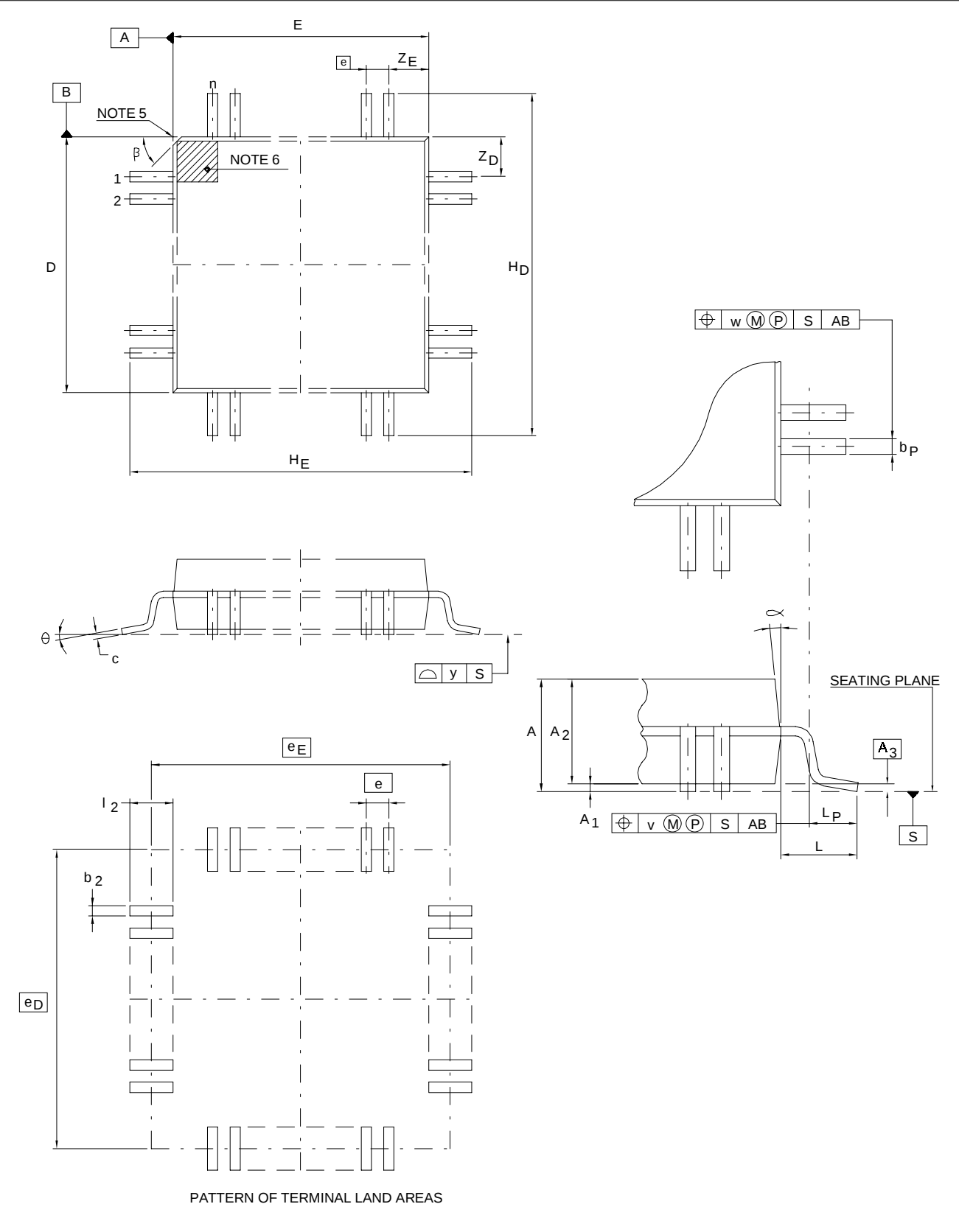
5. INDEX CORNER.
6. ZONE OF A VISIBLE INDEX ON THE TOP FACE.  
  
(P) MEANS PROJECTED TOLERANCE ZONE (SEE ISO 1101, PART 1, CLAUSE 11).  
  
 MEANS IN THIS DRAWING THAT THE DISTANCE FROM THE SEATING PLANE TO THE NEAREST POINT OF EACH TERMINAL SHOULD NOT EXCEED  $y$  mm.



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 1.0 mm PITCH, PQFP-G, 133E

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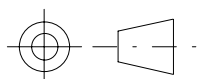
|                    |                                                                                        |                       |
|--------------------|----------------------------------------------------------------------------------------|-----------------------|
|                    | PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)<br>OUTLINE FAMILY, 0.80 mm PITCH, PQFP-G, 134E | 1998                  |
| 60191 IEC I-134E-a |                                                                                        | Publication IEC 60191 |

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 134E 01 |         |      | 134E 02 |         |      | 134E 03 |         |      | 134E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| n              | -       | 120     | -    | -       | 128     | -    | -       | 80      | -    | -       | 80      | -    |         | 1     |
| n <sub>D</sub> | -       | 30      | -    | -       | 32      | -    | -       | 24      | -    | -       | 24      | -    |         | 2, 4  |
| n <sub>E</sub> | -       | 30      | -    | -       | 32      | -    | -       | 16      | -    | -       | 16      | -    |         | 2, 4  |
| A              | -       | -       | 3.8  | -       | -       | 3.8  | -       | -       | 3.2  | -       | -       | 3.2  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 |         |       |
| A <sub>2</sub> | 3.2     | -       | -    | 3.2     | -       | -    | 2.6     | -       | -    | 1.4     | -       | -    |         |       |
| A <sub>3</sub> | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.30(*) | -    |         |       |
| b <sub>P</sub> | 0.25    | -       | 0.45 | 0.25    | -       | 0.45 | 0.25    | -       | 0.45 | 0.25    | -       | 0.45 |         | 3     |
| D              | -       | 28.0    | -    | -       | 28.0    | -    | -       | 20.0    | -    | -       | 20.0    | -    |         |       |
| E              | -       | 28.0    | -    | -       | 28.0    | -    | -       | 14.0    | -    | -       | 14.0    | -    |         |       |
| e              | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    |         | 3     |
| H <sub>D</sub> | 32.2    | -       | 33.2 | 32.2    | -       | 33.2 | 24.2    | -       | 25.2 | 24.2    | -       | 25.4 |         |       |
| H <sub>E</sub> | 32.2    | -       | 33.2 | 32.2    | -       | 33.2 | 18.2    | -       | 19.2 | 18.2    | -       | 19.4 |         |       |
| L              | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  |         |       |
| L <sub>P</sub> | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  |         | 3     |
| v              | -       | -       | 0.30 | -       | -       | 0.30 | -       | -       | 0.30 | -       | -       | 0.30 |         |       |
| w              | -       | -       | 0.16 | -       | -       | 0.16 | -       | -       | 0.16 | -       | -       | 0.16 |         |       |
| y              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -    | 0-8     |       |

| REF.           | 134E 05 |         |       | 134E 06 |         |       | 134E 07 |         |       | 134E 08 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 44      | -     | -       | 64      | -     | -       | 64      | -     | -       | 88      | -     |         |       |
| n <sub>D</sub> | -       | 11      | -     | -       | 16      | -     | -       | 16      | -     | -       | 22      | -     |         |       |
| n <sub>E</sub> | -       | 11      | -     | -       | 16      | -     | -       | 16      | -     | -       | 22      | -     |         |       |
| A              | -       | -       | 2.45  | -       | -       | 2.45  | -       | -       | 3.15  | -       | -       | 3.15  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  |         |       |
| A <sub>2</sub> | 1.80    | -       | -     | 1.80    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  |         | 3     |
| D              | -       | 10.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     |         |       |
| E              | -       | 10.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     |         |       |
| e              | -       | 0.80(*) | -     | -       | 0.80(*) | -     | -       | 0.80(*) | -     | -       | 0.80(*) | -     |         | 3     |
| H <sub>D</sub> | 12.95   | -       | 13.45 | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 |         |       |
| H <sub>E</sub> | 12.95   | -       | 13.45 | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.80 mm PITCH, PQFP-G, 134E

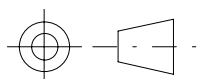
1998

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 134E 09 |         |       | 134E 10 |         |       | 134E 11 |         |       | 134E 12 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 88      | -     | -       | 120     | -     | -       | 120     | -     | -       | 128     | -     |         | 1     |
| n <sub>D</sub> | -       | 22      | -     | -       | 30      | -     | -       | 30      | -     | -       | 32      | -     |         |       |
| n <sub>E</sub> | -       | 22      | -     | -       | 30      | -     | -       | 30      | -     | -       | 32      | -     |         | 2, 4  |
| A              | -       | -       | 3.40  | -       | -       | 3.85  | -       | -       | 4.10  | -       | -       | 3.85  |         |       |
| A <sub>1</sub> | 0.25    | -       | 0.50  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  | 0.00    | -       | 0.25  |         |       |
| A <sub>2</sub> | 2.50    | -       | -     | 3.20    | -       | -     | 3.20    | -       | -     | 3.20    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  |         | 3     |
| D              | -       | 20.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     |         |       |
| E              | -       | 20.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     |         |       |
| e              | -       | 0.80(*) | -     | -       | 0.80(*) | -     | -       | 0.80(*) | -     | -       | 0.80(*) | -     |         | 3     |
| H <sub>D</sub> | 22.95   | -       | 23.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |         |       |
| H <sub>E</sub> | 22.95   | -       | 23.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 134E 13 |         |       | 134E 14 |         |       | 134E 15 |         |       |     |     |     | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|-----|-----|-----|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN | NOM | MAX |         |       |
| n              | -       | 128     | -     | -       | 80      | -     | -       | 80      | -     |     |     |     |         |       |
| n <sub>D</sub> | -       | 32      | -     | -       | 24      | -     | -       | 24      | -     |     |     |     |         |       |
| n <sub>E</sub> | -       | 32      | -     | -       | 16      | -     | -       | 16      | -     |     |     |     |         |       |
| A              | -       | -       | 4.10  | -       | -       | 3.15  | -       | -       | 3.40  |     |     |     |         |       |
| A <sub>1</sub> | 0.25    | -       | 0.50  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |     |     |     |         |       |
| A <sub>2</sub> | 3.20    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     |     |     |     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |     |     |     |         |       |
| b <sub>P</sub> | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  | 0.25    | -       | 0.45  |     |     |     |         |       |
| D              | -       | 28.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |     |     |     |         |       |
| E              | -       | 28.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |     |     |     |         |       |
| e              | -       | 0.80(*) | -     | -       | 0.80(*) | -     | -       | 0.80(*) | -     |     |     |     |         |       |
| H <sub>D</sub> | 30.95   | -       | 31.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |     |     |     |         |       |
| H <sub>E</sub> | 30.95   | -       | 31.45 | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 |     |     |     |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |     |     |     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |     |     |     |         |       |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |     |     |     |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |     |     |     |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |     |     |     |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     |     |     |     |         |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.80 mm PITCH, PQFP-G, 134E

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## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.  | 134E 01 |         |      | 134E 02 |         |      | 134E 03 |         |      | 134E 04 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.61 | -       | -       | 0.61 | -       | -       | 0.61 | -       | -       | 0.61 |         | 3     |
| $e$   | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    |         | 3     |
| $e_D$ | -       | 31.3(*) | -    | -       | 31.3(*) | -    | -       | 23.3(*) | -    | -       | 23.3(*) | -    |         | 3     |
| $e_E$ | -       | 31.3(*) | -    | -       | 31.3(*) | -    | -       | 17.3(*) | -    | -       | 17.3(*) | -    |         | 3     |
| $l_2$ | -       | -       | 2.2  | -       | -       | 2.2  | -       | -       | 2.2  | -       | -       | 2.2  |         | 3     |

| REF.  | 134E 05 |         |      | 134E 06 |         |      | 134E 07 |         |      | 134E 08 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.65 | -       | -       | 0.65 | -       | -       | 0.65 | -       | -       | 0.65 |         | 3     |
| $e$   | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    |         | 3     |
| $e_D$ | -       | 13.2(*) | -    | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    |         | 3     |
| $e_E$ | -       | 13.2(*) | -    | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    |         | 3     |
| $l_2$ | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |         | 3     |

| REF.  | 134E 09 |         |      | 134E 10 |         |      | 134E 11 |         |      | 134E 12 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.65 | -       | -       | 0.65 | -       | -       | 0.65 | -       | -       | 0.65 |         | 3     |
| $e$   | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    |         | 3     |
| $e_D$ | -       | 23.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    |         | 3     |
| $e_E$ | -       | 23.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    |         | 3     |
| $l_2$ | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |         | 3     |

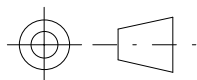
| REF.  | 134E 13 |         |      | 134E 14 |         |      | 134E 15 |         |      |     |     |     | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|-----|-----|-----|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN | NOM | MAX |         |       |
| $b_2$ | -       | -       | 0.65 | -       | -       | 0.65 | -       | -       | 0.65 |     |     |     |         | 3     |
| $e$   | -       | 0.80(*) | -    | -       | 0.80(*) | -    | -       | 0.80(*) | -    |     |     |     |         | 3     |
| $e_D$ | -       | 31.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |     |     |     |         | 3     |
| $e_E$ | -       | 31.2(*) | -    | -       | 17.2(*) | -    | -       | 17.2(*) | -    |     |     |     |         | 3     |
| $l_2$ | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |     |     |     |         | 3     |

## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.    | 134E 01 |     |      | 134E 02 |     |      | 134E 03 |     |      | 134E 04 |     |      | DEGREES | NOTES |
|---------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|         | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| $A_2$   | 3.2     | -   | -    | 3.2     | -   | -    | 2.6     | -   | -    | 2.6     | -   | -    |         |       |
| $D$     | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| $E$     | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| $\beta$ | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.    | 134E 05 |     |      | 134E 06 |     |      | 134E 07 |     |      | 134E 08 |     |      | DEGREES | NOTES |
|---------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|         | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| $A_2$   | 1.80    | -   | -    | 1.80    | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    |         |       |
| $D$     | 9.8     | -   | 10.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 |         |       |
| $E$     | 19.8    | -   | 10.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 |         |       |
| $\beta$ | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.80 mm PITCH, PQFP-G, 134E

1998

## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.           | 134E 09 |     |      | 134E 10 |     |      | 134E 11 |     |      | 134E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 2.5     | -   | -    | 3.2     | -   | -    | 3.2     | -   | -    | 3.2     | -   | -    |         |       |
| D              | 19.8    | -   | 20.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |         |       |
| E              | 19.8    | -   | 20.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 134E 13 |     |      | 134E 14 |     |      | 134E 15 |     |      |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN | NOM | MAX |         |       |
| A <sub>2</sub> | 3.2     | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    |     |     |     |         |       |
| D              | 27.8    | -   | 28.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |     |     |     |         |       |
| E              | 27.8    | -   | 28.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |     |     |     |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    |     |     |     | 45      |       |

## GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

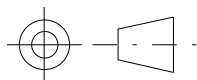
MILLIMETRES

| REF.           | 134E 01 |     |      | 134E 02 |     |      | 134E 03 |     |      | 134E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.12    | -   | 0.25 | 0.12    | -   | 0.25 | 0.12    | -   | 0.25 | 0.12    | -   | 0.30 |         |       |
| Z <sub>D</sub> | -       | -   | 2.6  | -       | -   | 1.8  | -       | -   | 1.0  | -       | -   | 1.0  |         |       |
| Z <sub>E</sub> | -       | -   | 2.6  | -       | -   | 1.8  | -       | -   | 1.2  | -       | -   | 1.2  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 134E 05 |     |      | 134E 06 |     |      | 134E 07 |     |      | 134E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.7  |         |       |
| Z <sub>E</sub> | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.1  | -       | -   | 1.7  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 134E 09 |     |      | 134E 10 |     |      | 134E 11 |     |      | 134E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.7  | -       | -   | 2.5  | -       | -   | 2.5  | -       | -   | 1.7  |         |       |
| Z <sub>E</sub> | -       | -   | 1.7  | -       | -   | 2.5  | -       | -   | 2.5  | -       | -   | 1.7  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 134E 13 |     |      | 134E 14 |     |      | 134E 15 |     |      |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN | NOM | MAX |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |     |     |     |         |       |
| Z <sub>D</sub> | -       | -   | 1.7  | -       | -   | 0.9  | -       | -   | 0.9  |     |     |     |         |       |
| Z <sub>E</sub> | -       | -   | 1.7  | -       | -   | 1.1  | -       | -   | 1.1  |     |     |     |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    |     |     |     | 5-16    |       |

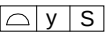


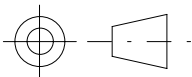
PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.80 mm PITCH, PQFP-G, 134E

1998

- 1.  $n$  REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
- 2.  $n_D$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION D.  
  
 $n_E$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION E.
- 3. CHECK OF THE DIMENSIONS AND POSITIONS OF PACKAGE TERMINALS IS VALIDLY PERFORMED WHEN IT IS ENSURED THAT THESE TERMINALS FIT WITH THE PATTERN OF TERMINAL LAND AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
- 4. INDIVIDUAL TERMINALS CAN BE OMITTED  
  
(\*) MEANS TRUE GEOMETRIC POSITION.  
[ ] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
- 5. INDEX CORNER.
- 6. ZONE OF A VISIBLE INDEX ON THE TOP FACE.

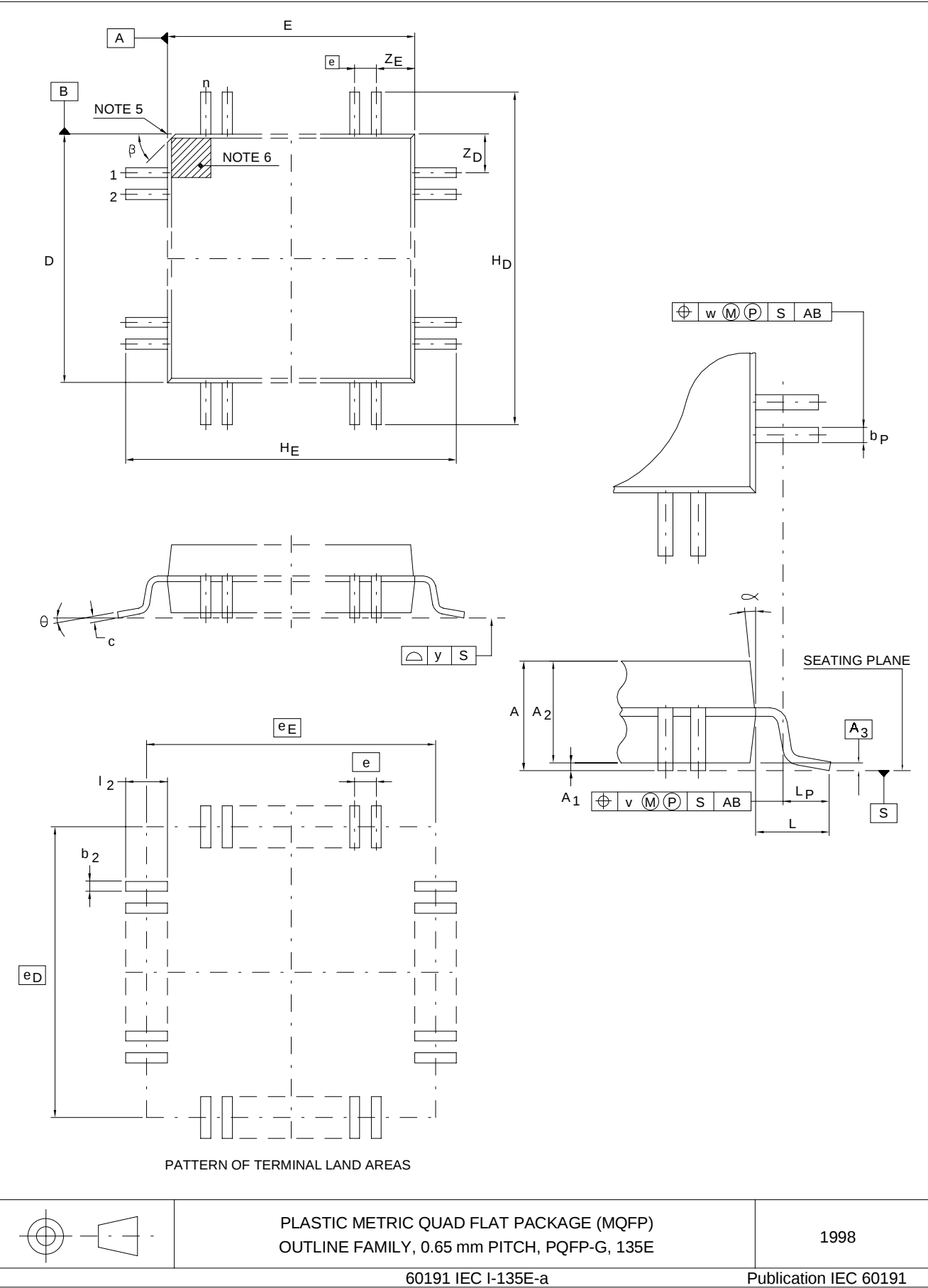
Ⓟ MEANS PROJECTED TOLERANCE ZONE (SEE ISO 1101, PART 1, CLAUSE 11).

 MEANS IN THIS DRAWING THAT THE DISTANCE FROM THE SEATING PLANE TO THE NEAREST POINT OF EACH TERMINAL SHOULD NOT EXCEED  $y$  mm.



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0,80 mm PITCH, PQFP-G 134E

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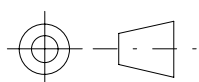


## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 135E 01 |         |      | 135E 02 |         |      | 135E 03 |         |      | 135E 04 |         |       | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX   |         |       |
| n              | -       | 160     | -    | -       | 100     | -    | -       | 100     | -    | -       | 52      | -     |         | 1     |
| n <sub>D</sub> | -       | 40      | -    | -       | 30      | -    | -       | 30      | -    | -       | 13      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 40      | -    | -       | 20      | -    | -       | 20      | -    | -       | 13      | -     |         | 2, 4  |
| A              | -       | -       | 3.8  | -       | -       | 3.2  | -       | -       | 3.2  | -       | -       | 2.45  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.30 | 0.00    | -       | 0.25  |         |       |
| A <sub>2</sub> | 3.2     | -       | -    | 2.6     | -       | -    | 1.4     | -       | -    | 1.80    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.30(*) | -    | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.20    | -       | 0.40 | 0.20    | -       | 0.40 | 0.20    | -       | 0.40 | 0.20    | -       | 0.40  |         | 3     |
| D              | -       | 28.0    | -    | -       | 20.0    | -    | -       | 20.0    | -    | -       | 10.0    | -     |         |       |
| E              | -       | 28.0    | -    | -       | 14.0    | -    | -       | 14.0    | -    | -       | 10.0    | -     |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -     |         | 3     |
| H <sub>D</sub> | 32.2    | -       | 33.2 | 24.2    | -       | 25.2 | 24.2    | -       | 25.4 | 12.95   | -       | 13.45 |         |       |
| H <sub>E</sub> | 32.2    | -       | 33.2 | 18.2    | -       | 19.2 | 18.2    | -       | 19.4 | 12.95   | -       | 13.45 |         |       |
| L              | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | 2.1     | -       | 2.8  | -       | 1.60(*) | -     |         |       |
| L <sub>P</sub> | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 1.0     | -       | 1.9  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.30 | -       | -       | 0.30 | -       | -       | 0.30 | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.13 | -       | -       | 0.13 | -       | -       | 0.13 | -       | -       | 0.13  |         |       |
| y              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -     | 0-8     |       |

| REF.           | 135E 05 |         |       | 135E 06 |         |       | 135E 07 |         |       | 135E 08 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 80      | -     | -       | 80      | -     | -       | 112     | -     | -       | 112     | -     |         | 1     |
| n <sub>D</sub> | -       | 20      | -     | -       | 20      | -     | -       | 28      | -     | -       | 28      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 20      | -     | -       | 20      | -     | -       | 28      | -     | -       | 28      | -     |         | 2, 4  |
| A              | -       | -       | 2.45  | -       | -       | 3.15  | -       | -       | 3.15  | -       | -       | 3.40  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |         |       |
| A <sub>2</sub> | 1.80    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  |         | 3     |
| D              | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |         |       |
| E              | -       | 14.0    | -     | -       | 14.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     |         | 3     |
| H <sub>D</sub> | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |         |       |
| H <sub>E</sub> | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E

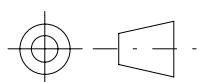
1998

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 135E 09 |         |       | 135E 10 |         |       | 135E 11 |         |       | 135E 12 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 144     | -     | -       | 144     | -     | -       | 160     | -     | -       | 160     | -     |         | 1     |
| n <sub>D</sub> | -       | 36      | -     | -       | 36      | -     | -       | 40      | -     | -       | 40      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 36      | -     | -       | 36      | -     | -       | 40      | -     | -       | 40      | -     |         | 2, 4  |
| A              | -       | -       | 3.85  | -       | -       | 4.10  | -       | -       | 3.85  | -       | -       | 4.10  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |         |       |
| A <sub>2</sub> | 3.2     | -       | -     | 3.2     | -       | -     | 3.2     | -       | -     | 3.2     | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     |         |       |
| b <sub>P</sub> | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  |         | 3     |
| D              | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     |         |       |
| E              | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     | -       | 28.0    | -     |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     |         | 3     |
| H <sub>D</sub> | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |         |       |
| H <sub>E</sub> | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 135E 13 |         |       | 135E 14 |         |       | 135E 15 |         |       | 135E 16 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 184     | -     | -       | 232     | -     | -       | 100     | -     | -       | 100     | -     |         | 1     |
| n <sub>D</sub> | -       | 46      | -     | -       | 58      | -     | -       | 30      | -     | -       | 30      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 46      | -     | -       | 58      | -     | -       | 20      | -     | -       | 20      | -     |         | 2, 4  |
| A              | -       | -       | 4.10  | -       | -       | 4.50  | -       | -       | 3.15  | -       | -       | 3.40  |         |       |
| A <sub>1</sub> | 0.25    | -       | 0.50  | 0.25    | -       | 0.50  | 0.00    | -       | 0.25  | 0.25    | -       | 0.50  |         |       |
| A <sub>2</sub> | 3.20    | -       | -     | 3.55    | -       | -     | 2.50    | -       | -     | 2.50    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     | -       | 0.25(*) | -     |         |       |
| b <sub>P</sub> | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  |         | 3     |
| D              | -       | 32.0    | -     | -       | 40.0    | -     | -       | 20.0    | -     | -       | 20.0    | -     |         |       |
| E              | -       | 32.0    | -     | -       | 40.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     | -       | 0.65(*) | -     |         | 3     |
| H <sub>D</sub> | 34.95   | -       | 35.45 | 42.95   | -       | 43.45 | 22.95   | -       | 23.45 | 22.95   | -       | 23.45 |         |       |
| H <sub>E</sub> | 34.95   | -       | 35.45 | 42.95   | -       | 43.45 | 16.95   | -       | 17.45 | 16.95   | -       | 17.45 |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  | 0.73    | 0.88    | 1.03  |         |       |
| v              | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  | -       | -       | 0.25  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  | -       | -       | 0.13  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     |         |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E

1998

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 135E 17 |         |       | 135E 18 |         |       |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |  |  |  |  |  |  |         |       |
| n              | -       | 144     | -     | -       | 160     | -     |  |  |  |  |  |  |         | 1     |
| n <sub>D</sub> | -       | 36      | -     | -       | 40      | -     |  |  |  |  |  |  |         | 2, 4  |
| n <sub>E</sub> | -       | 36      | -     | -       | 40      | -     |  |  |  |  |  |  |         | 2, 4  |
| A              | -       | -       | 2.75  | -       | -       | 2.75  |  |  |  |  |  |  |         |       |
| A <sub>1</sub> | 0.00    | -       | 0.25  | 0.00    | -       | 0.25  |  |  |  |  |  |  |         |       |
| A <sub>2</sub> | 2.4     | -       | -     | 2.4     | -       | -     |  |  |  |  |  |  |         |       |
| A <sub>3</sub> | -       | 0.25(*) | -     | -       | 0.25(*) | -     |  |  |  |  |  |  |         |       |
| b <sub>P</sub> | 0.20    | -       | 0.40  | 0.20    | -       | 0.40  |  |  |  |  |  |  |         | 3     |
| D              | -       | 28.0    | -     | -       | 28.0    | -     |  |  |  |  |  |  |         |       |
| E              | -       | 28.0    | -     | -       | 28.0    | -     |  |  |  |  |  |  |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.65(*) | -     |  |  |  |  |  |  |         | 3     |
| H <sub>D</sub> | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |  |  |  |  |  |  |         |       |
| H <sub>E</sub> | 30.95   | -       | 31.45 | 30.95   | -       | 31.45 |  |  |  |  |  |  |         |       |
| L              | -       | 1.6(*)  | -     | -       | 1.6(*)  | -     |  |  |  |  |  |  |         |       |
| L <sub>P</sub> | 0.73    | 0.88    | 1.03  | 0.72    | 0.88    | 1.03  |  |  |  |  |  |  |         | 3     |
| v              | -       | -       | 0.25  | -       | -       | 0.25  |  |  |  |  |  |  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.13  |  |  |  |  |  |  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  |  |  |  |  |  |  |         |       |
| θ              | -       | -       | -     | -       | -       | -     |  |  |  |  |  |  | 0-8     |       |

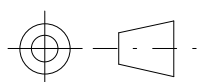
## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.           | 135E 01 |         |      | 135E 02 |         |      | 135E 03 |         |      | 135E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 |         | 3     |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    |         | 3     |
| e <sub>D</sub> | -       | 31.3(*) | -    | -       | 23.3(*) | -    | -       | 23.3(*) | -    | -       | 13.2(*) | -    |         | 3     |
| e <sub>E</sub> | -       | 31.3(*) | -    | -       | 17.3(*) | -    | -       | 17.3(*) | -    | -       | 13.2(*) | -    |         | 3     |
| l <sub>2</sub> | -       | -       | 2.2  | -       | -       | 2.2  | -       | -       | 2.2  | -       | -       | 1.28 |         | 3     |

| REF.           | 134E 05 |         |      | 134E 06 |         |      | 134E 07 |         |      | 134E 08 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    |         |       |
| e <sub>D</sub> | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |         |       |
| e <sub>E</sub> | -       | 17.2(*) | -    | -       | 17.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |         |       |
| l <sub>2</sub> | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |         |       |

| REF.           | 135E 09 |         |      | 135E 10 |         |      | 135E 11 |         |      | 135E 12 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    |         |       |
| e <sub>D</sub> | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    |         |       |
| e <sub>E</sub> | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    | -       | 31.2(*) | -    |         |       |
| l <sub>2</sub> | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |         |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E

1998

## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.           | 135E 13 |         |      | 135E 14 |         |      | 135E 15 |         |      | 135E 16 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 | -       | -       | 0.53 |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    | -       | 0.65(*) | -    |         |       |
| e <sub>D</sub> | -       | 35.2(*) | -    | -       | 43.2(*) | -    | -       | 23.2(*) | -    | -       | 23.2(*) | -    |         |       |
| e <sub>E</sub> | -       | 35.2(*) | -    | -       | 43.2(*) | -    | -       | 17.2(*) | -    | -       | 17.2(*) | -    |         |       |
| l <sub>2</sub> | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 | -       | -       | 1.28 |         |       |

| REF.           | 135E 17 |         |      | 135E 18 |         |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |  |  |  |  |  |  |         |       |
| b <sub>2</sub> | -       | -       | 0.53 | -       | -       | 0.53 |  |  |  |  |  |  |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.65(*) | -    |  |  |  |  |  |  |         |       |
| e <sub>D</sub> | -       | 31.2(*) | -    | -       | 31.2(*) | -    |  |  |  |  |  |  |         |       |
| e <sub>E</sub> | -       | 31.2(*) | -    | -       | 31.2(*) | -    |  |  |  |  |  |  |         |       |
| l <sub>2</sub> | -       | -       | 1.28 | -       | -       | 1.28 |  |  |  |  |  |  |         |       |

## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

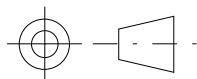
MILLIMETRES

| REF.           | 135E 01 |     |      | 135E 02 |     |      | 135E 03 |     |      | 135E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 3.2     | -   | -    | 2.6     | -   | -    | 2.6     | -   | -    | 1.8     | -   | -    |         |       |
| D              | 27.8    | -   | 28.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 9.8     | -   | 10.2 |         |       |
| E              | 27.8    | -   | 28.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 9.8     | -   | 10.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 135E 05 |     |      | 135E 06 |     |      | 135E 07 |     |      | 135E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.80    | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 135E 09 |     |      | 135E 10 |     |      | 135E 11 |     |      | 135E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 3.2     | -   | -    | 3.2     | -   | -    | 3.2     | -   | -    | 3.2     | -   | -    |         |       |
| D              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |         |       |
| E              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 135E 13 |     |      | 135E 14 |     |      | 135E 15 |     |      | 135E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 3.2     | -   | -    | 3.55    | -   | -    | 2.5     | -   | -    | 2.5     | -   | -    |         |       |
| D              | 31.8    | -   | 32.2 | 39.8    | -   | 40.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 31.8    | -   | 32.2 | 39.8    | -   | 40.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |



PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E

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## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.           | 135E 17 |     |      | 135E 18 |     |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  |  |  |  |  |  |  |         |       |
| A <sub>2</sub> | 3.2     | -   | -    | 3.2     | -   | -    |  |  |  |  |  |  |         |       |
| D              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |  |  |  |  |  |  |         |       |
| E              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 |  |  |  |  |  |  |         |       |
| β              | -       | -   | -    | -       | -   | -    |  |  |  |  |  |  | 45      |       |

## GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

MILLIMETRES

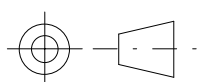
| REF.           | 135E 01 |     |      | 135E 02 |     |      | 135E 03 |     |      | 135E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.12    | -   | 0.25 | 0.12    | -   | 0.25 | 0.12    | -   | 0.30 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.5  | -       | -   | 0.8  | -       | -   | 0.8  | -       | -   | 1.2  |         |       |
| Z <sub>E</sub> | -       | -   | 1.5  | -       | -   | 1.0  | -       | -   | 1.0  | -       | -   | 1.2  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 135E 05 |     |      | 135E 06 |     |      | 135E 07 |     |      | 135E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 2.2  | -       | -   | 0.9  | -       | -   | 1.3  | -       | -   | 1.3  |         |       |
| Z <sub>E</sub> | -       | -   | 2.2  | -       | -   | 0.9  | -       | -   | 1.3  | -       | -   | 1.3  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 135E 09 |     |      | 135E 10 |     |      | 135E 11 |     |      | 135E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 2.7  | -       | -   | 2.7  | -       | -   | 1.4  | -       | -   | 1.4  |         |       |
| Z <sub>E</sub> | -       | -   | 2.7  | -       | -   | 2.7  | -       | -   | 1.4  | -       | -   | 1.4  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

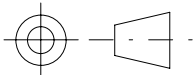
| REF.           | 135E 13 |     |      | 135E 14 |     |      | 135E 15 |     |      | 135E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.5  | -       | -   | 1.6  | -       | -   | 0.7  | -       | -   | 0.7  |         |       |
| Z <sub>E</sub> | -       | -   | 1.5  | -       | -   | 1.6  | -       | -   | 0.9  | -       | -   | 0.9  |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 5-16    |       |

| REF.           | 135E 17 |     |      | 135E 18 |     |      |  |  |  |  |  |  | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|--|--|--|--|--|--|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  |  |  |  |  |  |  |         |       |
| c              | 0.11    | -   | 0.22 | 0.11    | -   | 0.23 |  |  |  |  |  |  |         |       |
| Z <sub>D</sub> | -       | -   | 1.5  | -       | -   | 1.5  |  |  |  |  |  |  |         |       |
| Z <sub>E</sub> | -       | -   | 1.5  | -       | -   | 1.5  |  |  |  |  |  |  |         |       |
| α              | -       | -   | -    | -       | -   | -    |  |  |  |  |  |  | 5-16    |       |

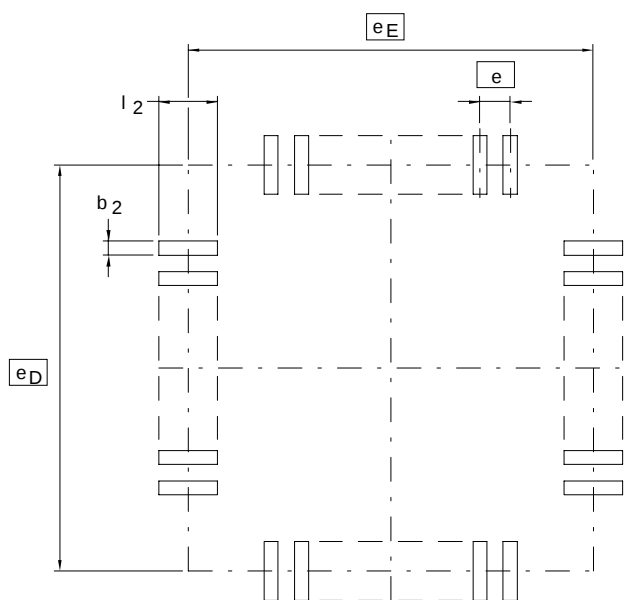
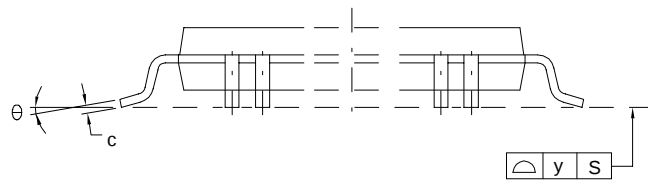
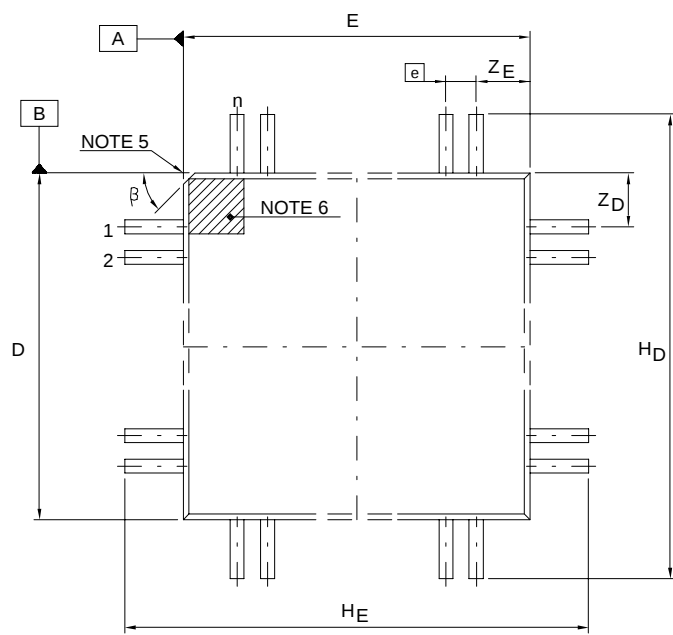


PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)  
OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E

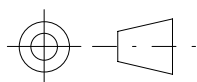
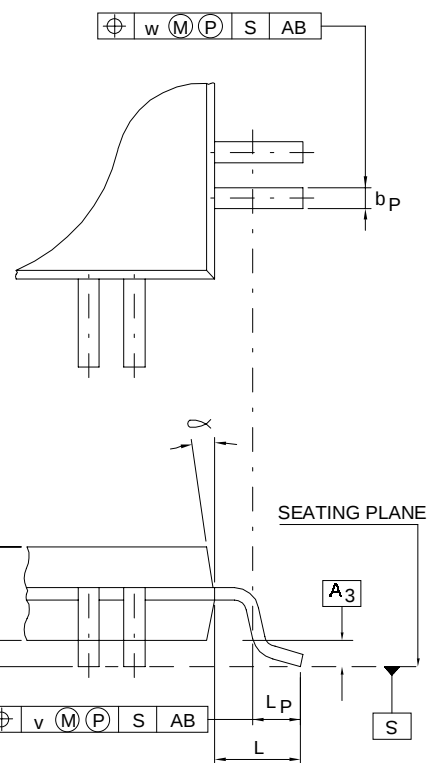
1998

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------|
| <div>1. <math>n</math> REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.</div> <div>2. <math>n_D</math> REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION D.</div> <div><math>n_E</math> REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION E.</div> <div>3. CHECK OF THE DIMENSIONS AND POSITIONS OF PACKAGE TERMINALS IS VALIDLY PERFORMED WHEN IT IS ENSURED THAT THESE TERMINALS FIT WITH THE PATTERN OF TERMINAL LAND AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.</div> <div>4. INDIVIDUAL TERMINALS CAN BE OMITTED</div> <div>(*) MEANS TRUE GEOMETRIC POSITION.</div> <div>[ ] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.</div> <div>5. INDEX CORNER.</div> <div>6. ZONE OF A VISIBLE INDEX ON THE TOP FACE.</div> <div>Ⓟ MEANS PROJECTED TOLERANCE ZONE (SEE ISO 1101, PART 1, CLAUSE 11).</div> <div><div><div><div></div><div>y</div><div>S</div></div></div> MEANS IN THIS DRAWING THAT THE DISTANCE FROM THE SEATING PLANE TO THE NEAREST POINT OF EACH TERMINAL SHOULD NOT EXCEED y mm.</div> |                                                                                        |                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PLASTIC METRIC QUAD FLAT PACKAGE (MQFP)<br>OUTLINE FAMILY, 0.65 mm PITCH, PQFP-G, 135E | 1998                  |
| 60191 IEC I-135E-g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                        | Publication IEC 60191 |





### PATTERN OF TERMINAL LAND AREAS



# PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE FAMILY, L-PQFP-G, 136E

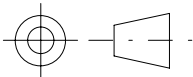
1998

GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 136E 01 |         |      | 136E 02 |         |      | 136E 03 |         |      | 136E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| n              | -       | 32      | -    | -       | 40      | -    | -       | 32      | -    | -       | 40      | -    |         | 1     |
| n <sub>D</sub> | -       | 8       | -    | -       | 10      | -    | -       | 8       | -    | -       | 10      | -    |         | 2, 4  |
| n <sub>E</sub> | -       | 8       | -    | -       | 10      | -    | -       | 8       | -    | -       | 10      | -    |         | 2, 4  |
| A              | -       | -       | 1.70 | -       | -       | 1.70 | -       | -       | 1.70 | -       | -       | 1.70 |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 |         |       |
| A <sub>2</sub> | 1.35    | -       | -    | 1.35    | -       | -    | 1.35    | -       | -    | 1.35    | -       | -    |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 | 0.30    | -       | 0.45 | 0.22    | -       | 0.38 |         | 3     |
| D              | -       | 5.0     | -    | -       | 5.0     | -    | -       | 7.0     | -    | -       | 7.0     | -    |         |       |
| E              | -       | 5.0     | -    | -       | 5.0     | -    | -       | 7.0     | -    | -       | 7.0     | -    |         |       |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    |         | 3     |
| H <sub>D</sub> | 6.80    | -       | 7.20 | 6.80    | -       | 7.20 | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 |         |       |
| H <sub>E</sub> | 6.80    | -       | 7.20 | 6.80    | -       | 7.20 | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 |         |       |
| w              | -       | -       | 0.08 | -       | -       | 0.07 | -       | -       | 0.20 | -       | -       | 0.13 |         |       |
| y              | -       | -       | 0.08 | -       | -       | 0.08 | -       | -       | 0.10 | -       | -       | 0.10 |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -    | 0-8     |       |

| REF.           | 136E 05 |         |      | 136E 06 |         |      | 136E 07 |        |       | 136E 08 |         |       | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|--------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM    | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 48      | -    | -       | 64      | -    | -       | 36     | -     | -       | 44      | -     |         | 1     |
| n <sub>D</sub> | -       | 12      | -    | -       | 16      | -    | -       | 9      | -     | -       | 11      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 12      | -    | -       | 16      | -    | -       | 9      | -     | -       | 11      | -     |         | 2, 4  |
| A              | -       | -       | 1.70 | -       | -       | 1.70 | -       | -      | 1.70  | -       | -       | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -      | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -       | -    | 1.35    | -       | -    | 1.35    | -      | -     | 1.35    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25   | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 | 0.35    | -      | 0.50  | 0.30    | -       | 0.45  |         | 3     |
| D              | -       | 7.0     | -    | -       | 7.0     | -    | -       | 10.0   | -     | -       | 10.0    | -     |         |       |
| E              | -       | 7.0     | -    | -       | 7.0     | -    | -       | 10.0   | -     | -       | 10.0    | -     |         |       |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*) | -     | -       | 0.80(*) | -     |         | 3     |
| H <sub>D</sub> | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 | 11.80   | -      | 12.20 | 11.80   | -       | 12.20 |         |       |
| H <sub>E</sub> | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 | 11.80   | -      | 12.20 | 11.80   | -       | 12.20 |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*) | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60   | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -      | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.08 | -       | -       | 0.07 | -       | -      | 0.20  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.08 | -       | -       | 0.08 | -       | -      | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -      | -     | -       | -       | -     | 0-8     |       |



PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE  
FAMILY, L-PQFP-G, 136E

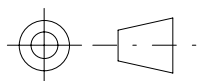
1998

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 136E 09 |         |       | 136E 10 |         |       | 136E 11 |         |       | 136E 12 |        |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|--------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM    | MAX   |         |       |
| n              | -       | 52      | -     | -       | 64      | -     | -       | 80      | -     | -       | 44     | -     |         | 1     |
| n <sub>D</sub> | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 11     | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 11     | -     |         | 2, 4  |
| A              | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  | -       | -      | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -      | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -      | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25   | -     |         |       |
| b <sub>P</sub> | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  | 0.35    | -      | 0.50  |         | 3     |
| D              | -       | 10.0    | -     | -       | 10.0    | -     | -       | 10.0    | -     | -       | 12.0   | -     |         |       |
| E              | -       | 10.0    | -     | -       | 10.0    | -     | -       | 10.0    | -     | -       | 12.0   | -     |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     | -       | 1.0(*) | -     |         | 3     |
| H <sub>D</sub> | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 13.80   | -      | 14.20 |         |       |
| H <sub>E</sub> | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 13.80   | -      | 14.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*) | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60   | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -      | 0.20  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  | -       | -      | 0.20  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  | -       | -      | 0.10  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -      | -     | 0-8     |       |

| REF.           | 136E 13 |         |       | 136E 14 |         |       | 136E 15 |         |       | 136E 16 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 52      | -     | -       | 64      | -     | -       | 80      | -     | -       | 100     | -     |         | 1     |
| n <sub>D</sub> | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| A              | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.30    | -       | 0.45  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  |         | 3     |
| D              | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     |         |       |
| E              | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     |         |       |
| e              | -       | 0.80(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     |         | 3     |
| H <sub>D</sub> | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 |         |       |
| H <sub>E</sub> | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE  
FAMILY, L-PQFP-G, 136E

1998

60191 IEC I-136E-c

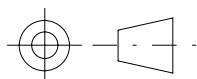
Publication IEC 60191

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 136E 17 |        |       | 136E 18 |         |       | 136E 19 |         |       | 136E 20 |         |       | DEGREES | NOTES |
|----------------|---------|--------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM    | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 52     | -     | -       | 64      | -     | -       | 80      | -     | -       | 100     | -     |         | 1     |
| n <sub>D</sub> | -       | 13     | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 13     | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| A              | -       | -      | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -      | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -      | -     | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25   | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.35    | -      | 0.50  | 0.30    | -       | 0.45  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  |         | 3     |
| D              | -       | 14.0   | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |         |       |
| E              | -       | 14.0   | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |         |       |
| e              | -       | 1.0(*) | -     | -       | 0.80(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     |         | 3     |
| H <sub>D</sub> | 15.80   | -      | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| H <sub>E</sub> | 15.80   | -      | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| L              | -       | 1.0(*) | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60   | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -      | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -      | 0.20  | -       | -       | 0.20  | -       | -       | 0.13  | -       | -       | 0.08  |         |       |
| y              | -       | -      | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.08  |         |       |
| θ              | -       | -      | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 136E 21 |         |       | 136E 22 |         |       | 136E 23 |         |       | 136E 24 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 120     | -     | -       | 112     | -     | -       | 144     | -     | -       | 176     | -     |         | 1     |
| n <sub>D</sub> | -       | 30      | -     | -       | 28      | -     | -       | 36      | -     | -       | 44      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 30      | -     | -       | 28      | -     | -       | 36      | -     | -       | 44      | -     |         | 2, 4  |
| A              | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.13    | -       | 0.23  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  |         |       |
| D              | -       | 14.0    | -     | -       | 20      | -     | -       | 20      | -     | -       | 20.0    | -     |         |       |
| E              | -       | 14.0    | -     | -       | 20      | -     | -       | 20      | -     | -       | 20.0    | -     |         |       |
| e              | -       | 0.40(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     |         | 3     |
| H <sub>D</sub> | 15.80   | -       | 16.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| H <sub>E</sub> | 15.80   | -       | 16.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.07  | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  |         |       |
| y              | -       | -       | 0.08  | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE  
FAMILY, L-PQFP-G, 136E

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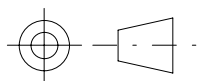
Publication IEC 60191

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 136E 25 |         |       | 136E 26 |         |       | 136E 27 |         |       | 136E 28 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 176     | -     | -       | 216     | -     | -       | 100     | -     | -       | 128     | -     |         | 1     |
| n <sub>D</sub> | -       | 44      | -     | -       | 54      | -     | -       | 30      | -     | -       | 38      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 44      | -     | -       | 54      | -     | -       | 20      | -     | -       | 26      | -     |         | 2, 4  |
| A              | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  | -       | -       | 1.70  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     | 1.35    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  |         | 3     |
| D              | -       | 24.0    | -     | -       | 24.0    | -     | -       | 20      | -     | -       | 20      | -     |         |       |
| E              | -       | 24.0    | -     | -       | 24.0    | -     | -       | 14      | -     | -       | 14      | -     |         |       |
| e              | -       | 0.50(*) | -     | -       | 0.40(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     |         | 3     |
| H <sub>D</sub> | 25.80   | -       | 26.20 | 25.80   | -       | 26.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| H <sub>E</sub> | 25.80   | -       | 26.20 | 25.80   | -       | 26.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.08  | -       | -       | 0.07  | -       | -       | 0.13  | -       | -       | 0.08  |         |       |
| y              | -       | -       | 0.08  | -       | -       | 0.08  | -       | -       | 0.10  | -       | -       | 0.08  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 136E 29 |         |      | 136E 30 |         |      | 136E 31 |         |      | 136E 32 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| n              | -       | 160     | -    | -       | 208     | -    | -       | 256     | -    | -       | 20      | -    |         | 1     |
| n <sub>D</sub> | -       | 40      | -    | -       | 52      | -    | -       | 64      | -    | -       | 5       | -    |         | 2, 4  |
| n <sub>E</sub> | -       | 40      | -    | -       | 52      | -    | -       | 64      | -    | -       | 5       | -    |         | 2, 4  |
| A              | -       | -       | 1.70 | -       | -       | 1.70 | -       | -       | 1.70 | -       | -       | 1.70 |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 |         |       |
| A <sub>2</sub> | 1.35    | -       | -    | 1.35    | -       | -    | 1.35    | -       | -    | 1.35    | -       | -    |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    |         |       |
| b <sub>P</sub> | 0.22    | -       | 0.38 | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 | 0.22    | -       | 0.38 |         | 3     |
| D              | -       | 28.0    | -    | -       | 28.0    | -    | -       | 28.0    | -    | -       | 4.0     | -    |         |       |
| E              | -       | 28.0    | -    | -       | 28.0    | -    | -       | 28.0    | -    | -       | 4.0     | -    |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.65(*) | -    |         | 3     |
| H <sub>D</sub> | 29.8    | -       | 30.2 | 29.8    | -       | 30.2 | 29.8    | -       | 30.2 | 5.80    | -       | 6.20 |         |       |
| H <sub>E</sub> | 29.8    | -       | 30.2 | 29.8    | -       | 30.2 | 29.8    | -       | 30.2 | 5.80    | -       | 6.20 |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 |         |       |
| w              | -       | -       | 0.13 | -       | -       | 0.08 | -       | -       | 0.07 | -       | -       | 0.13 |         |       |
| y              | -       | -       | 0.10 | -       | -       | 0.08 | -       | -       | 0.08 | -       | -       | 0.10 |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -    | 0-8     |       |



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## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

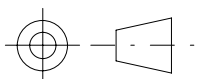
| REF.           | 136E 33 |         |      | 136E 34 |         |      |     |     |     |     |     |     | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|-----|-----|-----|-----|-----|-----|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN | NOM | MAX | MIN | NOM | MAX |         |       |
| n              | -       | 24      | -    | -       | 32      | -    |     |     |     |     |     |     |         | 1     |
| n <sub>D</sub> | -       | 6       | -    | -       | 8       | -    |     |     |     |     |     |     |         | 2, 4  |
| n <sub>E</sub> | -       | 6       | -    | -       | 8       | -    |     |     |     |     |     |     |         | 2, 4  |
| A              | -       | -       | 1.70 | -       | -       | 1.70 |     |     |     |     |     |     |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 |     |     |     |     |     |     |         |       |
| A <sub>2</sub> | 1.35    | -       | -    | 0.95    | 1.00    | 1.05 |     |     |     |     |     |     |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    |     |     |     |     |     |     |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 |     |     |     |     |     |     |         | 3     |
| D              | -       | 4.0     | -    | -       | 4.0     | -    |     |     |     |     |     |     |         |       |
| E              | -       | 4.0     | -    | -       | 4.0     | -    |     |     |     |     |     |     |         |       |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    |     |     |     |     |     |     |         | 3     |
| H <sub>D</sub> | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 |     |     |     |     |     |     |         |       |
| H <sub>E</sub> | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 |     |     |     |     |     |     |         |       |
| L              | -       | 1.00(*) | -    | -       | 1.00(*) | -    |     |     |     |     |     |     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 |     |     |     |     |     |     |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 |     |     |     |     |     |     |         |       |
| w              | -       | -       | 0.08 | -       | -       | 0.07 |     |     |     |     |     |     |         |       |
| y              | -       | -       | 0.08 | -       | -       | 0.08 |     |     |     |     |     |     |         |       |
| θ              | -       | -       | -    | -       | -       | -    |     |     |     |     |     |     | 0-8     |       |

## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.           | 136E 01 |         |      | 136E 02 |         |      | 136E 03 |         |      | 136E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.65 | -       | -       | 0.51 | -       | 3     |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 7.0(*)  | -    | -       | 7.0(*)  | -    | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 3     |
| e <sub>E</sub> | -       | 7.0(*)  | -    | -       | 7.0(*)  | -    | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 136E 05 |         |      | 136E 06 |         |      | 136E 07 |         |      | 136E 08 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.70 | -       | -       | 0.65 | -       | 3     |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*)  | -    | -       | 0.80(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |



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MILLIMETRES

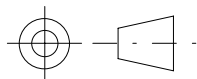
| REF.           | 136E 09 |         |      | 136E 10 |         |      | 136E 11 |         |      | 136E 12 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.70 | -       | 3     |
| e              | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*)  | -    | -       | 3     |
| e <sub>D</sub> | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 136E 13 |         |      | 136E 14 |         |      | 136E 15 |         |      | 136E 16 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.65 | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | 3     |
| e              | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 136E 17 |         |      | 136E 18 |         |      | 136E 19 |         |      | 136E 20 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.70 | -       | -       | 0.65 | -       | -       | 0.51 | -       | -       | 0.35 | -       | 3     |
| e              | -       | 1.0(*)  | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 136E 21 |         |      | 136E 22 |         |      | 136E 23 |         |      | 136E 24 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.30 | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | 3     |
| e              | -       | 0.40(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 16.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 16.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 136E 25 |         |      | 136E 26 |         |      | 136E 27 |         |      | 136E 28 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.51 | -       | -       | 0.35 | -       | 3     |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 26.0(*) | -    | -       | 26.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 26.0(*) | -    | -       | 26.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |



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## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

MILLIMETRES

| REF.  | 136E 29 |         |      | 136E 30 |         |      | 136E 31 |         |      | 136E 32 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.51 |         | 3     |
| $e$   | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.65(*) | -    |         | 3     |
| $e_D$ | -       | 30.0(*) | -    | -       | 30.0(*) | -    | -       | 30.0(*) | -    | -       | 6.00    | -    |         | 3     |
| $e_E$ | -       | 30.0(*) | -    | -       | 30.0(*) | -    | -       | 30.0(*) | -    | -       | 6.00    | -    |         | 3     |
| $l_2$ | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 |         | 3     |

| REF.  | 136E 33 |         |      | 136E 34 |         |      |     |     |     |     |     |     | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|-----|-----|-----|-----|-----|-----|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN | NOM | MAX | MIN | NOM | MAX |         |       |
| $b_2$ | -       | -       | 0.35 | -       | -       | 0.30 |     |     |     |     |     |     | -       | 3     |
| $e$   | -       | 0.50(*) | -    | -       | 0.40(*) | -    |     |     |     |     |     |     | -       | 3     |
| $e_D$ | -       | 6.00    | -    | -       | 6.00    | -    |     |     |     |     |     |     | -       | 3     |
| $e_E$ | -       | 6.00    | -    | -       | 6.00    | -    |     |     |     |     |     |     | -       | 3     |
| $l_2$ | -       |         | 0.95 | -       | -       | 0.95 |     |     |     |     |     |     | -       | 3     |

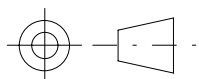
## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.    | 136E 01 |     |     | 136E 02 |     |     | 136E 03 |     |     | 136E 04 |     |     | DEGREES | NOTES |
|---------|---------|-----|-----|---------|-----|-----|---------|-----|-----|---------|-----|-----|---------|-------|
|         | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX |         |       |
| $A_2$   | 1.35    | -   | -   | 1.35    | -   | -   | 1.35    | -   | -   | 1.35    | -   | -   |         |       |
| $D$     | 4.8     | -   | 5.2 | 4.8     | -   | 5.2 | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 |         |       |
| $E$     | 4.8     | -   | 5.2 | 4.8     | -   | 5.2 | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 |         |       |
| $\beta$ | -       | -   | -   | -       | -   | -   | -       | -   | -   | -       | -   | -   | 45      |       |

| REF.    | 136E 05 |     |     | 136E 06 |     |     | 136E 07 |     |      | 136E 08 |     |      | DEGREES | NOTES |
|---------|---------|-----|-----|---------|-----|-----|---------|-----|------|---------|-----|------|---------|-------|
|         | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| $A_2$   | 1.35    | -   | -   | 1.35    | -   | -   | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| $D$     | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 |         |       |
| $E$     | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 |         |       |
| $\beta$ | -       | -   | -   | -       | -   | -   | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.    | 136E 09 |     |      | 136E 10 |     |      | 136E 11 |     |      | 136E 12 |     |      | DEGREES | NOTES |
|---------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|         | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| $A_2$   | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| $D$     | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 11.8    | -   | 12.2 |         |       |
| $E$     | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 11.8    | -   | 12.2 |         |       |
| $\beta$ | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |



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## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

MILLIMETRES

| REF.           | 136E 13 |     |      | 136E 14 |     |      | 136E 15 |     |      | 136E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| D              | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 |         |       |
| E              | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

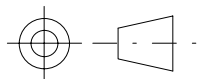
| REF.           | 136E 17 |     |      | 136E 18 |     |      | 136E 19 |     |      | 136E 20 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| E              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 136E 21 |     |      | 136E 22 |     |      | 136E 23 |     |      | 136E 24 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 136E 25 |     |      | 136E 26 |     |      | 136E 27 |     |      | 136E 28 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    |         |       |
| D              | 23.8    | -   | 24.2 | 23.8    | -   | 24.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 23.8    | -   | 24.2 | 23.8    | -   | 24.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 136E 29 |     |      | 136E 30 |     |      | 136E 31 |     |      | 136E 32 |     |     | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|-----|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX |         |       |
| A <sub>2</sub> | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -    | 1.35    | -   | -   |         |       |
| D              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 3.8     | -   | 4.2 |         |       |
| E              | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 27.8    | -   | 28.2 | 3.8     | -   | 4.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -   | 45      |       |

| REF.           | 136E 33 |     |     | 136E 34 |     |     |     |     |     |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|-----|---------|-----|-----|-----|-----|-----|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN | NOM | MAX | MIN | NOM | MAX |         |       |
| A <sub>2</sub> | 1.35    | -   | -   | 1.35    | -   | -   |     |     |     |     |     |     |         |       |
| D              | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 |     |     |     |     |     |     |         |       |
| E              | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 |     |     |     |     |     |     |         |       |
| β              | -       | -   | -   | -       | -   | -   |     |     |     |     |     |     | 45      |       |



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## GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

MILLIMETRES

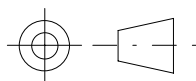
| REF.           | 136E 01 |     |      | 136E 02 |     |      | 136E 03 |     |      | 136E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 0.85 | -       | -   | 0.80 | -       | -   | 0.80 | -       | -   | 0.68 |         |       |
| Z <sub>E</sub> | -       | -   | 0.85 | -       | -   | 0.80 | -       | -   | 0.80 | -       | -   | 0.68 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 136E 05 |     |      | 136E 06 |     |      | 136E 07 |     |      | 136E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 0.85 | -       | -   | 0.60 | -       | -   | 1.10 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 0.85 | -       | -   | 0.60 | -       | -   | 1.10 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 136E 09 |     |      | 136E 10 |     |      | 136E 11 |     |      | 136E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.20 | -       | -   | 1.35 | -       | -   | 1.30 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 1.20 | -       | -   | 1.35 | -       | -   | 1.30 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 136E 13 |     |      | 136E 14 |     |      | 136E 15 |     |      | 136E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.30 | -       | -   | 1.22 | -       | -   | 1.35 | -       | -   | 1.30 |         |       |
| Z <sub>E</sub> | -       | -   | 1.30 | -       | -   | 1.22 | -       | -   | 1.35 | -       | -   | 1.30 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 136E 17 |     |      | 136E 18 |     |      | 136E 19 |     |      | 136E 20 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.10 | -       | -   | 1.10 | -       | -   | 0.92 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 1.10 | -       | -   | 1.10 | -       | -   | 0.92 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |



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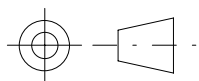
MILLIMETRES

| REF.           | 136E 21 |     |      | 136E 22 |     |      | 136E 23 |     |      | 136E 24 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.30 | -       | -   | 1.32 | -       | -   | 1.35 | -       | -   | 1.50 |         |       |
| Z <sub>E</sub> | -       | -   | 1.30 | -       | -   | 1.32 | -       | -   | 1.35 | -       | -   | 1.50 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 136E 25 |     |      | 136E 26 |     |      | 136E 27 |     |      | 136E 28 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.67 | -       | -   | 0.85 |         |       |
| Z <sub>E</sub> | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.92 | -       | -   | 0.85 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

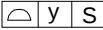
| REF.           | 136E 29 |     |      | 136E 30 |     |      | 136E 31 |     |      | 136E 32 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.42 | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.80 |         |       |
| Z <sub>E</sub> | -       | -   | 1.42 | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.80 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

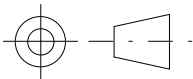
| REF.           | 136E 33 |     |      | 136E 34 |     |      |     |     |     |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|-----|-----|-----|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN | NOM | MAX | MIN | NOM | MAX |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |     |     |     |     |     |     |         |       |
| Z <sub>D</sub> | -       | -   | 2.00 | -       | -   | 0.70 |     |     |     |     |     |     |         |       |
| Z <sub>E</sub> | -       | -   | 2.00 | -       | -   | 0.70 |     |     |     |     |     |     |         |       |
| α              | -       | -   | -    | -       | -   | -    |     |     |     |     |     |     | 11-13   |       |



PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE  
FAMILY, L-PQFP-G, 136E

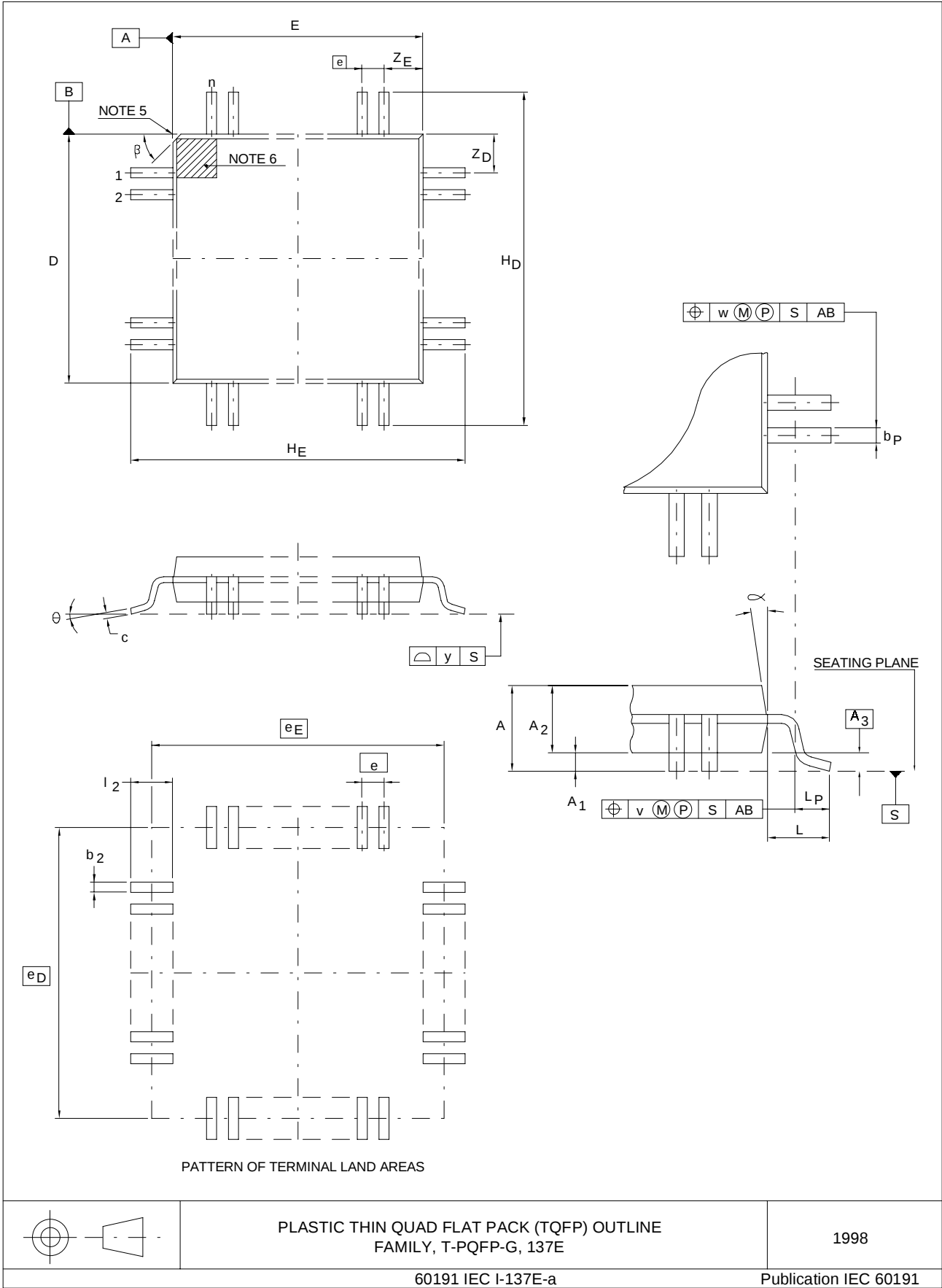
1998

- 1.  $n$  REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
- 2.  $n_D$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION D.  
  
 $n_E$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION E.
- 3. CHECK OF THE DIMENSIONS AND POSITIONS OF PACKAGE TERMINALS IS VALIDLY PERFORMED WHEN IT IS ENSURED THAT THESE TERMINALS FIT WITH THE PATTERN OF TERMINAL LAND AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
- 4. INDIVIDUAL TERMINALS CAN BE OMITTED  
  
(\*) MEANS TRUE GEOMETRIC POSITION.  
[ ] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
- 5. INDEX CORNER.
- 6. ZONE OF A VISIBLE INDEX ON THE TOP FACE.  
  
Ⓟ MEANS PROJECTED TOLERANCE ZONE (SEE ISO 1101, PART 1, CLAUSE 11).  
  
 MEANS IN THIS DRAWING THAT THE DISTANCE FROM THE SEATING PLANE TO THE NEAREST POINT OF EACH TERMINAL SHOULD NOT EXCEED  $y$  mm.



PLASTIC LOW PROFILE QUAD FLAT PACK (LQFP) OUTLINE  
FAMILY, L-PQFP-G, 136E

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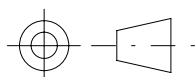


## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 137E 01 |         |      | 137E 02 |         |      | 137E 03 |         |      | 137E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| n              | -       | 32      | -    | -       | 40      | -    | -       | 32      | -    | -       | 40      | -    |         | 1     |
| n <sub>D</sub> | -       | 8       | -    | -       | 10      | -    | -       | 8       | -    | -       | 10      | -    |         | 2, 4  |
| n <sub>E</sub> | -       | 8       | -    | -       | 10      | -    | -       | 8       | -    | -       | 10      | -    |         | 2, 4  |
| A              | -       | -       | 1.20 | -       | -       | 1.20 | -       | -       | 1.20 | -       | -       | 1.20 |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 |         |       |
| A <sub>2</sub> | 0.95    | -       | -    | 0.95    | -       | -    | 0.95    | -       | -    | 0.95    | -       | -    |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 | 0.30    | -       | 0.45 | 0.22    | -       | 0.38 |         | 3     |
| D              | -       | 5.0     | -    | -       | 5.0     | -    | -       | 7.0     | -    | -       | 7.0     | -    |         |       |
| E              | -       | 5.0     | -    | -       | 5.0     | -    | -       | 7.0     | -    | -       | 7.0     | -    |         |       |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    |         | 3     |
| H <sub>D</sub> | 6.80    | -       | 7.20 | 6.80    | -       | 7.20 | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 |         |       |
| H <sub>E</sub> | 6.80    | -       | 7.20 | 6.80    | -       | 7.20 | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 |         |       |
| w              | -       | -       | 0.08 | -       | -       | 0.07 | -       | -       | 0.20 | -       | -       | 0.13 |         |       |
| y              | -       | -       | 0.08 | -       | -       | 0.08 | -       | -       | 0.10 | -       | -       | 0.10 |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    | -       | -       | -    | 0-8     |       |

| REF.           | 137E 05 |         |      | 137E 06 |         |      | 137E 07 |        |       | 137E 08 |         |       | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|--------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM    | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 48      | -    | -       | 64      | -    | -       | 36     | -     | -       | 44      | -     |         | 1     |
| n <sub>D</sub> | -       | 12      | -    | -       | 16      | -    | -       | 9      | -     | -       | 11      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 12      | -    | -       | 16      | -    | -       | 9      | -     | -       | 11      | -     |         | 2, 4  |
| A              | -       | -       | 1.20 | -       | -       | 1.20 | -       | -      | 1.20  | -       | -       | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -      | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -       | -    | 0.95    | -       | -    | 0.95    | -      | -     | 0.95    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25   | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27 | 0.13    | -       | 0.23 | 0.35    | -      | 0.50  | 0.30    | -       | 0.45  |         | 3     |
| D              | -       | 7.0     | -    | -       | 7.0     | -    | -       | 10.0   | -     | -       | 10.0    | -     |         |       |
| E              | -       | 7.0     | -    | -       | 7.0     | -    | -       | 10.0   | -     | -       | 10.0    | -     |         |       |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*) | -     | -       | 0.80(*) | -     |         | 3     |
| H <sub>D</sub> | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 | 11.80   | -      | 12.20 | 11.80   | -       | 12.20 |         |       |
| H <sub>E</sub> | 8.80    | -       | 9.20 | 8.80    | -       | 9.20 | 11.80   | -      | 12.20 | 11.80   | -       | 12.20 |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*) | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60   | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -      | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.08 | -       | -       | 0.07 | -       | -      | 0.20  | -       | -       | 0.20  |         |       |
| y              | -       | -       | 0.08 | -       | -       | 0.08 | -       | -      | 0.10  | -       | -       | 0.10  |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -      | -     | -       | -       | -     | 0-8     |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

1998

60191 IEC I-137E-b

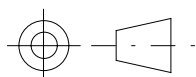
Publication IEC 60191

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 137E 09 |         |       | 137E 10 |         |       | 137E 11 |         |       | 137E 12 |        |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|--------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM    | MAX   |         |       |
| n              | -       | 52      | -     | -       | 64      | -     | -       | 80      | -     | -       | 44     | -     |         | 1     |
| $\eta_D$       | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 11     | -     |         | 2, 4  |
| $\eta_E$       | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 11     | -     |         | 2, 4  |
| A              | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  | -       | -      | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -      | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -      | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25   | -     |         |       |
| b <sub>P</sub> | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  | 0.35    | -      | 0.50  |         | 3     |
| D              | -       | 10.0    | -     | -       | 10.0    | -     | -       | 10.0    | -     | -       | 12.0   | -     |         |       |
| E              | -       | 10.0    | -     | -       | 10.0    | -     | -       | 10.0    | -     | -       | 12.0   | -     |         |       |
| e              | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     | -       | 1.0(*) | -     |         | 3     |
| H <sub>D</sub> | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 13.80   | -      | 14.20 |         |       |
| H <sub>E</sub> | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 11.80   | -       | 12.20 | 13.80   | -      | 14.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*) | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60   | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -      | 0.20  |         |       |
| w              | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  | -       | -      | 0.20  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  | -       | -      | 0.10  |         |       |
| $\theta$       | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -      | -     | 0-8     |       |

| REF.           | 137E 13 |         |       | 137E 14 |         |       | 137E 15 |         |       | 137E 16 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 52      | -     | -       | 64      | -     | -       | 80      | -     | -       | 100     | -     |         | 1     |
| $\eta_D$       | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| $\eta_E$       | -       | 13      | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| A              | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.30    | -       | 0.45  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  |         | 3     |
| D              | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     |         |       |
| E              | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     | -       | 12.0    | -     |         |       |
| e              | -       | 0.80(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     |         | 3     |
| H <sub>D</sub> | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 |         |       |
| H <sub>E</sub> | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 | 13.80   | -       | 14.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.20  | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  |         |       |
| y              | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  |         |       |
| $\theta$       | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

1998

60191 IEC I-137E-c

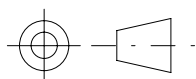
Publication IEC 60191

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 137E 17 |        |       | 137E 18 |         |       | 137E 19 |         |       | 137E 20 |         |       | DEGREES | NOTES |
|----------------|---------|--------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM    | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 52     | -     | -       | 64      | -     | -       | 80      | -     | -       | 100     | -     |         | 1     |
| n <sub>D</sub> | -       | 13     | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 13     | -     | -       | 16      | -     | -       | 20      | -     | -       | 25      | -     |         | 2, 4  |
| A              | -       | -      | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -      | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -      | -     | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25   | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.35    | -      | 0.50  | 0.30    | -       | 0.45  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  |         | 3     |
| D              | -       | 14.0   | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |         |       |
| E              | -       | 14.0   | -     | -       | 14.0    | -     | -       | 14.0    | -     | -       | 14.0    | -     |         |       |
| e              | -       | 1.0(*) | -     | -       | 0.80(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     |         | 3     |
| H <sub>D</sub> | 15.80   | -      | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| H <sub>E</sub> | 15.80   | -      | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| L              | -       | 1.0(*) | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60   | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -      | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -      | 0.20  | -       | -       | 0.20  | -       | -       | 0.13  | -       | -       | 0.08  |         |       |
| y              | -       | -      | 0.10  | -       | -       | 0.10  | -       | -       | 0.10  | -       | -       | 0.08  |         |       |
| θ              | -       | -      | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 137E 21 |         |       | 137E 22 |         |       | 137E 23 |         |       | 137E 24 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 120     | -     | -       | 112     | -     | -       | 144     | -     | -       | 176     | -     |         | 1     |
| n <sub>D</sub> | -       | 30      | -     | -       | 28      | -     | -       | 36      | -     | -       | 44      | -     |         | 2, 4  |
| n <sub>E</sub> | -       | 30      | -     | -       | 28      | -     | -       | 36      | -     | -       | 44      | -     |         | 2, 4  |
| A              | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.13    | -       | 0.23  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  |         |       |
| D              | -       | 14.0    | -     | -       | 20      | -     | -       | 20      | -     | -       | 20.0    | -     |         |       |
| E              | -       | 14.0    | -     | -       | 20      | -     | -       | 20      | -     | -       | 20.0    | -     |         |       |
| e              | -       | 0.40(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     | -       | 0.40(*) | -     |         | 3     |
| H <sub>D</sub> | 15.80   | -       | 16.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| H <sub>E</sub> | 15.80   | -       | 16.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.07  | -       | -       | 0.13  | -       | -       | 0.08  | -       | -       | 0.07  |         |       |
| y              | -       | -       | 0.08  | -       | -       | 0.10  | -       | -       | 0.08  | -       | -       | 0.08  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

1998

60191 IEC I-137E-d

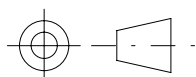
Publication IEC 60191

## GROUP 1 - DIMENSIONS APPROPRIATE TO MOUNTING AND INTERCHANGEABILITY

MILLIMETRES

| REF.           | 137E 25 |         |       | 137E 26 |         |       | 137E 27 |         |       | 137E 28 |         |       | DEGREES | NOTES |
|----------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|-------|
|                | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   | MIN     | NOM     | MAX   |         |       |
| n              | -       | 176     | -     | -       | 216     | -     | -       | 100     | -     | -       | 128     | -     |         | 1     |
| $\eta_D$       | -       | 44      | -     | -       | 54      | -     | -       | 30      | -     | -       | 38      | -     |         | 2, 4  |
| $\eta_E$       | -       | 44      | -     | -       | 54      | -     | -       | 20      | -     | -       | 26      | -     |         | 2, 4  |
| A              | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  | -       | -       | 1.20  |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  | 0.05    | -       | 0.15  |         |       |
| A <sub>2</sub> | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     | 0.95    | -       | -     |         |       |
| A <sub>3</sub> | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     | -       | 0.25    | -     |         |       |
| b <sub>P</sub> | 0.17    | -       | 0.27  | 0.13    | -       | 0.23  | 0.22    | -       | 0.38  | 0.17    | -       | 0.27  |         | 3     |
| D              | -       | 24.0    | -     | -       | 24.0    | -     | -       | 20      | -     | -       | 20      | -     |         |       |
| E              | -       | 24.0    | -     | -       | 24.0    | -     | -       | 14      | -     | -       | 14      | -     |         |       |
| e              | -       | 0.50(*) | -     | -       | 0.40(*) | -     | -       | 0.65(*) | -     | -       | 0.50(*) | -     |         | 3     |
| H <sub>D</sub> | 25.80   | -       | 26.20 | 25.80   | -       | 26.20 | 21.80   | -       | 22.20 | 21.80   | -       | 22.20 |         |       |
| H <sub>E</sub> | 25.80   | -       | 26.20 | 25.80   | -       | 26.20 | 15.80   | -       | 16.20 | 15.80   | -       | 16.20 |         |       |
| L              | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     | -       | 1.0(*)  | -     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  | 0.45    | 0.60    | 0.75  |         | 3     |
| v              | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  | -       | -       | 0.20  |         |       |
| w              | -       | -       | 0.08  | -       | -       | 0.07  | -       | -       | 0.13  | -       | -       | 0.08  |         |       |
| y              | -       | -       | 0.08  | -       | -       | 0.08  | -       | -       | 0.10  | -       | -       | 0.08  |         |       |
| θ              | -       | -       | -     | -       | -       | -     | -       | -       | -     | -       | -       | -     | 0-8     |       |

| REF.           | 137E 29 |         |      | 137E 30 |         |      | 137E 31 |         |      |     |     |     | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|-----|-----|-----|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN | NOM | MAX |         |       |
| n              | -       | 20      | -    | -       | 24      | -    | -       | 32      | -    |     |     |     |         |       |
| $\eta_D$       | -       | 5       | -    | -       | 6       | -    | -       | 8       | -    |     |     |     |         |       |
| $\eta_E$       | -       | 5       | -    | -       | 6       | -    | -       | 8       | -    |     |     |     |         |       |
| A              | -       | -       | 1.20 | -       | -       | 1.20 | -       | -       | 1.20 |     |     |     |         |       |
| A <sub>1</sub> | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 | 0.05    | -       | 0.15 |     |     |     |         |       |
| A <sub>2</sub> | 0.95    | 1.00    | 1.05 | 0.95    | 1.00    | 1.05 | 0.95    | 1.00    | 1.05 |     |     |     |         |       |
| A <sub>3</sub> | -       | 0.25    | -    | -       | 0.25    | -    | -       | 0.25    | -    |     |     |     |         |       |
| b <sub>P</sub> | 0.22    | -       | 0.38 | 0.17    | -       | 0.27 | 0.13    | -       | 0.27 |     |     |     |         |       |
| D              | -       | 4.0     | -    | -       | 4.0     | -    | -       | 4.0     | -    |     |     |     |         |       |
| E              | -       | 4.0     | -    | -       | 4.0     | -    | -       | 4.0     | -    |     |     |     |         |       |
| e              | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    |     |     |     |         |       |
| H <sub>D</sub> | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 |     |     |     |         |       |
| H <sub>E</sub> | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 | 5.80    | -       | 6.20 |     |     |     |         |       |
| L              | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    | -       | 1.0(*)  | -    |     |     |     |         |       |
| L <sub>P</sub> | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 | 0.45    | 0.60    | 0.75 |     |     |     |         |       |
| v              | -       | -       | 0.20 | -       | -       | 0.20 | -       | -       | 0.20 |     |     |     |         |       |
| w              | -       | -       | 0.13 | -       | -       | 0.08 | -       | -       | 0.07 |     |     |     |         |       |
| y              | -       | -       | 0.10 | -       | -       | 0.08 | -       | -       | 0.08 |     |     |     |         |       |
| θ              | -       | -       | -    | -       | -       | -    | -       | -       | -    |     |     |     | 0-8     |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

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## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

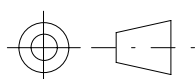
MILLIMETRES

| REF.           | 137E 01 |         |      | 137E 02 |         |      | 137E 03 |         |      | 137E 04 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.65 | -       | -       | 0.51 | -       | 3     |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 7.0(*)  | -    | -       | 7.0(*)  | -    | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 3     |
| e <sub>E</sub> | -       | 7.0(*)  | -    | -       | 7.0(*)  | -    | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 137E 05 |         |      | 137E 06 |         |      | 137E 07 |         |      | 137E 08 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.70 | -       | -       | 0.65 | -       | 3     |
| e              | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*)  | -    | -       | 0.80(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 9.0(*)  | -    | -       | 9.0(*)  | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 137E 09 |         |      | 137E 10 |         |      | 137E 11 |         |      | 137E 12 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.70 | -       | 3     |
| e              | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 1.0(*)  | -    | -       | 3     |
| e <sub>D</sub> | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 12.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.           | 137E 13 |         |      | 137E 14 |         |      | 137E 15 |         |      | 137E 16 |         |      | DEGREES | NOTES |
|----------------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|                | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| b <sub>2</sub> | -       | -       | 0.65 | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | 3     |
| e              | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 3     |
| e <sub>D</sub> | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| e <sub>E</sub> | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 14.0(*) | -    | -       | 3     |
| l <sub>2</sub> | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
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## GROUP 2 - DIMENSIONS APPROPRIATE TO MOUNTING AND GAUGING

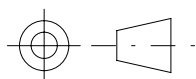
MILLIMETRES

| REF.  | 137E 17 |         |      | 137E 18 |         |      | 137E 19 |         |      | 137E 20 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.70 | -       | -       | 0.65 | -       | -       | 0.51 | -       | -       | 0.35 | -       | 3     |
| $e$   | -       | 1.0(*)  | -    | -       | 0.80(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 3     |
| $e_D$ | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| $e_E$ | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| $l_2$ | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.  | 137E 21 |         |      | 137E 22 |         |      | 137E 23 |         |      | 137E 24 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.30 | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 | -       | 3     |
| $e$   | -       | 0.40(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 3     |
| $e_D$ | -       | 16.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| $e_E$ | -       | 16.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| $l_2$ | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.  | 137E 25 |         |      | 137E 26 |         |      | 137E 27 |         |      | 137E 28 |         |      | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  |         |       |
| $b_2$ | -       | -       | 0.35 | -       | -       | 0.30 | -       | -       | 0.51 | -       | -       | 0.35 | -       | 3     |
| $e$   | -       | 0.50(*) | -    | -       | 0.40(*) | -    | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 3     |
| $e_D$ | -       | 26.0(*) | -    | -       | 26.0(*) | -    | -       | 22.0(*) | -    | -       | 22.0(*) | -    | -       | 3     |
| $e_E$ | -       | 26.0(*) | -    | -       | 26.0(*) | -    | -       | 16.0(*) | -    | -       | 16.0(*) | -    | -       | 3     |
| $l_2$ | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 | -       | 3     |

| REF.  | 137E 29 |         |      | 137E 30 |         |      | 137E 31 |         |      |     |     |     | DEGREES | NOTES |
|-------|---------|---------|------|---------|---------|------|---------|---------|------|-----|-----|-----|---------|-------|
|       | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN     | NOM     | MAX  | MIN | NOM | MAX |         |       |
| $b_2$ | -       | -       | 0.51 | -       | -       | 0.35 | -       | -       | 0.30 |     |     |     |         | 3     |
| $e$   | -       | 0.65(*) | -    | -       | 0.50(*) | -    | -       | 0.40(*) | -    |     |     |     |         | 3     |
| $e_D$ | -       | 6.00    | -    | -       | 6.00    | -    | -       | 6.00    | -    |     |     |     |         | 3     |
| $e_E$ | -       | 6.00    | -    | -       | 6.00    | -    | -       | 6.00    | -    |     |     |     |         | 3     |
| $l_2$ | -       | -       | 0.95 | -       | -       | 0.95 | -       | -       | 0.95 |     |     |     |         | 3     |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
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Publication IEC 60191

## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

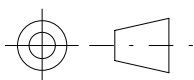
MILLIMETRES

| REF.           | 137E 01 |     |     | 137E 02 |     |     | 137E 03 |     |     | 137E 04 |     |     | DEGREES | NOTES |
|----------------|---------|-----|-----|---------|-----|-----|---------|-----|-----|---------|-----|-----|---------|-------|
|                | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX |         |       |
| A <sub>2</sub> | 0.95    | -   | -   | 0.95    | -   | -   | 0.95    | -   | -   | 0.95    | -   | -   |         |       |
| D              | 4.8     | -   | 5.2 | 4.8     | -   | 5.2 | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 |         |       |
| E              | 4.8     | -   | 5.2 | 4.8     | -   | 5.2 | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 |         |       |
| β              | -       | -   | -   | -       | -   | -   | -       | -   | -   | -       | -   | -   | 45      |       |

| REF.           | 137E 05 |     |     | 137E 06 |     |     | 137E 07 |     |      | 137E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|-----|---------|-----|-----|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -   | 0.95    | -   | -   | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 |         |       |
| E              | 6.8     | -   | 7.2 | 6.8     | -   | 7.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 |         |       |
| β              | -       | -   | -   | -       | -   | -   | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 137E 09 |     |      | 137E 10 |     |      | 137E 11 |     |      | 137E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 11.8    | -   | 12.2 |         |       |
| E              | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 9.8     | -   | 10.2 | 11.8    | -   | 12.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 137E 13 |     |      | 137E 14 |     |      | 137E 15 |     |      | 137E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 |         |       |
| E              | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 | 11.8    | -   | 12.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

1998

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Publication IEC 60191

## GROUP 3 - DIMENSIONS APPROPRIATE TO AUTOMATED HANDLING

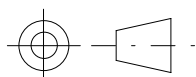
MILLIMETRES

| REF.           | 137E 17 |     |      | 137E 18 |     |      | 137E 19 |     |      | 137E 20 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| E              | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 137E 21 |     |      | 137E 22 |     |      | 137E 23 |     |      | 137E 24 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 13.8    | -   | 14.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 137E 25 |     |      | 137E 26 |     |      | 137E 27 |     |      | 137E 28 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| A <sub>2</sub> | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    | 0.95    | -   | -    |         |       |
| D              | 23.8    | -   | 24.2 | 23.8    | -   | 24.2 | 19.8    | -   | 20.2 | 19.8    | -   | 20.2 |         |       |
| E              | 23.8    | -   | 24.2 | 23.8    | -   | 24.2 | 13.8    | -   | 14.2 | 13.8    | -   | 14.2 |         |       |
| β              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 45      |       |

| REF.           | 137E 29 |     |     | 137E 30 |     |     | 137E 31 |     |     |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|-----|---------|-----|-----|---------|-----|-----|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN     | NOM | MAX | MIN | NOM | MAX |         |       |
| A <sub>2</sub> | 0.95    | -   | -   | 0.95    | -   | -   | 0.95    | -   | -   |     |     |     |         |       |
| D              | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 |     |     |     |         |       |
| E              | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 | 3.8     | -   | 4.2 |     |     |     |         |       |
| β              | -       | -   | -   | -       | -   | -   | -       | -   | -   |     |     |     | 45      |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
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## GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

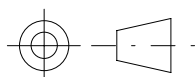
MILLIMETRES

| REF.           | 137E 01 |     |      | 137E 02 |     |      | 137E 03 |     |      | 137E 04 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 0.85 | -       | -   | 0.80 | -       | -   | 0.80 | -       | -   | 0.68 |         |       |
| Z <sub>E</sub> | -       | -   | 0.85 | -       | -   | 0.80 | -       | -   | 0.80 | -       | -   | 0.68 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 05 |     |      | 137E 06 |     |      | 137E 07 |     |      | 137E 08 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 0.85 | -       | -   | 0.60 | -       | -   | 1.10 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 0.85 | -       | -   | 0.60 | -       | -   | 1.10 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 09 |     |      | 137E 10 |     |      | 137E 11 |     |      | 137E 12 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 |         |       |
| Z <sub>D</sub> | -       | -   | 1.20 | -       | -   | 1.35 | -       | -   | 1.30 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 1.20 | -       | -   | 1.35 | -       | -   | 1.30 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 13 |     |      | 137E 14 |     |      | 137E 15 |     |      | 137E 16 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.30 | -       | -   | 1.22 | -       | -   | 1.35 | -       | -   | 1.30 |         |       |
| Z <sub>E</sub> | -       | -   | 1.30 | -       | -   | 1.22 | -       | -   | 1.35 | -       | -   | 1.30 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |



PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
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GROUP 4 - DIMENSIONS FOR INFORMATION ONLY

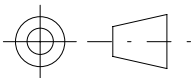
MILLIMETRES

| REF.           | 137E 17 |     |      | 137E 18 |     |      | 137E 19 |     |      | 137E 20 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.10 | -       | -   | 1.10 | -       | -   | 0.92 | -       | -   | 1.10 |         |       |
| Z <sub>E</sub> | -       | -   | 1.10 | -       | -   | 1.10 | -       | -   | 0.92 | -       | -   | 1.10 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 21 |     |      | 137E 22 |     |      | 137E 23 |     |      | 137E 24 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.30 | -       | -   | 1.32 | -       | -   | 1.35 | -       | -   | 1.50 |         |       |
| Z <sub>E</sub> | -       | -   | 1.30 | -       | -   | 1.32 | -       | -   | 1.35 | -       | -   | 1.50 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 25 |     |      | 137E 26 |     |      | 137E 27 |     |      | 137E 28 |     |      | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-----|------|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |       |
| c              | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 |         |       |
| Z <sub>D</sub> | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.67 | -       | -   | 0.85 |         |       |
| Z <sub>E</sub> | -       | -   | 1.35 | -       | -   | 1.50 | -       | -   | 0.92 | -       | -   | 0.85 |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    | -       | -   | -    | 11-13   |       |

| REF.           | 137E 29 |     |      | 137E 30 |     |      | 137E 31 |     |      |     |     |     | DEGREES | NOTES |
|----------------|---------|-----|------|---------|-----|------|---------|-----|------|-----|-----|-----|---------|-------|
|                | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN     | NOM | MAX  | MIN | NOM | MAX |         |       |
| c              | 0.11    | -   | 0.23 | 0.09    | -   | 0.20 | 0.09    | -   | 0.20 |     |     |     |         |       |
| Z <sub>D</sub> | -       | -   | 0.80 | -       | -   | 2.00 | -       | -   | 0.70 |     |     |     |         |       |
| Z <sub>E</sub> | -       | -   | 0.80 | -       | -   | 2.00 | -       | -   | 0.70 |     |     |     |         |       |
| α              | -       | -   | -    | -       | -   | -    | -       | -   | -    |     |     |     | 11-13   |       |

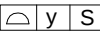


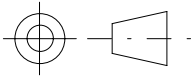
PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE  
FAMILY, T-PQFP-G, 137E

1998

- 1.  $n$  REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
- 2.  $n_D$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION D.  
  
 $n_E$  REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF DIMENSION E.
- 3. CHECK OF THE DIMENSIONS AND POSITIONS OF PACKAGE TERMINALS IS VALIDLY PERFORMED WHEN IT IS ENSURED THAT THESE TERMINALS FIT WITH THE PATTERN OF TERMINAL LAND AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
- 4. INDIVIDUAL TERMINALS CAN BE OMITTED  
  
(\*) MEANS TRUE GEOMETRIC POSITION.  
[ ] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
- 5. INDEX CORNER.
- 6. ZONE OF A VISIBLE INDEX ON THE TOP FACE.

Ⓟ MEANS PROJECTED TOLERANCE ZONE (SEE ISO 1101, PART 1, CLAUSE 11).

 MEANS IN THIS DRAWING THAT THE DISTANCE FROM THE SEATING PLANE TO THE NEAREST POINT OF EACH TERMINAL SHOULD NOT EXCEED  $y$  mm.

|                                                                                     |                                                                      |                       |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------|
|  | PLASTIC THIN QUAD FLAT PACK (TQFP) OUTLINE<br>FAMILY, T-PQFP-G, 137E | 1998                  |
| 60191 IEC I-137E-I                                                                  |                                                                      | Publication IEC 60191 |



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