

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60191-2

AMENDEMENT 7
AMENDMENT 7
2002-05

Amendement 7

**Normalisation mécanique des dispositifs
à semiconducteurs –**

**Partie 2:
Dimensions**

Amendment 7

**Mechanical standardization of semiconductor
devices –**

**Part 2:
Dimensions**

*Les feuilles de cet amendement sont à insérer dans la
Publication 60191-2*

*The sheets contained in this amendment are to be
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INSTRUCTIONS POUR L'INSERTION DES NOUVELLES PAGES DANS LA CEI 60191-2

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 à l'amendement 7 (2002).

Chapitre I:

Ajouter les nouvelles feuilles suivantes:

60191 IEC I-150E - a/b/c/d/e/f/g/h/i/j/k
60191 IEC I-151E - a/b/c/d/e/f/g/h/i/j/k
60191 IEC I-152E - a/b/c/d/e/f/g/h/i/j
60191 IEC I-153E - a/b/c/d/e/f/g/h/i/j

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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 Amendment 7 (2002).

Chapter I:

Add the following new sheets:

60191 IEC I-150E - a/b/c/d/e/f/g/h/i/j/k
60191 IEC I-151E - a/b/c/d/e/f/g/h/i/j/k
60191 IEC I-152E - a/b/c/d/e/f/g/h/i/j
60191 IEC I-153E - a/b/c/d/e/f/g/h/i/j

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Normalisation mécanique des dispositifs à semiconducteurs –

Partie 2: Dimensions

Mechanical standardization of semiconductor devices –

Part 2: Dimensions

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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

Amendement 7 (2002) à la CEI 60191-2 (1966)

**NORMALISATION MECANIQUE DES DISPOSITIFS
A 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 À L'AMENDEMENT 7 (2002)

Le présent amendement a été établi par le sous-comité 47D: Normalisation mécanique des dispositifs à semiconducteurs du comité d'études 47 de la CEI: Dispositifs à semiconducteurs.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
47D/485/FDIS	47D/499/RVD
47D/486/FDIS	47D/500/RVD
47D/487/FDIS	47D/501/RVD
47D/488/FDIS	47D/502/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

Amendment 7 (2002) 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 AMENDMENT 7 (2002)

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

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

FDIS	Report on voting
47D/485/FDIS	47D/499/RVD
47D/486/FDIS	47D/500/RVD
47D/487/FDIS	47D/501/RVD
47D/488/FDIS	47D/502/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 des 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
150E		I-150E	2002
151E		I-151E	2002
152E		I-152E	2002
153E		I-153E	2002
154E		I-154E	2001
155E		I-155E	2001
157E		I-157E	2001
158E		I-158E	2002
159E		I-159E	2002
160E		I-160E	2001
161E		I-161E	2001
162E		I-162E	2001
163E		I-163E	2002
164E		I-164E	2001
165E		I-165E	2002
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	2002
150E		I-150E	2002
151E		I-151E	2002
152E		I-152E	2002
153E		I-153E	2002
154E		I-154E	2001
155E		I-155E	2001
157E		I-157E	2001
158E		I-158E	2002
159E		I-159E	2002
160E		I-160E	2001
161E		I-161E	2001
162E		I-162E	2001
163E		I-163E	2002
164E		I-164E	2001
165E		I-165E	2002
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 des dessins <i>(suite)</i>			
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		

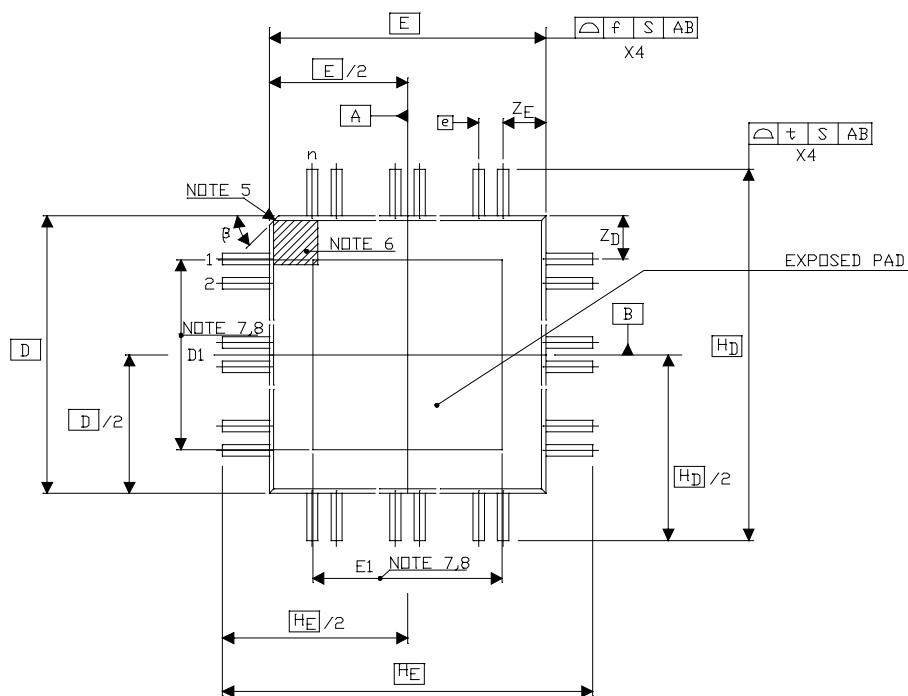
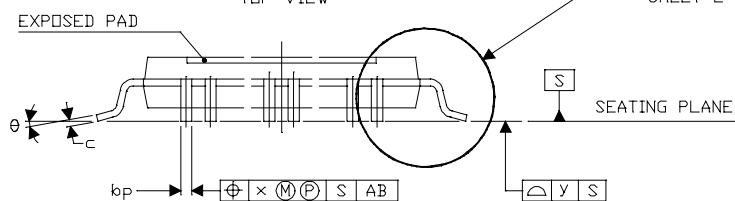
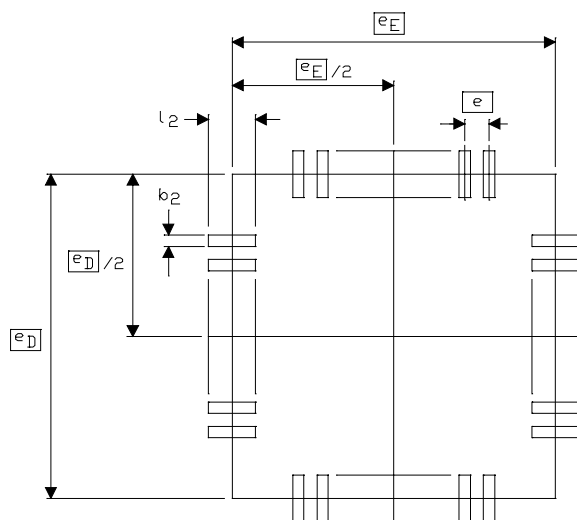
CHAPTER I – DEVICE OUTLINE DRAWINGS

List of drawings <i>(continued)</i>			
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

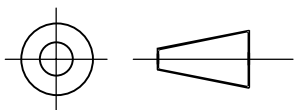
Types of semiconductor devices
generally mounted in the packages
of chapter I of IEC 60191-2

Type de dispositif Type of device	Numéro de code CEI du dessin du boîtier IEC code number of package drawing
Diodes de signal et diodes Zener de faible puissance Signal diodes and small-power Zener diodes	A1, A20, A24, A32, A54, A55, A58, A67, A69, A70, A71, 098H, 100H
Diodes hyperfréquences Microwave diodes	A18
Diodes de redressement de faible et moyenne puissance Rectifier diodes, small and medium power	A2, A3, A4, A6, A7, A19, A37, A44, A74, 077B, 100B
Diodes de redressement de forte puissance High-power rectifier diodes	A8, A9, A10, A15, A16, A17, A21, A22, A35, 083B, 103B
Thyristors de faible et moyenne puissance Thyristors, small and medium power	A11, A13, A14, A38, A43
Thyristors de forte puissance High-power thyristors	A12, A27, A28, A29, A34, A39, A47, 104B, 105B
Transistors de signal Signal transistors	A36, A40, A41, 068A, 046E, 114E
Transistors de puissance Power transistors	A23, A30, A31, A43, A48, A56, A57, A45, A73, 080B, 081B, 082B, 101B, 102B, 102F, 120E, 084F, P100F
Transistors hyperfréquences Microwave transistors	A26, A42, A43, A59, A66, A72, 100C
Dispositifs optoélectroniques Optoelectronic devices	A62, A64, A65, A63A, 100A, 101A, 106B, 107B
Circuits intégrés 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, 150E, 151E, 152E, 153E, 154E, 155E, 157E, 158E, 159E, 160E, 161E, 162E, 163E, 164E, 165E, 050G, 051G, 060G, 100G, 101G

FIGURE 1
TOP VIEWFIGURE 1b
SIDE VIEWFIGURE 2
PATTERN OF TERMINAL POSITION AREAS

$$l_2 = L_p \max + t/2$$

$$b_2 = b_p \max + x$$



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

60191 IEC I - 150E-a

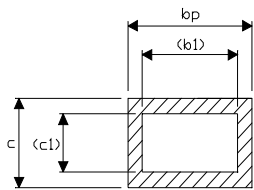


FIGURE 1c
LEAD SECTION

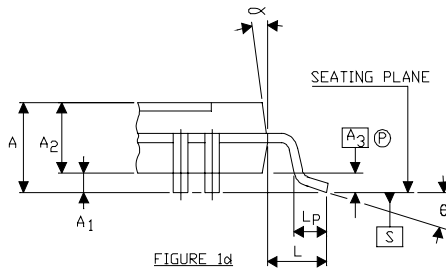


FIGURE 1d

Definition of Datum Target

(1) For even number of leads on a package side

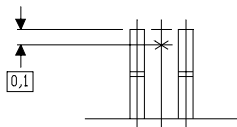


FIGURE 3a

A center of facing sides of adjacent leads
at a position 0,1 mm inside top of the leads

(2) For odd number of leads on a package side

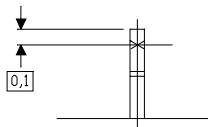
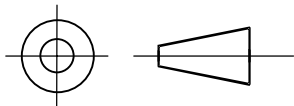


FIGURE 3b

A center of facing sides of adjacent leads
at a position 0,1 mm inside top of the leads



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

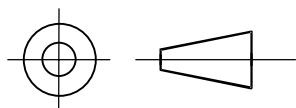
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	150 01			150 02			150 03			150 04			DEGRÉS DEGREES	NOTES
	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX		
n	–	32	–	–	40	–	–	32	–	–	40	–		1
n _D	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
n _E	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
bp	0.17	–	0.27	0.13	–	0.23	0.30	–	0.45	0.22	–	0.38		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
E	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.80(*)	–	–	0.65(*)	–		3
H _D	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
H _E	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.13		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	150 05			150 06			150 07			150 08			DEGRÉS DEGREES	NOTES
	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX		
n	–	48	–	–	64	–	–	36	–	–	44	–		1
n _D	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
n _E	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
bp	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50	0.30	–	0.45		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
E	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–	–	0.80(*)	–		3
H _D	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
H _E	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.20		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

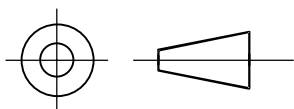
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	150 09			150 10			150 11			150 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	44	–		1
n _D	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
E	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–		3
H _D	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
H _E	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.13	–	–	0.08	–	–	0.07	–	–	0.20		
y	–	–	0.10	–	–	0.08	–	–	0.08	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	150 13			150 14			150 15			150 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
n _D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
E	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
H _E	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.10	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

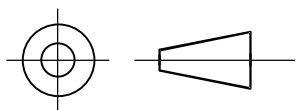
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GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	150 17			150 18			150 19			150 20			DEGRÉS DEGREES	NOTES
	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
r_D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
r_E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.35	–	0.50	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	10(*)	–	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
H _b	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
H _E	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.20	–	–	0.13	–	–	0.08		
y	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	150 21			150 22			150 23			150 24			DEGRÉS DEGREES	NOTES
	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX	MIN	NDM	MAX		
n	–	120	–	–	112	–	–	144	–	–	176	–		1
r_D	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
r_E	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	20	–	–	20	–	–	20.0	–		
E	–	14.0	–	–	20	–	–	20	–	–	20.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _b	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
H _E	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.07	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.08	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

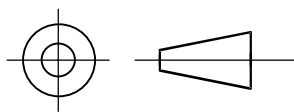
Date: 2002

GROUP 1 - DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	150 25			150 26			150 27			150 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	—	176	—	—	216	—	—	100	—	—	128	—		1
η_D	—	44	—	—	54	—	—	30	—	—	38	—		2, 4
η_E	—	44	—	—	54	—	—	20	—	—	26	—		2, 4
A	—	—	1.70	—	—	1.70	—	—	1.70	—	—	1.70		
A ₁	0.05	—	0.15	0.05	—	0.15	0.05	—	0.15	0.05	—	0.15		
A ₂	1.35	—	—	1.35	—	—	1.35	—	—	1.35	—	—		
A ₃	—	0.25(*)	—	—	0.25(*)	—	—	0.25(*)	—	—	0.25(*)	—		
k _p	0.17	—	0.27	0.13	—	0.23	0.22	—	0.38	0.17	—	0.27		3
c	0.09	—	0.20	0.09	—	0.20	0.09	—	0.20	0.09	—	0.20		
D	—	24.0	—	—	24.0	—	—	20.0	—	—	20.0	—		
E	—	24.0	—	—	24.0	—	—	14.0	—	—	14.0	—		
D1	2.00	—	—	2.00	—	—	2.00	—	—	2.00	—	—		7
E1	2.00	—	—	2.00	—	—	2.00	—	—	2.00	—	—		7
e	—	0.50(*)	—	—	0.40(*)	—	—	0.65(*)	—	—	0.50(*)	—		3
f	—	—	0.20	—	—	0.20	—	—	0.20	—	—	0.20		
H _D	—	26.00	—	—	26.00	—	—	22.00	—	—	22.00	—		
H _E	—	26.00	—	—	26.00	—	—	16.00	—	—	16.00	—		
L _p	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
t	—	—	0.20	—	—	0.20	—	—	0.20	—	—	0.20		
x	—	—	0.08	—	—	0.07	—	—	0.13	—	—	0.08		
y	—	—	0.08	—	—	0.08	—	—	0.10	—	—	0.08		
θ	—	—	—	—	—	—	—	—	—	—	—	—	0-8	
β	—	—	—	—	—	—	—	—	—	—	—	—	45	
α	—	—	—	—	—	—	—	—	—	—	—	—	11-13	

RÉF.	150 29			150 30			150 31			150 32			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	—	160	—	—	208	—	—	256	—	—	20	—		1
η_D	—	40	—	—	52	—	—	64	—	—	5	—		2, 4
η_E	—	40	—	—	52	—	—	64	—	—	5	—		2, 4
A	—	—	1.70	—	—	1.70	—	—	1.70	—	—	1.70		
A ₁	0.05	—	0.15	0.05	—	0.15	0.05	—	0.15	0.05	—	0.15		
A ₂	1.35	—	—	1.35	—	—	1.35	—	—	1.35	—	—		
A ₃	—	0.25(*)	—	—	0.25(*)	—	—	0.25(*)	—	—	0.25(*)	—		
k _p	0.22	—	0.38	0.17	—	0.27	0.13	—	0.23	0.22	—	0.38		3
c	0.09	—	0.20	0.09	—	0.20	0.09	—	0.20	0.09	—	0.20		
D	—	28.0	—	—	28.0	—	—	28.0	—	—	4.0	—		
E	—	28.0	—	—	28.0	—	—	28.0	—	—	4.0	—		
D1	2.00	—	—	2.00	—	—	2.00	—	—	2.00	—	—		7
E1	2.00	—	—	2.00	—	—	2.00	—	—	2.00	—	—		7
e	—	0.65(*)	—	—	0.50(*)	—	—	0.40(*)	—	—	0.65(*)	—		3
f	—	—	0.20	—	—	0.20	—	—	0.20	—	—	0.20		
H _D	—	30.00	—	—	30.00	—	—	30.00	—	—	6.00	—		
H _E	—	30.00	—	—	30.00	—	—	30.00	—	—	6.00	—		
L _p	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
t	—	—	0.20	—	—	0.20	—	—	0.20	—	—	0.20		
x	—	—	0.13	—	—	0.08	—	—	0.07	—	—	0.13		
y	—	—	0.10	—	—	0.08	—	—	0.08	—	—	0.10		
θ	—	—	—	—	—	—	—	—	—	—	—	—	0-8	
β	—	—	—	—	—	—	—	—	—	—	—	—	45	
α	—	—	—	—	—	—	—	—	—	—	—	—	11-13	



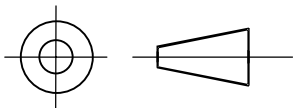
PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

GROUP 1 - DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	150 33			150 34									DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	—	24	—	—	32	—								1
n _D	—	6	—	—	8	—								2, 4
n _E	—	6	—	—	8	—								2, 4
A	—	—	1.70	—	—	1.70								
A ₁	0.05	—	0.15	0.05	—	0.15								
A ₂	1.35	—	—	0.135	—	—								
A ₃	—	0.25(*)	—	—	0.25(*)	—								
b _p	0.17	—	0.27	0.13	—	0.23								3
c	0.09	—	0.20	0.09	—	0.20								
D	—	4.0	—	—	4.0	—								
E	—	4.0	—	—	4.0	—								
D1	2.00	—	—	2.00	—	—								7
E1	2.00	—	—	2.00	—	—								7
e	—	0.50(*)	—	—	0.40(*)	—								3
f	—	—	0.20	—	—	0.20								
H _D	—	6.00	—	—	6.00	—								
H _E	—	6.00	—	—	6.00	—								
L _p	0.45	0.60	0.75	0.45	0.60	0.75								3
t	—	—	0.20	—	—	0.20								
x	—	—	0.08	—	—	0.07								
y	—	—	0.08	—	—	0.08								
θ	—	—	—	—	—	—							0-8	
β	—	—	—	—	—	—							45	
α	—	—	—	—	—	—							11-13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

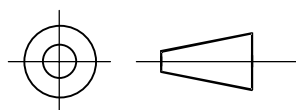
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	150 01			150 02			150 03			150 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.30	0.35	0.40	0.22	0.30	0.33	-	
b ₂	-	-	0.35	-	-	0.30	-	-	0.65	-	-	0.51	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
e _D	-	7.0	-	-	7.0	-	-	9.0	-	-	9.0	-	-	3
e _E	-	7.0	-	-	7.0	-	-	9.0	-	-	9.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	0.85	-	-	0.80	-	-	0.80	-	-	0.68	-	
Z _E	-	-	0.85	-	-	0.80	-	-	0.80	-	-	0.68	-	

RÉF.	150 05			150 06			150 07			150 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	0.30	0.35	0.40	-	
b ₂	-	-	0.35	-	-	0.30	-	-	0.70	-	-	0.65	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
e _D	-	9.0	-	-	9.0	-	-	12.0	-	-	12.0	-	-	3
e _E	-	9.0	-	-	9.0	-	-	12.0	-	-	12.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	0.85	-	-	0.60	-	-	1.10	-	-	1.10	-	
Z _E	-	-	0.85	-	-	0.60	-	-	1.10	-	-	1.10	-	

RÉF.	150 09			150 10			150 11			150 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	-	
b ₂	-	-	0.51	-	-	0.35	-	-	0.30	-	-	0.70	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
e _D	-	12.0	-	-	12.0	-	-	12.0	-	-	14.0	-	-	3
e _E	-	12.0	-	-	12.0	-	-	12.0	-	-	14.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	1.20	-	-	1.35	-	-	1.30	-	-	1.10	-	
Z _E	-	-	1.20	-	-	1.35	-	-	1.30	-	-	1.10	-	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

60191 IEC I – 150E-h

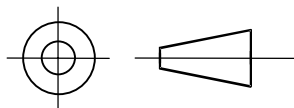
GROUP 2 – DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	150 13			150 14			150 15			150 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	–	
b ₂	–	–	0.65	–	–	0.51	–	–	0.35	–	–	0.30	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–	–	3
e _E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.30	–	–	1.22	–	–	1.35	–	–	1.30		
Z _E	–	–	1.30	–	–	1.22	–	–	1.35	–	–	1.30		

RÉF.	150 17			150 18			150 19			150 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.35	0.40	0.45	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	–	
b ₂	–	–	0.70	–	–	0.65	–	–	0.51	–	–	0.35	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	16.0	–	–	16.0	–	–	16.0	–	–	16.0	–	–	3
e _E	–	16.0	–	–	16.0	–	–	16.0	–	–	16.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.10	–	–	1.10	–	–	0.92	–	–	1.10		
Z _E	–	–	1.10	–	–	1.10	–	–	0.92	–	–	1.10		

RÉF.	150 21			150 22			150 23			150 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	–	
b ₂	–	–	0.30	–	–	0.51	–	–	0.35	–	–	0.30	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	16.0	–	–	22.0	–	–	22.0	–	–	22.0	–	–	3
e _E	–	16.0	–	–	22.0	–	–	22.0	–	–	22.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.30	–	–	1.32	–	–	1.35	–	–	1.50		
Z _E	–	–	1.30	–	–	1.32	–	–	1.35	–	–	1.50		



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

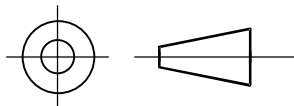
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	150 25			150 26			150 27			150 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	—	
b ₂	—	—	0.35	—	—	0.30	—	—	0.51	—	—	0.35	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	26.0	—	—	26.0	—	—	22.0	—	—	22.0	—	—	3
e _E	—	26.0	—	—	26.0	—	—	16.0	—	—	16.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.35	—	—	1.50	—	—	0.67	—	—	0.85		
Z _E	—	—	1.35	—	—	1.50	—	—	0.92	—	—	0.85		

RÉF.	150 29			150 30			150 31			150 32			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	—	
b ₂	—	—	0.51	—	—	0.35	—	—	0.30	—	—	0.51	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	30.0	—	—	30.0	—	—	30.0	—	—	6.00	—	—	3
e _E	—	30.0	—	—	30.0	—	—	30.0	—	—	6.00	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.42	—	—	1.35	—	—	1.50	—	—	0.80	—	
Z _E	—	—	1.42	—	—	1.35	—	—	1.50	—	—	0.80	—	

RÉF.	150 33			150 34									DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX				MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19							—	
b ₂	—	—	0.35	—	—	0.30							—	3
c ₁	0.09	—	0.16	0.09	—	0.16							—	
e _D	—	6.00	—	—	6.00	—							—	3
e _E	—	6.00	—	—	6.00	—							—	3
L	—	1.0	—	—	1.0	—							—	
l ₂	—	—	0.95	—	—	0.95							—	3
Z _D	—	—	2.00	—	—	0.70							—	
Z _E	—	—	2.00	—	—	0.70							—	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG UP
L-PQFP-G, 150E

Date: 2002

NOTES

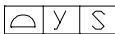
- 1. n REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
- 2. n_D REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION D.

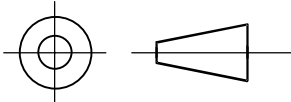
 n_E REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION E.
- 3. A CHECK OF THE PACKAGE TERMINAL DIMENSIONS AND THEIR TRUE POSITIONS IS PERFORMED TO ENSURED THAT THESE TERMINALS FIT WITH IN THE PATTERN OF TERMINAL LAND POSITION AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
- 4. INDIVIDUAL TERMINAL CAN BE OMITTED.

(*) MEANS TRUE GEOMETRIC POSITION.

[] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
- 5. INDEX CORNER.
- 6. ZONE OF A VISIBLE INDEX AREA ON THE TOP FACE OF THE PACKAGE.
- 7. MINIMUM DIMENSION D1 AND E1 IS 2.00 mm FOR THE HEATSLUG. THE MAXIMUM ALLOWABLE D1 AND E1 IS EQUAL TO THE PACKAGE BODY SIZE. HOWEVER, THE SIZE OF THE EXPOSED THERMAL PAD IS VARIABLE DEPENDING ON THE DEVICE FUNCTION (DIE SIZE). END USERS SHOULD VERIFY THE ACTUAL SIZE FOR SPECIFIC DEVICE APPLICATIONS.
- 8. THE EXPOSED HEAT SLUG IS COINCIDENT WITH THE TOP SURFACE OF THE PACKAGE AND IS NOT ALLOWED TO PROTRUDE BEYOND THE BODY SURFACE.

Ⓟ 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 ENHANCED LOW PROFILE QUAD FLAT PACK PACKAGE (HLQFP) OUTLINE FAMILY, HEAT SLUG UP L-PQFP-G, 150E	Date: 2002
60191 IEC I – 150E-k		

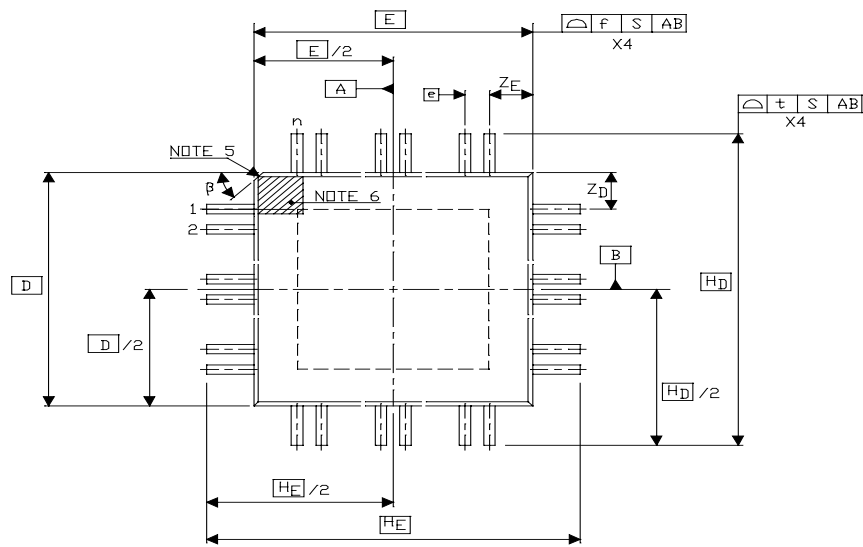


FIGURE 1
TOP VIEW

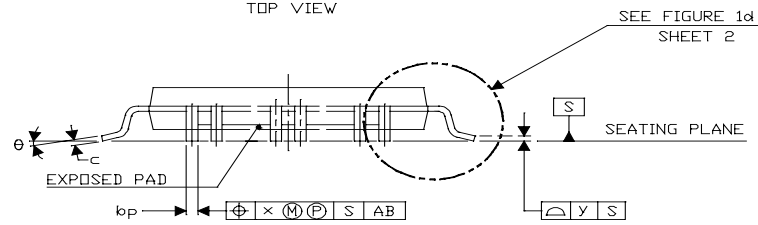


FIGURE 1b
SIDE VIEW

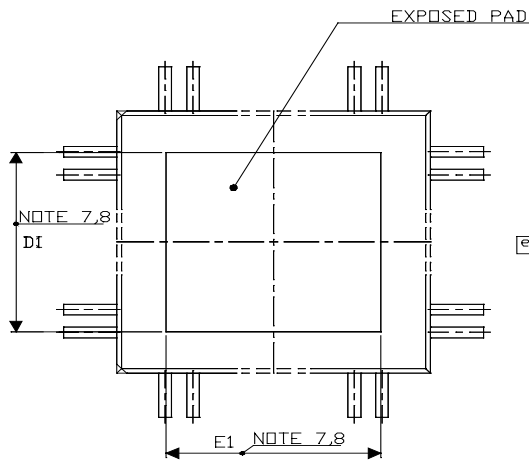


FIGURE 4
BOTTOM VIEW

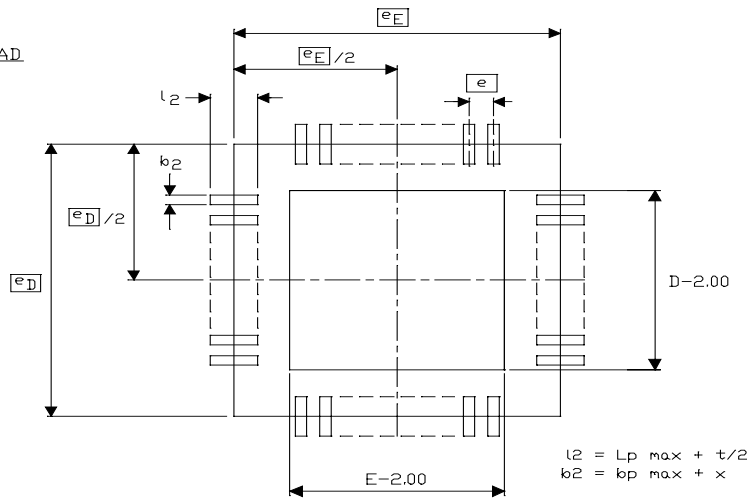
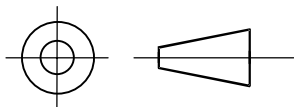


FIGURE 2
PATTERN OF TERMINAL POSITION AREAS

$l_2 = L_p \text{ max} + t/2$
 $b_2 = b_p \text{ max} + x$



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

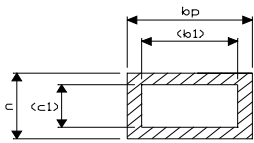


FIGURE 1c
LEAD SECTION

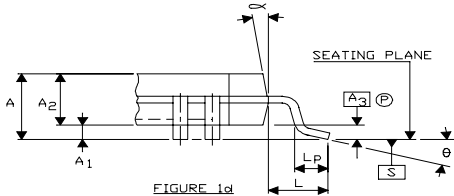


FIGURE 1d

Definition of Datum Target

<1> For even number of leads on a package side

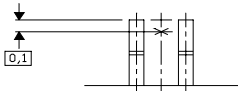


FIGURE 3a

A center of facing sides of adjacent leads
at a position 0.1 mm inside top of the leads

<2> For odd number of leads on a package side

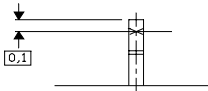
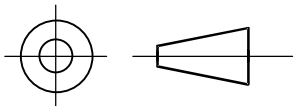


FIGURE 3b

A center of facing sides of adjacent leads
at a position 0.1 mm inside top of the leads



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

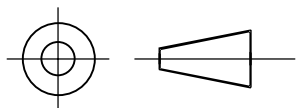
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	151 01			151 02			151 03			151 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	32	–	–	40	–	–	32	–	–	40	–		1
r _D	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
r _E	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.30	–	0.45	0.22	–	0.38		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
E	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.80(*)	–	–	0.65(*)	–		3
H _D	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
H _E	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.13		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	151 05			151 06			151 07			151 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	48	–	–	64	–	–	36	–	–	44	–		1
r _D	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
r _E	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50	0.30	–	0.45		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
E	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–	–	0.80(*)	–		3
H _D	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
H _E	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.20		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

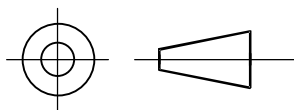
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	151 09			151 10			151 11			151 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	44	–		1
η_D	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
η_E	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
E	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–		3
H _D	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
H _E	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.13	–	–	0.08	–	–	0.07	–	–	0.20		
y	–	–	0.10	–	–	0.08	–	–	0.08	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	151 13			151 14			151 15			151 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
η_D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
η_E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
E	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
H _E	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.10	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

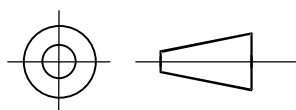
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	151 17			151 18			151 19			151 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
η_D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
η_E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.35	–	0.50	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	1.0(*)	–	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
H _D	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
H _E	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.20	–	–	0.13	–	–	0.08		
y	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	151 21			151 22			151 23			151 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	120	–	–	112	–	–	144	–	–	176	–		1
η_D	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
η_E	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	20	–	–	20	–	–	20.0	–		
E	–	14.0	–	–	20	–	–	20	–	–	20.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
H _E	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.07	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.08	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

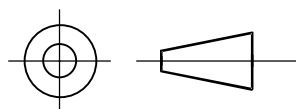
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GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	151 25			151 26			151 27			151 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	176	–	–	216	–	–	100	–	–	128	–		1
η_D	–	44	–	–	54	–	–	30	–	–	38	–		2, 4
η_E	–	44	–	–	54	–	–	20	–	–	26	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	24.0	–	–	24.0	–	–	20.0	–	–	20.0	–		
E	–	24.0	–	–	24.0	–	–	14.0	–	–	14.0	–		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
H _D	–	26.00	–	–	26.00	–	–	22.00	–	–	22.00	–		
H _E	–	26.00	–	–	26.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.13	–	–	0.08		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	151 29			151 30			151 31			151 32			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	160	–	–	208	–	–	256	–	–	20	–		1
η_D	–	40	–	–	52	–	–	64	–	–	5	–		2, 4
η_E	–	40	–	–	52	–	–	64	–	–	5	–		2, 4
A	–	–	1.70	–	–	1.70	–	–	1.70	–	–	1.70		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	1.35	–	–	1.35	–	–	1.35	–	–	1.35	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23	0.22	–	0.38		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	28.0	–	–	28.0	–	–	28.0	–	–	4.0	–		
E	–	28.0	–	–	28.0	–	–	28.0	–	–	4.0	–		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–	–	0.65(*)	–		3
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
H _D	–	30.00	–	–	30.00	–	–	30.00	–	–	6.00	–		
H _E	–	30.00	–	–	30.00	–	–	30.00	–	–	6.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.13	–	–	0.08	–	–	0.07	–	–	0.13		
y	–	–	0.10	–	–	0.08	–	–	0.08	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



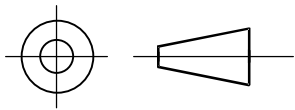
PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	151 33			151 34									DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	24	–	–	32	–								1
n _D	–	6	–	–	8	–								2, 4
n _E	–	6	–	–	8	–								2, 4
A	–	–	1.70	–	–	1.70								
A ₁	0.05	–	0.15	0.05	–	0.15								
A ₂	1.35	–	–	0.135	–	–								
A ₃	–	0.25(*)	–	–	0.25(*)	–								
b _P	0.17	–	0.27	0.13	–	0.23								3
c	0.09	–	0.20	0.09	–	0.20								
D	–	4.0	–	–	4.0	–								
E	–	4.0	–	–	4.0	–								
D1	2.00	–	–	2.00	–	–								7
E1	2.00	–	–	2.00	–	–								7
e	–	0.50(*)	–	–	0.40(*)	–								3
f	–	–	0.20	–	–	0.20								
H _D	–	6.00	–	–	6.00	–								
H _E	–	6.00	–	–	6.00	–								
L _P	0.45	0.60	0.75	0.45	0.60	0.75								3
t	–	–	0.20	–	–	0.20								
x	–	–	0.08	–	–	0.07								
y	–	–	0.08	–	–	0.08								
θ	–	–	–	–	–	–							0–8	
β	–	–	–	–	–	–							45	
α	–	–	–	–	–	–							11–13	



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

60191 IEC I – 151E-g

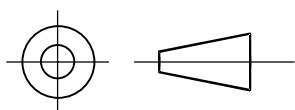
GROUP 2 – DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	151 01			151 02			151 03			151 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.30	0.35	0.40	0.22	0.30	0.33	–	
b ₂	–	–	0.35	–	–	0.30	–	–	0.65	–	–	0.51	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	7.0	–	–	7.0	–	–	9.0	–	–	9.0	–	–	3
e _E	–	7.0	–	–	7.0	–	–	9.0	–	–	9.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	0.85	–	–	0.80	–	–	0.80	–	–	0.68	–	
Z _E	–	–	0.85	–	–	0.80	–	–	0.80	–	–	0.68	–	

RÉF.	151 05			151 06			151 07			151 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	0.30	0.35	0.40	–	
b ₂	–	–	0.35	–	–	0.30	–	–	0.70	–	–	0.65	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	9.0	–	–	9.0	–	–	12.0	–	–	12.0	–	–	3
e _E	–	9.0	–	–	9.0	–	–	12.0	–	–	12.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	0.85	–	–	0.60	–	–	1.10	–	–	1.10		
Z _E	–	–	0.85	–	–	0.60	–	–	1.10	–	–	1.10		

RÉF.	151 09			151 10			151 11			151 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	–	
b ₂	–	–	0.51	–	–	0.35	–	–	0.30	–	–	0.70	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	12.0	–	–	12.0	–	–	12.0	–	–	14.0	–	–	3
e _E	–	12.0	–	–	12.0	–	–	12.0	–	–	14.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.20	–	–	1.35	–	–	1.30	–	–	1.10		
Z _E	–	–	1.20	–	–	1.35	–	–	1.30	–	–	1.10		



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

60191 IEC I – 151E-h

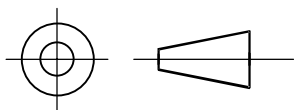
GROUP 2 – DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	151 13			151 14			151 15			151 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	–	
b ₂	–	–	0.65	–	–	0.51	–	–	0.35	–	–	0.30	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–	–	3
e _E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.30	–	–	1.22	–	–	1.35	–	–	1.30		
Z _E	–	–	1.30	–	–	1.22	–	–	1.35	–	–	1.30		

RÉF.	151 17			151 18			151 19			151 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.35	0.40	0.45	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	–	
b ₂	–	–	0.70	–	–	0.65	–	–	0.51	–	–	0.35	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	16.0	–	–	16.0	–	–	16.0	–	–	16.0	–	–	3
e _E	–	16.0	–	–	16.0	–	–	16.0	–	–	16.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.10	–	–	1.10	–	–	0.92	–	–	1.10		
Z _E	–	–	1.10	–	–	1.10	–	–	0.92	–	–	1.10		

RÉF.	151 21			151 22			151 23			151 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	–	
b ₂	–	–	0.30	–	–	0.51	–	–	0.35	–	–	0.30	–	3
c ₁	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	0.09	–	0.16	–	
e _D	–	16.0	–	–	22.0	–	–	22.0	–	–	22.0	–	–	3
e _E	–	16.0	–	–	22.0	–	–	22.0	–	–	22.0	–	–	3
L	–	1.0	–	–	1.0	–	–	1.0	–	–	1.0	–	–	
l ₂	–	–	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	3
Z _D	–	–	1.30	–	–	1.32	–	–	1.35	–	–	1.50		
Z _E	–	–	1.30	–	–	1.32	–	–	1.35	–	–	1.50		



PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

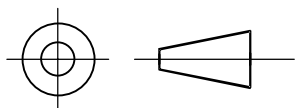
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	151 25			151 26			151 27			151 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	-	
b ₂	-	-	0.35	-	-	0.30	-	-	0.51	-	-	0.35	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
e _D	-	26.0	-	-	26.0	-	-	22.0	-	-	22.0	-	-	3
e _E	-	26.0	-	-	26.0	-	-	16.0	-	-	16.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	1.35	-	-	1.50	-	-	0.67	-	-	0.85	-	
Z _E	-	-	1.35	-	-	1.50	-	-	0.92	-	-	0.85	-	

RÉF.	151 29			151 30			151 31			151 32			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	-	
b ₂	-	-	0.51	-	-	0.35	-	-	0.30	-	-	0.51	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
e _D	-	30.0	-	-	30.0	-	-	30.0	-	-	6.00	-	-	3
e _E	-	30.0	-	-	30.0	-	-	30.0	-	-	6.00	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	1.42	-	-	1.35	-	-	1.50	-	-	0.80	-	
Z _E	-	-	1.42	-	-	1.35	-	-	1.50	-	-	0.80	-	

RÉF.	151 33			151 34									DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX				MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19							-	
b ₂	-	-	0.35	-	-	0.30							-	3
c ₁	0.09	-	0.16	0.09	-	0.16							-	
e _D	-	6.00	-	-	6.00	-							-	3
e _E	-	6.00	-	-	6.00	-							-	3
L	-	1.0	-	-	1.0	-							-	
l ₂	-	-	0.95	-	-	0.95							-	3
Z _D	-	-	2.00	-	-	0.70							-	
Z _E	-	-	2.00	-	-	0.70							-	



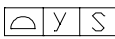
PLASTIC ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

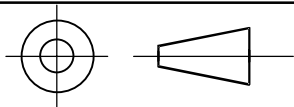
Date: 2002

NOTES

9. n REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
10. n_D REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION D.
- n_E REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION E.
11. A CHECK OF THE PACKAGE TERMINAL DIMENSIONS AND THEIR TRUE POSITIONS IS PERFORMED TO ENSURED THAT THESE TERMINALS FIT WITH IN THE PATTERN OF TERMINAL LAND POSITION AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
12. INDIVIDUAL TERMINAL CAN BE OMITTED.
- (*) MEANS TRUE GEOMETRIC POSITION.
- [] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
13. INDEX CORNER.
14. ZONE OF A VISIBLE INDEX AREA ON THE TOP FACE OF THE PACKAGE.
15. MINIMUM DIMENSION D1 AND E1 IS 2.00 mm FOR THE HEATSLUG. THE MAXIMUM ALLOWABLE D1 AND E1 IS EQUAL TO THE PACKAGE BODY SIZE. HOWEVER, THE SIZE OF THE EXPOSED THERMAL PAD IS VARIABLE DEPENDING ON THE DEVICE FUNCTION (DIE SIZE). END USERS SHOULD VERIFY THE ACTUAL SIZE FOR SPECIFIC DEVICE APPLICATIONS.
16. THE EXPOSED HEAT SLUG IS COINCIDENT WITH THE TOP SURFACE OF THE PACKAGE AND IS NOT ALLOWED TO PROTRUDE BEYOND THE BODY SURFACE.

Ⓟ 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 ENHANCED LOW PROFILE
QUAD FLAT PACK PACKAGE (HLQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
L-PQFP-G, 151E

Date: 2002

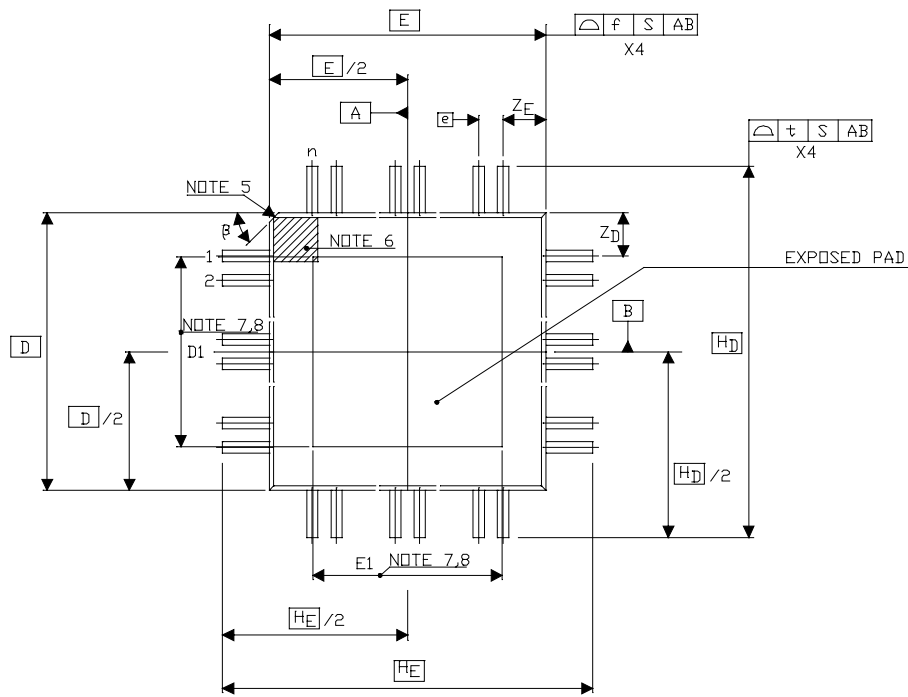


FIGURE 1
TOP VIEW

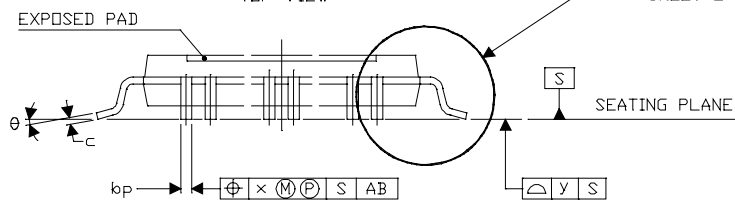


FIGURE 1b
SIDE VIEW

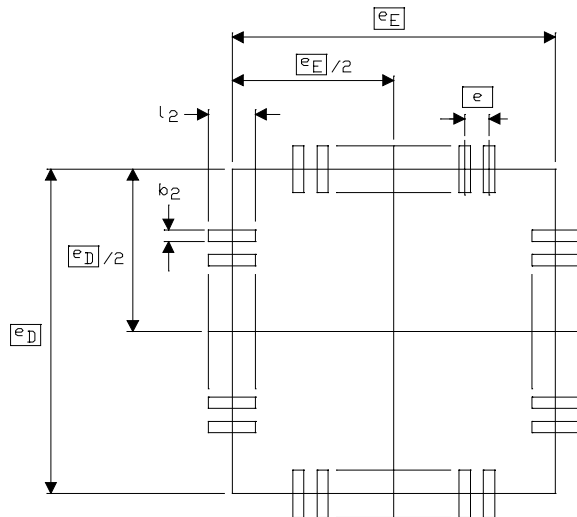
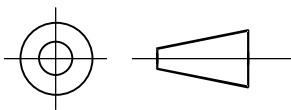


FIGURE 2
PATTERN OF TERMINAL POSITION AREAS

$$l_2 = L_p \max + t/2$$
$$b_2 = b_p \max + x$$



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

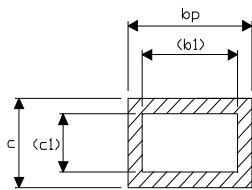


FIGURE 1c
LEAD SECTION

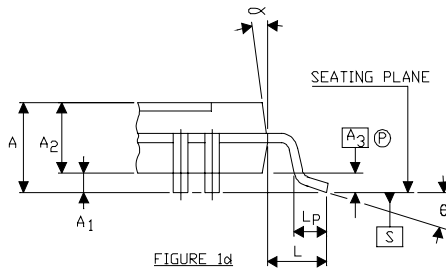


FIGURE 1d

Definition of Datum Target

(1) For even number of leads on a package side

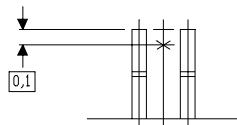


FIGURE 3a

A center of facing sides of adjacent leads
at a position 0,1 mm inside top of the leads

(2) For odd number of leads on a package side

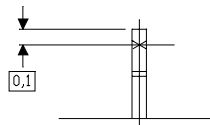
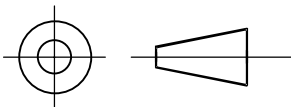


FIGURE 3b

A center of facing sides of adjacent leads
at a position 0,1 mm inside top of the leads



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

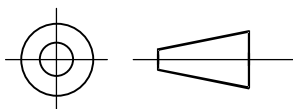
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	152 01			152 02			152 03			152 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	32	–	–	40	–	–	32	–	–	40	–		1
n _D	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
n _E	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.17	–	0.27	0.13	–	0.23	0.30	–	0.45	0.22	–	0.38		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
E	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.80(*)	–	–	0.65(*)	–		3
H _D	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
H _E	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.13		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	152 05			152 06			152 07			152 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	48	–	–	64	–	–	36	–	–	44	–		1
n _D	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
n _E	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50	0.30	–	0.45		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
E	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–	–	0.80(*)	–		3
H _D	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
H _E	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.20		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

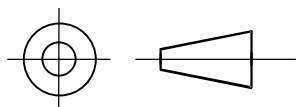
60191 IEC I – 152E-c

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	152 09			152 10			152 11			152 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	44	–		1
n _D	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
E	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–		3
H _D	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
H _E	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.13	–	–	0.08	–	–	0.07	–	–	0.20		
y	–	–	0.10	–	–	0.08	–	–	0.08	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	152 13			152 14			152 15			152 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
n _D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
E	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
H _E	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.10	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

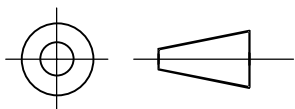
60191 IEC I – 152E-d

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	152 17			152 18			152 19			152 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
n _D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
bp	0.35	–	0.50	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	1.0(*)	–	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
H _D	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
H _E	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.20	–	–	0.13	–	–	0.08		
y	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	152 21			152 22			152 23			152 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	120	–	–	112	–	–	144	–	–	176	–		1
n _D	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
n _E	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
bp	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	20.0	–	–	20.0	–	–	20.0	–		
E	–	14.0	–	–	20.0	–	–	20.0	–	–	20.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
H _E	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.07	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.08	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

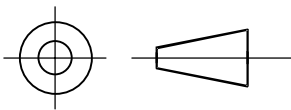
60191 IEC I – 152E-e

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	152 25			152 26			152 27			152 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	176	–	–	216	–	–	100	–	–	128	–		1
η_D	–	44	–	–	54	–	–	30	–	–	38	–		2, 4
η_E	–	44	–	–	54	–	–	20	–	–	26	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
$\overline{A_3}$	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
bp	0.17	–	0.27	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
$\overline{D}$	–	24.0	–	–	24.0	–	–	20.0	–	–	20.0	–		
$\overline{E}$	–	24.0	–	–	24.0	–	–	14.0	–	–	14.0	–		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
$\overline{e}$	–	0.50(*)	–	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
$\overline{H_D}$	–	26.00	–	–	26.00	–	–	22.00	–	–	22.00	–		
$\overline{H_E}$	–	26.00	–	–	26.00	–	–	16.00	–	–	16.00	–		
Lp	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.13	–	–	0.08		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	152 29			152 30			152 31						DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	20	–	–	24	–	–	32	–					1
η_D	–	5	–	–	6	–	–	8	–					2, 4
η_E	–	5	–	–	6	–	–	8	–					2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20					
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15					
A ₂	0.95	–	–	0.95	–	–	0.95	–	–					
$\overline{A_3}$	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–					
bp	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23					3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20					
$\overline{D}$	–	4.0	–	–	4.0	–	–	4.0	–					
$\overline{E}$	–	4.0	–	–	4.0	–	–	4.0	–					
D1	2.00	–	–	2.00	–	–	2.00	–	–					7
E1	2.00	–	–	2.00	–	–	2.00	–	–					7
$\overline{e}$	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–					3
f	–	–	0.20	–	–	0.20	–	–	0.20					
$\overline{H_D}$	–	6.0	–	–	6.0	–	–	6.0	–					
$\overline{H_E}$	–	6.0	–	–	6.0	–	–	6.0	–					
Lp	0.45	0.60	0.75	0.45	0.60	0.75	0.45	0.60	0.75					3
t	–	–	0.20	–	–	0.20	–	–	0.20					
x	–	–	0.13	–	–	0.08	–	–	0.07					
y	–	–	0.10	–	–	0.08	–	–	0.08					
θ	–	–	–	–	–	–	–	–	–				0–8	
β	–	–	–	–	–	–	–	–	–				45	
α	–	–	–	–	–	–	–	–	–				11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

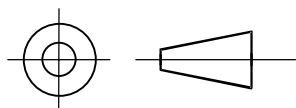
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	152 01			152 02			152 03			152 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.30	0.35	0.40	0.22	0.30	0.33	—	
b ₂	—	—	0.35	—	—	0.30	—	—	0.65	—	—	0.51	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	7.0	—	—	7.0	—	—	9.0	—	—	9.0	—	—	3
e _E	—	7.0	—	—	7.0	—	—	9.0	—	—	9.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	0.85	—	—	0.80	—	—	0.80	—	—	0.68	—	
Z _E	—	—	0.85	—	—	0.80	—	—	0.80	—	—	0.68	—	

RÉF.	152 05			152 06			152 07			152 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	0.30	0.35	0.40	—	
b ₂	—	—	0.35	—	—	0.30	—	—	0.70	—	—	0.65	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	9.0	—	—	9.0	—	—	12.0	—	—	12.0	—	—	3
e _E	—	9.0	—	—	9.0	—	—	12.0	—	—	12.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	0.85	—	—	0.60	—	—	1.10	—	—	1.10	—	
Z _E	—	—	0.85	—	—	0.60	—	—	1.10	—	—	1.10	—	

RÉF.	152 09			152 10			152 11			152 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	—	
b ₂	—	—	0.51	—	—	0.35	—	—	0.30	—	—	0.70	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	12.0	—	—	12.0	—	—	12.0	—	—	14.0	—	—	3
e _E	—	12.0	—	—	12.0	—	—	12.0	—	—	14.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.20	—	—	1.35	—	—	1.30	—	—	1.10	—	
Z _E	—	—	1.20	—	—	1.35	—	—	1.30	—	—	1.10	—	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

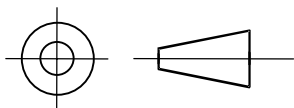
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	152 13			152 14			152 15			152 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	—	
b ₂	—	—	0.65	—	—	0.51	—	—	0.35	—	—	0.30	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	14.0	—	—	14.0	—	—	14.0	—	—	14.0	—	—	3
e _E	—	14.0	—	—	14.0	—	—	14.0	—	—	14.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.30	—	—	1.22	—	—	1.35	—	—	1.30		
Z _E	—	—	1.30	—	—	1.22	—	—	1.35	—	—	1.30		

RÉF.	152 17			152 18			152 19			152 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.35	0.40	0.45	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	—	
b ₂	—	—	0.70	—	—	0.65	—	—	0.51	—	—	0.35	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	16.0	—	—	16.0	—	—	16.0	—	—	16.0	—	—	3
e _E	—	16.0	—	—	16.0	—	—	16.0	—	—	16.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.10	—	—	1.10	—	—	0.92	—	—	1.10		
Z _E	—	—	1.10	—	—	1.10	—	—	0.92	—	—	1.10		

RÉF.	150 21			150 22			150 23			150 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	—	
b ₂	—	—	0.30	—	—	0.51	—	—	0.35	—	—	0.30	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	16.0	—	—	22.0	—	—	22.0	—	—	22.0	—	—	3
e _E	—	16.0	—	—	22.0	—	—	22.0	—	—	22.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.30	—	—	1.32	—	—	1.35	—	—	1.50		
Z _E	—	—	1.30	—	—	1.32	—	—	1.35	—	—	1.50		



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

Date: 2002

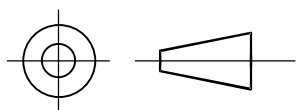
60191 IEC I – 152E-h

GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	152 25			152 26			152 27			152 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b_1	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	—	
b_2	—	—	0.35	—	—	0.30	—	—	0.51	—	—	0.35	—	3
c_1	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e_D	—	26.0	—	—	26.0	—	—	22.0	—	—	22.0	—	—	3
e_E	—	26.0	—	—	26.0	—	—	16.0	—	—	16.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l_2	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z_D	—	—	1.35	—	—	1.50	—	—	0.67	—	—	0.85		
Z_E	—	—	1.35	—	—	1.50	—	—	0.92	—	—	0.85		

RÉF.	152 29			152 30			152 31						DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b_1	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19				—	
b_2	—	—	0.51	—	—	0.35	—	—	0.30				—	3
c_1	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16				—	
e_D	—	6.00	—	—	6.00	—	—	6.00	—				—	3
e_E	—	6.00	—	—	6.00	—	—	6.00	—				—	3
L	—	1.0	—	—	1.0	—	—	1.0	—				—	
l_2	—	—	0.95	—	—	0.95	—	—	0.95				—	3
Z_D	—	—	0.80	—	—	2.00	—	—	0.70					
Z_E	—	—	0.80	—	—	2.00	—	—	0.70					



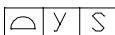
PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG UP
T-PQFP-G, 152E

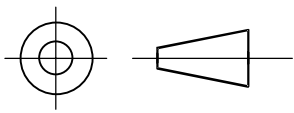
Date: 2002

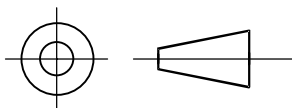
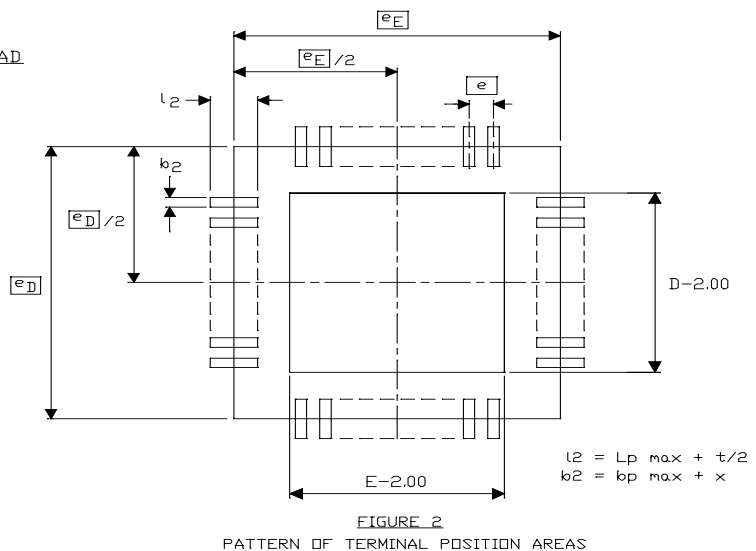
NOTES

17. n REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
18. n_D REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION D.
- n_E REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION E.
19. A CHECK OF THE PACKAGE TERMINAL DIMENSIONS AND THEIR TRUE POSITIONS IS PERFORMED TO ENSURED THAT THESE TERMINALS FIT WITH IN THE PATTERN OF TERMINAL LAND POSITION AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
20. INDIVIDUAL TERMINAL CAN BE OMITTED.
- (*) MEANS TRUE GEOMETRIC POSITION.
- [] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
21. INDEX CORNER.
22. ZONE OF A VISIBLE INDEX AREA ON THE TOP FACE OF THE PACKAGE.
23. MINIMUM DIMENSION D1 AND E1 IS 2.00 mm FOR THE HEATSLUG. THE MAXIMUM ALLOWABLE D1 AND E1 IS EQUAL TO THE PACKAGE BODY SIZE. HOWEVER, THE SIZE OF THE EXPOSED THERMAL PAD IS VARIABLE DEPENDING ON THE DEVICE FUNCTION (DIE SIZE). END USERS SHOULD VERIFY THE ACTUAL SIZE FOR SPECIFIC DEVICE APPLICATIONS.
24. THE EXPOSED HEAT SLUG IS COINCIDENT WITH THE TOP SURFACE OF THE PACKAGE AND IS NOT ALLOWED TO PROTRUDE BEYOND THE BODY SURFACE.

Ⓟ 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 ENHANCED THIN PROFILE QUAD FLAT PACK PACKAGE (HTQFP) OUTLINE FAMILY, HEAT SLUG UP T-PQFP-G, 152E	Date: 2002
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~~Date: 2002~~

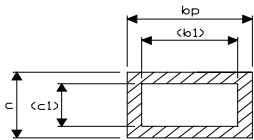


FIGURE 1c
LEAD SECTION

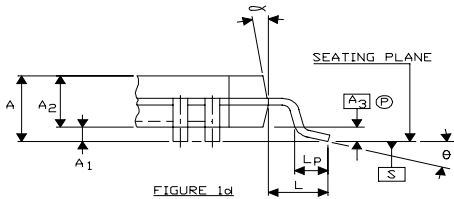


FIGURE 1d

Definition of Datum Target

(1) For even number of leads on a package side

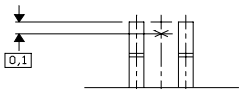


FIGURE 3a

A center of facing sides of adjacent leads
at a position 0.1 mm inside top of the leads

(2) For odd number of leads on a package side

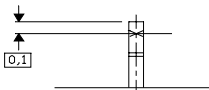
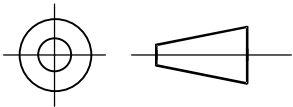


FIGURE 3b

A center of facing sides of adjacent leads
at a position 0.1 mm inside top of the leads



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

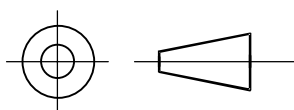
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	153 01			153 02			153 03			153 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	32	–	–	40	–	–	32	–	–	40	–		1
η_D	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
η_E	–	8	–	–	10	–	–	8	–	–	10	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.30	–	0.45	0.22	–	0.38		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
E	–	5.0	–	–	5.0	–	–	7.0	–	–	7.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.80(*)	–	–	0.65(*)	–		3
H _D	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
H _E	–	7.00	–	–	7.00	–	–	9.00	–	–	9.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.13		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	153 05			153 06			153 07			153 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	48	–	–	64	–	–	36	–	–	44	–		1
η_D	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
η_E	–	12	–	–	16	–	–	9	–	–	11	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50	0.30	–	0.45		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
E	–	7.0	–	–	7.0	–	–	10.0	–	–	10.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–	–	0.80(*)	–		3
H _D	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
H _E	–	9.00	–	–	9.00	–	–	12.00	–	–	12.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.20	–	–	0.20		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

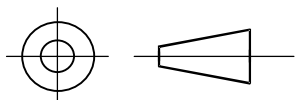
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	153 09			153 10			153 11			153 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	44	–		1
n _D	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	11	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23	0.35	–	0.50		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
E	–	10.0	–	–	10.0	–	–	10.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–	–	1.0(*)	–		3
H _D	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
H _E	–	12.00	–	–	12.00	–	–	12.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.13	–	–	0.08	–	–	0.07	–	–	0.20		
y	–	–	0.10	–	–	0.08	–	–	0.08	–	–	0.10		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	153 13			153 14			153 15			153 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
n _D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
b _p	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
E	–	12.0	–	–	12.0	–	–	12.0	–	–	12.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
H _E	–	14.00	–	–	14.00	–	–	14.00	–	–	14.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.10	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

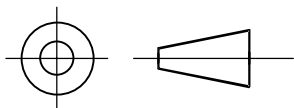
Date: 2002

GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	153 17			153 18			153 19			153 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	52	–	–	64	–	–	80	–	–	100	–		1
n _D	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
n _E	–	13	–	–	16	–	–	20	–	–	25	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.35	–	0.50	0.30	–	0.45	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
E	–	14.0	–	–	14.0	–	–	14.0	–	–	14.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	1.0(*)	–	–	0.80(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
H _D	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
H _E	–	16.00	–	–	16.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.20	–	–	0.20	–	–	0.13	–	–	0.08		
y	–	–	0.10	–	–	0.10	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	153 21			153 22			153 23			153 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	120	–	–	112	–	–	144	–	–	176	–		1
n _D	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
n _E	–	30	–	–	28	–	–	36	–	–	44	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23		
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	14.0	–	–	20.0	–	–	20.0	–	–	20.0	–		
E	–	14.0	–	–	20.0	–	–	20.0	–	–	20.0	–		
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–		3
H _D	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
H _E	–	16.00	–	–	22.00	–	–	22.00	–	–	22.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.07	–	–	0.13	–	–	0.08	–	–	0.07		
y	–	–	0.08	–	–	0.10	–	–	0.08	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

Date: 2002

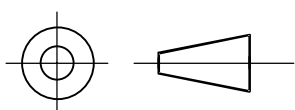
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GROUP 1 – DIMENSIONS APPROPRIATE TO PACKAGE CHARACTERISTICS

MILLIMETRES

RÉF.	153 25			153 26			153 27			153 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	176	–	–	216	–	–	100	–	–	128	–		1
n _D	–	44	–	–	54	–	–	30	–	–	38	–		2, 4
n _E	–	44	–	–	54	–	–	20	–	–	26	–		2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20	–	–	1.20		
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15		
A ₂	0.95	–	–	0.95	–	–	0.95	–	–	0.95	–	–		
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–		
k _p	0.17	–	0.27	0.13	–	0.23	0.22	–	0.38	0.17	–	0.27		3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20		
D	–	24.0	–	–	24.0	–	–	20.0	–	–	20.0	–		
E	–	24.0	–	–	24.0	–	–	14.0	–	–	14.0	–		
D1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
E1	2.00	–	–	2.00	–	–	2.00	–	–	2.00	–	–		7
e	–	0.50(*)	–	–	0.40(*)	–	–	0.65(*)	–	–	0.50(*)	–		3
f	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
H _D	–	26.00	–	–	26.00	–	–	22.00	–	–	22.00	–		
H _E	–	26.00	–	–	26.00	–	–	16.00	–	–	16.00	–		
L _p	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
t	–	–	0.20	–	–	0.20	–	–	0.20	–	–	0.20		
x	–	–	0.08	–	–	0.07	–	–	0.13	–	–	0.08		
y	–	–	0.08	–	–	0.08	–	–	0.10	–	–	0.08		
θ	–	–	–	–	–	–	–	–	–	–	–	–	0–8	
β	–	–	–	–	–	–	–	–	–	–	–	–	45	
α	–	–	–	–	–	–	–	–	–	–	–	–	11–13	

RÉF.	153 29			153 30			153 31						DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
n	–	20	–	–	24	–	–	32	–					1
n _D	–	5	–	–	6	–	–	8	–					2, 4
n _E	–	5	–	–	6	–	–	8	–					2, 4
A	–	–	1.20	–	–	1.20	–	–	1.20					
A ₁	0.05	–	0.15	0.05	–	0.15	0.05	–	0.15					
A ₂	0.95	–	–	0.95	–	–	0.95	–	–					
A ₃	–	0.25(*)	–	–	0.25(*)	–	–	0.25(*)	–					
k _p	0.22	–	0.38	0.17	–	0.27	0.13	–	0.23					3
c	0.09	–	0.20	0.09	–	0.20	0.09	–	0.20					
D	–	4.0	–	–	4.0	–	–	4.0	–					
E	–	4.0	–	–	4.0	–	–	4.0	–					
D1	2.00	–	–	2.00	–	–	2.00	–	–					7
E1	2.00	–	–	2.00	–	–	2.00	–	–					7
e	–	0.65(*)	–	–	0.50(*)	–	–	0.40(*)	–					3
f	–	–	0.20	–	–	0.20	–	–	0.20					
H _D	–	6.00	–	–	6.00	–	–	6.00	–					
H _E	–	6.00	–	–	6.00	–	–	6.00	–					
L _p	0.45	0.60	0.75	0.45	0.60	0.75	0.45	0.60	0.75					3
t	–	–	0.20	–	–	0.20	–	–	0.20					
x	–	–	0.13	–	–	0.08	–	–	0.07					
y	–	–	0.10	–	–	0.08	–	–	0.08					
θ	–	–	–	–	–	–	–	–	–				0–8	
β	–	–	–	–	–	–	–	–	–				45	
α	–	–	–	–	–	–	–	–	–				11–13	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

Date: 2002

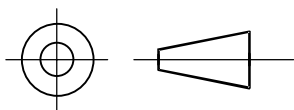
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	153 01			153 02			153 03			153 04			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.30	0.35	0.40	0.22	0.30	0.33	-	
b ₂	-	-	0.35	-	-	0.30	-	-	0.65	-	-	0.51	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
$\left[\begin{smallmatrix} e \\ D \end{smallmatrix} \right]$	-	7.0	-	-	7.0	-	-	9.0	-	-	9.0	-	-	3
$\left[\begin{smallmatrix} e \\ E \end{smallmatrix} \right]$	-	7.0	-	-	7.0	-	-	9.0	-	-	9.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	0.85	-	-	0.80	-	-	0.80	-	-	0.68	-	
Z _E	-	-	0.85	-	-	0.80	-	-	0.80	-	-	0.68	-	

RÉF.	153 05			153 06			153 07			153 08			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	0.30	0.35	0.40	-	
b ₂	-	-	0.35	-	-	0.30	-	-	0.70	-	-	0.65	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
$\left[\begin{smallmatrix} e \\ D \end{smallmatrix} \right]$	-	9.0	-	-	9.0	-	-	12.0	-	-	12.0	-	-	3
$\left[\begin{smallmatrix} e \\ E \end{smallmatrix} \right]$	-	9.0	-	-	9.0	-	-	12.0	-	-	12.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	0.85	-	-	0.60	-	-	1.10	-	-	1.10	-	
Z _E	-	-	0.85	-	-	0.60	-	-	1.10	-	-	1.10	-	

RÉF.	153 09			153 10			153 11			153 12			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	0.35	0.40	0.45	-	
b ₂	-	-	0.51	-	-	0.35	-	-	0.30	-	-	0.70	-	3
c ₁	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	0.09	-	0.16	-	
$\left[\begin{smallmatrix} e \\ D \end{smallmatrix} \right]$	-	12.0	-	-	12.0	-	-	12.0	-	-	14.0	-	-	3
$\left[\begin{smallmatrix} e \\ E \end{smallmatrix} \right]$	-	12.0	-	-	12.0	-	-	12.0	-	-	14.0	-	-	3
L	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	
l ₂	-	-	0.95	-	-	0.95	-	-	0.95	-	-	0.95	-	3
Z _D	-	-	1.20	-	-	1.35	-	-	1.30	-	-	1.10	-	
Z _E	-	-	1.20	-	-	1.35	-	-	1.30	-	-	1.10	-	



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

Date: 2002

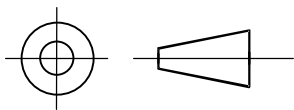
GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	153 13			153 14			153 15			153 16			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	—	
b ₂	—	—	0.65	—	—	0.51	—	—	0.35	—	—	0.30	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	14.0	—	—	14.0	—	—	14.0	—	—	14.0	—	—	3
e _E	—	14.0	—	—	14.0	—	—	14.0	—	—	14.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.30	—	—	1.22	—	—	1.35	—	—	1.30		
Z _E	—	—	1.30	—	—	1.22	—	—	1.35	—	—	1.30		

RÉF.	153 17			153 18			153 19			153 20			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.35	0.40	0.45	0.30	0.35	0.40	0.22	0.30	0.33	0.17	0.20	0.23	—	
b ₂	—	—	0.70	—	—	0.65	—	—	0.51	—	—	0.35	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	16.0	—	—	16.0	—	—	16.0	—	—	16.0	—	—	3
e _E	—	16.0	—	—	16.0	—	—	16.0	—	—	16.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.10	—	—	1.10	—	—	0.92	—	—	1.10		
Z _E	—	—	1.10	—	—	1.10	—	—	0.92	—	—	1.10		

RÉF.	153 21			153 22			153 23			153 24			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19	—	
b ₂	—	—	0.30	—	—	0.51	—	—	0.35	—	—	0.30	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	16.0	—	—	22.0	—	—	22.0	—	—	22.0	—	—	3
e _E	—	16.0	—	—	22.0	—	—	22.0	—	—	22.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.30	—	—	1.32	—	—	1.35	—	—	1.50		
Z _E	—	—	1.30	—	—	1.32	—	—	1.35	—	—	1.50		



PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

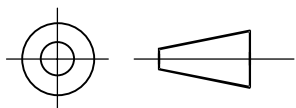
Date: 2002

GROUP 2 - DIMENSIONS APPROPRIATE TO TERMINAL POSITION AREA

MILLIMETRES

RÉF.	153 25			153 26			153 27			153 28			DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.17	0.20	0.23	0.13	0.16	0.19	0.22	0.30	0.33	0.17	0.20	0.23	—	
b ₂	—	—	0.35	—	—	0.30	—	—	0.51	—	—	0.35	—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16	—	
e _D	—	26.0	—	—	26.0	—	—	22.0	—	—	22.0	—	—	3
e _F	—	26.0	—	—	26.0	—	—	16.0	—	—	16.0	—	—	3
L	—	1.0	—	—	1.0	—	—	1.0	—	—	1.0	—	—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95	—	—	0.95	—	3
Z _D	—	—	1.35	—	—	1.50	—	—	0.67	—	—	0.85		
Z _E	—	—	1.35	—	—	1.50	—	—	0.92	—	—	0.85		

RÉF.	153 29			153 30			153 31						DEGRÉS DEGREES	NOTES
	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX		
b ₁	0.22	0.30	0.33	0.17	0.20	0.23	0.13	0.16	0.19				—	
b ₂	—	—	0.51	—	—	0.35	—	—	0.30				—	3
c ₁	0.09	—	0.16	0.09	—	0.16	0.09	—	0.16				—	
e _D	—	6.00	—	—	6.00	—	—	6.00	—				—	3
e _F	—	6.00	—	—	6.00	—	—	6.00	—				—	3
L	—	1.0	—	—	1.0	—	—	1.0	—				—	
l ₂	—	—	0.95	—	—	0.95	—	—	0.95				—	3
Z _D	—	—	0.80	—	—	2.00	—	—	0.70				—	
Z _E	—	—	0.80	—	—	2.00	—	—	0.70				—	



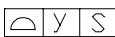
PLASTIC ENHANCED THIN PROFILE
QUAD FLAT PACK PACKAGE (HTQFP)
OUTLINE FAMILY, HEAT SLUG DOWN
T-PQFP-G, 153E

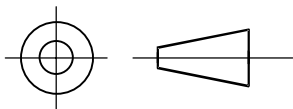
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NOTES

25. n REFERS TO THE TOTAL NUMBER OF TERMINAL POSITIONS.
26. n_D REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION D.
- n_E REFERS TO THE NUMBER OF TERMINAL POSITIONS ON ONE SIDE OF THE PACKAGE IN THE DIRECTION OF THE DIMENSION E.
27. A CHECK OF THE PACKAGE TERMINAL DIMENSIONS AND THEIR TRUE POSITIONS IS PERFORMED TO ENSURED THAT THESE TERMINALS FIT WITH IN THE PATTERN OF TERMINAL LAND POSITION AREAS. THIS CAN BE CARRIED OUT BY MEANS OF AN APPROPRIATE GAUGE.
28. INDIVIDUAL TERMINAL CAN BE OMMITTED.
- (*) MEANS TRUE GEOMETRIC POSITION.
- [] VALUES GIVEN WITHIN SQUARE BRACKETS ARE CALCULATED VALUES.
29. INDEX CORNER.
30. ZONE OF A VISIBLE INDEX AREA ON THE TOP FACE OF THE PACKAGE.
31. MINIMUM DIMENSION D1 AND E1 IS 2.00 mm FOR THE HEATSLUG. THE MAXIMUM ALLOWABLE D1 AND E1 IS EQUAL TO THE PACKAGE BODY SIZE. HOWEVER, THE SIZE OF THE EXPOSED THERMAL PAD IS VARIABLE DEPENDING ON THE DEVICE FUNCTION (DIE SIZE). END USERS SHOULD VERIFY THE ACTUAL SIZE FOR SPECIFIEC DEVICE APPLICATIONS.
32. THE EXPOSED HEAT SLUG IS COINCIDENT WITH THE TOP SURFACE OF THE PACKAGE AND IS NOT ALLOWED TO PROTRUDE BEYOND THE BODY SURFACE.

Ⓢ 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 ENHANCED THIN PROFILE
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