

EIAJ EDR-7330



Technical Report of Japan Electronics and Information Technology Industries Association

EIAJ EDR – 7330

**Design guideline of integrated circuits
for Plastic Small Outline J-Lead package
(P-SOJ)**

Established in June, 2002

Prepared by
Technical Standardization Committee on Semiconductor Device Package

Published by
Japan Electronics and Information Technology Industries Association

11, Kanda-Surugadai 3-chome, Chiyoda-ku, Tokyo 101-0062, Japan
Printed in Japan

Translation without guarantee in the event of any doubt arising, the original standard in Japanese is to be evidence.

JEITA standards are established independently to any existing patents on the products, materials or processes they cover.

JEITA assumes absolutely no responsibility toward parties applying these standards or toward patent owners.

© 2002 by the Japan Electronics and Information Technology Industries Association

All rights reserved. No part of this standards may be reproduced in any form or by any means without prior permission in writing from the publisher.

Design guideline of integrated circuits for Plastic Shrink Small Outline J-Lead package (P-SOJ)

1. Scope of Application

This technical report regulated outline drawings and dimensions of the Plastic Small Outline J-Lead package (hereinafter referred to as P-SOJ), P-SOJ is applied terminal straight pitch \boxed{e} is from 0.65mm to 1.27mm, which among the packages classified as form B in the **EIAJ ED-7300** [Recommended practice on Standard for the preparation of outline drawings of semiconductor packages]

Note: This technical report is revised in May 1995, **EIAJ ED-7406A** (Design guideline of integrated circuits for Plastic Small Outline J-Lead package). The other relation standards are shown below.

EIAJ ED-7304-2 (Measuring Method for Package Dimensions of Small Outline J-leaded package (SOJ)) established in April, 1998

EIAJ EDR-7319 (Design guideline of integrated circuits for Plastic Quad Flat J-Lead package) in December, 1998.

2. Definition of the Technical Terms

The definition of the technical terms used in this technical report is in conformity with **EIAJ ED-7300**, and the definition of technical terms appearing a new are given within the text of this standard.

3. BACKGROUND

Recently, Increasingly electronic appliance become smaller and thinner, so It corresponds to smaller and thinner, P-SOJ was applied terminal straight pitch \boxed{e} is 1.27mm (50mil) which P-SOJ first. And after that, It is applied terminal straight pitch \boxed{e} is 1.27mm or less which P-SOJ. This standard intended to standardize the outer dimensions of P-SOJ and ensure compatibility between products as far as possible for standardization.

4. Definition of P-SOJ

P-SOJ is defined as Form B with J terminal in the item 6, "Outline classification of shapes of semiconductor package" at the **EIAJ ED-7300**, and a package with formed terminals led out of longer side of itself in two directions, whose terminal pitch \boxed{e} is 1.27mm or less, and terminals are bended to J-shape, and it are toward the outside of the package body for mounting on print circuits board surface.

5. Numbering of Terminals

Numbering of terminals complies with the **EIAJ ED-7300**.

6. Nominal Dimensions

Package width x Package length(Symbol : \boxed{E} x \boxed{D}) is applied to Nominal Dimensions.

However as the exception, old nominal dimensions is possible to use places (side by side) and it writes which Package width (Symbol : E)

7. REFERENCE CHARACTERS AND DRAWING

7.1 Outline Drawing

Figure 1

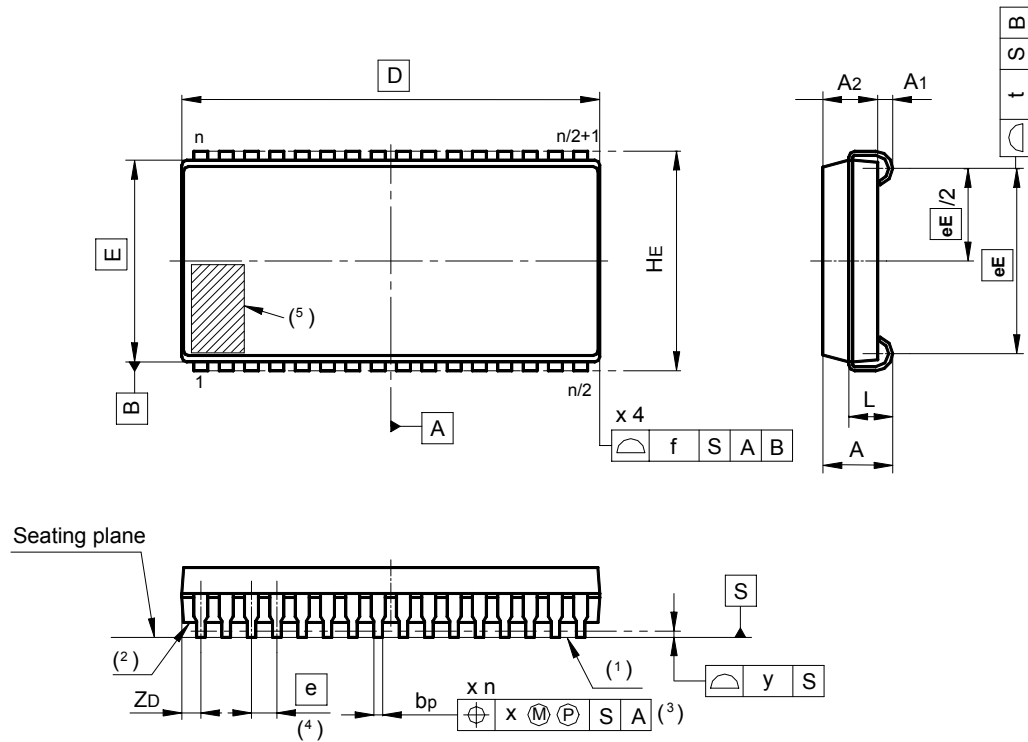


Figure 2 The detailed figure (target of datum A)

For even number of terminals on a package side

For odd number of terminals on a package side

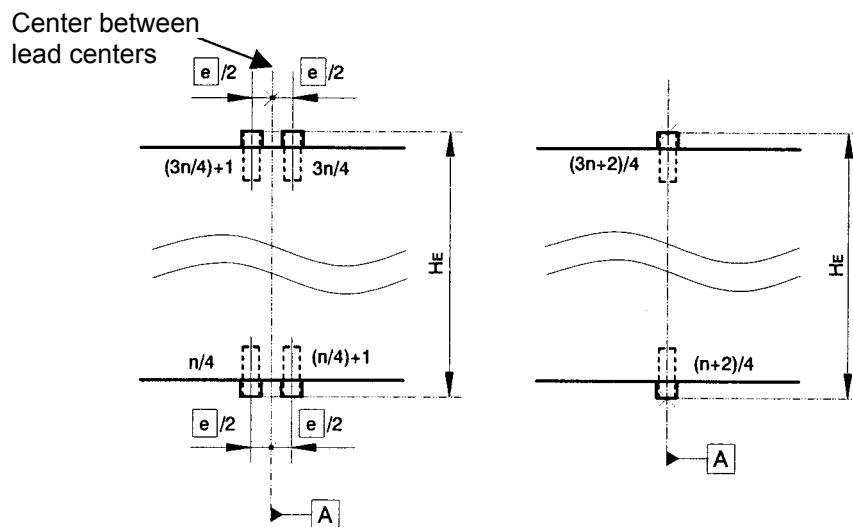
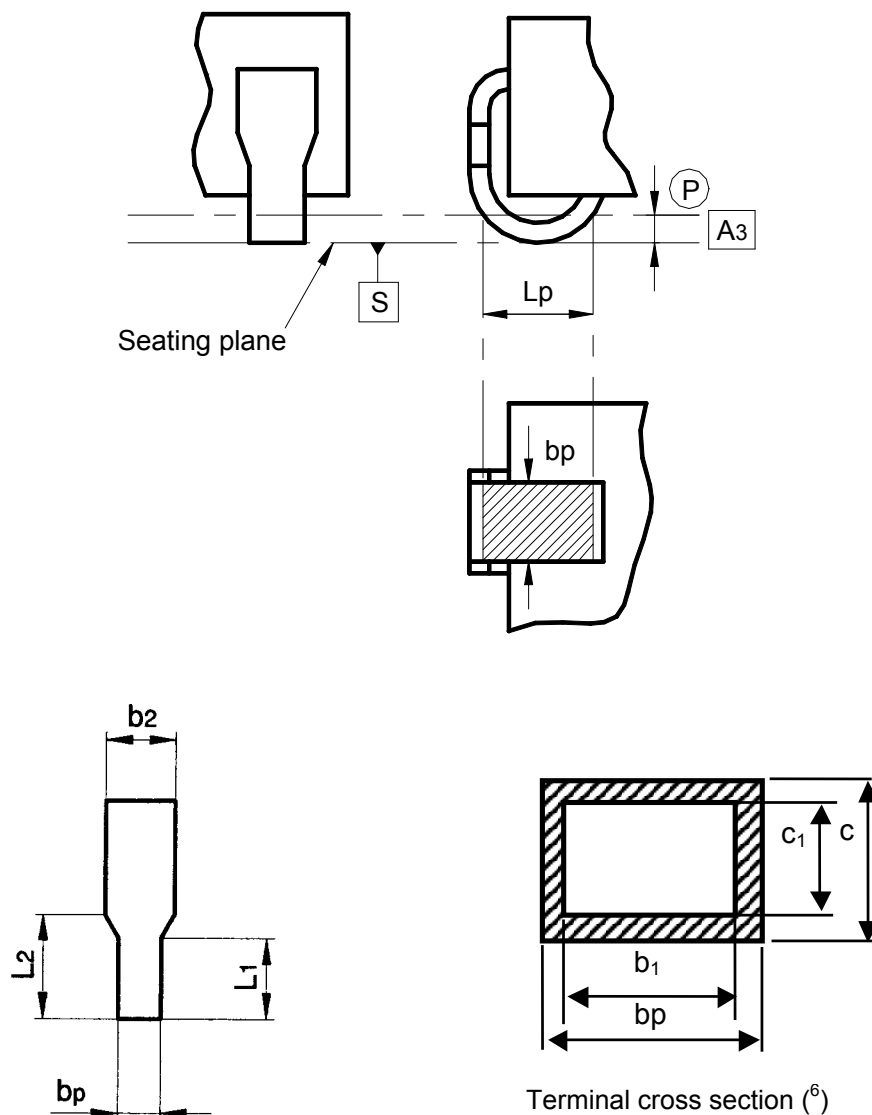


Figure 3 Detail of terminal, terminal cross section



Note: ⁽¹⁾ The seating plane, with which a package is in contact.

⁽²⁾ The base plane, which is in parallel with the seating plane and links the lowest point, except the stand-off.

⁽³⁾ The maximum material requirements apply to the positional tolerance of the terminals. (Refer to **ISO 2692/ JIS B 0023.**)

⁽⁴⁾ Specifies the true geometric position of the terminal axis.

⁽⁵⁾ Shows the allowable position of the Index mark area, which is basically 1/16 with package body size, however in case of small package body size, it is less than 1/4 with package body size, It must be included in the shaded area entirely.

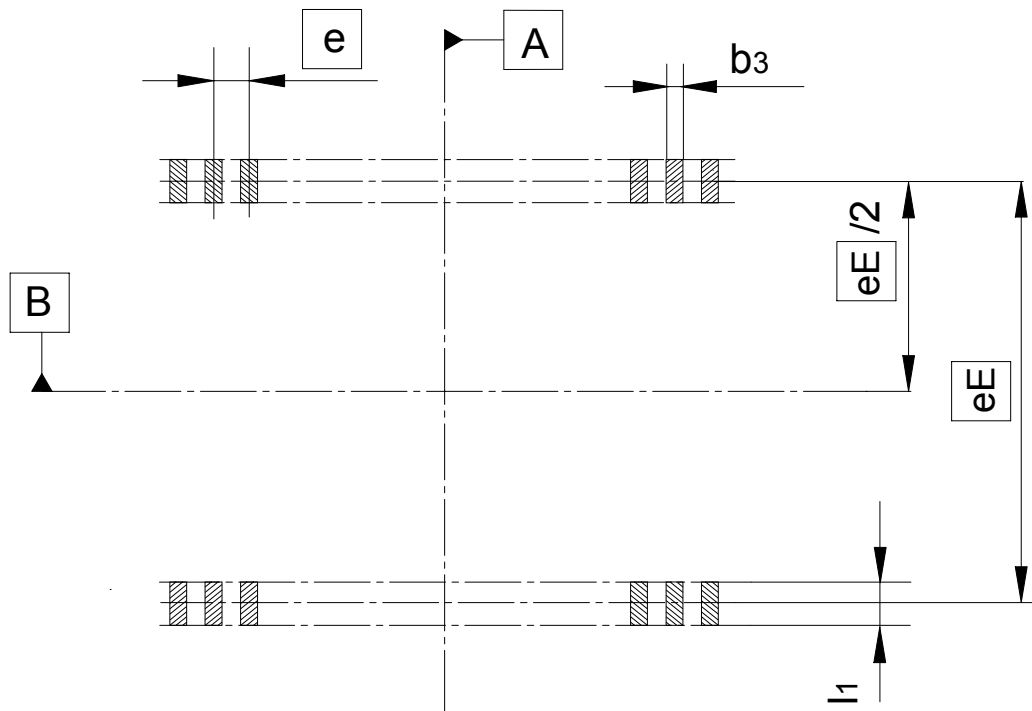
⁽⁶⁾ Resin burrs and gate remains of the package sides with no terminals are max.0.15mm per side.

⁽⁷⁾ Resin burrs of the terminal sides are max.0.25mm per side.

EIAJ EDR-7330

REMARKS PATTERN OF TERMINAL AREAS: Pattern of terminal areas can exist is shown **Figure 4** as reference for the print circuit board design.

Figure 4



$$l1_{max} = L_{pmax} + t/2$$

$$b3_{max} = bp_{max} + X$$

8. OUTER DIMENSION

Table 1 below shows the standard dimensions. Combinations of the standard dimensions shown below allow a number of package variations. If a package is newly designed, their dimensions shall be selected in the **8.3 Number of terminal list**, and **10. Standard package List**.

8.1 GROUP 1

Table 1

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks																																																											
Nominal dimensions	E x D	<p>Package width(\square) x Package length(\square) is applied to Nominal Dimensions.</p> <p>However as the exception, old nominal dimensions is possible to use places (side by side) and it writes which Package width (Symbol : E).</p> <p>Old nominal dimensions</p> <table><tr><td>E</td></tr><tr><td>0300</td></tr><tr><td>0350</td></tr><tr><td>0400</td></tr></table>	E	0300	0350	0400		Numerical value of Old nominal dimensions are from mil systems.																																																							
E																																																															
0300																																																															
0350																																																															
0400																																																															
Package width	\square	<table><tr><td>Old nominal dimensions</td><td>\square</td></tr><tr><td>0300</td><td>7.62</td></tr><tr><td>0350</td><td>8.89</td></tr><tr><td>0400</td><td>10.16</td></tr></table> <p>It makes the same rule with SSOP (Group2) and TSOP(2).</p>	Old nominal dimensions	\square	0300	7.62	0350	8.89	0400	10.16	It is recommend that the upper and lower cavities are equal size. If they are different, the larger dimension shall be regarded as Package width (\square).	(1) Mismatch of the upper and lower mold and gate remains and resin burrs are not included. (2) It makes max 0.15 mm, a side about resin burrs, the gate remain. Resin burrs on the side of the terminal make max 0.25 mm of sides. It refers to REFERENCE CHARACTERS AND DRAWING note ⁽⁶⁾ , ⁽⁷⁾ .																																																			
Old nominal dimensions	\square																																																														
0300	7.62																																																														
0350	8.89																																																														
0400	10.16																																																														
Overall width	H _E	<table><tr><th colspan="2" rowspan="2"></th><th colspan="3">NARROW</th><th colspan="3">WIDE</th></tr><tr><th>min</th><th>nom</th><th>max</th><th>min</th><th>nom</th><th>max</th></tr><tr><td rowspan="2">0300</td><td>H_E</td><td>8.39</td><td>8.51</td><td>8.63</td><td>8.51</td><td>8.64</td><td>8.76</td></tr><tr><td>\square</td><td></td><td>6.78</td><td></td><td></td><td>6.86</td><td></td></tr><tr><td rowspan="2">0350</td><td>H_E</td><td>9.65</td><td>9.78</td><td>9.90</td><td>9.66</td><td>9.78</td><td>9.90</td></tr><tr><td>\square</td><td></td><td>8.06</td><td></td><td></td><td>8.13</td><td></td></tr><tr><td rowspan="2">0400</td><td>H_E</td><td>11.05</td><td>11.20</td><td>11.30</td><td>11.15</td><td>11.40</td><td>11.65</td></tr><tr><td>\square</td><td></td><td>9.40</td><td></td><td></td><td>9.90</td><td></td></tr></table>			NARROW			WIDE			min	nom	max	min	nom	max	0300	H _E	8.39	8.51	8.63	8.51	8.64	8.76	\square		6.78			6.86		0350	H _E	9.65	9.78	9.90	9.66	9.78	9.90	\square		8.06			8.13		0400	H _E	11.05	11.20	11.30	11.15	11.40	11.65	\square		9.40			9.90			It prescribed both NARROW and WIDE packages like the JEDEC standard and it made a distinction clear. (Explanation note reference)
		NARROW			WIDE																																																										
		min	nom	max	min	nom	max																																																								
0300	H _E	8.39	8.51	8.63	8.51	8.64	8.76																																																								
	\square		6.78			6.86																																																									
0350	H _E	9.65	9.78	9.90	9.66	9.78	9.90																																																								
	\square		8.06			8.13																																																									
0400	H _E	11.05	11.20	11.30	11.15	11.40	11.65																																																								
	\square		9.40			9.90																																																									

Table1 (continued)

Unit: mm









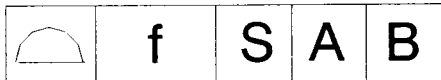
Description	Reference symbol	Standards	Recommended	Remarks																																																																				
Package length		<table><thead><tr><th></th><th colspan="3"></th></tr><tr><th></th><th>1.27</th><th>0.80</th><th>0.65</th></tr></thead><tbody><tr><td>10.79</td><td>16</td><td>26</td><td>32</td></tr><tr><td>12.06</td><td>18</td><td>28</td><td>36</td></tr><tr><td>13.33</td><td>20</td><td>32</td><td>38</td></tr><tr><td>14.60</td><td>22</td><td>36</td><td>42</td></tr><tr><td>15.87</td><td>24</td><td>38</td><td>46</td></tr><tr><td>17.14</td><td>26</td><td>42</td><td>50</td></tr><tr><td>18.41</td><td>28</td><td>44</td><td>54</td></tr><tr><td>19.68</td><td>30</td><td>48</td><td>58</td></tr><tr><td>20.95</td><td>32</td><td>50</td><td>62</td></tr><tr><td>22.22</td><td>34</td><td>54</td><td>66</td></tr><tr><td>23.49</td><td>36</td><td>58</td><td>70</td></tr><tr><td>24.76</td><td>38</td><td>60</td><td>74</td></tr><tr><td>26.03</td><td>40</td><td>64</td><td>78</td></tr><tr><td>27.30</td><td>42</td><td>66</td><td>82</td></tr><tr><td>28.57</td><td>44</td><td>70</td><td>86</td></tr></tbody></table> <p>It makes the same rule with SSOP (Group2) and TSOP(2).</p>						1.27	0.80	0.65	10.79	16	26	32	12.06	18	28	36	13.33	20	32	38	14.60	22	36	42	15.87	24	38	46	17.14	26	42	50	18.41	28	44	54	19.68	30	48	58	20.95	32	50	62	22.22	34	54	66	23.49	36	58	70	24.76	38	60	74	26.03	40	64	78	27.30	42	66	82	28.57	44	70	86	It is recommend that the upper and lower cavities are equal size. If they are different, the larger dimension shall be regarded as Package length ().	(1) Mismatch of the upper and lower mold and gate remains and resin burrs are not included. (2) It makes max 0.15 mm, a side about resin burrs, the gate remain. Resin burrs on the side of the terminal make max 0.25 mm of sides. It refers to REFERENCE CHARACTERS AND DRAWING note ⁽⁶⁾ , ⁽⁷⁾ . (3) Each Package overhang (Z_D) refers to Table 2 Number of terminal list.
																																																																								
	1.27	0.80	0.65																																																																					
10.79	16	26	32																																																																					
12.06	18	28	36																																																																					
13.33	20	32	38																																																																					
14.60	22	36	42																																																																					
15.87	24	38	46																																																																					
17.14	26	42	50																																																																					
18.41	28	44	54																																																																					
19.68	30	48	58																																																																					
20.95	32	50	62																																																																					
22.22	34	54	66																																																																					
23.49	36	58	70																																																																					
24.76	38	60	74																																																																					
26.03	40	64	78																																																																					
27.30	42	66	82																																																																					
28.57	44	70	86																																																																					
Tolerance of package lateral profile	f	(1) The tolerance of package lateral profile shall be specified in the outline drawing.  (2) Reference symbol " f " shall be replaced as below. $D \leq 14.00$, f = 0.10 $D > 14.00$, f = 0.20 (3) It makes the same rule with SSOP (Group2) and TSOP(2).	-	S and A and B is datum.																																																																				

Table1 (continued)

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks																	
Package seated height	A	<table><tr><td></td><td>A_{min}</td><td>A_{max}</td></tr><tr><td rowspan="3">SOJ</td><td>3.25</td><td>3.75</td></tr><tr><td>2.05</td><td>3.25</td></tr><tr><td>1.70</td><td>2.05</td></tr><tr><td>LSOJ</td><td>1.20</td><td>1.70</td></tr></table>		A _{min}	A _{max}	SOJ	3.25	3.75	2.05	3.25	1.70	2.05	LSOJ	1.20	1.70	<table><tr><td>A_{max}</td><td>A_{nom}</td></tr><tr><td>3.75</td><td>3.50</td></tr></table>	A _{max}	A _{nom}	3.75	3.50	Include package warp age.
	A _{min}	A _{max}																			
SOJ	3.25	3.75																			
	2.05	3.25																			
	1.70	2.05																			
LSOJ	1.20	1.70																			
A _{max}	A _{nom}																				
3.75	3.50																				
Stand-off height	A ₁	<table><tr><td>A_{max}</td><td></td><td>A_{1min}</td></tr><tr><td>3.75</td><td>High</td><td>0.80</td></tr><tr><td></td><td>Low</td><td>0.64</td></tr><tr><td>≤ 2.05</td><td></td><td>0.51</td></tr></table>	A _{max}		A _{1min}	3.75	High	0.80		Low	0.64	≤ 2.05		0.51	<table><tr><td>A_{1min}</td><td>A_{1nom}</td></tr><tr><td>0.64</td><td>0.90</td></tr></table>	A _{1min}	A _{1nom}	0.64	0.90	A _{1min} = 0.51mm (A _{max} ≤ 2.05 mm) makes the same rule with QFJ, DIP, SIP.	
A _{max}		A _{1min}																			
3.75	High	0.80																			
	Low	0.64																			
≤ 2.05		0.51																			
A _{1min}	A _{1nom}																				
0.64	0.90																				
Package height	A ₂	Recommendation value is shown.	<table><tr><td>A_{2min}</td><td>A_{2nom}</td><td>A_{2max}</td></tr><tr><td>2.50</td><td>2.70</td><td>2.90</td></tr><tr><td>1.80</td><td>2.00</td><td>2.20</td></tr><tr><td>1.35</td><td>1.40</td><td>1.55</td></tr><tr><td>0.95</td><td>1.00</td><td>1.05</td></tr></table>	A _{2min}	A _{2nom}	A _{2max}	2.50	2.70	2.90	1.80	2.00	2.20	1.35	1.40	1.55	0.95	1.00	1.05	Include package warp age.		
A _{2min}	A _{2nom}	A _{2max}																			
2.50	2.70	2.90																			
1.80	2.00	2.20																			
1.35	1.40	1.55																			
0.95	1.00	1.05																			
Standard height of soldered points	A ₃	A ₃ = 0.50	-	It makes the same rule with QFJ.																	

Table1 (continued)

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks																												
Terminal width	b _p	<table><tr><th>\overline{e}</th><th>b_pmin</th><th>b_pmax</th></tr><tr><td>1.27</td><td>0.39</td><td>0.50</td></tr><tr><td>0.80</td><td>0.24</td><td>0.40</td></tr><tr><td>0.65</td><td>0.22</td><td>0.40</td></tr></table>	\overline{e}	b _p min	b _p max	1.27	0.39	0.50	0.80	0.24	0.40	0.65	0.22	0.40	<div>(1) Solder plating<table><tr><th>\overline{e}</th><th>b_pnom</th></tr><tr><td>1.27</td><td>0.42</td></tr><tr><td>0.80</td><td>0.32</td></tr><tr><td>0.65</td><td>0.32</td></tr></table></div> <div>(2) Palladium plating<table><tr><th>\overline{e}</th><th>b_pnom</th></tr><tr><td>1.27</td><td>0.40</td></tr><tr><td>0.80</td><td>0.30</td></tr><tr><td>0.65</td><td>0.30</td></tr></table></div>	\overline{e}	b _p nom	1.27	0.42	0.80	0.32	0.65	0.32	\overline{e}	b _p nom	1.27	0.40	0.80	0.30	0.65	0.30	(1) b _p , b ₂ , c denote the terminal width and thickness with plating, b ₁ , c ₁ denote the terminal width and thickness before plating (2)The standard value of bp, b ₂ , c. Solder plating, the standard thickness of solder layer shall be, [0.010 +0.010/-0.005]
	\overline{e}	b _p min	b _p max																													
	1.27	0.39	0.50																													
0.80	0.24	0.40																														
0.65	0.22	0.40																														
\overline{e}	b _p nom																															
1.27	0.42																															
0.80	0.32																															
0.65	0.32																															
\overline{e}	b _p nom																															
1.27	0.40																															
0.80	0.30																															
0.65	0.30																															
b ₁	<table><tr><th>\overline{e}</th><th>b₁min</th><th>b₁nom</th><th>b₁max</th></tr><tr><td>1.27</td><td>0.34</td><td>0.40</td><td>0.46</td></tr><tr><td>0.80</td><td>0.24</td><td>0.30</td><td>0.36</td></tr><tr><td>0.65</td><td>0.16</td><td>0.30</td><td>0.28</td></tr></table>	\overline{e}	b ₁ min	b ₁ nom	b ₁ max	1.27	0.34	0.40	0.46	0.80	0.24	0.30	0.36	0.65	0.16	0.30	0.28	-	As palladium plating, it is very thin, so terminal width and thickness is,													
\overline{e}	b ₁ min	b ₁ nom	b ₁ max																													
1.27	0.34	0.40	0.46																													
0.80	0.24	0.30	0.36																													
0.65	0.16	0.30	0.28																													
b ₂	<table><tr><th>\overline{e}</th><th>b₂min</th><th>b₂max</th></tr><tr><td>1.27</td><td>0.66</td><td>0.81</td></tr><tr><td>0.80</td><td>0.30</td><td>0.51</td></tr><tr><td>0.65</td><td>0.22</td><td>0.46</td></tr></table> <p>It doesn't contain the Thai bar cutting remainder.</p>	\overline{e}	b ₂ min	b ₂ max	1.27	0.66	0.81	0.80	0.30	0.51	0.65	0.22	0.46	<div>(1) Solder plating<table><tr><th>\overline{e}</th><th>b₂nom</th></tr><tr><td>1.27</td><td>0.69</td></tr><tr><td>0.80</td><td>0.47</td></tr><tr><td>0.65</td><td>0.35</td></tr></table></div> <div>(2) Palladium plating<table><tr><th>\overline{e}</th><th>b₂nom</th></tr><tr><td>1.27</td><td>0.67</td></tr><tr><td>0.80</td><td>0.45</td></tr><tr><td>0.65</td><td>0.33</td></tr></table></div>	\overline{e}	b ₂ nom	1.27	0.69	0.80	0.47	0.65	0.35	\overline{e}	b ₂ nom	1.27	0.67	0.80	0.45	0.65	0.33	b _p nom=b ₁ nom C nom=C ₁ nom (3) The terminal width (b _p , b ₁ , b ₂), the terminal thickness (c, c ₁) refer to Figure 3 . (4) In case of \overline{e} =0.65,	
\overline{e}	b ₂ min	b ₂ max																														
1.27	0.66	0.81																														
0.80	0.30	0.51																														
0.65	0.22	0.46																														
\overline{e}	b ₂ nom																															
1.27	0.69																															
0.80	0.47																															
0.65	0.35																															
\overline{e}	b ₂ nom																															
1.27	0.67																															
0.80	0.45																															
0.65	0.33																															
Terminal thickness	c	<table><tr><th>c₁nom</th><th>cmin</th><th>cmax</th></tr><tr><td>0.20</td><td>0.15</td><td>0.25</td></tr><tr><td>0.15</td><td>0.12</td><td>0.20</td></tr></table>	c ₁ nom	cmin	cmax	0.20	0.15	0.25	0.15	0.12	0.20	<div>(1) Solder plating<table><tr><th>c₁nom</th><th>cnom</th></tr><tr><td>0.20</td><td>0.22</td></tr><tr><td>0.15</td><td>0.17</td></tr></table></div> <div>(2) Palladium plating<table><tr><th>c₁nom</th><th>cnom</th></tr><tr><td>0.20</td><td>0.20</td></tr><tr><td>0.15</td><td>0.15</td></tr></table></div>	c ₁ nom	cnom	0.20	0.22	0.15	0.17	c ₁ nom	cnom	0.20	0.20	0.15	0.15	b _p nom ≤b ₂ nom							
	c ₁ nom	cmin	cmax																													
0.20	0.15	0.25																														
0.15	0.12	0.20																														
c ₁ nom	cnom																															
0.20	0.22																															
0.15	0.17																															
c ₁ nom	cnom																															
0.20	0.20																															
0.15	0.15																															
c ₁	<table><tr><th>c₁ min</th><th>c₁ nom</th><th>c₁ max</th></tr><tr><td>0.15</td><td>0.20</td><td>0.21</td></tr><tr><td>0.12</td><td>0.15</td><td>0.16</td></tr></table>	c ₁ min	c ₁ nom	c ₁ max	0.15	0.20	0.21	0.12	0.15	0.16	-																					
c ₁ min	c ₁ nom	c ₁ max																														
0.15	0.20	0.21																														
0.12	0.15	0.16																														

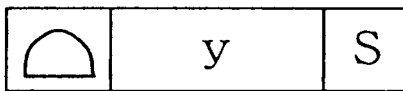
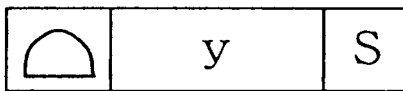
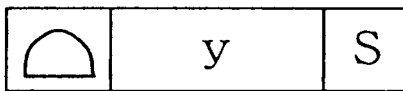
Table1 (continued)

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks														
Length of soldered part	L_p	<table><tr><td>L_p min</td><td>L_p nom</td><td>L_p max</td></tr><tr><td>1.45</td><td>-</td><td>1.75</td></tr></table>	L_p min	L_p nom	L_p max	1.45	-	1.75	—	It sees Length of soldered part (L_p) from the terminal side and it makes it the height of A_3 (See, The Figure 3)								
L_p min	L_p nom	L_p max																
1.45	-	1.75																
Terminal pitch	e	<table><tr><td>e</td></tr><tr><td>1.27</td></tr><tr><td>0.80</td></tr><tr><td>0.65</td></tr></table>	e	1.27	0.80	0.65	—											
e																		
1.27																		
0.80																		
0.65																		
Tolerance of terminal center position	x	<p>(1) Tolerance of terminal center position shall be specified in the outline drawing.</p> <table><tr><td>\oplus</td><td>x</td><td>M</td><td>P</td><td>S</td><td>A</td></tr></table> <p>(2) Reference symbol “x” shall be replaced as below.</p> <table><tr><td>e</td><td>x</td></tr><tr><td>1.27</td><td>0.17</td></tr><tr><td>0.80</td><td>0.13</td></tr><tr><td>0.65</td><td>0.13</td></tr></table>	\oplus	x	M	P	S	A	e	x	1.27	0.17	0.80	0.13	0.65	0.13	—	<p>(1) M means the concept of the maximum material requirements and it shall be applied.</p> <p>(2) P is Means projected tolerance zone, it shows the range of the measurement object which guaranteeing the height of A_3</p>
\oplus	x	M	P	S	A													
e	x																	
1.27	0.17																	
0.80	0.13																	
0.65	0.13																	

Table1 (continued)

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks							
Co planarity	y	<p>(1) The co planarity shall be specified in the outline drawing.</p> <table border="1"><tr><td></td></tr></table> <p>(2) Reference symbol “y” shall be replaced with any of the values shown below.</p> <table border="1"><tr><td>e</td><td>y</td></tr><tr><td>1.27</td><td rowspan="3">0.10</td></tr><tr><td>0.80</td></tr><tr><td>0.65</td></tr></table>		e	y	1.27	0.10	0.80	0.65	-	
											
e	y										
1.27	0.10										
0.80											
0.65											
Number of terminal	n	<p>It refers to Table 2 Number of terminal list. Also, it prescribes the number of the terminal in the following point of view.</p> <p>(1) $e = 1.27$ The number of the terminal which is gotten when making $Z_D = 0.95$</p> <p>(2) $e = 0.80, 0.65$ To the package length which was fixed at (1), The number of the terminal which is gotten when making $Z_D \geq 0.20 + b_{1nom}/2$, But, it makes $Z_D \geq 0.50$.</p> <p>(3) It makes the number of the recommendation terminals in each Terminal pitch(e) about each package length the number of the maximum terminals which meets the formula (2). Also, it made the number of the terminal (n) which can be provided even. (See, Table 2 Number of terminal list and explanation note)</p> <p>(4) It makes the same rule with SSOP (Group2) and TSOP(2).</p>	It refers to Table 4 Standard package List .	<p>However, terminal number n must not overlap in different package length in the same terminal pitch.</p> <p>And it must not overlap in different terminal pitch in the same package length.</p>							

8.2 Group 2

Table1 (continued)

Unit: mm

Description	Reference symbol	Standards	Recommended	Remarks												
Package overhang	Z_D	$Z_D = (\overline{D} - (n/2-1) \times \overline{e}) / 2$	-	The explanation note reference.												
Length of flat part of terminal	L	<table><tr><td>A_{max}</td><td>L_{min}</td><td>L_{nom}</td><td>L_{max}</td></tr><tr><td>3.75</td><td>2.05</td><td>(2.50)</td><td>3.00</td></tr><tr><td>≤ 2.05</td><td>1.00</td><td>-</td><td>-</td></tr></table>	A_{max}	L_{min}	L_{nom}	L_{max}	3.75	2.05	(2.50)	3.00	≤ 2.05	1.00	-	-	-	(1) Terminal length (L) is full length (height) from the seating plane. (2) Terminal length (L_1) is terminal width (b_p), length (height) from the seating plane. (3) Terminal length (L_2) is terminal foundation width(b_2),length h (height) from the seating plane. (4) As for the terminal length, it refers to Figure 3 .
		A_{max}	L_{min}	L_{nom}	L_{max}											
		3.75	2.05	(2.50)	3.00											
	≤ 2.05	1.00	-	-												
	L_1	<table><tr><td>L_{min}</td><td>L_{1min}</td><td>L_{1nom}</td><td>L_{1max}</td></tr><tr><td>2.05</td><td>0.89</td><td>(1.02)</td><td>1.14</td></tr><tr><td>1.00</td><td>0.75</td><td>-</td><td>1.00</td></tr></table>	L_{min}	L_{1min}	L_{1nom}	L_{1max}	2.05	0.89	(1.02)	1.14	1.00	0.75	-	1.00		
		L_{min}	L_{1min}	L_{1nom}	L_{1max}											
		2.05	0.89	(1.02)	1.14											
	1.00	0.75	-	1.00												
	L_2	<table><tr><td>L_{min}</td><td>L_{2min}</td><td>L_{2nom}</td><td>L_{2max}</td></tr><tr><td>2.05</td><td>-</td><td>-</td><td>1.27</td></tr><tr><td>1.00</td><td>-</td><td>-</td><td>1.15</td></tr></table>	L_{min}	L_{2min}	L_{2nom}	L_{2max}	2.05	-	-	1.27	1.00	-	-	1.15		
		L_{min}	L_{2min}	L_{2nom}	L_{2max}											
2.05		-	-	1.27												
1.00	-	-	1.15													
(): Recommendation value																
Terminal inline interval	\overline{eE}	(1) The rule value of Terminal inline interval (\overline{eE}) refers to Overall width (H_E). (2) In case of SOJ, SOP, TSOP(2), $\overline{eE} = \overline{e_1}$ In case of TSOP(1), $\overline{eD} = \overline{e_1}$	-													
Positional tolerance of terminal	t	"t" is defined positional tolerance of terminal at REMARKS PATT AERN OF TERMINAL AREAS. $t \leq 0.20$	-	It follows positional tolerance of terminal tips of TSOP (2). (EIAJ EDR-7313)												

8.3 Number of terminal list

Table 2 Number of terminal list

$\frac{e}{D}$	1.27		0.80		0.65	
	n	Z_D	n	Z_D	n	Z_D
10.79	* 16	0.95	22	1.395	28	1.17
			24	0.995	30	0.845
			* 26	0.595	* 32	0.52
12.06	* 18	0.95	* 28	0.83	34	0.83
					* 36	0.505
13.33	* 20	0.95	30	1.065	* 38	0.815
			* 32	0.665		
14.60	* 22	0.95	34	0.90	40	1.125
			* 36	0.50	* 42	0.8
15.87	* 24	0.95	* 38	0.735	44	1.11
					* 46	0.785
17.14	* 26	0.95	40	0.97	48	1.095
			* 42	0.57	* 50	0.77
18.41	* 28	0.95	* 44	0.805	52	1.08
					* 54	0.755
19.68	* 30	0.95	46	1.04	56	1.065
			* 48	0.64	* 58	0.74
20.95	* 32	0.95	* 50	0.875	60	1.05
					* 62	0.725
22.22	* 34	0.95	52	1.11	64	1.035
			* 54	0.71	* 66	0.71
23.49	* 36	0.95	56	0.945	68	1.02
			* 58	0.545	* 70	0.695
24.76	* 38	0.95	* 60	0.78	72	1.005
					* 74	0.68
26.03	* 40	0.95	62	1.015	76	0.99
			* 64	0.615	* 78	0.665
27.30	* 42	0.95	* 66	0.85	80	0.975
					* 82	0.65
28.57	* 44	0.95	68	1.085	84	0.96
			* 70	0.685	* 86	0.635

Note: ⁽¹⁾ $\frac{e}{D} = 1.27$: The number of the terminal which is gotten when making $Z_D = 0.95$.

⁽²⁾ $\frac{e}{D} = 0.80, 0.65$: To the package length which was fixed at (1), The number of the terminal which is gotten when making $Z_D \geq 0.20 + b_{1nom}/2$, But, it makes $Z_D \geq 0.50$.

⁽³⁾ The recommended number of terminals in a package length is the maximum number in the package length ($\frac{e}{D}$). (See "*" in **Table 2**)

EIAJ EDR-7330

9. Standard Registration

When you need to register a new outline specification on the standard, complete the appendix format 5 in Technical Standardization Committee on Semiconductor Device Package steering rule, in compliance with the Standardization Rule. In order to make a package dimension table, which come under Item 2, Appendix format 5, fill the dimensions marked with (L) in the following Table.

Incidentally, it supposes that it enters package code form type according to **EIAJ ED-7303B** (Name and Code for Integrated Circuits Package).

Table 3

Serial Number				
External Type		P-S0J00-0000 × 0000-0.00 (P-S0J00-0000-0.00)		
Reference Symbol		min	nom	max
Group1	D		L	
	E		L	
	A			L
	A ₁	L	L	L
	A ₂	L	L	L
	A ₃		L	
	b _p	L		L
	b ₁	L	L	L
	b ₂	L	L	L
	c	L		L
	c ₁	L	L	L
	H E	L	L	L
	L _p	L	L	L
	e		L(*)	
	x			L
	y			L
	f			L
	n		L	
Group2	Z _D		L	
	L		L	
	L ₁		L	
	L ₂		L	
	eE		L	

(*) Means true geometrical position

10. Standard package List

To further clarify the combinations of part dimensions, the combinations of recommended package classifications shall be indicated as shown below as assistance in the design and development of new package in the future.

Table 4 Standard package List

E	7.62			8.89			10.16		
	0300			0350			0400		
e	1.27	0.80	0.65	1.27	0.80	0.65	1.27	0.80	0.65
n	24			26			28	44	62
	26						32	50	66
	28						36	54	
	32						40	70	
							42	80	
							44		

Table 5 Registration of standard package List

	E	7.62		8.89	
	E	0300		0350	
	e	1.27		1.27	
	eE	NARROW	WIDE	NARROW	WIDE
A max	3.75	24-001-AA		26-001-BA	
	2.05	26-001-AA			
		28-001-AA			
	1.70	32-001-AA			

	E	10.16					
	E	0400					
	e	1.27		0.80		0.65	
	eE	NARROW	WIDE	NARROW	WIDE	NARROW	WIDE
A max	3.75	28-001-CA		44-001-CB		62-001-CC	
		32-001-CA		50-001-CB		66-001-CC	
	2.05	36-001-CA		54-001-CB			
	1.70	40-001-CA		70-001-CB			
		42-001-CA					
		44-001-CA					







Note. The Numbers in the table indicate, (Terminal number n) - 001 - (serial number)

EIAJ EDR-7330

10. Registration table of standard package

Package name:P-SOJ







old nominal dimensions(E): 0762(0300)

Serial Number		24-001-AA			26-001-AA		
External Type (Old nominal dimensions)		P-SOJ24-07.62×15.87-1.27 (P-SOJ24-0300-1.27)			P-SOJ26-07.62×17.14-1.27 (P-SOJ26-0300-1.27)		
Symbol		min	nom	max	min	nom	max
Group1		-	7.62	-	-	7.62	-
		-	15.87	-	-	17.14	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
		-	0.50	-	-	0.50	-
		-	1.27	-	-	1.27	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	8.39	8.51	8.63	8.39	8.51	8.63
	H _{E wide}	8.51	8.64	8.76	8.51	8.64	8.76
	f	-	-	0.20	-	-	0.20
	n	-	24	-	-	26	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	6.78	-	-	6.78	-
		-	6.86	-	-	6.86	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		MO-077D (1994.11) MS-023A (1995.05) MO-065A (1987.05)					

EIAJ EDR-7330

Package name:P-SOJ

old nominal dimensions(E): 0762(0300)

Serial Number		28-001-AA			32-001-AA		
External Type (Old nominal dimensions)		P-SOJ28-07.62×18.41-1.27 (P-SOJ28-0300-1.27)			P-SOJ32-07.62×20.95-1.27 (P-SOJ32-0300-1.27)		
Symbol		min	nom	max	min	nom	max
Group1		-	7.62	-	-	7.62	-
		-	18.41	-	-	20.95	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
		-	0.50	-	-	0.50	-
		-	1.27	-	-	1.27	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	8.39	8.51	8.63	8.39	8.51	8.63
	H _{E wide}	8.51	8.64	8.76	8.51	8.64	8.76
	f	-	-	0.20	-	-	0.20
	n	-	28	-	-	32	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	6.78	-	-	6.78	-
		-	6.86	-	-	6.86	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		MO-077D (1994.11) NARROW MS-023A (1995.05) NARROW MO-065A (1987.05) WIDE					

Package name:P-SOJ, P-LSOJ







old nominal dimensions(E): 0889(0350)

Serial Number		26-001-BA					
External Type (Old nominal dimensions)		P-SOJ26-08.89×18.41-1.27 (P-SOJ26-0350-1.27)			P-LSOJ26-08.89×18.41-1.27 (P-LSOJ26-0350-1.27)		
Symbol		min	nom	max	min	nom	max
Group1	E	-	8.89	-	-	8.89	-
	D	-	17.14	-	-	17.14	-
	A	-	-	3.75	-	-	1.70
	A ₁	0.64	0.90	-	0.51	-	-
	A ₂	2.50	2.70	2.90	0.95	1.00	1.05
	A ₃	-	0.50	-	-	0.50	-
	e	-	1.27	-	-	1.27	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.12	(0.17)	0.20
	c ₁	0.15	0.20	0.21	0.12	0.15	0.16
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	9.65	9.78	9.90	9.65	9.78	9.90
	H _{E wide}						
	f	-	-	0.20	-	-	0.20
	n	-	26	-	-	26	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	1.00	-	-
	L ₁	0.89	(1.02)	1.14	0.75	-	1.00
	L ₂	-	-	1.27	-	-	1.15
	eE _{narrow}	-	8.06	-	-	8.06	-
	eE _{wide}	-	8.13	-	-	8.13	-
Thin type	A	-	-	2.05			
	A ₁	0.51	-	-			
	A ₂	0.95	1.00	1.05			
	c	0.12	(0.17)	0.20			
	c ₁	0.12	0.15	0.16			
	L	1.00	-	-			
	L ₁	0.75	-	1.00			
	L ₂	-	-	1.15			
Remark		MO-063A (1987.04) NARROW MO-091A (1989.02) WIDE					

EIAJ EDR-7330





Package name:P-SOJ

old nominal dimensions(E): 1016(0400)

Serial Number		28-001-CA			32-001-CA		
External Type (Old nominal dimensions)		P-SOJ28-10.16×17.14-1.27 (P-SOJ28-0400-1.27)			P-SOJ32-10.16×20.95-1.27 (P-SOJ32-0400-1.27)		
Symbol		min	nom	max	min	nom	max
Group1		-	10.16	-	-	10.16	-
		-	17.14	-	-	20.95	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
		-	0.50	-	-	0.50	-
		-	1.27	-	-	1.27	-
	Lp	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	28	-	-	32	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	9.40	-	-	9.40	-
		-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

Package name:P-SOJ

old nominal dimensions(E): 1016(0400)

Serial Number		36-001-CA			40-001-CA		
External Type (Old nominal dimensions)		P-SOJ36-10.16×23.49-1.27 (P-SOJ36-0400-1.27)			P-SOJ40-10.16×26.03-1.27 (P-SOJ40-0400-1.27)		
Symbol		min	nom	max	min	nom	max
Group1		-	10.16	-	-	10.16	-
		-	23.49	-	-	26.03	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
	A ₃	-	0.50	-	-	0.50	-
	e	-	1.27	-	-	1.27	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	36	-	-	40	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	9.40	-	-	9.40	-
		-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

EIAJ EDR-7330







Package name:P-SOJ

old nominal dimensions(E): 1016(0400)

Serial Number		42-001-CA			44-001-CA		
External Type (Old nominal dimensions)		P-SOJ42-10.16×27.30-1.27 (P-SOJ42-0400-1.27)			P-SOJ44-10.16×28.57-1.27 (P-SOJ44-0400-1.27)		
Symbol		min	nom	max	min	nom	max
Group1	E	-	10.16	-	-	10.16	-
	D	-	27.30	-	-	28.57	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
	A ₃	-	0.50	-	-	0.50	-
	e	-	1.27	-	-	1.27	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.39	(0.42)	0.50	0.39	(0.42)	0.50
	b ₁	0.38	0.40	0.46	0.38	0.40	0.46
	b ₂	0.66	0.69	0.81	0.66	0.69	0.81
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.17	-	-	0.17
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	42	-	-	44	-
Group2	Z _D	-	0.95	-	-	0.95	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
	eE _{narrow}	-	9.40	-	-	9.40	-
	eE _{wide}	-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

Package name:P-SOJ





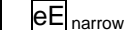

old nominal dimensions(E): 1016(0400)

Serial Number		44-001-CB			50-001-CB		
External Type (Old nominal dimensions)		P-SOJ44-10.16×18.40-0.80 (P-SOJ44-0400-0.80)			P-SOJ50-10.16×20.95-0.80 (P-SOJ50-0400-0.80)		
Symbol		min	nom	max	min	nom	max
Group1		-	10.16	-	-	10.16	-
		-	18.40	-	-	20.95	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
		-	0.50	-	-	0.50	-
		-	0.80	-	-	0.80	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.24	(0.32)	0.40	0.24	(0.32)	0.40
	b ₁	0.24	0.30	0.36	0.24	0.30	0.36
	b ₂	0.30	0.47	0.51	0.30	0.47	0.51
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.13	-	-	0.13
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	44	-	-	50	-
Group2	Z _D	-	0.80	-	-	0.875	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	9.40	-	-	9.40	-
		-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.12	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

EIAJ EDR-7330

Package name:P-SOJ

old nominal dimensions(E): 1016(0400)

Serial Number		54-001-CB			70-001-CB		
External Type (Old nominal dimensions)		P-SOJ54-10.16×22.22-0.80 (P-SOJ54-0400-0.80)			P-SOJ70-10.16×28.57-0.80 (P-SOJ70-0400-0.80)		
Symbol		min	nom	max	min	nom	max
Group1		-	10.16	-	-	10.16	-
		-	22.22	-	-	28.57	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
		-	0.50	-	-	0.50	-
		-	0.80	-	-	0.80	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.24	(0.32)	0.40	0.24	(0.32)	0.40
	b ₁	0.24	0.30	0.36	0.24	0.30	0.36
	b ₂	0.30	0.47	0.51	0.30	0.47	0.51
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.13	-	-	0.13
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	62	-	-	66	-
Group2	Z _D	-	0.71	-	-	0.685	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
		-	9.40	-	-	9.40	-
		-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.14	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

Package name:P-SOJ

old nominal dimensions(E): 1016(0400)

Serial Number		62-001-CC			66-001-CC		
External Type (Old nominal dimensions)		P-SOJ62-10.16×20.95-0.65 (P-SOJ62-0400-0.65)			P-SOJ66-10.16×28.57-0.65 (P-SOJ66-0400-0.65)		
Symbol		min	nom	max	min	nom	max
Group1	E	-	10.16	-	-	10.16	-
	D	-	20.95	-	-	22.22	-
	A	-	-	3.75	-	-	3.75
	A ₁	0.64	0.90	-	0.64	0.90	-
	A ₂	2.50	2.70	2.90	2.50	2.70	2.90
	A ₃	-	0.50	-	-	0.50	-
	e	-	0.65	-	-	0.65	-
	L _p	1.45	-	1.75	1.45	-	1.75
	b _p	0.24	(0.32)	0.40	0.24	(0.32)	0.40
	b ₁	0.22	0.30	0.36	0.22	0.30	0.36
	b ₂	0.22	0.35	0.46	0.22	0.35	0.46
	c	0.15	(0.22)	0.25	0.15	(0.22)	0.25
	c ₁	0.15	0.20	0.21	0.15	0.20	0.21
	x	-	-	0.13	-	-	0.13
	y	-	-	0.10	-	-	0.10
	H _{E narrow}	11.05	11.20	11.30	11.05	11.20	11.30
	H _{E wide}	11.15	11.40	11.65	11.15	11.40	11.65
	f	-	-	0.20	-	-	0.20
	n	-	62	-	-	66	-
Group2	Z _D	-	0.725	-	-	0.71	-
	L	2.05	(2.50)	3.00	2.05	(2.50)	3.00
	L ₁	0.89	(1.02)	1.14	0.89	(1.02)	1.14
	L ₂	-	-	1.27	-	-	1.27
	eE _{narrow}	-	9.40	-	-	9.40	-
	eE _{wide}	-	9.90	-	-	9.90	-
Thin type	A	-	-	2.05	-	-	2.05
	A ₁	0.51	-	-	0.51	-	-
	A ₂	0.95	1.00	1.05	0.95	1.00	1.05
	c	0.12	(0.17)	0.20	0.12	(0.17)	0.20
	c ₁	0.12	0.15	0.16	0.14	0.15	0.16
	L	1.00	-	-	1.00	-	-
	L ₁	0.75	-	1.00	0.75	-	1.00
	L ₂	-	-	1.15	-	-	1.15
Remark		IEC60191-2 (2002) / MO-165A (1996.09) NARROW MO-199B (1999.01) / MO-200B (1999.06) WIDE					

EXPLANATORY NOTES

1. Objective of establishment

This technical report accounts for the industrial standard of Plastic Small Outline J-Lead Package (herein after referred to as P- SOJ). It was established to provide the design guideline of P- SOJ when it is made in to product or when Automatic mounting machinery and associated parts are developed.

2. History of review

J -lead type plastic package was originally developed in the United States of America as Plastic Lead Chip Carrier (herein after referred to as PLCC) and have been standardized and used in conformity with the Joint Electron Device Engineering Council (herein after referred to as JEDEC). In JAPAN, they were deliberated as the Quad Flat J-lead (herein after referred to as QFJ) of Technical Committee on Semiconductor Package Outlines (currently, Technical Standardization Committee on Semiconductor Device Package) and were established in June 1988 as **EIAJ ED-7407** (General rules for the preparation of outline drawings of integrated circuits, Quad Flat J-lead package). After that, it is revised in December 1998 as **EIAJ EDR-7319** (Design guideline of integrated circuits for Quad Flat J-lead package) by the reconsideration in 10 years.

EIAJ ED-7406 (General rules for the preparation of outline drawings of integrated circuits, Small Outline J-lead package), which is the predecessor of this technical report, Contains the general rules for SOJ developed as a new type of package from the aforementioned QFJ, and was established May 1988. As for each size, after a consistence with the JEDEC standard was considered, and it was decided.

After that, it was suggested at Semiconductor Package Special Committee (currently, Technical Standardization Committee on Semiconductor Device Package) held in August 1992 to review the standard to cope with the need for SOJ fine pitch packages as in the case of TSOP(2) (Amendment 1 to **IEC60191-6, EIAJ EDR-7313**), and it was decided that further deliberations be concrete from by the Plastic Package Sub commission (currently, Integrated Circuits Package Subcommittee) and Fine pitch WG (it establishes from April, 1993 to March, 1995), and It was revised in May, 1995 as **EIAJ ED-7406A** (General rules for the preparation of outline drawings of integrated circuits, Small Outline J-lead package) which is the predecessor of this technical report. In case of reconsideration working, It exchanged an opinion (JWG2 Kobe conference in 1993 and JWG2 San Francisco Conference in 1994) for JC-11, which takes charge of the standardization of the integrated circuit package outline in JEDEC, And the consistence of both was more attempted. A consistence with the package width (\square) that SOJ package was prescribed in TSOP(2) (Amendment 1 to **IEC60191-6, EIAJ EDR-7313**) was examined. Package width \square = 7.62mm (300mil), 8.89mm (350mil), 10.15mm (400mil) of the soft metric (It converts) an inch to the millimeter) series was prescribed. However, The rule of the large-sized package with the equal to or more than 11.50 mm (450mil) package width which was made a hard metric series was sent at the future.

EIAJ EDR-7330

Later, As the match to the international standardization, It became necessary to conform in IEC global drawing format (Revision of **IEC 60191-6** Global drawing format (establishment schedule in 2002)) that establishment is carried forward in SC47D/WG2 which takes charge of the standardization of the semiconductor package outline in International Electro technical Commission (herein after referred to as IEC) and to revise. In case of reconsideration working, adoption of the datum notation and consistence with the JEDEC standard since then in 1995 is deliberation. Also, as the consideration when implementing standardization proposal in IEC, SC47D/WG1, according to the IEC format and we placed in the design guideline as the classification. The others, Insertion in this technical report was examined about CSOP (It bent lead into the C shape and thin type package of $e=0.40\text{mm}$) which was proposed to the second half of the 1990s from FUJITSU LTD. too, but it was judged not to apply to the standard range of the SOJ package. This technical report **EIAJ EDR-7330** (Design guideline of integrated circuits for Plastic Small Outline J-lead package) was revised in June, 2002.

3. BASIC IDEA

(1) Dimensions display

Dimension that becomes basics on the package size decision is “ inch “ because it was based on the JEDEC standard. But, The display dimension in this technology report was based on the ISO standard and made “mm “ display. In the way of converting from “ inch “ to the “mm “, it quoted IEC Publication 191-3 and it made the number of the effective digits 2 digits of the following of the decimal point.

Minimum values (min): The third decimal places to be reckoned as an unit.

Recommended values (nom): The third decimal places to be rounded off.

Maximum values (max): The third decimal places to be omitted.

Furthermore, in specifying each dimensional value, the concept set by the design centers was clearly shown by means of using the designed standard values (recommended nominal value) as guideline for standardization.

(2) Datum

Based on IEC global drawing format (Revision of **IEC 60191-6** Global drawing format (establishment schedule in 2002)), this technical report adopts a datum. In case of adoption of the datum, it made IEC standard, the JEDEC standard, the registration package of the various package references. As for the datum to the direction of the package length, it set a lead center at the center of the package as the datum target like the SOP type.

(3) The plating to the terminal

It prescribed terminal width and terminal thickness ,which solder plating and extremely thin plating (palladium).

EIAJ EDR-7330

(4) Outline drawing and Range where pattern of terminal position areas exist

It added Means projected tolerance zone (P) to Positional tolerance of terminal center (x) with the terminal width (b_p) of the package outline like P-QFP design guideline (**EIAJ EDR-7311A** Design guideline of integrated circuits for Plastic Quad Flat Package (P-QFP)) and P-SSOP design guideline (**EIAJ EDR-7314A** Design guideline of integrated circuits for Plastic Shrink Small Outline Package (P-SSOP)). And, in the same way TSOP(2) and SSOP, terminal inline interval symbol changed into e_E from e_I in Range where pattern of terminal position areas exist because the terminal existed in the direction of the package width(E). (TSOP(1) that the terminal exists in the direction of the package length(D) becomes e_D).

(5) Standard package List

To further clarifies the combinations of part dimensions, the combinations of recommended package classifications shall be indicated as shown Standard package List as assistance in the design and development of new package in the future.

4. BACKGROUND FOR DIMENSIONAL PROVISIONS

(1) Nominal dimension

Package width x Package length(Symbol : $E \times D$) is applied to Nominal Dimensions. However as the exception, old nominal dimensions is possible to use places (side by side) and it writes which Package width (Symbol: E).

(2) Overall width (H_E)

At IEC global drawing format (Revision of **IEC 60191-6** Global drawing format (establishment schedule in 2002)), Overall width (H_E) is written at true geometrical position (H_E), however it result which was deliberated by confirming JEDEC standard and **IEC60191-2** (P-SOJ, $E = 400\text{mil}(10.15\text{mm})$, $e = 0.80\text{mm}$, establishment schedule in 2002), Overall width (H_E) was the place to be bending lead actually, and to prescribe a correct size made difficult and it decided not to write at true geometrical position (box mark :).

(3) Overall width (H_E) , Terminal interval pitch (e_E)

At old **EIAJ ED-7406**, it investigated minimum value(min) and maximum value(max) of each of NARROW and WIDE of the JEDEC standard and it adopted the package lineup which includes them. Therefore, the distinction of both package lineup of NARROW, WIDE wasn't clear. It prescribes both package lineup of NARROW, WIDE from old **EIAJ ED-7406** like the JEDEC standard. Moreover, it made a feature as the standardization index clear by adding recommendation value (nom). However, the questionnaire result was based and it decided to recommend all NARROW package lineup. But, it decided to recommend the WIDE package of 400mil because standard in JEDEC. Also, the WIDE package of 350mil, the NARROW package of 400mil calculated the other package as the reference (Overall width $H_E \text{ nom} = 11.05\text{mm}$, Terminal interval pitch $e_E = 9.33\text{mm}$).

In this technical report **EIAJ EDR-7330**, in reference of the JEDEC standard since then in 1995, It changes the WIDE package of 400mil of old **EIAJ ED-7406** into the NARROW package and it set the WIDE package of 400mil newly.

Comparison of Overall width (H_E) and Terminal interval pitch (e_E) which IEC, JEDEC, JEITA standard is shown **Explanation table 1**.

EIAJ EDR-7330

Explanation table 1 Comparison of Overall width (H_E) and Terminal interval pitch (e_E) which IEC, JEDEC, JEITA standard

	E	0300						0350						0400					
		NARROW			WIDE			NARROW			WIDE			NARROW			WIDE		
		min	nom	max	min	nom	max	min	nom	max	min	nom	max	min	nom	max	min	nom	max
	規格 No.	MO-077D (1994.11) MS-023A (1995.05)			MO-065A (1987.05)			MO-063A (1987.04)			MO-091A (1989.02)			IEC60191-2 (2002) MO-165A (1996.09)			MO-200B (1999.06)		
JEDEC	H _E		8.51		8.51		8.76	9.65		9.90	9.65		9.90	11.05	11.20	11.30	11.15	11.40	11.65
	e _E		6.78		6.60		7.11	7.87		8.26	7.87		8.38		9.40			9.90	
JEITA	H _E	8.39	8.51	8.63	8.51	8.64	8.76	9.65	9.78	9.90	9.66	9.78	9.90	11.05	11.20	11.30	11.15	11.40	11.65
	e _E		6.78			6.86			8.06			8.13			9.40			9.90	

(4) Package width(E)

P-SOJ prescribed 3 kinds of the package width $E = 7.62\text{mm}$ (300mil), 8.89mm (350mil), 10.15mm (400mil) of the soft metric (It converts an inch to the millimeter) series. TSOP(2) and P-SSOP (Group3) prescribe a change newly by the doing to the hard metric series in the package width (E) which crosses 10.15mm (400mil) of the soft metric series. It judges provide that there are not much development and production in the future, about above package width $E = 11.50\text{mm}$ (450mil) which is the range of the large-sized package in P-SOJ, and it doesn't prescribe. Also, a resin burr among the terminals doesn't participate in the package size directly. However, it adopted side max 0.25mm from the point of the specification unification with JEDEC. Being reference, As the design index of the large-sized package, The rule value of TSOP(2) (Amendment 1 to IEC60191-6, EIAJ EDR-7313) and P-SSOP (EIAJ EDR-7314A) is shown in Explanation table 2.

Explanation table 2 Comparison of package width(E) which P-SOJ , TSOP(2), P-SSOP

P-SOJ EDR-7330 2002.June	P-TSOP(2) EDR-7313 (IEC60191-6) 1996.April (2000)	P-SSOP EDR-7314A 2002.March
E Soft metric	E Soft metric Hard metric	E Group1 Group2 Group3
		2.00
		3.00
		4.40
		5.60
		6.10
7.62	7.62	(8.00) 7.62
8.89	8.89	(9.90) 8.89
10.16	10.16	10.16
	11.50	
	13.00	
	14.50	
	16.00	
		11.50
		13.00
		14.50
		16.00

EIAJ EDR-7330

(5) Package length(D)

At old **EIAJ ED-7406**, it is same as the P-DIP design guide (**EIAJ EDR-7322** Design guideline of integrated circuits for Plastic Dual Inline Package, establishment in April 1999), The package length was prescribed at resin burr and gate remain which contains(D), and it doesn't contains(D_1). In this technical report **EIAJ EDR-7330**, In the same way like TSOP(2) (Amendment 1 to **IEC60191-6**, **EIAJ EDR-7313**) and P-SSOP (**EIAJ EDR-7314A**), it adopted an identical rule value as package length(D) which resin burr and gate remain doesn't contain. Based on terminal pitch $e = 1.27\text{mm}$ with rule value with package length(D), It makes package overhang $Z_D = (Z_{D_{\max}} + Z_{D_{\min}})/2 = 0.9525 = 0.95\text{mm}$ (nominal value change) and it calculates package length. Also, resin burr and gate remain in the end surface part and so on participate in the outline size directly, and it prescribed side max 0.15 mm (the same specification of JEDEC). In the same way the package width(E), it judges provide that there are not much development and production in the future which is the range of the large-sized package in P-SOJ, about package length(D) which corresponded to above package width $E = 11.50\text{mm}$ (450mil), and it doesn't prescribe.

(6) Package Seated height (A), The package name

At old **EIAJ ED-7406**, $A_{\min} = 3.26\text{mm}$, $A_{\text{nom}} = 3.50\text{mm}$, $A_{\max} = 3.75\text{mm}$ were prescribed, only. In this technical report **EIAJ EDR-7330**, With the rule in the lower range needing, it prescribed 4 kinds ($A_{\max} = 3.75\text{mm}$ ($A_{\min} = 3.25\text{mm}$), $A_{\max} = 3.25\text{mm}$, $A_{\max} = 2.05\text{mm}$, $A_{\max} = 1.70\text{mm}$) to the reference in the IEC standard **IEC60191-2** (P-SOJ, $e = 0.80\text{mm}$, The related standard, JEDEC **MO-165A**) and the JEDEC standard **MO-199B**. Also, it added the package name which is a thin type with low seated height according to the package height code, LSOJ (Low profile SOJ, $A_{\max} = 1.70\text{mm}$, $A_{\min} > 1.20\text{mm}$) which was prescribed in IEC standard Amendment 1 to **IEC 60191-4**, Ed.2 (establishment in 2001) And **EIAJ ED-7303B** (Name and Code for Integrated Circuits Package). The standardization of TSOJ (Thin SOJ, $A_{\max} = 1.20\text{mm}$, $A_{\min} > 1.00\text{mm}$) with the lower seated height, too, was deliberated but was let. However, it is in that the LOC(Lead On Chip) structure generalizes, that is the inner structure of the package which can be made thin. The standard, which stacks a package like the JEDEC standard **MO-200B** (establishment in June, 1999), too, appears. In the future, the thin package with low-seated height tends to increase. Package seated height list is shown in **Explanation table 3**.

Explanation table 3

	A_{\min}	A_{nom}	A_{\max}
SOJ	3.25	3.50	3.75
	2.05		3.25
	1.70		2.05
LSOJ	1.20		1.70

Explanation table 4

$A_{2\min}$	$A_{2\text{nom}}$	$A_{2\max}$
2.50	2.70	2.90
1.80	2.00	2.20
1.35	1.40	1.55
0.95	1.00	1.05

EIAJ EDR-7330

(7) Standoff height (A_1)

At old **EIAJ ED-7406**, At first, $A_{1min} = 0.80\text{mm}$, $A_{1nom} = 1.00\text{mm}$ were examined, However, the result of the investigation $A_{1min} = 0.64\text{mm}$ was prescribed and $A_{1nom} = 0.90\text{mm}$ was prescribed as the recommendation value. In this technical report **EIAJ EDR-7330**, It provided with $A_{1min} = 0.64\text{mm}$ and $A_{1min} = 0.51\text{mm}$, that stores up to correspond to the thin package to the reference in the JEDEC standard, **MO-199B**, **MO-200B** (establishment in 1999). Also, It prescribed $A_{1nom} = 0.90\text{mm}$ as the recommendation value with package seated height $A_{max} = 3.75\text{mm}$.

(8) Package height (A_2)

At old **EIAJ ED-7406**, Only $A_{nom} = 2.60\text{mm}$ were prescribed as the recommendation value. In this technical report **EIAJ EDR-7330**, It corresponds to the thin package seated height and the rule in the lower range is necessary. And in reference of P-QFP (**EIAJ EDR-7311A**) and P-SSOP (**EIAJ EDR-7314A**), It prescribed 4 kinds of $A_{nom} = 2.70, 2.00, 1.40, 1.00\text{mm}$ as the recommendation value. Package height list is shown in **Explanation table 4**.

(9) Height of soldered points (A_3)

Receiving that to write Length of the soldered part by symbol "Lp" and to provide were fixed in IEC, It is adoption from old **EIAJ ED-7406**, Corresponding to Length of the soldered part (Lp), It prescribed Height of soldered point (A_3), which is the shape height of fillet where a terminal was soldered. At first, $A_3 = 0.65\text{mm}$ were proposed based on the measurement value with soldering height, But considering relation with the standoff rule, It provided to $A_3 = 0.50\text{mm}$ as a result of the deliberation.

(10) Terminal pitch (e)

At old **EIAJ ED-7406**, 2 kinds that Terminal pitch $e = 1.27, 0.80\text{mm}$ were prescribed. In this technical report **EIAJ EDR-7330**, In reference of the JEDEC standard since then in 1995, That the developing of doing Terminal pitch (e) fine becoming of the pace is moving ahead confirms. And it prescribed 3 kinds that $e = 1.27, 0.80, 0.65\text{mm}$ in the actuality target. $e = 1.00, 0.50\text{mm}$ standardization, too, was examined, but to be hardly developed and to be produced were confirmed and decided not to provide.

(11) Terminal width, Terminal thickness (b_p, b_1, b_2, c, c_1)

Adjust to P-QFP (**EIAJ EDR-7311A**), P-SSOP (**EIAJ EDR-7314A**), the following ideas have been applied in order to deal that Minimum value, Nominal value and Maximum value with extremely thin plating (palladium) other than solder plating.

Minimum value: A lower value for extremely thin plating has been adopted in orders to share the standards for solder plating and extremely thin plating.

$$b_{p \min} = b_{1 \min}, c_{\min} = c_{1 \min}$$

Nominal value: Divide because rough thickness values of solder plating and extremely thin plating differs from each other.

Solder plating: $b_{p \text{ nom}} = b_{1 \text{ nom}} + 0.02 \text{ mm}$ (aim value of plating thickness side 0.01mm)

$$c_{\text{nom}} = c_{1 \text{ nom}} + 0.02 \text{ mm} \text{ (aim value of plating thickness side 0.01mm)}$$

Extremely thin plating: $b_{p \text{ nom}} = b_{1 \text{ nom}}, c_{\text{nom}} = c_{1 \text{ nom}}$

Maximum value: A higher value for solder plating has been adopted in order to share the standards for solder plating and extremely thin plating.

EIAJ EDR-7330

At old **EIAJ ED-7406**, Terminal width (b_p, b_1, b_2) corresponded to Terminal pitch $\boxed{e} = 1.27, 0.80\text{mm}$ and were prescribed. In this technical report **EIAJ EDR-7330**, It adds when Terminal pitch $\boxed{e} = 0.65\text{mm}$ are new, It is reference in the production package of each company and JEDEC standard, then Terminal width (b_p, b_1, b_2) was prescribed. At old **EIAJ ED-7406**, As for the terminal thickness (c, c_1), only $c_{1nom} = 0.20\text{mm}$ were prescribed, In this technical report **EIAJ EDR-7330**, It is reference in the JEDEC standard, 2 kinds that $c_{1nom} = 0.15, 0.20\text{mm}$ were prescribed.

(12) Positional tolerance of terminal center (x)

At old **EIAJ ED-7406**, In case of Terminal pitch $\boxed{e} = 1.27\text{mm}$, Positional tolerance of terminal center is prescribed with $x = 0.178\text{mm}$ (7mil). Also, In case of Terminal pitch $\boxed{e} = 0.80\text{mm}$, At first, $x = 0.16(\boxed{e} / 5)$ was proposed, but in the case that P-SOJ, When mounting a package, mounting chip resistance under the package and sometimes it's installs wiring during substrate lead, too. Therefore, Positional tolerance of terminal center is prescribed with $x = 0.13(\boxed{e} / 6)$. In this technical report **EIAJ EDR-7330**, It adds when Terminal pitch $\boxed{e} = 0.65\text{mm}$ are new, in the case, it prescribed Positional tolerance of terminal center with $x = 0.13(\boxed{e} / 5)$ which took coordination as SOP type and same rule.

(13) Terminal co planarity (y)

It stores up to take coordination as the package with the same SOP type, Adjust a rule value with TSOP(2) (Amendment 1 to **IEC60191-6, EIAJ EDR-7313**) and P-SSOP (**EIAJ EDR-7314A**), It made Terminal co planarity, $y = 0.10\text{mm}$.

(14) Number of terminal (n)

In this technical report **EIAJ EDR-7330**, It stores up to take coordination as the package with the same SOP type, It made the number of the terminal (n) which can be provided even. To the package length (\boxed{D}) which was calculated based on Terminal pitch $\boxed{e} = 1.27\text{mm}$, and in case of Terminal pitch $\boxed{e} = 0.80, 0.65\text{mm}$, it made number of the terminal (n) which is gotten when making $Z_D \geq 0.20 + b_{1nom}/2$ (But, it is equal to or more than $Z_D \geq 0.50$). An **Explanation table 5** standard package pin number list is shown in the rule of number of the terminal (n) at this design guide. It stores up to attempt to be coordinated with JEDEC, It is sometimes different from number of the terminal (n) which begins to be found out from the calculation method when above-mentioned. Also, it handles to display a coming-off pin in as the full pin and it isn't writing display to the table.

Explanation table 5. standard package pin number list

E	0300			0350			0400		
\boxed{e}	1.27	0.80	0.65	1.27	0.80	0.65	1.27	0.80	0.65
n	24			26			28	44	62
	26						32	50	66
	28						36	54	
	32						40	70	
	24						42	80	
	26						44		

EIAJ EDR-7330

(15) Package overhang (Z_D)

At old **EIAJ ED-7406**, it is same as the P-DIP design guide (**EIAJ EDR-7322** Design guideline of integrated circuits for Plastic Dual Inline Package, establishment in April, 1999), The Package overhang was prescribed at resin burr and gate remain which contains(Z), and it doesn't contains(Z_1). Also, based on Terminal pitch $e = 1.27\text{mm}$, Package overhang made $Z_{1\text{nom}} = (Z_{1\text{max}} + Z_{1\text{min}})/2 = 0.9525 = 0.95\text{mm}$ (nominal value change), and which resin burr and gate remain doesn't contains (Z_1). It calculates package length ($D_{1\text{nom}}$) in the standard in $Z_1 = 0.95\text{mm}$. In this technical report **EIAJ EDR-7330**, In the same way like TSOP(2) (Amendment 1 to **IEC60191-6**, **EIAJ EDR-7313**) and P-SSOP (**EIAJ EDR-7314A**), it adopted an identical rule value as Package overhang (Z_D) which resin burr and gate remain doesn't contain. Likewise TSOP(2) and P-SSOP(Gruop2), It made Package overhang $Z_D > 0.50\text{mm}$. Also, resin burr and gate remain in the end surface part and so on participate in the outline size directly, and it prescribed side max 0.15 mm (the same specification of JEDEC).

(16) Length of the soldered part (L_p)

To prescribe Length of the soldered part (L_p) in IEC is fixed, it adopted from old **EIAJ ED-7404A**. Length of the soldered part (L_p) is possible to measure and length of the filet shape which exerts influence by the reliability of the soldering and it defined based on the size investigation. It corresponded to Length of the soldered part (L_p) and Height of soldered points (A_3) was prescribed.

(17) Terminal length (L , L_1 , L_2)

At old **EIAJ ED-7404A**, it corresponds to the LOC (Lead On Chip) structure which is the inner structure of package which can be made thin, 2 kinds of lead were prescribed that the short lead $L_{\text{max}} = 2.70\text{mm}$ ($L_{\text{nom}} = 2.36\text{mm}$, $L_{\text{min}} = 2.09\text{mm}$) and the long lead $L_{\text{max}} = 3.00\text{mm}$ ($L_{\text{nom}} = 2.65\text{mm}$, $L_{\text{min}} = 2.09\text{mm}$).

At old **EIAJ ED-7404A**, it prescribed 2 kinds of lead were prescribed that the short lead and the long lead, however in this technical report **EIAJ EDR-7330**, it made one to the long lead $L_{\text{max}} = 3.00\text{mm}$ ($L_{\text{nom}} = 2.50\text{mm}$, $L_{\text{min}} = 2.05\text{mm}$). Moreover, it consulted the JEDEC standard **MO-199B** which is thin type package, it prescribed short lead $L_{\text{min}} = 1.00\text{mm}$, newly. Also, corresponding to the new short lead, it prescribed the terminal length (L_1 , L_2) too, which becomes an inflection point with terminal width.

(18) Positional tolerance of terminal (t)

This technical report added positional tolerance of terminal (t), it consulted the JEDEC standards **MO-199B**. Also, the value follows positional tolerance of terminal tips of TSOP(2) [**EIAJ EDR-7313**].

EIAJ EDR-7330

5. The reference standard

(1) IEC standard

Revision of IEC 60191-6 Global drawing format (establishment schedule in 2002)

IEC60191-1, Common Package Unit Design Guide for Gull-wing Lead Terminals (establishment in October, 2001)

IEC60191-2 (P-SOJ, \square = 400mil (10.15mm), \square = 0.80mm, establishment schedule in 2002) (The related standard, **MO-165A**, establishment in September 1996)

Amendment 1 to IEC 60191-4, Ed.2 (Package seating height) (The related standard, **EIAJ ED-7303B**, establishment schedule in 2002)

Amendment 1 to IEC 60191-6 (P-TSOP(2), establishment in 2000) (The related standard, **EIAJ EDR-7313**, establishment in April 1996)

(2) JEDEC standard

MS-023A (P-SOJ, \square = 300mil, \square = 1.27mm, establishment in May, 1995) (The related standard, **MO-077D**)

MS-027A (P-SOJ, \square = 400mil (10.15mm), \square = 1.27mm, establishment in June, 1994)

MO-063A (P-SOJ, \square = 350mil, \square = 1.27mm, establishment in April, 1987)

MO-065A (P-SOJ, \square = 300mil, \square = 1.27mm, establishment in May, 1987)

MO-077D (P-SOJ, \square = 300mil, \square = 1.27mm, establishment in November, 1994) (The related standard, **MS-023A**)

MO-088A (P-SOJ, \square = 300mil, \square = 1.27mm, establishment in June, 1988)

MO-091A (P-SOJ, \square = 350mil, \square = 1.27mm, establishment in February, 1989)

MO-105A (P-SOJ, \square = 350mil, \square = 1.27mm, A max = 1.88mm, establishment in August, 1990)

MO-124B (P-SOJ, \square = 12.70mm, \square = 1.27, 0.80mm, establishment in January, 1994)

MO-165C (P-SOJ, \square = 400mil (10.15mm), \square = 0.80mm, establishment in September, 1996)

MO-181A (Metric P-SOJ, \square = 16.00mm, \square = 1.25mm, establishment in January, 1996)

MO-199B (P-SOJ, \square = 400mil (10.15mm), \square = 1.27, 0.80, 0.65mm, A max = 2.05mm, establishment in January, 1999)

MO-200B (P-SOJ_STACK, \square = 400mil (10.15mm), \square = 1.27, 0.80, 0.65mm, establishment in June, 1999)

(3) JEITA standard

EIAJ EDR-7311A (Design guideline of integrated circuits for Plastic Quad Flat Package (P-QFP)), establishment schedule in June 2002

EIAJ EDR-7314A (Design guideline of integrated circuits for Plastic Shrink Small Outline Package (P-SSOP)), establishment in March 2002.

EIAJ EDR-7313 (Design guideline of integrated circuits for Thin Small Outline Package (Type2), TSOP(2)), establishment in April 1996.

EIAJ ED-7303B (Name and Code for Integrated Circuits Package), establishment schedule in 2002.

EIAJ EDR-7319 (Design guideline of integrated circuits for Plastic Quad Flat J-lead package (P-QFJ)), establishment in December 1998.

EIAJ EDR-7330

6. COMMITTEE MEMBERS

The IC Package Sub-committee of the Technical Standardization Committee on Semiconductor Device Package has mainly deliberated this standard.

The sub-committee members are shown below.

<Technical Standardization Committee on Semiconductor Device Package>

Chairman	SONY CORP.	Kazuo Nishiyama
----------	------------	-----------------

< IC Package Sub-committee>

Chief	MITSUBISHI ELECTRIC CORP.	Kazuya Fukuhara
-------	---------------------------	-----------------

Co- chief	TOSHIBA CORP.	Yasuhiro Koshio
-----------	---------------	-----------------

	HITACHI LTD.	Yoshinori Miyaki
--	--------------	------------------

	FUJITSU LTD.	Hiroshi Inoue
--	--------------	---------------

	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.	Tomohiro Tamaki
--	--	-----------------

Members	AMKOR THECHNOROLOGY JAPAN. INC	Kazuaki Sorimachi
---------	--------------------------------	-------------------

	ELPIDA MEMORY, INC.	Fumitake Okutsu
--	---------------------	-----------------

	ENPLAS CORP.	Hisao Ohshima
--	--------------	---------------

	OKI ELECTRIC INDUSTRY CO., LTD.	Yoshihiko Ino
--	---------------------------------	---------------

	KYOCERA CORP.	Akihiro Funahashi
--	---------------	-------------------

	SANYO ELECTRIC CORP.	Hideyuki Iwamura
--	----------------------	------------------

	SANYO ELECTRIC CORP.	Kiyoshi Mita
--	----------------------	--------------

	SUMITOMO 3M CORP.	Akiko Tsubota
--	-------------------	---------------

	SEIKO EPSON CORP.	Yoshiaki Emoto
--	-------------------	----------------

	SONY CORP.	Hiroshi Abe
--	------------	-------------

	NEC CORP.	Kaoru Sonobe
--	-----------	--------------

	NEC CORP.	Kenichi Kurihara
--	-----------	------------------

	IBM JAPAN CORP.	Tsuneo Kobayashi
--	-----------------	------------------

	TEXAS INSTRUMENTS JAPAN LTD.	Takayuki Ohuchida
--	------------------------------	-------------------

	HITACHI CABLE LTD.	Tadashi Kawanobe
--	--------------------	------------------

	FUJITSU LTD.	Shigeyuki Maruyama
--	--------------	--------------------

	FUJI ELECTRIC CO., LTD.	Osamu Hiroh0ashi
--	-------------------------	------------------

	MELCO INC.	Tsuneo Watanabe
--	------------	-----------------

	YAMAICHI ELECTRONICS CO., LTD.	Noriyuki Matsuoka
--	--------------------------------	-------------------

	UNITECHNO INC.	Hitoshi Matsunaga
--	----------------	-------------------

	ROHM CO., LTD.	Sadamasa Fujii
--	----------------	----------------

Special Members	SHIN-ETSU POLYMER	Ken Tamura
-----------------	-------------------	------------

	TOYOJUSHI CO., LTD.	Hitoshi Kazama
--	---------------------	----------------

< Project Group >

Leader	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.	Toshiyuki Fukuda
--------	--	------------------

Members	OKI ELECTRIC INDUSTRY CO., LTD.	Kazuhiko Sera
---------	---------------------------------	---------------

	NEC CORP.	Kaoru Sonobe
--	-----------	--------------

	FUJITSU LTD.	Kaoru Tachibana
--	--------------	-----------------