

Technical Report of Japan Electronics and Information Technology Industries Association

*EIAJ EDR-7328*

Design guideline of integrated circuits  
for Plastic Zigzag Inline Package  
(P-ZIP)

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Technical Report of Japan and Information Technology Industries Association

Design guideline of integrated circuits  
[Plastic Zigzag Inline Package (P-ZIP)]

## 1. SCOPE OF APPLICATION

This technical report regulates outline drawing and dimension of Plastic Zigzag Inline Package (hereinafter referred to as P-ZIP) whose terminal pitch  $\boxed{e}$  is 1.27mm, and Plastic Shrink Zigzag Inline Package (hereinafter referred to as P-SZIP) whose terminal pitch  $\boxed{e}$  is equal to or less than 0.889mm, among the package classified as form C in **EIAJ ED-7300** (Recommended practice on General Rule for preparing standard outline drawings (integrated circuits) of semiconductor devices).

**Note** This technical report is the revision version to have integrated two standards into which **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP).

## 2. TERMS

The definition of the terms used in this technical report complies with **EIAJ ED-7300**. New terms define in the description of this report.

## 3. BACKGROUND

Recently, through hole type package P-ZIP with reduced print circuits board area were developed for small size electronics devices. This technical report intended to standardize the outer dimensions of P-ZIP, P-SZIP, and ensure compatibility between products. It shows the standard design values on concept of the design center as far as possible for standardization.

## 4. DEFINITION OF P-ZIP

P-ZIP classified as form C in item 6 "Outline classification of the semiconductor package" of **EIAJ ED-7300**, and define a package with through hole terminals which are led out of the longer side of itself in single direction and make a terminal two lines in alternately forming leads which are perpendicular to the surface of a print circuits board.

## 5. NUMBER OF TERMINALS

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

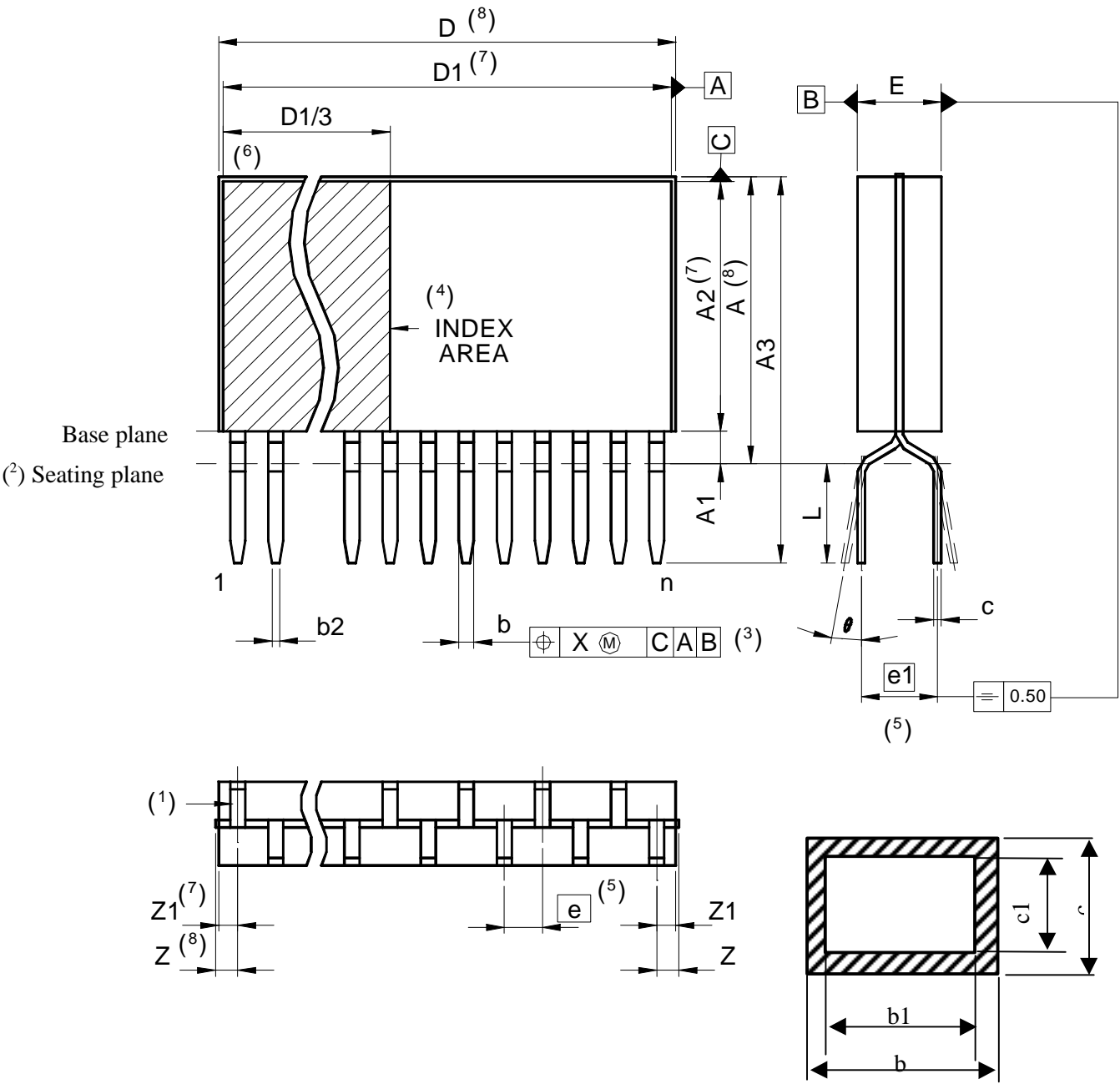
## 6. NOMINAL DIMENSIONS

The dimensions of package height  $\times$  package length (Symbol:  $A_{2nom} \times D_{1nom}$ ) is applied to nominal dimensions.

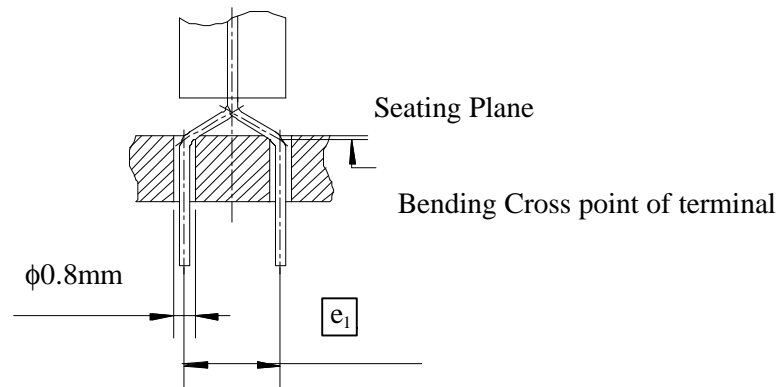
7. REFERENCE CHARACTERS AND DRAWING

7.1 Outline Drawings

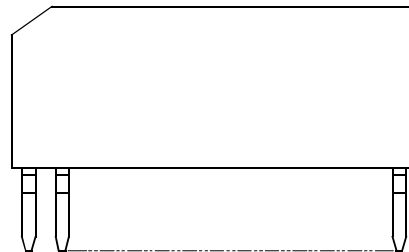
Figure 1



**Figure 2**



**Figure 3**



- Note**
- (<sup>1</sup>) The bending direction of terminal No.1 is in the side of the terminal No.1 index.
  - (<sup>2</sup>) The seating plane is determined when the terminal is inserted to hole that of center is located in the matrix as modulus  $\boxed{e} / \boxed{e_1}$ .
  - (<sup>3</sup>) The maximum mounting conditions apply to the positional tolerance of the terminals. (For the maximum body conditions, refer to ISO/1101, part II)
  - (<sup>4</sup>) Shows the allowable position of the index mark, which of more than half must be included in the shaded area.
  - (<sup>5</sup>) Specifies the true geometric position of the terminal axis.
  - (<sup>6</sup>) The shapes of chamfer is recommended in **Figure 3**.
  - (<sup>7</sup>) Resin flash, leadframe cutting remain and gate remains are not included.
  - (<sup>8</sup>) Resin flash, leadframe cutting remain and gate remains are included.

## 8. OUTER DIMENNSION

**Table 1** below shows the standard dimension. Combinations of the standard dimension shown below allow a number of package variations. If packages are design newly, their dimensions shall be selected in the table of Standard Package Dimension List in the Appendix.

### 8.1 Group 1

**Table 1**

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks																																																																																																												
Nominal Dimensions	$A_{2nom} \times D_{1nom}$	(1) Package height $A_{2nom} \times$ Package length $D_{1nom}$ is applied to Nominal dimensions.																																																																																																														
		(2) Nominal dimensions is defined combination of $A_{2nom}$ , $D_{1nom}$ , as follows.																																																																																																														
		$A_{2nom}$																																																																																																														
		<div><div></div><div><math>A_{2nom}</math></div><div>4.40</div><div>5.80</div><div>6.80</div><div>8.80</div><div>10.80</div><div>12.80</div></div>																																																																																																														
		$D_{1nom}$																																																																																																														
		<table><tr><td></td><td colspan="2">Terminal pitch <math>\boxed{e}</math></td><td></td><td colspan="2">Terminal pitch <math>\boxed{e}</math></td></tr><tr><td>n</td><td>1.27</td><td>0.89</td><td>n</td><td>1.27</td><td>0.89</td></tr><tr><td>4</td><td>5.26</td><td>3.68</td><td>36</td><td>45.90</td><td>32.13</td></tr><tr><td>6</td><td>7.80</td><td>5.46</td><td>38</td><td>48.44</td><td>33.91</td></tr><tr><td>8</td><td>10.34</td><td>7.24</td><td>40</td><td>50.98</td><td>35.69</td></tr><tr><td>10</td><td>12.88</td><td>9.02</td><td>42</td><td>53.52</td><td>37.47</td></tr><tr><td>12</td><td>15.42</td><td>10.80</td><td>44</td><td>-</td><td>39.24</td></tr><tr><td>14</td><td>17.96</td><td>12.57</td><td>46</td><td>-</td><td>41.02</td></tr><tr><td>16</td><td>20.50</td><td>14.35</td><td>48</td><td>-</td><td>42.80</td></tr><tr><td>18</td><td>23.04</td><td>16.13</td><td>50</td><td>-</td><td>44.58</td></tr><tr><td>20</td><td>25.58</td><td>17.91</td><td>52</td><td>-</td><td>46.36</td></tr><tr><td>22</td><td>28.12</td><td>19.69</td><td>54</td><td>-</td><td>48.13</td></tr><tr><td>24</td><td>30.66</td><td>21.46</td><td>56</td><td>-</td><td>49.91</td></tr><tr><td>26</td><td>33.20</td><td>23.24</td><td>58</td><td>-</td><td>51.69</td></tr><tr><td>28</td><td>35.74</td><td>25.02</td><td>60</td><td>-</td><td>53.47</td></tr><tr><td>30</td><td>38.28</td><td>26.80</td><td>62</td><td>-</td><td>55.25</td></tr><tr><td>32</td><td>40.82</td><td>28.58</td><td>64</td><td>-</td><td>57.02</td></tr><tr><td>34</td><td>43.36</td><td>30.35</td><td></td><td></td><td></td></tr></table>				Terminal pitch $\boxed{e}$			Terminal pitch $\boxed{e}$		n	1.27	0.89	n	1.27	0.89	4	5.26	3.68	36	45.90	32.13	6	7.80	5.46	38	48.44	33.91	8	10.34	7.24	40	50.98	35.69	10	12.88	9.02	42	53.52	37.47	12	15.42	10.80	44	-	39.24	14	17.96	12.57	46	-	41.02	16	20.50	14.35	48	-	42.80	18	23.04	16.13	50	-	44.58	20	25.58	17.91	52	-	46.36	22	28.12	19.69	54	-	48.13	24	30.66	21.46	56	-	49.91	26	33.20	23.24	58	-	51.69	28	35.74	25.02	60	-	53.47	30	38.28	26.80	62	-	55.25	32	40.82	28.58	64	-	57.02	34	43.36	30.35			
					Terminal pitch $\boxed{e}$			Terminal pitch $\boxed{e}$																																																																																																								
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34	43.36	30.35																																																																																																														
$D_{1nom} = \boxed{e} \times (n-1) + 2Z_{1nom}$																																																																																																																

Table 1 (continued)

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks																					
Seated hight	A	(1) A <sub>max</sub> is shown by the following formula.  A <sub>max</sub> =0.64×m m=9,11,13,16,19,22  (2) A <sub>min</sub> is shown by the following formula.  A <sub>min</sub> = A <sub>max</sub> - 0.64 <table><tr><th>A<sub>min</sub></th><th>A<sub>max</sub></th></tr><tr><td>5.08</td><td>5.72</td></tr><tr><td>6.35</td><td>6.99</td></tr><tr><td>7.62</td><td>8.26</td></tr><tr><td>9.53</td><td>10.16</td></tr><tr><td>11.43</td><td>12.07</td></tr><tr><td>13.34</td><td>13.97</td></tr></table>	A <sub>min</sub>	A <sub>max</sub>	5.08	5.72	6.35	6.99	7.62	8.26	9.53	10.16	11.43	12.07	13.34	13.97	<table><tr><th>A<sub>nom</sub></th></tr><tr><td>5.40</td></tr><tr><td>6.80</td></tr><tr><td>7.80</td></tr><tr><td>9.80</td></tr><tr><td>11.80</td></tr><tr><td>13.80</td></tr></table>	A <sub>nom</sub>	5.40	6.80	7.80	9.80	11.80	13.80	(1) Dimension of A <sub>max</sub> =8.26mm or less shall be systematized in 1.27mm step. Dimension of A <sub>max</sub> =over 8.26mm shall be systematized in 1.91mm step.  (2) Dimension of A <sub>max</sub> are included resinburrs, gate remains.
A <sub>min</sub>	A <sub>max</sub>																								
5.08	5.72																								
6.35	6.99																								
7.62	8.26																								
9.53	10.16																								
11.43	12.07																								
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A <sub>nom</sub>																									
5.40																									
6.80																									
7.80																									
9.80																									
11.80																									
13.80																									
Stand-off height	A <sub>1</sub>	A <sub>1min</sub> = 0.76  A <sub>1max</sub> =2.54	A <sub>1nom</sub> = 1.00																						
Package height	A <sub>2</sub>	A <sub>2max</sub> =A <sub>max</sub> - A <sub>1min</sub> A <sub>2min</sub> =A <sub>max</sub> - A <sub>1max</sub> <table><tr><th>A<sub>2min</sub></th><th>A<sub>2max</sub></th></tr><tr><td>3.18</td><td>4.95</td></tr><tr><td>4.45</td><td>6.22</td></tr><tr><td>5.72</td><td>7.49</td></tr><tr><td>7.62</td><td>9.40</td></tr><tr><td>9.53</td><td>11.30</td></tr><tr><td>11.43</td><td>13.21</td></tr></table>	A <sub>2min</sub>	A <sub>2max</sub>	3.18	4.95	4.45	6.22	5.72	7.49	7.62	9.40	9.53	11.30	11.43	13.21	A <sub>2nom</sub> =A <sub>nom</sub> - A <sub>1nom</sub> <table><tr><th>A<sub>2nom</sub></th></tr><tr><td>4.40</td></tr><tr><td>5.80</td></tr><tr><td>6.80</td></tr><tr><td>8.80</td></tr><tr><td>10.80</td></tr><tr><td>12.80</td></tr></table>	A <sub>2nom</sub>	4.40	5.80	6.80	8.80	10.80	12.80	Dimension of A <sub>2</sub> are not included resinburrs, gate remains.
A <sub>2min</sub>	A <sub>2max</sub>																								
3.18	4.95																								
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4.40																									
5.80																									
6.80																									
8.80																									
10.80																									
12.80																									
All Package height	A <sub>3</sub>	A <sub>3max</sub> =A <sub>max</sub> +L <sub>max</sub> A <sub>3min</sub> =A <sub>min</sub> +L <sub>min</sub> <table><tr><th>A<sub>3min</sub></th><th>A<sub>3max</sub></th></tr><tr><td>7.62</td><td>9.62</td></tr><tr><td>8.89</td><td>10.89</td></tr><tr><td>10.16</td><td>12.16</td></tr><tr><td>12.07</td><td>14.06</td></tr><tr><td>13.97</td><td>15.97</td></tr><tr><td>15.88</td><td>17.87</td></tr></table>	A <sub>3min</sub>	A <sub>3max</sub>	7.62	9.62	8.89	10.89	10.16	12.16	12.07	14.06	13.97	15.97	15.88	17.87	A <sub>3nom</sub> =A <sub>nom</sub> +L <sub>nom</sub> <table><tr><th>A<sub>3nom</sub></th></tr><tr><td>8.70</td></tr><tr><td>10.10</td></tr><tr><td>11.10</td></tr><tr><td>13.10</td></tr><tr><td>15.10</td></tr><tr><td>17.10</td></tr></table>	A <sub>3nom</sub>	8.70	10.10	11.10	13.10	15.10	17.10	L <sub>max</sub> =3.90  L <sub>nom</sub> =3.30  L <sub>min</sub> =2.54
A <sub>3min</sub>	A <sub>3max</sub>																								
7.62	9.62																								
8.89	10.89																								
10.16	12.16																								
12.07	14.06																								
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15.88	17.87																								
A <sub>3nom</sub>																									
8.70																									
10.10																									
11.10																									
13.10																									
15.10																									
17.10																									

Table 1 (continued)

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks																					
Terminal width	b	<table><tr><td>e</td><td>b<sub>min</sub></td><td>b<sub>max</sub></td></tr><tr><td>1.27</td><td>0.40</td><td>0.60</td></tr><tr><td>0.89</td><td>0.30</td><td>0.50</td></tr></table>	e	b <sub>min</sub>	b <sub>max</sub>	1.27	0.40	0.60	0.89	0.30	0.50	(1) solder plating <table><tr><td>e</td><td>b<sub>nom</sub></td></tr><tr><td>1.27</td><td>0.52</td></tr><tr><td>0.89</td><td>0.42</td></tr></table> (2) Palladium plating <table><tr><td>e</td><td>b<sub>nom</sub></td></tr><tr><td>1.27</td><td>0.50</td></tr><tr><td>0.89</td><td>0.40</td></tr></table>	e	b <sub>nom</sub>	1.27	0.52	0.89	0.42	e	b <sub>nom</sub>	1.27	0.50	0.89	0.40	(1) b include treatments, b <sub>1</sub> denote the raw material dimension.  (2) Thickness of solder plating layer shall be 0.010+0.010-0.005  (3) Thickness of Palladium plating is very thin so, b <sub>nom</sub> = b <sub>1nom</sub>
		e	b <sub>min</sub>	b <sub>max</sub>																					
	1.27	0.40	0.60																						
	0.89	0.30	0.50																						
e	b <sub>nom</sub>																								
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0.89	0.42																								
e	b <sub>nom</sub>																								
1.27	0.50																								
0.89	0.40																								
b <sub>1</sub>	<table><tr><td>e</td><td>b<sub>1min</sub></td><td>b<sub>1max</sub></td></tr><tr><td>1.27</td><td>0.40</td><td>0.60</td></tr><tr><td>0.89</td><td>0.30</td><td>0.50</td></tr></table>	e	b <sub>1min</sub>	b <sub>1max</sub>	1.27	0.40	0.60	0.89	0.30	0.50	<table><tr><td>e</td><td>b<sub>1nom</sub></td></tr><tr><td>1.27</td><td>0.50</td></tr><tr><td>0.89</td><td>0.40</td></tr></table>	e	b <sub>1nom</sub>	1.27	0.50	0.89	0.40								
e	b <sub>1min</sub>	b <sub>1max</sub>																							
1.27	0.40	0.60																							
0.89	0.30	0.50																							
e	b <sub>1nom</sub>																								
1.27	0.50																								
0.89	0.40																								
Terminal end width	b <sub>2</sub>	<table><tr><td>b<sub>2min</sub></td><td>b<sub>2max</sub></td></tr><tr><td>0</td><td>0.45</td></tr></table>	b <sub>2min</sub>	b <sub>2max</sub>	0	0.45	b <sub>2nom</sub> =0.25																		
b <sub>2min</sub>	b <sub>2max</sub>																								
0	0.45																								
Terminal thickness	c	<table><tr><td>c<sub>min</sub></td><td>c<sub>max</sub></td></tr><tr><td>0.10</td><td>0.45</td></tr></table>	c <sub>min</sub>	c <sub>max</sub>	0.10	0.45	(1) solder plating <table><tr><td>C<sub>nom</sub></td></tr><tr><td>0.27</td></tr><tr><td>0.22</td></tr></table> (2) Palladium plating <table><tr><td>c<sub>nom</sub></td></tr><tr><td>0.25</td></tr><tr><td>0.20</td></tr></table>	C <sub>nom</sub>	0.27	0.22	c <sub>nom</sub>	0.25	0.20	(1) c include treatments, c <sub>1</sub> denote the raw material dimension.  (2) Thickness of solder plating layer shall be 0.010+0.010-0.005  (3) Thickness of Palladium plating is very thin so, c <sub>nom</sub> = c <sub>1nom</sub>											
		c <sub>min</sub>	c <sub>max</sub>																						
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0.27																									
0.22																									
c <sub>nom</sub>																									
0.25																									
0.20																									
c <sub>1</sub>	<table><tr><td>C<sub>1min</sub></td><td>c<sub>1max</sub></td></tr><tr><td>0.10</td><td>0.45</td></tr></table>	C <sub>1min</sub>	c <sub>1max</sub>	0.10	0.45	<table><tr><td>c<sub>1nom</sub></td></tr><tr><td>0.25</td></tr><tr><td>0.20</td></tr></table>	c <sub>1nom</sub>	0.25	0.20																
C <sub>1min</sub>	c <sub>1max</sub>																								
0.10	0.45																								
c <sub>1nom</sub>																									
0.25																									
0.20																									
Terminal pitch	e	e =1.27 e =0.89	<table><tr><td>e</td><td>e<sub>1</sub></td></tr><tr><td>1.27</td><td>2.54</td></tr><tr><td>0.89</td><td>1.78</td></tr></table>	e	e <sub>1</sub>	1.27	2.54	0.89	1.78	This dimension should be true geometrical position. Terminal inline interval															
	e	e <sub>1</sub>																							
1.27	2.54																								
0.89	1.78																								
e <sub>1</sub>	e <sub>1</sub> =2.54 e <sub>1</sub> =1.78																								



Table 1 (continued)

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks
Package width	E	Package width $E_{\max}$ $E_{\max} = \boxed{e_l} + \boxed{e} = 2.54 + 1.27$ $E_{\max} = 3.81$	$E_{\text{nom}}$ 2.20 2.80	
Package length	D	Package length $D_{\max}$ $D_{\max} = \boxed{e} \times (n-1) + 2Z_{\max}$ (1) In case of $\boxed{e} = 1.27$ , $Z_{\max} = 1.27$ (2) In case of $\boxed{e} = 0.89$ , $Z_{\max} = 1.34$	$D_{\text{nom}} = \boxed{e} \times (n-1) + 2Z_{\text{nom}}$ In case of $\boxed{e} = 1.27$ $Z_{\text{nom}} = 0.83$ In case of $\boxed{e} = 0.89$ $Z_{\text{nom}} = 0.61$	Dimension of D are included resinburrs, gate remains.
	$D_1$	Package length $D_{1\max}$ $D_{1\max} = \boxed{e} \times (n-1) + 2Z_{1\max}$ (1) In case of $\boxed{e} = 1.27$ , $Z_{1\max} = 1.07$ (2) In case of $\boxed{e} = 0.89$ , $Z_{1\max} = 1.13$	$D_{1\text{nom}} = e \times (n-1) + 2Z_{1\text{nom}}$ In case of $\boxed{e} = 1.27$ $Z_{1\text{nom}} = 0.73$ In case of $\boxed{e} = 0.89$ $Z_{1\text{nom}} = 0.51$	Dimension of $D_1$ are not included resinburrs, gate remains.

Table 1 (continued)

unit: mm

Description	Symbol	Standard				Recommended Values			Remarks
Package length	D	List of D <sub>max</sub> , D <sub>lmax</sub> dimension as follows.				List of D <sub>nom</sub> , D <sub>lnom</sub> dimension as follows.			
	D <sub>1</sub>								
List of Package length(D,D <sub>1</sub> ) dimension.									
		e =1.27				e =0.89			
n		D <sub>max</sub>	D <sub>nom</sub>	D <sub>lmax</sub>	D <sub>lnom</sub>	D <sub>max</sub>	D <sub>nom</sub>	D <sub>lmax</sub>	D <sub>lnom</sub>
4		6.35	5.46	5.94	5.26	5.34	3.89	4.93	3.68
6		8.89	8.00	8.48	7.80	7.12	5.67	6.71	5.46
8		11.43	10.54	11.02	10.34	8.89	7.44	8.49	7.24
10		13.97	13.08	13.56	12.88	10.67	9.22	10.27	9.02
12		16.51	15.62	16.10	15.42	12.45	11.00	12.04	10.80
14		19.05	18.16	18.64	17.96	14.23	12.78	13.82	12.57
16		21.59	20.70	21.18	20.50	16.01	14.56	15.60	14.35
18		24.13	23.24	23.72	23.04	17.78	16.33	17.38	16.13
20		26.67	25.78	26.26	25.58	19.56	18.11	19.16	17.91
22		29.21	28.32	28.80	28.12	21.34	19.89	20.93	19.69
24		31.75	30.86	31.34	30.66	23.12	21.67	22.71	21.46
26		34.29	33.40	33.88	33.20	24.90	23.45	24.49	23.24
28		36.83	35.94	36.42	35.74	26.67	25.22	26.27	25.02
30		39.37	38.48	38.96	38.28	28.45	27.00	28.05	26.80
32		41.91	41.02	41.50	40.82	30.23	28.78	29.82	28.58
34		44.45	43.56	44.04	43.36	32.01	30.56	31.60	30.35
36		46.99	46.10	46.58	45.90	33.79	32.34	33.38	32.13
38		49.53	48.64	49.12	48.44	35.56	34.11	35.16	33.91
40		52.07	51.18	51.66	50.98	37.34	35.89	36.94	35.69
42		54.61	53.72	54.20	53.52	39.12	37.67	38.71	37.47
44		-	-	-	-	40.90	39.45	40.49	39.24
46		-	-	-	-	42.68	41.23	42.27	41.02
48		-	-	-	-	44.45	43.00	44.05	42.80
50		-	-	-	-	46.23	44.78	45.83	44.58
52		-	-	-	-	48.01	46.56	47.60	46.36
54		-	-	-	-	49.79	48.34	49.38	48.13
56		-	-	-	-	51.57	50.12	51.16	49.91
58		-	-	-	-	53.34	51.89	52.94	51.69
60		-	-	-	-	55.12	53.67	54.72	53.47
62		-	-	-	-	56.90	55.45	56.49	55.25
64		-	-	-	-	58.68	57.23	58.27	57.02

Table 1 (continued)

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks										
Terminal angle	$\theta$	<table><tr><td><math>\theta_{\min}</math></td><td><math>\theta_{\max}</math></td></tr><tr><td><math>0^{\circ}</math></td><td><math>8^{\circ}</math></td></tr></table>	$\theta_{\min}$	$\theta_{\max}$	$0^{\circ}$	$8^{\circ}$	<table><tr><td><math>\theta_{\min}</math></td><td><math>\theta_{\text{nom}}</math></td><td><math>\theta_{\max}</math></td></tr><tr><td><math>2^{\circ}</math></td><td><math>4^{\circ}</math></td><td><math>6^{\circ}</math></td></tr></table>	$\theta_{\min}$	$\theta_{\text{nom}}$	$\theta_{\max}$	$2^{\circ}$	$4^{\circ}$	$6^{\circ}$	
$\theta_{\min}$	$\theta_{\max}$													
$0^{\circ}$	$8^{\circ}$													
$\theta_{\min}$	$\theta_{\text{nom}}$	$\theta_{\max}$												
$2^{\circ}$	$4^{\circ}$	$6^{\circ}$												
Tolerance of terminal center position	x	$x \leq 0.25$												
Number of terminals	n	<p>(1) Number of terminals must be an even number. However, actual number of pins may be smaller than n. But the 1st terminal and nth terminal must be existence.</p> <p>(2) Package length (D,D<sub>1</sub>) which corresponds to each number of the terminals n, see <b>Table1</b>. List of Package length (D,D<sub>1</sub>) dimension.</p> <p>(3) n max are determined as follows.</p> <p>(a) In case of P-ZIP ( <math>\boxed{e}</math> =1.27), n max =42</p> <p>(b) In case of P-SZIP ( <math>\boxed{e}</math> =0.89), n max =64</p>	Package height (A <sub>2</sub> ) which corresponds to number of the terminals n, see <b>Table3</b> . Standard package list .											

## 8.2 Group 2

Table 2

unit: mm

Description	Symbol	Standard	Recommended Values	Remarks				
Package overhang	Z	(1) $\boxed{e} = 1.27$ $Z_{\max} = \boxed{e}$ , $Z_{\max} = 1.27$ (2) $\boxed{e} = 0.89$ $Z_{\max} = 1.5 \times \boxed{e}$ , $Z_{\max} = 1.34$	$\boxed{e} = 1.27$ $Z_{\text{nom}} = 0.83$ $\boxed{e} = 0.89$ $Z_{\text{nom}} = 0.61$	Dimension of Z are included resinburrs, gate remains.				
	Z <sub>1</sub>	(1) $\boxed{e} = 2.54$ $Z_{1\max} = \boxed{e} - 0.20$ , $Z_{1\max} = 1.07$ (2) $\boxed{e} = 0.89$ $Z_{1\max} = 1.5 \times \boxed{e} - 0.20$ , $Z_{1\max} = 1.13$	$\boxed{e} = 1.27$ $Z_{1\text{nom}} = 0.73$ $\boxed{e} = 0.89$ $Z_{1\text{nom}} = 0.51$	Dimension of Z <sub>1</sub> are not included resinburrs, gate remains.				
Terminal length	L	<table><tr><td><math>L_{\min}</math></td><td><math>L_{\max}</math></td></tr><tr><td>2.54</td><td>3.90</td></tr></table>	$L_{\min}$	$L_{\max}$	2.54	3.90	$L_{\text{nom}} = 3.30$	
$L_{\min}$	$L_{\max}$							
2.54	3.90							

9. 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 packages in the future.

Table 3

n	<div>e</div> = 1.27	<div>e</div> = 0.89
4		
6		
8		
10		
12		
14		
16		
18		
20		
22		
24		
26		
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		
50		
52		
54		
56		
58		
60		
62		
64		

## 10. STANDARD RESISTRATION

When you need to resister a new outline specification on the standard, complete the appendix format 5 in The Standardization Committee on Semiconductor Device Package steering rule, in compliance with the Standardization Rule.

In order to make a package dimension table, which comes under Item 2, Appendix format 5, fill the dimensions marked with (✓) in the following **Table 4**.

**Table 4**

Serial Number				
External Type		P-(S) ZIP00-00.0×00.0-0.00 (P-(S) ZIP00-0000-0.00)		
Reference Symbol		min	nom	max
Gtoup 1	A	✓		✓
	A <sub>1</sub>	✓		✓
	A <sub>2</sub>	✓	✓	✓
	A <sub>3</sub>	✓		✓
	b	✓		✓
	b <sub>1</sub>	✓		✓
	b <sub>2</sub>	✓		✓
	c	✓		✓
	c <sub>1</sub>	✓		✓
	E			✓
	D			✓
	D <sub>1</sub>		✓	✓
	e		✓	
	e <sub>1</sub>		✓	
	θ	✓		✓
	x			✓
	n		✓	
Gtoup 2	Z			✓
	Z <sub>1</sub>			✓
	L	✓		✓

## 11. RERATED STANDARD

- (1) **EIAJ ET-9001** “Rules for the drafting and presentation of EIAJ Standards”
- (2) **EIAJ ED-7300** “Recommended practice on General Rules for the preparation of outline drawings of semiconductor packages”
- (3) **EIAJ ED-7301** “Manual for the standard of integrated circuits package”
- (4) **EIAJ ED-7302** “Manual for integrated circuits package design guide”
- (5) **EIAJ ED-7303A** “Names and code for integrated circuits package”

## EXPOLANALY NOTE

## 1. OBJECTIVE OF THE TECHNICAL REPORT

This technical report intended to provide the industry standard for Plastic Zigzag Inline Package (hereinafter referred to as P-ZIP) and the design guideline in producing of P-ZIP and developing the automatic mounting machines and related parts.

## 2. PROGRESS OF DELIBERATION

## (1) P-ZIP (EIAJ IC-74-5, EIAJ ED-7405)

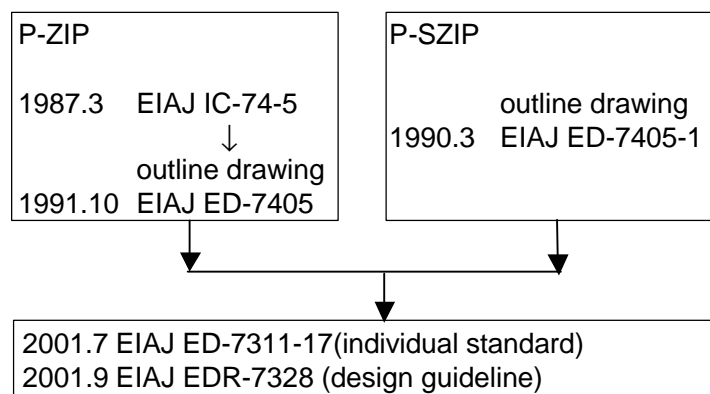
The forerunner of this technical report **EIAJ IC-74-5** (P-ZIP) was started a deliberation from August 1985 and established in March 1987. After that, a part was revised in the contents and **EIAJ ED-7405** (P-ZIP) was established in October 1991.

## (2) P-SZIP (EIAJ ED-7405-1)

The forerunner of this technical report **ED-7405-1** (P-SZIP) covered the numerous pin range and dwarfing print circuits board area, mounting height, which was not in **EIAJ ED-7405** (P-ZIP), it was possible to make by need and confirmation and started a deliberation from April 1988 and established in March 1990.

## (3) P-ZIP (EIAJ ED-7311-17, EIAJ EDR-7328)

**EIAJ ED-7405** (P-ZIP) and **ED-7405-1** (P-SZIP) would be abolished by the laps ten years, this technical report **EIAJ EDR-7328** (Design guideline of integrated circuits) is the revision version to have integrated two standards into and divide **EIAJ ED-7311-17** (Individual standard of integrated circuits), the elapse of these technology report are shown below by the time series.



## 3. KEYPOINT FOR REVIEW

(1) **Datum marking** The body datum and geometrical tolerance were adopted from this technical report. And the body datum position attempted a consistence Design guideline of integrated circuits Plastic Single Inline Package (P-SIP) (**EIAJ EDR-7327** [Revision in January 2001]).

(2) **Definitions of dimension** The recommended values in this technical report were adopted the values **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP) as far as possible, and a format was changed in according to **EIAJ ED-7302** "Manual for the Standard of integrated circuits package". Terminal width before treatment (b1) and terminal thickness before treatment (c1) are included conventional solder plating and newly shown Palladium plating is added.

- (3) **Standard package list** Standard package list was added in according to **EIAJ ED-7302**.
- (4) **Standard registration** Standard registration list was added in according to **EIAJ ED-7302**.

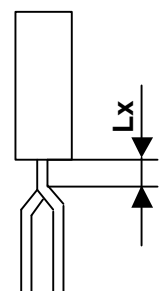
#### 4. BACKGROUND FOR THE RESPECTIVE DIMENSIONAL RULES

- (1) **Nominal dimensions ( $A_{2nom} \cdot D_{1nom}$ )** The forerunner of standards **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP) which maximum seated height ( $A_{max}$ , mil unit) was applied to nominal dimensions. However, This technical report follow **EIAJ ED-7303A** "Names and code for integrated circuits package" and nominal dimensions is changed to the dimension of package height  $\times$  package length (Symbol:  $A_{2nom} \times D_{1nom}$ ).
- (2) **Maximum seated height ( $A_{max}$ )** Maximum seated height ( $A_{max}$ ) have 6 kinds which shall be systematized, 5.72mm (225mil), 6.99mm (275mil), 8.26mm (325mil) in 1.27mm (50mil) step, and 10.16mm (400mil), 12.07mm (475mil), 13.97mm (550mil) in 1.91mm (75mil) step.  
**Note** **EIAJ EDR-7327** (P-SIP) have 3 kinds maximum seated height ( $A_{max}$ ) which shall be systematized, 6.10mm (240mil), 8.64mm (340mil), 11.18mm (440mil) in 2.54mm (100mil) step.
- (3) **Seated height ( $A_{nom}$ )** The forerunner of standards **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP) which made seated height ( $A_{nom}$ ) 5.40mm, 6.70mm, 7.90mm, 9.80mm, 11.70mm, 13.70mm. This technical report consulting maximum seated height ( $A_{max}$ ) of **EIAJ EDR-7317** (P-SVP) and change seated height ( $A_{nom}$ ) numerical value to 5.40mm, 6.80mm, 7.80mm, 9.80mm, 11.80mm, 13.80mm.
- (4) **Terminal width (b)** Making **EIAJ ED-7303A** reference, the forerunner of standards **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP), b in meant terminal width after treatment so it was replaced to b1 in this technical report. Terminal width before treatment was defined as b. Because terminal width before treatment (b1) was added, b1 in this technical report replace b2 respectively. bnom the size to have added the thickness of the exterior plating to b1nom. The exterior plating is conventional solder plating and newly shown Palladium plating is added.
- (5) **Terminal thickness (c)** Making **EIAJ ED-7303A** reference, the forerunner of standards which **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP), c in meant terminal thickness after treatment so it was replaced to c1 in this technical report. c nom the size to have added the thickness of the exterior plating to c1nom. The exterior plating is conventional solder plating and newly shown Palladium plating is added.
- (6) **Terminal pitch (  $\boxed{e}$  )** The forerunner of standards have 3 kinds Terminal pitch (  $\boxed{e}$  ), **EIAJ ED-7405** (P-ZIP) was defined  $\boxed{e} = 1.27\text{mm}$  (50mil), **EIAJ ED-7405-1** (P-SZIP) was defined  $\boxed{e} = 0.889\text{mm}$  (35mil), 0.635mm (25mil). This technical report is changed to narrowed down to 2 kinds,  $\boxed{e} = 1.27\text{mm}$ , 0.889mm. however, **EIAJ ED-7311-17** have registration 0.889mm or less (  $\boxed{e}$  ), therefore, P-SZIP is defined  $\boxed{e} = 0.889\text{mm}$  or less.
- (7) **Terminal inline interval (  $\boxed{e1}$  )** The forerunner of standards have 3 kinds terminal inline interval (  $\boxed{e1}$  ), **EIAJ ED-7405** (P-ZIP) was defined  $\boxed{e1} = 2.54\text{mm}$  (100mil), **EIAJ ED-7405-1** (P-SZIP) was defined  $\boxed{e1} = 1.778\text{mm}$  (70mil), 1.27mm (50mil). This technical report is changed to narrowed down to 2 kinds,  $\boxed{e1} = 2.54\text{mm}$ , 1.778mm, because adjust to the package which is produced at present.



- (8) **Terminal angle (q)** Standard value is defined  $\theta_{\min} = 0^\circ$ ,  $\theta_{\max} = 8^\circ$ , and recommended value  $\theta_{\min} = 0^\circ$ ,  $\theta_{\text{nom}} = 4^\circ$ .
- (9) **Package width (E)** The forerunner of standards **EIAJ ED-7405** (P-ZIP) and **EIAJ ED-7405-1** (P-SZIP) which were defined have 4 kinds recommended value  $E_{\text{nom}} = 2.80\text{mm}$ ,  $2.20\text{mm}$ ,  $1.50\text{mm}$ ,  $1.00\text{mm}$ . This technical report is changed to narrowed down to 2 kinds,  $E_{\text{nom}} = 2.80\text{mm}$ ,  $2.20\text{mm}$ , because adjust to the package which is produced at present, and standard value is defined  $E_{\text{max}} = \boxed{e1} + \boxed{e}$ ,  $E_{\text{max}} = 3.81\text{mm}$ .
- (10) **Misalignment of terminal inline interval (  $\boxed{e1}$  ) and package width (E)** Misalignment of terminal inline interval (  $\boxed{e1}$  ) and package width (E) shall be  $0.5\text{mm}$  or less from the viewpoint of automatic mounting.
- (11) **Number of terminals (n)** **EIAJ ED-7311-17** are registered max 40pin in P-ZIP, max 64pin in P-SZIP, therefore, these number of terminals are defined maximum pin number. According to it, package length (D1) also are defined.
- (12) **Package overhang (Z)** This technical report is adjusted a point of view value of  $Z_{\text{max}}$ ,  $Z1_{\text{max}}$  and changed for consider a consistence of **EIAJ EDR-7322** (P-DIP), **EIAJ EDR-7327** (P-SIP).  $Z_{\text{nom}}$ ,  $Z1_{\text{nom}}$  the same as forerunner of standards.
- (13) **Terminal length (L)** The forerunner of standards **EIAJ ED-7405** (P-ZIP) was defined  $L_{\min} = 2.54\text{mm}$  (100mil),  $L_{\max} = 3.81\text{mm}$  (150mil),  $L_{\text{nom}} = 3.18\text{mm}$ , and **EIAJ ED-7405-1** (P-SZIP) was defined  $L_{\min} = 2.54\text{mm}$  (100mil),  $L_{\max} = 4.064\text{mm}$  (160mil),  $L_{\text{nom}} = 3.18\text{mm}$ . This technical report is changed to  $L_{\min} = 2.54\text{mm}$ ,  $L_{\max} = 3.90\text{mm}$ ,  $L_{\text{nom}} = 3.30\text{mm}$ , for consider a consistence of **EIAJ EDR-7322** (P-DIP), **EIAJ EDR-7327** (P-SIP).
- (14) **Length to terminal bending position (Lx)**

It is necessary to secure sufficient length to terminal bending position ( $L_x$ ) shown in the figure to the right, by taking into consideration the stability of the bending operation, removal of the package from the socket. It must be remembered, however, that when the chipsize become extremely large, most of the manufacturers tend to increase the package width within the limits imposed by the package size (terminal inline interval:  $\boxed{e1}$ ) to cope with the situation, as occurred with the 300mil (7.62mm) type P-DIP. The same thing is expected to occur also P-ZIP. Such being the case, it was decided not to stipulate the length to terminal bending position ( $L_x$ ) in order to secure some degree of freedom in the package design. Because the problems mentioned before may occur, however, it is desirable to take into consideration the bending length when designing the package.



## 5. COMMITTEE MEMBERS

The IC Subcommittee of the Technical Standardization Committee on Semiconductor Device Packages has mainly deliberated this standard. The subcommittee members are shown below.

### <Technical Standardization Committee on Semiconductor Device Package>

Chairman	ELPIDA MEMORY,INC.	Ichiro Anjo
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Co-chief	SHARP CORP.	Katuyuki Tarui
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