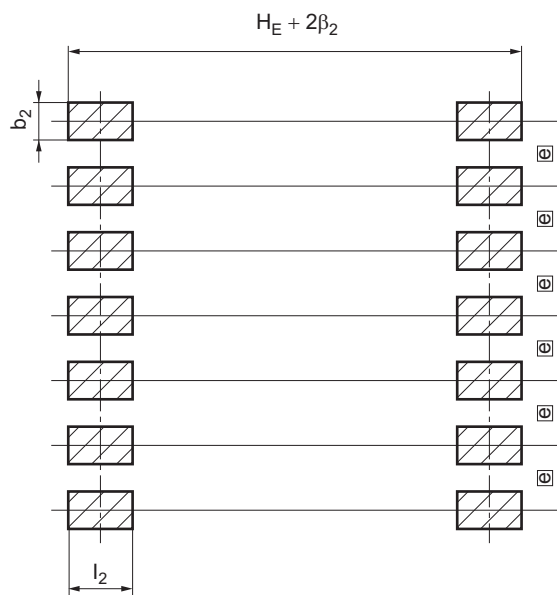
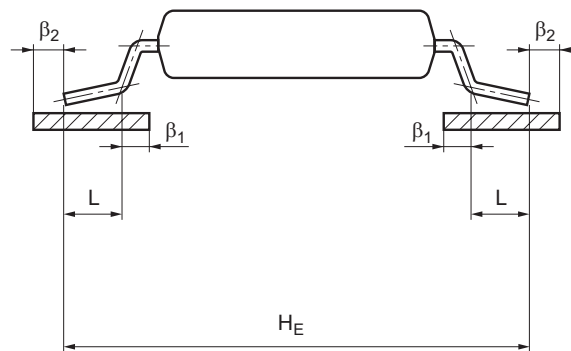


## 1 Integrated circuits

The land width for surface-mount semiconductor devices is related to on the amount of solder applied. It is necessary to optimize the land dimensions together with the method of solder application. Previously, JEITA defined recommended land dimensions by package type, but because of the above reasons, currently only the positions where the terminals should be (the terminal land area) are standardized. For reference, the land design guidelines previously defined by JEITA are shown below. During the actual design of the printed circuit board, the solder application method, etc. should be thoroughly considered before deciding.

### 1.1 SO type



$$l_2 \geq L + \beta_1 + \beta_2$$

$$b \leq b_2 \leq e - \gamma$$

$\gamma$  : Solder resistance bridge ( $\gamma = 0.3$  mm)

$b$  : Terminal width

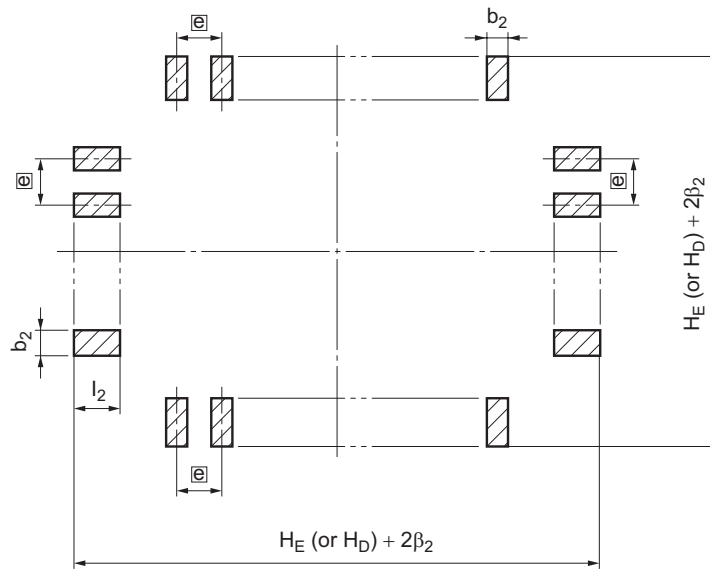
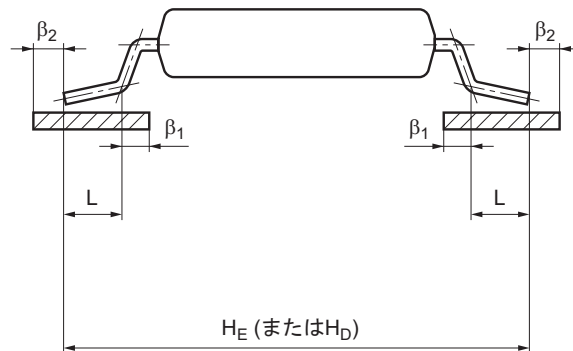
$\beta_1$  : Soldering strength ( $\beta_1 = 0.3$  mm)

$\beta_2$  : Solder mask pattern accuracy or soldering guideline ( $\beta_2 = 0.2$  mm)

Note: Values within parentheses ( ) are recommended values.

# Reference land dimensions

## 1.2 QFP type



$l_2 \geq L + \beta_1 + \beta_2$ $b \leq b_2 \leq e - \gamma$
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$\gamma$  : Solder resistance bridge ( $\gamma = 0.3$  mm)

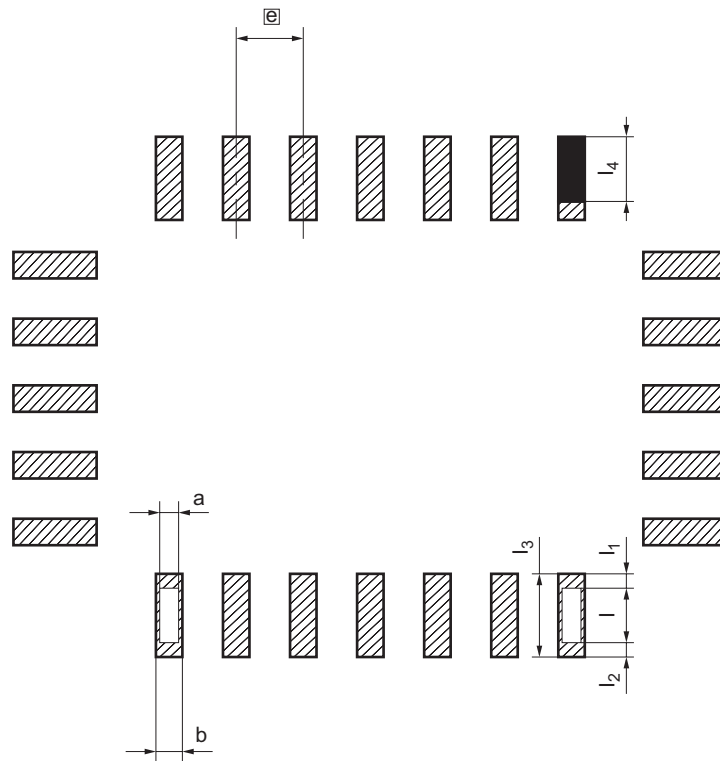
$b$  : Terminal width

$\beta_1$  : Soldering strength ( $\beta_1 = 0.5$  mm)

$\beta_2$  : Solder mask pattern accuracy or soldering guideline ( $\beta_2 = 0.2$  mm)

Note: Values within parentheses ( ) are recommended values.

## 1.3 QFN type



< For 0.4 mm pitch >

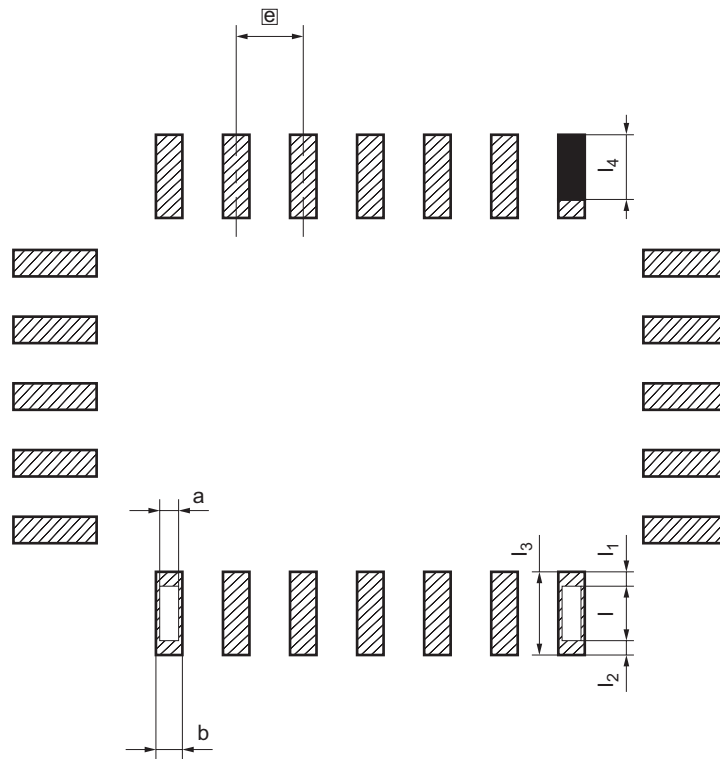
Item	Soldering land dimensions	Metal mask dimensions
Pad layout spacing $e$	0.40	-
Pad dimension $l_3 (= l + l_1 + l_2)$	1.00	-
Pad dimension $l_1$	0.10	-
Pad dimension $l_2$	0.30	-
Pad dimension $b$	0.20	0.20
Pad dimension $l$	0.60	-
Pad dimension $a$	0.16	-
Metal mask opening length $l_4$	-	0.90

Metal mask thickness	-	0.13
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\* The above dimensions are values calculated based on the results of investigations by our company.

# Reference land dimensions

## 1.3 QFN type (continued)



< For 0.5 mm pitch >

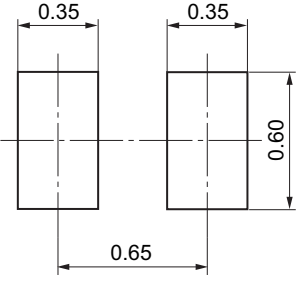
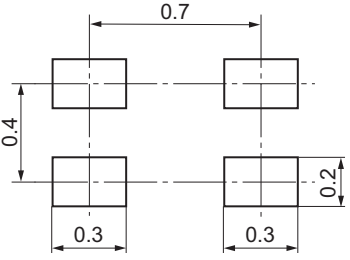
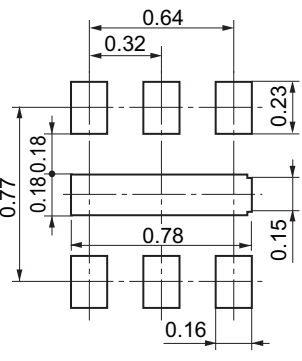
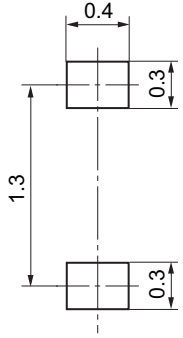
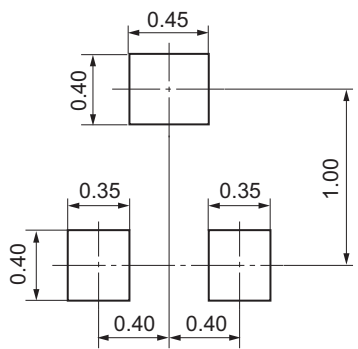
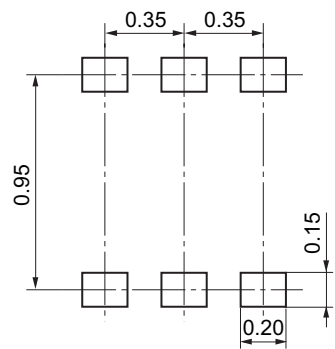
Item	Soldering land dimensions	Metal mask dimensions
Pad layout spacing $e$	0.50	–
Pad dimension $l_3 (= l + l_1 + l_2)$	1.00	–
Pad dimension $l_1$	0.10	–
Pad dimension $l_2$	0.30	–
Pad dimension $b$	0.26	0.26
Pad dimension $l$	0.60	–
Pad dimension $a$	0.20	–
Metal mask opening length $l_4$	–	0.90

Metal mask thickness	–	0.13
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\* The above dimensions are values calculated based on the results of investigations by our company.

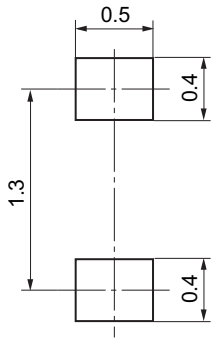
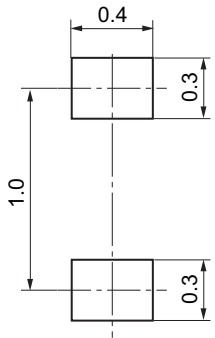
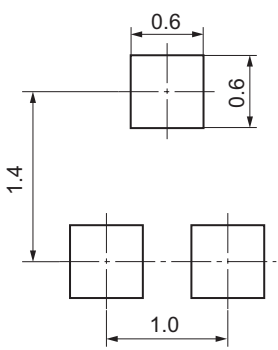
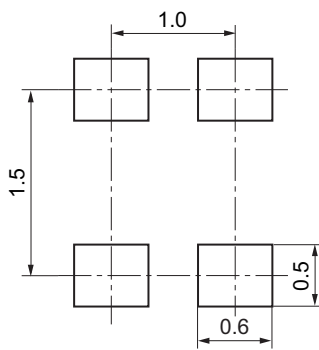
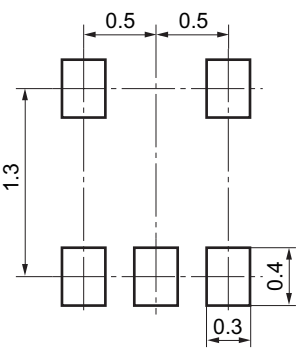
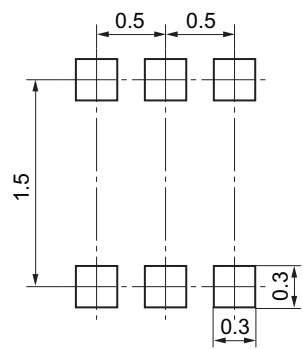
# Reference land dimensions

## 2 Discrete devices

<p>ML2-N1</p> <p>[Diodes]</p>	<p>ML3-N2</p> <p>[Transistors, Diodes]</p>
	
<p>ML6-N6</p> <p>[Transistors]</p>	<p>SSSMini2-F1 SSSMini2-F2 SSSMini2-F3</p> <p>[Diodes]</p>
	
<p>SSSMini3-F1 SSSMini3-F2 TSSSMini3-F1</p> <p>[Transistors, Diodes]</p>	<p>SSSMini6-F1</p> <p>[Transistors]</p>
	

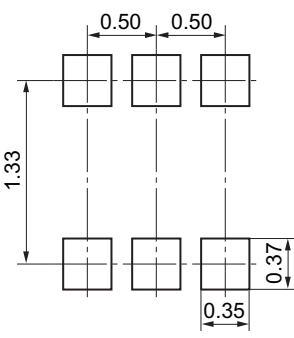
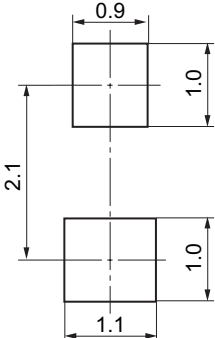
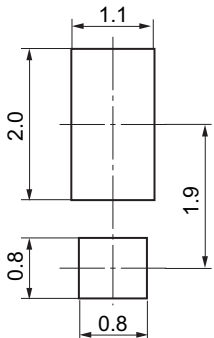
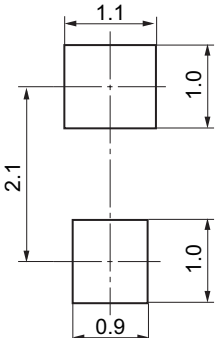
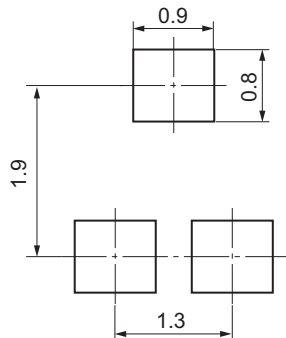
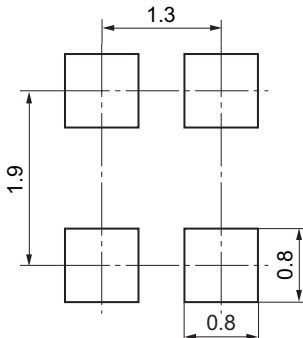
# Reference land dimensions

## 2 Discrete devices (continued)

SSMini2-F1 SSMini2-F2 SSMini2-F4  [Diodes]	USSMini2-F1  [Diodes]
	
SSMini3-F1 SSMini3-F2 SSMini3-F3  [Transistors, Diodes]	SSMini4-F1  [Diodes]
	
SSMini5-F2 SSMini5-F3  [Transistors, Diodes, Multi Chip Discrete Devices]	SSMini6-F1 SSMini6-F2  [Transistors, Multi Chip Discrete Devices]
	

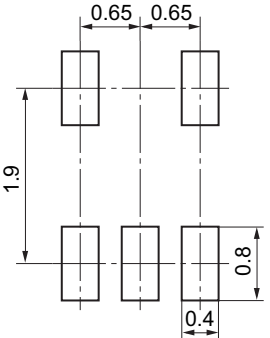
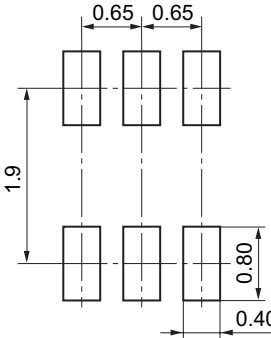
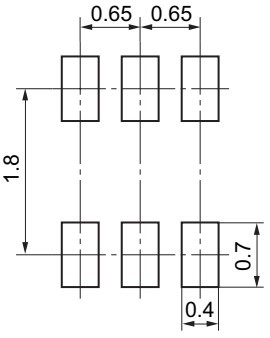
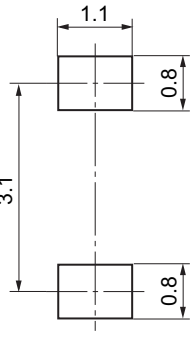
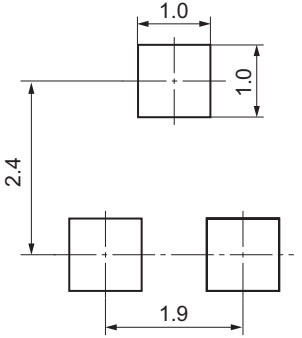
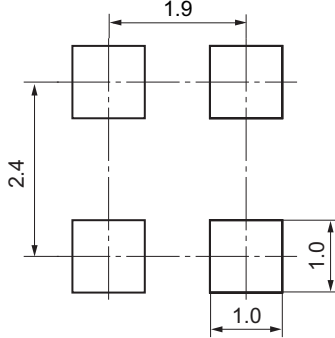
# Reference land dimensions

## 2 Discrete devices (continued)

<p>WSSMini6-F1</p> <p>[Transistors, Multi Chip Discrete Devices]</p>	<p>SMini2-F1</p> <p>[Diodes, Circuit Protector Elements]</p>
	
<p>SMini2-F2</p> <p>[Diodes]</p>	<p>SMini2-F3</p> <p>[Diodes]</p>
	
<p>SMini3-F1 SMini3-F2 SMini3-G1</p> <p>[Transistors, Diodes]</p>	<p>SMini4-F1 SMini4-F2</p> <p>[Diodes]</p>
	

# Reference land dimensions

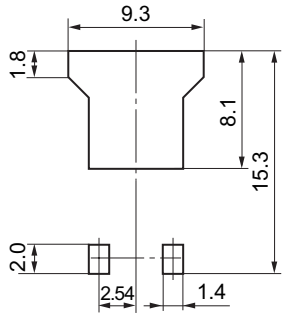
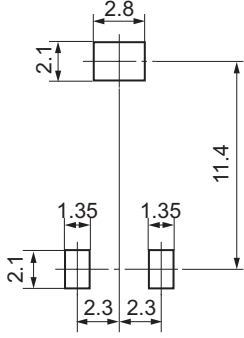
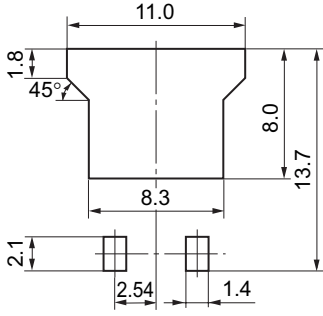
## 2 Discrete devices (continued)

<p>SMini5-F1 SMini5-G1</p> <p>[Transistors, Diodes]</p>	<p>SMini6-F1 SMini6-G1</p> <p>[Transistors, Diodes]</p>
	
<p>WSMini6-F1</p> <p>[Transistors]</p>	<p>Mini2-F1</p> <p>[Diodes]</p>
	
<p>Mini3-G1</p> <p>[Transistors, Diodes, Reset ICs]</p>	<p>Mini4-G1</p> <p>[Diodes]</p>
	



# Reference land dimensions

## 2 Discrete devices (continued)

<p>N-G1</p> <p>[Transistors]</p>	<p>I-G1</p> <p>[Transistors]</p>
 <p>Mechanical drawing of N-G1 transistor package showing dimensions: 9.3, 1.8, 8.1, 15.3, 2.0, 2.54, 1.4.</p>	 <p>Mechanical drawing of I-G1 transistor package showing dimensions: 2.8, 2.1, 11.4, 1.35, 2.3, 2.3.</p>
<p>TO-220C-G1</p> <p>[Transistors]</p>	
 <p>Mechanical drawing of TO-220C-G1 transistor package showing dimensions: 11.0, 1.8, 45°, 8.0, 13.7, 8.3, 2.1, 2.54, 1.4.</p>	