

# **RF AND MICROWAVE DEVICES PACKAGES**

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### Major Revisions in This Edition

Page	Description
p.7	<Package Dimensions> Addition of 3-Pin Super Lead-Less Minimold
p.10	<Package Dimensions> Addition of Flat-Lead 4-Pin Thin-Type Super Minimold (M05)
p.24	<Package Dimensions> Addition of T-91M
p.26	<Mounting Pad Layout> Addition of 3-Pin Super Lead-Less Minimold
p.27	<Mounting Pad Layout> Addition of Flat-Lead 4-Pin Thin-Type Super Minimold (M05)

**The mark ★ shows major revised points.**

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## Package Dimensions (1/19)

(Unit : mm)

3-Pin Lead-Less Minimold	3-Pin Minimold
<p style="text-align: center;"><b>(Bottom View)</b></p>	<p style="text-align: center;"><b>Marking</b></p>
<p>★</p> <p style="text-align: center;">3-Pin Power Minimold</p>	<p style="text-align: center;">3-Pin Super Lead-Less Minimold</p> <p style="text-align: center;"><b>(Bottom View)</b></p>

## Package Dimensions (2/19)

(Unit : mm)

3-Pin Super Minimold	3-Pin Ultra Super Minimold
<p>Technical drawing of a 3-Pin Super Minimold package. The top view shows a rectangular package with a total width of <math>2.1 \pm 0.1</math> mm and a central width of <math>1.25 \pm 0.1</math> mm. The height is <math>2.0 \pm 0.2</math> mm. Pin 1 is on the left, pin 2 is in the center, and pin 3 is on the right. Pin 1 height is <math>0.65</math> mm, pin 2 height is <math>0.3 \pm 0.1</math> mm, and pin 3 height is <math>0.3 \pm 0.1</math> mm. The side view shows a height of <math>0.9 \pm 0.1</math> mm, a marking area of <math>0.3</math> mm, and a lead height of <math>0.15 \pm 0.05</math> mm. The lead width is <math>0</math> to <math>0.1</math> mm.</p>	<p>Technical drawing of a 3-Pin Ultra Super Minimold package. The top view shows a rectangular package with a total width of <math>1.6 \pm 0.1</math> mm and a central width of <math>0.8 \pm 0.1</math> mm. The height is <math>1.6 \pm 0.1</math> mm. Pin 1 is on the left, pin 2 is in the center, and pin 3 is on the right. Pin 1 height is <math>0.5</math> mm, pin 2 height is <math>0.2 \pm 0.1</math> mm, and pin 3 height is <math>0.3 \pm 0.1</math> mm. The side view shows a height of <math>0.75 \pm 0.05</math> mm, a marking area of <math>0.6</math> mm, and a lead height of <math>0.15 \pm 0.05</math> mm. The lead width is <math>0</math> to <math>0.1</math> mm.</p>
<p>Technical drawing of a Flat-Lead 3-Pin Thin-Type Ultra Super Minimold package. The top view shows a rectangular package with a total width of <math>1.2 \pm 0.05</math> mm and a central width of <math>0.8 \pm 0.1</math> mm. The height is <math>1.4 \pm 0.1</math> mm. Pin 1 is on the left, pin 2 is in the center, and pin 3 is on the right. Pin 1 height is <math>0.45</math> mm, pin 2 height is <math>0.2 \pm 0.1</math> mm, and pin 3 height is <math>0.3 \pm 0.1</math> mm. The side view shows a height of <math>0.59 \pm 0.05</math> mm and a lead height of <math>0.15 \pm 0.05</math> mm.</p>	<p>Technical drawing of a 4-Pin Ceramic package. The top view shows a square package with a side length of <math>4.1</math> mm (minimum). The height is <math>4.6</math> mm (maximum). Pin 1 is on the top, pin 2 is on the left, pin 3 is on the bottom, and pin 4 is on the right. Pin 2 height is <math>0.4 \pm 0.06</math> mm, pin 3 height is <math>0.6 \pm 0.06</math> mm, and pin 4 height is <math>0.6 \pm 0.06</math> mm. The side view shows a height of <math>1.48</math> mm (maximum), a marking area of <math>0.7 \pm 0.07</math> mm, and a lead height of <math>0.1 \pm 0.06</math> mm.</p>





## Package Dimensions (4/19)

(Unit : mm)

★

Flat-Lead 4-Pin Thin-Type Super Minimold (M05)	6-Pin Lead-Less Minimold (1208 PKG)
<p>Top View Dimensions:            Total width: <math>2.05 \pm 0.1</math>            Lead width: <math>1.25 \pm 0.1</math>            Total height: <math>2.0 \pm 0.1</math>            Lead height: <math>0.30^{+0.1}_{-0.05}</math>            Lead spacing: <math>0.65</math>            Lead width: <math>0.65</math>            Lead thickness: <math>0.59 \pm 0.05</math>            Lead height: <math>0.11^{+0.1}_{-0.05}</math></p> <p>Side View Dimensions:            Lead height: <math>0.11^{+0.1}_{-0.05}</math>            Lead thickness: <math>0.59 \pm 0.05</math></p>	<p>Top View Dimensions:            Total width: <math>1.0 \pm 0.05</math>            Lead width: <math>0.8^{+0.07}_{-0.05}</math>            Total height: <math>1.2^{+0.07}_{-0.05}</math>            Lead height: <math>0.15 \pm 0.05</math>            Lead spacing: <math>0.4</math>            Lead width: <math>0.4</math>            Lead thickness: <math>0.5 \pm 0.05</math>            Lead height: <math>0.125^{+0.1}_{-0.05}</math></p> <p>Side View Dimensions:            Lead height: <math>0.125^{+0.1}_{-0.05}</math>            Lead thickness: <math>0.5 \pm 0.05</math></p>
6-Pin Lead-Less Minimold (1511 PKG) for Silicon MMIC	6-Pin Lead-Less Minimold (1511 PKG) for GaAs MMIC
<p>Top View Dimensions:            Total width: <math>1.3 \pm 0.05</math>            Lead width: <math>1.1 \pm 0.1</math>            Total height: <math>1.5 \pm 0.1</math>            Lead height: <math>0.16 \pm 0.05</math>            Lead spacing: <math>0.48</math>            Lead width: <math>0.48</math>            Lead thickness: <math>0.2 \pm 0.1</math>            Lead height: <math>0.11^{+0.1}_{-0.05}</math></p> <p>Bottom View Dimensions:            Lead width: <math>0.2 \pm 0.1</math>            Lead spacing: <math>0.9</math></p> <p>Side View Dimensions:            Lead height: <math>0.11^{+0.1}_{-0.05}</math>            Lead thickness: <math>0.55 \pm 0.03</math></p>	<p>Top View Dimensions:            Total width: <math>1.3 \pm 0.1</math>            Lead width: <math>1.1 \pm 0.1</math>            Total height: <math>1.5 \pm 0.1</math>            Lead height: <math>0.16^{+0.1}_{-0.05}</math>            Lead spacing: <math>0.48</math>            Lead width: <math>0.48</math>            Lead thickness: <math>0.55 \pm 0.05</math>            Lead height: <math>0.11^{+0.1}_{-0.05}</math></p> <p>Side View Dimensions:            Lead height: <math>0.11^{+0.1}_{-0.05}</math>            Lead thickness: <math>0.55 \pm 0.05</math></p>

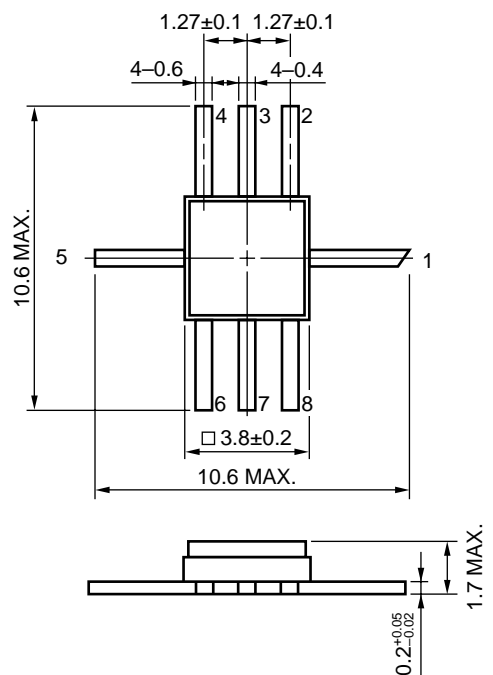
## Package Dimensions (5/19)

(Unit : mm)

6-Pin Minimold	6-Pin Super Minimold (M01)
<p>Top view dimensions:            Total width: <math>2.8^{+0.2}_{-0.3}</math>            Pin pitch: <math>1.5^{+0.2}_{-0.1}</math>            Total height: <math>2.9 \pm 0.2</math>            Pin 1 to center: <math>0.95</math>            Pin 2 to center: <math>0.95</math>            Pin 3 to center: <math>0.95</math>            Pin 4 to center: <math>1.9</math>            Pin 5 to center: <math>1.9</math>            Pin 6 to center: <math>1.9</math>            Pin width: <math>0.3^{+0.1}_{-0.05}</math>            Pin spacing: <math>0.2 \text{ MIN.}</math></p> <p>Side view dimensions:            Lead height: <math>1.1^{+0.2}_{-0.1}</math>            Lead width: <math>0.8</math>            Lead thickness: <math>0 \text{ to } 0.1</math>            Lead angle: <math>0.13 \pm 0.1</math></p>	<p>Top view dimensions:            Total width: <math>2.1 \pm 0.1</math>            Pin pitch: <math>1.25 \pm 0.1</math>            Total height: <math>2.0 \pm 0.2</math>            Pin 1 to center: <math>0.65</math>            Pin 2 to center: <math>0.65</math>            Pin 3 to center: <math>0.65</math>            Pin 4 to center: <math>1.3</math>            Pin 5 to center: <math>1.3</math>            Pin 6 to center: <math>1.3</math>            Pin width: <math>0.2^{+0.1}_{-0.05}</math>            Pin spacing: <math>0.1 \text{ MIN.}</math></p> <p>Side view dimensions:            Lead height: <math>0.9 \pm 0.1</math>            Lead width: <math>0.7</math>            Lead thickness: <math>0 \text{ to } 0.1</math>            Lead angle: <math>0.15^{+0.1}_{-0.05}</math></p>
6-Pin Thin-Type Super Minimold	Flat-Lead 6-Pin Thin-Type Ultra Super Minimold
<p>Top view dimensions:            Total width: <math>2.10 \pm 0.1</math>            Pin pitch: <math>1.25 \pm 0.1</math>            Total height: <math>2.00 \pm 0.2</math>            Pin 1 to center: <math>0.65</math>            Pin 2 to center: <math>0.65</math>            Pin 3 to center: <math>0.65</math>            Pin 4 to center: <math>1.30</math>            Pin 5 to center: <math>1.30</math>            Pin 6 to center: <math>1.30</math>            Pin width: <math>0.22^{+0.1}_{-0.05}</math>            Pin spacing: <math>0.22^{+0.1}_{-0.05}</math></p> <p>Side view dimensions:            Lead height: <math>0.60 \pm 0.1</math>            Lead width: <math>0.45</math>            Lead thickness: <math>0 \text{ to } 0.1</math>            Lead angle: <math>0.13 \pm 0.05</math></p>	<p>Top view dimensions:            Total width: <math>1.50 \pm 0.1</math>            Pin pitch: <math>1.10 \pm 0.1</math>            Total height: <math>1.50 \pm 0.1</math>            Pin 1 to center: <math>0.48</math>            Pin 2 to center: <math>0.48</math>            Pin 3 to center: <math>0.48</math>            Pin 4 to center: <math>0.96</math>            Pin 5 to center: <math>0.96</math>            Pin 6 to center: <math>0.96</math>            Pin width: <math>0.20^{+0.1}_{-0.05}</math>            Pin spacing: <math>0.20^{+0.1}_{-0.05}</math></p> <p>Side view dimensions:            Lead height: <math>0.55 \pm 0.05</math>            Lead thickness: <math>0 \text{ to } 0.1</math>            Lead angle: <math>0.11^{+0.1}_{-0.05}</math></p>

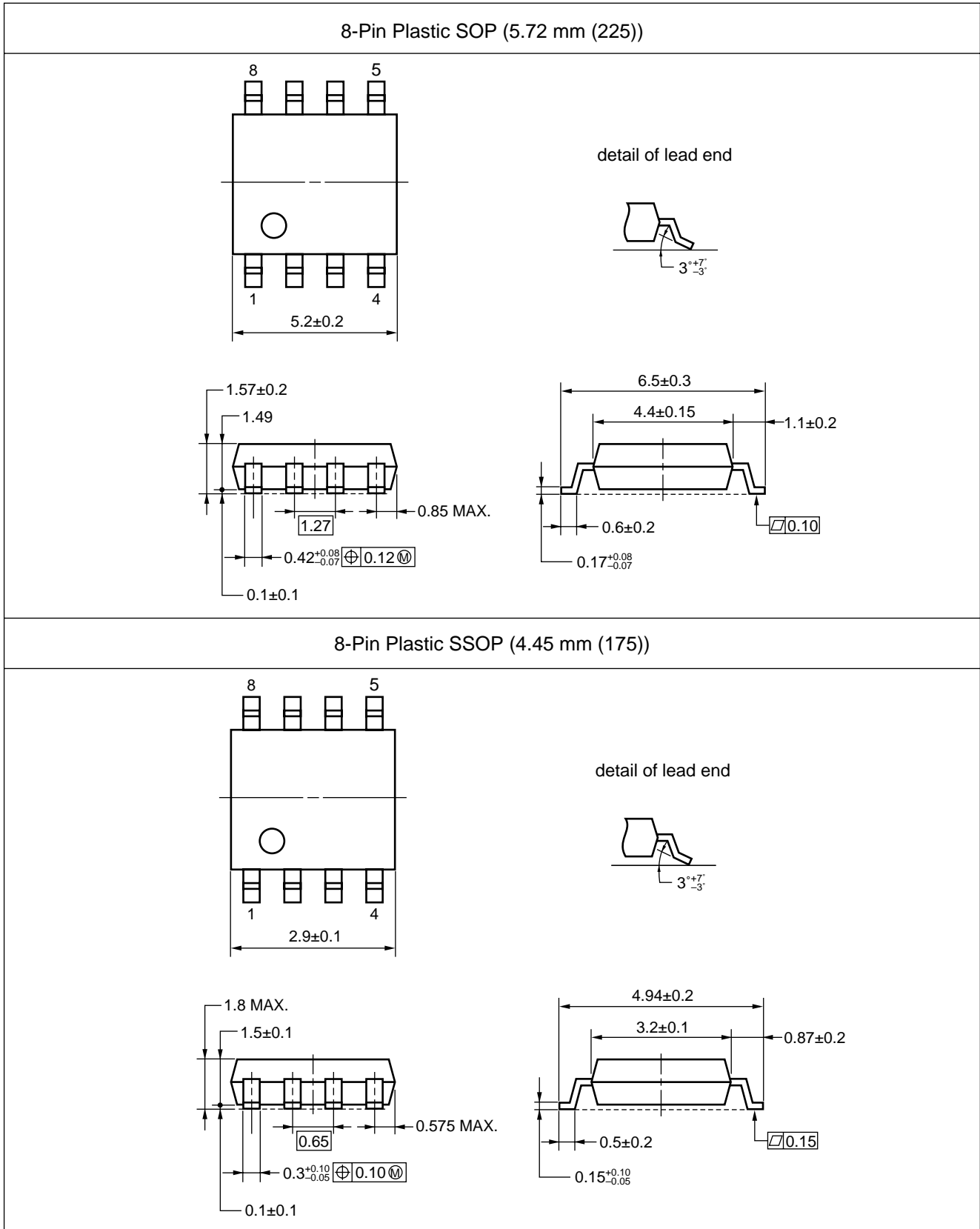
## Package Dimensions (6/19)

(Unit : mm)

8-Pin Ceramic (T-31)	
 <p>The drawing shows the dimensions for an 8-pin ceramic package (T-31). The top view shows a square body with a width of 10.6 MAX. and a height of 10.6 MAX. The pins are numbered 1 through 8. The distance between pins 2 and 3 is 1.27±0.1 mm, and between pins 3 and 4 is 1.27±0.1 mm. The distance from the center to pin 4 is 4-0.6 mm, and from the center to pin 2 is 4-0.4 mm. The distance between pins 6 and 7 is 3.8±0.2 mm. The side view shows a height of 1.7 MAX. and a thickness of 0.2<sup>+0.05</sup>/<sub>-0.02</sub> mm.</p>	

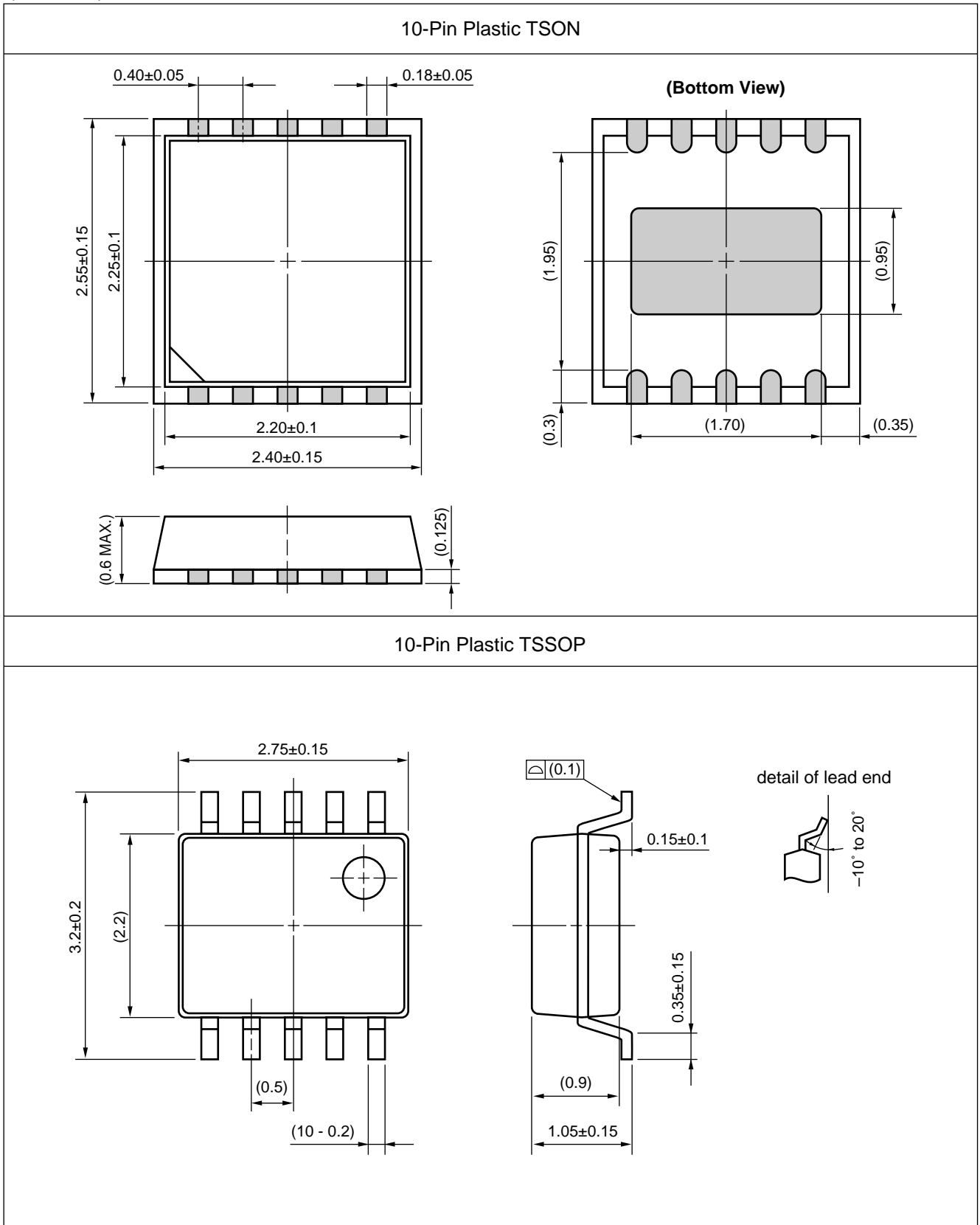
## Package Dimensions (7/19)

(Unit : mm)



## Package Dimensions (8/19)

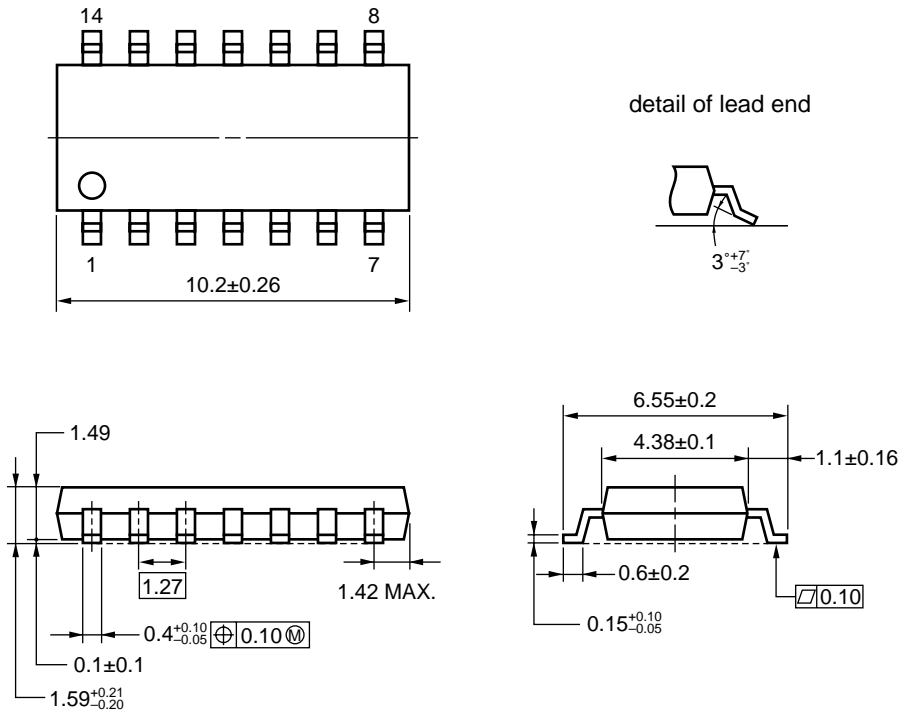
(Unit : mm)



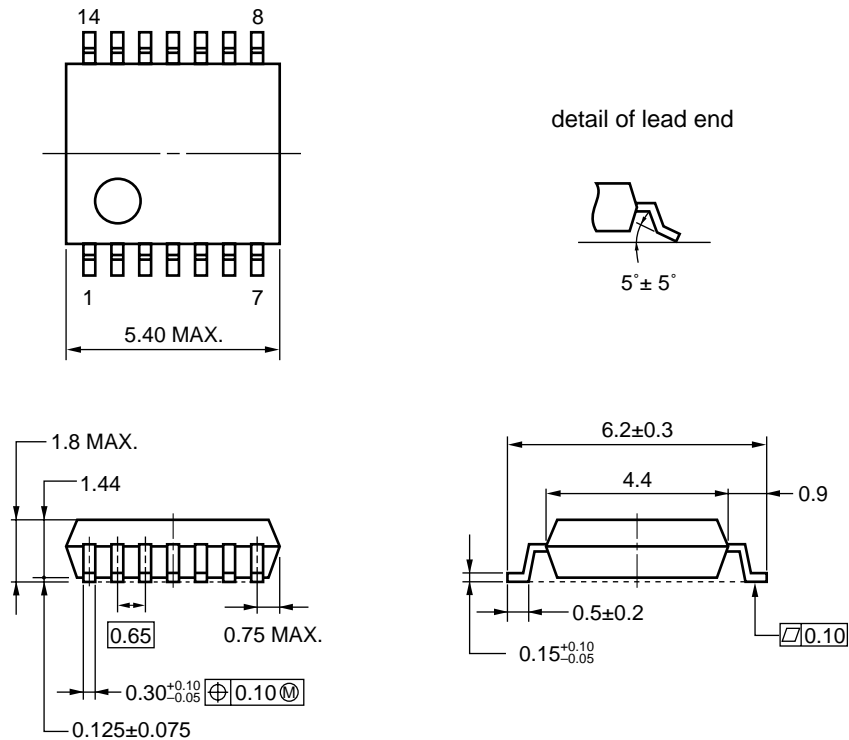
## Package Dimensions (9/19)

(Unit : mm)

### 14-Pin Plastic SOP (5.72 mm (225))

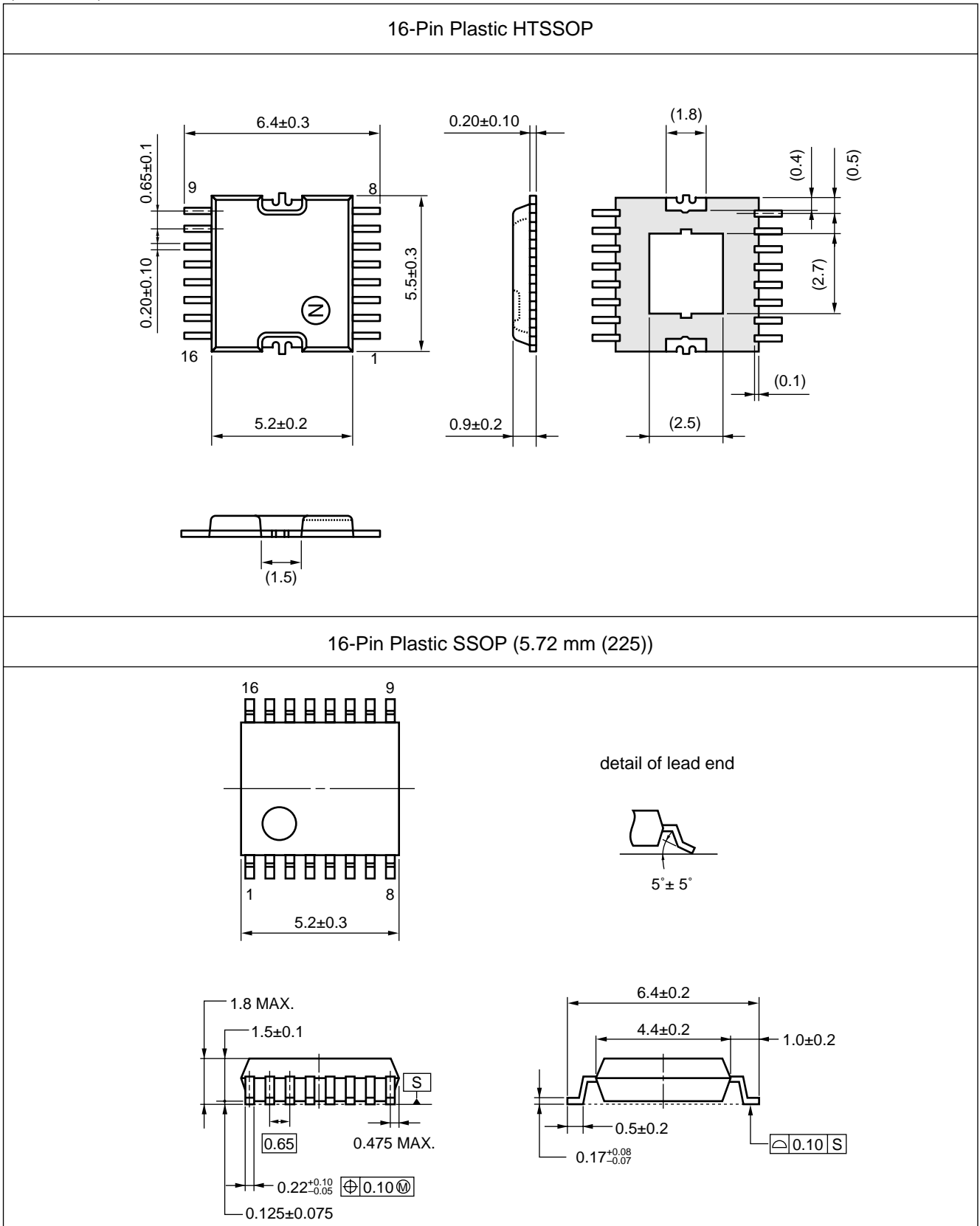


### 14-Pin Plastic SSOP (5.72 mm (225))



## Package Dimensions (10/19)

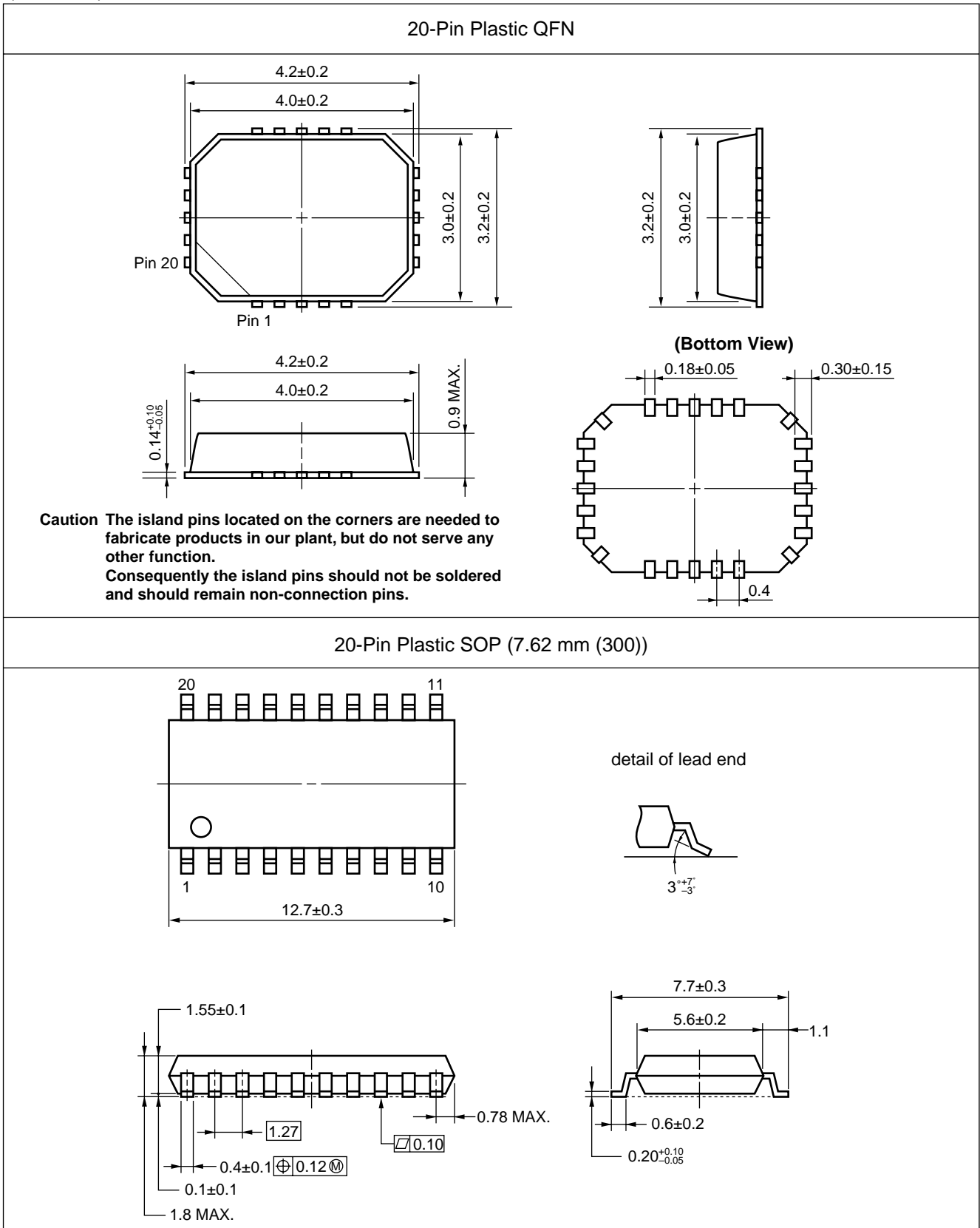
(Unit : mm)





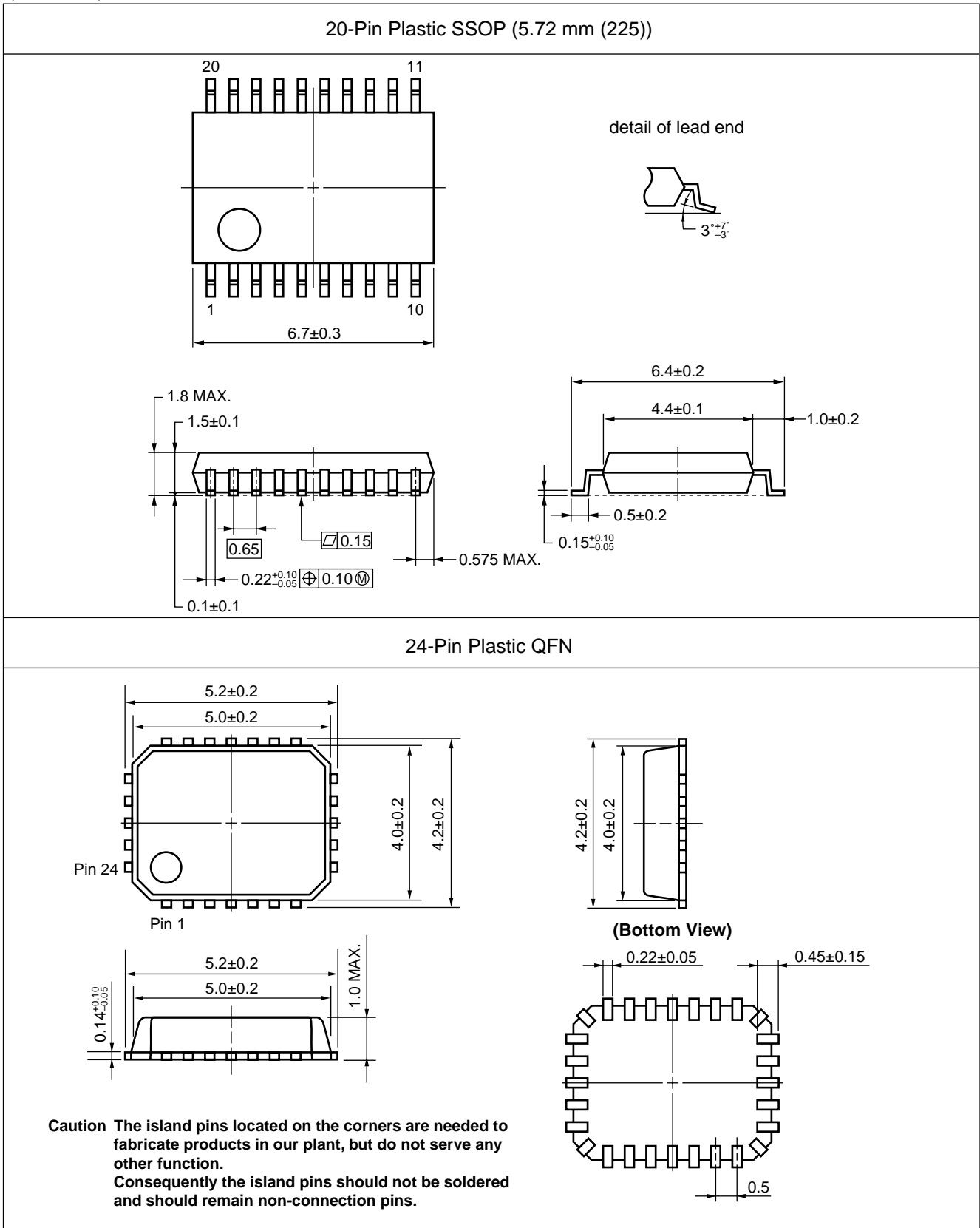
## Package Dimensions (11/19)

(Unit : mm)



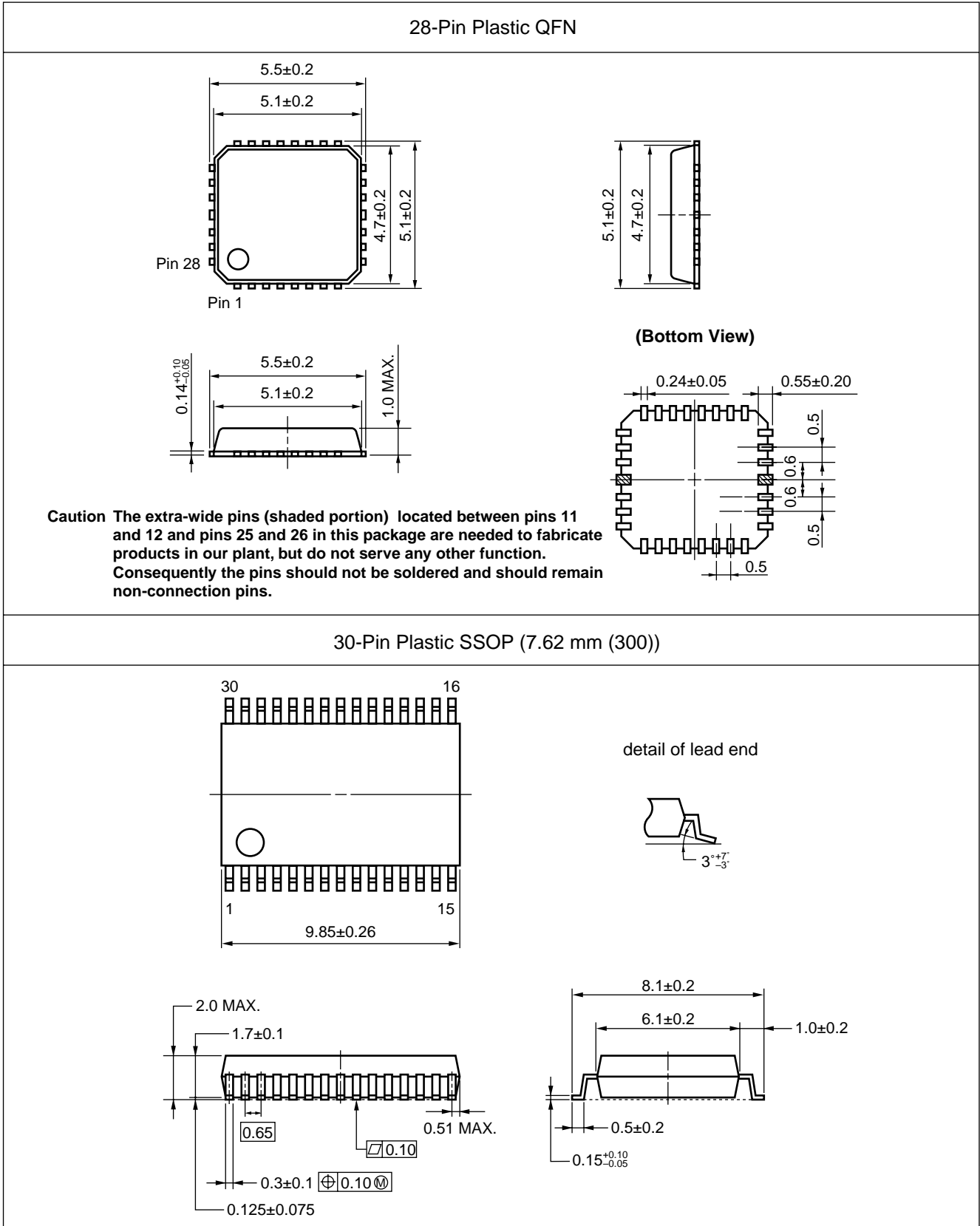
## Package Dimensions (12/19)

(Unit : mm)



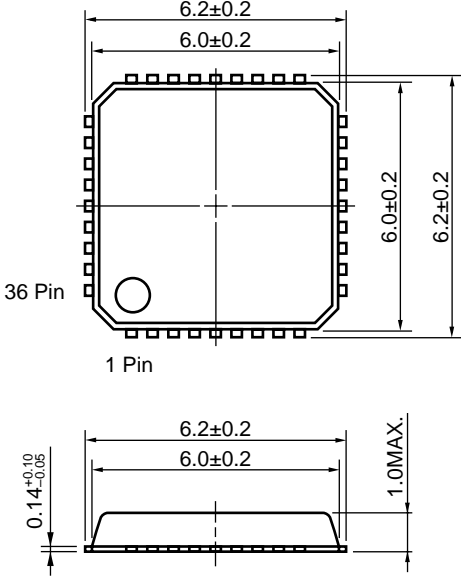
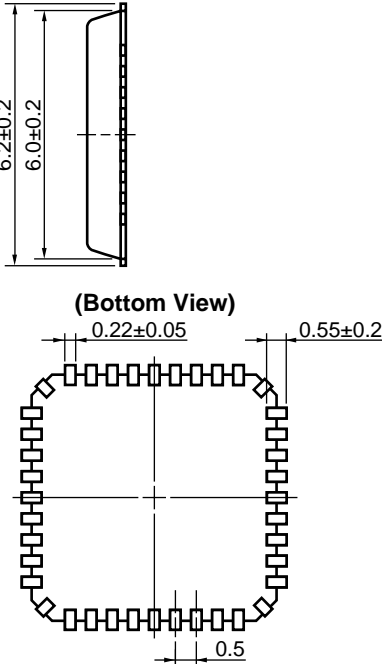
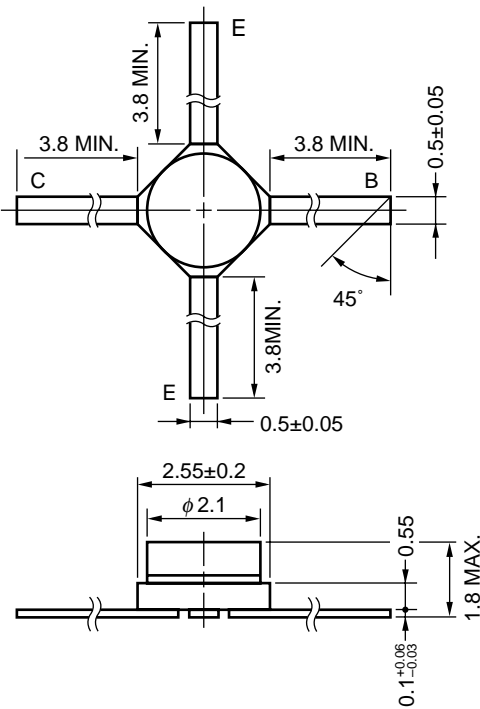
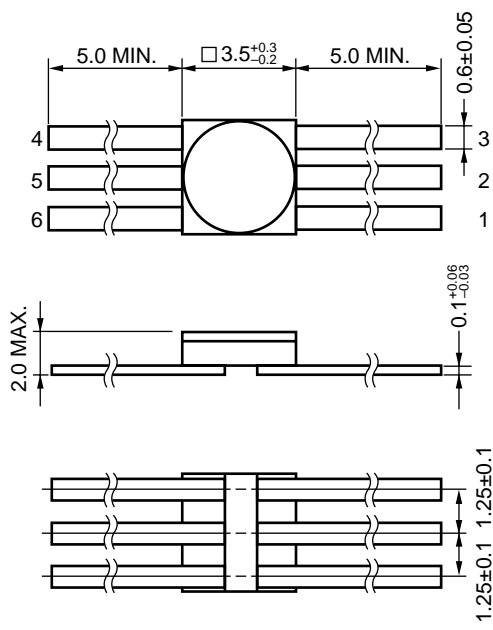
## Package Dimensions (13/19)

(Unit : mm)



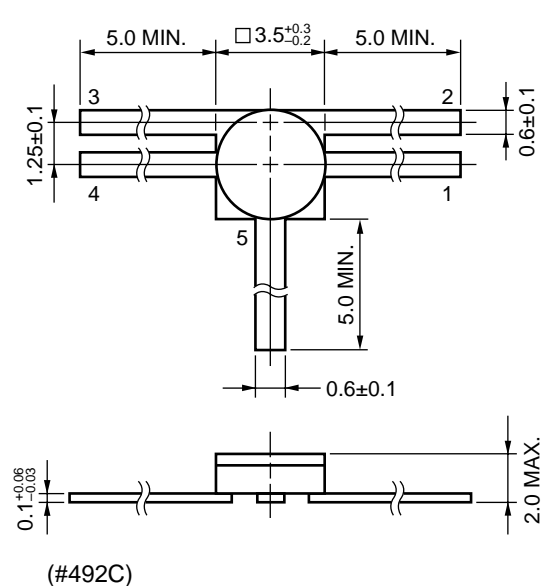
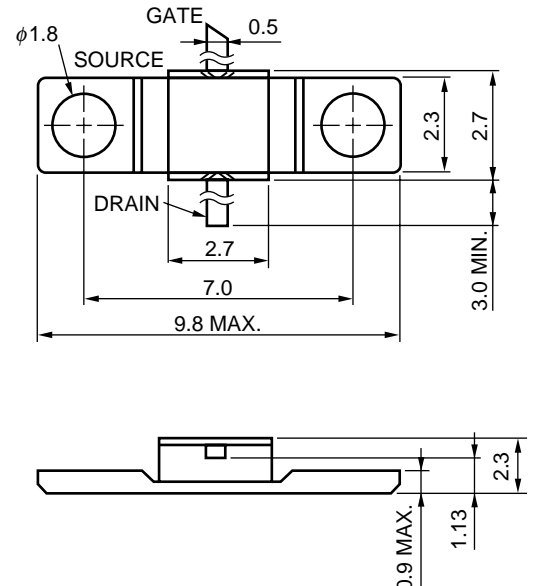
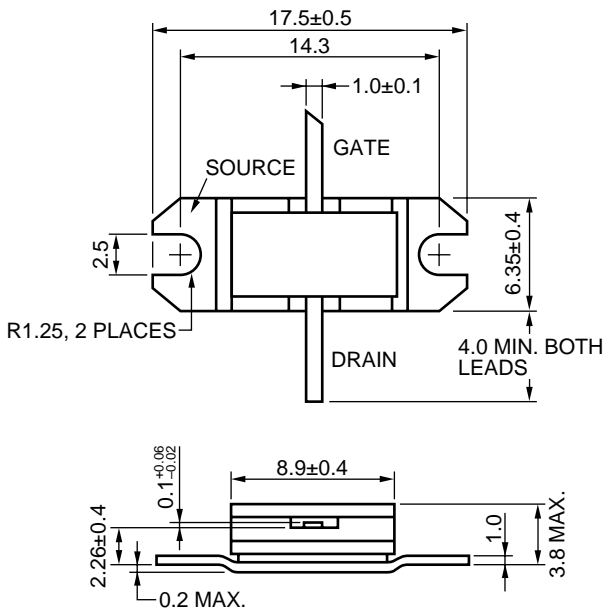
# Package Dimensions (14/19)

(Unit : mm)

36-Pin Plastic QFN	
 <p>36 Pin</p> <p>1 Pin</p> <p>0.14<sup>+0.10</sup>/<sub>-0.06</sub></p> <p>6.2±0.2</p> <p>6.0±0.2</p> <p>6.0±0.2</p> <p>6.2±0.2</p> <p>1.0MAX.</p>	 <p>(Bottom View)</p> <p>0.22±0.05</p> <p>0.55±0.2</p> <p>0.5</p>
<p style="text-align: center;"><math>\mu</math>-X</p>  <p>3.8 MIN.</p> <p>3.8 MIN.</p> <p>3.8 MIN.</p> <p>3.8 MIN.</p> <p>3.8 MIN.</p> <p>45°</p> <p>0.5±0.05</p> <p>2.55±0.2</p> <p>2.1</p> <p>0.55</p> <p>1.8 MAX.</p> <p>0.1<sup>+0.06</sup>/<sub>-0.03</sub></p>	<p style="text-align: center;">40 (Ceramic)</p>  <p>5.0 MIN.</p> <p>3.5<sup>+0.3</sup>/<sub>-0.2</sub></p> <p>5.0 MIN.</p> <p>0.6±0.05</p> <p>3</p> <p>2</p> <p>1</p> <p>2.0 MAX.</p> <p>0.1<sup>+0.06</sup>/<sub>-0.03</sub></p> <p>1.25±0.1</p>

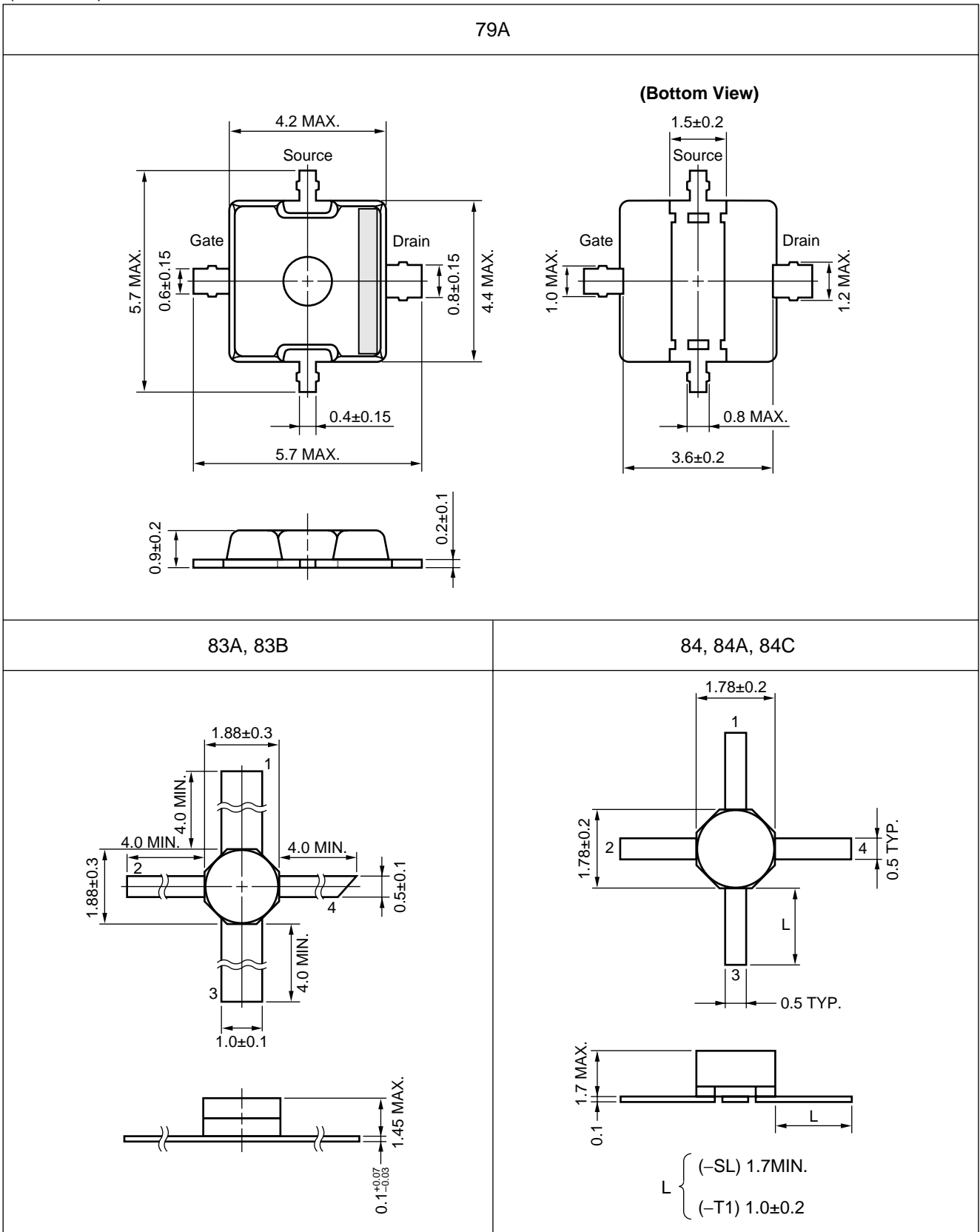
## Package Dimensions (15/19)

(Unit : mm)

41 (Ceramic)	75
 <p style="text-align: center;">41 (Ceramic)</p> <p style="text-align: center;">(#492C)</p> <p>Dimensions for package 41 (Ceramic):</p> <ul style="list-style-type: none"> <li>Top view: 5.0 MIN. (twice), 3.5<sup>+0.3</sup>/<sub>-0.2</sub> (center), 1.25±0.1 (twice), 0.6±0.1 (twice), 5.0 MIN. (bottom lead), 0.6±0.1 (bottom lead width).</li> <li>Side view: 0.1<sup>+0.08</sup>/<sub>-0.03</sub> (lead thickness), 2.0 MAX. (lead height).</li> </ul>	 <p style="text-align: center;">75</p> <p>Dimensions for package 75:</p> <ul style="list-style-type: none"> <li>Top view: φ1.8 (SOURCE), 0.5 (GATE), 2.3 (lead width), 2.7 (lead width), 7.0 (total width), 9.8 MAX. (total width), 3.0 MIN. (total width), 2.7 (lead width).</li> <li>Side view: 0.9 MAX. (lead height), 1.13 (lead height), 2.3 (lead height).</li> </ul>
 <p style="text-align: center;">77</p> <p>Dimensions for package 77:</p> <ul style="list-style-type: none"> <li>Top view: 17.5±0.5 (total width), 14.3 (total width), 1.0±0.1 (lead width), 2.5 (lead width), R1.25, 2 PLACES (fillet), 6.35±0.4 (lead width), 4.0 MIN. BOTH LEADS (lead height).</li> <li>Side view: 2.26±0.4 (lead height), 0.2 MAX. (lead height), 0.1<sup>+0.08</sup>/<sub>-0.02</sub> (lead thickness), 8.9±0.4 (total width), 1.0 (lead height), 3.8 MAX. (lead height).</li> </ul>	

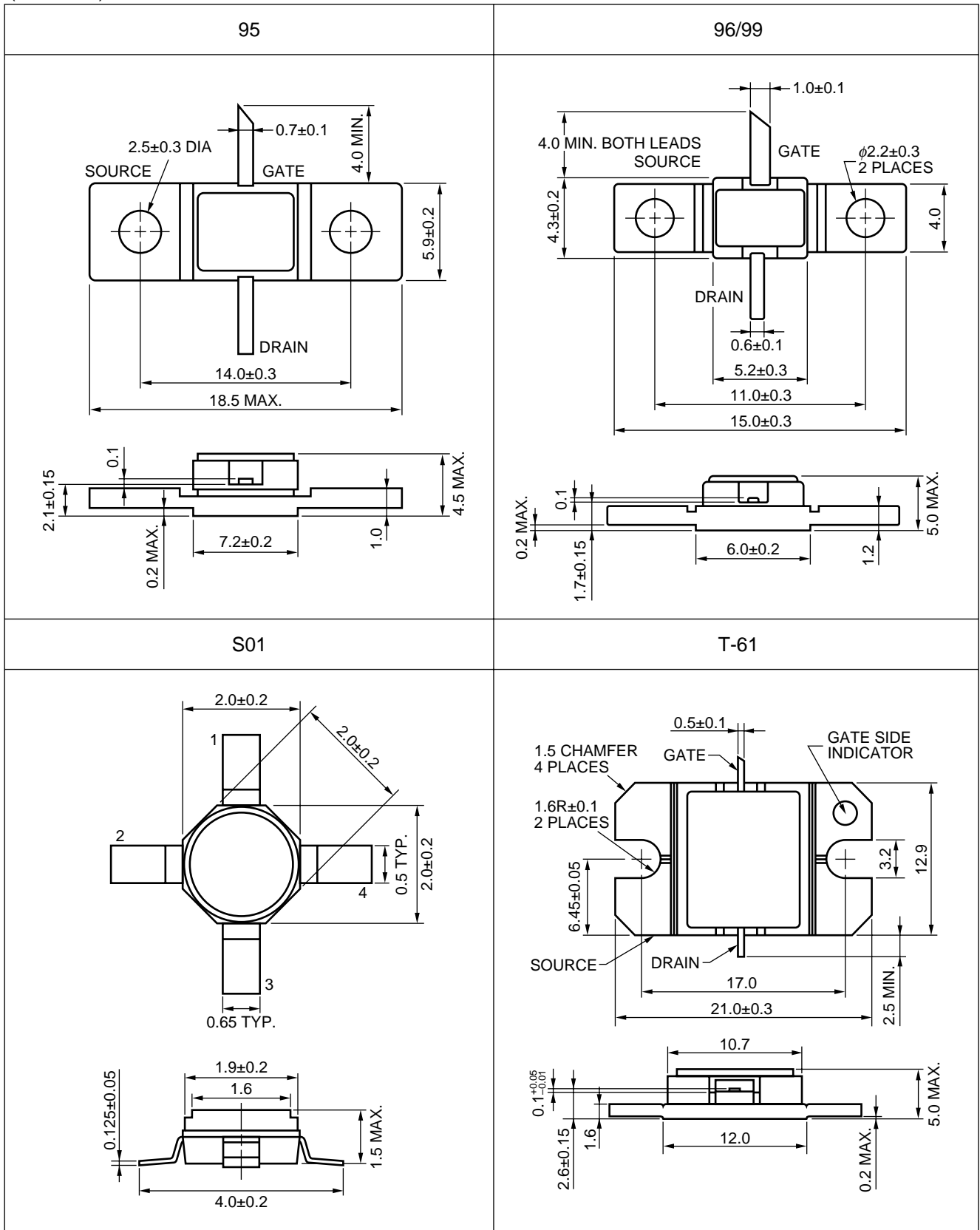
## Package Dimensions (16/19)

(Unit : mm)



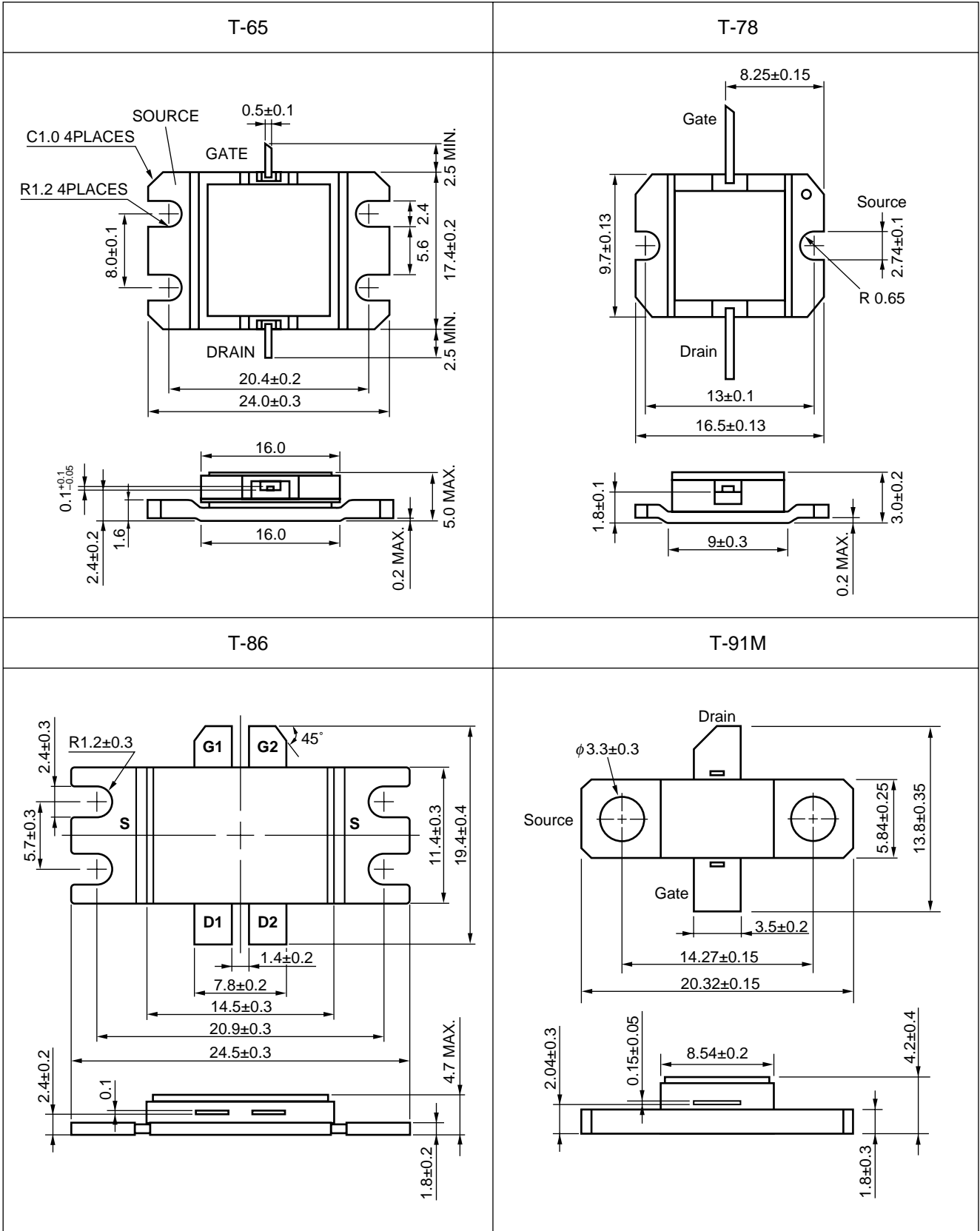
## Package Dimensions (17/19)

(Unit : mm)



# Package Dimensions (18/19)

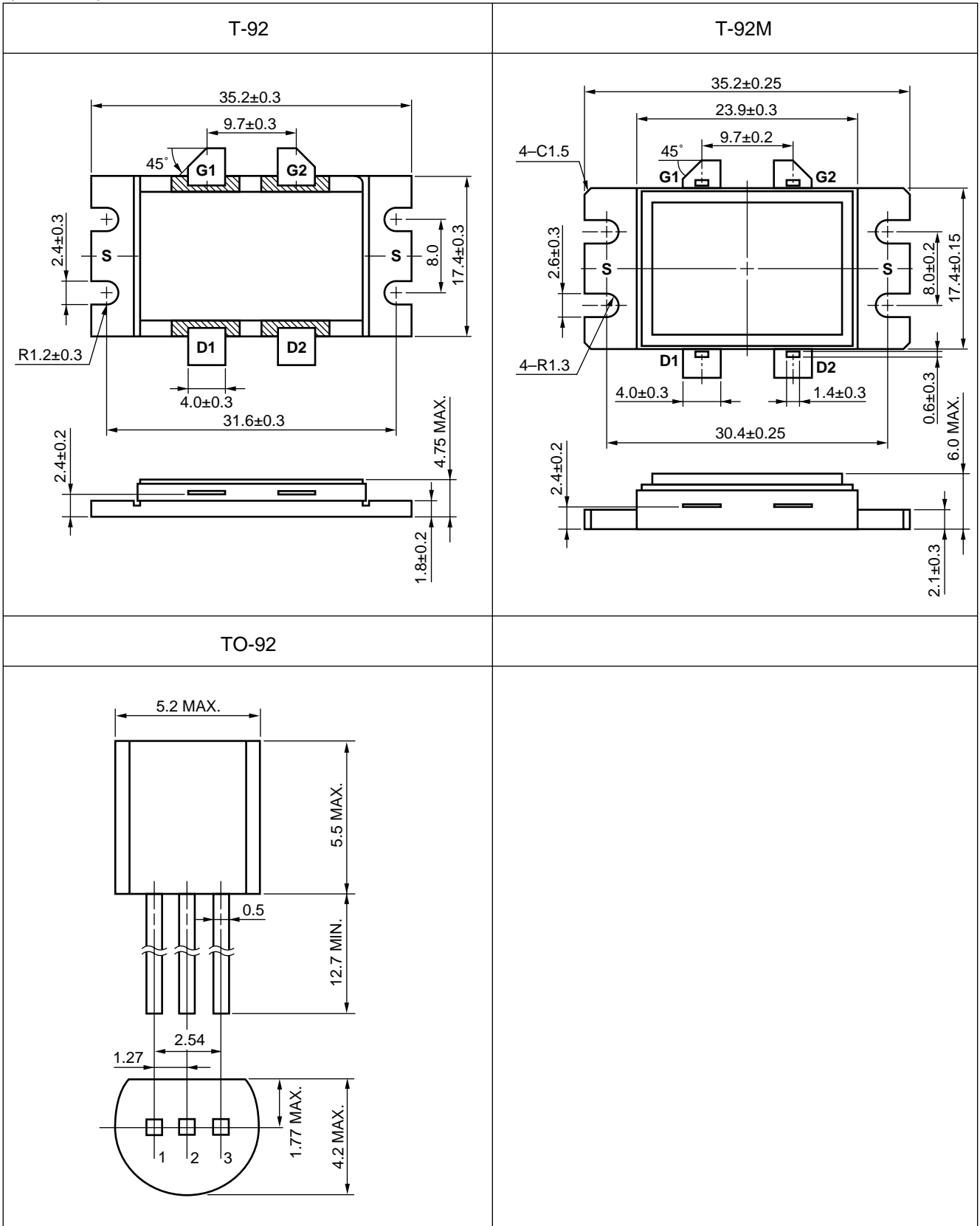
(Unit : mm)





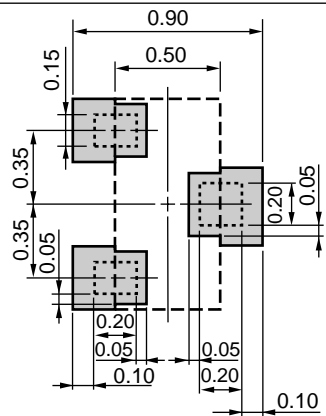
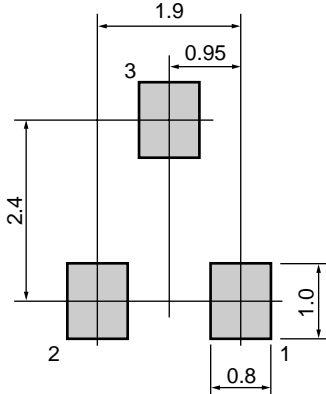
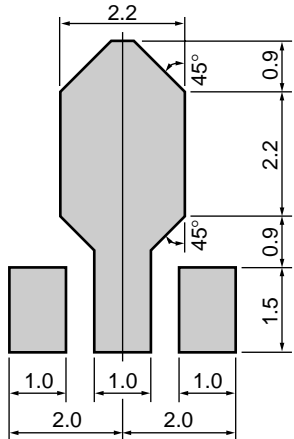
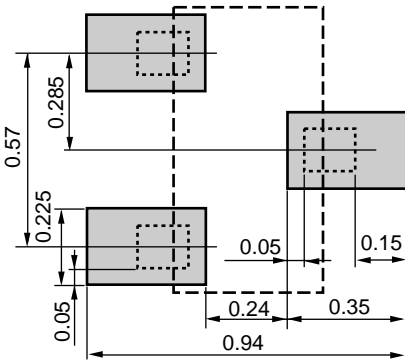
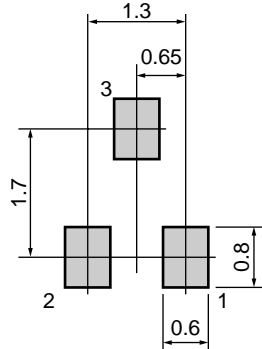
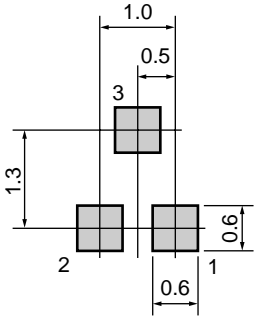
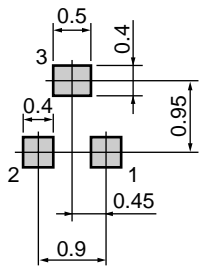
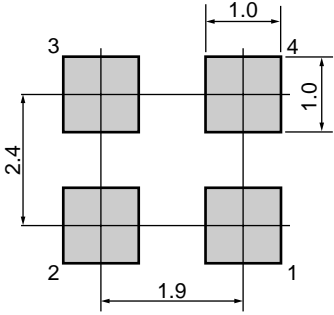
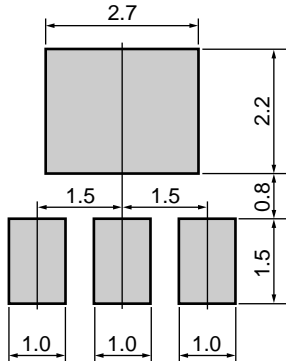
## Package Dimensions (19/19)

(Unit : mm)



## Mounting Pad Layout (1/3)

(Unit : mm)

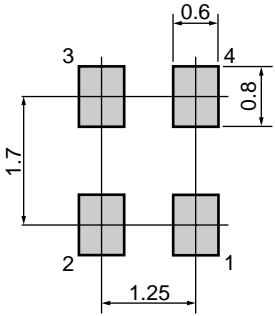
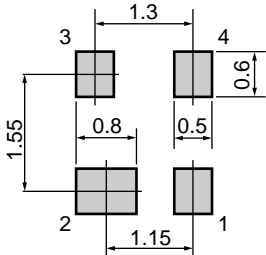
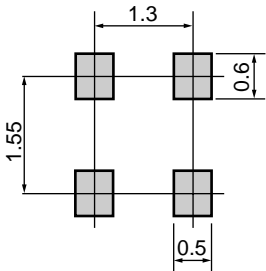
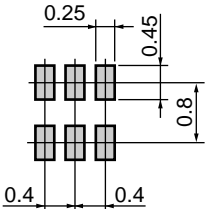
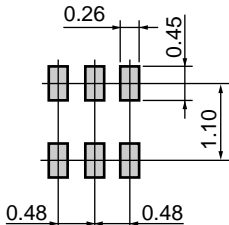
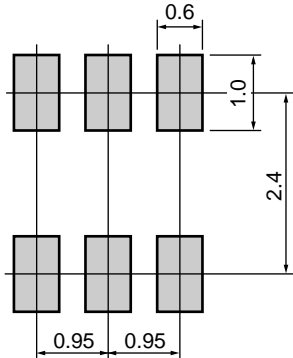
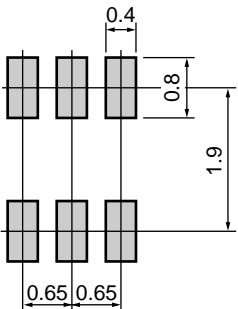
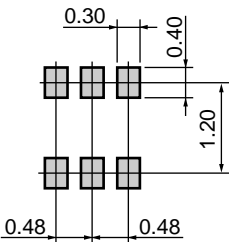
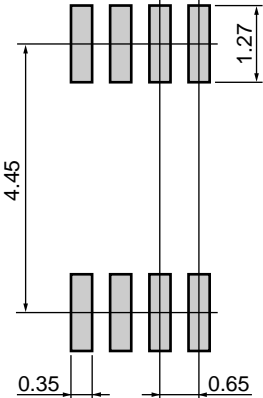
3-Pin Lead-Less Minimold	3-Pin Minimold	3-Pin Power Minimold
 <p style="font-size: small;"> <b>Remark</b>    - - - : Mold package                         ····· : Lead         </p>		
★ 3-Pin Super Lead-Less Minimold	3-Pin Super Minimold	3-Pin Ultra Super Minimold
 <p style="font-size: small;"> <b>Remark</b>    - - - : Mold package                         ····· : Lead         </p>		
Flat-Lead 3-Pin Thin-Type Ultra Super Minimold	4-Pin Minimold (39)	4-Pin Power Minimold
		

**Remark** The mounting pad layouts in this document are for reference only.

## Mounting Pad Layout (2/3)

(Unit : mm)

★

<p style="text-align: center;">4-Pin Super Minimold (18)</p> 	<p style="text-align: center;">Flat-Lead 4-Pin Thin-Type Super Minimold (M04)</p> 	<p style="text-align: center;">Flat-Lead 4-Pin Thin-Type Super Minimold (M05)</p> 
<p style="text-align: center;">6-Pin Lead-Less Minimold (1208 PKG)</p> 	<p style="text-align: center;">6-Pin Lead-Less Minimold (1511 PKG) for Silicon MMIC/GaAs MMIC</p> 	<p style="text-align: center;">6-Pin Minimold</p> 
<p style="text-align: center;">6-Pin Super Minimold (M01)</p> 	<p style="text-align: center;">Flat-Lead 6-Pin Thin-Type Ultra Super Minimold</p> 	<p style="text-align: center;">8-Pin Plastic SSOP (4.45 mm (175))</p> 

### Mounting Pad Layout (3/3)

(Unit : mm)

<p><b>10-Pin Plastic TSON</b></p>	<p><b>14-Pin Plastic SSOP (5.72 mm (225))</b></p>	<p><b>16-Pin Plastic SSOP (5.72 mm (225))</b></p>
<p><b>20-Pin Plastic SSOP (5.72 mm (225))</b></p>	<p><b>24-Pin Plastic QFN</b></p>	<p><b>28-Pin Plastic QFN</b></p>
<p><b>79A</b></p> <p>Stop up the hole with a rosin or something to avoid solder flow.</p>		

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► **Business issue**

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► **Technical issue**

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