

MITSUBISHI ELECTRIC CORPORATION

Technical Note	Prepared by	<i>T. Hozumi</i>	R				
	Checked by	<i>J. Ishida</i>	E				
	Approved by	<i>K. Maemura</i>	V				
	DATE	<i>108-4/28</i>					

Recommended assemble method for MITSUBISHI's leadless packaged device

Contents

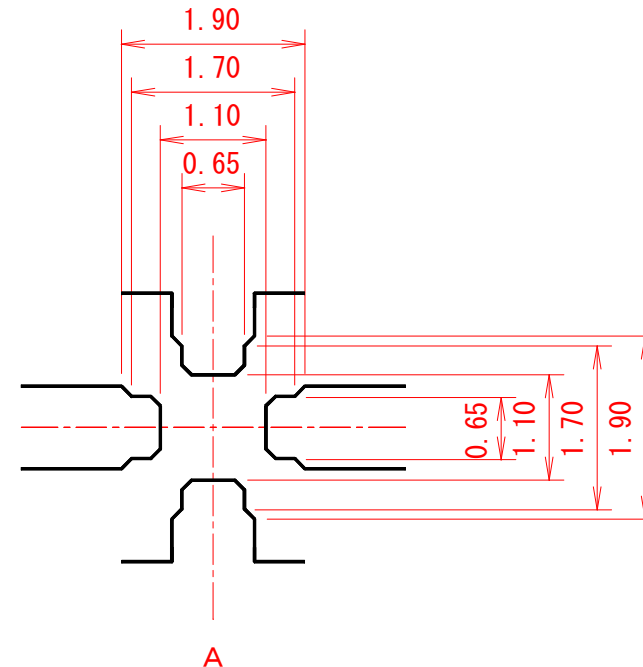
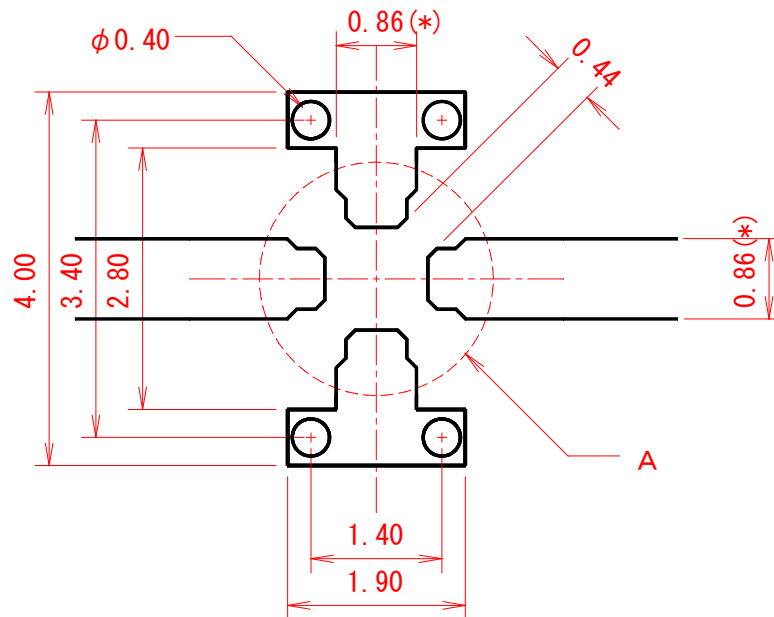
1. Recommended foot pattern and metal mask pattern
2. Recommended reflow soldering
3. Visual Inspection
4. Rework process
5. Evaluation of Solder Printing
6. Notice

1-a Recommended Foot pattern for MGF495*A

Unit : mm

 Tolerance : ± 0.05

Point 1: The distance between approaching foot patterns is keeping 0.3 mm or more.
(\rightarrow Prevent short circuit by soldering.)

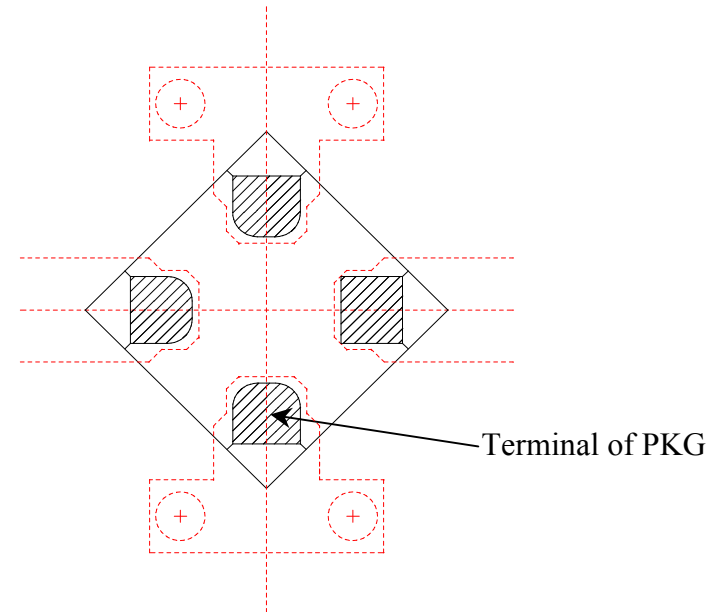
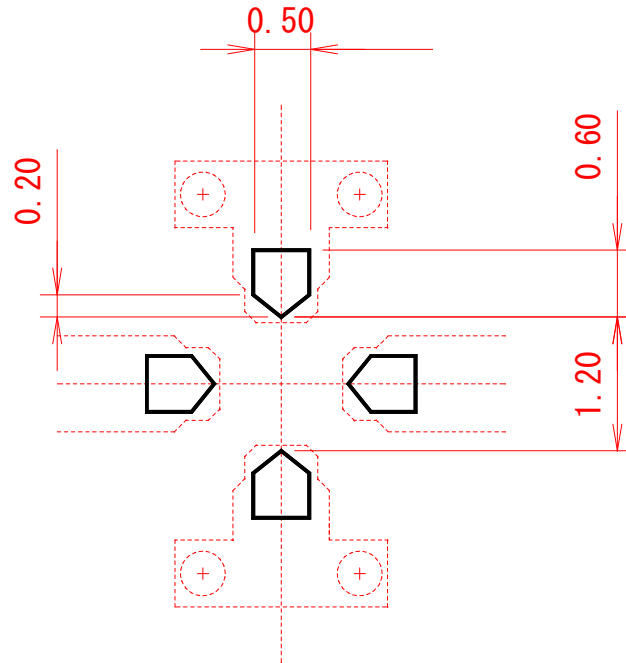


Point 2: The width of foot pattern is made as equal as possible to the terminals width of package. (Recommend : 0.65mm)
The distance between inner foot pattern edge is set 1.10mm.
(\rightarrow We can guarantee the best position Accuracy.)

(*) This dimension be changed by following conditions.
 a. characteristic impedance
 b. substrate characteristics (material,thickness,and so on)
 0.96mm is the width of 50-ohm micro strip line for teflon ($\epsilon_r=2.6,t=0.4\text{mm}$) substrate.

1-b Recommended Metal Mask pattern for MGF495*A

Unit : mm
Tolerance : ± 0.05



Metal Mask Thickness = 0.15mm

Point 3 : Each quantity of solder have to be same quantity for all terminals.
(→ Prevent inclination of package.)

Point 4 : The distance of a sauce Via hole edge and package edge is keeping 0.4mm or more.
(→ Prevent that solder flow in Via hole.)

2 Recommended reflow soldering (Lead free Solder)

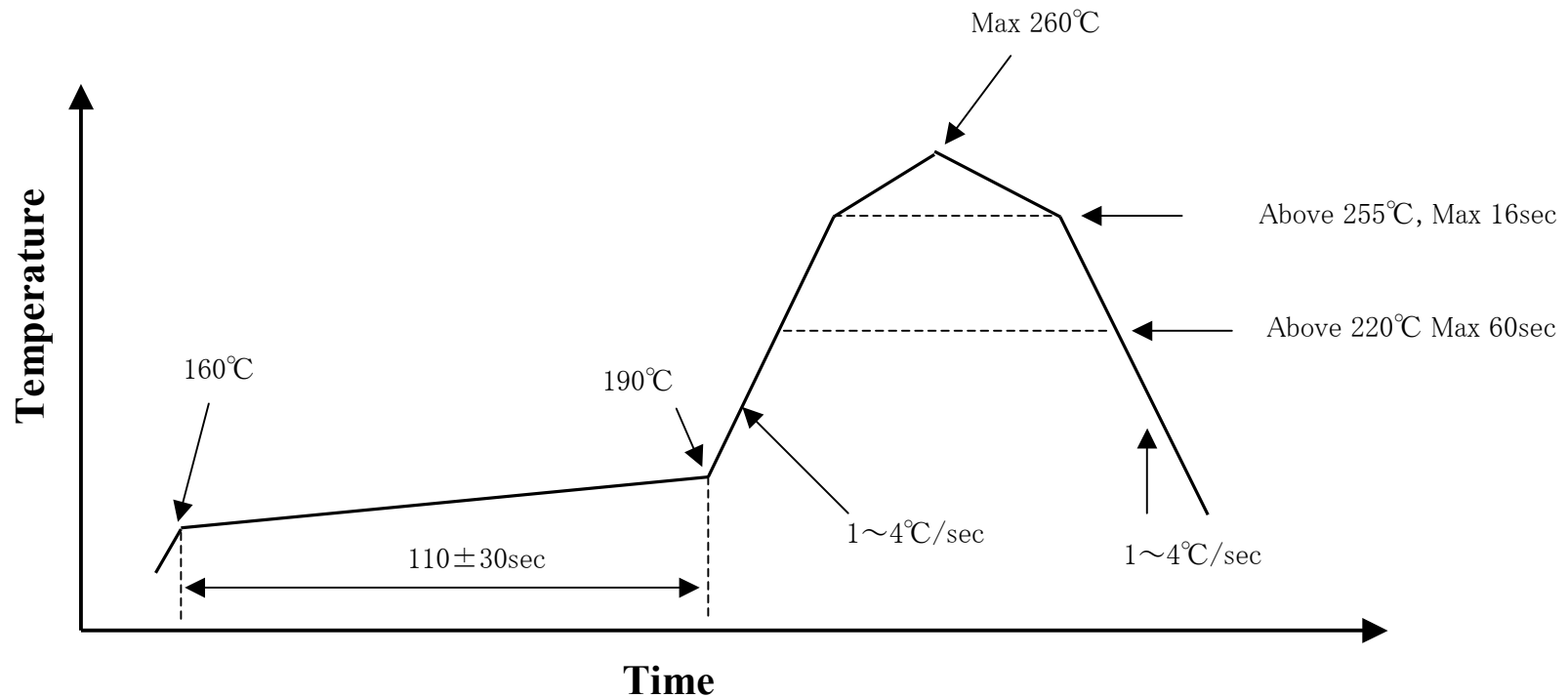
2-1. Solder type

- Alloy : Sn-3Ag-0.5Cu
- Particle Size : 25~35 μ m
- Content of Halide : under 0.1wt%

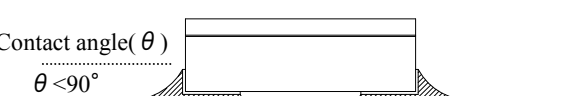

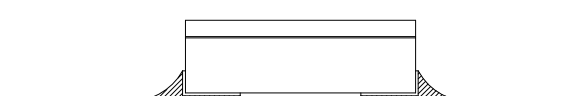
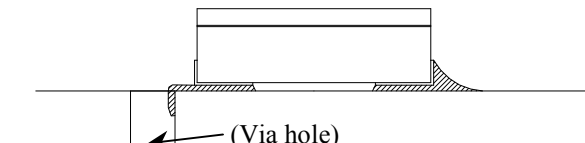
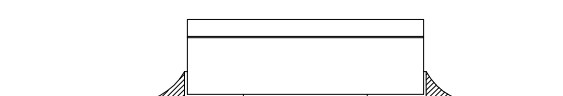

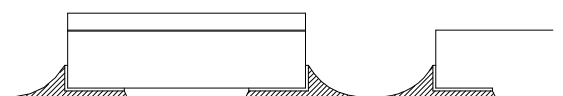
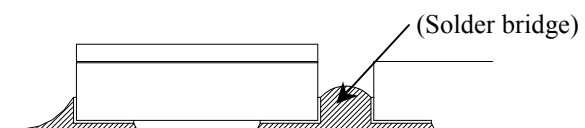
Point:

- Number of reflow : 3 times max
- Indicated temperature means the temperature on the surface of package.
- Keep under 260°C

2-2. Reflow Profile

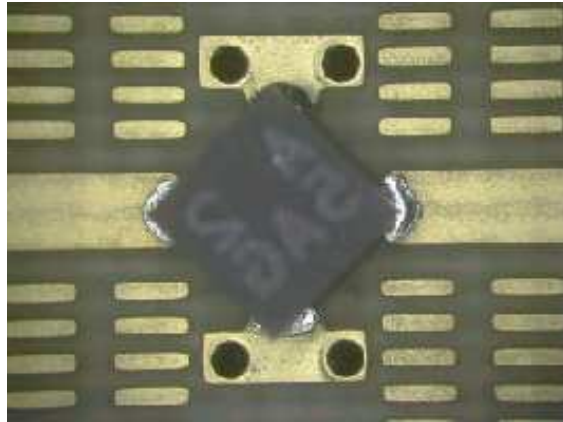


3-a Visual inspection criteria for MGF495*A

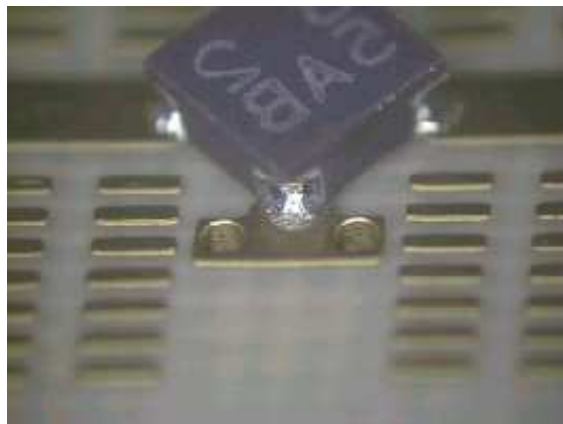
	accept	failure
Shape of solder fillet -.Excess solder	Solder fillet contact angle is less than 90° . Solder is wetting to more than $\frac{1}{2}$ height of a side terminals. Contact angle(θ) $\theta < 90^\circ$ 	Solder fillet contact angle is more than 90° . Contact angle(θ) $\theta > 90^\circ$ 
Shape of solder fillet -.Poor solder	Solder fillet contact angle is less than 90° . Solder is wetting to more than $\frac{1}{2}$ height of a side terminals. 	There is no fillet. (Solder flow into Via hole.)  (Via hole)
Tile of device	The device does not tile. 	Tile of device is more than $100 \mu\text{m}$. $H > 100 \mu\text{m}$ H 
Solder bridge	There is no solder bride. 	Solder bridge between devices on the same pattern.  (Solder bridge)

3-b Visual inspection

(a) Ideal mounting



Top view

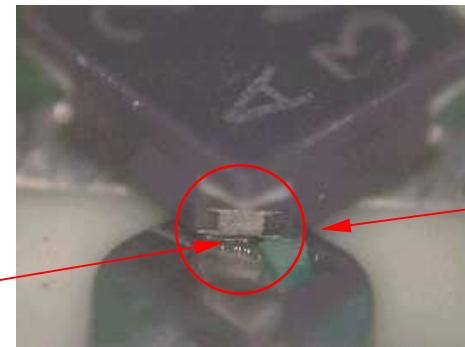


Side view

(b) failure mounting



Excess solder
(Fillet angle $> 90^\circ$)



Poor solder
(There is no fillet)

Floating

If quantity of solder increases (excess solder), Package may float and the RF characteristic may degrade.

4 Rework Process for MGF495*A

To rework MGF495*A on application board, We recommend the following soldering rework Method.

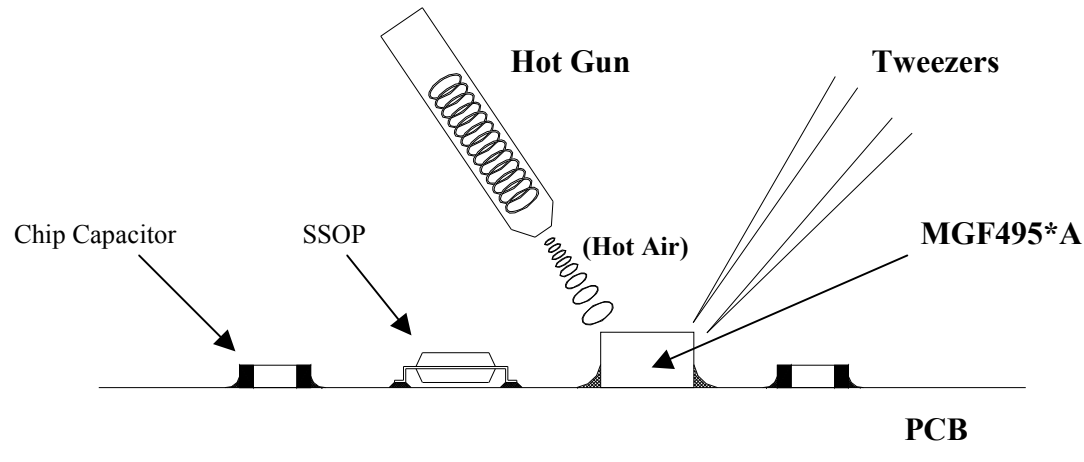


Fig. Soldering Rework Method for MGF495*A

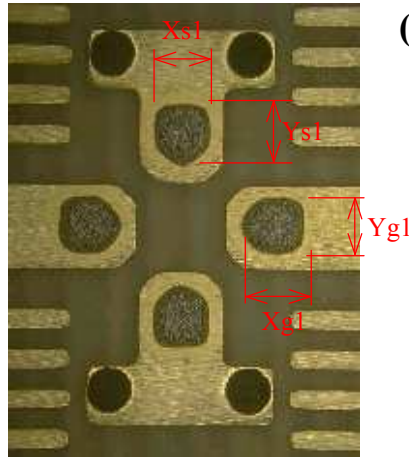
Soldering rework method

1. Please adjust the temperature and position of hot gun so that the surface temperature of Package which needs rework becomes about 240 ~ 260deg.C.
2. After the solder melts, please take rework Package using tweezers.

Attention

1. Please be careful so that the solder of the other adjacent components does not melt by thermal influence
2. Mitsubishi does not recommended, and also not guarantee to use the removed Package.
3. Please put on a wrist wrap in order to protect the other devices from ESD.

5 Evaluation of Solder Printing



(1) Solder shape of MGF495*A

Metal Mask Size & Solder shape after printing

	Xs1	Ys1	Xg1	Yg1
Mask Size	0.5	0.6	0.6	0.5
Solder Size	0.539	0.599	0.589	0.549



Printability is no problem.

Equipment

NM-PC10 (Panaset)

Solder

OZ 2062-221CM5-32-11
(Senju-Metal)

Printing Condition

1. Rubber Plate Speed :
- 2.
- 3.

4 Notice

These conditions which is shown on this technical note is not only guaranteed condition but also MITSUBISHI's recommended conditions.

Please confirm the assembly conditions at customer side before using our device.

MITSUBISHI ELECTRIC CORPORATION

Rev. No.	SUMMARY OF CHANGES	SIGNATURE & DATE
*	Newly prepared based on CSTG-11544	<i>T. Horomi</i> 28/Apr./2008