

Mounting Instructions for High Power Modules

Mounting Instruction

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1. Scope

This document describes about recommended mounting procedures for M151/M152/M155/M156/M256/M278 packages.

This mounting instruction is available only for the following modules.

1MBIxxxxVC-120P/1MBIxxxxVC-170E (M151 package)
1MBIxxxxVD-120P/1MBIxxxxVD-170E (M152 package)
1MBIxxxxVR-170E/1MBIxxxxUG-330x (M155 package)
1MBIxxxxVS-170E/1MBIxxxxUE-330x (M156 package)
2MBIxxxxVG-120P/2MBIxxxxVG-170E (M256 package)
2MBIxxxxVT-170E (M278 package)
(ex. 1MBI1200VC-120P)

Note: M151/M152/M256 package.....Cu-baseplate
M155/M156/M278 package.....AlSiC-baseplate

2. The surface of the heat sink

Please keep the following surface about the heat sink surface to attach IGBT.

Flatness $\leq 50\mu\text{m}$ (Sampling frequency = 100mm)

Surface Rz $\leq 10\mu\text{m}$

When mounting (when tightened it) IGBT module when a heat sink surface is out of the range mentioned above, the ceramic (insulation board) which there is between the chip in the IGBT module and a metal base increases stress and might break this module.

When the plane of the heat sink becomes hollow, CTR (contact thermal resistance) may increase

3. Thermal grease application

Please apply thermal grease between a heat sink and the mounting surface of the IGBT module to decrease CTR. Please apply the thermal grease on appropriate thickness. When an application thickness of the thermal grease is inappropriate, the heat radiation to a fin worsens, and it may lead to destruction that chip temperature exceeds T_{vjmax} . As an application method of the thermal grease, we recommend the application method with the stencil mask. (This is because application on the thickness that is uniform on the module back side is possible)

The figure 1 show an outline of the thermal grease application method.

The figure 2,3 shows the example of the stencil mask.

The IGBT module which thermal paste was applied to is attached to a heat sink, and, please tighten a screw by recommended torque.

When a thermal grease thickness is uniform, it can calculate the necessary weight as follows.

$$\text{Thermal grease thickness (}\mu\text{m)} = \frac{\text{Weight of thermal grease (g)} \times 10^4}{\text{Baseplate area of IGBT module (cm}^2\text{)} \times \text{Density of thermal grease (g/cm}^3\text{)}}$$

The thickness of the thermal grease recommends 100 μm .

Model name: HTC01K

Manufacturer: ELECTROLUBE

The most suitable application thickness of the thermal grease changes by a characteristic and an application method of the thermal grease to use. Please use it after confirming it.

4. Clamping

The figure 4,5 show a clamping sequence of the screws for the mounting IGBT module.

Please tighten the screw by prescribed clamping torque.

(Please refer to each model specification for the prescribed torque.)

When torque is short, a module might be warped during movement, and CTR might grow big.

When torque is excessive, a case might be broken.



1. Back to Room Temp.



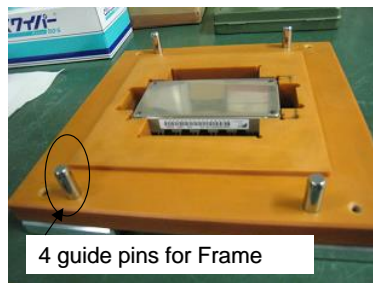
2. Measure weight of IGBT



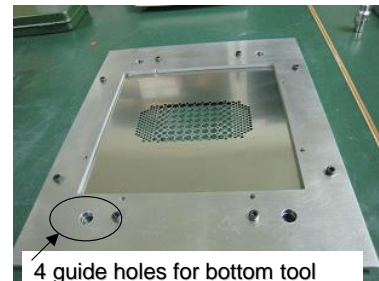
3. Adjust zero



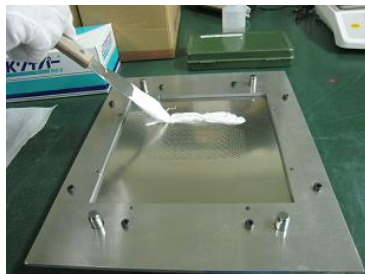
4. Bottom tool



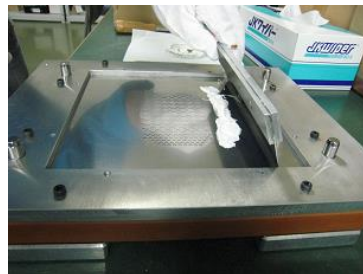
5. Set IGBT module



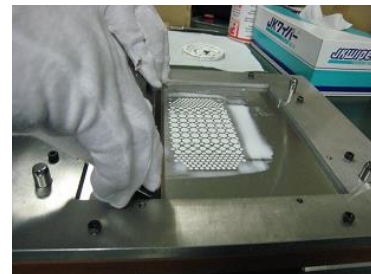
6. Metal mask and Frame



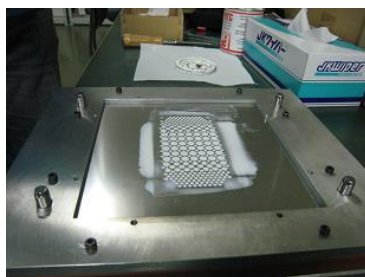
7. Fix tools and put grease with Knife



8. Print with metal squeegee (begin)



9. Print with metal squeegee (end)



10. After printing



11. Open metal mask



12. Check grease weight

Figure 1. Outline of the thermal grease application method

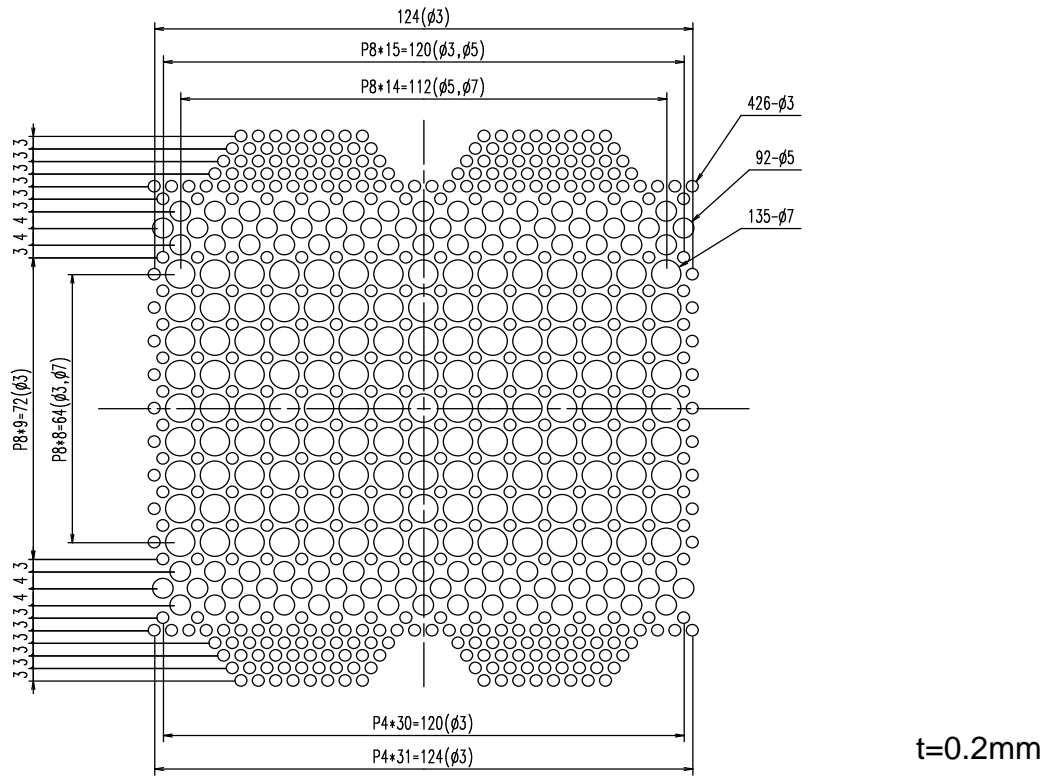


Figure 2. The example of the stencil mask for M151/M155/M256/M278 packages

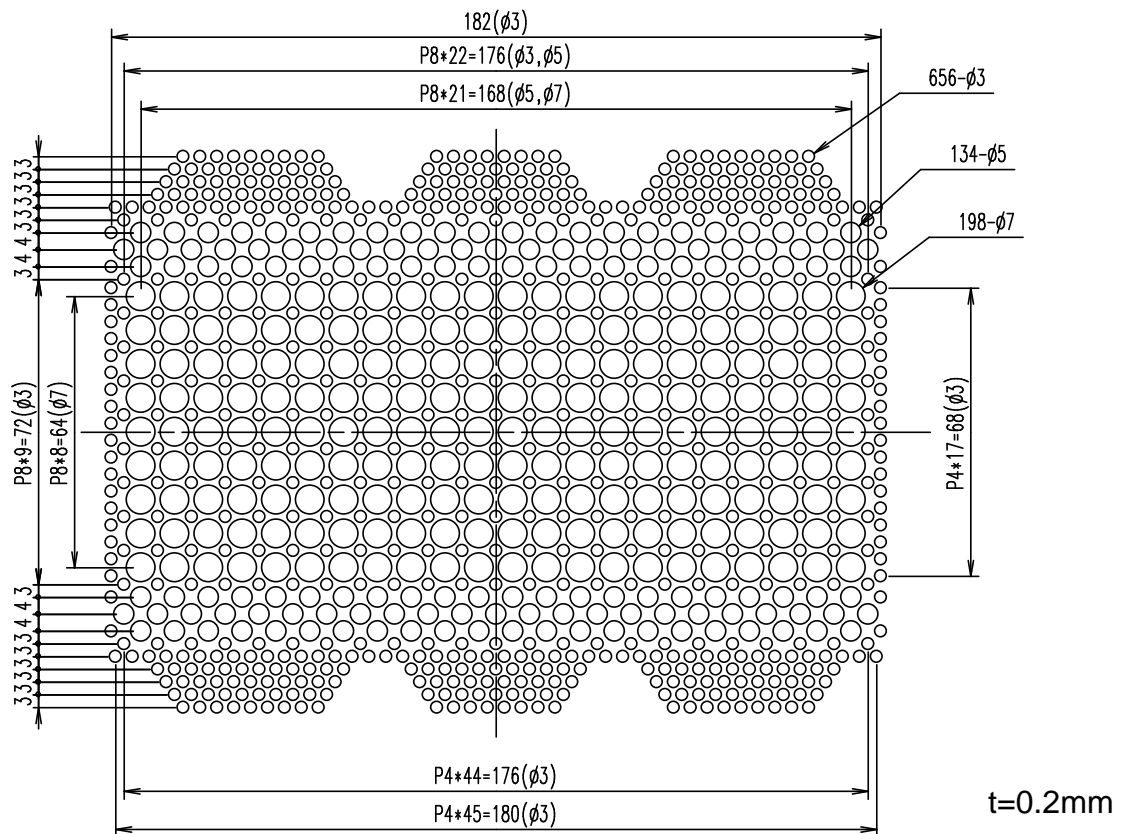
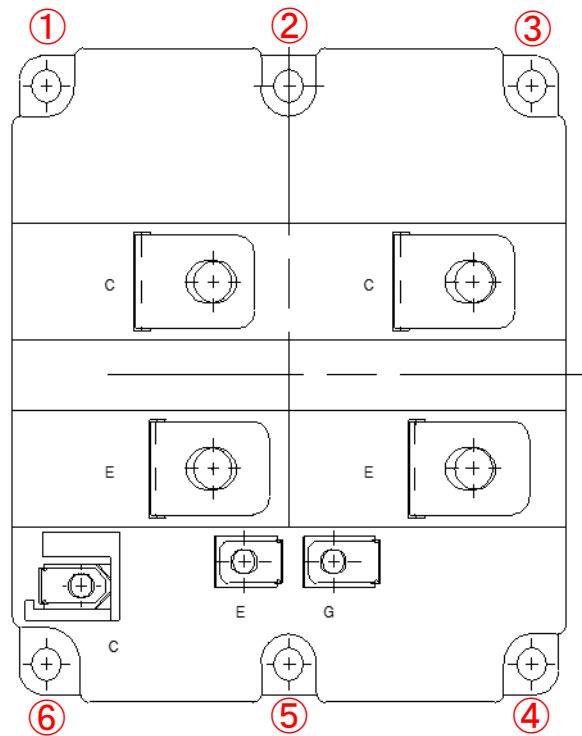
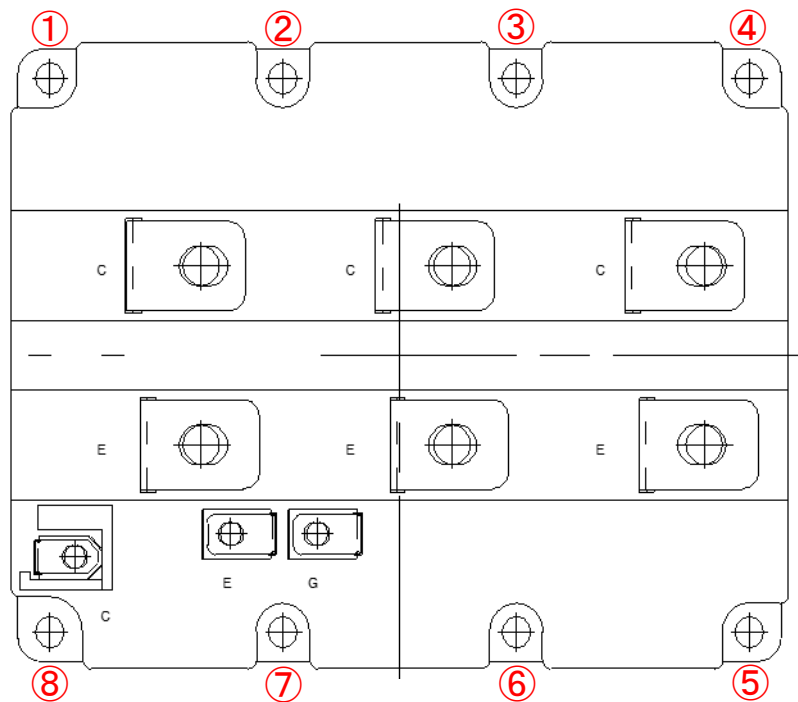


Figure 3. The example of the stencil mask for M152/M156 packages



	torque	sequence
The first (Temporary clamping)	specified torque $\times 1/3$	② \Rightarrow ⑤ \Rightarrow ③ \Rightarrow ⑥ \Rightarrow ① \Rightarrow ④
The second	specified torque	② \Rightarrow ⑤ \Rightarrow ③ \Rightarrow ⑥ \Rightarrow ① \Rightarrow ④

Figure 4. Clamping sequence of the screws for the M151/M155/M256/M278 packages.



	torque	sequence
The first (Temporary clamping)	specified torque $\times 1/3$	② \Rightarrow ⑥ \Rightarrow ③ \Rightarrow ⑦ \Rightarrow ④ \Rightarrow ⑧ \Rightarrow ① \Rightarrow ⑤
The second	specified torque	② \Rightarrow ⑥ \Rightarrow ③ \Rightarrow ⑦ \Rightarrow ④ \Rightarrow ⑧ \Rightarrow ① \Rightarrow ⑤

Figure 5. Clamping sequence of the screws for the M152/M156 packages.

Warning:

This manual contains the product specifications, characteristics, data, materials, and structures as of Oct. 2017.

The contents are subject to change without notice for specification changes or other reasons. When using a product listed in this manual, be sure to obtain the latest specifications.

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Cautions

(1) During transportation and storage

Keep locating the shipping carton boxes to suitable side up. Otherwise, unexpected stress might affect to the boxes. For example, bend the terminal pins, deform the inner resin case, and so on.

When you throw or drop the product, it gives the product damage.

If the product is wet with water, that it may be broken or malfunctions, please subjected to sufficient measures to rain or condensation.

Temperature and humidity of an environment during transportation are described in the specification sheet. There conditions shall be kept under the specification.

(2) Assembly environment

Since this power module device is very weak against electro static discharge, the ESD countermeasure in the assembly environment shall be suitable within the specification described in specification sheet. Especially, when the conducting pad is removed from control pins, the product is most likely to get electrical damage.

(3) Operating environment

If the product had been used in the environment with acid, organic matter, and corrosive gas (hydrogen sulfide, sulfurous acid gas), the product's performance and appearance can not be ensured easily.