



AN-9076

New SPM® 2 Package Mounting Guidance

Mounting Guidance

This application note shows the electric spacing and mounting guidance of new SPM® 2 package.

Electric Spacing

The electric spacing specification of new SPM 2 package is shown Table 1.

Table 1. SPM 2 Package Typical Electric Spacing

| Location | Clearance [mm] | Creepage Distance [mm] |
|---------------------------|----------------|------------------------|
| Between Power Terminals | 7.80 | 8.00 |
| Between Control Terminals | 3.05 | 6.85 |
| Between Terminals & H/S | 3.8 | 6.06 |

Mounting Method and Precautions

When installing a module to a heat sink, excessive uneven fastening force might apply stress to the inside of chips, which leads to damage or degradation of the device. Figure 1 shows recommended fastening order.

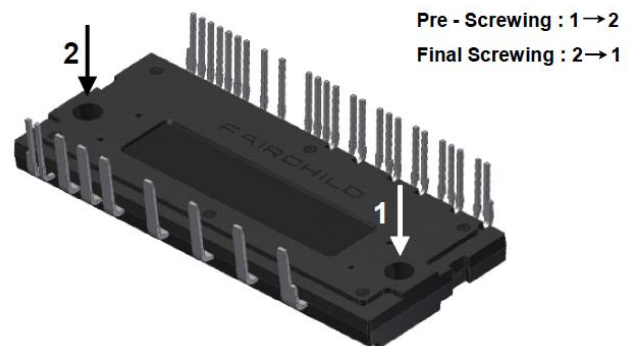


Figure 1. Mounting Screws Fastening Order:

Notes:

- Do not apply excessive torque when mounting screws. Too much torque may cause ceramic cracks as well as destruction of screws and the heat sink.
- Avoid tightening only one side at once. Figure 1 shows the recommended torque order for mounting screws. Uneven mounting can damage the ceramic substrate. The pre-screwing torque needs to be set as 20~30% of the maximum torque rating.

Table 2. Mounting Torque and Heat Sink Flatness Specifications

| Parameter | Conditions | Limits | | | Unit | |
|--------------------|--------------|------------------------|------|------|------|--------|
| | | Min. | Typ. | Max. | | |
| Device Flatness | See Figure 2 | 0 | | +200 | µm | |
| Heat Sink Flatness | See Figure 3 | -50 | | +100 | µm | |
| Mounting Torque | Screw: M4 | Recommended 0.9 N·m | 0.9 | 1.0 | 1.5 | N·m |
| | | Recommended 9.1 kgf·cm | 9.1 | 10.1 | 15.1 | kgf·cm |
| Weight | | | 50 | | g | |

Note:

- SEMS screws (include spring/plain washer, M4) are recommended.

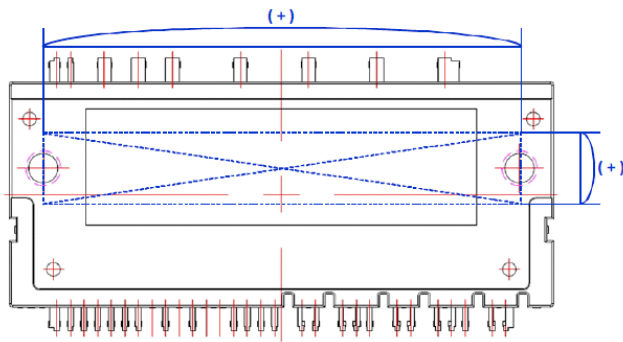


Figure 2. Measurement Points of Package Surface Flatness

Note:

- The measurement points for the flatness of the package surface are at the package center and the four outside corners.

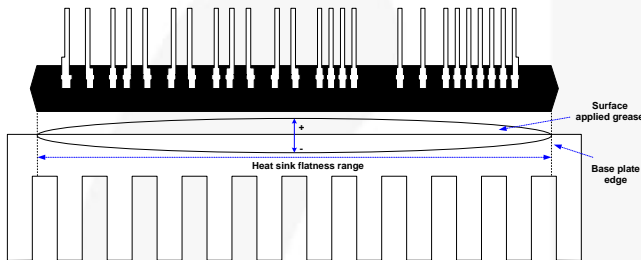


Figure 3. Measurement Point of Heat Sink Flatness

To get the most effective heat dissipation, it is necessary to enlarge the contact area as much as possible to minimize the contact thermal resistance.

Properly apply thermal-conductive grease over the contact surface between the module and the heat sink. It is also

Related Resources

[FNA41012A, FNA42512A^{\(5\)}, FNA42512A^{\(5\)} – 1200-V Motion SPM[®] 2 Series](#)

[AN-9075 – 1200-V Motion SPM[®] 2 Series User's Guide](#)

[AN-9079 – 1200-V Motion SPM[®] 2 Series Thermal Performance by Mounting Torque](#)

Note:

- These products are not fully released to production. Contact Fairchild Semiconductor for more information.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
- A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

useful for preventing contact surface corrosion. Furthermore, ensure the grease has stable quality and long endurance within the wide operation temperature range. Use a torque wrench to fasten screws to the specified torque rating. Exceeding the maximum torque limitation can cause damaged or degradation. Use care not to allow any dust or debris on the contact surface.

Thermal Compound

- Use a minimum, 150 μ m layer of thermal grease to the module base plate or to the heat sink.
- While fastening the module, a rim of thermal compound must be observed around the mounted module.

Fixing Sequence

- Fix all screws with torque below 1.0 N·m (by hand or driver)
- Apply impact torque 1.5 ~ 2.5 N m crosswise
- Use recommended screws SEMS screw (included spring/plain washer M4)



Figure 4. SEMS Screw (Size M4, Spring Washer 7.0 Φ , Plain Washer 9.0 Φ)