

## Safety Precautions (Common precautions for ESD Suppressor)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products under the actual conditions for use.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.
  - \* Systems equipped with a protection circuit and a protection device.
  - \* Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.
  - \* Systems equipped with an arresting the spread of fire or preventing glitch.

### (1) Precautions for use

- It is prohibited to use these products for the following usage.
  - ① Usage in the engine room.
  - ② Usage in any driving applications or any other critical functions that affect passenger safety. (e.g. Power train, ABS, Engine ECU, Air bag, etc.)
  - ③ Usage in applications related to the autonomous driving equipment with system level 3 or higher.
  - ④ Usage for power supply circuits because this product is suitable for Gbps level high-speed differential signal circuits and GHz level high-frequency circuit.
  - ⑤ Usage in managed medical devices (classes 3 or 4) that may affect a serious impact on human life or health.
- These products are designed and manufactured for general and standard use in general electronic equipment. (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment) For applications in which special quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or cause threat of personal injury (such as for aircraft and aerospace equipment, traffic and transport equipment, combustion equipment, medical equipment, accident prevention and anti-theft devices, and safety equipment), please be sure to consult with our sales representative in advance and to exchange product specifications which conform to such applications.
- These products are not intended for use in the following special conditions. Before using the products, carefully check the effects on their quality and performance, and determine whether or not they can be used.
  - ① In liquid, such as water, oil, chemicals, or organic solvent.
  - ② In direct sunlight, outdoors, or in dust.
  - ③ In salty air or air with a high concentration of corrosive gas, such as  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ , or  $\text{NO}_x$ .
  - ④ Electromagnetic and Radioactive Environment.  
Avoid any environment where strong electromagnetic waves and radiation exist.
  - ⑤ In an environment where these products cause dew condensation.
  - ⑥ Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin or other materials.
- These products generate Joule heat when energized. Carefully position these products so that their heat will not affect the other components.
- Carefully position these products so that their temperatures will not exceed the category temperature range due to the effects of neighboring heat-generating components. Do not mount or place heat-generating components or inflammables, such as vinyl-coated wires, near these products.
- Note that non-cleaning solder, halogen-based highly active flux, or water-soluble flux may deteriorate the performance or reliability of the products.
- Carefully select a flux cleaning agent for use after soldering. An unsuitable agent may deteriorate the performance or reliability. In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues. Otherwise, the insulation performance may be deteriorated.
- Do not apply flux to these products after soldering. The activity of flux may be a cause of failures in these products.

- Refer to the recommended soldering conditions and set the soldering condition. High peak temperature or long heating time may impair the performance or the reliability of these products.
- Recommended soldering condition is for the guideline for ensuring the basic characteristics of the products, not for the stable soldering conditions. Conditions for proper soldering should be set up according to individual conditions.
- Do not reuse any products after removal from mounting boards.
- Do not drop these products. If these products are dropped, do not use them. Such products may have received mechanical or electrical damage.
- If any doubt or concern to the safety on these products arise, make sure to inform us immediately and conduct technical examinations at your side.

## (2) Precautions for storage

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of 5 °C to 35 °C and a relative humidity of 45 % to 85 %.

Even within the above guarantee periods, do not store these products in the following conditions. Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

- ① In salty air or in air with a high concentration of corrosive gas, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>x</sub>.
- ② In direct sunlight.

## (3) Precaution specific to this product

- ① If a large electric surge (especially, one which is larger than an ESD) is expected to be applied, be sure to test and confirm proper ESD Suppressor (hereafter called the suppressors) functionality when mounted on your board. When the applied load is more than the allowable rated power under normal load conditions, it may impair performance and/or the reliability of the suppressors. Never exceed the rated power. If the product will be used under these special conditions, be sure to contact a Panasonic representative first.
- ② Do not use halogen-based or other high-activity flux. Otherwise, the residue may impair the suppressors' performance and/or reliability.
- ③ When soldering with a soldering iron, never touch the suppressors' bodies with the tip of the soldering iron. When using a soldering iron with a high temperature tip, finish soldering as quickly as possible (within three seconds at 350 °C max.).
- ④ Mounting of the suppressors with excessive or insufficient wetting amount of solder may affect the connection reliability or the performance of the suppressors. Carefully check the effects and apply a proper amount of solder for use.
- ⑤ When the suppressors' protective coatings are chipped, flawed, or removed, the characteristics of the suppressors may be impaired. Take special care not to apply mechanical shock during automatic mounting or cause damage during handling of the boards with the suppressors mounted
- ⑥ Do not apply shock to the suppressors or pinch them with a hard tool (e.g. pliers and tweezers). Otherwise, the suppressors' protective coatings and bodies may be chipped, affecting their performance.
- ⑦ Avoid excessive bending of printed circuit boards in order to protect the suppressors from abnormal stress.
- ⑧ Do not immerse the suppressors in solvent for a long time. Before using solvent, carefully check the effects of immersion.
- ⑨ Do not apply excessive tension to the terminals.

## (4) AEC-Q200 Compliant (ESD Suppressor, High withstanding type)

The products are tested based on all or part of the test conditions and methods defined in AEC-Q200. Please consult with Panasonic for the details of the product specification and specific evaluation test results, etc., and please review and approve Panasonic's product specification before ordering.

<Package markings>

Package markings include the product number, quantity, and country of origin.

In principle, the country of origin should be indicated in English.