

|         |         |         |                      |      |        |
|---------|---------|---------|----------------------|------|--------|
| Product | SiC SBD | Package | Through Hole Devices | Type | SCS*** |
|---------|---------|---------|----------------------|------|--------|

## 1. Life Test

| Test Item                     | Test Method/ Standard  | Test Condition | Sample Size<br>n [pcs] | Failure(s)<br>Pn [pcs] |
|-------------------------------|--|----------------|------------------------|------------------------|
| High Temperature Reverse Bias | $T_a = T_{jmax}$ , $V_R = V_{Rmax} \times 0.8$<br>JEITA ED-4701/100A-101A                        | 1000 h         | 22                     | 0                      |
| Temperature humidity bias     | $T_a = 85^\circ\text{C}$ , Rh= 85%, $V_R = 100\text{V}$<br>JEITA ED-4701/100A-102A               | 1000 h         | 22                     | 0                      |
| Temperature cycle             | $T_a = -55^\circ\text{C}$ (30min) ~ $T_a = 150^\circ\text{C}$ (30min)<br>JEITA ED-4701/100A-105A | 100 cycles     | 22                     | 0                      |
| Pressure cooker               | $T_a = 121^\circ\text{C}$ , 2atm, Rh= 100%<br>JESD22-A102C                                       | 48 h           | 22                     | 0                      |
| High Temperature storage      | $T_a = 175^\circ\text{C}$<br>JEITA ED-4701/200A-201A   | 1000 h         | 22                     | 0                      |
| Low Temperature storage       | $T_a = -55^\circ\text{C}$<br>JEITA ED-4701/200A-202A   | 1000 h         | 22                     | 0                      |

## 2. Stress Test

| Test Item                   | Test Method/ Standard  | Test Condition | Sample Size<br>n [pcs] | Failure(s)<br>Pn [pcs] |
|-----------------------------|--|----------------|------------------------|------------------------|
| Resistance to solder heat 1 | Dipping leads into solder bath at $260 \pm 5^\circ\text{C}$ .<br>JEITA ED-4701/301-302A  | 10 sec         | 22                     | 0                      |
| Resistance to solder heat 2 | Dipping leads into solder bath at $350 \pm 10^\circ\text{C}$ .<br>JEITA ED-4701/301-302A   | 3.5 sec        | 22                     | 0                      |
| Solderability               | Dipping into solder bath at $245 \pm 5^\circ\text{C}$ .<br>JEITA ED-4701/301-303A  | 5 sec          | 22                     | 0                      |
| Thermal shock               | $0 \begin{smallmatrix} +5 \\ -0 \end{smallmatrix}$ (5min) ~ $10 \begin{smallmatrix} 0 \\ 5 \end{smallmatrix}$ (5min)<br>JEITA ED-4701/302-307B | 100 cycle      | 22                     | 0                      |
| Terminal strength (Pull)    | Pull force = 20 N<br>JEITA ED-4701/400A-401A   | 10 sec         | 22                     | 0                      |
| Terminal strength (Bending) | Bending Load = 10 N<br>JEITA ED-4701/400A-401A   | 2 times        | 22                     | 0                      |

※ Failure criteria : According to the electrical characteristics specified by the specification.

Regarding solderability test, failure criteria is 95% or more area covered with solder.

※ Sample standard:[Reliability level:90%][Failure reliability level( $\lambda$ 1):10%][C=0 decision] is adopted

And the number of samples is being made 22 in accordance with single sampling inspection plan with exponential distribution type based on MIL-STD-19500.

## 3. Test description

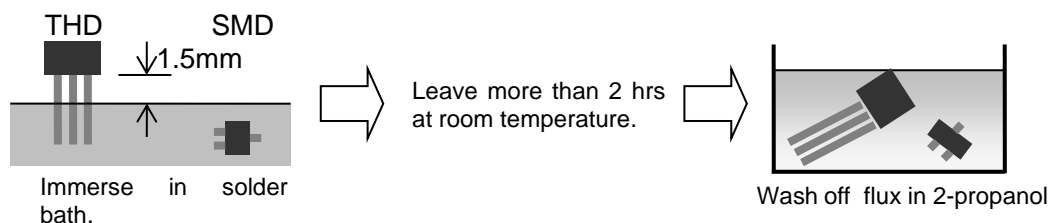
| Test description                  | Test Condition  | Failure criteria  |
|-----------------------------------|---|---|
| 1. Soldering heat resistance 1 *3 | 1) Solder: Sn-3Ag-0.5Cu (Lead free)<br>2) <Method><br>Solder temperature: 260 ±5°C<br>Immerse time: 10 ±1 s<br>Dip the leads once into solder bath. The dipping depth should be up to the stopper. If without stopper, dip up to 1 to 1.5 mm from the body.<br>3) After dipping, leave at room temperature for more than 2 h.                               | <ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion for electrical characteristics.</li> </ul>          |
| 2. Soldering heat resistance 2 *3 | 1) Solder: Sn-3Ag-0.5Cu (Lead free)<br>2) <Method><br>Solder temperature: 350 ±10°C<br>Immerse time: 3.5 ±0.5 s<br>Dip the leads once into solder bath. The dipping depth should be up to the stopper. If without stopper, dip up to 1 to 1.5 mm from the body.<br>3) After dipping, leave at room temperature for more than 2 h.                           | <ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion for electrical characteristics.</li> </ul>          |
| 3. Solderability *3               | 1) Solder: Sn-3Ag-0.5Cu (Lead free)<br>2) Flux: 2-propanol (IPA) (Rosin 25wt%)<br>3) <Method><br>Immerse the leads into flux once to the point 1.0 mm from the package body for 10 s, then into solder bath of 245 ±5°C to the point 1.0 mm from the package body for 5 ±0.5 s.<br>Thereafter, leave at room temperature. Then wash off flux in 2-propanol. | <ul style="list-style-type: none"> <li>• At least 95% of immersed surface must be covered by solder, which is confirmed through 10~20X magnifying glass.</li> </ul> |
| 4. Heat shock                     | 1) <Temperature & Time><br>95~100°C      ⇔      0~5°C<br>(Liquid) 5 min      (Liquid) 5 min<br>Change within 10 s.<br>2) Repeat prescribed cycles.<br>3) After completion of test, leave at room temperature for more than 2 h.   | <ul style="list-style-type: none"> <li>• See *1 for failure criterion for electrical characteristics.</li> </ul>  |
| 5. Temperature cycle              | 1) <Temperature & Time><br>-55°C      ⇔      150°C<br>(Air) 30 min      (Air) 30 min<br>2) Repeat prescribed cycles.<br>3) After completion of test, leave at room temperature for more than 2 h.   | <ul style="list-style-type: none"> <li>• See *1 for failure criterion for electrical characteristics.</li> </ul>  |
| 6. Temperature humidity bias      | 1) T <sub>a</sub> = 85±3°C<br>RH= 75~90%<br>2) V= 100V<br>3) After completion of test, leave at room temperature for more than 2 h.   | <ul style="list-style-type: none"> <li>• See *1 for failure criterion for electrical characteristics.</li> </ul>  |

|                                  |  |  |
|----------------------------------|--|--|
| 7. Pressure cooker test          | 1) $T_a=121^{\circ}\text{C}$ , 100%RH<br>2) $P=203\text{kPa}$ [2 atm]<br>3) After completion of test, leave at room temperature for more than 2 h.               | • See *1 for failure criterion for electrical characteristics.                                     |
| 8. High temperature reverse bias | 1) $T_a=T_{j(\text{max})} \pm 2^{\circ}\text{C}$<br>2) $V=\text{SPECIFIED VOLTAGE}$<br>3) After completion of test, leave at room temperature for more than 2 h. | • Shall be no mechanical damage.<br>• See *1 for failure criterion for electrical characteristics. |
| 9. High temperature storage      | 1) $T_a= T_{\text{stg}(\text{max})}$<br>2) After completion of test, leave at room temperature for more than 2 h.  | • Shall be no mechanical damage.<br>• See *1 for failure criterion for electrical characteristics. |
| 10. Low temperature storage      | 1) $T_a= T_{\text{stg}(\text{min})}$<br>2) After completion of test, leave at room temperature for more than 2 h.  | • Shall be no mechanical damage.<br>• See *1 for failure criterion for electrical characteristics. |
| 11. Lead strength (Lead bend)    | 1) <Method><br>Fix the sample body, and bend the terminal to $90^{\circ}$ twice loading specified force.   | • Shall be no mechanical damage, detachment, extension between the lead and the package body       |
| 12. Lead strength (Lead pull)    | 1) <Method><br>Fix the sample body and keep pulling the lead in lead axis direction with specified load for $10 \pm 1$ s.  | • Shall be no mechanical damage, detachment, extension between the lead and the package body       |

#### 4. Remark

\*1 Failure criterion : According to the electrical characteristics specified by the specification

\*2 Method of No.1, No.2



\*3 Preconditioning

Perform aging with the pressurecooker equipment. ( $105^{\circ}\text{C}$ , 100%,  $1.22 \times 10^5$  Pa, 4 h)

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