

Product	MOSFET	Package	Through Hole Devices	Type	SCT4*** 6inch wafer
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## 1. Life Test

Test Item	Test Method/ Standard	Test Condition	Sample Size n [pcs]	Failure(s) Pn [pcs]
High Temperature Reverse Bias	$T_a = T_{jmax}$ , $V_{DS} = V_{DSmax}$ JEITA ED-4701/100A-101A	1000 h	22	0
High Temperature Gate Bias	$T_a = T_{jmax}$ , $V_{GS} = V_{GSmax}$ JEITA ED-4701/100A-101A	1000 h	22	0
High Temperature Gate Bias	$T_a = T_{jmax}$ , $V_{GS} = V_{GSmin}$ JEITA ED-4701/100A-101A	1000 h	22	0
Temperature humidity bias	$T_a = 85^\circ\text{C}$ , RH = 85%, $V_{DS} = 100\text{V}$ JEITA ED-4701/100A-102A	1000 h	22	0
Temperature cycle	$T_a = -55^\circ\text{C}$ (30 min) ~ $T_a = 150^\circ\text{C}$ (30 min) JEITA ED-4701/100A-105A	100 cycles	22	0
Pressure cooker	$T_a = 121^\circ\text{C}$ , 203kPa [2 atm], RH = 100% JESD22-A102C	48 h	22	0
High Temperature storage	$T_a = 175^\circ\text{C}$ JEITA ED-4701/200A-201A	1000 h	22	0
Low Temperature storage	$T_a = -55^\circ\text{C}$ JEITA ED-4701/200A-202A	1000 h	22	0

## 2. Stress Test

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

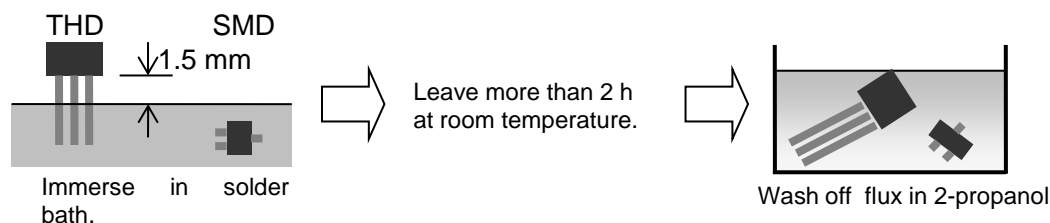
Test description	Test Condition	Failure criteria
1. Soldering heat resistance 1 *3	1) Solder: Sn-3Ag-0.5Cu (Lead free) 2) <Method> Solder temperature: 260 ±5°C Immerse time: 10 ±1 s Dip the leads once into solder bath. The dipping depth should be up to the stopper. If without stopper, dip up to 1 to 1.5 mm from the body. 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.</li> </ul>
2. Soldering heat resistance 2 *3	1) Solder: Sn-3Ag-0.5Cu (Lead free) 2) <Method> Solder temperature: 350 ±10°C Immerse time: 3.5 ±0.5 s 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. 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.</li> </ul>
3. Solderability *3	1) Solder: Sn-3Ag-0.5Cu (Lead free) 2) Flux: 2-propanol (IPA) (Rosin 25wt%) 3) <Method> 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. 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> 95~100°C      ⇔      0~5°C (Liquid) 5 min      (Liquid) 5 min Change within 10 s. 2) Repeat prescribed cycles. 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.</li> </ul>
5. Temperature cycle	1) <Temperature & Time> -55°C              ⇔              150°C (Air) 30 min              (Air) 30 min 2) Repeat prescribed cycles. 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.</li> </ul>
6. Temperature humidity bias	1) $T_a = 85 \pm 3^\circ\text{C}$ RH = 75~90% 2) V = 100V 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.</li> </ul>

7. Pressure cooker test	<ol style="list-style-type: none"> <li>1) <math>T_a = 121^{\circ}\text{C}</math>, 100%RH</li> <li>2) <math>P = 203 \text{ kPa}</math> [2 atm]</li> <li>3) After completion of test, leave at room temperature for more than 2 h.</li> </ol>	<ul style="list-style-type: none"> <li>• See *1 for failure criterion.</li> </ul>
8. High temperature reverse bias	<ol style="list-style-type: none"> <li>1) <math>T_a = T_{j(\text{max})} \pm 2^{\circ}\text{C}</math></li> <li>2) <math>V = \text{SPECIFIED VOLTAGE}</math></li> <li>3) After completion of test, leave at room temperature for more than 2 h.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion.</li> </ul>
9. High temperature gate bias *3	<ol style="list-style-type: none"> <li>1) <math>T_a = T_{j(\text{max})} \pm 2^{\circ}\text{C}</math></li> <li>2) <math>V_{\text{GS}} = \text{Maximum Rating}</math></li> <li>3) After completion of test, leave at room temperature for more than 2 h.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion.</li> </ul>
10. High temperature storage	<ol style="list-style-type: none"> <li>1) <math>T_a = T_{\text{stg}(\text{max})}</math></li> <li>2) After completion of test, leave at room temperature for more than 2 h.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion.</li> </ul>
11. Low temperature storage	<ol style="list-style-type: none"> <li>1) <math>T_a = T_{\text{stg}(\text{min})}</math></li> <li>2) After completion of test, leave at room temperature for more than 2 h.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage.</li> <li>• See *1 for failure criterion.</li> </ul>
12. Lead strength (Lead bend)	<ol style="list-style-type: none"> <li>1) &lt;Method&gt; Fix the sample body, and bend the terminal to <math>90^{\circ}</math> twice loading specified force.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage, detachment, extension between the lead and the package body</li> </ul>
13. Lead strength (Lead pull)	<ol style="list-style-type: none"> <li>1) &lt;Method&gt; Fix the sample body and keep pulling the lead in lead axis direction with specified load for <math>10 \pm 1 \text{ s}</math>.</li> </ol>	<ul style="list-style-type: none"> <li>• Shall be no mechanical damage, detachment, extension between the lead and the package body</li> </ul>

#### 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%,  $1.22 \times 10^5 \text{ Pa}$ , 4 h)

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