

Product	MOSFET	Package	Through Hole Devices	Type	SCT3***
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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	$T_a = -55^\circ\text{C}$ (30min) ~ $T_a = 150^\circ\text{C}$ (30min) JEITA ED-4701/100A-105A	100 cycles	22	0
Pressure cooker	$T_a = 121^\circ\text{C}$, 2atm, 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 sec	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 sec	22	0
Solderability	Dipping into solder bath at $245 \pm 5^\circ\text{C}$. JEITA ED-4701/301-303A	5 sec	22	0
Thermal shock	$0 \overset{+5}{-0}$ (5min) ~ $10 \overset{0}{-5}$ (5min) JEITA ED-4701/302-307B	100 cycle	22	0
Terminal strength (Pull)	Pull force = 20 N JEITA ED-4701/400A-401A	10 sec	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(λ 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

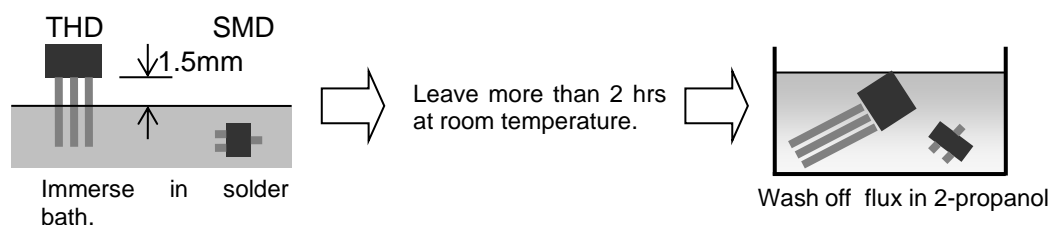
Test description	Test Condition	Failure criteria
1. Soldering heat resistance 1 *3	1) Solder: Sn-3Ag-0.5Cu (Lead free) 2) <Method> Solder temperature: 260 ±5°C Immerse time: 10 ±1 s Dip the leads once into solder bath. The dipping depth should be up to the stopper. If without stopper, dip up to 1 to 1.5 mm from the body. 3) After dipping, leave at room temperature for more than 2 h.	<ul style="list-style-type: none"> • Shall be no mechanical damage. • See *1 for failure criterion.
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"> • Shall be no mechanical damage. • See *1 for failure criterion.
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"> • At least 95% of immersed surface must be covered by solder, which is confirmed through 10~20X magnifying glass.
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"> • See *1 for failure criterion.
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"> • See *1 for failure criterion.
6. Temperature humidity bias	1) T _a = 85±3°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"> • See *1 for failure criterion.

7. Pressure cooker test	1) $T_a=121^{\circ}\text{C}$, 100%RH 2) $P=203\text{kPa}$ [2 atm] 3) After completion of test, leave at room temperature for more than 2 h.	• See *1 for failure criterion.
8. High temperature reverse bias	1) $T_a=T_{j(\text{max})} \pm 2^{\circ}\text{C}$ 2) $V=\text{SPECIFIED VOLTAGE}$ 3) After completion of test, leave at room temperature for more than 2 h.	• Shall be no mechanical damage. • See *1 for failure criterion.
9. High temperature gate bias *3	1) $T_a=T_{j(\text{max})} \pm 2^{\circ}\text{C}$ 2) $V_{\text{GS}}=\text{Maximum Rating}$ 3) After completion of test, leave at room temperature for more than 2 h.	• Shall be no mechanical damage. • See *1 for failure criterion.
10. High temperature storage	1) $T_a= T_{\text{stg}(\text{max})}$ 2) After completion of test, leave at room temperature for more than 2 h.	• Shall be no mechanical damage. • See *1 for failure criterion.
11. Low temperature storage	1) $T_a= T_{\text{stg}(\text{min})}$ 2) After completion of test, leave at room temperature for more than 2 h.	• Shall be no mechanical damage. • See *1 for failure criterion.
12. Lead strength (Lead bend)	1) <Method> Fix the sample body, and bend the terminal to 90° twice loading specified force.	• Shall be no mechanical damage, detachment, extension between the lead and the package body
13. Lead strength (Lead pull)	1) <Method> Fix the sample body and keep pulling the lead in lead axis direction with specified load for 10 ± 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°C , 100%, 1.22×10^5 Pa, 4 h)