

Product	IGBT	Package	SMD
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1. Life Test

Test Item	Test Method/Standard	Test Condition	n [pcs]	Pn [pcs]
High Temperature Reverse Bias	Tjmax、VCE=BVCES Min JEITA ED-4701/100A-101A	1000h	22	0
High Temperature Gate Bias	Ta=Tjmax、VGE=Maximum Rating JEITA ED-4701/100A-101A	1000h	22	0
Temperature humidity bias	Ta=85°C、Rh=85%、VCE=BVCES Min JEITA ED-4701/100A-102A	1000h	22	0
Temperature cycle	Ta= -55°C (30min) ~ Ta=150°C (30min) JEITA ED-4701/100A-105A	200cycle	22	0
Pressure cooker	Ta=121°C、2atm、Rh=100% JESD22-A102C	100h	22	0
High Temperature storage	Ta=Tstgmax JEITA ED-4701/200A-201A	1000h	22	0
Low Temperature storage	Ta=Tstgmin JEITA ED-4701/200A-202A	1000h	22	0

2. Stress Test

Test Item	Test Method/Standard	Test Condition	n [pcs]	Pn [pcs]
Resistance to solder heat1	Reflow at 260±5°C(peak temperature). JEITA ED-4701/301-301C	2times	22	0
Resistance to solder heat2	Dipping into solder bath at 260±5°C. JEITA ED-4701/301-301C	10sec	22	0
Resistance to solder heat3	Dipping leads into solder bath at 350±10°C. JEITA ED-4701/301-301C	3.5sec	22	0
Solderability	Dipping into solder bath at 245±5°C. JEITA ED-4701/301-303A	5sec	22	0
Thermal shock	0 ⁺⁵ / ₀ °C(5min) ~ 100 ⁰ / ₀ °C(5min) JEITA ED-4701/302-307B	100cycle	22	0
Terminal strength (Pull)	Pull force ; 10N JEITA ED-4701/400A-401A	10sec	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(λ1):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

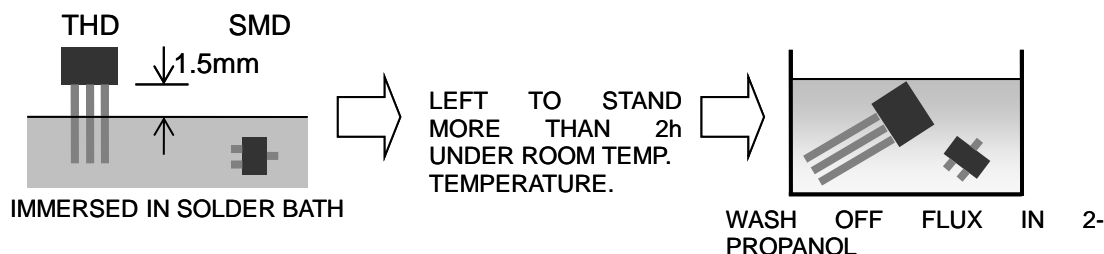
Test description	Test Condition	Failure criteria
1.Soldering heat resistance 1 *4	1) Solder Sn-3Ag-0.5Cu(Lead free) 2) <Method> Solder temperature 260±5°C Immerse time 10±1s Leaded device : dip the leads once into solder bath the dipping depth should be up to the stopper when the specimen is provided with stopper, and up to 1 to 1.5mm from the body of the specimen when it is not provided with stopper. Surface mount device: dip the whole 3) After dipping, leave at room temperature for more than 2h	<ul style="list-style-type: none"> • Shall be no mechanical damage • See * 1 for failure criterion electrical characteristics
2.Soldering heat resistance 2 *4	1) Solder Sn-3Ag-0.5Cu(Lead free) 2) <Method> Solder temperature 350±10°C Immerse time 3.5±0.5s Leaded device : dip the leads once into solder bath the dipping depth should be up to the stopper when the specimen is provided with stopper, and up to 1 to 1.5mm from the body of the specimen when it is not provided with stopper. Surface mount device: dip the whole 3) After dipping, leave at room temperature for more than 2h	<ul style="list-style-type: none"> • Shall be no mechanical damage • See * 1 for failure criterion electrical characteristics
3. Solderability *4	1) Solder Sn-3Ag-0.5Cu(Lead free) 2) Flux 2-propanol(IPA)(Rosin 25wt%) 3) <Method> Leaded device: Immerse the leads into flux once TIL the point 1.0mm from the package body for 10s, then into solder bath of 245±5°C TIL the point 1.0mm from the package body for 5±0.5s. (mini-mold surface mount device whole body to be immersed). Thereafter, leave for natural dry at room	<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 *3	1) <Temperature. & Time> 95~100°C → 0~5°C (Liquid) 5min ← (Liquid) 5min 2) Freq. 100 cycles 3) After completion of test, leave at room temperature for more than 2h	<ul style="list-style-type: none"> • See *1 for failure criteria on electrical characteristics.
5. Temperature cycle *3	1) <Temperature. & Time> -55°C → 150°C (AIR) 30min ← (AIR) 30min 2) Freq. 200 cycles 3) After completion of test, leave at room temperature for more than 2h	<ul style="list-style-type: none"> • See *1 for failure criteria on electrical characteristics.
6. Temperature humidity bias *3	1) Ta=85±3°C RH=85 ⁺⁵ ₋₁₀ % 2) Time 1000h 3) VCE=BVCES(min) 4) After completion of test, leave at room temperature for more than 2h	<ul style="list-style-type: none"> • See *1 for failure criteria on electrical characteristics.

7. Pressure cooker test *3	1) $T_a=121^{\circ}\text{C}$ 、100%RH 2) $P=203\text{KPa}\{2\text{atm}\}$ Time 100h 3) After completion of test, leave at room temperature for more than 2h	• See *1 for failure criteria on electrical characteristics.
8. High temperature reverse bias *3	1) $T_j(\text{max})\pm 2^{\circ}\text{C}$ 2) Time 1000h 3) $V_{CE}=BV_{CES}(\text{min})$ 4) After completion of test, leave at room temperature for more than 2h	• SAME AS No.1
9. High temperature gate bias [only for FET] *3	1) $T_a=T_j(\text{max})\pm 2^{\circ}\text{C}$ 2) Time 1000h 3) $V_{GS}=\text{Maximum Rating}$ 4) After completion of test, leave at room temperature for more than 2h	• SAME AS No.1
10. High temperature storage	1) $T_a=T_{stg}(\text{max})$ 2) Time 1000h 3) After completion of test, leave at room temperature for more than 2h	• SAME AS No.1
11. Low temperature storage	1) $T_a=T_{stg}(\text{min})$ 2) Time 1000h 3) After completion of test, leave at room temperature for more than 2h	• SAME AS No.1
12. Lead strength (Lead bend) [only for THD]	1) <Method> The sample body is fixed, and the terminal is to be bent by 90° twice, loading specified force to the axis direction.	• Shall be no mechanical damage, detachment, extension between the Lead and the package body
13. Lead strength (Lead pull)	1) <Method> The sample body is fixed, and keep pulling the lead in lead axis direction with specified load for $10\pm 1\text{s}$.	• 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

[only for SMD]

Soldering Heat resistance (reflow) is carried out after it is Left under the high temperature and the high humidity. (85°C , 85%, 168h) unless specially mentioned

*4 Preconditioning

Aging is done with the PCT device. (105°C , 100%, $1.22\times 10^5\text{Pa}$, 4h)