Reliability Test Result

Product	SiC SBD	Package	Surface Mount Device	Type	SCS***

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_R= V_{Rmax} ×0.8 JEITA ED-4701/100A-101A	1000 h	22	0
Temperature humidity bias	T_a= 85℃, Rh= 85%, V_R= 100V JEITA ED-4701/100A-102A	1000 h	22	0
Temperature cycle	T_a= -55℃ (30min) ～ T_a= 150℃ (30min) JEITA ED-4701/100A-105A	100 cycles	22	0
Pressure cooker	T_a= 121℃, 2atm, Rh= 100% JESD22-A102C	48 h	22	0
High Temperature storage	T_a= 175℃ JEITA ED-4701/200A-201A	1000 h	22	0
Low Temperature storage	T_a= -55℃ 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	Reflow at 260 ±5℃(peak temperature). JEITA ED-4701/301-301C	2 times	22	0
Resistance to solder heat 2	Dipping into solder bath at 260±5℃. JEITA ED-4701/301-301C	10 sec	22	0
Resistance to solder heat 3	Dipping leads into solder bath at 350±10℃. JEITA ED-4701/301-301C	3.5 sec	22	0
Solderability	Dipping into solder bath at 245 ±5℃. JEITA ED-4701/301-303A	5 sec	22	0
Thermal shock	0^{+5}_{-0} (5min) ～ 100^{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

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

3. Test description

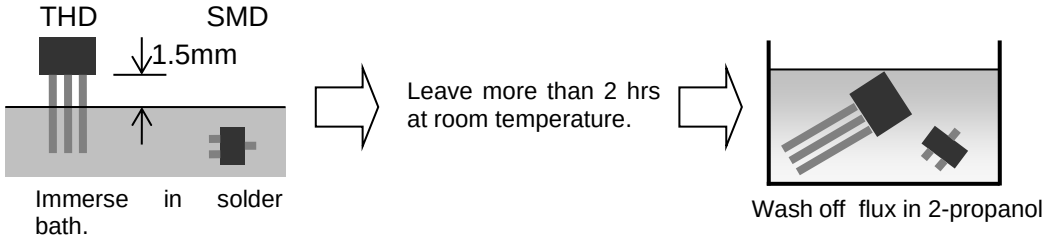
Test description	Test Condition	Failure criteria
1. Soldering heat resistance 2 *3	1）Solder: Sn-3Ag-0.5Cu (Lead free) 2）<Method> Solder temperature: 260 ±5℃ Immerse time: 10 ±1 s Dip the whole body once into solder bath. 3）After dipping, leave at room temperature for more than 2 h.	・Shall be no mechanical damage. ・See *1 for failure criterion for electrical characteristics.
2. Soldering heat resistance 3 *3	1）Solder: Sn-3Ag-0.5Cu (Lead free) 2）<Method> Solder temperature: 350 ±10℃ Immerse time: 3.5 ±0.5 s Dip the whole body once into solder bath. 3）After dipping, leave at room temperature for more than 2 h.	・Shall be no mechanical damage. ・See *1 for failure criterion for electrical characteristics.
3. Solderability *3	1）Solder: Sn-3Ag-0.5Cu (Lead free) 2）Flux: 2-propanol (IPA) (Rosin 25wt%) 3） <Method> Immerse the whole body into flux once for 10 s, then into solder bath of 245 ±5℃ for 5 ±0.5 s. Thereafter, leave at room temperature. Then wash off flux in 2-propanol.	・At least 95% of immersed surface must be covered by solder, which is confirmed through 10~20X magnifying glass.
4. Heat shock *4	1） <Temperature & Time> 95～100℃ ⇔ 0～5℃ (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.	・See *1 for failure criterion for electrical characteristics.
5. Temperature cycle *4	1） <Temperature & Time> -55℃ ⇔ 150℃ (Air) 30 min (Air) 30 min 2）Repeat prescribed cycles. 3）After completion of test, leave at room temperature for more than 2 h.	・See *1 for failure criterion for electrical characteristics.
6. Temperature humidity bias *4	1) T_a= 85±3℃ RH= 75~90% 2) V= 100V 3) After completion of test, leave at room temperature for more than 2 h.	・See *1 for failure criterion for electrical characteristics.

7. Pressure cooker test *4	1) T_a=121℃, 100%RH 2) P=203kPa [2 atm] 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 *4	1) T_a=$T_{j(max)}$ ±2℃ 2) V=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 for electrical characteristics.
9. High temperature storage	1) T_a= $T_{stg(max)}$ 2) After completion of test, leave at room temperature for more than 2 h.	・Shall be no mechanical damage. ・See *1 for failure criterion for electrical characteristics.
10. Low temperature storage	1) T_a= $T_{stg(min)}$ 2) After completion of test, leave at room temperature for more than 2 h.	・Shall be no mechanical damage. ・See *1 for failure criterion for electrical characteristics.
11. 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, extention 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℃, 100%, 1.22×10^5 Pa, 4 h)

*4 Preconditioning

Soldering heat resistance (reflow) is carried out after moisture soak at 85℃, 85%, for 168 h unless specially mentioned.

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