

## RELIABILITY TEST DATA

Product name : S-T111xxxMC-xxxTxU

Package type : SOT-23-5

No.	Test item	Test Condition	Test Time	r/n
1	High Temperature Operation	Ta=125 °C V <sub>IN</sub> =Vopr max.	1000 h	0/22
2	High Temperature Bias	Ta=125 °C V <sub>IN</sub> =Vabs max.×0.9	1000 h	0/22
3	#1 Temperature Humidity Bias	Ta=85 °C RH=85 % V <sub>IN</sub> =Vabs max.×0.9	1000 h	0/22
4	#1 Un-saturated Pressure Cooker Bias	Ta=125 °C RH=85 % P=2×10 <sup>5</sup> Pa V <sub>IN</sub> =Vabs max.×0.9	100 h	0/22
5	High Temperature Storage	Tstg max.=150 °C	1000 h	0/22
6	Low Temperature Storage	Tstg min.=−65 °C	1000 h	0/22
7	#1 Temperature Cycle (Gas phase)	Tstg max.=150 °C , Tstg min.=−65 °C ( 30 min each )	200 cycles	0/22
8	#1 Thermal Shock (Liquid phase)	Tstg max.=150 °C , Tstg min.=−65 °C ( 5 min each )	100 cycles	0/22
9	#1 Resistance to soldering heat - 1 (reflow)	T=260 °C , 10 s	3 times	0/22
10	#1 Resistance to soldering heat - 2 (Solder iron)	T=380 °C , 5 s	Twice	0/22
11	#2 Solderability	T=230 °C Solder material ; Sn-3.0Ag-0.5Cu	3 s	0/11
12	Whisker - 1 (Room Temperature Storage)	Ta=25±3 °C RH=40~70% criteria ; Whisker should be less than 50μm	3 months	0/10
13	Whisker - 2 (Temperature Cycle)	Tstg max.=85 °C , Tstg min.=−40 °C (30 min each) criteria ; Whisker should be less than 50μm	1000 cycles	0/10
14	Whisker - 3 (Temperature Humidity Storage)	Ta=60 °C RH=93 % criteria ; Whisker should be less than 50μm	2000 h	0/10
15	Solder Joint Reliability (Temperature Cycle + shear test)	Tstg max.=125 °C , Tstg min.=−40 °C (30 min each) Solder material ; Sn-3.0Ag-0.5Cu criteria ;After temperature cycle test, keep strength for shear stress more than the 50 % of initial mean value.	2000 cycles	0/5
16	Lead Strength (Pull test)	Pull force ; 2.5 N	30 s	0/11
17	Lead Strength (Bending test)	Load ; 1.25 N 45 degree Bend a lead	Twice	0/11
18	ESD - 1 (Human Body Model)	V=±2000 V C=100 pF R=1.5 kΩ Ref. To V <sub>IN</sub> / V <sub>ss</sub> (5units for each direction)	5 pulses	0/20

19	ESD - 2 (Machine Model)	$V=\pm 200\text{ V}$ $C=200\text{ pF}$ $R=0\ \Omega$ Ref. To $V_{IN}/V_{SS}$ (5units for each direction)	3 pulses	0/20
20	Latch Up	$\pm 100\text{ mA}$ ( $V_{CLAMP} = V_{opr\ max.}$ ) 10 ms pulse $V_{IN}=V_{opr\ max.}$	1 pulse	0/5

Remark :  $V_{abs\ max.}$  = Absolute maximum voltage ,  $V_{opr\ max.}$  =Maximum operation voltage

# : Each test designated # is performed after Pre-Treatment finished.

Pre-Treatment consists of High Temperature Storage , Temperature Humidity Storage and Soldering Heat. (See the table below.)

Pre Treatment (#1)		
High Temp. Storage	Temperature Humidity Storage	Soldering Heat
$T_a=125\text{ }^\circ\text{C}$ $t=24\text{ h}$	$T_a=85\text{ }^\circ\text{C}$ $RH=85\ \%$ $t=168\text{ h}$	Infrared Reflow 3 times $T=260\text{ }^\circ\text{C}$ $t=10\text{ s}$

Pre Treatment (#2)		
High Temp. Storage	Temperature Humidity Storage	Soldering Heat
$T_a=125\text{ }^\circ\text{C}$ $t=24\text{ h}$	$T_a=105\text{ }^\circ\text{C}$ $RH=100\ \%$ $t=8\text{ h}$	—