

## RELIABILITY TEST DATA

Product name : S-1315xxx-M5TxU3

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<br>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 ⇔ −65 °C ( 30 min each )   | 200 cycles  | 0/22 |
| 8   | #1 Thermal Shock (Liquid phase)                           | Tstg max.=150 °C ⇔ −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<br>Solder material ; Sn-3.0Ag-0.5Cu  | 3 s         | 0/11 |
| 12  | Whisker - 1 (Room Temperature Storage)                    | Ta=25±3 °C RH=40~70%<br>criteria ; Whisker should be less than 50μm   | 3 months    | 0/10 |
| 13  | Whisker - 2 (Temperature Cycle)                           | Tstg max.=85 °C ⇔ −40 °C (30 min each)<br>criteria ; Whisker should be less than 50μm   | 1000 cycles | 0/10 |
| 14  | Whisker - 3 (Temperature Humidity Storage)                | Ta=60 °C RH=93 %<br>criteria ; Whisker should be less than 50μm   | 2000 h      | 0/10 |
| 15  | Solder Joint Reliability (Temperature Cycle + shear test) | Tstg max.=125 °C ⇔ −40 °C (30 min each)<br>Solder material ; Sn-3.0Ag-0.5Cu<br>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<br>45 degree Bend a lead  | Twice       | 0/11 |

|    |                            |  |          |      |
|----|----------------------------|--|----------|------|
| 18 | ESD - 1 (Human Body Model) | V=±2000 V C=100 pF R=1.5 kΩ<br>Ref. To V <sub>IN</sub> / V <sub>SS</sub> (5units for each direction) | 5 pulses | 0/20 |
| 19 | ESD - 2 (Machine Model)    | V=±200 V C=200 pF R=0 Ω<br>Ref. To V <sub>IN</sub> / V <sub>SS</sub> (5units for each direction)     | 3 pulses | 0/20 |
| 20 | Latch Up                   | ±100 mA (V <sub>CLAMP</sub> = Vopr max.) 10 ms pulse<br>V <sub>IN</sub> =Vopr max.                   | 1 pulse  | 0/5  |

Remark : Vabs max. = Absolute maximum voltage , Vopr 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                                |
| Ta=125 °C<br>t=24 h | Ta=85 °C<br>RH=85 %<br>t=168 h | Infrared Reflow 3 times<br>T=260 °C<br>t=10 s |

| Pre Treatment (#2)  |                                |                |
|---------------------|--------------------------------|----------------|
| High Temp. Storage  | Temperature Humidity Storage   | Soldering Heat |
| Ta=125 °C<br>t=24 h | Ta=105 °C<br>RH=100 %<br>t=8 h | —              |