

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RZ/T2L
DEVICE : R9A07G074MXXGBG
APPLICATION : Consumer / Industry

Quality Assurance Div.
Renesas Electronics Corporation

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Table.1 Reliability test result

| Test Items | Reference | Test Conditions | Results Failure/Size | N.B. |
|---|------------------------|--------------------------------------|----------------------|------|
| High Temperature Operating Life (HTOL) | JESD22-A108 | Tj=125 °C, Vccmax, 1000 hrs | 0/22 | |
| High Temperature Storage Life (HTSL) | JESD22-A103 | Ta=150 °C, 1000 hrs | 0/22 | |
| Highly Accelerated Temperature and Humidity Stress (HAST)(*1) | JESD22-A110 | Ta=110 °C, RH=85 %, Vccmax, 264 hrs | 0/22 | |
| Temperature Cycling (TC)(*1) | JESD22-A104 | Ta=-55 °C to 125 °C , 500 cycles | 0/22 | |
| Latch-Up (LU) | JESD78 | Pulse Current Injection, I=+/-100 mA | 0/3 | |
| Electrostatic discharge (ESD-HBM) | JS-001 | 1.5 kΩ, 100 pF, +/-1000 V, 1 time | 0/3 | |
| Resistance to Soldering Heat (PC) | JESD22-A113, J-STD-020 | MSL3(Moisture Sensitivity Level 3) | 0/22 | |

*1) With preconditioning per JESD22-A113, MSL

·It is tested to confirm that all the samples are satisfied with an individual product specification.

Note :

Basically qualification tests were performed using a representative product with the same wafer process and the same package structure .

The failure rate of the device in an actual use condition can be estimated by the below procedure.

•Equation for the failure rate estimation (λ)

$$\lambda = \lambda_b \times \pi T \text{ (FIT)}$$

①Unique failure rate (λ_b)

$$\lambda_b = 0.67 \text{ FIT}$$

Unique failure rate at $T_a = 55 \text{ }^\circ\text{C}$ using 60 % confidence level.

②Temperature term (πT)

$$\pi T = \exp\{11600 \times E_a \times (1/(273+55) - 1/(273+T_a))\}$$

E_a : Activation energy (eV)

T_a : Ambient temperature ($^\circ\text{C}$)

| πT simplified chart as $E_a = 0.7 \text{ eV}$ | | | | | | | | | | | | |
|--|------|------|----|------|------|------|------|------|------|-------|-------|-------|
| T_a ($^\circ\text{C}$) | 40 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 100 | 110 |
| πT | 0.31 | 0.68 | 1 | 1.45 | 2.08 | 2.95 | 4.15 | 5.77 | 7.96 | 10.88 | 19.82 | 34.99 |

•MTTF (Mean Time To Failure)

$$MTTF = 1/\lambda$$

Table.2 Product list

MCR-23-0413

| No | Group | Product part number | Package code | No | Group | Product part number | Package code |
|----|--------|---------------------|--------------|-----|-------|---------------------|--------------|
| 1 | RZ/T2L | R9A07G074M01GBG | PLBG0196GC-A | 51 | | | |
| 2 | RZ/T2L | R9A07G074M04GBG | PLBG0320GA-A | 52 | | | |
| 3 | RZ/T2L | R9A07G074M05GBG | PLBG0320GA-A | 53 | | | |
| 4 | RZ/T2L | R9A07G074M08GBG | PLBG0320GA-A | 54 | | | |
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