

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RZ/G3E
DEVICE : R9A09G047HXXGBG
APPLICATION : Standard

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	
Temperature Humidity bias (THB)(*1)	JESD22-A101	Ta=85 °C, RH=85 %, Vccmax, 1000 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)

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

① Unique failure rate (λb)

$$\lambda b = 6.4 \text{ FIT}$$

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

② Temperature 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-26-0036

No	Group	Product part number	Package code	No	Group	Product part number	Package code
1	RZ/G3E	R9A09G047E27GBG	PRBG0529KA-A	51			
2	RZ/G3E	R9A09G047E27GBG	PRBG0529KA-B	52			
3	RZ/G3E	R9A09G047E37GBG	PRBG0529KA-A	53			
4	RZ/G3E	R9A09G047E37GBG	PRBG0529KA-B	54			
5	RZ/G3E	R9A09G047E47GBG	PRBG0529KA-A	55			
6	RZ/G3E	R9A09G047E47GBG	PRBG0529KA-B	56			
7	RZ/G3E	R9A09G047E57GBG	PRBG0529KA-A	57			
8	RZ/G3E	R9A09G047E57GBG	PRBG0529KA-B	58			
9	RZ/G3E	R9A09G047E28GBG	PRBG0625GA-A	59			
10	RZ/G3E	R9A09G047E38GBG	PRBG0625GA-A	60			
11	RZ/G3E	R9A09G047E48GBG	PRBG0625GA-A	61			
12	RZ/G3E	R9A09G047E58GBG	PRBG0625GA-A	62			
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