

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RZ/T1
DEVICE : R7S910XXXCBG
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	Ta=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=-65 °C to 150 °C , 300 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 (λ_b)

$$\lambda_b = 20 \text{ FIT}$$

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-22-0454-A

No	Group	Product part number	Package code	No	Group	Product part number	Package code
1	RZ/T1	R7S910002CBG	PRBG0320GA-A	51	RZ/T1	R7S910023CBG	PLBG0112KA-A
2	RZ/T1	R7S910006CBG	PRBG0320GA-A	52	RZ/T1	R7S910120XXCBG	PLBG0112KA-A
3	RZ/T1	R7S910007CBG	PRBG0320GA-A	53	RZ/T1	R7S910121CBG	PLBG0112KA-A
4	RZ/T1	R7S910011CBG	PRBG0320GA-A	54	RZ/T1	R7S910121XXCBG	PLBG0112KA-A
5	RZ/T1	R7S910013CBG	PRBG0320GA-A	55	RZ/T1	R7S910122XXCBG	PLBG0112KA-A
6	RZ/T1	R7S910015CBG	PRBG0320GA-A	56	RZ/T1	R7S910123CBG	PLBG0112KA-A
7	RZ/T1	R7S910016CBG	PRBG0320GA-A	57	RZ/T1	R7S910123XXCBG	PLBG0112KA-A
8	RZ/T1	R7S910017CBG	PRBG0320GA-A	58			
9	RZ/T1	R7S910018CBG	PRBG0320GA-A	59			
10	RZ/T1	R7S910025CBG	PRBG0320GA-A	60			
11	RZ/T1	R7S910026CBG	PRBG0320GA-A	61			
12	RZ/T1	R7S910027CBG	PRBG0320GA-A	62			
13	RZ/T1	R7S910028CBG	PRBG0320GA-A	63			
14	RZ/T1	R7S910035CBG	PRBG0320GA-A	64			
15	RZ/T1	R7S910036CBG	PRBG0320GA-A	65			
16	RZ/T1	R7S910037CBG	PRBG0320GA-A	66			
17	RZ/T1	R7S910045CBG	PRBG0320GA-A	67			
18	RZ/T1	R7S910046CBG	PRBG0320GA-A	68			
19	RZ/T1	R7S910047CBG	PRBG0320GA-A	69			
20	RZ/T1	R7S910048CBG	PRBG0320GA-A	70			
21	RZ/T1	R7S910051CBG	PRBG0320GA-A	71			
22	RZ/T1	R7S910052CBG	PRBG0320GA-A	72			
23	RZ/T1	R7S910055CBG	PRBG0320GA-A	73			
24	RZ/T1	R7S910056CBG	PRBG0320GA-A	74			
25	RZ/T1	R7S910102XXCBG	PRBG0320GA-A	75			
26	RZ/T1	R7S910106XXCBG	PRBG0320GA-A	76			
27	RZ/T1	R7S910107XXCBG	PRBG0320GA-A	77			
28	RZ/T1	R7S910111XXCBG	PRBG0320GA-A	78			
29	RZ/T1	R7S910113XXCBG	PRBG0320GA-A	79			
30	RZ/T1	R7S910115XXCBG	PRBG0320GA-A	80			
31	RZ/T1	R7S910116XXCBG	PRBG0320GA-A	81			
32	RZ/T1	R7S910117XXCBG	PRBG0320GA-A	82			
33	RZ/T1	R7S910118XXCBG	PRBG0320GA-A	83			
34	RZ/T1	R7S910118CBG	PRBG0320GA-A	84			
35	RZ/T1	R7S910125XXCBG	PRBG0320GA-A	85			
36	RZ/T1	R7S910126XXCBG	PRBG0320GA-A	86			
37	RZ/T1	R7S910127XXCBG	PRBG0320GA-A	87			
38	RZ/T1	R7S910128XXCBG	PRBG0320GA-A	88			
39	RZ/T1	R7S910135XXCBG	PRBG0320GA-A	89			
40	RZ/T1	R7S910136XXCBG	PRBG0320GA-A	90			
41	RZ/T1	R7S910137XXCBG	PRBG0320GA-A	91			
42	RZ/T1	R7S910145XXCBG	PRBG0320GA-A	92			
43	RZ/T1	R7S910146XXCBG	PRBG0320GA-A	93			
44	RZ/T1	R7S910147XXCBG	PRBG0320GA-A	94			
45	RZ/T1	R7S910148XXCBG	PRBG0320GA-A	95			
46	RZ/T1	R7S910151CBG	PRBG0320GA-A	96			
47	RZ/T1	R7S910151XXCBG	PRBG0320GA-A	97			
48	RZ/T1	R7S910020CBG	PLBG0112KA-A	98			
49	RZ/T1	R7S910021CBG	PLBG0112KA-A	99			
50	RZ/T1	R7S910022CBG	PLBG0112KA-A	100			