Report No. MCR-22-0314
April 26,2022

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX63T

DEVICE : R5F563TXXX

APPLICATION : Consumer / Industry

Quality Assurance Div.
Renesas Electronics Corporation

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Table. Reliability test results (QFP)

Test Items	Reference	Test Conditions	Results Failure/Size	Comment
High Temperature Operating Life (HTOL)	JESD22-A108	Ta=125 ℃, Vccmax, 1000 hrs	0/22	
High Temperature Storage Life (HTSL)	JESD22-A103	Ta=150 ℃, 1000 hrs	0/22	
Temperature Humidity bias (THB) (*1)	JESD22-A101	Ta=85 ℃, RH=85 %, Vccmax, 1000 hrs	0/22	
Temperature Cycling (TC) (*1)	JESD22-A104	Ta=-65 ℃ to 150 ℃ , 300 cycles	0/22	
Latch-Up (LU)	JESD78	Pulse Current Injection, I=+/-150 mA	0/3	
Electrostatic discharge (ESD-HBM)	JS-001	1.5 kΩ, 100 pF, +/-2000 V, 1 time	0/3	Class: 2
Electrostatic discharge (ESD-CDM)	JEITA ED-4701/302	+/-1000V,1time	0/3	Class: Equivalent to C2b
Solderability (SD)	J-STD-002	245 ℃, 5 s, Solder coverage ≥95 %	0/5	
Resistance to Soldering Heat (PC)	JESD22-A113, J-STD-020	MSL3(Moisture Sensitivity Level 3)	0/22	

*1) With preconditioning per JESD22-A113, MSL 3
・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)

$$\lambda = \lambda b \times \pi T \quad (FIT)$$

①Unique failure rate (λb)

λb= 0.03 FIT

Unique failure rate at Ta=55 ℃ using 60 % confidence level.

②Temperature term (πT)

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

Ea : Activation energy (eV)
Ta : Ambient temperature (℃)

πT simplified chart as Ea=0.7 eV

Ta (℃)	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)

$$MTTF = 1/\lambda$$

Reference about Renesas package code

Package type		Package code *1
Lead type plastic package	QFP	PxQP
Non-lead type plastic package	QFN	PxQN
Grid array type plastic package	BGA	PxBG
	LGA	PxLG

*1. First four digit

Table. Product list

No	Group	Product part number	Package code
1	RX63T	R5F563TBADFA	PLQP0120K*
2	RX63T	R5F563TBAGFA	PLQP0120K*
3	RX63T	R5F563TBBDFA	PLQP0120K*
4	RX63T	R5F563TBBGFA	PLQP0120K*
5	RX63T	R5F563TBDDFA	PLQP0120K*
6	RX63T	R5F563TBEDFA	PLQP0120K*
7	RX63T	R5F563TCADFA	PLQP0120K*
8	RX63T	R5F563TCAGFA	PLQP0120K*
9	RX63T	R5F563TCBDFA	PLQP0120K*
10	RX63T	R5F563TCBGFA	PLQP0120K*
11	RX63T	R5F563TCDDFA	PLQP0120K*
12	RX63T	R5F563TCEDFA	PLQP0120K*
13	RX63T	R5F563TEADFA	PLQP0120K*
14	RX63T	R5F563TEAGFA	PLQP0120K*
15	RX63T	R5F563TEBDFA	PLQP0120K*
16	RX63T	R5F563TEBGFA	PLQP0120K*
17	RX63T	R5F563TEDDFA	PLQP0120K*
18	RX63T	R5F563TEEDFA	PLQP0120K*
19	RX63T	R5F563TBADFB	PLQP0144K*
20	RX63T	R5F563TBAGFB	PLQP0144K*
21	RX63T	R5F563TBBDFB	PLQP0144K*
22	RX63T	R5F563TBBGFB	PLQP0144K*
23	RX63T	R5F563TBDDFB	PLQP0144K*
24	RX63T	R5F563TBEDFB	PLQP0144K*
25	RX63T	R5F563TCADFB	PLQP0144K*
26	RX63T	R5F563TCAGFB	PLQP0144K*
27	RX63T	R5F563TCBDFB	PLQP0144K*
28	RX63T	R5F563TCBGFB	PLQP0144K*
29	RX63T	R5F563TCDDFB	PLQP0144K*
30	RX63T	R5F563TCEDFB	PLQP0144K*
31	RX63T	R5F563TEADFB	PLQP0144K*
32	RX63T	R5F563TEAGFB	PLQP0144K*
33	RX63T	R5F563TEBDFB	PLQP0144K*
34	RX63T	R5F563TEBGFB	PLQP0144K*
35	RX63T	R5F563TEDDFB	PLQP0144K*
36	RX63T	R5F563TEEDFB	PLQP0144K*
37	RX63T	R5F563TBADFH	PLQP0112J*
38	RX63T	R5F563TBAGFH	PLQP0112J*
39	RX63T	R5F563TBBDFH	PLQP0112J*
40	RX63T	R5F563TBBGFH	PLQP0112J*
41	RX63T	R5F563TBDDFH	PLQP0112J*
42	RX63T	R5F563TBEDFH	PLQP0112J*
43	RX63T	R5F563TCADFH	PLQP0112J*
44	RX63T	R5F563TCAGFH	PLQP0112J*
45	RX63T	R5F563TCBDFH	PLQP0112J*
46	RX63T	R5F563TCBGFH	PLQP0112J*
47	RX63T	R5F563TCDDFH	PLQP0112J*
48	RX63T	R5F563TCEDFH	PLQP0112J*
49	RX63T	R5F563TEADFH	PLQP0112J*
50	RX63T	R5F563TEAGFH	PLQP0112J*

No	Group	Product part number	Package code
51	RX63T	R5F563TEBDFH	PLQP0112J*
52	RX63T	R5F563TEBGFH	PLQP0112J*
53	RX63T	R5F563TEDDFH	PLQP0112J*
54	RX63T	R5F563TEEDFH	PLQP0112J*
55	RX63T	R5F563T4EDFL	PLQP0048K*
56	RX63T	R5F563T4EGFL	PLQP0048K*
57	RX63T	R5F563T5EDFL	PLQP0048K*
58	RX63T	R5F563T5EGFL	PLQP0048K*
59	RX63T	R5F563T6EDFL	PLQP0048K*
60	RX63T	R5F563T6EGFL	PLQP0048K*
61	RX63T	R5F563T4EDFM	PLQP0064K*
62	RX63T	R5F563T4EGFM	PLQP0064K*
63	RX63T	R5F563T5EDFM	PLQP0064K*
64	RX63T	R5F563T5EGFM	PLQP0064K*
65	RX63T	R5F563T6EDFM	PLQP0064K*
66	RX63T	R5F563T6EGFM	PLQP0064K*
67	RX63T	R5F563TBADFP	PLQP0100K*
68	RX63T	R5F563TBAGFP	PLQP0100K*
69	RX63T	R5F563TBBDFP	PLQP0100K*
70	RX63T	R5F563TBBGFP	PLQP0100K*
71	RX63T	R5F563TBDDFP	PLQP0100K*
72	RX63T	R5F563TBEDFP	PLQP0100K*
73	RX63T	R5F563TCADFP	PLQP0100K*
74	RX63T	R5F563TCAGFP	PLQP0100K*
75	RX63T	R5F563TCBDFP	PLQP0100K*
76	RX63T	R5F563TCBGFP	PLQP0100K*
77	RX63T	R5F563TCDDFP	PLQP0100K*
78	RX63T	R5F563TCEDFP	PLQP0100K*
79	RX63T	R5F563TEADFP	PLQP0100K*
80	RX63T	R5F563TEAGFP	PLQP0100K*
81	RX63T	R5F563TEBDFP	PLQP0100K*
82	RX63T	R5F563TEBGFP	PLQP0100K*
83	RX63T	R5F563TEDDFP	PLQP0100K*
84	RX63T	R5F563TEEDFP	PLQP0100K*
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