

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX63T

DEVICE : R5F563TXXX

QUALITY GRADE : Standard

Quality Assurance Div.
Renesas Electronics Corporation

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Summary of Reliability Test Results for QFP Package (MSL3)

Test Item	Reference	Test Conditions	Results Failure/Size	Comment
High Temperature Operating Life (HTOL)	JESD22-A108	Ta=125 °C, Vccmax, 1000 hrs	0/231	3 lots or more
High Temperature Storage Life (HTSL)	JESD22-A103	Ta=150 °C, 1000 hrs	0/75	3 lots or more
Temperature Humidity bias (THB) (*1)	JESD22-A101	Ta=85 °C, RH=85 %, Vccmax, 1000 hrs	0/75	3 lots or more
Temperature Cycling (TC) (*1)	JESD22-A104	Ta=-65 °C to 150 °C , 500 cycles	0/75	3 lots or more
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	+/-1000 V,1 time	0/3	Class: Equivalent to C2b
Solderability (SD)	J-STD-002	245 °C, 5 s, Solder coverage ≥95 %	0/5	
Resistance to Soldering Heat (MSL3)	JESD22-A113, J-STD-020	MSL3(Moisture Sensitivity Level 3) Peak Reflow Temp=260 °C	Pass	Verified after MSL preconditioning; applied to applicable reliability tests (*1).

Note :

- (*1) With preconditioning per JESD22-A113, MSL 3
- It is tested to confirm that all the samples are satisfied with an individual product specification.
- 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 (λb)

$\lambda b= 0.006 \text{ FIT}$

Unique failure rate at $Ta=55 \text{ }^{\circ}\text{C}$ 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 ($^{\circ}\text{C}$)

πT simplified chart as $Ea=0.7 \text{ eV}$												
Ta ($^{\circ}\text{C}$)	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)

$$MTTF = 1/\lambda$$

Reference about Renesas package code

Package type		Package code *1
Lead type plastic package	QFP	PxQP
	SOP	PxSP
Non-lead type plastic package	QFN	PxQN
Grid array type plastic package	BGA	PxBG
	LGA	PxLG
Wafer level chip scale package	WLCSP	SxBG

*1. First four digit

Table. Product list

No	Product part number	Package code	MSL	No	Product part number	Package code	MSL
1	R5F563TBADFA	PLQP0120K*	MSL3	51	R5F563TEBDFH	PLQP0112J*	MSL3
2	R5F563TBAGFA	PLQP0120K*	MSL3	52	R5F563TEBGFH	PLQP0112J*	MSL3
3	R5F563TBBDFFA	PLQP0120K*	MSL3	53	R5F563TEDDFH	PLQP0112J*	MSL3
4	R5F563TBBGFA	PLQP0120K*	MSL3	54	R5F563TEEDFH	PLQP0112J*	MSL3
5	R5F563TBDDFA	PLQP0120K*	MSL3	55	R5F563T4EDFL	PLQP0048K*	MSL3
6	R5F563TBEDFA	PLQP0120K*	MSL3	56	R5F563T4EGFL	PLQP0048K*	MSL3
7	R5F563TCADFA	PLQP0120K*	MSL3	57	R5F563T5EDFL	PLQP0048K*	MSL3
8	R5F563TCAGFA	PLQP0120K*	MSL3	58	R5F563T5EGFL	PLQP0048K*	MSL3
9	R5F563TCBDFFA	PLQP0120K*	MSL3	59	R5F563T6EDFL	PLQP0048K*	MSL3
10	R5F563TCBGFA	PLQP0120K*	MSL3	60	R5F563T6EGFL	PLQP0048K*	MSL3
11	R5F563TCDDFA	PLQP0120K*	MSL3	61	R5F563T4EDFM	PLQP0064K*	MSL3
12	R5F563TCEDFA	PLQP0120K*	MSL3	62	R5F563T4EGFM	PLQP0064K*	MSL3
13	R5F563TEADFA	PLQP0120K*	MSL3	63	R5F563T5EDFM	PLQP0064K*	MSL3
14	R5F563TEAGFA	PLQP0120K*	MSL3	64	R5F563T5EGFM	PLQP0064K*	MSL3
15	R5F563TEBDFFA	PLQP0120K*	MSL3	65	R5F563T6EDFM	PLQP0064K*	MSL3
16	R5F563TEBGFA	PLQP0120K*	MSL3	66	R5F563T6EGFM	PLQP0064K*	MSL3
17	R5F563TEDDFA	PLQP0120K*	MSL3	67	R5F563TBADFP	PLQP0100K*	MSL3
18	R5F563TEEDFA	PLQP0120K*	MSL3	68	R5F563TBAGFP	PLQP0100K*	MSL3
19	R5F563TBADFB	PLQP0144K*	MSL3	69	R5F563TBBDFP	PLQP0100K*	MSL3
20	R5F563TBAGFB	PLQP0144K*	MSL3	70	R5F563TBBGFP	PLQP0100K*	MSL3
21	R5F563TBBDFB	PLQP0144K*	MSL3	71	R5F563TBDDFP	PLQP0100K*	MSL3
22	R5F563TBBGFB	PLQP0144K*	MSL3	72	R5F563TBEDFP	PLQP0100K*	MSL3
23	R5F563TBDDFB	PLQP0144K*	MSL3	73	R5F563TCADFP	PLQP0100K*	MSL3
24	R5F563TBEDFB	PLQP0144K*	MSL3	74	R5F563TCAGFP	PLQP0100K*	MSL3
25	R5F563TCADFB	PLQP0144K*	MSL3	75	R5F563TCBDFP	PLQP0100K*	MSL3
26	R5F563TCAGFB	PLQP0144K*	MSL3	76	R5F563TCBGFP	PLQP0100K*	MSL3
27	R5F563TCBDFB	PLQP0144K*	MSL3	77	R5F563TCDDFP	PLQP0100K*	MSL3
28	R5F563TCBGFB	PLQP0144K*	MSL3	78	R5F563TCEDFP	PLQP0100K*	MSL3
29	R5F563TCDDFB	PLQP0144K*	MSL3	79	R5F563TEADFP	PLQP0100K*	MSL3
30	R5F563TCEDFB	PLQP0144K*	MSL3	80	R5F563TEAGFP	PLQP0100K*	MSL3
31	R5F563TEADFB	PLQP0144K*	MSL3	81	R5F563TEBDFP	PLQP0100K*	MSL3
32	R5F563TEAGFB	PLQP0144K*	MSL3	82	R5F563TEBGFP	PLQP0100K*	MSL3
33	R5F563TEBDFB	PLQP0144K*	MSL3	83	R5F563TEDDFP	PLQP0100K*	MSL3
34	R5F563TEBGFB	PLQP0144K*	MSL3	84	R5F563TEEDFP	PLQP0100K*	MSL3
35	R5F563TEDDFB	PLQP0144K*	MSL3	85			
36	R5F563TEEDFB	PLQP0144K*	MSL3	86			
37	R5F563TBADFH	PLQP0112J*	MSL3	87			
38	R5F563TBAGFH	PLQP0112J*	MSL3	88			
39	R5F563TBBDFH	PLQP0112J*	MSL3	89			
40	R5F563TBBGFH	PLQP0112J*	MSL3	90			
41	R5F563TBDDFH	PLQP0112J*	MSL3	91			
42	R5F563TBEDFH	PLQP0112J*	MSL3	92			
43	R5F563TCADFH	PLQP0112J*	MSL3	93			
44	R5F563TCAGFH	PLQP0112J*	MSL3	94			
45	R5F563TCBDFH	PLQP0112J*	MSL3	95			
46	R5F563TCBGFH	PLQP0112J*	MSL3	96			
47	R5F563TCDDFH	PLQP0112J*	MSL3	97			
48	R5F563TCEDFH	PLQP0112J*	MSL3	98			
49	R5F563TEADFH	PLQP0112J*	MSL3	99			
50	R5F563TEAGFH	PLQP0112J*	MSL3	100			

Note: MSL stands for Moisture Sensitivity Level.