

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX66T

DEVICE : R5F566TXXX

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 Humidity bias (HAST) (*1)	JESD22-A110	Ta=110 °C, RH=85 %, Vccmax, 264 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)	JESD22-C101	+/-500 V, 1 time	0/3	Class: C2
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)

$\lambda b= 0.004 \text{ FIT}$

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	R5F566TFCDFB	PLQP0144K*	MSL3	51	R5F566TABDFP	PLQP0100K*	MSL3
2	R5F566TFCGFB	PLQP0144K*	MSL3	52	R5F566TABGFP	PLQP0100K*	MSL3
3	R5F566TFGDFB	PLQP0144K*	MSL3	53	R5F566TAEDFP	PLQP0100K*	MSL3
4	R5F566TFGGFB	PLQP0144K*	MSL3	54	R5F566TAEGFP	PLQP0100K*	MSL3
5	R5F566TKCDFB	PLQP0144K*	MSL3	55	R5F566TAFDFP	PLQP0100K*	MSL3
6	R5F566TKCGFB	PLQP0144K*	MSL3	56	R5F566TAFGFP	PLQP0100K*	MSL3
7	R5F566TKGDFB	PLQP0144K*	MSL3	57	R5F566TEADFP	PLQP0100K*	MSL3
8	R5F566TKGGFB	PLQP0144K*	MSL3	58	R5F566TEAGFP	PLQP0100K*	MSL3
9	R5F566TAADFF	PLQP0080J*	MSL3	59	R5F566TEBDFP	PLQP0100K*	MSL3
10	R5F566TAAGFF	PLQP0080J*	MSL3	60	R5F566TEBGFP	PLQP0100K*	MSL3
11	R5F566TAEDFF	PLQP0080J*	MSL3	61	R5F566TEEDFP	PLQP0100K*	MSL3
12	R5F566TAEGFF	PLQP0080J*	MSL3	62	R5F566TEEGFP	PLQP0100K*	MSL3
13	R5F566TEADFF	PLQP0080J*	MSL3	63	R5F566TEFDFP	PLQP0100K*	MSL3
14	R5F566TEAGFF	PLQP0080J*	MSL3	64	R5F566TEFGFP	PLQP0100K*	MSL3
15	R5F566TEEDFF	PLQP0080J*	MSL3	65	R5F566TFADFP	PLQP0100K*	MSL3
16	R5F566TEEGFF	PLQP0080J*	MSL3	66	R5F566TFAGFP	PLQP0100K*	MSL3
17	R5F566TAADFH	PLQP0112J*	MSL3	67	R5F566TFBDFP	PLQP0100K*	MSL3
18	R5F566TAAGFH	PLQP0112J*	MSL3	68	R5F566TFBGFP	PLQP0100K*	MSL3
19	R5F566TAEDFH	PLQP0112J*	MSL3	69	R5F566TFCDFP	PLQP0100K*	MSL3
20	R5F566TAEGFH	PLQP0112J*	MSL3	70	R5F566TFCGFP	PLQP0100K*	MSL3
21	R5F566TEADFH	PLQP0112J*	MSL3	71	R5F566TFEDFP	PLQP0100K*	MSL3
22	R5F566TEAGFH	PLQP0112J*	MSL3	72	R5F566TFEGFP	PLQP0100K*	MSL3
23	R5F566TEEDFH	PLQP0112J*	MSL3	73	R5F566TFFDFP	PLQP0100K*	MSL3
24	R5F566TEEGFH	PLQP0112J*	MSL3	74	R5F566TFFGFP	PLQP0100K*	MSL3
25	R5F566TABDFL	PLQP0048K*	MSL3	75	R5F566TFGDFP	PLQP0100K*	MSL3
26	R5F566TABGFL	PLQP0048K*	MSL3	76	R5F566TFGGFP	PLQP0100K*	MSL3
27	R5F566TAFDFL	PLQP0048K*	MSL3	77	R5F566TKADFP	PLQP0100K*	MSL3
28	R5F566TAFGFL	PLQP0048K*	MSL3	78	R5F566TKAGFP	PLQP0100K*	MSL3
29	R5F566TEBDFL	PLQP0048K*	MSL3	79	R5F566TKBDFP	PLQP0100K*	MSL3
30	R5F566TEBGFL	PLQP0048K*	MSL3	80	R5F566TKBGFP	PLQP0100K*	MSL3
31	R5F566TEFDFL	PLQP0048K*	MSL3	81	R5F566TKCDFP	PLQP0100K*	MSL3
32	R5F566TEFGFL	PLQP0048K*	MSL3	82	R5F566TKCGFP	PLQP0100K*	MSL3
33	R5F566TAADFM	PLQP0064K*	MSL3	83	R5F566TKEDFP	PLQP0100K*	MSL3
34	R5F566TAAGFM	PLQP0064K*	MSL3	84	R5F566TKEGFP	PLQP0100K*	MSL3
35	R5F566TAEDFM	PLQP0064K*	MSL3	85	R5F566TKFDFP	PLQP0100K*	MSL3
36	R5F566TAEGFM	PLQP0064K*	MSL3	86	R5F566TKFGFP	PLQP0100K*	MSL3
37	R5F566TEADFM	PLQP0064K*	MSL3	87	R5F566TKGDFP	PLQP0100K*	MSL3
38	R5F566TEAGFM	PLQP0064K*	MSL3	88	R5F566TKGGFP	PLQP0100K*	MSL3
39	R5F566TEEDFM	PLQP0064K*	MSL3	89			
40	R5F566TEEGFM	PLQP0064K*	MSL3	90			
41	R5F566TAADFN	PLQP0080K*	MSL3	91			
42	R5F566TAAGFN	PLQP0080K*	MSL3	92			
43	R5F566TAEDFN	PLQP0080K*	MSL3	93			
44	R5F566TAEGFN	PLQP0080K*	MSL3	94			
45	R5F566TEADFN	PLQP0080K*	MSL3	95			
46	R5F566TEAGFN	PLQP0080K*	MSL3	96			
47	R5F566TEEDFN	PLQP0080K*	MSL3	97			
48	R5F566TEEGFN	PLQP0080K*	MSL3	98			
49	R5F566TAADFP	PLQP0100K*	MSL3	99			
50	R5F566TAAGFP	PLQP0100K*	MSL3	100			

Note: MSL stands for Moisture Sensitivity Level.