

# RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX66T  
DEVICE : R5F566TXXX  
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 °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=+/-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	+/-500V,1time	0/3	Class: C2
Solderability (SD)	J-STD-002	245 °C, 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 ( $\lambda$ )**

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

① Unique failure rate ( $\lambda_b$ )

$$\lambda_b = 0.04 \text{ FIT}$$

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

② Temperature term ( $\pi T$ )

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

$E_a$  : Activation energy (eV)

$T_a$  : Ambient temperature ( $^\circ\text{C}$ )

$\pi T$ 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
$\pi T$	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	No	Group	Product part number	Package code
1	RX66T	R5F566TFCDFB	PLQP0144K*	51	RX66T	R5F566TABDFP	PLQP0100K*
2	RX66T	R5F566TFCGFB	PLQP0144K*	52	RX66T	R5F566TABGFP	PLQP0100K*
3	RX66T	R5F566TFGDFB	PLQP0144K*	53	RX66T	R5F566TAEDFP	PLQP0100K*
4	RX66T	R5F566TFGGFB	PLQP0144K*	54	RX66T	R5F566TAEGFP	PLQP0100K*
5	RX66T	R5F566TKCDFB	PLQP0144K*	55	RX66T	R5F566TAFDFP	PLQP0100K*
6	RX66T	R5F566TKCGFB	PLQP0144K*	56	RX66T	R5F566TAFGFP	PLQP0100K*
7	RX66T	R5F566TKGDFB	PLQP0144K*	57	RX66T	R5F566TEADFP	PLQP0100K*
8	RX66T	R5F566TKGGFB	PLQP0144K*	58	RX66T	R5F566TEAGFP	PLQP0100K*
9	RX66T	R5F566TAADFF	PLQP0080J*	59	RX66T	R5F566TEBDFP	PLQP0100K*
10	RX66T	R5F566TAAGFF	PLQP0080J*	60	RX66T	R5F566TEBGFP	PLQP0100K*
11	RX66T	R5F566TAEDFF	PLQP0080J*	61	RX66T	R5F566TEEDFP	PLQP0100K*
12	RX66T	R5F566TAEGFF	PLQP0080J*	62	RX66T	R5F566TEEGFP	PLQP0100K*
13	RX66T	R5F566TEADFF	PLQP0080J*	63	RX66T	R5F566TEFDFF	PLQP0100K*
14	RX66T	R5F566TEAGFF	PLQP0080J*	64	RX66T	R5F566TEFGFP	PLQP0100K*
15	RX66T	R5F566TEEDFF	PLQP0080J*	65	RX66T	R5F566TFADFP	PLQP0100K*
16	RX66T	R5F566TEEGFF	PLQP0080J*	66	RX66T	R5F566TFAGFP	PLQP0100K*
17	RX66T	R5F566TAADFH	PLQP0112J*	67	RX66T	R5F566TFBDFP	PLQP0100K*
18	RX66T	R5F566TAAGFH	PLQP0112J*	68	RX66T	R5F566TFBGFP	PLQP0100K*
19	RX66T	R5F566TAEDFH	PLQP0112J*	69	RX66T	R5F566TFCDFP	PLQP0100K*
20	RX66T	R5F566TAEGFH	PLQP0112J*	70	RX66T	R5F566TFCGFP	PLQP0100K*
21	RX66T	R5F566TEADFH	PLQP0112J*	71	RX66T	R5F566TFEDFP	PLQP0100K*
22	RX66T	R5F566TEAGFH	PLQP0112J*	72	RX66T	R5F566TFEGFP	PLQP0100K*
23	RX66T	R5F566TEEDFH	PLQP0112J*	73	RX66T	R5F566TFFDFP	PLQP0100K*
24	RX66T	R5F566TEEGFH	PLQP0112J*	74	RX66T	R5F566TFFGFP	PLQP0100K*
25	RX66T	R5F566TABDFL	PLQP0048K*	75	RX66T	R5F566TFGDFP	PLQP0100K*
26	RX66T	R5F566TABGFL	PLQP0048K*	76	RX66T	R5F566TFGGFP	PLQP0100K*
27	RX66T	R5F566TAFDFL	PLQP0048K*	77	RX66T	R5F566TKADFP	PLQP0100K*
28	RX66T	R5F566TAFGFL	PLQP0048K*	78	RX66T	R5F566TKAGFP	PLQP0100K*
29	RX66T	R5F566TEBDFL	PLQP0048K*	79	RX66T	R5F566TKBDFP	PLQP0100K*
30	RX66T	R5F566TEBGFL	PLQP0048K*	80	RX66T	R5F566TKBGFP	PLQP0100K*
31	RX66T	R5F566TEFDFFL	PLQP0048K*	81	RX66T	R5F566TKCDFP	PLQP0100K*
32	RX66T	R5F566TEFGFL	PLQP0048K*	82	RX66T	R5F566TKCGFP	PLQP0100K*
33	RX66T	R5F566TAADFM	PLQP0064K*	83	RX66T	R5F566TKEDFP	PLQP0100K*
34	RX66T	R5F566TAAGFM	PLQP0064K*	84	RX66T	R5F566TKEGFP	PLQP0100K*
35	RX66T	R5F566TAEDFM	PLQP0064K*	85	RX66T	R5F566TKFDFP	PLQP0100K*
36	RX66T	R5F566TAEGFM	PLQP0064K*	86	RX66T	R5F566TKFGFP	PLQP0100K*
37	RX66T	R5F566TEADFM	PLQP0064K*	87	RX66T	R5F566TKGDFP	PLQP0100K*
38	RX66T	R5F566TEAGFM	PLQP0064K*	88	RX66T	R5F566TKGGFP	PLQP0100K*
39	RX66T	R5F566TEEDFM	PLQP0064K*	89			
40	RX66T	R5F566TEEGFM	PLQP0064K*	90			
41	RX66T	R5F566TAADFN	PLQP0080K*	91			
42	RX66T	R5F566TAAGFN	PLQP0080K*	92			
43	RX66T	R5F566TAEDFN	PLQP0080K*	93			
44	RX66T	R5F566TAEGFN	PLQP0080K*	94			
45	RX66T	R5F566TEADFN	PLQP0080K*	95			
46	RX66T	R5F566TEAGFN	PLQP0080K*	96			
47	RX66T	R5F566TEEDFN	PLQP0080K*	97			
48	RX66T	R5F566TEEGFN	PLQP0080K*	98			
49	RX66T	R5F566TAADFP	PLQP0100K*	99			
50	RX66T	R5F566TAAGFP	PLQP0100K*	100			