

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX660
DEVICE : R5F5660XXX
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 (λ)

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

①Unique failure rate (λ_b)

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

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

②Temperature 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)

$$MTTF = 1/\lambda$$

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	RX660	R5F56604ADFB	PLQP0144K*	51	RX660	R5F56609BDFM	PLQP0064K*
2	RX660	R5F56604AGFB	PLQP0144K*	52	RX660	R5F56609BGFM	PLQP0064K*
3	RX660	R5F56604BDFB	PLQP0144K*	53	RX660	R5F56609CDFM	PLQP0064K*
4	RX660	R5F56604BGFB	PLQP0144K*	54	RX660	R5F56609CGFM	PLQP0064K*
5	RX660	R5F56604CDFB	PLQP0144K*	55	RX660	R5F56609DDFM	PLQP0064K*
6	RX660	R5F56604CGFB	PLQP0144K*	56	RX660	R5F56609DGFM	PLQP0064K*
7	RX660	R5F56604DDFB	PLQP0144K*	57	RX660	R5F56604ADFN	PLQP0080K*
8	RX660	R5F56604DGFB	PLQP0144K*	58	RX660	R5F56604AGFN	PLQP0080K*
9	RX660	R5F56604EDFB	PLQP0144K*	59	RX660	R5F56604BDFN	PLQP0080K*
10	RX660	R5F56604EGFB	PLQP0144K*	60	RX660	R5F56604BGFN	PLQP0080K*
11	RX660	R5F56604FDFB	PLQP0144K*	61	RX660	R5F56604CDFN	PLQP0080K*
12	RX660	R5F56604FGFB	PLQP0144K*	62	RX660	R5F56604CGFN	PLQP0080K*
13	RX660	R5F56604GDFB	PLQP0144K*	63	RX660	R5F56604DDFN	PLQP0080K*
14	RX660	R5F56604GGFB	PLQP0144K*	64	RX660	R5F56604DGFN	PLQP0080K*
15	RX660	R5F56604HDFB	PLQP0144K*	65	RX660	R5F56609ADFN	PLQP0080K*
16	RX660	R5F56604HGFB	PLQP0144K*	66	RX660	R5F56609AGFN	PLQP0080K*
17	RX660	R5F56609ADFB	PLQP0144K*	67	RX660	R5F56609BDFN	PLQP0080K*
18	RX660	R5F56609AGFB	PLQP0144K*	68	RX660	R5F56609BGFN	PLQP0080K*
19	RX660	R5F56609BDFB	PLQP0144K*	69	RX660	R5F56609CDFN	PLQP0080K*
20	RX660	R5F56609BGFB	PLQP0144K*	70	RX660	R5F56609CGFN	PLQP0080K*
21	RX660	R5F56609CDFB	PLQP0144K*	71	RX660	R5F56609DDFN	PLQP0080K*
22	RX660	R5F56609CGFB	PLQP0144K*	72	RX660	R5F56609DGFN	PLQP0080K*
23	RX660	R5F56609DDFB	PLQP0144K*	73	RX660	R5F56604ADFP	PLQP0100K*
24	RX660	R5F56609DGFB	PLQP0144K*	74	RX660	R5F56604AGFP	PLQP0100K*
25	RX660	R5F56609EDFB	PLQP0144K*	75	RX660	R5F56604BDFP	PLQP0100K*
26	RX660	R5F56609EGFB	PLQP0144K*	76	RX660	R5F56604BGFP	PLQP0100K*
27	RX660	R5F56609FDFB	PLQP0144K*	77	RX660	R5F56604CDFP	PLQP0100K*
28	RX660	R5F56609FGFB	PLQP0144K*	78	RX660	R5F56604CGFP	PLQP0100K*
29	RX660	R5F56609GDFB	PLQP0144K*	79	RX660	R5F56604DDFP	PLQP0100K*
30	RX660	R5F56609GGFB	PLQP0144K*	80	RX660	R5F56604DGFP	PLQP0100K*
31	RX660	R5F56609HDFB	PLQP0144K*	81	RX660	R5F56604EDFP	PLQP0100K*
32	RX660	R5F56609HGFB	PLQP0144K*	82	RX660	R5F56604EGFP	PLQP0100K*
33	RX660	R5F56604ADFL	PLQP0048K*	83	RX660	R5F56604FDFP	PLQP0100K*
34	RX660	R5F56604AGFL	PLQP0048K*	84	RX660	R5F56604FGFP	PLQP0100K*
35	RX660	R5F56604BDFL	PLQP0048K*	85	RX660	R5F56604GDGP	PLQP0100K*
36	RX660	R5F56604BGFL	PLQP0048K*	86	RX660	R5F56604GGFP	PLQP0100K*
37	RX660	R5F56609ADFL	PLQP0048K*	87	RX660	R5F56604HDFP	PLQP0100K*
38	RX660	R5F56609AGFL	PLQP0048K*	88	RX660	R5F56604HGFP	PLQP0100K*
39	RX660	R5F56609BDFL	PLQP0048K*	89	RX660	R5F56609ADFP	PLQP0100K*
40	RX660	R5F56609BGFL	PLQP0048K*	90	RX660	R5F56609AGFP	PLQP0100K*
41	RX660	R5F56604ADFM	PLQP0064K*	91	RX660	R5F56609BDFP	PLQP0100K*
42	RX660	R5F56604AGFM	PLQP0064K*	92	RX660	R5F56609BGFP	PLQP0100K*
43	RX660	R5F56604BDFM	PLQP0064K*	93	RX660	R5F56609CDFP	PLQP0100K*
44	RX660	R5F56604BGFM	PLQP0064K*	94	RX660	R5F56609CGFP	PLQP0100K*
45	RX660	R5F56604CDFM	PLQP0064K*	95	RX660	R5F56609DDFP	PLQP0100K*
46	RX660	R5F56604CGFM	PLQP0064K*	96	RX660	R5F56609DGFP	PLQP0100K*
47	RX660	R5F56604DDFM	PLQP0064K*	97	RX660	R5F56609EDFP	PLQP0100K*
48	RX660	R5F56604DGFM	PLQP0064K*	98	RX660	R5F56609EGFP	PLQP0100K*
49	RX660	R5F56609ADFM	PLQP0064K*	99	RX660	R5F56609FDFP	PLQP0100K*
50	RX660	R5F56609AGFM	PLQP0064K*	100	RX660	R5F56609FGFP	PLQP0100K*

Table. Product list

MCR-22-0373

No	Group	Product part number	Package code	No	Group	Product part number	Package code
101	RX660	R5F56609GDFF	PLQP0100K*	161			
102	RX660	R5F56609GGFP	PLQP0100K*	162			
103	RX660	R5F56609HDFP	PLQP0100K*	163			
104	RX660	R5F56609HGFP	PLQP0100K*	164			
105				165			
106				166			
107				167			
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