

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX210
DEVICE : R5F5210XXX
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)	JEITA ED-4701/302	+/-1000V,1time	0/3	Class: Equivalent to C2b
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 .

Table. Reliability test results (LGA)

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=-55 °C to 125 °C , 500 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
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)

$$\lambda_b = 2.3 \text{ FIT}$$

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 $E_a=0.5 \text{ eV}$												
T_a ($^\circ\text{C}$)	40	50	55	60	65	70	75	80	85	90	100	110
πT	0.43	0.76	1	1.30	1.69	2.17	2.76	3.50	4.40	5.50	8.44	12.67

•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	RX210	R5F52105BDFB	PLQP0144K*	51	RX210	R5F52107CGFM	PLQP0064K*
2	RX210	R5F52105BGFB	PLQP0144K*	52	RX210	R5F52108ADFM	PLQP0064K*
3	RX210	R5F52106BDFB	PLQP0144K*	53	RX210	R5F52108CDFM	PLQP0064K*
4	RX210	R5F52106BGFB	PLQP0144K*	54	RX210	R5F52108CGFM	PLQP0064K*
5	RX210	R5F52107BDFB	PLQP0144K*	55	RX210	R5F52105ADFN	PLQP0080K*
6	RX210	R5F52107BGFB	PLQP0144K*	56	RX210	R5F52105BDFN	PLQP0080K*
7	RX210	R5F52108BDFB	PLQP0144K*	57	RX210	R5F52105BGFN	PLQP0080K*
8	RX210	R5F52108BGFB	PLQP0144K*	58	RX210	R5F52105CDFN	PLQP0080K*
9	RX210	R5F5210ABDFB	PLQP0144K*	59	RX210	R5F52105CGFN	PLQP0080K*
10	RX210	R5F5210ABGFB	PLQP0144K*	60	RX210	R5F52106ADFN	PLQP0080K*
11	RX210	R5F5210BBDFB	PLQP0144K*	61	RX210	R5F52106BDFN	PLQP0080K*
12	RX210	R5F5210BBGFB	PLQP0144K*	62	RX210	R5F52106BGFN	PLQP0080K*
13	RX210	R5F52103BDFF	PLQP0080J*	63	RX210	R5F52106CDFN	PLQP0080K*
14	RX210	R5F52104BDFF	PLQP0080J*	64	RX210	R5F52106CGFN	PLQP0080K*
15	RX210	R5F52105BDFF	PLQP0080J*	65	RX210	R5F52107ADFN	PLQP0080K*
16	RX210	R5F52106BDFF	PLQP0080J*	66	RX210	R5F52107CDFN	PLQP0080K*
17	RX210	R5F52107CDFF	PLQP0080J*	67	RX210	R5F52107CGFN	PLQP0080K*
18	RX210	R5F52108CDFF	PLQP0080J*	68	RX210	R5F52108ADFN	PLQP0080K*
19	RX210	R5F52105BDFK	PLQP0064G*	69	RX210	R5F52108CDFN	PLQP0080K*
20	RX210	R5F52105BGFK	PLQP0064G*	70	RX210	R5F52108CGFN	PLQP0080K*
21	RX210	R5F52106BDFK	PLQP0064G*	71	RX210	R5F52105ADFP	PLQP0100K*
22	RX210	R5F52106BGFK	PLQP0064G*	72	RX210	R5F52105BDFP	PLQP0100K*
23	RX210	R5F52107CDFK	PLQP0064G*	73	RX210	R5F52105BGFP	PLQP0100K*
24	RX210	R5F52107CGFK	PLQP0064G*	74	RX210	R5F52105CDFP	PLQP0100K*
25	RX210	R5F52108CDFK	PLQP0064G*	75	RX210	R5F52105CGFP	PLQP0100K*
26	RX210	R5F52108CGFK	PLQP0064G*	76	RX210	R5F52106ADFP	PLQP0100K*
27	RX210	R5F52103BDL	PLQP0048K*	77	RX210	R5F52106BDFP	PLQP0100K*
28	RX210	R5F52103BGL	PLQP0048K*	78	RX210	R5F52106BGFP	PLQP0100K*
29	RX210	R5F52104BDL	PLQP0048K*	79	RX210	R5F52106CDFP	PLQP0100K*
30	RX210	R5F52104BGL	PLQP0048K*	80	RX210	R5F52106CGFP	PLQP0100K*
31	RX210	R5F52105BDL	PLQP0048K*	81	RX210	R5F52107ADFP	PLQP0100K*
32	RX210	R5F52105BGL	PLQP0048K*	82	RX210	R5F52107CDFP	PLQP0100K*
33	RX210	R5F52106BDL	PLQP0048K*	83	RX210	R5F52107CGFP	PLQP0100K*
34	RX210	R5F52106BGL	PLQP0048K*	84	RX210	R5F52108ADFP	PLQP0100K*
35	RX210	R5F52103BDFM	PLQP0064K*	85	RX210	R5F52108CDFP	PLQP0100K*
36	RX210	R5F52103BGFM	PLQP0064K*	86	RX210	R5F52108CGFP	PLQP0100K*
37	RX210	R5F52104BDFM	PLQP0064K*	87	RX210	R5F5210ABDFP	PLQP0100K*
38	RX210	R5F52104BGFM	PLQP0064K*	88	RX210	R5F5210ABGFP	PLQP0100K*
39	RX210	R5F52105ADFM	PLQP0064K*	89	RX210	R5F5210AHDFP	PLQP0100K*
40	RX210	R5F52105BDFM	PLQP0064K*	90	RX210	R5F5210BBDFP	PLQP0100K*
41	RX210	R5F52105BGFM	PLQP0064K*	91	RX210	R5F5210BBGFP	PLQP0100K*
42	RX210	R5F52105CDFM	PLQP0064K*	92	RX210	R5F5210BHDFP	PLQP0100K*
43	RX210	R5F52105CGFM	PLQP0064K*	93	RX210	R5F52105BDLA	PTLG0100K*
44	RX210	R5F52106ADFM	PLQP0064K*	94	RX210	R5F52106BDLA	PTLG0100K*
45	RX210	R5F52106BDFM	PLQP0064K*	95	RX210	R5F52105ADLJ	PTLG0100J*
46	RX210	R5F52106BGFM	PLQP0064K*	96	RX210	R5F52105BDLJ	PTLG0100J*
47	RX210	R5F52106CDFM	PLQP0064K*	97	RX210	R5F52105CDLJ	PTLG0100J*
48	RX210	R5F52106CGFM	PLQP0064K*	98	RX210	R5F52106ADLJ	PTLG0100J*
49	RX210	R5F52107ADFM	PLQP0064K*	99	RX210	R5F52106BDLJ	PTLG0100J*
50	RX210	R5F52107CDFM	PLQP0064K*	100	RX210	R5F52106CDLJ	PTLG0100J*

Table. Product list

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No	Group	Product part number	Package code	No	Group	Product part number	Package code
101	RX210	R5F52107ADLJ	PTLG0100J*	161			
102	RX210	R5F52107CDLJ	PTLG0100J*	162			
103	RX210	R5F52108ADLJ	PTLG0100J*	163			
104	RX210	R5F52108CDLJ	PTLG0100J*	164			
105	RX210	R5F5210ABDLJ	PTLG0100J*	165			
106	RX210	R5F5210AHD LJ	PTLG0100J*	166			
107	RX210	R5F5210BBD LJ	PTLG0100J*	167			
108	RX210	R5F5210BHDLJ	PTLG0100J*	168			
109	RX210	R5F52105BDLK	PTLG0145K*	169			
110	RX210	R5F52106BDLK	PTLG0145K*	170			
111	RX210	R5F52107BDLK	PTLG0145K*	171			
112	RX210	R5F52108BDLK	PTLG0145K*	172			
113	RX210	R5F5210ABDLK	PTLG0145K*	173			
114	RX210	R5F5210BBDLK	PTLG0145K*	174			
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