Report No. MCR-22-0296
April 26,2022

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX210

DEVICE : R5F5210XXX

APPLICATION : Consumer / Industry

Quality Assurance Div.
Renesas Electronics Corporation

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(Rev.5.0-2 October 2020)

Table. Reliability test results (QFP)

Test Items	Reference	Test Conditions	Results Failure/Size	Comment
High Temperature Operating Life (HTOL)	JESD22-A108	Ta=125 ℃, Vccmax, 1000 hrs	0/22	
High Temperature Storage Life (HTSL)	JESD22-A103	Ta=150 ℃, 1000 hrs	0/22	
Temperature Humidity bias (THB) (*1)	JESD22-A101	Ta=85 ℃, RH=85 %, Vccmax, 1000 hrs	0/22	
Temperature Cycling (TC) (*1)	JESD22-A104	Ta=-65 ℃ to 150 ℃ , 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 ℃, 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 ℃, Vccmax, 1000 hrs	0/22	
High Temperature Storage Life (HTSL)	JESD22-A103	Ta=150 ℃, 1000 hrs	0/22	
Temperature Humidity bias (THB) (*1)	JESD22-A101	Ta=85 ℃, RH=85 %, Vccmax, 1000 hrs	0/22	
Temperature Cycling (TC) (*1)	JESD22-A104	Ta=-55 ℃ to 125 ℃ , 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)

$$\lambda = \lambda b \times \pi T \quad (FIT)$$

①Unique failure rate (λb)

λb= 2.3 FIT

Unique failure rate at Ta=55 ℃ 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 (℃)

πT simplified chart as Ea=0.5 eV

Ta (℃)	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
1	RX210	R5F52105BDFB	PLQP0144K*
2	RX210	R5F52105BGFB	PLQP0144K*
3	RX210	R5F52106BDFB	PLQP0144K*
4	RX210	R5F52106BGFB	PLQP0144K*
5	RX210	R5F52107BDFB	PLQP0144K*
6	RX210	R5F52107BGFB	PLQP0144K*
7	RX210	R5F52108BDFB	PLQP0144K*
8	RX210	R5F52108BGFB	PLQP0144K*
9	RX210	R5F5210ABDFB	PLQP0144K*
10	RX210	R5F5210ABGFB	PLQP0144K*
11	RX210	R5F5210BBDFB	PLQP0144K*
12	RX210	R5F5210BBGFB	PLQP0144K*
13	RX210	R5F52103BDFF	PLQP0080J*
14	RX210	R5F52104BDFF	PLQP0080J*
15	RX210	R5F52105BDFF	PLQP0080J*
16	RX210	R5F52106BDFF	PLQP0080J*
17	RX210	R5F52107CDFF	PLQP0080J*
18	RX210	R5F52108CDFF	PLQP0080J*
19	RX210	R5F52105BDFK	PLQP0064G*
20	RX210	R5F52105BGFK	PLQP0064G*
21	RX210	R5F52106BDFK	PLQP0064G*
22	RX210	R5F52106BGFK	PLQP0064G*
23	RX210	R5F52107CDFK	PLQP0064G*
24	RX210	R5F52107CGFK	PLQP0064G*
25	RX210	R5F52108CDFK	PLQP0064G*
26	RX210	R5F52108CGFK	PLQP0064G*
27	RX210	R5F52103BDFL	PLQP0048K*
28	RX210	R5F52103BGFL	PLQP0048K*
29	RX210	R5F52104BDFL	PLQP0048K*
30	RX210	R5F52104BGFL	PLQP0048K*
31	RX210	R5F52105BDFL	PLQP0048K*
32	RX210	R5F52105BGFL	PLQP0048K*
33	RX210	R5F52106BDFL	PLQP0048K*
34	RX210	R5F52106BGFL	PLQP0048K*
35	RX210	R5F52103BDFM	PLQP0064K*
36	RX210	R5F52103BGFM	PLQP0064K*
37	RX210	R5F52104BDFM	PLQP0064K*
38	RX210	R5F52104BGFM	PLQP0064K*
39	RX210	R5F52105ADFM	PLQP0064K*
40	RX210	R5F52105BDFM	PLQP0064K*
41	RX210	R5F52105BGFM	PLQP0064K*
42	RX210	R5F52105CDFM	PLQP0064K*
43	RX210	R5F52105CGFM	PLQP0064K*
44	RX210	R5F52106ADFM	PLQP0064K*
45	RX210	R5F52106BDFM	PLQP0064K*
46	RX210	R5F52106BGFM	PLQP0064K*
47	RX210	R5F52106CDFM	PLQP0064K*
48	RX210	R5F52106CGFM	PLQP0064K*
49	RX210	R5F52107ADFM	PLQP0064K*
50	RX210	R5F52107CDFM	PLQP0064K*
51	RX210	R5F52107CGFM	PLQP0064K*
52	RX210	R5F52108ADFM	PLQP0064K*
53	RX210	R5F52108CDFM	PLQP0064K*
54	RX210	R5F52108CGFM	PLQP0064K*
55	RX210	R5F52105ADFN	PLQP0080K*
56	RX210	R5F52105BDFN	PLQP0080K*
57	RX210	R5F52105BGFN	PLQP0080K*
58	RX210	R5F52105CDFN	PLQP0080K*
59	RX210	R5F52105CGFN	PLQP0080K*
60	RX210	R5F52106ADFN	PLQP0080K*
61	RX210	R5F52106BDFN	PLQP0080K*
62	RX210	R5F52106BGFN	PLQP0080K*
63	RX210	R5F52106CDFN	PLQP0080K*
64	RX210	R5F52106CGFN	PLQP0080K*
65	RX210	R5F52107ADFN	PLQP0080K*
66	RX210	R5F52107CDFN	PLQP0080K*
67	RX210	R5F52107CGFN	PLQP0080K*
68	RX210	R5F52108ADFN	PLQP0080K*
69	RX210	R5F52108CDFN	PLQP0080K*
70	RX210	R5F52108CGFN	PLQP0080K*
71	RX210	R5F52105ADFP	PLQP0100K*
72	RX210	R5F52105BDFP	PLQP0100K*
73	RX210	R5F52105BGFP	PLQP0100K*
74	RX210	R5F52105CDFP	PLQP0100K*
75	RX210	R5F52105CGFP	PLQP0100K*
76	RX210	R5F52106ADFP	PLQP0100K*
77	RX210	R5F52106BDFP	PLQP0100K*
78	RX210	R5F52106BGFP	PLQP0100K*
79	RX210	R5F52106CDFP	PLQP0100K*
80	RX210	R5F52106CGFP	PLQP0100K*
81	RX210	R5F52107ADFP	PLQP0100K*
82	RX210	R5F52107CDFP	PLQP0100K*
83	RX210	R5F52107CGFP	PLQP0100K*
84	RX210	R5F52108ADFP	PLQP0100K*
85	RX210	R5F52108CDFP	PLQP0100K*
86	RX210	R5F52108CGFP	PLQP0100K*
87	RX210	R5F5210ABDFP	PLQP0100K*
88	RX210	R5F5210ABGFP	PLQP0100K*
89	RX210	R5F5210AHDFP	PLQP0100K*
90	RX210	R5F5210BBDFP	PLQP0100K*
91	RX210	R5F5210BBGFP	PLQP0100K*
92	RX210	R5F5210BHDFP	PLQP0100K*
93	RX210	R5F52105BDLA	PTLG0100K*
94	RX210	R5F52106BDLA	PTLG0100K*
95	RX210	R5F52105ADLJ	PTLG0100J*
96	RX210	R5F52105BDLJ	PTLG0100J*
97	RX210	R5F52105CDLJ	PTLG0100J*
98	RX210	R5F52106ADLJ	PTLG0100J*
99	RX210	R5F52106BDLJ	PTLG0100J*
100	RX210	R5F52106CDLJ	PTLG0100J*

Table. Product list

No	Group	Product part number	Package code
101	RX210	R5F52107ADLJ	PTLG0100J*
102	RX210	R5F52107CDLJ	PTLG0100J*
103	RX210	R5F52108ADLJ	PTLG0100J*
104	RX210	R5F52108CDLJ	PTLG0100J*
105	RX210	R5F5210ABDLJ	PTLG0100J*
106	RX210	R5F5210AHDLJ	PTLG0100J*
107	RX210	R5F5210BBDLJ	PTLG0100J*
108	RX210	R5F5210BHDLJ	PTLG0100J*
109	RX210	R5F52105BDLK	PTLG0145K*
110	RX210	R5F52106BDLK	PTLG0145K*
111	RX210	R5F52107BDLK	PTLG0145K*
112	RX210	R5F52108BDLK	PTLG0145K*
113	RX210	R5F5210ABDLK	PTLG0145K*
114	RX210	R5F5210BBDLK	PTLG0145K*
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No	Group	Product part number	Package code
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