

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX71M
DEVICE : R5F571MXXX
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 °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 (BGA)

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 .

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)

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

① Unique failure rate (λ_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 (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	RX71M	R5F571MFCDBG	PLBG0176G*	51	RX71M	R5F571MFDDFC	PLQP0176K*
2	RX71M	R5F571MFDDBG	PLBG0176G*	52	RX71M	R5F571MFDGFC	PLQP0176K*
3	RX71M	R5F571MFGDBG	PLBG0176G*	53	RX71M	R5F571MFGDFC	PLQP0176K*
4	RX71M	R5F571MFHDBG	PLBG0176G*	54	RX71M	R5F571MFGGFC	PLQP0176K*
5	RX71M	R5F571MGCDBG	PLBG0176G*	55	RX71M	R5F571MFHDFC	PLQP0176K*
6	RX71M	R5F571MGDDBG	PLBG0176G*	56	RX71M	R5F571MFHGFC	PLQP0176K*
7	RX71M	R5F571MGDBG	PLBG0176G*	57	RX71M	R5F571MGCDFC	PLQP0176K*
8	RX71M	R5F571MGHDBG	PLBG0176G*	58	RX71M	R5F571MGCDFC	PLQP0176K*
9	RX71M	R5F571MJCDBG	PLBG0176G*	59	RX71M	R5F571MGDDFC	PLQP0176K*
10	RX71M	R5F571MJDDBG	PLBG0176G*	60	RX71M	R5F571MGDGFC	PLQP0176K*
11	RX71M	R5F571MJGDBG	PLBG0176G*	61	RX71M	R5F571MGGDFC	PLQP0176K*
12	RX71M	R5F571MJHDBG	PLBG0176G*	62	RX71M	R5F571MGGGFC	PLQP0176K*
13	RX71M	R5F571MLCDBG	PLBG0176G*	63	RX71M	R5F571MGHDFC	PLQP0176K*
14	RX71M	R5F571MLDDBG	PLBG0176G*	64	RX71M	R5F571MGHGFC	PLQP0176K*
15	RX71M	R5F571MLGDBG	PLBG0176G*	65	RX71M	R5F571MJCDFC	PLQP0176K*
16	RX71M	R5F571MLHDBG	PLBG0176G*	66	RX71M	R5F571MJCGFC	PLQP0176K*
17	RX71M	R5F571MFCDFB	PLQP0144K*	67	RX71M	R5F571MJDDFC	PLQP0176K*
18	RX71M	R5F571MFCGFB	PLQP0144K*	68	RX71M	R5F571MJDGFC	PLQP0176K*
19	RX71M	R5F571MFDDFB	PLQP0144K*	69	RX71M	R5F571MJGDFC	PLQP0176K*
20	RX71M	R5F571MFDGFB	PLQP0144K*	70	RX71M	R5F571MJGGFC	PLQP0176K*
21	RX71M	R5F571MFGDFB	PLQP0144K*	71	RX71M	R5F571MJHDFC	PLQP0176K*
22	RX71M	R5F571MFGGFB	PLQP0144K*	72	RX71M	R5F571MJHGFC	PLQP0176K*
23	RX71M	R5F571MFHDFB	PLQP0144K*	73	RX71M	R5F571MLCDFC	PLQP0176K*
24	RX71M	R5F571MFHGFB	PLQP0144K*	74	RX71M	R5F571MLCGFC	PLQP0176K*
25	RX71M	R5F571MGCDFB	PLQP0144K*	75	RX71M	R5F571MLDDFC	PLQP0176K*
26	RX71M	R5F571MGCDFB	PLQP0144K*	76	RX71M	R5F571MLDGFC	PLQP0176K*
27	RX71M	R5F571MGDDFB	PLQP0144K*	77	RX71M	R5F571MLGDFC	PLQP0176K*
28	RX71M	R5F571MGDGFB	PLQP0144K*	78	RX71M	R5F571MLGGFC	PLQP0176K*
29	RX71M	R5F571MGDFB	PLQP0144K*	79	RX71M	R5F571MLHDFC	PLQP0176K*
30	RX71M	R5F571MGGGFB	PLQP0144K*	80	RX71M	R5F571MLHGFC	PLQP0176K*
31	RX71M	R5F571MGHDFB	PLQP0144K*	81	RX71M	R5F571MFCDFP	PLQP0100K*
32	RX71M	R5F571MGHGFB	PLQP0144K*	82	RX71M	R5F571MFCGFP	PLQP0100K*
33	RX71M	R5F571MJCDFB	PLQP0144K*	83	RX71M	R5F571MFDDFP	PLQP0100K*
34	RX71M	R5F571MJCGFB	PLQP0144K*	84	RX71M	R5F571MFDGFP	PLQP0100K*
35	RX71M	R5F571MJDDFB	PLQP0144K*	85	RX71M	R5F571MFGDFP	PLQP0100K*
36	RX71M	R5F571MJDGFB	PLQP0144K*	86	RX71M	R5F571MFGGFP	PLQP0100K*
37	RX71M	R5F571MJGDFB	PLQP0144K*	87	RX71M	R5F571MFHDFP	PLQP0100K*
38	RX71M	R5F571MJGGFB	PLQP0144K*	88	RX71M	R5F571MFHGFP	PLQP0100K*
39	RX71M	R5F571MJHDFB	PLQP0144K*	89	RX71M	R5F571MGCDFP	PLQP0100K*
40	RX71M	R5F571MJHGFB	PLQP0144K*	90	RX71M	R5F571MGCDFP	PLQP0100K*
41	RX71M	R5F571MLCDFB	PLQP0144K*	91	RX71M	R5F571MGDDFP	PLQP0100K*
42	RX71M	R5F571MLCGFB	PLQP0144K*	92	RX71M	R5F571MGDGFP	PLQP0100K*
43	RX71M	R5F571MLDDFB	PLQP0144K*	93	RX71M	R5F571MGGDFP	PLQP0100K*
44	RX71M	R5F571MLDGFB	PLQP0144K*	94	RX71M	R5F571MGGGFP	PLQP0100K*
45	RX71M	R5F571MLGDFB	PLQP0144K*	95	RX71M	R5F571MGHDFP	PLQP0100K*
46	RX71M	R5F571MLGGFB	PLQP0144K*	96	RX71M	R5F571MGHGFP	PLQP0100K*
47	RX71M	R5F571MLHDFB	PLQP0144K*	97	RX71M	R5F571MJCDFP	PLQP0100K*
48	RX71M	R5F571MLHGFB	PLQP0144K*	98	RX71M	R5F571MJCGFP	PLQP0100K*
49	RX71M	R5F571MFCDFC	PLQP0176K*	99	RX71M	R5F571MJDDFP	PLQP0100K*
50	RX71M	R5F571MFCGFC	PLQP0176K*	100	RX71M	R5F571MJDGFP	PLQP0100K*

Table. Product list

MCR-22-0321

No	Group	Product part number	Package code	No	Group	Product part number	Package code
101	RX71M	R5F571MJGDFP	PLQP0100K*	161			
102	RX71M	R5F571MJGGFP	PLQP0100K*	162			
103	RX71M	R5F571MJHDFP	PLQP0100K*	163			
104	RX71M	R5F571MJHGFP	PLQP0100K*	164			
105	RX71M	R5F571MLCDFP	PLQP0100K*	165			
106	RX71M	R5F571MLCGFP	PLQP0100K*	166			
107	RX71M	R5F571MLDDFP	PLQP0100K*	167			
108	RX71M	R5F571MLDGFP	PLQP0100K*	168			
109	RX71M	R5F571MLGDFP	PLQP0100K*	169			
110	RX71M	R5F571MLGGFP	PLQP0100K*	170			
111	RX71M	R5F571MLHDFP	PLQP0100K*	171			
112	RX71M	R5F571MLHGFP	PLQP0100K*	172			
113	RX71M	R5F571MFC DLC	PTLG0177K*	173			
114	RX71M	R5F571MFDDLC	PTLG0177K*	174			
115	RX71M	R5F571MFGDLC	PTLG0177K*	175			
116	RX71M	R5F571MFHDLC	PTLG0177K*	176			
117	RX71M	R5F571MGCDLC	PTLG0177K*	177			
118	RX71M	R5F571MGDDLDC	PTLG0177K*	178			
119	RX71M	R5F571MGGDLC	PTLG0177K*	179			
120	RX71M	R5F571MGHDLC	PTLG0177K*	180			
121	RX71M	R5F571MJCDLC	PTLG0177K*	181			
122	RX71M	R5F571MJDDLDC	PTLG0177K*	182			
123	RX71M	R5F571MJGDLC	PTLG0177K*	183			
124	RX71M	R5F571MJHDLC	PTLG0177K*	184			
125	RX71M	R5F571MLCDLC	PTLG0177K*	185			
126	RX71M	R5F571MLDDLDC	PTLG0177K*	186			
127	RX71M	R5F571MLGDLC	PTLG0177K*	187			
128	RX71M	R5F571MLHDLC	PTLG0177K*	188			
129	RX71M	R5F571MFC DLJ	PTLG0100J*	189			
130	RX71M	R5F571MFDDLJ	PTLG0100J*	190			
131	RX71M	R5F571MFGDLJ	PTLG0100J*	191			
132	RX71M	R5F571MFHDLJ	PTLG0100J*	192			
133	RX71M	R5F571MGCDLJ	PTLG0100J*	193			
134	RX71M	R5F571MGDDLJ	PTLG0100J*	194			
135	RX71M	R5F571MGGDLJ	PTLG0100J*	195			
136	RX71M	R5F571MGHDLJ	PTLG0100J*	196			
137	RX71M	R5F571MJCDLJ	PTLG0100J*	197			
138	RX71M	R5F571MJDDLJ	PTLG0100J*	198			
139	RX71M	R5F571MJGDLJ	PTLG0100J*	199			
140	RX71M	R5F571MJHDLJ	PTLG0100J*	200			
141	RX71M	R5F571MLCDLJ	PTLG0100J*	201			
142	RX71M	R5F571MLDDLJ	PTLG0100J*	202			
143	RX71M	R5F571MLGDLJ	PTLG0100J*	203			
144	RX71M	R5F571MLHDLJ	PTLG0100J*	204			
145	RX71M	R5F571MFC DLK	PTLG0145K*	205			
146	RX71M	R5F571MFDDLK	PTLG0145K*	206			
147	RX71M	R5F571MFGDLK	PTLG0145K*	207			
148	RX71M	R5F571MFHDLK	PTLG0145K*	208			
149	RX71M	R5F571MGCDLK	PTLG0145K*	209			
150	RX71M	R5F571MGDDLK	PTLG0145K*	210			
151	RX71M	R5F571MGGDLK	PTLG0145K*	211			
152	RX71M	R5F571MGHDLK	PTLG0145K*	212			
153	RX71M	R5F571MJCDLK	PTLG0145K*	213			
154	RX71M	R5F571MJDDLK	PTLG0145K*	214			
155	RX71M	R5F571MJGDLK	PTLG0145K*	215			
156	RX71M	R5F571MJHDLK	PTLG0145K*	216			
157	RX71M	R5F571MLCDLK	PTLG0145K*	217			
158	RX71M	R5F571MLDDLK	PTLG0145K*	218			
159	RX71M	R5F571MLGDLK	PTLG0145K*	219			
160	RX71M	R5F571MLHDLK	PTLG0145K*	220			