

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX630
DEVICE : R5F5630XXX
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 (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)

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

①Unique failure rate (λ_b)

$$\lambda_b = 0.03 \text{ FIT}$$

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	RX630	R5F56308CDBG	PLBG0176G*	51	RX630	R5F56306CDFN	PLQP0080K*
2	RX630	R5F56308DDBG	PLBG0176G*	52	RX630	R5F56306DDFN	PLQP0080K*
3	RX630	R5F5630ACDBG	PLBG0176G*	53	RX630	R5F56307CDFN	PLQP0080K*
4	RX630	R5F5630ADDBG	PLBG0176G*	54	RX630	R5F56307DDFN	PLQP0080K*
5	RX630	R5F5630BCDBG	PLBG0176G*	55	RX630	R5F56307DGFN	PLQP0080K*
6	RX630	R5F5630BDDBG	PLBG0176G*	56	RX630	R5F56308CDFN	PLQP0080K*
7	RX630	R5F5630DCDBG	PLBG0176G*	57	RX630	R5F56308DDFN	PLQP0080K*
8	RX630	R5F5630DDDBG	PLBG0176G*	58	RX630	R5F56308DGFN	PLQP0080K*
9	RX630	R5F5630ECDBG	PLBG0176G*	59	RX630	R5F56303CDFP	PLQP0100K*
10	RX630	R5F5630EDDBG	PLBG0176G*	60	RX630	R5F56303DDFP	PLQP0100K*
11	RX630	R5F56306CDFB	PLQP0144K*	61	RX630	R5F56305CDFP	PLQP0100K*
12	RX630	R5F56306DDFB	PLQP0144K*	62	RX630	R5F56305DDFP	PLQP0100K*
13	RX630	R5F56307CDFB	PLQP0144K*	63	RX630	R5F56306CDFP	PLQP0100K*
14	RX630	R5F56307DDFB	PLQP0144K*	64	RX630	R5F56306DDFP	PLQP0100K*
15	RX630	R5F56308CDFB	PLQP0144K*	65	RX630	R5F56307CDFP	PLQP0100K*
16	RX630	R5F56308DDFB	PLQP0144K*	66	RX630	R5F56307DDFP	PLQP0100K*
17	RX630	R5F56308JDFB	PLQP0144K*	67	RX630	R5F56307DGFN	PLQP0100K*
18	RX630	R5F5630ACDFB	PLQP0144K*	68	RX630	R5F56308CDFP	PLQP0100K*
19	RX630	R5F5630ADDFB	PLQP0144K*	69	RX630	R5F56308DDFP	PLQP0100K*
20	RX630	R5F5630ADGFB	PLQP0144K*	70	RX630	R5F56308DGFN	PLQP0100K*
21	RX630	R5F5630BCDFB	PLQP0144K*	71	RX630	R5F56308JDFP	PLQP0100K*
22	RX630	R5F5630BDDFB	PLQP0144K*	72	RX630	R5F56308MDFP	PLQP0100K*
23	RX630	R5F5630BDGFB	PLQP0144K*	73	RX630	R5F5630ACDFP	PLQP0100K*
24	RX630	R5F5630DCDFB	PLQP0144K*	74	RX630	R5F5630ADDFP	PLQP0100K*
25	RX630	R5F5630DDDFB	PLQP0144K*	75	RX630	R5F5630ADGFP	PLQP0100K*
26	RX630	R5F5630DJDFB	PLQP0144K*	76	RX630	R5F5630BCDFP	PLQP0100K*
27	RX630	R5F5630ECDFB	PLQP0144K*	77	RX630	R5F5630BDDFP	PLQP0100K*
28	RX630	R5F5630EDDFB	PLQP0144K*	78	RX630	R5F5630BDGFP	PLQP0100K*
29	RX630	R5F5630KCDFB	PLQP0144K*	79	RX630	R5F5630DCDFP	PLQP0100K*
30	RX630	R5F5630KDDFB	PLQP0144K*	80	RX630	R5F5630DDDFP	PLQP0100K*
31	RX630	R5F5630NJDFB	PLQP0144K*	81	RX630	R5F5630ECDFP	PLQP0100K*
32	RX630	R5F5630QJDFB	PLQP0144K*	82	RX630	R5F5630EDDFP	PLQP0100K*
33	RX630	R5F5630SDDFB	PLQP0144K*	83	RX630	R5F5630LJDFP	PLQP0100K*
34	RX630	R5F5630SJDFB	PLQP0144K*	84	RX630	R5F5630NJDFP	PLQP0100K*
35	RX630	R5F5630TJDFB	PLQP0144K*	85	RX630	R5F5630QJDFP	PLQP0100K*
36	RX630	R5F56308CDFFC	PLQP0176K*	86	RX630	R5F5630ACDFR	PLQP0176L*
37	RX630	R5F56308DDFC	PLQP0176K*	87	RX630	R5F5630ADDFR	PLQP0176L*
38	RX630	R5F5630ACDFC	PLQP0176K*	88	RX630	R5F5630BCDFR	PLQP0176L*
39	RX630	R5F5630ADDFC	PLQP0176K*	89	RX630	R5F5630BDDFR	PLQP0176L*
40	RX630	R5F5630BCDFC	PLQP0176K*	90	RX630	R5F5630DCDFR	PLQP0176L*
41	RX630	R5F5630BDDFC	PLQP0176K*	91	RX630	R5F5630DDDFR	PLQP0176L*
42	RX630	R5F5630DCDFC	PLQP0176K*	92	RX630	R5F5630ECDFR	PLQP0176L*
43	RX630	R5F5630DDDFC	PLQP0176K*	93	RX630	R5F5630EDDFR	PLQP0176L*
44	RX630	R5F5630ECDFC	PLQP0176K*	94	RX630	R5F56303CDLA	PTLG0100K*
45	RX630	R5F5630EDDFC	PLQP0176K*	95	RX630	R5F56303DDLA	PTLG0100K*
46	RX630	R5F5630TJDFC	PLQP0176K*	96	RX630	R5F56305CDLA	PTLG0100K*
47	RX630	R5F56303CDFN	PLQP0080K*	97	RX630	R5F56305DDLA	PTLG0100K*
48	RX630	R5F56303DDFN	PLQP0080K*	98	RX630	R5F56306CDLA	PTLG0100K*
49	RX630	R5F56305CDFN	PLQP0080K*	99	RX630	R5F56306DDLA	PTLG0100K*
50	RX630	R5F56305DDFN	PLQP0080K*	100	RX630	R5F56307CDLA	PTLG0100K*

Table. Product list

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No	Group	Product part number	Package code	No	Group	Product part number	Package code
101	RX630	R5F56307DDLA	PTLG0100K*	161			
102	RX630	R5F56308CDLA	PTLG0100K*	162			
103	RX630	R5F56308DDLA	PTLG0100K*	163			
104	RX630	R5F56308CDLC	PTLG0177K*	164			
105	RX630	R5F56308DDLC	PTLG0177K*	165			
106	RX630	R5F5630ACDLC	PTLG0177K*	166			
107	RX630	R5F5630ADDLC	PTLG0177K*	167			
108	RX630	R5F5630BCDLC	PTLG0177K*	168			
109	RX630	R5F5630BDDLC	PTLG0177K*	169			
110	RX630	R5F5630DCDLC	PTLG0177K*	170			
111	RX630	R5F5630DDDL	PTLG0177K*	171			
112	RX630	R5F5630ECDLC	PTLG0177K*	172			
113	RX630	R5F5630EDDL	PTLG0177K*	173			
114	RX630	R5F56306CDLE	PTLG0145J*	174			
115	RX630	R5F56306DDLE	PTLG0145J*	175			
116	RX630	R5F56307CDLE	PTLG0145J*	176			
117	RX630	R5F56307DDLE	PTLG0145J*	177			
118	RX630	R5F56308CDLE	PTLG0145J*	178			
119	RX630	R5F56308DDLE	PTLG0145J*	179			
120	RX630	R5F5630ACDLE	PTLG0145J*	180			
121	RX630	R5F5630ADDLE	PTLG0145J*	181			
122	RX630	R5F5630BCDLE	PTLG0145J*	182			
123	RX630	R5F5630BDDLE	PTLG0145J*	183			
124	RX630	R5F5630DCDLE	PTLG0145J*	184			
125	RX630	R5F5630DDDL	PTLG0145J*	185			
126	RX630	R5F5630ECDLE	PTLG0145J*	186			
127	RX630	R5F5630EDDL	PTLG0145J*	187			
128	RX630	R5F56303CDLJ	PTLG0100J*	188			
129	RX630	R5F56303DDLJ	PTLG0100J*	189			
130	RX630	R5F56305CDLJ	PTLG0100J*	190			
131	RX630	R5F56305DDLJ	PTLG0100J*	191			
132	RX630	R5F56306CDLJ	PTLG0100J*	192			
133	RX630	R5F56306DDLJ	PTLG0100J*	193			
134	RX630	R5F56307CDLJ	PTLG0100J*	194			
135	RX630	R5F56307DDLJ	PTLG0100J*	195			
136	RX630	R5F56308CDLJ	PTLG0100J*	196			
137	RX630	R5F56308DDLJ	PTLG0100J*	197			
138	RX630	R5F5630ACDLJ	PTLG0100J*	198			
139	RX630	R5F5630ADDLJ	PTLG0100J*	199			
140	RX630	R5F5630BCDLJ	PTLG0100J*	200			
141	RX630	R5F5630BDDLJ	PTLG0100J*	201			
142	RX630	R5F5630DCDLJ	PTLG0100J*	202			
143	RX630	R5F5630DDDLJ	PTLG0100J*	203			
144	RX630	R5F5630ECDLJ	PTLG0100J*	204			
145	RX630	R5F5630EDDLJ	PTLG0100J*	205			
146	RX630	R5F56306CDLK	PTLG0145K*	206			
147	RX630	R5F56306DDLK	PTLG0145K*	207			
148	RX630	R5F56307CDLK	PTLG0145K*	208			
149	RX630	R5F56307DDLK	PTLG0145K*	209			
150	RX630	R5F56308CDLK	PTLG0145K*	210			
151	RX630	R5F56308DDLK	PTLG0145K*	211			
152	RX630	R5F5630ACDLK	PTLG0145K*	212			
153	RX630	R5F5630ADDLK	PTLG0145K*	213			
154	RX630	R5F5630BCDLK	PTLG0145K*	214			
155	RX630	R5F5630BDDLK	PTLG0145K*	215			
156	RX630	R5F5630DCDLK	PTLG0145K*	216			
157	RX630	R5F5630DDDLK	PTLG0145K*	217			
158	RX630	R5F5630ECDLK	PTLG0145K*	218			
159	RX630	R5F5630EDDLK	PTLG0145K*	219			
160				220			