

RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX63N
DEVICE : R5F563NXXX
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)

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

① Unique failure rate (λ_b)

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

Unique failure rate at $T_a = 55^\circ\text{C}$ 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	RX63N	R5F563NACDBG	PLBG0176G*	51	RX63N	R5F563NKDDFC	PLQP0176K*
2	RX63N	R5F563NADDBG	PLBG0176G*	52	RX63N	R5F563NKDGFC	PLQP0176K*
3	RX63N	R5F563NBCDBG	PLBG0176G*	53	RX63N	R5F563NWDDFC	PLQP0176K*
4	RX63N	R5F563NBDDBG	PLBG0176G*	54	RX63N	R5F563NWDGFC	PLQP0176K*
5	RX63N	R5F563NDCDBG	PLBG0176G*	55	RX63N	R5F563NWHDFC	PLQP0176K*
6	RX63N	R5F563NDDDBG	PLBG0176G*	56	RX63N	R5F563NWHGFC	PLQP0176K*
7	RX63N	R5F563NECDBG	PLBG0176G*	57	RX63N	R5F563NYDDFC	PLQP0176K*
8	RX63N	R5F563NEDDBG	PLBG0176G*	58	RX63N	R5F563NYDGFC	PLQP0176K*
9	RX63N	R5F563NACDFB	PLQP0144K*	59	RX63N	R5F563NYHDFC	PLQP0176K*
10	RX63N	R5F563NADDFB	PLQP0144K*	60	RX63N	R5F563NYHGFC	PLQP0176K*
11	RX63N	R5F563NADGFB	PLQP0144K*	61	RX63N	R5F563NACDFP	PLQP0100K*
12	RX63N	R5F563NBCDFB	PLQP0144K*	62	RX63N	R5F563NADDFP	PLQP0100K*
13	RX63N	R5F563NBDDFB	PLQP0144K*	63	RX63N	R5F563NADGFP	PLQP0100K*
14	RX63N	R5F563NBDGFB	PLQP0144K*	64	RX63N	R5F563NBCDFP	PLQP0100K*
15	RX63N	R5F563NDCDFB	PLQP0144K*	65	RX63N	R5F563NBDDFP	PLQP0100K*
16	RX63N	R5F563NDDDFB	PLQP0144K*	66	RX63N	R5F563NBDGFP	PLQP0100K*
17	RX63N	R5F563NDDGFB	PLQP0144K*	67	RX63N	R5F563NDCDFP	PLQP0100K*
18	RX63N	R5F563NECDFB	PLQP0144K*	68	RX63N	R5F563NDDDFP	PLQP0100K*
19	RX63N	R5F563NEDDFB	PLQP0144K*	69	RX63N	R5F563NDDGFP	PLQP0100K*
20	RX63N	R5F563NEDGFB	PLQP0144K*	70	RX63N	R5F563NECDFP	PLQP0100K*
21	RX63N	R5F563NFDDFB	PLQP0144K*	71	RX63N	R5F563NEDDFP	PLQP0100K*
22	RX63N	R5F563NFDGFB	PLQP0144K*	72	RX63N	R5F563NEDGFP	PLQP0100K*
23	RX63N	R5F563NFHDFB	PLQP0144K*	73	RX63N	R5F563NFDDFP	PLQP0100K*
24	RX63N	R5F563NFHGFB	PLQP0144K*	74	RX63N	R5F563NFDGFP	PLQP0100K*
25	RX63N	R5F563NKDDFB	PLQP0144K*	75	RX63N	R5F563NFHDFP	PLQP0100K*
26	RX63N	R5F563NKDGFB	PLQP0144K*	76	RX63N	R5F563NFHGFP	PLQP0100K*
27	RX63N	R5F563NWDDFB	PLQP0144K*	77	RX63N	R5F563NKDDFP	PLQP0100K*
28	RX63N	R5F563NWDGFB	PLQP0144K*	78	RX63N	R5F563NKDGFP	PLQP0100K*
29	RX63N	R5F563NWHDFB	PLQP0144K*	79	RX63N	R5F563NWDDFP	PLQP0100K*
30	RX63N	R5F563NWHGFB	PLQP0144K*	80	RX63N	R5F563NWDGFP	PLQP0100K*
31	RX63N	R5F563NYDDFB	PLQP0144K*	81	RX63N	R5F563NWHDFP	PLQP0100K*
32	RX63N	R5F563NYDGFB	PLQP0144K*	82	RX63N	R5F563NWHGFP	PLQP0100K*
33	RX63N	R5F563NYHDFB	PLQP0144K*	83	RX63N	R5F563NYDDFP	PLQP0100K*
34	RX63N	R5F563NYHGFB	PLQP0144K*	84	RX63N	R5F563NYDGFP	PLQP0100K*
35	RX63N	R5F563NACDFC	PLQP0176K*	85	RX63N	R5F563NYHDFP	PLQP0100K*
36	RX63N	R5F563NADDFC	PLQP0176K*	86	RX63N	R5F563NYHGFP	PLQP0100K*
37	RX63N	R5F563NADGFC	PLQP0176K*	87	RX63N	R5F563NACDFR	PLQP0176L*
38	RX63N	R5F563NBCDFC	PLQP0176K*	88	RX63N	R5F563NADDFR	PLQP0176L*
39	RX63N	R5F563NBDDFC	PLQP0176K*	89	RX63N	R5F563NADGFR	PLQP0176L*
40	RX63N	R5F563NBDGFC	PLQP0176K*	90	RX63N	R5F563NBCDFR	PLQP0176L*
41	RX63N	R5F563NDCDFC	PLQP0176K*	91	RX63N	R5F563NBDDFR	PLQP0176L*
42	RX63N	R5F563NDDDFC	PLQP0176K*	92	RX63N	R5F563NBDGFR	PLQP0176L*
43	RX63N	R5F563NDDGFC	PLQP0176K*	93	RX63N	R5F563NDCDFR	PLQP0176L*
44	RX63N	R5F563NECDFC	PLQP0176K*	94	RX63N	R5F563NDDDFR	PLQP0176L*
45	RX63N	R5F563NEDDFC	PLQP0176K*	95	RX63N	R5F563NDDGFR	PLQP0176L*
46	RX63N	R5F563NEDGFC	PLQP0176K*	96	RX63N	R5F563NECDFR	PLQP0176L*
47	RX63N	R5F563NFDDFC	PLQP0176K*	97	RX63N	R5F563NEDDFR	PLQP0176L*
48	RX63N	R5F563NFDGFC	PLQP0176K*	98	RX63N	R5F563NEDGFR	PLQP0176L*
49	RX63N	R5F563NFHDFC	PLQP0176K*	99	RX63N	R5F563NACDLC	PTLG0177K*
50	RX63N	R5F563NFHGFC	PLQP0176K*	100	RX63N	R5F563NADDLC	PTLG0177K*

Table. Product list

MCR-22-0313

No	Group	Product part number	Package code	No	Group	Product part number	Package code
101	RX63N	R5F563NBCDLC	PTLG0177K*	161			
102	RX63N	R5F563NBDDLDC	PTLG0177K*	162			
103	RX63N	R5F563NDCDLC	PTLG0177K*	163			
104	RX63N	R5F563NDDDLDC	PTLG0177K*	164			
105	RX63N	R5F563NECDLC	PTLG0177K*	165			
106	RX63N	R5F563NEDDLDC	PTLG0177K*	166			
107	RX63N	R5F563NACDLE	PTLG0145J*	167			
108	RX63N	R5F563NADDLE	PTLG0145J*	168			
109	RX63N	R5F563NBCDLE	PTLG0145J*	169			
110	RX63N	R5F563NBDDLE	PTLG0145J*	170			
111	RX63N	R5F563NDCDLE	PTLG0145J*	171			
112	RX63N	R5F563NDDDLLE	PTLG0145J*	172			
113	RX63N	R5F563NECDLE	PTLG0145J*	173			
114	RX63N	R5F563NEDDLLE	PTLG0145J*	174			
115	RX63N	R5F563NACDLJ	PTLG0100J*	175			
116	RX63N	R5F563NADDLJ	PTLG0100J*	176			
117	RX63N	R5F563NBCDLJ	PTLG0100J*	177			
118	RX63N	R5F563NBDDLJ	PTLG0100J*	178			
119	RX63N	R5F563NDCDLJ	PTLG0100J*	179			
120	RX63N	R5F563NDDDLJ	PTLG0100J*	180			
121	RX63N	R5F563NECDLJ	PTLG0100J*	181			
122	RX63N	R5F563NEDDLJ	PTLG0100J*	182			
123	RX63N	R5F563NACDLK	PTLG0145K*	183			
124	RX63N	R5F563NADDLK	PTLG0145K*	184			
125	RX63N	R5F563NBCDLK	PTLG0145K*	185			
126	RX63N	R5F563NBDDLK	PTLG0145K*	186			
127	RX63N	R5F563NDCDLK	PTLG0145K*	187			
128	RX63N	R5F563NDDDLK	PTLG0145K*	188			
129	RX63N	R5F563NECDLK	PTLG0145K*	189			
130	RX63N	R5F563NEDDLK	PTLG0145K*	190			
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