

# RENESAS SEMICONDUCTOR RELIABILITY REPORT

GROUP : RX261  
DEVICE : R5F5261XXX  
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)	JESD22-C101	+/-500V,1time	0/3	Class: C2
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 (QFN)**

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)	JESD22-C101	+/-500V,1time	0/3	Class: C2
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 .

The failure rate of the device in an actual use condition can be estimated by the below procedure.

**•Equation for the failure rate estimation ( $\lambda$ )**

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

① Unique failure rate ( $\lambda_b$ )

$$\lambda_b = 4.1 \text{ FIT}$$

Unique failure rate at  $T_a = 55^\circ\text{C}$  using 60 % confidence level.

② Temperature term ( $\pi T$ )

$$\pi T = \exp\{11600 \times E_a \times (1/(273+55) - 1/(273+T_a))\}$$

$E_a$  : Activation energy (eV)

$T_a$  : Ambient temperature ( $^\circ\text{C}$ )

$\pi T$ 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
$\pi T$	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
	SOP	PxSP
Non-lead type plastic package	QFN	PxQN
Grid array type plastic package	BGA	PxBG
	LGA	PxLG
Wafer level chip scale package	WLCSP	SxBG

\*1. First four digit

Table. Product list

No	Group	Product part number	Package code	No	Group	Product part number	Package code
1	RX261	R5F52616ADFL	PLQP0048K*	51	RX261	R5F52616BDNE	PWQN0048K*
2	RX261	R5F52616AGFL	PLQP0048K*	52	RX261	R5F52616BGNE	PWQN0048K*
3	RX261	R5F52616BDFL	PLQP0048K*	53	RX261	R5F52617ADNE	PWQN0048K*
4	RX261	R5F52616BGFL	PLQP0048K*	54	RX261	R5F52617AGNE	PWQN0048K*
5	RX261	R5F52617ADFL	PLQP0048K*	55	RX261	R5F52617BDNE	PWQN0048K*
6	RX261	R5F52617AGFL	PLQP0048K*	56	RX261	R5F52617BGNE	PWQN0048K*
7	RX261	R5F52617BDFL	PLQP0048K*	57	RX261	R5F52618ADNE	PWQN0048K*
8	RX261	R5F52617BGFL	PLQP0048K*	58	RX261	R5F52618AGNE	PWQN0048K*
9	RX261	R5F52618ADFL	PLQP0048K*	59	RX261	R5F52618BDNE	PWQN0048K*
10	RX261	R5F52618AGFL	PLQP0048K*	60	RX261	R5F52618BGNE	PWQN0048K*
11	RX261	R5F52618BDFL	PLQP0048K*	61			
12	RX261	R5F52618BGFL	PLQP0048K*	62			
13	RX261	R5F52616ADFM	PLQP0064K*	63			
14	RX261	R5F52616AGFM	PLQP0064K*	64			
15	RX261	R5F52616BDFM	PLQP0064K*	65			
16	RX261	R5F52616BGFM	PLQP0064K*	66			
17	RX261	R5F52617ADFM	PLQP0064K*	67			
18	RX261	R5F52617AGFM	PLQP0064K*	68			
19	RX261	R5F52617BDFM	PLQP0064K*	69			
20	RX261	R5F52617BGFM	PLQP0064K*	70			
21	RX261	R5F52618ADFM	PLQP0064K*	71			
22	RX261	R5F52618AGFM	PLQP0064K*	72			
23	RX261	R5F52618BDFM	PLQP0064K*	73			
24	RX261	R5F52618BGFM	PLQP0064K*	74			
25	RX261	R5F52616ADFN	PLQP0080K*	75			
26	RX261	R5F52616AGFN	PLQP0080K*	76			
27	RX261	R5F52616BDFN	PLQP0080K*	77			
28	RX261	R5F52616BGFN	PLQP0080K*	78			
29	RX261	R5F52617ADFN	PLQP0080K*	79			
30	RX261	R5F52617AGFN	PLQP0080K*	80			
31	RX261	R5F52617BDFN	PLQP0080K*	81			
32	RX261	R5F52617BGFN	PLQP0080K*	82			
33	RX261	R5F52618ADFN	PLQP0080K*	83			
34	RX261	R5F52618AGFN	PLQP0080K*	84			
35	RX261	R5F52618BDFN	PLQP0080K*	85			
36	RX261	R5F52618BGFN	PLQP0080K*	86			
37	RX261	R5F52616ADFP	PLQP0100K*	87			
38	RX261	R5F52616AGFP	PLQP0100K*	88			
39	RX261	R5F52616BDFP	PLQP0100K*	89			
40	RX261	R5F52616BGFP	PLQP0100K*	90			
41	RX261	R5F52617ADFP	PLQP0100K*	91			
42	RX261	R5F52617AGFP	PLQP0100K*	92			
43	RX261	R5F52617BDFP	PLQP0100K*	93			
44	RX261	R5F52617BGFP	PLQP0100K*	94			
45	RX261	R5F52618ADFP	PLQP0100K*	95			
46	RX261	R5F52618AGFP	PLQP0100K*	96			
47	RX261	R5F52618BDFP	PLQP0100K*	97			
48	RX261	R5F52618BGFP	PLQP0100K*	98			
49	RX261	R5F52616ADNE	PWQN0048K*	99			
50	RX261	R5F52616AGNE	PWQN0048K*	100			