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Date: March 31, 2025

RENESAS SEMICONDUCTOR RELIABILITY REPORT

DEVICE: RAA270000KFT

APPLICATION: Automotive

Quality Assurance Div.
Renesas Electronics Corporation

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Reliability Test Results

DEVICE RAA270000KFT

1.RELIABILITY TEST

ITEM	TEST CONDITION	NUMBER OF SAMPLES	NUMBER OF FAILURE
Solderability	245°C, 5sec., ≥95% coverage	15	0
Soldering Heat	MSL3, 260°C max, 255°C, 30sec., 3 times	77	0
Temperature Cycling *1	-65°C~150°C, 500cycles	77	0
Autoclave *1	121°C, 100%RH, 96hours	77	0
High Temperature Operating Life	Ta=150°C, max operating voltage, 1000hours	77	0
High Temperature Storage Life	Ta=150°C, 1000hours	45	0
Temperature Humidity Bias *1	Ta=85°C, 85%RH, max operating voltage, 1000hours	77	0
Electrostatic Discharge (HBM)	C=100pF, R=1.5kΩ, 3 times, ±2000V	3	0
Electrostatic Discharge (CDM)	3 times, ±500V (Corner pins : ±750V)	3	0
Latch-Up	I=±100mA	6	0

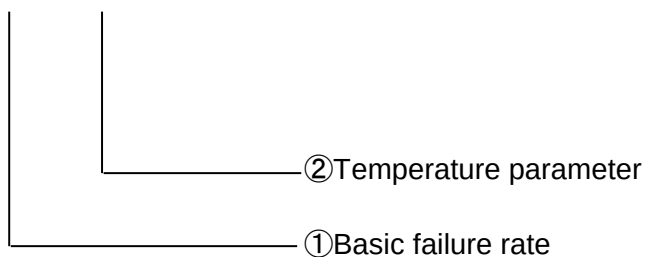
*1 Pre-Conditioning : 125°C/24h → 30°C/70%RH/192h → (Air) Reflow (260°C max, 255°C, 30sec., 3times)

·Calculation method of standard failure rate

Operating reliability is decided by inherent reliability of device and environment condition of use (See below).

·Calculation method of standard failure rate (λ)

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



①Basic failure rate(λ_b)

DEVICE: RAA270000KFT

λ_b :

1 (fit)

②Temperature parameter (πT)

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

E_a : 1.0eV (Activation energy)

T_a : ambient temperature

πT simplified chart										
$T_a(j)$	40	55	60	65	70	75	80	90	100	110
πT	0.18	1.00	1.70	2.85	4.70	7.63	12.24	30.27	71.31	160.62

③MTTF (Mean Time to Failure)

$$MTTF = \frac{1}{\lambda}$$

·Confidence level 60% ·Standard temperature $T_a = 55^\circ\text{C}$ for LSI devices