



### Assessed Failure Rate on ECX-31B

1. Assessed Failure Rate  
Assessed Failure Rate of ECS-.327-12.5-34B; 21.9 (Fit) Confidence Level at 60%  
Temperature at 25°C
2. Calculation Method  
(1) Results of Live Test at +85°C

Model	Sample Size	Testing Time	Total Testing Time	Number of Failures
ECX-31B	300	2,000 H	600,000 H	0 pc.

- (2) Assessed Failure Rate with Life Test at +85°C Confidence Level at 60%  
Failure Rate

$$\lambda = r/T$$

Where r: Number of Failures  
T: Total Testing Time

We presume with the upper failure rate because the number of failures is 0.

$$\begin{aligned} \lambda_u &= 0.917/T && \text{Confidence Level at 60\%, } r=0 \\ &= 0.917/600,000 \\ &= 1,528 \text{ (Fit)} \end{aligned}$$

Note: This formula can be found in JIS C5003-1974: General Test Procedure of Failure Rate for Electronic Components.

- (3) Assessed Failure Rate at +25°C

The Temperature Acceleration Factor is given by Arrhenius Law.

Acceleration Factor

$$\alpha = e^{(\Delta/k) * (1/T_0 - 1/T_1)} = 69.6$$

Where: Activation Energy:  $\Delta E = 0.65 \text{ (eV)}$   
Boltzmann Constant:  $k = 8.6173 \times 10^{-5} \text{ (eV/K)}$   
Reference Temperature:  $T_0 = 25^\circ\text{C} = 298 \text{ (K)}$   
Temp at Acceleration Condition:  $T_1 = 85^\circ\text{C} = 358 \text{ (K)}$

Conclusion Assessed Failure Rate at 25°C

$$\begin{aligned} \lambda_u &= 1,528 \text{ (Fit)} / 69.6 \\ &= 21.9 \text{ (Fit)} \end{aligned}$$