Failure rate (MTBF)

Device: **Real-Time Clock ICs**

It is reported failure rate as follows. This is based on JIS-C5003.

# Reliability result of High temperature bias test.

- **Ta = 125℃**
- **t = 1000h**
- **n = 64pcs.**
- **R = 0pcs.**

Device Hours = 64 X 1000 = 64000 (h)

# Case1: Operating temperature Ta = 55℃

(Activation energy; Ea=0.7eV, Confidence level=60%)

Temperature acceleration factor from 55K to 125K = 0.0128

Equivalent time = 64000/0.0128 = 0.05E8 (h)

Failure rate (λ) = \( \frac{0.917}{0.05E8} = 184E^{-9} = 184 \text{ FIT} \)

MTBF = MTTF = \( 0.54E7 \text{ (h)} \)

# Case2: Operating temperature Ta = 40℃

(Activation energy; Ea=0.7eV, Confidence level=60%)

Temperature acceleration factor from 40K to 125K = 0.0039

Equivalent time = 64000/0.0039 = 0.163E8 (h)

 Failure rate (λ) = \( \frac{0.917}{0.163E8} = 56E^{-9} = 56 \text{ FIT} \)

MTBF = MTTF = \( 1.78E7 \text{ (h)} \)