Device: RTC

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

# Reliability result of High temperature bias test.

\[ Ta = 125°C \]
\[ t = 1000h \]
\[ n = 160pcs. \]
\[ R = 0pc. \]

Device Hours = 160 X 1000 = 160000 (h)

Activation energy (Ea) =0.7eV, Boltzmann constant (k) = 8.617×10^{-5} (eV/K),

Confidence level=60%

# Case1: Operating temperature Ta = 40°C

Temperature acceleration factor (L) = \( \exp \left( \frac{Ea}{k} \times \left( \frac{1}{T1} - \frac{1}{T2} \right) \right) \)

\[ = \exp \left( \frac{0.7}{(8.617\times10^{-5})} \times \left( \frac{1}{125+273} - \frac{1}{40+273} \right) \right) \]

\[ = 0.0039 \]

Equivalent time = 160000/0.0039 = 0.408×10^8 (h)

Failure rate (\( \lambda \)) = 0.917/(0.408×10^8) = 22×10^{-8} = 22 FIT

MTTF = 4.45×10^7 (h)

# Case2: Operating temperature Ta = 55°C

Temperature acceleration factor (L) = \( \exp \left( \frac{0.7}{(8.617\times10^{-5})} \times \left( \frac{1}{125+273} - \frac{1}{55+273} \right) \right) \)

\[ = 0.0128 \]

Equivalent time = 160000/0.0128 = 0.125×10^8 (h)

Failure rate (\( \lambda \)) = 0.917/(0.125×10^8) = 74×10^{-8} = 74 FIT

MTTF = 1.36×10^7 (h)