Device: **Power Management ICs**

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

# Reliability result of High temperature bias test.

\[ Ta = 125 \degree C \]
\[ T = 1000h \]
\[ N = 320pcs. \]
\[ R = 0pc. \]

Device Hours = \( 320 \times 1000 = 320000 \) (h)

Activation energy (\( \text{Ea} \)) = 0.7eV, Boltzmann constant (\( k \)) = \( 8.617 \times 10^{-5} \) (eV/K), Confidence level= 60%

# Case1: Operating temperature \( Ta = 40 \degree C \)

Temperature acceleration factor (\( L \))

\[ = \exp \left( \frac{\text{Ea}}{k} \times \left( \frac{1}{T1} - \frac{1}{T2} \right) \right) \]
\[ = \exp \left( \frac{0.7}{(8.617 \times 10^{-5})\times(1/(125+273)-1/(40+273))} \right) \]
\[ = 0.0039 \]

Equivalent time = \( 320000/0.0039 = 0.816 \times 10^8 \) (h)

Failure rate (\( \lambda \)) = \( 0.917/(0.816 \times 10^8) \)

\[ = 11 \times 10^{-9} = 11 \text{ FIT} \]

\( \text{MTTF} = 8.9 \times 10^7 \text{ (h)} \)

# Case2: Operating temperature \( Ta = 55 \degree C \)

Temperature acceleration factor (\( L \))

\[ = \exp \left( \frac{0.7}{(8.617 \times 10^{-5})\times(1/(125+273)-1/(55+273))} \right) \]
\[ = 0.0128 \]

Equivalent time = \( 320000/0.0128 = 0.249 \times 10^8 \) (h)

Failure rate (\( \lambda \)) = \( 0.917/(0.249 \times 10^8) \)

\[ = 37 \times 10^{-9} = 37 \text{ FIT} \]

\( \text{MTTF} = 2.72 \times 10^7 \text{ (h)} \)