

QUALITY & RELIABILITY ENGINEERING

FIT and MTTF Calculation Report

November 6, 2023

PN Family Series	TQL850CSV33
Part Description	500mA, Low-IQ 40µA Low-Dropout Linear Regulator with Enable, Reset
Package Type	SOP-8 EP

Test Variables:

Stress Test	=	HTOL	
No. of failures	=	0	units
Sample Size	=	80	units
Test Duration	=	1000	hours
Total device hours	=	80000	hours
Accelerated Temp (Ta)	=	125	° C
Operating Temp (Tu)	=	55	° C
Activation Energy (Ea)	=	0.7	eV
Confidence Level	=	90	%
Boltzman's Constant (k)	=	8.617E-05	eV / °K

Calculations:

Chi squared value = **4.60517** @ 90% Confidence Level

Failure Rate (@accelerated condition) = $\frac{(\text{Chi squared value})}{2 * (\text{Sample Size}) * (\text{Test Duration})}$
= **28782.31 FIT**

Acceleration Factor, AF = $e^{(Ea/k)(1/Tu - 1/Ta)}$
= **77.94097874**

Results:

Failure Rate (@operating condition) = (Failure Rate @accelerated condition) / (AF)
= **369 FIT**

Mean Time to Failure (MTTF) = **2707947 hours**
= **309 years**