

## QUALITY & RELIABILITY ENGINEERING

### FIT and MTTF Calculation Report

November 6, 2023

<b>PN Family Series</b>	<b>TQL851CSV33</b>
<b>Part Description</b>	500mA, Low-IQ 30μA Low-Dropout Liner Regulator with Enable
<b>Package Type</b>	SOP-8 EP

#### Test Variables:

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

#### 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:

<b>Failure Rate</b> ( <i>@operating condition</i> ) = (Failure Rate <i>@accelerated condition</i> ) / (AF) = <b>369 FIT</b>
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<b>Mean Time to Failure (MTTF)</b> = <b>270797 hours</b> = <b>309 years</b>
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