

QUALITY & RELIABILITY ENGINEERING

FIT and MTTF Calculation Report

November 6, 2023

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|-------------------------|--|
| PN Family | TQL851CSV50 |
| Series | |
| Part Description | 500mA, Low-IQ 30μA Low-Dropout Liner Regulator with Enable |
| 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 (<i>@accelerated condition</i>) | = | $\frac{(\text{Chi squared value})}{2 * (\text{Sample Size}) * (\text{Test Duration})}$ | |
| | = | 28782.31 | FIT |
| Acceleration Factor, AF | = | $e^{(Ea/k)(1/Tu - 1/Ta)}$ | |
| | = | 77.94097874 | |

Results:

| | | |
|---|---|--|
| Failure Rate (<i>@operating condition</i>) | = | (Failure Rate <i>@accelerated condition</i>) / (AF) |
| | = | 369 FIT |
| Mean Time to Failure (MTTF) | = | 2707947 hours |
| | = | 309 years |