

QUALITY & RELIABILITY ENGINEERING

FIT and MTTF Calculation Report

June 26, 2023

PN Family Series	TSM056NH04LCR
Part Description	40V, 54A, Single N-Channel Power MOSFET
Package Type	PDFN56U

Test Variables:

Stress Test	=	HTRB	
No. of failures	=	0	units
Sample Size	=	77	units
Test Duration	=	1000	hours
Total device hours	=	77000	hours
Accelerated Temp (Ta)	=	175	° C
Operating Temp (Tu)	=	55	° C
Activation Energy (Ea)	=	0.7	eV
Confidence Level	=	90	%
Boltzmann's Constant (k)	=	8.617E-05	eV / °K

Calculations:

Chi squared value	=	4.6051702	@ 90% Confidence Level
Failure Rate (<i>@accelerated condition</i>)	=	$\frac{(\text{Chi squared value})}{2 * (\text{Sample Size}) * (\text{Test Duration})}$	
	=	29903.70	FIT
Acceleration Factor, AF	=	$e^{(Ea/k)(1/Tu - 1/Ta)}$	
	=	760.4701686	

Results:

Failure Rate (<i>@operating condition</i>)	=	(Failure Rate <i>@accelerated condition</i>) / (AF)	
	=	39	FIT
Mean Time to Failure (MTTF)	=	25430636	hours
	=	2903	years