

QUALITY & RELIABILITY ENGINEERING

FIT and MTTF Calculation Report

PN Family Series	TQM84KCX, TQM84KCU, TQM84KDCU6
Part Description	P-Channel Small Signal MOSFETs
Package Type	SOT-23, SOT-323, SOT-363
Market Segment	Automotive

Test Variables:

Stress Test	=	HTRB	
No. of failures	=	0	units
Sample Size	=	231	units
Test Duration	=	1000	hours
Total device hours	=	231000	hours
Accelerated Temp (Ta)	=	150	° 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	=	4.6051702	@ 90% Confidence Level
Failure Rate (@accelerated condition)	=	$\frac{(\text{Chi squared value})}{2 * (\text{Sample Size}) * (\text{Test Duration})}$	
	=	9967.90	FIT
Acceleration Factor, AF	=	$e^{(Ea/k)(1/Tu - 1/Ta)}$	
	=	260.4108858	

Results:

Failure Rate (@operating condition)	=	(Failure Rate @accelerated condition) / (AF)	
	=	38	FIT
Mean Time to Failure (MTTF)	=	26124947	hours
	=	2982	years