

## QUALITY & RELIABILITY ENGINEERING

### FIT and MTTF Calculation Report

<b>PN Family Series</b>	<b>TQM138KDCU6, TQM2N7002KDCU6</b>
<b>Part Description</b>	N-Channel Small Signal MOSFETs
<b>Package Type</b>	SOT-363
<b>Market Segment</b>	Automotive

#### Test Variables:

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

#### Results:

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