TAIWAN SEMICONDUCTOR

QUALITY & RELIABILITY ENGINEERING
FIT and MTTF Calculation Report

PN Family Series	PUUP3J
Part Description	600V Ultra Fast Surface Mount Rectifier
Package Type	SMPC4.6U

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)	=	175	**° 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 = **4.60517019** @ 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

$$= e^{(Ea/k)(1/Tu - 1/Ta)}$$

= **760.4701686**

Results:

Failure Rate *(@operating condition)*	=	(Failure Rate *@accelerated condition*) / (AF)	
	=	**13**	**FIT**
Mean Time to Failure (MTTF)	=	**76291907.5**	**hours**
	=	**8709**	**years**