TAIWAN SEMICONDUCTOR

Report Date: January 5, 2024

QUALITY & RELIABILITY ENGINEERING
FIT and MTTF Calculation Report

PN Family Series	MBRAD5150H
Part Description	5A, 150V Schottky Barrier Surface Mount Rectifier
Package Type	Thin DPAK

Test Variables:

Stress Test	=	**HTRB**	
No. of failures	=	0	**units**
Sample Size	=	308	**units**
Test Duration	=	1000	**hours**
Total device hours	=	308000	**hours**
Accelerated Temp (Ta)	=	150	**° C**
Operating Temp (Tu)	=	50	**° 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)*

$$= \frac{\text{(Chi squared value)}}{\text{2*(Sample Size)*(Test Duration)}}$$

= **7475.93** **FIT**

Acceleration Factor, AF

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

= **382.0861577**

Results:

Failure Rate *(@operating condition)* = (Failure Rate *@accelerated condition*) / (AF)

= **19.57** **FIT**

Mean Time to Failure (MTTF) = **51108876** **hours**

= **5834** **years**