TAIWAN SEMICONDUCTOR

Report Date: May 13, 2025

QUALITY & RELIABILITY ENGINEERING
FIT and MTTF Calculation Report

PN Family Series	**1N4148WH&1N4148WSH&1N4148WTH&BAS16H&BAS21H&BAV21WH&BAV23CH&BAV23SH&BAV70H&BAV70WH&BAV99H&BAV99WH&BAW56H&BAW56WH**
Part Description	High Speed Switching Diode
Package Type	SOT-323&SOD-523F&SOT-23&SOD-123&SOD-323

Test Variables:

Stress Test = **HTRB**
No. of failures = 0 **units**
Sample Size = 400 **units**
Test Duration = 1000 **hours**
Total device hours = 400000 **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)*

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

= **5756.46** **FIT**

Acceleration Factor, AF

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

= **2.604E+02**

Results:

Failure Rate *(@operating condition)* = (Failure Rate *@accelerated condition*) / (AF)
= **22** **FIT**

Mean Time to Failure (MTTF) = **45238004** **hours**
= **5164** **years**