TAIWAN SEMICONDUCTOR

AMF20230119

QUALITY & RELIABILITY ENGINEERING
FIT and MTTF Calculation Report

June 26, 2023

PN Family Series	**TSM076NH04DCR**
Part Description	40V, 34A, Dual N-Channel Power MOSFET
Package Type	PDFN56U

Test Variables:

Stress Test = **HTRB**
No. of failures = 0 **units**
Sample Size = 77 **units**
Test Duration = 1000 **hours**
Total device hours = 77000 **hours**
Accelerated Temp (Ta) = 175 **° C**
Operating Temp (Tu) = 55 **° C**
Activation Energy (Ea) = 0.7 **eV**
Confidence Level = 90 **%**
Boltzmann's Constant (k) = 8.617E-05 **eV / °K**

Calculations:

Chi squared value = **4.6051702** @ 90% Confidence Level

Failure Rate *(@accelerated condition)*

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

= **29903.70** **FIT**

Acceleration Factor, AF

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

= **760.4701686**

Results:

Failure Rate *(@operating condition)* = (Failure Rate *@accelerated condition*) / (AF)
= **39** **FIT**

Mean Time to Failure (MTTF) = **25430636** **hours**
= **2903** **years**