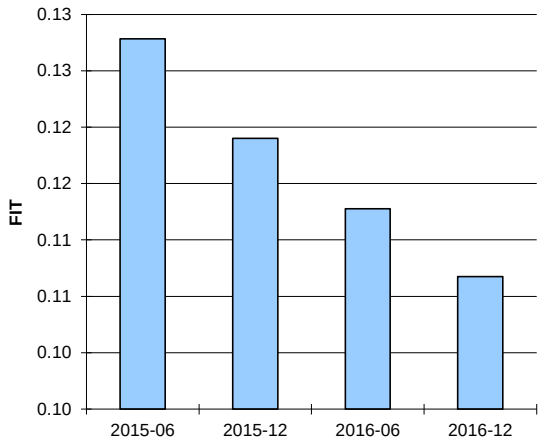
Product Reliability Data

10 December 2018

Sales Name: IPP90R1K2C3
SP-Number: SP000683096
ISPN-Number IPP90R1K2C3
Package: PG-TO220-3

AFR – Average Failure Rate
upper limit of the average failure rate in time for a given confidence level, based on technology data

Timeframe	2015-06	2015-12	2016-06	2016-12
cumulated values				
tested devices	131619	141461	150705	158826
device hours @ stress conditions	136187883	146407215	154855676	164167971
failed devices	5	5	5	5
FIT Value	0.13	0.12	0.11	0.11
MTTF [h] Value	7,822,434,668	8,403,000,179	8,868,912,154	9,368,267,001



Confidence Level 60%
Activation Energy 0,7 eV
Ambient Temperature 55°C

Notes: 70% rated BVDSS

Please note: Average Failure Rate is shown as upper limit and represents the status of the respective reporting period. High failure rate may be caused by limited number of devices tested.

The calculation Method is based on JEDEC JESD85 (chapter 3.1). This standard can be used for further reference and details.

The stress duration must be scaled with the acceleration factor AF for obtaining the simulated operation time.
AF depends on the use and stress conditions of the product:

$$AF = \exp\left(\frac{E_A}{k_B} \times \left(\frac{1}{T_{j_{use}}} - \frac{1}{T_{j_{stress}}}\right)\right)$$

Where E_A is the activation energy, typically 0.7 eV -- used value is noted below the table above
k_B Boltzmann constant
$T_{j_{use}}, T_{j_{stress}}$ junction temperature at use and stress conditions
$t_{operation} = t_{stress} \times AF$

The average failure rate is described as follow:

$$AFR = \frac{X^2\left(P_A, 2(r+1)\right)/2}{n \times \Delta t \times AF} \times 10^9\, FIT$$

Where $X^2(P_A, 2(r+1))/2$ s the chi-square distribution
Δt is the stress duration between 168h and 1000h (or more)
r is the number failures that happened in the time
P_A is the confidence level (given in number between 0 and 1)
n is the number of stressed parts
