




# FPS1000 - 12

# RELIABILITY

# DATA

DWG: IA659-79-01		
APPD	CHK	DWG
 21.05.07	 21.05.07	 21.05.07

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The above data is typical value. As all units have nearly the same characteristics, the data to be considered as ability value.

## 1. M.T.B.F

1.1 Method of calculation according to JEITA (RCR-9102) based on part count reliability projection of MIL-HDBK-217F. Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part.

$$MTBF = \frac{1}{\lambda_{\text{equip}}} = \frac{1}{\sum_{i=1}^n N_i (\lambda_G \pi_Q)_i} \times 10^6 (\text{Hours})$$

Where:

- $\lambda_{\text{equip}}$  = Total Equipment Failure Rate (Failures / 10<sup>6</sup> Hours)
- $\lambda_G$  = Generic Failure Rate For The ith Generic Part (Failure / 10<sup>6</sup> Hours)
- $N_i$  = Quantity of ith Generic Part
- $n$  = Number of Different Generic Part Categories
- $\pi_Q$  = Generic Quality factor for the Generic Part ( $\pi_Q = 1$ )

### 1.2 M.T.B.F Values

GF (GROUND, FIXED)

**M.T.B.F = 75344 (HOURS)**

1.3 Method of calculation according to JEITA (RCR-9102) based on part count reliability projection of MIL-HDBK-217F. Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part.

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^n N_i (\lambda_G \pi_Q)_i} \times 10^6 \text{ (Hours)}$$

Where:

- $\lambda_{equip}$  = Total Equipment Failure Rate (Failures / 10<sup>6</sup> Hours)
- $\lambda_G$  = Generic Failure Rate For The ith Generic Part (Failure / 10<sup>6</sup> Hours)
- $N_i$  = Quantity of ith Generic Part
- $n$  = Number of Different Generic Part Categories
- $\pi_Q$  = Generic Quality factor for the Generic Part ( $\pi_Q = 1$ )

1.4 M.T.B.F Values

G<sub>F</sub> (GROUND, FIXED)

M.T.B.F = 72682 (HOURS)

1.5 Method of calculation according to JEITA (RCR-9102)  
 based on part count reliability projection of MIL-HDBK-217F.  
 Individual failure rates is given to each part and M.T.B.F is  
 calculated by the count of each part.

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^n N_i (\lambda_G \pi_Q)_i} \times 10^6 (\text{Hours})$$

Where:

- $\lambda_{equip}$  = Total Equipment Failure Rate (Failures / 10<sup>6</sup> Hours)
- $\lambda_G$  = Generic Failure Rate For The ith Generic Part (Failure / 10<sup>6</sup> Hours)
- $N_i$  = Quantity of ith Generic Part
- $n$  = Number of Different Generic Part Categories
- $\pi_Q$  = Generic Quality factor for the Generic Part ( $\pi_Q = 1$ )

1.6 M.T.B.F Values

GF (GROUND, FIXED)

M.T.B.F = 75025 (HOURS)

1.7 Method of calculation according to JEITA (RCR-9102)  
 based on part count reliability projection of MIL-HDBK-217F.  
 Individual failure rates is given to each part and M.T.B.F is  
 calculated by the count of each part.

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^n N_i (\lambda_G \pi_Q)^i} \times 10^6 \text{ (Hours)}$$

Where:

- $\lambda_{equip}$  = Total Equipment Failure Rate (Failures / 10<sup>6</sup> Hours)
- $\lambda_G$  = Generic Failure Rate For The ith Generic Part (Failure / 10<sup>6</sup> Hours)
- $N_i$  = Quantity of ith Generic Part
- $n$  = Number of Different Generic Part Categories
- $\pi_Q$  = Generic Quality factor for the Generic Part ( $\pi_Q = 1$ )

1.8 M.T.B.F Values

GF (GROUND, FIXED)

M.T.B.F = 72385 (HOURS)

1.9 Method of calculation according to BELLCORE calculation method:

Limited Stress - Method I, Case 3

Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part

$$\lambda = \sum_{i=1}^n \lambda_i \qquad MTBF = \frac{1}{\lambda}$$

where:

$\lambda_i$  failure rate of I's item

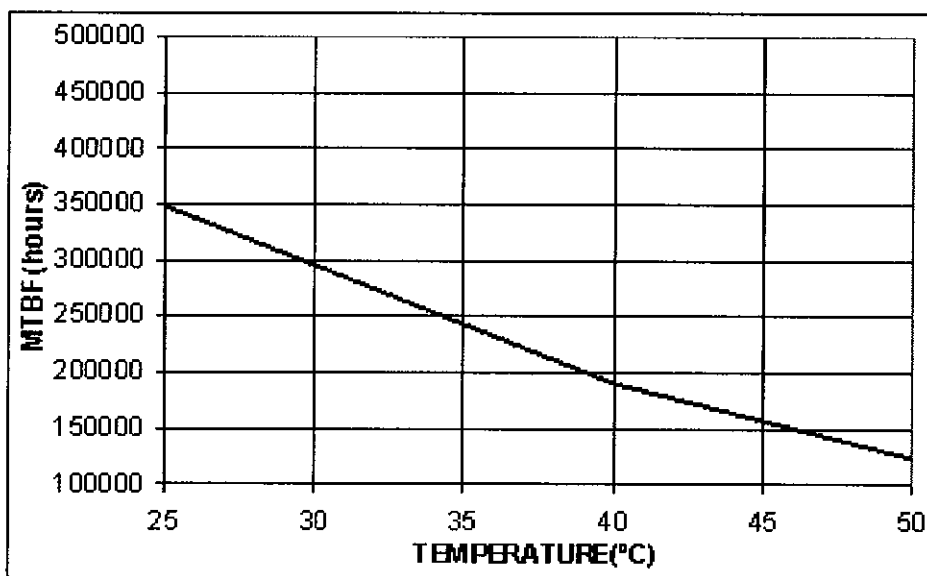
$n$  number of item

1.10 M.T.B.F Values for 25°C

GB (GROUND, FIXED)

M.T.B.F = 347406 (HOURS)

TEMPERATURE CURVE



1.11 Method of calculation according to BELLCORE calculation method:

Limited Stress - Method I, Case 3

Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part

$$\lambda = \sum_{i=1}^n \lambda_i \qquad MTBF = \frac{1}{\lambda}$$

where:

$\lambda_i$  failure rate of I's item

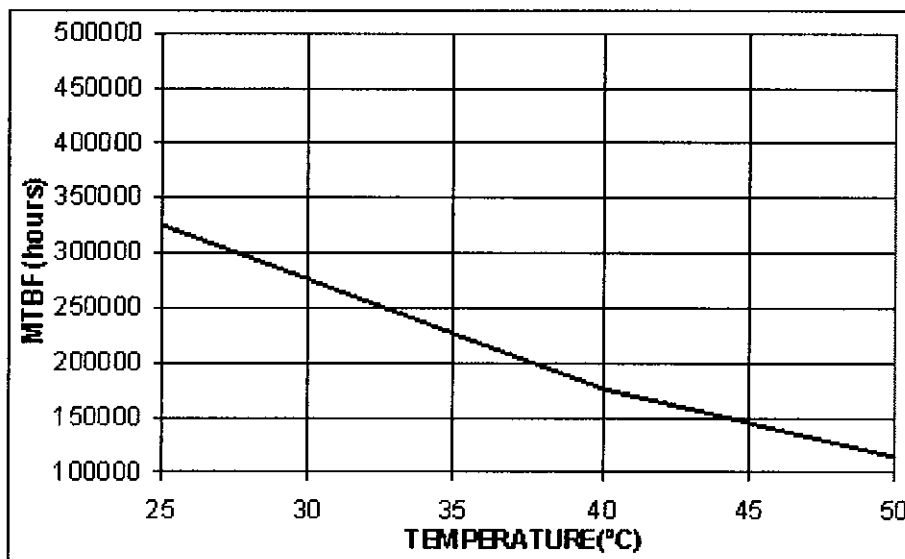
$n$  number of item

1.12 M.T.B.F Values for 25°C

GB (GROUND, FIXED)

M.T.B.F = 325668 (HOURS)

TEMPERATURE CURVE





1.13 Method of calculation according to BELLCORE calculation method:

Limited Stress - Method I, Case 3

Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part

$$\lambda = \sum_{i=1}^n \lambda_i \qquad MTBF = \frac{1}{\lambda}$$

where:

$\lambda_i$  failure rate of I's item

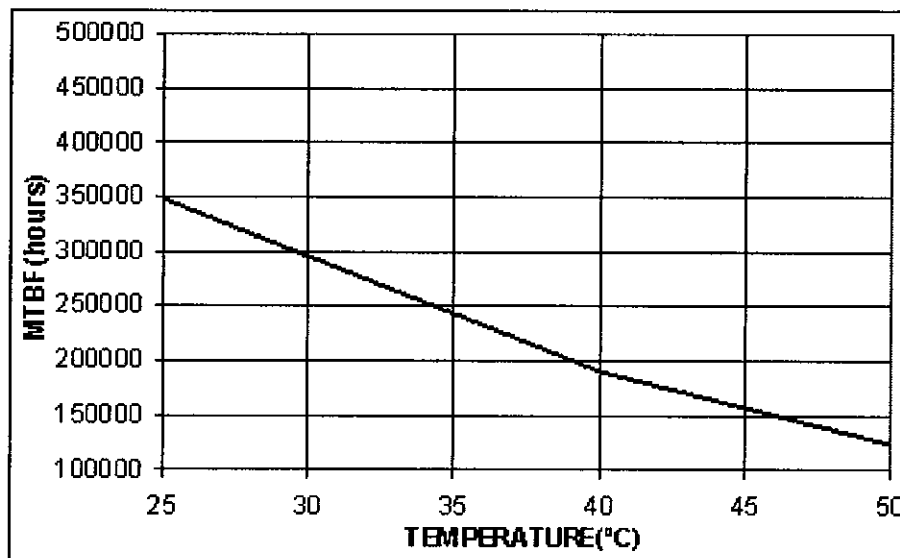
$n$  number of item

1.14 M.T.B.F Values for 25°C

GB (GROUND, FIXED)

M.T.B.F = 347254 (HOURS)

TEMPERATURE CURVE



1.15 Method of calculation according to BELLCORE calculation method:

Limited Stress - Method I, Case 3

Individual failure rates is given to each part and M.T.B.F is calculated by the count of each part

$$\lambda = \sum_{i=1}^n \lambda_i \qquad MTBF = \frac{1}{\lambda}$$

where:

$\lambda_i$  failure rate of I's item

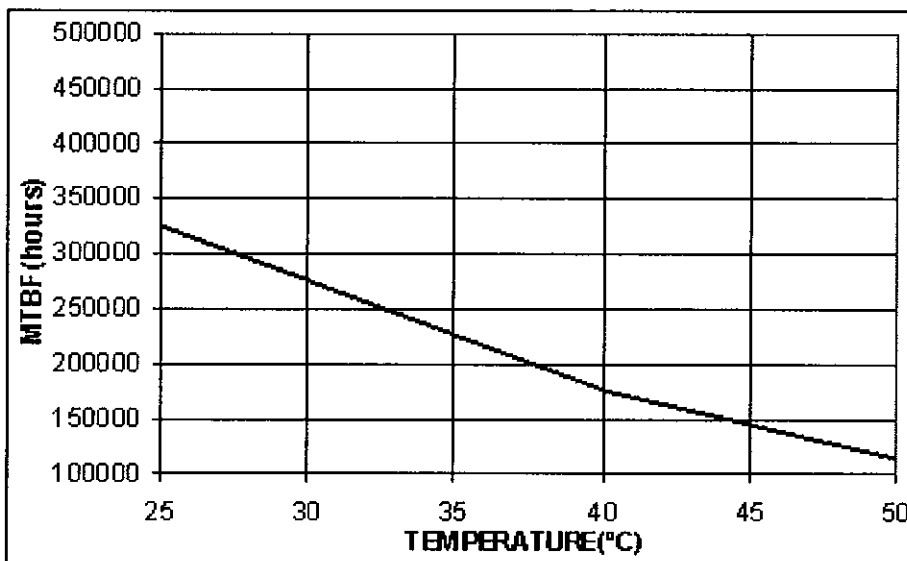
$n$  number of item

1.16 M.T.B.F Values for 25°C

GB (GROUND, FIXED)

M.T.B.F = 325535 (HOURS)

TEMPERATURE CURVE



## 2.COMPONENT DERATING

### (1) Calculation method

#### (a) Condition

Input:	100Vac
Output:	Vout - 100%, Iout - 80,100%
Ambient temperature:	50,60°C
Mounting Method:	Standard (horizontal) mounting

#### (b) Semiconductors

Compared with maximum junction temperature and actual one which is calculated on case temperature, power dissipation and thermal impedance.

#### (c) IC, Resistors, Capacitors, etc.

Ambient temperature, operating condition, power dissipation and so on are within derating criteria.

#### (d) Calculation method of thermal impedance

$$\theta_{j-c} = \frac{T_j(\max) - T_c}{P_c(\max)}$$

$$\theta_{j-a} = \frac{T_j(\max) - T_a}{P_c(\max)}$$

$$\theta_{j-l} = \frac{T_j(\max) - T_l}{P_c(\max)}$$

T<sub>c</sub>: Case Temperature at Start Point of Derating; 25°C in General

T<sub>a</sub>: Ambient Temperature at Start Point of Derating; 25°C in General

P<sub>c</sub>(max): Maximum Power Dissipation

T<sub>j</sub>(max): Maximum Junction temperature

θ<sub>j-c</sub>: Thermal Impedance between Junction and Case

θ<sub>j-a</sub>: Thermal Impedance between Junction and Air

θ<sub>j-l</sub>: Thermal Impedance between Junction and Lead

Vin = 100Vac

Load = 100%

Ta=50°C

D101	Tjmax= 150 °C	$\theta_{j-c} = 1.0$ °C/W	Pmax = 125.0 W
D25XB60H	Pd = 17 W	$\Delta T_c = 48.0$ °C	Tc = 98.0 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 115.0$ °C		D.F. = 76.7 %
D102	Tjmax= 150 °C	$\theta_{j-c} = 3.5$ °C/W	Pmax = 35.7 W
YG902C3R	Pd = 2.7 W	$\Delta T_c = 21.0$ °C	Tc = 71.0 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d) = 80.5$ °C		D.F. = 53.6 %
D104	Tjmax= 150 °C	$\theta_{j-c} = 3.5$ °C/W	Pmax = 35.7 W
YG902C3R	Pd = 2.7 W	$\Delta T_c = 28.0$ °C	Tc = 78.0 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d) = 87.5$ °C		D.F. = 58.3 %
D125	Tjmax= 150 °C	$\theta_{j-c} = 0.50$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 10 W	$\Delta T_c = 44.5$ °C	Tc = 94.5 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 99.5$ °C		D.F. = 66.3 %
D126	Tjmax= 150 °C	$\theta_{j-c} = 0.50$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 8 W	$\Delta T_c = 54.5$ °C	Tc = 104.5 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 108.5$ °C		D.F. = 72.3 %
D127	Tjmax= 150 °C	$\theta_{j-c} = 0.50$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 8 W	$\Delta T_c = 48.9$ °C	Tc = 98.9 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 102.9$ °C		D.F. = 68.6 %
D128	Tjmax= 150 °C	$\theta_{j-c} = 0.5$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 10 W	$\Delta T_c = 60.0$ °C	Tc = 110.0 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 115.0$ °C		D.F. = 76.7 %
D130	Tjmax= 150 °C	$\theta_{j-c} = 0.5$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 10 W	$\Delta T_c = 55.5$ °C	Tc = 105.5 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d) = 110.5$ °C		D.F. = 73.7 %
Q101	Tjmax= 150 °C	$\theta_{j-c} = 0.440$ °C/W	Pmax = 284.0 W
SPW32N50C3	Pd = 12 W	$\Delta T_c = 43.3$ °C	Tc = 93.3 °C
INFINEON	$T_j = T_c + (\theta_{j-c} \times P_d) = 98.6$ °C		D.F. = 65.7 %
Q103	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 9.0 W	$\Delta T_c = 48.3$ °C	Tc = 98.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d) = 105.8$ °C		D.F. = 70.5 %
Q105	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 9.0 W	$\Delta T_c = 28.4$ °C	Tc = 78.4 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d) = 85.9$ °C		D.F. = 57.3 %

Vin = 100Vac

Load = 100%

Ta=50°C

Q126 IPP03N03LA INFINEON	Tjmax= 175 °C Pd = 2 W Tj = Tc + (θj-c x Pd) =	θj-c = 1.0 °C/W ΔTc = 65.8 °C 117.8 °C	Pmax = 150.0 W Tc = 115.8 °C D.F. = 67.3 %
Q127 IPP03N03LA INFINEON	Tjmax= 175 °C Pd = 2 W Tj = Tc + (θj-c x Pd) =	θj-c = 1.0 °C/W ΔTc = 61.4 °C 113.4 °C	Pmax = 150.0 W Tc = 111.4 °C D.F. = 64.8 %
Q110 2SD1624S SANYO	Tjmax= 175 °C Pd = 0.24 W Tj = Tc + (θj-c x Pd) =	θj-c = 83.3 °C/W ΔTc = 30.0 °C 100.0 °C	Pmax = 1.5 W Tc = 80.0 °C D.F. = 57.1 %
Q118 2SD1624S SANYO	Tjmax= 175 °C Pd = 0.046 W Tj = Tc + (θj-c x Pd) =	θj-c = 250.0 °C/W ΔTc = 20.0 °C 81.5 °C	Pmax = 0.5 W Tc = 70.0 °C D.F. = 46.6 %
Q2 2SB1123S SANYO	Tjmax= 150 °C Pd = 0.1 W Tj = Tc + (θj-c x Pd) =	θj-c = 250.0 °C/W ΔTc = 10.5 °C 85.5 °C	Pmax = 0.5 W Tc = 60.5 °C D.F. = 57.0 %
A102 MIP0224SY MATSUSHITA	Tjmax= 150 °C Pd = 0.7 W Tj = Tc + (θj-c x Pd) =	θj-c = 3.0 °C/W ΔTc = 22.3 °C 74.4 °C	Pmax = 41.6 W Tc = 72.3 °C D.F. = 49.6 %
A104 UCC2806DW TEXAS INSTR.	Tjmax= 150 °C Pd = 0.04 W Tj = Tc + (θj-c x Pd) =	θj-c = 27.0 °C/W ΔTc = 13.7 °C 64.8 °C	Pmax = 1 W Tc = 63.7 °C D.F. = 43.2 %
A105 LM78L05ACM NEC	Tjmax= 125 °C Pd = 0.03 W Tj = Ta + (θj-a x Pd) =	θj-a = 180.0 °C/W ΔTa = 33.9 °C 89.3 °C	Pmax = 0.6 W Ta = 83.9 °C D.F. = 71.4 %
A106 uPC7805AHF NEC	Tjmax= 150 °C Pd = 1.5 W Tj = Tc + (θj-c x Pd) =	θj-c = 7.0 °C/W ΔTc = 33.5 °C 94.0 °C	Pmax = 17.8 W Tc = 83.5 °C D.F. = 62.7 %
A109 uPC78M05AHF NEC	Tjmax= 150 °C Pd = 1.3 W Tj = Tc + (θj-c x Pd) =	θj-c = 7.0 °C/W ΔTc = 36.3 °C 95.4 °C	Pmax = 17.8 W Tc = 86.3 °C D.F. = 63.6 %
A1 FA5502M FUJI	Tjmax= 150 °C Pd = 0.074 W Tj = Tc + (θj-c x Pd) =	θj-c = 50.0 °C/W ΔTc = 17.2 °C 70.9 °C	Pmax = 0.65 W Tc = 67.2 °C D.F. = 47.3 %

Vin = 100Vac

Load = 80%

Ta=60°C

D101	Tjmax= 150 °C	$\theta_{j-c} = 1.0$ °C/W	Pmax = 125.0 W
D25XB60H	Pd = 13.6 W	$\Delta T_c = 34.2$ °C	Tc = 94.2 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	107.8 °C	D.F. = 71.9 %
D102	Tjmax= 150 °C	$\theta_{j-c} = 3.5$ °C/W	Pmax = 35.7 W
YG902C3R	Pd = 2.2 W	$\Delta T_c = 17.7$ °C	Tc = 77.7 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times Pd) =$	85.4 °C	D.F. = 56.9 %
D104	Tjmax= 150 °C	$\theta_{j-c} = 3.5$ °C/W	Pmax = 35.7 W
YG902C3R	Pd = 2.2 W	$\Delta T_c = 24.4$ °C	Tc = 84.4 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times Pd) =$	92.1 °C	D.F. = 61.4 %
D125	Tjmax= 150 °C	$\theta_{j-c} = 0.85$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 8 W	$\Delta T_c = 32.4$ °C	Tc = 92.4 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	99.2 °C	D.F. = 66.1 %
D126	Tjmax= 150 °C	$\theta_{j-c} = 0.55$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 6.4 W	$\Delta T_c = 42.7$ °C	Tc = 102.7 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	106.2 °C	D.F. = 70.8 %
D127	Tjmax= 150 °C	$\theta_{j-c} = 0.85$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 6.4 W	$\Delta T_c = 37.7$ °C	Tc = 97.7 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	103.1 °C	D.F. = 68.8 %
D128	Tjmax= 150 °C	$\theta_{j-c} = 0.5$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 8 W	$\Delta T_c = 43.9$ °C	Tc = 103.9 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	107.9 °C	D.F. = 71.9 %
D130	Tjmax= 150 °C	$\theta_{j-c} = 0.5$ °C/W	Pmax = 250.0 W
S60SC4M-7100	Pd = 8 W	$\Delta T_c = 40.4$ °C	Tc = 100.4 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times Pd) =$	104.4 °C	D.F. = 69.6 %
Q101	Tjmax= 150 °C	$\theta_{j-c} = 0.440$ °C/W	Pmax = 284.0 W
SPW32N50C3	Pd = 9.6 W	$\Delta T_c = 35.8$ °C	Tc = 95.8 °C
INFINEON	$T_j = T_c + (\theta_{j-c} \times Pd) =$	100.0 °C	D.F. = 66.7 %
Q103	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 7.2 W	$\Delta T_c = 38.5$ °C	Tc = 98.5 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times Pd) =$	104.5 °C	D.F. = 69.7 %
Q105	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 7.2 W	$\Delta T_c = 20.9$ °C	Tc = 80.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times Pd) =$	86.9 °C	D.F. = 57.9 %

Vin = 100Vac

Load = 80%

Ta=60°C

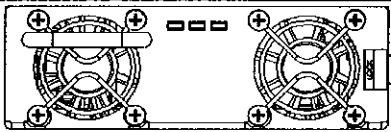
Q126	Tjmax= 175 °C	$\theta_{j-c} = 1.0$ °C/W	Pmax = 150.0 W
IPP03N03LA	Pd = 1.6 W	$\Delta T_c = 47.3$ °C	Tc = 107.3 °C
INFINEON	$T_j = T_c + (\theta_{j-c} \times Pd) = 108.9$ °C		D.F. = 62.2 %
Q127	Tjmax= 175 °C	$\theta_{j-c} = 1.0$ °C/W	Pmax = 150.0 W
IPP03N03LA	Pd = 1.6 W	$\Delta T_c = 44.1$ °C	Tc = 104.1 °C
INFINEON	$T_j = T_c + (\theta_{j-c} \times Pd) = 105.7$ °C		D.F. = 60.4 %
Q110	Tjmax= 150 °C	$\theta_{j-c} = 83.3$ °C/W	Pmax = 0.9 W
2SC2655	Pd = 0.24 W	$\Delta T_c = 25.0$ °C	Tc = 85.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times Pd) = 105.0$ °C		D.F. = 70.0 %
Q118	Tjmax= 150 °C	$\theta_{j-c} = 250.0$ °C/W	Pmax = 0.5 W
2SB1123T	Pd = 0.046 W	$\Delta T_c = 18.6$ °C	Tc = 68.6 °C
SANYO	$T_j = T_c + (\theta_{j-c} \times Pd) = 80.1$ °C		D.F. = 53.4 %
Q2	Tjmax= 150 °C	$\theta_{j-c} = 250.0$ °C/W	Pmax = 0.5 W
2SB1123T	Pd = 0.1 W	$\Delta T_c = 9.2$ °C	Tc = 69.2 °C
SANYO	$T_j = T_c + (\theta_{j-c} \times Pd) = 94.2$ °C		D.F. = 62.8 %
A102	Tjmax= 150 °C	$\theta_{j-c} = 3.0$ °C/W	Pmax = 41.6 W
MIP0224SY	Pd = 0.7 W	$\Delta T_c = 19.8$ °C	Tc = 79.8 °C
MATSUSHITA	$T_j = T_c + (\theta_{j-c} \times Pd) = 81.9$ °C		D.F. = 54.6 %
A104	Tjmax= 150 °C	$\theta_{j-c} = 27.0$ °C/W	Pmax = 1.0 W
UCC2806DW	Pd = 0.04 W	$\Delta T_c = 10.8$ °C	Tc = 70.8 °C
TEXAS INSTR.	$T_j = T_c + (\theta_{j-c} \times Pd) = 71.9$ °C		D.F. = 47.9 %
A105	Tjmax= 125 °C	$\theta_{j-a} = 180.0$ °C/W	Pmax = 0.6 W
LM78L05ACM	Pd = 0.03 W	$\Delta T_a = 28.7$ °C	Ta = 88.7 °C
NEC	$T_j = T_a + (\theta_{j-a} \times Pd) = 94.1$ °C		D.F. = 75.3 %
A106	Tjmax= 150 °C	$\theta_{j-c} = 7.0$ °C/W	Pmax = 17.8 W
uPC7805AHF	Pd = 1.5 W	$\Delta T_c = 33.5$ °C	Tc = 93.5 °C
NEC	$T_j = T_c + (\theta_{j-c} \times Pd) = 104.0$ °C		D.F. = 69.3 %
A109	Tjmax= 150 °C	$\theta_{j-c} = 7.0$ °C/W	Pmax = 17.8 W
uPC78M05AHF	Pd = 1.04 W	$\Delta T_c = 32.8$ °C	Tc = 92.8 °C
NEC	$T_j = T_c + (\theta_{j-c} \times Pd) = 100.1$ °C		D.F. = 66.7 %
A1	Tjmax= 150 °C	$\theta_{j-c} = 50.0$ °C/W	Pmax = 0.65 W
FA5502M	Pd = 0.074 W	$\Delta T_c = 16.6$ °C	Tc = 76.6 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times Pd) = 80.3$ °C		D.F. = 53.5 %

3.MAIN COMPONENTS TEMPERATURE RISE

a) Output voltage: 10.5V

Location No.	Parts Name	Temperature Rise (°C)
A1	IC	18.0
A102	IC	23.0
A104	IC	15.0
A106	IC	35.0
A109	IC	38.0
C101	FILM CAP	19.2
C102	FILM CAP	20.7
C110	ELEC. CAP.	9.3
C143	ELEC. CAP.	49.1
D101	BRIDGE	44.5
D126	DIODE	57.3
D128	DIODE	57.3
D130	DIODE	47.1
L101	CHOKE	28.3
L104	CHOKE	48.2
L136	CHOKE	65.7
Q101	MOSFET	37.9
Q102	MOSFET	26.4
Q103	MOSFET	44.3
Q105	MOSFET	24.1
Q126	MOSFET	64.7
Q127	MOSFET	60.9
T101	TRANSFORMER	66.3
T102	TRANSFORMER	49.9
T103	TRANSFORMER	18.1

Conditions:

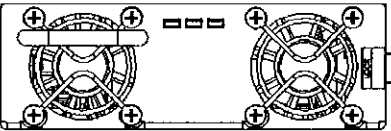
Standard Mounting	
Ta	50°C
Input Voltage	100VAC
Output Voltage	10.5V
Output Current	72A



b) Output voltage: 12V

Location No.	Parts Name	Temperature Rise (°C)
A1	IC	19.0
A102	IC	23.5
A104	IC	16.0
A106	IC	35.5
A109	IC	38.0
C101	FILM CAP	22.9
C102	FILM CAP	28.1
C110	ELEC. CAP.	11.2
C143	ELEC. CAP.	49.6
D101	BRIDGE	48.0
D126	DIODE	54.5
D128	DIODE	60.0
D130	DIODE	55.5
L101	CHOKE	37.1
L104	CHOKE	54.7
L136	CHOKE	63.4
Q101	MOSFET	43.3
Q102	MOSFET	29.5
Q103	MOSFET	48.3
Q105	MOSFET	28.4
Q126	MOSFET	65.8
Q127	MOSFET	61.4
T101	TRANSFORMER	67.6
T102	TRANSFORMER	49.7
T103	TRANSFORMER	18.3

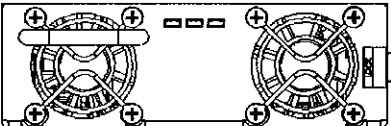
Conditions:

Standard Mounting	
Ta	50°C
Input Voltage	100VAC
Output Voltage	12V
Output Current	72A

c) Output voltage: 13.2V

Location No.	Parts Name	Temperature Rise (°C)
A1	IC	19.0
A102	IC	23.5
A104	IC	16.0
A106	IC	35.5
A109	IC	38.0
C101	FILM CAP	20.6
C102	FILM CAP	23.0
C110	ELEC. CAP.	9.7
C143	ELEC. CAP.	44.0
D101	BRIDGE	48.0
D126	DIODE	51.5
D128	DIODE	55.1
D130	DIODE	47.6
L101	CHOKE	32.4
L104	CHOKE	51.3
L136	CHOKE	59.9
Q101	MOSFET	42.4
Q102	MOSFET	29.6
Q103	MOSFET	42.8
Q105	MOSFET	27.8
Q126	MOSFET	57.3
Q127	MOSFET	54.0
T101	TRANSFORMER	64.1
T102	TRANSFORMER	48.8
T103	TRANSFORMER	17.9

Conditions:

Standard Mounting	
Ta	50°C
Input Voltage	100VAC
Output Voltage	13.2V
Output Current	66A

**4.ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION**

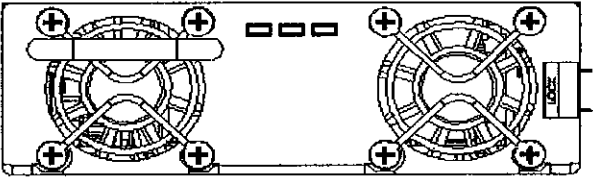
MODEL	COMPUTED LIFE (years) at Ta			
	30°C	40°C	50°C	60°C
FPS1000 - 12	6.68	4.11	1.75	2.15
Load(%)	100	100	100	80

FORMULA: 
$$L = L_0 \times 2^{\frac{105 - T_c}{10}} \quad (\text{years})$$

L: Elec.capacitor computed life (24 hours per day,365 days operation)

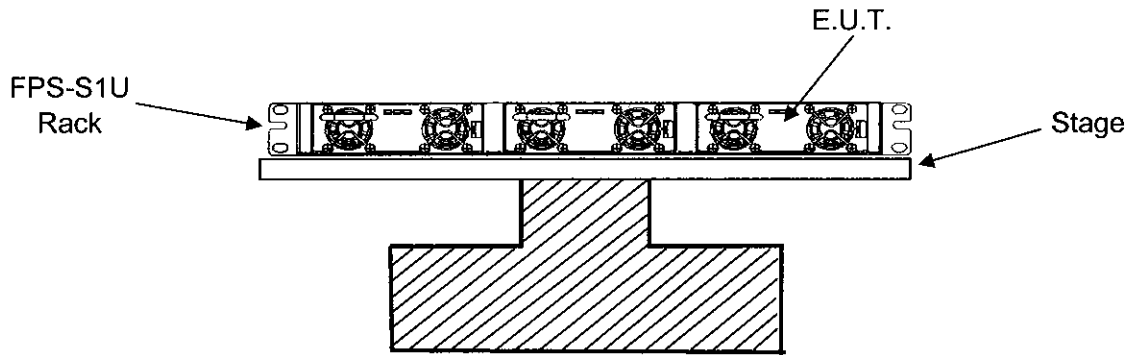
Lo: Guaranteed life for Elec.capacitor

Tc: Case temperature of Elec.capacitor

Standard Mounting	
Input Voltage	100VAC
Output Voltage	12V

6.VIBRATION TEST

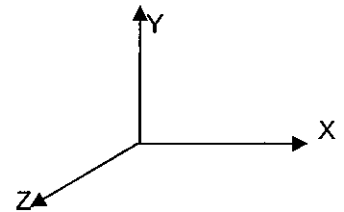
- 1) Vibration test class  
Frequency variable endurance test
- 2) Equipment used  
Controller: GENRAD-2503  
Vibrator: ULHOLTZ-DICKIE TA1000
- 3) Testing method  
FPS1000-12 installed in FPS-S1U Rack



Test condition:

A) Vibration Test with Frequency Sweep

Sinusoidal Vibration in Freq.: 5 - 500 Hz  
 Test level: 1.5G  
 Test time: 1 oct/min, 20 sweeps Per axis  
 Test performed in Axes x-y-z



B) Mech. Shock

Test level: half sine, 30G 11ms  
 3 mech.shocks in all of the 3 axes at each direction.

(4)Test Result

Pass

5. ABNORMAL TEST

**FPS1000 - 12**

Model:12V  
Input:230VAC

Ta:25°C

Vout=12V  
Iout=72A

No	Test Position		Test Mode		Test Result											Note					
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Blown	V	O	P	C		O	No Output	No Change	Others	
1	D125		•							•	•						•			F102 open approx after 5 min, Q103, Q104-shortcd	
				•																•	
2	D126		•							•	•						•			F102 open approx after 5 min, Q103, Q104-shortcd	
				•																•	
3	T101	1-3	•							•	•						•			F102 open approx after 2 sec, Q103, Q104, D138 and D139-shortcd	
		H-G	•							•	•						•			F102 open approx after 2 sec, Q103, Q104, D138 and D139-shortcd	
		1		•															•		
		H		•																•	Vout~8.5V, Pin down to ~700W
		5		•																•	Vout~8.5V, Pin down to ~700W
4	L136		•							•	•						•			F102 open after approx 12 min, D125-shortcd	
				•															•		
5	C138		•							•										R184 open	
				•																•	
6	C139		•							•										R185, R197 open	
				•																•	
7	C141		•							•										F102 open	
				•																•	
8	C148		•													•					
				•																•	