

GEN1500 SERIES RELIABILITY DATA

DWG: IA575-79-01		
APPD	CHK	DWG
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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.

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M.T.B.F.

MODEL: GEN6-200

1. Method of calculation according to EIAJ (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.

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

Where:

- λ_{equip} = Total Equipment Failure Rate (Failures /10⁶ Hours)
- λ_G = Generic Failure Rate For The ith Generic Part (Failure/10⁶ Hours)
- N_i = Quantity of ith Generic Part
- n = Number of Different Generic Part Categories
- π_Q = Generic Quality factor for the ith Generic Part ($\pi_Q = 1$)

2. M.T.B.F. Values

G_F (GROUND, FIXED)

M.T.B.F. =46140 (HOURS)

2. Component Derating

GEN1500 SERIES

(1) Calculation method

(a) Condition

Input :	100Vac,
Output:	Vout - 100%,Iout - 100%,
Ambient temperature:	50°C
Mounting Method:	Standard Mounting

(b) Semiconductors

Compared with maximum junction temperature and actual one which is calculated based 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

$$\Theta_{j-c} = \frac{T_j(\max) - T_c}{P_c(\max)} \quad \Theta_{j-a} = \frac{T_j(\max) - T_a}{P_c(\max)} \quad \Theta_{j-l} = \frac{T_j(\max) - T_l}{P_c(\max)}$$

T_c : Case Temperature at Start Point of Derating; 25°C in General

T_a : Ambient Temperature at Start Point of Derating; 25°C in General

P_c(max): Maximum Power Dissipation

T_j (max) : Maximum Junction temperature

⊕_{j-c} : Thermal Impedance between Junction and Case

⊕_{j-a} : Thermal Impedance between Junction and Air

⊕_{j-l} : Thermal Impedance between Junction and lead

V_{in} = 100Vac

Load = 100%

T_a=50°C

GEN1500-INPUT

A303 MIP0224SY MATSUSHITA	T _{jmax} = 150 °C P _d = 0.55 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.0 °C/W ΔT _c = 13.8 °C 65.5 °C	P _{max} = 125.0 W T _c = 63.8 °C D.F. = 43.6 %
A304 uPC24A05HF NEC	T _{jmax} = 150 °C P _d = 0.552 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5.0 °C/W ΔT _c = 37.1 °C 89.9 °C	P _{max} = 15.0 W T _c = 87.1 °C D.F. = 59.9 %
A305 LM78L15ACM NAT. SEMI.	T _{jmax} = 125 °C P _d = 0.04 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 180.0 °C/W ΔT _a = 20.0 °C 77.2 °C	P _{max} = 0.6 W T _a = 70.0 °C D.F. = 61.8 %
A306 uPC7805AHF NEC	T _{jmax} = 150 °C P _d = 2.95 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5.0 °C/W ΔT _c = 43.4 °C 108.2 °C	P _{max} = 15.0 W T _c = 93.4 °C D.F. = 72.1 %
A307 LM79L15ACM NAT. SEMI.	T _{jmax} = 125 °C P _d = 0.04 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 180.0 °C/W ΔT _a = 16.6 °C 73.8 °C	P _{max} = 0.6 W T _a = 66.6 °C D.F. = 59.0 %
Q301 2SA1244 TOSHIBA	T _{jmax} = 150 °C P _d = 0.12 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 6.3 °C/W ΔT _c = 18.5 °C 69.3 °C	P _{max} = 1.0 W T _c = 68.5 °C D.F. = 46.2 %
Q304 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 8.4 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 46.1 °C 103.1 °C	P _{max} = 150.0 W T _c = 96.1 °C D.F. = 68.7 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN1500-control

A114 LM78L05ACM NATIONAL	T _{jmax} = 125 °C P _d = 0.05 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 180.0 °C/W ΔT _a = 32.7 °C 91.7 °C	P _{max} = 0.6 W T _a = 82.7 °C D.F. = 73.4 %
A115 (*1) P87C51RD+IA PHILIPS	T _{jmax} = 150 °C P _d = 0.125 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 52.5 °C/W ΔT _a = 34.4 °C 91.0 °C	P _{max} = 1.5 W T _a = 84.4 °C D.F. = 60.6 %
A119 AD7705BR ANALOG DEVICES	T _{jmax} = 150 °C P _d = 0.0065 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 139.0 °C/W ΔT _c = 29.1 °C 80.0 °C	P _{max} = 0.450 W T _c = 79.1 °C D.F. = 53.3 %
A120 MAX5541CSA MAXIM	T _{jmax} = 150 °C P _d = 0.002 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 173.0 °C/W ΔT _a = 29.6 °C 79.9 °C	P _{max} = 0.471 W T _a = 79.6 °C D.F. = 53.24 %
A122 MAX515CSA MAXIM	T _{jmax} = 150 °C P _d = 0.002 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 173.0 °C/W ΔT _a = 32.4 °C 82.7 °C	P _{max} = 0.471 W T _a = 82.4 °C D.F. = 55.11 %
A123 MAX6225BCSA MAXIM	T _{jmax} = 150 °C P _d = 0.009 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 173.0 °C/W ΔT _a = 29.7 °C 81.3 °C	P _{max} = 0.471 W T _a = 79.7 °C D.F. = 54.17 %

Note:

(*1) -- θ_{j-a} is taken as the highest value for PLCC44 (Philips Semiconductors IC26_1998_1,

Chapter 6, Thermal Design Considerations.)

Vin = 100Vac

Load = 100% Ta=50°C

GEN6-200

D501 D25XB60H SHINDENGEN	T _{jmax} = 150 °C P _d = 18 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1.0 °C/W ΔT _c = 31.2 °C 99.2 °C	P _{max} = 60.0 W T _c = 81.2 °C D.F. = 66.1 %
D503 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 2.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 15.0 °C 72.7 °C	P _{max} = 7.5 W T _c = 65.0 °C D.F. = 48.5 %
D506 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 4 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 15.8 °C 79.8 °C	P _{max} = 7.5 W T _c = 65.8 °C D.F. = 53.2 %
D508 2NU41 TOSHIBA	T _{jmax} = 150 °C P _d = 0.06 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 12.0 °C/W ΔT _c = 30.9 °C 81.6 °C	P _{max} = W T _c = 80.9 °C D.F. = 54.4 %
D518 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 14 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 43.9 °C 100.9 °C	P _{max} = W T _c = 93.9 °C D.F. = 67.3 %
D521 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 14 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 64.9 °C 121.9 °C	P _{max} = W T _c = 114.9 °C D.F. = 81.3 %
A501 L4981AD ST	T _{jmax} = 150 °C P _d = 0.2 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 120.0 °C/W ΔT _a = 28.6 °C 102.6 °C	P _{max} = 0.6 W T _a = 78.6 °C D.F. = 68.4 %
A504 M51995 MITSUBISHI	T _{jmax} = 150 °C P _d = 0.35 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 20.0 °C/W ΔT _c = 31.7 °C 88.7 °C	P _{max} = 1.5 W T _c = 81.7 °C D.F. = 59.1 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN6-200

A502 UC3706DW TI	T _{jmax} = 150 °C P _d = 0.5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 27.0 °C/W ΔT _c = 50.0 °C 113.5 °C	P _{max} = 1.0 W T _c = 100.0 °C D.F. = 75.7 %
Q501 2SK2837 TOSHIBA	T _{jmax} = 150 °C P _d = 9 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 35.0 °C 92.5 °C	P _{max} = 150.0 W T _c = 85.0 °C D.F. = 61.7 %
Q506 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 6.0 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 25.5 °C 80.5 °C	P _{max} = 150.0 W T _c = 75.5 °C D.F. = 53.7 %
Q509 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 6 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 26.9 °C 81.9 °C	P _{max} = 150.0 W T _c = 76.9 °C D.F. = 54.6 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN60-25

D501 D25XB60H SHINDENGEN	T _{jmax} = 150 °C P _d = 22 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1.0 °C/W ΔT _c = 33.6 °C 105.6 °C	P _{max} = 60.0 W T _c = 83.6 °C D.F. = 70.4 %
D503 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 2.8 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 15.4 °C 75.2 °C	P _{max} = 7.5 W T _c = 65.4 °C D.F. = 50.1 %
D506 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 19.2 °C 86.7 °C	P _{max} = 7.5 W T _c = 69.2 °C D.F. = 57.8 %
D508 2NU41 TOSHIBA	T _{jmax} = 150 °C P _d = 0.07 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 12.0 °C/W ΔT _c = 27.9 °C 78.7 °C	P _{max} = W T _c = 77.9 °C D.F. = 52.5 %
D516 20FL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 25.9 °C 78.4 °C	P _{max} = W T _c = 75.9 °C D.F. = 52.3 %
D520 20FL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 19.2 °C 71.7 °C	P _{max} = W T _c = 69.2 °C D.F. = 47.8 %
A501 L4981AD ST	T _{jmax} = 150 °C P _d = 0.2 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 120.0 °C/W ΔT _a = 28.6 °C 102.6 °C	P _{max} = 0.6 W T _a = 78.6 °C D.F. = 68.4 %
A504 M51995 MITSUBISHI	T _{jmax} = 150 °C P _d = 0.35 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 20.0 °C/W ΔT _c = 21.5 °C 78.5 °C	P _{max} = 1.5 W T _c = 71.5 °C D.F. = 52.3 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN60-25

A502	T _{jmax} = 150 °C	θ _{j-c} = 27.0 °C/W	P _{max} = 1.0 W
UC3706DW	P _d = 0.5 W	ΔT _c = 45.2 °C	T _c = 95.2 °C
TI	T _j = T _c + (θ _{j-c} x P _d) =	108.7 °C	D.F. = 72.5 %
Q501	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2837	P _d = 11 W	ΔT _c = 37.4 °C	T _c = 87.4 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	96.6 °C	D.F. = 64.4 %
Q506	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2611	P _d = 7.5 W	ΔT _c = 30.6 °C	T _c = 80.6 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	86.8 °C	D.F. = 57.9 %
Q509	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2611	P _d = 7.5 W	ΔT _c = 34.3 °C	T _c = 84.3 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	90.5 °C	D.F. = 60.4 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN100-15

D501 D25XB60H SHINDENGEN	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 22 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 1.0 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 33.9 \text{ } ^\circ\text{C}$ 105.9 °C	$P_{max} = 60.0 \text{ W}$ $T_c = 83.9 \text{ } ^\circ\text{C}$ D.F. = 70.6 %
D503 YG902C3R FUJI	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 2.8 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 3.5 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 17.4 \text{ } ^\circ\text{C}$ 77.2 °C	$P_{max} = 7.5 \text{ W}$ $T_c = 67.4 \text{ } ^\circ\text{C}$ D.F. = 51.5 %
D506 YG902C3R FUJI	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 5 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 3.5 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 19.4 \text{ } ^\circ\text{C}$ 86.9 °C	$P_{max} = 7.5 \text{ W}$ $T_c = 69.4 \text{ } ^\circ\text{C}$ D.F. = 57.9 %
D508 2NU41 TOSHIBA	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 0.07 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 12.0 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 27.4 \text{ } ^\circ\text{C}$ 78.2 °C	$P_{max} = \text{ W}$ $T_c = 77.4 \text{ } ^\circ\text{C}$ D.F. = 52.2 %
D518 20GL2C41A TOSHIBA	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 8.2 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 0.5 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 16.4 \text{ } ^\circ\text{C}$ 70.5 °C	$P_{max} = \text{ W}$ $T_c = 66.4 \text{ } ^\circ\text{C}$ D.F. = 47.0 %
D519 20GL2C41A TOSHIBA	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 8.2 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 0.5 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 22.8 \text{ } ^\circ\text{C}$ 76.9 °C	$P_{max} = \text{ W}$ $T_c = 72.8 \text{ } ^\circ\text{C}$ D.F. = 51.3 %
A501 L4981AD ST	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 0.2 \text{ W}$ $T_j = T_a + (\theta_{j-a} \times P_d) =$	$\theta_{j-a} = 120.0 \text{ } ^\circ\text{C/W}$ $\Delta T_a = 25.4 \text{ } ^\circ\text{C}$ 99.4 °C	$P_{max} = 0.6 \text{ W}$ $T_a = 75.4 \text{ } ^\circ\text{C}$ D.F. = 66.3 %
A504 M51995 MITSUBISHI	$T_{jmax} = 150 \text{ } ^\circ\text{C}$ $P_d = 0.35 \text{ W}$ $T_j = T_c + (\theta_{j-c} \times P_d) =$	$\theta_{j-c} = 20.0 \text{ } ^\circ\text{C/W}$ $\Delta T_c = 21.6 \text{ } ^\circ\text{C}$ 78.6 °C	$P_{max} = 1.5 \text{ W}$ $T_c = 71.6 \text{ } ^\circ\text{C}$ D.F. = 52.4 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN100-15

A502	Tjmax= 150 °C	$\theta_{j-c} = 27.0$ °C/W	Pmax = 1.0 W
UC3706DW	Pd = 0.5 W	$\Delta T_c = 49.9$ °C	Tc = 99.9 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d) =$	113.4 °C	D.F. = 75.6 %
Q501	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2837	Pd = 11 W	$\Delta T_c = 38.0$ °C	Tc = 88.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d) =$	97.2 °C	D.F. = 64.8 %
Q506	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 8.2 W	$\Delta T_c = 40.8$ °C	Tc = 90.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d) =$	97.6 °C	D.F. = 65.1 %
Q509	Tjmax= 150 °C	$\theta_{j-c} = 0.833$ °C/W	Pmax = 150.0 W
2SK2611	Pd = 8.2 W	$\Delta T_c = 43.9$ °C	Tc = 93.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d) =$	100.7 °C	D.F. = 67.2 %

Vin = 100Vac

Load = 100% Ta=50°C

GEN600-2.6

D701 D25XB60H SHINDENGEN	T _{jmax} = 150 °C P _d = 23 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1.0 °C/W ΔT _c = 36.9 °C 109.9 °C	P _{max} = 60.0 W T _c = 86.9 °C D.F. = 73.3 %
D703 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 3 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 26.8 °C 87.3 °C	P _{max} = 7.5 W T _c = 76.8 °C D.F. = 58.2 %
D706 YG902C3R FUJI	T _{jmax} = 150 °C P _d = 5.5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3.5 °C/W ΔT _c = 24.1 °C 93.4 °C	P _{max} = 7.5 W T _c = 74.1 °C D.F. = 62.2 %
D708 2NU41 TOSHIBA	T _{jmax} = 150 °C P _d = 0.07 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 12.0 °C/W ΔT _c = 26.8 °C 77.6 °C	P _{max} = W T _c = 76.8 °C D.F. = 51.8 %
D715 5JLZ47A TOSHIBA	T _{jmax} = 150 °C P _d = 2.1 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 40.3 °C 91.4 °C	P _{max} = W T _c = 90.3 °C D.F. = 60.9 %
D721 5JLZ47A TOSHIBA	T _{jmax} = 150 °C P _d = 1 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 36.9 °C 87.4 °C	P _{max} = W T _c = 86.9 °C D.F. = 58.3 %
A701 L4981AD ST	T _{jmax} = 150 °C P _d = 0.2 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 120.0 °C/W ΔT _a = 26.8 °C 100.8 °C	P _{max} = 0.6 W T _a = 76.8 °C D.F. = 67.2 %
A704 UC3706DW MITSUBISHI	T _{jmax} = 150 °C P _d = 0.5 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 27.0 °C/W ΔT _c = 41.9 °C 105.4 °C	P _{max} = 1.0 W T _c = 91.9 °C D.F. = 70.3 %

V_{in} = 100Vac

Load = 100% Ta=50°C

GEN600-2.6

A702	T _{jmax} = 150 °C	θ _{j-c} = 20.0 °C/W	P _{max} = 1.5 W
M51995	P _d = 0.35 W	ΔT _c = 28.7 °C	T _c = 78.7 °C
TI	T _j = T _c + (θ _{j-c} x P _d) =	85.7 °C	D.F. = 57.1 %
Q701	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2837	P _d = 11.5 W	ΔT _c = 38.2 °C	T _c = 88.2 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	97.8 °C	D.F. = 65.2 %
Q706	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2611	P _d = 8 W	ΔT _c = 38.2 °C	T _c = 88.2 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	94.9 °C	D.F. = 63.3 %
Q709	T _{jmax} = 150 °C	θ _{j-c} = 0.833 °C/W	P _{max} = 150.0 W
2SK2611	P _d = 8 W	ΔT _c = 45.6 °C	T _c = 95.6 °C
TOSHIBA	T _j = T _c + (θ _{j-c} x P _d) =	102.3 °C	D.F. = 68.2 %

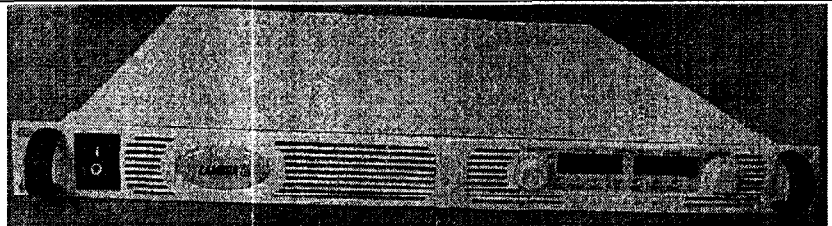
3.MAIN COMPONENTS TEMPERATURE RISE

GEN1500

Model:GEN6-200

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	35
Q506	MOSFET	25.5
Q509	MOSFET	26.9
D501	BRIDGE	31.2
D508	DIODE	30.9
D518	DIODE	43.9
D521	DIODE	64.9
T501	TRANSFORMER	65.6
T502	TRANSFORMER	72
C507	ELEC.CAP.	9.8
C509	FILM CAP.	18.9
C544	ELEC.CAP.	43.4
L301	CHOKE	26.8
L303	CHOKE	26.5
L501	CHOKE	41.3
L530	CHOKE	66.5
A502	IC	50
A504	IC	31.7

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	6V
Output Current	200A

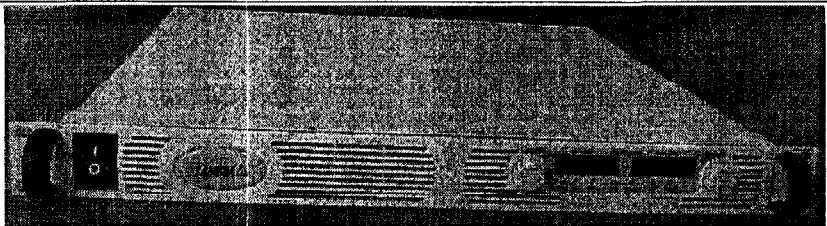
3.MAIN COMPONENTS TEMPERATURE RISE

GEN1500

Model:GEN60-25

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	37.4
Q506	MOSFET	30.6
Q509	MOSFET	34.3
D501	BRIDGE	33.6
D508	DIODE	27.9
D516	DIODE	25.9
D520	DIODE	19.2
T501	TRANSFORMER	54.3
T502	TRANSFORMER	59.5
C507	ELEC.CAP.	7.8
C509	FILM CAP.	21.7
C544	ELEC.CAP.	19.8
L301	CHOKE	29.8
L303	CHOKE	30.2
L501	CHOKE	53
L530	CHOKE	34.2
A502	IC	45.2
A504	IC	21.5

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	60V
Output Current	25A

NEMIC-LAMBDA

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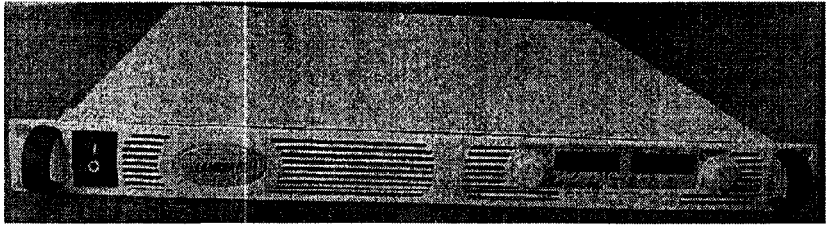
3.MAIN COMPONENTS TEMPERATURE RISE

GEN1500

Model:GEN100-15

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	38
Q506	MOSFET	40.8
Q509	MOSFET	43.9
D501	BRIDGE	33.9
D508	DIODE	27.4
D518	DIODE	16.4
D519	DIODE	22.8
T501	TRANSFORMER	51
T502	TRANSFORMER	60
C507	ELEC.CAP.	10.1
C509	FILM CAP.	30.7
C544	ELEC.CAP.	16.6
L301	CHOKE	30
L303	CHOKE	30.7
L501	CHOKE	57.5
L530	CHOKE	32.6
A502	IC	49.9
A504	IC	21.6

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	100V
Output Current	15A

NEMIC-LAMBDA

R-15

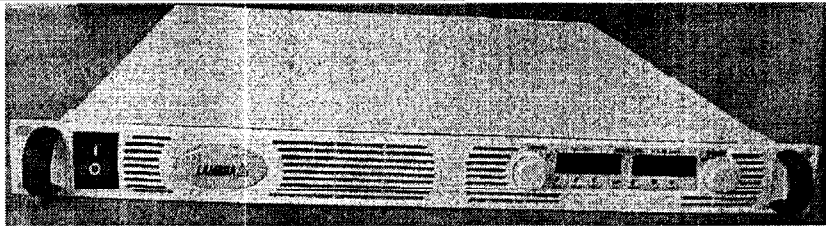
3.MAIN COMPONENTS TEMPERATURE RISE

GEN1500

Model:GEN600-2.6

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q701	MOSFET	38.2
Q706	MOSFET	38.2
Q709	MOSFET	45.6
D701	BRIDGE	36.9
D708	DIODE	26.8
D715	DIODE	40.3
D721	DIODE	36.9
T701	TRANSFORMER	55
T702	TRANSFORMER	54.6
C707	ELEC.CAP.	9.6
C709	FILM CAP.	26.1
C710	ELEC.CAP.	22.2
L301	CHOKE	37.6
L303	CHOKE	39.5
L701	CHOKE	59.7
L727	CHOKE	48.6
A702	IC	28.7
A704	IC	41.9

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	600V
Output Current	2.6A

NEMIC-LAMBDA

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4. ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION

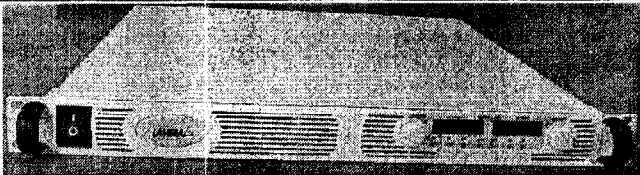
MODEL	COMPUTED LIFE (year) at Tambient		
	30°C	40°C	50°C
GEN6-200	12.4	6.2	3.1
GEN60-25	19.85	9.92	4.96
GEN100-15	27.3	13.65	6.83
GEN600-2.6	13.31	6.65	3.33

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

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

L_o- Guarantee life for Elec. capacitor

T_c- Case temperature of Elec. capacitor

Standard Mounting	
Input Voltage	100VAC

5.ABNORMAL TEST

GEN12.5-120

Condition:

Input: 115VAC

Ta: 25°C 70%RH

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hot	(6) Damaged	(7) Fuse Open	(8) V O P	(9) P C O	(10) No Output	(11) No Change	(12) Others	
1	A303	D-S	•								•			•			F302
2		D-G	•							•	•			•			F302,ZD303,A303
3		G-S	•							•				•			ZD303
4		D		•										•			
5		S		•										•			
6		G		•										•			
7	Q304	D-S	•								•						F304
8		D-G	•								•						F304
9		G-S	•														
10		D		•													
11		S		•													
12		G		•													
13	D306		•											•			
14				•													
15	D307		•											•			
16				•													
17	D308		•											•			
18				•													
19	D309		•											•			
20				•													
21	D310		•											•			
22				•													
23	D311		•													•	Low output voltage
24				•												•	
25	D312		•													•	Low output voltage
26				•												•	
27	D313		•									•					
28				•												•	
29	D314		•									•					
30				•												•	
31	D315		•													•	Low output voltage
32				•												•	
33	D316		•													•	
34				•												•	
35	C315		•							•				•			R328,R327-open
36				•												•	
37	C316		•											•			
38				•												•	
39	C318		•											•			
40				•												•	
41	C319		•											•			
42				•												•	

Condition:

Input:115VAC

Ta:25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hct	(6) Damaged	(7) Fuse Open	(8) P < O	(9) P C O	(10) No Output	(11) No Change	(12) Others	
43	C323		•							•						•	HICC-UP AFTER 5min.Low output voltage. D311,D312
44				•												•	
45	C324		•							•						•	HICC-UP AFTER 5min.Low output voltage.D311,D312
46				•												•	
47	C325		•													•	Low output voltage
48				•												•	
49	C328		•													•	HICC-UP
50				•												•	
51	C330		•													•	HICC-UP
52				•												•	
53	C332		•													•	OTP
54				•												•	
55	C340		•				•							•			D315
56				•												•	
57	C343		•													•	
58				•												•	
59	C344		•													•	
60				•												•	
61	PC301	1-2	•														
62		3-4	•														
63		1		•													
64		3		•													
65	PC302	1-2	•														
66		3-4	•														
67		1		•													
68		3		•													
69	T301	6-4	•											•			
70		2-1	•											•			
71		A-B	•											•			
72		11-8	•													•	Low output voltage
73		9-8	•													•	Low output voltage
74		7-8	•													•	Low output voltage
75		12-10	•													•	
76		6		•										•			
77		2		•										•			
78		B		•										•			
79		11		•												•	Low output voltage
80		9		•										•			
81		7		•												•	Low output voltage
82		12		•												•	
83																	
84																	

Condition:

Input: 115VAC

Ta: 25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hot	(6) Damaged	(7) Fuse Open	(8) P < C	(9) P C C	(10) No Output	(11) No Change	(12) Others	
85	Q501	D-S	•							•	•			•			F301
86		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
87		D-G	•							•	•			•			R303,4-open,Q501,Q502,R501,R502,ZD301
88		G-S	•							•	•			•			F301,Q502,ZD501,ZD502
89		D		•												•	Increased input power
90		S		•												•	
91		G		•						•	•			•			F301,Q501,Q504,Q505,A501
92	Q502	D-S	•							•	•			•			F301
93		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
94		D-G	•							•	•			•			R303,4-open,Q501,Q502,R501,R502,ZD501
95		G-S	•							•	•			•			F301,Q501,ZD501,ZD502
96		D		•												•	Increased input power
97		S		•												•	
98		G		•						•	•			•			F301,Q501,Q502,Q504,Q505,A501
99	Q506	D-S	•							•	•			•			F301,ZD501-4,D515,Q501,Q502
100		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R545,R546
101		G-S	•													•	Low output voltage
102		D		•												•	
103		S		•												•	
104		G		•						•	•					•	Low output voltage Q506,A502
105	Q507	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
106		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R547,R548
107		G-S	•													•	Low output voltage
108		D		•												•	
109		S		•												•	
110		C		•						•	•					•	Low output voltage. Q506,Q507,A502
111	Q508	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
112		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
113		G-S	•													•	Low output voltage
114		D		•												•	
115		S		•												•	
116		G		•						•	•					•	Low output voltage. Q508,A502
117	Q509	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
118		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
119		G-S	•													•	Low output voltage
120		D		•												•	
121		S		•												•	
122		G		•						•	•					•	Low output voltage. Q508,Q509,A502
123	D501	AC-AC	•							•	•			•			F301
124		AC-DC	•							•	•			•			F301,D501
125		AC		•										•			
126		DC		•										•			
127	D502		•													•	
128				•												•	

Condition:

Input:115VAC

Ta:25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hot	(6) Damaged	(7) Fuse Open	(8) V C P	(9) P C C	(10) No Output	(11) No Change	(12) Others	
129	D503		•														
130				•													
131	D504		•							•							R533,R587-open
132				•													
133	D505		•														• Increased input power
134				•													
135	D506		•														• Increased input power
136				•													
137	D507		•							•	•			•			F301,D515
138				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
139	D508		•							•	•			•			F301,D515
140				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
141	D515		•													•	
142				•												•	
143	D516		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
144				•												•	
145	D517		•														• Low output voltage
146				•												•	
147	D520		•														• Low output voltage
148				•												•	
149	D521		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
150				•												•	
151	D522		•							•							R533,R587-open
152				•												•	
153	C503		•							•	•			•			F301,D501
154				•												•	
155	C504		•							•	•			•			F301,D501
156				•												•	
157	C505		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
158				•												•	
159	C506		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
160				•												•	
161	C507		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
162				•												•	
163	C508		•							•	•			•			F301,D515
164				•												•	
165	C509		•							•	•			•			F301,D515
166				•												•	
167	C510		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
168				•												•	
169	C511		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
170				•												•	
171	C537		•							•							R581
172				•												•	

Condition:

Input: 115VAC

Ta: 25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hot	(6) Damaged	(7) Fuse Open	(8) P < O	(9) P C O	(10) No Output	(11) No Change	(12) Others	
173	C538		•							•							R582 open
174				•												•	
175	C539		•														
176				•													
177	C540		•							•							R584 open
178				•												•	
179	C542		•										•	•			
180				•												•	
181	C543		•										•	•			
182				•												•	
183	C544		•										•	•			
184				•												•	
185	PC501	1-2	•													•	
186		3-4	•											•			
187		1		•												•	
188		3		•												•	
189	PC502	1-2	•									•		•			
190		3-4	•									•		•			
191		1		•								•		•			
192		3		•								•		•			
193	T501	4-6	•							•	•			•			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
194		1-3	•							•	•			•			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
195		11,12-7,8	•					•		•				•			D507,D515,R507-8,R303,R304
196		4		•												•	Unstable output voltage
197		3		•												•	
198		11,12		•												•	Unstable output voltage
199	L501		•											•			
200				•										•			
201	L502		•													•	
202				•												•	
203	L517		•													•	
204				•												•	
205	L530		•													•	Unstable output voltage
206				•										•			
207																	
208																	
209																	
210																	
211																	
212																	

Condition:

Input:230VAC

Ta:25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
					Fire	Smoke	Burst	Smell	Red Hct	Damaged	Fuse Open	P < C	P C C	No Output	No Change	Others	
213	Q501	D-S	•							•				•		F301	
214		D-G	•							•	•			•		F301,Q501,Q502,ZD501,ZD502	
215		D-G	•							•				•		R303,4-open,Q501,Q502,R501,R502,ZD501	
216		G-S	•							•	•			•		F301,Q501,Q502,ZD501,ZD502	
217		D		•											•	Increased input power	
218		S		•											•		
219		G		•						•	•			•		F301,Q501,Q502,Q504,Q505,A501	
220	Q502	D-S	•							•	•			•		F301	
221		D-G	•							•	•			•		F301,Q501,Q502,ZD501,ZD502	
222		D-G	•							•				•		R303,4-open,Q501,Q502,R501,R502,ZD301	
223		G-S	•							•	•			•		F301,Q501,Q502,ZD501,ZD502	
224		D		•											•	Increased input power	
225		S		•											•		
226		G		•						•	•			•		F301,Q501,Q502,Q504,Q505,A501	
227	Q506	D-S	•							•	•			•		F301,ZD501-4,D515,Q501,Q502	
228		D-G	•							•	•			•		F301,ZD506,D513,D515,Q506,Q507,A502,R545,R546	
229		G-S	•												•	Low output voltage	
230		D		•											•		
231		S		•											•		
232		G		•						•					•	Low output voltage. Q506,Q507,A502	
233	Q507	D-S	•							•	•			•		F301,ZD501,2,3,4,D515,Q501,Q502	
234		D-G	•							•	•			•		F301,ZD506,D513,D515,Q506,Q507,A502,R547,R548	
235		G-S	•												•	Low output voltage	
236		D		•											•		
237		S		•											•		
238		G		•						•					•	Low output voltage. Q506,Q507,A502	
239	Q508	D-S	•							•	•			•		F301,ZD501,2,3,4,D515,Q501,Q502	
240		D-G	•							•	•			•		F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552	
241		G-S	•												•	Low output voltage	
242		D		•											•		
243		S		•											•		
244		G		•						•					•	Low output voltage. Q508,Q509,A502	
245	Q509	D-S	•							•	•			•		F301,ZD501,2,3,4,D515,Q501,Q502	
246		D-G	•							•	•			•		F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552	
247		G-S	•												•	Low output voltage	
248		D		•											•		
249		S		•											•		
250		G		•						•					•	Low output voltage. Q508,Q509,A502	
251	D501	AC-AC	•							•	•			•		F301	
252		AC-DC	•							•	•			•		F301,D501	
253		AC		•										•			
254		DC		•										•			
255	D502		•												•		
256			•												•		

Condition:

Input:230VAC

Ta:25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
					Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	P V O	P C O	No Output	No Change	Others	
257	D503		•													•	
258				•												•	
259	D504		•							•							R533,R587-open
260				•												•	
261	D505		•													•	Increased input power
262				•												•	
263	D506		•													•	Increased input power
264				•												•	
265	D507		•							•	•			•			F301,D515
266				•						•	•			•			F301,R516,R516,ZD506,D511,D516,A502
267	D508		•							•	•			•			F301,D515
268				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
269	D515		•							•						•	PF-0.6,Q501,Q502,ZD501-2,R501-4,R531,R532
270				•												•	
271	D516		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
272				•												•	
273	D517		•													•	Low output voltage
274				•												•	
275	D520		•													•	Low output voltage
276				•												•	
277	D521		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
278				•												•	
279	D522		•							•							R533,R587-open
280				•												•	
281	C503		•							•	•			•			F301,D501
282				•												•	
283	C504		•							•	•			•			F301,D501
284				•												•	
285	C505		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
286				•												•	
287	C506		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
288				•												•	
289	C507		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
290				•												•	
291	C508		•							•	•			•			F301,D515
292				•												•	
293	C509		•							•	•			•			F301,D515
294				•												•	
295	C510		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
296				•												•	
297	C511		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
298				•												•	
299	C537		•							•							R581 open
300				•												•	

Condition:

Input:230VAC

Ta:25°C 70%RH

GEN12.5-120

No	Test Position		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	(1) Fire	(2) Smoke	(3) Burst	(4) Smell	(5) Red Hot	(6) Damaged	(7) Fuse Open	(8) V P	(9) C O	(10) No Output	(11) No Change	(12) Others	
301	C538		•							•							R582 open
302				•													
303	C539		•														
304				•													
305	C540		•							•							R584 open
306				•													
307	C542		•										•	•			
308				•													
309	C543		•										•	•			
310				•													
311	C544		•										•	•			
312				•													
313	PC501	1-2	•														
314		3-4	•											•			
315		1		•													
316		3		•													
317	PC502	1-2	•									•		•			
318		3-4	•										•	•			
319		1		•									•	•			
320		3		•									•	•			
321	T501	4-6	•							•	•			•			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
322		1-3	•							•	•			•			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
323		11,12-7,8	•					•		•				•			D507,D515,R507-8,R303,R304
324		4		•													• Unstable output voltage
325		3		•													
326		11,12		•													• Unstable output voltage
327	L501		•														• Low power factor
328				•										•			
329	L502		•														
330				•													
331	L517		•														
332				•													
333	L530		•														• Unstable output voltage
334				•										•			
335																	
336																	
337																	
338																	
339																	
340																	

6. VIBRATION TEST

Model: GEN20-76

(1) Vibration test class

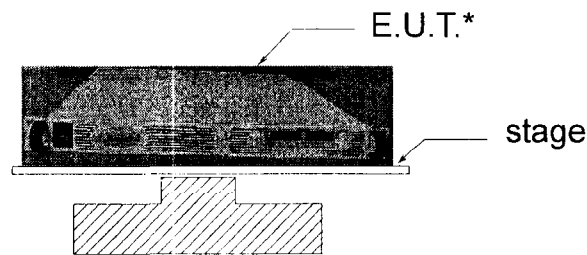
Frequency variable endurance test

(2) Equipment used

Controller: GENRAD-2503.

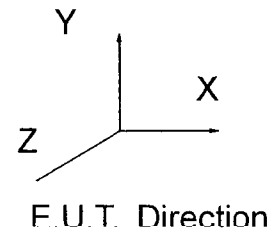
Vibrator: ULHOLTZ-DICKIE TA1000.

(3) Testing method



Test condition:

Sweep frequency 10~500HZ
 Acceleration 1.04G const.
 Direction X,Y,Z.
 Test time 1H. each



*E.U.T. is fixed to vibrator surface by mounting screws

(4) Test Result

Vin=100Vac; Iout=76A

OK NG

Check item	Vout	Ripple (mVp-p)	E.U.T.state
Initial	20.04	42	O.K.
Directions			
X	20.04	42	O.K.
Y	20.04	42	O.K.
Z	20.04	42	O.K.