GEN750 SERIES RELIABILITY DATA

DWG: IA584-79-01		
APPD	CHK	DWG
Doron P. May-15-03	Doron P. May-15-03	MICHAEL G. 25.03.2003

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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: GEN6-100

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.

$$MTBF = \frac{1}{\lambda \ equip}$$

$$= \frac{1}{\sum_{i=1}^{n} Ni(\lambda_G \pi_Q)i} \times 10^6 (Hours)$$

Where:

λ equip = Total Equipment Failure Rate (Failures /10^6 Hours)
λ_G = Generic Failure Rate For The ith Generic Part (Failure/10^6 Hours)
Ni = Quantity of ith Generic Part
n = Number of Different Generic Part Categories
π_Q = Generic Quality factor for the ith Generic Part (π_Q =1)

2. M.T.B.F. Values

G_F (GROUND, FIXED)

M.T.B.F. =52919 (HOURS)

2. Component Derating

GEN750 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

$$\Theta_{j\text{-}c} = \frac{Tj(max)-Tc}{Pc(max)} \qquad \Theta_{j\text{-}a} = \frac{Tj(max)-Ta}{Pc(max)} \qquad \Theta_{j\text{-}l} = \frac{Tj(max)-Tl}{Pc(max)}$$

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

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

Pc(max):Maximum Power Dissipation

T_j(max) :Maximum Junction temperature

$\Theta_{j\text{-}c}$: Thermal Impedance between Junction and Case

$\Theta_{j\text{-}a}$: Thermal Impedance between Junction and Air

$\Theta_{j\text{-}l}$: Thermal Impedance between Junction and lead

Vin = 100Vac Load = 100% Ta=50°C

GEN750-INPUT

A303	T_{jmax}=	150	°C	θ_{j-c} =	3.0	°C/W	P_{max} =	125.0 W
MIP0224SY	P_d =	0.4	W	ΔT_c =	11.3	°C	Tc =	61.3 °C
MATSUSHITA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				62.5	°C	D.F. =	41.7 %
A304	T_{jmax}=	150	°C	θ_{j-c} =	5.0	°C/W	P_{max} =	15.0 W
uPC24A05HF	P_d =	0.552	W	ΔT_c =	21.2	°C	Tc =	71.2 °C
NEC	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				74.0	°C	D.F. =	49.3 %
A305	T_{jmax}=	125	°C	θ_{j-a} =	180.0	°C/W	P_{max} =	0.6 W
LM78L15ACM	P_d =	0.04	W	ΔT_a =	19.5	°C	Ta =	69.5 °C
NAT. SEMI.	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				76.7	°C	D.F. =	61.4 %
A306	T_{jmax}=	150	°C	θ_{j-c} =	5.0	°C/W	P_{max} =	15.0 W
uPC7805AHF	P_d =	2	W	ΔT_c =	42.0	°C	Tc=	92.0 °C
NEC	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				102.0	°C	D.F. =	68.0 %
A307	T_{jmax}=	125	°C	θ_{j-a} =	180.0	°C/W	P_{max} =	0.6 W
LM79L15ACM	P_d =	0.04	W	ΔT_a =	18.7	°C	Ta =	68.7 °C
NAT. SEMI.	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				75.9	°C	D.F. =	60.7 %
Q301	T_{jmax}=	150	°C	θ_{j-c} =	6.3	°C/W	P_{max} =	1.0 W
2SA1244	P_d =	0.12	W	ΔT_c =	11.6	°C	Tc =	61.6 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				62.4	°C	D.F. =	41.6 %
Q304	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8.4	W	ΔT_c =	37.0	°C	Tc =	87.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				94.0	°C	D.F. =	62.7 %

Vin = 100Vac Load = 100% Ta=50°C

GEN750-control

A114	T_{jmax}=	125 °C	θ_{j-a} =	180.0	°C/W	P_{max} =	0.6	W
LM78L05ACM	P_d =	0.05 W	ΔT_a =	22.6	°C	Ta=	72.6	°C
NATIONAL	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			81.6	°C	D.F. =	65.3	%
A115 (*1)	T_{jmax}=	150 °C	θ_{j-a} =	52.5	°C/W	P_{max} =	1.5	W
P87C51RD+IA	P_d =	0.125 W	ΔT_a =	24.9	°C	Ta =	74.9	°C
PHILIPS	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			81.5	°C	D.F. =	54.3	%
A119	T_{jmax}=	150 °C	θ_{j-c} =	139.0	°C/W	P_{max} =	0.450	W
AD7705BR	P_d =	0.0065 W	ΔT_c =	16.4	°C	Tc =	66.4	°C
ANALOG DEVICES	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			67.3	°C	D.F. =	44.9	%
A120	T_{jmax}=	150 °C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471	W
MAX5541CSA	P_d =	0.002 W	ΔT_a =	16.1	°C	Ta =	66.1	°C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			66.4	°C	D.F. =	44.24	%
A122	T_{jmax}=	150 °C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471	W
MAX515CSA	P_d =	0.002 W	ΔT_a =	15.2	°C	Ta =	65.2	°C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			65.5	°C	D.F. =	43.64	%
A123	T_{jmax}=	150 °C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471	W
MAX6225BCSA	P_d =	0.009 W	ΔT_a =	18.9	°C	Ta =	68.9	°C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			70.5	°C	D.F. =	46.97	%

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

GEN6-100

D501	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	18	W	ΔT_c =	24.0	°C	Tc=	74.0 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.0	°C	D.F. =	61.3 %
D503	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	2.2	W	ΔT_c =	15.4	°C	Tc =	65.4 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				73.1	°C	D.F. =	48.7 %
D506	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	4	W	ΔT_c =	15.4	°C	Tc =	65.4 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				79.4	°C	D.F. =	52.9 %
D508	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.06	W	ΔT_c =	26.8	°C	Tc =	76.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				77.5	°C	D.F. =	51.7 %
D518	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
S60SC4M	P_d =	14	W	ΔT_c =	38.2	°C	Tc =	88.2 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				95.2	°C	D.F. =	63.5 %
D521	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
S60SC4M	P_d =	14	W	ΔT_c =	59.0	°C	Tc =	109.0 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				116.0	°C	D.F. =	77.3 %
A501	T_{jmax}=	150	°C	θ_{j-a} =	120.0	°C/W	P_{max} =	0.6 W
L4981AD	P_d =	0.2	W	ΔT_a =	23.0	°C	Ta =	73.0 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				97.0	°C	D.F. =	64.7 %
A504	T_{jmax}=	150	°C	θ_{j-c} =	20.0	°C/W	P_{max} =	1.5 W
M51995	P_d =	0.35	W	ΔT_c =	21.5	°C	Tc =	71.5 °C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				78.5	°C	D.F. =	52.3 %

Vin = 100Vac Load = 100% Ta=50°C

GEN6-100

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 =	41.9	°C	T_c =	91.9 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				105.4	°C	D.F. =	70.3 %
Q501	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	9	W	ΔT_c =	24.1	°C	T_c =	74.1 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				81.6	°C	D.F. =	54.4 %
Q506	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	6	W	ΔT_c =	23.7	°C	T_c =	73.7 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				78.7	°C	D.F. =	52.5 %
Q509	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	6	W	ΔT_c =	26.9	°C	T_c =	76.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				81.9	°C	D.F. =	54.6 %

Vin = 100Vac Load = 100% Ta=50°C

GEN60-12.5

D501	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	22	W	ΔT_c =	24.9	°C	Tc=	74.9 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				96.9	°C	D.F. =	64.6 %
D503	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	2.8	W	ΔT_c =	19.2	°C	Tc =	69.2 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				79.0	°C	D.F. =	52.7 %
D506	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	5	W	ΔT_c =	17.4	°C	Tc =	67.4 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				84.9	°C	D.F. =	56.6 %
D508	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.07	W	ΔT_c =	28.7	°C	Tc =	78.7 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				79.5	°C	D.F. =	53.0 %
D516	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20FL2C41A	P_d =	5	W	ΔT_c =	22.9	°C	Tc =	72.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				75.4	°C	D.F. =	50.3 %
D520	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20FL2C41A	P_d =	5	W	ΔT_c =	19.2	°C	Tc =	69.2 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				71.7	°C	D.F. =	47.8 %
A501	T_{jmax}=	150	°C	θ_{j-a} =	120.0	°C/W	P_{max} =	0.6 W
L4981AD	P_d =	0.2	W	ΔT_a =	23.0	°C	Ta =	73.0 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				97.0	°C	D.F. =	64.7 %
A504	T_{jmax}=	150	°C	θ_{j-c} =	20.0	°C/W	P_{max} =	1.5 W
M51995	P_d =	0.35	W	ΔT_c =	21.5	°C	Tc =	71.5 °C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				78.5	°C	D.F. =	52.3 %

Vin = 100Vac Load = 100% Ta=50°C

GEN60-12.5

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	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				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 =	26.8	°C	T_c =	76.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				86.0	°C	D.F. =	57.3 %
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 =	36.3	°C	T_c =	86.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.5	°C	D.F. =	61.7 %
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 =	36.5	°C	T_c =	86.5 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.7	°C	D.F. =	61.8 %

Vin = 100Vac Load = 100% Ta=50°C

GEN100-7.5

D501	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	22	W	ΔT_c =	24.9	°C	Tc=	74.9 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				96.9	°C	D.F. =	64.6 %
D503	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	2.8	W	ΔT_c =	19.5	°C	Tc =	69.5 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				79.3	°C	D.F. =	52.9 %
D506	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	5	W	ΔT_c =	19.4	°C	Tc =	69.4 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				86.9	°C	D.F. =	57.9 %
D508	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.07	W	ΔT_c =	33.5	°C	Tc =	83.5 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				84.3	°C	D.F. =	56.2 %
D518	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20GL2C41A	P_d =	8.2	W	ΔT_c =	15.3	°C	Tc =	65.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				69.4	°C	D.F. =	46.3 %
D519	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20GL2C41A	P_d =	8.2	W	ΔT_c =	22.5	°C	Tc =	72.5 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				76.6	°C	D.F. =	51.1 %
A501	T_{jmax}=	150	°C	θ_{j-a} =	120.0	°C/W	P_{max} =	0.6 W
L4981AD	P_d =	0.2	W	ΔT_a =	24.9	°C	Ta =	74.9 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				98.9	°C	D.F. =	65.9 %
A504	T_{jmax}=	150	°C	θ_{j-c} =	20.0	°C/W	P_{max} =	1.5 W
M51995	P_d =	0.35	W	ΔT_c =	19.2	°C	Tc =	69.2 °C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				76.2	°C	D.F. =	50.8 %

Vin = 100Vac Load = 100% Ta=50°C

GEN100-7.5

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 =	49.5	°C	Tc =	99.5 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				113.0	°C	D.F. =	75.3 %
Q501	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	11	W	ΔT_c =	26.8	°C	Tc =	76.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				86.0	°C	D.F. =	57.3 %
Q506	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8.2	W	ΔT_c =	43.8	°C	Tc =	93.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				100.6	°C	D.F. =	67.1 %
Q509	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8.2	W	ΔT_c =	46.7	°C	Tc =	96.7 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				103.5	°C	D.F. =	69.0 %

Vin = 100Vac Load = 100% Ta=50°C

GEN600-1.3

D701	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	23	W	ΔT_c =	26.5	°C	Tc=	76.5 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				99.5	°C	D.F. =	66.3 %
D703	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	3	W	ΔT_c =	24.2	°C	Tc =	74.2 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				84.7	°C	D.F. =	56.5 %
D706	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	5.5	W	ΔT_c =	23.0	°C	Tc =	73.0 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.3	°C	D.F. =	61.5 %
D708	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.07	W	ΔT_c =	24.9	°C	Tc =	74.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				75.7	°C	D.F. =	50.5 %
D715	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
5JLZ47A	P_d =	2.1	W	ΔT_c =	27.1	°C	Tc =	77.1 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				78.2	°C	D.F. =	52.1 %
D721	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
5JLZ47A	P_d =	1	W	ΔT_c =	26.8	°C	Tc =	76.8 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				77.3	°C	D.F. =	51.5 %
A701	T_{jmax}=	150	°C	θ_{j-a} =	120.0	°C/W	P_{max} =	0.6 W
L4981AD	P_d =	0.2	W	ΔT_a =	24.9	°C	Ta =	74.9 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				98.9	°C	D.F. =	65.9 %
A704	T_{jmax}=	150	°C	θ_{j-c} =	27.0	°C/W	P_{max} =	1.0 W
UC3706DW	P_d =	0.5	W	ΔT_c =	34.4	°C	Tc =	84.4 °C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				97.9	°C	D.F. =	65.3 %

Vin = 100Vac Load = 100% Ta=50°C

GEN600-1.3

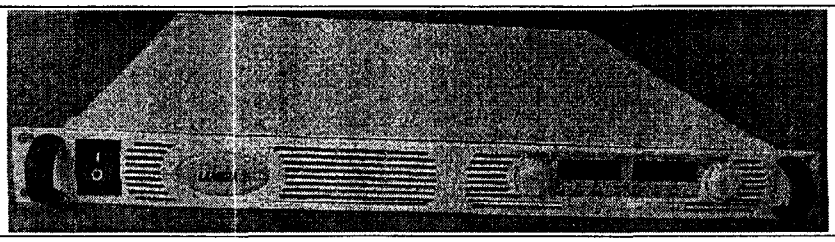
A702	T_{jmax}=	150	°C	θ_{j-c} =	20.0	°C/W	P_{max} =	1.5 W
M51995	P_d =	0.35	W	ΔT_c =	23.0	°C	Tc =	73.0 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				80.0	°C	D.F. =	53.3 %
Q701	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	11.5	W	ΔT_c =	28.7	°C	Tc =	78.7 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				88.3	°C	D.F. =	58.9 %
Q706	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8	W	ΔT_c =	34.4	°C	Tc =	84.4 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				91.1	°C	D.F. =	60.7 %
Q709	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8	W	ΔT_c =	40.1	°C	Tc =	90.1 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				96.8	°C	D.F. =	64.5 %

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GEN6-100

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	24.1
Q506	MOSFET	23.7
Q509	MOSFET	26.9
D501	BRIDGE	24
D508	DIODE	26.8
D518	DIODE	38.2
D521	DIODE	59
T501	TRANSFORMER	54.8
T502	TRANSFORMER	63
C507	ELEC.CAP.	5.9
C509	FILM CAP.	21.2
C544	ELEC.CAP.	35.9
L301	CHOKE	26.8
L303	CHOKE	23
L501	CHOKE	38.7
L530	CHOKE	52.5
A502	IC	41.9
A504	IC	21.5

Conditions:

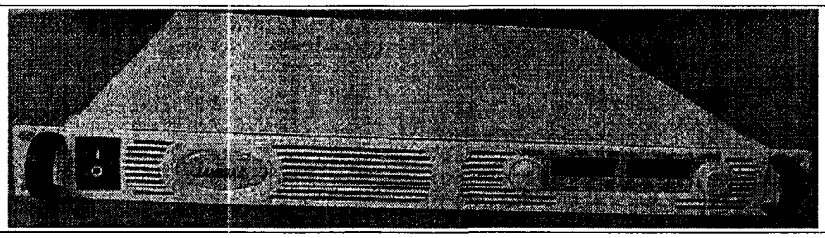
Standard Mounting	
Input Voltage	100VAC
Output Voltage	6V
Output Current	100A

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GEN60-12.5

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	26.8
Q506	MOSFET	36.3
Q509	MOSFET	36.5
D501	BRIDGE	24.9
D508	DIODE	28.7
D516	DIODE	22.9
D520	DIODE	19.2
T501	TRANSFORMER	49.3
T502	TRANSFORMER	59.2
C507	ELEC.CAP.	7.8
C509	FILM CAP.	21.2
C544	ELEC.CAP.	15.3
L301	CHOKE	33.2
L303	CHOKE	33.5
L501	CHOKE	51.2
L530	CHOKE	28.1
A502	IC	45.2
A504	IC	21.5

Conditions:

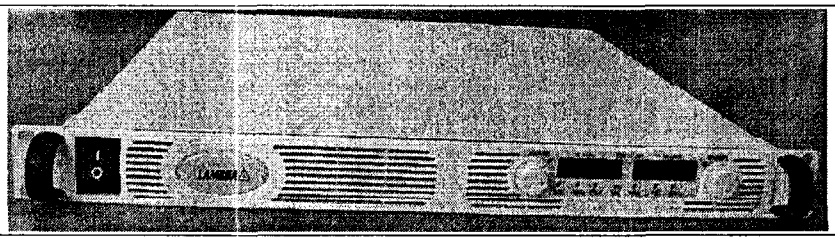
Standard Mounting	
Input Voltage	100VAC
Output Voltage	60V
Output Current	12.5A

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GEN100-7.5

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	26.8
Q506	MOSFET	43.8
Q509	MOSFET	46.7
D501	BRIDGE	24.9
D508	DIODE	33.5
D518	DIODE	15.3
D519	DIODE	22.5
T501	TRANSFORMER	36.3
T502	TRANSFORMER	45.6
C507	ELEC.CAP.	7
C509	FILM CAP.	23
C544	ELEC.CAP.	15
L301	CHOKE	35.3
L303	CHOKE	33.9
L501	CHOKE	32.6
L530	CHOKE	42
A502	IC	49.5
A504	IC	19.2

Conditions:

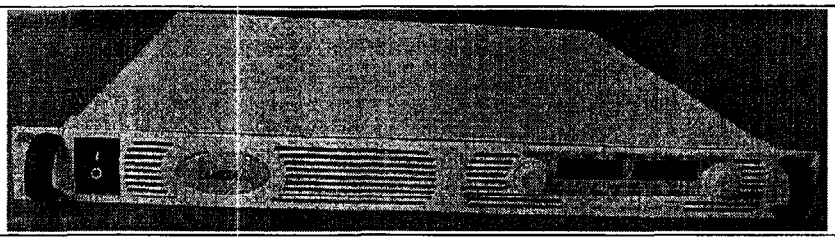
Standard Mounting	
Input Voltage	100VAC
Output Voltage	100V
Output Current	7.5A

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GEN600-1.3

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q701	MOSFET	28.7
Q706	MOSFET	34.4
Q709	MOSFET	40.1
D701	BRIDGE	26.5
D708	DIODE	24.9
D715	DIODE	27.1
D721	DIODE	26.8
T701	TRANSFORMER	46
T702	TRANSFORMER	52.8
C707	ELEC.CAP.	8.6
C709	FILM CAP.	23
C710	ELEC.CAP.	9.6
L301	CHOKE	34.6
L303	CHOKE	33.3
L701	CHOKE	47.6
L727	CHOKE	39.6
A702	IC	23
A704	IC	34.4

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	600V
Output Current	1.3A

4. ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION

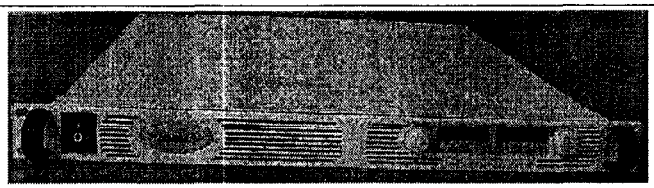
MODEL	COMPUTED LIFE (year) at Tambient		
	30°C	40°C	50°C
GEN6-100	15.1	7.6	3.8
GEN60-12.5	53.3	26.7	13.3
GEN100-7.5	60.0	30.0	15.0
GEN600-1.3	45.8	22.9	11.4

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

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

Lo- Guarantee life for Elec.capacitor

Tc- Case temperature of Elec. capacitor

Standard Mounting	
Input Voltage	100VAC

5.ABNORMAL TEST

GEN12.5-60

Condition:

Input:115VAC Ta:25°C 70%RH

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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

GEN12.5-60

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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:

GEN12.5-60

Input:115VAC Ta:25°C 70%RH

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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 voltageQ506,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		G		•						•						•	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

GEN12.5-60

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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

GEN12.5-60

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	O V P	O C P	No Output	No Change	Others	Note
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

GEN12.5-60

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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

GEN12.5-60

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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,R545,R546,ZD506,D514,D515,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:

GEN12.5-60

Input:230VAC Ta:25°C 70%RH

No	Test Position		Test Mode		Test Result												
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
	Location No.	Test Point	Short	Open	Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	No Output	No Change	Others	Note
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:GEN20-38

(1) Vibration test class

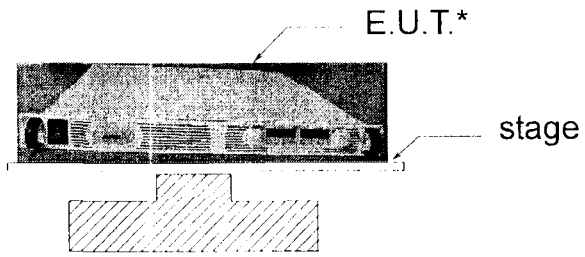
Frequency variable endurance test

(2) Equipment used

Controller: GENRAD-2503.

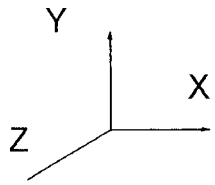
Vibrator: ULHOLTZ-DICKIE TA1000.

(3) Testing method



Test condition:

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



E.U.T. Direction

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

(4) Test Result

Vin=100Vac;Iout=38A (OK) NG

Check item	Vout	Ripple (mVp-p)	E.U.T.state
Initial / Directions	20.02	41	O.K.
X	20.02	41	O.K.
Y	20.02	41	O.K.
Z	20.02	41	O.K.