GENH SERIES
RELIABILITY DATA

DWG: IA598-79-01		
APPD	CHK	DWG
Dorow P. Sep-3-03	18.06.03	MICHAEL G. 18.06.2003

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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.

M.T.B.F.

MODEL: GENH8-90

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.

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

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

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. =52835 (HOURS)

2. Component Derating

GENH SERIES

(1) Calculation method

(a) Condition

Input :	100Vac,
Output:	Vout - 100%,Iout - 100%,
Ambient temperature:	50℃
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℃ in General

Ta : Ambient Temperature at Start Point of Derating; 25℃ 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

GENH-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 =	25.0	°C	T_c =	75.0	°C
MATSUSHITA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				76.2	°C	D.F. =	50.8	%
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 =	36.9	°C	T_c =	86.9	°C
NEC	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				89.7	°C	D.F. =	59.8	%
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 =	29.9	°C	T_a =	79.9	°C
NAT. SEMI.	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				87.1	°C	D.F. =	69.7	%
A306	T_{jmax}=	150	°C	θ_{j-c} =	5.0	°C/W	P_{max} =	15.0	W
uPC7805AHF	P_d =	2	W	ΔT_c =	42.1	°C	T_c=	92.1	°C
NEC	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				102.1	°C	D.F. =	68.1	%
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 =	27.4	°C	T_a =	77.4	°C
NAT. SEMI.	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				84.6	°C	D.F. =	67.7	%
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 =	10.5	°C	T_c =	60.5	°C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				61.3	°C	D.F. =	40.8	%
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 =	39.6	°C	T_c =	89.6	°C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				96.6	°C	D.F. =	64.4	%

Vin = 100Vac Load = 100% Ta=50°C

GENH -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_c =	29.2	°C	Ta=	79.2 °C
NATIONAL	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				88.2	°C	D.F. =	70.6 %
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_c =	32.4	°C	Ta =	82.4 °C
PHILIPS	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				89.0	°C	D.F. =	59.3 %
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 =	29.4	°C	Tc =	79.4 °C
ANALOG	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				80.3	°C	D.F. =	53.5 %
A120	T_{jmax}=	150	°C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471 W
MAX5541CSA	P_d =	0.002	W	ΔT_c =	30.3	°C	Ta =	80.3 °C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				80.6	°C	D.F. =	53.8 %
A122	T_{jmax}=	150	°C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471 W
MAX515CSA	P_d =	0.002	W	ΔT_c =	29.1	°C	Ta =	79.1 °C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				79.4	°C	D.F. =	53.0 %
A123	T_{jmax}=	150	°C	θ_{j-a} =	173.0	°C/W	P_{max} =	0.471 W
MAX6225BCSA	P_d =	0.009	W	ΔT_c =	31.5	°C	Ta =	81.5 °C
MAXIM	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				83.1	°C	D.F. =	55.4 %

Note:

(*1) -- As θ_{j-a} is taken highest value for PLCC44 (Thermal Design Considerations, Philips Semiconductors, Fig.33), because die size information is unavailable.

Vin = 100Vac Load = 100% Ta=50°C

GENH 8-90

D501	T_{jmax}=	150 °C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0	W
D25XB60H	P_d =	18 W	ΔT_c =	27.1	°C	Tc=	77.1	°C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			95.1	°C	D.F. =	63.4	%
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 =	28.5	°C	Tc =	78.5	°C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			86.2	°C	D.F. =	57.5	%
D506	T_{jmax}=	150 °C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5	W
YG902C3R	P_d =	4 W	ΔT_c =	26.8	°C	Tc =	76.8	°C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			90.8	°C	D.F. =	60.5	%
D508	T_{jmax}=	150 °C	θ_{j-c} =	12.0	°C/W	P_{max} =		W
2NU41	P_d =	0.06 W	ΔT_c =	38.5	°C	Tc =	88.5	°C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			89.2	°C	D.F. =	59.5	%
D518	T_{jmax}=	150 °C	θ_{j-c} =	0.5	°C/W	P_{max} =		W
S60SC4M	P_d =	14 W	ΔT_c =	48.7	°C	Tc =	98.7	°C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			105.7	°C	D.F. =	70.5	%
D521	T_{jmax}=	150 °C	θ_{j-c} =	0.5	°C/W	P_{max} =		W
S60SC4M	P_d =	14 W	ΔT_c =	66.7	°C	Tc =	116.7	°C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			123.7	°C	D.F. =	82.5	%
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 =	27.0	°C	Ta =	77.0	°C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =			101.0	°C	D.F. =	67.3	%
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 =	31.5	°C	Tc =	81.5	°C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =			88.5	°C	D.F. =	59.0	%

Vin = 100Vac Load = 100% Ta=50°C

GENH 8-90

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 =	41.0	°C	T_c =	91.0 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				104.5	°C	D.F. =	69.7 %
Q501	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	9	W	ΔT_c =	34.1	°C	T_c =	84.1 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.5	°C	D.F. =	61.7 %
Q506	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	6.0	W	ΔT_c =	37.0	°C	T_c =	87.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				92.0	°C	D.F. =	61.3 %
Q509	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	6	W	ΔT_c =	40.4	°C	T_c =	90.4 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				95.4	°C	D.F. =	63.6 %

Vin = 100Vac Load = 100% Ta=50°C

GENH60-12.5

D501	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	22	W	ΔT_c =	31.2	°C	Tc=	81.2 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				103.2	°C	D.F. =	68.8 %
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 =	28.5	°C	Tc =	78.5 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				88.3	°C	D.F. =	58.9 %
D506	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	5	W	ΔT_c =	26.7	°C	Tc =	76.7 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				94.2	°C	D.F. =	62.8 %
D508	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.07	W	ΔT_c =	27.4	°C	Tc =	77.4 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				78.2	°C	D.F. =	52.2 %
D516	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20FL2C41A	P_d =	5	W	ΔT_c =	24.6	°C	Tc =	74.6 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				77.1	°C	D.F. =	51.4 %
D520	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
20FL2C41A	P_d =	5	W	ΔT_c =	24.1	°C	Tc =	74.1 °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 =	25.5	°C	Ta =	75.5 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				99.5	°C	D.F. =	66.3 %
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

GENH60-12.5

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 =	41.4	°C	Tc =	91.4 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				104.9	°C	D.F. =	69.9 %
Q501	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	11	W	ΔT_c =	34.3	°C	Tc =	84.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				93.5	°C	D.F. =	62.3 %
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 =	37.6	°C	Tc =	87.6 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				93.8	°C	D.F. =	62.5 %
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 =	44.3	°C	Tc =	94.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				100.5	°C	D.F. =	67.0 %

Vin = 100Vac Load = 100% Ta=50°C

GENH 300-2.5

D701	T_{jmax}=	150	°C	θ_{j-c} =	1.0	°C/W	P_{max} =	60.0 W
D25XB60H	P_d =	22	W	ΔT_c =	32.8	°C	Tc=	82.8 °C
SHINDENGEN	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				104.8	°C	D.F. =	69.9 %
D703	T_{jmax}=	150	°C	θ_{j-c} =	3.5	°C/W	P_{max} =	7.5 W
YG902C3R	P_d =	2.8	W	ΔT_c =	25.0	°C	Tc =	75.0 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				84.8	°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	W	ΔT_c =	21.9	°C	Tc =	71.9 °C
FUJI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				89.4	°C	D.F. =	59.6 %
D708	T_{jmax}=	150	°C	θ_{j-c} =	12.0	°C/W	P_{max} =	W
2NU41	P_d =	0.07	W	ΔT_c =	33.3	°C	Tc =	83.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				84.1	°C	D.F. =	56.1 %
D715	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
5JLZ47A	P_d =	1	W	ΔT_c =	30.9	°C	Tc =	80.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				81.4	°C	D.F. =	54.3 %
D720	T_{jmax}=	150	°C	θ_{j-c} =	0.5	°C/W	P_{max} =	W
5JLZ47A	P_d =	3.1	W	ΔT_c =	29.3	°C	Tc =	79.3 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				80.9	°C	D.F. =	53.9 %
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 =	26.1	°C	Ta =	76.1 °C
ST	$T_j = T_a + (\theta_{j-a} \times P_d)$ =				100.1	°C	D.F. =	66.7 %
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 =	28.3	°C	Tc =	78.3 °C
MITSUBISHI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				85.3	°C	D.F. =	56.9 %

Vin = 100Vac Load = 100% Ta=50°C

GENH 300-2.5

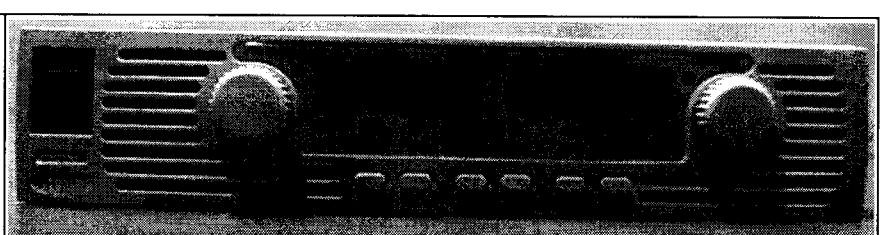
A704	T_{jmax}=	150	°C	θ_{j-c} =	27.0	°C/W	P_{max} =	1.0 W
UC3706DW	P_d =	0.5	W	ΔT_c =	43.6	°C	T_c =	93.6 °C
TI	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				107.1	°C	D.F. =	71.4 %
Q701	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2837	P_d =	11	W	ΔT_c =	24.0	°C	T_c =	74.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				83.2	°C	D.F. =	55.5 %
Q707	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8.2	W	ΔT_c =	40.0	°C	T_c =	90.0 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				96.8	°C	D.F. =	64.5 %
Q709	T_{jmax}=	150	°C	θ_{j-c} =	0.833	°C/W	P_{max} =	150.0 W
2SK2611	P_d =	8.2	W	ΔT_c =	43.9	°C	T_c =	93.9 °C
TOSHIBA	$T_j = T_c + (\theta_{j-c} \times P_d)$ =				100.7	°C	D.F. =	67.2 %

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GENH8-90

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q501	MOSFET	34.1
Q506	MOSFET	37
Q509	MOSFET	40.4
D501	BRIDGE	27.1
D508	DIODE	38.5
D518	DIODE	48.7
D521	DIODE	66.7
T501	TRANSFORMER	69.2
T502	TRANSFORMER	80.0
C507	ELEC.CAP.	13
C509	FILM CAP.	37
C544	ELEC.CAP.	41.9
L301	CHOKE	35.3
L303	CHOKE	34.6
L501	CHOKE	35.8
L530	CHOKE	60.3
A502	IC	41
A504	IC	31.5

Conditions:

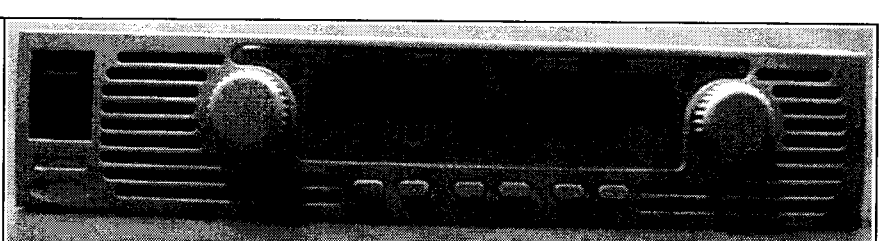
Standard Mounting	
Input Voltage	100VAC
Output Voltage	8V
Output Current	90A

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GENH60-12.5

Location No.	Parts Name	DT Temperature Rise (℃)
		Standard Mounting
Q501	MOSFET	34.3
Q506	MOSFET	37.6
Q509	MOSFET	44.3
D501	BRIDGE	31.2
D508	DIODE	27.4
D516	DIODE	24.6
D520	DIODE	24.1
T501	TRANSFORMER	45.4
T502	TRANSFORMER	56.8
C507	ELEC.CAP.	10.3
C509	FILM CAP.	22.9
C544	ELEC.CAP.	18.7
L301	CHOKE	36.9
L303	CHOKE	42.1
L501	CHOKE	51
L530	CHOKE	26.7
A502	IC	41.4
A504	IC	32

Conditions:

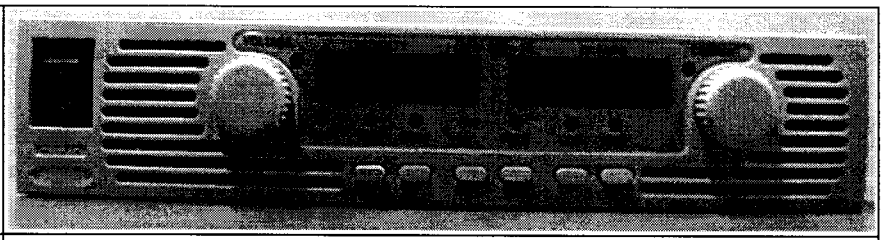
Standard Mounting	
Input Voltage	100VAC
Output Voltage	60V
Output Current	12.5A

3.MAIN COMPONENTS TEMPERATURE RISE

Model:GENH300-2.5

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q701	MOSFET	24
Q706	MOSFET	33.8
Q709	MOSFET	43.9
D701	BRIDGE	32.8
D708	DIODE	33.3
D715	DIODE	30.9
D720	DIODE	29.3
T701	TRANSFORMER	65.8
T702	TRANSFORMER	67
C707	ELEC.CAP.	9.9
C709	FILM CAP.	25.4
C710	ELEC.CAP.	12.2
L301	CHOKE	32.8
L303	CHOKE	38.5
L701	CHOKE	33.9
L727	CHOKE	34.8
A702	IC	28.3
A704	IC	43.6

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	300V
Output Current	2.5A

4. ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION

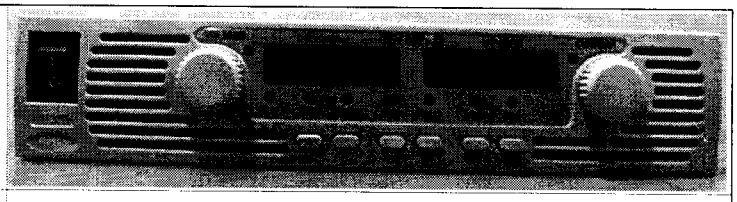
MODEL	COMPUTED LIFE (year) at Tambient		
	30°C	40°C	50°C
GENH8-90	15.85	7.93	3.96
GENH60-12.5	28.27	14.13	7.07
GENH300-2.5	26.61	13.31	6.65

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

Condition:

Input:115VAC Ta:25°C 70%RH

GENH 60-12.5

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
4		G-S	●											●			
5		D		●										●			
6		S		●										●			
7		G		●										●			
8	Q304	D-S	●								●				●		F304-opened. No output change
9		D-G	●								●				●		F304-opened. No output change
11		G-S	●												●		
12		D		●											●		
13		S		●											●		
14		G		●											●		
15	D306		●											●			
16				●											●		
17	D307		●											●			
18				●											●		
19	D308		●											●			
20				●											●		
21	D309		●											●			
22				●											●		
23	D310		●											●			
24				●											●		
25	D311		●													●	Low output voltage
26				●											●		
27	D312		●													●	Low output voltage
28				●											●		
29	D313		●									●					
30				●											●		
31	D314		●									●					
32				●											●		
33	D315		●											●			
34				●											●		
35	D316		●												●		
36				●											●		
37	C315		●							●				●			R328,R327-open
38				●											●		
39	C316		●											●			
40				●											●		
41	C318		●					●		●				●			D309,310-Short
42				●											●		

Condition:

Input:115VAC Ta:25°C 70%RH

GENH 60-12.5

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 D311,D312-Short
44				●											●		
45	C325		●													●	Low output voltage
46				●											●		
47	C328		●													●	HICC-UP
48				●											●		
49	C330		●													●	HICC-UP
50				●											●		
51	C332		●												●	●	OTP
52				●											●		
53	C340		●											●			
54				●											●		
55	C344		●					●		●						●	After 1min.P.S.-Shut-off.D316-Short
56				●											●		
57	PC301	1-2	●											●			
58		3-4	●												●		
59		1		●										●			
60		3		●										●			
61	PC302	1-2	●												●		
62		3-4	●											●			
63		1		●											●		
64		3		●											●		
65	T301	6-4	●											●			
66		2-1	●											●			
67		A-B	●											●			
68		11-8	●													●	Low output voltage
69		9-8	●											●			
70		7-8	●											●			
71		12-10	●												●		
72		6		●										●			
73		2		●										●			HICC-UP
74		B		●										●			
75		11		●										●			
76		9		●										●			
77		7		●										●			
78		12		●											●		
79																	
80																	

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	Q501	D-S	•								•			•			F301
2		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
3		D-G	•							•				•			R303,4-open,Q501,Q502,R501,R502,ZD301
4		G-S	•							•	•			•			F301,Q502,ZD501,ZD502
5		D		•												•	Increased input power
6		S		•											•		
7		G		•						•	•			•			F301,Q501,Q504,Q505,A501
8	Q502	D-S	•								•			•			F301
9		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
10		D-G	•							•				•			R303,4-open,Q501,Q502,R501,R502,ZD501
11		G-S	•							•	•			•			F301,Q501,ZD501,ZD502
12		D		•												•	Increased input power
13		S		•											•		
14		G		•						•	•			•			F301,Q501,Q502,Q504,Q505,A501
15	Q506	D-S	•							•	•			•			F301,ZD501-4,D515,Q501,Q502
16		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R545,R546
17		G-S	•													•	Low output voltage
18		D		•											•		
19		S		•											•		
20		G		•						•						•	Low output voltageQ506,A502
21	Q507	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
22		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R547,R548
23		G-S	•													•	Low output voltage
24		D		•											•		
25		S		•											•		
26		G		•						•						•	Low output voltage. Q506,Q507,A502
27	Q508	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
28		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
29		G-S	•													•	Low output voltage
30		D		•											•		
31		S		•											•		
32		G		•						•						•	Low output voltage. Q508,A502
33	Q509	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
34		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
35		G-S	•													•	Low output voltage
36		D		•											•		
37		S		•											•		
38		G		•						•						•	Low output voltage. Q508,Q509,A502
39	D501	AC-AC	•								•			•			F301
40		LN - "+"	•								•			•			F301
41		LN - "-"	•								•			•			F301
42		N - "+"	•								•			•			F301
43		N - "-"	•								•			•			F301
44		AC		•										•			
45		DC		•										•			
46	D502		•												•		
47				•											•		

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
48	D503		•												•		
49				•											•		
50	D504		•							•					•		R533,R587-open,no output change
51				•											•		
52	D505		•													•	Increased input power
53				•											•		
54	D506		•													•	Increased input power
55				•											•		
56	D507		•							•	•			•			F301,D515
57				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
58	D508		•							•	•			•			F301,D515
59				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
60	D515		•												•		
61				•											•		
62	D516		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
63				•											•		
64	D517		•													•	Low output voltage
65				•											•		
66	D520		•													•	Low output voltage
67				•											•		
68	D521		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
69				•											•		
70	D522		•							•							R533,R587-open
71				•											•		
72	C503		•							•	•			•			F301,D501
73				•											•		
74	C504		•							•	•			•			F301,D501
75				•											•		
76	C505		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
77				•											•		
78	C506		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
79				•											•		
80	C507		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
81				•											•		
82	C508		•							•	•			•			F301,D515
83				•											•		
84	C509		•							•	•			•			F301,D515
85				•											•		
86	C510		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
87				•											•		
88	C511		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
89				•											•		
90	C537		•							•					•		R581,no output change
91				•											•		

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
92	C538		●							●							R582 open
93				●											●		
94	C539		●							●							R582 open
95				●											●		
96	C540		●							●							R584 open
97				●											●		
98	C542		●										●	●			
99				●											●		
100	C543		●										●	●			
101				●											●		
102	C544		●										●	●			
103				●											●		
104	PC501	1-2	●												●		
105		3-4	●											●			
106		1		●											●		
107		3		●											●		
108	PC502	1-2	●									●		●			
109		3-4	●									●		●			
110		1		●								●		●			
111		3		●								●		●			
112	T501	4-6	●							●	●			●			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
113		1-3	●							●	●			●			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
114		11,12-7,8	●					●		●				●			D507,D515,R507-8,R303,R304
115		4		●												●	Unstable output voltage
116		3		●											●		
117		11,12		●												●	Unstable output voltage
118	L501		●											●			
119				●										●			
120	L502		●												●		
121				●											●		
122	L517		●												●		
123				●											●		
124	L530		●													●	Unstable output voltage
125				●										●			
126																	
127																	
128																	
129																	
130																	
131																	

Condition:

Input:230VAC Ta:25°C 70%RH

GENH 60-12.5

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	Q501	D-S	•								•			•			F301
2		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
3		D-G	•							•				•			R303,4-open,Q501,Q502,R501,R502,ZD501
4		G-S	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
5		D		•												•	Increased input power
6		S		•											•		
7		G		•						•	•			•			F301,Q501,Q502,Q504,Q505,A501
8	Q502	D-S	•								•			•			F301
9		D-G	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
10		D-G	•							•				•			R303,4-open,Q501,Q502,R501,R502,ZD301
11		G-S	•							•	•			•			F301,Q501,Q502,ZD501,ZD502
12		D		•												•	Increased input power
13		S		•											•		
14		G		•						•	•			•			F301,Q501,Q502,Q504,Q505,A501
15	Q506	D-S	•							•	•			•			F301,ZD501-4,D515,Q501,Q502
16		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R545,R546
17		G-S	•													•	Low output voltage
18		D		•											•		
19		S		•											•		
20		G		•						•						•	Low output voltage. Q506,Q507,A502
21	Q507	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
22		D-G	•							•	•			•			F301,ZD506,D513,D515,Q506,Q507,A502,R547,R548
23		G-S	•													•	Low output voltage
24		D		•											•		
25		S		•											•		
26		G		•						•						•	Low output voltage. Q506,Q507,A502
27	Q508	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
28		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
29		G-S	•													•	Low output voltage
30		D		•											•		
31		S		•											•		
32		G		•						•						•	Low output voltage. Q508,Q509,A502
33	Q509	D-S	•							•	•			•			F301,ZD501,2,3,4,D515,Q501,Q502
34		D-G	•							•	•			•			F301,ZD506,D514,D515,Q508,Q509,A502,R551,R552
35		G-S	•													•	Low output voltage
36		D		•											•		
37		S		•											•		
38		G		•						•						•	Low output voltage. Q508,Q509,A502
39	D501	AC-AC	•								•			•			F301
40		LN - "+"	•								•			•			F301
41		LN - "-"	•								•			•			F301
42		N - "+"	•								•			•			F301
43		N - "-"	•								•			•			F301
44		AC		•										•			
45		DC		•										•			
46	D502		•												•		
47				•											•		

Condition:

Input:230VAC Ta:25°C 70%RH

GENH 60-12.5

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
48	D503		•												•		
49				•											•		
50	D504		•							•							R533,R587-open
51				•											•		
52	D505		•													•	Increased input power
53				•											•		
54	D506		•													•	Increased input power
55				•											•		
56	D507		•							•	•			•			F301,D515
57				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
58	D508		•							•	•			•			F301,D515
59				•						•	•			•			F301,R545,R546,ZD506,D514,D515,A502
60	D515		•							•						•	PF-0.6,Q501,Q502,ZD501-2,R501-4,R531,R532
61				•											•		
62	D516		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
63				•											•		
64	D517		•													•	Low output voltage
65				•											•		
66	D520		•													•	Low output voltage
67				•											•		
68	D521		•							•	•			•			F301,Q506-7,A504,A502,ZD503,ZD504,D514
69				•											•		
70	D522		•							•							R533,R587-open
71				•											•		
72	C503		•							•	•			•			F301,D501
73				•											•		
74	C504		•							•	•			•			F301,D501
75				•											•		
76	C505		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
77				•											•		
78	C506		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
79				•											•		
80	C507		•							•	•			•			F301,Q501,Q502,D515,ZD501,ZD502
81				•											•		
82	C508		•							•	•			•			F301,D515
83				•											•		
84	C509		•							•	•			•			F301,D515
85				•											•		
86	C510		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
87				•											•		
88	C511		•							•	•			•			F301,ZD501-4,D515,Q501,Q502
89				•											•		
90	C537		•							•							R581 open
91				•											•		

Condition:

Input:230VAC Ta:25°C 70%RH

GENH 60-12.5

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
92	C538		●							●							R582 open
93				●											●		
94	C539		●							●							R582 open
95				●											●		
96	C540		●							●							R584 open
97				●											●		
98	C542		●										●	●			
99				●											●		
100	C543		●										●	●			
101				●											●		
102	C544		●										●	●			
103				●											●		
104	PC501	1-2	●												●		
105		3-4	●											●			
106		1		●											●		
107		3		●											●		
108	PC502	1-2	●									●		●			
109		3-4	●									●		●			
110		1		●								●		●			
111		3		●								●		●			
112	T501	4-6	●							●	●			●			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
113		1-3	●							●	●			●			F301,Q501-2,6-7,R545-8,ZD506,D513,A501-2,4
114		11,12-7,8	●					●		●				●			D507,D515,R507-8,R303,R304
115		4		●												●	Unstable output voltage
116		3		●											●		
117		11,12		●												●	Unstable output voltage
118	L501		●													●	Low power factor
119				●										●			
120	L502		●												●		
121				●											●		
122	L517		●												●		
123				●											●		
124	L530		●													●	Unstable output voltage
125				●										●			
126																	
127																	
128																	
129																	
130																	
131																	

6. VIBRATION TEST

Model:GEN6-100

(1) Vibration test class

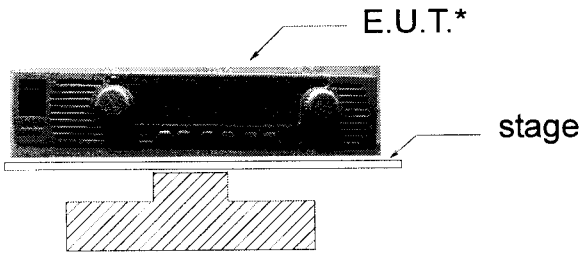
Frequency variable endurance test

(2) Equipment used

Controller: GENRAD-2503.

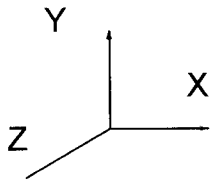
Vibrator: ULHOLTZ-DICKIE TA1000.

(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
Directions \ Initial	6.004	22	O.K.
X	6.004	22	O.K.
Y	6.004	22	O.K.
Z	6.004	22	O.K.