

ZUP-400 SERIES RELIABILITY DATA

DWG: IA549-79-01			
QA APPD	APPD	CHK	DWG
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oct-21-99	Oct-21-99	2" a' d' n' J	20. 10. 1999

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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: ZUP 6-66

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. = 78811 (HOURS)

2. Component Derating

Model:ZUP 6-66

(1) Calculation method

(a) Condition

Input :	100Vac , 200Vac
Output :	6V 66A (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

Vin = 100Vac

Load = 100%

Ta=50°C

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Q101 2SK2699 TOSHIBA	T _{jmax} = 150 °C P _d = 13 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 23.5 °C 84.3 °C	P _{max} = 150.0 W T _c = 73.5 °C D.F. = 56.2 %
Q102 2SK2699 TOSHIBA	T _{jmax} = 150 °C P _d = 13 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 24.9 °C 85.7 °C	P _{max} = 150.0 W T _a = 74.9 °C D.F. = 57.1 %
Q103 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 11 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 24.1 °C 83.3 °C	P _{max} = 150.0 W T _c = 74.1 °C D.F. = 55.5 %
Q104 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 11 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 21.8 °C 81.0 °C	P _{max} = 150.0 W T _c = 71.8 °C D.F. = 54.0 %
Q105 2SA1162-Y TOSHIBA	T _{jmax} = 150 °C P _d = 0.5 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 667 °C/W ΔT _a = 16 °C 66.3 °C	P _{max} = 0.15 W T _a = 66.0 °C D.F. = 44.2 %
D101 D25XB60 SHINDENGEN	T _{jmax} = 150 °C P _d = 8 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1 °C/W ΔT _c = 43.4 °C 101.4 °C	P _{max} = T _c = 93.4 °C D.F. = 67.6 %
D102 U05NU44 TOSHIBA	T _{jmax} = 150 °C P _d = 6 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 83.3 °C/W ΔT _a = 13.7 °C 64.2 °C	P _{max} = T _a = 63.7 °C D.F. = 42.8 %
D104 20GL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1.5 °C/W ΔT _c = 11.6 °C 64.6 °C	P _{max} = T _c = 61.6 °C D.F. = 43.0 %
D105 20GL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1.5 °C/W ΔT _c = 9.6 °C 62.6 °C	P _{max} = T _c = 59.6 °C D.F. = 41.7 %
D107 2NU41 TOSHIBA	T _{jmax} = 150 °C P _d = 0.46 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 37 °C/W ΔT _c = 19.4 °C 86.4 °C	P _{max} = T _c = 69.4 °C D.F. = 57.6 %

Vin = 100Vac

Load = 100%

Ta=50°C

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D108 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 7.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 42.8 °C 96.4 °C	P _{max} = T _i = 92.8 °C D.F. = 64.3 %
D109 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 7.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 38.5 °C 92.1 °C	P _{max} = T _a = 88.5 °C D.F. = 61.4 %
D110 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 7.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 37.2 °C 90.8 °C	P _{max} = T _a = 87.2 °C D.F. = 60.5 %
D111 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 7.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 36.9 °C 90.5 °C	P _{max} = T _a = 86.9 °C D.F. = 60.3 %
D112 S60SC4M SHINDENGEN	T _{jmax} = 150 °C P _d = 7.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 0.5 °C/W ΔT _c = 37.2 °C 90.8 °C	P _{max} = T _c = 87.2 °C D.F. = 60.5 %
PC101-LED PS2561L1-1V NEC	T _{jmax} = 100 °C P _d = 1.6 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 667 °C/W ΔT _a = 4 °C 55 °C	I _{fmax} = 80m A T _c = 54.0 °C D.F. = 55.0 %
PC101-DET PS2561L1-1V NEC	T _{jmax} = 100 °C P _d = 0.01 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 667 °C/W ΔT _a = 4 °C 60.7 °C	P _{max} = 0.15 W T _a = 54.0 °C D.F. = 60.7 %
A101 HA17431UA-04-TL TOSHIBA	T _{jmax} = 150 °C P _d = 6 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 156.3 °C/W ΔT _a = 14 °C 65 °C	P _{max} = 0.8 W T _a = 64.0 °C D.F. = 43.3 %
A102 UC3854DW UNITRODE	T _{jmax} = 150 °C P _d = 0.29 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 27 °C/W ΔT _c = 15.4 °C 73.2 °C	P _{max} = 1.0 W T _a = 65.4 °C D.F. = 48.8 %
A104 M51995AFP-600C MITSUBISHI	T _{jmax} = 150 °C P _d = 0.31 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 83.3 °C/W ΔT _a = 43.8 °C 119.6 °C	P _{max} = 1.5 W T _a = 93.8 °C D.F. = 79.7 %

Vin = 100Vac

Load = 100% Ta=50°C

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Q205 2SK1937 FUJI	T _{jmax} = 150 °C P _d = 4.9 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1 °C/W ΔT _c = 28.7 °C 83.6 °C	P _{max} = 125.0 W T _c = 78.7 °C D.F. = 55.7 %
D201 D1FL20U SHINDENGEN	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 60 °C	P _{max} = W T _c = 54.0 °C D.F. = 40.0 %
D202 D1FL20U SHINDENGEN	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 60 °C	P _{max} = W T _c = 54.0 °C D.F. = 40.0 %
D221 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 80 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 66.6 °C	P _{max} = W T _c = 54.0 °C D.F. = 44.4 %
D222 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 80 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 66.6 °C	P _{max} = W T _c = 54.0 °C D.F. = 44.4 %
D229 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 60.0 °C	P _{max} = W T _c = 54.0 °C D.F. = 40.0 %
D230 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.6 %
D231 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 60 °C	P _{max} = W T _c = 54.0 °C D.F. = 40.0 %
D232 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 60 °C	P _{max} = W T _c = 54.0 °C D.F. = 40.0 %
A201 UPC814G2 NEC	T _{jmax} = 125 °C P _d = 0.036 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 227 °C/W ΔT _a = 11.6 °C 69.7 °C	P _{max} = 440m W T _c = 61.6 °C D.F. = 55.8 %

Vin = 100Vac

Load = 100%

Ta=50°C

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A202 UPC324G2 NEC	T _{jmax} = 125 °C P _d = 0.02 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 189 °C/W ΔT _a = 9.6 °C 63.4 °C	P _{max} = 550m W T _c = 59.6 °C D.F. = 50.7 %
A208 MIPO224SY MATSUSHITA	T _{jmax} = 150 °C P _d = 0.55 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 3 °C/W ΔT _c = 19.2 °C 71.0 °C	P _{max} = 125.0 W T _c = 69.2 °C D.F. = 47.3 %
A209 UPC7805AHF NEC	T _{jmax} = 150 °C P _d = 0.7 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5 °C/W ΔT _c = 11.6 °C 65.1 °C	P _{max} = 15.0 W T _c = 61.6 °C D.F. = 43.4 %
A210 UPC7805AHF NEC	T _{jmax} = 150 °C P _d = 0.51 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5 °C/W ΔT _c = 5.9 °C 58.5 °C	P _{max} = 15.0 W T _c = 55.9 °C D.F. = 39.0 %
A211 UPC7805AHF NEC	T _{jmax} = 150 °C P _d = 0.51 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5 °C/W ΔT _c = 15.4 °C 68.0 °C	P _{max} = 15.0 W T _c = 65.4 °C D.F. = 45.3 %
A212 UPC78M12AHF NEC	T _{jmax} = 150 °C P _d = 0.2 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 5 °C/W ΔT _c = 4 °C 55 °C	P _{max} = 15.0 W T _c = 54.0 °C D.F. = 36.7 %
A213 AN79M12 MATSUSHITA	T _{jmax} = 125 °C P _d = 0.2 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 27 °C/W ΔT _a = 4 °C 59.4 °C	P _{max} = 15.0 W T _c = 54.0 °C D.F. = 47.5 %
PC201-LED TLP621(D4-GRH-LF4) TOSHIBA	T _{jmax} = 100 °C I _f = 1.5 mA I _f (T _a)= 50.9 mA	ΔI _f /°C -0.7 mA/°C ΔT _a = 2 °C	I _{fmax} = 60m A T _c = 52.0 °C D.F. = 3.0 %
PC201-DET TLP621(D4-GRH-LF4) TOSHIBA	T _{jmax} = 100 °C P _d = 1 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 400 °C/W ΔT _a = 2 °C 52.4 °C	P _{max} = 0.15 W T _c = 52.0 °C D.F. = 52.4 %
PC202-LED TLP621(D4-GRH-LF4) TOSHIBA	T _{jmax} = 100 °C I _f = 0 A I _f (T _a)= 51.5 mA	ΔI _f /°C -0.7 mA/°C ΔT _a = 1.2 °C	I _{fmax} = 60m A T _c = 51.2 °C D.F. = 0.0 %

Vin = 100Vac

Load = 100% Ta=50°C

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PC202-DET	T _{jmax} = 100 °C	θ _{j-a} = 400 °C/W	P _{max} = 0.15 W
TLP621(D4-GRH-LF4)	P _d = 0 W	ΔT _a = 1.2 °C	T _c = 51.2 °C
TOSHIBA	T _j = T _a + (θ _{j-a} × P _d) =	51.2 °C	D.F. = 51.2 %
PC203-LED	T _{jmax} = 100 °C	ΔI _f /°C -0.7 mA/°C	I _{fmax} = 60m A
TLP621(D4-GRH-LF4)	I _f = 0 A	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	I _f (T _a)= 51.5 mA	52.0 °C	D.F. = 0.0 %
PC203-DET	T _{jmax} = 100 °C	θ _{j-a} = 400 °C/W	P _{max} = 0.15 W
TLP621(D4-GRH-LF4)	P _d = 0 W	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	T _j = T _a + (θ _{j-a} × P _d) =	52.0 °C	D.F. = 52.0 %

Vin = 200Vac

Load = 100% Ta=50°C

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Q101 2SK2699 TOSHIBA	T _{jmax} = 150 °C P _d = 6 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 7.7 °C 62.7 °C	P _{max} = 150.0 W T _c = 57.7 °C D.F. = 41.8 %
Q102 2SK2699 TOSHIBA	T _{jmax} = 150 °C P _d = 6 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 8.5 °C 63.5 °C	P _{max} = 150.0 W T _a = 58.5 °C D.F. = 42.3 %
Q103 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 11 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 21.5 °C 80.6 °C	P _{max} = 150.0 W T _c = 71.5 °C D.F. = 53.8 %
Q104 2SK2611 TOSHIBA	T _{jmax} = 150 °C P _d = 11 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 0.833 °C/W ΔT _c = 19.8 °C 79.0 °C	P _{max} = 150.0 W T _c = 69.8 °C D.F. = 52.6 %
Q105 2SA1162-Y TOSHIBA	T _{jmax} = 150 °C P _d = 0.5 mW T _j = T _a + (θ _{j-a} × P _d) =	θ _{j-a} = 667 °C/W ΔT _a = 10 °C 60.3 °C	P _{max} = 0.15 W T _a = 60.0 °C D.F. = 40.2 %
D101 D25XB60 SHINDENGEN	T _{jmax} = 150 °C P _d = 4 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 1 °C/W ΔT _c = 21.2 °C 75.2 °C	P _{max} = T _c = 71.2 °C D.F. = 50.1 %
D102 U05NU44 TOSHIBA	T _{jmax} = 150 °C P _d = 1.2 mW T _j = T _a + (θ _{j-a} × P _d) =	θ _{j-a} = 83.3 °C/W ΔT _a = 8.1 °C 58.1 °C	P _{max} = T _a = 58.1 °C D.F. = 38.7 %
D104 20GL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 1.8 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 1.5 °C/W ΔT _c = 4 °C 56.7 °C	P _{max} = T _i = 54.0 °C D.F. = 37.8 %
D105 20GL2C41A TOSHIBA	T _{jmax} = 150 °C P _d = 1.8 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 1.5 °C/W ΔT _c = 2 °C 54.7 °C	P _{max} = T _c = 52.0 °C D.F. = 36.4 %
D107 2NU41 TOSHIBA	T _{jmax} = 150 °C P _d = 0.46 W T _j = T _c + (θ _{j-c} × P _d) =	θ _{j-c} = 37 °C/W ΔT _c = 15.9 °C 82.9 °C	P _{max} = T _c = 65.9 °C D.F. = 55.3 %

Vin = 200Vac

Load = 100%

Ta=50°C

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D108	T _{jmax} = 150 °C	θ _{j-c} = 0.5 °C/W	P _{max} =
S60SC4M	P _d = 7.2 W	ΔT _c = 41.2 °C	T _i = 91.2 °C
SHINDENGEN	T _j = T _c + (θ _{j-c} × P _d) =	94.8 °C	D.F. = 63.2 %
D109	T _{jmax} = 150 °C	θ _{j-c} = 0.5 °C/W	P _{max} =
S60SC4M	P _d = 7.2 W	ΔT _c = 37 °C	T _a = 87.0 °C
SHINDENGEN	T _j = T _c + (θ _{j-c} × P _d) =	90.6 °C	D.F. = 60.4 %
D110	T _{jmax} = 150 °C	θ _{j-c} = 0.5 °C/W	P _{max} =
S60SC4M	P _d = 7.2 W	ΔT _c = 35.6 °C	T _a = 85.6 °C
SHINDENGEN	T _j = T _c + (θ _{j-c} × P _d) =	89.2 °C	D.F. = 59.5 %
D111	T _{jmax} = 150 °C	θ _{j-c} = 0.5 °C/W	P _{max} =
S60SC4M	P _d = 7.2 W	ΔT _c = 35.3 °C	T _a = 85.3 °C
SHINDENGEN	T _j = T _c + (θ _{j-c} × P _d) =	88.9 °C	D.F. = 59.3 %
D112	T _{jmax} = 150 °C	θ _{j-c} = 0.5 °C/W	P _{max} =
S60SC4M	P _d = 7.2 W	ΔT _c = 35.7 °C	T _c = 85.7 °C
SHINDENGEN	T _j = T _c + (θ _{j-c} × P _d) =	89.3 °C	D.F. = 59.5 %
PC101-LED	T _{jmax} = 100 °C	θ _{j-a} = 667 °C/W	I _{fmax} = 80m A
PS2561L1-1V	P _d = 1.6 mW	ΔT _a = 4 °C	T _c = 54.0 °C
NEC	T _j = T _a + (θ _{j-a} × P _d) =	55 °C	D.F. = 55.0 %
PC101-DET	T _{jmax} = 100 °C	θ _{j-a} = 667 °C/W	P _{max} = 0.15 W
PS2561L1-1V	P _d = 0.01 W	ΔT _a = 4 °C	T _a = 54.0 °C
NEC	T _j = T _a + (θ _{j-a} × P _d) =	60.7 °C	D.F. = 60.7 %
A101	T _{jmax} = 150 °C	θ _{j-a} = 156.3 °C/W	P _{max} = 0.8 W
HA17431UA-04-TL	P _d = 6 mW	ΔT _a = 4 °C	T _a = 54.0 °C
TOSHIBA	T _j = T _a + (θ _{j-a} × P _d) =	55 °C	D.F. = 36.6 %
A102	T _{jmax} = 150 °C	θ _{j-c} = 27 °C/W	P _{max} = 1.0 W
UC3854DW	P _d = 0.29 W	ΔT _c = 13.5 °C	T _a = 63.5 °C
UNITRODE	T _j = T _c + (θ _{j-c} × P _d) =	71.3 °C	D.F. = 47.6 %
A104	T _{jmax} = 150 °C	θ _{j-a} = 83.3 °C/W	P _{max} = 1.5 W
M51995AFP-600C	P _d = 0.31 W	ΔT _a = 38.2 °C	T _a = 88.2 °C
mitsubishi	T _j = T _a + (θ _{j-a} × P _d) =	114 °C	D.F. = 76.0 %

Vin = 200Vac

Load = 100% Ta=50°C

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Q205 2SK1937 FUJI	T _{jmax} = 150 °C P _d = 4.9 W T _j = T _c + (θ _{j-c} x P _d) =	θ _{j-c} = 1 °C/W ΔT _c = 24.9 °C 79.8 °C	P _{max} = 125.0 W T _c = 74.9 °C D.F. = 53.2 %
D201 D1FL20U SHINDENGEN	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
D202 D1FL20U SHINDENGEN	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
D221 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 80 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 4 °C 66.6 °C	P _{max} = W T _c = 54.0 °C D.F. = 44.4 %
D222 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 80 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 64.6 °C	P _{max} = W T _c = 52.0 °C D.F. = 43.0 %
D229 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58.0 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
D230 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
D231 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
D232 D1FL20U TOSHIBA	T _{jmax} = 150 °C P _d = 38 mW T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 157 °C/W ΔT _a = 2 °C 58 °C	P _{max} = W T _c = 52.0 °C D.F. = 38.7 %
A201 UPC814G2 NEC	T _{jmax} = 125 °C P _d = 0.036 W T _j = T _a + (θ _{j-a} x P _d) =	θ _{j-a} = 227 °C/W ΔT _a = 9.6 °C 67.8 °C	P _{max} = 440m W T _c = 59.6 °C D.F. = 54.2 %

Vin = 200Vac

Load = 100% Ta=50°C

ZUP- 400

A202	T _{jmax} = 125 °C	θ _{j-a} = 189 °C/W	P _{max} = 550m W
UPC324G2	P _d = 0.02 W	ΔT _a = 7.8 °C	T _c = 57.8 °C
NEC	T _j = T _a + (θ _{j-a} x P _d) =	61.6 °C	D.F. = 49.3 %
A208	T _{jmax} = 150 °C	θ _{j-c} = 3 °C/W	P _{max} = 125.0 W
MIPO224SY	P _d = 0.55 W	ΔT _c = 17.4 °C	T _c = 67.4 °C
MATSUSHITA	T _j = T _c + (θ _{j-c} x P _d) =	69.0 °C	D.F. = 46.0 %
A209	T _{jmax} = 150 °C	θ _{j-c} = 5 °C/W	P _{max} = 15.0 W
UPC7805AHF	P _d = 0.7 W	ΔT _c = 9.6 °C	T _c = 59.6 °C
NEC	T _j = T _c + (θ _{j-c} x P _d) =	63.1 °C	D.F. = 42.0 %
A210	T _{jmax} = 150 °C	θ _{j-c} = 5 °C/W	P _{max} = 15.0 W
UPC7805AHF	P _d = 0.51 W	ΔT _c = 5.9 °C	T _c = 55.9 °C
NEC	T _j = T _c + (θ _{j-c} x P _d) =	58.5 °C	D.F. = 39.0 %
A211	T _{jmax} = 150 °C	θ _{j-c} = 5 °C/W	P _{max} = 15.0 W
UPC7805AHF	P _d = 0.51 W	ΔT _c = 11.6 °C	T _c = 61.6 °C
NEC	T _j = T _c + (θ _{j-c} x P _d) =	64.2 °C	D.F. = 42.7 %
A212	T _j = T _c 150 °C	θ _{j-c} = 5 °C/W	P _{max} = 15.0 W
UPC78M12AHF	P _d = 0.2 W	ΔT _c = 2 °C	T _c = 52.0 °C
NEC	T _j = T _c + (θ _{j-c} x P _d) =	55 °C	D.F. = 36.7 %
A213	T _{jmax} = 125 °C	θ _{j-a} = 27 °C/W	P _{max} = 15.0 W
AN79M12	P _d = 0.2 W	ΔT _a = 2 °C	T _c = 52.0 °C
MATSUSHITA	T _j = T _a + (θ _{j-a} x P _d) =	57.4 °C	D.F. = 45.9 %
PC201-LED	T _{jmax} = 100 °C	ΔI _f /°C -0.7 mA/°C	I _{fmax} = 60m A
TLP621(D4-GRH-LF4)	I _f = 2.5 mA	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	I _f (T _a)= 50.9 mA		D.F. = 4.9 %
PC201-DET	T _{jmax} = 100 °C	θ _{j-a} = 400 °C/W	P _{max} = 0.15 W
TLP621(D4-GRH-LF4)	P _d = 1 mW	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	T _j = T _a + (θ _{j-a} x P _d) =	52.4 °C	D.F. = 52.4 %
PC202-LED	T _{jmax} = 100 °C	ΔI _f /°C -0.7 mA/°C	I _{fmax} = 60m A
TLP621(D4-GRH-LF4)	I _f = 0 A	ΔT _a = 1.2 °C	T _c = 51.2 °C
TOSHIBA	I _f (T _a)= 51.5 mA		D.F. = 0.0 %

Vin = 200Vac

Load = 100%

Ta=50°C

ZUP- 400

PC202-DET	T _{jmax} = 100 °C	θ _{j-a} = 400 °C/W	P _{max} = 0.15 W
TLP621(D4-GRH-LF4)	P _d = 0 W	ΔT _a = 1.2 °C	T _c = 51.2 °C
TOSHIBA	T _j = T _a + (θ _{j-a} x P _d) =	51.2 °C	D.F. = 51.2 %
PC203-LED	T _{jmax} = 100 °C	ΔI _f /°C -0.7 mA/°C	I _{fmax} = 60m A
TLP621(D4-GRH-LF4)	I _f = 0 A	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	I _f (T _a)= 51.5 mA	52.0 °C	D F = 0.0 %
PC203-DET	T _{jmax} = 100 °C	θ _{j-a} = 400 °C/W	P _{max} = 0.15 W
TLP621(D4-GRH-LF4)	P _d = 0 W	ΔT _a = 2 °C	T _c = 52.0 °C
TOSHIBA	T _j = T _a + (θ _{j-a} x P _d) =	52.0 °C	D.F. = 52.0 %


3.MAIN COMPONENTS TEMPERATURE RISE

ZUP-400

Model:ZUP 6-66

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q102	MOSFET	24.9
Q103	MOSFET	24.1
Q205	MOSFET	28.7
D101	BRIDGE	43.4
D104	DIODE	11.6
D107	DIODE	19.4
D108	DIODE	42.8
T101	TRANSFORMER	54.4
T201	TRANSFORMER	11.6
C114	ELEC.CAP.	5.9
C153	ELEC.CAP.	24.6
L 102	BALUN COIL	17.4
L103	BALUN COIL	28.9
L105	CHOKE COIL	45.2
L106	CHOKE COIL	56.7
L107	CHOKE COIL.	53.8
A102	IC	15.4
A104	IC	43.8

Conditions:

Standard Mounting	
Input Voltage	100VAC
Output Voltage	6V
Output Current	66A

NEMIC-LAMBDA

R-13

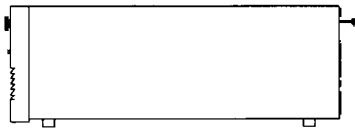
3.MAIN COMPONENTS TEMPERATURE RISE

ZUP-400

Model:ZUP 6-66

Location No.	Parts Name	DT Temperature Rise (°C)
		Standard Mounting
Q102	MOSFET	8.5
Q103	MOSFET	21.5
Q205	MOSFET	24.9
D101	BRIDGE	21.2
D104	DIODE	4
D107	DIODE	15.9
D108	DIODE	41.2
T101	TRANSFORMER	50.9
T201	TRANSFORMER	5.9
C114	ELEC.CAP.	4
C153	ELEC.CAP.	21.1
L102	BALUN COIL	8.4
L103	BALUN COIL	12.2
L105	CHOKER COIL	19.2
L106	CHOKER COIL	51
L107	CHOKER COIL.	53
A102	IC	13.5
A104	IC	38.2

Conditions:

Standard Mounting	
Input Voltage	200VAC
Output Voltage	6V
Output Current	66A

NEMIC-LAMBDA

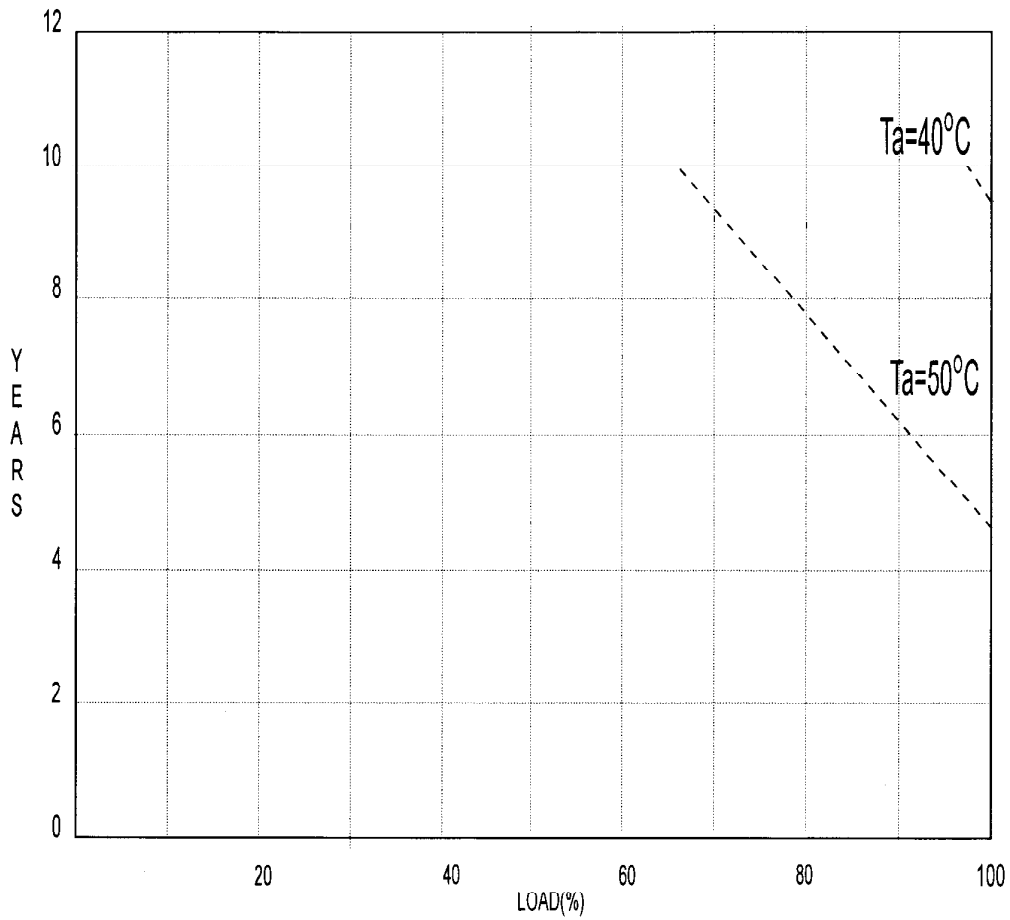
R-14

4. E-CAP LIFETIME VERSUS LOAD

ZUP-400

Model:ZUP 6-66

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

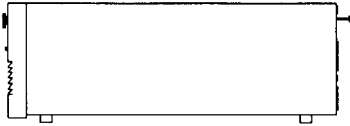


FORMULA: $L = L_o \times 2^{\frac{105 - T_c}{10}}$ (years)

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
Output Voltage	6V
Output Current	66A

NEMIC-LAMBDA

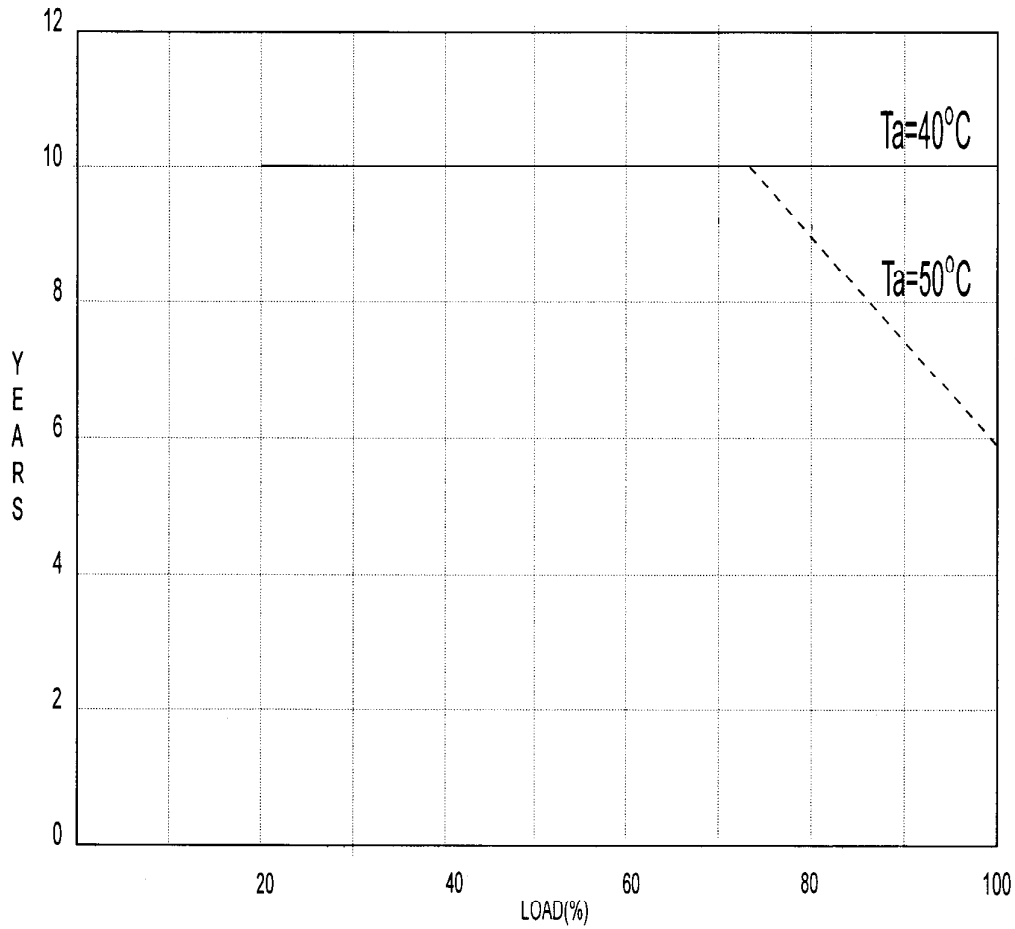
R-15

4. E-CAP LIFETIME VERSUS LOAD

ZUP-400

Model: ZUP 6-66

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

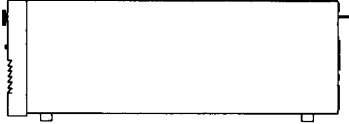


FORMULA: $L = L_0 \times 2^{\frac{105 - T_c}{10}}$ (years)

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

L₀ - Guarantee life for Elec. capacitor

T_c - Case temperature of Elec. capacitor

Standard Mounting	
Input Voltage	200VAC
Output Voltage	6V
Output Current	66A

ZUP-400

Model: ZUP6-66

Condition:

Input:100VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	P < O	P O O	No Output	No Change	Others	
1	Q101	D-S	o								o			o			
2		D-G	o							o	o			o			Da:Q101,Q102,ZD101-short,R110 - open.
3		G-S	o											o			
4		D		o											o		
5		S		o											o		
6		G		o						o	o			o			Da:Q101,Q102,ZD101-short.
7	Q102	D-G	u								u			u			
8		D-G	o							o	o			o			Da:Q101,Q102,ZD101-short,R110-open.
9		G-S	o											o			
10		D		o											o		
11		S		o											o		
12		G		o						o	o			o			Da:Q101,Q102,ZD101-short.
13	Q103	D-S	o							o	o			o			Da:ZD106,ZD108,-short.
14		D-G	o							o	o			o			Da:Q103,Q104,ZD102,R116-open,ZD106,ZD108-short.
15		G-S	o											o			
16		D		o											o		
17		S		o											o		
18		G		o						o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
19	Q104	D-S	o							o	o			o			Da:ZD106,ZD108-short.
20		D-G	o							o	o			o			Da:Q103,Q104,ZD102,R116-open,ZD106,ZD108-short.
21		G-S	o											o			
22		D		o											o		
23		S		o											o		
24		G		o						o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
25	D101	AC-AC	o								o			o			
26		AC-DC	o								o			o			
27		AC		o										o			
28		DC		o										o			
29	D102		o											o			
30				o										o			
31	D104		o												o		
32				o						o	o			o			Da:Q101,Q102-open.
33	D105		o												o		
34				o						o	o			o			Da:Q101,Q102-open.
35	D107		o								o			o			
36				o											o		
37	D108		o											o			
38				o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input: 100VAC Output: 6V 66A

Ia: 25°C

70%RH

Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
39	D109		o											o			
40				o											o		
41	D110		o											o			
42				o											o		
43	D111		o											o			
44				o											o		
45	D112		o											o			
46				o											o		
47	PC101	1-2	o									o		o			
48		3-4	o											o			
49		1		o								o		o			
50		3		o								o		o			
51	C109		o							o				o			Da:FR101-open.
52				o										o			
53	C110		o												o		
54				o											o		
55	C111		o												o		
56				o											o		
57	C112		o							o							Da:R112-open.
58				o											o		
59	C113		o								o			o			
60				o											o		
61	C114		o								o			o			
62				o											o		
63	C115		o							o							Da:R114-open.
64				o											o		
65	C116		o												o		
66				o											o		
67	C117		o							o							Da:R121-open.
68				o											o		
69	C118		o							o							Da:R122-open.
70				o											o		
71	C119		o												o		
72				o											o		
73	C122		o												o		
74				o											o		
75	C125		o											o			
76				o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input: 100VAC Output: 6V 66A

Ta: 25°C

70%RH

Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
77	C128		o												o		
78				o											o		
79	C136		o											o			
80				o												o	Vo not stable
81	C145		o											o			
82				o											o		
83	C146		o											o			
84				o											o		
85	C147		o										o	o			
86				o											o		
87	C148		o										o	o			
88				o											o		
89	C152		o											o			
90				o											o		
91	C153		o											o			
92				o											o		
93	FR101		o											o			
94	R103		o													o	Vo not stable
95	R104		o													o	Vo not stable
96	R107		o												o		
97	R108		o												u		
98	R110		o							o	o			o			Da: Q101, Q102, ZD101-short.
99	R111		o							o	o			o			Da: Q101, Q102, ZD101-short.
100	R112		o												o		
101	R116		o							o	o			o			Da: Q103, Q104, ZD106, ZD108-short.
102	R117		o							o	o			o			Da: Q103, Q104, ZD106, ZD108-short.
103	R120		o											o			
104	R121		o												o		
105	R122		o												o		
106	R123		o											o			
107	R124		o											o			
108	R125		o											o			
109	R130		o											o			
110	R133		o									o		o			
111	R134		o												o		
112	R142		o											o			
113	R143		o											o			
114	R144		o											o			
115	R151		o												o		

ZUP-400

Model: ZUP6-66

Condition:

Input:100VAC Output:6V 66A Ta:25°C 70%RH Da: Damaged

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 Blown	V	C	O	No Output	No Change	Others
116	R160			o											o		
117	R161			o											o		
118	R162			o											o		
119	R171			o												o	
120	R179			o											o		
121	R180			o											o		
122	R181			o											o		
123	R185			o											o		
124	Q107	C - E	o													o	
125		C - B	o							o	o				o		Da:Q101,Q102-short.
126		B - E	o													o	
127		C		o												o	
128		E		o											o		
129		B - E		o											o		
130	Q108	C - E	o												o		
131		C - B	o												o		
132		B - E	o													o	
133		C		o											o		
134		E		o						o	o				o		Da:Q101,Q102,R111-open.
135		B		o						o	o				o		Da:Q101,Q102,R111-open.
136	T101	4 - 6	o												o		
137		13 - 14	o												o		
138		1 - 3	o												o		
139		4		o												o	
140		13		o											o		
141		1		o											o		
142	L105		o							o	o				o		Da:Q101,Q102,ZD101-short,F101-open.
143				o											o		
144	L106		o													o	Vo not stable
145				o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input: 100VAC Output: 6V 66A

Ta: 25°C

70%RH

Da: Damaged

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 Blown	P < O	P C O	No Output	No Change	Others	
146	A208	D - S	o							o				o			Da: R105, R106-open.
147		D - C	o							o				o			R105, R106, ZD214, A208-open.
148		C - S	o											o			
149		D		o										o			
150		S		o										o			
151		G		o										o			
152	Q201	B - E	o												o		
153		B - C	o											o			
154		C - E	o											o			
155		B		o											o		
156		C		o											o		
157		E		o											o		
158	Q202	B - E	o												o		
159		B - C	o											o			
160		C - E	o											o			
161		B		o											o		
162		C		o											o		
163		E		o											o		
164	Q203	D - S	o												o		
165		D - G	o												o		
166		G - S	o												o		
167		D		o											o		
168		S		o											o		
169		G		o											o		
170	Q204	D - S	o												o		
171		D - G	o												o		
172		G - S	o												o		
173		D		o											o		
174		S		o											o		
175		G		o											o		
176	Q205	D - S	o											o			
177		D - G	o											o			
178		G - S	o												o		
179		D		o											o		
180		S		o											o		
181		G		o											o		
182	Q206	B - E	o												o		
183		B - C	o												o		

ZUP-400

Model: ZUP6-66

Condition:

Input: 100VAC Output: 6V 66A

Ta: 25°C

70%RH

Da: Damaged

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 Blown	P	V	C	P	C	C	No Output	No Change	Others	
184	Q206	C - E	o																		
185		B		o																	
186		C		o																	
187		E		o																	
188	D201		o																		
189				o																	
190	D204		o																		
191				o									o					o			
192	D205		o										o					o			
193				o																o	
194	D207		o																o		
195				o																o	
196	D221		o																	o	HICC-UP
197				o																o	
198	D227		o																	o	
199				o						o								o			Da:A102,R111,Q102,R105,R106-open.
200	D228		o																	o	
201				o																o	
202	D229		o																o		
203				o																o	
204	D231		o																	o	HICC-UP
205				o																o	
206	D233		o																	o	
207				o																o	
208	D235		o																	o	
209				o																o	
210	PC201	1 - 2	o																	o	
211		3 - 4	o																	o	
212		1		o															o		
213		3		o															o		
214	PC202	1 - 2	o																	o	
215		3 - 4	o																o		
216		1		o																o	
217		3		o																o	
218	PC203	1 - 2	o																	o	
219		3 - 4	o																o		
220		1		o																o	
221		3		o																o	

ZUP-400

Model: ZUP6-66

Condition:

Input: 100VAC Output: 6V 66A

Ta: 25°C

70%RH

Da: Damaged

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 Blown	P < O	P O O	No Output	No Change	Others	
222	C218		o											o			
223				o												o	
224	C219		o											o			
225				o												o	
226	C221		o											o			
227				o												o	
228	C222		o													u	OTP
229				o												o	
230	C223		o													o	
231				o												o	
232	C224		o													o	HICC-UP
233				o												o	
234	C225		o													o	
235				o												o	
236	C227		o											o			
237				o												o	
238	C228		o											o			
239				o												o	
240	C230		o													o	HICC-UP
241				o												o	
242	C231		o													o	OTP
243				o												o	
244	C233		o													o	HICC-UP
245				o												o	
246	C234		o											o			
247				o												o	
248	C236		o							o				o			Da: D233-short
249				o												o	
250	C261		o							o				o			Da: D224-short.
251				o												o	
252	R201			o								o		o			
253	R202			o												o	Max Io=0A.
254	R206			o												o	
255	R200			o										o			
256	R211			o												o	Vo=3.9V.
257	R213			o												o	Vo=3.5V
258	R220			o								o		o			
259	R227			o												o	Vo=4V.
260	R231			o												o	P.S. in C.C. MODE

ZUP-400

Model: ZUP6-66

Condition:

Input:100VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	P < O	P > O	No Output	No Change	Others	
261	R241			o													
262	R243			o										o			
263	R253			o										o			
264	R263			o											o		
265	R290			o											o		
266	R291			o											o		
267	R292			o								o		o			
268	R293			o								o			o		
269	R294			o											o		
270	ZD204		o											o			
271	ZD205		o											o			
272	T201	1 - 3	o											o			
273		5 - 6	o											o			
274		7 - 8	o											o			
275		8 - 9	o											o			
276		8 - 10	o											o			
277		11 - 12	o											o			
278		13 - 14	o												o		
279		3		o										o			
280		5		o										o			
281		7		o										o			
282		9		o											o	OTP	
283		10		o										o			
284		11		o											o		
285		13		o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input:200VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
1	Q101	D-S	o								o			o			
2		D-G	o							o	o			o			Da:Q101,Q102,ZD101-short,R110 - open.
3		G-S	o											o			
4		D		o											o		
5		S		o											o		
6		G		o						o	o			o			Da:Q101,Q102,ZD101-short.
7	Q102	D-S	o								o			o			
8		D-G	o							o	o			o			Da:Q101,Q102,ZD101-short,R110-open.
9		G-S	o											o			
10		D		o											o		
11		S		o											o		
12		G		o						o	o			o			Da:Q101,Q102,ZD101-short.
13	Q103	D-S	o							o	o			o			Da:ZD106,ZD108,-short.
14		D-G	o							o	o			o			Da:Q103,Q104,ZD102,R116-open,ZD106,ZD108-short.
15		G-S	o											o			
16		D		o											o		
17		S		o											o		
18		G		o						o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
19	Q104	D-S	o							o	o			o			Da:ZD106,ZD108-short.
20		D-G	o							o	o			o			Da:Q103,Q104,ZD102,R117-open,ZD106,ZD108-short.
21		G-S	o											o			
22		D		o											o		
23		S		o											o		
24		G		o						o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
25	D101	AC-AC	o								o			o			
26		AC-DC	o								o			o			
27		AC		o										u			
28		DC		o										o			
29	D102		o											o			
30				o										n			
31	D104		o												o		
32				o						o	o			o			Da:Q101,Q102-short.
33	D105		o												o		
34				o						o	o			o			Da:Q101,Q102-short.
35	D107		o								o			o			
36				o											o		
37	D108		o											o			
38				o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input:200VAC Output:6V 66A Ta:25°C 70%RH Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
39	D109		o											o			
40				o											o		
41	D110		o											o			
42				o											o		
43	D111		o											o			
44				o											o		
45	D112		o											o			
46				o											o		
47	PC101	1-2	o									o		o			
48		3-4	o											o			
49		1		o								o		o			
50		3		o								o		o			
51	C109		o							o				o			Da:FR101-open.
52				o										o			
53	C110		o												o		
54				o											o		
55	C111		o												o		
56				o											o		
57	C112		o							o							Da:R112-open.
58				o											o		
59	C113		o								o			o			
60				o											o		
61	C114		o								o			o			
62				o											o		
63	C115		o							o							Da:R114-open.
64				o											o		
65	C116		o												o		
66				o											o		
67	C117		o							o							Da:R121-open.
68				o											o		
69	C118		o							o							Da:R122-open.
70				o											o		
71	C119		o												o		
72				o											o		
73	C122		o												o		
74				o											o		
75	C125		o												o		
76				o											o		

ZUP-400

Model: ZUP6-66

Condition:

Input:200VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
77	C128		o														
78				o													
79	C136		o												o		
80				o													o
81	C145		o												o		
82				o													o
83	C146		o												o		
84				o													o
85	C147		o											o	o		
86				o													o
87	C148		o											o	o		
88				o													o
89	C152		o												o		
90				o													o
91	C153		o												o		
92				o													o
93	FR101		o												o		
94	R103		o														o
95	R104		o														o
96	R107		o														o
97	R108		o														o
98	R110		o							o	o			o			Da:Q101,Q102,ZD101-short.
99	R111		o							o	o			o			Da:Q101,Q102,ZD101-short.
100	R112		o												o		
101	R116		o							o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
102	R117		o							o	o			o			Da:Q103,Q104,ZD106,ZD108-short.
103	R120		o												o		
104	R121		o														o
105	R122		o														o
106	R123		o														o
107	R124		o														o
108	R125		o														o
109	R130		o														o
110	R133		o														o
111	R134		o									o		o			o
112	R142		o														o
113	R143		o														o
114	R144		o														o
115	R151		o														o

ZUP-400

Model: ZUP6-66

Condition:

Input:200VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	V P	O P	No Output	No Change	Others	
116	R160			o											o		
117	R161			o											o		
118	R162			o											o		
119	R171			o											o		
120	R179			o											o		
121	R180			o											o		
122	R181			o											o		
123	R185			o											o		
124	Q107	C - E	o												o		
125		C - B	o							o	o			o			Da:Q101,Q102-short.
126		B - E	o												o		
127		C		o											o		
128		E		o										o			
129		B - E		o										o			
130	Q108	C - E	o											o			
131		C - B	o											o			
132		B - E	o												o		
133		C		o										o			
134		E		o						o	o			o			Da:Q101,Q102,R111-open.
135		B		o						o	o			o			Da:Q101,Q102,R111-open.
136	T101	4 - 6	o											o			
137		13 - 14	o											o			
138		1 - 3	o											o			
139		4		o											o		
140		13		o										o			
141		1		o										o			
142	L105		o							o	o			o			Da:Q101,Q102,ZD101-short,F101-open.
143				o										o			
144	L106		o													o	Vo not stable
145				o										o			

ZUP-400

Model: ZUP6-66

Condition:

Input: 200VAC Output:6V 66A

Ta:25°C

70%RH

Da: Damaged

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 Blown	P	V	O	P	C	O	No Output	No Change	Others	
146	A208	D - S	o							o				o							Da:R105,R106-open.
147		D - C	o							o				o							Da:R105,R106,ZD214,A208-open.
148		C - S	o											o							
149		D		o										o							
150		S		o										o							
151		C		o										o							
152	Q201	B - E	o															o			
153		B - C	o											o							
154		C - E	o											o							
155		B		o														o			
156		C		o														o			
157		E		o														o			
158	Q202	B - E	o															o			
159		B - C	o											o							
160		C - E	o											o							
161		B		o														o			
162		C		o														o			
163		E		o														o			
164	Q203	D - S	o															o			
165		D - G	o															o			
166		G - S	o															o			
167		D		o														o			
168		S		o														o			
169		G		o														o			
170	Q204	D - S	o															o			
171		D - G	o															o			
172		G - S	o															o			
173		D		o														o			
174		S		o														o			
175		G		o														o			
176	Q205	D - S	o											o							
177		D - G	o											o							
178		G - S	o															o			
179		D		o														o			
180		S		o														o			
181		G		o														o			
182	Q206	B - E	o															o			
183		B - C	o															o			

ZUP-400

Model: ZUP6-66

Condition:

Input: 200VAC Output: 6V 66A

Ta: 25°C

70%RH

Da: Damaged

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 Blown	P	V	P	C	O	No Output	No Change	Others	
184	Q206	C - E	o																	
185		B		o																
186		C		o																
187		E		o																
188	D201		o														o			
189				o																
190	D204		o																	
191				o									o				o			
192	D205		o										o				o			
193				o																
194	D207		o														o			
195				o																
196	D221		o																o	HICC-UP
197				o																
198	D227		o																	
199				o						o							o			Da: A102, R111, Q102, R105, R106-open.
200	D228		o																	
201				o																
202	D229		o														o			
203				o																
204	D231		o																o	HICC-UP
205				o																
206	D233		o																	
207				o																
208	D235		o																	
209				o																
210	PC201	1 - 2	o																	
211		3 - 4	o																	
212		1		o													o			
213		3		o													o			
214	PC202	1 - 2	o																	
215		3 - 4	o																	
216		1		o																
217		3		o																
218	PC203	1 - 2	o																	
219		3 - 4	o																o	
220		1		o																
221		3		o																

ZUP-400

Model: ZUP6-66

Condition:

Input: 200VAC Output: 6V 66A

Ta: 25°C

/0%RH

Da: Damaged

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 Blown	V	O	No Output	No Change	Others	
222	C218		o											o			
223				o											o		
224	C219		o											o			
225				o											o		
226	C221		o											o			
227				o											o		
228	C222		o													o	OTP
229				o											o		
230	C223		o												o		
231				o											o		
232	C224		o													o	HICC-UP
233				o											o		
234	C225		o												o		
235				o											o		
236	C227		o											o			
237				o											o		
238	C228		o											o			
239				o											o		
240	C230		o													o	HICC-UP
241				o											o		
242	C231		o													o	OTP
243				o											o		
244	C233		o													o	HICC-UP
245				o											o		
246	C234		o											o			
247				o											o		
248	C236		o							o				o			Da:D233-open.
249				o											o		
250	C261		o							o				o			Da:D224-open.
251				o											o		
252	R201			o								o		o			
253	R202			o											o		Max Io=0A.
254	R206			o											o		
255	R208			o										o			
256	R211			o											o		Vo=3.9V
257	R213			o											o		Vo=3.5V.
258	R220			o								o		o			
259	R227			o											o		Vo=4V.
260	R231			o											o		P.S. in C.C. MODE.

ZUP-400

Model: ZUP6-66

Condition:

Input: 200VAC Output: 6V 66A

Ta: 25°C

/0%RH

Da: Damaged

No	Test Position		Test Mode		Test Result												Note
					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 Blown	P < O	P O O	No Output	No Change	Others	
261	R241		o												o		
262	R243		o												o		
263	R253		o												o		
264	R263		o												o		
265	R290		o												o		
266	R291		o												o		
267	R292		o									o			o		
268	R293		o												o		
269	R294		o												o		
270	ZD204		o											o			
271	ZD205		o											o			
272	T201	1 - 3	o											o			
273		5 - 6	o											o			
274		7 - 8	o											o			
275		8 - 9	o											o			
276		8 - 10	o											o			
277		11 - 12	o											o			
278		13 - 14	o											o			
279		3	o											o			
280		5	o											o			
281		7	o											o			
282		9	o											o		o	OTP
283		10	o											o			
284		11	o											o			
285		13	o											o			

6. VIBRATION TEST

Model:ZUP 6-66

(1) Vibration test class

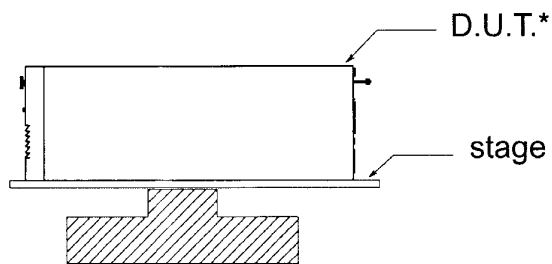
Frequency variable endurance test

(2) Equipment used

Controller: GENRAD-2503.

Vibrator: ULHOLTZ-DICKIE TA1000.

(3) Testing method



Test condition:

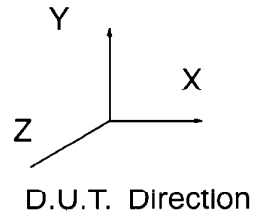
Sweep frequency 10~55HZ

Sweep time 1min.

Acceleration 2G const.

Direction X,Y,Z.

Test time 1H. each



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

(4) Test Result

Vin=100Vac;lout=66A

OK NG

Check item	Vout	Ripple (mVp-p)	D.U.T.state
Initial	6.019	33	O.K.
Directions			
X	6.019	33	O.K.
Y	6.019	33	O.K.
Z	6.019	33	O.K.