ZWD100PAF

RELIABILITY DATA

DWG No.	PA572-57-01	
APPD	CHK	DWG
17/Aug/04	17/8/04	16.01.2004

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* The following data are typical values. Nevertheless the following result are consider to be actual capability data because all units have nearly the same charateristics.

1. CALCULATED VALUES OF MTBF

MODEL : ZWD100PAF-0524

1. Calculating Method

Calculated based on part count reliability projection of JEITA (RCR-9102).
Individual failure rates λ_G is given to each part and MTBF is calculated by the count of each part.

Formula :

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

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

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)

N_i = 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. MTBF Values

G_F : (GROUND, FIXED)

MTBF = 311230 Hours

2. COMPONENT DERATING

MODEL : ZWD100PAF-0524

(1) Calculation Method

a) Measuring Conditions

Input Voltage	:	100VAC
Output Current	:	100%
Mounting Method	:	Standard Mounting
Ambient Temperature	:	50°C

b) Semiconductors

The derating is derived by comparing the junction temperature with the device maximum rating temperature. The junction temperature is calculated based on case temperature, power dissipation and thermal impedance.

c) IC, Resistors, Capacitors, etc.

Ambient temperature , operating condition, power dissipation, etc are within derating criteria.

d) Calculation Method of Thermal Impedance

$$R_{j-c} = \frac{T_{j(max)} - T_c}{P_{c(max)}} \qquad R_{j-a} = \frac{T_{j(max)} - T_a}{P_{c(max)}} \qquad R_{j-\ell} = \frac{T_{j(max)} - T_\ell}{P_{c(max)}}$$

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
T_ℓ	=	Lead Temperature at Start Point of Derating , 25°C in General
$P_{c(max)}$ ($P_{ch(max)}$)	=	Maximum Collector (Channel) Dissipation
$T_{j(max)}$ ($T_{ch(max)}$)	=	Maximum Junction (Channel) Temperature
R_{j-c} (R_{ch-c})	=	Thermal Impedance between Junction (channel) and Case
R_{j-a}	=	Thermal Impedance between Junction and Air
$R_{j-\ell}$	=	Thermal Impedance between Junction and Lead

(2) Component Derating List

Standard Mounting Position

Conditions Ta : 50°C
Vin : 100VAC
I_1 : 5A
I_2 : 3.1A

Q1 2SK2698 TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	50.1 °C	Tc =	100.1 °C
	Rj(Rch) - c =	0.833 °C/W	Pd(max) =	150 W	Pd =	5.5 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	104.68 °C			
	Derating =	69.79 %				
Q3 2SK1985-01MR FUJI ELEC.	Tj(Tch)max =	150 °C	delta Tc =	51.8 °C	Tc =	101.8 °C
	Rj(Rch) - c =	2.5 °C/W	Pd(max) =	50 W	Pd =	1.925 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	106.61 °C			
	Derating =	71.08 %				
Q5 2SK2611 TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	49.9 °C	Tc =	99.9 °C
	Rj(Rch) - c =	0.833 °C/W	Pd(max) =	150 W	Pd =	4.867 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	103.95 °C			
	Derating =	69.30 %				
Q100 2SC2712-Y TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	41.5 °C	Tc =	91.5 °C
	Rj(Rch) - a =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.02 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	104.84 °C			
	Derating =	83.87 %				
Q101 2SK2177 SHINDENGEN	Tj(Tch)max =	150 °C	delta Tc =	42.5 °C	Tc =	24.4 °C
	Rj(Rch) - c =	12.5 °C/W	Pd(max) =	10 W	Pd =	0.00 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	24.40 °C			
	Derating =	16.27 %				
Q102 2SA1162-Y-TE85L TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	46.4 °C	Tc =	96.4 °C
	Rj(Rch) -c =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.00 W
	Tj(Tch) =	Tc + [(Rj(Rch)-l) x Pd] =	96.40 °C			
	Derating =	77.12 %				
Q103 HN1B01F TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	41.0 °C	Tc =	91.0 °C
	Rj(Rch) -c =	500 °C/W	Pd(max) =	0.2 W	Pd =	0.00 W
	Tj(Tch) =	Tc + [(Rj(Rch)-l) x Pd] =	91.00 °C			
	Derating =	72.80 %				
Q104 2SA1162-Y-TE85L TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	44.0 °C	Tc =	94.0 °C
	Rj(Rch) -c =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.00 W
	Tj(Tch) =	Tc + [(Rj(Rch)-l) x Pd] =	94.00 °C			
	Derating =	75.20 %				
A1 UC2842AN ON-SEMI	Tj(Tch)max =	150 °C	delta Tc =	52.2 °C	Tc =	102.2 °C
	Rj(Rch) - a =	100 °C/W	Pd(max) =	1.25 W	Pd =	0.21 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	123.20 °C			
	Derating =	82.13 %				
A100 FA5502M FUJI ELEC.	Tj(Tch)max =	150 °C	delta Tc =	52.8 °C	Tc =	102.8 °C
	Rj(Rch) - c =	50 °C/W	Pd(max) =	0.85 W	Pd =	0.2 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	112.80 °C			
	Derating =	75.20 %				

(2) Component Derating List

Standard Mounting Position

Conditions Ta : 50°C
Vin : 100VAC
I_1 : 5A
I_2 : 3.1A

A101 M51995AFP-600C MITSUBISHI	Tj(Tch)max =	150 °C	delta Tc =	65.7 °C	Tc =	115.7 °C
	Rj(Rch) - c =	37 °C/W	Pd(max) =	1.5 W	Pd =	0.270 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	125.69 °C		
	Derating =	83.79 %				
A102 HA17431UA HITACHI	Tj(Tch)max =	150 °C	delta Tc =	26.1 °C	Tc =	76.1 °C
	Rj(Rch) - c =	0.156 °C/W	Pd(max) =	0.8 W	Pd =	0.01 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	76.10 °C		
	Derating =	50.73 %				
A103 HA17431UA HITACHI	Tj(Tch)max =	150 °C	delta Tc =	38.3 °C	Tc =	88.3 °C
	Rj(Rch) - a =	0.156 °C/W	Pd(max) =	0.8 W	Pd =	0.01 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	88.30 °C		
	Derating =	58.87 %				
A104 UPC358G2-T1 NEC	Tj(Tch)max =	125 °C	delta Tc =	38.2 °C	Tc =	88.2 °C
	Rj(Rch) - c =	227 °C/W	Pd(max) =	0.44 W	Pd =	0.01 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd]	=	89.34 °C		
	Derating =	71.47 %				
PC1 TLP721F (LED) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	33.5 °C	Tc =	83.5 °C
	Rj(Rch) - a =	- °C/W	Pd(max) =	- W	I_F =	2.00 mA
	ALLOWABLE I_F (max) ≈ 35mA (at Ta=72.7°C)					
	Derating =	5.71 %				
PC1 TLP721F (TRANSISTOR) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	33.5 °C	Tc =	83.5 °C
	Rj(Rch) - 1 =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.002 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	84.83 °C		
	Derating =	67.87 %				
PC2 TLP721F (LED) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	31.1 °C	Tc =	81.1 °C
	Rj(Rch) - a =	- °C/W	Pd(max) =	- W	I_F =	0.00 mA
	ALLOWABLE I_F (max) ≈ 28mA (at Ta=83.3°C)					
	Derating =	0.00 %				
PC2 TLP721F (TRANSISTOR) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	31.1 °C	Tc =	81.1 °C
	Rj(Rch) - a =	667 °C/W	Pd(max) =	0.15 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	81.10 °C		
	Derating =	64.88 %				
PC3 TLP721F (LED) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	29.0 °C	Tc =	79.0 °C
	Rj(Rch) - a =	- °C/W	Pd(max) =	- W	I_F =	6.00 mA
	ALLOWABLE I_F (max) ≈ 33mA (at Ta=77.6°C)					
	Derating =	18.18 %				
PC3 TLP721F (TRANSISTOR) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	29.0 °C	Tc =	79.0 °C
	Rj(Rch) - a =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.006 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	83.00 °C		
	Derating =	66.40 %				

(2) Component Derating List

Standard Mounting Position

Conditions Ta : 50°C
Vin : 100VAC
I_1 : 5A
I_2 : 3.1A

PC4 TLP721F (LED) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	31.1 °C	Tc =	81.1 °C		
	Rj(Rch) - a =	- °C/W	Pd(max) =	- W	I_F =	5.00 mA		
	ALLOWABLE I_F (max) ≈ 28mA (at Ta=83.3°C)							
	Derating =	17.86 %						
PC4 TLP721F (TRANSISTOR) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	31.1 °C	Tc =	81.1 °C		
	Rj(Rch) - a =	667 °C/W	Pd(max) =	0.15 W	Pd =	0.005 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	84.44 °C				
	Derating =	67.55 %						
PC5 TLP721F (LED) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	33.5 °C	Tc =	83.5 °C		
	Rj(Rch) - a =	- °C/W	Pd(max) =	- W	I_F =	0.00 mA		
	ALLOWABLE I_F (max) ≈ 33mA (at Ta=77.6°C)							
	Derating =	0.00 %						
PC5 TLP721F (TRANSISTOR) TOSHIBA	Tj(Tch)max =	125 °C	delta Tc =	33.5 °C	Tc =	83.5 °C		
	Rj(Rch) - a =	667 °C/W	Pd(max) =	0.15 W	Pd =	0 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	83.50 °C				
	Derating =	66.80 %						
D1 D5SB60 SHINDENGEN	Tj(Tch)max =	150 °C	delta Tc =	49.0 °C	Tc =	99.0 °C		
	Rj(Rch) - c =	3.4 °C/W	Pd(max) =	- W	Pd =	1.88 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd]	=	105.39 °C				
	Derating =	70.26 %						
D2 FSU05B60 NIHON INTER	Tj(Tch)max =	150 °C	delta Tc =	48.3 °C	Tc =	98.3 °C		
	Rj(Rch) - c =	5 °C/W	Pd(max) =	16 W	Pd =	0.6993 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	101.80 °C				
	Derating =	67.86 %						
D4 SF30SC4 SHINDENGEN	Tj(Tch)max =	150 °C	delta Tc =	50.7 °C	Tc =	100.7 °C		
	Rj(Rch) - c =	2 °C/W	Pd(max) =	- W	Pd =	3 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd]	=	106.70 °C				
	Derating =	71.13 %						
D5 ESAD92M-02R FUJI ELEC.	Tj(Tch)max =	150 °C	delta Tc =	33.8 °C	Tc =	83.8 °C		
	Rj(Rch) - c =	2 °C/W	Pd(max) =	- W	Pd =	2.17 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd]	=	88.14 °C				
	Derating =	58.76 %						
D100 SFPB-54V SHINDENGEN	Tj(Tch)max =	125 °C	delta Tc =	51.0 °C	Tc =	101.0 °C		
	Rj(Rch) - l =	155 °C/W	Pd(max) =	- W	Pd =	0.013 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd]	=	103.02 °C				
	Derating =	82.41 %						
D101 1SS184-TE85L SHINDENGEN	Tj(Tch)max =	125 °C	delta Tc =	55.2 °C	Tc =	105.2 °C		
	Rj(Rch) - c =	667 °C/W	Pd(max) =	0.15 W	Pd =	0 W		
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd]	=	105.20 °C				
	Derating =	84.16 %						

(2) Component Derating List

Standard Mounting Position

Conditions Ta : 50°C
Vin : 100VAC
I_1 : 5A
I_2 : 3.1A

D102 1SS184-TE85L TOSHIBA	Tj(Tch)max	=	125 °C	delta Tc	=	49.5 °C	Tc	= 99.5 °C
	Rj(Rch) - c	=	667 °C/W	Pd(max)	=	0.15 W	Pd	= 0 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-c) x Pd]		=	99.50 °C		
	Derating	=	79.60 %					
D103 U05NU44-TE12L TOSHIBA	Tj(Tch)max	=	150 °C	delta Tc	=	67.4 °C	Tc	= 117.4 °C
	Rj(Rch) - a	=	125 °C/W	Pd(max)	=	1 W	Pd	= 0.046 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	123.15 °C		
	Derating	=	82.10 %					
D104 D1FL20U-4063 SHINDENGEN	Tj(Tch)max	=	150 °C	delta Tc	=	50.0 °C	Tc	= 100.0 °C
	Rj(Rch) - a	=	157 °C/W	Pd(max)	=	- W	Pd	= 0.013 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	102.04 °C		
	Derating	=	68.03 %					
D106 1SS184-TE85L TOSHIBA	Tj(Tch)max	=	125 °C	delta Tc	=	44.2 °C	Tc	= 94.2 °C
	Rj(Rch) - a	=	667 °C/W	Pd(max)	=	0.15 W	Pd	= 0 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	94.20 °C		
	Derating	=	75.36 %					
D107 1SS226-TE85L TOSHIBA	Tj(Tch)max	=	125 °C	delta Tc	=	44.0 °C	Tc	= 94.0 °C
	Rj(Rch) - a	=	667 °C/W	Pd(max)	=	0.15 W	Pd	= 0 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	94.00 °C		
	Derating	=	75.20 %					
D108 D1FL20U-4063 SHINDENGEN	Tj(Tch)max	=	150 °C	delta Tc	=	58.7 °C	Tc	= 108.7 °C
	Rj(Rch) - a	=	157 °C/W	Pd(max)	=	- W	Pd	= 0.001 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	108.86 °C		
	Derating	=	72.57 %					
D109 D1FL20U-4063 SHINDENGEN	Tj(Tch)max	=	150 °C	delta Tc	=	54.4 °C	Tc	= 104.4 °C
	Rj(Rch) - a	=	157 °C/W	Pd(max)	=	- W	Pd	= 0.001 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	104.56 °C		
	Derating	=	69.70 %					
D110 CRS04-TE85L TOSHIBA	Tj(Tch)max	=	150 °C	delta Tc	=	49.5 °C	Tc	= 99.5 °C
	Rj(Rch) - a	=	140 °C/W	Pd(max)	=	0.7 W	Pd	= 0.001 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	99.64 °C		
	Derating	=	66.43 %					
D112 D1FL20U-4063 SHINDENGEN	Tj(Tch)max	=	150 °C	delta Tc	=	33.5 °C	Tc	= 83.5 °C
	Rj(Rch) - a	=	157 °C/W	Pd(max)	=	- W	Pd	= 0 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	83.50 °C		
	Derating	=	55.67 %					
D113 D1FL20U-4063 SHINDENGEN	Tj(Tch)max	=	150 °C	delta Tc	=	47.6 °C	Tc	= 97.6 °C
	Rj(Rch) - a	=	108 °C/W	Pd(max)	=	- W	Pd	= 0 W
	Tj(Tch)	=	Tc + [(Rj(Rch)-a) x Pd]		=	97.60 °C		
	Derating	=	65.07 %					

(2) Component Derating List

Standard Mounting Position

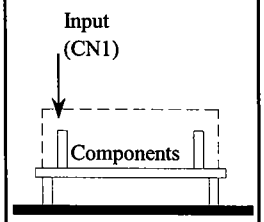
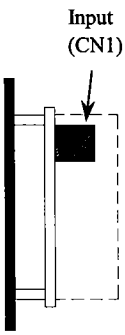
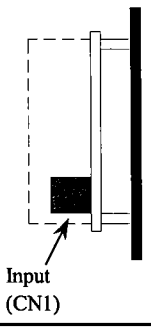
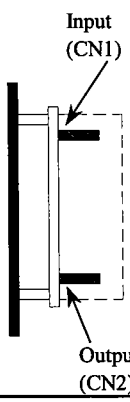
Conditions Ta : 50°C
Vin : 100VAC
I_1 : 5A
I_2 : 3.1A

D114 1SS184-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	34.0 °C	Tc =	84.0 °C
	Rj(Rch) - a =	125 °C/W	Pd(max) =	1 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	84.00 °C			
	Derating =	56.00 %				
ZD100 U1ZB27-TE12L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	43.6 °C	Tc =	93.6 °C
	Rj(Rch) - a =	125 °C/W	Pd(max) =	1 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	93.60 °C			
	Derating =	62.40 %				
ZD101 02CZ2.2-X-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	48.4 °C	Tc =	98.4 °C
	Rj(Rch) - c =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	98.40 °C			
	Derating =	65.60 %				
ZD103 U1ZB27-TE12L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	49.5 °C	Tc =	99.5 °C
	Rj(Rch) - a =	125 °C/W	Pd(max) =	1 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	99.50 °C			
	Derating =	66.33 %				
ZD104 02CZ15-Z-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	40.6 °C	Tc =	90.6 °C
	Rj(Rch) - a =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	90.60 °C			
	Derating =	60.40 %				
ZD105 02CZ11-X-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	40.6 °C	Tc =	90.6 °C
	Rj(Rch) - a =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	90.60 °C			
	Derating =	60.40 %				
ZD107 U1ZB27-TE12L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	32.0 °C	Tc =	82.0 °C
	Rj(Rch) - c =	125 °C/W	Pd(max) =	1 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	82.00 °C			
	Derating =	54.67 %				
ZD108 02CZ5.6-X-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	35.7 °C	Tc =	85.7 °C
	Rj(Rch) - a =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	85.70 °C			
	Derating =	57.13 %				
ZD109 02CZ30-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	34.0 °C	Tc =	84.0 °C
	Rj(Rch) - a =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-a) x Pd] =	84.00 °C			
	Derating =	56.00 %				
ZD110 02CZ2.2-X-TE85L TOSHIBA	Tj(Tch)max =	150 °C	delta Tc =	27.1 °C	Tc =	77.1 °C
	Rj(Rch) - c =	625 °C/W	Pd(max) =	0.2 W	Pd =	0 W
	Tj(Tch) =	Tc + [(Rj(Rch)-c) x Pd] =	77.10 °C			
	Derating =	51.40 %				

3. MAIN COMPONENTS TEMPERATURE RISE ΔT LIST

MODEL : ZWD100PAF-0524

Measuring Conditions

Mounting Method	A	B	C	D	E
(Standard Mounting Method: (A))					
Input (VAC)	100			100	
Output (VDC)	5, 24			5, 24	
Output Current (A)	5.0, 3.1			3, 1.9	

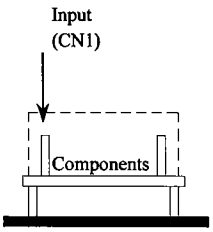
※ Condition Ta = 50°C , Convection cooling.

		ΔT List Temperature Rise (°C)				
Output Derating (%) Ta = 50°C		100			60	
Location No.	Parts Name	Mounting A	Mounting B	Mounting C	Mounting D	Mounting E
Q1	MOSFET	50.1	49.0	61.2	55.2	45.7
Q3	MOSFET	51.8	47.9	62.5	59.2	55.5
Q5	MOSFET	49.9	59.5	52.3	55.6	51.6
A1	I.C.	52.2	42.0	61.4	46.5	56.3
A100	CHIP I.C.	52.8	51.1	50.1	58.4	46.1
A101	CHIP I.C.	65.7	58.3	58.2	57.6	58.4
D1	BRIDGE DIODE	49.0	57.2	53.1	54.9	44.4
D2	DIODE	48.3	46.9	60.7	56.6	51.0
D4	S.B.D.	50.7	48.6	54.3	36.9	46.9
D5	L.L.D.	33.8	46.1	33.3	27.5	32.3
C6	CAP., ELECT	38.9	30.4	37.7	36.9	39.7
C8	CAP., ELECT	31.8	26.0	41.4	28.2	36.5
C9	CAP., ELECT	44.1	45.7	43.0	48.1	36.1
C10	CAP., ELECT	44.2	41.1	39.8	29.5	32.8
C13	CAP., ELECT	34.5	33.7	38.1	22.8	40.6
C15	CAP., ELECT	30.0	28.3	38.1	38.8	47.1
C16	CAP., ELECT	33.1	38.4	41.8	20.6	37.8
C18	CAP., ELECT	27.1	32.2	30.2	20.2	38.5
T1	TRANS. PULSE	52.7	48.1	51.5	40.1	47.0
T2	TRANS. PULSE	46.4	54.4	45.3	38.5	46.5
L2	BALUN COIL	45.4	56.6	60.4	43.5	28.1
L3	CHOKE COIL	70.9	69.7	70.6	58.5	55.5
L4	CHOKE COIL	42.5	42.7	50.0	44.0	41.7
L5	CHOKE COIL	47.5	49.7	44.0	27.0	39.9

4. ELECTROLYTIC CAPACITOR LIFETIME

MODEL : ZWD100PAF-0524

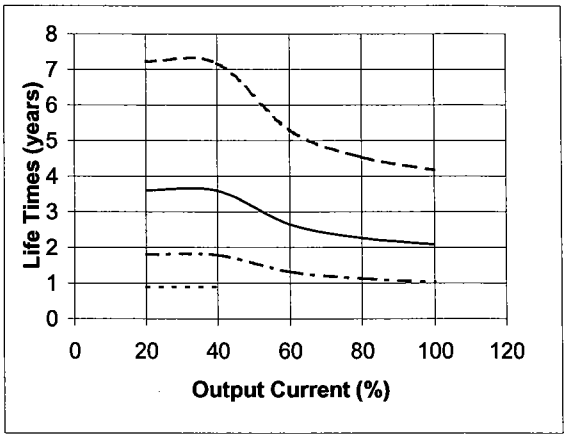
Mounting A



Ta = 30°C
= 40°C
= 50°C
= 60°C

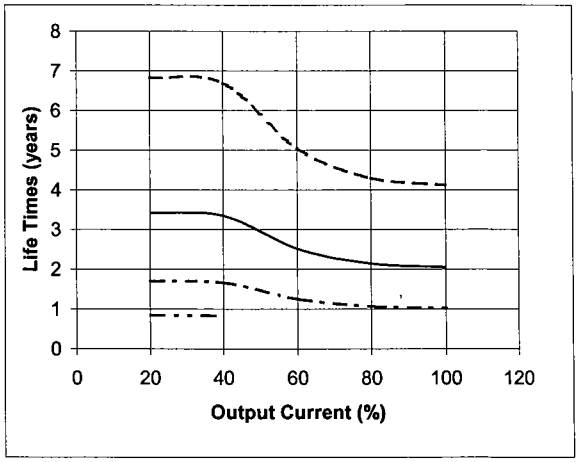
Vin = 100VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	7.2	3.6	1.8	0.9
40	7.2	3.6	1.8	0.9
60	5.3	2.6	1.3	-
80	4.5	2.3	1.1	-
100	4.2	2.1	1.0	-



Vin = 200VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	6.8	3.4	1.7	0.9
40	6.7	3.3	1.7	0.8
60	5.0	2.5	1.3	-
80	4.3	2.1	1.1	-
100	4.1	2.1	1.0	-

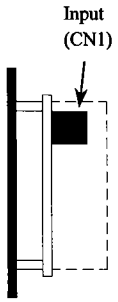


4. ELECTROLYTIC CAPACITOR LIFETIME

MODEL : ZWD100PAF-0524

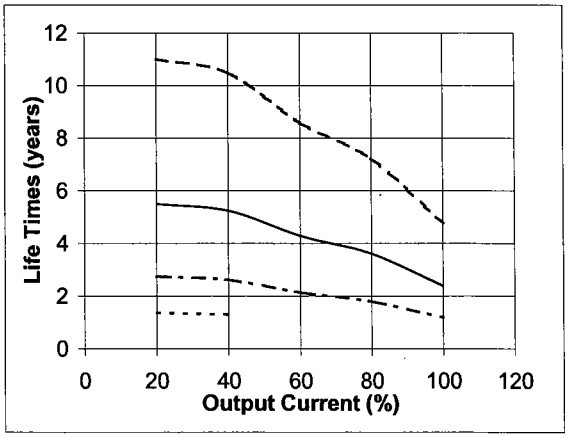
Ta = 30°C
= 40°C
= 50°C
= 60°C

Mounting B



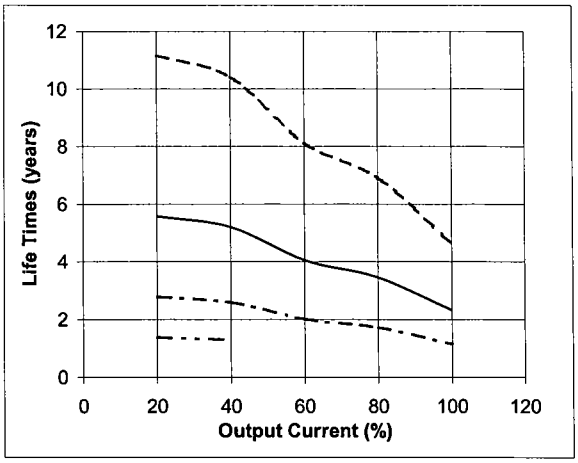
Vin = 100VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	11.0	5.5	2.8	1.4
40	10.5	5.2	2.6	1.3
60	8.6	4.3	2.1	-
80	7.2	3.6	1.8	-
100	4.8	2.4	1.2	-



Vin = 200VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	11.2	5.6	2.8	1.4
40	10.4	5.2	2.6	1.3
60	8.1	4.1	2.0	-
80	6.9	3.5	1.7	-
100	4.6	2.3	1.2	-

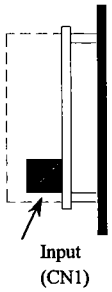


4. ELECTROLYTIC CAPACITOR LIFETIME

MODEL : ZWD100PAF-0524

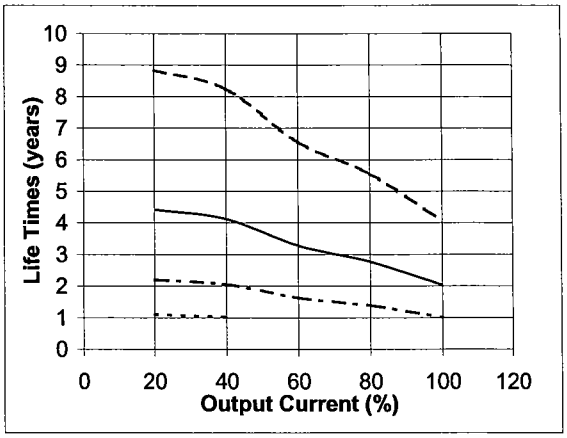
Ta = 30°C
= 40°C
= 50°C
= 60°C

Mounting C



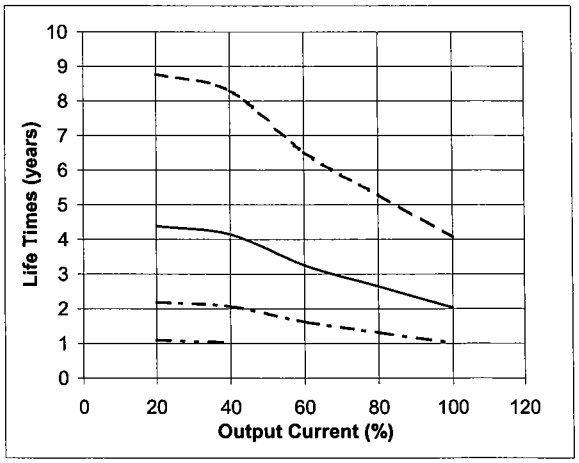
Vin = 100VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	8.8	4.4	2.2	1.1
40	8.2	4.1	2.1	1.0
60	6.6	3.3	1.6	-
80	5.6	2.8	1.4	-
100	4.1	2.0	1.0	-



Vin = 200VAC

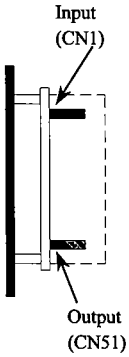
Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	8.8	4.4	2.2	1.1
40	8.3	4.2	2.1	1.0
60	6.5	3.3	1.6	-
80	5.3	2.6	1.3	-
100	4.1	2.0	1.0	-



4. ELECTROLYTIC CAPACITOR LIFETIME

MODEL : ZWD100PAF-0524

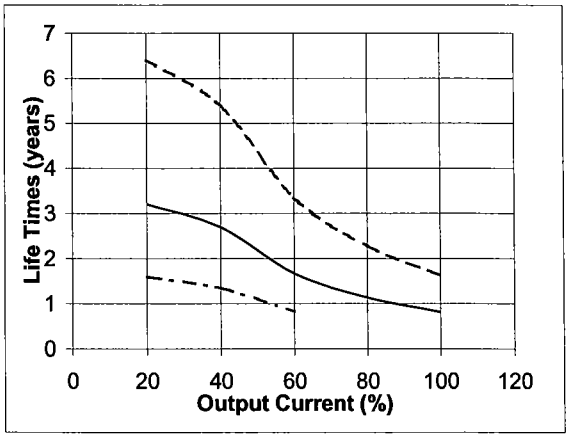
Mounting D



Ta = 30°C
= 40°C
= 50°C
= 60°C

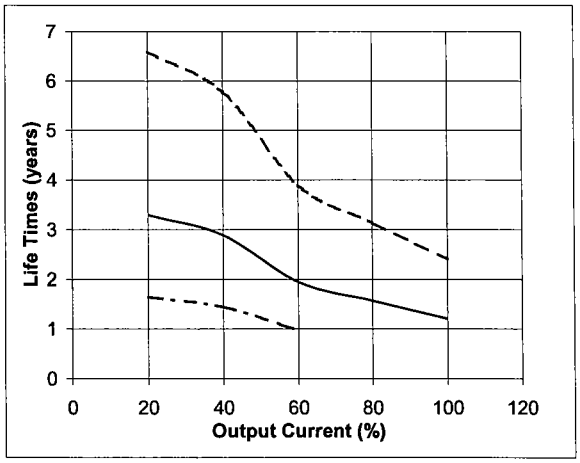
Vin = 100VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	6.4	3.2	1.6	0.8
40	5.4	2.7	1.3	-
60	3.3	1.7	0.8	-
80	2.3	1.1	-	-
100	1.6	0.8	-	-



Vin = 200VAC

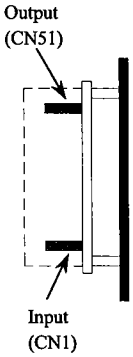
Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	6.6	3.3	1.6	0.8
40	5.8	2.9	1.4	-
60	3.9	1.9	1.0	-
80	3.1	1.6	-	-
100	2.4	1.2	-	-



4. ELECTROLYTIC CAPACITOR LIFETIME

MODEL : ZWD100PAF-0524

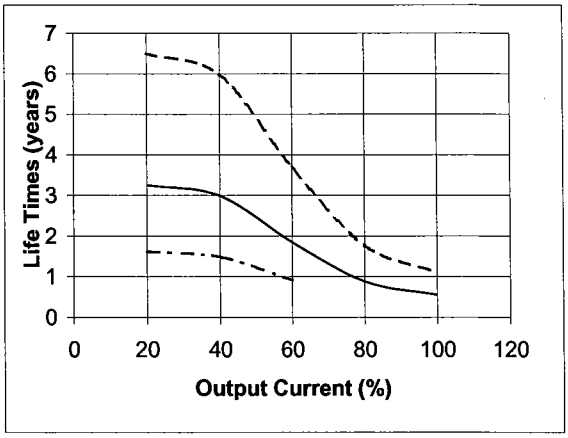
Mounting E



Ta = 30°C
= 40°C
= 50°C
= 60°C

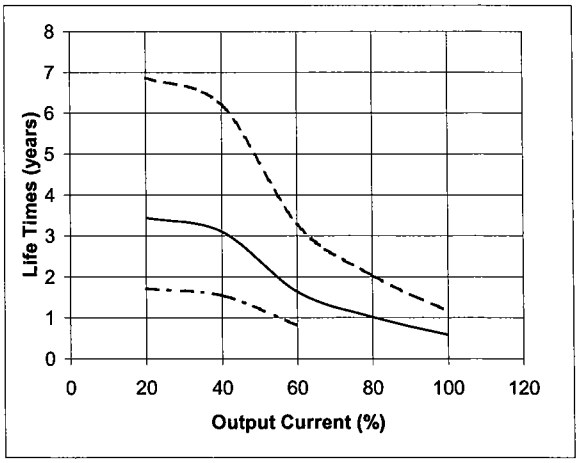
Vin = 100VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	6.5	3.3	1.6	0.8
40	6.0	3.0	1.5	-
60	3.7	1.8	0.9	-
80	1.8	0.9	-	-
100	1.1	0.6	-	-



Vin = 200VAC

Load (%)	Life Time (years)			
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C
20	6.9	3.4	1.7	0.9
40	6.2	3.1	1.6	-
60	3.3	1.6	0.8	-
80	2.0	1.0	-	-
100	1.2	0.6	-	-



5. ABNORMAL TEST

MODEL : ZWD100PAF-0524

(1) Test Condition and Circuit

Input Voltage : 200VAC Output Current : 100% Ta : 25°C

(2) Test Results

(Da: Damaged)

No.	Test Position		Test Mode		Test Results												
					1	2	3	4	5	6	7	8	9	10	11	12	
	LOCATION	TEST POINT	SHORT	OPEN	FIRE	SMOKE	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOW	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHER	NOTE
1	Q1	G		●												●	Input Power Increase
		D		●												●	Input Power Increase
		S		●												●	Input Power Increase
		G - S	●													●	Input Power Increase
		D - G	●							●	●			●			Da: ZD100
		D - S	●								●			●			
2	Q3	G		●						●				●		●	Da:Q3,D103,D110,R135,R131,R133,A 1
																	ZD103,ZD102
		D		●										●			
		S		●										●			
		G - S	●											●			
		D - G	●							●	●			●			Da: A1,ZD103
		D - S	●							●	●			●			Da: Q3,D100,D110
3	Q5	G		●						●	●			●			Da: Q5,D112,R200,R201
		D		●										●			Only for CH2
		S		●										●			Only for CH2
		G - S	●											●			Only for CH2
		D - G	●							●	●			●			Da: ZD107,D112, R200,R201
		D - S	●							●	●			●			Da: D112, R200,R201
4	D1	AC - AC	●								●			●			
		AC - DC	●								●			●			
		AC		●										●			
		DC		●										●			
5	D2		●							●	●			●			Da: Q1
				●						●	●			●			Da: Q1
6	D4	A1		●											●		
		A2		●											●		
		K		●										●			
		A1 - K	●							●				●			Da: D103
		A2 - K	●							●				●			Da: D103
7	D5	A1		●										●			Only for CH2
		A2		●										●			Only for CH2
		K		●										●			Only for CH2
		A1 - K	●													●	Output Voltage Low Only For CH2
		A2 - K	●													●	Output Voltage Low Only For CH2
8	D103	A - K	●							●	●			●		●	Da: Q3
		A - K		●											●		
9	D104	A - K	●											●			
		A - K		●												●	Output Hiccup
10	D108	A - K	●													●	Output Hiccup
		A - K		●												●	Output Hiccup
11	D109	A - K	●													●	Output Hiccup
		A - K		●												●	Output Hiccup

5. ABNORMAL TEST

MODEL : ZWD100PAF-0524

(1) Test Condition and Circuit

Input Voltage : 200VAC Output Current : 100% Ta : 25°C

(2) Test Results

(Da: Damaged)

No.	Test Position		Test Mode		Test Results												
					1	2	3	4	5	6	7	8	9	10	11	12	
	LOCATION	TEST POINT	SHORT	OPEN	FIRE	SMOKE	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOW	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHER	NOTE
12	D113	A - K	●											●			Only For CH2
		A - K		●												●	Output Hiccup Only For CH2
13	ZD102		●											●			
				●											●		
14	ZD110		●												●		
				●										●			
14	A1	1		●										●			
		2		●										●			
		3		●										●			
		4		●										●			
		5		●										●			
		6		●										●			
		7		●										●			
		8		●										●			
15	A100	1 - 2	●											●			
		2 - 3	●												●		
		3 - 4	●												●		
		4 - 5	●													●	Low Output
		5 -6	●													●	Low Output
		6 -7	●												●		
		7 - 8	●													●	Low Output
		9 - 10	●												●		
		10 - 11	●												●		
		11 - 12	●												●		
		12 - 13	●												●		
		13 - 14	●													●	Low Output
		14 - 15	●												●		
		15 - 16	●											●			
16	A101	1 - 2	●												●		
		2 - 3	●											●			Only For CH2
		3 - 4	●												●		
		4 - 5	●												●		
		6 - 7	●												●		
		7 - 8	●												●		
		9 - 10	●											●			Only For CH2
		11 - 12	●											●			Only For CH2
		12 - 13	●											●			Only For CH2
		13 - 14	●												●		
		14 - 15	●												●		
		18 - 19	●												●		
		19 - 20	●											●			Only For CH2
17	T1	2,3 - 4,5	●								●			●			Da: D103,D104,Q3,R128,R129
		7 - 8	●											●			
		9 - 10	●											●			
		2,3		●										●			
		7		●												●	Output Hiccup
		9		●												●	Output Hiccup

5. ABNORMAL TEST

MODEL : ZWD100PAF-0524

(1) Test Condition and Circuit

Input Voltage : 200VAC Output Current : 100% Ta : 25°C

(2) Test Results

(Da: Damaged)

No.	Test Position		Test Mode		Test Results												
					1	2	3	4	5	6	7	8	9	10	11	12	
	LOCATION	TEST POINT	SHORT	OPEN	FIRE	SMOKE	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOW	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHER	NOTE
18	T2	1 - 2	●													●	Output Hiccup Only for CH2
		2 - 4	●							●	●			●			Da: D103
		3 - 4	●											●			Only for CH2
		6,7 - 8,9	●											●			Only for CH2
		1		●												●	Output Voltage Low Only for CH2
		3		●										●			Only for CH2
		6,7		●										●			Only for CH2
19	L3	1 - 5	●											●			
		7 - 8	●													●	Output Voltage Unstable
		1		●										●			
		7		●												●	Output Voltage Unstable
		8		●												●	Output Voltage Unstable
20	L4		●												●		Only for CH1
				●										●			Only for CH1
21	L5		●													●	Output Voltage Low Only for CH2
				●										●			Only for CH2
22	C6		●								●			●			
				●						●	●			●			Da: Q1
23	C13		●											●			Da: D103,D104,D4,Q3,R128,R129
				●												●	Output Noise Increase only For CH1
24	C18		●									●		●			Only For CH2. CH1 No Changed
				●												●	Output Noise Increase only For CH2
25	R5		●												●		
				●										●			
26	R155		●												●		
				●												●	Input Power Increase

6. VIBRATION TEST

MODEL : ZWD100PAF-0524

(1) Vibration Test Class
Frequency Variable Endurance Test

(2) Equipment Used

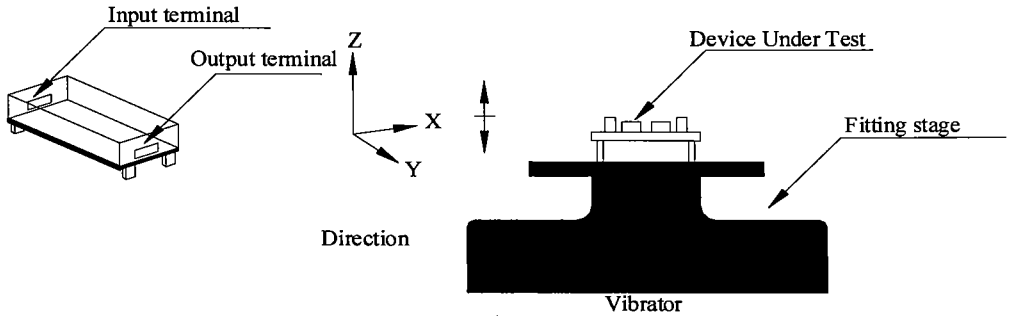
Controller	:	F-400-BM-E47 (EMIC CORP.)
Vibrator	:	905-FN (EMIC CORP.)

(3) The Number Of D.U.T. (Device Under Test)
1 Units : ZWD100

(4) Test Conditions

Sweep Frequency	:	10 - 55Hz	Direction	:	X, Y, Z
Sweep Time	:	1 min.	Test Time	:	1 hour each axis
Acceleration	:	Constant 19.6m/s^2 (2G)			

(5) Test Method



(6) Test results - OK

Test Conditions :- Vin = 100 VAC I1 = 5A
Ambient Temperature = 25 °C I2 = 4A

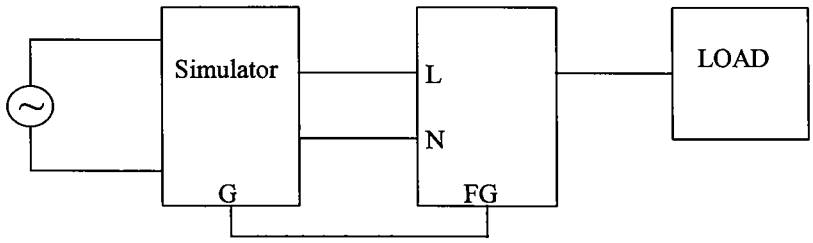
Output Voltage		V1	V2	D.U.T	V1	V2	D.U.T
Check Item		Output Voltage(V)		State	Ripple & Noise (mV)		State
Before Test		5.004	24.001	OK	36	62	OK
After test	X	5.004	23.989	OK	40	59	OK
	Y	5.003	23.972	OK	38	60	OK
	Z	5.004	23.953	OK	42	61	OK

7. NOISE SIMULATION TEST

MODEL : ZWD100PAF-0524

(1) Test Circuit And Equipment

Noise Simulator : ENS-24X SANKI E.IND



(2) Test Conditions

Input voltage	:	100 , 230VAC	Noise level	:	0V - 2KV
Output Voltage	:	Rated	Phase shift	:	0° - 360°
Output Current	:	0%, 100%	Polarity	:	+ , -
Ambient Temperature	:	25°C	Mode	:	NORMAL, COMMON
Pulse width	:	50ns - 1000ns	Trig Select	:	LINE

(3) Acceptable Conditions

1. Nothing broken.
2. Output does not shut down.
3. No other abnormalities.

(5) Test results - OK

8. THERMAL SHOCK TEST

MODEL : ZWD100PAF-0524

(1) Equipment Used

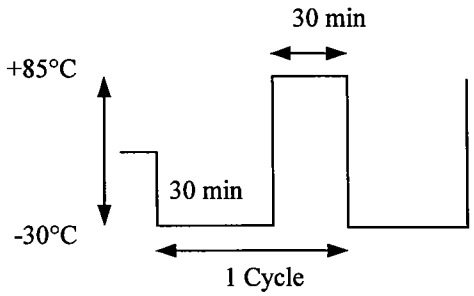
Thermal Shock Chamber TSA - 715 - A (ESPEC CORP.)

(2) The Number Of D.U.T. (Device Under Test)

1 units

(3) Test Conditions

Ambient Temperature	:	-30°C ~ +85°C
Test Time	:	Refer to drawing
Test Cycle	:	100 Cycles
Not Operating		



(4) Test Method

Before testing, check if there is no abnormal output, then put the D.U.T. in testing chamber, and test it according to the above cycle. 100 cycles later, leave it for 1 hour at the room temperature, then check if there is no abnormal output.

(5) Test Results - OK

Vin : 100VAC
I1 : 5A
I2 : 4A

			V1				V2			
			From		To		From		To	
Ripple & Noise		mv	35		29		61		69	
Line Regulation	MIN	V	4.9893	0.3mV	5.0055	1.2mV	23.965	2mV	23.967	3mV
	MAX	V	4.9896		5.0067		23.967		23.970	
Load Regulation	0%	V	4.9895	1mV	5.0067	1mV	23.966	10mV	23.968	10mV
	100%	V	4.9905		5.0077		23.976		23.978	
Solder Condition • etc			OK							