

KWD15

RELIABILITY DATA

信頼性データ

No. RD-08T-743A		
承認	査閲	担当
<i>Kinsawa</i>	<i>Y. Kihama</i>	<i>M. Nagai</i>
<i>31. Oct. '08</i>	<i>30. Oct. '08</i>	<i>30. Oct. '08</i>

I N D E X

	PAGE
1. MTBF 計算値 Calculated Values of MTBF	2/40
2. 部品ディレーティング Component Derating	3/40～6/40
3. 部品温度上昇値 Components Temperature Rise ΔT List	7/40
4. 電解コンデンサ推定寿命計算値 Electrolytic Capacitor Lifetime Versus Load	8/40～17/40
5. アブノーマル試験 Abnormal Test	18/40～32/40
6. 振動試験 Vibration Test	33/40～34/40
7. ノイズシミュレート試験 Noise Simulate Test	35/40
8. 静電気シミュレート試験 Electro-Static Discharge Test	36/40
9. 雷サージ試験 Impulse Test	37/40
10. 雑音端子電圧 EMI Test	38/40～40/40

※信頼性試験は代表データであり、この値は実力値とお考え願います。

※本データに掲載してあります内蔵部品の名称は、本製品を開発した当初のものです。

これらは改善等の為に変更されている可能性もありますが、ご了承下さい。

The following data are typical values and the data to be considered as ability values.

The built-in components names on this data are the things the time of Development.

Please understand that it may be changed for an improvement etc.

M . T . B . F

1. Method of calculation

This calculation is by the components count method' laid down by the DC Stabilized Power Supplies (Switching mode) committee of EIAJ.

The MTBF is determined by means of a fixed component failure rate λ_o given to each component and the number of component count of each type of component. λ_o is determined based on MIL-HDBK-217D.

Please refer to the EIAJ handbook no. RCF-9021 for detail.

Formula:

$$MTBF = \frac{1}{\lambda_{o\text{equip}}} = \frac{1}{\sum_{i=1}^n N_i(\lambda_o)_i} \times 10^6 \quad (\text{Hrs})$$

$\lambda_{o\text{equip}}$ = Total equipment failure rate (Failures/10⁶hrs)

λ_o = Failure rate of the ith component

N_i = Number of ith component

n = Number of categories of components

2. MTBF Value

MTBF = 80,866 hrs.

Components Derating Data

(At Nominal Line and Rated Load, Ambient Temperature 50°C)

Calculation Method

A. Semiconductors

The derating factor is taken as the ratio of the actual operating junction temperature taking into consideration operating ambient temperature, power loss and thermal resistance to the maximum rated junction temperature specifications of the components.

B. IC, Resistors, Capacitors etc.

Operating ambient temperature, operating condition, power loss for each individual component are all designed to meet the requirements of Nemic-Lambda's design standard.

C. Thermal Resistance Calculation

$$\theta_{jc} = \frac{T_j(\max) - T_c}{P_c(\max)}$$

$$\theta_{ja} = \frac{T_j(\max) - T_a}{P_c(\max)}$$

T_c : Case Temperature (Normally 25°C)

T_a : Ambient Temperature (Normally 25°C)

P_c(max) : Maximum Power Loss

T_j(max) : Maximum Junction Temperature

θ_{jc} : Junction to Case Thermal Resistance

θ_{ja} : Junction to ambient Thermal Resistance

認 APPD		設 計 ENGR		図面番号 DWG - No. PA775-56-02 -
検 図 CHK		製 図 DWG		

SEMICONDUCTOR DERATING

DWG. NO. : PA775-56-03

DATE : 6-DEC-92

MODEL : KWD15-1212

VIN = AC 100V

LOAD = 100%

Ta = 50°C

Q1 2SK1510 FUJI	Tchmax = 150 °C	$\Theta_{ch-c} = 1.563$ °C/W	Pdmax = 80.0 W
	Pd = 0.64 W	$\Delta T_c = 41.2$ °C	Tc = 91.2 °C
	Tch = Tc + (Θ_{ch-c})*Pd = 92.2 °C		
	D.F. = 61.5 %		
Q2 2SC2873-Y TOSHIBA	Tjmax = 150 °C	$\Theta_{j-c} = 125$	Pdmax = 1 W
	Pd = 0 W	$\Delta T_c = 33.0$ °C	Tc = 83.0 °C
	Tj = Tc + (Θ_{j-c})*Pd = 83.0 °C		
	D.F. = 55.3 %		
A1 UC2842ADW UNITRODE	Tjmax = 150 °C	$\Theta_{j-c} = 70$ °C/W	Pdmax = 0.725 W
	Pd = 0.435 W	$\Delta T_c = 36.3$ °C	Tc = 86.3 °C
	Tj = Tc + (Θ_{j-c})*Pd = 116.8 °C		
	D.F. = 77.9 %		
A2 HA17431UA HITACHI	Tjmax = 125 °C	$\Theta_{j-c} = 259.7$ °C/W	Pdmax = 0.39 W
	Pd = 17.77 mW	$\Delta T_c = 32.8$ °C	Tc = 82.8 °C
	Tj = Tc + (Θ_{j-c})*Pd = 87.4 °C		
	D.F. = 69.9 %		
PC1 (LED) TLP121GR TOSHIBA	Tjmax = 125 °C	$\Theta_{j-c} = 400$ °C/W	Pdmax = 50 mW
	If = 1.3 mA	$\Delta T_c = 33.8$ °C	Tc = 83.8 °C
	ALLOWABLE If (max) = 29.0 mA (at 83.8 °C)		
	D.F. = 4.5 %		
PC1 (TRANSISTOR) TLP121GR TOSHIBA	Tjmax = 125 °C	$\Theta_{j-c} = 400$ °C/W	Pdmax = 150 mW
	Pd = 5.2 mW	$\Delta T_c = 33.8$ °C	Tc = 83.8 °C
	Tj = Tc + (Θ_{j-c})*Pd = 85.9 °C		
	D.F. = 68.7 %		
D1 S1WB(A)60B SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 10$ °C/W	Pdmax = 12.5 W
	Pd = 0.286 W	$\Delta T_l = 41.4$ °C	T(lead) = 91.4 °C
	Tj = Tl + (Θ_{j-l})*Pd = 94.3 °C		
	D.F. = 62.9 %		

SEMICONDUCTOR DERATING

DWG. NO. : PA775-56-04

DATE : 6-DEC-92

MODEL : KWD15-1212

VIN = AC 100V

LOAD = 100%

Ta = 50°C

D2 EC8FS6 NIHON-INTER	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 37 mW	$\Delta T_l = 41.0$ °C	T(lead) = 91.0 °C
	Tj = Tl + (Θ_{j-l})*Pd = 91.9 °C		
	D.F. = 61.3 %		
D3 1SS184TE85L TOSHIBA	Tjmax = 125 °C	$\Theta_{j-l} = 100$ °C/W	Pdmax = 150 mW
	Pd = 0 W	$\Delta T_l = 40.2$ °C	T(lead) = 90.2 °C
	Tj = Tl + (Θ_{j-l})*Pd = 90.2 °C		
	D.F. = 72.2 %		
D4 1SS184TE85L TOSHIBA	Tjmax = 125 °C	$\Theta_{j-l} = 100$ °C/W	Pdmax = 150 mW
	Pd = 10.8 mW	$\Delta T_l = 37.2$ °C	T(lead) = 87.2 °C
	Tj = Tl + (Θ_{j-l})*Pd = 88.3 °C		
	D.F. = 70.6 %		
D5 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 28.6 mW	$\Delta T_l = 39.3$ °C	T(lead) = 89.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 90.0 °C		
	D.F. = 60.0 %		
D6 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.159 W	$\Delta T_l = 52.7$ °C	T(lead) = 102.7 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.4 °C		
	D.F. = 70.9 %		
D7 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.7$ °C	T(lead) = 102.7 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.8 °C		
	D.F. = 71.2 %		
D8 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.7$ °C	T(lead) = 102.7 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.8 °C		
	D.F. = 71.2 %		

SEMICONDUCTOR DERATING

DWG. NO. : PA775-56-05

DATE : 6-DEC-92

MODEL : KWD15-1212

VIN = AC 100V

LOAD = 100%

Ta = 50°C

D9 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.7$ °C	T(lead) = 102.7 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.8 °C		
	D.F. = 71.2 %		
D10 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.3$ °C	T(lead) = 102.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.4 °C		
	D.F. = 70.9 %		
D11 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.3$ °C	T(lead) = 102.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.4 °C		
	D.F. = 70.9 %		
D12 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.3$ °C	T(lead) = 102.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.4 °C		
	D.F. = 70.9 %		
D13 D1FL20U SHINDENGEN	Tjmax = 150 °C	$\Theta_{j-l} = 23$ °C/W	Pdmax = 5.43 W
	Pd = 0.179 W	$\Delta T_l = 52.3$ °C	T(lead) = 102.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 106.4 °C		
	D.F. = 70.9 %		
ZD1 1N4744A MOTOROLA	Tjmax = 200 °C	$\Theta_{j-l} = 175$ °C/W	Pdmax = 1 W
	Pd = 0 W	$\Delta T_l = 37.2$ °C	T(lead) = 87.2 °C
	Tj = Tl + (Θ_{j-l})*Pd = 87.2 °C		
	D.F. = 43.6 %		
ZD2 02CZ12-Z TOSHIBA	Tjmax = 150 °C	$\Theta_{j-l} = 100$ °C/W	Pdmax = 150 mW
	Pd = 21.6 mW	$\Delta T_l = 32.3$ °C	T(lead) = 82.3 °C
	Tj = Tl + (Θ_{j-l})*Pd = 84.5 °C		
	D.F. = 56.3 %		

Δ T TEMPERATURE RISE

DWG. NO. PA775-66-02

MODEL : KWD15-1212

DATE : 6-DEC-92

INPUT VOLTAGE = 100VAC

Ta = 50°C		Δ T TEMPERATURE RISE (°C)				
OUTPUT DERATING (%)		100%	100%	100%	100%	100%
SYMBOL	PARTS NAME	MOUNTING A	MOUNTING B	MOUNTING C	MOUNTING D	MOUNTING E
Q1	MOSFET	41.2	42.8	41.9	42.5	41.6
A1	PWM IC	36.3	39.2	36.9	38.7	37.0
D6	UFRD	52.7	49.7	50.5	49.3	50.3
D11	UFRD	52.3	54.3	54.6	53.5	54.7
C6	E. CAP	34.2	34.6	32.6	33.6	33.0
C18	OS CAP	34.6	34.1	33.6	34.4	36.8
C21	OS CAP	33.3	30.3	32.2	31.7	34.0

INPUT VOLTAGE = 200VAC

Ta = 50°C		Δ T TEMPERATURE RISE (°C)				
OUTPUT DERATING (%)		100%	100%	100%	100%	100%
SYMBOL	PARTS NAME	MOUNTING A	MOUNTING B	MOUNTING C	MOUNTING D	MOUNTING E
Q1	MOSFET	48.4	49.7	47.8	47.8	47.5
A1	PWM IC	42.2	41.8	38.6	40.1	38.6
D6	UFRD	53.4	53.6	53.6	54.0	54.1
D11	UFRD	54.5	54.5	54.2	54.7	58.6
C6	E. CAP	37.1	38.2	35.1	35.9	35.7
C18	OS CAP	36.0	39.6	39.0	38.9	31.0
C21	OS CAP	30.8	31.1	34.0	35.6	36.8

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

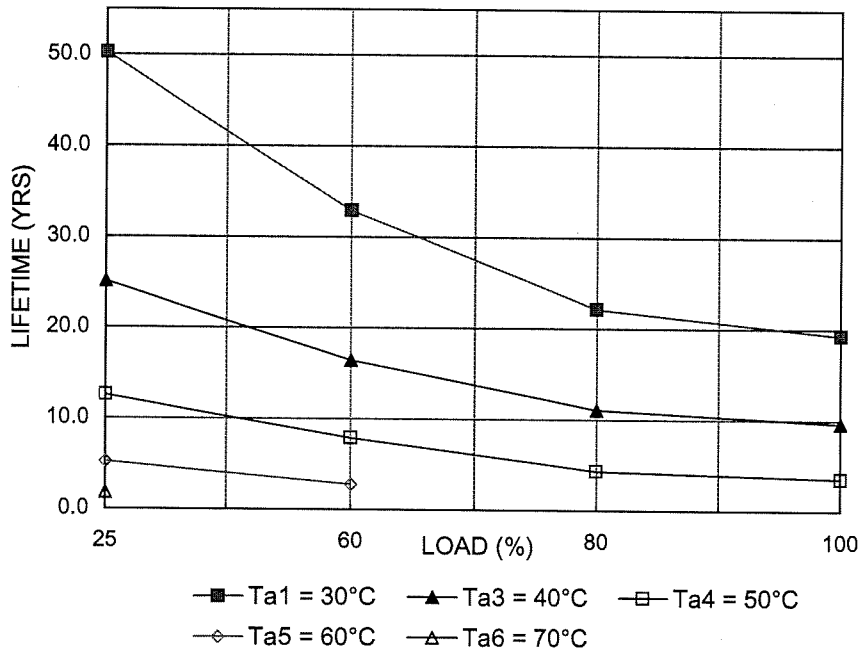
MOUNTING : A

VIN : 100VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	50.2	25.1	12.6	5.2	1.8
60	32.9	16.5	7.9	2.8	
80	22.2	11.1	4.3		
100	19.3	9.7	3.6		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING A KWD15-1212



計算式 **FORMULA**

1. アルミ電解コンデンサ
AL. Electrolytic capacitor
 $L = L_o \times 2^{(105-T_c)/10}$ (year) L : 電解コンデンサ推定寿命計算値
 Elec. Capacitor computed life.
 (24時間連続稼動、365日)
 (24 hrs per day, 365 days per year)

2. OSコンデンサ
O.S capacitor
 $L = L_o \times 10^{(105-T_c)/22}$ (year) L_o : 電解コンデンサ保証寿命値
 Guarantee life for Elec. cap.
 T_c : 電解コンデンサのケース温度
 Case temperature of Elec. cap.

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

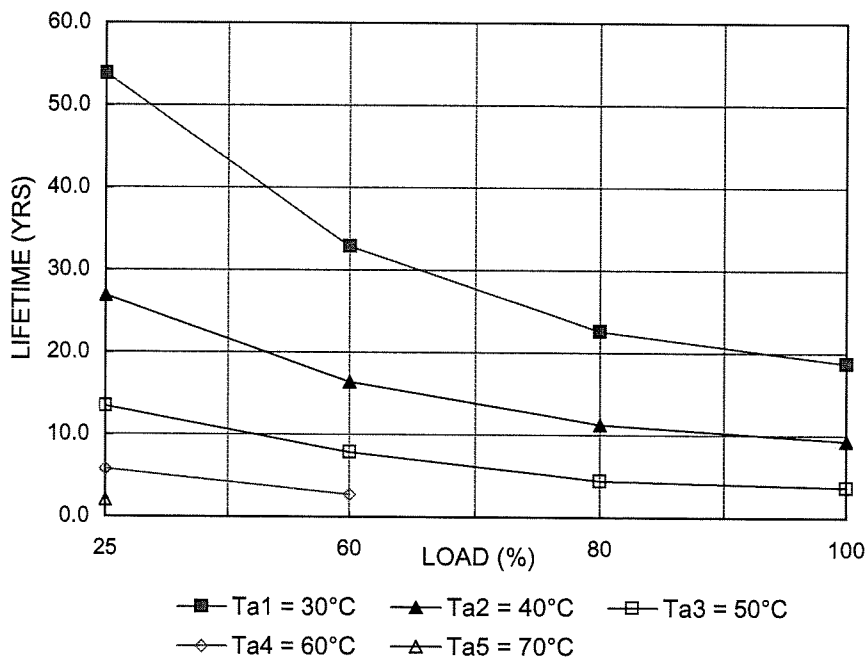
MOUNTING : B

VIN : 100VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	53.9	26.9	13.5	5.8	2.0
60	32.9	16.5	7.9	2.8	
80	22.6	11.3	4.5		
100	18.8	9.4	3.8		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING B KWD15-1212



計算式 **FORMULA**

- | | | | |
|--|----------------|---|--|
| <p>1. アルミ電解コンデンサ
AL. Electrolytic capacitor</p> <p>$L = L_o \times 2^{(105-T_c)/10}$ (year)</p> | L | : | <p>電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year)</p> |
| <p>2. OSコンデンサ
O.S capacitor</p> <p>$L = L_o \times 10^{(105-T_c)/22}$ (year)</p> | L _o | : | <p>電解コンデンサ保証寿命値
Guarantee life for Elec. cap.</p> |
| | T _c | : | <p>電解コンデンサのケース温度
Case temperature of Elec. cap.</p> |

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

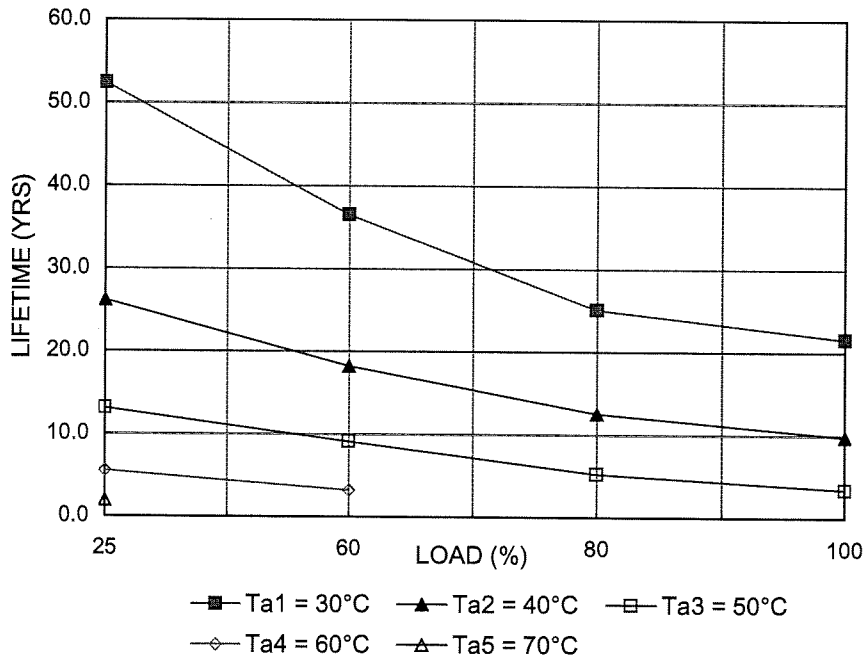
MOUNTING : C

VIN : 100VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	52.4	26.2	13.1	5.6	2.0
60	36.5	18.3	9.1	3.2	
80	25.1	12.6	5.2		
100	21.6	9.8	3.5		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING C KWD15-1212



計算式 **FORMULA**

1. アルミ電解コンデンサ
AL. Electrolytic capacitor
 $L = L_o \times 2^{(105-T_c)/10}$ (year) L : 電解コンデンサ推定寿命計算値
 Elec. Capacitor computed life.
 (24時間連続稼動、365日)
 (24 hrs per day, 365 days per year)

2. OSコンデンサ
O.S capacitor
 $L = L_o \times 10^{(105-T_c)/22}$ (year) L_o : 電解コンデンサ保証寿命値
 Guarantee life for Elec. cap.
 T_c : 電解コンデンサのケース温度
 Case temperature of Elec. cap.

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

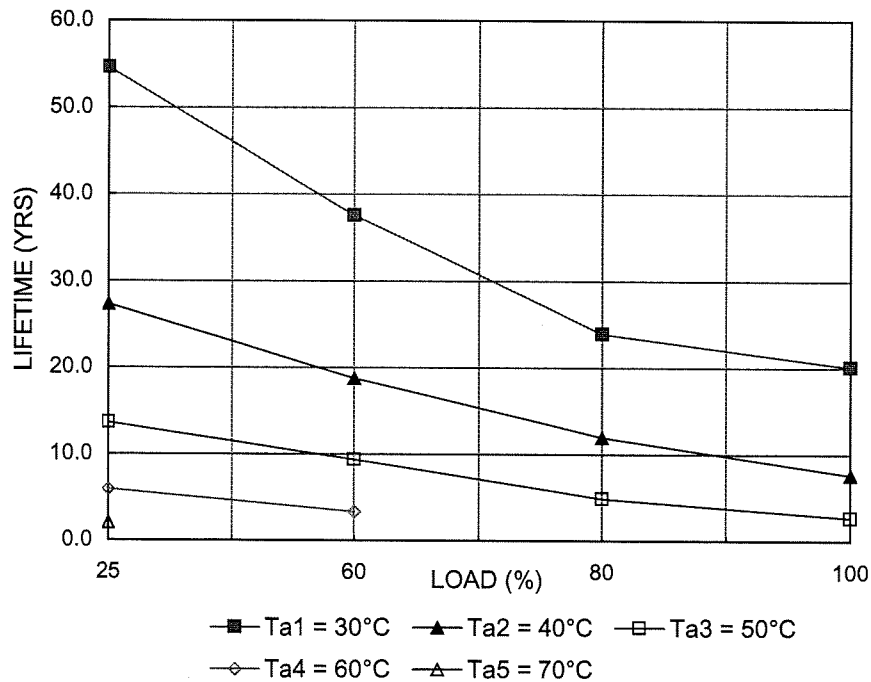
MOUNTING : D

VIN : 100VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	54.6	27.3	13.7	5.9	2.1
60	37.6	18.8	9.4	3.4	
80	23.9	12.0	4.9		
100	20.1	7.6	2.7		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING D KWD15-1212



計算式 FORMULA

- | | | | |
|---|-------|---|--|
| 1. アルミ電解コンデンサ
AL. Electrolytic capacitor | L | : | 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life. |
| $L = L_0 \times 2^{(105-T_c)/10}$ (year) | | | (24時間連続稼働、365日)
(24 hrs per day, 365 days per year) |
| 2. OSコンデンサ
O.S capacitor | L_0 | : | 電解コンデンサ保証寿命値
Guarantee life for Elec. cap. |
| $L = L_0 \times 10^{(105-T_c)/22}$ (year) | T_c | : | 電解コンデンサのケース温度
Case temperature of Elec. cap. |

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

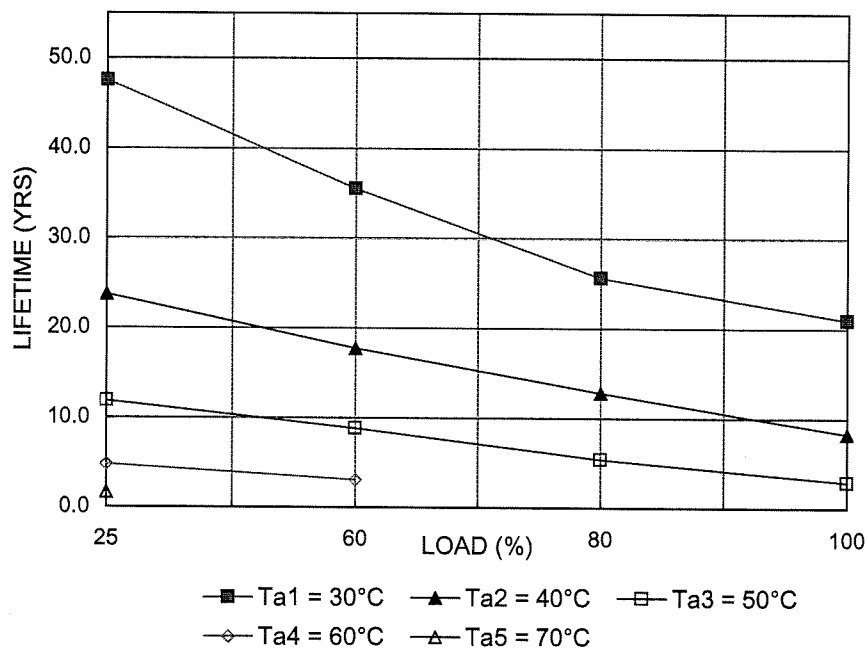
MOUNTING : E

VIN : 100VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	47.5	23.8	11.9	4.8	1.7
60	35.5	17.8	8.9	3.1	
80	25.7	12.8	5.4		
100	21.0	8.3	2.9		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING E KWD15-1212



計算式 FORMULA

- | | |
|---|--|
| 1. アルミ電解コンデンサ
AL. Electrolytic capacitor
$L = L_0 \times 2^{(105-T_c)/10}$ (year) | L : 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year) |
| 2. OSコンデンサ
O.S capacitor
$L = L_0 \times 10^{(105-T_c)/22}$ (year) | L ₀ : 電解コンデンサ保証寿命値
Guarantee life for Elec. cap.
T _c : 電解コンデンサのケース温度
Case temperature of Elec. cap. |

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

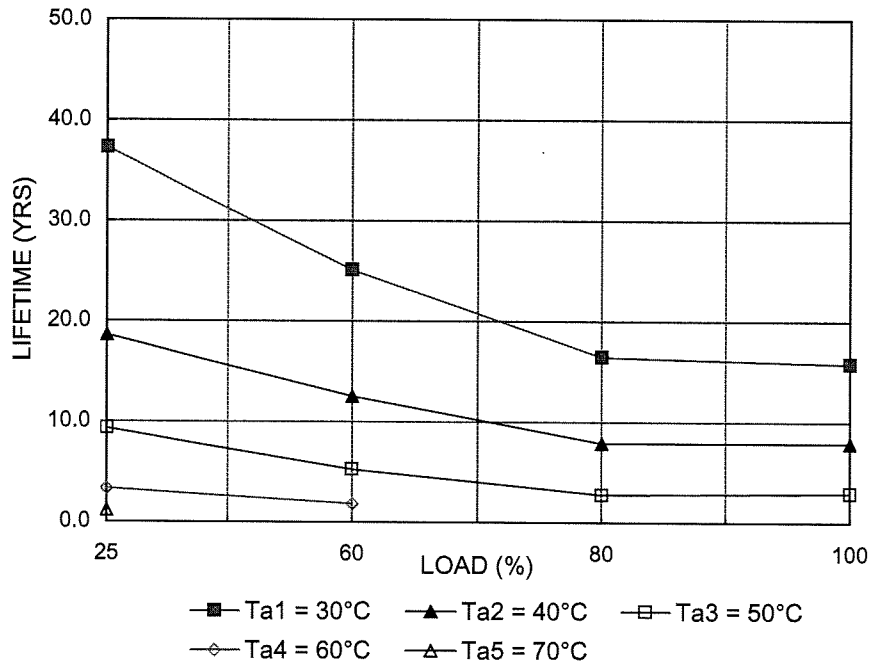
MOUNTING : A

VIN : 200VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	37.3	18.6	9.3	3.3	1.2
60	25.1	12.6	5.2	1.8	
80	16.5	7.9	2.8		
100	15.8	7.9	2.9		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING A KWD15-1212



計算式 FORMULA

- | | |
|---|--|
| <p>1. アルミ電解コンデンサ
AL. Electrolytic capacitor
$L = L_o \times 2^{(105-T_c)/10}$ (year)</p> | <p>L : 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year)</p> |
| <p>2. OSコンデンサ
O.S capacitor
$L = L_o \times 10^{(105-T_c)/22}$ (year)</p> | <p>L_o : 電解コンデンサ保証寿命値
Guarantee life for Elec. cap.
T_c : 電解コンデンサのケース温度
Case temperature of Elec. cap.</p> |

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

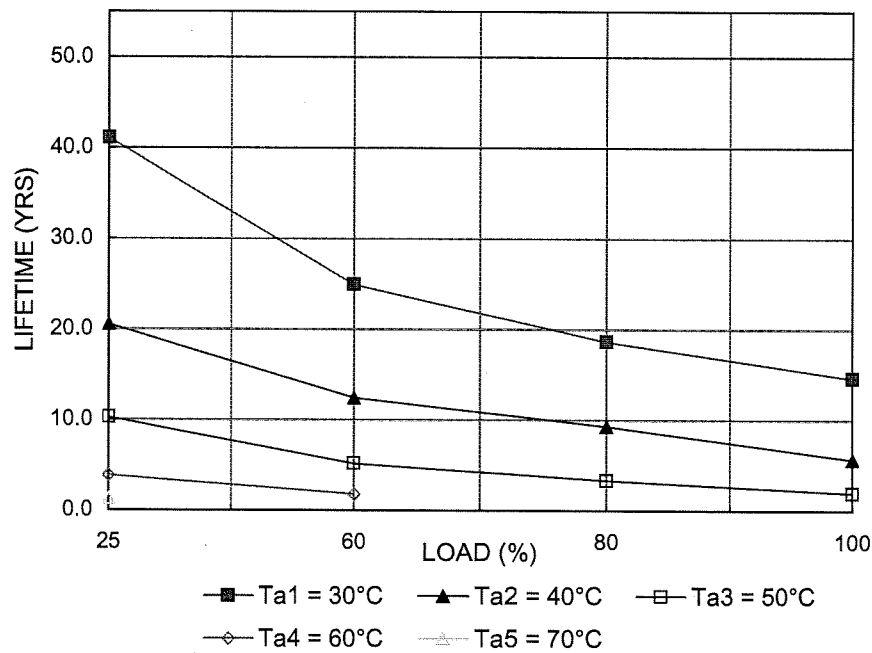
MOUNTING : B

VIN : 200VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	41.1	20.5	10.3	3.9	1.4
60	25.0	12.5	5.2	1.8	
80	18.6	9.3	3.3		
100	14.6	5.7	2.0		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING B KWD15-1212



計算式 FORMULA

1. アルミ電解コンデンサ
AL. Electrolytic capacitor

$$L = L_0 \times 2^{(105-T_c)/10} \quad (\text{year})$$

2. OSコンデンサ
O.S capacitor

$$L = L_0 \times 10^{(105-T_c)/22} \quad (\text{year})$$

L : 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year)

L₀ : 電解コンデンサ保証寿命値
Guarantee life for Elec. cap.

T_c : 電解コンデンサのケース温度
Case temperature of Elec. cap.

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

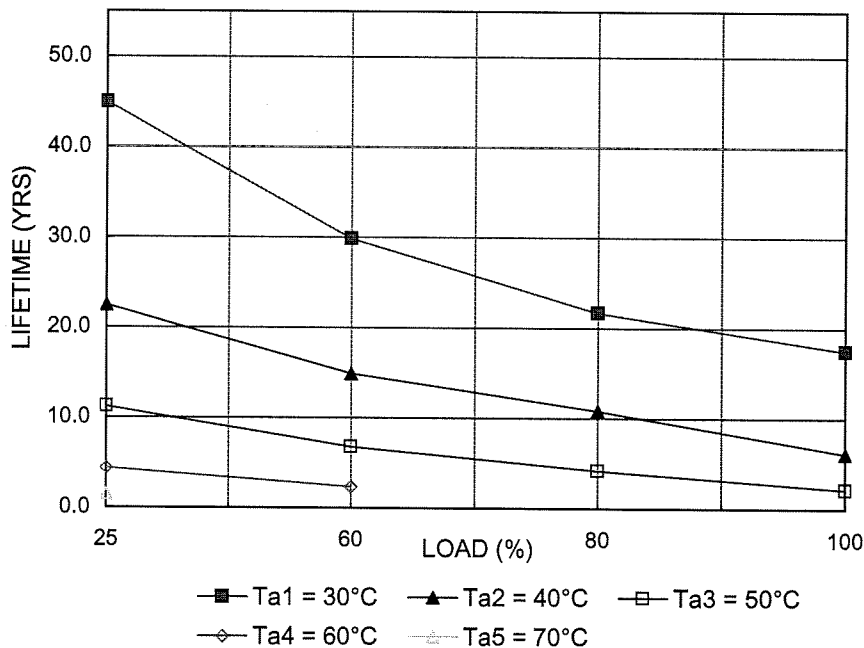
MOUNTING : C

VIN : 200VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	45.0	22.5	11.2	4.4	1.6
60	29.9	14.9	6.8	2.4	
80	21.7	10.9	4.2		
100	17.5	6.1	2.2		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING C KWD15-1212



計算式 **FORMULA**

1. アルミ電解コンデンサ
AL. Electrolytic capacitor
 $L = L_o \times 2^{(105-T_c)/10}$ (year)

2. OSコンデンサ
O.S capacitor
 $L = L_o \times 10^{(105-T_c)/22}$ (year)

L : 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year)

L_o : 電解コンデンサ保証寿命値
Guarantee life for Elec. cap.

T_c : 電解コンデンサのケース温度
Case temperature of Elec. cap.

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

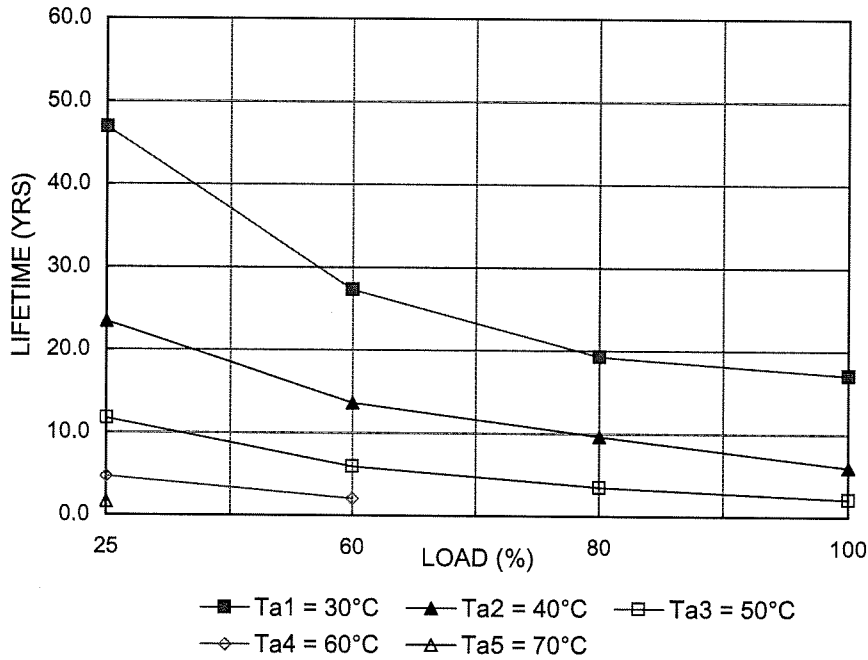
MOUNTING : D

VIN : 200VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	46.9	23.4	11.7	4.7	1.7
60	27.3	13.7	5.9	2.1	
80	19.3	9.7	3.5		
100	17.1	6.0	2.1		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING D KWD15-1212



計算式 **FORMULA**

1. アルミ電解コンデンサ
AL. Electrolytic capacitor
 $L = L_o \times 2^{(105-T_c)/10}$ (year) L : 電解コンデンサ推定寿命計算値
 Elec. Capacitor computed life.
 (24時間連続稼動、365日)
 (24 hrs per day, 365 days per year)

2. OSコンデンサ
O.S capacitor
 $L = L_o \times 10^{(105-T_c)/22}$ (year) L_o : 電解コンデンサ保証寿命値
 Guarantee life for Elec. cap.
 T_c : 電解コンデンサのケース温度
 Case temperature of Elec. cap.

ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : KWD15-1212

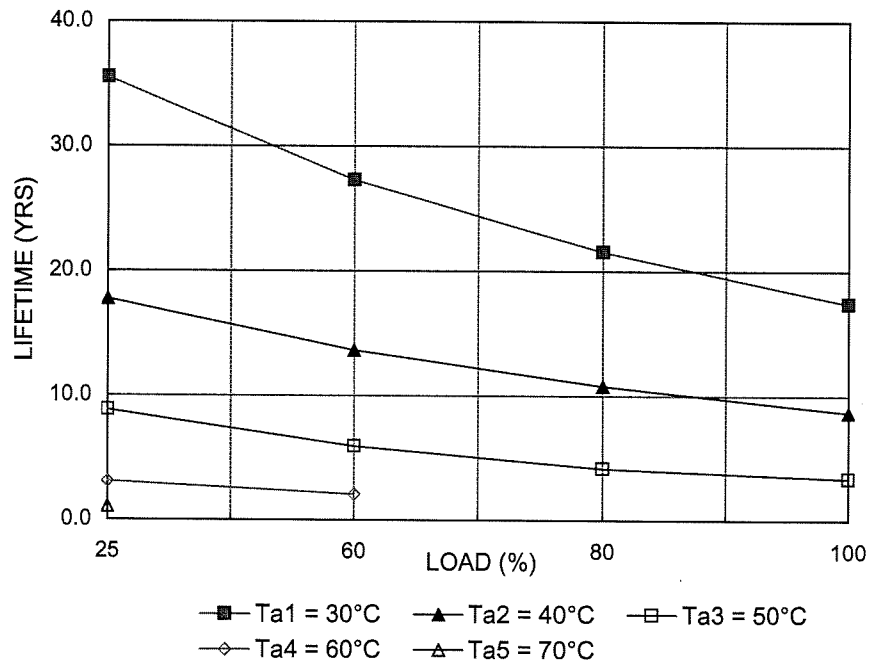
MOUNTING : E

VIN : 200VAC

DATE: SEPT 12, 2008

LOAD (%)	LIFETIME (YRS)				
	Ta = 30°C	Ta = 40°C	Ta = 50°C	Ta = 60°C	Ta = 70°C
25	35.5	17.8	8.9	3.1	1.1
60	27.3	13.7	5.9	2.1	
80	21.6	10.8	4.2		
100	17.4	8.7	3.4		

GRAPH OF ELECTROLYTIC CAPACITOR LIFETIME VS LOAD
MOUNTING E KWD15-1212



計算式 FORMULA

- | | |
|---|--|
| <p>1. アルミ電解コンデンサ
AL. Electrolytic capacitor
$L = L_0 \times 2^{(105-T_c)/10}$ (year)</p> | <p>L : 電解コンデンサ推定寿命計算値
Elec. Capacitor computed life.
(24時間連続稼動、365日)
(24 hrs per day, 365 days per year)</p> |
| <p>2. OSコンデンサ
O.S capacitor
$L = L_0 \times 10^{(105-T_c)/22}$ (year)</p> | <p>L₀ : 電解コンデンサ保証寿命値
Guarantee life for Elec. cap.
T_c : 電解コンデンサのケース温度
Case temperature of Elec. cap.</p> |

MODEL : KWD15-1212										ABNORMAL TESTING										TEST CONDITIONS				DWG NO: PA775-57-02 APPROVED BY TESTED BY							
																				LOAD = 100%				Vin = 200VAC Ta = 25°C		RCNED 5/12/12					
PARTS NAME	PART NO.	TEST MODE	TEST MODE										OTHERS										NOTE	OK	R E T E S T	N O G O O D					
1	MOSFET	Q1	D-G	Y																					Q1,R24,R25,R26,R17,A1.	Y					
2	2SK1510-01L		D-S	Y																					Q1,R24,R25,R26,R17,A1.	Y					
3			G-S	Y																											
4			D		Y																										
5			S		Y																										
6			G		Y																										
7																															
8	TRANSISTOR	Q2	C-E	Y																											
9	2SC2873-Y-TE12L		C-B	Y																											
10			B-E	Y																											
11			C		Y																										
12			E		Y																										
13			B		Y																										
14																															
15	I.C.	A1	1-2	Y																											
16	UC2842ADW		2-3	Y																											
17			3-4	Y																											
18			4-5	Y																											
19			5-6	Y																											
20			6-7	Y																											
21			7-8	Y																											
22			9-10	Y																											
23			10-11	Y																											
24			11-12	Y																											
25																															

*** A : SUGHT B : PROLONGED

TDK-Lambda

MODEL: KWD15-1212		ABNORMAL TESTING														TEST CONDITIONS		APPROVED	TESTED							
PARTS NAME		PART NO.	TEST MODE		FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHERS	NOTE	OK	RETEST	NO GOOD					
			SHORT	OPEN																						
1		A1	12-13	Y											Y						Y					
2			13-14	Y											Y							Y				
3			14-15	Y											Y							Y				
4			15-16	Y											Y							Y				
5			1		Y											Y						Y				
6			2		Y											Y						Y				
7			3		Y								Y									Y				
8			4		Y										Y							Y				
9			5		Y										Y							Y				
10			6		Y										Y							Y				
11			7		Y											Y						Y				
12			8		Y											Y						Y				
13			9		Y											Y						Y				
14			10		Y																	Y				
15			11		Y																	Y				
16			12		Y																	Y				
17			13		Y																	Y				
18			14		Y																	Y				
19			15		Y																	Y				
20			16		Y																	Y				
21																										
22																										
23																										
24																										
25																										

*** A: SUGHT B: PROLONGED

MODEL : KWD15-1212		ABNORMAL TESTING												TEST CONDITIONS					APPROVED	TESTED																		
														LOAD = 100%	Vin = 200VAC Ta = 25°C		CCNEO 27/09/93	12/10/93																				
PARTS NAME	PART NO.	TEST MODE										TESTED	RETEST	NO GOOD																								
		OPEN	SHORT	FIRE	SMOKE A	SMOKE B	BURST	SMELL	HOT	DAMAGE	FUSION				OV	VP	NO OUTPUT	NO CHANGE	OTHERS	NOTE																		
1 SHUNT REGULATOR	A2		Y													Y	Hiccup; Vout low					Y																
2 HA17431UA-TL			Y													Y	Hiccup; Vout low						Y															
3			Y													Y							Y															
4			Y													Y							Y															
5			Y													Y							Y															
6			Y													Y							Y															
7																																						
8 PHOTO COUPLER	PC1		Y													Y																						
9 TLP121GR-TPL			Y													Y																						
10							Y									Y																						
11							Y									Y																						
12							Y									Y																						
13							Y									Y																						
14							Y									Y																						
15 CHIP BRIDGE	D1		Y													Y																						
16 S1WB(A)60B	D1		Y													Y																						
17	D1		Y													Y																						
18	D1		Y													Y																						
19																																						
20																																						
21 CHIP DIODE	D2		Y													Y																						
22 EC8FS6-TE12L	A-K		Y													Y																						
23																																						
24 1SS184-TE85L	D3		Y													Y																						
25			Y													Y																						

*** A: SLIGHT B: PROLONGED

MODEL: KWD 15-1212		ABNORMAL TESTING														TEST CONDITIONS			APPROVED		TESTED				
		TEST MODE		TEST CONDITIONS												APPROVED		TESTED							
				LOAD = 100%	Vin = 200VAC Ta = 25°C																				
PARTS NAME	PART NO.	TEST MODE	TEST MODE	SHORT	OPEN	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGES	OTHERS	NOTE	OK	TEST	GOOD	NO		
1SS184-TE85L	D4	A-K		Y	Y												Y			Y					
		A-K															Y				Y				
CHIP DIODE	D5	A-K		Y	Y											Y				Y					
D1FL20U		A-K														Y					Y				
CHIP DIODE	D6	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				
CHIP DIODE	D7	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				
CHIP DIODE	D8	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				
CHIP DIODE	D9	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				
CHIP DIODE	D10	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				
CHIP DIODE	D11	A-K		Y	Y										Y			Hiccup			Y				
D1FL20U		A-K													Y						Y				

*** A: SLIGHT B: PROLONGED

TDK-Lambda

MODEL : KWD15 - 1212		ABNORMAL TESTING												TEST CONDITIONS			DWG NO: PA775-57-06			
														LOAD = 100%			APPROVED		TESTED	
														Vin = 200VAC Ta = 25°C			CCNEO 1/27/2023		Walt	
PARTS NAME	PART NO.	TEST MODE												NOTE	OK	TEST	NO			
		S	O	F	S	R	D	F	O	O	N	O	O					O		
		SHORT	OPEN	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN	O.C.P.	V.P.	NO OUTPUT	NO CHANGE	OTHERS				
1	CHIP DIODE																			
2	D1FL20U																			
3																				
4	CHIP DIODE																			
5	D1FL20U																			
6																				
7	ZENER DIODE																			
8	1N4744A																			
9																				
10	CHIP ZENER DIODE																			
11	02CZ12-Z																			
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				

*** A: SLIGHT B: PROLONGED

TDK-Lambda

MODEL : KWD15-1212		ABNORMAL TESTING										TEST CONDITIONS					APPROVED	TESTED	
												LOAD = 100%	Vin = 200VAC Ta = 25°C					CCNEO 1/23/93	Wd/ner
PARTS NAME	PART NO.	TEST MODE										NOTE	O K	R E T	N O G O O D				
		S H O R T	S O P E N	F I R E	S M O K E A	S M O K E B	B U R S T	S M E L L	R E D H O T	D A M A G E	F U S B L O W N					O . V . P .	O . C . P .	O N O U T P U T	N O C H A N G E
CAP. FILM	C1	Y	Y							Y							Y		
MKC-S683M														Y			Y		
CAP. CERAMIC	C2	Y	Y														Y		
ECKDNS101MB														Y			Y		
CAP. CERAMIC	C3	Y	Y														Y		
ECKDNS332ME														Y			Y		
NOT ASSIGNED	C4																		
CAP. CERAMIC	C5	Y	Y														Y		
ECKDNS332ME														Y			Y		
CAP. ELEFT	C6	Y	Y														Y		
LXA400VBSN-75(M)														Y			Y		
CHIP CAP. CERAMIC	C7	Y	Y														Y		
GR43-2W5R103K500FT																	Y		
CHIP CAP. CERAMIC	C8	Y	Y														Y		
C3216X7R1E334KT														Y			Y		
NOT ASSIGNED	C9																		

*** A: SLIGHT B: PROLONGED

DWG NO: PA775 -57-08

MODEL: KWD15-1212		ABNORMAL TESTING													TEST CONDITIONS		APPROVED	TESTED					
															LOAD = 100%	Vin = 200VAC Ta = 25°C	CCNEO 1703193	1/18/08					
PARTS NAME	PART NO.	TEST MODE										TEST CONDITIONS				NOTE	OK	TESTED					
		SHORT	OPEN	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGES				OTHERS				
1	CHIP CAP. CERAMIC C10		Y											Y						Y			
2	C55Y5U1E186Z-TE12																				Y		
3																							
4	CHIP CAP. CERAMIC C11		Y											Y									Y
5	C2012X7R1E104KT			Y																	Y		
6																							
7	CHIP CAP. CERAMIC C12		Y											Y									Y
8	C3225COG1H472JT			Y															Y	Switching freq higher; Pin high			Y
9																							
10	CHIP CAP. CERAMIC C13		Y																		Y		Y
11	C2012COG1H221KT			Y																	Y		Y
12																							
13	CHIP CAP. CERAMIC C14		Y																	Y	Hiccup		Y
14	C2012X7R1H223KT			Y																	Y		Y
15																							
16	CHIP CAP. CERAMIC C15		Y																	Y	Hiccup		Y
17	C2012COG1H101KT			Y																	Y		Y
18																							
19																							
20	CHIP CAP. CERAMIC C16		Y																	Y	R27,R28,R29,R30 gradually open		Y
21	CM21W5R331K200BT			Y																	Y		Y
22																							
23	CHIP CAP. CERAMIC C17		Y																	Y	Hiccup		Y
24	C25Y5U1E106Z			Y																			Y
25																							

*** A: SLIGHT B: PROLONGED


TDK-Lambda

25/40

DWG NO: PA775-57-09										TEST CONDITIONS		APPROVED		TESTED					
MODEL: KWD15-1212			ABNORMAL TESTING							LOAD = 100%					TESTED				
			TEST MODE										TESTED						
PARTS NAME	PART NO.	TEST CONDITIONS													O K	R E T E S T	N O G O O D		
		SHOR T	OPEN	F I R E	S M O K E	S M O K E A	B U R S T	S M E L L	RED HOT	D A M A G E	F U S E B L O W N	O . C . P .	O . V . P .	N O O U T P U T				N O C H A N G E	O T H E R S
		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
1 O.S CAP	C18																		
2 20SA33M+H																			
3																			
4 CHIP CERAMIC CAP.	C19																		
5 CM21W5R331K200BT																			
6																			
7 CHIP CERAMIC CAP	C20																		
8 C25Y5U1E106Z																			
9 O.S. CAP	C21																		
10 20SA33M+H																			
11																			
12 CAP. CERAMIC	C22																		
13 DE7100F222MVA1N																			
14																			
15 CHIP CERAMIC CAP	C23																		
16 C2012XR1H473KT																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			

*** A : SUGHT B : PROLONGED

TDK-Lambda

MODEL: KWD15-1212			ABNORMAL TESTING										TEST CONDITIONS				APPROVED	TESTED		
													LOAD = 100%	Vin = 200VAC Ta = 25°C	CC MED 1/26/23					
			TEST MODE																	
	PARTS NAME	PART NO.																		
1	CHIP RESISTOR	R1																		
2	ERJ8GEYJ304V																			
3																				
4	CHIP RESISTOR	R2																		
5	ERJ8GEYJ304V																			
6																				
7	CHIP RESISTOR	R3																		
8	ERJ8GEYJ304V																			
9																				
10	METAL O. RESISTOR	R4																		
11	ERG1SJ-623																			
12																				
13	METAL O. RESISTOR	R5																		
14	ERG1SJ-623																			
15																				
16	CHIP RESISTOR	R6																		
17	ERJ8GEYJ823V																			
18																				
19	CHIP RESISTOR	R7																		
20	ERJ8GEYJ823V																			
21																				
22	CHIP RESISTOR	R8																		
23	ERJ8GEYJ823V																			
24																				
25																				

*** A : SUGHT B : PROLONGED

MODEL : KWD15-1212		ABNORMAL TESTING											TEST CONDITIONS		APPROVED	TESTED							
PARTS NAME		PART NO.	TEST MODE											LOAD = 100%	$V_{in} = 200VAC$ $T_a = 25^{\circ}C$	CCNEO 17/03/93	Mod 17/03/93						
1	CHIP RESISTOR	R9																					
2	ERJ8GEYJ823V																						
3																							
4	CHIP RESISTOR	R10																					
5	ERJ8GEYJ100V																						
6																							
7	CHIP RESISTOR	R11																					
8	ERJ8GEYJ563V																						
9																							
10	CHIP RESISTOR	R12																					
11	ERJ8GEYJ332V																						
12																							
13	CHIP RESISTOR	R13																					
14	ERJ8GEYJ101V																						
15																							
16	CHIP RESISTOR	R14																					
17	CR1/10W2211DV																						
18																							
19	CHIP RESISTOR	R15																					
20	CR1/10W152JV																						
21																							
22	CHIP RESISTOR	R16																					
23	CR1/10W331JV																						
24																							
25																							

*** A : SLIGHT B : PROLONGED

MODEL: KWD15-1212		ABNORMAL TESTING										TEST CONDITIONS					APPROVED		TESTED				
PARTS NAME	PART NO.	TEST MODE	S H O R T	O P E N	F I R E	S M O K E A	S M O K E B	B U R S T	S M E L L	R E D H O T	D A M A G E	F U S B L O W N	O . C . P .	O . V . P .	N O O U T P U T	N O C H A N G E	O T H E R S	N O T E	A P P R O V E D	T E S T E D			
																					LOAD = 100%	ViN = 200VAC	Ta = 25°C
1 CHIP RESISTOR	R17		Y	Y											Y	Y			CCN/EO	18/02/93	OK		
2 ERJ8GEYJ100V																							
3																							
4 CHIP RESISTOR	R18		Y	Y										Y									
5 ERJ8GEYJ390V																							
6																							
7 CHIP RESISTOR	R19		Y	Y										Y									
8 CR1/10W102JV																							
9																							
10 CHIP RESISTOR	R20		Y	Y											Y	Y							
11 ERJ8GEYJ100V																							
12																							
13 CHIP RESISTOR	R21		Y	Y											Y	Y							
14 ERJ8GEYJ100V																							
15																							
16 CHIP RESISTOR	R22		Y	Y											Y	Y							
17 ERJ8GEYJ100V																							
18																							
19 CHIP RESISTOR	R23		Y	Y											Y								
20 CR1/10W183JV																							
21																							
22 CHIP RESISTOR	R24		Y	Y													Y	Vds unstable					
23 ERJ8GEYJ3R9V																							
24																							
25																							

*** A: SUGHT B: PROLONGED

TDK-Lambda

MODEL: KWD15-1212		ABNORMAL TESTING													TEST CONDITIONS		APPROVED	TESTED					
															LOAD = 100%	Vin = 200VAC Ta = 25°C	CCNEO 1/17/03/93	<i>[Signature]</i>					
PARTS NAME	PART NO.	TEST MODE	TEST MODE										O C P .	O V P .	N O U T P U T	N C H A N G E	O T H E R S	NOTE	O K	R E T E S T	N O G O O D		
			S H O R T	O P E N	F I R E	S M O K E A	S M O K E B	B U R S T	S M E L L	R E D H O T	D A M A G E	F U S B L O W N											
1 CHIP RESISTOR ERJ8GEYJ3R9V	R25		Y	Y													Y Vds unstable				Y		
2																						Y	
3																							
4 CHIP RESISTOR ERJ8GEYJ3R9V	R26		Y	Y													Y Vds unstable					Y	
5																						Y	
6																							
7 CHIP RESISTOR ERJ8GEYJ100V	R27		Y	Y																		Y	
8																						Y	
9																							
10 CHIP RESISTOR ERJ8GEYJ100V	R28		Y	Y																		Y	
11																						Y	
12																							
13 CHIP RESISTOR ERJ8GEYJ100V	R29		Y	Y																		Y	
14																						Y	
15																							
16 CHIP RESISTOR ERJ8GEYJ100V	R30		Y	Y																		Y	
17																						Y	
18																							
19 CHIP RESISTOR ERJ8GEYJ132V	R31		Y	Y																		Y	
20																						Y	
21																							
22 CHIP RESISTOR ERJ8GEYJ132V	R32		Y	Y																		Y	
23																						Y	
24																							
25																							

*** A : SLIGHT B : PROLONGED

MODEL : KWD15-1212		ABNORMAL TESTING															TEST CONDITIONS		APPROVED		TESTED			
		TEST MODE															LOAD = 100%		Vin = 200VAC Ta = 25°C		CC NEO 157.6.3/93		[Signature]	
PARTS NAME	PART NO.	SHORT	OPEN	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE	BLOWN	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHERS	NOTE	O.K.	TEST	GOOD			
1	CHIP RESISTOR ERJ8GEYJ100V	R33	Y	Y											Y	Y			Y	Y				
2																								
3																								
4	CHIP RESISTOR ERJ8GEYJ100V	R34	Y	Y											Y	Y			Y	Y				
5																								
6																								
7	CHIP RESISTOR ERJ8GEYJ100V	R35	Y	Y											Y	Y			Y	Y				
8																								
9																								
10	CHIP RESISTOR ERJ8GEYJ100V	R36	Y	Y											Y	Y			Y	Y				
11																								
12																								
13	CHIP RESISTOR ERJ8GEYJ132V	R37	Y	Y										Y					Hiccup	Y	Y			
14																								
15																								
16	CHIP RESISTOR ERJ8GEYJ132V	R38	Y	Y										Y					Hiccup	Y	Y			
17																								
18																								
19	CHIP RESISTOR ERJ8GEYJ511V	R39	Y	Y													Y	Vout and Pin low	Y	Y				
20																								
21																								
22	CHIP RESISTOR CR1/10W222JV	R40	Y	Y																				
23																								
24																								
25																								

*** A: SLIGHT B: PROLONGED

TDK-Lambda

MODEL : KWD 15-1212		ABNORMAL TESTING										TEST CONDITIONS				APPROVED	TESTED																							
												LOAD = 100%		Vin = 200VAC Ta = 25°C		CC/NEO 2/18/92	M.H. (Signature)																							
		TEST MODE	PART NO.	PARTS NAME	OPEN	SHORT	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN	O.C.P.	O.V.P.	NO OUTPUT	NO CHANGES	OTHERS	NOTE																				
1			R41	CHIP RESISTOR		Y											Y		Y		Stability problem	Y																		
2				CR1/10W7681DV																																				
3																																								
4			R42	CHIP RESISTOR		Y											Y																							
5				CR1/10W1742DV			Y										Y																							
6																																								
7			R43	CHIP RESISTOR		Y											Y																							
8				CR1/10W2001DV																																				
9																																								
10			T1	TRANSFORMER		Y																																		
11				PA77501	1-2	Y																																		
12					3-4	Y											Y																							
13					6-7	Y																																		
14					6-8	Y																																		
15					7-8	Y																																		
16					1		Y										Y																							
17					2		Y										Y																							
18					3		Y										Y																							
19					4		Y										Y																							
20					6		Y																																	
21					7		Y										Y																							
22					8		Y										Y																							
23																																								
24																																								
25																																								

*** A: SUGHT B: PROLONGED

TDK-Lambda

MODEL : KWD15-1212		ABNORMAL TESTING										TEST CONDITIONS			APPROVED	TESTED			
												LOAD = 100%	Vin = 200VAC Ta = 25°C		CC/VED 15/08/93				
PARTS NAME	PART NO.	TEST MODE										NOTE	OK	TESTED					
		SHORT	OPEN	FIRE	SMOKE A	SMOKE B	BURST	SMELL	RED HOT	DAMAGE	FUSE BLOWN				O.C.P.	O.V.P.	NO OUTPUT	NO CHANGE	OTHERS
1 BALUN COIL	L1		Y															Y	
2 UF1717H-702Y0R3-01		1-2	Y															Y	
3		3-4	Y															Y	
4		1		Y														Y	
5		2		Y														Y	
6		3		Y														Y	
7		4		Y														Y	
8 CHIP COIL	L4		Y															Y	
9				Y														Y	
10																			
11 CHIP COIL	L5		Y															Y	
12				Y														Y	
13																			
14 CHIP COIL	L6		Y															Y	
15				Y														Y	
16																			
17 CHIP COIL	L7		Y															Y	
18				Y														Y	
19																			
20																			
21																			
22																			
23																			
24																			
25																			

*** A: SLIGHT B: PROLONGED

TDK-Lambda

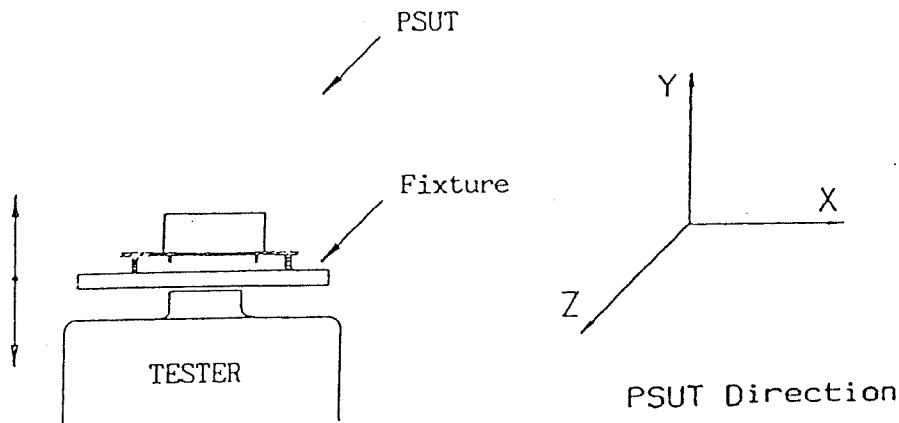
VIBRATION TEST

TYPES OF VIBRATION TEST :

- A) OSCILLATOR FREQUENCY SWEEP
- B) RESONANCE FREQUENCY

EQUIPMENT : EMIC CORPORATION VIBRATION TEST SYSTEM F-400-BM-E47
 VIBRATION GENERATOR 905-FN

PROCEDURE :



VIBRATION TEST WITH FREQUENCY SWEEP

FREQUENCY	10 ~ 55 Hz.
SWEEP TIME	1 min.
ACCELERATION	MAX 10G.
AMPLITUDE	1.65mmPP CONSTANT.
DIRECTION	X, Y, Z.
DURATION	1 hr. for each direction.

TEST POINT :

1. Output voltage (Apply some shock when checking the o/p voltage, and observe any abnormalities.)
2. Ripple voltage (At AC 100V input and output)
3. Mechanical Condition (No breakage)

認 APPD	<i>[Signature]</i> 5/MAR/93	設 計 ENGR	<i>[Signature]</i> 27 · NOV · 92	図面番号 DWG-No.	PA775-64-01	□
検 査 CHK	CCNEO. 30 · DEC · 92	製 図 DWG	WILLIAM PHIA 25 · NOV · 92			

DATE

TEST RESULTS :
(after vibration)

TEST POINT	OUTPUT VOLTAGE (V)			RIPPLE VOLTAGE (mV)			MECHANICAL CONDITION	NOTE
	CH1	CH2	CH3	CH1	CH2	CH3		
BEFORE DIRECT TEST	11.853	11.855	—	50	50	—	O.K	
X	11.865	11.860	—	50	50	—	O.K	
Y	11.854	11.861	—	50	50	—	O.K	
Z	11.862	11.855	—	50	50	—	O.K	

EVALUATION RESULT :

(PASS)

/

FAIL

VISUAL INSPECTION RESULT :

(PASS)

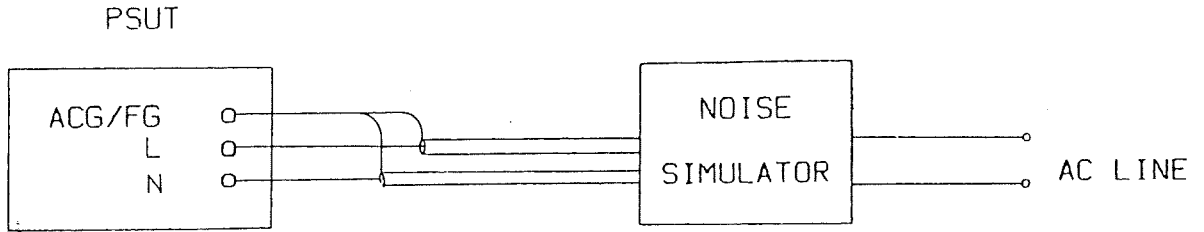
/

FAIL

認 . APPD		設 計 ENGR		図面番号 DWG - No.	<input type="checkbox"/>
検 図 CHK		製 図 DWG			

NOISE SIMULATION TEST

Circuit for measurement and equipment used :



MODEL : ENS-24X (SANKI)

Testing Conditions :

- Input Voltage : AC100V
- Output Voltage : Rated
- Output Current : 0% , 100%
- Ambient Temp. : 25 °C

Settings :

- MODE Normal , Common
- TRIG SELECT Line or Ext (Line)
- PULSE WIDTH 50, 200, 800, 1000ns
- PHASE SHIFT 0 ~ 360 Degree
- POLARITY + , -
- NOISE LEVEL 0 ~ 2KV

Acceptance Criteria :

- 1) No damage of PSUT
- 2) No output failure
(eg. Over/Undershoot ≤ 3% of Vo)
- 3) Check any abnormalities (eg. noise)

Evaluation Result :

PASS / FAIL

認・ APPD	<i>[Signature]</i> 15-MAR-93	設 計 ENGR	<i>[Signature]</i> 12. 1. 93	図面番号 DWG-No.	PA775-61-01 -
検 査 CHK	CCNEO 12. 01. 93	製 作 DWG	Ramchi, m 12. 1. 93		

ELECTROSTATIC DISCHARGE TEST

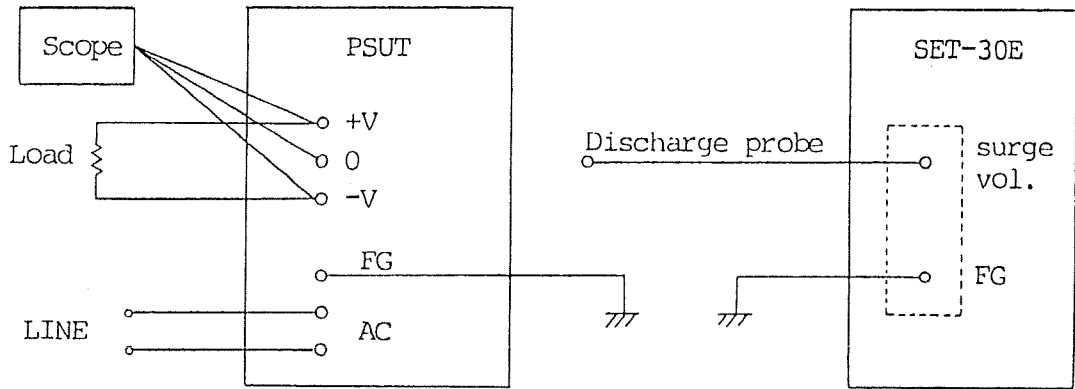
EQUIPMENT : SET-30E (SANKI ELECTRONIC)

Discharge Resistor : 250 ohm
Capacitor unit : 200 pF

CONDITIONS : Ambient Temperature : 25°C
Input Voltage : AC100V
Output Voltage : Rated
Output Current : Rated
Applied Voltage : ±3kV, ±5kV, ±10kV, ±15kV

PROCEDURE : The PSUT should be in a good working condition. Discharge the applied voltage to the touchable parts of the PSUT (Chassis, Input Terminal, Output Terminal, FG Terminal, ACG Terminal) and check any abnormalities.

Each point to be tested 3 times with different polarity. Voltage should be applied from 3kV to 15kV.



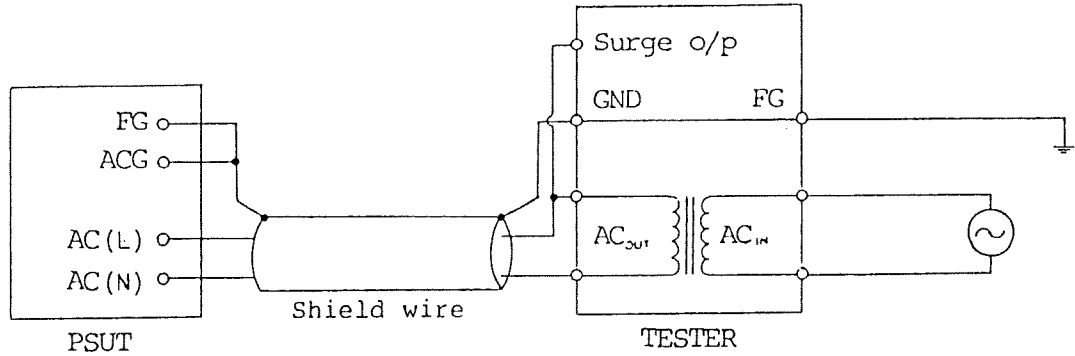
ACCEPTANCE CRITERIA : 1. No damage of PSUT
2. No output failure ($\Delta V_o < 3\%$ of V_o)
3. No abnormalities

EVALUATION RESULT : PASS / FAIL

認 APPD	<i>[Signature]</i> 15. MAR. 93	設 計 ENGR	<i>[Signature]</i> 12. 1. 93	図面番号 DWG-No.	PA775-62-01 --
検 査 C H K	KCNEO 12. 01. 93	製 作 DWG	Kamachim 12. 1. 93		

LIGHTNING SURGE TEST

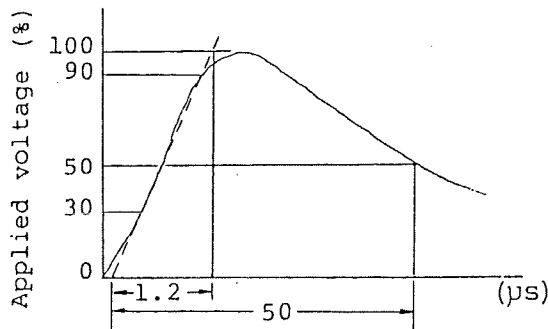
TEST CIRCUIT, TEST EQUIPMENT



MODEL : LSG - 12K - E (SANKI)

- CONDITIONS :
- Input Voltage : AC100V
 - Output Voltage : Rated
 - Output Current : Rated
 - Applied Voltage : From 3kV in steps of 0.5kV
Check the max. withstand voltage
 - Applied Point : Between FG - AC
 - Number of Test : Each voltage 3 times
 - Polarity : + , -
 - Ambient Temp. : 25°C

APPLIED VOLTAGE WAVEFORM :



- ACCEPTANCE CRITERIA :
1. No damage to the PSUT
 2. No output failure
 3. No abnormalities

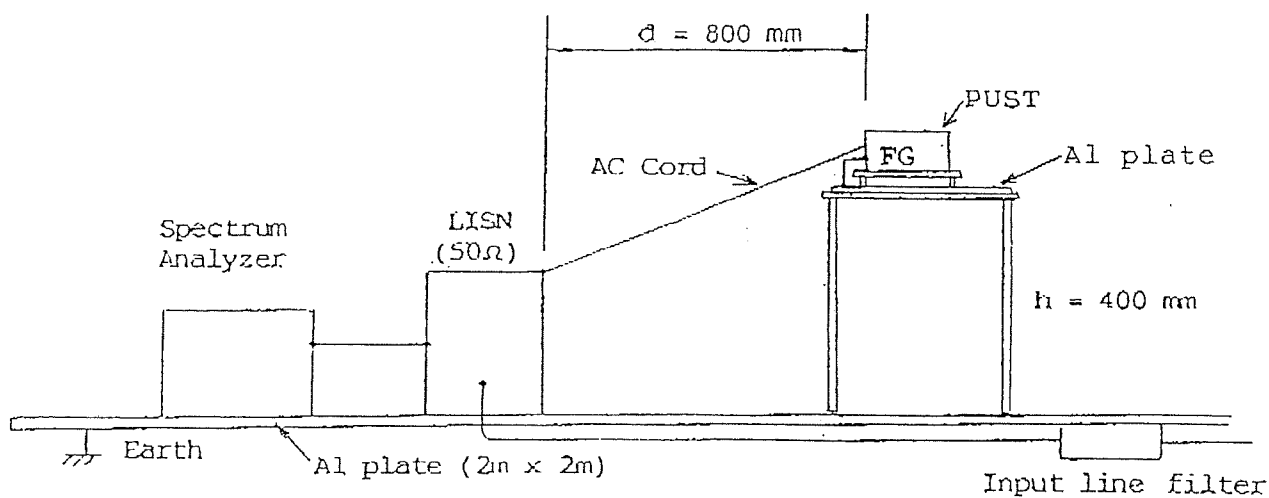
EVALUATION RESULT :

PASS / FAIL
5KV

認・ APPD	<i>S. Mar 93</i>	設 計 ENGR	<i>fel</i>	図面番号 DWG - No.	PA775-74-01
検 査 CHK	CCNEO	製 作 DWG	Ramish.M		
	12.01.93		12.1.93		

EMI TEST

TEST CIRCUIT :



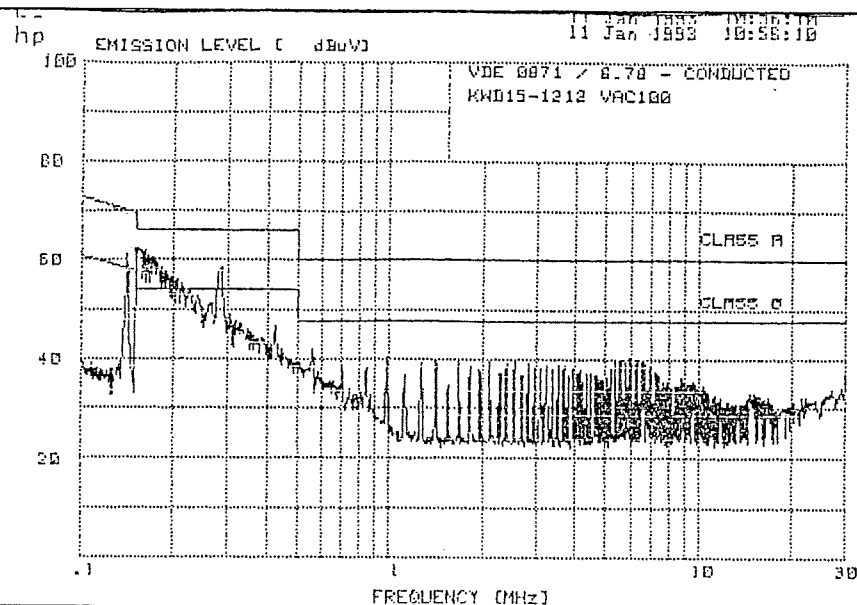
TEST EQUIPHENTS :

SPECTRUM ANALYZER	8568B	HEWLETT PACKARD
QUASI-PEAK ADAPTER	85650A	HEWLETT PACKARD
RF PRESELECTOR	85685A	HEWLETT PACKARD
LISN	3825/2	EMCO

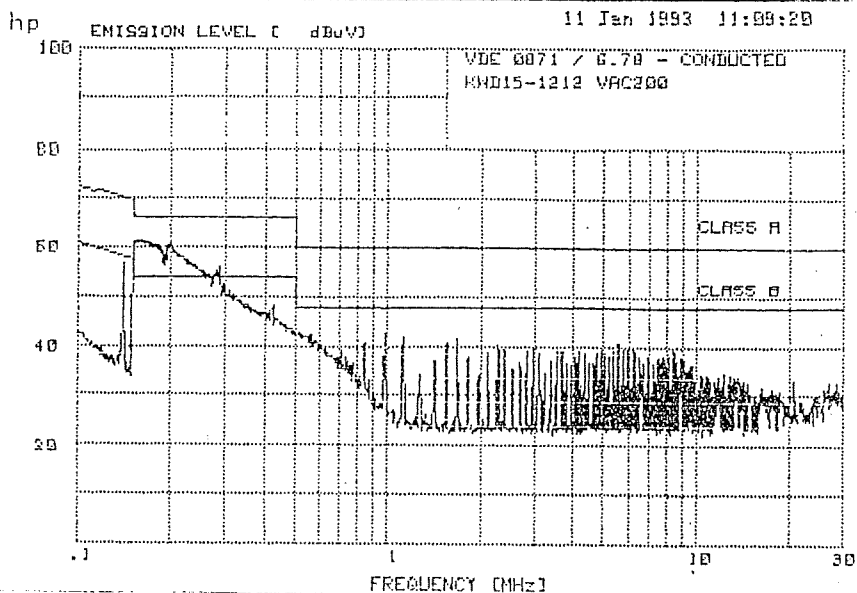
CONDITIONS :

INPUT VOLTAGE	:	AC100V, AC200V
OUTPUT VOLTAGE	:	RATED
OUTPUT CURRENT	:	RATED
AMBIENT TEMP	:	25°C

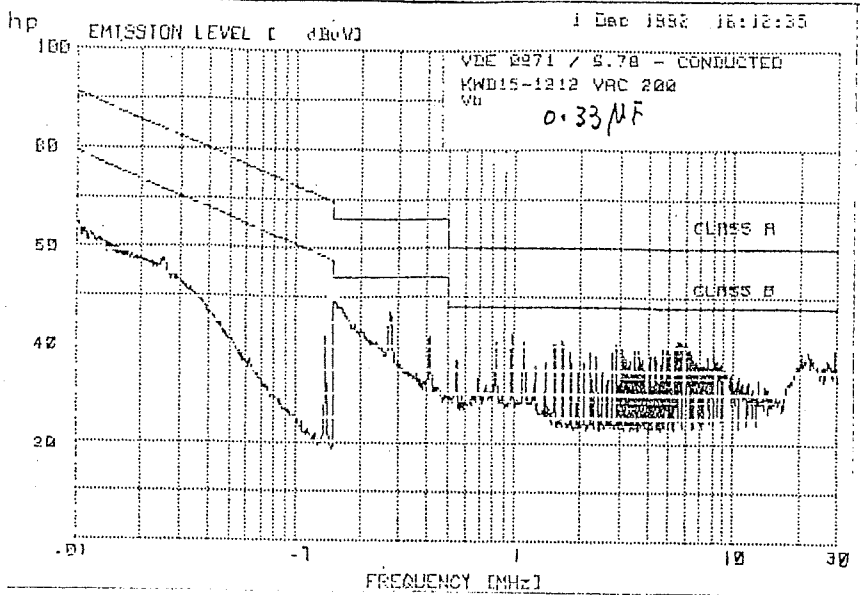
認 APPD		設 計 ENGR		図面番号 DWG - No.	
検 図 CHK		製 図 DWG			



Vin = 100Vac



Vin = 200Vac



Vin = 200Vac

VDE

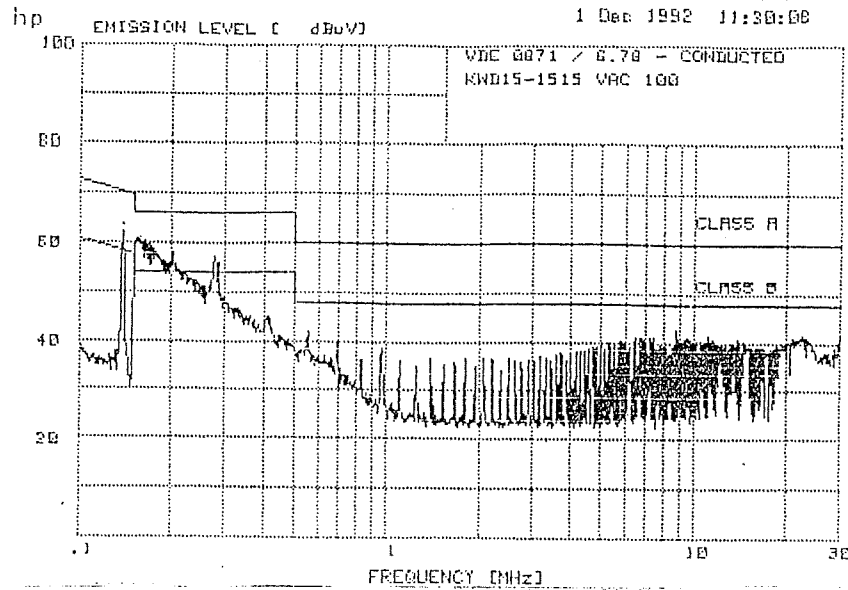
with external cap.
0.33 μ F between
AC(L) and AC(N)

認 APPD	.	設 計 ENGR	.	図面番号 DWG-No.	PA775-70-02- <input type="checkbox"/>
検 閲 CHK	.	製 図 DWG	.		

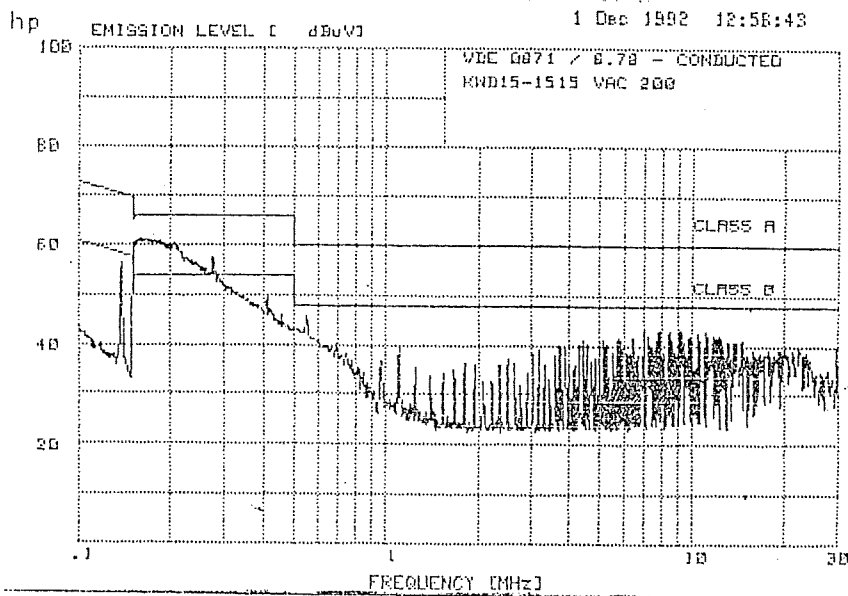
KWD 15-1515

LOAD 100%

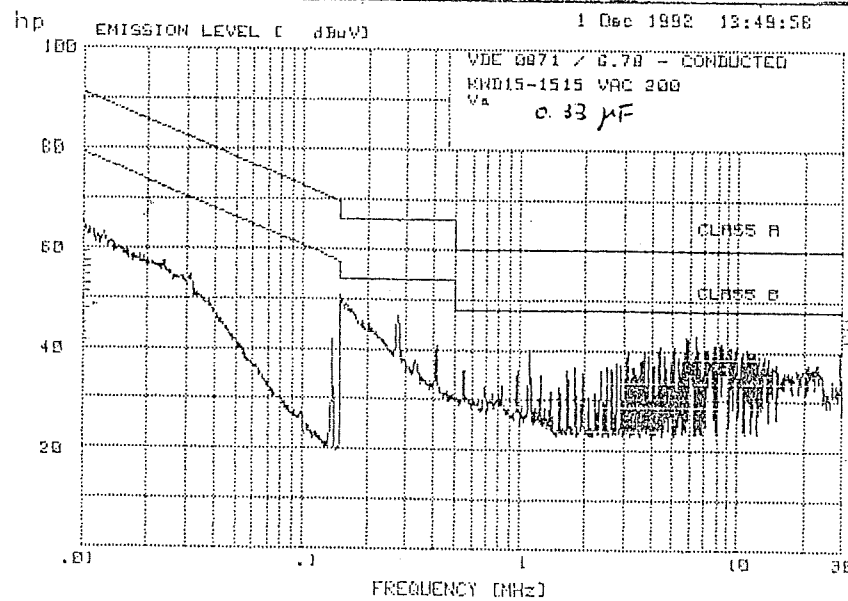
DATE 15 · MAR · 1993 ·



Vin = 100Vac



Vin = 200Vac



Vin = 200Vac

VDE with external cap. 0.33 μ F between AC(L) and AC(N)

認 APPD	.	設 計 ENGR	.	図面番号 DWG - No.	PA775-70-03-
検 閲 CHK	.	製 図 DWG	.		