CUS30M

RELIABILITY DATA

信頼性データ

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※ 試験結果は、代表データでありますが、全ての製品はほぼ同等な特性を示します。
従いまして、以下の結果は実力値とお考え願います。

Test results are typical data. Nevertheless the following results are considered to be actual capability data because all units have nearly the same characteristics.

1. MTBF計算値 Calculated Values of MTBF

MODEL：CUS30M-24

(1) 算出方法 Calculating Method

Telcordiaの部品ストレス解析法(*1)で算出されています。
故障率λ_{SS}は、それぞれの部品ごとに電気ストレスと動作温度によって決定されます。
Calculated based on parts stress reliability projection of Telcordia (*1).
Individual failure rate λ_{SS} is calculated by the electric stress and temperature rise of the each part.

*1: Telcordia Document “Reliability Prediction Procedure for Electronic Equipment”
(Document number SR-332 Issue3 ,Method I,Quality level II)

＜算出式＞

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\pi_E \sum_{i=1}^{m} (N_i \cdot \lambda_{ssi})} \times 10^9 \quad \text{時間 (Hours)}$$

$$\lambda_{ssi} = \lambda_{Gi} \cdot \pi_{Qi} \cdot \pi_{Si} \cdot \pi_{Ti}$$

λ_{equip} : 全機器故障率（FITs） Total equipment failure rate (FITs = Failures in10^9 hours)

λ_{Gi} : i 番目の部品に対する基礎故障率 Generic failure rate for the ith part

π_{Qi} : i 番目の部品に対する品質ファクタ Quality factor for the ith part

π_{Si} : i 番目の部品に対するストレスファクタ Stress factor for the ith part

π_{Ti} : i 番目の部品に対する温度ファクタ Temperature factor for the ith part

m : 異なる部品の数 Number of different part types

N_i : i 番目の部品の個数 Quantity of ith part type

π_E : 機器の環境ファクタ Equipment environmental factor

(2) MTBF値 MTBF Values

条件 Conditions

- 入力電圧 Input voltage : 115VAC,230VAC
- 出力電圧、電流 Output voltage & current : 24VDC, 1.25A (100%)
- 環境ファクタ Environmental factor : GB (Ground, Benign)
- 取付方法 Mounting method : 標準取付 A Standard mounting A
- 周囲温度 Ambient temperature : 25℃, 40℃

MTBF(Vin=115VAC & Ta=25℃) ≒ 8008742.4895 時間 (Hours)

MTBF(Vin=115VAC & Ta=40℃) ≒ 3962758.0502 時間 (Hours)

MTBF(Vin=230VAC & Ta=25℃) ≒ 9960323.6007 時間 (Hours)

MTBF(Vin=230VAC & Ta=40℃) ≒ 5042034.8537 時間 (Hours)

2. 部品ディレーティング　Components Derating

MODEL：CUS30M

(1) 算出方法　Calculating Method

(a) 測定方法　Measuring method

・取付方法　:標準取付 Mounting method　Standard mounting	・周囲温度　：45℃ or 50℃ Ambient temperature
・入力電圧　:115, 230VAC Input voltage	・出力電圧、電流　: 100% Output voltage & current

(b)　半導体　Semiconductors

ケース温度、消費電力、熱抵抗より使用状態の接合点温度を求め
最大定格、接合点温度との比較を求めました。
Compared with maximum junction temperature and actual one which is calculated based on case temperature, power dissipation and thermal impedance.

(c)　IC、抵抗、コンデンサ等　IC, Resistors, Capacitors, etc.

周囲温度、使用状態、消費電力など、個々の値は設計基準内に入っています。
Ambient temperature, operating condition, power dissipation and so on are within derating criteria.

(d)　熱抵抗算出方法　Calculating method of thermal impedance

$$\theta j-c=\frac{Tj(max)-Tc}{Pd(max)} \qquad \theta j-a=\frac{Tj(max)-Ta}{Pd(max)} \qquad \theta j-l=\frac{Tj(max)-Tl}{Pd(max)}$$

Tc　:ディレーティングの始まるケース温度　一般に25℃
Case Temperature at Start Point of Derating;25℃ in General

Ta　:ディレーティングの始まる周囲温度　一般に25℃
Ambient Temperature at Start Point of Derating;25℃ in General

Tl　:ディレーティングの始まるリード温度　一般に25℃
Lead Temperature at Start Point of Derating;25℃ in General

Pd(max)　:最大電力損失
Maximum Power Dissipation

Tj(max)　:最大接合点(チャネル)温度
(Tch(max))　Maximum Junction (channel) Temperature

θj-c　:接合点(チャネル)からケースまでの熱抵抗
(θch-c)　Thermal Impedance between Junction (channel) and Case

θj-a　:接合点から周囲までの熱抵抗
Thermal Impedance between Junction and air

θj-l　:接合点からリードまでの熱抵抗
Thermal Impedance between Junction and Lead

(2) 部品ディレーティング表 Component Derating List

Model: CUS30M-12

部品番号 Location No.	Vin = 115VAC Ta = 50℃ Load = 100%(Vo: 12V, Io: 2.5A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 0.90 W Tch= Tc+ ((θch-c)× Pd) =116.4℃ D.F. = 77.62%	θch-c = 8.7 ℃/W ΔTc= 58.6℃	Pd (max) = 17.0 W Tc= 108.6 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 16.4 mW Tj= Tc+ ((θj-c)× Pd) =76.8℃ D.F. = 51.23%	θj-c = 76.0 ℃/W ΔTc= 25.6℃	 Tc= 75.6 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 0.50 W Tj= Tl+ ((θj-l)× Pd) =88.4℃ D.F. = 58.93%	θj-l = 10.0 ℃/W ΔTl= 33.4℃	 Tl= 83.4 ℃
D51 YG865C12R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 2.38 W Tj= Tc+ ((θj-c)× Pd) =126.8℃ D.F. = 84.51%	θj-c = 1.75 ℃/W ΔTc= 72.6℃	 Tc= 122.6 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 10.0 mW Tj= Tc+ ((θj-c)× Pd) =98.4℃ D.F. = 65.60%	θj-c = .0 ℃/W ΔTc= 48.4℃	 Tc= 98.4 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 18.70 mW Tj= Ta+ ((θj-a)× Pd) =89.9℃ D.F. = 59.95%	θj-a = 130.0 ℃/W ΔTa= 37.5℃	 Tc= 87.5 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 8.4 mW Tj= Ta+ ((θj-a)× Pd) =82.2℃ D.F. = 65.76%	θj-a = 666.7 ℃/W ΔTa= 26.6℃	Pd (max) = 150.0 mW Tc= 76.6 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 8.4 mW Tj= Ta+ ((θj-a)× Pd) =79.5℃ D.F. = 63.63%	θj-a = 350.0 ℃/W ΔTa= 26.6℃	Pd(max) = 100.0 mW Tc= 76.6 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =76.6℃ D.F. = 61.28%	θj-a = 666.7 ℃/W ΔTa= 26.6℃	Pd (max) = 150.0 mW Tc= 76.6 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =76.6℃ D.F. = 61.28%	θj-a = 350.0 ℃/W ΔTa= 26.6℃	Pd(max) = 100.0 mW Tc= 76.6 ℃

(2) 部品ディレーティング表 Component Derating List

Model: CUS30M-12

部品番号 Location No.	Vin = 230VAC Ta = 50℃ Load = 100%(Vo: 12V, Io: 2.5A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 1.13 W Tch= Tc+ ((θch-c)× Pd) =109.5℃ D.F. = 73.02%	θch-c = 8.7 ℃/W ΔTc= 49.7℃	Pd (max) = 17.0 W Tc= 99.7 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 16.4 mW Tj= Tc+ ((θj-c)× Pd) =74.2℃ D.F. = 49.5%	θj-c = 76.0 ℃/W ΔTc= 23.0℃	 Tc= 73.0 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 0.20 W Tj= Tl+ ((θj-l)× Pd) =72.7℃ D.F. = 48.47%	θj-l = 10.0 ℃/W ΔTl= 20.7℃	 Tl= 70.7 ℃
D51 YG865C12R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 2.38 W Tj= Tc+ ((θj-c)× Pd) =126.2℃ D.F. = 84.11%	θj-c = 1.75 ℃/W ΔTc= 72.0℃	 Tc= 122.0 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 10.0 mW Tj= Tc+ ((θj-c)× Pd) =92.4℃ D.F. = 61.60%	θj-c = .0 ℃/W ΔTc= 42.4℃	 Tc= 92.4 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 14.30 mW Tj= Ta+ ((θj-a)× Pd) =84.2℃ D.F. = 56.11%	θj-a = 130.0 ℃/W ΔTa= 32.3℃	 Tc= 82.3 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 8.5 mW Tj= Ta+ ((θj-a)× Pd) =77.6℃ D.F. = 62.05%	θj-a = 666.7 ℃/W ΔTa= 21.9℃	Pd (max) = 150.0 mW Tc= 71.9 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 8.5 mW Tj= Ta+ ((θj-a)× Pd) =74.9℃ D.F. = 59.9%	θj-a = 350.0 ℃/W ΔTa= 21.9℃	Pd(max) = 100.0 mW Tc= 71.9 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =71.9℃ D.F. = 57.52%	θj-a = 666.7 ℃/W ΔTa= 21.9℃	Pd (max) = 150.0 mW Tc= 71.9 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =71.9℃ D.F. = 57.52%	θj-a = 350.0 ℃/W ΔTa= 21.9℃	Pd(max) = 100.0 mW Tc= 71.9 ℃

(2) 部品ディレーティング表 Component Derating List

Model: CUS30M-24

部品番号 Location No.	Vin = 115VAC Ta = 50℃ Load = 100%(Vo: 24V, Io: 1.25A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 0.65 W Tch= Tc+ ((θch-c)× Pd) =119.2℃ D.F. = 79.44%	θch-c = 8.7 ℃/W ΔTc= 58.5℃	Pd (max) = 17.0 W Tc= 113.5 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 32.0 mW Tj= Tc+ ((θj-c)× Pd) =77.9℃ D.F. = 51.95%	θj-c = 76.0 ℃/W ΔTc= 25.5℃	 Tc= 75.5 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 0.40 W Tj= Tl+ ((θj-l)× Pd) =95.4℃ D.F. = 63.60%	θj-l = 10.0 ℃/W ΔTl= 36.4℃	 Tl= 91.4 ℃
D51 YG902C3R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.19 W Tj= Tc+ ((θj-c)× Pd) =110.0℃ D.F. = 73.31%	θj-c = 3.5 ℃/W ΔTc= 50.8℃	 Tc= 105.8 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 43.2 mW Tj= Tc+ ((θj-c)× Pd) =98.0℃ D.F. = 65.33%	θj-c = 30.0 ℃/W ΔTc= 41.7℃	 Tc= 96.7 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 14.10 mW Tj= Ta+ ((θj-a)× Pd) =91.6℃ D.F. = 61.09%	θj-a = 130.0 ℃/W ΔTa= 34.8℃	 Tc= 89.8 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 6.6 mW Tj= Ta+ ((θj-a)× Pd) =80.3℃ D.F. = 64.24%	θj-a = 666.7 ℃/W ΔTa= 25.9℃	Pd (max) = 150.0 mW Tc= 75.9 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 1.94 mW Tj= Ta+ ((θj-a)× Pd) =76.6℃ D.F. = 61.26%	θj-a = 350.0 ℃/W ΔTa= 25.9℃	Pd(max) = 100.0 mW Tc= 75.9 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =75.9℃ D.F. = 60.72%	θj-a = 666.7 ℃/W ΔTa= 25.9℃	Pd (max) = 150.0 mW Tc= 75.9 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =75.9℃ D.F. = 60.72%	θj-a = 350.0 ℃/W ΔTa= 25.9℃	Pd(max) = 100.0 mW Tc= 75.9 ℃

(2) 部品ディレーティング表 Component Derating List

Model: CUS30M-24

部品番号 Location No.	Vin = 230VAC Ta = 50℃ Load = 100%(Vo: 24V, Io: 1.25A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 1.04 W Tch= Tc+ ((θch-c)× Pd) =112.3℃ D.F. = 74.90%	θch-c = 8.7 ℃/W ΔTc= 48.3℃	Pd (max) = 17.0 W Tc= 103.3 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 33.0 mW Tj= Tc+ ((θj-c)× Pd) =75.3℃ D.F. = 50.21%	θj-c = 76.0 ℃/W ΔTc= 22.8℃	 Tc= 72.8 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 0.20 W Tj= Tl+ ((θj-l)× Pd) =80.1℃ D.F. = 53.40%	θj-l = 10.0 ℃/W ΔTl= 23.1℃	 Tl= 78.1 ℃
D51 YG902C3R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 1.19 W Tj= Tc+ ((θj-c)× Pd) =109.0℃ D.F. = 72.64%	θj-c = 3.5 ℃/W ΔTc= 49.8℃	 Tc= 104.8 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 27.9 mW Tj= Tc+ ((θj-c)× Pd) =92.6℃ D.F. = 61.76%	θj-c = 30.0 ℃/W ΔTc= 36.8℃	 Tc= 91.8 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 6.10 mW Tj= Ta+ ((θj-a)× Pd) =86.0℃ D.F. = 57.33%	θj-a = 130.0 ℃/W ΔTa= 30.2℃	 Tc= 85.2 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 5.1 mW Tj= Ta+ ((θj-a)× Pd) =74.8℃ D.F. = 59.84%	θj-a = 666.7 ℃/W ΔTa= 21.4℃	Pd (max) = 150.0 mW Tc= 71.4 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 1.94 mW Tj= Ta+ ((θj-a)× Pd) =72.1℃ D.F. = 57.66%	θj-a = 350.0 ℃/W ΔTa= 21.4℃	Pd(max) = 100.0 mW Tc= 71.4 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =71.4℃ D.F. = 57.12%	θj-a = 666.7 ℃/W ΔTa= 21.4℃	Pd (max) = 150.0 mW Tc= 71.4 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =71.4℃ D.F. = 57.12%	θj-a = 350.0 ℃/W ΔTa= 21.4℃	Pd(max) = 100.0 mW Tc= 71.4 ℃

(2) 部品ディレーティング表 Component Derating List

Model: CUS30M-48

部品番号 Location No.	Vin = 115VAC Ta = 45℃ Load = 100%(Vo: 48V, Io: 0.63A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 0.73 W Tch= Tc+ ((θch-c)× Pd) =109.6℃ D.F. = 73.03%	θch-c = 8.7 ℃/W ΔTc= 58.2℃	Pd (max) = 17.0 W Tc= 103.2 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 32.0 mW Tj= Tc+ ((θj-c)× Pd) =67.8℃ D.F. = 45.22%	θj-c = 76.0 ℃/W ΔTc= 20.4℃	 Tc= 65.4 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 1.00 W Tj= Tl+ ((θj-l)× Pd) =87.9℃ D.F. = 58.60%	θj-l = 10.0 ℃/W ΔTl= 32.9℃	 Tl= 77.9 ℃
D51 YG982C4R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 0.91 W Tj= Tc+ ((θj-c)× Pd) =85.4℃ D.F. = 56.96%	θj-c = 3.0 ℃/W ΔTc= 37.7℃	 Tc= 82.7 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 43.2 mW Tj= Tc+ ((θj-c)× Pd) =97.2℃ D.F. = 64.80%	θj-c = 30.0 ℃/W ΔTc= 50.9℃	 Tc= 95.9 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 14.11 mW Tj= Ta+ ((θj-a)× Pd) =81.6℃ D.F. = 54.42%	θj-a = 130.0 ℃/W ΔTa= 34.8℃	 Tc= 79.8 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 6.56 mW Tj= Ta+ ((θj-a)× Pd) =73.7℃ D.F. = 58.94%	θj-a = 666.7 ℃/W ΔTa= 24.3℃	Pd (max) = 150.0 mW Tc= 69.3 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 1.94 mW Tj= Ta+ ((θj-a)× Pd) =70.0℃ D.F. = 55.98%	θj-a = 350.0 ℃/W ΔTa= 24.3℃	Pd(max) = 100.0 mW Tc= 69.3 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =69.3℃ D.F. = 55.44%	θj-a = 666.7 ℃/W ΔTa= 24.3℃	Pd (max) = 150.0 mW Tc= 69.3 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =69.3℃ D.F. = 55.44%	θj-a = 350.0 ℃/W ΔTa= 24.3℃	Pd(max) = 100.0 mW Tc= 69.3 ℃

(2) 部品ディレーティング表 Component Derating List

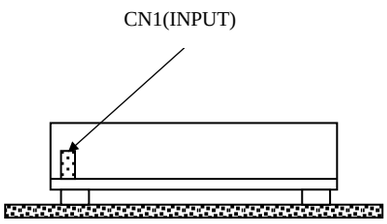
Model: CUS30M-48

部品番号 Location No.	Vin = 230VAC Ta = 45℃ Load = 100%(Vo: 48V, Io: 0.63A)		
A1 (MOS) ICE3A2065ELJ INFINEON	Tch (max) = 150 ℃ Pd = 0.90 W Tch= Tc+ ((θch-c)× Pd) =105.5℃ D.F. = 70.36%	θch-c = 8.7 ℃/W ΔTc= 52.7℃	Pd (max) = 17.0 W Tc= 97.7 ℃
A201 TL431AQDBZR TI	Tj (max) = 150 ℃ Pd = 33.0 mW Tj= Tc+ ((θj-c)× Pd) =64.8℃ D.F. = 43.21%	θj-c = 76.0 ℃/W ΔTc= 17.3℃	Tc= 62.3 ℃
D1 S1WB(A)60B-7101 SHINDENGEN	Tj (max) = 150 ℃ Pd = 0.68 W Tj= Tl+ ((θj-l)× Pd) =72.4℃ D.F. = 48.24%	θj-l = 10.0 ℃/W ΔTl= 20.6℃	Tl= 65.6 ℃
D51 YG982C4R FUJI ELECTRIC	Tj (max) = 150 ℃ Pd = 0.91 W Tj= Tc+ ((θj-c)× Pd) =85.8℃ D.F. = 57.23%	θj-c = 3.0 ℃/W ΔTc= 38.1℃	Tc= 83.1 ℃
D101 1SR154-600TE25 ROHM	Tj (max) = 150 ℃ Pd = 27.9 mW Tj= Tc+ ((θj-c)× Pd) =92.4℃ D.F. = 61.63%	θj-c = 30.0 ℃/W ΔTc= 46.6℃	Tc= 91.6 ℃
D102 CRH01(TE85L,Q) TOSHIBA	Tj (max) = 150 ℃ Pd = 6.05 mW Tj= Ta+ ((θj-a)× Pd) =76.5℃ D.F. = 50.99%	θj-a = 130.0 ℃/W ΔTa= 30.7℃	Tc= 75.7 ℃
PC101 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 5.12 mW Tj= Ta+ ((θj-a)× Pd) =67.7℃ D.F. = 54.17%	θj-a = 666.7 ℃/W ΔTa= 19.3℃	Pd (max) = 150.0 mW Tc= 64.3 ℃
PC101 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 1.94 mW Tj= Ta+ ((θj-a)× Pd) =65.0℃ D.F. = 51.98%	θj-a = 350.0 ℃/W ΔTa= 19.3℃	Pd(max) = 100.0 mW Tc= 64.3 ℃
PC102 TLP385(D4GR-TL,E (DETECTOR) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =64.3℃ D.F. = 51.44%	θj-a = 666.7 ℃/W ΔTa= 19.3℃	Pd (max) = 150.0 mW Tc= 64.3 ℃
PC102 TLP385(D4GR-TL,E (LED) TOSHIBA	Tj (max) = 125 ℃ Pd = 0.0 mW Tj= Ta+ ((θj-a)× Pd) =64.3℃ D.F. = 51.44%	θj-a = 350.0 ℃/W ΔTa= 19.3℃	Pd(max) = 100.0 mW Tc= 64.3 ℃

3. 主要部品温度上昇値 Main Components Temperature Rise △T List

MODEL : CUS30M

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting 	
入力電圧 Vin Input Voltage	115VAC	
出力電圧 Vo Output Voltage	12VDC	24VDC
出力電流 Io Output Current	2.5A(100%)	1.25A(100%)

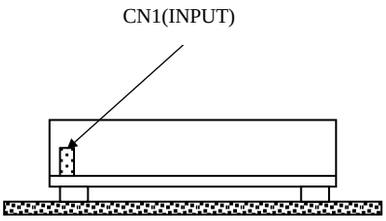
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)	
出力ディレーティング Output Derating		Io=100 %	
		Ta=50℃	
部品番号 Location No.	部品名 Part name	取付方向	
		Standard Mounting	
		12VDC	24VDC
A1	IC	58.6	58.5
A201	CHIP IC	25.6	25.5
C6	E.CAP.	19.6	20.0
C51	E.CAP.	35.5	28.3
C52	E.CAP.	25.8	21.3
D1	BRIDGE DIODE	33.4	36.4
D51	DIODE	72.6	50.8
L1	BALUN COIL	21.4	19.7
L2	BALUN COIL	20.9	20.6
L51	CHOKE COIL	33.1	28.6
L52	CHOKE COIL	25.4	25.3
PC101	PHOTO COUPLER	26.6	25.9
PC102	PHOTO COUPLER	26.6	25.9
T1	TRANSFORMER	53.4	48.7

3. 主要部品温度上昇値 Main Components Temperature Rise △T List

MODEL : CUS30M

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting 	
入力電圧 Vin Input Voltage	230VAC	
出力電圧 Vo Output Voltage	12VDC	24VDC
出力電流 Io Output Current	2.5A(100%)	1.25A(100%)

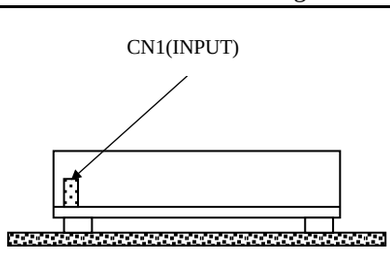
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)	
出力ディレーティング Output Derating		Io=100 % Ta=50℃	
部品番号 Location No.	部品名 Part name	取付方向 Standard Mounting	
		12VDC	24VDC
A1	IC	49.7	48.3
A201	CHIP IC	23.0	22.8
C6	E.CAP.	14.6	15.2
C51	E.CAP.	34.2	27.0
C52	E.CAP.	24.5	20.0
D1	BRIDGE DIODE	20.7	23.1
D51	DIODE	72.0	49.8
L1	BALUN COIL	13.0	12.3
L2	BALUN COIL	12.3	12.8
L51	CHOKE COIL	31.4	26.9
L52	CHOKE COIL	24.4	24.0
PC101	PHOTO COUPLER	21.9	21.4
PC102	PHOTO COUPLER	21.9	21.4
T1	TRANSFORMER	51.2	46.4

3. 主要部品温度上昇値 Main Components Temperature Rise △T List

MODEL : CUS30M

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting 	
入力電圧 Vin Input Voltage	115VAC	
出力電圧 Vo Output Voltage	48VDC	-
出力電流 Io Output Current	0.63A(100%)	-

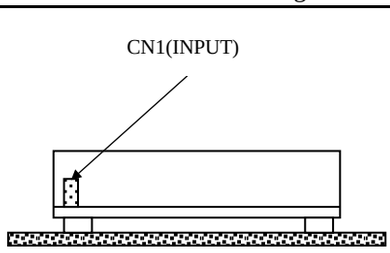
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)	
出力ディレーティング Output Derating		Io=100 %	
		Ta=45℃	
部品番号 Location No.	部品名 Part name	取付方向	
		Standard Mounting	
		48VDC	-
A1	IC	58.2	-
A201	CHIP IC	20.4	-
C6	E.CAP.	18.9	-
C51	E.CAP.	18.6	-
C52	E.CAP.	14.1	-
D1	BRIDGE DIODE	32.9	-
D51	DIODE	37.7	-
L1	BALUN COIL	21.1	-
L2	BALUN COIL	19.2	-
L51	CHOKE COIL	18.8	-
L52	CHOKE COIL	10.7	-
PC101	PHOTO COUPLER	24.3	-
PC102	PHOTO COUPLER	24.4	-
T1	TRANSFORMER	48.2	-

3. 主要部品温度上昇値 Main Components Temperature Rise △T List

MODEL : CUS30M

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付) (Standard Mounting)	Standard Mounting 	
入力電圧 Vin Input Voltage	230VAC	
出力電圧 Vo Output Voltage	48VDC	-
出力電流 Io Output Current	0.63A(100%)	-

(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)	
出力ディレーティング Output Derating		Io=100 %	
		Ta=45℃	
部品番号 Location No.	部品名 Part name	取付方向	
		Standard Mounting	
		48VDC	-
A1	IC	52.7	-
A201	CHIP IC	17.3	-
C6	E.CAP.	13.9	-
C51	E.CAP.	17.9	-
C52	E.CAP.	13.0	-
D1	BRIDGE DIODE	20.6	-
D51	DIODE	38.1	-
L1	BALUN COIL	12.9	-
L2	BALUN COIL	11.0	-
L51	CHOKE COIL	17.6	-
L52	CHOKE COIL	10.2	-
PC101	PHOTO COUPLER	19.3	-
PC102	PHOTO COUPLER	19.3	-
T1	TRANSFORMER	47.5	-

4. 電解コンデンサ推定寿命計算値　　Electrolytic Capacitor Lifetime

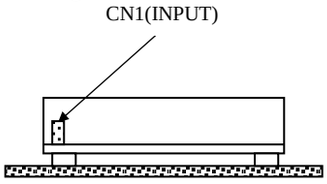
MODEL : CUS30M-12

空冷条件：自然空冷

Cooling condition : Convection cooling

標準取付

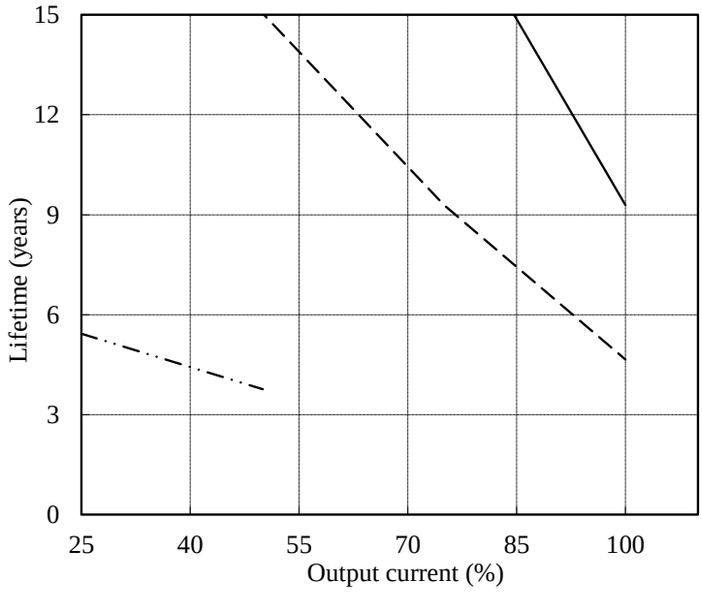
Standard Mounting



Conditions　　Ta　40℃ : ——
50℃ : – – –
70℃ : —·—

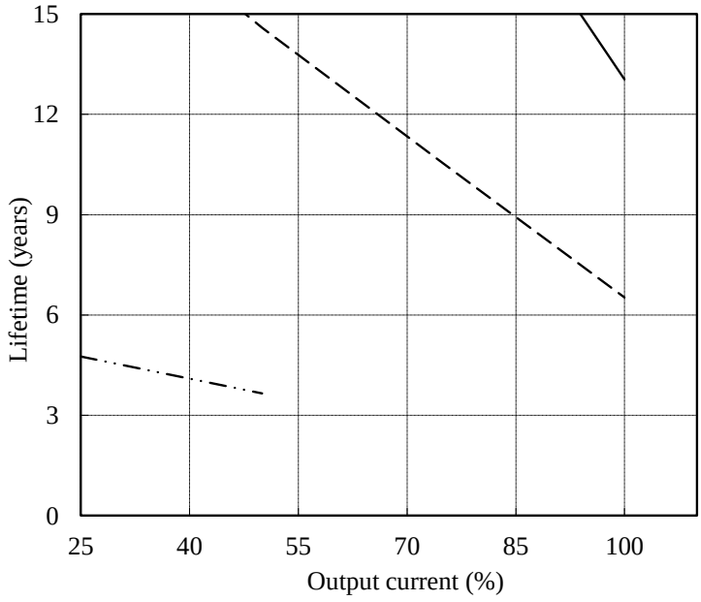
Vin=115VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	43.4	21.7	5.4
50	30.1	15.0	3.8
75	18.6	9.3	-
100	9.3	4.7	-



Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	38.1	19.0	4.8
50	29.2	14.6	3.7
75	21.1	10.5	-
100	13.1	6.5	-



4. 電解コンデンサ推定寿命計算値　　Electrolytic Capacitor Lifetime

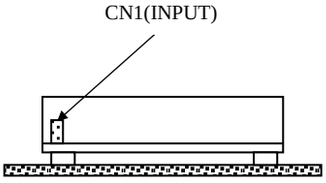
MODEL : CUS30M-24

空冷条件：自然空冷

Cooling condition : Convection cooling

標準取付

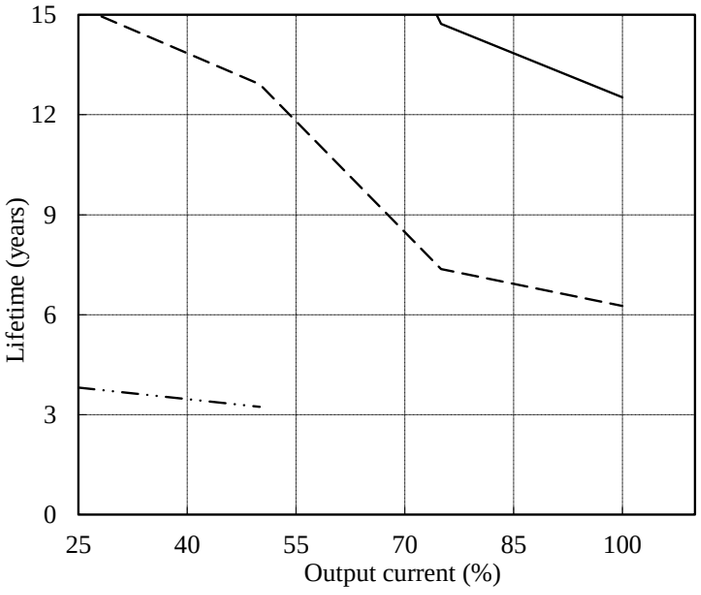
Standard Mounting



Conditions　　Ta　40℃ : ——
50℃ : – – –
70℃ : –·–

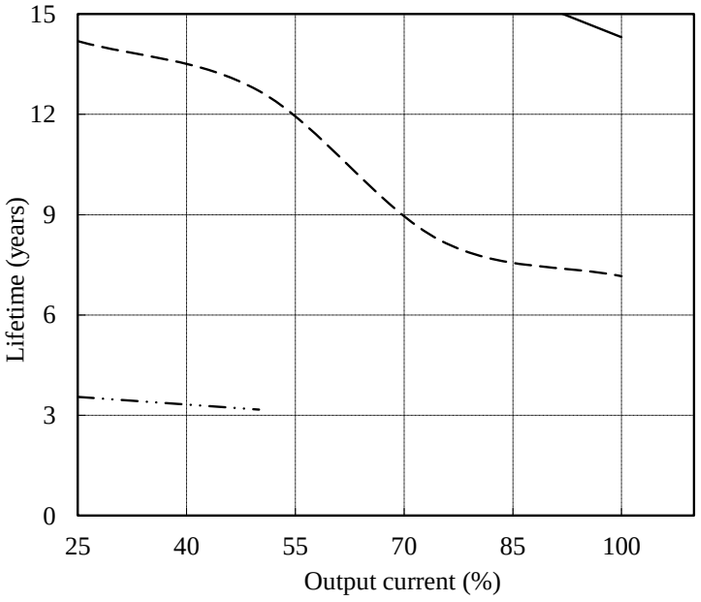
Vin=115VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	30.5	15.3	3.8
50	19.8	9.9	2.5
75	12.1	6.0	-
100	6.7	3.4	-



Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	28.4	14.2	3.6
50	14.8	7.4	1.9
75	10.7	5.3	-
100	7.8	3.9	-



4. 電解コンデンサ推定寿命計算値　　Electrolytic Capacitor Lifetime

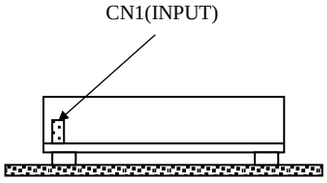
MODEL : CUS30M-48

空冷条件：自然空冷

Cooling condition : Convection cooling

標準取付

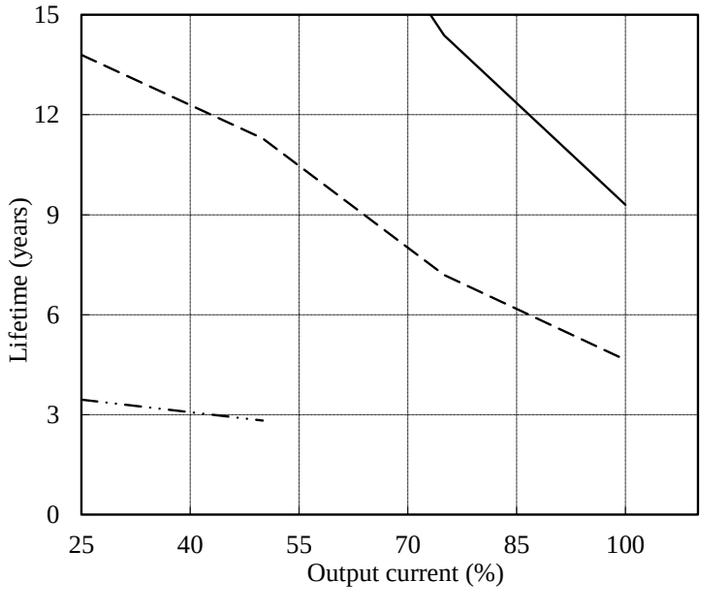
Standard Mounting



Conditions　　Ta　40℃ : ——
50℃ : – – –
70℃ : —·—

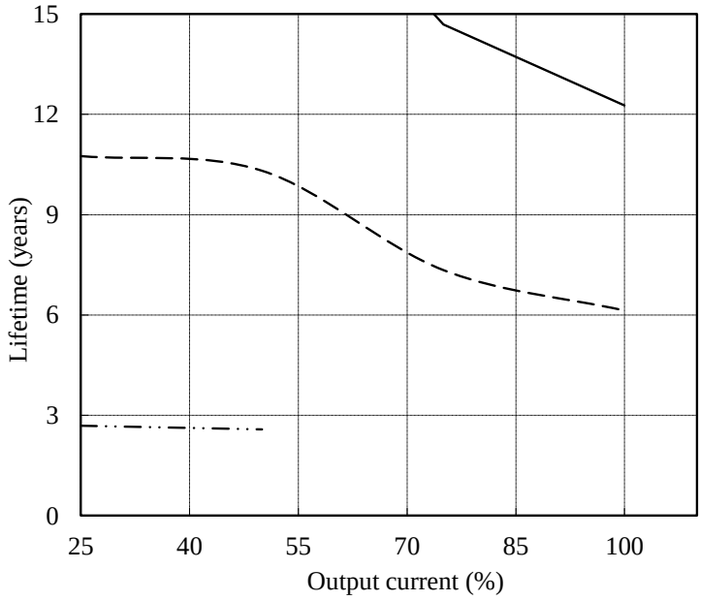
Vin=115VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	27.6	13.8	3.4
50	22.6	11.3	2.8
75	14.4	7.2	-
100	9.3	4.6	-



Vin=230VAC

Load (%)	Lifetime (years)		
	Ta= 40℃	Ta= 50℃	Ta= 70℃
25	21.5	10.8	2.7
50	20.6	10.3	2.6
75	14.7	7.3	-
100	12.3	6.1	-



5. アブノーマル試験 Abnormal Test

MODEL :CUS30M-24

(1) 試験条件 Test Conditions

Input : 230VAC Output : 24V, 1.25A Ta : 25℃

(2) 試験結果 Test Results

(Da : Damaged)

No.	Test position		Test mode		Test result													
					a	b	c	d	e	f	g	h	i	j	k	l		
No.	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change	その他 Others	記事 Note	
1	D1	AC-AC	○							○	○			○			Da: F1A,F1B	
2		AC-DC	○							○	○			○			Da: F1A,F1B,D1	
3		DC-DC	○							○	○			○			Da: F1A,F1B,D1	
4		AC		○										○				
5		DC		○										○				
6	D51	A-K	○											○			A1：latched off	
7		A/K		○										○			A1：latched off	
8	D101	A-K	○											○			A1：latched off	
9		A/K		○												○	Effi. Increase	
10	D102	A-K	○											○				
11		A/K		○												○	Output hiccup	
12	Z101	A-K	○											○			A1：latched off	
13		A/K		○											○			
14	Z102	A-K	○											○			A1：latched off	
15		A/K		○											○			
16	Z103	A-K	○											○				
17		A/K		○											○			
18	Z204	A-K	○											○			A1：latched off	
19		A/K		○											○			
20	L1	1-2	○							○	○			○			Da: F1A,F1B	
21		1-3	○							○	○			○			Da: F1A,F1B	
22		1-4	○												○			
23		2-3	○												○			
24		2-4	○							○	○			○			Da: F1A,F1B	
25		3-4	○							○	○			○			Da: F1A,F2B	
26		1/2		○										○				
27		3/4		○										○				
28	L2	1-2	○							○	○			○			Da: F1A,F1B	
29		1-3	○												○			
30		1-4	○							○	○			○			Da: F1A,F1B	
31		2-3	○							○	○			○			Da: F1A,F1B	
32		2-4	○												○			
33		3-4	○							○	○			○			Da: F1A,F1B	
34		1/2		○										○				
35		3/4		○										○				

(Da : Damaged)

No.	Test position		Test mode		Test result												
					a	b	c	d	e	f	g	h	i	j	k	l	
No.	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change	その他 Others	記事 Note
36	L51	1-2	○												○		
37		1/2		○										○			
38	L52	1-2	○											○			
39		1-3	○											○			
40		1-4	○												○		
41		2-3	○												○		
42		2-4	○											○			
43		3-4	○											○			
44		1/2		○										○			
45		3/4		○										○			
46	PC101	1-2	○									○		○			A1：latched off
47		3-4	○											○			
48		1/2		○								○		○			A1：latched off
49		3/4		○								○		○			A1：latched off
50	PC102	1-2	○												○		OVP malfunction
51		3-4	○											○			A1：latched off
52		1/2		○											○		OVP malfunction
53		3/4		○											○		OVP malfunction
54	Q101	G-D	○												○		OVP and UL508 class 2 malfunction
55		G-S	○												○		OVP and UL508 class 2 malfunction
56		D-S	○											○			A1：latched off
57		G		○										○			A1：latched off
58		D		○											○		OVP and UL508 class 2 malfunction
59		S		○											○		OVP and UL508 class 2 malfunction
60	T1	1-2	○													○	Output hiccup
61		1-3	○							○	○			○			Da: F1A,F1B,D1
62		1-5	○							○	○			○			Da: F1A,F1B,D1
63		2-3	○							○	○			○			Da: F1A,F1B,D1,A1
64		2-5	○							○	○			○			Da: F1A,F1B,D1
65		3-5	○											○			A1：latched off
66		A-B	○											○			A1：latched off
67		3/5		○										○			
68		1		○										○			
69		2		○										○			
70		A		○										○			A1：latched off
71		B		○										○			A1：latched off
72	TH1		○													○	Effi. Increase
73				○										○			

(Da : Damaged)

No.	Test position		Test mode		Test result													
					a	b	c	d	e	f	g	h	i	j	k	l		
No.	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change	その他 Others	記事 Note	
74	A1	1-2	○											○		○	Output hiccup (Pin max 5.72W and Vout max 3.6V)	
75		1-3	○												○			
76		1-4/5	○							○	○			○			Da: F1A,F1B,A1,Q101,C102,Z102	
77		1-6	○												○			
78		1-7	○							○				○			Da: A1	
79		1-8	○											○			A1：latched off	
80		2-3	○											○				
81		2-4/5	○							○	○			○			Da: F1A,F1B,A1,Z103	
82		2-6	○											○				
83		2-7	○									○		○			A1：latched off	
84		2-8	○											○				
85		3-4/5	○							○	○			○			Da: F1A,F1B,D1,A1,Z101	
86		3-6	○												○			
87		3-7	○											○				
88		3-8	○											○			A1：latched off	
89		4/5-6	○							○	○			○			Da: F1A,F1B,D1,A1,Z101	
90		4/5-7	○							○	○			○			Da: F1A,F1B,A1,Z102,Q101	
91		4/5-8	○							○	○			○			Da: F1A,F1B, D1	
92		6-7	○											○				
93		6-8	○											○			A1：latched off	
94		7-8	○											○				
95		1		○											○			
96		2		○								○		○			A1：latched off	
97		3		○										○				
98		4		○											○			
99		5		○											○			
100		6		○											○			
101		7		○										○				
102		8		○										○				
103	A201	A-K	○													○	Output hiccup	
104		A-Ref	○									○		○			A1：latched off	
105		K-Ref	○													○	Output hiccup	
106		K		○								○		○			A1：latched off	
107		A		○								○		○			A1：latched off	
108		Ref		○								○		○			A1：latched off	
109	C1		○							○	○			○			Da: F1A,F1B	
110				○											○			
111	C6		○							○	○			○			Da: F1A,F1B,D1	
112				○												○	Effi. Decrease	

(Da : Damaged)

No.	Test position		Test mode		Test result												記事 Note
					a	b	c	d	e	f	g	h	i	j	k	l	
	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change	その他 Others	
113	C51/C52		○											○			
114				○											○		
115	C101		○											○		○	Output hiccup
116				○												○	Effi. Decrease
117	C102		○											○			A1：latched off
118				○											○		
119	C103		○											○			
120				○											○		
121	C104/C105		○												○		
122	C109/C110			○											○		
123	C107		○											○			A1：latched off
124				○												○	Effi. Increase
125	C201		○											○			A1：latched off
126				○												○	Effi. Increase
127	C202		○									○		○			A1：latched off
128				○												○	Output unsteady
129	C203		○											○		○	Output hiccup
130				○												○	Have noise
131	C204		○													○	Output drop
132				○											○		
133	C205		○													○	Output hiccup
134				○											○		
135	C206/C207		○											○			
136				○											○		
137	R101/R102 /R103		○													○	Effi. Decrease
138				○											○		
139	R104/R105		○													○	Effi. Decrease
140				○												○	Effi. Increase
141	R106/R107		○											○			A1：latched off
142				○										○			A1：latched off
143	R108		○												○		
144				○										○			
145	R113/R114 /R115		○												○		
146				○											○		Effi. Increase
147	R201/R202		○												○		
148				○												○	Effi. Decrease
149	R204		○									○		○			A1：latched off
150				○											○		
151	R206		○												○		
152				○											○		

(Da : Damaged)

No.	Test position		Test mode		Test result												
					a	b	c	d	e	f	g	h	i	j	k	l	
No.	部品No. Location No.	試験端子 Test point	ショート Short	オープン Open	発火 Fire	発煙 Smoke	破裂 Burst	異臭 Smell	赤熱 Red hot	破損 Damaged	ヒューズ断 Fuse blown	OVP	OCP	出力断 No output	変化なし No change	その他 Others	記事 Note
153	R207		○													○	Output ascend
154				○												○	Output descend
155	R208/R209		○											○			Output descend
156				○								○		○			
157	R210		○													○	Output ascend
158				○												○	Output descend
159	R216		○												○		
160				○											○		OVP malfunction
161	C7		○											○			
162				○												○	Output hiccup
163	C106		○												○		OVP malfunction
164				○											○		
165	C108		○											○			
166				○											○		
167	C111		○											○			
168				○											○		
169	C208		○												○		
170				○											○		
171	R111/R112		○												○		
172				○											○		
173	R116		○												○		
174				○											○		OVP malfunction
175	R117		○												○		OVP malfunction
176				○											○		
177	R211/R212		○												○		
178				○								○		○			A1：latched off
179	R213		○												○		
180				○											○		
181	R217		○												○		OVP malfunction
182				○											○		
183	R218		○												○		
184				○											○		

6. 振動試験 Vibration Test

MODEL：CUS30M

(1) 振動試験種類 Vibration Test Class

掃引振動数耐久試験 Frequency variable endurance test

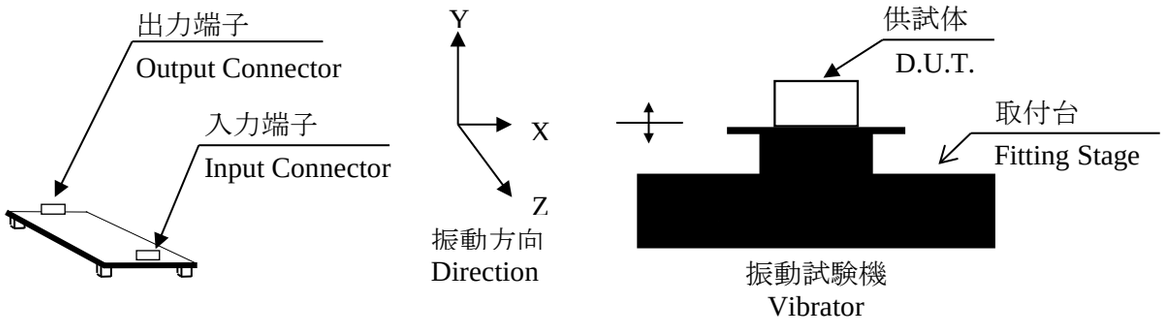
(2) 使用振動試験装置 Equipment Used

Unholtz Dickie Corp. SAI30-R16C

(3) 試験条件 Test Conditions

・周波数範囲 Sweep frequency	: 10～500Hz	・振動方向 Direction	: X, Y, Z
・掃引時間 Sweep time	: 1.0分間 1.0min	・試験時間 Sweep count	: 各方向共 1時間 1 hour each
・加速度 Acceleration	: 一定 19.6m/s^2 (2G) Constant		

(4) 試験方法 Test Method



(5) 判定条件 Judging Conditions

1.破壊しない事
Not to be broken
2.試験後の特性は初期値から変動していない事
Characteristic to be within regulation specification after the test.

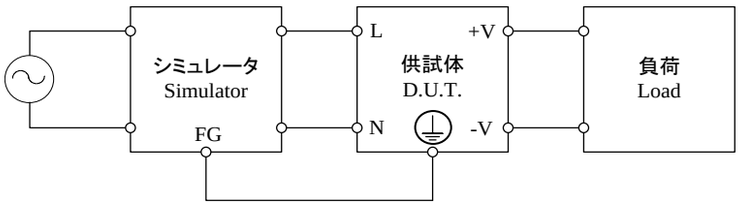
(6) 試験結果 Test Results

合格 OK

7. ノイズシミュレート試験　Noise Simulate Test

MODEL：CUS30M

(1)　試験回路及び測定器　Test Circuit and Equipment



シミュレータ
Simulator　:INS-4040　（NOISEKEN）

(2)　試験条件　Test Conditions

・入力電圧 Input voltage	: 100, 240VAC	・ノイズ電圧 Noise level	: 0～2kV
・出力電圧 Output Voltage	: 定格 Rated	・位相 Phase	: 0～360 deg
・出力電流 Output current	: 0, 100%	・極性 Polarity	: ＋,－
・周囲温度 Ambient temperature	: 25℃	・印加モード Mode	: コモン、ノーマル Common, Normal
・パルス幅 Pulse width	: 50～1000ns	・トリガ選択 Trigger select	: Line

(3)　判定条件　Judging Conditions

1.破壊しない事
Not to be broken
2.出力がダウンしない事
Not to be shut down output
3.その他異常のない事
No other out of orders

(4)　試験結果　Test Results

合格　OK

8. 熱衝撃試験 Thermal Shock Test

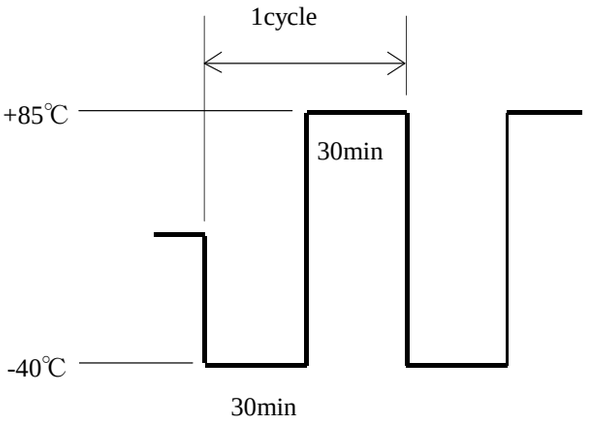
MODEL：CUS30M

(1) 使用計測器 Equipment Used

TSA-101S-W : ESPEC

(2) 試験条件 Test Conditions

・電源周囲温度 : -40℃ ⇔ 85℃
Ambient Temperature
・試験時間 : 図参照
Test Time Refer to Dwg.
・試験サイクル : 700 サイクル
Test Cycle 700 Cycles
・非動作
Not Operating



(3) 試験方法 Test Method

初期測定の後、供試品を試験槽に入れ、上記サイクルで試験を行う。700サイクル後に、供試品を常温常湿下に1時間放置し、出力に異常がない事を確認する。

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. 700 cycles later, leave it for 1 hour at the room temperature , then check if there is no abnormal output.

(4) 判定条件 Judging Conditions

1.破壊しない事
Not to be broken
2.試験後の特性は初期値から変動していない事
Characteristic to be within regulation specification after the test.

(5) 試験結果 Test Results

合格 OK

9. 電圧ディップ試験
Voltage Dips Immunity Test (SEMI-F47)

MODEL : CUS30M

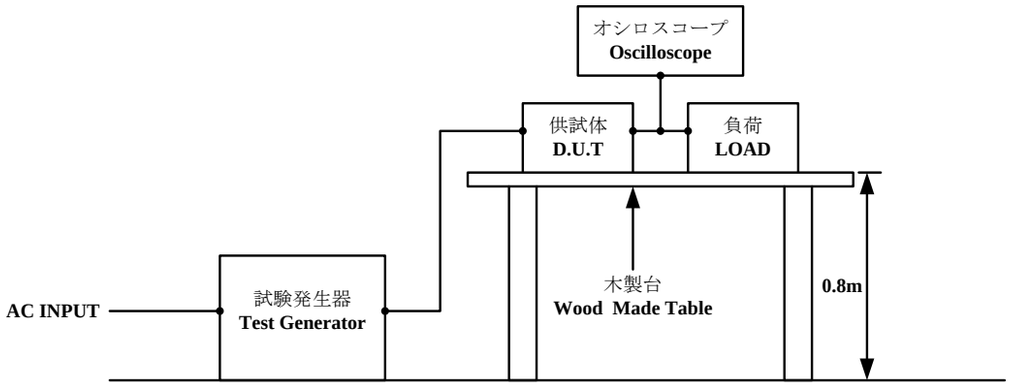
(1) 使用計測器 Equipment Used

試験発生器 :PCR2000L（KIKUSUI）
Test Generator

(2) 試験条件 Test Conditions

・入力電圧 Input Voltage	:200VAC	・出力電圧 Output Voltage	:定格 Rated
・出力電流 Output Current	:100%	・周囲温度 Ambient Temperature	:25℃
・試験回数 Number of Tests	:3回 3 times	・試験間隔 Test interval	:10秒以上 More than 10 seconds

(3) 試験方法及び印加箇所 Test Method and Device Test Point



(4) 判定条件 Judging Conditions

1. 試験後の出力電圧は初期値から変動していない事。
Output voltage to be within output voltage regulation specification after the test.
2. 発煙／発火なき事。
Smoke and fire do not occur.

(5) 試験結果 Test Result

Test Level	Dip rate	Continue Time	CUS30M-＊
50%	50%	50~200ms	PASS
70%	30%	200~500ms	PASS
80%	20%	500~1000ms	PASS
50%	50%	1000ms	PASS