CUS100ME

RELIABILITY DATA

DWG. No.		
APPD	CHK	DWG

TDK·Lambda

I N D E X

※Test results are typical data.

1. Calculated Values for MTBF

MODEL : CUS100ME-24

Calculating Method

Calculated based on part count reliability projection of Telcordia (*1).
Individual failure rates λ_G is given to each part and MTBF is calculated by the count of each part.

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

Formula:

$$MTBF = \frac{1}{\lambda_{equip}} \times 10^6 = \frac{1}{\sum_{i=1}^{n} n_i \left(\lambda_G \pi_Q\right)_i} \times 10^6 (hours)$$

λ_{equip} = Total Equipment Failure Rate (Failure /10^6 Hours)

λ_G = Generic failure rate for the i^{th} generic part (Failure / 10^6 Hours)

n_i = Quantity of i^{th} part

n = Number of different generic part categories

π_Q = Generic quality factor for the ith generic part ($\pi_{Q = 1}$)

MTBF Values

Environmental factor: G_B (Ground, Benign)

Line Input	Output Volts	Load	T_{amb}	MTBF (hrs)
230V	24V	4.16A	20C	19,181,479
230V	24V	4.16A	30^{o}C	10,719,765
230V	24V	4.16A	40^{o}C	5,734,828
230V	24V	4.16A	50^{o}C	3,003,623

2. Components Derating List

MODEL: CUS100ME-24

Location No.	Vin = 100VAC Load = 100% Ta = 50°C		
XD8 FURS360B Fagor	Tjmax=175°C Pd=0.5W Tj = Tc + ((θ j-c) × Pd) =121°C D.F.=69.1%	θ j-c=20°C/W ΔTc=10°C	 Tc=111°C
XD10 S5MB Taiwan Semiconductor	Tjmax=150°C Pd=0.5W Tj = Tc + ((θ j-c) × Pd) =129.9°C D.F.=86.6%	θ j-c=13°C/W ΔTc=6.5°C	 Tc=123.4°C
XD11 S5MB Taiwan Semiconductor	Tjmax=150°C Pd=0.5W Tj = Tc + ((θ j-c) × Pd) =129.9°C D.F.=86.6%	θ j-c=13°C/W ΔTc=6.5°C	 Tc=123.4°C
XD12 S5MB Taiwan Semiconductor	Tjmax=150°C Pd=0.5W Tj = Tc + ((θ j-c) × Pd) =129.9°C D.F.=86.6%	θ j-c=13°C/W ΔTc=6.5°C	 Tc=123.4°C
XD13 S5MB Taiwan Semiconductor	Tjmax=150°C Pd=0.5W Tj = Tc + ((θ j-c) × Pd) =129.9°C D.F.=86.6%	θ j-c=13°C/W ΔTc=6.5°C	 Tc=123.4°C
XQ1 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=0.36W Tj = Tc + ((θ j-c) × Pd) =125°C D.F.=83.4%	θ j-c=4°C/W ΔTc=1.4°C	 Tc=123.6°C
XQ2 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=0.36W Tj = Tc + ((θ j-c) × Pd) =125°C D.F.=83.4%	θ j-c=4°C/W ΔTc=1.4°C	 Tc=123.6°C
XQ3 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=1W Tj = Tc + ((θ j-c) × Pd) =130°C D.F.=86.7%	θ j-c=4°C/W ΔTc=4°C	 Tc=126°C
XQ4 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=1W Tj = Tc + ((θ j-c) × Pd) =130°C D.F.=86.7%	θ j-c=4°C/W ΔTc=4°C	 Tc=126°C
XQ5 2SK3018T106 ROHM	Tjmax=150°C Pd=0W Tj = Tc + ((θ j-c) × Pd) =100°C D.F.=66.7%	θ j-c=625°C/W ΔTc=0°C	 Tc=100°C

Location No.	**Vin = 100VAC Load = 100% Ta = 50°C**		
XQ105 BSC039N06NSATMA1 Infineon	Tjmax=150°C Pd=0.44W Tj = Tc + ((θ j-c) × Pd) =135.8°C D.F.=90.5%	θ j-c=20°C/W ΔTc=8.8°C	 Tc=127°C
XQ106 BSC039N06NSATMA1 Infineon	Tjmax=150°C Pd=0.39W Tj = Tc + ((θ j-c) × Pd) =134.7°C D.F.=89.8%	θ j-c=20°C/W ΔTc=7.7°C	 Tc=127°C
XU1 TEA1716T NXP	Tjmax=150°C Pd=0W Tj = Tc + ((θ j-c) × Pd) =99.9°C D.F.=66.6%	θ j-c=90°C/W ΔTc=0°C	 Tc=99.9°C
XU100 TEA1995T	Tjmax=150°C Pd=0W Tj = Tc + ((θ j-c) × Pd) =100.5°C D.F.=67%	θ j-c=140°C/W ΔTc=0°C	 Tc=100.5°C
XD100 NCP431B On-Semi	Tjmax=150°C Pd=0.1W Tj = Tc + ((θ j-c) × Pd) =91.4°C D.F.=60.9%	θ j-c=80°C/W ΔTc=10.6°C	 Tc=80.8°C
XD102 NCP431B On-Semi	Tjmax=150°C Pd=0.02W Tj = Tc + ((θ j-c) × Pd) =95.5°C D.F.=63.7%	θ j-c=80°C/W ΔTc=1.4°C	 Tc=94.1°C

3. Main components temperature rise ΔT list

MODEL: CUS100ME-12

Measuring conditions

Mounting Method Standard Mounting (A) Open Frame	
Input Voltage (VAC)	90
Output Voltage (VDC)	12
Output Current (A)	8.313

Measuring Results

		ΔT Temperature Rise (°C)	
Output Derating		**Io = 100 % Ta = 50 °C**	**Io = 60 % Ta = 70 °C**
Location No.	**Parts Name**	**Mounting(A)**	**Mounting (A)**
XD13	Bridge Diode	60.7	35.7
XQ3	Boost FET	58.3	34.3
XD8	Boost Diode	61.6	38.3
XQ2	Primary FET	59.6	37.8
XQ106	Secondary FET	51.0	32.9
XU101	Optocoupler	43.0	28.1
XU102	Optocoupler	39.1	26.7
L1	Common Mode Choke	47.0	26.0
L2	Boost Choke	51.6	31.3
TX100	Transformer Primary	55.6	37.6
TX100	Transformer Secondary	54.3	36.2
C1	Resonant Cap	44.0	28.4
C2	Auxilliary Cap	34.7	23.9
C3	X Cap	25.7	14.8
C6	Boost Cap	41.9	26.0
C7	X Cap	34.4	21.5
C102	Output Cap	37.3	23.8
F1	Fuse	37.4	19.8
XR112	Sense Resistor	65.4	49.6
XD13	Bridge Diode	60.7	35.7

4. Electrolytic capacitor lifetime

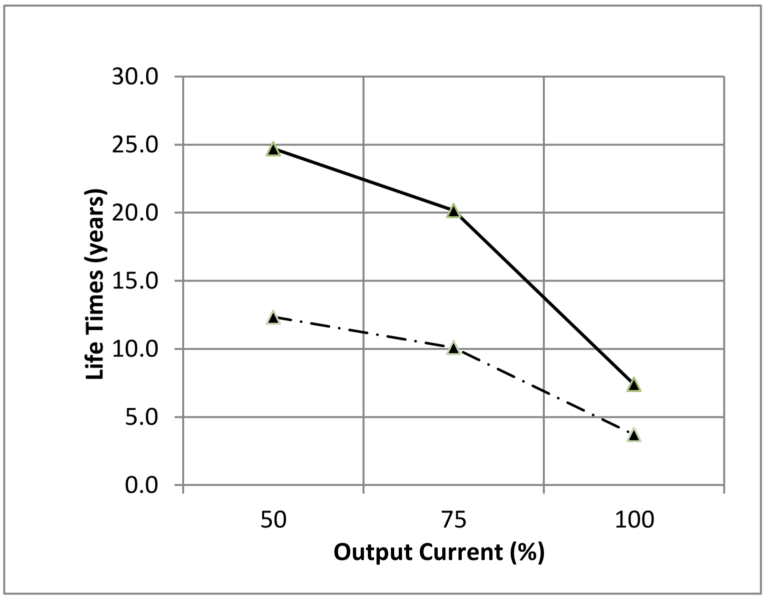
MODEL: CUS100ME-12

Standard Mounting

Conditions	Ta	40°C	———
		50°C	–·–·–

Vin = 100 VAC

Load (%)	Lifetime (years)	
	Ta = 40°C	Ta = 50°C
50	24.7	12.3
75	20.2	10.1
100	7.4	3.7



Note : E-cap life calculation is based on 24hrs/day operation.
e.g. For 12Hrs/day operation life numbers will double

5. Vibration Test

MODEL: CUS100ME

(1) Vibration Test Class

Frequency Variable Endurance Test

(2) Equipment Used

Controller:	LDS Dactron Comet
Vibrator:	V830-335 T M8 R-CE
Accelerometer:	DeltaTron 4533-B

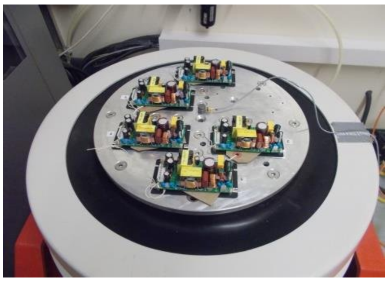
(3) The Number of D.U.T. (Device Under Test)

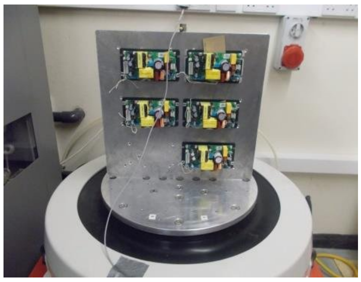
5 Units

(4) Test Conditions

Sweep Frequency:	10 - 500Hz	Direction:	X, Y, Z
Sweep Time:	1 minute	Test Time:	1 hour each axis
Acceleration:	2.2G	Non-operation	
Mounting:	Standard Mounting		

(5) Test Method





Fix the PSUT on the mounting rail with stopper on each corner.
Standard mounting position as per picture above.

(6) Acceptable Conditions

1. Not to be broken.
2. No abnormal output after test.

(7) Test Results

Visually OK and functions after test.

6. Thermal shock test

MODEL : CUS100ME-24

(1) Equipment used

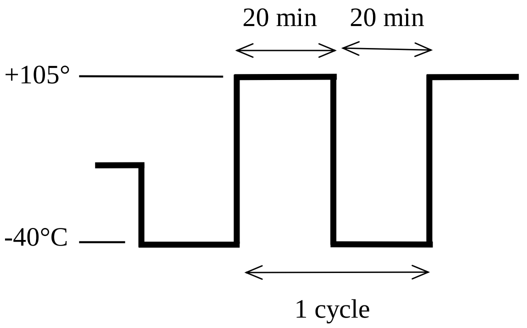
Thermal shock chamber Thermotron

(2) The number of PSUT. (Power Supply Under Test)

1 unit

(3) Test Conditions

Ambient Tempetature:	-40°C ↔ 105°C
Test Time:	20 min ~ 20 min
Test Cycle:	523 cycles
Not Operating	



(4) Test Method

Before the test, check if there is no abnormal output and put the PSUT in the testing chamber. Then test it in above cycles. After the test is completed, leave it for 1 hour at the room temperature and check to make sure that there is no abnormal output.

(5) Test Results

Visually and electrically OK.