260583 iss2

CUS150M

RELIABILITY DATA

DWG. No.	XXXXXX iss X		
	APPD	CHK	DWG
Sign			
Name	A. Knill	R. Solc	N. Heighington
Date			

TDK·Lambda

I N D E X

※Test results are example data based on a unit under our standard measurement condition.

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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), for all units without "F" option

T_{amb}	MTBF (hrs)
20°C	19,022,520
30°C	10,669,959
40°C	5,720,522
50°C	2,999,683
60°C	1,567,907
70°C	827,618
85°C	328,595

Environmental factor: G_B (Ground, Benign), for all units with "F" option

T_{amb}	MTBF (hrs)
20°C	4,279,255
30°C	2,968,381
40°C	1,753,457
50°C	1,104,269
60°C	693,685
70°C	432,694
85°C	210,044

2. Components Derating List

MODEL: CUS150M

Location No.	Vin = 100VAC Load = 100% Ta = 50°C		
XD8 STTH506B-TR ST MICROELECTRONICS	Tjmax=175°C Pd=0.7W Tj = Tc + ((θ j-c) × Pd) =126.2°C D.F.=72%	θ j-c=3.5°C/W ΔTc=2.5°C	Tc=123.7°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=1W Tj = Tc + ((θ j-c) × Pd) =127.6°C D.F.=85%	θ j-c=4°C/W ΔTc=4°C	Tc=123.6°C
XQ2 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=1W Tj = Tc + ((θ j-c) × Pd) =127.6°C D.F.=85%	θ j-c=4°C/W ΔTc=4°C	Tc=123.6°C
XQ3 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=1.5W Tj = Tc + ((θ j-c) × Pd) =132°C D.F.=88%	θ j-c=4°C/W ΔTc=6°C	Tc=126°C
XQ4 IPD60R400CEAUMA1 Infineon	Tjmax=150°C Pd=1.5W Tj = Tc + ((θ j-c) × Pd) =132°C D.F.=88%	θ j-c=4°C/W ΔTc=6°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=1W Tj = Tc + ((θ j-c) × Pd) =128.8°C D.F.=86%	θ j-c=1.8°C/W ΔTc=1.8°C	Tc=127°C
XQ106 BSC039N06NSATMA1 Infineon	Tjmax=150°C Pd=1W Tj = Tc + ((θ j-c) × Pd) =128.8°C D.F.=86%	θ j-c=1.8°C/W ΔTc=1.8°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) =110°C D.F.=73%	θ j-c=80°C/W ΔTc=8°C	Tc=102°C
XD102 NCP431B On-Semi	Tjmax=150°C Pd=0.02W Tj = Tc + ((θ j-c) × Pd) =103.6°C D.F.=69%	θ j-c=80°C/W ΔTc=1.6°C	Tc=102°C

3. Main components temperature rise ΔT list

MODEL: CUS150M

Measuring conditions

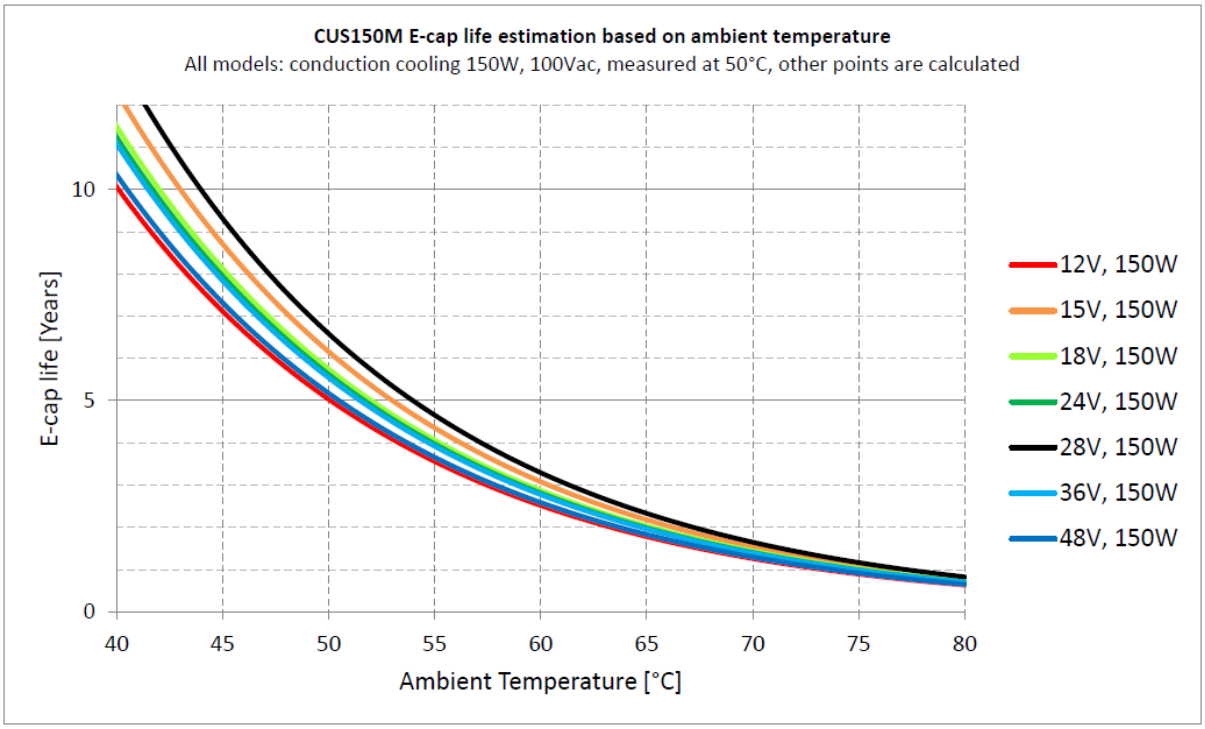
Mounting Method Standard Mounting (A) Open Frame	
Input Voltage (VAC)	90
Output Voltage (VDC)	12
Output Current (A)	9.17 / 6.25

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	67.2	26.9
XQ3	PFC FET	72.4	27.6
XD8	PFC Diode	70.7	28.9
XQ2	HB FET	70.1	28.7
XQ106	Synchronous Rectifier FET	54.2	22.5
XU101	Opto feedback	45.2	25.2
XU102	Opto OVP	36.8	20.2
L1	CM choke	52.2	25.3
L2	PFC choke	56.4	30.7
TX100 PRI	Main transformer	62.1	36.1
TX100 SEC	Main transformer	53.2	26.8
C1	Resonant cap	51.0	28.9
C2	Aux cap	37.3	25.1
C3	X1 cap	32.9	21.5
C6	Bulk Cap	46.1	25.8
C7	PFC in cap	36.1	20.8
C102	Output cap	34.9	17.7
F1	Input Fuse	41.8	23.0
XR112	SR's snubber	62.1	27.9
C110	Output cap (fan out)	35.6	18.8
L3	DM choke	49.5	24.2
C104	Output cap	25.8	15.2
C105	Output cap	31.7	15.7
C5	Y1 cap	30.4	16.6
C100		14.1	12.8
C101		20.3	14.5
C103	Y1 cap	33.0	19.7
J1		21.8	11.8
J100		20.8	11.3

4. Electrolytic capacitor lifetime

MODEL: CUS150M



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: CUS150M

(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

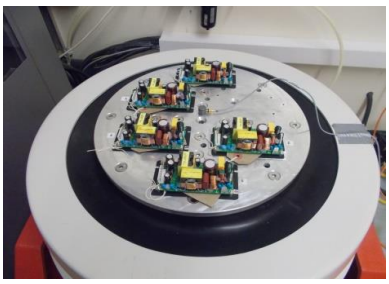
(3) The Number of D.U.T. (Device Under Test)

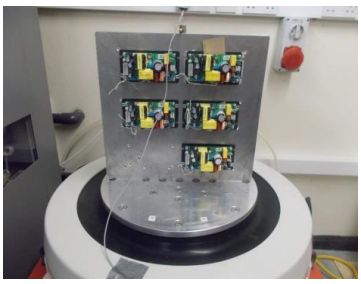
5 Units

(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 : CUS150M

(1) Equipment used

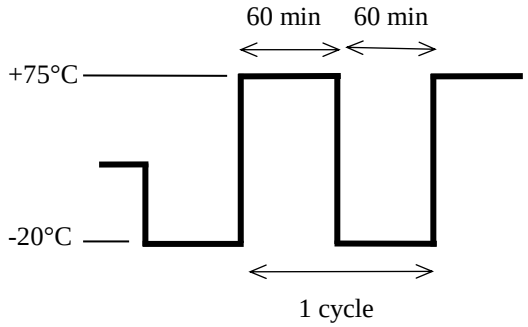
Thermal shock chamber Thermotron

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

1 unit

(3) Test Conditions

Ambient Temperature:	-20°C ↔ 70°C
Test Time:	60 min ~ 60 min
Test Cycle:	500 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.