

CUS250M

RELIABILITY DATA

Template	260473 iss 2
DWG. No.	XXXXXX iss X

I N D E X

1. Calculated Values for MTBFR-1

2. Components Derating List.....R-2

3. Main components temperature rise ΔT list.....R-3

4. Electrolytic capacitor lifetimeR-4

5. Vibration Test.....R-5

6. Thermal shock test.....R-6

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

TDK Lambda UK Ltd.
Kingsley Avenue
Ilfracombe
Devon, EX34 8ES
United Kingdom

Website: <https://uk.tdk-lambda.com>

1. Calculated Values for MTBF**MODEL : CUS250M-24****Calculating Method**

Test Specifications: Telcordia SR332 Issue 4, 2016
Test Method: Method I-D (Black Box)
Confidence Level: 90%
Environment: Ground, Fixed, Controlled
Device Method: I-D
Quality Level: II

The failure rates in Failures In Time_ (FITs) is given for the different sub-assemblies at a confidence level of 90% in the table below at 20°C; 30°C; 40°C; 50°C; 60°C; and 70°C.

Telcordia SR332 Issue 4		
Ambient (°C)	FITs	MTBF (hrs)
20	196	5102041
30	278	3597122
40	405	2469136
50	589	1697793
60	858	1165501
70	1250	800000

2. Components Derating List

MODEL : CUS250M-12

Test Conditions

Vout: 12V_{DC}
 Vin: 115V_{AC}
 Iout: 100% Load
 Ambient: 25

Cir Ref: XQ1 Manu Part No. IPD60R180P7SAUMA1 Manufacturer: Infineon	T _{jmax} =150°C Pd=3W T _j = T _c + ((θ _{j-c}) × Pd) =114°C D.F.=76%	θ _{j-c} =1.74°C/W ΔT _c =5.2°C T _c =108.78°C
Cir Ref: XQ2/3 Manu Part No. IPD60R180P7SAUMA1 Manufacturer: Infineon	T _{jmax} =150°C Pd=1W T _j = T _c + ((θ _{j-c}) × Pd) =108°C D.F.=72%	θ _{j-c} =1.74°C/W ΔT _c =1.7°C T _c =102.78°C
Cir Ref: XQ4 Manu Part No. 2SK3018 Manufacturer ROHM	T _{jmax} =150°C Pd=0.005W T _j = T _c + ((θ _{j-c}) × Pd) =104°C D.F.=69.3%	θ _{j-c} =625°C/W ΔT _c =3.1°C T _c =100.875°C
Cir Ref: XQ5 A/B Manu Part No. 2N7002DWH6327XTS Manufacturer: Infineon	T _{jmax} =150°C Pd=0.012W T _j = T _c + ((θ _{j-c}) × Pd) =100°C D.F.=66.7%	θ _{j-c} =250°C/W ΔT _c =3°C T _c =97°C
Cir Ref: XD1 - 4 Manu Part No. S5MBHM4G Manufacturer: Taiwan	T _{jmax} =150°C Pd=1.3W T _j = T _c + ((θ _{j-c}) × Pd) =112°C D.F.=74.7%	θ _{j-c} =13°C/W ΔT _c =16.9°C T _c =95.1°C
Cir Ref: XD5 Manu Part No. S5MBHM4G Manufacturer: Taiwan	T _{jmax} =150°C Pd=0.3W T _j = T _c + ((θ _{j-c}) × Pd) =114°C D.F.=76%	θ _{j-c} =13°C/W ΔT _c =3.9°C T _c =110.1°C
Cir Ref: XD6 Manu Part No. STTH3L06UFY Manufacturer: ST	T _{jmax} =175°C Pd=1.54W T _j = T _c + ((θ _{j-c}) × Pd) =118°C D.F.=67.4%	θ _{j-c} =16°C/W ΔT _c =24.6°C T _c =93.36°C



CUS250M

Cir Ref: XU100 Manu Part No: VOL618A-3X001T S Manufacturer: Vishay	$T_{jmax}=125^{\circ}\text{C}$ $P_d=448\mu\text{W}$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 101^{\circ}\text{C}$ D.F.=80.8%	$\theta_{j-c}=0^{\circ}\text{C/W}$ $\Delta T_c=0^{\circ}\text{C}$	$T_c=101^{\circ}\text{C}$
Cir Ref: XU1 Manu Part No. NCP1611BDR2G Manufacturer: Onsemi	$T_{jmax}=150^{\circ}\text{C}$ $P_d=131\text{mW}$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 113^{\circ}\text{C}$ D.F.=75.3%	$\theta_{j-c}=50^{\circ}\text{C/W}$ $\Delta T_c=0^{\circ}\text{C}$	$T_c=106.5^{\circ}\text{C}$
Cir Ref: XU2 Manu Part No. TEA19161T Manufacturer: NXP	$T_{jmax}=150^{\circ}\text{C}$ $P_d=306\text{mW}$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 113^{\circ}\text{C}$ D.F.=75.3%	$\theta_{j-c}=60^{\circ}\text{C/W}$ $\Delta T_c=0^{\circ}\text{C}$	$T_c=94.64^{\circ}\text{C}$
Cir Ref: XU101 Manu Part No: TEA1995T/1J Manufacturer: NXP	$T_{jmax}=150^{\circ}\text{C}$ $P_d=85\text{mW}$ $T_j = T_c + ((\theta_{j-c}) \times P_d) = 108^{\circ}\text{C}$ D.F.=72%	$\theta_{j-c}=50^{\circ}\text{C/W}$ $\Delta T_c=0^{\circ}\text{C}$	$T_c=103.8^{\circ}\text{C}$

3. Main components temperature rise ΔT list

MODEL: CUS250M-12/FJ

Measuring conditions

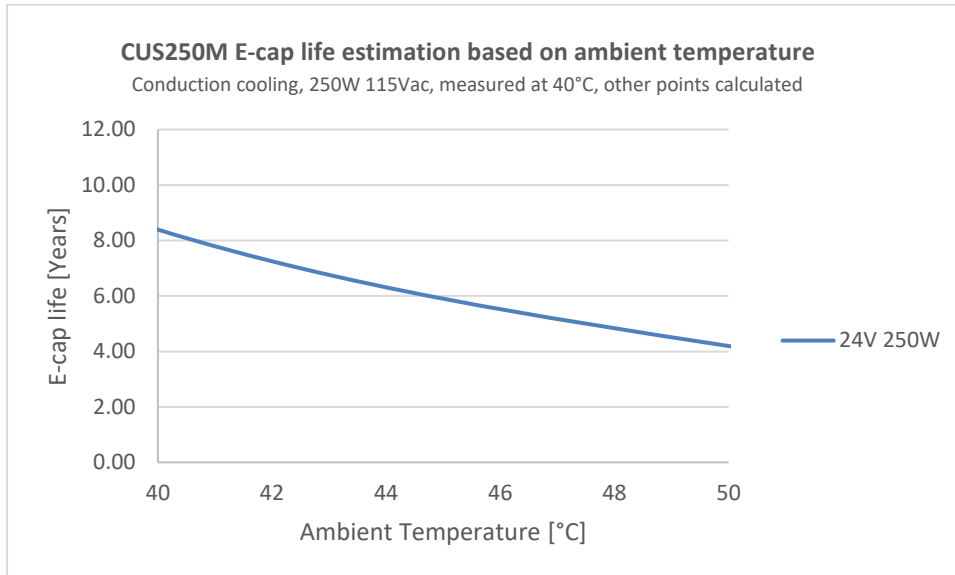
	
Input Voltage (VAC)	100Vac
Output Voltage (VDC)	12V
Output Current (A)	20.80A

Measuring Results

Output Derating		ΔT Temperature Rise ($^{\circ}\text{C}$)
		$I_o = 100\%$
		$T_a = 50^{\circ}\text{C}$
Location No.	Parts Name	Mounting(A)
L1	CM Choke	68.9
L3	PFC Choke	72.4
L4	DM Choke	79.0
C5	Film Capacitor	67.2
C11	Film Capacitor	56.0
C6	E-Cap	67.8
C104	E-Cap	56.7
XC104	E-Cap	72.5
XC105	E-Cap	69.2
XC400	E-Cap	54.6
XC502	E-Cap	55.3
C1	X- Cap	77.5
C2	Y-Capacitor	62.0
C3	Y-Capacitor	60.0
C100	Y-Capacitor	58.3
TX1	TRX Primary Winding	76.5
TX300	TRX Winding	56.7
XU100	Opto-Coupler	72.8
XU301	Opto-Coupler	61.7
XU400	Opto-Coupler	63.0
XD2	Bridge Diode	88.6
XQ2	FET	78.7
J1	Input Connector	71.9

4. Electrolytic capacitor lifetime

MODEL: CUS250M



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: CUS250M-12/F; CUS250M-12/FJ

(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)

3 x Units

(4) Test Conditions

Sweep Frequency:	10Hz – 500Hz – 10Hz	Direction:	X, Y, Z
Sweep Time:	1 Octave/ minute	Test Time:	60 Minutes
Acceleration:	2.2G	Non-operation	
Mounting:	Customer Fixings		

(5) Test Method



Standard mounting position as per picture above.

(6) Acceptable Conditions

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

(7) Test Results

No mechanical damage observed

6. Thermal shock test

MODEL : CUS250M-12/F; CUS250M-12/FJ; CUS250M-24/FJ

(1) Equipment used

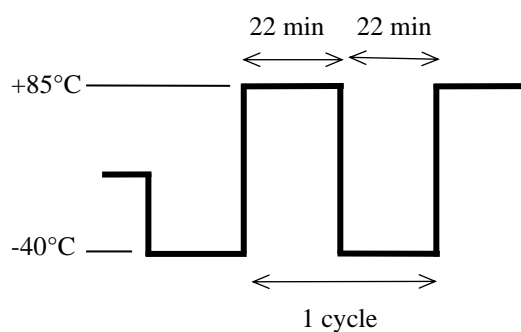
Thermotron Thermal Shock Chamber 6907-2357

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

3 x Units

(3) Test Conditions

Ambient Temperature:	-40°C ↔ 85°C
Test Time:	22min ~ 22min
Test Cycle:	500 cycles
Operating Condition:	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.