POWER MATE TECHNOLOGY CO.,LTD.

P-DUKE

TEM03 SERIES

FEATURES

- 3 WATTS MAXIMUM OUTPUT POWER
- OUTPUT CURRENT UP TO 600mA
- PACKAGE, 1.12 x 0.81 x 0.33 INCH
- HIGH EFFICIENCY UP TO 82%
- 2:1 WIDE INPUT VOLTAGE RANGE
- FIVE-SIDED SHIELD
- SWITCHING FREQENCY 100K TO 1500KHz.
- NO EXTERNAL INPUT AND OUTPUT CAPACITOR NEEDED
- LOW RIPPLE & NOISE
- OVER CURRENT PROTECTION
- SHORT CIRCUIT PROTECTION
- LONG LIFE WITHOUT ELECTROLYTIC CAPACITOR
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108//EC
- DESIGN MEETS J60950-1, UL60950-1, EN60950-1 AND IEC60950-1
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement
Semiconductor Equipment

DESCRIPTION

The TEM03 series offer 3 watts of output power from a 1.12 x 0.81 x 0.33 inch package without derating to 50ºC and without external input/output capacitor. The TEM03 series with 2:1 wide input voltage of 4.5-9, 9-18, 18-36 and 36-75VDC and features 500VAC of isolation, short-circuit protection.

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25ºC otherwise noted

OUTPUT SPECIFICATIONS

Maximum output power		3 Watts
Voltage accuracy	Full load and nominal Vin	± 1%
Minimum load		0%
Line regulation	LL to HL at Full Load	± 0.2%
Load regulation	No load to Full load	± 0.5%
Ripple and noise	50MHz bandwidth	See table
Maximum temperature drift		±0.02% / ºC
Transient response recovery time	25% load step change	500uS, typ
Short circuit protection		Continuous, automatics recovery
Over current protection		170%, typ

OUTPUT VOLTAGE ADJUSTMENT TERMINAL(Vset) (Note 6)

Model number	Open	-Vout shorted	+Vout shorted
XXS33	3.3V	3.67V	2.84V
XXS05	5V	6V	4.3V
XXS12	12V	15V	N/A
XXD12	±12V	±15V	N/A

Model number	Open	-Vout connected with resistance (7)		+Vout connected with resistance (7)	
XXS33	3.3V	3.3 to 3.67V	(8-1)	3.3 to 2.84V	(8-2)
XXS05	5V	5 to 6V	(8-3)	5 to 4.3V	(8-4)
XXS12	12V	12 to 15V	(8-5)	12 to 9V	(8-6)
XXD12	±12V	±12 to ±15V	(8-7)	±12 to ±9V	(8-8)

GENERAL SPECIFICATIONS

Efficiency			See table
Isolation voltage	Input to Output Input (Output) to Case		500 Vac
Isolation resistance	Input to Output Input (Output) to Case	DC500V	50M ohms
Isolation capacitance			300 pF, max
Safety standard pending	IEC60950-1, J60950-1, UL60950-1, EN60950-1		
Switching frequency	Full load to No load		100K to 1500K Hz
Case material			Metal case
Base material			None
Weight			11.5g (0.41oz)
Dimension			1.12 x 0.81 x 0.33 Inch (28.5 x 20.5 x 8.5 mm)
MTBF (Note 1)	BELLCORE TR-NWT-000332 MIL-HDBK-217F		4.248×10^6 hrs 4.941×10^6 hrs

INPUT SPECIFICATIONS

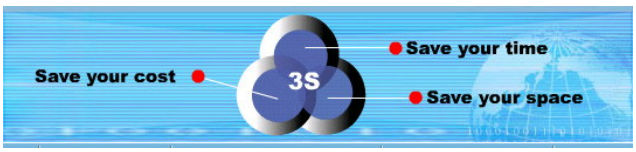
Input voltage range	5V nominal input	4.5 – 9VDC
	12V nominal input	9 – 18VDC
	24V nominal input	18 – 36VDC
	48V nominal input	36 – 75VDC
Input filter		L-C filter
Input surge voltage 100mS max	5V nominal input	15VDC
	12V nominal input	36VDC
	24V nominal input	50VDC
	48V nominal input	100VDC

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-25ºC ~ +85ºC (with derating)
Maximum case temperature	100ºC
Storage temperature range	-55ºC ~ +105ºC
Cooling	Nature convection
Thermal shock	MIL-STD-810F
Vibration	At no operation, 10~55~10Hz (sweep for 15min.) amplitude 1.5mm constant (maximum 9G X, Y, Z 2hrs each)
Shock	100G
Operating humidity range	20% to 95% RH
Storage humidity range	20% to 95% RH

EMC CHARACTERISTICS

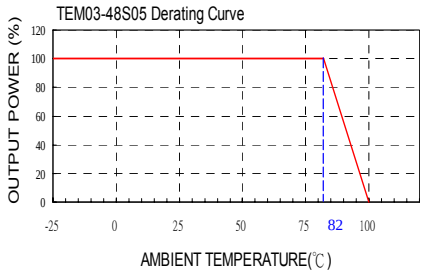
EMI (Note 9)	EN55022	Class A

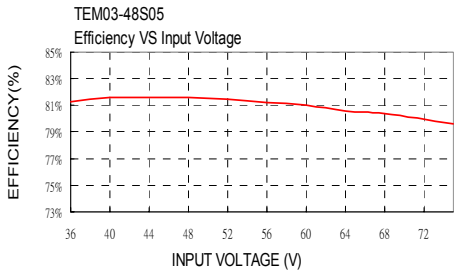


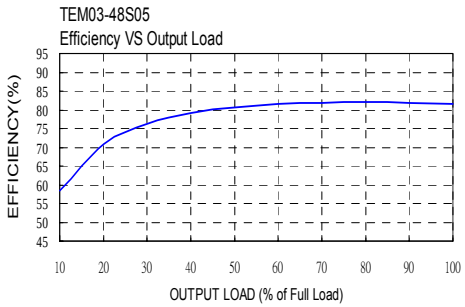
Model Number	Input Range	Output Voltage	Output Voltage Range	Output Current		Output [2] Ripple&Noise	Input Current		Eff [4] (%)	Capacitor[5] Load max
				Min. load	Full load		No Load[3]	Full Load[2]		
TEM03-05S33	4.5 – 9 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	600mA	75mVp-p	50mA	591mA	71	3300uF
TEM03-05S05	4.5 – 9 VDC	5 VDC	4.3 – 6 VDC	0mA	600mA	75mVp-p	60mA	857mA	74	1500uF
TEM03-05S12	4.5 – 9 VDC	12 VDC	9 – 15 VDC	0mA	250mA	75mVp-p	55mA	811mA	78	700uF
TEM03-05D12	4.5 – 9 VDC	±12 VDC	±9 – ±15 VDC	0mA	±125mA	75mVp-p	50mA	779mA	81	±250uF
TEM03-12S33	9 – 18 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	600mA	75mVp-p	40mA	232mA	75	3300uF
TEM03-12S05	9 – 18 VDC	5 VDC	4.3 – 6 VDC	0mA	600mA	75mVp-p	55mA	333mA	79	1500uF
TEM03-12S12	9 – 18 VDC	12 VDC	9 – 15 VDC	0mA	250mA	75mVp-p	55mA	325mA	81	700uF
TEM03-12D12	9 – 18 VDC	±12 VDC	±9 – ±15 VDC	0mA	±125mA	75mVp-p	60mA	328mA	80	±250uF
TEM03-24S33	18 – 36 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	600mA	75mVp-p	10mA	116mA	75	3300uF
TEM03-24S05	18 – 36 VDC	5 VDC	4.3 – 6 VDC	0mA	600mA	75mVp-p	10mA	166mA	79	1500uF
TEM03-24S12	18 – 36 VDC	12 VDC	9 – 15 VDC	0mA	250mA	75mVp-p	15mA	162mA	81	700uF
TEM03-24D12	18 – 36 VDC	±12 VDC	±9 – ±15 VDC	0mA	±125mA	75mVp-p	30mA	160mA	82	±250uF
TEM03-48S33	36 – 75 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	600mA	75mVp-p	5mA	58mA	75	3300uF
TEM03-48S05	36 – 75 VDC	5 VDC	4.3 – 6 VDC	0mA	600mA	75mVp-p	5mA	83mA	79	1500uF
TEM03-48S12	36 – 75 VDC	12 VDC	9 – 15 VDC	0mA	250mA	75mVp-p	15mA	80mA	82	700uF
TEM03-48D12	36 – 75 VDC	±12 VDC	±9 – ±15 VDC	0mA	±125mA	75mVp-p	10mA	80mA	82	±250uF

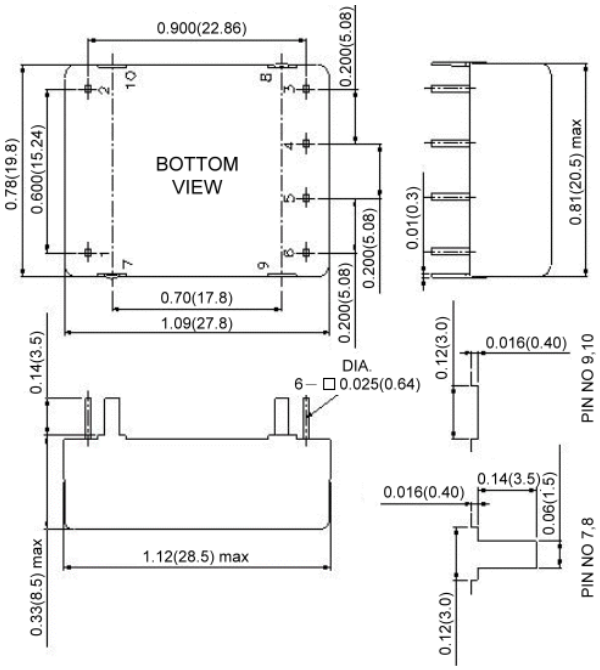
Note:

1. Bellcore TR-NWT-000332. Case 1:50% Stress, temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The following output voltage can be obtained by connecting this terminal to an output + or – terminal. Unless the output voltage is adjusted, this terminal should be open.
7. In addition, the voltage can be adjusted not by shorting these terminals, but by connecting them to resistances as shown below.
8. Arithmetic expression connected resistance: R (KΩ)
   8-1 Vo=(3.3*R+36.7)/(R+10)
   8-2 Vo=(3.3*R+36.7)/(R+12.92)
   8-3 Vo=2.5*[2+2.7/(R+6.8)]
   8-4 Vo=2.5*[2-2.7/(R+9.5)]
   8-5 Vo=2.5+9.5(R+10.9)/(R+8.2)
   8-6 Vo=2.5+0.9*(11R+100)/(R+20.1)
   8-7 Vo=2.5+22*(R+12.7)/(R+10) [Between two outputs]
   8-8 Vo=2.5+0.9*(24R+218.4)/(R+33.1) [Between two outputs]
9. The TEM03 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
   Recommend : 05Vin : 10μF/25V 1210 MLCC
   12Vin : 4.7μF/25V 1210 MLCC
   24Vin : 3.3μF/50V 1210 MLCC
   48Vin : 1.5μF/100V 1812 MLCC







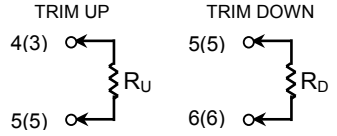


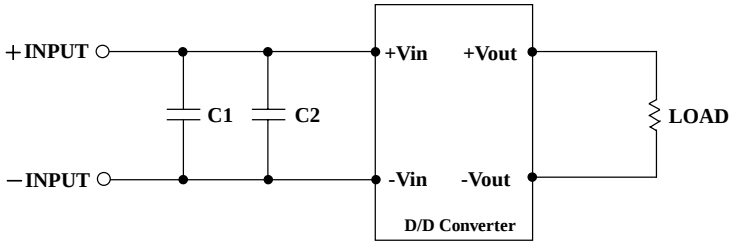
1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	NC	- OUTPUT
4	- OUTPUT	COMMON
5	Vset	Vset
6	+ OUTPUT	+ OUTPUT
7	CASE	CASE
8	CASE	CASE
9	CASE STAND OFF	CASE STAND OFF
10	CASE STAND OFF	CASE STAND OFF

EXTERNAL OUTPUT TRIMMING

Output voltage setting can be externally trimmed by using the method shown below. ( ) for dual output trim

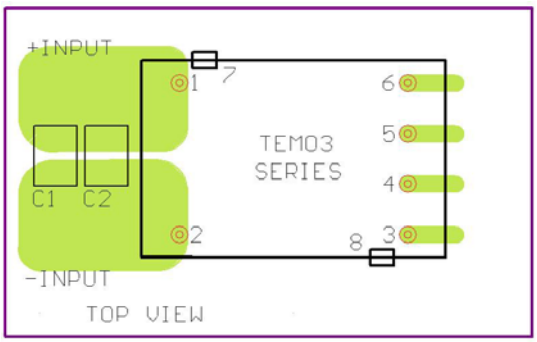




Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2
TEM03 -05XXX	22uF/10V 1210 MLCC	N/A
TEM03 -12XXX	22uF/25V 1812 MLCC	N/A
TEM03 -24XXX	3.3uF/50V 1812 MLCC	N/A
TEM03 -48XXX	2.2uF/100V 1812 MLCC	2.2uF/100V 1812 MLCC



Recommended EN55022 Class B Filter Circuit Layout