POWER MATE TECHNOLOGY CO., LTD.

TEM03 SERIES

3 WATTS DC-DC CONVERTER

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, 2011/95/EC AND 2004/108/EC**
- **SAFETY MEETS J60950-1, UL60950-1, EN60950-1 AND IEC60950-1**
- **ISO9001 CERTIFIED MANUFACTURING FACILITIES**
- **COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU**

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
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 4.5~9VDC, 9~18VDC, 18~36VDC 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		± 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	500µs
Short circuit protection		Continuous, automatics recovery
Over current protection		170%

OUTPUT VOLTAGE ADJUSTMENT TERMINAL(Vset) (Note 6)

Model number	Open	-OUTPUT shorted	+OUTPUT shorted
XXS33	3.3VDC	3.67VDC	2.84VDC
XXS05	5VDC	6VDC	4.3VDC
XXS12	12VDC	15VDC	-
XXD12	±12VDC	±15VDC	-

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

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output Input (Output) to Case	500 VAC, min. 1minute 500 VAC, min. 1minute
Isolation resistance	Input to Output Input (Output) to Case	50M ohms, min. 500VDC 50M ohms, min. 500VDC
Isolation capacitance		300 pF, max.
Design meet safety standard	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 x 10^6 hrs 4.941 x 10^6 hrs

INPUT SPECIFICATIONS

Input voltage range	5VDC nominal input	4.5 ~ 9VDC
	12VDC nominal input	9 ~ 18VDC
	24VDC nominal input	18 ~ 36VDC
	48VDC nominal input	36 ~ 75VDC
Input filter		L-C filter
Input surge voltage	5VDC input	15VDC 100ms, max.
	12VDC input	36VDC 100ms, max.
	24VDC input	50VDC 100ms, max.
	48VDC input	100VDC 100ms, max.

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature	-25ºC ~ +85ºC (Non-derating)
Operating case temperature range	-25ºC ~ +100ºC
Storage temperature range	-55ºC ~ +125ºC
Cooling	Natural 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)
Operating humidity range	20% to 95% RH
Storage humidity range	20% to 95% RH

EMC CHARACTERISTICS

EMI (Note 9)	EN55022	Class A, Class B

TEM03 SERIES

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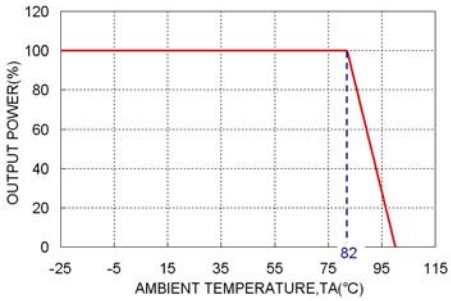
Model Number	Input Range	Output Voltage	Output Voltage Range	Output Current		Output [2] Ripple&Noise	No Load[3] Input Current	Eff [4] (%)	Capacitor[5] Load max
				Min. load	Full load				
TEM03-05S33	4.5 ~ 9 VDC	3.3 VDC	2.84 ~ 3.67 VDC	0mA	600mA	75mVp-p	50mA	71	3300μF
TEM03-05S05	4.5 ~ 9 VDC	5 VDC	4.3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

Note:

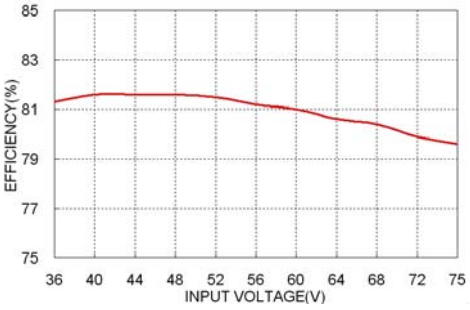
1. BELLCORE TR-NWT-000332. Case 1:50% Stress, temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Typical value at nominal input and full load.
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input 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) [Between two outputs] 8-6 Vo=2.5+22*(R+12.7)/(R+10) [Between two outputs]
9. The TEM03 series standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

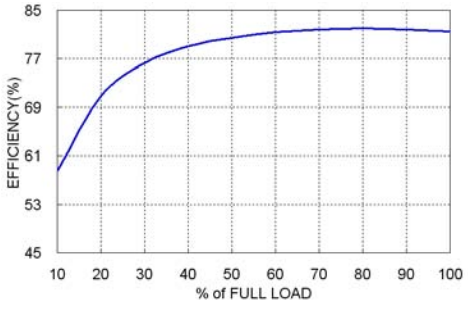
TEM03-48S05 Derating Curve



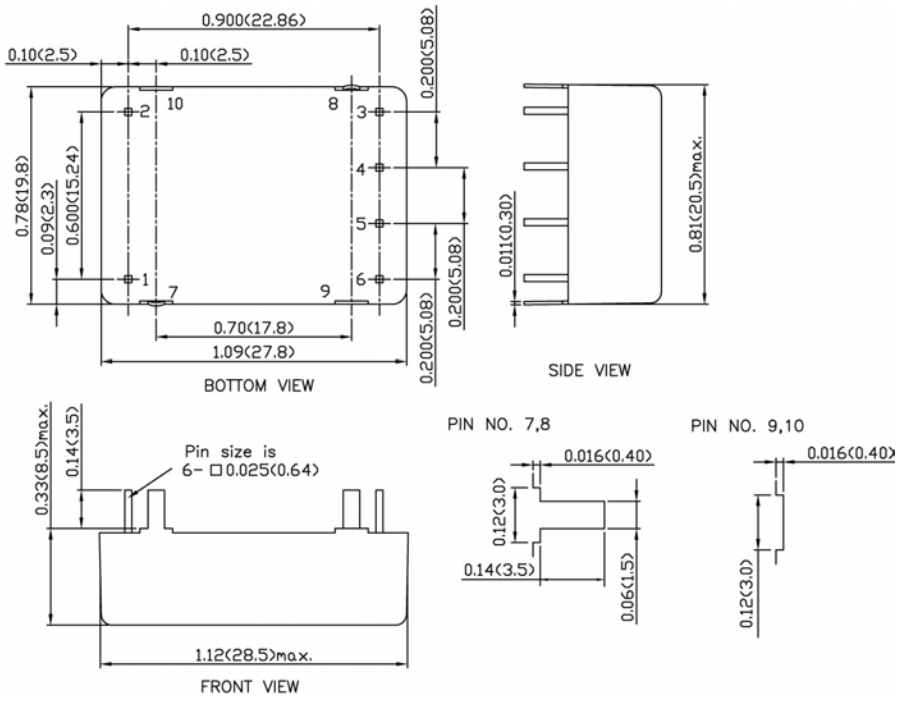
TEM03-48S05 Efficiency VS Input Voltage



TEM03-48S05 Efficiency VS Output Current



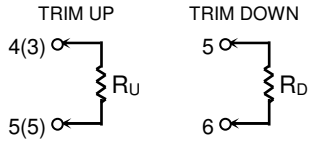
MECHANICAL DRAWING :



1. All dimensions in Inch (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 can be externally trimmed by using the method shown below.
( ) for dual output trim