POWER MATE TECHNOLOGY

TEN06 – SERIES

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

FEATURES

- **6 WATTS MAXIMUM OUTPUT POWER**
- **OUTPUT CURRENT UP TO 1200mA**
- **PACKAGE, 1.61 x 1.02 x 0.33 INCH**
- **HIGH EFFICIENCY UP TO 85%**
- **2:1 WIDE INPUT VOLTAGE RANGE**
- **FIVE-SIDED SHIELD**
- **SWITCHING FREQUENCY 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**

DESCRIPTION

The TEN06 series offer 6 watts of output power from a 1.61 x 1.02 x 0.33 inch package without derating to 50ºC and without external input/output capacitor. The TEN06 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		6 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	500µS, typ
Short circuit protection		Continuous, automatics recovery
Over current protection		150%, 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	500VDC 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		20.0g (0.71oz)
Dimension		1.61 x 1.02 x 0.33 Inch (41 x 25.8 x 8.5 mm)
MTBF (Note 1)	BELLCORE TR-NWT-000332 MIL-HDBK-217F	3.706 x 10^6 hrs 1.679 x 10^6 hrs

INPUT SPECIFICATIONS		
Input voltage range	5V nominal input 12V nominal input 24V nominal input 48V nominal input	4.5 – 9VDC 9 – 18VDC 18 – 36VDC 36 – 75VDC
Input filter		L-C filter
Input surge voltage 100mS max	5V nominal input 12V nominal input 24V nominal input 48V nominal input	15VDC 36VDC 50VDC 100VDC
Remote ON/OFF		See figure 1

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)
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]		
TEN06-05S33	4.5 – 9 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	1200mA	100mVp-p	80mA	1131mA	74	6600μF
TEN06-05S05	4.5 – 9 VDC	5 VDC	4.3 – 6 VDC	0mA	1000mA	100mVp-p	65mA	1370mA	77	3000μF
TEN06-05S12	4.5 – 9 VDC	12 VDC	9 – 15 VDC	0mA	500mA	100mVp-p	140mA	1519mA	83	1400μF
TEN06-05D12	4.5 – 9 VDC	±12 VDC	±9 – ±15 VDC	0mA	±250mA	100mVp-p	140mA	1519mA	83	±510μF
TEN06-12S33	9 – 18 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	1500mA	100mVp-p	45mA	573mA	76	6600μF
TEN06-12S05	9 – 18 VDC	5 VDC	4.3 – 6 VDC	0mA	1200mA	100mVp-p	55mA	658mA	80	3000μF
TEN06-12S12	9 – 18 VDC	12 VDC	9 – 15 VDC	0mA	500mA	100mVp-p	60mA	617mA	85	1400μF
TEN06-12D12	9 – 18 VDC	±12 VDC	±9 – ±15 VDC	0mA	±250mA	100mVp-p	55mA	617mA	85	±510μF
TEN06-24S33	18 – 36 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	1500mA	100mVp-p	15mA	286mA	77	6600μF
TEN06-24S05	18 – 36 VDC	5 VDC	4.3 – 6 VDC	0mA	1200mA	100mVp-p	20mA	321mA	82	3000μF
TEN06-24S12	18 – 36 VDC	12 VDC	9 – 15 VDC	0mA	500mA	100mVp-p	30mA	309mA	85	1400μF
TEN06-24D12	18 – 36 VDC	±12 VDC	±9 – ±15 VDC	0mA	±250mA	100mVp-p	30mA	309mA	85	±510μF
TEN06-48S33	36 – 75 VDC	3.3 VDC	2.84 – 3.67 VDC	0mA	1500mA	100mVp-p	15mA	143mA	77	6600μF
TEN06-48S05	36 – 75 VDC	5 VDC	4.3 – 6 VDC	0mA	1200mA	100mVp-p	15mA	165mA	80	3000μF
TEN06-48S12	36 – 75 VDC	12 VDC	9 – 15 VDC	0mA	500mA	100mVp-p	20mA	155mA	85	1400μF
TEN06-48D12	36 – 75 VDC	±12 VDC	±9 – ±15 VDC	0mA	±250mA	100mVp-p	15mA	155mA	85	±510μF

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 TEN06 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

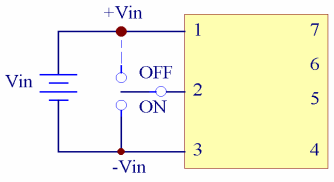
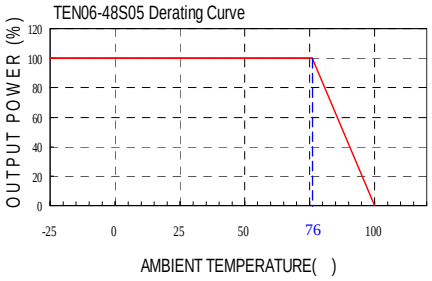
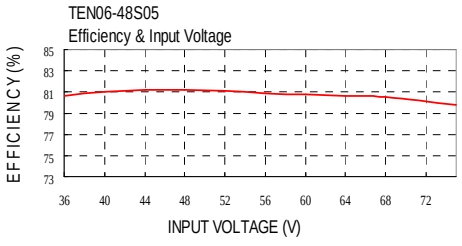
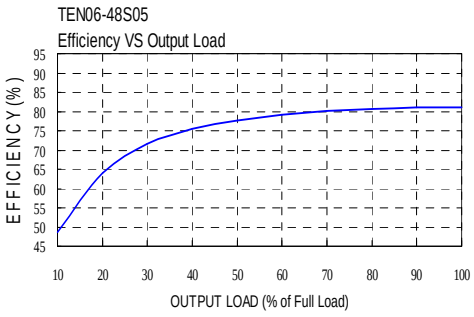
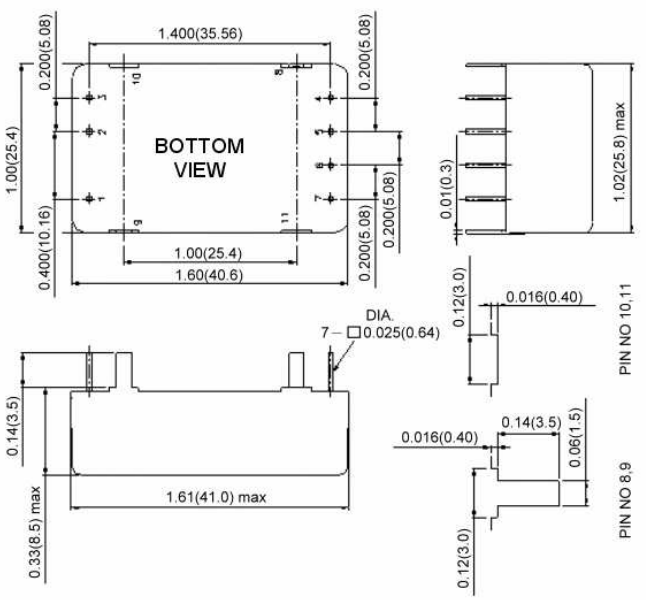


Figure 1







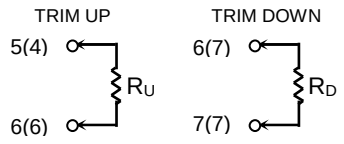


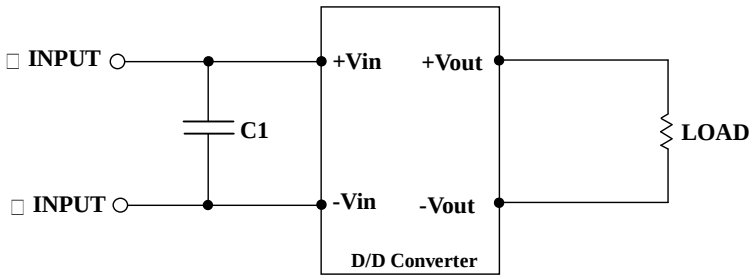
1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	CTRL	CTRL
3	- INPUT	- INPUT
4	NC	- OUTPUT
5	- OUTPUT	COMMON
6	Vset	Vset
7	+ OUTPUT	+ OUTPUT
8	CASE	CASE
9	CASE	CASE
10	CASE STAND OFF	CASE STAND OFF
11	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

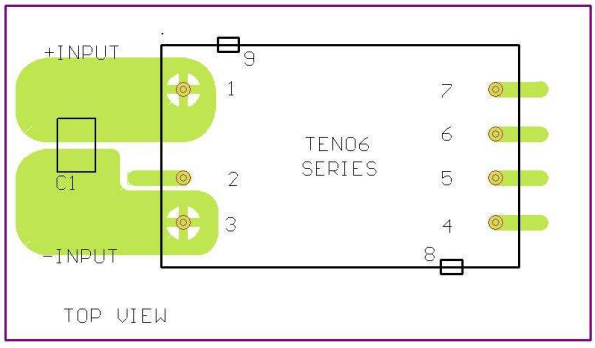




Recommended Filter for EN55022 Class B Compliance

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

	C1
TEN06-05XXX	22μF/10V 1210 MLCC
TEN06-12XXX	22μF/25V 1812 MLCC
TEN06-24XXX	6.8μF/50V 1812 MLCC
TEN06-48XXX	2.2μF/100V 1812 MLCC



Recommended EN55022 Class B Filter Circuit Layout