



10 WATT Single & Dual Output

Regulated, 4:1 Wide Input Range

MEDICAL
DC/DC Converters

FEATURES

- **4:1 Wide Input Voltage Range**
- **Operating Temperature Range:**
-40° to +105° C (with derating)
- **Miniature DIP Package**
- **High Efficiency: To 89%**
- **Reinforced Insulation**
- **Clearance and Creepage**
Distance: 8.0 mm/2MOPP
- **5000 Vac Input/Output**
2MOPP Isolation
- **Built-In EMI Class A Filter**
- **2uA Patient Leakage Current**
- **Medical Safety Approvals**
Including: UL, CE and
ANSI/AAMI ES60601-1,
EN60601-1 and IEC60601-1
- **RoHS Compliant to 2011/65/EU**

TWB10/MHIA5 Series

Specifications - All specifications are typical at nominal input, full load and 25° C.

INPUT

Voltage Range.....	24VDC nominal input	9 -36VDC
	48VDC nominal input	18 -75VDC
Input filter.....		Pi Filter
Input Surge Voltage.....	24VDC input.....	50VDC 100ms, max.
	48VDC input.....	100VDC 100ms, max.
Input Reflected Ripple Current		20mA/p
Start up Time.	Constant resistive load.....	Power up.....30ms
		Remote ON/OFF.....30ms
Startup Voltage.....	24VDC input.....	9VDC, max.
	48VDC input.....	18VDC, max.
Shutdown Voltage.....	24VDC input.....	8VDC
	48VDC input.....	16VDC
Remote ON/OFF (Only for B-Type Pin connection option)	Referenced to - INPUT pin	
	DC-DC ON.....	Open or 0 - 1.2VDC
	DC-DC OFF.....	2.2 - 12VDC
	Input Current of Remote Control Pin.....	0.5 - 1mA
	Remote off state input current.....	2.5mA

OUTPUT

Output Power.....		10 Watts max.
Voltage Accuracy.....		±1.0%
Line Regulation.....	LL to HL at Full Load.....	Single.....±0.2%
		Dual.....±0.5%
Load Regulation.....	No Load to Full Load.....	Single.....±0.2%
		Dual.....±1.0%
Cross Regulation.....	Asymmetrical Load 25% / 100% FL.....	Dual.....±5%
Ripple and Noise.....	Measured by 20MHz band width	
	With a 10µF/25V X7R MLCC.....	3.3Vout, 5Vout.....30mVp-p
		12Vout, 15Vout.....40mVp-p
	With a 4.7µF/50V X7R MLCC.....	24Vout.....50mVp-p
Temperature Coefficient.....		±0.2% / °C, max.
Transient Response recovery Time	25% load step change.....	250µs
	3.3 Vout.....	3.7 - 5.4VDC
	5Vout.....	5.6 - 7.0VDC
Over voltage protection.....	Continuous clamp.....	12Vout.....13.5 - 19.6VDC
		15Vout.....18.3 - 22.0VDC
		24Vout.....29.1 - 32.5 VDC
Overload Protection.....	% of Iout rated; Hiccup mode.....	150%
Short Circuit Protection.....		Continuous, automatic recovery

Additional specifications on next page.

GENERAL

Efficiency.....See table
 Isolation VoltageInput to Output.....5000VAC, min. 1 minute
 Isolation Capacitance12-17pF
 Leakage Current.....24VAC, 60HZ.....2μA
 Switching Frequency..300kHz Typ.
 Clearance/Creepage..8mm
 Approvals and StandardANSI/AAMI, ES60601-1, IEC60601-1, EN60601-1
 Case MaterialNickel Coated Copper
 Base MaterialNon-conductive black plastic
 Potting MaterialSilicon (UL94-V0)
 Dimensions1.25 x 0.80 x 0.40 inches
(31.8 x 20.3 x 10.2 mm)
 Weight14g (0.48 oz.)
 MTBF.. MIL-HDBK-217F Ta25°C, Full load (G/B, controlled environment)...8.638 x 10⁵ hrs

ENVIRONMENTAL

Operating Ambient Temperaturewithout derating.....-40°C - +77°C
with derating.....+77°C - +105°C
 Storage Temperature Range.....-55°C - +125°C
 Thermal Impedance.....Natural Convection (20LFM).....18°C/Watt
 Thermal Shock.....MIL-STD-810F
 Vibration.....MIL-STD-810F
 Relative Humidity.....5% to 95% RH

EMC CHARACTERISTICS

EMI (Note 1).....EN55011, EN55022Class A, Class B
 and FCC Part 18.....
 ESD.....EN61000-4-2Air ±8KV
 Contact ±6KVPerf. Criteria A
 Radiated Immunity.....EN61000-4-3.....10 V/m.....Perf. Criteria A
 Fast Transient.....EN61000-4-4.....±2KV.....Perf. Criteria A
 Surge.....EN61000-4-5.....±2KV.....Perf. Criteria A
 Conducted Immunity.....EN61000-4-6.....10Vr.m.s.....Perf. Criteria A

* For Case "B", use suffix "B" after Model Number.
 Case "A" does not require any suffix.

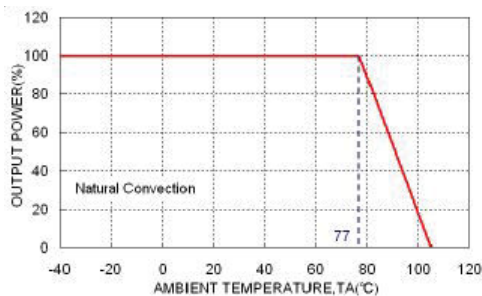
SELECTION GUIDE

	Input Voltage Nominal (Range) (Vdc)	Output Voltage (Vdc)	Output Current (mA)	Output Ripple & Noise	Input Current	Efficiency (%)	Model Number*	Capacitor Load max.
					No load (mA)			
SINGLE OUTPUT VOLTAGE	24(9-36)	3.3	2500	30m Vp-p	6	83	TWB10-24S33/MHIA5	3000μF
	24(9-36)	5	2000	30m Vp-p	6	86.5	TWB10-24S5/MHIA5	2500μF
	24(9-36)	12	830	40m Vp-p	6	89	TWB10-24S12/MHIA5	430μF
	24(9-36)	15	670	40m Vp-p	6	89	TWB10-24S15/MHIA5	350μF
	24(9-36)	24	416	50m Vp-p	6	89	TWB10-24S24/MHIA5	125μF
	48(18-75)	3.3	2500	30m Vp-p	4	82.5	TWB10-48S33/MHIA5	3000μF
	48(18-75)	5	2000	30m Vp-p	4	86.5	TWB10-48S5/MHIA5	2500μF
	48(18-75)	12	830	40m Vp-p	4	89	TWB10-48S12/MHIA5	430μF
	48(18-75)	15	670	40m Vp-p	4	89	TWB10-48S15/MHIA5	350μF
	48(18-75)	24	416	50m Vp-p	4	86.5	TWB10-48S24/MHIA5	125μF
DUAL OUTPUT VOLTAGE	24(9-36)	±5	±1000	30m Vp-p	6	85	TWB10-24-5/MHIA5	+/-1440μF
	24(9-36)	±12	±416	40m Vp-p	6	89	TWB10-24-12/MHIA5	+/-250μF
	24(9-36)	±15	±333	40m Vp-p	6	88	TWB10-24-15/MHIA5	+/-180μF
	48(18-75)	±5	±1000	30m Vp-p	4	85	TWB10-48-5/MHIA5	+/-1440μF
	48(18-75)	±12	±416	40m Vp-p	4	88	TWB10-48-12/MHIA5	+/-250μF
	48(18-75)	±15	±333	40m Vp-p	4	88	TWB10-48-15/MHIA5	+/-180μF

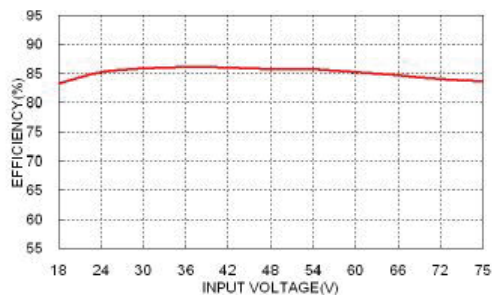
Notes:

- The TWB10/MHIA5 Series can meet EMI Class A with no external filter. And Class B only with external components. For more detailed information, please contact Polytron Devices, Inc.

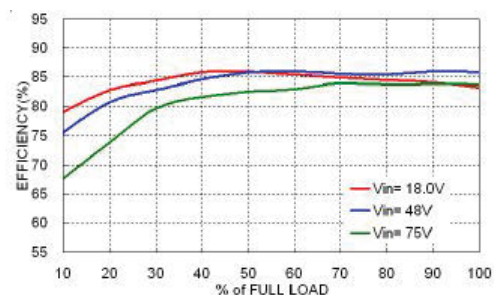
CAUTION: This power module is not internally fused. An input line fuse must always be used.



TWB10-48S5/MHIA5 Derating Curve

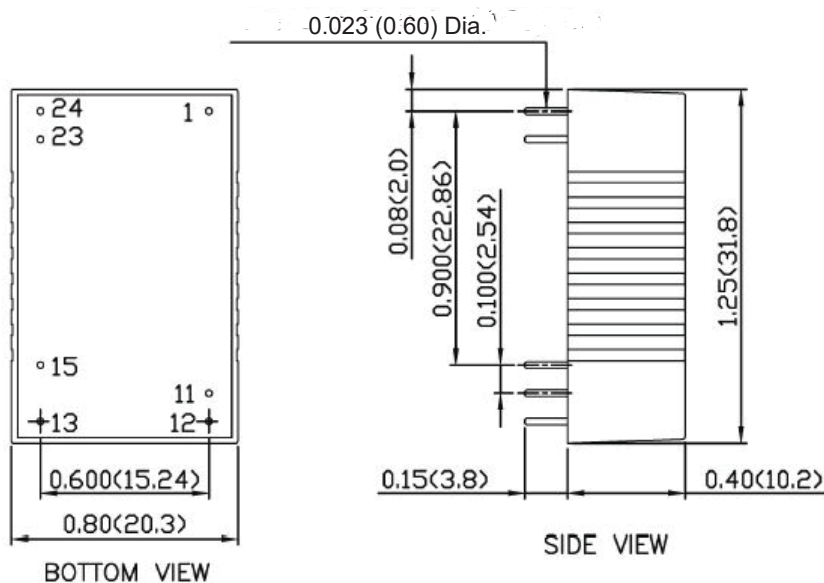


TWB10-48S5/MHIA5 Efficiency VS Input Voltage

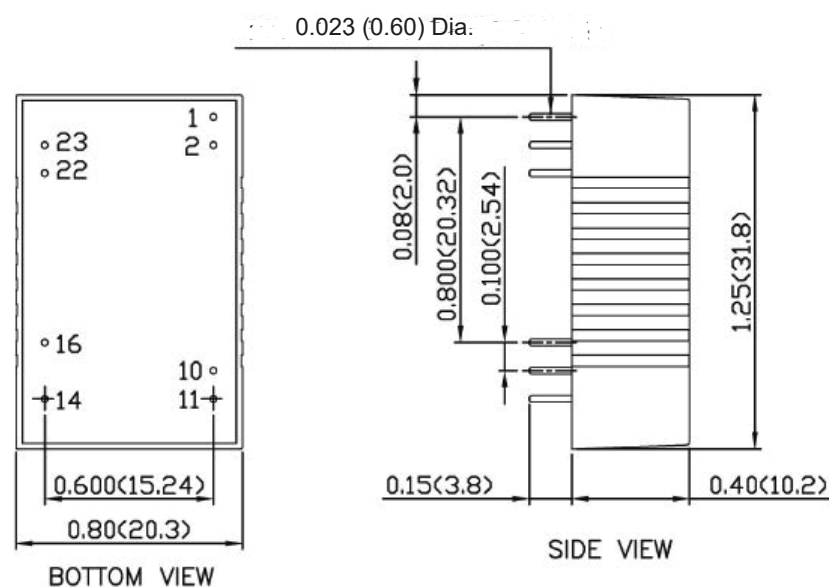


TWB10-48S5/MHIA5 Efficiency VS Output Load

MECHANICAL DRAWINGS



CASE A



CASE B

DIP PIN CONNECTION

PIN	SINGLE	DUAL
1	+INPUT	+INPUT
11	NO PIN	COMMON
12	-OUTPUT	NO PIN
13	+OUTPUT	-OUTPUT
15	NO PIN	+OUTPUT
23	-INPUT	-INPUT
24	-INPUT	-INPUT

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

DIP PIN CONNECTION

PIN	SINGLE	DUAL
1	CTRL (Option)	CTRL (Option)
2	-INPUT	-INPUT
10	TRIM (Option)	TRIM (Option)
11	NO PIN/NC(**)	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22	+INPUT	+INPUT
23	+INPUT	+INPUT

** : The Pin 11 is "NO PIN" when single output
With Trim option (Suffix - T)
The Pin 11 is "NC" when single output
Without Trim pin.

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