



3 WATT Single & Dual Output

Regulated, 4:1 Wide Input Range

MEDICAL
DC/DC Converters



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

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**

TWB3/MHIA5 Series

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-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.....		3 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, IEC6060-1, 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..... EN61000-4-2 Air ±8KVPerf. Criteria A
 Contact ±6KV
 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	1000	30m Vp-p	6	82	TWB3-24S33/MHIA5	1050µF
	24(9-36)	5	600	30m Vp-p	6	84.5	TWB3-24S5/MHIA5	750µF
	24(9-36)	12	250	40m Vp-p	6	87	TWB3-24S12/MHIA5	130µF
	24(9-36)	15	200	40m Vp-p	6	87	TWB3-24S15/MHIA5	100µF
	24(9-36)	24	125	50m Vp-p	6	87	TWB3-24S24/MHIA5	39µF
	48(18-75)	3.3	1000	30m Vp-p	4	81	TWB3-48S33/MHIA5	1050µF
	48(18-75)	5	600	30m Vp-p	4	83	TWB3-48S5/MHIA5	750µF
	48(18-75)	12	250	40m Vp-p	4	87	TWB3-48S12/MHIA5	130µF
	48(18-75)	15	200	40m Vp-p	4	87	TWB3-48S15/MHIA5	100µF
	48(18-75)	24	125	50m Vp-p	4	86	TWB3-48S24/MHIA5	39µF
DUAL OUTPUT VOLTAGE	24(9-36)	±5	±300	30m Vp-p	6	83	TWB3-24-5/MHIA5	+/-430µF
	24(9-36)	±12	±125	40m Vp-p	6	87	TWB3-24-12/MHIA5	+/-75µF
	24(9-36)	±15	±100	40m Vp-p	6	86	TWB3-24-15/MHIA5	+/-56µF
	48(18-75)	±5	±300	30m Vp-p	4	83	TWB3-48-5/MHIA5	+/-430µF
	48(18-75)	±12	±125	40m Vp-p	4	86	TWB3-48-12/MHIA5	+/-75µF
	48(18-75)	±15	±100	40m Vp-p	4	86	TWB3-48-15/MHIA5	+/-56µF

Notes:

- The TWB3/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.

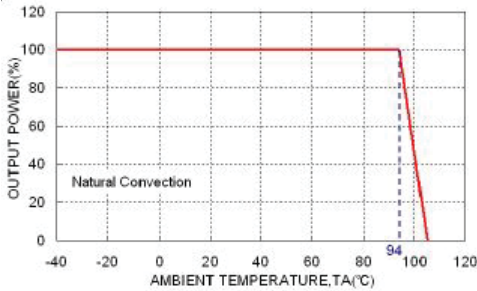
CAUTION: This power module is not internally fused. An input line fuse must always be used.

Mechanical specifications on next page.

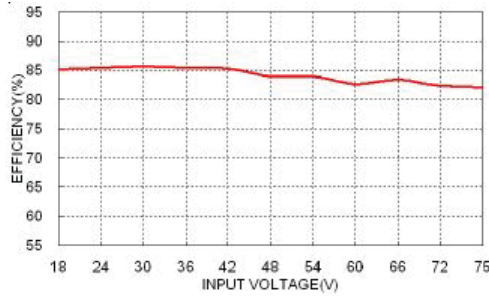


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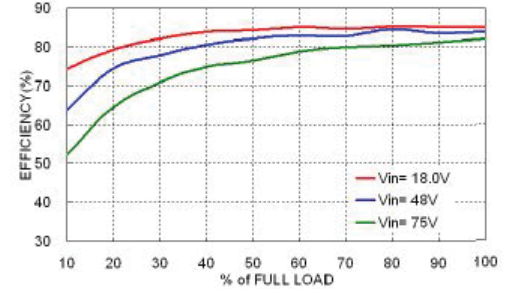
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TWB3-48S5/MHIA5 Derating Curve

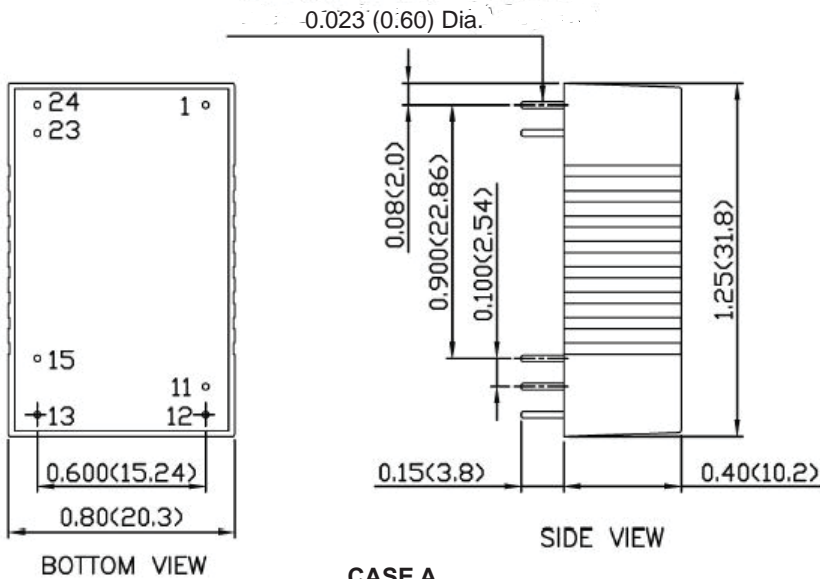


TWB3-48S5/MHIA5 Efficiency VS Input Voltage



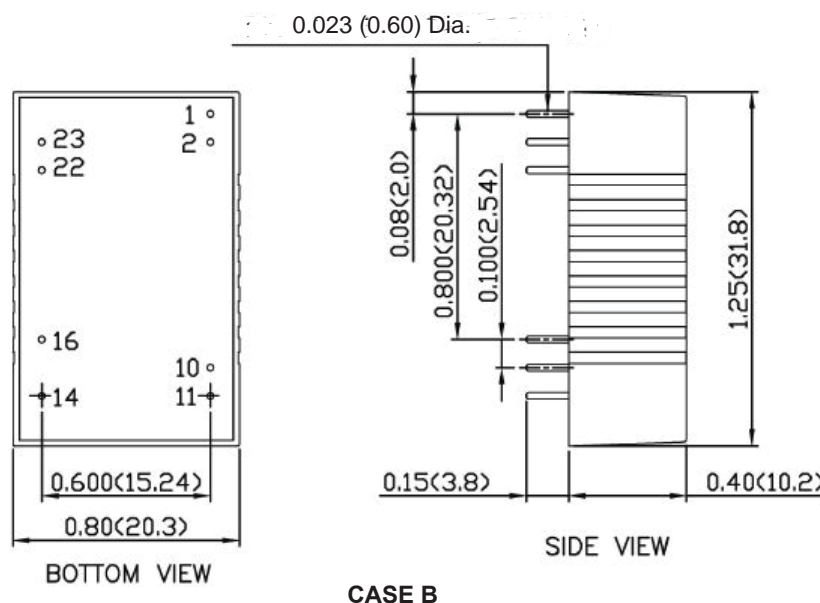
TWB3-48S5/MHIA5 Efficiency VS Output Load

MECHANICAL DRAWINGS



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±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±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±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
3. Pin pitch tolerance: ±0.01 (0.25)
4. Pin dimension tolerance: ±0.004 (0.1)



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