

DC-DC CONVERTERS

REGULATED, 2:1 WIDE INPUT RANGE, 3 WATTS

MEDICAL APPLICATIONS

TWA3/MHIA SERIES



FEATURES

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

SELECTION GUIDE (SINGLE) All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load μ F
4.5 - 9	3.3	1000	10	81	TWA3-5S33/MHIA5	1050
4.5 - 9	5	600	10	84.5	TWA3-5S5/MHIA5	750
4.5 - 9	12	250	15	85.5	TWA3-5S12/MHIA5	130
4.5 - 9	15	200	15	87.5	TWA3-5S15/MHIA5	100
4.5 - 9	24	125	20	85.5	TWA3-5S24/MHIA5	39
9 - 18	3.3	1000	10	82	TWA3-12S33/MHIA5	1050
9 - 18	5	600	10	84.5	TWA3-12S5/MHIA5	750
9 - 18	12	250	10	87	TWA3-12S12/MHIA5	130
9 - 18	15	200	10	87	TWA3-12S15/MHIA5	100
9 - 18	24	125	10	87	TWA3-12S24/MHIA5	39
18 - 36	3.3	1000	6	82	TWA3-24S33/MHIA5	1050
18 - 36	5	600	6	84.5	TWA3-24S5/MHIA5	750
18 - 36	12	250	6	87	TWA3-24S12/MHIA5	130
18 - 36	15	200	6	87	TWA3-24S15/MHIA5	100
18 - 36	24	125	6	87	TWA3-24S24/MHIA5	39
36 - 72	3.3	1000	4	81	TWA3-48S33/MHIA5	1050
36 - 72	5	600	4	84	TWA3-48S5/MHIA5	750
36 - 72	12	250	4	87	TWA3-48S12/MHIA5	130
36 - 72	15	200	4	86.5	TWA3-48S15/MHIA5	100
36 - 72	24	125	4	86.5	TWA3-48S24/MHIA5	39

TWA3/MHIA5 SERIES

SELECTION GUIDE (DUAL) All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load μ F
4.5 - 9	± 5	± 300	25	83	TWA3-5-5/MHIA5	± 430
4.5 - 9	± 12	± 125	25	86	TWA3-5-12/MHIA5	± 75
4.5 - 9	± 15	± 100	25	86	TWA3-5-15/MHIA5	± 56
9 - 18	± 5	± 300	10	83.5	TWA3-12-5/MHIA5	± 430
9 - 18	± 12	± 125	10	87.5	TWA3-12-12/MHIA5	± 75
9 - 18	± 15	± 100	10	86.5	TWA3-12-15/MHIA5	± 56
18 - 36	± 5	± 300	6	83	TWA3-24-5/MHIA5	± 430
18 - 36	± 12	± 125	6	87	TWA3-24-12/MHIA5	± 75
18 - 36	± 15	± 100	6	86	TWA3-24-15/MHIA5	± 56
36 - 72	± 5	± 300	4	83	TWA3-48-5/MHIA5	± 430
36 - 72	± 12	± 125	4	86	TWA3-48-12/MHIA5	± 75
36 - 72	± 15	± 100	4	86	TWA3-48-15/MHIA5	± 56

Input Specifications			Output Specifications		
Operating input voltage range, Vdc	9-18	12Vin(nom)	Output power, Watts	3 Max.	
	18-36	24Vin(nom)	Voltage accuracy, %	± 1.0	
	36-72	48Vin(nom)	Line regulation, %	Low Line to High Line at Full Load	
4.5 Max.	5Vin(nom)	± 0.2		Single	
9 Max.	12Vin(nom)	± 0.5		Dual	
Start up voltage, Vdc	18 Max.	24Vin(nom)	Load regulation, %	No Load to Full Load	
	36 Max.	48Vin(nom)		± 0.2	Single
				± 1.0	Dual
Shutdown voltage, Vdc	4 Typ.	5Vin(nom)	Cross regulation, %	± 5 Asymmetrical load 25%/100%FL, Dual	
	8 Typ.	12Vin(nom)		Measured by 20MHz bandwidth	
	16Typ.	24Vin(nom)	Ripple and noise, mVp-p	30	With a 10 μ F/25V X7R MLCC, 3.3Vout, 5Vout
	33 Typ.	48Vin(nom)		40	With a 10 μ F/25V X7R MLCC, 12Vout, 15Vout
		50		With a 4.7 μ F/50V X7R MLCC, 24Vout	
Start up time, ms	Constant resistive load		Temperature coefficient, %/°C	± 0.02 Max.	
	30	Power up		Transient response recovery time, μ s	250 Typ.
Input surge voltage, Vdc	30	Remote ON/OFF	Over voltage protection, Vdc		3.7-5.4
		3 seconds, max.		5.6-7.0	5Vout
	16 Max.	5Vin(nom)		13.5-19.6	12Vout
	25 Max.	12Vin(nom)		18.3-22.0	15Vout
Input filter		Pi type	Over load protection, %	29.1-32.5	24Vout
				150 Typ.	% of lout rated; Hiccup mode
				Short circuit protection	
Reflected Ripple Current, mA _{p-p}	20		Continuous, automatic recovery		
Remote ON/OFF		Referred to -Vin pin			
	Open or 0 - 1.2 Vdc	DC-DC ON			
	2.2 - 12 Vdc	DC-DC OFF			
	-0.5 Min., 1 Max., mA	Input current of Ctrl pin			
	2.5 mA Typ.	Remote off input current			

TWA3/MHIA5 SERIES

General Specifications

Isolation voltage, Vac	1 minute	Input to Output	5000 Min.	
Leakage current, μ A	24VAC, 60Hz		2 Min.	
Isolation capacitance, pF			12 Typ.	17 Max.
Switching frequency, kHz			300 Typ.	

Environmental Specifications

Operating ambient temperature, $^{\circ}$ C	Without derating	-40 Min.	+94 Max.
	With derating	+77 Min.	+105 Max.
Storage temperature range, $^{\circ}$ C		-55 Min.	+125 Max.
Thermal impedance, $^{\circ}$ C/W	Natural convection (20LFM)		18 Typ.
Thermal shock		MIL-STD-810F	
Vibration		MIL-STD-810F	
Relative humidity		5% to 95% RH	

Physical Specifications

Clearance/creepage	8 mm
Design meet safety standard	ANSI/AAMI, ES60601-1, IEC60601-1, EN60601-1
Case material	Nickel coated copper
Base material	Non-conductive, black, plastic
Potting material	Silicone (UL94 V-0)
Weight	14g (0.48oz)
Dimensions	1.25" \times 0.80" \times 0.40" (31.8 \times 20.3 \times 10.2 mm)
MTBF	8.638 \times 10 ⁵ hrs, MIL-HDBK-217F Ta25 $^{\circ}$ C, Full load (G/B, controlled environment)

EMC Specifications

Specifications	Conditions	Level
EMI ⁽¹⁾	EN55011, EN55022 and FCC Part 18	Class A
		Class B
ESD	EN61000-4-2 Air \pm 8kV and Contact \pm 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10V/m	Perf. Criteria A
Fast transient	EN61000-4-4 \pm 2kV	Perf. Criteria A
Surge	EN61000-4-5 \pm 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10Vr.m.s	Perf. Criteria A

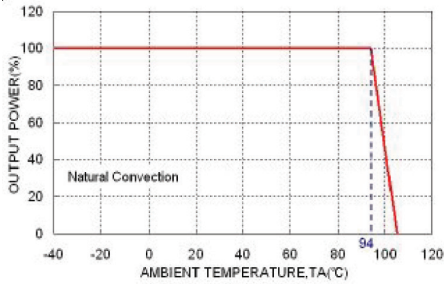
Note:

- The TWA3/MHIA5 series can meet EMI Class A with no external filter. And Class B only with external components. For further information, please contact Polytron Devices, Inc.

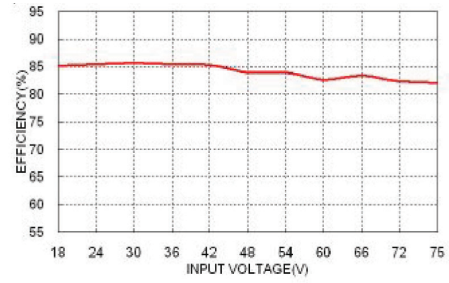
CAUTION: This power module is not internally fused. An input line fuse must always be used.

TWA3/MHIA5 SERIES

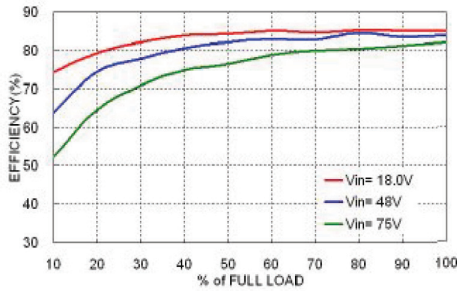
Characteristic Curve



TWA3-48S5/MHIA5 Derating Curve



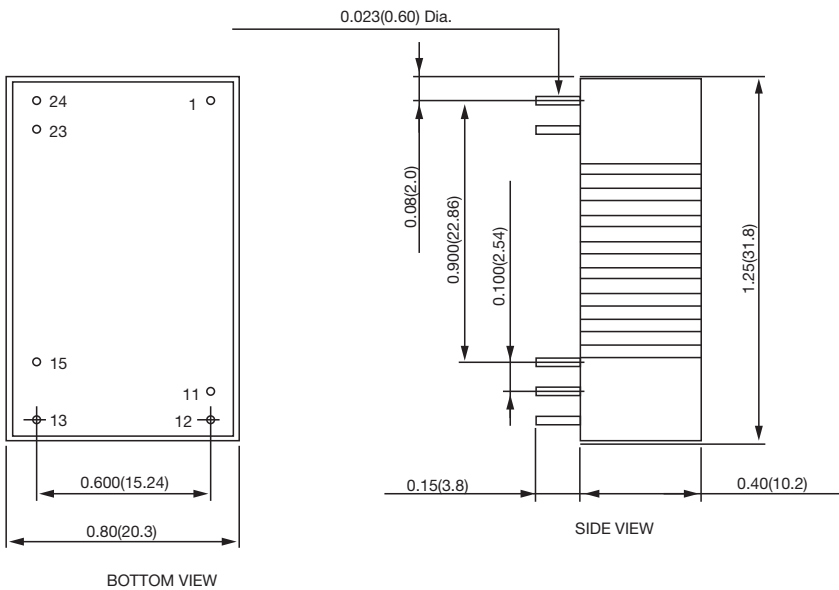
TWA3-48S5/MHIA5 Efficiency vs. Input Voltage



TWA3-48S5/MHIA5 Efficiency vs. Output Load

Mechanical Drawing

A Type



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

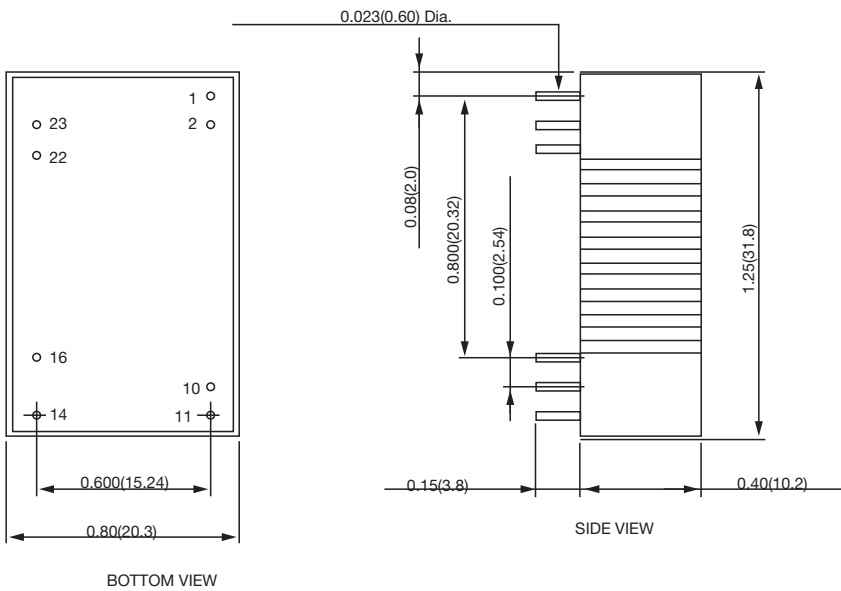
** Pin 11 is "No pin" when single output is with Trim option (Suffix-T)

Pin 11 is "NC" when single output is without Trim pin

- All dimensions in inch (mm)
- Tolerance: $x.xx \pm 0.02$ ($x.x \pm 0.5$) $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
- Pin pitch tolerance ± 0.01 (0.25)
- Pin dimension tolerance ± 0.004 (0.1)

Mechanical Drawing

B Type



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

** Pin 11 is "No pin" when single output is with Trim option (Suffix-T)

Pin 11 is "NC" when single output is without Trim pin

1. All dimensions in inch (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)