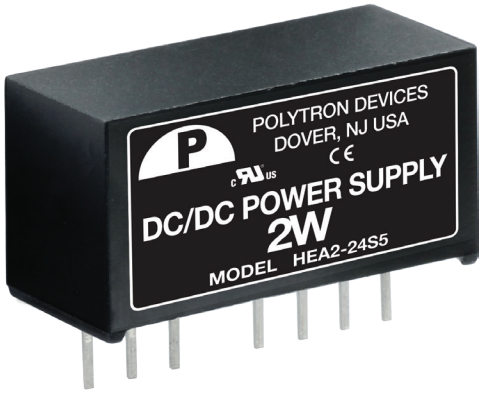
Polytron Power Supplies

DABURN



DC-DC CONVERTERS

2:1 WIDE INPUT RANGE, SIP 8 PACKAGE, SINGLE AND DUAL OUTPUT, UP TO 2 WATTS

INDUSTRIAL APPLICATIONS

HEA2 SERIES

FEATURES

- Extra Wide Input Range (4.5-13.2V, 9-36V, 18-75V)
- SIP 8 Package
- No Minimum Load Requirement
- High Efficiency Up to 86%
- Remote ON/OFF
- Wide Operating Temperature Range: -40 to +105°C
- Short Circuit Protection
- Under Voltage Protection
- Meets IEC/UL/EN60950-1
- CE Marked

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 µF
4.5 - 13.2	3.3	500	35	78	HEA2-5S33	3300
4.5 - 13.2	5	400	35	81	HEA2-5S5	1680
4.5 - 13.2	9	222	45	84	HEA2-5S9	1000
4.5 - 13.2	12	167	45	84	HEA2-5S12	820
4.5 - 13.2	15	134	45	84	HEA2-5S15	680
4.5 - 13.2	24	83	45	85	HEA2-5S24	220
9 - 18	3.3	500	20	78	HEA2-12S33	3300
9 - 18	5	400	20	82	HEA2-12S5	1680
9 - 18	9	222	25	84	HEA2-12S9	1000
9 - 18	12	167	25	85	HEA2-12S12	820
9 - 18	15	134	25	85	HEA2-12S15	680
9 - 18	24	83	25	85	HEA2-12S24	220
18 - 36	3.3	500	10	78	HEA2-24S33	3300
18 - 36	5	400	10	83	HEA2-24S5	1680
18 - 36	9	222	10	85	HEA2-24S9	1000
18 - 36	12	167	10	86	HEA2-24S12	820
18 - 36	15	134	10	85	HEA2-24S15	680
18 - 36	24	83	10	85	HEA2-24S24	220
36 - 75	3.3	500	8	76	HEA2-48S33	3300
36 - 75	5	400	8	80	HEA2-48S5	1680
36 - 75	9	222	8	82	HEA2-48S9	1000
36 - 75	12	167	8	84	HEA2-48S12	820
36 - 75	15	134	8	85	HEA2-48S15	680
36 - 75	24	83	8	85	HEA2-48S24	220

Polytron Power Supplies

HEA2 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 µF
4.5 - 13.2	±5	±200	45	81	HEA2-5-5	±1000
4.5 - 13.2	±12	±83	45	85	HEA2-5-12	±470
4.5 - 13.2	±15	±67	55	84	HEA2-5-15	±330
9 - 18	±5	±200	25	82	HEA2-12-5	±1000
9 - 18	±12	±83	25	85	HEA2-12-12	±470
9 - 18	±15	±67	25	84	HEA2-12-15	±330
18 - 36	±5	±200	10	83	HEA2-24-5	±1000
18 - 36	±12	±83	10	85	HEA2-24-12	±470
18 - 36	±15	±67	15	86	HEA2-24-15	±330
36 - 75	±5	±200	8	80	HEA2-48-5	±1000
36 - 75	±12	±83	8	85	HEA2-48-12	±470
36 - 75	±15	±67	8	83	HEA2-48-15	±330

Input Specifications

Operating input voltage range, Vdc	4.5 Min., 5 Typ., 13.2 Max.	5Vin(nom)
	9 Min., 12 Typ., 18 Max.	12Vin(nom)
	18 Min., 24 Typ., 36 Max.	24Vin(nom)
	36 Min., 48 Typ., 75 Max.	48Vin(nom)
Start up voltage, Vdc	4.5 Max.	5Vin(nom)
	9 Max.	12Vin(nom)
	18 Max.	24Vin(nom)
	36 Max.	48Vin(nom)
Shutdown voltage, Vdc	2 Min., 3 Typ., 4 Max.	5Vin(nom)
	6 Min., 7 Typ., 8 Max.	12Vin(nom)
	13 Min., 15 Typ., 17 Max.	24Vin(nom)
	29 Min., 32 Typ., 35 Max.	48Vin(nom)
Start up time, ms		Constant resistive load
	10 Typ., 20 Max.	Power up
	10 Typ., 20 Max.	Remote ON/OFF
Input surge voltage, Vdc		1 second, Max.
	15 Max.	5Vin(nom)
	25 Max.	12Vin(nom)
	50 Max.	24Vin(nom)
	100 Max.	48Vin(nom)
Input filter		Capacitor type
Remote ON/OFF	Open or high impedance	DC-DC ON
	2 Min., 3 Typ., 4 Max.	DC-DC OFF, Ctrl pin applied current via 1k Ω
	2.5 Typ.	Remote off input current

Output Specifications

Voltage accuracy, %	±1	
Line regulation, %	±0.2	Low Line to High Line at Full Load
Load regulation, %	±1	No Load to Full Load, Single
	±1	No Load to Full Load, Dual
	±0.5	10% load to 90% load, Single
	±0.8	10% load to 90% load, Dual
Cross regulation, %	±5	Asymmetrical load 25%/100%FL, Dual
Ripple and noise, mVp-p	75 Typ.	Measured by 20MHz bandwidth
Temperature coefficient, %/°C	±0.02	
Transient response recovery time, µs	500 Typ.	25% load step change
Over load protection, %	150 Min., 180 Typ., 240 Max.	% of Iout rated; Hiccup mode
Short circuit protection	Continuous, automatics recovery	

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Polytron Power Supplies

HEA2 SERIES

General Specifications

Isolation voltage, Vdc	1 minute	Input to Output	1600 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF					50 Max.
Switching frequency, kHz	Full load to minimum load		100 Min.		

Environmental Specifications

Operating ambient temperature, ºC	With derating	-40 Min.		105 Max.
Maximum case temperature, ºC				105 Max.
Storage Temperature Range, ºC		-55 Min.		125 Max.
Thermal shock		MIL-STD-810F		
Vibration		MIL-STD-810F		
Relative humidity		5% to 95% RH		

Physical Specifications

Design meet safety standard	IEC/UL/EN60950-1
Case material	Non-conductive black plastic
Base material	FR4 PCB
Potting material	Silicone (UL94 V-0)
Weight	4.5g (0.16oz)
Dimensions	1.25" × 0.80" × 0.40" (31.8 × 20.3 × 10.2 mm)
MTBF	6.621×10⁶ hrs, MIL-HDBK-217F

EMC Specifications

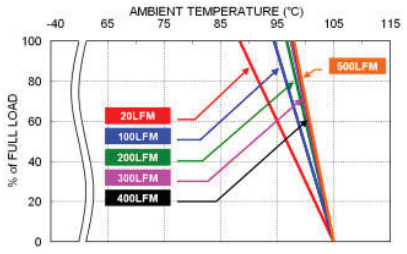
Specifications	Conditions		Level
EMI	EN55032	With external components	Class A, Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient(1)	EN61000-4-4	±2kV	Perf. Criteria A
Surge (1)	EN61000-4-5	±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

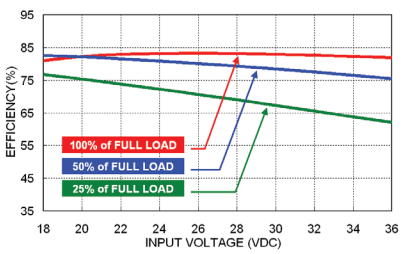
1. For the HEA2 Series, it is recommended to us an external filter capacitor (Nippon chemi-con KY series, 220 μF/100 V). For further information, please contact Polytron Devices.

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

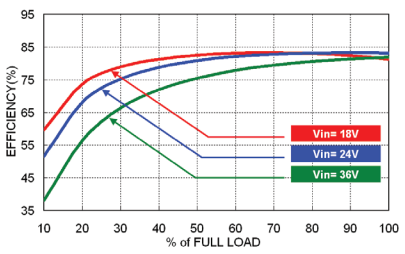
Characteristic Curve



Derating Curve



Efficiency vs. Input Voltage



Efficiency vs. Output Load

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Fuse Consideration

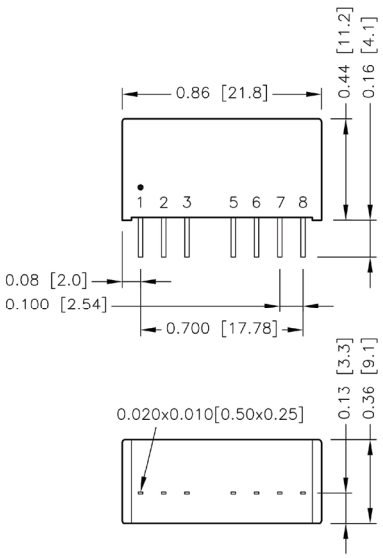
Model	Fuse Rating (A)	Fuse Type
HEA2-5SXX, HEA2-5-XX	1	Slow-Blow
HEA2-12SXX, HEA2-12-XX	0.5	Slow-Blow
HEA2-24SXX, HEA2-24-XX	0.315	Slow-Blow
HEA2-48SXX, HEA2-48-XX	0.16	Slow-Blow

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

For maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.

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

Mechanical Drawing



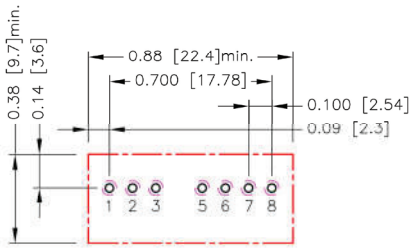
BOTTOM VIEW

DIP PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

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)

Recommended Pad Layout



1. **All dimensions in inches (mm)**
2. **Pad Size (lead free recommended)**
3. **Through hole 1, 2, 3, 5, 6, 7, 8: ø0.03(0.8)**
4. **Top view pad 1, 2, 3, 5, 6, 7, 8: ø0.039(1)**
5. **Bottom view pad 1, 2, 3, 5, 6, 7, 8: ø0.063(1.6)**

Thermal Considerations

The power module operates in a variety of thermal environments.

However, sufficient cooling should be provided to help ensure reliable operation of the unit.

Heat is removed by conduction, convection and radiation to the surrounding Environment.

Proper cooling can be verified by measuring the point in the figure below.

The temperature at this location should not exceed “Maximum case temperature”.

When Operating, adequate cooling must be provided to maintain the test point temperature at or below “Maximum case temperature”.

You can limit this Temperature to a lower value for extremely high reliability.

Thermal test condition with vertical direction by natural convection (20LFM)