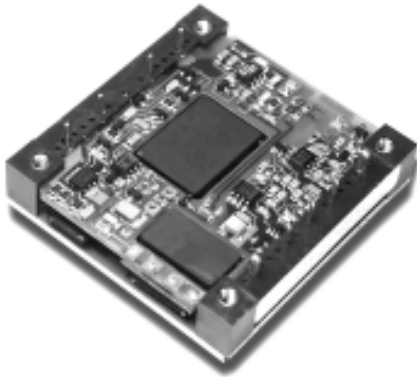


HES SERIES - 150 WATT

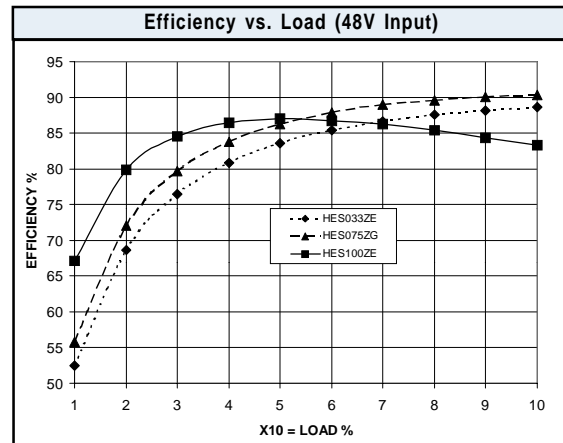
DESCRIPTION

HES single output DC/DC converters provide up to 150 Watts of output power in an industry standard, half-brick package and footprint. These units feature ultra-high efficiency, Class A conducted noise specs, and fixed switching frequency. The HES is designed with open-frame packaging, along with planar magnetics to provide maximum useable power with minimal thermal constraints. The HES is especially suited to harsh telecom, networking, and industrial applications, and is fully compatible with production board washing processes.



FEATURES

- High Efficiency
- Industry Standard Half-Brick
- Open-Frame Packaging
- 100°C Baseplate Operation
- Water Washable
- “True-Trim” Option
- 1500V Isolation
- Positive or Negative Logic



TECHNICAL SPECIFICATIONS

Input	
Voltage Range	
24 VDC Nominal	18 - 36 VDC
48 VDC Nominal	36 - 72 VDC
Reflected Ripple	50 mA
Input Reverse Voltage Protection	Shunt Diode
Input Undervoltage Lockout / Hysteresis	<34V/1V Nom.

Output	
Setpoint Accuracy	±1%
Line Regulation V_{in} Min. - V_{in} Max., I_{out} Rated	0.2% V_{out}
Load Regulation I_{out} Min. - I_{out} Max., V_{in} Nom.	0.2% V_{out}
Remote Sense Headroom	0.5 VDC
Minimum Output Current	10 %
Dynamic Regulation, Loadstep	25% I_{out}
Pk Deviation	4% V_{out}
Settling Time	500 μ s
Voltage Trim Range	±10%
Short Circuit / Overcurrent Protection	Shutdown / Hiccup
Current Limit Threshold Range, % of I_{out} Rated	110 - 130%
OVP Trip Range	120 - 140% V_{out} Nom.
OVP Type	Self Recovering

General	
Turn-On Time	10 ms
Remote Shutdown	Positive Or Negative Logic
Remote Shutdown Reference	V_{in} Negative
Switching Frequency 2.5 & 3.3, 5V Model	200 kHz, 300 kHz (Respectively)
Isolation	
Input - Output	1500 VDC
Input - Case	1050 VDC
Output - Case	500 VDC
Temperature Coefficient	0.2%/°C
Case Temperature	
Operating Range	-40 To +100°C
Storage Range	-40 To +125°C
Thermal Shutdown Range	105 To 115°C
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
MTBF† (Bellcore Tr-nwt-000332)	1.8 X 10 ⁶ hrs
Safety	UL 1950, Csa 22.2-950, En60950
Weight (Approx.)	1.4 oz

Notes
¹ Industrial temp range of -40 to +85C available, add suffix -I to P/N
[†] MTBF predictions may vary slightly from model to model.
Specifications typically at 25°C, normal line, and full load, unless otherwise stated.
Soldering Conditions: I/O pins, 260°C, ten seconds; fully compatible with commercial wave-soldering equipment.
Safety: Agency approvals may vary from model to model. Please consult factory for specific model information.
Units are water-washable and fully compatible with commercial spray or immersion post wave-solder washing equipment.

HES SERIES - 150 WATT

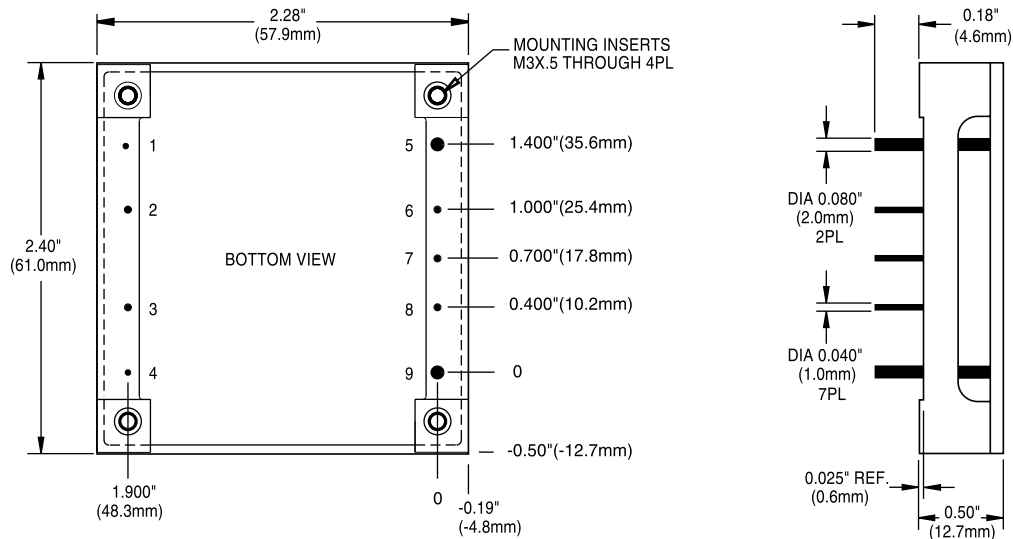
MODELS - (See the last page of this file for options.)

Vin (Volts)	Vin Range (Volts)	Iin Max* (Amps)	Vout (Volts)	Iout Rated (Amps)	Ripple & Noise Pk-Pk (mV)	Efficiency Typ. **	Model
48	36 - 72	0.89	2.5	10	100	89%	HES025ZD-A
48	36 - 72	1.13	3.3	10	100	87%	HES033ZE-A
48	36 - 72	1.62	5	10	100	88%	HES050ZG-A
48	36 - 72	1.33	2.5	15	100	86%	HES037ZD-A
48	36 - 72	1.69	3.3	15	100	88%	HES050ZE-A
48	36 - 72	2.42	5	15	100	89%	HES075ZG-A
48	36 - 72	1.77	2.5	20	100	86%	HES050ZD-A
48	36 - 72	2.26	3.3	20	100	85%	HES066ZE-A
48	36 - 72	3.23	5	20	100	88%	HES100ZG-A
48	36 - 72	2.60	2.5	30	100	82%	HES075ZD-A
48	36 - 72	3.33	3.3	30	100	83%	HES100ZE-A
48	36 - 72	4.72	5	30	100	86%	HES150ZG-A
48	36 - 72	2.20	2.1	30	100	80%	HES063ZC-A

* Maximum input current at minimum input voltage, maximum rated output power.

** At nominal Vin, rated output.

MECHANICAL DRAWING



Thermal Impedance	
Natural Convection	15.4 °C/W
100 LFM	12.2 °C/W
200 LFM	9.3 °C/W
300 LFM	7.4 °C/W
400 LFM	6.4 °C/W

Note:
Thermal impedance data is dependent on many environmental factors. The exact thermal performance should be validated for specific application.

Pin	Function
1	+V _{in}
2	-V _{in}
3	No Pin (Shutdown)
4	+V _{out}
5	No Pin (Trim)
6	-V _{out}

Tolerances	
Inches:	(Millimeters)
.XX ± 0.020	.X ± 0.5
.XXX ± 0.010	.XX ± 0.25
Pin:	
± 0.002	± 0.05

(Dimensions as listed unless otherwise specified.)

OPTIONS

When ordering equipment options, use the following suffix information. Select the option(s) that you prefer and add them to the model number. Example ordering options are located below the options table.

OPTION	SUFFIX	APPLICABLE SERIES	REMARKS
Negative Logic	N	HAS, HBD, HBS, HES, LES, QBS, QES, TES, TQD	TTL "Low" Turns Module ON TTL "High" Turns Module OFF
Lucent Compatible Trim	T	HAS, HBD, HBS, HES, QBS, QES	
Terminal Strip	TS	XWS, XWD, XWT	
Trim	1	IAS, LES	
Enable	2	IAD, IAS, LES, SMS	
Trim and Enable	3	IAS, LES	
Current Share	4	SMS	
Headerless	Y	Encapsulated EWS, IWS, OWS	
PIN LENGTH AND HEATSINK OPTIONS			Standard Pin Length is 0.180" (4.6mm)
0.110" (2.8mm) Pin Length	8	All Units (Except SMS)	
0.150" (3.8mm) Pin Length	9	All Units (Except SMS)	
0.24" (6.1mm) Horizontal Heatsink	1H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad

Example Options: HBS050ZG-ANT3V = HBS050ZG-A with negative logic, Lucent compatible trim, and 0.95" vertical heatsink.

LES015YJ-3N = LES015YJ with optional trim and enable, negative logic.

QBS066ZG-AT8 = QBS066ZG-A with Lucent compatible trim and 0.110" pin length.

NUCLEAR AND MEDICAL APPLICATIONS Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.

TECHNICAL REVISIONS The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.