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 specifications, 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

- RoHS lead solder exemption compliant
- High efficiency
- Industry standard half-brick
- Open-frame packaging
- 100 °C baseplate operation
- Water washable
- "True-Trim" option
- 1500 V isolation
- Positive or negative logic

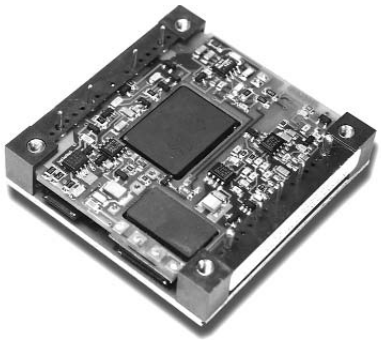
RoHS Compliant

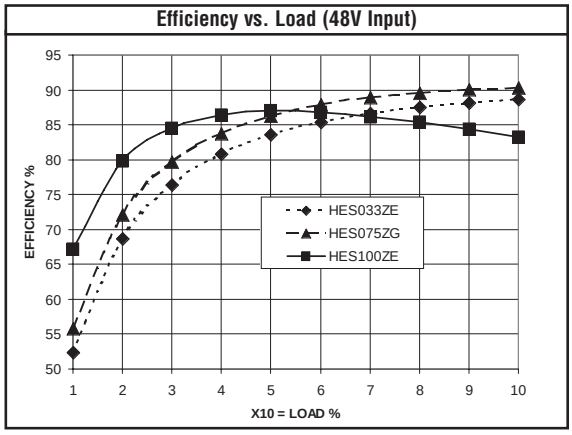
Technical Specifications

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 ms
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	0.02%/°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

† 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.

Model Selection

MODEL	INPUT VOLTAGE (VOLTS)	INPUT VOLTAGE RANGE (VOLTS)	MAXIMUM INPUT CURRENT (AMPS)*	OUTPUT VOLTAGE (VOLTS)	RATED OUTPUT CURRENT (AMPS)	RIPPLE & NOISE pk-pk (mV)	TYPICAL EFFICIENCY**
HES075YD-A	24	18-36	5.5	2.5	30	150	81%
HES100YE-A	24	18-36	7.4	3.3	30	100	83%
HES033ZE-A	48	36-72	1.13	3.3	10	100	87%
HES050ZG-A	48	36-72	1.62	5	10	100	88%
HES037ZD-A	48	36-72	1.33	2.5	15	100	86%
HES050ZE-A	48	36-72	1.69	3.3	15	100	88%
HES075ZG-A	48	36-72	2.42	5	15	100	89%
HES050ZD-A	48	36-72	1.77	2.5	20	100	86%
HES066ZE-A	48	36-72	2.26	3.3	20	100	85%
HES100ZG-A	48	36-72	3.23	5	20	100	88%
HES075ZD-A	48	36-72	2.60	2.5	30	100	82%
HES100ZE-A	48	36-72	3.33	3.3	30	100	83%
HES150ZG-A	48	36-72	4.72	5	30	100	86%
HES063ZC-A	48	36-72	2.20	2.1	30	100	80%

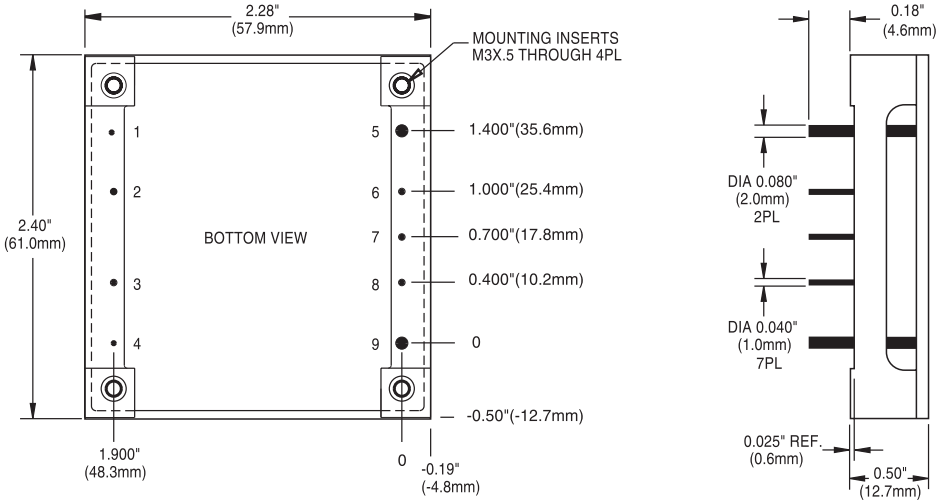
NOTES:

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

** At nominal V_{in}, rated output.

Model numbers highlighted in yellow or shaded are not recommended for new designs.

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	Case
3	On/Off
4	$+V_{in}$
5	$-V_{out}$
6	-Sense
7	Trim
8	+Sense
9	$+V_{out}$

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.)

Ordering Information

Suffix Code Identification:

Series Applicability: HAS, HBD, HBS, HES, QBS, QES, TES, TQD

Features & Options	Descriptions	Suffix Code
Remote ON/OFF	Positive Logic	None
	Negative Logic	N
Trim	Standard Power-One (Negative)	None
	Industry-standard (Positive)	T
Pin Length	0.18” (4.6mm), standard model length	None
	0.145” (3.68mm)	7
	0.110” (2.8mm)	8
Special Options	Customer-specific models	S#

NOTE: Contact factory for availability of specific options.