

**Description**

HBS dc-dc converters provide up to 50 watts of output power in an industry-standard, half-brick footprint. The HBS units feature excellent efficiency, Class A conducted noise specs, and fixed switching frequency. The HBS, using open-frame packaging, along with planar magnetics provides maximum useable power with minimal thermal constraints. The HBS Series is especially suited to telecom, networking, and industrial applications.

**Technical Specifications**

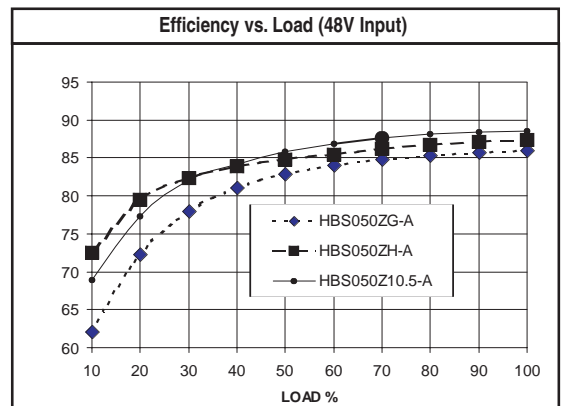
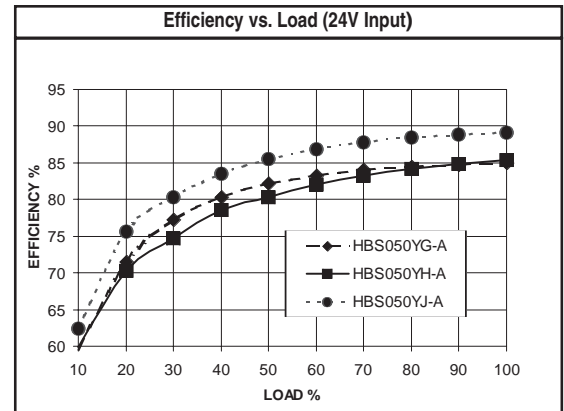
Input	
Voltage Range	18 - 36 VDC
24 VDC nominal	48 VDC nominal
48 VDC nominal	34 - 75 VDC
Reflected Ripple	25 mA
Input Reverse Voltage Protection	Shunt Diode

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%, $I_{out}$ Rated
Dynamic Regulation, Loadstep	25% $I_{out}$
Pk Deviation	4% $V_{out}$
Settling Time	500 ms
Voltage Trim Range	±10%
Short Circuit / Overcurrent Protection	Hiccup
Current Limit Threshold Range, % of $I_{out}$ Rated	110 - 140%
OVP Trip Range	115 - 140% $V_{out}$ Nom.
OVP	Hiccup

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.	

**Features**

- Industry-standard half-brick
- Open-frame packaging
- 100°C baseplate operation
- Water washable
- “True-trim” option
- 1500V isolation
- Positive or negative logic



General	
Turn-On Time	10 ms
Remote Shutdown	Positive or Negative Logic
Remote Shutdown Reference	$V_{in}$ Negative
Switching Frequency	500 kHz
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)	$2.1 \times 10^6$ hrs
Safety	UL, cUL
Weight (approx.)	2.5 oz



### 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**
<b>HBS050YE-A</b>	24	18-36	3.50	3.3	15	100	80%
<b>HBS033YE-A</b>	24	18-36	2.30	3.3	10	100	80%
<b>HBS050YG-A</b>	24	18-36	3.60	5	10	100	84%
<b>HBS050YH-A</b>	24	18-36	3.50	12	4.2	150	85%
<b>HBS050YJ-A</b>	24	18-36	3.50	15	3.3	150	86%
<b>HBS050ZE-A</b>	48	34-75	1.32	3.3	15	100	80%
<b>HBS033ZE-ANT</b>	48	34-75	1.22	3.3	10	100	80%
<b>HBS050ZG-A</b>	48	34-75	1.80	5	10	100	82%
<b>HBS050ZH-A</b>	48	34-75	1.75	12	4.2	150	85%
<b>HBS050ZJ-AT</b>	48	34-75	1.75	15	3.3	150	87%

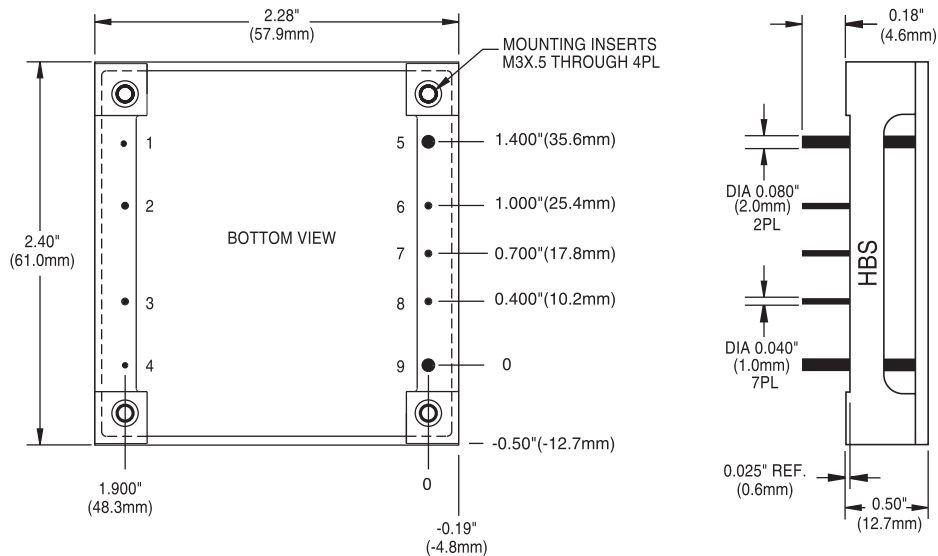
**NOTES:**

\* 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	6.6 °C/W
100 LFM	5.7 °C/W
200 LFM	4.2 °C/W
300 LFM	3.1 °C/W
400 LFM	2.6 °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 <sub>in</sub>
2	Case
3	On/Off
4	+V <sub>in</sub>
5	-V <sub>out</sub>
6	-Sense
7	Trim
8	+Sense
9	+V <sub>out</sub>

Tolerances	
Inches:	(Millimeters)
.XX ± 0.020	.X ± 0.5
.XXX ± 0.010	.XX ± 0.25
Pin:	± 0.05
± 0.002 ± 0.05	
(Dimensions as listed unless otherwise specified.)	

This page is offered as a reference. Consult factory for actual availability of options. When ordering equipment options, use the following suffix information. Select preferred option(s) and add the suffix to the model number. Ordering option examples are located below the options table.

OPTION	SUFFIX	APPLICABLE SERIES	REMARKS
Negative Logic	N	HAS, HBD, HBS, HES, HLS, HLD, LES, QBS, QES, QLS, TES, TQD	TTL "Low" Turns Module ON TTL "High" Turns Module OFF
Lucent-Compatible Trim	T	HAS, HBD, HBS, HES, HLS, QBS, QES, QLS	
Trim	1	IAS, LES	
Enable	2	IAD, IAS, LES, SMS	
Trim and Enable	3	IAS, LES	
<b>Pin Length and Heatsink Options</b>			Standard Pin Length is 0.180" (4.6mm)
0.110" (2.8mm) Pin Length	8	All Leaded Models	
0.150" (3.8mm) Pin Length	9	All Leaded Models	
0.24" (6.1mm) Horizontal Heatsink	1H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD 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 respective divisional 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.