



# **Description**

HBD dual output, dc-dc converters feature high efficiency, 1500 VDC isolation, and open-frame packaging. The HBD family allows board designers to deliver any combination of power from either output, up to each model's maximum rating. The HBD is available in 5V/3.3V or 3.3V/2.5V combinations in either a 24 V or 48 V input version. The HBD uses planar magnetics and has an MTBF of over a million hours.

#### **Technical Specifications**

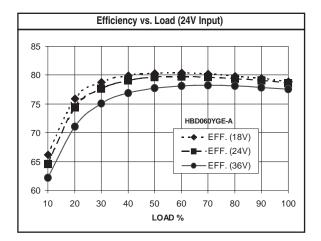
	Input
Voltage Range	
24 VDC Nominal	18.00 - 36.00 VDC
48 VDC Nominal	34.00 - 75.00 VDC
Reflected Ripple	80 mA
Input Reverse Voltage Protection	Shunt Diode

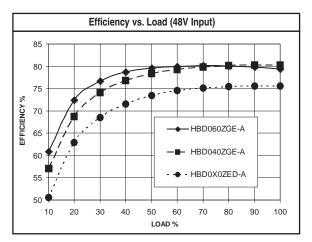
Output	
Setpoint Accuracy	±1%
Line Regulation V <sub>in</sub> Min V <sub>in</sub> Max., I <sub>OUT</sub> Rated, Output 1	<sup>0.2% V</sup> out
Line Regulation V <sub>In</sub> Min V <sub>In</sub> Max., I <sub>Out</sub> Rated, Output 2	1.0% V <sub>OLI</sub> t
Load Regulation I <sub>Out</sub> Min I <sub>Out</sub> Max., V <sub>in</sub> Nom., Output 1	0.5% Vout
Load Regulation Iout Min Iout Max., Vin Nom., Output2	1.0% Vout
Minimum Output Current	10% lout Rated
Dynamic Regulation, Loadstep	<sup>25%</sup> lout
Pk Deviation	<sup>4%</sup> Vout
Settling Time	500 μs
Voltage Trim Range (5V/3.3V Units)	±10%
Power Limit Threshold Range, % of IOUT Rated	110 - 140%
OVP Trip Range (Main Ouput)	115 - 140% V <sub>out</sub> Nom.

General	
Turn-On Time Remote Shutdown	10 ms Positive Logic
Switching Frequency Isolation	500 kHz
Input - Output	1500 VDC
Input - Case Output - Case	1050 VDC 500 VDC
Temperature Coefficient Case Temperature	0.03%/°C
Operating Range	-40 To +100 °C
Storage Range Thermal Shutdown Range	-40 To +125 °C 105 To 115 °C
Humidity Max., Non-Condensing Vibration, 3 Axes, 5 Min Each	95% , 5 g
MTBF <sup>†</sup> (Bellcore TR-NWT-000332)	1.3 x 10 <sup>6</sup> Hrs
Safety Weight (approx.)	UL, cUL, VDE 2.4 oz

#### **Features**

- RoHS lead solder exemption compliant
- · Independent dual outputs
- Flexible load sharing
- High efficiency topology
- Open-frame design
- Planar magnetics
- · Independent trim for each output
- 1500 V Isolation
- 100 °C baseplate operation





# Notes (1) For negative logic, add suffix "N" to model number. † 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**

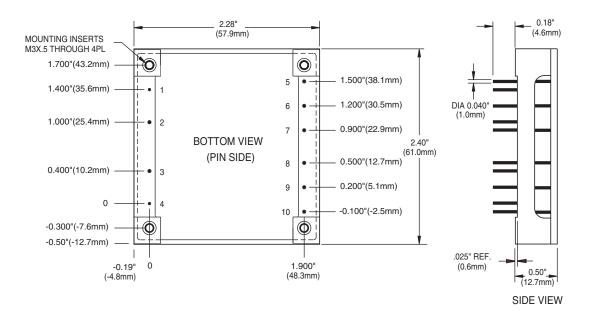
MODEL	INPUT VOLTAGE (VOLTS)	INPUT VOLTAGE RANGE (VOLTS)	MAXIMUM INPUT CURRENT (AMPS)*	OUTPUT Voltage (volts)	RATED OUTPUT Current (AMPS)&&	RIPPLE & NOISE pk-pk (mV)	TYPICAL Efficiency**
HBD040YED-A	24	18-36	2.89	3.3/2.5	12/15	75/75	75%
HBD060YGE-A	24	18-36	4.54	5.0/3.3	12/15	100/75	78%
HBD040YGE-A	24	18-36	3.02	5.0/3.3	8/12	100/75	80%
HBD030ZED-A	48	34-75	1.50	3.3/2.5	9/12***	75/75	75%
HBD040ZGE-A	48	34-75	1.51	5.0/3.3	8/12	100/75	80%
HBD040ZED-A	48	34-75	1.62	3.3/2.5	12/15	75/75	75%
HBD060ZGE-A	48	34-75	2.27	5.0/3.3	12/15	75/75	75%

NOTES:

- \* Maximum input current at minimum input voltage, maximum rated output power.
- $^{\star\star}$  At nominal  ${\rm V}_{\rm in},$  rated output.
- \*\*\* Total output power to be restricted to 30 Watts.
- && Current can be drawn from either output to its maximum value, or from both outputs to a combined total of 15A.

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

### **Mechanical Drawing**



Thermal Impedance			
Natural Convection 100 LFM 200 LFM 300 LFM 400 LFM	6.6 °C/W 5.7 °C/W 4.2 °C/W 3.1 °C/W 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	<sup>-V</sup> in
2 3	Case
3	On/Off
4	<sup>+V</sup> in
5	<sup>+V</sup> out 2
6	- V <sub>out 2</sub>
7	Trim 2
8	<sup>+V</sup> out 1
9	-Vout 1
10	Trim 1

Tolerances		
Inches: .XX ± 0.020 .XXX ± 0.010	(Millimeters) .X ± 0.5 .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)	Т	
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.			

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