



Features

- Planar magnetics
- 1500V isolation
- 45A 3/4-brick
- Very-high efficiency
- Open-frame packaging
- 100°C baseplate operation
- Synchronous rectification
- Low-voltage output

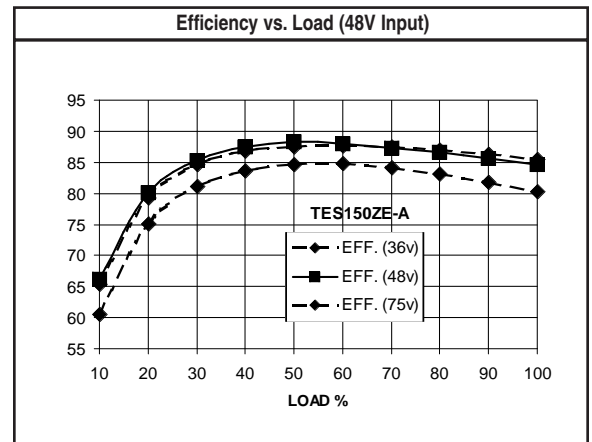
Description

TES single output DC-DC converters provide up to 150 watts of output power at up to 45A of output current in an industry-standard 3/4-brick package. The TES converters feature open-frame packaging, along with planar magnetics and a high efficiency topology, to provide maximum useable power density. The TES converters use 100% surface-mount construction and are fully-compatible with production board washing processes.

Technical Specifications

Input	
Voltage Range	36 - 72 VDC
48 VDC Nominal	

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.	0.5% 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 μ s
Voltage Trim Range	±10%
Current Limit Type	Latch
Current Limit Threshold Range, % of I_{out} Rated	110 - 140%
Short Circuit Threshold Range, % of I_{out} Rated	200%
OVP Trip Range	115 - 140% V_{out} Nom.
UVP Trip Range	70 - 90% V_{out} Nom.
OVP/UVP Type	Latch



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.

General	
Turn-On Time	10 ms
Remote Shutdown	Positive Logic
Remote Shutdown Reference	V_{in} Negative
Switching Frequency $5V_{out}$ / $3.3V$ & $2.5V_{out}$	300 kHz / 200 kHz
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)	1.0 X 10 ⁶ hrs
Safety	UL, cUL, TUV
Weight (Approx.)	3.3 oz

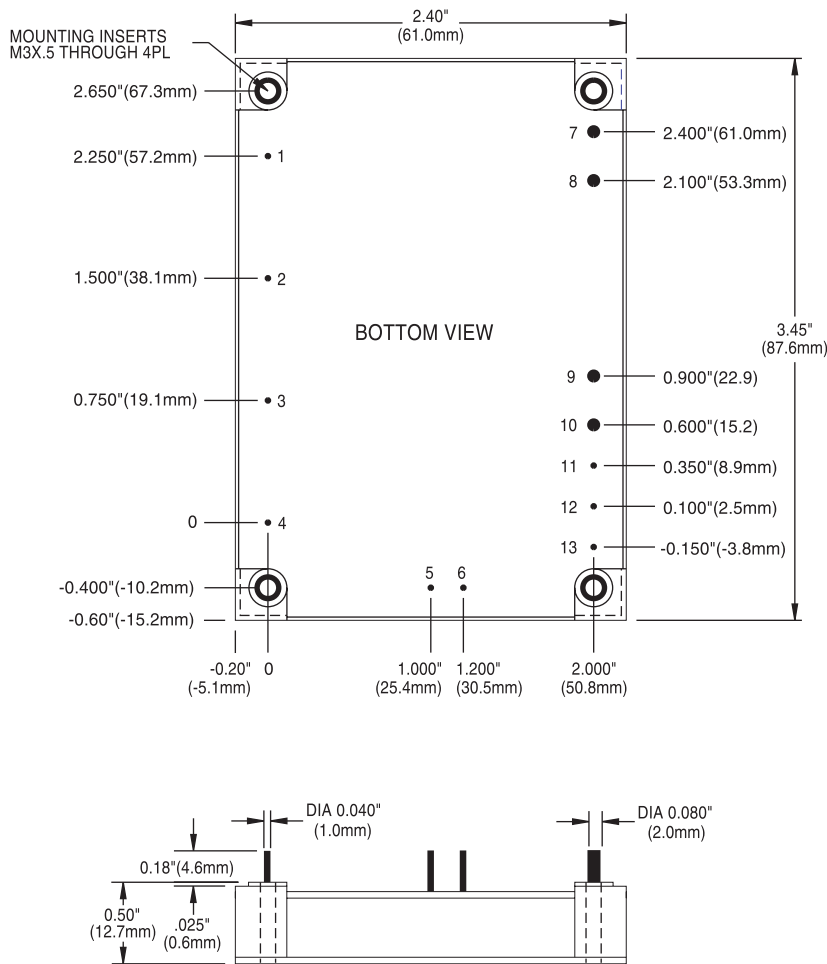
Model Selection

MODEL	INPUT VOLTAGE (VOLTS)	INPUT VOLTAGE RANGE (VOLTS)	MAXIMUM INPUT CURRENT (AMPS)*	OUTPUT VOLTAGE (VOLTS)	RATED OUTPUT CURRENT (AMPS)	RIPPLE & NOISE μ k-pk (mV)	TYPICAL EFFICIENCY**
TES113ZD-A	48	36-72	4.0	2.5	45	100	80%
TES150ZE-A	48	36-72	5.1	3.3	45	100	83%

NOTES:

- * Maximum input current at minimum input voltage, maximum rated output power.
- ** At nominal V_{in} , rated output.

Mechanical Drawing



Thermal Impedance	
Natural Convection	5.7 °C/W
100 LFM	3.9 °C/W
200 LFM	2.6 °C/W
300 LFM	1.9 °C/W
400 LFM	1.7 °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	Enable
3	Case
4	+ V_{in}
5	CN2 (opt.)
6	CN1 (opt.)
7	+ V_{out}
8	+ V_{out}
9	- V_{out}
10	- V_{out}
11	-Sense
12	Trim
13	+Sense

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.)

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	
Pin Length and Heatsink Options			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.