

## LES SERIES - 15 WATT

### DESCRIPTION

LES DC/DC converters provide up to 15 Watts of output power in an industry standard package and footprint. With a maximum case temperature of 100°C, the LES is well suited for the most demanding telecom, networking, and industrial applications. The LES features 1500 VDC isolation, short circuit, and overtemperature protection, as well as six-sided shielding. The LES is available with optional enable and voltage trim pins. Please see the IAD Series for dual output applications.



### FEATURES

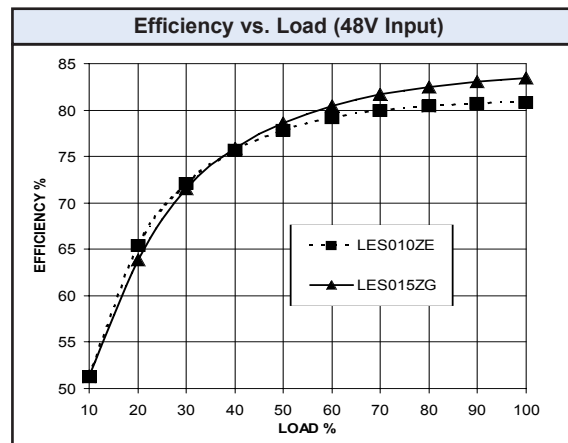
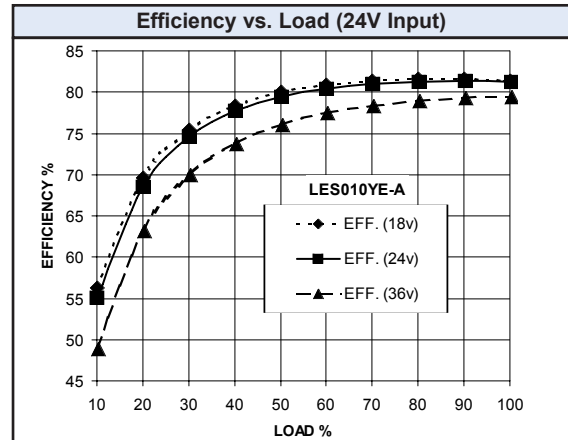
- Industry Standard Package
- Industry Standard Pinout
- 85°C Case Operation
- Short Circuit Protection
- 24V and 48V Inputs
- Input Pi Filter and 6-Sided Shielding
- Regulated Outputs
- 1500V Isolation

### TECHNICAL SPECIFICATIONS

Input	
Voltage Range	18 - 36 VDC
24 VDC Nominal	48 VDC Nominal
Reflected Ripple	50 mA

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% $V_{out}$
Minimum Output Current	10% $I_{out}$ Rated
Dynamic Regulation, Loadstep	25% $I_{out}$
Pk Deviation	2% $V_{out}$
Settling Time	500 $\mu$ s
Voltage Trim Range	±10%
Short Circuit / Overcurrent Protection	Shutdown / Hiccup
Current Limit Threshold Range, % of $I_{out}$ Rated	110 - 150%
Short Circuit Current Max.	200% $I_{out}$
(12V <sub>out</sub> & 15V <sub>out</sub> : 4.0A when $V_{out}$ = 0.25V)	
OVP Trip Range	115 -140% $V_{out}$ Nom.
OVP Type	Second Control Loop

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.



General	
Turn-On Time	10 mS
Remote Shutdown	Positive/Negative Logic
Switching Frequency	400 kHz
Isolation	
Input - Output	1500 VDC
Output - Case	500 VDC
Temperature Coefficient	0.02 ppm/°C
Case Temperature	
Operating Range	-40 To +100°C
Storage Range	-40 To +100°C
Humidity Max., Non-Condensing	95%
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
MTBF† (Bellcore TR-NWT-000332)	2.5 X 10 <sup>6</sup> hrs
Safety	UL, cUL, TUV

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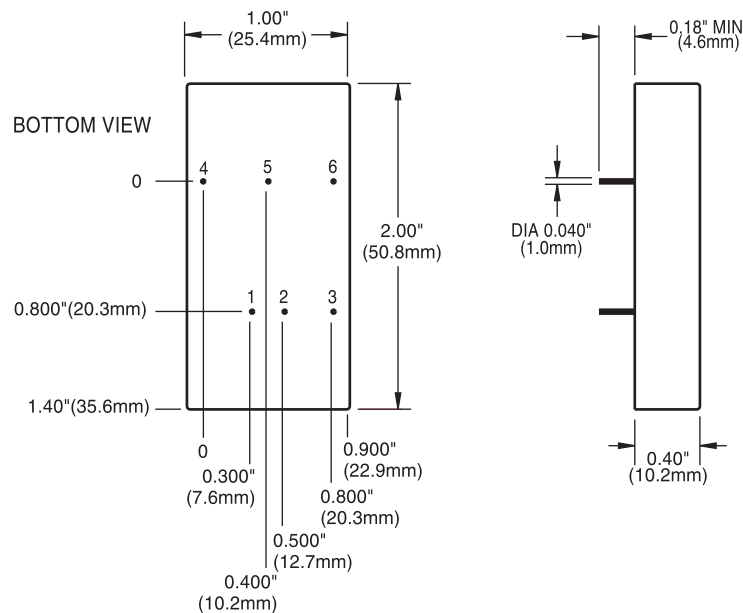
MODELS - (See the last page of section for options.)

### SINGLE OUTPUT MODEL SELECTION CHART

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**
LES008YD	24	18-36	0.6	2.5	3.00	75	77%
LES010YE	24	18-36	0.8	3.3	3.00	100	81%
LES015YG	24	18-36	1.1	5	3.00	100	84%
LES015YH	24	18-36	1.3	12	1.25	120	85%
LES015YJ	24	18-36	1.3	15	1.00	150	86%
LES006ZB	48	36-75	0.25	1.8	3.00	75	73%
LES008ZD	48	36-75	0.35	2.5	3.00	75	77%
LES010ZE	48	36-75	0.4	3.3	3.00	100	81%
LES015ZG	48	36-75	0.6	5	3.00	100	83%
LES020ZG	48	40-60	0.63	5	4.00	100	84%
LES015ZH	48	36-75	0.65	12	1.25	120	86%
LES015ZJ	48	36-75	0.65	15	1.00	150	86%

NOTES: \* Maximum input current at minimum input voltage, maximum rated output power.  
 \*\* At nominal  $V_{in}$ , 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 <sub>in</sub>
2	-V <sub>in</sub>
3	No Pin (Optional Shutdown Pin)
4	+V <sub>out</sub>
5	No Pin (Optional Trim Pin)
6	-V <sub>out</sub>

Tolerances	
Inches:	(Millimeters)
.XX ± 0.020	.X ± 0.5
.XXX ± 0.010	.XX ± 0.25
Pin:	
± 0.002	± 0.05
Case:	
+ 0.04, - 0.00	+ 1.0, - 0.00
(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, HLS, HLD, LES, QBS, QES, QLS, TES, TQD	TTL "Low" Turns Module ON TTL "High" Turns Module OFF
Lucent-Compatible	T	HAS, HBD, HBS, HES, HLS, QBS, QES, QLS	
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	
<b>Pin Length and Heatsink Options</b>			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 (All Units Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All Units (All Units Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All Units (All Units Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All Units (All Units Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All Units (All Units Except DIP, HLS, HLD, QLS, SIP, SM, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All Units (All Units Except DIP, HLS, HLD, QLS, SIP, SM, 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.

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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.

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