# 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. 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 | |
| 24 VDC Nominal | 18 - 36 VDC |
| 48 VDC Nominal | 36 - 75 VDC |
| 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% $I_{out}$ |
| OVP Trip Range | 115 -140% $V_{out}$ Nom. |
| OVP Type | Second Control Loop |

| 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 +125°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 10^6 hrs |
| Safety | UL, cUL, TUV |



Efficiency vs. Load (24V Input)

LES010YE-A
- EFF. (18v)
- EFF. (24v)
- EFF. (36v)



Efficiency vs. Load (48V Input)

- LES010ZE
- LES015ZG
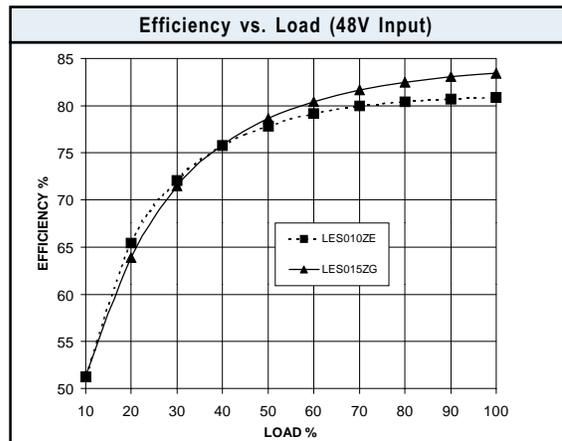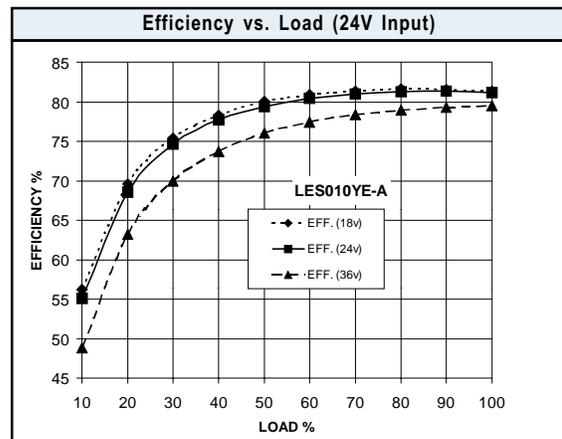
| Notes |
|---|
| [†] MTBF predictions may vary slightly from model to model. |
| Specifications typically at 25°C, normal line, and full load, unless otherwise stated. |
| Soldering Conditions: I/O pins, 260°C, ten seconds; fully compatible with commercial wave-soldering equipment. |
| Safety: Agency 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. |

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## MODELS - (See the last page of this file for options.)

| Vin (Volts) | Vin Range (Volts) | Iin Max.* (Amps) | Vout (Volts) | Iout Rated (Amps) | Ripple & Noise Pk-Pk (mV) | Efficiency Typ. ** | Model |
|---|---|---|---|---|---|---|---|
| 24 | 18 - 36 | 1.00 | 15 | 1.00 | 150 | 86% | LES015YJ |
| 24 | 18 - 36 | 1.00 | 12 | 1.25 | 120 | 83% | LES015YH † |
| 24 | 18 - 36 | 1.10 | 5 | 3.00 | 100 | 82% | LES015YG |
| 24 | 18 - 36 | 0.80 | 3.3 | 3.00 | 100 | 79% | LES010YE |
| 24 | 18 - 36 | 0.60 | 2.5 | 3.00 | 75 | 77% | LES008YD † |
| 48 | 36 - 75 | 0.50 | 15 | 1.00 | 150 | 87% | LES015ZJ † |
| 48 | 36 - 75 | 0.50 | 12 | 1.25 | 120 | 85% | LES015ZH † |
| 48 | 36 - 75 | 0.60 | 5 | 3.00 | 100 | 82% | LES015ZG |
| 48 | 36 - 75 | 0.40 | 3.3 | 3.00 | 100 | 79% | LES010ZE |
| 48 | 36 - 75 | 0.35 | 2.5 | 3.00 | 75 | 77% | LES008ZD † |

† Denotes advanced product release.  Consult factory for product availability.

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

\*\* At nominal Vin, rated output.

## MECHANICAL DRAWING
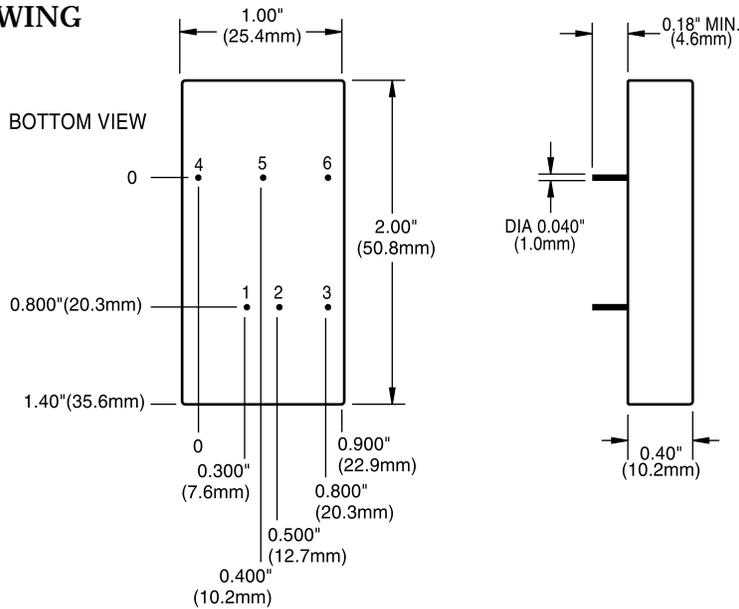


| Thermal Impedance | |
|---|---|
| Natural Convection | 15.4 °C/W |
| 100 LFM | 12.2 °C/W |
| 200 LFM | 9.3 °C/W |
| 300 LFM | 7.4 °C/W |
| 400 LFM | 6.4 °C/W |

Note:
Thermal impedance data is dependent on many environmental factors.  The exact thermal performance should be validated for specific application.

| Pin | Function |
|---|---|
| 1 | +$V_{in}$ |
| 2 | -$V_{in}$ |
| 3 | No Pin (Shutdown) |
| 4 | +$V_{out}$ |
| 5 | No Pin (Trim) |
| 6 | -$V_{out}$ |

| 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, LES, QBS, QES, TES, TQD | TTL "Low" Turns Module ON TTL "High" Turns Module OFF |
| Lucent Compatible Trim | T | HAS, HBD, HBS, HES, QBS, QES | |
| Terminal Strip | TS | XWS | |
| 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 | |
| | | | |
| **PIN LENGTH AND HEATSINK OPTIONS** | | | 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 (Except DIP, SIP, and SM Packages) | Includes Thermal Pad |
| 0.24" (6.1mm) Vertical Heatsink | 1V | All Units (Except DIP, SIP, and SM Packages) | Includes Thermal Pad |
| 0.45" (11.4mm) Horizontal Heatsink | 2H | All Units (Except DIP, SIP, and SM Packages) | Includes Thermal Pad |
| 0.45" (11.4mm) Vertical Heatsink | 2V | All Units (Except DIP, SIP, and SM Packages) | Includes Thermal Pad |
| 0.95" (24.1mm) Horizontal Heatsink | 3H | All Units (Except DIP, SIP, and SM Packages) | Includes Thermal Pad |
| 0.95" (24.1mm) Vertical Heatsink | 3V | All Units (Except DIP, SIP, and SM 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.