



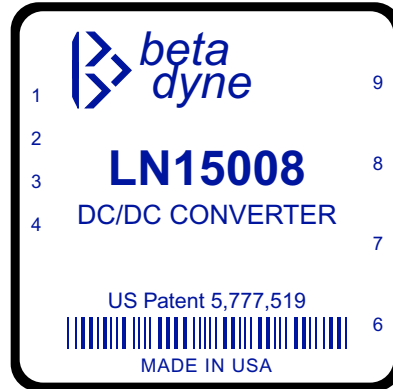
# LN15008

## LOW-NOISE 18W DC/DC CONVERTER

9-18V<sub>IN</sub>, 6V<sub>OUT</sub>@3A  
US Patent 5,777,519

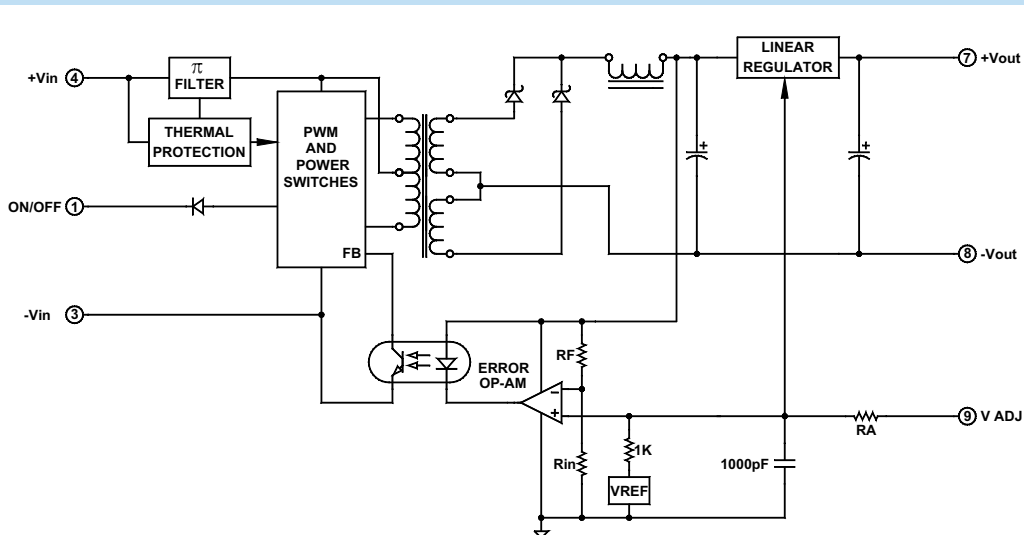
### Key Features

- Less than 5mV output noise
- 80% efficiency
- Six-sided shielding
- Soft start
- Single
- Short circuit and thermal protection
- Adjustable output
- 750µA off state current
- Wide input voltage range (2:1)
- 250mV dropout linear regulators



### Functional Description

The LN15008 is a single output, low-noise 18W DC/DC converter that accepts 9-18V<sub>IN</sub> and provides 6V<sub>OUT</sub>@3A. Low dropout linear regulators reduce the output noise to 10mV<sub>PP</sub>. A patented control circuit maintains minimum constant dropout voltage over line, load, temperature and output adjust range.



Typical Block Diagram

## Electrical Specifications

### INPUT SPECIFICATIONS

Unless otherwise specified, all parameters are given under typical +25°C with nominal input voltage and under full output load conditions.

| PARAMETER                        | CONDITION / NOTE                               | MIN  | TYP  | MAX | UNIT              |
|----------------------------------|--|------|------|-----|-------------------|
| Input Voltage                    |  | 9    | 12   | 18  | Vdc               |
| No Load Input Current            |  |      | 10   |     | mA                |
| Full Load Input Current          |  |      | 1875 |     | mA                |
| Input Filter                     |  |      |      |     |                   |
| Reverse Polarity Input Current   | External series-blocking diode                 |      |      | 12  | A                 |
| Input Surge Current (20µS Spike) |  |      |      | 10  | A                 |
| Short Circuit Current Limit      |  |      | 150  |     | % I <sub>IN</sub> |
| Undervoltage Shutdown            |  |      | 8    |     | Vdc               |
| Off State Current, 24V           |  |      | 750  |     | µA                |
| Remote ON/OFF Control            |  |      |      |     |                   |
| Converter ON                     | Open (Open circuit voltage at Pin 1: 10V Max.) |      |      |     |                   |
| Converter OFF                    |  | -0.6 | 0    | 0.2 | Vdc               |
| Logic Input Reference            | -Input   |      |      |     |                   |
| Logic Compatibility              | TTL Open Collector or CMOS Open Drain          |      |      |     |                   |

### OUTPUT SPECIFICATIONS

| PARAMETER   | CONDITION / NOTE                       | MIN | TYP  | MAX  | UNIT             |
|---|--|-----|------|------|------------------|
| Output Voltage  |  |     | 6    |      | Vdc              |
| Output Voltage Accuracy                                       |  |     |      | ±0.5 | %                |
| Output Voltage Adjustment                                     |  |     | 3    | ±5   | %                |
| Output Current  |  |     | 3000 |      | mA               |
| Ripple & Noise  |  |     | 10   | 15   | mV <sub>pp</sub> |
| Line Regulation   |  |     | 0.05 | 0.1  | %                |
| Load Regulation   | NL to FL                               |     | 0.05 | 0.1  | %                |
| Temperature Coefficient @ FL                                  |  |     | 0.02 |      | %/°C             |
| Transient Response Time (to within 0.5% of V <sub>OUT</sub> ) | 50% FL to FL to 50% FL, See Figure 1   |     | 5    |      | µS               |
| Short Circuit Protection                                      | All outputs, by input current limiting |     |      |      |                  |
| Output Short Circuit Duration                                 | Continuous                             |     |      |      |                  |

### GENERAL SPECIFICATIONS

| PARAMETER                  | CONDITION / NOTE | MIN | TYP             | MAX | UNIT |
|----------------------------|------------------|-----|-----------------|-----|------|
| Efficiency                 |                  |     | 80              |     | %    |
| Isolation Voltage (1 min.) |                  |     | 1500            |     | Vdc  |
| Isolation Resistance       |                  |     | 10 <sup>9</sup> |     | Ω    |
| Isolation Capacitance      |                  |     | 80              |     | pF   |
| Switching Frequency        |                  |     | 100             |     | kHz  |

### ENVIRONMENTAL SPECIFICATIONS

| PARAMETER                                    | CONDITION / NOTE                         | MIN | TYP     | MAX  | UNIT                 |
|--|--|-----|---------|------|----------------------|
| Operating Temperature, Industrial (Ambient)* | See Figure 2                             | -40 |         | +75  | °C                   |
| Storage Temperature Range                    |  | -55 |         | +125 | °C                   |
| Thermal Resistance                           |  |     | 3.5     | 4    | °C/W <sub>DISS</sub> |
| Maximum Operating Case Temperature           |  |     |         | 105  | °C                   |
| Thermal Turn Off, Case Temperature           |  | 95  | 100     | 115  | °C                   |
| Thermal Hysteresis                           |  |     | 20      |      | °C                   |
| Derating                                     | See Figure 2                             |     |         |      |                      |
| Humidity                                     | Up to 95% non-condensing                 |     |         |      |                      |
| Cooling                                      | Free-air convection                      |     |         |      |                      |
| EMI/RFI                                      | Six-sided continuous shielded metal case |     |         |      |                      |
| MTBF   | per MIL-HNBK-217F (Ground benign, +25°C) |     | 625,000 |      | hours                |

\* See footnotes 1, 2, 3 and 4.

## PHYSICAL CHARACTERISTICS

| PARAMETER                               | CONDITION / NOTE                          | MIN | TYP | MAX | UNIT |
|---|---|-----|-----|-----|------|
| Dimensions (L×W×H)                      | 2.00×2.00×0.395 in. (50.80×50.80×10.03mm) |     |     |     |      |
| Weight                                  | 2 oz. (58g)                               |     |     |     |      |
| Case Material                           | Coated metal                              |     |     |     |      |
| Shielding Connection, 24V <sub>IN</sub> | -Input (Pin 3)                            |     |     |     |      |

<sup>1</sup> Contact factory for -55° to +85°C operating temperature range.

<sup>2</sup> The maximum input current at any given input range measured at minimum input voltage is given as  $1.6 \cdot I_{\text{NOMINAL}}$ . Nominal input current is the typical value measured at the input of the converter under full-load room temperature and nominal input voltage (5, 12, 24 and 48V<sub>IN</sub>).

<sup>3</sup> Adequate insulation is to be provided to the converters at the end usage as per applicable requirements.

<sup>4</sup> Temperature rise on the case of the converters is to be considered during the end usage as per applicable requirements.

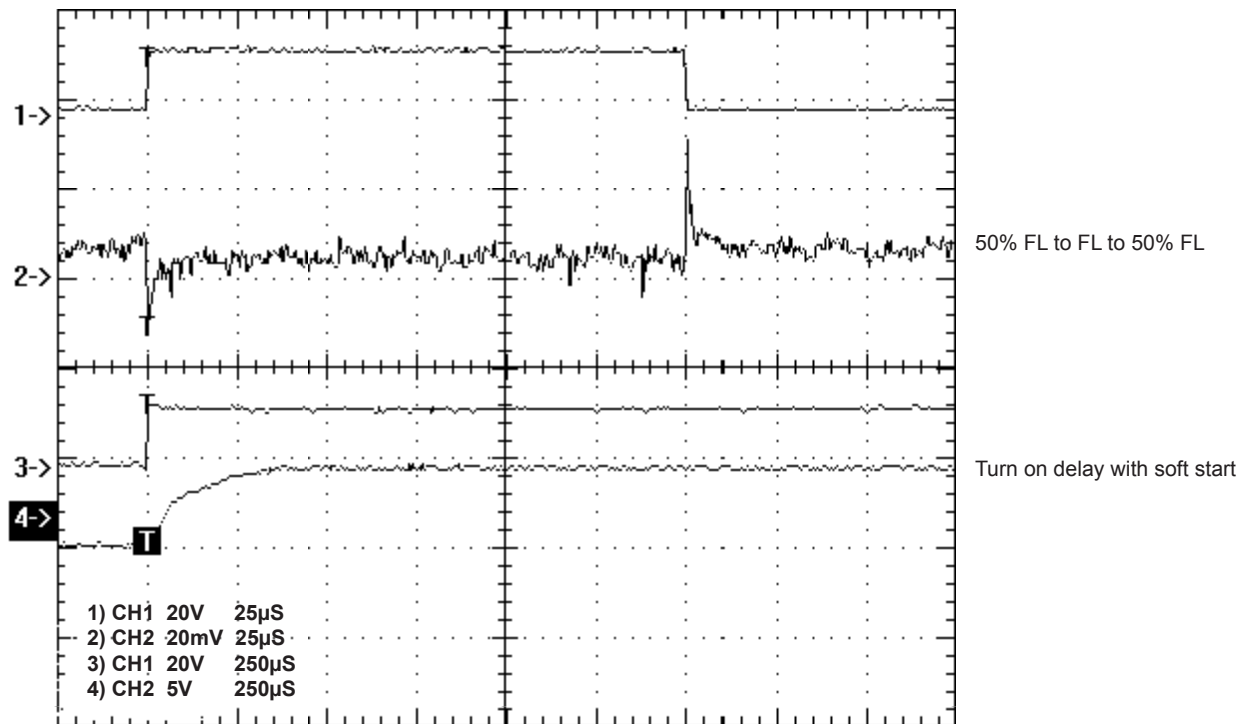


FIGURE 1. Transient response and turn on delay with soft start

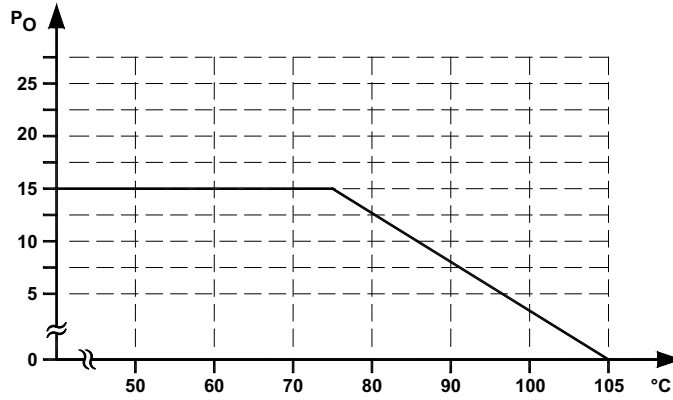


FIGURE 2. Typical derating curve

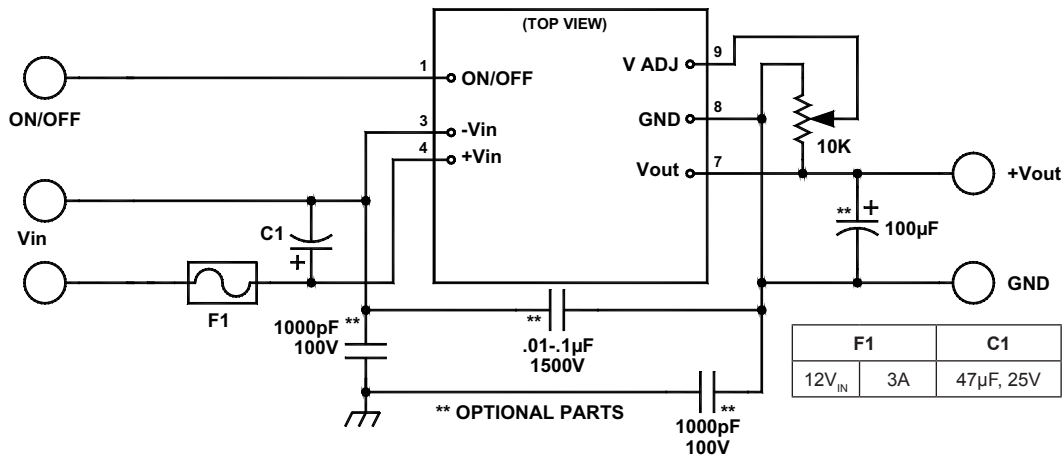
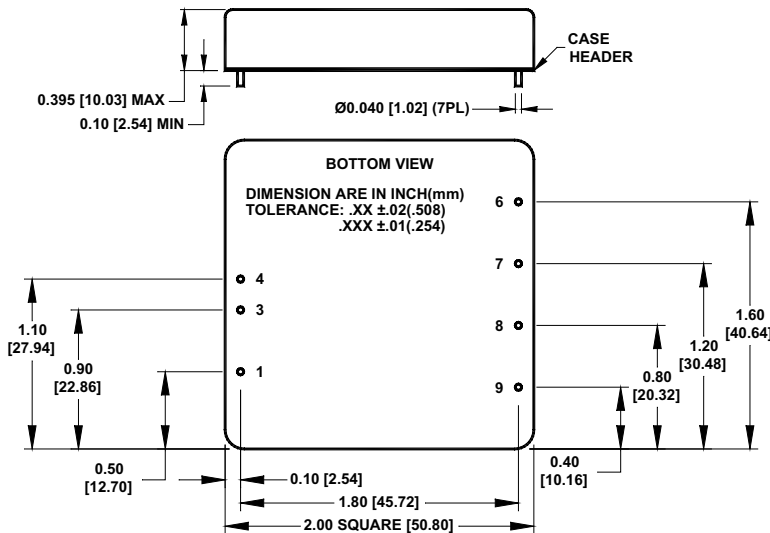


FIGURE 3. Typical connection diagram

**MECHANICAL SPECIFICATIONS**



| Pin | Function          |
|-----|-------------------|
|     | <b>SINGLE</b>     |
| 1   | ON/OFF            |
| 2   | No Pin            |
| 3   | -V <sub>IN</sub>  |
| 4   | +V <sub>IN</sub>  |
| 5   | No Pin            |
| 6   | No Pin            |
| 7   | +V <sub>OUT</sub> |
| 8   | -V <sub>OUT</sub> |
| 9   | V <sub>ADJ</sub>  |