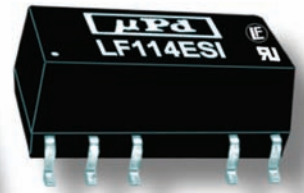
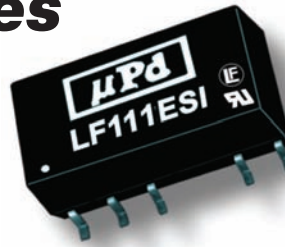


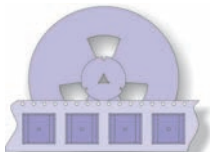
# LF100ESI Series

## Low Cost, Single Output 1W High Isolation SMT DC/DC Converters



### Key Features:

- 1W Output Power
- Ultra-Miniature SMT Case
- 3,000 VDC Isolation
- UL Approved (File E245422)
- Single Output
- Low 0.24" Profile
- >3.5 MHour MTBF
- 3.3, 5V, & 12V Inputs
- **LOWEST COST!**



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### MicroPower Direct

292 Page Street  
Suite D  
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W: www.micropowerdirect.com



### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

#### Input

| Parameter                      | Conditions    | Min. | Typ. | Max. | Units |
|--------------------------------|---------------|------|------|------|-------|
| Input Voltage Range            | 3.3 VDC Input | 3.0  | 3.3  | 3.6  | VDC   |
|                                | 5 VDC Input   | 4.5  | 5.0  | 5.5  |       |
|                                | 12 VDC Input  | 10.8 | 12.0 | 13.2 |       |
| Reverse Polarity Input Current |               |      |      | 1.0  | A     |
| Input Filter                   | Capacitor     |      |      |      |       |

#### Output

| Parameter               | Conditions                | Min. | Typ.  | Max.  | Units    |
|-------------------------|---------------------------|------|-------|-------|----------|
| Output Voltage Accuracy |                           |      | ±3.0  |       | %        |
| Line Regulation         | For Vin Change of 1%      |      |       | ±1.2  | %        |
| Load Regulation         | See Model Selection Guide |      |       |       |          |
| Ripple & Noise (20 MHz) |                           |      | 60    | 120   | mV P - P |
| Temperature Coefficient |                           |      | ±0.01 | ±0.02 | %/°C     |
| Output Short Circuit    | Momentary (0.5 Sec.)      |      |       |       |          |

#### General

| Parameter             | Conditions  | Min.  | Typ. | Max. | Units |
|-----------------------|-------------|-------|------|------|-------|
| Isolation Voltage     | 60 Seconds  | 3,000 |      |      | VDC   |
| Isolation Resistance  | 500 VDC     | 1,000 |      |      | MΩ    |
| Isolation Capacitance | 100 kHz, 1V |       | 70   |      | pF    |
| Switching Frequency   |             |       | 100  |      | kHz   |

#### Environmental

| Parameter                   | Conditions          | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------|------|------|------|-------|
| Operating Temperature Range | Ambient             | -40  | +25  | +85  | °C    |
| Storage Temperature Range   |                     | -55  |      | +125 | °C    |
| Cooling                     | Free Air Convection |      |      |      |       |
| Humidity                    | RH, Non-condensing  |      |      | 95   | %     |

#### Physical

|               |                                                  |  |  |  |  |
|---------------|--------------------------------------------------|--|--|--|--|
| Case Size     | 0.60 x 0.30 x 0.24 Inches (15.24 x 7.5 x 6.0 mm) |  |  |  |  |
| Case Material | Non-Conductive Black Plastic (UL94-V0)           |  |  |  |  |
| Weight        | 0.05 Oz (1.5g)                                   |  |  |  |  |

#### Reliability Specifications

| Parameter        | Conditions                      | Min. | Typ. | Max. | Units  |
|------------------|---------------------------------|------|------|------|--------|
| MTBF             | MIL HDBK 217F, 25°C, Gnd Benign | 3.5  |      |      | MHours |
| Safety Standards | UL 1950, EN 60950, IEC 60950    |      |      |      |        |
| Safety Approvals | UL, cUL; File No. E245422       |      |      |      |        |

#### Absolute Maximum Ratings

| Parameter                   | Conditions                  | Min. | Typ. | Max.  | Units |
|-----------------------------|-----------------------------|------|------|-------|-------|
| Input Voltage Surge (1 Sec) | 3.3 VDC Input               | -0.7 |      | 7.0   | VDC   |
|                             | 5 VDC Input                 | -0.7 |      | 7.0   |       |
|                             | 12 VDC Input                | -0.7 |      | 15.0  |       |
| Lead Temperature            | 1.5 mm From Case For 10 Sec |      |      | 260.0 | °C    |
| Internal Power Dissipation  | All Models                  |      |      | 450   | mW    |

**Caution:** Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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| Model Number | Input         |             |              |         | Output        |                   |                   | Load Regulation (% , Max) | Efficiency (% , Typ) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------|---------------------------|----------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) |                           |                      |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |               |                   |                   |                           |                      |                            |
| LF101ESI     | 5             | 4.5 - 5.5   | 285          | 30      | 5.0           | 200.0             | 20.0              | 15.0                      | 70                   | 500                        |
| LF102ESI     | 5             | 4.5 - 5.5   | 266          | 30      | 9.0           | 111.0             | 23.0              | 9.0                       | 75                   | 500                        |
| LF103ESI     | 5             | 4.5 - 5.5   | 256          | 30      | 12.0          | 84.0              | 17.0              | 7.5                       | 78                   | 500                        |
| LF104ESI     | 5             | 4.5 - 5.5   | 250          | 30      | 15.0          | 67.0              | 13.0              | 7.0                       | 80                   | 500                        |
| LF111ESI     | 12            | 10.8 - 13.2 | 116          | 15      | 5.0           | 200.0             | 20.0              | 15.0                      | 72                   | 200                        |
| LF112ESI     | 12            | 10.8 - 13.2 | 110          | 15      | 9.0           | 111.0             | 23.0              | 9.0                       | 76                   | 200                        |
| LF113ESI     | 12            | 10.8 - 13.2 | 105          | 15      | 12.0          | 84.0              | 17.0              | 7.5                       | 79                   | 200                        |
| LF114ESI     | 12            | 10.8 - 13.2 | 103          | 15      | 15.0          | 67.0              | 13.0              | 7.0                       | 81                   | 200                        |
| LF151ESI     | 3.3           | 3.0 - 3.6   | 415          | 55      | 5.0           | 200.0             | 20.0              | 15.0                      | 73                   | 750                        |
| LF152ESI     | 3.3           | 3.0 - 3.6   | 433          | 55      | 9.0           | 111.0             | 23.0              | 9.0                       | 70                   | 750                        |
| LF153ESI     | 3.3           | 3.0 - 3.6   | 433          | 55      | 12.0          | 84.0              | 17.0              | 7.5                       | 70                   | 750                        |

## Notes:

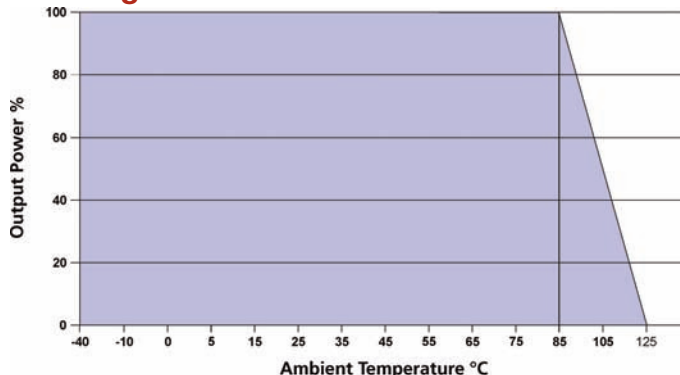
- Output load regulation is specified for a load change of 20% to 100%.
- When measuring output ripple, it is recommended that an external 0.33  $\mu$ F ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units.
- During operation, care must be taken not to exceed the specified input range of the unit or to allow the output load to drop below the specified minimum (10% of full load). Operating the unit under either of these conditions could cause damage to the unit.
- These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors will enhance stability and reduce output ripple. Recommended capacitor values are:

| Vin     | Input Capacitor | Vout   | Output Capacitor |
|---------|-----------------|--------|------------------|
| 3.3 VDC | 4.7 $\mu$ F     | 5 VDC  | 4.7 $\mu$ F      |
| 5 VDC   | 4.7 $\mu$ F     | 9 VDC  | 2.2 $\mu$ F      |
| 12 VDC  | 2.2 $\mu$ F     | 12 VDC | 1.0 $\mu$ F      |
|         |                 | 15 VDC | 0.47 $\mu$ F     |

For applications requiring very low output noise levels, a simple LC filter should be effective.

- It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

## Derating Curve

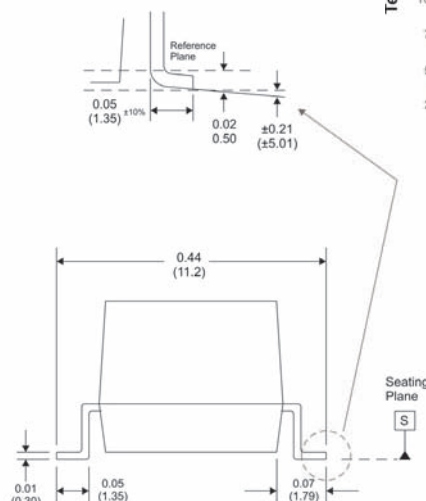
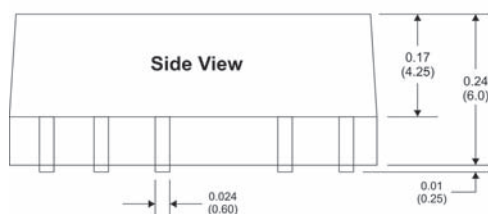
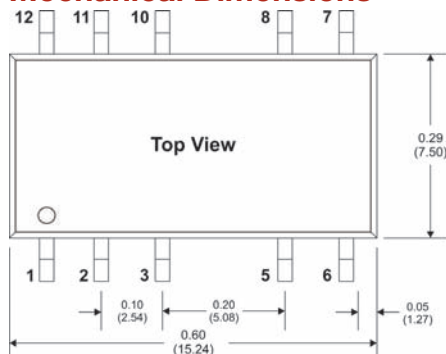


## Pin Connections

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | -Vin        | 7   | NC          |
| 2   | +Vin        | 8   | +Vout       |
| 3   | NC          | 10  | NC          |
| 5   | -Vout       | 11  | NC          |
| 6   | NC          | 12  | NC          |

NC = No Connection

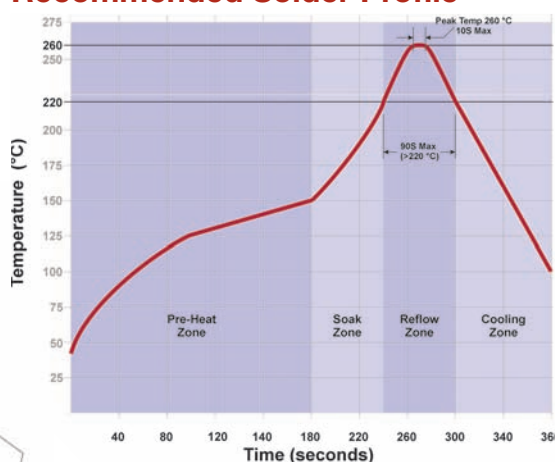
## Mechanical Dimensions



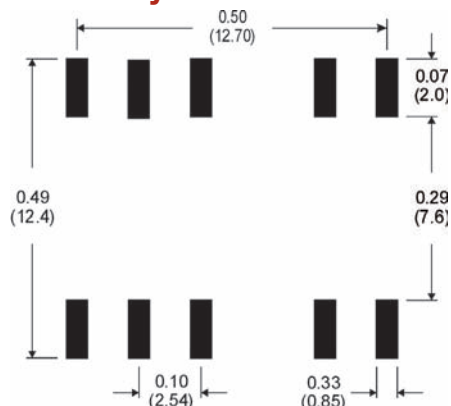
## Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx =  $\pm 0.01$  ( $\pm 0.25$ )
- Pin 1 is marked by a "dot" or indentation on the unit

## Recommended Solder Profile



## Board Layout



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