

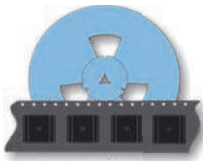
LF200ES Series

Low Cost, 2W SMT Single Output DC/DC Converters



Key Features:

- 2W Output Power
- Ultra-Miniature SMT Case
- 1,000 VDC Isolation
- -40°C to +85°C Operation
- Single Output
- Low 0.24" Profile
- >3.5 MHour MTBF
- Industry Standard Pin-Out
- **LOWEST COST!**



Tape/Reel Available



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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 | 5 VDC Input | 4.5 | 5.0 | 5.5 | VDC |
| | 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 | For Iout = 10% to 100% | | ±8 | ±15 | % |
| Output Ripple (20 MHz) | | | 75 | 150 | mV P - P |
| Output Noise (20 MHz) | | | 150 | 250 | mV P - P |
| Temperature Coefficient | | | | ±0.03 | %/°C |
| Output Short Circuit | Momentary (0.5 Sec.) | | | | |

General

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------|-------------|-------|------|------|-------|
| Isolation Voltage | 60 Seconds | 1,000 | | | 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 | 0.70 x 0.72 x 0.24 Inches (17.78 x 18.03 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 |

Absolute Maximum Ratings

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------------------------|-----------------------------|------|------|-------|-------|
| Input Voltage Surge (1 Sec) | 5 VDC Input | -0.7 | | 7.0 | VDC |
| | 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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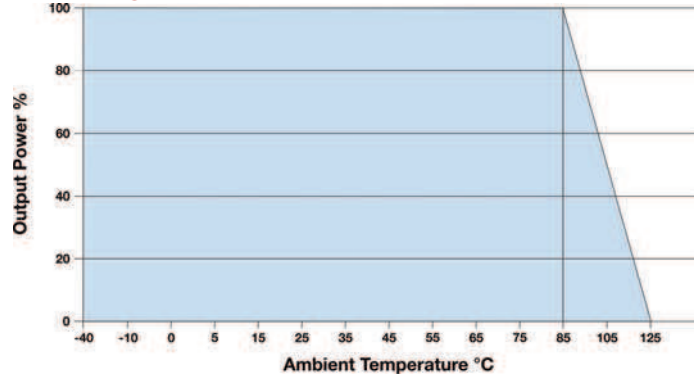
| Model Number | Input | | | | Output | | | Efficiency (% , Typ) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------|----------------------|----------------------------|
| | Voltage (VDC) | | Current (mA) | | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) | | |
| | Nominal | Range | Full-Load | No-Load | | | | | |
| LF201ES | 5 | 4.5 - 5.5 | 494 | 30 | 5.0 | 400.0 | 40.0 | 81 | 500 |
| LF202ES | 5 | 4.5 - 5.5 | 487 | 30 | 9.0 | 222.0 | 23.0 | 82 | 500 |
| LF203ES | 5 | 4.5 - 5.5 | 477 | 30 | 12.0 | 167.0 | 17.0 | 84 | 500 |
| LF204ES | 5 | 4.5 - 5.5 | 475 | 30 | 15.0 | 133.0 | 14.0 | 84 | 500 |
| LF211ES | 12 | 10.8 - 13.2 | 203 | 15 | 5.0 | 400.0 | 40.0 | 82 | 200 |
| LF212ES | 12 | 10.8 - 13.2 | 201 | 15 | 9.0 | 222.0 | 23.0 | 83 | 200 |
| LF213ES | 12 | 10.8 - 13.2 | 197 | 15 | 12.0 | 167.0 | 17.0 | 85 | 200 |
| LF214ES | 12 | 10.8 - 13.2 | 196 | 15 | 15.0 | 133.0 | 14.0 | 85 | 200 |

Notes:

- Output load regulation is specified for a load change of 10% to 100%.
- When measuring output ripple, it is recommended that an external 0.33 μF ceramic capacitor be placed from the +Vout pin to the -Vout pin.
- 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 |
|--------|-------------------|--------|--------------------|
| 5 VDC | 4.7 μF | 5 VDC | 4.7 μF |
| 12 VDC | 2.2 μF | 9 VDC | 2.2 μF |
| | | 12 VDC | 1.0 μF |
| | | 15 VDC | 0.47 μF |

Derating Curve



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

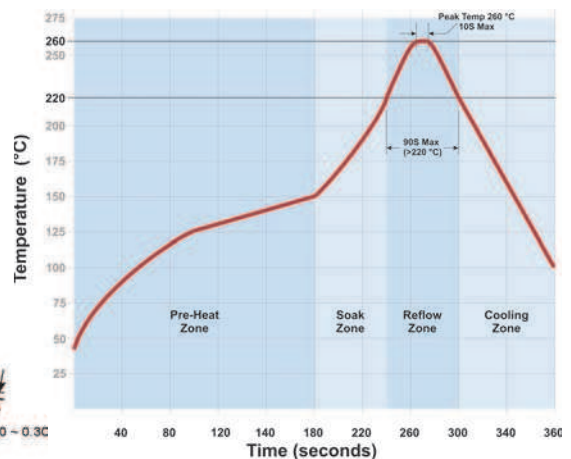
- It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

Pin Connections

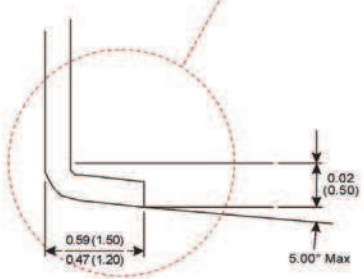
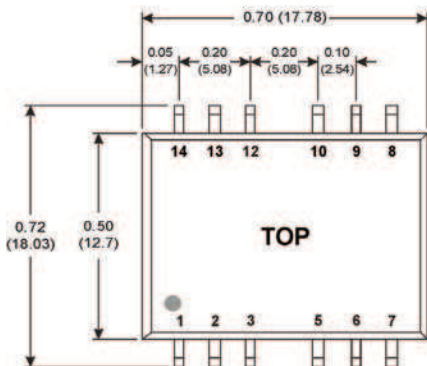
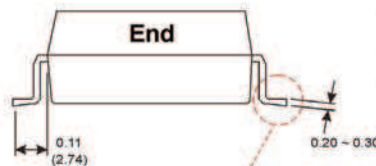
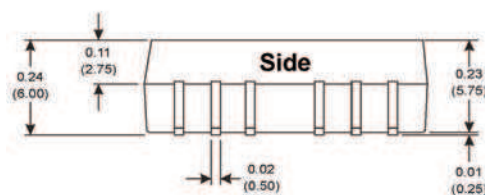
| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 1 | -Vin | 8 | NC |
| 2 | +Vin | 9 | NC |
| 3 | NC | 10 | NC |
| 5 | NC | 12 | NC |
| 6 | -Vout | 13 | NC |
| 7 | +Vout | 14 | NC |

NC = No Connection

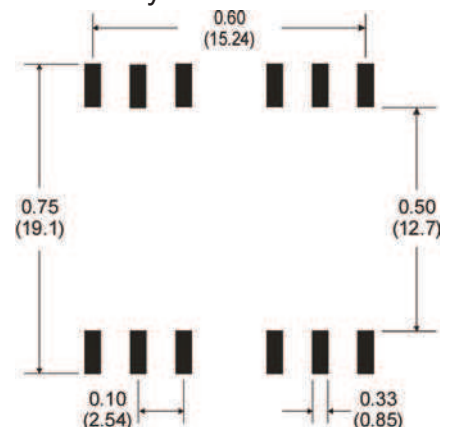
Recommended Solder Profile



Mechanical Dimensions



Board Layout



Notes:

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



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