



200LFR series

Single & Dual Output DC/DC Converter



DESCRIPTIONS

The 200LFR series 2 watt power modules are specially designed to provide low output ripple, and tight regulation in a low-profile 16 pin DIP package. The series consists of 28 models with input voltages of 5V, 12V, 24V and 48V, and offers regulated output voltages of 3.3V, 5V, 12V, 15V, $\pm 5V$, $\pm 12V$ and $\pm 15V$.

The -40°C to $+65^{\circ}\text{C}$ operating temperature range makes it ideal for data communication equipment, mobile battery driven equipment, distributed power systems, telecommunication equipment, mixed analog/digital subsystems, automatic test instrumentation and industrial robot systems.

OUTPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|--------------------------------|------------|-----|------------|--|
| Output Voltage Set Point | | | ± 2.0 | % Output voltage at nominal line & FL |
| Output Voltage Balance (Duals) | ± 1.0 | | ± 3.0 | % Equal Output Loads |
| Line Regulation | ± 0.2 | | ± 0.5 | % Output voltage measured from min. input line to maximum |
| Load Regulation | | | ± 0.75 | % Output voltage measured from FL to 25% load |
| Ripple/Noise | | | 75 | mV p-p, Over Line, Load & Temp., 20 MHz B.W., using 1 μf bypass capacitor |
| Overload Protection | 120 | | | % Rated Output Load |
| Short Circuit Protection | | | | Continuous, Automatic Recovery |
| Temperature Coefficient | ± 0.01 | | ± 0.02 | % per degree C |

FEATURES

- Up to 81 % Efficiency
- Single and Dual Output, 2 watt converter
- Available in 5, 12, 24 and 48 VDC Inputs
- Industry Standard Pinout
- Short Circuit Protection

INPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|--------------------------------|-----|------|-----|--------------------|
| Input Voltage | | | | |
| 5 VDC Input Models | 4.5 | 5 | 9 | VDC |
| 12 VDC Input Models | 9 | 12 | 18 | VDC |
| 24 VDC Input Models | 18 | 24 | 36 | VDC |
| 48 VDC Input Models | 36 | 48 | 72 | VDC |
| Input Fuse Requirements | | | | |
| 5 VDC Input Models | | 1000 | | mA; Slow blow type |
| 12 VDC Input Models | | 500 | | mA; Slow blow type |
| 24 VDC Input Models | | 250 | | mA; Slow blow type |
| 48 VDC Input Models | | 120 | | mA; Slow blow type |
| Reverse Polarity Input Current | | | 1.0 | Amp |
| Input Filter | | | | Pi Filter |

GENERAL CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|------|-----|-----|--|
| Switching Frequency | | 300 | | kHz |
| Isolation Voltage | 1500 | | | VDC, 1 minute |
| Isolation Resistance | 1000 | | | Mohm, 500VDC |
| Isolation Capacitance | | 250 | 420 | pF, 100kHz, 1Volt |
| MTBF (MIL-HBK-217F) | 1 | | | Million Hours, $+25^{\circ}\text{C}$, Ground Benign |



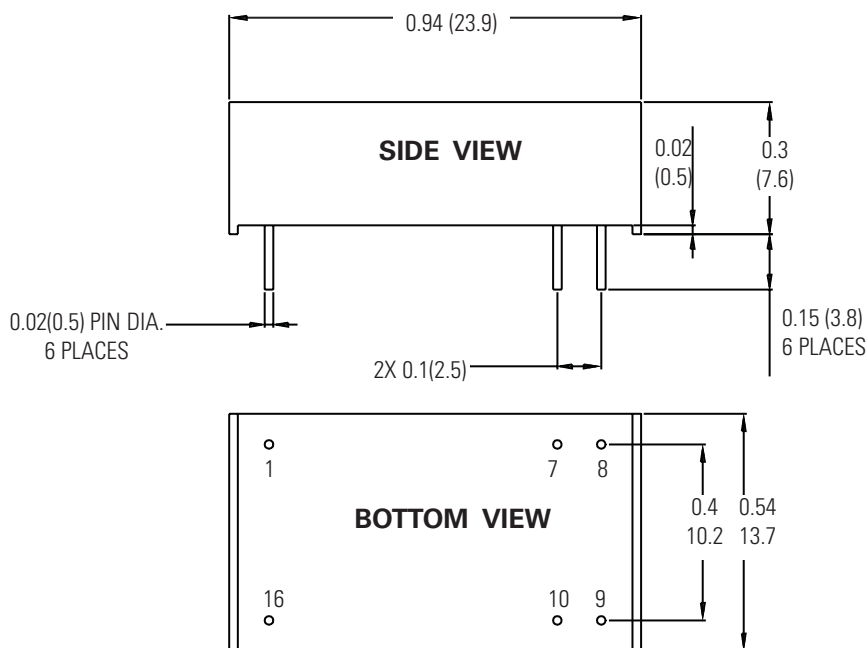
ENVIRONMENTAL SPECIFICATIONS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|-----|-----|------|----------------------------|
| Operating Temp. Range | -40 | | +65 | °C; Ambient |
| Storage Temp. Range | -40 | | +125 | °C |
| Relative Humidity | | | 95 | % Humidity; non-condensing |
| Cooling | | | | Free-Air Convection |

PHYSICAL CHARACTERISTICS

| | Unit/Comments |
|---------------|--|
| Case Size | 0.94 X 0.54 X 0.3 inches (23.9 X 13.7 X 7.6 mm) |
| Case Material | Non-Conductive Black Plastic |
| Flammability | UL94V-0 |
| Weight | 5.1 Grams |

OUTLINE DRAWING



PIN OUT CHART

| Pins | SINGLE | DUAL |
|------|---------|---------|
| 1 | - V in | - Vin |
| 7 | NC | NC |
| 8 | NC | Common |
| 9 | + V out | +V out |
| 10 | - V out | - V out |
| 16 | + V in | +V in |

NC = No Connection

Notes:

1. Unless otherwise specified dimensions are in inches (mm).

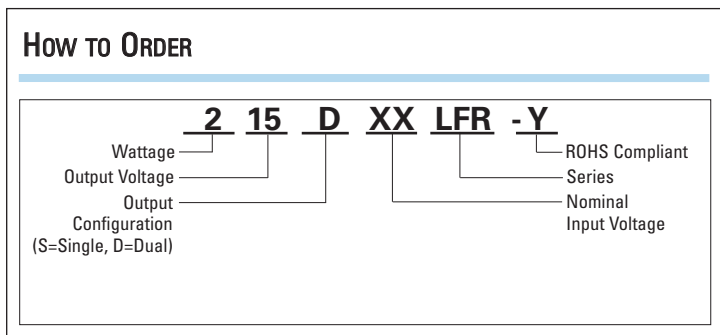
| Tolerances | Inches | mm |
|------------|----------------|--------------|
| | X.XX = ±0.02 | X.X = ±0.5 |
| | X.XXX = ±0.010 | X.XX = ±0.25 |
| Pin : | ±0.002 | ±0.05 |

All specifications are typical at nominal input, nominal load and 25°C unless otherwise specified.

Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low ESR capacitor of 2.2mF for the 5V input devices, a 1.0mF for the 12V input devices and a 0.47mF for the 24V and 48V devices.



How To ORDER



MODEL SELECTION CHART

| Model | Nominal Input Voltage (VDC) | Output Voltage (VDC) | Full Load Output Current (mA) | Min Load Output Current (mA) | No Load Input Current (mA) | Full Load Input Current (mA) | Efficiency (%) |
|-------------|-----------------------------|----------------------|-------------------------------|------------------------------|----------------------------|------------------------------|----------------|
| 203V3S5LFR | 5 | 3.3 | 500 | 125 | 40 | 471 | 70 |
| 205S5LFR | 5 | 5 | 400 | 100 | 40 | 548 | 73 |
| 212S5LFR | 5 | 12 | 167 | 42 | 40 | 534 | 75 |
| 215S5LFR | 5 | 15 | 134 | 33 | 40 | 582 | 73 |
| 203V3S12LFR | 12 | 3.3 | 500 | 125 | 20 | 184 | 73 |
| 205S12LFR | 12 | 5 | 400 | 100 | 20 | 217 | 77 |
| 212S12LFR | 12 | 12 | 167 | 42 | 20 | 209 | 80 |
| 215S12LFR | 12 | 15 | 134 | 33 | 20 | 220 | 80 |
| 203V3S24LFR | 24 | 3.3 | 500 | 125 | 10 | 96 | 72 |
| 205S24LFR | 24 | 5 | 400 | 100 | 10 | 109 | 77 |
| 212S24LFR | 24 | 12 | 167 | 42 | 10 | 109 | 80 |
| 215S24LFR | 24 | 15 | 134 | 33 | 10 | 108 | 81 |
| 203V3S48LFR | 48 | 3.3 | 500 | 125 | 8 | 108 | 71 |
| 205S48LFR | 48 | 5 | 400 | 100 | 8 | 108 | 73 |
| 212S48LFR | 48 | 12 | 167 | 42 | 8 | 108 | 79 |
| 215S48LFR | 48 | 15 | 134 | 33 | 8 | 108 | 79 |
| 205D5LFR | 5 | ±5 | ±200 | ±50 | 40 | 667 | 64 |
| 212D5LFR | 5 | ±12 | ±83 | ±21 | 40 | 615 | 69 |
| 215D5LFR | 5 | ±15 | ±67 | ±17 | 40 | 598 | 71 |
| 205D12LFR | 12 | ±5 | ±200 | ±50 | 20 | 242 | 73 |
| 212D12LFR | 12 | ±12 | ±83 | ±21 | 20 | 224 | 78 |
| 215D12LFR | 12 | ±15 | ±67 | ±17 | 20 | 226 | 78 |
| 205D24LFR | 24 | ±5 | ±200 | ±50 | 10 | 119 | 74 |
| 212D24LFR | 24 | ±12 | ±83 | ±21 | 10 | 112 | 78 |
| 215D24LFR | 24 | ±15 | ±67 | ±17 | 10 | 110 | 80 |
| 205D48LFR | 48 | ±5 | ±200 | ±50 | 8 | 62 | 71 |
| 212D48LFR | 48 | ±12 | ±83 | ±21 | 8 | 57 | 77 |
| 215D48LFR | 48 | ±15 | ±67 | ±17 | 8 | 57 | 77 |



DERATING CURVES

MODEL 200LFR

