



# 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  $-40^{\circ}\text{C}$  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			$\pm 2.0$	% Output voltage at nominal line & FL
Output Voltage Balance (Duals)	$\pm 1.0$		$\pm 3.0$	% Equal Output Loads
Line Regulation	$\pm 0.2$		$\pm 0.5$	% Output voltage measured from min. input line to maximum
Load Regulation			$\pm 0.75$	% Output voltage measured from FL to 25% load
Ripple/Noise			75	mV p-p, Over Line, Load & Temp., 20 MHz B.W., using 1 $\mu\text{f}$ bypass capacitor
Overload Protection	120			% Rated Output Load
Short Circuit Protection				Continuous, Automatic Recovery
Temperature Coefficient	$\pm 0.01$		$\pm 0.02$	% 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



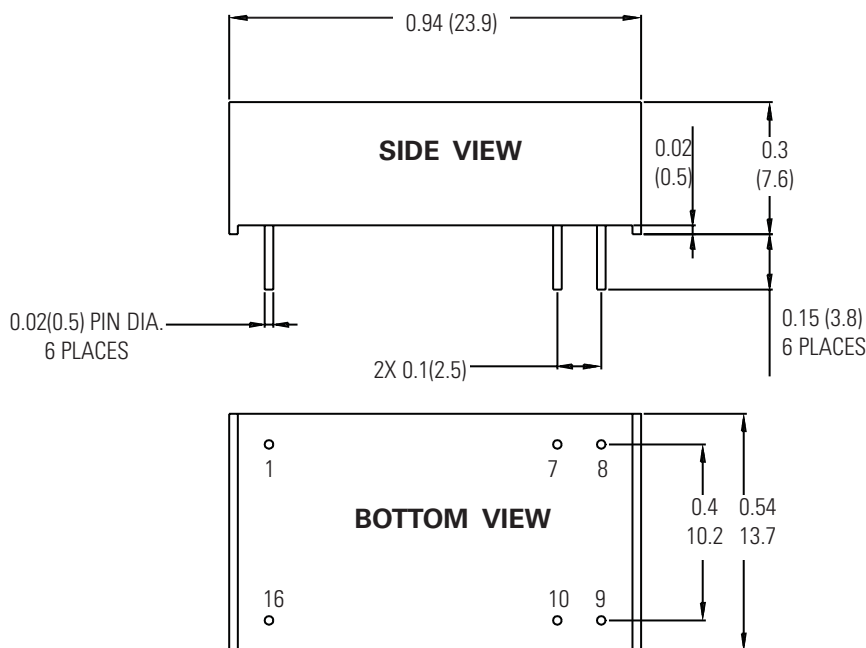
### ENVIRONMENTAL SPECIFICATIONS

	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).

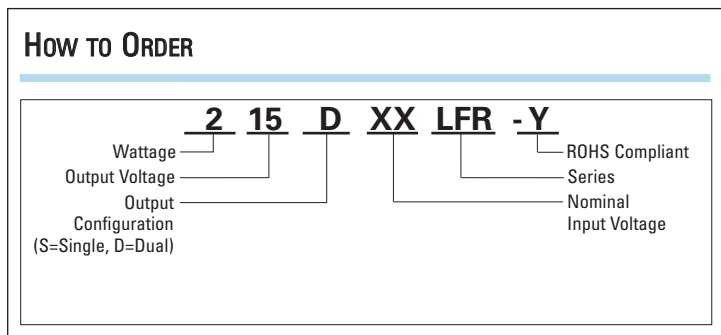
Tolerances	Inches	mm
	X.XX = ±0.02	X.X = ±0.5
	X.XXX = ±0.010	X.XX = ±0.25
Pin :	±0.002	±0.05

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

