



- ▶ Miniature Single-Inline Package (SIP)
- ▶ Tight Regulation (200FSR Series)
- ▶ 22 Models
- ▶ 500 VDC Input/Output Isolation
- ▶ Single and Dual Outputs
- ▶ Requires Only 0.425 Square Inches of Board Space
- ▶ Low Cost

200FS / FSR Series

General Description

The 200FS and 200FSR are a family of cost effective 1.8 and 2W single & dual output DC/DC converters. These converters use innovative engineering to combine miniature SIP packaging and low cost without sacrificing performance or field reliability. High performance features include 500 VDC input/output isolation, high efficiency operation and low noise operation. The 200FSR series is tightly regulated.

Twenty two models operate from input bus voltages of 5 and 12 VDC; producing output voltage levels of 5, 9, 12, 15, ± 5 , ± 12 or ± 15 VDC. Standard features include an output voltage accuracy of $\pm 3.0\%$ and an input voltage range of $\pm 5\%$ tolerance.

All models are packaged in ultra-miniature 1.25 x 0.34 x 0.57 inch single-inline package (SIP). Operation is specified over the full operating temperature range of -25°C to $+71^{\circ}\text{C}$ with no derating required. Cooling is by free-air convection.

Electrical Specifications

Input Specifications:

Input Voltage Range	$\pm 5\%$
Input Filter	Internal Capacitor
Reflected Ripple Current	See Model Selection Guide

Output Specifications:

Output Voltage Accuracy	$\pm 3\%$
Voltage Balance (Dual Outputs)	$\pm 1\%$
Ripple & Noise (20 MHz BW)	1% Pk-Pk, Max.
Line Regulation (200FS models) ⁽¹⁾	$\pm 1.2\%/%$ change in Vin
Line Regulation (200FSR models) ⁽¹⁾	$\pm 0.3\%$
Load Regulation (200FS models) ⁽²⁾	$\pm 10\%$
Load Regulation (200FSR models) ⁽²⁾	$\pm 0.5\%$
Minimum Load	20%
Temperature Coefficient @ FL	$\pm 0.02\%/^{\circ}\text{C}$
Transient Response ⁽³⁾	$< 500 \mu\text{Sec.}$
Short Circuit Protection	Momentary

General Specifications:

Efficiency	See Model Selection Guide
Isolation Voltage (1 min)	500 VDC
Isolation Capacitance	60 pF
Isolation Resistance	$10^9 \Omega$
Switching Frequency	$< 25 \text{ kHz}$

Environmental Specifications:

Operating Temperature Range (Ambient)	-25°C to $+71^{\circ}\text{C}$
Storage Temperature Range	-55°C to $+125^{\circ}\text{C}$
Derating	None Required
Humidity	Up to 95%, Non-condensing
Cooling	Free-air Convection

Physical Characteristics:

Size	1.25 x 0.34 x 0.57 inches (31.8 x 8.6 x 14.5 mm)
Weight	0.1 Oz (3g)
Case Material	Non-conductive Black Plastic

Absolute Maximum Ratings:⁽⁴⁾

Input Voltage	175% of Nominal Input Line
Output Short Circuit Duration	Momentary
Internal Power Dissipation, 200FS	1.4W
200FSR	1.9W

All specifications are typical @ $+25^{\circ}\text{C}$ with nominal input voltage and under full output load conditions, unless otherwise noted. Specifications subject to change without notice.

Notes:

1. Line regulation is measured by monitoring the output voltage while the module input voltage is varied from low line to high line.
2. Load regulation is measured at nominal input voltage while the output load is varied from no load to full load. Dual output models are loaded equally.
3. Transient response is measured to within a 1% error band with a 25% step load change for single output units and a 50% load step for dual output units.
4. Absolute Maximum Ratings are specification limits that, if exceeded, could permanently damage the unit. These are not continuous operating ratings.

Application Notes:

1. Converters may be configured to produce different outputs. Please contact the factory for more information.
2. These units operate as complete converters with no need for external components. However, in some noise sensitive analog applications it is recommended that a 15 μF - 25V tantalum electrolytic capacitor be placed in parallel with a 0.1 μF ceramic capacitor as close to the load as possible. This will reduce ripple significantly.

* For information on the standard conditions and methods used or approved by CDI to test DC/DC converter parameters, see the application note "Testing DC/DC converters" on page 92.

Typical Applications:

- ▶ Mixed Analog/Digital Subsystem
- ▶ Mobile/Portable Equipment
- ▶ Distributed Power Networks
- ▶ RS-232 Line Drivers
- ▶ General Purpose Board Level DC/DC Converter

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200FS/FSR Series
 ULTRA-MINIATURE SINGLE-INLINE PACKAGE
 2W SINGLE and DUAL OUTPUT
 ISOLATED DC/DC CONVERTERS

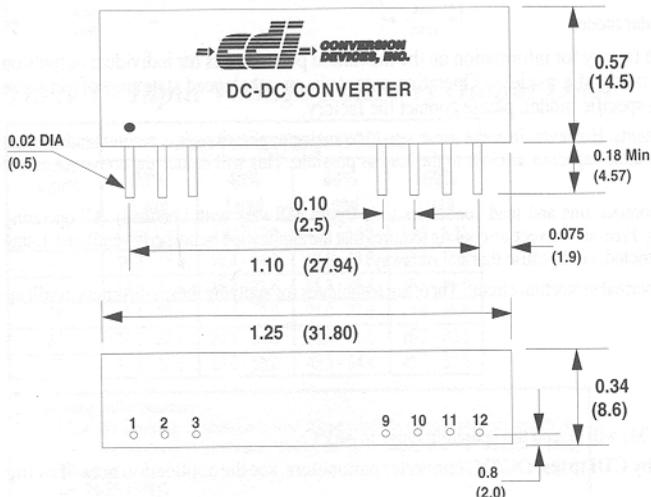
Model Selection Guide for 200FS Series

Model Number	Input				Output		Efficiency @FL (%)
	Nominal Voltage (VDC)	Current (mA)		Reflected Ripple (mA P-P)	Voltage (VDC)	Current (mA)	
		No-Load	Full-Load				
205S5FS	5	55	610	68	5	400	64
209S5FS	5	55	600	60	9	222	67
212S5FS	5	40	560	56	12	166	71
215S5FS	5	70	560	56	15	133	71
205D5FS	5	50	514	52	± 5	± 200	78
212D5FS	5	60	500	50	± 12	± 83	80
215D5FS	5	65	800	80	± 15	± 66	67
205S12FS	12	25	250	25	5	400	67
212S12FS	12	25	220	22	12	166	76
212D12FS	12	25	240	24	± 12	± 83	69
215D12FS	12	25	240	24	± 15	± 66	69

Model Selection Guide for 200FSR Series

Model Number	Input				Output		Efficiency @FL (%)
	Nominal Voltage (VDC)	Current (mA)		Reflected Ripple (mA P-P)	Voltage (VDC)	Current (mA)	
		No-Load	Full-Load				
205S5FSR	5	55	740	68	5	360	48
209S5FSR	5	55	720	60	9	200	50
212S5FSR	5	40	720	56	12	150	50
215S5FSR	5	70	720	56	15	120	50
205D5FSR	5	50	720	52	± 5	± 180	50
212D5FSR	5	60	720	50	± 12	± 75	50
215D5FSR	5	65	720	80	± 15	± 60	50
205S12FSR	12	25	308	25	5	360	48
212S12FSR	12	25	300	22	12	150	50
212D12FSR	12	25	300	24	± 12	± 75	50
215D12FSR	12	25	300	24	± 15	± 60	50

Mechanical Configuration:



Pin-Out

Pin	Single Output	Dual Output
1	+V Input	+V Input
2	N/C	-V Input
3	-V Output	Common
9	N/C	N/C
10	-V Output	Common
11	+V Output	+V Output
12	-V Input	-V Input

Note: All dimensions are typical in inches (mm).
 Tolerance X.XX = ± 0.02, (± 0.5)
 X.XXX = ± 0.010, (± 0.25)
 N/C = No Connection