

FRD SERIES - DUAL OUTPUT, 5 WATT

DESCRIPTION

FRD dual output DC/DC converters offer excellent regulation and isolation in an industry standard package. Available in several input versions, the FRD is perfect for industrial, datacom, or telecom applications. The FRD features short circuit protection, six-sided shielding, and 500 VDC isolation. Please see the FRS series for single output applications.



FEATURES

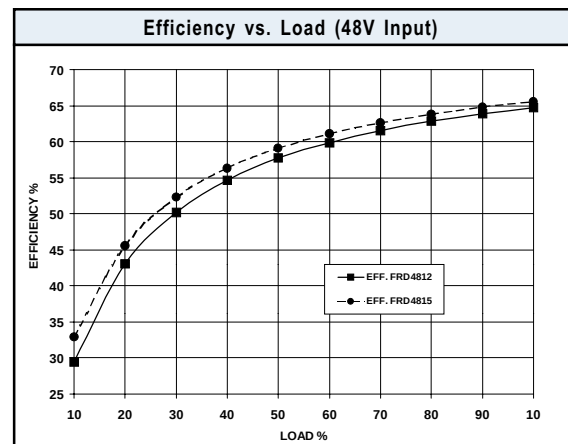
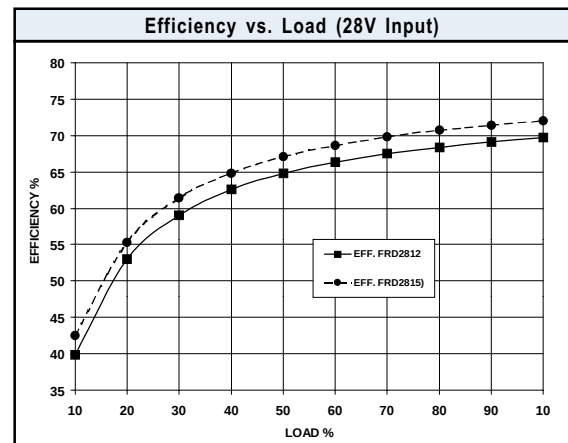
- Wide Input Range
- Trim and Enable Pins
- Remote Sense Pins
- 500V Isolation
- Short Circuit Protection
- 6-Sided Shielding

TECHNICAL SPECIFICATIONS

Input	
Voltage Range	5V, 12V, 24V, 28V, and 48V Nominal See selection chart for specific input range.
Reflected Ripple	20% I_{in} Max.
Reverse Input Current	100% I_{in} Max.

Output	
Setpoint Accuracy	$\pm 1\%$ V_{out}
Line Regulation V_{in} Min. - V_{in} Max., I_{out} Rated	$\pm 0.15\%$ V_{out}
Load Regulation I_{out} Min. - I_{out} Max., V_{in} Nom.	$\pm 0.15\%$ V_{out} I_{out} Rated
Minimum Output Current	10 % I_{out} Rated
Short Circuit Protection ¹	Continuous

General	
Switching Frequency	20 kHz
Isolation	
Input - Output	500 VDC
Isolation Resistance - Input to Output	10^9 Ohms
Case Temperature	
Operating Range	-25 To +85°C
Storage Range	-40 To +125°C
Humidity Max, Non-Condensing	95%
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
Safety	Consult Factory
Weight (Approx.)	2.2 oz



Notes

[†] MTBF predictions may vary slightly from model to model.

Specifications typically at 25°C, normal line, and full load, unless otherwise stated.

Soldering Conditions: I/O pins, 260°C, ten seconds; fully compatible with commercial wave-soldering equipment.

Safety: Agency approvals may vary from model to model. Please consult factory for specific model information.

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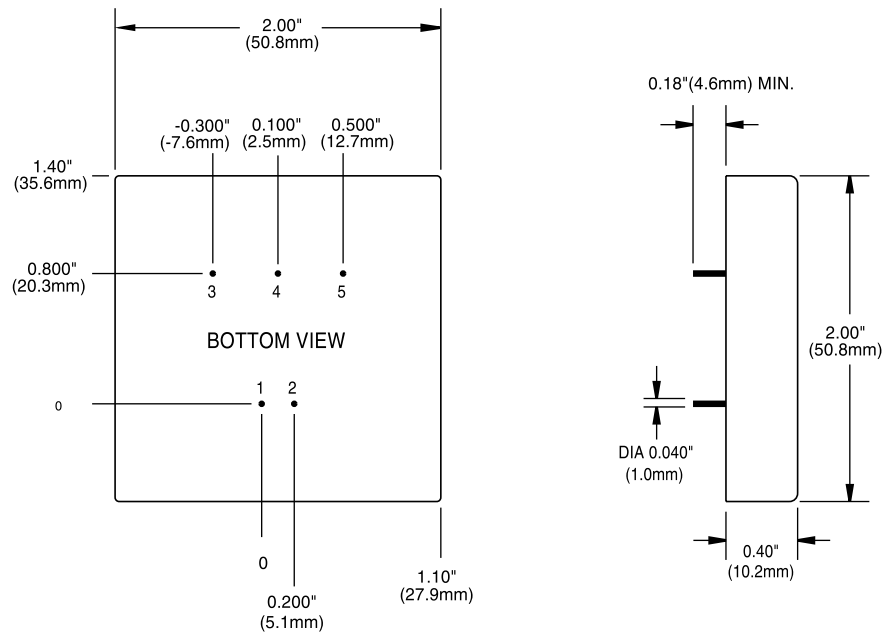
MODELS - (See the last page of this file for options.)

Vin (Volts)	Vin Range (Volts)	Iin Max* (Amps)	Vout (Volts)	Iout Rated (Amps)	Ripple & Noise Pk-Pk (mV)	Efficiency Typ. **	Model
5	4.65 - 5.50	2.01	±12	±0.23	40	65%	FRD512
5	4.65 - 5.50	2.04	±15	±0.19	40	66%	FRD515
12	10.90 - 13.20	0.85	±12	±0.23	40	66%	FRD1212
12	10.90 - 13.20	0.86	±15	±0.19	40	67%	FRD1215
24	21.60 - 26.40	0.43	±12	±0.23	40	66%	FRD2412
24	21.60 - 26.40	0.45	±15	±0.19	40	65%	FRD2415
28	25.20 - 30.80	0.37	±12	±0.23	40	69%	FRD2812
28	25.20 - 30.80	0.38	±15	±0.19	40	71%	FRD2815
48	43.20 - 52.80	0.21	±12	±0.23	40	65%	FRD4812
48	43.20 - 52.80	0.22	±15	±0.19	40	66%	FRD4815

* Maximum input current at minimum input voltage, maximum rated output power.

** At nominal Vin, rated output.

MECHANICAL DRAWING



Thermal Impedance	
Natural convection	10.3 °C/W
100 LFM	7.7 °C/W
200 LFM	6.3 °C/W
300 LFM	5.1 °C/W
400 LFM	4.1 °C/W
Note: Thermal impedance data is dependent on many environmental factors. The exact thermal performance should be validated for specific application.	

Pin	Function
1	+V _{in}
2	-V _{in}
3	+ V _{out}
4	Common
5	- V _{out}

Tolerances	
Inches:	(Millimeters)
.XX ± 0.040	.X ± 1.0
.XXX ± 0.010	.XX ± 0.25
Pin:	
± 0.002	± 0.05
Case:	
+ 0.04, - 0.00	+ 1.0, - 0.0
(Tolerances as listed unless otherwise specified.)	

OPTIONS

When ordering equipment options, use the following suffix information. Select the option(s) that you prefer and add them to the model number. Example ordering options are located below the options table.

OPTION	SUFFIX	APPLICABLE SERIES	REMARKS
Negative Logic	N	HAS, HBD, HBS, HES, LES, QBS, QES, TES, TQD	TTL "Low" Turns Module ON TTL "High" Turns Module OFF
Lucent Compatible Trim	T	HAS, HBD, HBS, HES, QBS, QES	
Terminal Strip	TS	XWS, XWD, XWT	
Trim	1	IAS, LES	
Enable	2	IAD, IAS, LES, SMS	
Trim and Enable	3	IAS, LES	
Current Share	4	SMS	
Headerless	Y	Encapsulated EWS, IWS, OWS	
PIN LENGTH AND HEATSINK OPTIONS			Standard Pin Length is 0.180" (4.6mm)
0.110" (2.8mm) Pin Length	8	All Units (Except SMS)	
0.150" (3.8mm) Pin Length	9	All Units (Except SMS)	
0.24" (6.1mm) Horizontal Heatsink	1H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All Units (Except DIP, SIP, and SM Packages)	Includes Thermal Pad

Example Options: HBS050ZG-ANT3V = HBS050ZG-A with negative logic, Lucent compatible trim, and 0.95" vertical heatsink.

LES015YJ-3N = LES015YJ with optional trim and enable, negative logic.

QBS066ZG-AT8 = QBS066ZG-A with Lucent compatible trim and 0.110" pin length.

NUCLEAR AND MEDICAL APPLICATIONS Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.

TECHNICAL REVISIONS The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.