



FEATURES

- 20 WATTS MAXIMUM OUTPUT POWER
- OUTPUT CURRENT UP TO 6A
- STANDARD 2.0 X 1.0 X 0.4 INCH PACKAGE
- HIGH EFFICIENCY UP TO 89%
- 2:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

Negative logic Remote On/Off

DESCRIPTION

The FED20 series offer 20 watts of output power from a 2 x 1 x 0.4 inch package. The FED20 series with 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC and features 1600VDC of isolation, short-circuit and over-voltage protection.

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

OUTPUT SPECIFICATIONS		INPUT SPECIFICATIONS	
Output power	20 Watts, max.	Input voltage range	12V nominal input 9 – 18VDC 24V nominal input 18 – 36VDC 48V nominal input 36 – 75VDC
Voltage accuracy	Full load and nominal Vin ± 1%	Input filter	L-C type
Minimum load	0%	Input surge voltage	12V input 36VDC 24V input 50VDC 100mS max 100VDC
Voltage adjustability	Single output ± 10%	Input reflected ripple current	Nominal Vin and full load 20mA-p-p
Line regulation	LL to HL at Full Load ± 0.2%	Start up time	Nominal Vin and Power up 10mS, typ. constant resistive load Remote ON/OFF 10mS, typ.
Load regulation	No Load to Full Load ± 0.5%	Remote ON/OFF (Note 6)	
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL ± 5%	(Positive logic)(Standard)	DC-DC ON Open or 3V < Vr < 12V DC-DC OFF Short or 0V < Vr < 1.2V
Ripple and noise	20MHz bandwidth (Measured with a 0.1µF/50V MLCC) See table	(Negative logic)(Option)	DC-DC ON Short or 0V < Vr < 1.2V DC-DC OFF Open or 3V < Vr < 12V
Temperature coefficient	±0.02% / °C, max.	Input current of remote control pin	Nominal Vin -0.5mA ~ +0.5mA
Transient response recovery time	25% load step change 250µS	Remote off state input current	Nominal Vin 2.5mA
Over voltage protection	1.5V output 3.9VDC 1.8V output 3.9VDC 2.5V output 3.9VDC 3.3V output 3.9VDC 5V output 6.2VDC 12V output 15VDC 15V output 18VDC	ENVIRONMENTAL SPECIFICATIONS	
Zener diode clamp		Operating ambient temperature	-40°C ~ +85°C (with derating)
Over load protection	% of FL at nominal input 150%, max.	Maximum case temperature	100°C
Short circuit protection	Hiccup, automatics recovery	Storage temperature range	-55°C ~ +105°C
GENERAL SPECIFICATIONS		Thermal impedance (Note 7)	Nature convection 12°C/Watt Nature convection with heat-sink 10°C/Watt
Efficiency	See table	Thermal shock	MIL-STD-810F
Isolation voltage	Input to Output 1600VDC, min. Input(Output) to case 1600VDC, min.	Vibration	MIL-STD-810F
Isolation resistance	10 ⁹ ohms, min.	Relative humidity	5% to 95% RH
Isolation capacitance	1000pF, max.	EMC CHARACTERISTICS	
Switching frequency	500KHz, typ.	EMI (Note 8)	EN55022 Class A
Approvals and standard	IEC60950-1, UL60950-1, EN60950-1	ESD	EN61000-4-2 Air ± 8KV Contact ± 6KV Perf. Criteria B
Case material	Nickel-coated copper	Radiated immunity	EN61000-4-3 10 V/m Perf. Criteria A
Base material	Non-conductive black plastic	Fast transient (Note 9)	EN61000-4-4 ± 2KV Perf. Criteria A
Potting material	Epoxy (UL94-V0)	Surge (Note 9)	EN61000-4-5 ± 1KV Perf. Criteria B
Dimensions	2.00 X 1.00 X 0.40 Inch (50.8 X 25.4 X 10.2 mm)	Conducted immunity	EN61000-4-6 10 Vr.m.s Perf. Criteria A
Weight	27g (0.95oz)		
MTBF (Note 1)	BELLCORE TR-NWT-000332 1.791 x 10 ⁶ hrs MIL-HDBK-217F 6.842 x 10 ⁵ hrs		

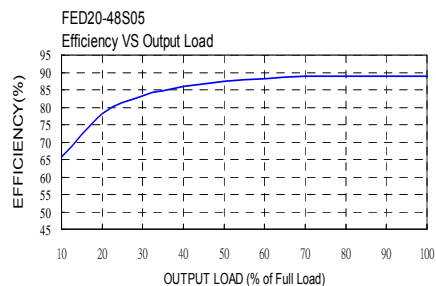
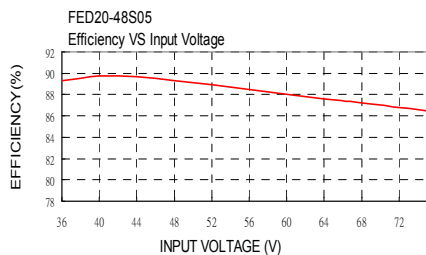
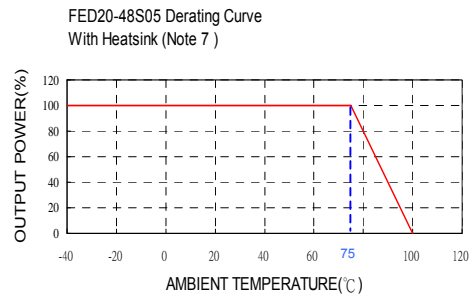
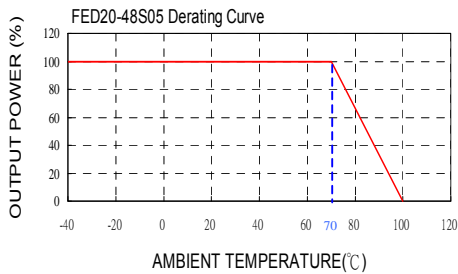


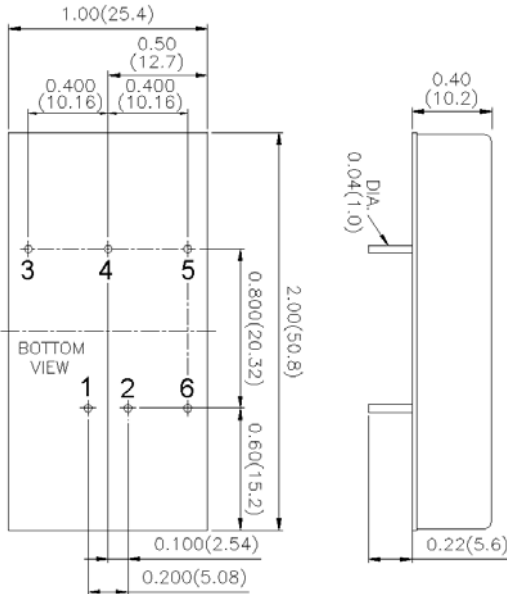


Model Number	Input Range	Output Voltage	Output Current		Output (4) Ripple & Noise	Input Current		Eff (4) (%)	Capacitor (5) Load max
			Min. load	Full load		No load (3)	Full load (2)		
FED20-12S1P5	9 – 18 VDC	1.5 VDC	0mA	6000mA	60mVp-p	70mA	1014mA	78	65000µF
FED20-12S1P8	9 – 18 VDC	1.8 VDC	0mA	6000mA	60mVp-p	75mA	1200mA	79	65000µF
FED20-12S2P5	9 – 18 VDC	2.5 VDC	0mA	6000mA	60mVp-p	80mA	1582mA	83	33000µF
FED20-12S3P3	9 – 18 VDC	3.3 VDC	0mA	5000mA	60mVp-p	115mA	1698mA	85	13000µF
FED20-12S05	9 – 18 VDC	5 VDC	0mA	4000mA	75mVp-p	75mA	2008mA	87	6800µF
FED20-12S12	9 – 18 VDC	12 VDC	0mA	1670mA	75mVp-p	90mA	2037mA	86	2200µF
FED20-12S15	9 – 18 VDC	15 VDC	0mA	1330mA	75mVp-p	35mA	2027mA	86	755µF
FED20-12D12	9 – 18 VDC	±12VDC	0mA	±833mA	100mVp-p	45mA	2032mA	86	±680µF
FED20-12D15	9 – 18 VDC	±15VDC	0mA	±667mA	100mVp-p	50mA	2034mA	86	±450µF
FED20-24S1P5	18 – 36 VDC	1.5 VDC	0mA	6000mA	60mVp-p	35mA	493mA	80	65000µF
FED20-24S1P8	18 – 36 VDC	1.8 VDC	0mA	6000mA	60mVp-p	45mA	584mA	81	65000µF
FED20-24S2P5	18 – 36 VDC	2.5 VDC	0mA	6000mA	60mVp-p	40mA	781mA	84	33000µF
FED20-24S3P3	18 – 36 VDC	3.3 VDC	0mA	5000mA	60mVp-p	30mA	838mA	86	13000µF
FED20-24S05	18 – 36 VDC	5 VDC	0mA	4000mA	75mVp-p	35mA	980mA	89	6800µF
FED20-24S12	18 – 36 VDC	12 VDC	0mA	1670mA	75mVp-p	55mA	1006mA	87	2200µF
FED20-24S15	18 – 36 VDC	15 VDC	0mA	1330mA	75mVp-p	40mA	1002mA	87	755µF
FED20-24D12	18 – 36 VDC	±12VDC	0mA	±833mA	100mVp-p	30mA	1004mA	87	±680µF
FED20-24D15	18 – 36 VDC	±15VDC	0mA	±667mA	100mVp-p	30mA	993mA	88	±450µF
FED20-48S1P5	36 – 75 VDC	1.5 VDC	0mA	6000mA	60mVp-p	15mA	247mA	80	65000µF
FED20-48S1P8	36 – 75 VDC	1.8 VDC	0mA	6000mA	60mVp-p	20mA	288mA	82	65000µF
FED20-48S2P5	36 – 75 VDC	2.5 VDC	0mA	6000mA	60mVp-p	30mA	391mA	84	33000µF
FED20-48S3P3	36 – 75 VDC	3.3 VDC	0mA	5000mA	60mVp-p	15mA	414mA	87	13000µF
FED20-48S05	36 – 75 VDC	5 VDC	0mA	4000mA	75mVp-p	20mA	490mA	89	6800µF
FED20-48S12	36 – 75 VDC	12 VDC	0mA	1670mA	75mVp-p	35mA	497mA	88	2200µF
FED20-48S15	36 – 75 VDC	15 VDC	0mA	1330mA	75mVp-p	50mA	501mA	87	755µF
FED20-48D12	36 – 75 VDC	±12VDC	0mA	±833mA	100mVp-p	20mA	496mA	88	±680µF
FED20-48D15	36 – 75 VDC	±15VDC	0mA	±667mA	100mVp-p	20mA	496mA	88	±450µF

Note

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment).
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The ON/OFF control pin voltage is referenced to -Vin.
To order negative logic ON-OFF control add the suffix-N (Ex: FED20-24S05-N).
- Heat sink is optional and P/N: 7G-0020C-F.
- The FED20 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
Recommend: 12Vin : 4.7µF/50V 1812 MLCC .
24Vin : 2.2µF/50V 1812 MLCC .
48Vin : 2.2µF/100V 1812 MLCC.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220 µF/100V, ESR 48mΩ.



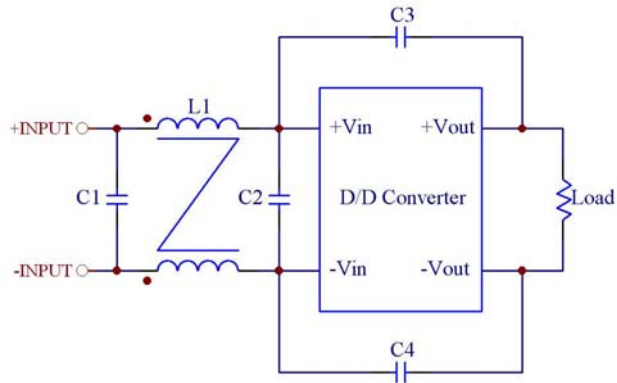
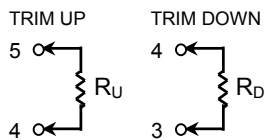


- All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	+ OUTPUT	+ OUTPUT
4	TRIM	COMMON
5	- OUTPUT	- OUTPUT
6	CTRL	CTRL

EXTERNAL OUTPUT TRIMMING

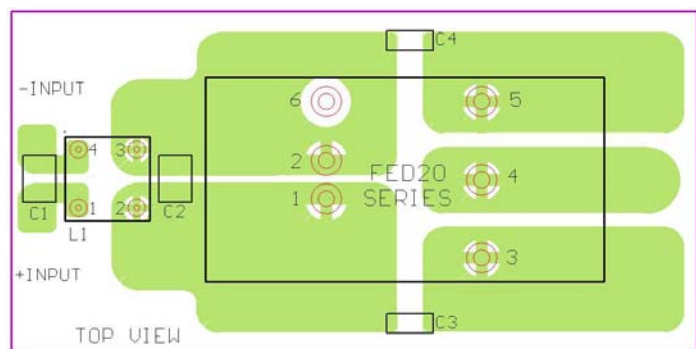
Output can be externally trimmed by using the method shown below.



Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
FED20-12xxx	3.3µF/50V 1812 MLCC	3.3µF/50V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	450µH Common Choke PMT-048
FED20-24xxx	4.7µF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	450µH Common Choke PMT-048
FED20-48xxx	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325µH Common Choke PMT-050



Recommended EN55022 Class B Filter Circuit Layout