POWER MATE TECHNOLOGY CO.,LTD.

FED20-SERIES

VER:12 1 / 3

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 25ºC unless otherwise noted

OUTPUT SPECIFICATIONS		
Output power		20 Watts, max.
Voltage accuracy	Full load and nominal Vin	± 1%
Minimum load		0%
Voltage adjustability	Single output	± 10%
Line regulation	LL to HL at Full Load	± 0.2%
Load regulation	No Load to Full Load	± 0.5%
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL	± 5%
Ripple and noise	20MHz bandwidth (Measured with a 0.1µF/50V MLCC)	See table
Temperature coefficient		±0.02% / ºC, max.
Transient response recovery time	25% load step change	250µS
Over voltage protection Zener diode clamp	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
Over load protection	% of FL at nominal input	150%, max.
Short circuit protection		Hiccup, automatics recovery

GENERAL SPECIFICATIONS		
Efficiency		See table
Isolation voltage	Input to Output	1600VDC, min.
	Input(Output) to case	1600VDC, min.
Isolation resistance		10^9 ohms, min.
Isolation capacitance		1000pF, max.
Switching frequency		500KHz, typ.
Approvals and standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		Non-conductive black plastic
Potting material		Epoxy (UL94-V0)
Dimensions		2.00 X 1.00 X 0.40 Inch (50.8 X 25.4 X 10.2 mm)
Weight		27g (0.95oz)
MTBF (Note 1)	BELLCORE TR-NWT-000332	1.791×10^6 hrs
	MIL-HDBK-217F	6.842×10^5 hrs

INPUT SPECIFICATIONS			
Input voltage range	12V nominal input		9 – 18VDC
	24V nominal input		18 – 36VDC
	48V nominal input		36 – 75VDC
Input filter			L-C type
Input surge voltage 100mS max	12V input		36VDC
	24V input		50VDC
	48V input		100VDC
Input reflected ripple current	Nominal Vin and full load		20mAp-p
Start up time	Nominal Vin and constant resistive load	Power up	10mS, typ.
		Remote ON/OFF	10mS, typ.
Remote ON/OFF (Note 6) (Positive logic)(Standard)	DC-DC ON		Open or 3V < Vr < 12V
	DC-DC OFF		Short or 0V < Vr < 1.2V
(Negative logic)(Option)	DC-DC ON		Short or 0V < Vr < 1.2V
	DC-DC OFF		Open or 3V < Vr < 12V
Input current of remote control pin	Nominal Vin		-0.5mA ~ +0.5mA
Remote off state input current	Nominal Vin		2.5mA

ENVIRONMENTAL SPECIFICATIONS		
Operating ambient temperature		-40ºC ~ +85ºC (with derating)
Maximum case temperature		100ºC
Storage temperature range		-55ºC ~ +105ºC
Thermal impedance (Note 7)	Nature convection	12ºC/Watt
	Nature convection with heat-sink	10ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS				
EMI (Note 8)	EN55022			Class A
ESD	EN61000-4-2	Air	± 8KV	Perf. Criteria B
		Contact	± 6KV	
Radiated immunity	EN61000-4-3		10 V/m	Perf. Criteria A
Fast transient (Note 9)	EN61000-4-4		± 2KV	Perf. Criteria A
Surge (Note 9)	EN61000-4-5		± 1KV	Perf. Criteria B
Conducted immunity	EN61000-4-6		10 Vr.m.s	Perf. Criteria A

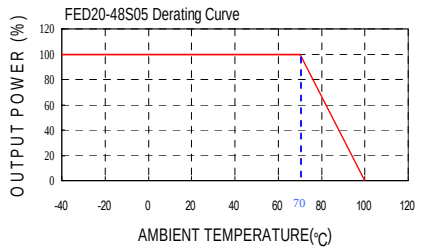
POWER MATE TECHNOLOGY CO.,LTD.

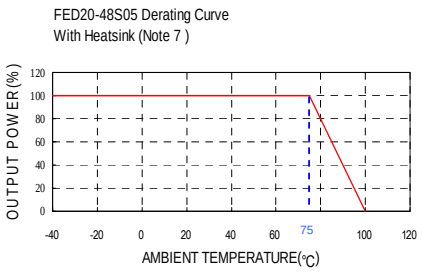
20 WATTS DC-DC CONVERTER

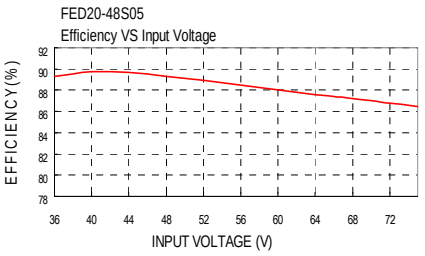
Model Number	Input Range	Output Voltage	Output Current		Output (4) Ripple & Noise	Input Current		Eff (4) (%)	Capacitor (5) Load max
			Min. load	Full load		No load (3)	Full load (2)		
FED20-12S1P5	9 – 18 VDC	1.5 VDC	0mA	6000mA	60mVp-p	70mA	1014mA	78	65000µF
FED20-12S1P8	9 – 18 VDC	1.8 VDC	0mA	6000mA	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

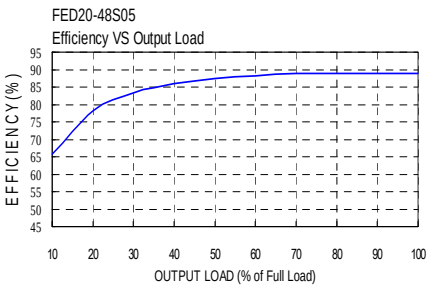
Note

1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. 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).
7. Heat sink is optional and P/N: 7G-0020C-F.
8. 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.
9. 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, 220µF/100V, ESR 48mΩ.



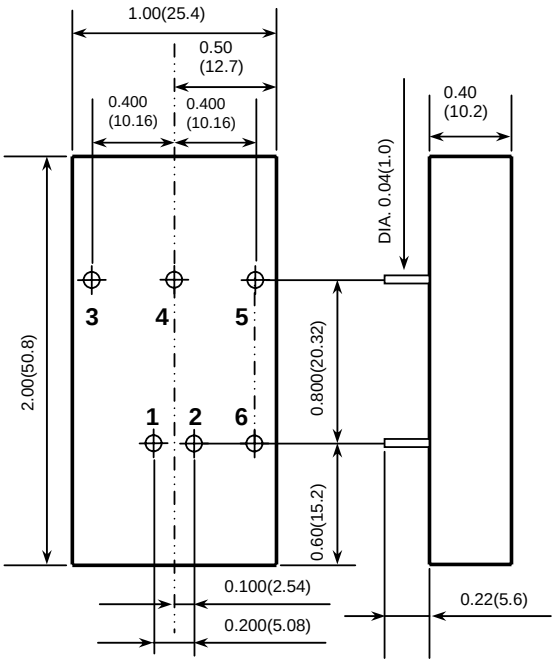






POWER MATE TECHNOLOGY CO.,LTD.

20 WATTS DC-DC CONVERTER

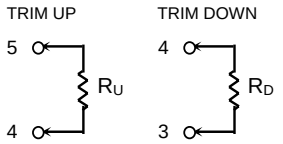


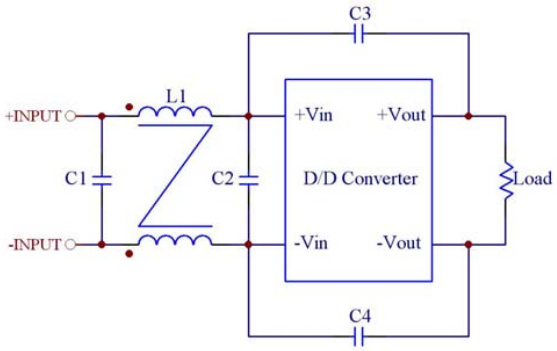
1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

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.

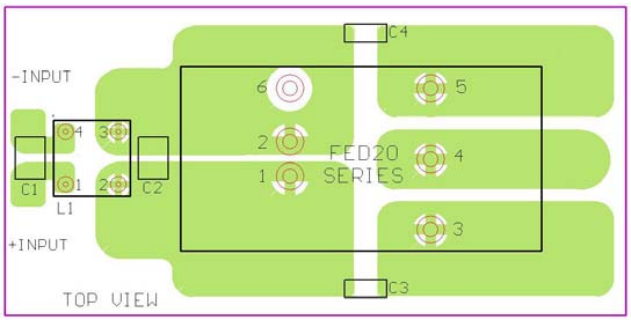




Recommended Filter for EN55022 Class B Compliance

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

PEWATRON
a member of the Angst + Pfister Group

We are here for you. Addresses and Contacts

Sales Switzerland

Postcode 3000 – 9999
Liechtenstein

Matthias Rüegg
Ruhbergstrasse 32
CH-9230 Flawil

Phone + 41 44 877 35 18
Mobile + 41 76 491 66 66
Fax + 41 44 877 35 19

matthias.rueegg@pewatron.com

Postcode 1000 – 2999

Raffael Favaretto
Route d'Oron 124
CH-1673 Promasens

Phone + 41 44 877 35 22
Mobile + 41 76 444 63 14
Fax + 41 44 877 35 23

raffael.favaretto@pewatron.com

Sales Germany

Postcode 60000 – 79999

Dieter Hirthe
Mühlweg 23
D-71554 Weissach i.T.

Phone + 49 719 149 60 58
Mobile + 49 163 762 74 30
Fax + 49 719 193 31 88

dieter.hirthe@pewatron.com

Postcode 10000 – 59999
Postcode 80000 – 99999

Kurt Stritzelberger
Neumarkter Str. 86a
D-81673 Munich

Phone + 49 89 260 38 47
Mobile + 49 171 803 41 35
Fax + 49 89 43 10 91 91

kurt.stritzelberger@pewatron.com

Key Accounts
Aerospace and Defence

Claus Wübbena
Vogelkamp 26
D-26655 Westerstede

Phone + 49 4488 5204 614
Mobile + 49 173 9700 691
Fax + 49 4488 5204 616

claus.wuebbena@pewatron.com

Sales Austria

Kurt Stritzelberger
Neumarkter Str. 86a
D-81673 Munich

Phone + 49 89 260 38 47
Mobile + 49 17 18 03 41 35
Fax + 49 89 43 10 91 91

kurt.stritzelberger@pewatron.com

Sales Other Countries / Product Management

Sensors

Physical Sensors
Data Acquisition

Peter Felder
Phone + 41 44 877 35 05
peter.felder@pewatron.com

Geometrical Sensors

Eric Letsch
Phone + 41 44 877 35 14
eric.letsch@pewatron.com

Power Supplies

DC-DC Converters
Switching Power Supplies
DC-AC Inverters

Sebastiano Leggio
Phone + 41 44 877 35 06
sebastiano.leggio@pewatron.com

E-Components

Current Sensors
Man Machine Interface
Measurement Probes

Sebastiano Leggio
Phone + 41 44 877 35 06
sebastiano.leggio@pewatron.com

PEWATRON AG
Thurgauerstrasse 66
CH-8052 Zurich

Phone + 41 44 877 35 00
Fax + 41 44 877 35 25

www.pewatron.com
info@pewatron.com