POWER MATE TECHNOLOGY CO., LTD.

FED20 SERIES

20 WATTS DC-DC CONVERTER

FEATURES

- **20 WATTS MAXIMUM OUTPUT POWER**
- **OUTPUT CURRENT UP TO 6A**
- **STANDARD 2.00 X 1.00 X 0.40 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, 2011/95/EC AND 2004/108/EC**
- **SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1**
- **ISO9001 CERTIFIED MANUFACTURING FACILITIES**
- **COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU**

OPTIONS

Negative logic Remote On/Off

APPLICATIONS

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

DESCRIPTION

The FED20 series offer 20 watts of output power from a 2.00 x 1.00 x 0.40 inch package. The FED20 series with 2:1 wide input voltage of 9~18VDC, 18~36VDC 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 otherwise noted

OUTPUT SPECIFICATIONS

Output power		20 Watts, max.
Voltage accuracy		± 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	1.5VDC output	3.9VDC
	1.8VDC output	3.9VDC
	2.5VDC output	3.9VDC
	3.3VDC output	3.9VDC
	5VDC output	6.2VDC
	12VDC output	15VDC
	15VDC output	18VDC
Over load protection	% of FL at nominal input	150%, max.
Short circuit protection		Continuous, automatics recovery

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output	1600VDC, min. 1minute
	Input(Output) to case	1600VDC, min. 1minute
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		1000pF, max.
Switching frequency		500kHz±10%
Design meet safety 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)	MIL-HDBK-217F	1.583 x 10^6 hrs

INPUT SPECIFICATIONS

Input voltage range	12VDC nominal input	9 ~ 18VDC
	24VDC nominal input	18 ~ 36VDC
	48VDC nominal input	36 ~ 75VDC
Input filter		L-C type
Input surge voltage	12VDC input	36VDC 100ms, max.
	24VDC input	50VDC 100ms, max.
	48VDC input	100VDC 100ms, max.
Input reflected ripple current		20mAp-p
Start up time	Nominal input and constant resistive load	Power up 10ms, Remote ON/OFF 10ms
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 input	-0.5mA ~ +0.5mA
Remote off state input current	Nominal input	2.5mA

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature		-40ºC ~ +85ºC (with derating)
Maximum case temperature		100ºC
Storage temperature range		-55ºC ~ +125ºC
Thermal impedance (Note 7)	Natural convection	12ºC/Watt
	Natural 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, Class B
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

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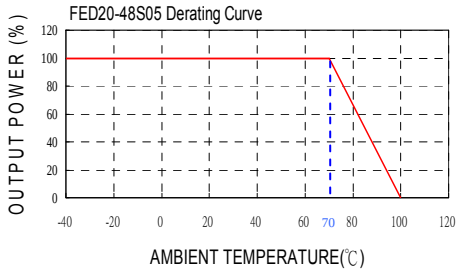
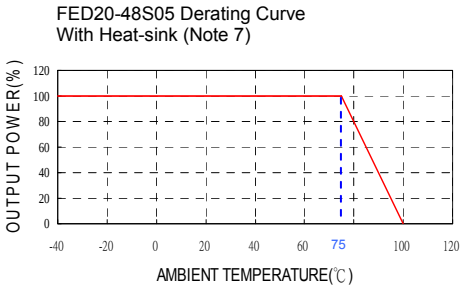
Model Number	Input Range	Output Voltage	Output Current		Output [2] Ripple & Noise	No load [3] Input Current	Eff [4] (%)	Capacitor [5] Load max
			Min. load	Full load				
FED20-12S1P5	9 ~ 18 VDC	1.5 VDC	0mA	6000mA	60mVp-p	70mA	78	65000μF
FED20-12S1P8	9 ~ 18 VDC	1.8 VDC	0mA	6000mA	60mVp-p	75mA	79	65000μF
FED20-12S2P5	9 ~ 18 VDC	2.5 VDC	0mA	6000mA	60mVp-p	80mA	83	33000μF
FED20-12S3P3	9 ~ 18 VDC	3.3 VDC	0mA	5000mA	60mVp-p	115mA	85	13000μF
FED20-12S05	9 ~ 18 VDC	5 VDC	0mA	4000mA	75mVp-p	75mA	87	6800μF
FED20-12S12	9 ~ 18 VDC	12 VDC	0mA	1670mA	75mVp-p	90mA	86	2200μF
FED20-12S15	9 ~ 18 VDC	15 VDC	0mA	1330mA	75mVp-p	35mA	86	755μF
FED20-12D12	9 ~ 18 VDC	±12VDC	0mA	±833mA	100mVp-p	45mA	86	±680μF
FED20-12D15	9 ~ 18 VDC	±15VDC	0mA	±667mA	100mVp-p	50mA	86	±450μF
FED20-24S1P5	18 ~ 36 VDC	1.5 VDC	0mA	6000mA	60mVp-p	35mA	80	65000μF
FED20-24S1P8	18 ~ 36 VDC	1.8 VDC	0mA	6000mA	60mVp-p	45mA	81	65000μF
FED20-24S2P5	18 ~ 36 VDC	2.5 VDC	0mA	6000mA	60mVp-p	40mA	84	33000μF
FED20-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	5000mA	60mVp-p	30mA	86	13000μF
FED20-24S05	18 ~ 36 VDC	5 VDC	0mA	4000mA	75mVp-p	35mA	89	6800μF
FED20-24S12	18 ~ 36 VDC	12 VDC	0mA	1670mA	75mVp-p	55mA	87	2200μF
FED20-24S15	18 ~ 36 VDC	15 VDC	0mA	1330mA	75mVp-p	40mA	87	755μF
FED20-24D12	18 ~ 36 VDC	±12VDC	0mA	±833mA	100mVp-p	30mA	87	±680μF
FED20-24D15	18 ~ 36 VDC	±15VDC	0mA	±667mA	100mVp-p	30mA	88	±450μF
FED20-48S1P5	36 ~ 75 VDC	1.5 VDC	0mA	6000mA	60mVp-p	15mA	80	65000μF
FED20-48S1P8	36 ~ 75 VDC	1.8 VDC	0mA	6000mA	60mVp-p	20mA	82	65000μF
FED20-48S2P5	36 ~ 75 VDC	2.5 VDC	0mA	6000mA	60mVp-p	30mA	84	33000μF
FED20-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	5000mA	60mVp-p	15mA	87	13000μF
FED20-48S05	36 ~ 75 VDC	5 VDC	0mA	4000mA	75mVp-p	20mA	89	6800μF
FED20-48S12	36 ~ 75 VDC	12 VDC	0mA	1670mA	75mVp-p	35mA	88	2200μF
FED20-48S15	36 ~ 75 VDC	15 VDC	0mA	1330mA	75mVp-p	50mA	87	755μF
FED20-48D12	36 ~ 75 VDC	±12VDC	0mA	±833mA	100mVp-p	20mA	88	±680μF
FED20-48D15	36 ~ 75 VDC	±15VDC	0mA	±667mA	100mVp-p	20mA	88	±450μF

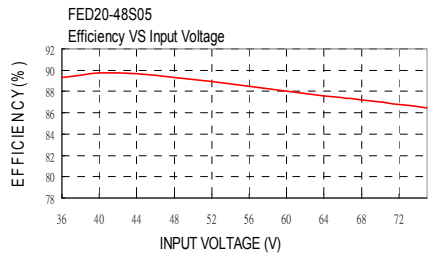
Note

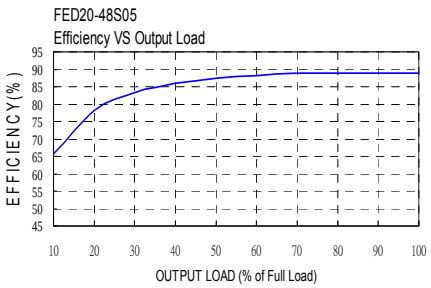
1. MIL-HDBK-217F @Ta=25 ºC, Full load.
2. Typical value at nominal input and full load. (20MHZ BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The CTRL pin voltage is referenced to -INPUT.
   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 standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.
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.

CAUTION: This power module is not internally fused. An input line fuse must always be used.









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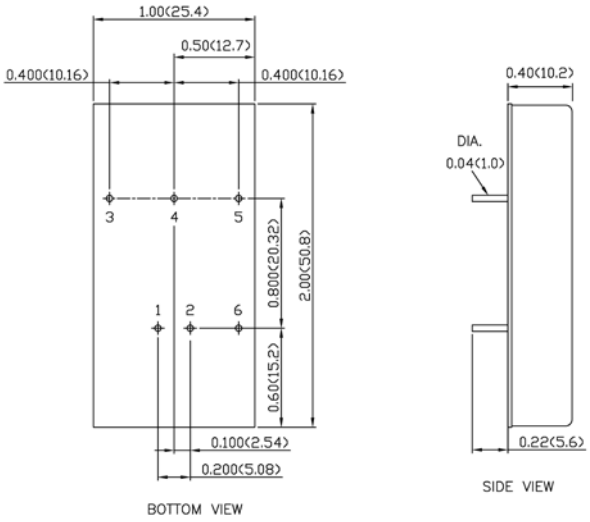
MECHANICAL DRAWING：



1. All dimensions in Inch (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.