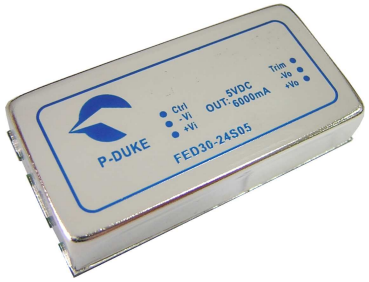
POWER MATE TECHNOLOGY CO.,LTD.

P-DUKE

FED30-SERIES



FEATURES

- 30 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 8.5A
- STANDARD 2.00 X 1.00 X 0.40 INCH
- HIGH EFFICIENCY UP TO 91%
- 2:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 89/336 EEC
- DESIGN MEETS UL60950-1, EN60950-1 AND IEC60950-1
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

OPTIONS

Negative logic Remote On/Off

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement
Semiconductor Equipment

DESCRIPTION

The FED30 series offer 30 watts of output power from a 2 x 1 x 0.4 inch package. FED30 series have 2:1 wide input voltage of 9-18 and 18-36 and 36-75VDC. The FED30 series have features 1600VDC of isolation, short circuit protection, over-current protection, over-voltage protection, over-temperature protection and six sided shielding.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS			
Output power			30 Watts max.
Voltage accuracy	Full load and nominal Vin		±1%
Voltage adjustability	Single output		± 10%
Minimum load			0%
Line regulation	LL to HL at Full Load		± 0.2%
Load regulation	No load to Full load	Single Dual	± 0.5% ± 1%
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL		± 5%
Ripple and noise	20MHz bandwidth (Measured with a 1uF/50V MLCC)	1.5-5.1Vo 12-15Vo	100mVp-p 150mVp-p
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time		25% load step change	250µS
Over voltage protection Zener diode clamp	1.5V 2.5V 3.3V 5.0V & 5.1V & ±5V 12V & ±12V 15V & ±15V	Output Output Output Output Output Output	2.0V 3.3V 3.9V 6.2V 15V 18V
Over load protection	% of FL at nominal input		150%, typ.
Short circuit protection			Hiccup, automatics recovery

GENERAL SPECIFICATIONS		
Efficiency		See table
Isolation voltage	Input to Output Input (Output) to Case	1600VDC, min. 1600VDC, min.
Case grounding		Connect case to -Vin with decoupling Y Cap
Isolation resistance		10^9ohms, min.
Isolation capacitance		1500pF, max.
Switching frequency		430KHz, typ.
Design meets safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		FR4 PCB
Potting material		Epoxy (UL94-V0)
Dimensions		2.00 X 1.00 X 0.40 Inch (50.8X 25.4 X 10.2 mm)
Weight		30.5g(1.07oz)
MTBF (Note 1)	BELLCORE-TR-NWT-000332 MIL-HDBK-217F	3.173×10^6 hrs. 5.548×10^5 hrs.

INPUT SPECIFICATIONS			
Input voltage range	12V nominal input 24V nominal input 48V nominal input		9 – 18VDC 18 – 36VDC 36 – 75VDC
Input filter			Pi type
Input surge voltage 100mS max	12V input 24V input 48V input		25VDC 50VDC 100VDC
Input reflected ripple current	Nominal Vin and full load		20mAp-p
Start up time	Nominal Vin and constant resistive load	Power up Remote ON/OFF	30mS, typ. 30mS, typ.
Start-up voltage	12V input 24V input 48V input		9VDC 18VDC 36VDC
Shutdown voltage	12V input 24V input 48V input		8VDC 16VDC 32VDC
Remote ON/OFF (Note 6) (Positive logic)(Standard)	DC-DC ON DC-DC OFF		Open or 3V < Vr < 12V Short or 0V < Vr < 1.2V
(Negative logic)(Option)	DC-DC ON DC-DC OFF		Short or 0V < Vr < 1.2V Open or 3V < Vr < 12V
Input current of Remote control pin	Nominal Vin		-0.5mA ~ +0.5mA
Remote off state input current	Nominal Vin		3mA

ENVIRONMENTAL SPECIFICATIONS		
Operating ambient temperature		-40ºC to +50ºC (without derating) +50ºC to +85ºC (with derating)
Maximum case temperature		105ºC
Storage temperature range		-55ºC to +125ºC
Over temperature protection		115ºC, typ.
Thermal impedance (Note 7)	Nature convection Nature convection with heat-sink	12ºC/Watt 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 Contact ± 6KV	Perf. Criteria A
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 A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

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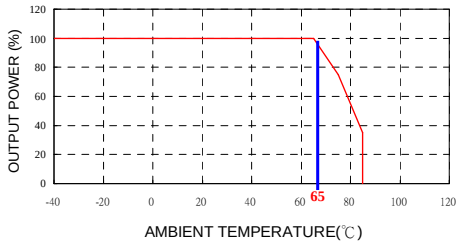
30 WATTS DC-DC CONVERTER

Model Number	Input Range	Output Voltage	Output Current		Output [4] Ripple & Noise	Input Current		Eff [4] (%)	Capacitor[5] Load max
			Min. Load	Max. Load		No load[3]	Full Load[2]		
FED30-12S1P5	9 – 18 VDC	1.5 VDC	0mA	8500mA	100mVp-p	70mA	1416mA	79	20000μF
FED30-12S2P5	9 – 18 VDC	2.5 VDC	0mA	8000mA	100mVp-p	100mA	2083mA	84	20000μF
FED30-12S3P3	9 – 18 VDC	3.3 VDC	0mA	8000mA	100mVp-p	90mA	2716mA	85	20000μF
FED30-12S05	9 – 18 VDC	5.0 VDC	0mA	6000mA	100mVp-p	130mA	3012mA	87	14400μF
FED30-12S5P1	9 – 18 VDC	5.1 VDC	0mA	6000mA	100mVp-p	130mA	3072mA	87	14400μF
FED30-12S12	9 – 18 VDC	12 VDC	0mA	2500mA	150mVp-p	90mA	2941mA	89	3000μF
FED30-12S15	9 – 18 VDC	15 VDC	0mA	2000mA	150mVp-p	80mA	2941mA	89	2000μF
FED30-12D05	9 – 18 VDC	±5VDC	0mA	±3000mA	100mVp-p	90mA	3012mA	87	± 3000μF
FED30-12D12	9 – 18 VDC	±12VDC	0mA	±1250mA	150mVp-p	50mA	3012mA	87	± 2000μF
FED30-12D15	9 – 18 VDC	±15VDC	0mA	±1000mA	150mVp-p	40mA	3012mA	87	± 1300μF
FED30-24S1P5	18 – 36 VDC	1.5 VDC	0mA	8500mA	100mVp-p	50mA	700mA	80	20000μF
FED30-24S2P5	18 – 36 VDC	2.5 VDC	0mA	8000mA	100mVp-p	50mA	1028mA	85	20000μF
FED30-24S3P3	18 – 36 VDC	3.3 VDC	0mA	8000mA	100mVp-p	50mA	1325mA	87	20000μF
FED30-24S05	18 – 36 VDC	5.0 VDC	0mA	6000mA	100mVp-p	75mA	1453mA	90	14400μF
FED30-24S5P1	18 – 36 VDC	5.1 VDC	0mA	6000mA	100mVp-p	75mA	1482mA	90	14400μF
FED30-24S12	18 – 36 VDC	12 VDC	0mA	2500mA	150mVp-p	40mA	1437mA	91	3000μF
FED30-24S15	18 – 36 VDC	15 VDC	0mA	2000mA	150mVp-p	30mA	1437mA	91	2000μF
FED30-24D05	18 – 36 VDC	±5VDC	0mA	±3000mA	100mVp-p	70mA	1453mA	90	± 3000μF
FED30-24D12	18 – 36 VDC	±12VDC	0mA	±1250mA	150mVp-p	30mA	1471mA	89	± 2000μF
FED30-24D15	18 – 36 VDC	±15VDC	0mA	±1000mA	150mVp-p	30mA	1453mA	90	± 1300μF
FED30-48S1P5	36 – 75 VDC	1.5 VDC	0mA	8500mA	100mVp-p	45mA	350mA	80	20000μF
FED30-48S2P5	36 – 75 VDC	2.5 VDC	0mA	8000mA	100mVp-p	45mA	514mA	85	20000μF
FED30-48S3P3	36 – 75 VDC	3.3 VDC	0mA	8000mA	100mVp-p	30mA	663mA	87	20000μF
FED30-48S05	36 – 75 VDC	5.0 VDC	0mA	6000mA	100mVp-p	45mA	727mA	90	14400μF
FED30-48S5P1	36 – 75 VDC	5.1 VDC	0mA	6000mA	100mVp-p	45mA	750mA	89	14400μF
FED30-48S12	36 – 75 VDC	12 VDC	0mA	2500mA	150mVp-p	40mA	718mA	91	3000μF
FED30-48S15	36 – 75 VDC	15 VDC	0mA	2000mA	150mVp-p	40mA	718mA	91	2000μF
FED30-48D05	36 – 75 VDC	±5VDC	0mA	±3000mA	100mVp-p	35mA	727mA	90	± 3000μF
FED30-48D12	36 – 75 VDC	±12VDC	0mA	±1250mA	150mVp-p	30mA	744mA	88	± 2000μF
FED30-48D15	36 – 75 VDC	±15VDC	0mA	±1000mA	150mVp-p	20mA	735mA	89	± 1300μF

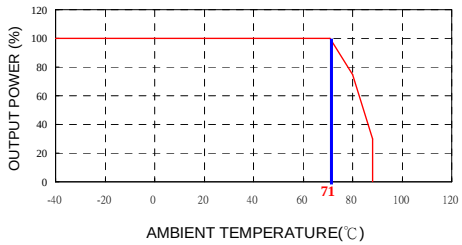
Note

1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40ºC. (Ground fixed and controlled environment)
   MIL-STD-217F Notice2 @Ta=25 ºC, Full load (Ground, Benign, controlled environment)
2. Maximum value at nominal input voltage.
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 -Input.
7. Heat sink is optional and P/N: 7G-0020A-F.
8. The FED30 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
   Recommend: 12Vin : 10μF/25V X7R 1812 MLCC; 24Vin : 4.7μF/50V X7R 1812 MLCC; 48Vin : 2.2μF/100V X7R 1812 MLCC .
9. An external filter capacitor is required if the module has to meet EN61000-4-4,EN61000-4-5.
   The filter capacitor we suggest: 12Vin & 24Vin : Nippon chemi-con KY series, 330μF/50V, ESR 55mΩ.
   48Vin : Nippon chemi-con KY series, 220μF/100V, ESR 48mΩ

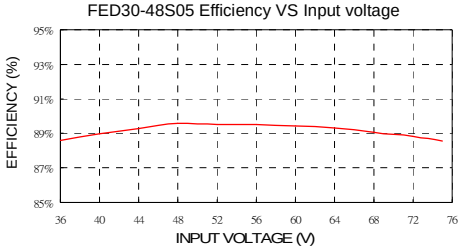
FED30-48S05 Derating Curve



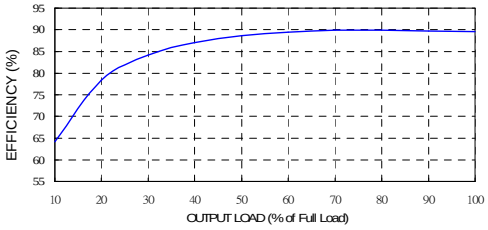
FED30-48S05 Derating Curve with Heat-Sink



FED30-48S05 Efficiency VS Input voltage



FED30-48S05 Efficiency VS Output Load



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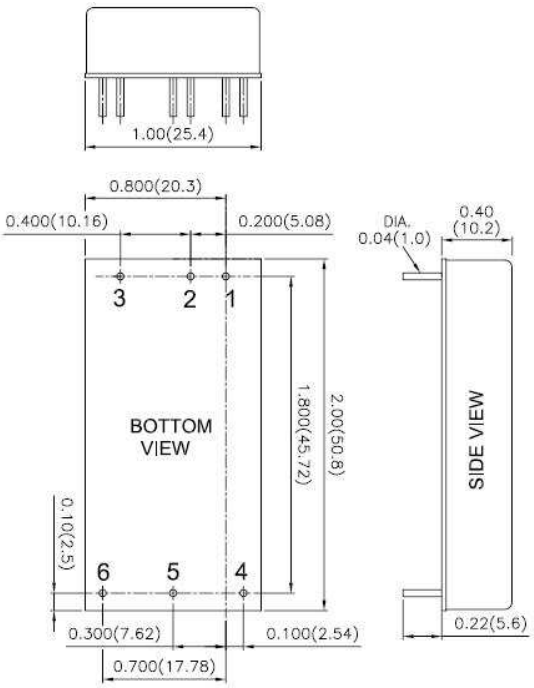
P-DUKE

30 WATTS DC-DC CONVERTER

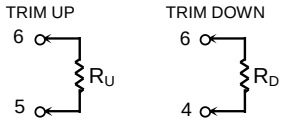


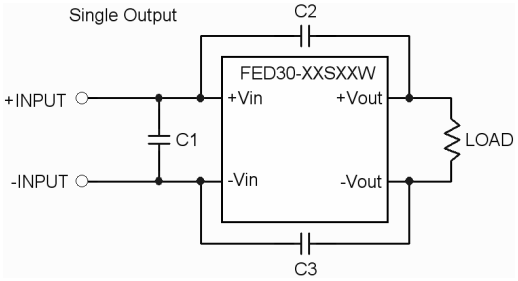
1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

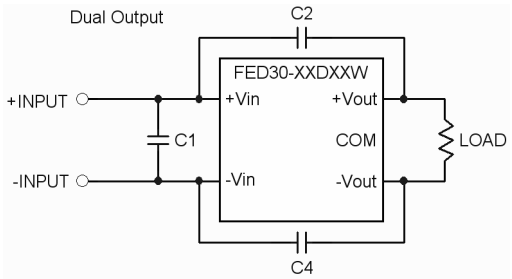
PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	CTRL	CTRL
4	+ OUTPUT	+ OUTPUT
5	- OUTPUT	COMMON
6	TRIM	- OUTPUT

EXTERNAL OUTPUT TRIMMING

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





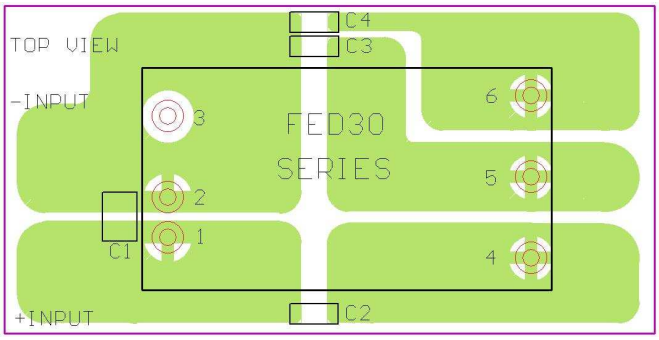


Recommended Filter for EN55022 Class A Compliance

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

Single Output	C1	C2 & C3
FED30-12S XX	10μF/25V 1812 MLCC	1000pF/2KV 1808 MLCC
FED30-24S XX	6.8μF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
FED30-48S XX	2.2μF/100V 1812 MLCC	1000pF/2KV 1808 MLCC

Dual Output	C1	C2 & C4
FED30-12D XX	10μF/25V 1812 MLCC	1000pF/2KV 1808 MLCC
FED30-24D XX	6.8μF/50V 1812 MLCC	1000pF/2KV 1808 MLCC
FED30-48D XX	2.2μF/100V 1812 MLCC	1000pF/2KV 1808 MLCC



Recommended EN55022 Class A Filter Circuit Layout

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