POWER MATE TECHNOLOGY CO.,LTD.

P-DUKE

FEC40W SERIES

FEATURES

- 40 WATTS MAXIMUM OUTPUT POWER
- OUTPUT CURRENT UP TO 10A
- STANDARD 2" X 2" X 0.4" PACKAGE
- HIGH EFFICIENCY UP TO 88%
- 4:1 ULTRA 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 Remove On/Off

DESCRIPTION

The FEC40W series offer 40 watts of output power from a 2.00 x 2.00 x 0.4 inch package. The FEC40W series with 4:1 ultra wide input voltage of 9-36VDC and 18-75VDC 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			40 Watts, max.
Voltage accuracy	FL and nominal Vin	Single / Dual	± 1%
Minimum load (Note 6)			See Table
Voltage adjustability (Note 7)	Single and Dual output		± 10%
Line regulation	LL to HL at Full Load	Single/Dual	± 0.2%
Load regulation (Note 8)	Min. Load to Full Load	Single Dual	± 0.5% ± 1%
Load cross regulation (Note 9)		Dual	± 5%
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µS
Over voltage protection Zener diode clamp	3.3V output 5V output 12V output 15V output ±12V output ±15V output		3.9VDC 6.2VDC 15VDC 18VDC ±15VDC ±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 Input(Output) to Case	1600VDC, min. 1600VDC, min.
Case grounding		Connect case to –Vin with decoupling Y Cap
Isolation resistance		10^9 ohms, min.
Isolation capacitance		2500pF, max.
Switching frequency		300KHz, typ.
Approvals and 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 2.00 X 0.40 Inch (50.8 X 50.8 X 10.2 mm)
Weight		60g (2.11oz)
MTBF (Note 1)	BELLCORE TR-NWT-000332 MIL-HDBK-217F	1.105×10^6 hrs 1.511×10^5 hrs

INPUT SPECIFICATIONS			
Input voltage range	24V nominal input 48V nominal input		9 – 36VDC 18 – 75VDC
Input filter			Pi type
Input surge voltage 100mS max	24V input 48V input		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	20mS, max. 20mS, max.
Start-up voltage	24V input 48V input		9VDC 18VDC
Shutdown voltage	24V input 48V input		8VDC 16VDC
Remote ON/OFF (Note 10) 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	24 Vin 48 Vin		10mA 5mA

ENVIRONMENTAL SPECIFICATIONS		
Operating ambient temperature		-40ºC ~ +50ºC (without derating) +50ºC ~ +105ºC (with derating)
Maximum case temperature		+105ºC
Storage temperature range		-55ºC ~ +125ºC
Over temperature protection		110ºC, typ.
Thermal impedance (Note 11)	Without Heat-sink With Heat-sink	9.2ºC/Watt 7.6ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS			
EMI (Note 12)	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 13)	EN61000-4-4	± 2KV	Perf. Criteria B
Surge (Note 13)	EN61000-4-5	± 1KV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

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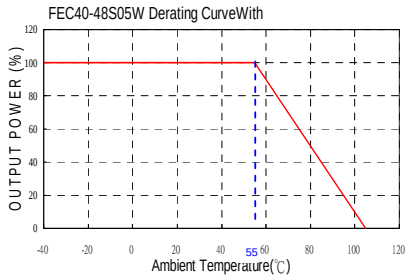
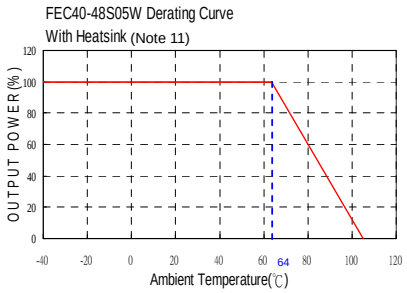
40 WATTS DC-DC CONVERTER

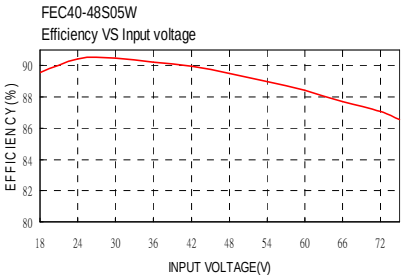
Model Number	Input Range	Output Voltage	Output Current		Output[4] Ripple & Noise	Input Current		Eff [4] (%)	Capacitor [5] Load max
			Min. load	Full load		No load[3]	Full load[2]		
FEC40-24S3P3W	9 – 36 VDC	3.3 VDC	0mA	10000mA	50mVp-p	80mA	1677mA	86	25750μF
FEC40-24S05W	9 – 36 VDC	5 VDC	0mA	8000mA	50mVp-p	100mA	2008mA	87	13600μF
FEC40-24S12W	9 – 36 VDC	12 VDC	50mA	3333mA	75mVp-p	50mA	2008mA	87	2360μF
FEC40-24S15W	9 – 36 VDC	15 VDC	50mA	2666mA	75mVp-p	50mA	2008mA	87	1510μF
FEC40-24D12W	9 – 36 VDC	± 12 VDC	±65 mA	± 1667mA	120mVp-p	60mA	2032mA	86	± 1200μF
FEC40-24D15W	9 – 36 VDC	± 15 VDC	±50 mA	± 1333mA	150mVp-p	70mA	2032mA	86	± 750μF
FEC40-48S3P3W	18 – 75 VDC	3.3 VDC	0mA	10000mA	50mVp-p	60mA	838mA	86	25750μF
FEC40-48S05W	18 – 75 VDC	5 VDC	0mA	8000mA	50mVp-p	65mA	992mA	88	13600μF
FEC40-48S12W	18 – 75 VDC	12 VDC	50mA	3333mA	75mVp-p	30mA	1004mA	87	2360μF
FEC40-48S15W	18 – 75 VDC	15 VDC	50mA	2666mA	75mVp-p	30mA	1004mA	87	1510μF
FEC40-48D12W	18 – 75 VDC	± 12 VDC	±65 mA	± 1667mA	120mVp-p	30mA	1016mA	86	± 1200μF
FEC40-48D15W	18 – 75 VDC	± 15 VDC	±60 mA	± 1333mA	150mVp-p	30mA	1016mA	86	± 750μF

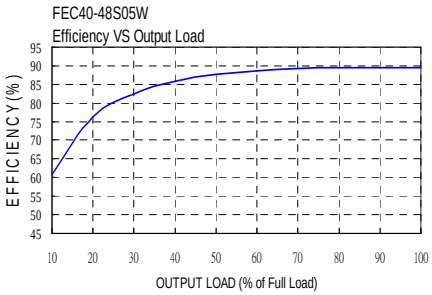
Note

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 output requires minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
7. For the single output: Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding –OUTPUT.
8. Load regulation for dual output : Min load to 100% load balanced on all outputs.
9. Cross regulation for dual output : asymmetrical load 25% / 100% FL
10. The ON/OFF pin voltage is referenced to –Vin
    To order negative logic ON/OFF control add the suffix-N (Ex: FEC40-24S05W-N).
11. Heat sink is optional and P/N：7G-0026C-F.
12. The FEC40W series can meet EN55022 Class A with parallel an external capacitor to the input pins.
    Recommend : 24Vin : N/A
    48Vin :2.2μF/100V*2 PCS 1812 MLCC.
13. 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.









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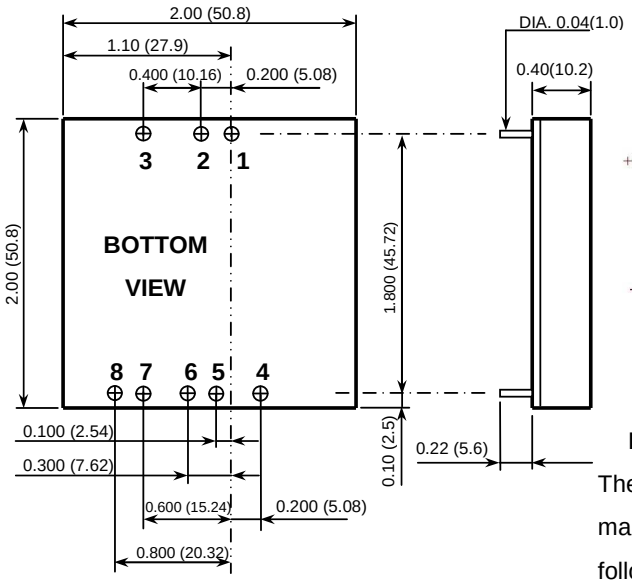
40 WATTS DC-DC CONVERTER

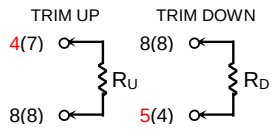


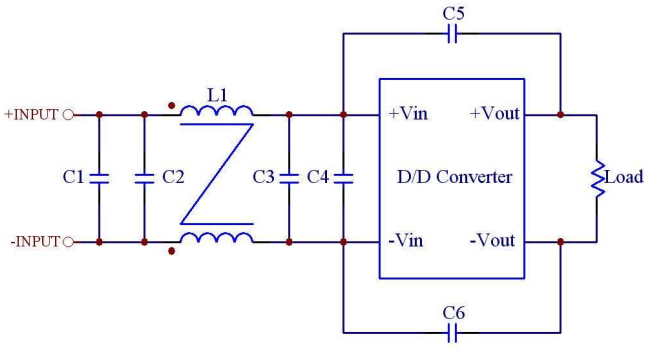
1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	CTRL	CTRL
4	-SENSE	+OUTPUT
5	+SENSE	COM
6	+OUTPUT	COM
7	-OUTPUT	-OUTPUT
8	TRIM	TRIM

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.
( ) for dual output trim

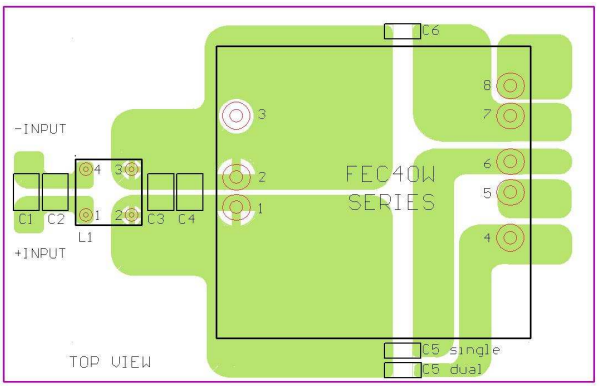




Recommended Filter for EN55022 Class B Compliance

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

	C1	C2	C3	C4	C5 & C6	L1
FEC40-24xxxW	4.7μF/50V 1812 MLCC	N/A	4.7μF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	450μH Common Choke PMT-048
FEC40-48xxxW	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	1000pF/2KV MLCC	830μH Common Choke PMT-053



Recommended EN55022 Class B Filter Circuit Layout

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