POWER MATE TECHNOLOGY CO., LTD.

FEC40W SERIES

40 WATTS DC-DC CONVERTER

FEATURES

- **40 WATTS MAXIMUM OUTPUT POWER**
- **OUTPUT CURRENT UP TO 10A**
- **STANDARD 2.00 X 2.00 X 0.40 INCH PACKAGE**
- **HIGH EFFICIENCY UP TO 89%**
- **4:1 ULTRA 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**

APPLICATIONS

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

OPTIONS

Negative logic Remote On/Off

DESCRIPTION

The FEC40W series offer 40 watts of output power from a 2.00 x 2.00 x 0.40 inch package. The FEC40W series with 4:1 ultra wide input voltage of 9~36VDC and 18~75VDC and features 2000VDC 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			± 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%
Ripple and noise	20MHz bandwidth		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µs
Over voltage protection Zener diode clamp	3.3VDC output 5VDC output 12VDC output 15VDC output ±12VDC output ±15VDC output		3.9VDC 6.2VDC 15VDC 18VDC ±15VDC ±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 Input(Output) to Case	1600VDC, min. 1minute 1600VDC, min. 1minute
Case grounding		Connect case to –INPUT with decoupling Y Cap
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		2500pF, max.
Switching frequency		300kHz±10%
Design meet 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 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	24VDC nominal input 48VDC nominal input	9 ~ 36VDC 18 ~ 75VDC
Input filter		Pi type
Input surge voltage	24VDC input 48VDC input	50VDC 100ms, max. 100VDC 100ms, max.
Input reflected ripple current		20mAp-p
Start up time	Nominal Vin and constant resistive load	Power up 20ms, max. Remote ON/OFF 20ms, max.
Start-up voltage	24VDC input 48VDC input	9VDC 18VDC
Shutdown voltage	24VDC input 48VDC 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 input	-0.5mA ~ +0.5mA
Remote off state input current	24VDC input 48VDC input	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
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, Class B
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

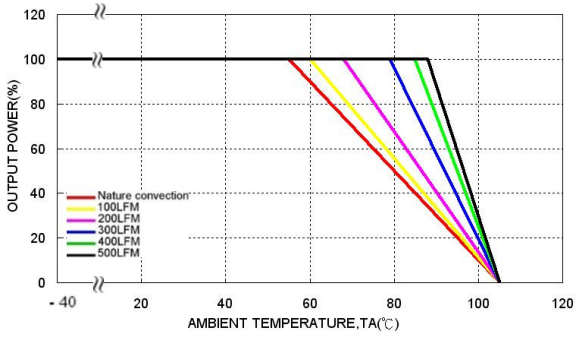
Model Number	Input Range	Output Voltage	Output Current		Output[2] Ripple & Noise	No load[3] Input Current	Eff [4] (%)	Capacitor [5] Load max
			Min. load	Full load				
FEC40-24S3P3W	9 ~ 36 VDC	3.3 VDC	0mA	10000mA	50mVp-p	75mA	87	25750μF
FEC40-24S05W	9 ~ 36 VDC	5 VDC	0mA	8000mA	50mVp-p	95mA	88	13600μF
FEC40-24S12W	9 ~ 36 VDC	12 VDC	50mA	3333mA	75mVp-p	50mA	87	2360μF
FEC40-24S15W	9 ~ 36 VDC	15 VDC	50mA	2666mA	75mVp-p	50mA	87	1510μF
FEC40-24D12W	9 ~ 36 VDC	± 12 VDC	±65 mA	± 1667mA	120mVp-p	60mA	86	± 1200μF
FEC40-24D15W	9 ~ 36 VDC	± 15 VDC	±50 mA	± 1333mA	150mVp-p	70mA	86	± 750μF
FEC40-48S3P3W	18 ~ 75 VDC	3.3 VDC	0mA	10000mA	50mVp-p	55mA	87	25750μF
FEC40-48S05W	18 ~ 75 VDC	5 VDC	0mA	8000mA	50mVp-p	60mA	89	13600μF
FEC40-48S12W	18 ~ 75 VDC	12 VDC	50mA	3333mA	75mVp-p	30mA	87	2360μF
FEC40-48S15W	18 ~ 75 VDC	15 VDC	50mA	2666mA	75mVp-p	25mA	88	1510μF
FEC40-48D12W	18 ~ 75 VDC	± 12 VDC	±65 mA	± 1667mA	120mVp-p	30mA	86	± 1200μF
FEC40-48D15W	18 ~ 75 VDC	± 15 VDC	±60 mA	± 1333mA	150mVp-p	30mA	86	± 750μF

Note

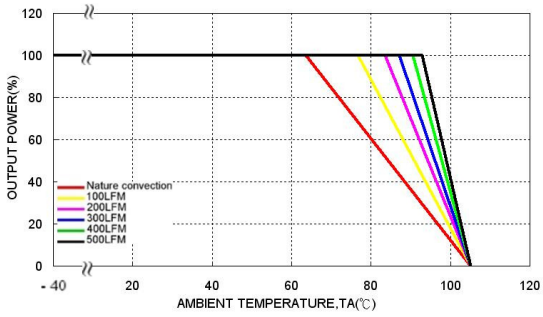
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment).
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The 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 CTRL pin voltage is referenced to –INPUT
    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 standard module meets EN55022 Class A and Class B with external components.
    For more detail information, please contact with P-DUKE.
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.

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

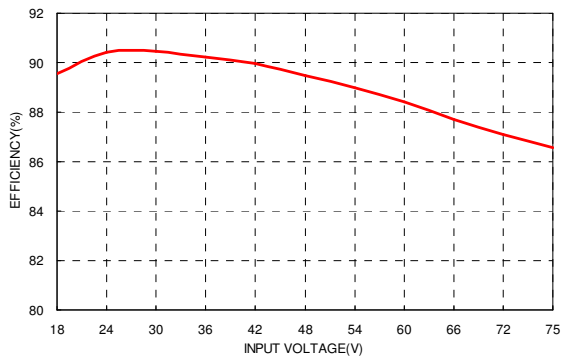
FEC40-48S05W Derating Curve



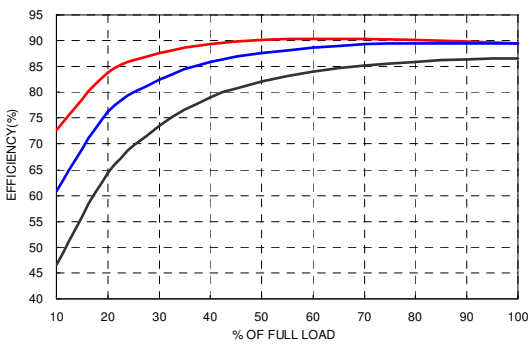
FEC40-48S05W Derating Curve With Heat-sink(Note 11)



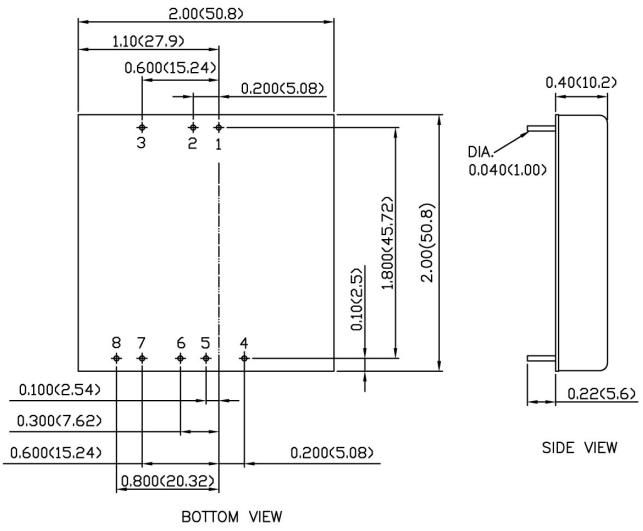
FEC40-48S05W Efficiency VS Input Voltage



FEC40-48S05W Efficiency VS Output Load



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 ±0.014(0.35)
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