



APPLICATIONS

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

FEATURES

- 15 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 4.5A
- STANDARD 2.0 X 1.0 X 0.4 INCH PACKAGE
- HIGH EFFICIENCY UP TO 88%
- 4:1 ULTRA WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- RAILWAY APPLICATION
- 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

OPTIONS

Positive logic & Negative logic Remote On/Off

DESCRIPTION

The FEC15W series offer 15 watts of output power from a 2 x 1 x 0.4 inch package. The FEC15W series with 4:1 ultra wide input voltage of 9-36 and 18-75 VDC.

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25°C otherwise noted

OUTPUT SPECIFICATIONS			
Output power		15 Watts, max.	
Voltage accuracy	Full load and nominal Vin	± 1%	
Minimum load		0%	
Line regulation	LL to hl at Full load	Single ± 0.2% Dual ± 0.5%	
Load regulation	No load to Full load	Single ± 0.5% Dual ± 1%	
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% / °C, max.	
Transient response recovery time	25% load step change	250µs	
Over voltage protection	3.3V output	3.9VDC	
Zener diode clamp	5V output	6.2VDC	
	12V output	15VDC	
	15V output	18VDC	
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	1600VDC, min.	
	Input(Output) to case	1600VDC, min.	
Case grounding		Connect case to -Vin with decoupling Y Cap	
Isolation resistance		10 ⁹ ohms, min.	
Isolation capacitance		1500pF, max.	
Switching frequency		400KHz, 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 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	1.819 x 10 ⁶ hrs	
	MIL-HDBK-217F	9.205 x 10 ⁵ hrs	

INPUT SPECIFICATIONS			
Input voltage range	24V nominal input	9 – 36VDC	
	48V nominal input	18 – 75VDC	
Input filter		Pi type	
Input surge voltage	24V input	50VDC	
1Sec max	48V input	100VDC	
Input reflected ripple current	Nominal Vin and full load	20mA _{p-p}	
Start up time	Nominal Vin and constant resistive load	Power up	20mS, typ.
Start-up voltage	24V input	9VDC	
	48V input	18VDC	
Shutdown voltage	24V input	7.5VDC	
	48V input	15VDC	
Remote ON/OFF (Option) (Note 6)			
(Positive logic)	DC-DC ON	Open or 3 V < Vr < 12V	
	DC-DC OFF	Short or 0V < Vr < 1.2V	
(Negative logic)	DC-DC ON	Short or 0V < Vr < 1.2V	
	DC-DC OFF	Open or 3 V < 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 (Note 7)		-40°C ~ +76°C (without derating) +76°C ~ +105°C (with derating)	
Maximum case temperature		105°C	
Storage temperature range		-55°C ~ +125°C	
Thermal impedance (Note 8)	Nature convection	12°C/Watt	
	Nature convection with heat-sink	10°C/Watt	
Thermal shock		EN61373, MIL-STD-810F	
Vibration		EN61373, MIL-STD-810F	
Relative humidity		5% to 95% RH	
EMC CHARACTERISTICS			
EMI (Note 9)	EN55022, EN55011		Class B
ESD	EN61000-4-2	Air Contact ± 8KV ± 6KV	Perf. Criteria B
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient(Note 10)	EN61000-4-4	± 2KV	Perf. Criteria B
Surge (Note 10)	EN61000-4-5	± 1KV	Perf. Criteria A
		± 2KV	Perf. Criteria B
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

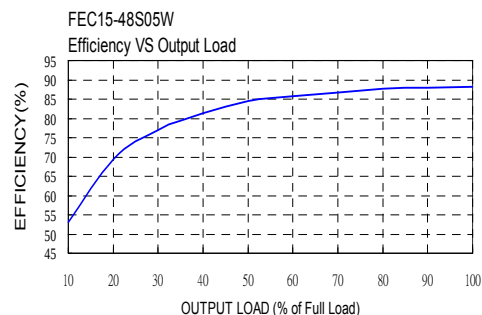
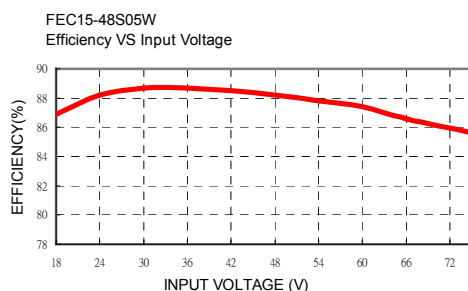
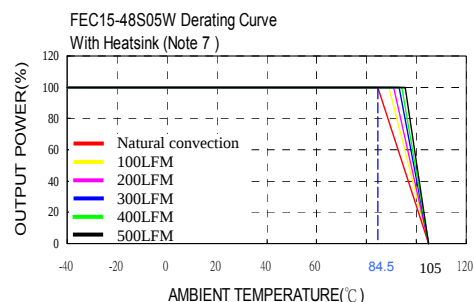
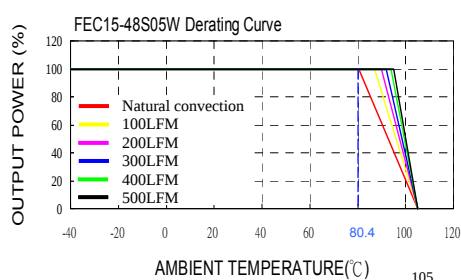




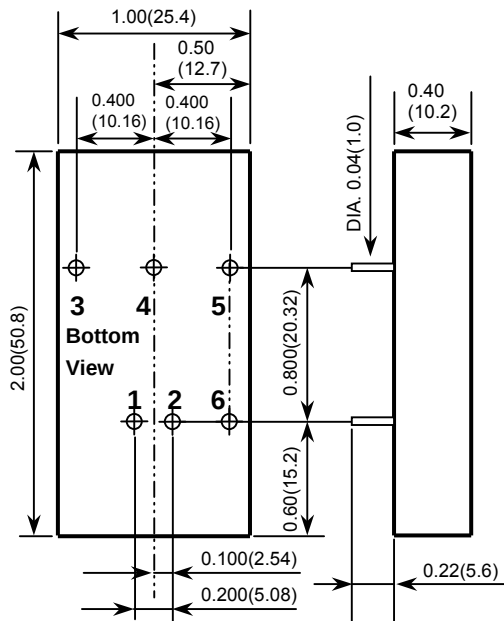
Model Number	Input Range	Output Voltage	Output Current		Output ⁽⁴⁾ Ripple & Noise	Input Current		Eff ⁽⁴⁾ (%)	Capacitor ⁽⁵⁾ Load max
			Min. load	Full load		No Load ⁽³⁾	Full Load ⁽²⁾		
FEC15-24S3P3W	9 – 36 VDC	3.3 VDC	0mA	4500mA	50mVp-p	50mA	755mA	86	14700μF
FEC15-24S05W	9 – 36 VDC	5 VDC	0mA	3000mA	50mVp-p	65mA	753mA	87	7200μF
FEC15-24S5P1W	9 – 36 VDC	5.1 VDC	0mA	3000mA	50mVp-p	65mA	768mA	87	7200μF
FEC15-24S12W	9 – 36 VDC	12 VDC	0mA	1250mA	75mVp-p	22mA	753mA	87	1250μF
FEC15-24S15W	9 – 36 VDC	15 VDC	0mA	1000mA	75mVp-p	22mA	753mA	87	800μF
FEC15-24D05W	9 – 36 VDC	± 5 VDC	0mA	± 1500mA	75mVp-p	55mA	753mA	87	± 3600μF
FEC15-24D12W	9 – 36 VDC	± 12 VDC	0mA	± 625mA	75mVp-p	30mA	744mA	88	± 625μF
FEC15-24D15W	9 – 36 VDC	± 15 VDC	0mA	± 500mA	75mVp-p	30mA	744mA	88	± 400μF
FEC15-48S3P3W	18 – 75 VDC	3.3 VDC	0mA	4500mA	50mVp-p	35mA	377mA	86	14700μF
FEC15-48S05W	18 – 75 VDC	5 VDC	0mA	3000mA	50mVp-p	35mA	372mA	88	7200μF
FEC15-48S5P1W	18 – 75 VDC	5.1 VDC	0mA	3000mA	50mVp-p	35mA	379mA	88	7200μF
FEC15-48S12W	18 – 75 VDC	12 VDC	0mA	1250mA	75mVp-p	15mA	377mA	87	1250μF
FEC15-48S15W	18 – 75 VDC	15 VDC	0mA	1000mA	75mVp-p	15mA	377mA	87	800μF
FEC15-48D05W	18 – 75 VDC	± 5 VDC	0mA	± 1500mA	75mVp-p	35mA	372mA	88	± 3600μF
FEC15-48D12W	18 – 75 VDC	± 12 VDC	0mA	± 625mA	75mVp-p	17mA	372mA	88	± 625μF
FEC15-48D15W	18 – 75 VDC	± 15 VDC	0mA	± 500mA	75mVp-p	17mA	372mA	88	± 400μF

Note:

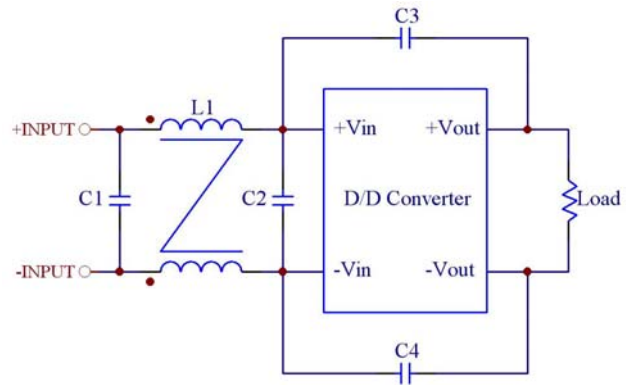
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment)
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The ON/OFF control pin voltage is referenced to -Vin.
To order positive logic ON/OFF control add the suffix-P (Ex: FEC15-48S05W-P)
To order negative logic ON/OFF control add the suffix-N (Ex: FEC15-48S05W-N)
- Operating ambient temperature:
Converter can meet the railway T2 temperature requirement at full load. The operating temperature can up to Ta = 85°C as power derating from 100% to 80% for TX requirement.
- Heat sink is optional and P/N: 7G-0020C-F.
- EN55022 and EN50155
1) To meet Class A with parallel an external capacitor to the input pins.
Recommend : 24Vin : NA.
48Vin : 1μF/100V 1210 MLCC.
2) To meet Class B please refer to the suggestion filter in next page.
- 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, 220 μF/100V, ESR 48mΩ.



15 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)

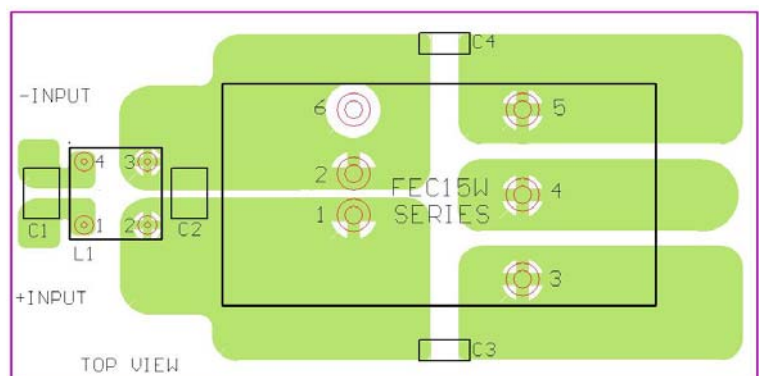


Recommended Filter for EN55022 Class B Compliance

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

	C1	C2	C3	C4	L1
FEC15-24XXXW	2.2μF/50V 1812 MLCC	NA	1000pF/2KV MLCC	1000pF/2KV MLCC	450μH Common Choke PMT-048
FEC15-48XXXW	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325μH Common Choke PMT-050

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	+ OUTPUT	+ OUTPUT
4	NO PIN	COMMON
5	- OUTPUT	- OUTPUT
6	CTRL (Option)	CTRL (Option)



Recommended EN55022 Class B Filter Circuit Layout



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