



### APPLICATIONS

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

### FEATURES

- 15 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 4.5A
- STANDARD 2.00 X 1.00 X 0.40 INCH PACKAGE
- HIGH EFFICIENCY UP TO 88%
- 4:1 ULTRA WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

### OPTIONS

Positive logic & Negative logic Remote On/Off

### DESCRIPTION

The FEC15W series offer 15 watts of output power from a 2.00 x 1.00 x 0.40 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	± 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	3.3VDC output		3.9VDC
	5VDC output		6.2VDC
Zener diode clamp	12VDC output		15VDC
	15VDC output		18VDC
Over load protection	% of FL at nominal input		150%.
Short circuit protection	Continuous, automatic recovery		

GENERAL SPECIFICATIONS			
Efficiency	See table		
Isolation voltage	Input to Output	1600VDC, min. 1minute	
	Input(Output) to case	1600VDC, min. 1minute	
Case grounding	Connect case to -INPUT with decoupling Y Cap		
Isolation resistance	500VDC	10 <sup>9</sup> ohms, min.	
Isolation capacitance	1500pF, max.		
Switching frequency	400kHz±10%.		
Safety approvals	IEC60950-1, UL60950-1, & EN60950-1		
Case material	Nickel-coated copper		
Base material	FR4 PCB		
Potting material	Epoxy (UL94 V-0)		
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	2.430 x 10 <sup>6</sup> hrs	

INPUT SPECIFICATIONS			
Input voltage range	24VDC nominal input	9 ~ 36VDC	
	48VDC nominal input	18 ~ 75VDC	
Input filter	Pi type		
Input surge voltage	24VDC input	50VDC 100ms,max	
	48VDC input	100VDC 100ms,max	
Input reflected ripple current	20mA <sub>p-p</sub>		
Start up time	Nominal input and constant resistive load	Power up	20ms.
Start-up voltage	24VDC input	9VDC	
	48VDC input	18VDC	
Shutdown voltage	24VDC input	7.5VDC	
	48VDC 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 input	-0.5mA ~ + 0.5mA	
Remote off state input current	Nominal input	2.5mA	

ENVIRONMENTAL SPECIFICATIONS			
Operating ambient temperature	-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 7)	Natural convection	12°C/Watt	
	Natural convection with heat-sink	10°C/Watt	
Thermal shock	MIL-STD-810F		
Vibration	MIL-STD-810F		
Relative humidity	5% to 95% RH		

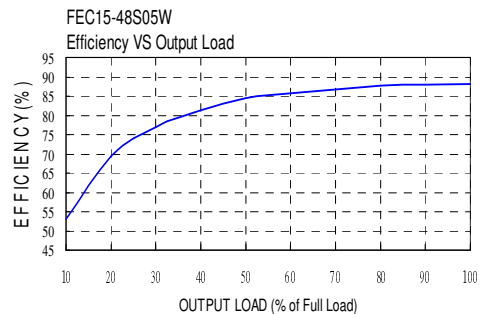
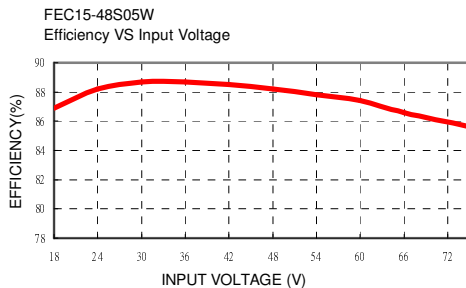
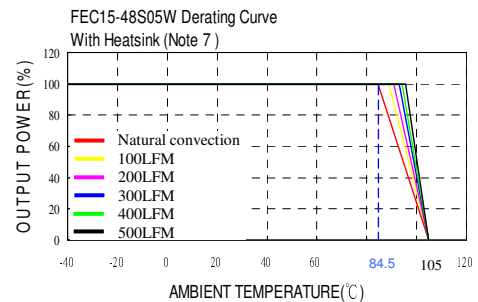
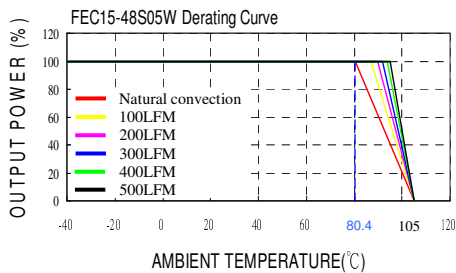
EMC CHARACTERISTICS			
EMI (Note 8)	EN55022	Class A, Class B	
ESD	EN61000-4-2	Air	± 8kV
		Contact	± 6kV
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (Note 9)	EN61000-4-4	± 2kV	Perf. Criteria B
Surge (Note 9)	EN61000-4-5	± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

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

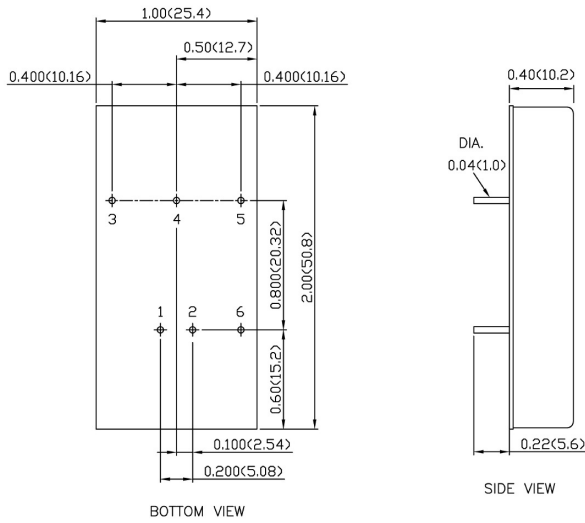
**Note:**

- MIL-HDBK-217F @Ta=25 °C, Full load.
- Typical value at nominal input and full load. (20MHZ BW.)
- Typical value at nominal input and no load.
- Typical value at nominal input and full load.
- Test by minimum input and constant resistive load.
- The ON/OFF control pin voltage is referenced to -INPUT.  
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)
- Heat-sink is optional and P/N: 7G-0020C-F.
- The FEC15W series standard module meets EN55022 Class A and Class B with external components.  
For more detail information, please contact with P-DUKE.
- 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.

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



**MECHANICAL DRAWING :**



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

- All dimensions in Inch (mm)  
Tolerance: X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01 (0.25)
- Pin dimension tolerance ±0.004 (0.1)