

**POWER MATE**  
**TECHNOLOGY CO., LTD.**  
**FEC15W SERIES**

DC-DC CONVERTER



4 : 1 ULTRA WIDE INPUT RANGE  
 UP TO 15Watts



**FEATURES**

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- STANDARD 2.00 X 1.00 X 0.40 INCH
- SIX-SIDED CONTINUOUS SHIELD
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

**APPLICATIONS**

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

<b>1600VDC ISOLATION</b>	<b>REMOTE CONTROL</b>	<b>UVP</b>	<b>OCP</b>	<b>SCP</b>	<b>OVP</b>
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**TECHNICAL SPECIFICATION** All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA		
FEC15-24S3P3W	9 ~ 36	3.3	4500	50	86	14700
FEC15-24S05W	9 ~ 36	5	3000	65	87	7200
FEC15-24S5P1W	9 ~ 36	5.1	3000	65	87	7200
FEC15-24S12W	9 ~ 36	12	1250	22	87	1250
FEC15-24S15W	9 ~ 36	15	1000	22	87	800
FEC15-24D05W	9 ~ 36	±5	±1500	55	87	±3600
FEC15-24D12W	9 ~ 36	±12	±625	30	88	±625
FEC15-24D15W	9 ~ 36	±15	±500	30	88	±400
FEC15-48S3P3W	18 ~ 75	3.3	4500	35	86	14700
FEC15-48S05W	18 ~ 75	5	3000	35	88	7200
FEC15-48S5P1W	18 ~ 75	5.1	3000	35	88	7200
FEC15-48S12W	18 ~ 75	12	1250	15	87	1250
FEC15-48S15W	18 ~ 75	15	1000	15	87	800
FEC15-48D05W	18 ~ 75	±5	±1500	35	88	±3600
FEC15-48D12W	18 ~ 75	±12	±625	17	88	±625
FEC15-48D15W	18 ~ 75	±15	±500	17	88	±400

**PART NUMBER STRUCTURE**

<b>FEC15</b>	<b>- 48</b>	<b>S</b>	<b>05</b>	<b>W</b>	<b>- P</b>	<b>HS</b>
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Remote Control Option	Assembly Option
	24: 9~36 48: 18~75	S: Single	3P3: 3.3 05: 5 5P1: 5.1 12: 12 15: 15	4:1	P: Positive logic N: Negative logic	□: None HS: Heat-sink HC: Heat-sink & Clamp
		D: Dual	05: ±5 12: ±12 15: ±15			

## INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
Input reflected ripple current			20			mAp-p	
Start up voltage	24Vin(nom)					9	
	48Vin(nom)					18	
Shutdown voltage	24Vin(nom)					7.5	
	48Vin(nom)					15	
Start up time	Constant resistive load	Power up	20			ms	
Input surge voltage	100 ms, max.	24Vin(nom)				50	
		48Vin(nom)				100	
Input filter			Pi type				
Remote ON/OFF (Option)	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 12VDC			mA
			DC-DC OFF	Short or 0 ~ 1.2VDC			
		Negative logic	DC-DC ON	Short or 0 ~ 1.2VDC			
			DC-DC OFF	Open or 3 ~ 12VDC			
		Input current of Ctrl pin	-0.5			+0.5	
		Remote off input current	2.5				

## OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0			+1.0 %
Line regulation	Low Line to High Line at Full Load	Single	-0.2			+0.2 %
		Dual	-0.5			+0.5 %
Load regulation	No Load to Full Load	Single	-0.5			+0.5 %
		Dual	-1.0			+1.0 %
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0			+5.0 %
Ripple and noise	20MHz bandwidth With a 0.1μF/50V MLCC	Single	3.3Vout, 5Vout, 5.1Vout		50	mVp-p
		Dual	12Vout, 15Vout		75	
			All		75	
Temperature coefficient			-0.02			+0.02 %/°C
Transient response recovery time	25% load step change		250			μs
Over voltage protection	Zener diode clamp	3.3Vout	3.9			VDC
		5Vout, 5.1Vout	6.2			
		12Vout	15			
		15Vout	18			
Over load protection	% of Iout rated		150			%
Short circuit protection			Continuous, automatic recovery			

## GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output Input (Output) to Case	1600			VDC
Case grounding	Connect case to -Vin with decoupling Y Cap					
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			1500			pF
Switching frequency			360	400	440	kHz
Safety approvals			UL60950-1 EN60950-1 IEC60950-1			
Case material			Nickel-coated copper			
Base material			FR4 PCB			
Potting material			Epoxy (UL94 V-0)			
Weight			27g (0.95oz)			
MTBF	MIL-HDBK-217F, Full load		2.430 x 10 <sup>6</sup>			hrs

## ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating		-40			+76 °C
	With derating		+76			+105 °C
Maximum case temperature						+105 °C
Storage temperature range			-55			+125 °C
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink				°C/W
		With heat-sink				
Thermal shock			MIL-STD-810F			
Vibration			MIL-STD-810F			
Relative humidity			5% to 95% RH			

**EMC SPECIFICATIONS**

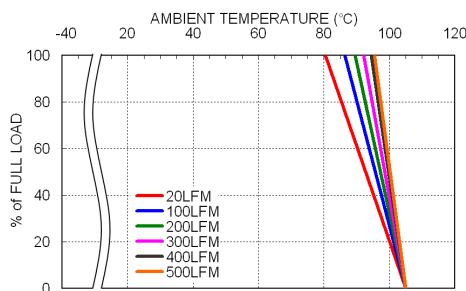
Parameter	Conditions	Level
EMI (2)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria B
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4 ±2kV	Perf. Criteria B
Surge (3)	EN61000-4-5 ±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

**Note:**

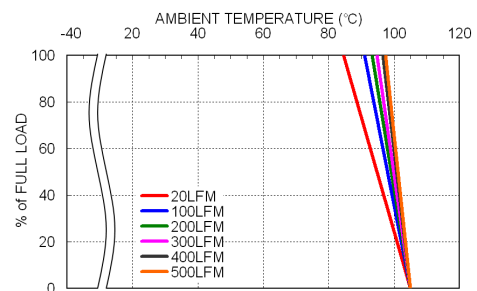
1. Test by minimum input and constant resistive load.
2. The standard module meets EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
3. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter 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.

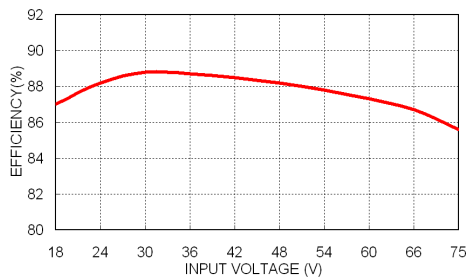
**CHARACTERISTIC CURVE**



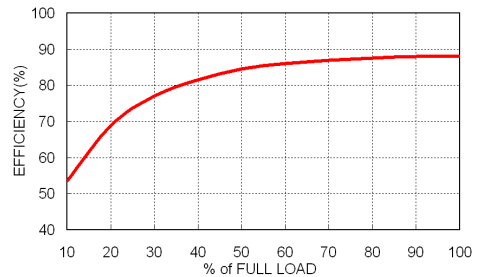
FEC15-48S05W Derating Curve



FEC15-48S05W Derating Curve With Heat-sink

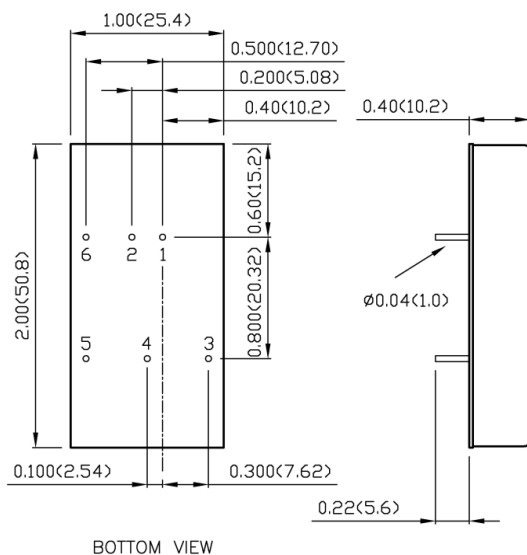


FEC15-48S05W Efficiency vs. Input Voltage



FEC15-48S05W Efficiency vs. Output Load

**MECHANICAL DRAWING**



**PIN CONNECTION**

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No pin	Common
5	-Vout	-Vout
6	Ctrl(Optional)	Ctrl(Optional)

1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.xx±0.5)  
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004 (0.1)