

# FEC30 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 30Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- STANDARD 2.00 X 1.60 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

1600VDC  
ISOLATION

REMOTE  
CONTROL

UVP

OCP

SCP

OVP

OTP

## 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	A	mA		
FEC30-12S1P5	9 ~ 18	1.5	6	100	78	85800
FEC30-12S1P8	9 ~ 18	1.8	6	100	81	65000
FEC30-12S2P5	9 ~ 18	2.5	6	110	83	33000
FEC30-12S3P3	9 ~ 18	3.3	6	115	85	19500
FEC30-12S05	9 ~ 18	5	6	95	87	10200
FEC30-12S12	9 ~ 18	12	2.5	170	88	3240
FEC30-12S15	9 ~ 18	15	2	210	88	1100
FEC30-12D12	9 ~ 18	±12	±1.25	60	87	±1020
FEC30-12D15	9 ~ 18	±15	±1	40	87	±675
FEC30-24S1P5	18 ~ 36	1.5	6	50	80	85800
FEC30-24S1P8	18 ~ 36	1.8	6	35	82	65000
FEC30-24S2P5	18 ~ 36	2.5	6	45	84	33000
FEC30-24S3P3	18 ~ 36	3.3	6	50	86	19500
FEC30-24S05	18 ~ 36	5	6	50	88	10200
FEC30-24S12	18 ~ 36	12	2.5	80	89	3300
FEC30-24S15	18 ~ 36	15	2	90	89	1100
FEC30-24D12	18 ~ 36	±12	±1.25	30	88	±1020
FEC30-24D15	18 ~ 36	±15	±1	30	88	±675
FEC30-48S1P5	36 ~ 75	1.5	6	20	81	85800
FEC30-48S1P8	36 ~ 75	1.8	6	20	83	65000
FEC30-48S2P5	36 ~ 75	2.5	6	25	85	33000
FEC30-48S3P3	36 ~ 75	3.3	6	30	87	19500
FEC30-48S05	36 ~ 75	5	6	35	89	10200
FEC30-48S12	36 ~ 75	12	2.5	35	90	3300
FEC30-48S15	36 ~ 75	15	2	55	90	1100
FEC30-48D12	36 ~ 75	±12	±1.25	20	88	±1020
FEC30-48D15	36 ~ 75	±15	±1	20	88	±675

## PART NUMBER STRUCTURE

<b>FEC30</b>	<b>- 48</b>	<b>S</b>	<b>05</b>	<b>- HS</b>
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Assembly Option
	12: 9-18 24: 18-36 48: 36-75	S: Single          D: Dual	1P5: 1.5 1P8: 1.8 2P5: 2.5 3P3: 3.3 05: 5 12: 12 15: 15 12: ±12 15: ±15	□: None HS: Heat-sink HC: Heat-sink with Clamp

**INPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)		9	12	18	VDC
	24Vin(nom)		18	24	36	
	48Vin(nom)		36	48	75	
Input reflected ripple current	Nominal input and Full load		30			mAp-p
Start-up voltage	12Vin(nom)		9			VDC
	24Vin(nom)		17.8			
	48Vin(nom)		36			
Shutdown voltage	12Vin(nom)		8			VDC
	24Vin(nom)		16			
	48Vin(nom)		33			
Start up time	Constant resistive load	Power up	25			ms
		Remote ON/OFF	25			
Input surge voltage	100 ms, max.	12Vin(nom)	36			VDC
		24Vin(nom)	50			
		48Vin(nom)	100			
Input filter	L-C type					
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 12VDC		mA
			DC-DC OFF	Short or 0 ~ 1.2VDC		
			Input current of Ctrl pin	-0.5	+0.5	
		Remote off input current	2.5			mA

**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	%
Voltage adjustability			-10		+10	%
Ripple and noise	Measured by 20MHz bandwidth With a 0.1µF/50V MLCC	Single		50		mVp-p
		Dual	Others 12Vout, 15Vout	75		
		All		100		
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change			300		µs
Over voltage protection	Zener diode clamp	1.5Vout		3.9		VDC
		1.8Vout		3.9		
		2.5Vout		3.9		
		3.3Vout		3.9		
		5Vout		6.2		
		12Vout		15		
		15Vout		18		
Over load protection	% of lout rated				150	%
Short circuit protection						Continuous, automatics recovery

**GENERAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			VDC
		Input(Output) to Case	1600			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					1000	pF
Switching frequency			270	300	330	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						48g (1.69oz)
MTBF	MIL-HDBK-217F, Full load					1.283 x 10 <sup>6</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+85	°C
Maximum case temperature				+100	°C
Over temperature protection			+115		°C
Storage temperature range		-55		+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM) Without heat-sink With heat-sink		10 8.24		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

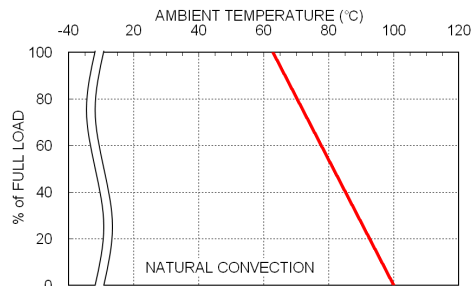
**EMC SPECIFICATIONS**

Parameter	Conditions	Level
EMI <sup>(2)</sup>	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 <sup>(3)</sup>	EN61000-4-4 ± 2kV	Perf. Criteria B
Surge <sup>(3)</sup>	EN61000-4-5 ± 1kV	Perf. Criteria B
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

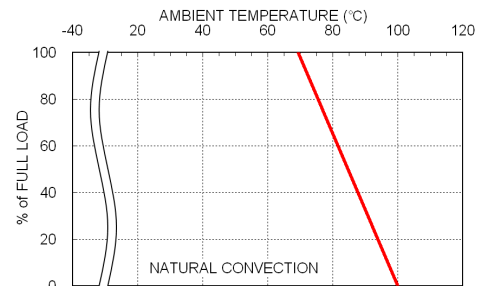
**Note:**

1. Test by minimum input and constant resistive load.
2. The standard module meet 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.

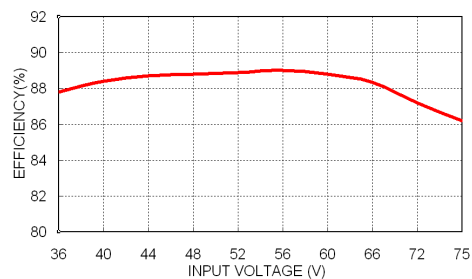
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

**CHARACTERISTIC CURVE**


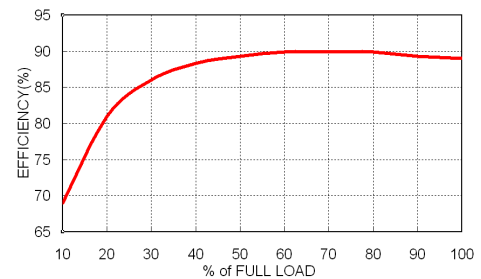
FEC30-48S05 Derating Curve



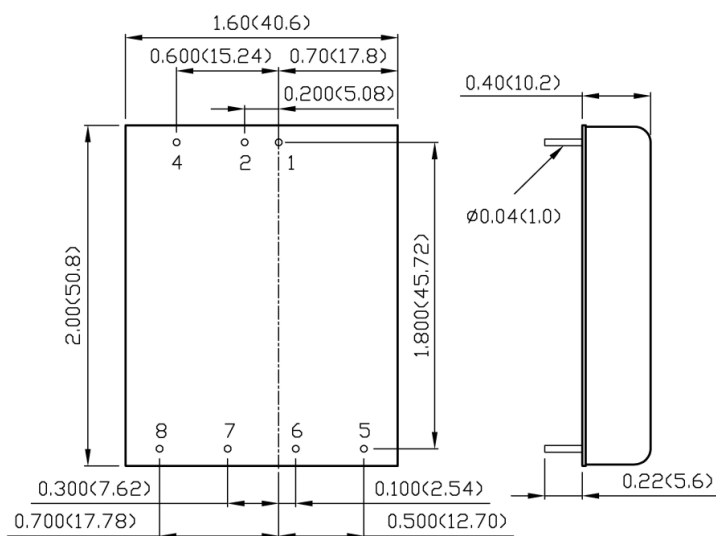
FEC30-48S05 Derating Curve With Heat-sink



FEC30-48S05 Efficiency vs. Input Voltage



FEC30-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**


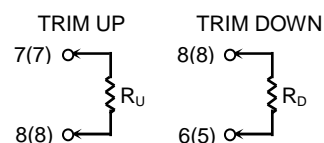
BOTTOM VIEW

**PIN CONNECTION**

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	Ctrl	Ctrl
5	No pin	+Vout
6	+Vout	Common
7	-Vout	-Vout
8	Trim	Trim

**EXTERNAL OUTPUT TRIMMING**

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



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±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)