

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

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP
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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

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

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 18	
	48Vin(nom)						
Shutdown voltage	24Vin(nom)					7.5 15	
	48Vin(nom)						
Start up time	Constant resistive load	Power up	20			ms	
Input surge voltage	100 ms, max.	24Vin(nom)				50 100	
		48Vin(nom)					
Input filter			Pi type				
Remote ON/OFF (Option)	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 12VDC			-0.5 2.5
			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				mA	
		Remote off input current				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	%
Ripple and noise	20MHz bandwidth With a 0.1µF/50V MLCC	Single	3.3Vout, 5Vout, 5.1Vout	50		mVp-p
			12Vout, 15Vout	75		
		Dual	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 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 ⁶			hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating ambient temperature	Without derating		-40		+76	°C	
	With derating		+76		+105		
Maximum case temperature			+105			°C	
Storage temperature range			-55			+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink				12	
		With heat-sink					10
Thermal shock			MIL-STD-810F				
Vibration			MIL-STD-810F				
Relative humidity			5% to 95% RH				

EMC SPECIFICATIONS

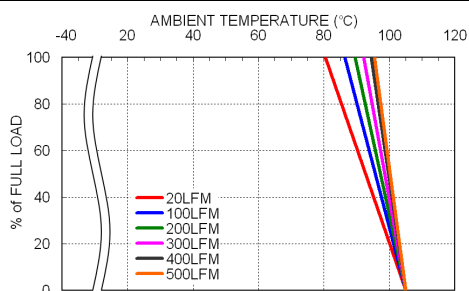
Parameter	Conditions	Level
EMI (2)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air $\pm 8kV$ and Contact $\pm 6kV$	Perf. Criteria B
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4 $\pm 2kV$	Perf. Criteria B
Surge (3)	EN61000-4-5 $\pm 1kV$	Perf. Criteria A
Conducted immunity	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:

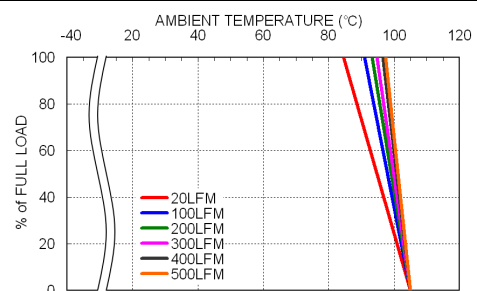
- Test by minimum input and constant resistive load.
- The standard module meets EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor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

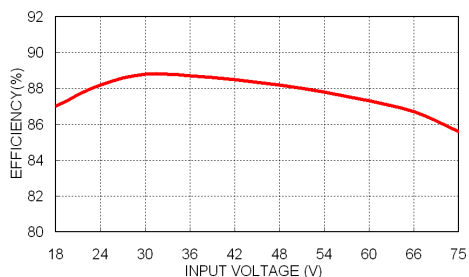
CHARACTERISTIC CURVE



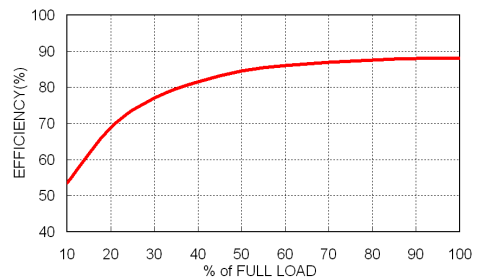
FEC15-48S05W Derating Curve



FEC15-48S05W Derating Curve With Heat-sink

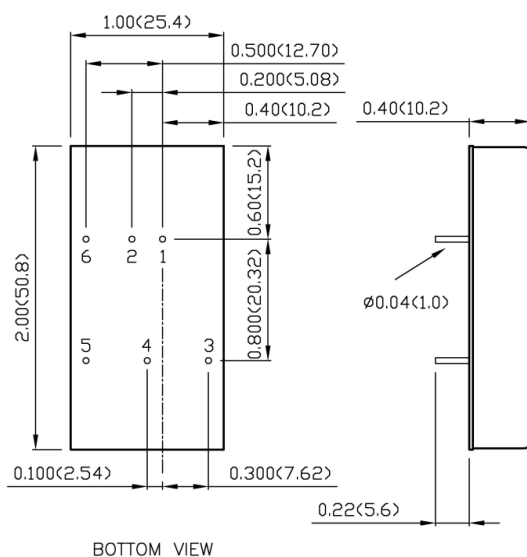


FEC15-48S05W Efficiency vs. Input Voltage



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)

- 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)