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

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25℃ otherwise noted

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load (1) µF
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

FEC15 - 48 S 05 W - P HS

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	□: No pin **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) 48Vin(nom)	9 18	24 48	36 75	VDC
Input reflected ripple current				20		mAp-p
Start up voltage		24Vin(nom) 48Vin(nom)			9 18	VDC
Shutdown voltage		24Vin(nom) 48Vin(nom)		7.5 15		VDC
Start up time	Constant resistive load	Power up		20		ms
Input surge voltage	100 ms, max.	24Vin(nom) 48Vin(nom)			50 100	VDC
Input filter				Pi type		
Remote ON/OFF (Option)	Referred to –Vin pin	Positive logic DC-DC ON DC-DC OFF Negative logic DC-DC ON DC-DC OFF Input current of Ctrl pin Remote off input current	-0.5	Open or 3 ~ 12VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 12VDC 2.5	+0.5	mA 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 Dual	-0.2 -0.5		+0.2 +0.5	%
Load regulation	No Load to Full Load	Single Dual	-0.5 -1.0		+0.5 +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 12Vout, 15Vout Dual All		50 75 75		mVp-p
Temperature coefficient			-0.02		+0.02	%/℃
Transient response recovery time	25% load step change			250		μs
Over voltage protection	Zener diode clamp	3.3Vout 5Vout, 5.1Vout 12Vout 15Vout		3.9 6.2 15 18		VDC
Over load protection	% of Iout rated			150		%
Short circuit protection				Continuous, automatics 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 With derating	-40 +76		+76 +105	℃
Maximum case temperature					+105	℃
Storage temperature range			-55		+125	℃
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink With heat-sink		12 10		℃/W
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

EMC SPECIFICATIONS

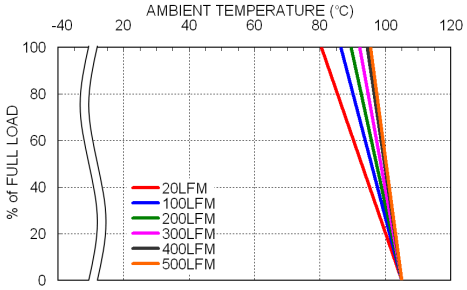
Parameter	Conditions		Level
EMI (2)	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria B
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4	±2kV	Perf. Criteria B
Surge (3)	EN61000-4-5	±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

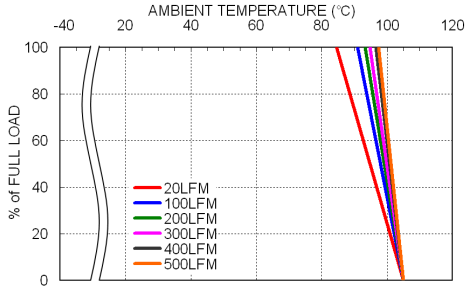
1. Test by minimum input and constant resistive load.
2. The standard module meets EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
3. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor P-DUKE suggest: Nippon chemi-con KY series, 220μF/100V.

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

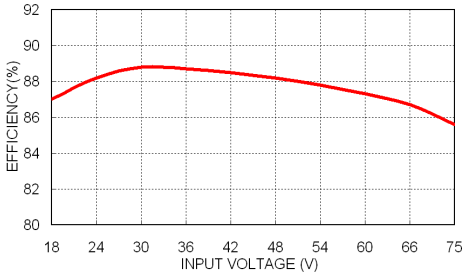
CHARACTERISTIC CURVE



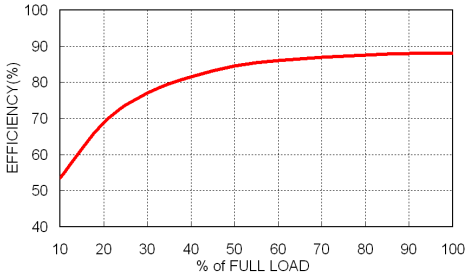
FEC15-48S05W Derating Curve



FEC15-48S05W Derating Curve With Heat-sink

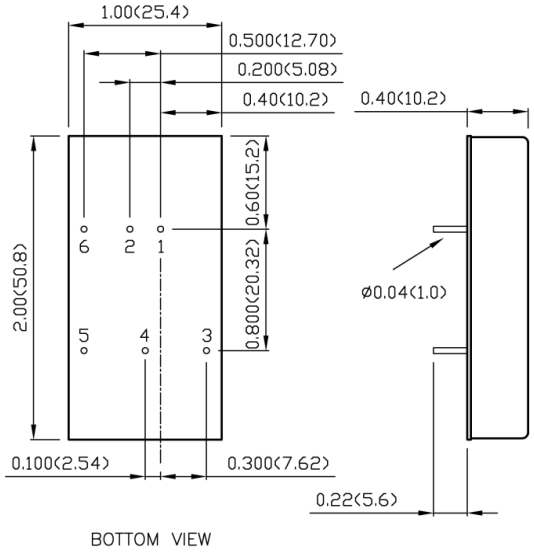


FEC15-48S05W Efficiency vs. Input Voltage



FEC15-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING



BOTTOM VIEW

PIN CONNECTION

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

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)