POWER MATE TECHNOLOGY CO., LTD.

FEC15 SERIES

15 WATTS DC-DC CONVERTER

FEATURES

- **15 WATTS OUTPUT POWER**
- **OUTPUT CURRENT UP TO 4A**
- **STANDARD 2.00 X 1.00 X 0.40 INCH PACKAGE**
- **HIGH EFFICIENCY UP TO 88%**
- **2:1 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**

APPLICATIONS

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

OPTIONS

Positive logic & Negative logic Remote On/Off

DESCRIPTION

The FEC15 series offer 15 watts of output power from a 2.00 x 1.00 x 0.40 inch package. The FEC15 series with 2:1 wide input voltage of 9~18VDC, 18~36VDC and 36~75VDC.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power			15 Watts, max.
Voltage accuracy			± 1%
Minimum load (Note 6)			See Table
Line regulation	LL to HL at Full Load		± 0.5%
Load regulation	Min. load to Full load	Single Dual	± 0.5% ± 1%
Cross regulation (Dual)	Asymmetrical load 25% / 100% FL		± 5%
Ripple and noise	20MHz bandwidth	Single Dual	50mVp-p 75mVp-p
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µs
Over voltage protection (Zener diode clamp)	3.3VDC output 5VDC output 12VDC output 15VDC output		3.9VDC 6.2VDC 15VDC 18VDC
Over load protection	% of FL at nominal input		150%, max.
Short circuit protection			Continuous, automatics recovery

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output Input(Output) to case	1600VDC, min. 1minute 1600VDC, min. 1minute
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		300pF, max.
Switching frequency	Single output Dual output	500kHz±10% 300kHz±10%
Safety approvals		IEC60950-1, UL60950-1, & EN60950-1
Case material		Nickel-coated copper
Base material		Non-conductive black plastic
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	2.318 x 10^6 hrs

INPUT SPECIFICATIONS

Input voltage range	12VDC nominal input 24VDC nominal input 48VDC nominal input	9 ~ 18VDC 18 ~ 36VDC 36 ~ 75VDC
Input filter		Pi type
Input surge voltage	12VDC input 24VDC input 48VDC input	36VDC 100ms, max. 50VDC 100ms, max. 100VDC 100ms, max.
Input reflected ripple current		20mAp-p
Start up time	Nominal input and constant resistive load	Power up 20ms
Remote ON/OFF (Option) (Note 7)		
(Positive logic)	DC-DC ON DC-DC OFF	Open or 3.5V < Vr < 12V Short or 0V < Vr < 1.2V
(Negative logic)	DC-DC ON DC-DC OFF	Short or 0V < Vr < 1.2V Open or 3.5V < Vr < 12V
Input current of remote control pin	Nominal input	-0.5mA ~ +1mA
Remote off state input current	Nominal input	20mA

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature		-40ºC ~ +85ºC (with derating)
Maximum case temperature		100ºC
Storage temperature range		-55ºC ~ +125ºC
Thermal impedance (Note 8)	Natural convection Natural convection with Heat-sink	12ºC/Watt 10ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS

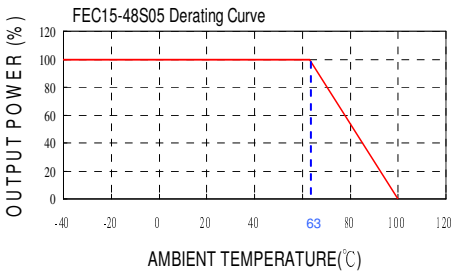
EMI (Note 9)	EN55022			Class A, Class B
ESD	EN61000-4-2	Air Contact	± 8kV ± 6kV	Perf. Criteria B
Radiated immunity	EN61000-4-3		10 V/m	Perf. Criteria A
Fast transient (Note 10)	EN61000-4-4		± 2kV	Perf. Criteria B
Surge (Note 10)	EN61000-4-5		± 1kV	Perf. Criteria B
Conducted immunity	EN61000-4-6		10 Vr.m.s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

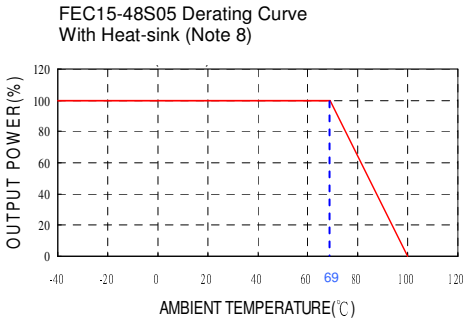
Model Number	Input Range	Output Voltage	Output Current		Output [2] Ripple & Noise	No load [3] Input Current	Eff [4] (%)	Capacitor [5] Load max
			Min. load	Full load				
FEC15-12S33	9 ~ 18 VDC	3.3 VDC	0mA	4000mA	50mVp-p	30mA	79	10200μF
FEC15-12S05	9 ~ 18 VDC	5 VDC	15mA	3000mA	50mVp-p	25mA	82	7050μF
FEC15-12S12	9 ~ 18 VDC	12 VDC	0mA	1250mA	50mVp-p	25mA	86	1035μF
FEC15-12S15	9 ~ 18 VDC	15 VDC	0mA	1000mA	50mVp-p	20mA	86	705μF
FEC15-12D05	9 ~ 18 VDC	± 5 VDC	0mA	± 1500mA	75mVp-p	20mA	83	± 1020μF
FEC15-12D12	9 ~ 18 VDC	± 12 VDC	0mA	± 625mA	75mVp-p	30mA	86	± 495μF
FEC15-12D15	9 ~ 18 VDC	± 15 VDC	±10mA	± 500mA	75mVp-p	35mA	84	± 165μF
FEC15-24S33	18 ~ 36 VDC	3.3 VDC	0mA	4000mA	50mVp-p	15mA	80	10200μF
FEC15-24S05	18 ~ 36 VDC	5 VDC	15mA	3000mA	50mVp-p	10mA	84	7050μF
FEC15-24S12	18 ~ 36 VDC	12 VDC	0mA	1250mA	50mVp-p	20mA	85	1035μF
FEC15-24S15	18 ~ 36 VDC	15 VDC	10mA	1000mA	50mVp-p	15mA	85	705μF
FEC15-24D05	18 ~ 36 VDC	± 5 VDC	0mA	± 1500mA	75mVp-p	15mA	84	± 1020μF
FEC15-24D12	18 ~ 36 VDC	± 12 VDC	0mA	± 625mA	75mVp-p	25mA	86	± 495μF
FEC15-24D15	18 ~ 36 VDC	± 15 VDC	0mA	± 500mA	75mVp-p	25mA	86	± 165μF
FEC15-48S33	36 ~ 75 VDC	3.3 VDC	0mA	4000mA	50mVp-p	10mA	81	10200μF
FEC15-48S05	36 ~ 75 VDC	5 VDC	0mA	3000mA	50mVp-p	20mA	83	7050μF
FEC15-48S12	36 ~ 75 VDC	12 VDC	10mA	1250mA	50mVp-p	15mA	87	1035μF
FEC15-48S15	36 ~ 75 VDC	15 VDC	0mA	1000mA	50mVp-p	15mA	86	705μF
FEC15-48D05	36 ~ 75 VDC	± 5 VDC	0mA	± 1500mA	75mVp-p	10mA	85	± 1020μF
FEC15-48D12	36 ~ 75 VDC	± 12 VDC	0mA	± 625mA	75mVp-p	15mA	88	± 495μF
FEC15-48D15	36 ~ 75 VDC	± 15 VDC	0mA	± 500mA	75mVp-p	15mA	87	± 165μF

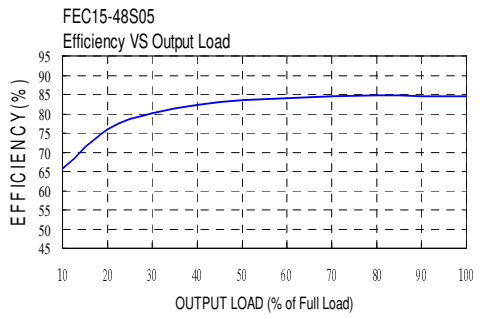
Note

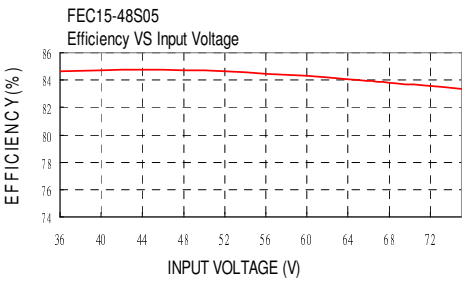
1. MIL-HDBK-217F @Ta=25 ºC, Full load.
2. Typical value at nominal input and full load. (20MHZ BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The output requires a minimum loading on the output to maintain specified regulation.
   Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
7. The CTRL pin voltage is referenced to -INPUT.
   To order positive logic ON-OFF control add the suffix-P (Ex: FEC15-24S05-P)
   To order negative logic ON-OFF control add the suffix-N (Ex: FEC15-24S05-N)
8. Heat-sink is optional and P/N: 7G-0020C-F.
9. The FEC15 series standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.
10. 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.

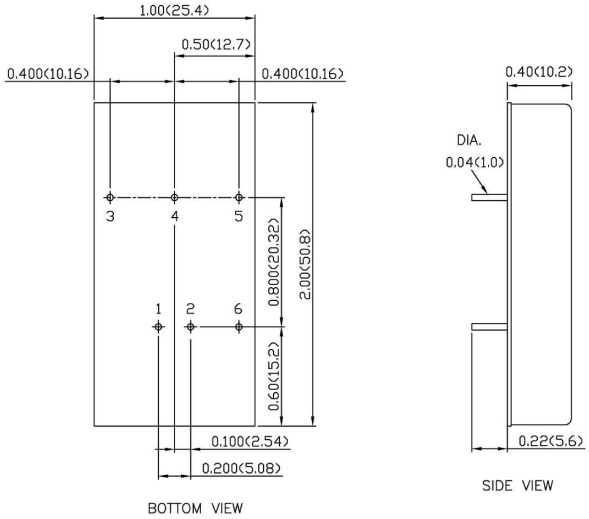








MECHANICAL DRAWING :



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

1. All dimensions in Inch (mm)

   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01 (0.25)
3. Pin dimension tolerance ±0.004 (0.1)