

FEC60 SERIES

DC / DC Single Output: 60 Watts



Features

- 2:1 input range
- 24V and 48V input options
- Single output
- 60 watts output power
- Six-Sided continuous shield
- High efficiency up to 90%
- Industry standard package
- Fixed switching efficiency
- High isolation 1600VDC
- Output voltage trim: Single output
- Overload & Overvoltage protection
- Remote ON/OFF

Specifications

Input Voltage	24VDC (18 ~ 36) 48VDC (36 ~75)
Input Filter	Pi type
Input Surge Voltage. (100mS)	24V: 50VDC, 48V: 100VDC
Input Reflected Ripple Current	20mA pk-pk (@ nominal input & 100% load
Start Up time	Typically 20mS constant resistive load
Start UP Voltage	24V input typ 17V, 48V input: typ 34V
Remote ON/OFF Positive logic -Standard	DC-DC ON Open or 3.5V < Vr < 12V DC-DC OFF Short or 0V < Vr < 1.2V Input current of remote control pin: 30mA
Remote ON/OFF Negative logic - Option	DC-DC ON Short or 0V < Vr < 1.2V DC-DC OFF Open or 3V < Vr < 1.2V Input current of remote control pin: 4mA
Output power	60 watts
Voltage Accuracy	±1%
Voltage Trim	±10% (see output trim table)
Minim Load	Zero
Line Regulation	±0.2%
Load Regulation	±0.5% (0% to 100% load)
Ripple & noise	750 ~ 100mV. 20MHZ bandwidth
Temp. Coefficient	±0.02% / °C
Transient Response	250uS (25% load step change)
Over voltage Protection (Zener Diode Clamp)	3.3V: 3.7 ~ 5.4V 5.0V: 5.6 ~ 7.0V 12V: 13.8 ~ 17.5V 15V: 16.8 ~ 20.5V
Overload Protection	Typically 150% of load

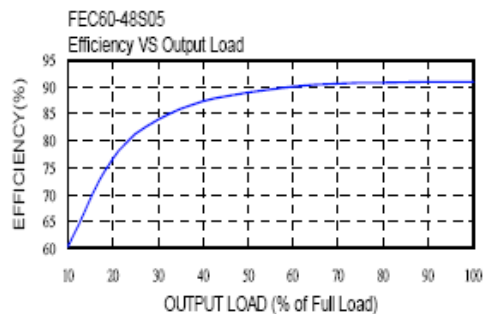
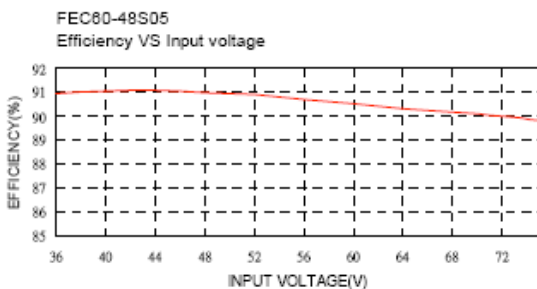
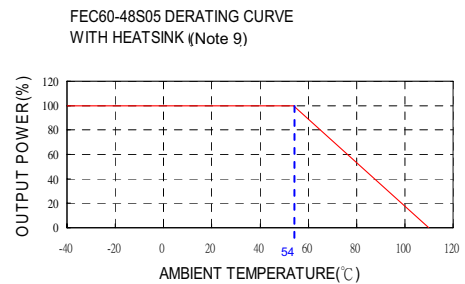
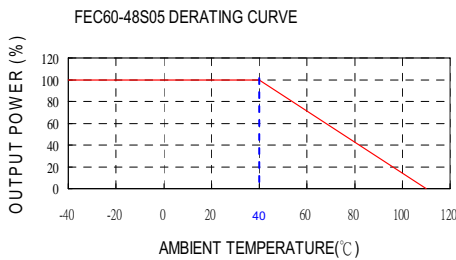
Short Circuit protection	Continuous hiccup mode, auto recovery
Efficiency	Model dependant 78 ~ 87%
Isolation	1600VDC
Case Grounding	Connect case to -Vin with decoupling Cap.
Isolation Cap.	1500pF
Switching Freq.	300KHz
Safety	EN60950-1, UL60950-1
Case Material	Nickel-coated copper
Base Material	Non-conductive black plastic
Potting	Epoxy UL94-V0
Dimensions	50.8 x 50.8 x 10.2mm
Weight	60g
MTBF	1.096 x 10 ⁶ Hrs
Operating Temp	-40°C to +40°C (without derating) -40°C to +110°C (with derating)
Case Temp	+110°C maximum case temperate
Thermal Shutdown	At approximately 120°C
Thermal Impedance	10.5°C / watt without Heat sink 8.4°C / watt without Heat sink
Thermal shock	MIL-STD-810F
Vibration	10-55Hz, 10G, 30min along X, Y,Z
Humidity	5-95% RH
EMC	EN55022 Class A
ESD	EN61000-4-2
Radiated Immunity	EN61000-4-3
Fast Transients	EN61000-4-4
Surge	EN61000-4-5
Conducted Immunity	EN61000-4-6

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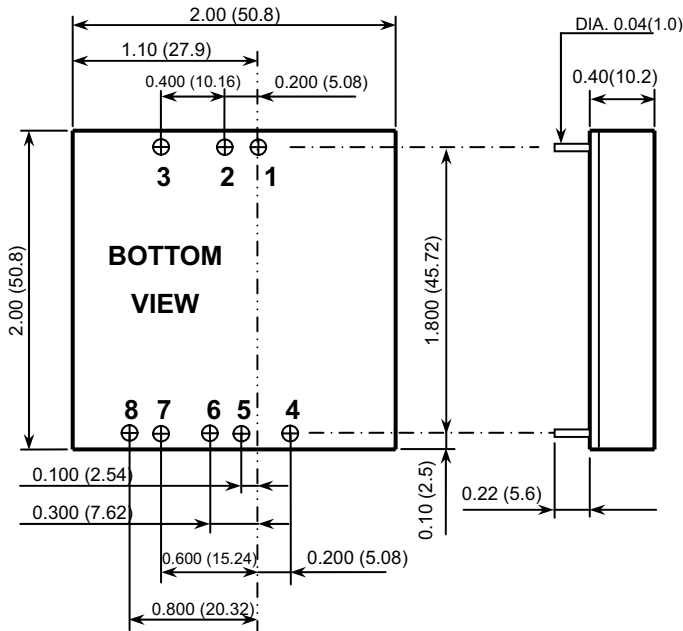
Model	Input V	Output V	Output A		Output ⁽⁴⁾ Ripple & Noise	Input A		Eff ⁽⁴⁾ (%)	Capacitor ⁽⁵⁾ Load max
			Min. load	Full load		No load ⁽³⁾	Full load ⁽²⁾		
FEC60-24S3P3	18 – 36 V	3.3 V	0mA	14000mA	75mVp-p	100mA	2264mA	89	36000uF
FEC60-24S05	18 – 36 V	5 V	0mA	12000mA	75mVp-p	130mA	2941mA	90	20400uF
FEC60-24S12	18 – 36 V	12 V	0mA	5000mA	100mVp-p	150mA	2907mA	90	3550uF
FEC60-24S15	18 – 36 V	15 V	0mA	4000mA	100mVp-p	150mA	2907mA	90	2300uF
FEC60-48S3P3	36 – 75 V	3.3 V	0mA	14000mA	75mVp-p	80mA	1132mA	89	36000uF
FEC60-48S05	36 – 75 V	5 V	0mA	12000mA	75mVp-p	90mA	1453mA	90	20400uF
FEC60-48S12	36 – 75 V	12 V	0mA	5000mA	100mVp-p	100mA	1453mA	90	3550uF
FEC60-48S15	36 – 75 V	15 V	0mA	4000mA	100mVp-p	100mA	1453mA	90	2300uF

- Notes:**
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)
MIL-STD-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment)
 - Maximum value at nominal input voltage and full load.
 - Typical value at nominal input voltage and no load.
 - Typical value at nominal input voltage and full load.
 - Test by minimum Vin and constant resistive load.
 - Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding -OUTPUT.
 - The ON/OFF control pin voltage is referenced to -Vin.
To order negative logic ON/OFF control add the suffix-N (Ex: FEC60-48S05-N).
 - Test condition with vertical direction by natural convection.
 - Heat sink is optional and P/N : **7G-0026A**.
 - The FEC60 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
Recommend: 24Vin : 6.8uF/50V 1812 MLCC
48Vin : 2.2uF/100V*2 PCS 1812 MLCC.
 - An external filter capacitor is required if the module has to meet EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220uF/100V, ESR 48mΩ.

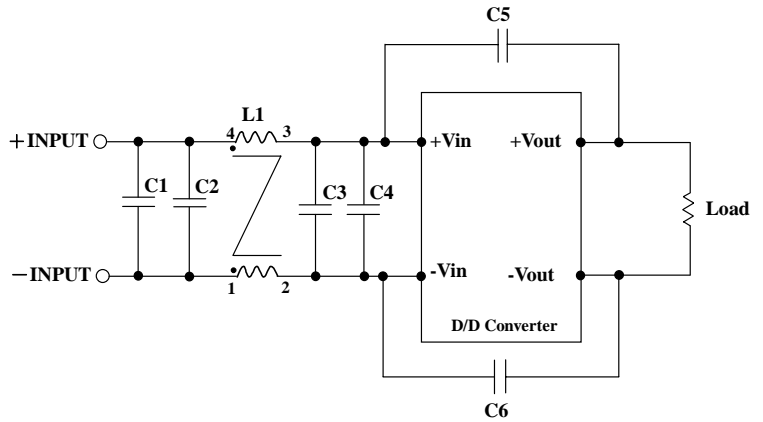


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- All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

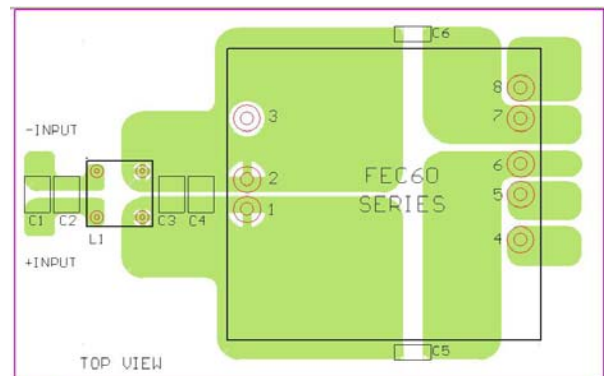
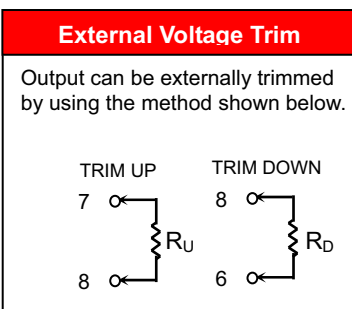


Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

	C1	C2	C3	C4	C5 & C6	L1
FEC60-24xxx	4.7uF/50V 1812MLCC	N/A	4.7uF/50V 1812MLCC	N/A	1000pF/2KV MLCC	450uH Common Choke PMT-048
FEC60-48xxx	2.2uF/100V 1812MLCC	2.2uF/100V 1812MLCC	2.2uF/100V 1812MLCC	N/A	1000pF/2KV MLCC	830uH Common Choke PMT-053

Pin Assignment	
PIN	SINGLE
1	+INPUT
2	-INPUT
3	CTRL
4	-SENSE
5	+SENSE
6	+OUTPUT
7	-OUTPUT
8	TRIM



Recommended EN55022 Class B Filter Circuit Layout