

FEC15 SERIES

DC / DC Single & Dual Output: 15 Watts



Features

- 2:1 standard input range
- Input options: 12V, 24V and 48VDC
- Single & Dual outputs
- Industry Standard 2 x 1in package
- High efficiency up to 83%
- Regulated output & Short circuit protection
- 1600V isolation
- Five sided continuous copper shield
- Remote ON / OFF (Negative or Positive) - **option**
- High operating temperature +85°C
- Fixed switching frequency
- Safety EN60950, UL1950
- EMC compliance

Specifications:

Input Voltage	12VDC (9 ~ 18) 24VDC (18 ~ 36) 48VDC (36 ~75)
Input Filter	Pi type
Input Surge Voltage. (100mS)	12V: 36VDC 24V: 50VDC. 48V: 100VDC
Input Reflected Ripple Current	20mA pk-pk (@ nominal input & 100% load
Start Up time	20mS constant resistive load
Remote ON/OFF (Positive logic) (Negative logic) (Option)	DC-DC ON Open or $3.5V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$ DC-DC ON Short or $0V < V_r < 1.2V$ DC-DC OFF Open or $3.5V < V_r < 12V$ Input current of remote control pin: 1mA Remote off state input current: 20mA
Output power	15 watts
Voltage Accuracy	±1.0%
Minim Load	See table
Line Regulation	Single ±0.5% Dual ±0.5%
Load Regulation	Single ±0.5% , Dual ±1% (Min% -100% load)
Cross Regulation	±5% Asymmetrical load: 25-100% load)
Ripple & noise	See table. 20MHZ bandwidth
Temp. Coefficient	±0.02% / °C
Transient Response	250uS (25% load step change)
Over Voltage Protection	3.3V: 3.9V 5.0V: 6.2V 12V: 15V 15V: 18V
Overload Protection	Typically 150% of load
Short Circuit protection	Continuous hiccup mode

Efficiency	Model dependant 79 ~ 87%
Isolation	1600VDC
Isolation Cap.	300pF
Switching Freq.	Single: 500KHz Dual: 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 25.4 x 10.2mm
Weight	27g
MTBF	2.011 x 10 ⁶ Hrs
Operating Temp	Standard: -40°C to +85°C (with derating)
Case Temp	+100°C maximum case temperature
Thermal Impedance	12°C / watt Standard convection 10°C / watt with optional heatsink
Thermal shock	MIL-STD-810F
Vibration	10-55Hz, 10G, 30min along X, Y,Z
Humidity	5-95% RH
EMC	EN55022 Class A Consult office for Class B design
ESD	EN61000-4-2
Radiated Immunity	EN61000-4-3
Fast Transients	EN61000-4-4
Surge	EN61000-4-5
Conducted Immunity	EN61000-4-6

FEC15 SERIES

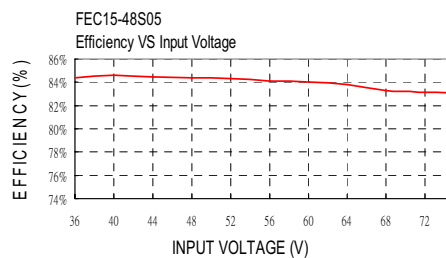
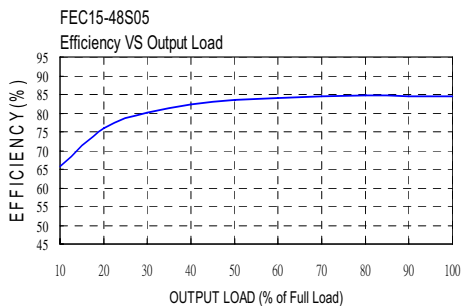
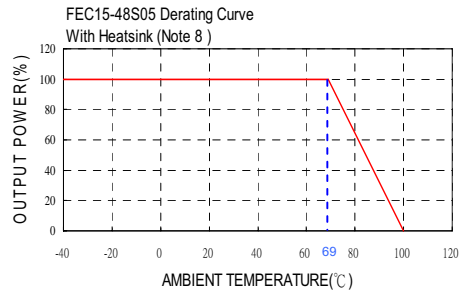
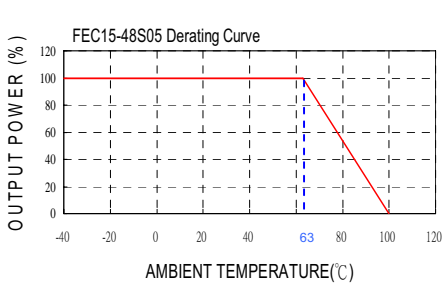
DC / DC Single & Dual Output: 15 Watts



Model	Input V	Output V	Output Current		Output Ripple & Noise	Input Current		Eff (%)	Capacitor Load max
			Min. load	Full load		No load	Full load		
FEC15-12S33	9 – 18 V	3.3 V	0mA	4000mA	50mVp-p	30mA	1467mA	79	10200uF
FEC15-12S05	9 – 18 V	5 V	15mA	3000mA	50mVp-p	25mA	1603mA	82	7050uF
FEC15-12S12	9 – 18 V	12 V	0mA	1250mA	50mVp-p	25mA	1524mA	86	1035uF
FEC15-12S15	9 – 18 V	15 V	0mA	1000mA	50mVp-p	20mA	1524mA	86	705uF
FEC15-12D05	9 – 18 V	± 5 V	0mA	± 1500mA	75mVp-p	20mA	1582mA	83	± 1020uF
FEC15-12D12	9 – 18 V	± 12 V	0mA	± 625mA	75mVp-p	30mA	1524mA	86	± 495uF
FEC15-12D15	9 – 18 V	± 15 V	±10mA	± 500mA	75mVp-p	35mA	1563mA	84	± 165uF
FEC15-24S33	18 – 36 V	3.3 V	0mA	4000mA	50mVp-p	15mA	724mA	80	10200uF
FEC15-24S05	18 – 36 V	5 V	15mA	3000mA	50mVp-p	10mA	781mA	84	7050uF
FEC15-24S12	18 – 36 V	12 V	0mA	1250mA	50mVp-p	20mA	772mA	85	1035uF
FEC15-24S15	18 – 36 V	15 V	10mA	1000mA	50mVp-p	15mA	772mA	85	705uF
FEC15-24D05	18 – 36 V	± 5 V	0mA	± 1500mA	75mVp-p	15mA	781mA	84	± 1020uF
FEC15-24D12	18 – 36 V	± 12 V	0mA	± 625mA	75mVp-p	25mA	762mA	86	± 495uF
FEC15-24D15	18 – 36 V	± 15 V	0mA	± 500mA	75mVp-p	25mA	762mA	86	± 165uF
FEC15-48S33	36 – 75 V	3.3 V	0mA	4000mA	50mVp-p	10mA	357mA	81	10200uF
FEC15-48S05	36 – 75 V	5 V	0mA	3000mA	50mVp-p	20mA	396mA	83	7050uF
FEC15-48S12	36 – 75 V	12 V	10mA	1250mA	50mVp-p	15mA	377mA	87	1035uF
FEC15-48S15	36 – 75 V	15 V	0mA	1000mA	50mVp-p	15mA	381mA	86	705uF
FEC15-48D05	36 – 75 V	± 5 V	0mA	± 1500mA	75mVp-p	10mA	386mA	85	± 1020uF
FEC15-48D12	36 – 75 V	± 12 V	0mA	± 625mA	75mVp-p	15mA	372mA	88	± 495uF
FEC15-48D15	36 – 75 V	± 15 V	0mA	± 500mA	75mVp-p	15mA	377mA	87	± 165uF

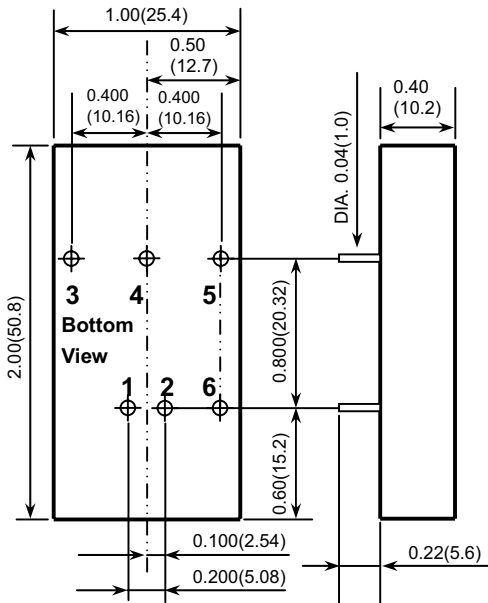
Notes:

1. MTBF as BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)
2. Typical value at nominal input voltage and full load resistive load.
3. 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.
4. The ON/OFF control pin voltage is referenced to -Vin. (Option)
To order positive logic ON-OFF control add the suffix **-P** (eg: FEC15-24S05-P) To order negative logic ON-OFF control add the suffix **-N** (eg: FEC15-24S05-N)
5. Heat sink is optional and **P/N: 7G-0020A**
6. The FEC15 series can meet EN55022 Class A with parallel an external capacitor to the input pins.
Recommend: 12Vin : 6.8µF/50V 1812 MLCC . 24Vin : 2.2µF/50V 1812 MLCC . 48Vin : 1.5µF/100V 1812 MLCC.
7. An external filter capacitor is required if the module has to meet EN61000-4-5. Recommended filter capacitor : Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.

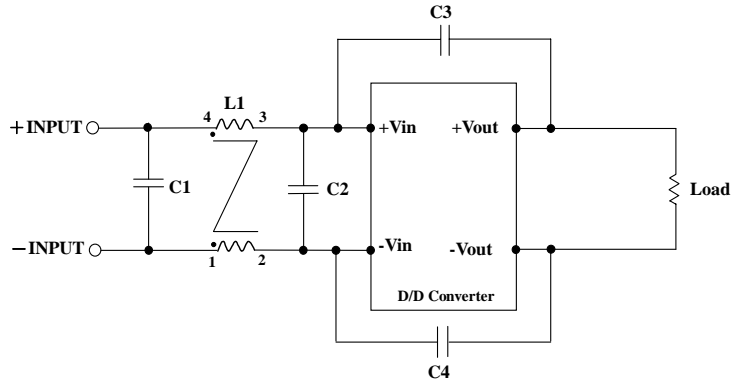


FEC15 SERIES

DC / DC Single & Dual Output: 15 Watts



- 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)

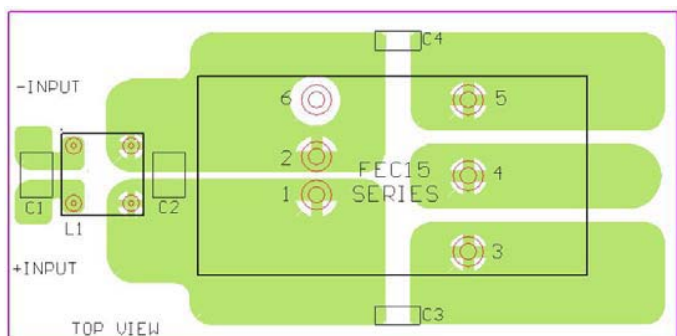


Recommended Filter for EN5022 Class B Compliance

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

	C1	C2	C3	C4	L1
FEC15-12xxx	4.7uF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke PMT-050
FEC15-24xxx	3.3uF/50V 1812 MLCC	N/A	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke PMT-050
FEC15-48xxx	2.2uF/100V 1812 MLCC	2.2uF/100V 1812 MLCC	1000pF/2KV MLCC	1000pF/2KV MLCC	325uH Common Choke PMT-050

Pin Assignment		
PIN	Single	Dual
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	NO PIN	COMMON
5	- Output	- Output
6	CTRL (Option)	CTRL (Option)



Recommended EN5022 Class B Filter Circuit Layout