

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) | Efficiency | Model dependant 79 ~ 87% |
| Input Filter | Pi type | Isolation | 1600VDC |
| Input Surge Voltage. (100mS) | 12V: 36VDC 24V: 50VDC. 48V: 100VDC | Isolation Cap. | 300pF |
| Input Reflected Ripple Current | 20mA pk-pk (@ nominal input & 100% load | Switching Freq. | Single: 500KHz Dual: 300KHz |
| Start Up time | 20mS constant resistive load | Safety | EN60950-1, UL60950-1 |
| 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 | Case Material | Nickel-coated copper |
| Output power | 15 watts | Base Material | Non-conductive black plastic |
| Voltage Accuracy | $\pm 1.0\%$ | Potting | Epoxy UL94-V0 |
| Minim Load | See table | Dimensions | 50.8 x 25.4 x 10.2mm |
| Line Regulation | Single $\pm 0.5\%$ Dual $\pm 0.5\%$ | Weight | 27g |
| Load Regulation | Single $\pm 0.5\%$, Dual $\pm 1\%$ (Min% -100% load) | MTBF | 2.011 x 10 ⁶ Hrs |
| Cross Regulation | $\pm 5\%$ Asymmetrical load: 25-100% load) | Operating Temp | Standard: -40°C to +85°C (with derating) |
| Ripple & noise | See table. 20MHZ bandwidth | Case Temp | +100°C maximum case temperature |
| Temp. Coefficient | $\pm 0.02\%$ / °C | Thermal Impedance | 12°C / watt Standard convection 10°C / watt with optional heatsink |
| Transient Response | 250uS (25% load step change) | Thermal shock | MIL-STD-810F |
| Over Voltage Protection | 3.3V: 3.9V 5.0V: 6.2V 12V: 15V 15V: 18V | Vibration | 10-55Hz, 10G, 30min along X, Y,Z |
| Overload Protection | Typically 150% of load | Humidity | 5-95% RH |
| Short Circuit protection | Continuous hiccup mode | 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 |

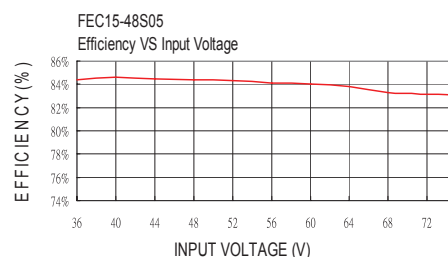
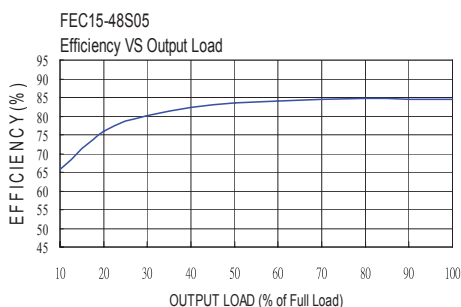
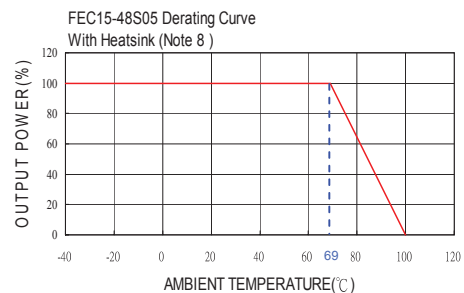
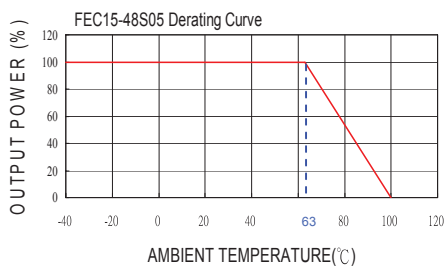
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| Model | Input V | Output V | Output Current | | Output Ripple & Noise | Input Current | | Eff (%) | Capacitor Load max |
|-------------|-----------|----------|----------------|-----------|-----------------------|---------------|-----------|---------|--------------------|
| | | | 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 |

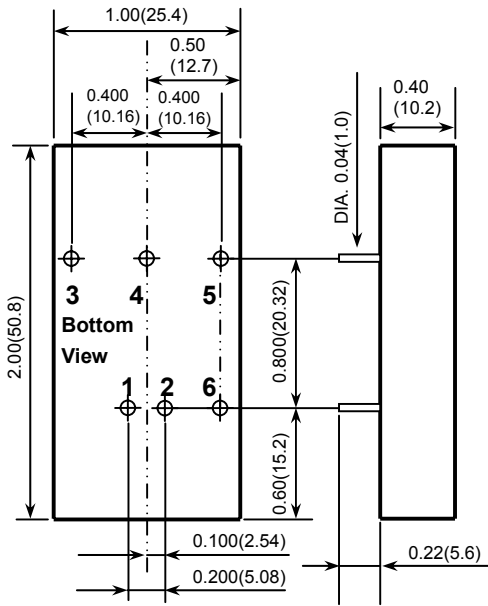
Notes:

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.

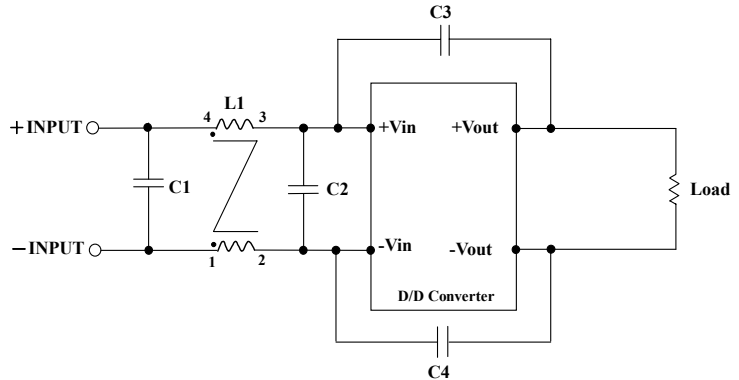


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- All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

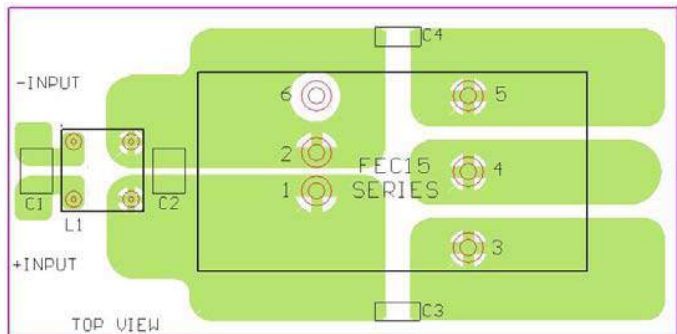


Recommended Filter for EN55022 Class B Compliance

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

| | C1 | C2 | C3 | C4 | 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 EN55022 Class B Filter Circuit Layout