



**POWER MATE  
TECHNOLOGY CO.,LTD.**

# FEC15-SERIES

VER:03 1 / 2



- 15 WATTS OUTPUT POWER
- 2:1 WIDE INPUT VOLTAGE RANGE
- INTERNATIONAL SAFETY STANDARD APPROVAL
- SIX-SIDED CONTINUOUS SHIELD
- HIGH EFFICIENCY UP TO 88%
- STANDARD 2" X 1" X 0.4" PACKAGE
- FIXED SWITCHING FREQUENCY

The FEC15 series offer 15 watts of output power from a 2 x 1 x 0.4 inch package. The FEC15 series with 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC. The FEC15 features 1600VDC of isolation, short-circuit and over-voltage protection, as well as six sided shielding. A safety approval to EN60950-1 and UL60950-1. All models are particularly suited to telecommunications, industrial, mobile telecom and test equipment applications.



**UL E193009  
TUV  
CB  
CE MARK**

## TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25°C otherwise noted

| OUTPUT SPECIFICATIONS                          |   |                         |                             |  |
|--|---|-------------------------|-----------------------------|--|
| Output power                                   |   |                         | 15 Watts max                |  |
| Voltage accuracy                               | Full load and nominal Vin               |                         | ± 1%                        |  |
| Minimum load (Note 1)                          |   |                         | 10% of FL                   |  |
| Line regulation                                | LL to HL at Full Load                   |                         | ± 0.5%                      |  |
| Load regulation                                | 10% to 100% FL                          | Single<br>Dual          | ± 0.5%<br>± 1%              |  |
| Cross regulation (Dual)                        | Asymmetrical load 25% / 100% FL         |                         | ± 5%                        |  |
| Ripple and noise                               | 20MHz bandwidth                         | Single<br>Dual          | 50mVp-p<br>75mVp-p          |  |
| Temperature coefficient                        |   |                         | ±0.02% / °C, max            |  |
| Transient response recovery time               | 25% load step change                    |                         | 250uS                       |  |
| Over voltage protection<br>(Zener diode clamp) | 3.3V output                             |                         | 3.9V                        |  |
|  | 5V output                               |                         | 6.2V                        |  |
|  | 12V output                              |                         | 15V                         |  |
|  | 15V output                              |                         | 18V                         |  |
| Over load protection                           | % of FL at nominal input                |                         | 150% max                    |  |
| Short circuit protection                       |   |                         | Hiccup, automatics recovery |  |
| INPUT SPECIFICATIONS                           |   |                         |                             |  |
| Input voltage range                            | 12V nominal input                       |                         | 9 – 18VDC                   |  |
|  | 24V nominal input                       |                         | 18 – 36VDC                  |  |
|  | 48V nominal input                       |                         | 36 – 75VDC                  |  |
| Input filter                                   |   |                         | Pi type                     |  |
| Input surge voltage<br>100mS max               | 12V input                               |                         | 36VDC                       |  |
|  | 24V input                               |                         | 50VDC                       |  |
|  | 48V input                               |                         | 100VDC                      |  |
| Input reflected ripple (Note 2)                | Nominal Vin and full load               |                         | 20mA <sub>p-p</sub>         |  |
| Start up time                                  | Nominal Vin and constant resistive load | Power up                | 20mS typ                    |  |
| Remote ON/OFF (Note 3)<br>(Positive logic)     | DC-DC ON                                | Open or 3.5V < Vr < 12V |                             |  |
|  | DC-DC OFF                               | Short or 0V < Vr < 1.2V |                             |  |
|  | (Negative logic)                        | DC-DC ON                | Short or 0V < Vr < 1.2V     |  |
|  |   | DC-DC OFF               | Open or 3.5V < Vr < 12V     |  |
| Remote off input current                       | Nominal input                           |                         | 20mA                        |  |

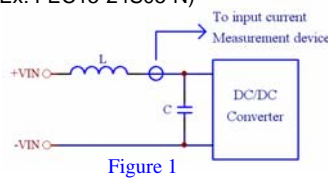
| GENERAL SPECIFICATIONS       |                                  |  |
|------------------------------|----------------------------------|--|
| Efficiency                   |                                  | See table  |
| Isolation voltage            |                                  | 1600VDC, min                                       |
| Isolation resistance         |                                  | 10 <sup>9</sup> ohms, min                          |
| Isolation capacitance        |                                  | 300pF, max   |
| Switching frequency          | Single output<br>Dual output     | 500KHz, typ<br>300KHz, typ                         |
| Approvals and standard       |                                  | IEC60950-1, UL60950-1, EN60950-1                   |
| Case material                |                                  | Nickel-coated copper                               |
| Base material                |                                  | Non-conductive black plastic                       |
| Potting material             |                                  | Epoxy (UL94-V0)                                    |
| Dimensions                   |                                  | 2.00 X 1.00 X 0.40 Inch<br>(50.8 X 25.4 X 10.2 mm) |
| Weight                       |                                  | 27g (0.95oz)                                       |
| MTBF (Note 4)                |                                  | 2.041 x 10 <sup>6</sup> hrs                        |
| ENVIRONMENTAL SPECIFICATIONS |                                  |  |
| Operating temperature range  |                                  | -40°C ~ +85°C (with derating)                      |
| Maximum case temperature     |                                  | 100°C  |
| Storage temperature range    |                                  | -55°C ~ +105°C                                     |
| Thermal impedance (Note 5)   | Nature convection                | 12°C/Watt  |
|                              | Nature convection with heat-sink | 10°C/Watt  |
| Thermal shock                |                                  | MIL-STD-810D                                       |
| Vibration                    |                                  | 10~55Hz, 10G, 30minutes along X,Y and Z            |
| Relative humidity            |                                  | 5% to 95% RH                                       |
| EMC CHARACTERISTICS          |                                  |  |
| Conducted emissions          | EN55022                          | Class A  |
| Radiated emissions           | EN55022                          | Class A  |
| ESD                          | EN61000-4-2                      | Perf. Criteria B                                   |
| Radiated immunity            | EN61000-4-3                      | Perf. Criteria A                                   |
| Fast transient               | EN61000-4-4                      | Perf. Criteria B                                   |
| Surge                        | EN61000-4-5                      | Perf. Criteria B                                   |
| Conducted immunity           | EN61000-4-6                      | Perf. Criteria A                                   |



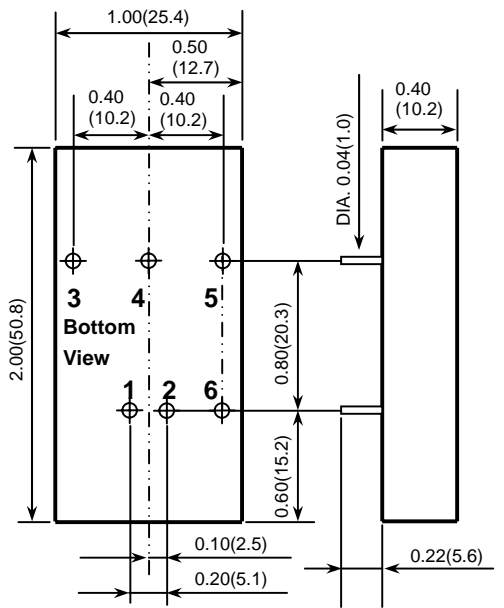
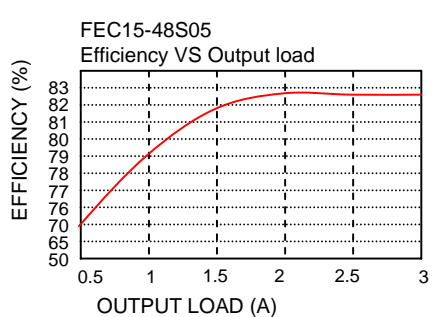
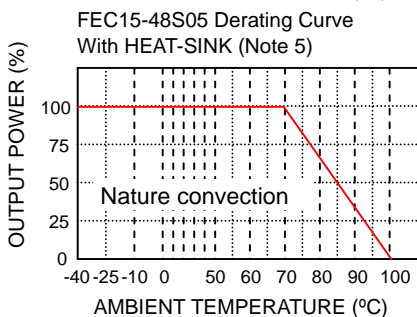
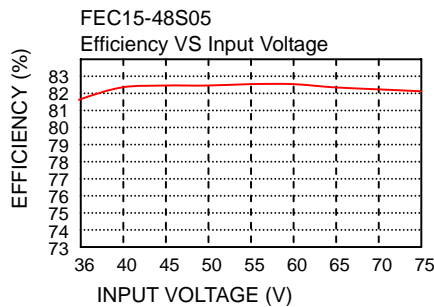
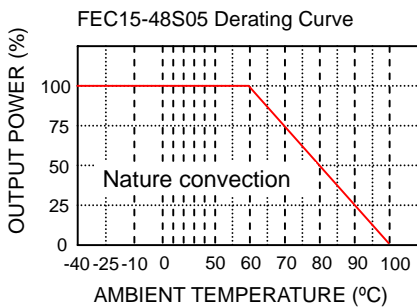
| Model Number | Input Range | Output Voltage | Output Current | Input Current <sup>(6)</sup> | Eff <sup>(7)</sup> (%) | Capacitor <sup>(8)</sup> Load max |
|--------------|-------------|----------------|----------------|------------------------------|------------------------|-----------------------------------|
| FEC15-12S33  | 9 – 18 VDC  | 3.3 VDC        | 4000mA         | 1467mA                       | 79                     | 10200uF                           |
| FEC15-12S05  | 9 – 18 VDC  | 5 VDC          | 3000mA         | 1603mA                       | 82                     | 7050uF                            |
| FEC15-12S12  | 9 – 18 VDC  | 12 VDC         | 1250mA         | 1524mA                       | 86                     | 1035uF                            |
| FEC15-12S15  | 9 – 18 VDC  | 15 VDC         | 1000mA         | 1524mA                       | 86                     | 705uF                             |
| FEC15-12D05  | 9 – 18 VDC  | ± 5 VDC        | ± 1500mA       | 1582mA                       | 83                     | ± 1020uF                          |
| FEC15-12D12  | 9 – 18 VDC  | ± 12 VDC       | ± 625mA        | 1524mA                       | 86                     | ± 495uF                           |
| FEC15-12D15  | 9 – 18 VDC  | ± 15 VDC       | ± 500mA        | 1563mA                       | 84                     | ± 165uF                           |
| FEC15-24S33  | 18 – 36 VDC | 3.3 VDC        | 4000mA         | 724mA                        | 80                     | 10200uF                           |
| FEC15-24S05  | 18 – 36 VDC | 5 VDC          | 3000mA         | 781mA                        | 84                     | 7050uF                            |
| FEC15-24S12  | 18 – 36 VDC | 12 VDC         | 1250mA         | 772mA                        | 85                     | 1035uF                            |
| FEC15-24S15  | 18 – 36 VDC | 15 VDC         | 1000mA         | 772mA                        | 85                     | 705uF                             |
| FEC15-24D05  | 18 – 36 VDC | ± 5 VDC        | ± 1500mA       | 781mA                        | 84                     | ± 1020uF                          |
| FEC15-24D12  | 18 – 36 VDC | ± 12 VDC       | ± 625mA        | 762mA                        | 86                     | ± 495uF                           |
| FEC15-24D15  | 18 – 36 VDC | ± 15 VDC       | ± 500mA        | 762mA                        | 86                     | ± 165uF                           |
| FEC15-48S33  | 36 – 75 VDC | 3.3 VDC        | 4000mA         | 357mA                        | 81                     | 10200uF                           |
| FEC15-48S05  | 36 – 75 VDC | 5 VDC          | 3000mA         | 396mA                        | 83                     | 7050uF                            |
| FEC15-48S12  | 36 – 75 VDC | 12 VDC         | 1250mA         | 377mA                        | 87                     | 1035uF                            |
| FEC15-48S15  | 36 – 75 VDC | 15 VDC         | 1000mA         | 381mA                        | 86                     | 705uF                             |
| FEC15-48D05  | 36 – 75 VDC | ± 5 VDC        | ± 1500mA       | 386mA                        | 85                     | ± 1020uF                          |
| FEC15-48D12  | 36 – 75 VDC | ± 12 VDC       | ± 625mA        | 372mA                        | 88                     | ± 495uF                           |
| FEC15-48D15  | 36 – 75 VDC | ± 15 VDC       | ± 500mA        | 377mA                        | 87                     | ± 165uF                           |

**Note**

- The FEC15 series required a minimum 10% 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
- Please add an external filter at converter input terminals when measuring input reflected ripple, as figure 1.  
L: Simulated source impedance of 12 μH C: Nippon chemi-con KMF series 100 μF/100V
- The ON/OFF control is option function. There are positive logic and negative logic. The pin voltage is referenced to negative 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)
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment)
- Heat sink is optional and P/N: 7G-0020A
- Maximum value at nominal input voltage and full load
- Typical value at nominal input voltage and full load
- Test by minimum Vin and constant resistive load.



| 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) |



- All dimensions in Inches (mm)  
Tolerance  $x.xx \pm 0.02 (x.xx \pm 0.5)$
- Pin Pitch tolerance  $\pm 0.014 (0.35)$