



## FEATURES

- 5 WATTS OUTPUT POWER
- OUTPUT CURRENT UP TO 1000mA
- STANDARD 2.0 X 1.0 X 0.4 INCH PACKAGE
- HIGH EFFICIENCY UP TO 83%
- 2:1 AND 4:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

## APPLICATIONS

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

## OPTIONS

Negative & Positive logic Remote On/Off

## DESCRIPTION

The FDC05 and FDC05-W series offer 5 watts of output power from a 2 x 1 x 0.4 inch package without derating to 71°C ambient temperature.

FDC05 series have 2:1 wide input voltage of 9-18, 18-36 and 36-75VDC.

FDC05-W series have 4:1 ultra wide input voltage of 9-36 and 18-75VDC.

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

### OUTPUT SPECIFICATIONS

|                          |                                 |        |                   |
|--------------------------|---------------------------------|--------|-------------------|
| Output power             | 5 Watts, max.                   |        |                   |
| Voltage accuracy         | Full load and nominal Vin       |        | ± 1%              |
| Minimum load             |                                 |        | 0%                |
| Line regulation          | LL to HL at Full Load           |        | ± 0.2%            |
| Load regulation          | No load to Full load            | Single | ± 0.2%            |
|                          |                                 | Dual   | ± 1%              |
| Cross regulation (Dual)  | Asymmetrical load 25% / 100% FL |        | ± 5%              |
| Ripple and noise         | 20MHz bandwidth                 |        | See table         |
| Temperature coefficient  |                                 |        | ±0.02% / °C, max. |
| Transient response       | 25% load step change            | Single | 200µs             |
| recovery time            | FL to 1/2 FL ±1% error band     | Dual   | 200µs             |
| Over load protection     | % of FL at nominal input        |        | 170%, typ.        |
| Short circuit protection | Continuous, automatics recovery |        |                   |

### GENERAL SPECIFICATIONS

|                        |                                                    |                             |                            |
|------------------------|----------------------------------------------------|-----------------------------|----------------------------|
| Efficiency             | See table                                          |                             |                            |
| Isolation Voltage      | Input to Output to Case                            |                             | 1600VDC, min.              |
| Isolation resistance   |                                                    |                             | 10 <sup>9</sup> ohms, min. |
| Isolation capacitance  |                                                    |                             | 300pF, max.                |
| Switching frequency    | Standard                                           |                             | 300KHz, typ.               |
|                        | "W" series                                         |                             | 200KHz, typ.               |
| Approvals and standard | IEC60950-1, UL60950-1, EN60950-1                   |                             |                            |
| Case material          | Nickel-coated copper                               |                             |                            |
| Base material          | Non-conducted 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 1)          | BELLCORE TR-NWT-000332                             | 3.145 x 10 <sup>6</sup> hrs |                            |
|                        | MIL-HDBK-217F                                      | 2.326 x 10 <sup>6</sup> hrs |                            |

### INPUT SPECIFICATIONS

|                                     |                                         |                         |             |
|-------------------------------------|-----------------------------------------|-------------------------|-------------|
| Input voltage range                 | FDC05                                   | 12V nominal input       | 9 – 18VDC   |
|                                     |                                         | 24V nominal input       | 18 – 36VDC  |
|                                     |                                         | 48V nominal input       | 36 – 75VDC  |
|                                     | FDC05-W                                 | 24V nominal input       | 9 – 36VDC   |
|                                     |                                         | 48V nominal input       | 18 – 75VDC  |
| Input filter                        |                                         |                         | Pi type     |
| Input surge voltage 100mS max       |                                         | 12V input               | 36VDC       |
|                                     |                                         | 24V input               | 50VDC       |
|                                     |                                         | 48V input               | 100VDC      |
| Input reflected ripple current      | Nominal Vin and full load               |                         | 20mAp-p     |
| Start up time                       | Nominal Vin and Constant resistive load | Power up                | 450mS, max. |
| Remote ON/OFF (Option) (Note 6)     |                                         |                         |             |
| (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 |             |
| Input current of remote control pin | Nominal Vin                             | -0.5mA ~ +1mA           |             |
| Remote off state input current      | Nominal Vin                             | 2.5mA                   |             |

### ENVIRONMENTAL SPECIFICATIONS

|                                                             |                                  |                               |  |
|-------------------------------------------------------------|----------------------------------|-------------------------------|--|
| Operating ambient temperature<br>(Reference derating curve) | Standard                         | -25°C ~ +85°C (with derating) |  |
|                                                             | M1 (Note 7)                      | -40°C ~ +85°C (non-derating)  |  |
|                                                             | M2 (W series)                    | -40°C ~ +85°C (with derating) |  |
| Maximum case temperature                                    | +100°C                           |                               |  |
| Storage temperature range                                   | -55°C ~ +105°C                   |                               |  |
| Thermal impedance (Note 8)                                  | Nature convection                | 12°C/watt                     |  |
|                                                             | Nature convection with heat-sink | 10°C/watt                     |  |
| Thermal shock                                               | MIL-STD-810F                     |                               |  |
| Vibration                                                   | MIL-STD-810F                     |                               |  |
| Relative humidity                                           | 5% to 95% RH                     |                               |  |

### EMC CHARACTERISTICS

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

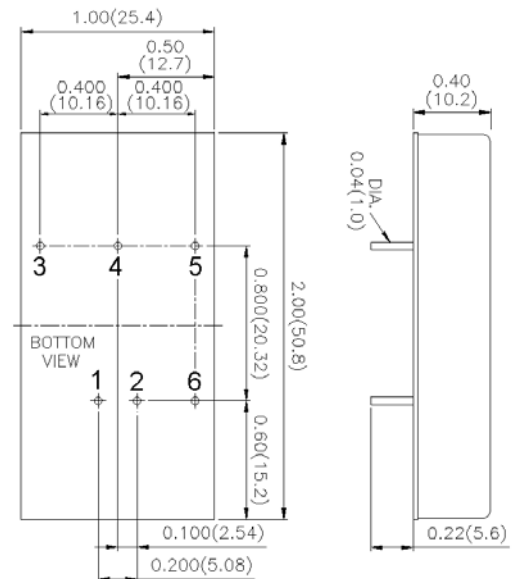
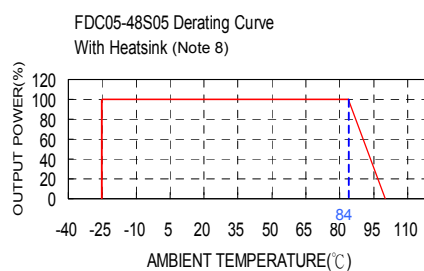
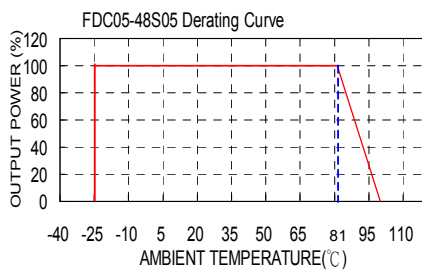




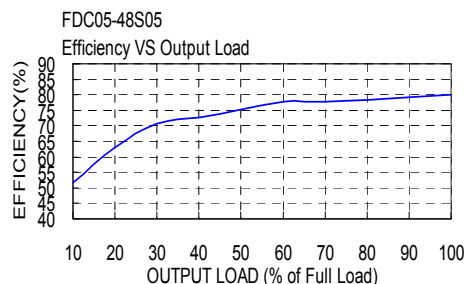
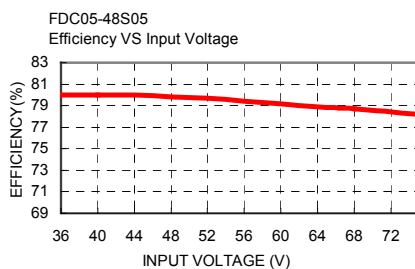
| Model Number    | Input Range           | Output Voltage | Output Current |           | Output <sup>(4)</sup><br>Ripple & Noise | Input Current          |                          | Eff <sup>(4)</sup><br>(%) | Capacitor Load max <sup>(5)</sup> |
|-----------------|-----------------------|----------------|----------------|-----------|-----------------------------------------|------------------------|--------------------------|---------------------------|-----------------------------------|
|                 |                       |                | Min. load      | Full load |                                         | No load <sup>(3)</sup> | Full load <sup>(2)</sup> |                           |                                   |
| FDC05-12S33     | 9 – 18 VDC            | 3.3 VDC        | 0mA            | 1000mA    | 50mVp-p                                 | 10mA                   | 382mA                    | 76                        | 3700μF                            |
| FDC05-12S05     | 9 – 18 VDC            | 5 VDC          | 0mA            | 1000mA    | 50mVp-p                                 | 10mA                   | 556mA                    | 79                        | 1700μF                            |
| FDC05-12S12     | 9 – 18 VDC            | 12 VDC         | 0mA            | 470mA     | 50mVp-p                                 | 10mA                   | 610mA                    | 81                        | 290μF                             |
| FDC05-12S15     | 9 – 18 VDC            | 15 VDC         | 0mA            | 400mA     | 50mVp-p                                 | 15mA                   | 658mA                    | 80                        | 188μF                             |
| FDC05-12D05     | 9 – 18 VDC            | ± 5 VDC        | 0mA            | ± 500mA   | 50mVp-p                                 | 20mA                   | 556mA                    | 79                        | ± 850μF                           |
| FDC05-12D12     | 9 – 18 VDC            | ± 12 VDC       | 0mA            | ± 230mA   | 50mVp-p                                 | 15mA                   | 597mA                    | 81                        | ± 140μF                           |
| FDC05-12D15     | 9 – 18 VDC            | ± 15 VDC       | 0mA            | ± 190mA   | 50mVp-p                                 | 20mA                   | 609mA                    | 82                        | ± 47μF                            |
| FDC05-24S33 (W) | 18 – 36 (9 – 36) VDC  | 3.3 VDC        | 0mA            | 1000mA    | 50mVp-p                                 | 15(5mA)                | 199 (188mA)              | 73 (77)                   | 3700μF                            |
| FDC05-24S05 (W) | 18 – 36 (9 – 36) VDC  | 5 VDC          | 0mA            | 1000mA    | 50mVp-p                                 | 15(5mA)                | 282 (274mA)              | 78 (80)                   | 1700μF                            |
| FDC05-24S12 (W) | 18 – 36 (9 – 36) VDC  | 12 VDC         | 0mA            | 470mA     | 50mVp-p                                 | 10(5mA)                | 305 (301mA)              | 81 (82)                   | 290μF                             |
| FDC05-24S15 (W) | 18 – 36 (9 – 36) VDC  | 15 VDC         | 0mA            | 400mA     | 50mVp-p                                 | 20(5mA)                | 325 (325mA)              | 81 (81)                   | 188μF                             |
| FDC05-24D05 (W) | 18 – 36 (9 – 36) VDC  | ± 5 VDC        | 0mA            | ± 500mA   | 50mVp-p                                 | 15(5mA)                | 278 (274mA)              | 79 (80)                   | ± 850μF                           |
| FDC05-24D12 (W) | 18 – 36 (9 – 36) VDC  | ± 12 VDC       | 0mA            | ± 230mA   | 50mVp-p                                 | 20(5mA)                | 295 (295mA)              | 82 (82)                   | ± 140μF                           |
| FDC05-24D15 (W) | 18 – 36 (9 – 36) VDC  | ± 15 VDC       | 0mA            | ± 190mA   | 50mVp-p                                 | 20(10mA)               | 308 (301mA)              | 81 (83)                   | ± 47μF                            |
| FDC05-48S33 (W) | 36 – 75 (18 – 75) VDC | 3.3 VDC        | 0mA            | 1000mA    | 50mVp-p                                 | 5(5mA)                 | 100 (100mA)              | 73 (73)                   | 3700μF                            |
| FDC05-48S05 (W) | 36 – 75 (18 – 75) VDC | 5 VDC          | 0mA            | 1000mA    | 50mVp-p                                 | 10(10mA)               | 145 (145mA)              | 76 (76)                   | 1700μF                            |
| FDC05-48S12 (W) | 36 – 75 (18 – 75) VDC | 12 VDC         | 0mA            | 470mA     | 50mVp-p                                 | 10(10mA)               | 151 (151mA)              | 82 (82)                   | 290μF                             |
| FDC05-48S15 (W) | 36 – 75 (18 – 75) VDC | 15 VDC         | 0mA            | 400mA     | 50mVp-p                                 | 10(10mA)               | 160 (163mA)              | 82 (81)                   | 188μF                             |
| FDC05-48D05 (W) | 36 – 75 (18 – 75) VDC | ± 5 VDC        | 0mA            | ± 500mA   | 50mVp-p                                 | 10(5mA)                | 141 (141mA)              | 78 (78)                   | ± 850μF                           |
| FDC05-48D12 (W) | 36 – 75 (18 – 75) VDC | ± 12 VDC       | 0mA            | ± 230mA   | 50mVp-p                                 | 10(10mA)               | 149 (149mA)              | 81 (81)                   | ± 140μF                           |
| FDC05-48D15 (W) | 36 – 75 (18 – 75) VDC | ± 15 VDC       | 0mA            | ± 190mA   | 50mVp-p                                 | 10(10mA)               | 154 (154mA)              | 81 (81)                   | ± 47μF                            |

#### Note

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.  
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment).
- Maximum value at nominal input voltage and full load of standard type.
- 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.
- The ON/OFF control pin voltage is referenced to -Vin  
To order positive logic ON/OFF control add the suffix-P (Ex: FDC05-48S05-P)  
To order negative logic ON/OFF control add the suffix-N (Ex: FDC05-48S05-N)
- M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard and M2 version.
- Heat sink is optional and P/N: 7G-0020C-F.
- 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, ESR 48mΩ.



- 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)



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