



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

# FDC05-SERIES



**UL E193009**  
**TUV R3-50007936**  
**CB JPTUV-003641**  
**CE MARK**

- 5 WATTS OUTPUT POWER
- 2:1 AND 4:1 WIDE INPUT VOLTAGE RANGE
- INTERNATIONAL SAFETY STANDARD APPROVAL
- SIX-SIDED CONTINUOUS SHIELD
- HIGH EFFICIENCY UP TO 83%
- STANDARD 2" X 1" X 0.4" PACKAGE
- FIXED SWITCHING FREQUENCY

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. The FDC05 and FDC05-W features 1600VDC of isolation, short-circuit protection, as well as six sided shielding. The safety approve with EN60950 and UL1950. All models are particularly suited to telecommunications, industrial, mobile telecom and test equipment applications. According the extended operation temperature range, there are "M1" and "M2" version for special application.

**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              |                         | ± 2%                           |
| Minimum load (Note 1)            |                                        |                         | 10% of FL                      |
| Line regulation                  | LL to HL at Full Load                  |                         | ± 0.2%                         |
| Load regulation                  | 10% to 100% FL Single                  |                         | ± 0.2%                         |
|                                  | Dual                                   |                         | ± 1%                           |
| Cross regulation (Dual)          | Asymmetrical load 25% / 100% FL        |                         | ± 5%                           |
| Ripple and noise                 | 20MHz bandwidth                        |                         | 50mVp-p                        |
| Temperature coefficient          |                                        |                         | ±0.02% / °C, max               |
| Transient response               | 25% load step change                   | Single                  | 200uS                          |
| recovery time                    | FL to 1/2 FL ±1% error band            | Dual                    | 200uS                          |
| Over load protection             | % of FL at nominal input               |                         | 170% typ                       |
| Short circuit protection         |                                        |                         | Continuous, automatic recovery |
| 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<br>100mS max | 12V input                              |                         | 36VDC                          |
|                                  | 24V input                              |                         | 50VDC                          |
|                                  | 48V input                              |                         | 100VDC                         |
| Input reflected ripple (Note 2)  | Nominal Vin and full load              |                         | 20mAp-p                        |
| Start up time                    | Nominal Vin and constant resistor load |                         | 600mS typ                      |
| Remote ON/OFF (Note 3)           |                                        |                         |                                |
| (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 Vin                            |                         | 2.5mA                          |

| 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<br>"W" series           |  | 300KHz, typ<br>200KHz, typ                         |
| Approvals and standard                                    |                                  |  | IEC60950, UL1950, EN60950                          |
| 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 4)                                             |                                  |  | 3.145 x 10 <sup>6</sup> hrs                        |
| ENVIRONMENTAL SPECIFICATIONS                              |                                  |  |                                                    |
| Operating temperature range<br>(Reference derating curve) | Standard                         |  | -25°C ~ +85°C (with derating)                      |
|                                                           | M1 (Note 5)                      |  | -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 6)                                | Nature convection                |  | 12°C/watt                                          |
|                                                           | Nature convection with heat-sink |  | 10°C/watt                                          |
| Thermal shock                                             |                                  |  | MIL-STD-810D                                       |
| Vibration                                                 |                                  |  | 10~55Hz, 2G, 30minutes along X,Y and Z             |
| Relative humidity                                         |                                  |  | 5% to 95% RH                                       |
| EMC CHARACTERISTICS                                       |                                  |  |                                                    |
| Conducted emissions                                       | EN55022                          |  | Level A                                            |
| Radiated emissions                                        | EN55022                          |  | Level A                                            |
| ESD                                                       | EN61000-4-2                      |  | Perf. Criteria2                                    |
| Radiated immunity                                         | EN61000-4-3                      |  | Perf. Criteria2                                    |
| Fast transient                                            | EN61000-4-4                      |  | Perf. Criteria2                                    |
| Surge                                                     | EN61000-4-5                      |  | Perf. Criteria2                                    |
| Conducted immunity                                        | EN61000-4-6                      |  | Perf. Criteria2                                    |



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## 5 WATTS DC-DC CONVERTER

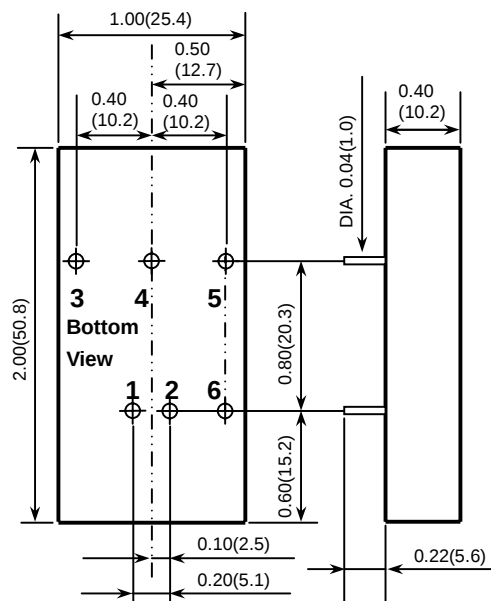
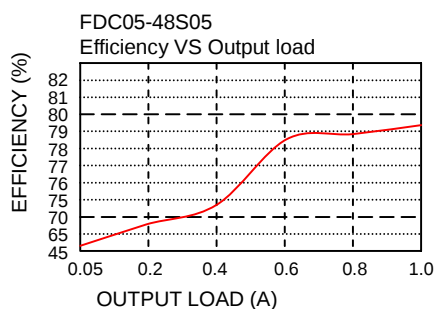
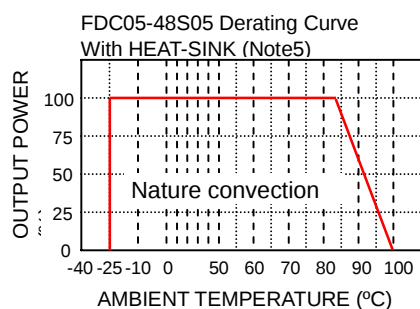
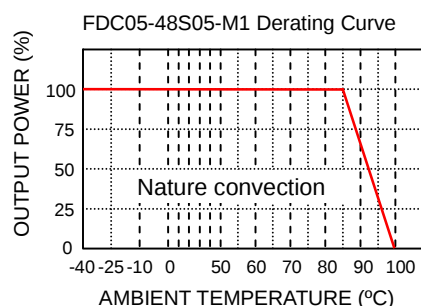
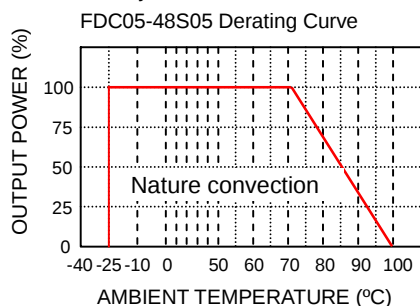
| Model Number    | Input Range           | Output Voltage | Output Current | Input Current <sup>(7)</sup> | Eff <sup>(8)</sup> (%) | Capacitor Load max <sup>(9)</sup> |
|-----------------|-----------------------|----------------|----------------|------------------------------|------------------------|-----------------------------------|
| FDC05-12S33     | 9 – 18 VDC            | 3.3 VDC        | 1000mA         | 387mA                        | 75                     | 3700uF                            |
| FDC05-12S05     | 9 – 18 VDC            | 5 VDC          | 1000mA         | 556mA                        | 79                     | 1700uF                            |
| FDC05-12S12     | 9 – 18 VDC            | 12 VDC         | 470mA          | 610mA                        | 81                     | 290uF                             |
| FDC05-12S15     | 9 – 18 VDC            | 15 VDC         | 400mA          | 658mA                        | 80                     | 188uF                             |
| FDC05-12D05     | 9 – 18 VDC            | ± 5 VDC        | ± 500mA        | 595mA                        | 74                     | ± 850uF                           |
| FDC05-12D12     | 9 – 18 VDC            | ± 12 VDC       | ± 230mA        | 597mA                        | 81                     | ± 140uF                           |
| FDC05-12D15     | 9 – 18 VDC            | ± 15 VDC       | ± 190mA        | 609mA                        | 82                     | ± 47uF                            |
| FDC05-24S33 (W) | 18 – 36 (9 – 36) VDC  | 3.3 VDC        | 1000mA         | 199 (196mA)                  | 73 (74)                | 3700uF                            |
| FDC05-24S05 (W) | 18 – 36 (9 – 36) VDC  | 5 VDC          | 1000mA         | 282 (274mA)                  | 78 (80)                | 1700uF                            |
| FDC05-24S12 (W) | 18 – 36 (9 – 36) VDC  | 12 VDC         | 470mA          | 305 (301mA)                  | 81 (82)                | 290uF                             |
| FDC05-24S15 (W) | 18 – 36 (9 – 36) VDC  | 15 VDC         | 400mA          | 325 (325mA)                  | 81 (81)                | 188uF                             |
| FDC05-24D05 (W) | 18 – 36 (9 – 36) VDC  | ± 5 VDC        | ± 500mA        | 289 (289mA)                  | 76 (76)                | ± 850uF                           |
| FDC05-24D12 (W) | 18 – 36 (9 – 36) VDC  | ± 12 VDC       | ± 230mA        | 295 (295mA)                  | 82 (82)                | ± 140uF                           |
| FDC05-24D15 (W) | 18 – 36 (9 – 36) VDC  | ± 15 VDC       | ± 190mA        | 308 (301mA)                  | 81 (83)                | ± 47uF                            |
| FDC05-48S33 (W) | 36 – 75 (18 – 75) VDC | 3.3 VDC        | 1000mA         | 100 (100mA)                  | 73 (73)                | 3700uF                            |
| FDC05-48S05 (W) | 36 – 75 (18 – 75) VDC | 5 VDC          | 1000mA         | 145 (149mA)                  | 76 (74)                | 1700uF                            |
| FDC05-48S12 (W) | 36 – 75 (18 – 75) VDC | 12 VDC         | 470mA          | 151 (151mA)                  | 82 (82)                | 290uF                             |
| FDC05-48S15 (W) | 36 – 75 (18 – 75) VDC | 15 VDC         | 400mA          | 160 (163mA)                  | 82 (81)                | 188uF                             |
| FDC05-48D05 (W) | 36 – 75 (18 – 75) VDC | ± 5 VDC        | ± 500mA        | 149 (149mA)                  | 74 (74)                | ± 850uF                           |
| FDC05-48D12 (W) | 36 – 75 (18 – 75) VDC | ± 12 VDC       | ± 230mA        | 149 (149mA)                  | 81 (81)                | ± 140uF                           |
| FDC05-48D15 (W) | 36 – 75 (18 – 75) VDC | ± 15 VDC       | ± 190mA        | 154 (154mA)                  | 81 (81)                | ± 47uF                            |

### Note

- The FDC05 (W) 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
- Simulated source impedance of 12uH. 12uH inductor on series with + Vin.
- 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: FDC05-24S05-P)  
To order negative logic ON-OFF control add the suffix-N (Ex: FDC05-24S05-N)
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C.  
(Ground fixed and controlled environment)
- 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-0020A.
- Maximum value at nominal input voltage and full load of standard type.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load.

### 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) |



- All dimensions in Inches (mm)
- Pin Pitch tolerance  $\pm 0.014(0.35)$