

DC - DC CONVERTER  
1W SINGLE & DUAL OUTPUT



## FEATURES

- EFFICIENCY UP TO 60%
- INPUT 5 V $\pm$ 10%
- DIP24 PACKAGE
- I / O ISOLATION
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 3 YEARS WARRANTY

## MODEL LIST

| MODEL NO. | INPUT VOLTAGE | INPUT CURRENT (typ.) | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) | CAPACITOR LOAD (max.) |
|-----------|---------------|----------------------|----------------|----------------|----------------|-------------|-------------|-----------------------|
|-----------|---------------|----------------------|----------------|----------------|----------------|-------------|-------------|-----------------------|

### Single Output Models

|              |             |        |         |          |        |     |     |              |
|--------------|-------------|--------|---------|----------|--------|-----|-----|--------------|
| FDD01 - 05S0 | 4.5~5.5 VDC | 315 mA | 1 WATTS | + 5 VDC  | 200 mA | 53% | 55% | 1000 $\mu$ F |
| FDD01 - 12S0 | 4.5~5.5 VDC | 310 mA | 1 WATTS | + 12 VDC | 84 mA  | 58% | 60% | 470 $\mu$ F  |
| FDD01 - 15S0 | 4.5~5.5 VDC | 300 mA | 1 WATTS | + 15 VDC | 66 mA  | 58% | 60% | 330 $\mu$ F  |

### Dual Output Models

|              |             |        |         |              |              |     |     |                   |
|--------------|-------------|--------|---------|--------------|--------------|-----|-----|-------------------|
| FDD01 - 05D0 | 4.5~5.5 VDC | 315 mA | 1 WATTS | $\pm$ 5 VDC  | $\pm$ 100 mA | 53% | 55% | $\pm$ 680 $\mu$ F |
| FDD01 - 12D0 | 4.5~5.5 VDC | 310 mA | 1 WATTS | $\pm$ 12 VDC | $\pm$ 42 mA  | 58% | 60% | $\pm$ 150 $\mu$ F |
| FDD01 - 15D0 | 4.5~5.5 VDC | 300 mA | 1 WATTS | $\pm$ 15 VDC | $\pm$ 33 mA  | 58% | 60% | $\pm$ 68 $\mu$ F  |

### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

#### GENERAL

| Characteristics         | Conditions                  | min.                  | typ.      | max.   | unit   |
|-------------------------|-----------------------------|-----------------------|-----------|--------|--------|
| Switching frequency     | Vi nom, Io nom              | 50                    |           |        | KHz    |
| Isolation voltage       | Input - Output              | 1,500                 |           |        | VDC    |
| Isolation resistance    | Input - Output, @ 500VDC    | 100                   |           |        | MΩ     |
| Ambient temperature     | Operating at Vi nom, Io nom | -25                   |           | + 71   | °C     |
| Case temperature        | Operating at Vi nom, Io nom |                       |           | + 90   | °C     |
| Derating                | Vi nom                      | See derating curve    |           |        |        |
| Storage temperature     | Non operational             | -40                   |           | + 100  | °C     |
| Relative humidity       | Vi nom, Io nom              | 20                    |           | 95     | % RH   |
| Temperature coefficient | Vi nom, Io min              |                       |           | ± 0.02 | % / °C |
| Dimension               |                             | L31.8 x W20.3 x H12.7 |           |        | mm     |
| MTBF                    | Bellcore issue 6@40°C, GB   |                       | 2,050,000 |        | Hours  |
| Cooling                 | Free air convection         |                       |           |        |        |

#### INPUT SPECIFICATIONS

| Characteristics          | Conditions                | min. | typ. | max. | unit |
|--------------------------|---------------------------|------|------|------|------|
| Input voltage range      | Ta min ... Ta max, Io nom | 4.5  | 5    | 5.5  | VDC  |
| No load input current    | Vi nom, Io = 0            |      |      | 65   | mA   |
| Input voltage w/o damage | Io nom                    |      |      | 7    | VDC  |
| Startup voltage          | Io nom                    |      | 4    |      | VDC  |

#### OUTPUT SPECIFICATIONS

| Characteristics               | Conditions                                    | min.                                           | typ. | max. | unit |
|-------------------------------|-----------------------------------------------|------------------------------------------------|------|------|------|
| Output voltage accuracy       | Vi nom, Io nom                                |                                                |      | ± 2  | %    |
| Minimum load                  | Vi nom    single output models                | 0                                              |      |      | %    |
|                               | dual output models (each output)              | 20                                             |      |      | %    |
| Line regulation               | Io nom, Vi min ... Vi max                     |                                                |      | ± 1  | %    |
| Load regulation               | Vi nom, Io 0 ... Io nom, single output models |                                                |      | ± 2  | %    |
|                               | Vi nom, Io min ... Io nom, dual output models |                                                |      | ± 3  | %    |
| Cross regulation (Dual model) | Aymmetrical load 20% - 100% FL                |                                                |      | ± 5  | %    |
| Startup time                  | Vi nom, Io nom                                |                                                |      | 50   | ms   |
| Transient recovery time       | Vi nom, I ~ 0.5 Io nom                        |                                                |      | 3    | ms   |
| Ripple & noise                | Vi nom, Io nom, BW = 20MHz                    |                                                |      | 100  | mV   |
| Efficiency                    | Vi nom, Io nom, Po / Pi                       | Up to 60%, See model list and efficiency curve |      |      |      |

#### CONTROL AND PROTECTION

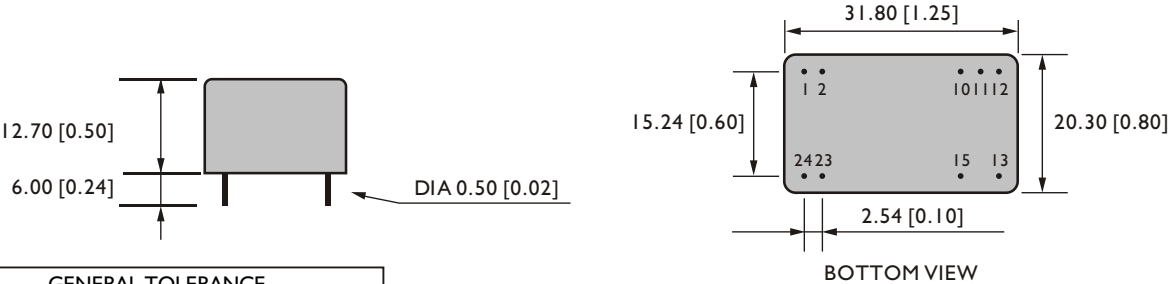
|                      |                                                      |
|----------------------|------------------------------------------------------|
| Input reversed       | External shunt diode, external fuse recommended 0.5A |
| Output short circuit | Current limited (Auto-recovery)                      |

PHYSICAL CHARACTERISTICS

|                  |                                                 |
|------------------|-------------------------------------------------|
| Case size        | 31.8 x 20.3 x 12.7 mm (1.25 x 0.8 x 0.5 inches) |
| Case material    | Plastic                                         |
| Weight           | 15 g                                            |
| Potting material | Epoxy                                           |

MECHANISM & PIN CONFIGURATION

mm [inch]

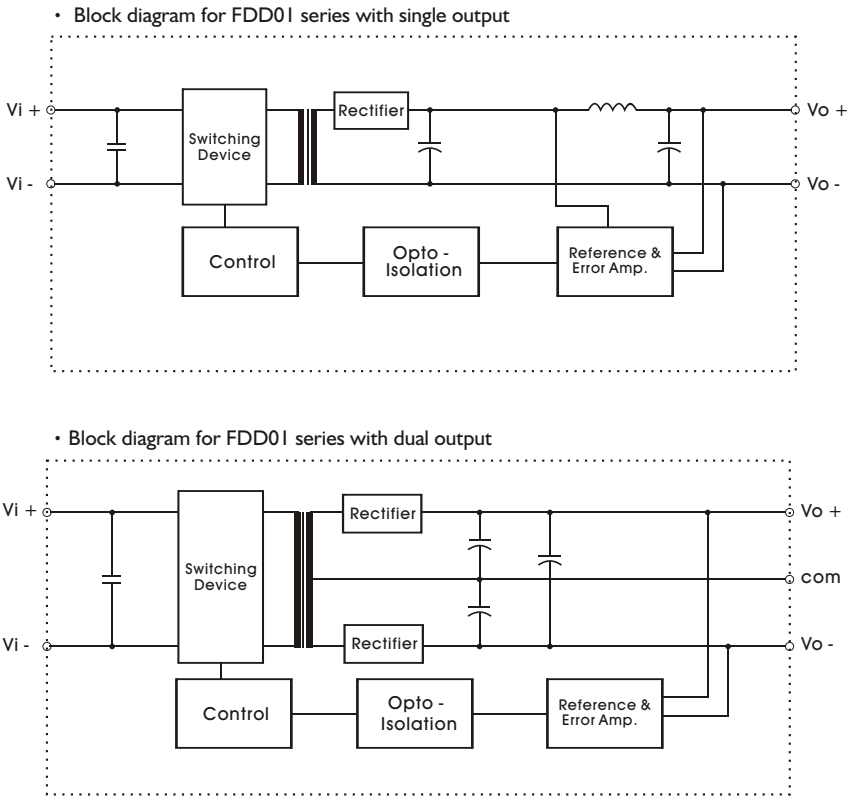


| GENERAL TOLERANCE          |             |
|----------------------------|-------------|
| 0.00[0.00] - 30.00[1.18]   | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72] | ±0.50[0.02] |

PIN ASSIGNMENT

| GENERAL |       |        |        |        |      |        |         |
|---------|-------|--------|--------|--------|------|--------|---------|
| PIN NO. | 1 & 2 | 10     | 11     | 12     | 13   | 15     | 23 & 24 |
| SINGLE  | Vi +  | NO PIN | NO PIN | Vo -   | Vo + | NO PIN | Vi -    |
| DUAL    | Vi +  | com    | com    | NO PIN | Vo - | Vo +   | Vi -    |

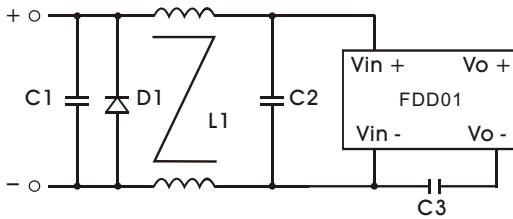
CIRCUIT SCHEMATIC



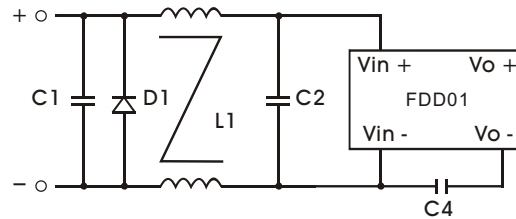
### RECOMMENDED CIRCUIT

- Recommended filter for EN 55032 Class B compliance

SINGLE OUTPUT MODELS



DUAL OUTPUT MODELS

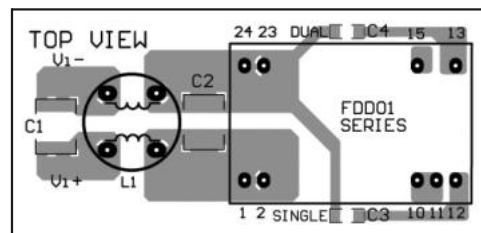


Note: D1 - Reverse Diode (1A/100V)

- The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

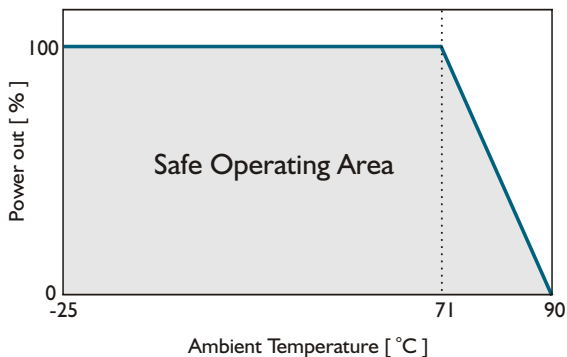
|            | C1                     | C2                     | C3           | C4           | L1               |
|------------|------------------------|------------------------|--------------|--------------|------------------|
| FDD01-XXS0 | 3.3 $\mu$ F / 16V MLCC | 4.7 $\mu$ F / 16V MLCC | 1nF/2KV MLCC |              | 3mH Common Choke |
| FDD01-XXD0 | 3.3 $\mu$ F / 16V MLCC | 4.7 $\mu$ F / 16V MLCC |              | 1nF/2KV MLCC | 3mH Common Choke |

- Recommended EN 55032 Class B filter circuit layout.

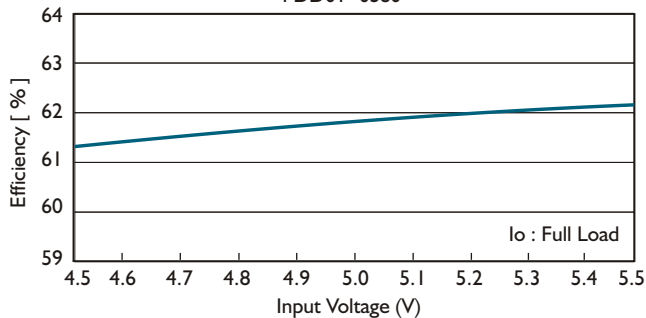


### DERATING AND EFFICIENCY CURVE

Temperature derating curve



Efficiency Vs Input Voltage  
FDD01-05S0



Efficiency Vs Output Load  
FDD01-05S0

