

FDD25 SERIES

DC - DC CONVERTER
20 ~ 30W SINGLE & DUAL OUTPUT



FEATURES

- 2:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT P_i FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 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 | | | | | | | | |
| FDD25 - 03S1 | 9~18 VDC | 2.1 A | 20 WATTS | +3.3 VDC | 6000 mA | 77% | 79% | 7000 μ F |
| FDD25 - 05S1 | 9~18 VDC | 2.55 A | 25 WATTS | + 5 VDC | 5000 mA | 81% | 83% | 7000 μ F |
| FDD25 - 12S1 | 9~18 VDC | 2.45 A | 25 WATTS | + 12 VDC | 2100 mA | 84% | 86% | 3500 μ F |
| FDD25 - 15S1 | 9~18 VDC | 2.42 A | 25 WATTS | + 15 VDC | 1700 mA | 85% | 87% | 1000 μ F |
| FDD25 - 03S2 | 18~36 VDC | 1.05 A | 20 WATTS | +3.3 VDC | 6000 mA | 78% | 80% | 7000 μ F |
| FDD25 - 05S2 | 18~36 VDC | 1.24 A | 25 WATTS | + 5 VDC | 5000 mA | 83% | 85% | 7000 μ F |
| FDD25 - 12S2 | 18~36 VDC | 1.45 A | 30 WATTS | + 12 VDC | 2500 mA | 84% | 86% | 3500 μ F |
| FDD25 - 15S2 | 18~36 VDC | 1.45 A | 30 WATTS | + 15 VDC | 2000 mA | 86% | 88% | 1000 μ F |
| FDD25 - 03S3 | 36~72 VDC | 0.5 A | 20 WATTS | +3.3 VDC | 6000 mA | 78% | 80% | 7000 μ F |
| FDD25 - 05S3 | 36~72 VDC | 0.6 A | 25 WATTS | + 5 VDC | 5000 mA | 83% | 85% | 7000 μ F |
| FDD25 - 12S3 | 36~72 VDC | 0.71 A | 30 WATTS | + 12 VDC | 2500 mA | 85% | 87% | 3500 μ F |
| FDD25 - 15S3 | 36~72 VDC | 0.7 A | 30 WATTS | + 15 VDC | 2000 mA | 86% | 88% | 1000 μ F |
| Dual Output Models | | | | | | | | |
| FDD25 - 12D1 | 9~18 VDC | 2.5 A | 25 WATTS | \pm 12 VDC | \pm 1050 mA | 83% | 85% | \pm 470 μ F |
| FDD25 - 15D1 | 9~18 VDC | 2.47 A | 25 WATTS | \pm 15 VDC | \pm 850 mA | 85% | 87% | \pm 220 μ F |
| FDD25 - 12D2 | 18~36 VDC | 1.45 A | 30 WATTS | \pm 12 VDC | \pm 1250 mA | 85% | 87% | \pm 470 μ F |
| FDD25 - 15D2 | 18~36 VDC | 1.44 A | 30 WATTS | \pm 15 VDC | \pm 1000 mA | 86% | 88% | \pm 220 μ F |
| FDD25 - 12D3 | 36~72 VDC | 0.73 A | 30 WATTS | \pm 12 VDC | \pm 1250 mA | 85% | 87% | \pm 470 μ F |
| FDD25 - 15D3 | 36~72 VDC | 0.72 A | 30 WATTS | \pm 15 VDC | \pm 1000 mA | 87% | 89% | \pm 220 μ 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 | | 200 | | KHz |
| Isolation voltage | Input - Output | 1500 | | | VDC |
| Isolation resistance | Input - Output, @ 500VDC | 100 | | | MΩ |
| Isolation capacitance | 100KHz / 1V | | | 1000 | PF |
| Ambient temperature | Operating at Vi nom, Io nom | -25 | | + 71 | °C |
| Case temperature | Operating at Vi nom, Io nom | | | + 100 | °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 | | L50.8 x W50.8 x H12.0 | | | mm |
| MTBF | Belcore issue 6@40°C, GB | | 720000 | | Hours |
| Cooling | Free air convection | | | | |

INPUT SPECIFICATIONS

| Characteristics | Conditions | min. | typ. | max. | unit |
|--------------------------|---------------------------|------------|------|------|------|
| Input voltage range | Ta min ... Ta max, Io nom | 9 | 12 | 18 | VDC |
| | | 18 | 24 | 36 | VDC |
| | | 36 | 48 | 72 | VDC |
| No load input current | Vi nom, Io = 0 | 12V models | | 20 | mA |
| | | 24V models | | 15 | mA |
| | | 48V models | | 10 | mA |
| Input voltage w/o damage | Io nom | 12V models | | 20 | VDC |
| | | 24V models | | 40 | VDC |
| | | 48V models | | 75 | VDC |
| Startup voltage | Io nom | 12V models | 8.5 | | VDC |
| | | 24V models | 15 | | VDC |
| | | 48V models | 35 | | VDC |
| Input filter | Pi type | | | | |

OUTPUT SPECIFICATIONS

| Characteristics | Conditions | min. | typ. | max. | unit |
|-------------------------------|--|--|------|------|------|
| Output voltage accuracy | Vi nom, Io nom | | | ± 2 | % |
| Minimum load | Vi nom | 0 | | | % |
| | single output models dual output models (each output) | 10 | | | % |
| 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 | | | ± 5 | % |
| Cross regulation (Dual model) | Aymmetrical load 10% - 100% FL | | | ± 5 | % |
| Startup time | Vi nom, Io nom | | | 30 | ms |
| Transient recovery time | Vi nom, I ~ 0.5 Io nom | | | 500 | μs |
| Ripple & noise | Vi nom, Io nom, BW = 20MHz | 3.3V & 5V models 12V, 15V & dual | | 100 | mV |
| | | 3.3V model 5V, 12V, 15V & dual | | 150 | mV |
| Voltage trim range (I) | Vi nom, Io nom | | ± 5 | | % |
| | | | ± 10 | | % |
| Efficiency | Vi nom, Io nom, Po / Pi | Up to 89%, See model list and efficiency curve | | | |

NOTE 1 : Pls refer to Fig 1 & Table 1 for connection and resistance recommended.

CONTROL AND PROTECTION

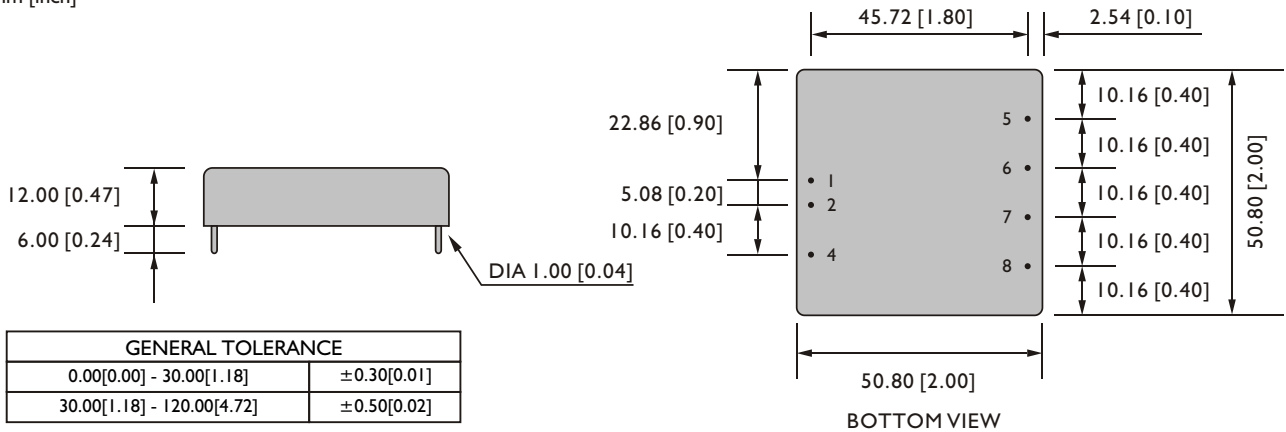
| | |
|----------------------------|---|
| Remote ON / OFF | ON : opened or 5 ~ 10VDC applied, reference to input GND OFF : -0.3 ~ 2VDC applied, reference to input GND |
| Input reversed | Shunt diode built in, external fuse recommended (12Vin : 3A, 24Vin : 2A, 48Vin : 1A) |
| Output short circuit | Current limited (Auto-recovery) |
| Rated over load protection | I 10%min.... 140%max |

PHYSICAL CHARACTERISTICS

| | |
|------------------|---|
| Case size | 50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches) |
| Case material | Plastic base / Metal case |
| Weight | 70 g |
| Patting material | Epoxy |

MECHANISM & PIN CONFIGURATION

mm [inch]

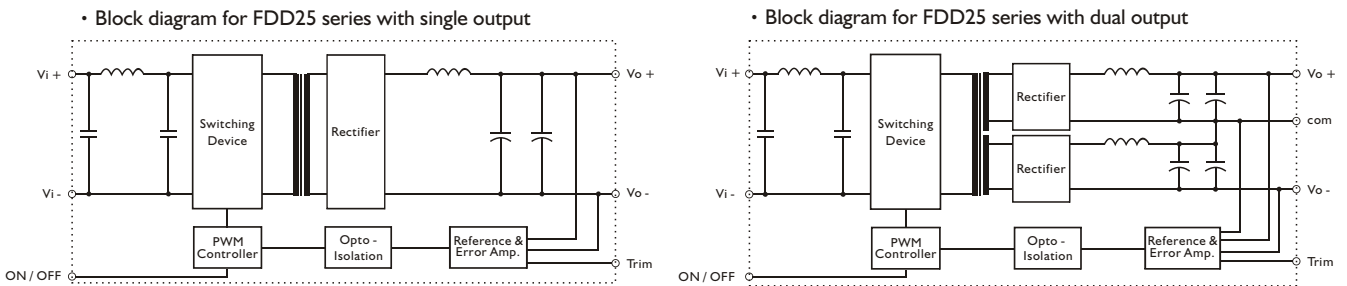


PIN ASSIGNMENT

GENERAL

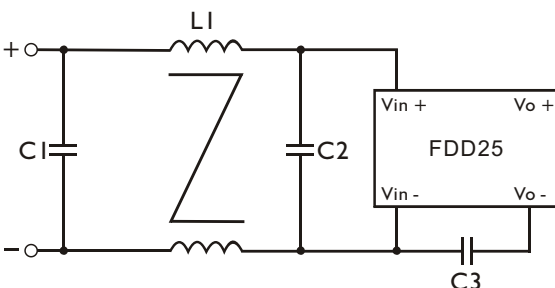
| PIN NO. | 1 | 2 | 4 | 5 | 6 | 7 | 8 |
|---------|------|------|--------|--------|------|------|------|
| SINGLE | Vi + | Vi - | ON/OFF | NO PIN | Vo + | Vo - | Trim |
| DUAL | Vi + | Vi - | ON/OFF | Vo + | com | Vo - | Trim |

CIRCUIT SCHEMATIC



RECOMMENDED CIRCUIT

• Recommended filter for EN55022 Class B compliance

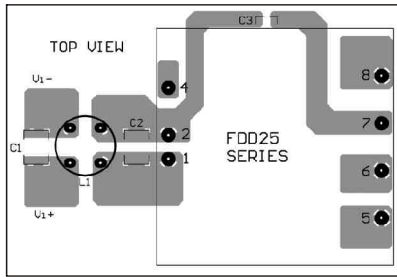


• The components used in the above figure, together with the manufacturer part numbers for these components, are as follows.

| | C1 | C2 | C3 | L1 |
|------------|-------------------------|-------------------------|----------------|--------------------|
| FDD25-XXX1 | 4.7 μ F / 50V MLCC | 4.7 μ F / 50V MLCC | 1nF / 2KV MLCC | 1.5mH Common Choke |
| FDD25-XXX2 | 3.3 μ F / 50V MLCC | 3.3 μ F / 50V MLCC | 1nF / 2KV MLCC | 1.5mH Common Choke |
| FDD25-XXX3 | 3.3 μ F / 100V MLCC | 3.3 μ F / 100V MLCC | 1nF / 2KV MLCC | 1.5mH Common Choke |

RECOMMENDED CIRCUIT

- Recommended EN 55022 Class B filter circuit layout.



DERATING AND EFFICIENCY CURVE

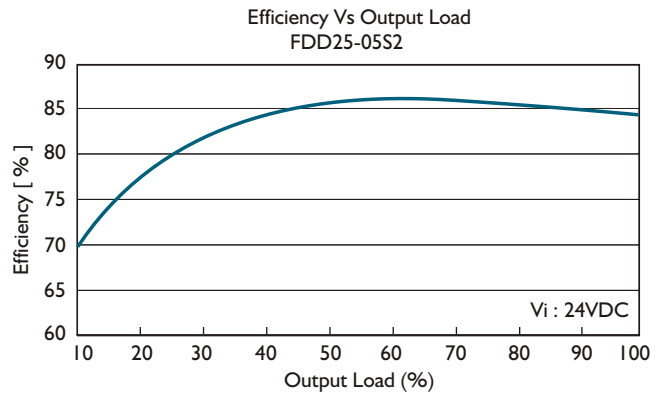
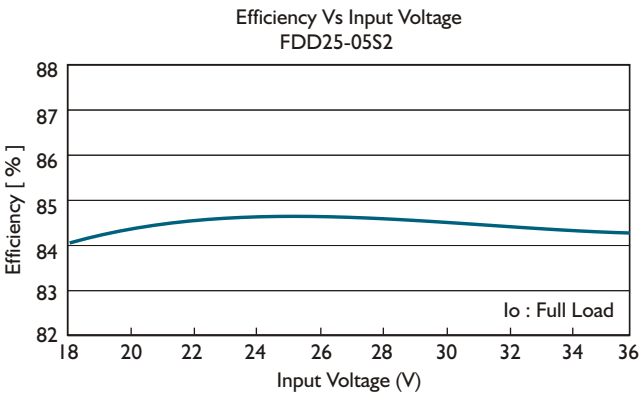
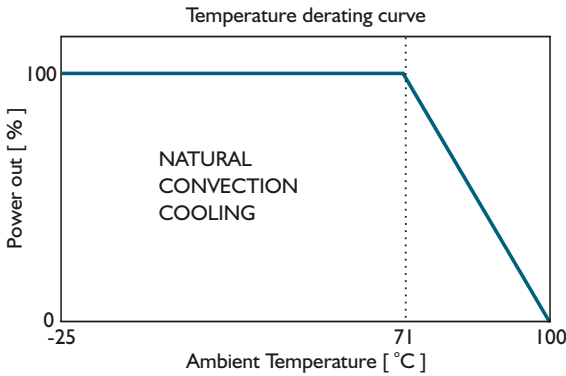
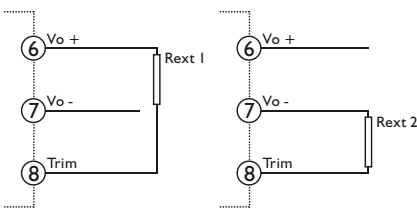


Fig. 1 Trim connection

(For Single output)



(For Dual output)

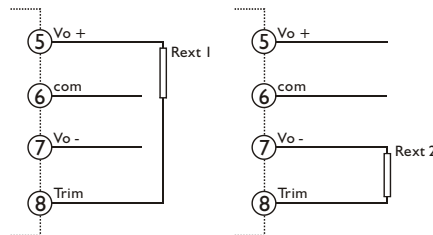


Table 1 Typical resistor values for various output voltage adjustment settings

| Type | Rext 1 | | Rext 2 | |
|------------|--------------|-------------|--------------|-------------|
| | Vo nom -2.5% | Vo nom -5% | Vo nom +2.5% | Vo nom +5% |
| FDD25-03SX | 3.3KΩ | 1KΩ | 12KΩ | 5.6KΩ |
| Type | Vo nom -5% | Vo nom -10% | Vo nom +5% | Vo nom +10% |
| FDD25-05SX | 6.8KΩ | 680Ω | 4.7KΩ | 680Ω |
| FDD25-12SX | 22KΩ | 6.2KΩ | 6.2KΩ | 0Ω |
| FDD25-15SX | 150KΩ | 6.2KΩ | 20KΩ | 3.9KΩ |
| FDD25-12DX | 150KΩ | 68KΩ | 10KΩ | 1.5KΩ |
| FDD25-15DX | 330KΩ | 180KΩ | 27KΩ | 6.8KΩ |



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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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