

TDD25 SERIES

DC - DC CONVERTER
23 ~ 25W SINGLE & DUAL OUTPUT



FEATURES

- EFFICIENCY UP TO 86%
- 2:1 & 3:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- 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 | | | | | | | | |
| TDD25 - 03S2 | 18~60 VDC | 1.17 A | 23 WATTS | +3.3 VDC | 7000 mA | 78% | 80% | 3500 μ F |
| TDD25 - 05S2 | 18~60 VDC | 1.20 A | 25 WATTS | + 5 VDC | 5000 mA | 84% | 86% | 3500 μ F |
| TDD25 - 12S2 | 18~60 VDC | 1.13 A | 24 WATTS | + 12 VDC | 2000 mA | 84% | 86% | 470 μ F |
| TDD25 - 15S2 | 18~60 VDC | 1.18 A | 25 WATTS | + 15 VDC | 1700 mA | 84% | 86% | 300 μ F |
| TDD25 - 03S3 | 35~75 VDC | 0.58 A | 23 WATTS | +3.3 VDC | 7000 mA | 78% | 80% | 3500 μ F |
| TDD25 - 05S3 | 35~75 VDC | 0.60 A | 25 WATTS | + 5 VDC | 5000 mA | 84% | 86% | 3500 μ F |
| TDD25 - 12S3 | 35~75 VDC | 0.56 A | 24 WATTS | + 12 VDC | 2000 mA | 84% | 86% | 470 μ F |
| TDD25 - 15S3 | 35~75 VDC | 0.59 A | 25 WATTS | + 15 VDC | 1700 mA | 84% | 86% | 300 μ F |
| Dual Output Models | | | | | | | | |
| TDD25 - 12D2 | 18~60 VDC | 1.11 A | 25 WATTS | \pm 12 VDC | \pm 1000 mA | 84% | 86% | \pm 220 μ F |
| TDD25 - 15D2 | 18~60 VDC | 1.21 A | 25 WATTS | \pm 15 VDC | \pm 850 mA | 84% | 86% | \pm 100 μ F |
| TDD25 - 12D3 | 35~75 VDC | 0.59 A | 25 WATTS | \pm 12 VDC | \pm 1000 mA | 84% | 86% | \pm 220 μ F |
| TDD25 - 15D3 | 35~75 VDC | 0.61 A | 25 WATTS | \pm 15 VDC | \pm 850 mA | 84% | 86% | \pm 100 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 | | | 300 | | KHz |
| Isolation voltage | Input - Output | | 1,500 | | | VDC |
| Isolation resistance | Input - Output, @ 500VDC | | 100 | | | MΩ |
| Isolation capacitance | 100KHz / 1V | | | | 1,000 | PF |
| Ambient temperature | Vi nom, | 3.3V & 5V output models | -25 | | + 61 | °C |
| | Io nom | 12V, 15V & dual output models | -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 | | | L76.2 x W50.8 x H12 | | | mm |
| MTBF | Bellcore issue 6@40°C, GB | | | 701.800 | | Hours |
| Cooling | Free air convection | | | | | |

| INPUT SPECIFICATIONS | | | | | | |
|--------------------------|---------------------------|-----|------|------|------|------|
| Characteristics | Conditions | | min. | typ. | max. | unit |
| Input voltage range | Ta min ... Ta max, Io nom | | 18 | 24 | 60 | VDC |
| | | | 35 | 48 | 75 | VDC |
| No load input current | Vi nom, Io = 0 | 24V | | 20 | mA | |
| | | 48V | | 15 | mA | |
| Input voltage w/o damage | Io nom | 24V | | 65 | VDC | |
| | | 48V | | 80 | VDC | |
| Startup voltage | Io nom | 24V | | 16 | VDC | |
| | | 48V | | 30 | 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 | 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 | | | | ± 5 | % |
| Cross regulation (Dual model) | Aymmetrical load 20% - 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 | | | 150 | mV |
| | | 12V, 15V & dual | | | Vout x ± 1% | mV |
| Voltage trim range * | Vi nom | 3.3V | | ± 5 | | % |
| | | 5V, 12V, 15V & dual | | ± 10 | | % |
| Efficiency | Vi nom, Io nom, Po / Pi | | Up to 86%, See model list and efficiency curve | | | |

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

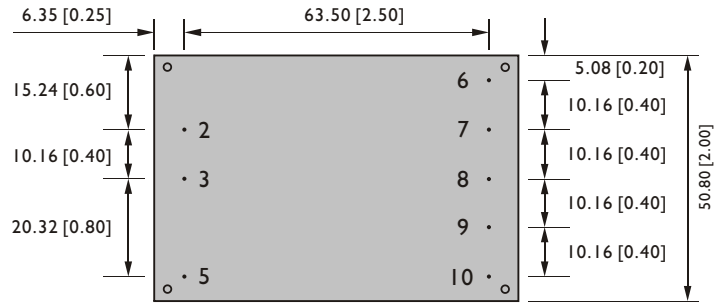
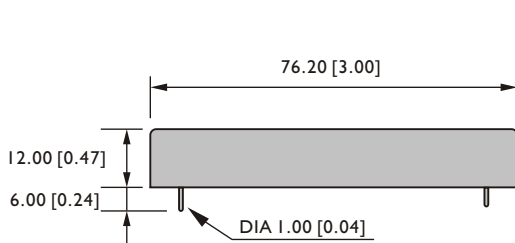
| CONTROL AND PROTECTION | |
|----------------------------|---|
| Remote ON / OFF | ON: opened or 8 ~ 10VDC applied, reference to input GND OFF: -0.3 ~ 2VDC applied, reference to input GND |
| Input reversed | Shunt diode built in, external fuse recommended (24Vin : 2A, 48Vin : 1.5A) |
| Output short circuit | Current limited (Auto-recovery) |
| Rated over load protection | 110%min....140%max |

PHYSICAL CHARACTERISTICS

| | |
|------------------|---|
| Case size | 76.2 x 50.8 x 12 mm (3 x 2 x 0.47 inches) |
| Case material | Plastic base / Metal case |
| Weight | 105 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] |

BURL AT 4 CORNER
BOTTOM VIEW

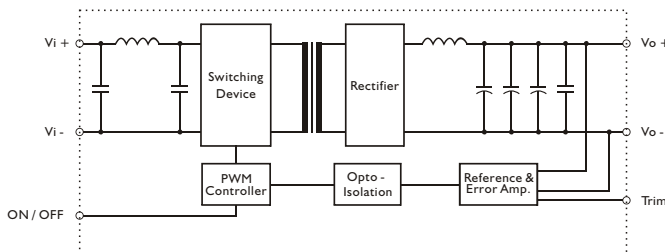
PIN ASSIGNMENT

GENERAL

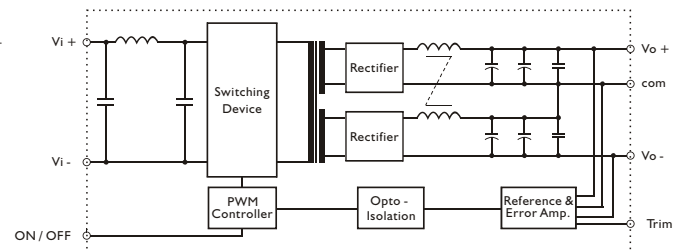
| PIN NO. | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------|------|------|----------|-------|-------|------|------|------|
| SINGLE | Vi - | Vi + | ON / OFF | N. C. | N. C. | Vo - | Vo + | Trim |
| DUAL | Vi - | Vi + | ON / OFF | Vo - | N. C. | com | Vo + | Trim |

CIRCUIT SCHEMATIC

• Block diagram for TDD25 series with single output

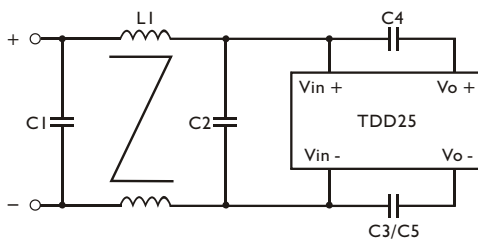


• Block diagram for TDD25 series with dual output



RECOMMENDED CIRCUIT

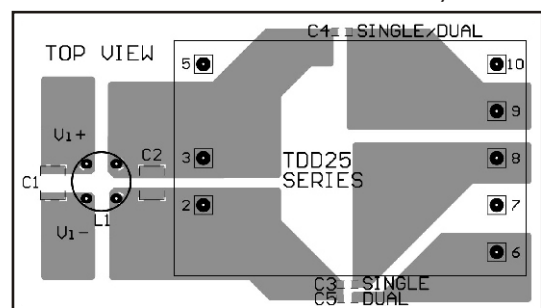
• Recommended filter for EN 55032 Class B compliance.



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

| | C1 | C2 | C3/C4/C5 | L1 |
|------------|--------------------|--------------------|------------------|----------------------|
| TDD25-XXSX | 6.8 μF / 100V MLCC | 6.8 μF / 100V MLCC | InF / 2KV MLCC | 500 μH Command Chock |
| TDD25-XXDX | 6.8 μF / 100V MLCC | 6.8 μF / 100V MLCC | 2.2nF / 2KV MLCC | 500 μH Command Chock |

• Recommended EN 55032 Class B filter circuit layout.



DERATING AND EFFICIENCY CURVE

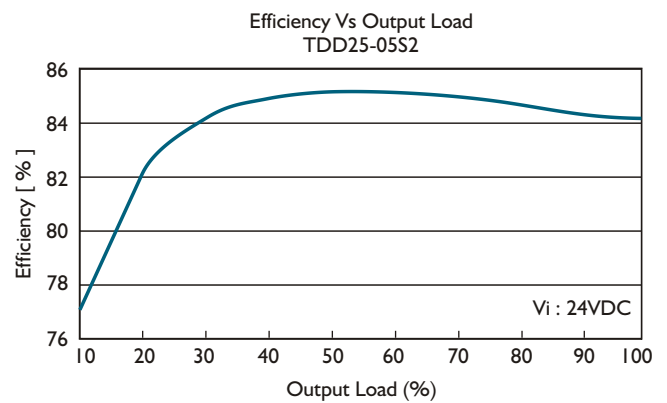
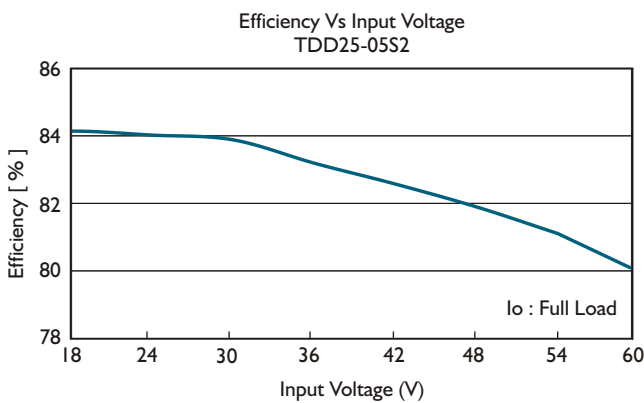
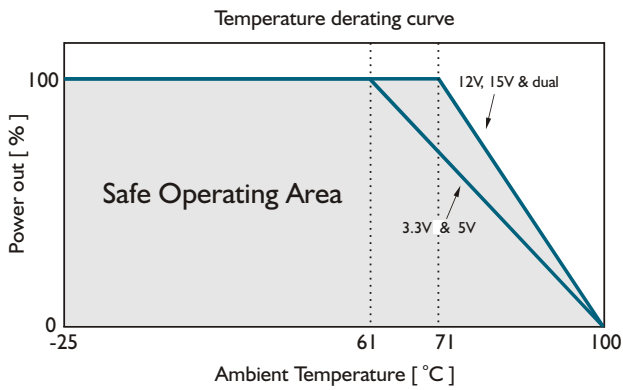
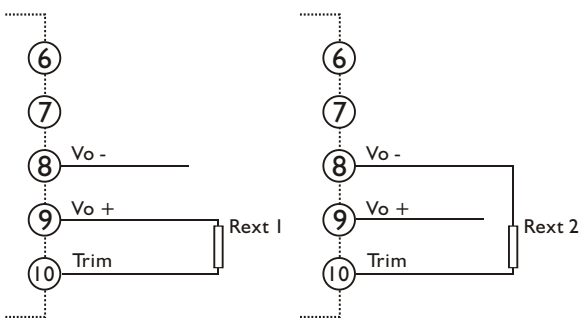


Fig. 1 Trim connection

(For Single output)



(For Dual output)

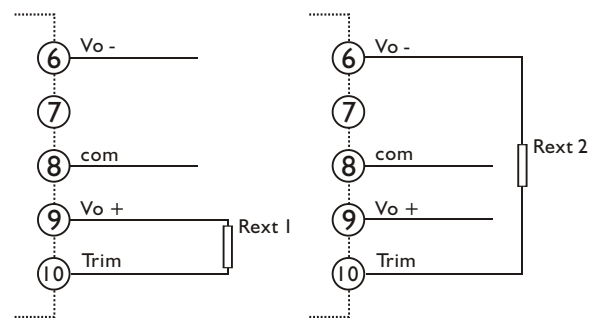


Table I Typical resistor values for various output voltage adjustment settings

| Type | Rext 1 | | Rext 2 | |
|------------|--------------|-------------|--------------|-------------|
| | Vo nom -2.5% | Vo nom -5% | Vo nom +2.5% | Vo nom +5% |
| TDD25-03SX | 1KΩ | 0Ω | 6.8KΩ | 3.9KΩ |
| Type | Vo nom -5% | Vo nom -10% | Vo nom +5% | Vo nom +10% |
| TDD25-05SX | 1KΩ | 0Ω | 1KΩ | 0Ω |
| TDD25-12SX | 62KΩ | 20KΩ | 8.2KΩ | 1KΩ |
| TDD25-15SX | 180KΩ | 62KΩ | 20KΩ | 0Ω |
| TDD25-12DX | 100KΩ | 51KΩ | 10KΩ | 1KΩ |
| TDD25-15DX | 180KΩ | 68KΩ | 10KΩ | 0Ω |