

DC - DC CONVERTER  
15 ~ 20W SINGLE & DUAL OUTPUT

## FEATURES

- EFFICIENCY UP TO 89%
- 2:1 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

|              |           |        |          |          |         |     |     |              |
|--------------|-----------|--------|----------|----------|---------|-----|-----|--------------|
| WDD20 - 03S1 | 9~18 VDC  | 1.6 A  | 15 WATTS | +3.3 VDC | 4500 mA | 77% | 80% | 7000 $\mu$ F |
| WDD20 - 05S1 | 9~18 VDC  | 2.0 A  | 20 WATTS | + 5 VDC  | 4000 mA | 81% | 83% | 7000 $\mu$ F |
| WDD20 - 12S1 | 9~18 VDC  | 2.0 A  | 20 WATTS | + 12 VDC | 1670 mA | 84% | 86% | 1000 $\mu$ F |
| WDD20 - 15S1 | 9~18 VDC  | 1.95 A | 20 WATTS | + 15 VDC | 1330 mA | 85% | 87% | 470 $\mu$ F  |
| WDD20 - 03S2 | 18~36 VDC | 0.78 A | 15 WATTS | +3.3 VDC | 4500 mA | 78% | 80% | 7000 $\mu$ F |
| WDD20 - 05S2 | 18~36 VDC | 1.0 A  | 20 WATTS | + 5 VDC  | 4000 mA | 83% | 85% | 7000 $\mu$ F |
| WDD20 - 12S2 | 18~36 VDC | 1.0 A  | 20 WATTS | + 12 VDC | 1670 mA | 84% | 86% | 1000 $\mu$ F |
| WDD20 - 15S2 | 18~36 VDC | 0.96 A | 20 WATTS | + 15 VDC | 1330 mA | 86% | 88% | 470 $\mu$ F  |
| WDD20 - 03S3 | 36~72 VDC | 0.39 A | 15 WATTS | +3.3 VDC | 4500 mA | 78% | 80% | 7000 $\mu$ F |
| WDD20 - 05S3 | 36~72 VDC | 0.5 A  | 20 WATTS | + 5 VDC  | 4000 mA | 83% | 85% | 7000 $\mu$ F |
| WDD20 - 12S3 | 36~72 VDC | 0.49 A | 20 WATTS | + 12 VDC | 1670 mA | 85% | 87% | 1000 $\mu$ F |
| WDD20 - 15S3 | 36~72 VDC | 0.48 A | 20 WATTS | + 15 VDC | 1330 mA | 86% | 88% | 470 $\mu$ F  |

## Dual Output Models

|              |           |        |          |              |              |     |     |                   |
|--------------|-----------|--------|----------|--------------|--------------|-----|-----|-------------------|
| WDD20 - 12D1 | 9~18 VDC  | 2.0 A  | 20 WATTS | $\pm$ 12 VDC | $\pm$ 830 mA | 83% | 85% | $\pm$ 470 $\mu$ F |
| WDD20 - 15D1 | 9~18 VDC  | 1.95 A | 20 WATTS | $\pm$ 15 VDC | $\pm$ 670 mA | 85% | 87% | $\pm$ 470 $\mu$ F |
| WDD20 - 12D2 | 18~36 VDC | 0.97 A | 20 WATTS | $\pm$ 12 VDC | $\pm$ 830 mA | 85% | 87% | $\pm$ 470 $\mu$ F |
| WDD20 - 15D2 | 18~36 VDC | 0.96 A | 20 WATTS | $\pm$ 15 VDC | $\pm$ 670 mA | 86% | 88% | $\pm$ 470 $\mu$ F |
| WDD20 - 12D3 | 36~72 VDC | 0.48 A | 20 WATTS | $\pm$ 12 VDC | $\pm$ 830 mA | 85% | 87% | $\pm$ 470 $\mu$ F |
| WDD20 - 15D3 | 36~72 VDC | 0.48 A | 20 WATTS | $\pm$ 15 VDC | $\pm$ 670 mA | 87% | 89% | $\pm$ 470 $\mu$ F |

## SPECIFICATION

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

## GENERAL

| Characteristics       | Conditions               | min.  | typ. | max.  | unit       |
|-----------------------|--------------------------|-------|------|-------|------------|
| Switching frequency   | $V_i$ nom, $I_o$ nom     |       | 180  |       | KHz        |
| Isolation voltage     | Input - Output           | 1,500 |      |       | VDC        |
| Isolation resistance  | Input - Output, @ 500VDC | 100   |      |       | M $\Omega$ |
| Isolation capacitance | 100KHz / 1V              |       |      | 1,000 | PF         |

### SPECIFICATION

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

#### GENERAL

| Characteristics         | Conditions                  |                               | min.                    | typ.    | max.   | unit   |
|-------------------------|-----------------------------|-------------------------------|-------------------------|---------|--------|--------|
| Ambient temperature     | Vi nom, Io nom              | 3.3V & 5V output models       | -25                     |         | + 61   | °C     |
|                         |                             | 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               |                             |                               | L50.8 x W40.64 x H10.16 |         |        | mm     |
| MTBF                    | Bellcore issue 6@40°C, GB   |                               |                         | 950,000 |        | 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 |      |      | 20   | mA   |
|                          |                           | 24V |      |      | 15   | mA   |
|                          |                           | 48V |      |      | 10   | mA   |
| Input voltage w/o damage | Io nom                    | 12V |      |      | 20   | VDC  |
|                          |                           | 24V |      |      | 40   | VDC  |
|                          |                           | 48V |      |      | 75   | VDC  |
| Startup voltage          | Io nom                    | 12V |      | 8.5  |      | VDC  |
|                          |                           | 24V |      | 16   |      | VDC  |
|                          |                           | 48V |      | 33   |      | 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) | 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                        |                                                |      | 100  | mV   |
|                               |                                               | 12V, 15V & dual                  |                                                |      | 150  | mV   |
| Voltage trim range 1)         | Vi nom                                        | 3.3V                             |                                                | ± 5  |      | %    |
|                               |                                               | 5V, 12V, 15V & dual              |                                                | ± 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

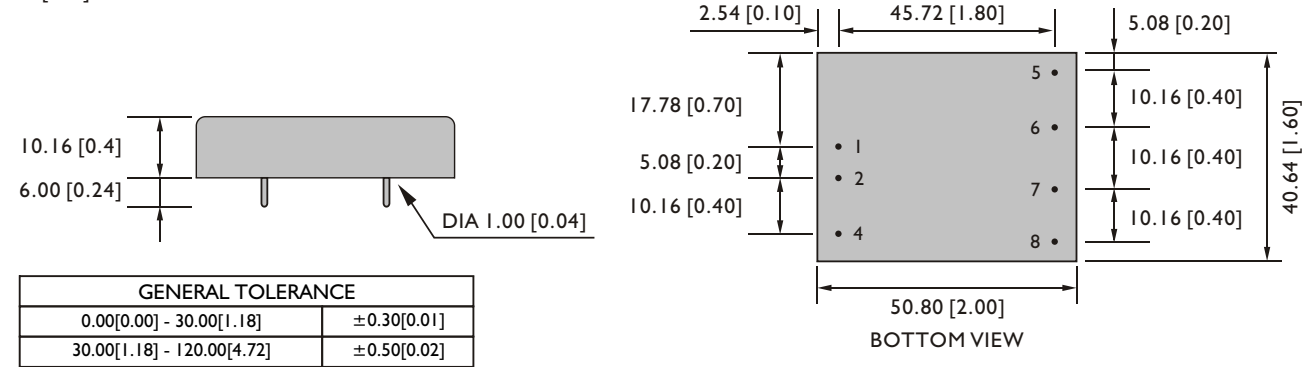
|                            |                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------|
| Remote ON / OFF            | ON : opened or 8 ~ 10VDC applied, reference to input GND<br>OFF : -0.3 ~ 2VDC applied, reference to input GND |
| Input reversed             | Shunt diode built in, external fuse recommended (12Vin : 3A, 24Vin : 1.5A, 48Vin : 1A)                        |
| Output short circuit       | Current limited (Auto-recovery)                                                                               |
| Rated over load protection | 110%min....140%max                                                                                            |

PHYSICAL CHARACTERISTICS

|                  |                                                |
|------------------|------------------------------------------------|
| Case size        | 50.8 x 40.64 x 10.16 mm (2 x 1.6 x 0.4 inches) |
| Case material    | Plastic base / Metal case                      |
| Weight           | 60 g                                           |
| Potting material | Epoxy                                          |

MECHANISM & PIN CONFIGURATION

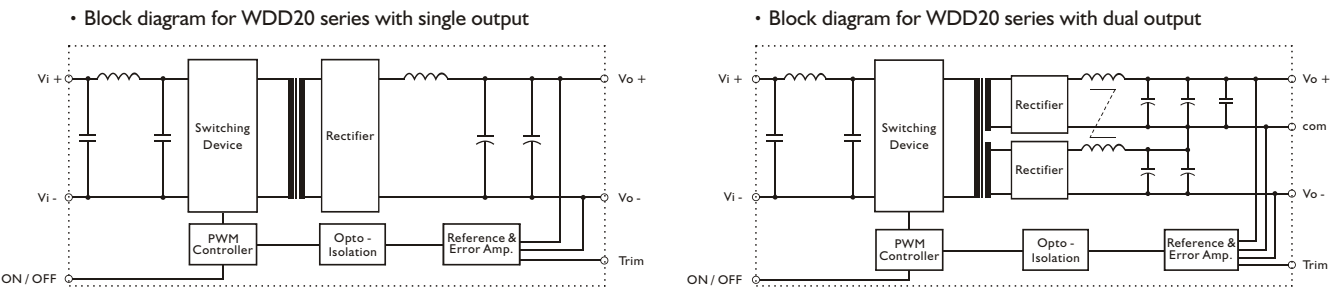
mm [inch]



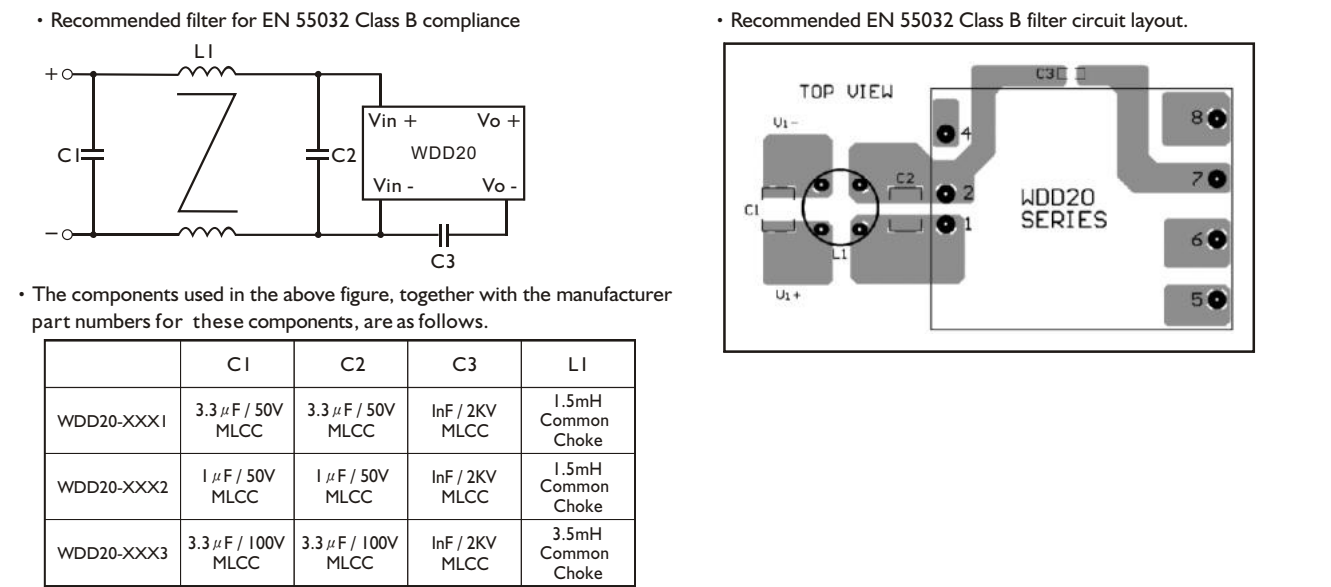
PIN ASSIGNMENT

| 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 |

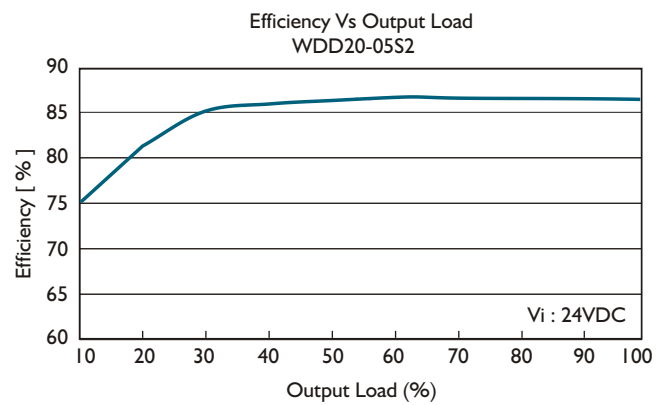
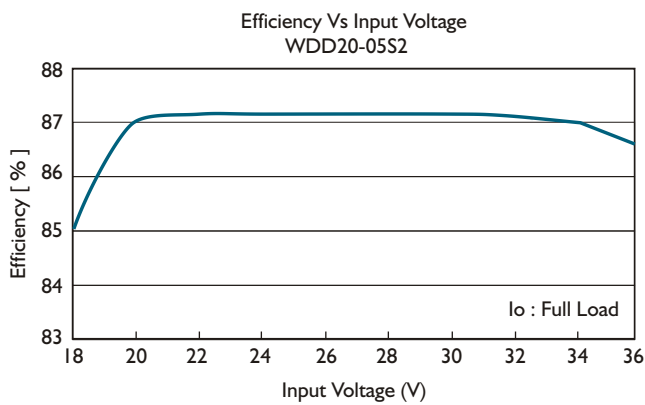
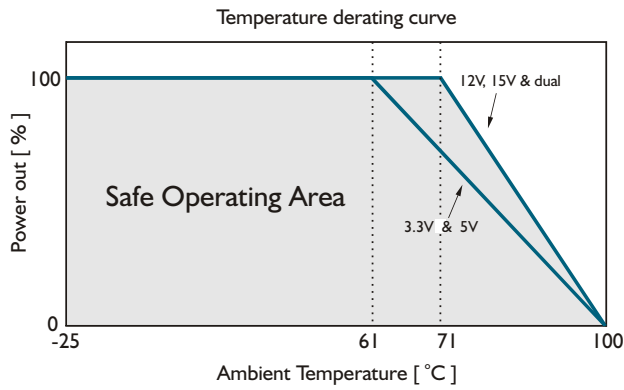
CIRCUIT SCHEMATIC



RECOMMENDED CIRCUIT

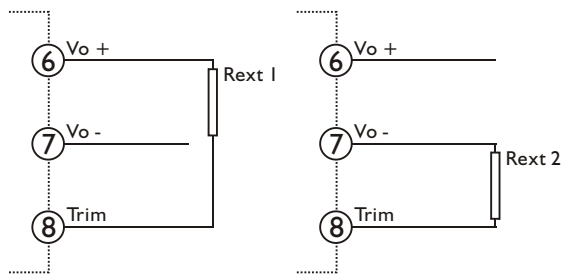


### DERATING AND EFFICIENCY CURVE

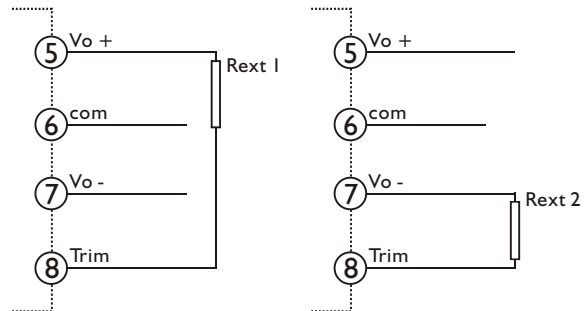


**Fig. 1 Trim connection**

( For Single output )



( For Dual output )



**Table 1 Typical resistor values for various output voltage adjustment settings**

| Type       | Rext 1          |                | Rext 2          |                |
|------------|-----------------|----------------|-----------------|----------------|
|            | $V_o$ nom -2.5% | $V_o$ nom -5%  | $V_o$ nom +2.5% | $V_o$ nom +5%  |
| WDD20-03SX | 1K $\Omega$     | 0 $\Omega$     | 10K $\Omega$    | 4.7K $\Omega$  |
| Type       | $V_o$ nom -5%   | $V_o$ nom -10% | $V_o$ nom +5%   | $V_o$ nom +10% |
| WDD20-05SX | 4.7K $\Omega$   | 100 $\Omega$   | 4.7K $\Omega$   | 470 $\Omega$   |
| WDD20-12SX | 30K $\Omega$    | 20K $\Omega$   | 10K $\Omega$    | 2K $\Omega$    |
| WDD20-15SX | 150K $\Omega$   | 56K $\Omega$   | 15K $\Omega$    | 3K $\Omega$    |
| WDD20-12DX | 120K $\Omega$   | 56K $\Omega$   | 12K $\Omega$    | 2K $\Omega$    |
| WDD20-15DX | 180K $\Omega$   | 75K $\Omega$   | 10K $\Omega$    | 1.2K $\Omega$  |