

## 2:1 WIDE INPUT RANGE DC/DC CONVERTER

### WPC10R



#### FEATURES

- SAFETY APPROVALS (cULus, CE)
- MEETS EN55022 LEVEL A & B FOR CONDUCTED EMISSIONS WITH A 10 MFD EXTERNAL CAPACITOR
- OPERATING TEMPERATURE RANGE:  
-40°C TO +100°C
- INDUSTRY STANDARD PINOUTS
- INDUSTRY STANDARD PACKAGE
- LOW PROFILE 0.4 INCH (10MM)
- SHORT CIRCUIT PROTECTION
- TEMPERATURE SHUTDOWN
- REMOTE ON/OFF (OPTIONAL)
- LOW RADIATED EMISSIONS

#### APPLICATIONS

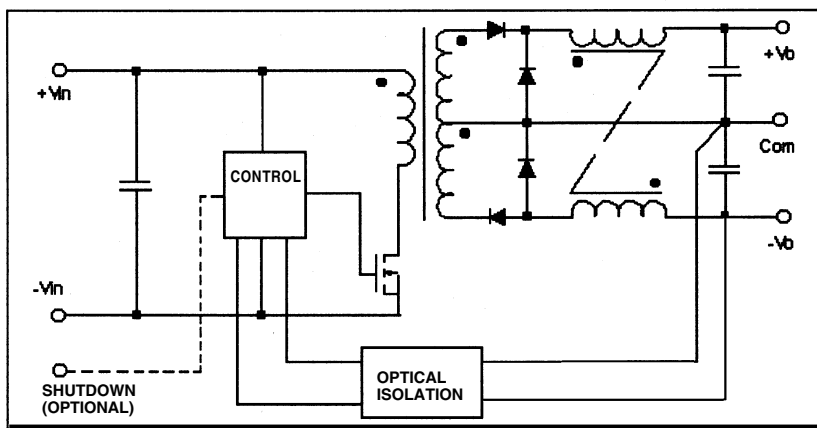
- TELECOMMUNICATION APPLICATIONS
- BATTERY POWERED SYSTEMS
- PORTABLE INSTRUMENTS
- PROCESS CONTROL EQUIPMENT
- TRANSPORTATION EQUIPMENT
- DISTRIBUTED POWER SYSTEMS

#### DESCRIPTION

The WPC10R is a family of high performance DC/DC converters that offer regulated outputs over two input voltage ranges of 18 - 36 and 28 - 75V and over a wide operating temperature range of -40°C to +100°C without derating.

The 350kHz switching frequency and forward converter topology provide optimum performance in a space-saving package. The design uses all surface mounted components, including magnetics, to provide enhanced reliability. All models will operate even under no-load conditions, although a minimum load is specified for load regulation measurement purposes. A metal package is utilized for decreased radiated noise and an optional remote enable feature allows low power standby operation.

#### SIMPLIFIED CIRCUIT DIAGRAM



#### AGENCY APPROVALS



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# ELECTRICAL SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

| MODEL       | NOMINAL<br>INPUT<br>VOLTAGE<br>(VDC) | RATED<br>OUTPUT<br>VOLTAGE<br>(VDC) | OUTPUT CURRENT   |                    | VOLTAGE REGULATION |                   | NOISE<br>(mVpp) | EFFICIENCY<br>(%) |
|-------------|--------------------------------------|-------------------------------------|------------------|--------------------|--------------------|-------------------|-----------------|-------------------|
|             |                                      |                                     | MIN LOAD<br>(mA) | RATED LOAD<br>(mA) | LINE<br>( $\pm$ )  | LOAD<br>( $\pm$ ) |                 |                   |
| WPC10R24S03 | 24                                   | 3.3                                 | 300              | 3000               | 0.5%               | 1%                | 75              | 75                |
| WPC10R24S05 | 24                                   | 5                                   | 200              | 2000               | 0.5%               | 1%                | 75              | 77                |
| WPC10R24S12 | 24                                   | 12                                  | 83               | 833                | 0.5%               | 1%                | 75              | 78                |
| WPC10R24S15 | 24                                   | 15                                  | 67               | 666                | 0.5%               | 1%                | 75              | 79                |
| WPC10R24D05 | 24                                   | $\pm 5$                             | $\pm 100$        | $\pm 1000$         | 0.5%               | 2%                | 75              | 77                |
| WPC10R24D12 | 24                                   | $\pm 12$                            | $\pm 42$         | $\pm 417$          | 0.5%               | 2%                | 75              | 78                |
| WPC10R24D15 | 24                                   | $\pm 15$                            | $\pm 33$         | $\pm 333$          | 0.5%               | 2%                | 75              | 79                |
| WPC10R48S03 | 48                                   | 3.3                                 | 300              | 3000               | 0.5%               | 1%                | 75              | 77                |
| WPC10R48S05 | 48                                   | 5                                   | 200              | 2000               | 0.5%               | 1%                | 75              | 79                |
| WPC10R48S12 | 48                                   | 12                                  | 83               | 833                | 0.5%               | 1%                | 75              | 80                |
| WPC10R48S15 | 48                                   | 15                                  | 67               | 666                | 0.5%               | 1%                | 75              | 81                |
| WPC10R48D05 | 48                                   | $\pm 5$                             | $\pm 100$        | $\pm 1000$         | 0.5%               | 2%                | 75              | 79                |
| WPC10R48D12 | 48                                   | $\pm 12$                            | $\pm 42$         | $\pm 417$          | 0.5%               | 2%                | 75              | 80                |
| WPC10R48D15 | 48                                   | $\pm 15$                            | $\pm 33$         | $\pm 333$          | 0.5%               | 2%                | 75              | 81                |

# COMMON SPECIFICATIONS

Specifications typical at  $T_A = +25^{\circ}\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

| PARAMETER                    | CONDITIONS                                            | MIN  | TYP        | MAX      | UNITS                 |
|------------------------------|-------------------------------------------------------|------|------------|----------|-----------------------|
| <b>INPUT</b>                 |                                                       |      |            |          |                       |
| Voltage Range                | $V_{IN}=34-75$ for $3.3V_{out}$                       | 18   | 24         | 36       | VDC                   |
| Reflected Ripple Current     |                                                       | 28   | 48<br>20   | 75<br>50 | VDC<br>mAp-p          |
| <b>ISOLATION</b>             |                                                       |      |            |          |                       |
| Test Voltage                 | 60 Hz, 10 Seconds                                     | 1500 |            |          | Vpk                   |
| Resistance                   |                                                       |      | 10         |          | G $\Omega$            |
| Capacitance                  | $V_{ISO}=240\text{VAC}$ , 60Hz                        |      | 1500       |          | pF                    |
| Leakage Current              |                                                       |      | 100        |          | mArms                 |
| <b>OUTPUT</b>                |                                                       |      |            |          |                       |
| Rated Power                  | Low Line to High Line                                 |      |            | 10       | Watts                 |
| Voltage Setpoint Accuracy    |                                                       |      | $\pm 1$    |          | %                     |
| Temperature Coefficient      |                                                       |      | $\pm 0.02$ |          | %/ $^{\circ}\text{C}$ |
| Line Regulation              |                                                       |      |            |          |                       |
| Singles                      | Min Load to Rated Load                                |      | $\pm 0.2$  |          | %                     |
| Duals                        |                                                       |      | $\pm 0.2$  |          | %                     |
| Load Regulation              |                                                       |      |            |          |                       |
| Singles                      |                                                       |      | $\pm 0.2$  |          | %                     |
| Duals                        | BW = 5 Hz to 20 MHz                                   |      | $\pm 0.5$  |          | %                     |
| Ripple & Noise               |                                                       |      |            | 75       | mVp-p                 |
| <b>GENERAL</b>               |                                                       |      |            |          |                       |
| Switching Frequency          | Circuit Stress Method,<br>$T_A = +25^{\circ}\text{C}$ |      | 350        |          | kHz                   |
| MTTF per MIL-HDBK-217, Rev F |                                                       |      | 933        |          | hr                    |
| Ground Benign                |                                                       |      |            |          |                       |
| Package Weight               |                                                       |      | 35         |          | g                     |
| <b>TEMPERATURE</b>           |                                                       |      |            |          |                       |
| Specification (ambient)      |                                                       | -25  |            | +71      | $^{\circ}\text{C}$    |
| Specification (case)         |                                                       | -25  |            | +100     | $^{\circ}\text{C}$    |
| Operation (case)             |                                                       | -40  |            | +100     | $^{\circ}\text{C}$    |
| Storage                      |                                                       | -55  |            | +125     | $^{\circ}\text{C}$    |

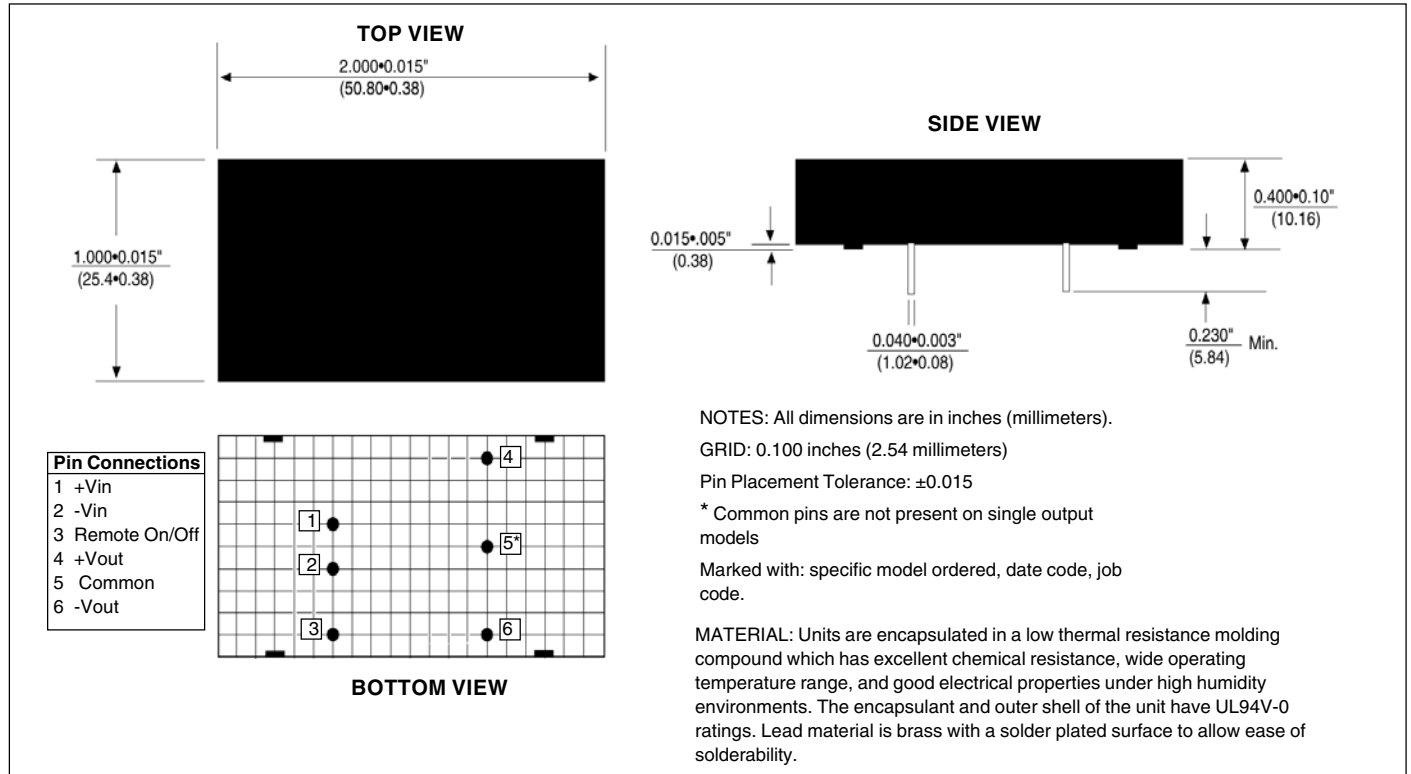
## ABSOLUTE MAXIMUM RATINGS

Output Short Circuit Protection  
(at  $T_A = 25^\circ\text{C}$ , nominal input voltage) .....Continuous  
Internal Power Dissipation..... 2.5W  
Lead Temperature (soldering 10seconds, max) .....+300°C  
Maximum Case Temperature .....+110°C

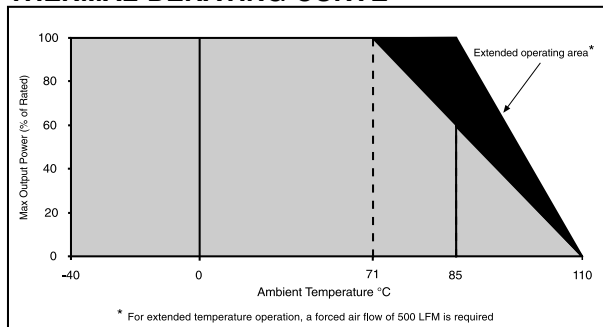
## ORDERING INFORMATION

|                                                     | WPC10R | xx | yyzz | N/P/F | R |
|-----------------------------------------------------|--------|----|------|-------|---|
| Device Family                                       |        |    |      |       |   |
| Indicates Wide Input Voltage 10 Watt Regulated Unit |        |    |      |       |   |
| Model Number                                        |        |    |      |       |   |
| Selected from Table of Electrical Characteristics   |        |    |      |       |   |
| xx = Input Voltage                                  |        |    |      |       |   |
| y = Number of Outputs (Single "S", Dual "D")        |        |    |      |       |   |
| zz = Output Voltage                                 |        |    |      |       |   |
| Case Ground Option                                  |        |    |      |       |   |
| "P" = Positive Input Connection                     |        |    |      |       |   |
| "N" = Negative Input Connection                     |        |    |      |       |   |
| "F" = Floating Input Connection                     |        |    |      |       |   |
| Remote ON/OFF (optional)                            |        |    |      |       |   |

## MECHANICAL



## THERMAL DERATING CURVE



## REMOTE ON/OFF CONTROL

Logic Compatibility ..... CMOS or Open Collector TTL  
 EC On ..... Open Circuit or > 2VDC  
 EC Off ..... < 1.3VDC  
 Shutdown Idle Current ..... <10mA  
 Control Common ..... -Vin

### Hiweise:

- Geraet wird mit einer 2A Sicherung abgesichert
- Eingangsspannung muss SELV oder TNV nach EN60950, IEC60950 entsprechen
- Ein- und Ausgang des Converters muessen mit dem Schutzleiter verbunden werden
- Power supply must be fused with a 2A fuse or current limited to 2A max
- Input must be SELV or TNV according to EN60950/ IEC950
- One input and output pin must be tied to safety earth ground

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