

### DC/DC CONVERTERS

### HIGH-DENSITY, INDUSTRY STANDARD PACKAGE

#### FEATURES

- TYPICAL EFFICIENCY: 82%
- LOW COST
- INDUSTRY-STANDARD PACKAGE
- SINGLE AND DUAL OUTPUTS
- 100% NON-CONDUCTIVE CASE
- SIX-SIDED SHIELDING
- 20mVrms RIPPLE AND NOISE WITH NO EXTERNAL COMPONENTS

#### DESCRIPTION

The PWR16XX series of DC/DC converters give high power densities where space is critical and tight regulation is not. The small industry standard package (1"x2"x0.4") and pin-out are used to address the possibility of upgrading present end products. Designed for high-density boards, the package is non-conductive, which presents advantages over painted metal enclosures.

The series includes thirteen models (other input and output voltages are available upon request), all set in a thermal resistance molding compound for excel-

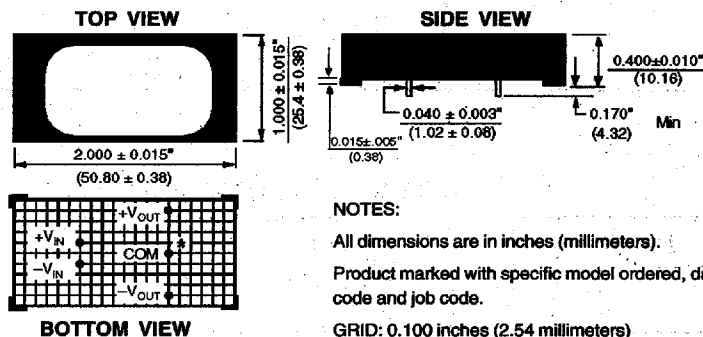
#### APPLICATIONS

- HIGH DENSITY PC BOARDS
- TEST EQUIPMENT
- PROCESS CONTROL
- COMPUTER PERIPHERALS

lent heat dissipation for internal components. The use of surface mount devices and manufacturing processes, combined with the encapsulation process, provides the user a product that is environmentally rugged.

The PWR16XX has a full 500VDC isolation barrier between input and output to give the designer maximum flexibility in grounding options and polarity configurations. The outstanding MTTF, superior-reliability, and low cost make it an excellent choice for industry standard usages.

#### MECHANICAL



#### NOTES:

All dimensions are in inches (millimeters).

Product marked with specific model ordered, date code and job code.

GRID: 0.100 inches (2.54 millimeters)

\* Common pins not present on single output models.

PIN PLACEMENT TOLERANCE:  $\pm 0.015$

**MATERIAL:** Units are encapsulated in Iso-ThermoFlex™ a low thermal resistance molding compound that has excellent chemical resistance, wide operating temperature range, and good electrical properties under high humidity environments. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is brass with a solder plated surface to allow ease of solderability.

# ELECTRICAL SPECIFICATIONS

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

| MODEL   | MINIMUM<br>INPUT<br>VOLTAGE<br>(VDC) | RATED<br>INPUT<br>VOLTAGE<br>(VDC) | MAXIMUM<br>INPUT<br>VOLTAGE<br>(VDC) | RATED<br>OUTPUT<br>VOLTAGE<br>(VDC) | RATED<br>OUTPUT<br>CURRENT<br>(mA) | INPUT CURRENT      |                       | REFLECTED<br>RIPPLE<br>CURRENT<br>(mAp-p) |
|---------|--------------------------------------|------------------------------------|--------------------------------------|-------------------------------------|------------------------------------|--------------------|-----------------------|-------------------------------------------|
|         |                                      |                                    |                                      |                                     |                                    | NO<br>LOAD<br>(mA) | RATED<br>LOAD<br>(mA) |                                           |
| PWR1600 | 4.5                                  | 5                                  | 5.5                                  | 5                                   | 1000                               | 50                 | 1220                  | 60                                        |
| PWR1604 | 4.5                                  | 5                                  | 5.5                                  | $\pm 12$                            | $\pm 250$                          | 50                 | 1460                  | 60                                        |
| PWR1605 | 4.5                                  | 5                                  | 5.5                                  | $\pm 15$                            | $\pm 200$                          | 50                 | 1460                  | 60                                        |
| PWR1606 | 10                                   | 12                                 | 14                                   | 5                                   | 1000                               | 30                 | 510                   | 60                                        |
| PWR1607 | 10                                   | 12                                 | 14                                   | 12                                  | 500                                | 30                 | 610                   | 60                                        |
| PWR1610 | 10                                   | 12                                 | 14                                   | $\pm 12$                            | $\pm 250$                          | 30                 | 610                   | 60                                        |
| PWR1611 | 10                                   | 12                                 | 14                                   | $\pm 15$                            | $\pm 200$                          | 30                 | 610                   | 60                                        |
| PWR1612 | 13                                   | 15                                 | 17                                   | 5                                   | 1000                               | 30                 | 410                   | 60                                        |
| PWR1616 | 13                                   | 15                                 | 17                                   | $\pm 12$                            | $\pm 250$                          | 30                 | 490                   | 60                                        |
| PWR1617 | 13                                   | 15                                 | 17                                   | $\pm 15$                            | $\pm 200$                          | 30                 | 490                   | 60                                        |
| PWR1618 | 21                                   | 24                                 | 28                                   | 5                                   | 1000                               | 30                 | 260                   | 60                                        |
| PWR1622 | 21                                   | 24                                 | 28                                   | $\pm 12$                            | $\pm 250$                          | 30                 | 305                   | 60                                        |
| PWR1623 | 21                                   | 24                                 | 28                                   | $\pm 15$                            | $\pm 200$                          | 30                 | 305                   | 60                                        |

Note: Other input to output voltages may be available. Please contact factory.

## COMMON SPECIFICATIONS

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

| PARAMETER                     | CONDITIONS                                                                             | MIN | TYP        | MAX                       | UNITS                 |
|-------------------------------|----------------------------------------------------------------------------------------|-----|------------|---------------------------|-----------------------|
| <b>OUTPUT</b>                 |                                                                                        |     |            |                           |                       |
| Rated Power                   | 5V Output Models<br>All Other Output Models                                            |     | 5.0<br>6.0 |                           | W<br>W                |
| Voltage Setpoint Accuracy     | Rated Load, Nominal $V_{IN}$                                                           |     | $\pm 3$    | $\pm 5$                   | %                     |
| Temperature Coefficient       |                                                                                        |     | $\pm 0.05$ |                           | %/ $^{\circ}\text{C}$ |
| Ripple and Noise              | BW = DC to 10MHz. No External Components<br>BW = 10Hz to 20MHz. No External Components |     | 70<br>20   |                           | mVp-p<br>mVrms        |
| Voltage                       | No Load, $V_{OUT} = +5$<br>No Load, $V_{OUT} = \pm 12$<br>No Load, $V_{OUT} = \pm 15$  |     |            | 7<br>$\pm 15$<br>$\pm 18$ | VDC<br>VDC<br>VDC     |
| Line Regulation               |                                                                                        |     | 1.0        |                           | %/ $\%V_{IN}$         |
| Load Regulation               |                                                                                        |     | See Curves |                           |                       |
| <b>ISOLATION</b>              |                                                                                        |     |            |                           |                       |
| Rated Voltage                 |                                                                                        | 500 |            |                           | VDC                   |
| Test Voltage                  | 60 Hz, 10 Seconds                                                                      | 500 |            |                           | Vpk                   |
| Resistance                    |                                                                                        |     | 10         |                           | G $\Omega$            |
| Capacitance                   |                                                                                        |     | 80         |                           | pF                    |
| Leakage Current               | 240VAC, 60Hz                                                                           |     | 5          |                           | $\mu\text{Arms}$      |
| <b>GENERAL</b>                |                                                                                        |     |            |                           |                       |
| Switching Frequency           |                                                                                        |     | 150        |                           | kHz                   |
| Package Weight                |                                                                                        |     | 20         |                           | g                     |
| MTTF per MIL-HDBK-217, Rev. E | Circuit Stress Method                                                                  |     | 2,220,000  |                           | Hr                    |
| Efficiency                    |                                                                                        |     | 82         |                           | %                     |
| <b>TEMPERATURE</b>            |                                                                                        |     |            |                           |                       |
| Specification                 |                                                                                        | -25 | +25        | +85                       | $^{\circ}\text{C}$    |
| Operation                     |                                                                                        | -25 |            | +100                      | $^{\circ}\text{C}$    |
| Storage                       |                                                                                        | -40 |            | +110                      | $^{\circ}\text{C}$    |

## ORDERING INFORMATION

|                                                  |             |
|--------------------------------------------------|-------------|
| Device Family                                    | PWR 16XX /H |
| PWR indicates DC/DC converter                    |             |
| Model Number                                     |             |
| Selected from table of Electrical Specifications |             |
| Screening Option                                 |             |

## ABSOLUTE MAXIMUM RATINGS

|                                             |                         |
|---------------------------------------------|-------------------------|
| Output Short-Circuit Duration               | 10 seconds              |
| Output Power                                |                         |
| 5V Output Models                            | 5.0W                    |
| All Other Models                            | 6.0W                    |
| Lead Temperature (soldering, 10seconds max) | +300 $^{\circ}\text{C}$ |
| Internal Power Dissipation                  | 1.67W                   |

# TYPICAL PERFORMANCE CURVES

$T_A = +25^\circ\text{C}$ , Rated Input Voltage, Rated Output Current unless otherwise noted.

