

## 1.5 WATTS UNREGULATED DC/DC CONVERTERS

### PWR13XX



#### FEATURES

- HIGH ISOLATION - 4000V RATING
- 8000V ISOLATION TEST VOLTAGE
- BARRIER 100% PRODUCTION TESTED
- LOW BARRIER CAPACITANCE - 10PF
- LOW LEAKAGE CURRENT - 2 $\mu$ A MAX
- 24-PIN DIP PACKAGE
- INTERNAL FILTERING

#### APPLICATIONS

- BIOMEDICAL DATA ACQUISITION
- INDUSTRIAL PROCESS CONTROL
- ANALYTICAL MEASUREMENTS
- GROUND LOOP ELIMINATION
- INTRINSIC SAFETY SYSTEMS

#### DESCRIPTION

The PWR13XX Series offers a broad line of low-cost, high-isolation voltage, unregulated, single and dual output DC/DC converters in a 24-pin DIP package. These small converters offer a 4000V isolation rating in a 1.25" x 0.8" package area.

The dielectric withstand characteristics of each converter is tested in production to ensure barrier integrity. During the development of the PWR13XX Series extensive testing was done to verify that subjecting the barrier to as many as ten barrier tests will not destroy the barrier.

The PWR13XX Series uses advanced circuit design and packaging technology to realize superior reliability and performance. A 220kHz driven push-pull oscillator is used to ensure stable frequency and non-saturating operation of the input stage. This means there are no high peak voltages or currents like other design topologies, which

can reduce unit reliability. Reliability is further enhanced by the use of MOSPOWER transistors. These rugged devices permit higher frequency operation with less complicated drive circuitry than is possible with bipolar power transistors. Reduced parts count adds to the reliability of the PWR13XX Series.

The high efficiency of the PWR13XX Series means less internal power dissipation. With less heat to dissipate, the PWR13XX Series can operate over a wider ambient temperature range with no degradation of reliable operation.

The PWR13XX Series offers the user low cost without sacrificing reliability. The use of surface mounted devices and manufacturing technologies make it possible to offer premium performance and low cost. Testing of the PWR13XX isolation barrier is performed per the methods set forth by UL544, VDE750, CSA 22.2 and IEC 601-1.

Website: <http://www.cdpowerelectronics.com>

Power Electronics Division, United States  
3400 E Britannia Drive, Tucson, Arizona 85706  
Phone: 520.295.4100 Fax: 520.295.4197

C&D Technologies, (NCL)  
Milton Keynes MK14 5BU UK  
Tel: +44 (0)1908 615232 Fax: +44 (0)1908 617545

# ELECTRICAL SPECIFICATIONS

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

| MODEL   | NOMINAL<br>INPUT VOLTAGE<br>(Vbc) | RATED<br>OUTPUT VOLTAGE<br>(Vbc) | RATED<br>OUTPUT CURRENT<br>(mA) | INPUT CURRENT   |                    | REFLECTED<br>RIPPLE CURRENT<br>(mA <sub>p-p</sub> ) |
|---------|-----------------------------------|----------------------------------|---------------------------------|-----------------|--------------------|---|
|         |                                   |                                  |                                 | NO LOAD<br>(mA) | RATED LOAD<br>(mA) |   |
| PWR1300 | 5                                 | 5                                | 300                             | 50              | 400                | 30  |
| PWR1301 | 5                                 | 12                               | 125                             | 50              | 400                | 30  |
| PWR1302 | 5                                 | 15                               | 100                             | 50              | 400                | 30  |
| PWR1303 | 5                                 | ±5                               | ±150                            | 50              | 400                | 30  |
| PWR1304 | 5                                 | ±12                              | ±63                             | 50              | 400                | 30  |
| PWR1305 | 5                                 | ±15                              | ±50                             | 50              | 400                | 30  |
| PWR1306 | 12                                | 5                                | 300                             | 30              | 167                | 25  |
| PWR1307 | 12                                | 12                               | 125                             | 30              | 167                | 25  |
| PWR1308 | 12                                | 15                               | 100                             | 30              | 167                | 25  |
| PWR1309 | 12                                | ±5                               | ±150                            | 30              | 167                | 25  |
| PWR1310 | 12                                | ±12                              | ±63                             | 30              | 167                | 25  |
| PWR1311 | 12                                | ±15                              | ±50                             | 30              | 167                | 25  |
| PWR1312 | 15                                | 5                                | 300                             | 30              | 133                | 20  |
| PWR1313 | 15                                | 12                               | 125                             | 30              | 133                | 20  |
| PWR1314 | 15                                | 15                               | 100                             | 30              | 133                | 20  |
| PWR1315 | 15                                | ±5                               | ±150                            | 30              | 133                | 20  |
| PWR1316 | 15                                | ±12                              | ±63                             | 30              | 133                | 20  |
| PWR1317 | 15                                | ±15                              | ±50                             | 30              | 133                | 20  |

# COMMON SPECIFICATIONS

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

| PARAMETER  | CONDITIONS   | MIN                 | TYP  | MAX                 | UNITS   |
|--|--|---------------------|--|---------------------|---|
| <b>INPUT</b><br>Voltage Range  |  | 4.5<br>10.8<br>13.5 | 5<br>12<br>15  | 5.5<br>13.2<br>16.5 | V <sub>DC</sub><br>V <sub>DC</sub><br>V <sub>DC</sub>   |
| <b>ISOLATION</b><br>Rated Voltage<br>Test Voltage<br>Resistance<br>Capacitance<br>Leakage Current  | 60 Hz, 60 Seconds<br><br><br><br>V <sub>ISO</sub> = 240VAC, 60Hz   | 4,000<br>8,000      | 10<br>10<br>1  | 2                   | V <sub>DC</sub><br>V <sub>pk</sub><br>GΩ<br>pF<br>μArms |
| <b>OUTPUT</b><br>Rated Power<br>Voltage Setpoint Accuracy<br>Ripple & Noise  | Rated Load, Nominal V <sub>in</sub><br>BW = DC to 10MHz<br>BW = 10Hz to 2MHz   |                     | 1.5<br>40<br>10  | ±5                  | Watts<br>%<br>mV <sub>p-p</sub><br>mV <sub>rms</sub>    |
| <b>REGULATION</b><br>Line Regulation<br>Load Regulation  | High Line to Low Line<br>See Performance Curves  |                     | 1.5  |                     | %/%   |
| <b>GENERAL</b><br>Efficiency<br>Switching Frequency<br>Package Weight<br>MTTF per MIL-HDBK-217, Rev. E<br>Ground Benign<br><br>Fixed Ground<br>Naval Sheltered<br><br>Airborne Uninhabited Fighter | Circuit Stress Method<br>T <sub>A</sub> =+25°C<br>T <sub>A</sub> =+85°C<br>T <sub>A</sub> =+35°C<br>T <sub>A</sub> =+35°C<br><br>T <sub>A</sub> =+35°C |                     | 75<br>220<br>12<br><br>2,000,000<br>90,000<br>540,000<br>300,000<br><br>55,000 |                     | %<br>kHz<br>g<br>Hr<br>Hr<br>Hr<br>Hr<br><br>Hr         |
| <b>TEMPERATURE</b><br>Specification<br>Operation<br>Storage  |  | -40<br>-55<br>-55   | +25  | +85<br>+100<br>+110 | °C<br>°C<br>°C  |

## ABSOLUTE MAXIMUM RATINGS

Output Short-Circuit Duration ..... 5 seconds  
 Internal Power Dissipation ..... 750mW  
 Lead Temperature (soldering, 10 seconds max) ..... +300°C

## ORDERING INFORMATION

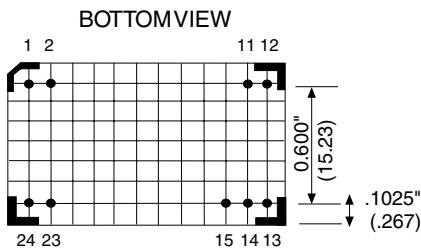
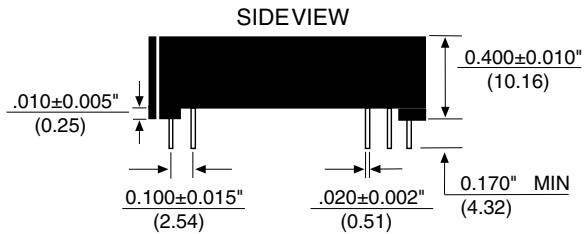
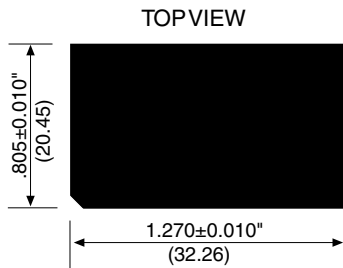
**PWR 13XX A**

Device Family \_\_\_\_\_  
 PWR indicates DC/DC converter

Model Number \_\_\_\_\_  
 Selected from Table of Electrical Characteristics

Package \_\_\_\_\_

## MECHANICAL



## PIN CONNECTIONS

| PIN | SINGLE MODELS     | DUAL MODELS       |
|-----|-------------------|-------------------|
| 1   | +V <sub>IN</sub>  | +V <sub>IN</sub>  |
| 2   | +V <sub>IN</sub>  | +V <sub>IN</sub>  |
| 11  | +V <sub>OUT</sub> | +V <sub>OUT</sub> |
| 12  | +V <sub>OUT</sub> | +V <sub>OUT</sub> |
| 13  | -V <sub>OUT</sub> | Common            |
| 14  | -V <sub>OUT</sub> | Common            |
| 15  | No Pin            | -V <sub>OUT</sub> |
| 23  | -V <sub>IN</sub>  | -V <sub>IN</sub>  |
| 24  | -V <sub>IN</sub>  | -V <sub>IN</sub>  |

### Notes:

All dimensions are in inches (millimeters).

GRID: 0.100 inches (2.54 millimeters)

\* Common pins not present on single output models.

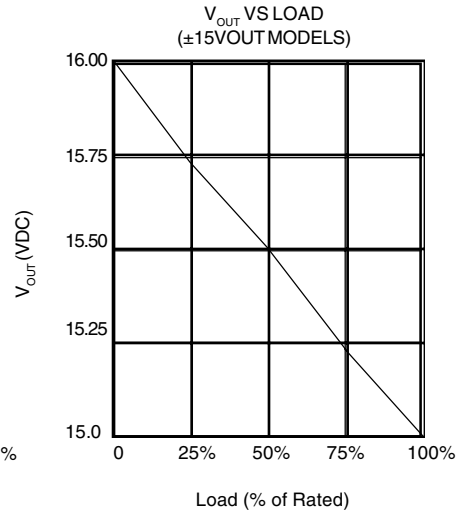
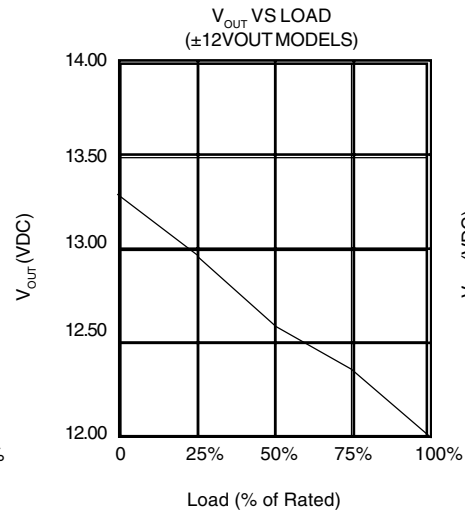
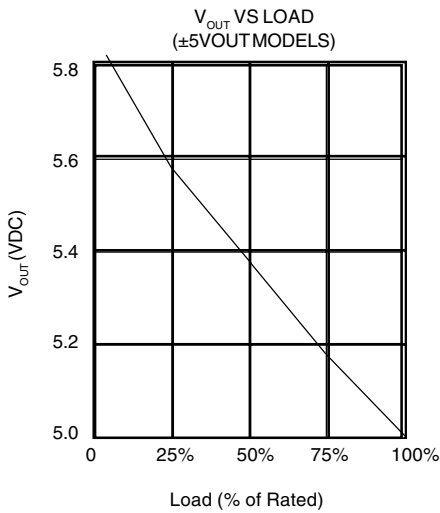
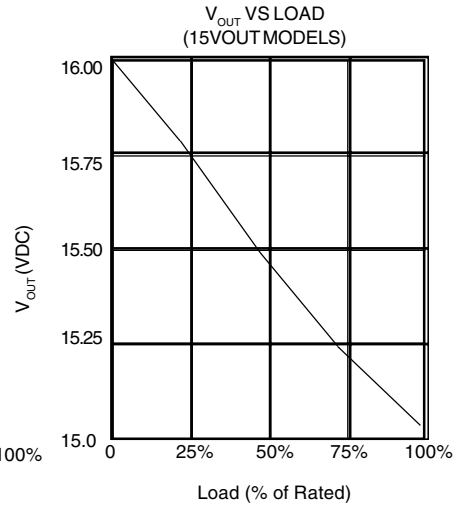
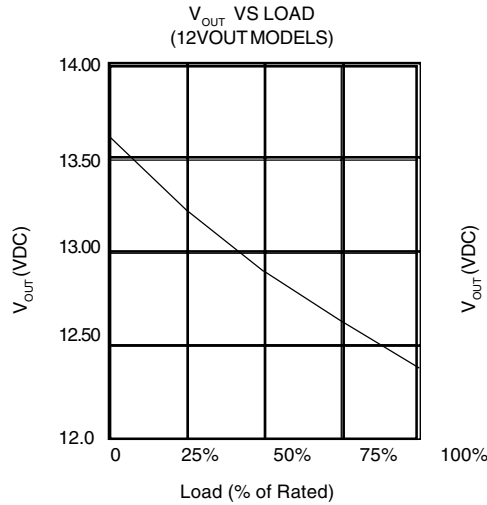
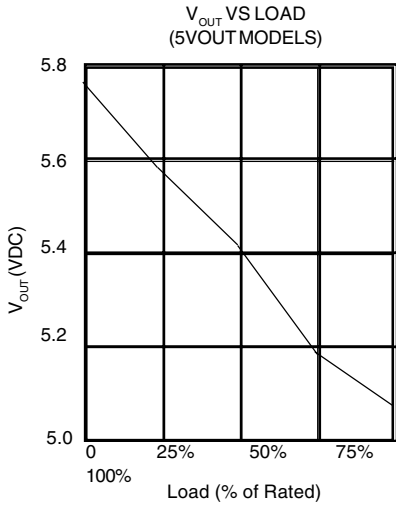
PIN PLACEMENT TOLERANCE: ±0.015"

Marked with: specific model ordered, date code, job code.

**MATERIAL:** Units are encapsulated in a low thermal resistance molding compound which 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.

# TYPICAL PERFORMANCE CURVES

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



Any data, prices, descriptions or specifications presented herein are subject to revision by C&D Technologies, Inc. without notice. While such information is believed to be accurate as indicated herein, C&D Technologies, Inc. makes no warranty and hereby disclaims all warranties, express or implied, with regard to the accuracy or completeness of such information. Further, because the product(s) featured herein may be used under conditions beyond its control, C&D Technologies, Inc. hereby disclaims all warranties, either express or implied, concerning the fitness or suitability of such product(s) for any particular use or in any specific application or arising from any course of dealing or usage of trade. The user is solely responsible for determining the suitability of the product(s) featured herein for user's intended purpose and in user's specific application. C&D Technologies, Inc. does not warrant or recommend that any of its products be used in any life support or aviation or aerospace applications.