

## FEATURES

- ROHS COMPLIANT
- LOW COST
- SINGLE-IN-LINE PACKAGE (SIP)
- INTERNAL INPUT AND OUTPUT FILTERING
- NON-CONDUCTIVE CASE
- HIGH OUTPUT POWER DENSITY: 13 WATTS/INCH<sup>3</sup>
- EXTENDED TEMPERATURE RANGE:  
-25°C TO +65°C
- HIGH EFFICIENCY: TO 72% (TYPICAL)

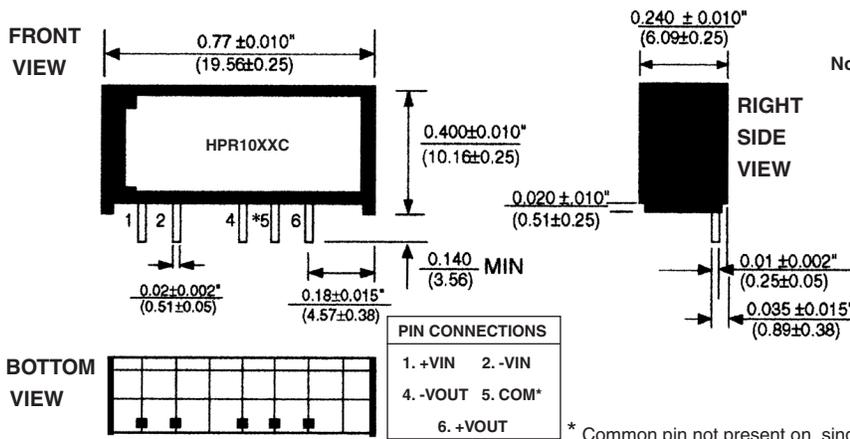
## DESCRIPTION

The HPR10XXC Series uses advanced circuit design and packaging technology to deliver superior reliability and performance. A 170kHz push-pull oscillator is used in the input stage. Beat-frequency oscillation problems are reduced when using the HPR10XXC Series with high frequency isolation amplifiers.

Reduced parts count and high efficiency add to the reliability of the HPR10XXC Series. The high efficiency of the HPR10XXC Series means less internal power dissipation, as low as 190mW. With reduced heat dissipation the HPR10XXC Series can operate at higher temperatures with no degradation. In addition, the high efficiency of the HPR10XXC Series means the series is able to offer greater than 13 W/inch<sup>3</sup> of output power density. Operation down to no load will not impact the reliability of the series, although a 1mA minimum load is needed to realize published specifications.

The HPR10XXC Series provides the user low cost without sacrificing reliability. The use of surface mounted devices and advanced manufacturing technologies make it possible to offer premium performance and low cost.

## MECHANICAL



Notes: All dimensions are in inches (millimeters).

GRID: 0.100 inches (2.54 millimeters)

PIN PLACEMENT TOLERANCE:  $\pm 0.015"$

MATERIAL: Lead material is phosphor bronze; finish is 100-300 micro-inches of matte tin over a barrier layer of 5-40 micro-inches of nickel.



For full details go to  
[www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

### ELECTRICAL SPECIFICATIONS

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

| MODEL    | NOMINAL INPUT VOLTAGE (Vdc) | RATED OUTPUT VOLTAGE (Vdc) | RATED OUTPUT CURRENT (mA) | INPUT CURRENT |                 | REFLECTED RIPPLE CURRENT (mA <sub>p-p</sub> ) | EFFICIENCY (%) |
|----------|-----------------------------|----------------------------|---------------------------|---------------|-----------------|---|----------------|
|          |                             |                            |                           | NO LOAD (mA)  | RATED LOAD (mA) |   |                |
| HPR1000C | 5                           | 5                          | 200                       | 33            | 290             | 8   | 68             |
| HPR1001C | 5                           | 12                         | 83                        | 33            | 290             | 8   | 69             |
| HPR1002C | 5                           | 15                         | 67                        | 33            | 285             | 8   | 70             |
| HPR1003C | 5                           | ±5                         | ±100                      | 33            | 285             | 8   | 70             |
| HPR1004C | 5                           | ±12                        | ±42                       | 33            | 285             | 8   | 70             |
| HPR1005C | 5                           | ±15                        | ±34                       | 33            | 285             | 8   | 70             |
| HPR1006C | 12                          | 5                          | 200                       | 18            | 110             | 10  | 70             |
| HPR1007C | 12                          | 12                         | 83                        | 18            | 107             | 10  | 71             |
| HPR1008C | 12                          | 15                         | 67                        | 18            | 107             | 10  | 71             |
| HPR1009C | 12                          | ±5                         | ±100                      | 18            | 107             | 10  | 71             |
| HPR1010C | 12                          | ±12                        | ±42                       | 18            | 107             | 10  | 71             |
| HPR1011C | 12                          | ±15                        | ±34                       | 18            | 107             | 10  | 71             |
| HPR1012C | 15                          | 5                          | 200                       | 15            | 96              | 10  | 70             |
| HPR1013C | 15                          | 12                         | 83                        | 15            | 94              | 10  | 70             |
| HPR1014C | 15                          | 15                         | 67                        | 15            | 94              | 10  | 71             |
| HPR1015C | 15                          | ±12                        | ±42                       | 15            | 94              | 10  | 71             |
| HPR1016C | 15                          | ±15                        | ±34                       | 15            | 94              | 10  | 71             |
| HPR1017C | 15                          | ±15                        | ±34                       | 15            | 94              | 10  | 71             |
| HPR1018C | 24                          | 5                          | 200                       | 12            | 60              | 15  | 71             |
| HPR1019C | 24                          | 12                         | 83                        | 12            | 60              | 15  | 71             |
| HPR1020C | 24                          | 15                         | 67                        | 12            | 58              | 15  | 72             |
| HPR1021C | 24                          | ±5                         | ±100                      | 12            | 58              | 15  | 72             |
| HPR1022C | 24                          | ±12                        | ±42                       | 12            | 58              | 15  | 72             |
| HPR1023C | 24                          | ±15                        | ±34                       | 12            | 58              | 15  | 72             |

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

### COMMON SPECIFICATIONS

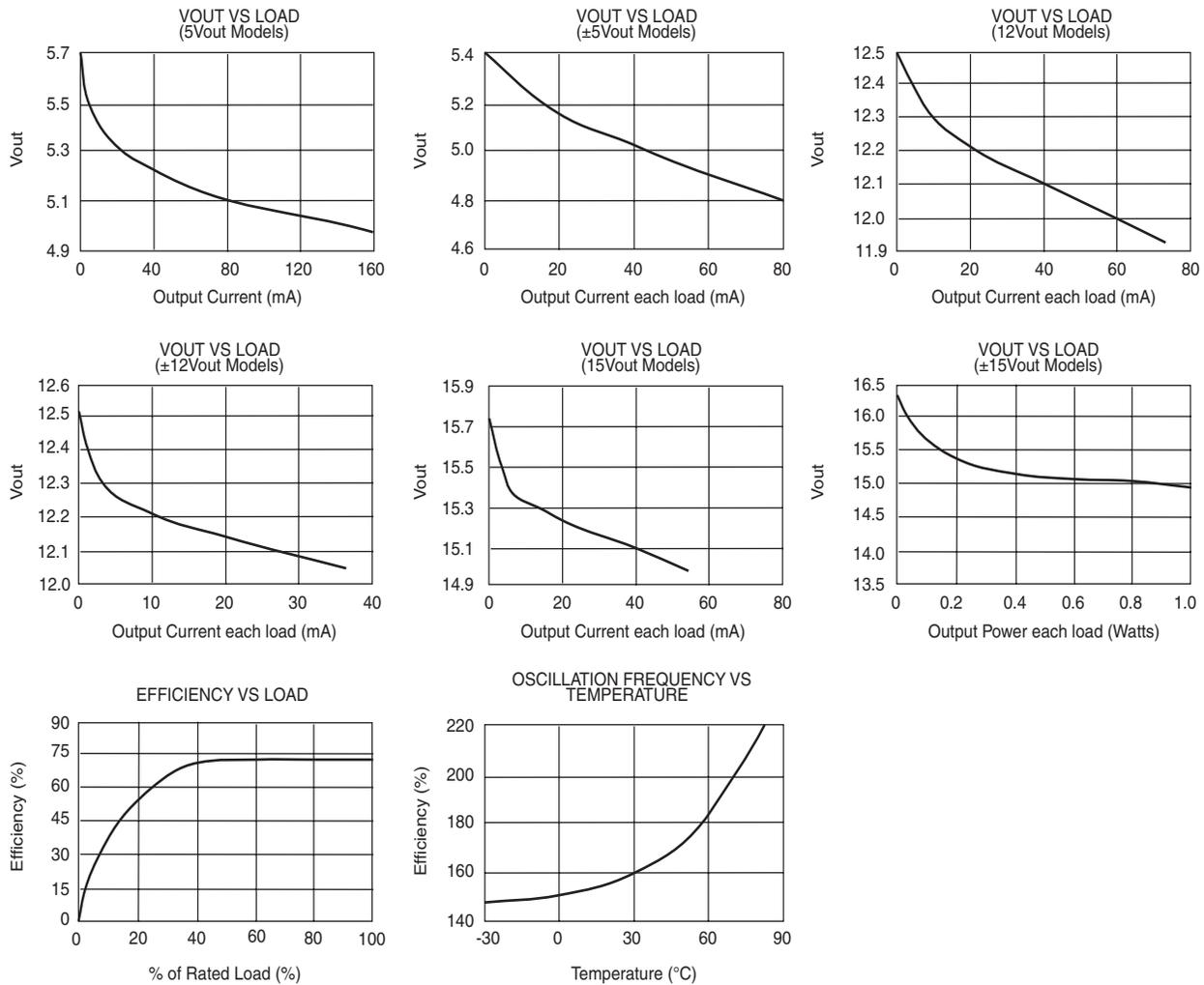
Specifications typical at  $T_A = +25^\circ\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

| PARAMETER                          | CONDITIONS   | MIN                         | TYP                 | MAX                         | UNITS  |
|------------------------------------|--|-----------------------------|---------------------|-----------------------------|--|
| <b>INPUT</b>                       |  |                             |                     |                             |  |
| Voltage Range                      |  | 4.5<br>10.8<br>13.5<br>21.6 | 5<br>12<br>15<br>24 | 5.5<br>13.2<br>16.5<br>26.4 | V <sub>DC</sub><br>V <sub>DC</sub><br>V <sub>DC</sub><br>V <sub>DC</sub> |
| Voltage Rise Time                  | See Typical Performance Curves & Application Notes: "Capacitive Loading Effects on Start-Up of DC/DC Converters" |                             |                     |                             |  |
| <b>ISOLATION</b>                   |  |                             |                     |                             |  |
| Rated Voltage                      |  | 1000                        |                     |                             | V <sub>DC</sub>  |
| Test Voltage                       | 60 Hz, 10 Seconds  | 1000                        |                     |                             | V <sub>pk</sub>  |
| Resistance                         |  |                             | 10                  |                             | GΩ   |
| Capacitance                        |  |                             | 25                  | 100                         | pF   |
| Leakage Current                    | V <sub>ISO</sub> = 240VAC, 60Hz  |                             | 2                   | 8.5                         | μArms  |
| <b>OUTPUT</b>                      |  |                             |                     |                             |  |
| Rated Power                        |  |                             | 1.0                 |                             | W  |
| Voltage Setpoint Accuracy          | Rated Load, Nominal V <sub>IN</sub>  |                             |                     | ±5                          | %  |
| Ripple & Noise                     | BW = DC to 10MHz<br>BW = 10Hz to 2MHz  |                             | 30                  | 100                         | mV <sub>p-p</sub><br>mV <sub>rms</sub>                                   |
| Voltage                            | 1mA Load, V <sub>OUT</sub> = 5V<br>1mA Load, V <sub>OUT</sub> = 12V<br>1mA Load, V <sub>OUT</sub> = 15V          |                             |                     | 7<br>15<br>18               | V <sub>DC</sub><br>V <sub>DC</sub><br>V <sub>DC</sub>                    |
| Temperature Coefficient            |  |                             | .01                 |                             | %/Deg C  |
| <b>REGULATION</b>                  |  |                             |                     |                             |  |
| Line Regulation                    | High Line to Low Line  |                             | 1                   |                             | %/%V <sub>in</sub>   |
| Load Regulation (5V out only)      | Rated Load to 1mA Load   |                             | 10                  |                             | %  |
| Load Regulation (All other Models) | Rated Load to 1mA Load   |                             | 3                   |                             | %  |
| <b>GENERAL</b>                     |  |                             |                     |                             |  |
| Switching Frequency                |  |                             | 170                 |                             | kHz  |
| Frequency Change                   | Over Line and Load   |                             | 24                  |                             | %  |
| Package Weight                     |  |                             | 2                   |                             | g  |
| MTTF per MIL-HDBK-217, Rev. E      | Circuit Stress Method  |                             |                     |                             |  |
| Ground Benign                      | T <sub>A</sub> = +25°C   |                             | 3.8                 |                             | MHr  |
| Fixed Ground                       | T <sub>A</sub> = +35°C   |                             | 1.4                 |                             | MHr  |
| Naval Sheltered                    | T <sub>A</sub> = +35°C   |                             | 685                 |                             | kHr  |
| Airborne Uninhabited Fighter       | T <sub>A</sub> = +35°C   |                             | 211                 |                             | kHr  |
| Moisture Sensitivity Level (MSL)   | IPC/JEDEC J-STD-20   |                             | 2                   |                             |  |
| <b>TEMPERATURE</b>                 |  |                             |                     |                             |  |
| Specification                      |  | -25                         | +25                 | +65                         | °C   |
| Storage                            |  | -50                         |                     | +110                        | °C   |

\* For demonstrated MTTF results reference Reliability Report HPR105

## TYPICAL PERFORMANCE CURVES

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



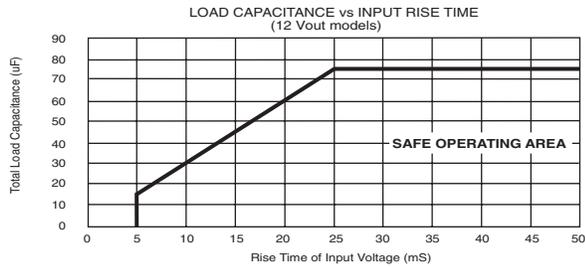
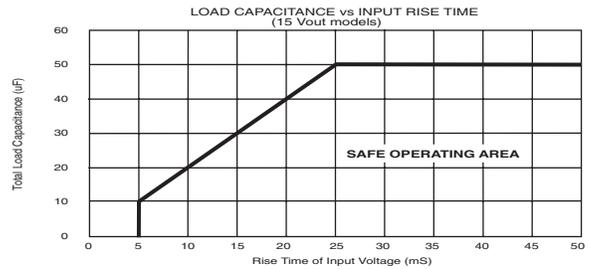
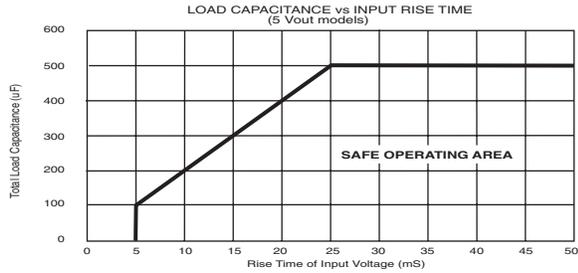
## THROUGH-HOLE SOLDERING INFORMATION

These devices are intended for wave soldering or manual soldering.

**They are not intended to be subject to surface mount processes under any circumstances.**

The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of  $260^\circ\text{C}$  for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and internal temperatures within the converter will not exceed  $175^\circ\text{C}$ . Care should be taken to control manual soldering limits identical to that of wave soldering.

**SAFE OPERATING AREA**



**NOTES:**

1. When operated within the SAFE OPERATING AREA as defined by the above curves, the output voltage of Hpr10xxC devices is guaranteed to be within 95% of its steady-state value within 100 milliseconds after the input voltage has reached 95% of its steady-state value.
2. For dual output models, total load capacitance is the sum of the capacitances on the plus and minus outputs.

**ORDERING INFORMATION**

|   |                   |
|---|-------------------|
| Device Family                                     | <b>HPR 10XX C</b> |
| HPR Indicates DC/DC Converter                     |                   |
| Model Number                                      |                   |
| Selected from Table of Electrical Characteristics |                   |
| RoHS Compliance                                   |                   |

**ABSOLUTE MAXIMUM RATINGS**

|                                 |           |
|---------------------------------|-----------|
| Internal Power Dissipation..... | 490mW     |
| Short Circuit Duration.....     | Momentary |