

# 3.0 WATT

# MINIATURE SIP DC/DC CONVERTER

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# HPR2XXC

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## FEATURES

- ROHS COMPLIANT
- FOUR CHANNELS OF ISOLATED POWER
- HIGH OUTPUT POWER DENSITY: > 9.4 WATTS/INCH<sup>3</sup>
- EXTENDED TEMPERATURE RANGE: -25°C TO +85°C
- HIGH EFFICIENCY: TO 84%
- LOW COST
- HIGH ISOLATION VOLTAGE: 750V CONTINUOUS INPUT-TO-OUTPUT AND CHANNEL-TO-CHANNEL
- SINGLE IN-LINE PACKAGE (SIP)
- INTERNAL INPUT AND OUTPUT FILTERING
- NON-CONDUCTIVE CASE

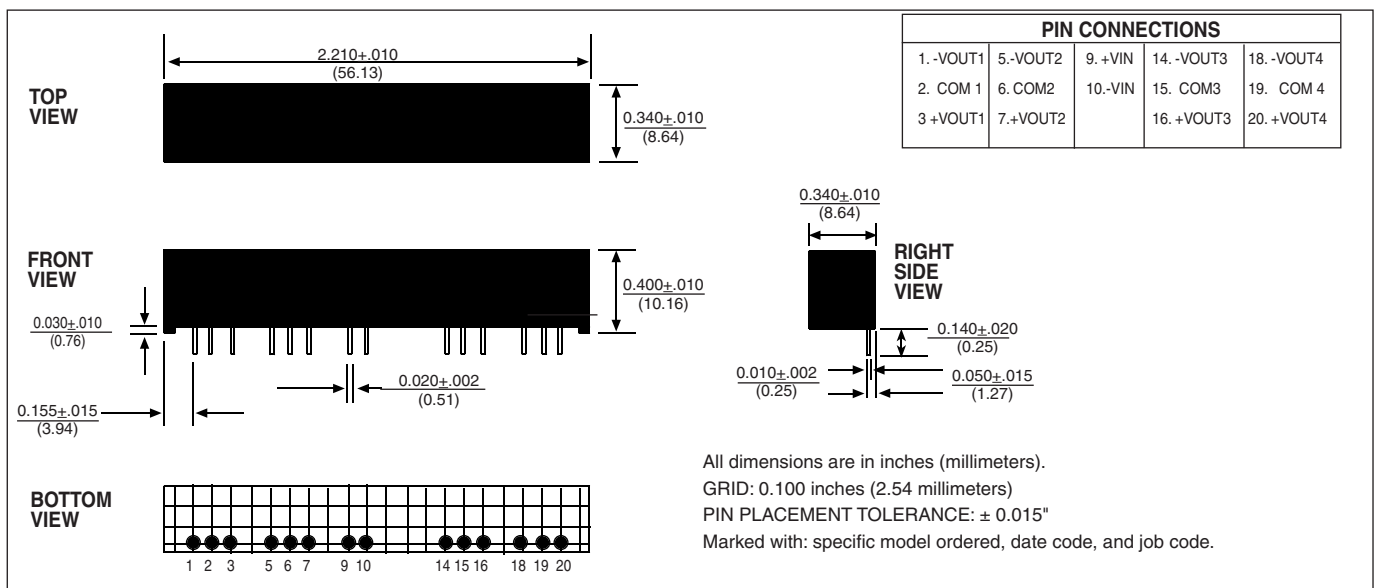
The HPR2XXC Series is designed for multiple channel applications that require small size and could benefit from a complete one-package solution. The HPR2XXC Series offers four isolated channels of output power in a footprint less than the size of many singular devices. This unregulated series of DC/DC converters provides three watts of total output power. Each isolated channel can supply up to 750mW.

The HPR2XXC Series uses advanced circuit design and packaging technology to realize superior reliability and performance. With only one switching converter on the board, the HPR2XXC eliminates the possibility of separate converters creating beat frequencies, or "aliasing" in multiple channel applications.

The high efficiency of the HPR2XXC Series means less internal power dissipation than comparable solutions. With reduced heat to dissipate, the HPR2XXC Series can operate at higher temperatures with no degradation in reliability. In addition, the high efficiency of the HPR2XXC Series provides greater than 9 watts/inch<sup>3</sup> output power density.

The HPR2XXC 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.

## MECHANICAL



# ELECTRICAL SPECIFICATIONS

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

| NOMINAL INPUT<br>MODEL | RATED OUTPUT VOLTAGE<br>(VDC) | RATED OUTPUT VOLTAGE<br>(VDC) | RATED OUTPUT CURRENT<br>(mA) | INPUT CURRENT   |                    | REFLECTED RIPPLE CURRENT<br>(mAp-p) | EFFICIENCY<br>(%) |
|------------------------|-------------------------------|-------------------------------|------------------------------|-----------------|--------------------|-------------------------------------|-------------------|
|                        |                               |                               |                              | NO LOAD<br>(mA) | RATED LOAD<br>(mA) |                                     |                   |
| HPR203C                | 5                             | $\pm 5.2$                     | $\pm 73$                     | 70              | 820                | 35                                  | 74                |
| HPR204C                | 5                             | $\pm 12$                      | $\pm 30$                     | 75              | 750                | 35                                  | 80                |
| HPR205C                | 5                             | $\pm 15$                      | $\pm 25$                     | 75              | 750                | 35                                  | 80                |
| HPR210C                | 12                            | $\pm 12$                      | $\pm 30$                     | 30              | 305                | 15                                  | 82                |
| HPR211C                | 12                            | $\pm 15$                      | $\pm 25$                     | 30              | 300                | 15                                  | 84                |
| HPR216C                | 15                            | $\pm 12$                      | $\pm 30$                     | 20              | 240                | 15                                  | 83                |
| HPR217C                | 15                            | $\pm 15$                      | $\pm 25$                     | 20              | 240                | 20                                  | 84                |
| HPR221C                | 24                            | $\pm 5.0$                     | $\pm 75$                     | 20              | 170                | 20                                  | 74                |
| HPR223C                | 24                            | $\pm 15$                      | $\pm 25$                     | 20              | 155                | 20                                  | 81                |

Note: Other input to output voltage options may be available. Please consult 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><br>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      | VDC<br>VDC<br>VDC<br>VDC                                       |
| Voltage Rise Time<br>In Rush Current   | At Startup   |                             |  | 1                                | V/ $\mu\text{sec}$<br>Amps                                     |
| <b>ISOLATION</b><br>Rated Voltage<br>Test Voltage<br>Resistance<br>Capacitance<br>Leakage Current  | Input to Output, Channel to Channel<br>60 Hz, 10 seconds<br><br><br>$V_{\text{ISO}} = 240\text{VAC}, 60\text{Hz}$  | 750<br>750                  | 10<br>30<br>4                                  |                                  | VDC<br>Vpk<br>G $\Omega$<br>pF<br>$\mu\text{Arms}$             |
| <b>OUTPUT</b><br>Total Rated Power<br>Rated Power Each Channel<br>Voltage Setpoint Accuracy<br>Ripple & Noise<br>Voltage<br>Temperature Coefficient  | Rated Load, Nominal $V_{\text{IN}}$<br>BW = DC to 10MHz<br>BW = 10Hz to 2MHz<br>$I_L = 1\text{mA}, V_{\text{OUT}} = 5\text{V}$<br>$I_L = 1\text{mA}, V_{\text{OUT}} = 12\text{V}$<br>$I_L = 1\text{mA}, V_{\text{OUT}} = 15\text{V}$ |                             | 3<br>750<br>40<br>7<br>.<br>.05                | $\pm 5$<br><br><br>8<br>17<br>20 | W<br>mW<br>%<br>mVp-p<br>mVrms<br>VDC<br>VDC<br>VDC<br>%/Deg C |
| <b>REGULATION</b><br>Line Regulation<br>Load Regulation (5V out only)<br>Load Regulation (All other Models)  | High Line to Low Line<br>Rated Load to 1mA Load<br>Rated Load to 1mA Load  |                             | 1<br>10<br>3                                   |                                  | %/ $\%V_{\text{IN}}$<br>%<br>%                                 |
| <b>GENERAL</b><br>Switching Frequency<br>Package Weight<br>Frequency Change<br>MTTF per MIL-HDBK-217, Rev. E<br>Ground Benign<br>Fixed Ground<br>Naval Sheltered<br>Airborne Uninhabited Fighter | Rated Load to 1mA Load<br>High Line to Low Line<br>Circuit Stress Method<br>$T_A = +25^\circ\text{C}$<br>$T_A = +35^\circ\text{C}$<br>$T_A = +35^\circ\text{C}$<br>$T_A = +35^\circ\text{C}$   |                             | 300<br>7<br>5<br>20<br>1.8<br>450<br>270<br>45 |                                  | kHz<br>g<br>%<br>%<br>Mhr<br>kHr<br>kHr<br>kHr                 |
| <b>TEMPERATURE</b><br>Specification<br>Operation<br>Storage  |  | -25<br>-40<br>-40           | +25  | +85<br>+100<br>+110              | $^\circ\text{C}$<br>$^\circ\text{C}$<br>$^\circ\text{C}$       |

## ABSOLUTE MAXIMUM RATINGS

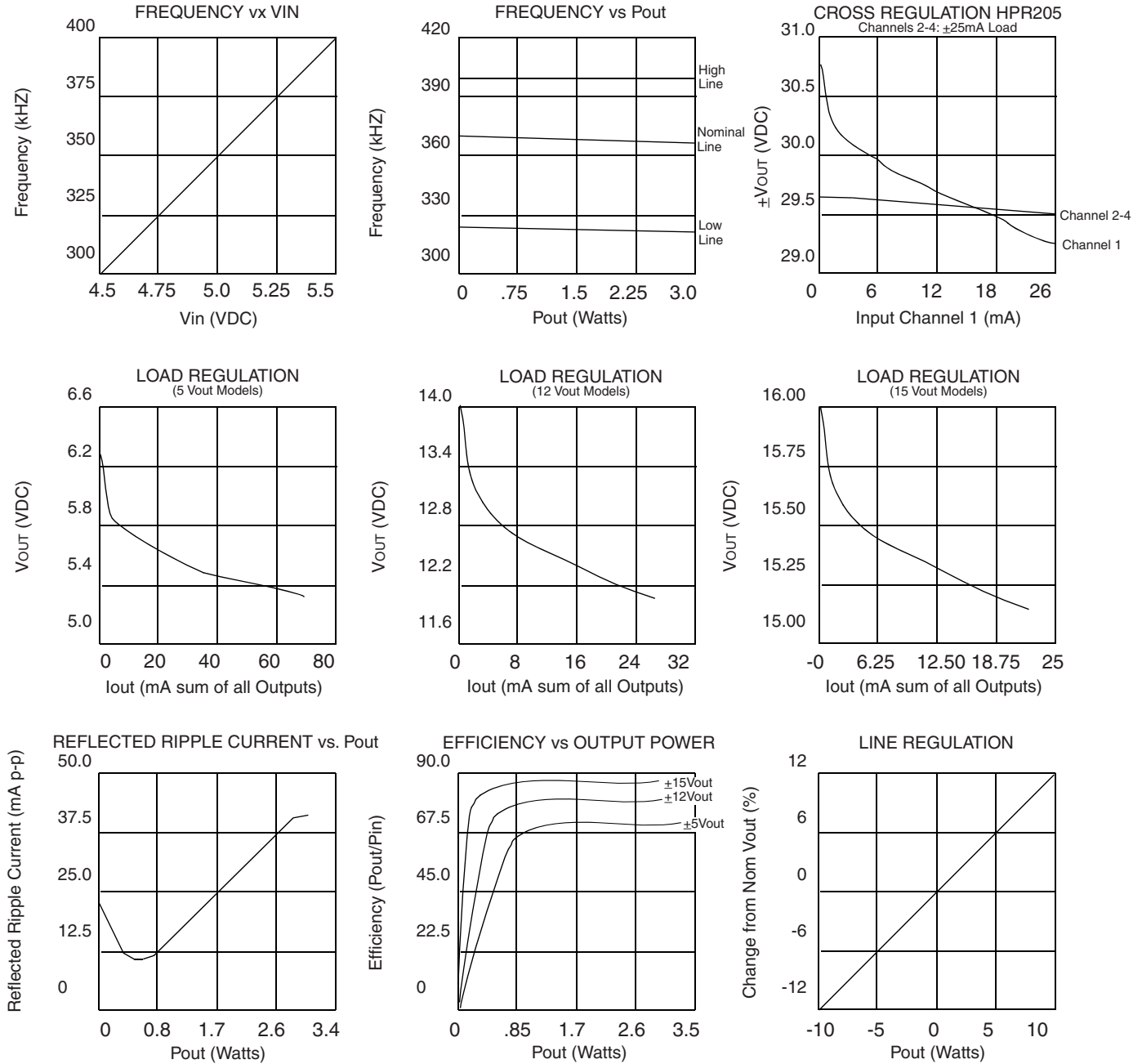
|   |                       |
|---|-----------------------|
| Internal Power Dissipation.....                   | 1.2W                  |
| Short Circuit Protection.....                     | < 1 second            |
| Lead Temperature (soldering, 10 seconds max)..... | +300 $^\circ\text{C}$ |

## ORDERING INFORMATION

|                               |           |
|-------------------------------|-----------|
| Device Family                 | HPR 2XX C |
| HPR Indicates DC/DC Converter |           |
| Model Number                  |           |
| Selected From Table Above     |           |
| RoHS Compliance               |           |

# TYPICAL PERFORMANCE CURVES

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



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