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0.75 Watt Single Output DC/DC Converter



- Low Cost
- Multiple Package Styles
- Internal Input and Output
- Filtering
- Non-Conductive Case
- High Output Power Density: 10 Watts/Inch³
- Extended Temperature Range: -25°C to +85°C
- Efficiency to 79%
- RoHS Compliant

The HPR1XXC 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 HPR1XXC Series with high frequency isolation amplifiers.

Reduced parts count and high efficiency add to the reliability of the

HPR1XXC Series. The high efficiency of the HPR1XXC Series means less internal power dissipation, as low as 190mW. With reduced heat dissipation the HPR1XXC Series can operate at higher temperatures with no degradation.

In addition, the high efficiency of the HPR1XXC Series means the series is able to offer greater than 10 W/inch³ of output power density. Operation down to no load

will not impact the reliability of the series, although a $\geq 1\text{mA}$ minimum load is needed to realize published specifications.

The HPR1XXC Series provides the user a low cost converter without sacrificing reliability. The use of surface mounted devices and advanced manufacturing technologies make it possible to offer premium performance and low cost.

SPECIFICATIONS All specifications are typical at $T_A = +25^\circ\text{C}$ nominal input voltage unless otherwise specified.

PRODUCT SELECTION CHART

| MODEL | NOMINAL INPUT VOLTAGE (VDC) | RATED OUTPUT VOLTAGE (VDC) | RATED OUTPUT CURRENT (mA) | INPUT CURRENT | | REFLECTED RIPPLE CURRENT (mAp-p) | EFFICIENCY (%) |
|--------------------|-----------------------------|----------------------------|---------------------------|---------------|-----------------|----------------------------------|----------------|
| | | | | NO LOAD (mA) | RATED LOAD (mA) | | |
| HPR100C | 5 | 5 | 150 | 20 | 216 | 10 | 69 |
| HPR101C | 5 | 12 | 62 | 20 | 212 | 5 | 70 |
| HPR102C | 5 | 15 | 50 | 20 | 212 | 5 | 71 |
| HPR103C | 5 | ± 5 | ± 75 | 20 | 218 | 5 | 68 |
| HPR104C | 5 | ± 12 | ± 30 | 20 | 212 | 5 | 68 |
| HPR105C | 5 | ± 15 | ± 25 | 20 | 200 | 5 | 75 |
| HPR106C | 12 | 5 | 150 | 10 | 90 | 5 | 69 |
| HPR107C | 12 | 12 | 62 | 10 | 81 | 5 | 77 |
| HPR108C | 12 | 15 | 50 | 10 | 81 | 5 | 77 |
| HPR109C | 12 | 15 | 175 | 10 | 88 | 5 | 74 |
| HPR110C | 12 | ± 12 | ± 30 | 10 | 81 | 5 | 74 |
| HPR111C | 12 | ± 15 | ± 25 | 10 | 81 | 5 | 77 |
| HPR112C | 15 | 5 | 150 | 8 | 72 | 5 | 69 |
| HPR113C | 15 | 12 | 62 | 8 | 72 | 5 | 69 |
| HPR114C | 15 | 15 | 50 | 8 | 72 | 5 | 69 |
| HPR115C | 15 | 15 | 175 | 8 | 72 | 5 | 69 |
| HPR116C | 15 | ± 12 | ± 30 | 8 | 63 | 5 | 76 |
| HPR117C | 15 | ± 15 | ± 25 | 8 | 63 | 5 | 79 |
| HPR118C | 24 | 5 | 150 | 8 | 48 | 15 | 65 |
| HPR119C | 24 | 12 | 62 | 8 | 48 | 15 | 65 |
| HPR120C | 24 | 15 | 50 | 8 | 45 | 15 | 76 |
| HPR121C | 24 | 15 | 175 | 8 | 45 | 15 | 69 |
| HPR122C | 24 | ± 12 | ± 30 | 8 | 45 | 15 | 67 |
| HPR123C | 24 | ± 15 | ± 25 | 8 | 45 | 15 | 69 |

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

SPECIFICATIONS, ALL MODELS

Specifications are at $T_A = +25^\circ\text{C}$ nominal input voltage unless otherwise specified.

| | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS | |
|------------------------------------|--|------------------------------|-------|-----|---------|-------|--|
| OUTPUT | INPUT | | | | | | |
| | Voltage Range | | 4.5 | 5 | 5.5 | VDC | |
| | | | 10.8 | 12 | 13.2 | VDC | |
| | | | 13.5 | 15 | 16.5 | VDC | |
| | | | 21.6 | 24 | 26.4 | VDC | |
| | Voltage Rise Time See Typical Performance Curves & Application Notes: "Capacitive Loading Effects on Start-Up of DC/DC Converters" | | | | | | |
| | OUTPUT | | | | | | |
| | Rated Power | | | | 750 | mW | |
| | Voltage Setpoint Accuracy | Rated Load, Nominal V_{IN} | | | ± 5 | % | |
| | Ripple & Noise | BW = DC to 10MHz | | | 150 | mVp-p | |
| BW = 10Hz to 2MHz | | | | 30 | mVrms | | |
| Voltage (Over Input Voltage Range) | 1mA to Rated Current, $V_{OUT} = 5V$ | | 4.75 | | 7 | VDC | |
| | 1mA to Rated Current, $V_{OUT} = 12V$ | | 11.40 | | 15 | VDC | |
| | 1mA to Rated Current, $V_{OUT} = 15V$ | | 14.25 | | 18 | VDC | |
| Temperature Coefficient | | | .01 | .05 | %/°C | | |
| REGULATION | | | | | | | |
| Load Regulation (All other modes) | Rated Load to 1mA Load | | | 3 | % | | |
| GENERAL | | | | | | | |
| ISOLATION | | | | | | | |
| Rated Voltage | | | 750 | | | VDC | |
| Test Voltage | 60 Hz, 10 Seconds | | 750 | | | Vrms | |
| Resistance | | | 10 | | | GΩ | |
| Capacitance | | | | 25 | 100 | pF | |
| Leakage Current | $V_{ISO} = 240VAC, 60Hz$ | | | 2 | 8.5 | μArms | |
| Switching Frequency | | | | 170 | | kHz | |
| Frequency Change | Over Line and Load | | | 24 | | % | |
| Package Weight | | | | | 3 | g | |
| MTTF per MIL-HDBK-217, Rev. F* | Circuit Stress Method | | | | | | |
| Ground Benign | $T_A = +25^\circ\text{C}$ | | 7.9 | | | MHr | |
| Fixed Ground | $T_A = +35^\circ\text{C}$ | | 1.9 | | | MHr | |
| Naval Sheltered | $T_A = +35^\circ\text{C}$ | | 1.2 | | | MHr | |
| Airborne Uninhabited Fighter | $T_A = +35^\circ\text{C}$ | | 300 | | | kHr | |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-20 | | | 2 | | | |
| TEMPERATURE | | | | | | | |
| Specification | | | -25 | +25 | +85 | °C | |
| Operation | | | -40 | | +100 | °C | |
| Storage | | | -40 | | +110 | °C | |

SOLDERING INFORMATION

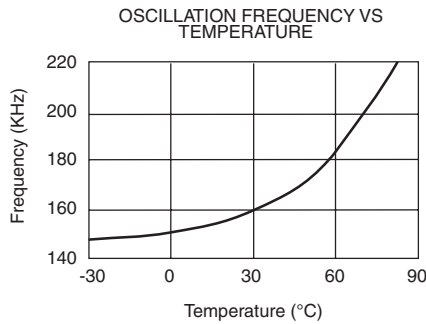
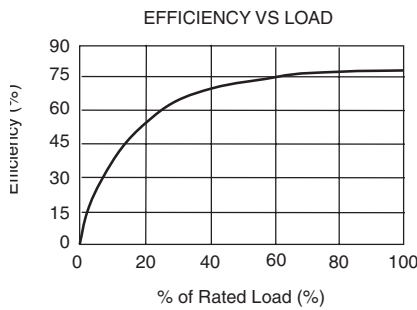
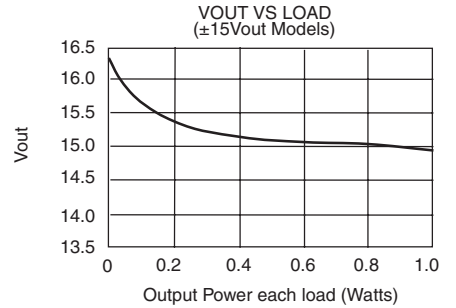
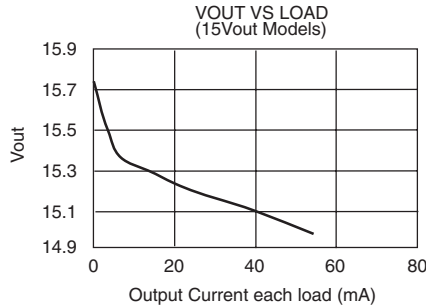
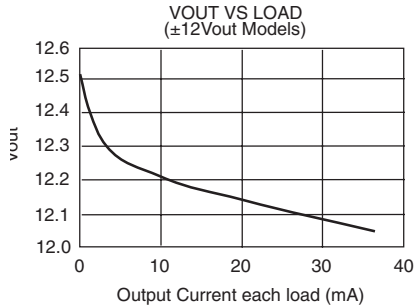
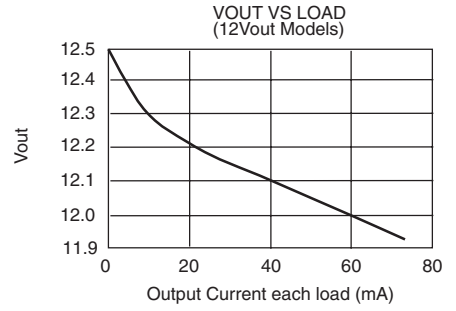
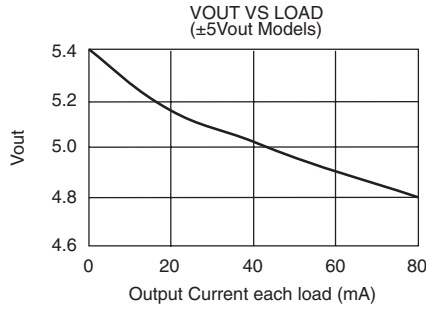
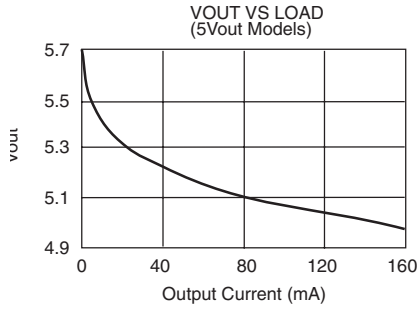
The HPR1XXC devices are intended for wave soldering or manual soldering.

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

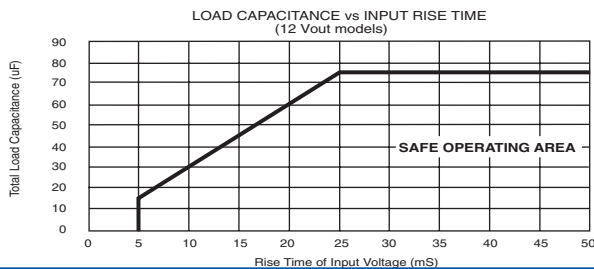
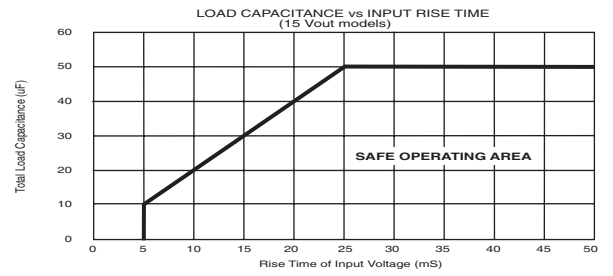
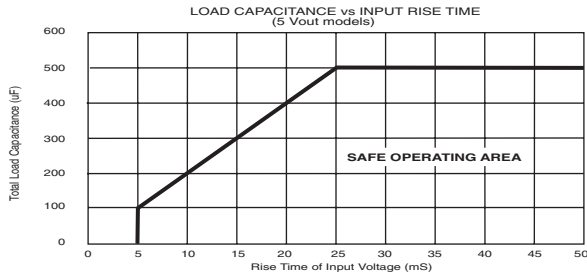
The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of 260°C for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and internal temperatures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

TYPICAL PERFORMANCE CURVES

Specifications are at $T_A = +25^\circ\text{C}$ nominal input voltage and nominal load.



SAFE OPERATING AREA

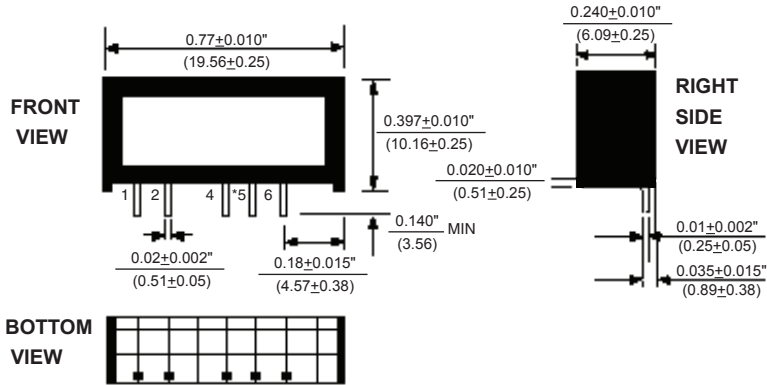


NOTES:

- 1.) When operated within the SAFE OPERATING AREA as defined by the above curves, the output voltage of HPR1XXC 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.

MECHANICAL

"SIP" PACKAGE/PINOUT



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; lead finish is 100-300 microinches of matte tin over a nickel barrier layer of 5-40 microinches.

*Common pin not present on single output models.

PIN CONNECTIONS

1. +VIN
2. -VIN
4. -VOUT
5. COM*
6. +VOUT

ABSOLUTE MAXIMUM RATINGS

Internal Power Dissipation 450mW
 Short Circuit Duration Momentary

ORDERING INFORMATION

Device Family _____ **HPR** **1XX** **C**
 HPR Indicates DC/DC Converter
 Model Number _____
 Selected from Table of Electrical Characteristics
 RoHS Compliant Version _____

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