

## 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)

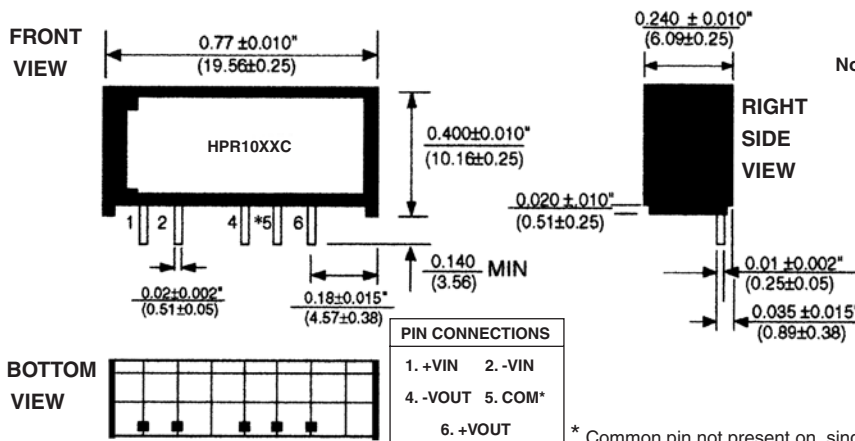
## DESCRIPTION

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

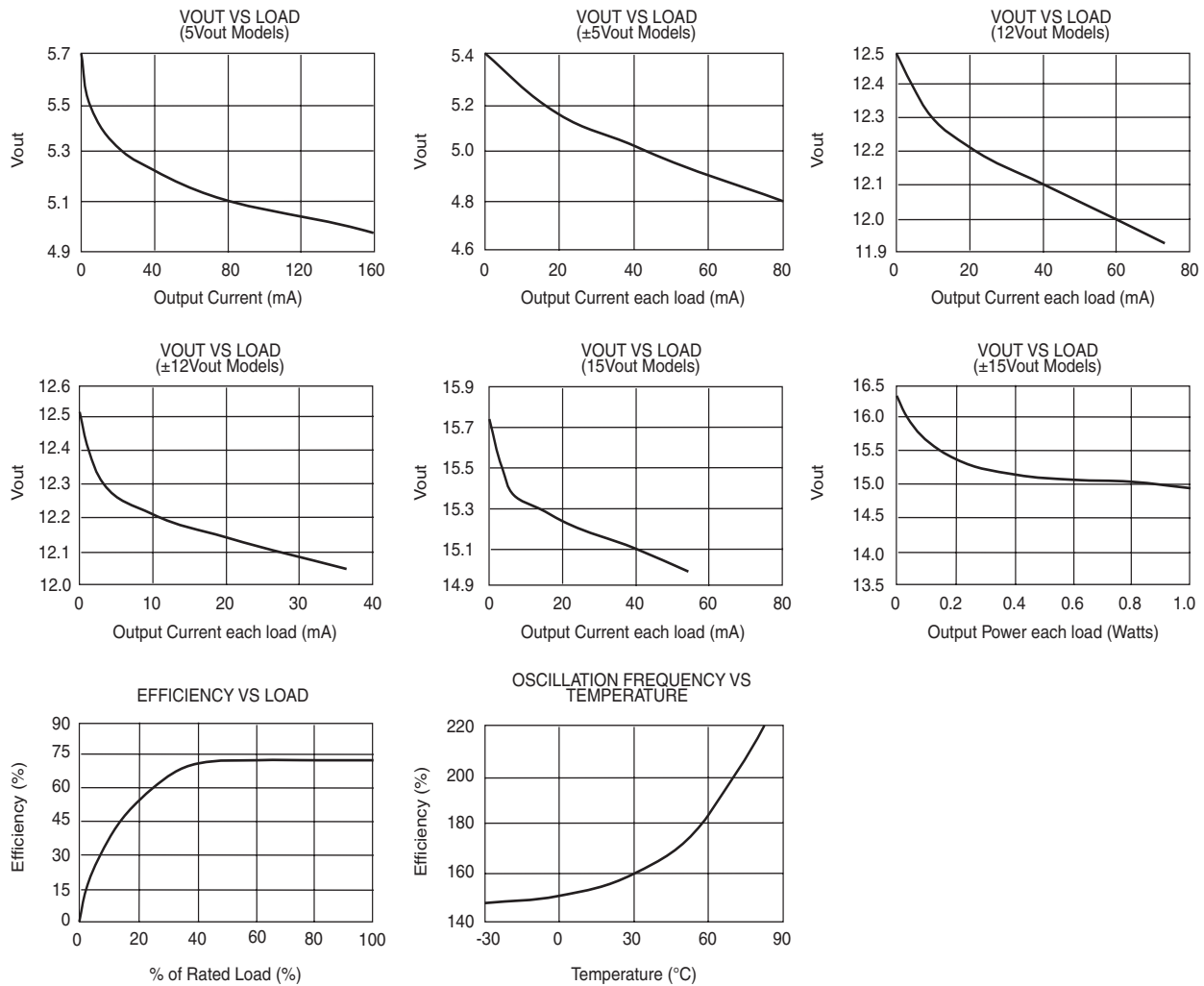
Specifications typical at  $T_A = +25^\circ\text{C}$ , nominal input voltage, rated output current unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>INPUT</b>					
Voltage Range		4.5 10.8 13.5 21.6	5 12 15 24	5.5 13.2 16.5 26.4	V <sub>DC</sub> V <sub>DC</sub> V <sub>DC</sub> 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 BW = 10Hz to 2MHz		30	100	mV <sub>p-p</sub> mV <sub>rms</sub>
Voltage	1mA Load, V <sub>OUT</sub> = 5V 1mA Load, V <sub>OUT</sub> = 12V 1mA Load, V <sub>OUT</sub> = 15V			7 15 18	V <sub>DC</sub> V <sub>DC</sub> 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.



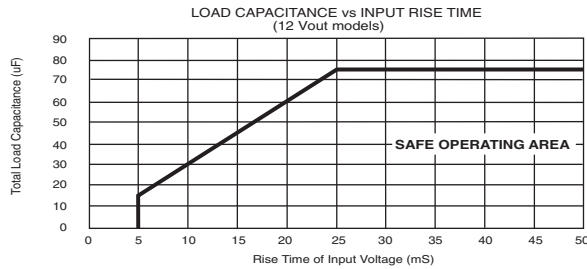
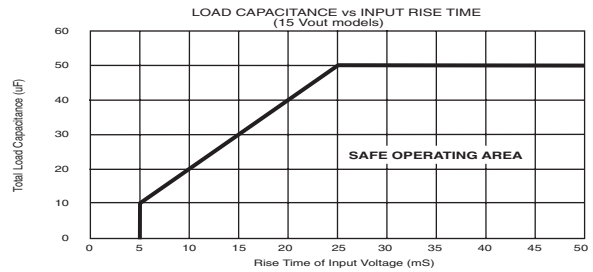
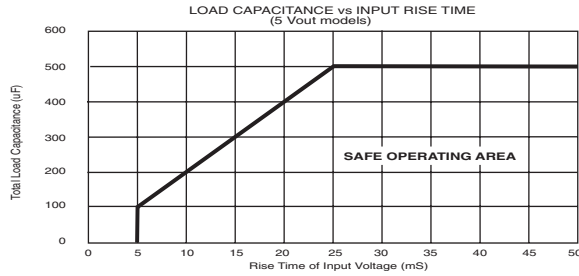
## THROUGH-HOLE SOLDERING INFORMATION

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