

**NOT RECOMMENDED FOR NEW DESIGNS**  
 See page Electrical Specifications  
 for alternatives



### 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
- 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.

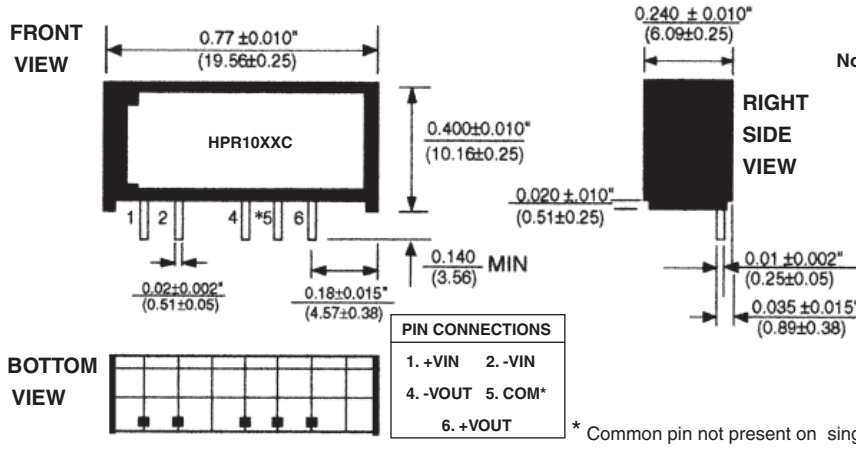
### ELECTRICAL SPECIFICATIONS

Specifications typical at T<sub>A</sub> = +25°C, nominal input voltage, rated output current unless otherwise specified.

Model	Nominal Input Voltage V <sub>DC</sub>	Rated Output Voltage V <sub>DC</sub>	Rated Output Current mA	Input Current		Reflected Ripple Current mAp-p	Efficiency %	Recommended Alternatives	
				No Load mA	Rated Load mA				
NOT RECOMMENDED FOR NEW DESIGNS	HPR1000C	5	5	200	33	290	8	68	NMR100C / MER1S0505SC
	HPR1001C	5	12	83	33	290	8	69	NMR101C / MER1S0512SC
	HPR1004C	5	±12	±42	33	285	8	70	NMA0512SC / MEA1D0512SC
	HPR1005C	5	±15	±34	33	285	8	70	NMA0515SC / MEA1D0515SC
	HPR1018C	24	5	200	12	60	15	71	MER1S2405SC
	HPR1022C	24	±12	±42	12	58	15	72	MEA1D2412SC
	HPR1023C	24	±15	±34	12	58	15	72	MEA1D2415SC
OBSOLETE	HPR1002C	5	15	67	33	285	8	70	NMR102C / MER1S0515SC
	HPR1003C	5	±5	±100	33	285	8	70	NMA0505SC / MEA1D0505SC
	HPR1006C	12	5	200	18	110	10	70	NMR106C / MER1S1205SC
	HPR1007C	12	12	83	18	107	10	71	NMR107C / MER1S1212SC
	HPR1008C	12	15	67	18	107	10	71	NMR108C / MER1S1215SC
	HPR1009C	12	±5	±100	18	107	10	71	NMA1205SC / MEA1D1205SC
	HPR1010C	12	±12	±42	18	107	10	71	NMA1212SC / MEA1D1212SC
	HPR1011C	12	±15	±34	18	107	10	71	NMA1215SC / MEA1D1215SC
	HPR1012C	15	5	200	15	96	10	70	MER1S1505SC
	HPR1013C	15	12	83	15	94	10	70	MER1S1512SC
	HPR1014C	15	15	67	15	94	10	71	MER1S1515SC
	HPR1015C								MEA1D1505SC
	HPR1016C	15	±12	±42	15	94	10	71	MEA1D1512SC
	HPR1017C	15	±15	±34	15	94	10	71	MEA1D1515SC
	HPR1019C	24	12	83	12	60	15	71	MER1S2412SC
HPR1020C	24	15	67	12	58	15	72	MER1S2415SC	
HPR1021C	24	±5	±100	12	58	15	72	MEA1D2405SC	



**MECHANICAL**



**Notes:** All dimensions are in inches (millimeters).  
 GRID: 0.100 inches (2.54 millimeters)  
 PIN PLACEMENT TOLERANCE: ± 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.

**COMMON SPECIFICATIONS**

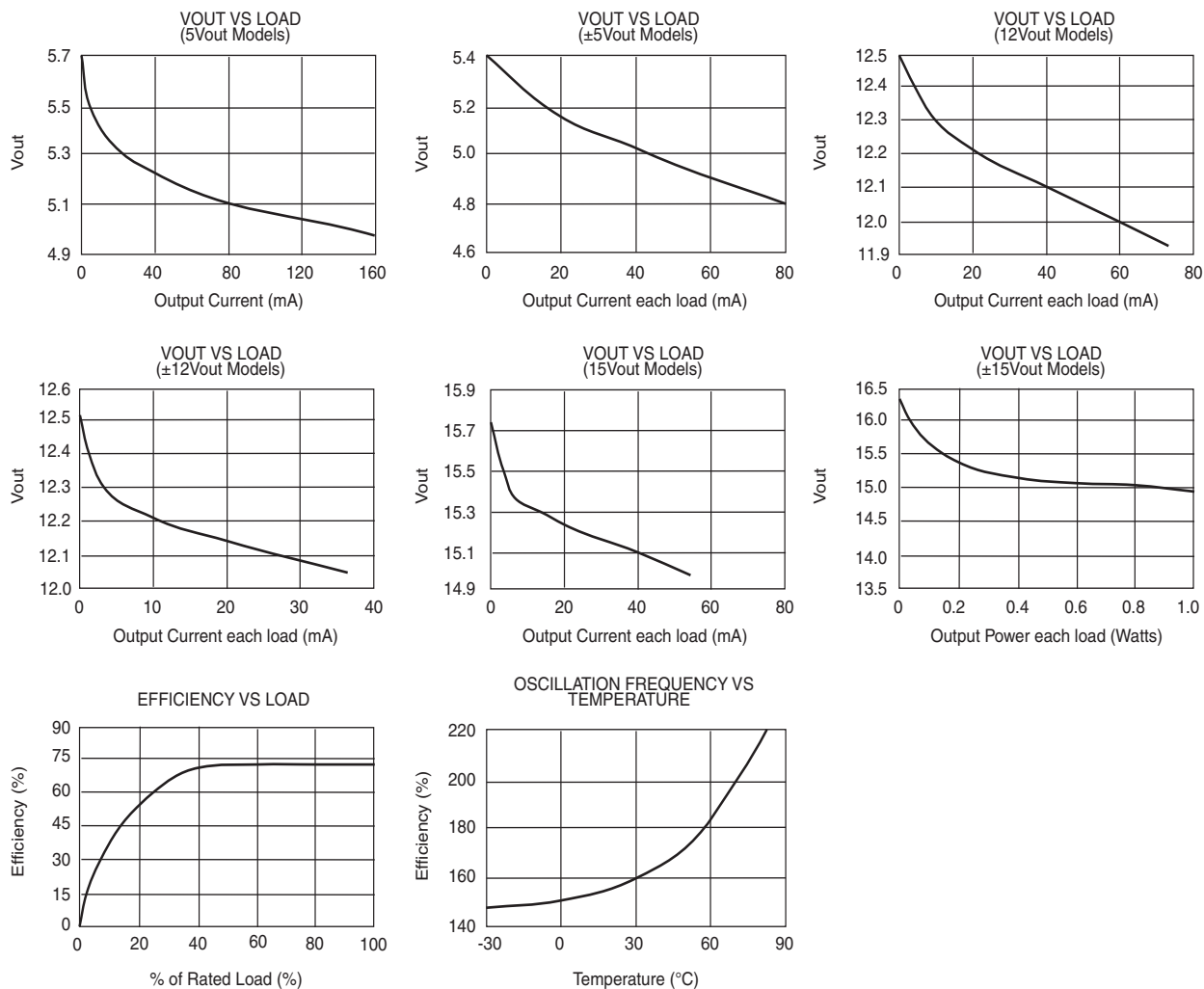
Specifications typical at T<sub>A</sub> = +25°C, nominal input voltage, rated output current unless otherwise specified.

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> mVrms
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
<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.



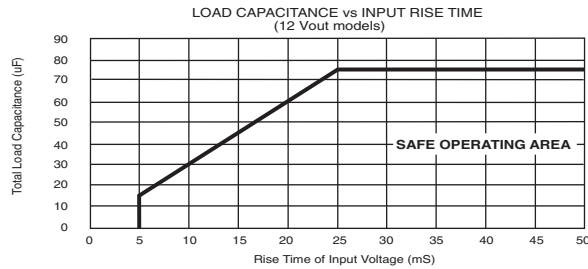
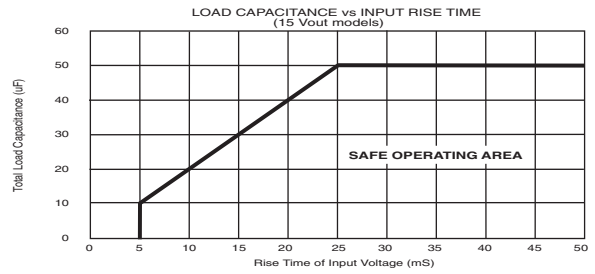
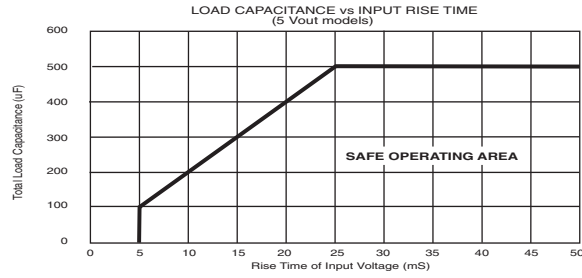
## THROUGH-HOLE SOLDERING INFORMATION

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

Murata Power Solutions, Inc.  
 11 Cabot Boulevard, Mansfield, MA 02048-1151 U.S.A.  
 ISO 9001 and 14001 REGISTERED

Murata Power Solutions, Inc. makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Specifications are subject to change without notice. © 2010 Murata Power Solutions, Inc.