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# HPR4XXC

## 0.75 Watt Miniature SIP DC/DC Converter



### PRODUCT OVERVIEW

The HPR4XXC Series provides advanced circuit design reliability and performance. A 70kHz push-pull stage. The HPR4XXC Series is designed to reduce oscillation problems when used with high frequency isolation amplifiers. Reduced parts count and high efficiency add to the reliability of the HPR4XXC Series.

degradation of reliable operation. In addition, the high efficiency of the HPR4XXC Series means the series is able to offer greater than 10 W/inch<sup>3</sup> of output power density. Operation down to no load will not impact the reliability of the series, although this product has a >1mA minimum load for specifications purposes.

The HPR4XXC Series provides high isolation in a very small package. The use of surface mounted devices and manufacturing technologies makes it possible to offer premium performance and low cost.

### FEATURES

- High Isolation Voltage: 3000 VPK Test
- Single-In-Line Package (SIP)
- Internal Input and Output
- Low Cost
- Non-Conductive Case

- High Output Power Density: 10 Watts/Inch<sup>3</sup>
- Extended Temperature Range: -25°C to +85°C
- High Efficiency to 79%
- RoHS Compliant

As of September 2014, ONLY the following part numbers will be available: HPR400C; HPR403C; HPR404C; HPR417C

### PRODUCT SELECTION CHART

Model	Nominal Input Voltage	Rated Output Voltage	Rated Output Current	Input Current			Reflected Ripple Current	Efficiency	Recommended Alternatives
				No Load	Rated Load				
					Typ. mA	Max.			
	V <sub>dc</sub>	V <sub>dc</sub>	mA				mAp-p	%	
<b>OBSOLETE</b> ★ HPR400C	5	5	150	20	216	235	10	69	NMV0505SAC / MEV1S0505SC
<b>OBSOLETE</b> ★ HPR402C	5	15	50	20	212	235	5	71	NMV0515SAC / MEV1S0515SC
HPR403C	5	±5	±75	20	218	245	5	68	NMV0505SC / MEV1D0505SC
HPR404C	5	±12	±30	20	212	235	5	68	NMV0512SC / MEV1D0512SC
<b>OBSOLETE</b> ★ HPR405C	5	±15	±25	20	220	220	5	75	NMV0515SC / MEV1D0515SC
<b>OBSOLETE</b> ★ HPR407C	12	12	62	10	81	90	5	77	NMV1212SAC / MEV1S1212SC
<b>OBSOLETE</b> ★ HPR410C	12	±12	±30	10	81	90	5	74	NMV1212SC / MEV1D1212SC
<b>OBSOLETE</b> ★ HPR411C	12	±15	±25	10	81	90	5	77	NMV1215SC / MEV1D1215SC
<b>OBSOLETE</b> ★ HPR414C	15	15	50	8	72	80	5	69	NMV1515SAC / MEV1S1515SC
HPR417C	15	±15	±25	8	63	66	5	79	NMV1515SC / MEV1D1515SC
<b>OBSOLETE</b> ★ HPR418C	24	5	150	8	48	53	15	65	MEV1S2405SC
<b>OBSOLETE</b> ★ HPR422C	24	±12	±30	8	45	50	15	67	MEV1D2412SC
<b>OBSOLETE</b> ★ HPR423C	24	±15	±25	8	45	50	15	69	MEV1D2415SC
HPR401C	5	12	62	20	212	235	5	70	NMV0512SAC / MEV1S0512SC
HPR406C	12	5	150	10	90	100	5	69	NMV1205SAC / MEV1S1205SC
HPR408C	12	15	50	10	81	90	5	77	NMV1215SAC / MEV1S1215SC
HPR409C	12	±5	±75	10	88	98	5	71	NMV1205SC / MEV1D1205SC
HPR412C	15	5	150	8	72	80	5	69	NMV1505SAC / MEV1S1505SC
HPR413C	15	12	62	8	72	80	5	69	NMV1512SAC / MEV1S1512SC
HPR415C	15	±5	±75	8	72	80	5	69	NMV1505SC / MEV1D1505SC
HPR416C	15	±12	±30	8	63	70	5	76	NMV1512SC / MEV1D1512SC
HPR419C	24	12	62	8	48	53	15	65	MEV1S2412SC
HPR420C	24	15	50	8	45	50	15	69	MEV1S2415SC
HPR421C	24	±5	±75	8	45	50	15	69	MEV1D2405SC

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### 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	<b>INPUT</b>						
	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	
	<b>OUTPUT</b>						
	Rated Power				750	mW	
	Voltage Setpoint Accuracy	Rated Load, Nominal $V_{IN}$			$\pm 5$	%	
	Ripple & Noise	BW = DC to 10MHz			150	200	mVp-p
		BW = 10Hz to 2MHz			30	40	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	%/ $^\circ\text{C}$		
<b>REGULATION</b>							
Load Regulation (All other modes)	Rated Load to 1mA Load			3		%	
<b>GENERAL</b>							
<b>ISOLATION</b>							
Rated Voltage			1000			VDC	
Test Voltage	60 Hz, 60 Seconds		3000			Vpk	
Resistance			10			$\text{G}\Omega$	
Capacitance				25	100	pF	
Leakage Current	$V_{ISO} = 240\text{VAC}, 60\text{Hz}$			2	7	$\mu\text{Arms}$	
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	
<b>TEMPERATURE</b>							
Specification			-25	+25	+85	$^\circ\text{C}$	
Operation			-40		+100	$^\circ\text{C}$	
Storage			-40		+110	$^\circ\text{C}$	

### SOLDERING INFORMATION

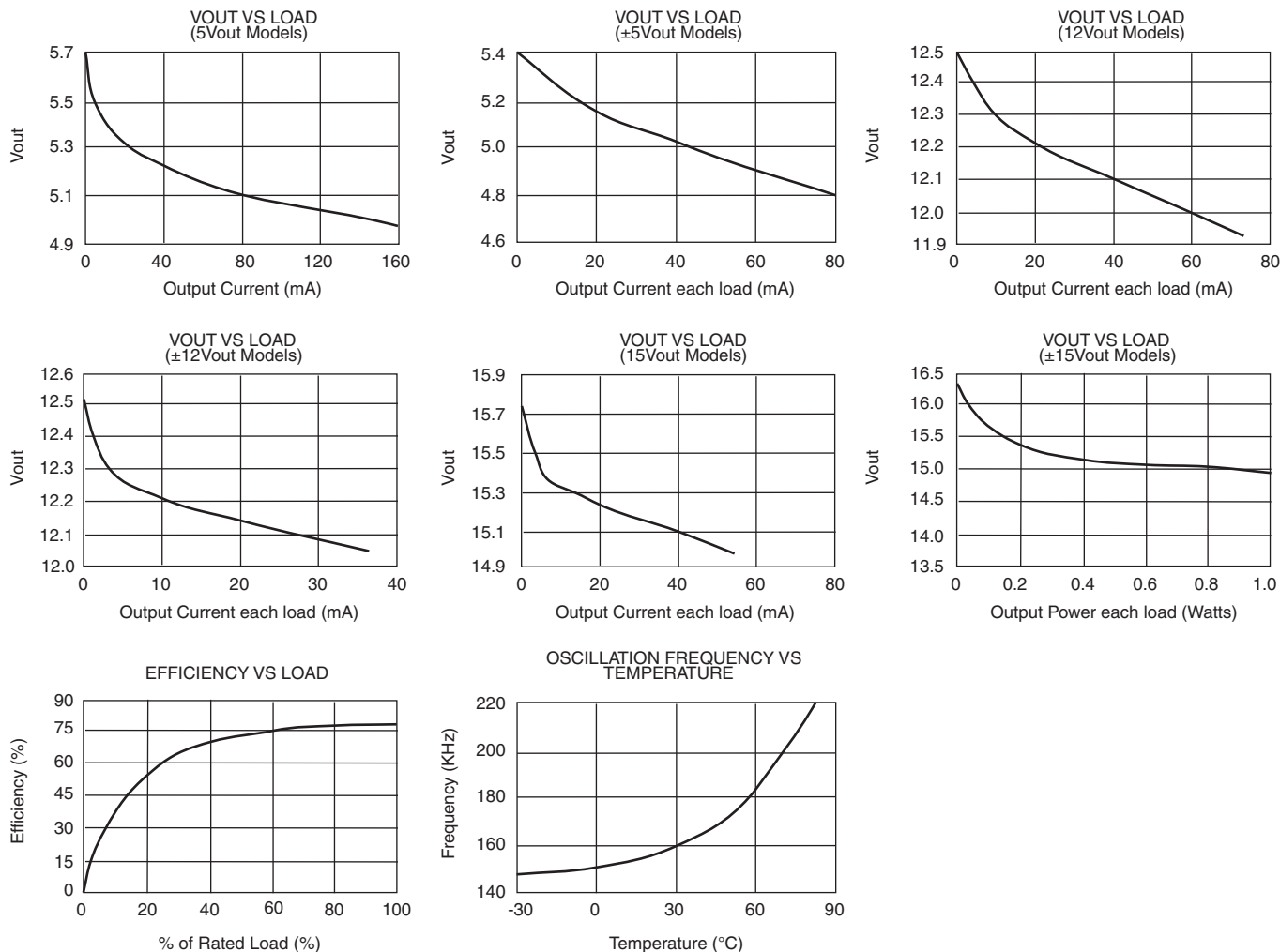
The HPR4XXC devices are intended for wave soldering or manual soldering.

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

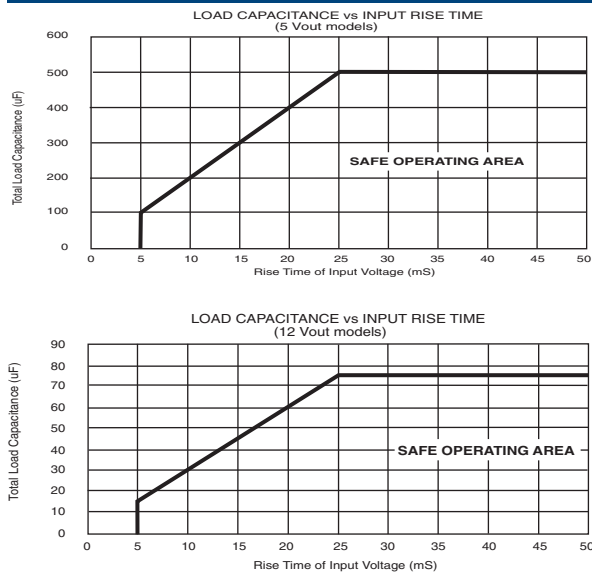
The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of  $260^\circ\text{C}$  for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and 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.

**TYPICAL PERFORMANCE CURVES**

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



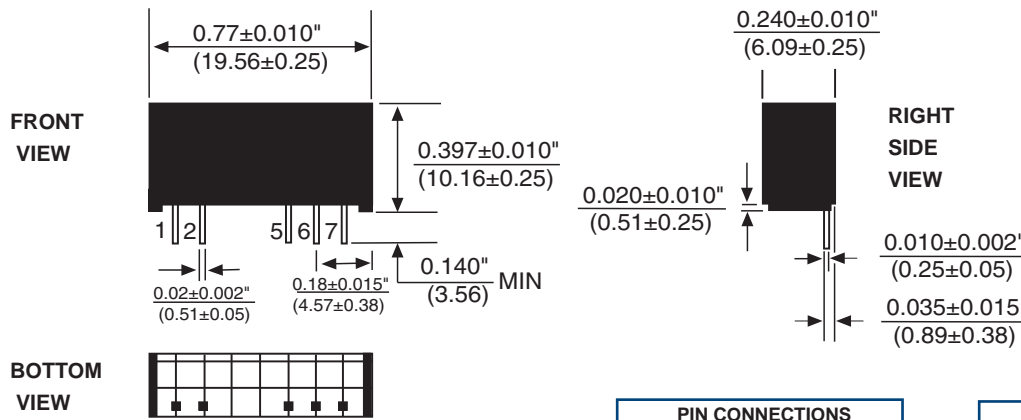
**SAFE OPERATING AREA**



**NOTES:**

- 1.) When operated within the SAFE OPERATING AREA as defined by the above curves, the output voltage of HPR4XXC 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**



PIN CONNECTIONS	
1.	+VIN
2.	-VIN
5.	-VOUT
6.	COM*
7.	+VOUT

\*Common pin not present on single output models.

**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 barrier layer of 5-40 microinches of nickel.

**ABSOLUTE MAXIMUM RATINGS**

Internal Power Dissipation.....450mW  
 ShortCircuitDuration .....Momentary  
 Lead Temperature (soldering, 10 seconds max ...+300°C\*)

\*NOTE: Refer to Reflow Profile for SMD Models.

**ORDERING INFORMATION**

Device Family \_\_\_\_\_ **HPR** **4XX** **C**  
 HPR Indicates DC/DC Converter  
 Model Number \_\_\_\_\_  
 Selected from Table of Electrical Characteristics  
 RoHS Compliant Version \_\_\_\_\_



This product is subject to the following **operating requirements** and the **Life and Safety Critical Application Sales Policy**:  
 Refer to: <http://www.murata-ps.com/requirements/>

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