

### PRODUCT OVERVIEW

The HPR4XXC Series uses advanced circuit design and packaging technology to realize superior reliability and performance. A 170kHz push-pull oscillator is used in the input stage. The HPR4XXC Series reduces beat-frequency oscillation problems when used with high frequency isolation amplifiers. Reduced parts count and high efficiency add to the reliability of the HPR4XXC Series.

The high efficiency of the HPR4XXC Series means less internal power dissipation, as low as 190mW. With less heat to dissipate the HPR4XXC Series can operate at higher temperatures with no 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  $\geq 1$ mA 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

**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 (mA)			REFLECTED RIPPLE CURRENT (mA <sub>p-p</sub> )	EFFICIENCY (%)
				NO LOAD (mA)	RATED TYP	LOAD MAX		
HPR400C	5	5	150	20	216	235	10	69
<del>HPR401C</del>	<del>5</del>	<del>12</del>	<del>62</del>	<del>20</del>	<del>212</del>	<del>235</del>	<del>5</del>	<del>70</del>
HPR402C	5	15	50	20	212	235	5	71
HPR403C	5	$\pm 5$	$\pm 75$	20	218	245	5	68
HPR404C	5	$\pm 12$	$\pm 30$	20	212	235	5	68
HPR405C	5	$\pm 15$	$\pm 25$	20	220	220	5	75
<del>HPR406C</del>	<del>12</del>	<del>5</del>	<del>150</del>	<del>10</del>	<del>90</del>	<del>100</del>	<del>5</del>	<del>69</del>
HPR407C	12	12	62	10	81	90	5	77
<del>HPR408C</del>	<del>12</del>	<del>15</del>	<del>50</del>	<del>10</del>	<del>81</del>	<del>90</del>	<del>5</del>	<del>77</del>
<del>HPR409C</del>	<del>12</del>	<del><math>\pm 5</math></del>	<del><math>\pm 75</math></del>	<del>10</del>	<del>88</del>	<del>98</del>	<del>5</del>	<del>71</del>
HPR410C	12	$\pm 12$	$\pm 30$	10	81	90	5	74
HPR411C	12	$\pm 15$	$\pm 25$	10	81	90	5	77
<del>HPR412C</del>	<del>15</del>	<del>5</del>	<del>150</del>	<del>8</del>	<del>72</del>	<del>80</del>	<del>5</del>	<del>69</del>
<del>HPR413C</del>	<del>15</del>	<del>12</del>	<del>62</del>	<del>8</del>	<del>72</del>	<del>80</del>	<del>5</del>	<del>69</del>
HPR414C	15	15	50	8	72	80	5	69
<del>HPR415C</del>	<del>15</del>	<del><math>\pm 5</math></del>	<del><math>\pm 75</math></del>	<del>8</del>	<del>72</del>	<del>80</del>	<del>5</del>	<del>69</del>
<del>HPR416C</del>	<del>15</del>	<del><math>\pm 12</math></del>	<del><math>\pm 30</math></del>	<del>8</del>	<del>63</del>	<del>70</del>	<del>5</del>	<del>76</del>
HPR417C	15	$\pm 15$	$\pm 25$	8	63	66	5	79
HPR418C	24	5	150	8	48	53	15	65
<del>HPR419C</del>	<del>24</del>	<del>12</del>	<del>62</del>	<del>8</del>	<del>48</del>	<del>53</del>	<del>15</del>	<del>65</del>
<del>HPR420C</del>	<del>24</del>	<del>15</del>	<del>50</del>	<del>8</del>	<del>45</del>	<del>50</del>	<del>15</del>	<del>69</del>
<del>HPR421C</del>	<del>24</del>	<del><math>\pm 5</math></del>	<del><math>\pm 75</math></del>	<del>8</del>	<del>45</del>	<del>50</del>	<del>15</del>	<del>69</del>
HPR422C	24	$\pm 12$	$\pm 30$	8	45	50	15	67
HPR423C	24	$\pm 15$	$\pm 25$	8	45	50	15	69

Note: Other input to output voltages may be available. Please contact Murata Power Solutions.



For full details go to  
[www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

### 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	$V_{ISO} = 240\text{VAC}$ , 60Hz			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	
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-20			2			
<b>TEMPERATURE</b>							
Specification			-25	+25	+85	$^\circ\text{C}$	
Operation			-40		+100	$^\circ\text{C}$	
Storage			-40		+110	$^\circ\text{C}$	

### SOLDERING INFORMATION

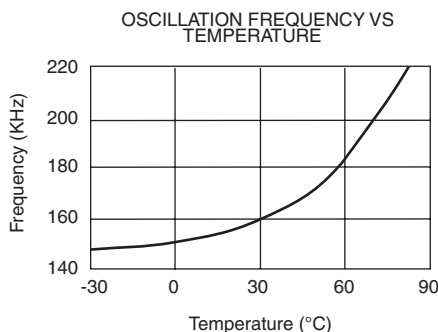
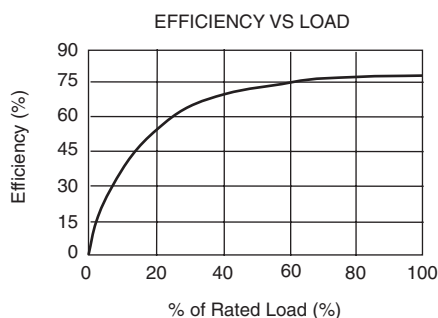
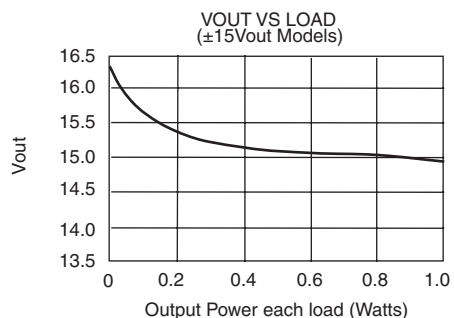
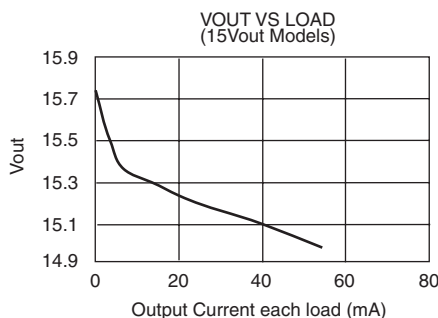
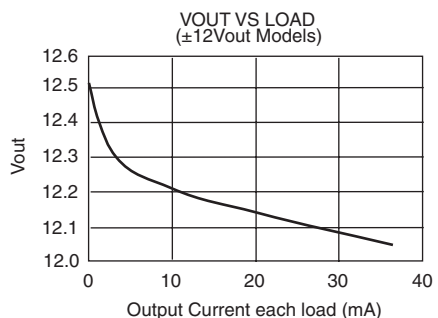
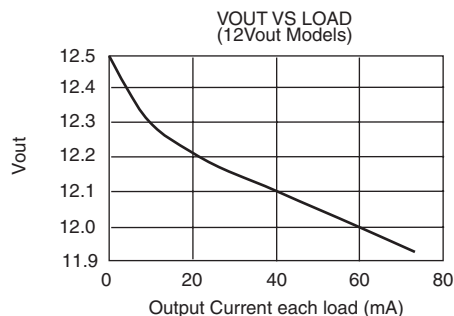
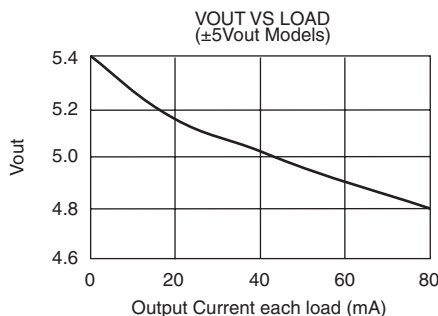
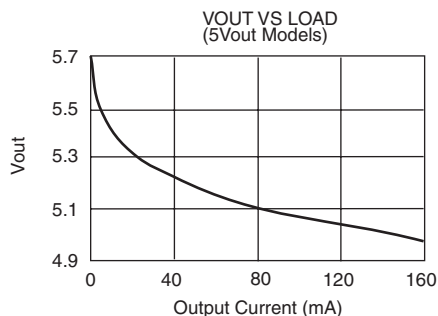
The HPR4XXC devices are intended for wave soldering or manual soldering.

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

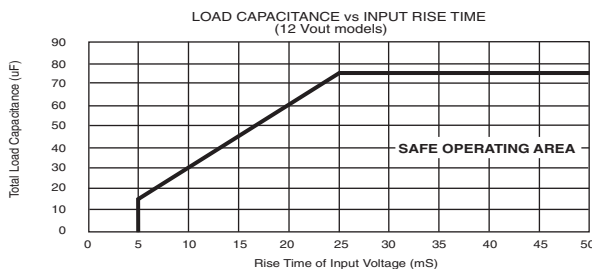
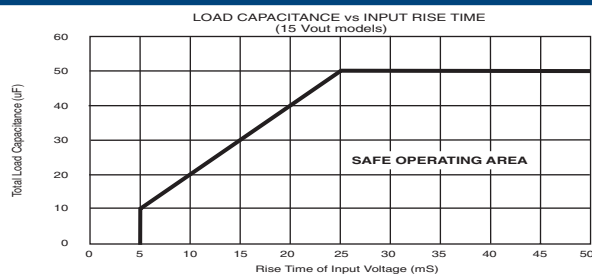
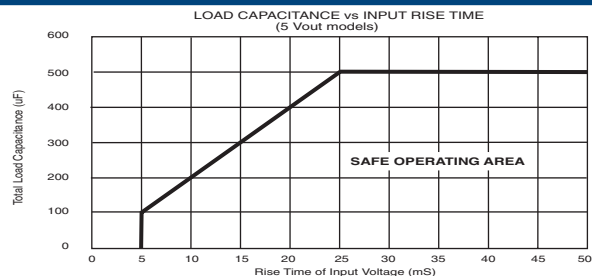
The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of  $260^\circ\text{C}$  for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and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

- When operated within the SAFE OPERATING AREA as defined 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.
- For dual output models, total load capacitance is the sum of the capacitances on the plus and minus outputs.

