Murata Power Solutions

HPR4XXC

0.75 Watt Miniature SIP DC/DC Converter

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/inch3 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/Inch3
- Extended Temperature Range: -25°C to +85°C
- High Efficiency to 79%
- RoHS Compliant

As of October 2016, ONLY the following part numbers will be available: HPR400C; 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.	Max.			
		V_{DC}	V_{DC}	mA	mA			mAp-p	%	
Available	HPR400C	5	5	150	20	216	235	10	69	NMV0505SAC / MEV1S0505SC
Discontinued	HPR402C	5	15	50	20	212	235	5	71	NMV0515SAC / MEV1S0515SC
Discontinued	HPR403C	5	±5	±75	20	218	245	5	68	NMV0505SC / MEV1D0505SC
Available	HPR404C	5	±12	±30	20	212	235	5	68	NMV0512SC / MEV1D0512SC
Discontinued	HPR405C	5	±15	±25	20	220	220	5	75	NMV0515SC / MEV1D0515SC
Discontinued	HPR407C	12	12	62	10	81	90	5	77	NMV1212SAC / MEV1S1212SC
Discontinued	HPR410C	12	±12	±30	10	81	90	5	74	NMV1212SC / MEV1D1212SC
Discontinued	HPR411C	12	±15	±25	10	81	90	5	77	NMV1215SC / MEV1D1215SC
Discontinued	HPR414C	15	15	50	8	72	80	5	69	NMV1515SAC / MEV1S1515SC
Available	HPR417C	15	±15	±25	8	63	66	5	79	NMV1515SC / MEV1D1515SC
Discontinued	HPR418C	24	5	150	8	48	53	15	65	MEV1S2405SC
Discontinued	HPR422C	24	±12	±30	8	45	50	15	67	MEV1D2412SC
Discontinued	HPR423C	24	±15	±25	8	45	50	15	69	MEV1D2415SC
Discontinued	HPR401C	5	12	62	20	212	235	5	70	NMV0512SAC / MEV1S0512SC
Discontinued	HPR406C	12	5	150	10	90	100	5	69	NMV1205SAC / MEV1S1205SC
Discontinued	HPR408C	12	15	50	10	81	90	5	77	NMV1215SAC / MEV1S1215SC
Discontinued	HPR409C	12	±5	±75	10	88	98	5	71	NMV1205SC / MEV1D1205SC
Discontinued	HPR412C	15	5	150	8	72	80	5	69	NMV1505SAC/ MEV1S1505SC
Discontinued	HPR413C	15	12	62	8	72	80	5	69	NMV1512SAC / MEV1S1512SC
Discontinued	HPR415C	15	±5	±75	8	72	80	5	69	NMV1505SC / MEV1D1505SC
Discontinued	HPR416C	15	±12	±30	8	63	70	5	76	NMV1512SC / MEV1D1512SC
Discontinued	HPR419C	24	12	62	8	48	53	15	65	MEV1S2412SC
Discontinued	HPR420C	24	15	50	8	45	50	15	69	MEV1S2415SC
Discontinued	HPR421C	24	±5	±75	8	45	50	15	69	MEV1D2405SC

RoHS COMPLIANT

For full details go to www.murata-ps.com/rohs

ISO9001 CERTIFIED

SPECIFICATIONS, ALL MODELS

Specifications are at T_A = +25°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
	OUTPUT					
	Rated Power				750	mW
	Voltage Setpoint Accuracy	Rated Load, Nominal V_{IN}			±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 Coefficent			.01	.05	%/°C
	REGULATION					
	Load Regulation (All other modes)	Rated Load to 1mA Load		3		%
GENERAL	**GENERAL**					
	ISOLATION					
	Rated Voltage		1000			VDC
	Test Voltage	60 Hz, 60 Seconds	3000			Vpk
	Resistance		10			GΩ
	Capacitance			25	100	pF
	Leakage Current	V_{ISO}= 240VAC, 60Hz		2	7	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°C	7.9			MHr
	TEMPERATURE					
	Specification		-25	+25	+85	°C
	Operation		-40		+100	°C
	Storage		-40		+110	°C

SOLDERING INFORMATION

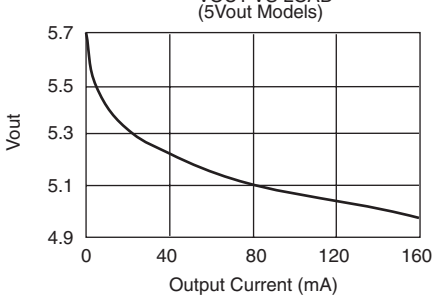
The HPR4XXC devices are intended for wave soldering or manual soldering.
They are not intended to be subject to surface mount processes under any circumstances.

The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of 260°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.

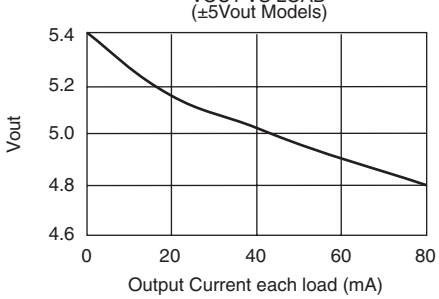
TYPICAL PERFORMANCE CURVES

Specifications are at T_A = +25°C nominal input voltage and nominal load.

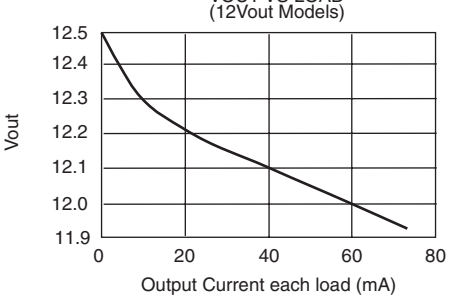
VOUT VS LOAD (5Vout Models)



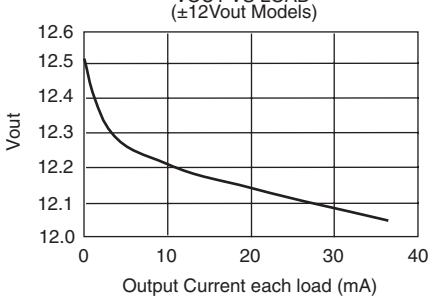
VOUT VS LOAD (±5Vout Models)



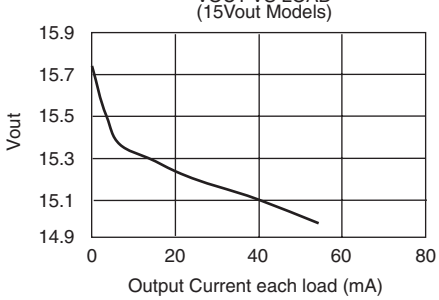
VOUT VS LOAD (12Vout Models)



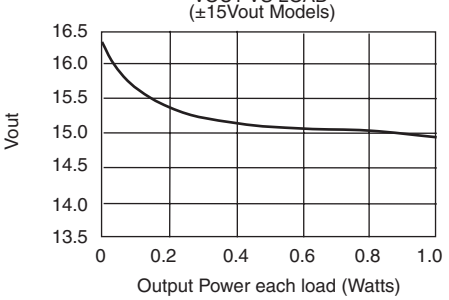
VOUT VS LOAD (±12Vout Models)



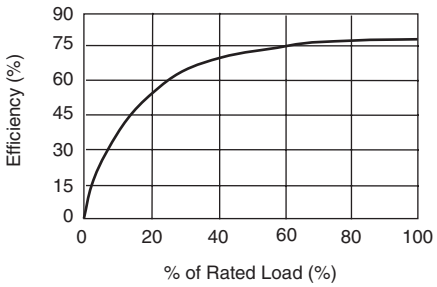
VOUT VS LOAD (15Vout Models)



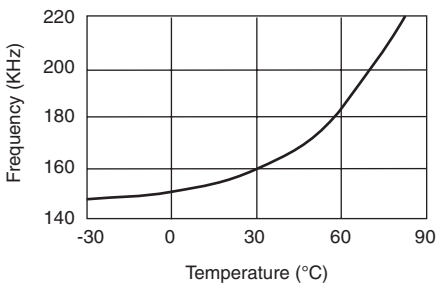
VOUT VS LOAD (±15Vout Models)



EFFICIENCY VS LOAD

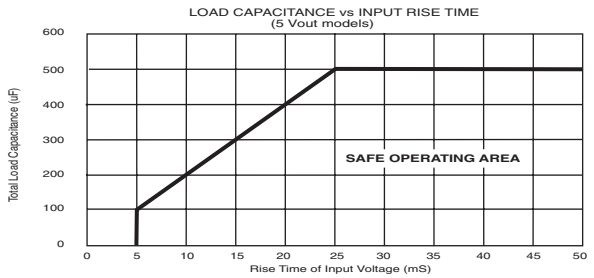


OSCILLATION FREQUENCY VS TEMPERATURE

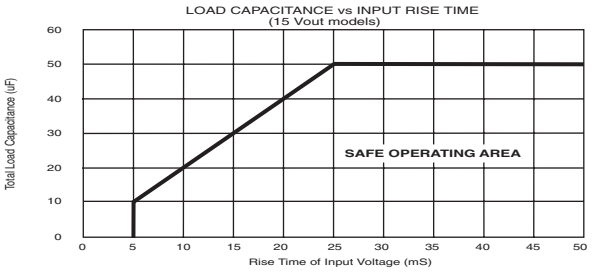


SAFE OPERATING AREA

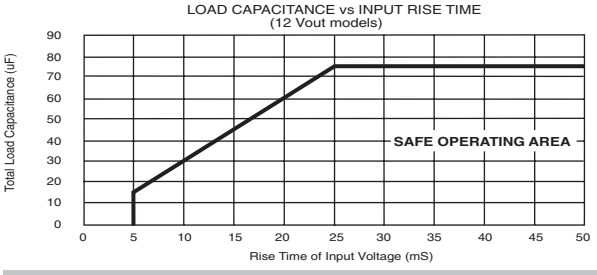
LOAD CAPACITANCE vs INPUT RISE TIME (5 Vout models)



LOAD CAPACITANCE vs INPUT RISE TIME (15 Vout models)



LOAD CAPACITANCE vs INPUT RISE TIME (12 Vout models)

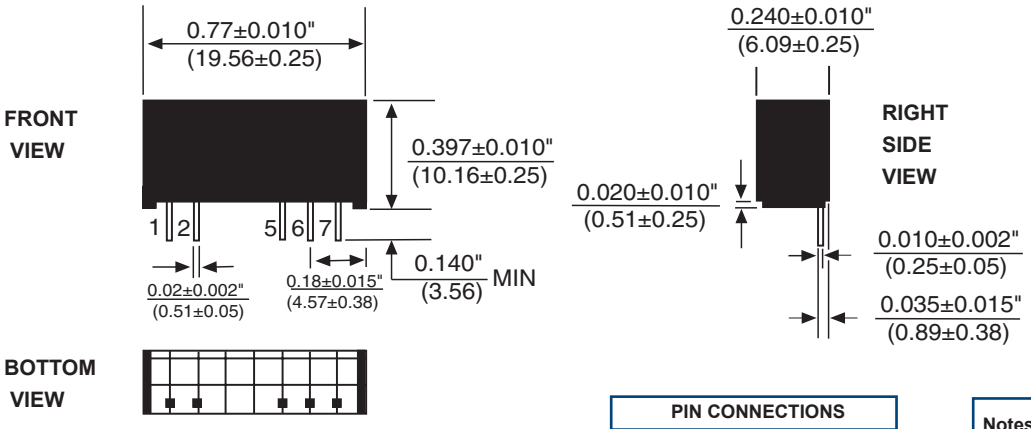


NOTES:

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: ± 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

HPR 4XX C

Device Family
HPR Indicates DC/DC Converter
Model Number
Selected from Table of Electrical Characteristics
RoHS Compliant Version

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ISO 9001 and 14001 REGISTERED