

0.75 WATT MINIATURE SIP DC/DC CONVERTER

HPR4XX

FEATURES

- High Isolation Voltage: 3000 VPK Test
- Single-In-Line Package (SIP)
- Internal Input and Output Filtering
- Low Cost
- Non-Conductive Case
- High Output Power Density: 10 Watts/Inch³
- Extended Temperature Range: -25°C to +85°C
- High Efficiency: To 79%

DESCRIPTION

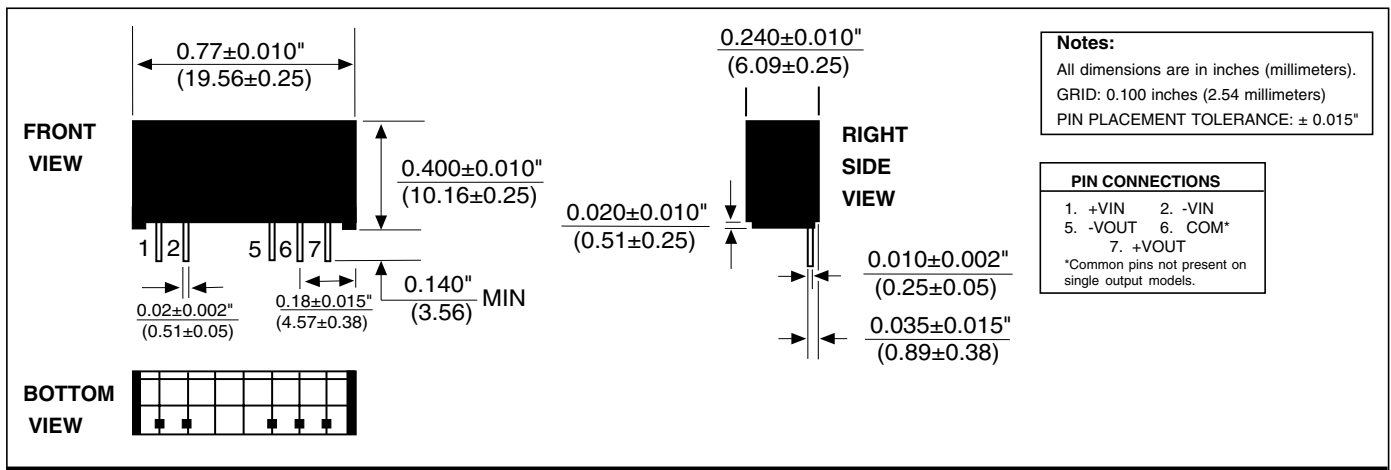
The HPR4XX Series uses advanced circuit design and packaging technology to realize superior reliability and performance. A 170kHz push-pull oscillator is used in the input stage. The HPR4XX Series reduces beat-frequency oscillation problems when used with high frequency isolation amplifiers. Reduced parts count and high efficiency add to the reliability of the HPR4XX Series.

The high efficiency of the HPR4XX Series means less internal power dissipation, as low as 190mW. With less heat to dissipate the HPR4XX Series can operate at high temperatures with no

degradation of reliable operation. In addition, the high efficiency of the HPR4XX 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 HPR4XX 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.

MECHANICAL



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ELECTRICAL SPECIFICATIONS

Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

MODEL	NOMINAL INPUT VOLTAGE (V _{DC})	RATED OUTPUT VOLTAGE (V _{DC})	RATED OUTPUT CURRENT (mA)	INPUT CURRENT			REFLECTED RIPPLE CURRENT (mA _{p-p})	EFFICIENCY (%)
				NO LOAD (mA)	RATED LOAD			
					TYP	MAX		
HPR400	5	5	150	20	216	235	10	69
HPR401	5	12	62	20	212	235	5	70
HPR402	5	15	50	20	212	235	5	71
HPR403	5	±5	±75	20	218	245	5	68
HPR404	5	±12	±30	20	212	235	5	68
HPR405	5	±15	±25	20	220	220	5	75
HPR406	12	5	150	10	90	100	5	69
HPR407	12	12	62	10	81	90	5	77
HPR408	12	15	50	10	81	90	5	77
HPR409	12	±5	±75	10	88	98	5	71
HPR410	12	±12	±30	10	81	90	5	74
HPR411	12	±15	±25	10	81	90	5	77
HPR412	15	5	150	8	72	80	5	69
HPR413	15	12	62	8	72	80	5	69
HPR414	15	15	50	8	72	80	5	69
HPR415	15	±5	±75	8	72	80	5	69
HPR416	15	±12	±30	8	63	70	5	76
HPR417	15	±15	±25	8	63	66	5	79
HPR418	24	5	150	8	48	53	15	65
HPR419	24	12	62	8	48	53	15	65
HPR420	24	15	50	8	45	50	15	69
HPR421	24	±5	±75	8	45	50	15	69
HPR422	24	±12	±30	8	45	50	15	67
HPR423	24	±15	±25	8	45	50	15	69

Note: Other input to output voltages may be available. Please consult factory

COMMON SPECIFICATIONS

Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT Voltage Range		4.5 10.8 13.5 21.6	5 12 15 24	5.5 13.2 16.5 26.4	V _{DC} V _{DC} V _{DC} V _{DC}
ISOLATION Rated Voltage Test Voltage Resistance Capacitance Leakage Current	60Hz, 60 Sec V _{ISO} = 240V _{AC} , 60Hz	1000 3000	10 15 2	7	V _{DC} V _{PK} GW pF μArms
OUTPUT Rated Power Voltage Setpoint Accuracy Ripple & Noise HPR403 Voltage Temperature Coefficient	Rated Load, Nominal V _{IN} BW = DC to 10MHz BW = 10Hz to 2MHz BW = DC to 10MHz 1 mA Load, V _{OUT} = 5V 1 mA Load, V _{OUT} = 12V 1 mA Load, V _{OUT} = 15V		750 45 30 90 .01	±5 7 15 18	mW % mV _{p-p} mV _{rms} mV _{p-p} V _{DC} V _{DC} V _{DC} %/Deg C
REGULATION Line Regulation Load Regulation (5V out only) Load Regulation (All other Models)	High Line to Low Line Rated Load to 1mA Load Rated Load to 1mA Load		1 10 3		%/V _{in} % %
GENERAL Switching Frequency Frequency Change Package Weight MTTF per MIL-HDBK-217, Rev. E Ground Benign	Over Line and Load Circuit Stress Method T _A = +25°C		170 24 2 7.9		kHz % g Mhr
TEMPERATURE Specification Operation Storage		-25 -40 -40	+25	+85 +100 +110	°C °C °C

ABSOLUTE MAXIMUM RATINGS

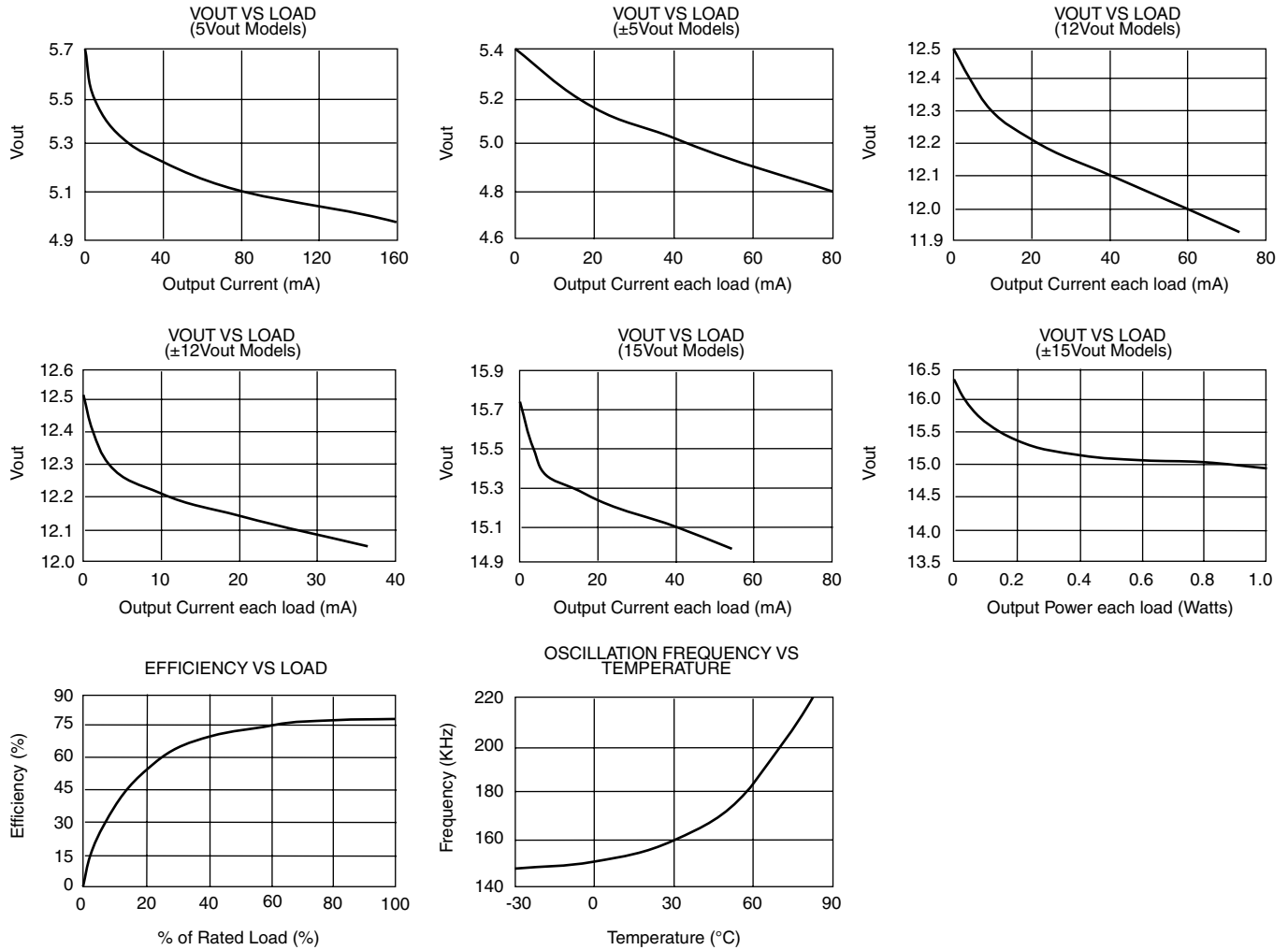
Internal Power Dissipation.....	450mW
Short Circuit Duration.....	Momentary
Lead Temperature (soldering, 10 seconds max).....	+300°C

ORDERING INFORMATION

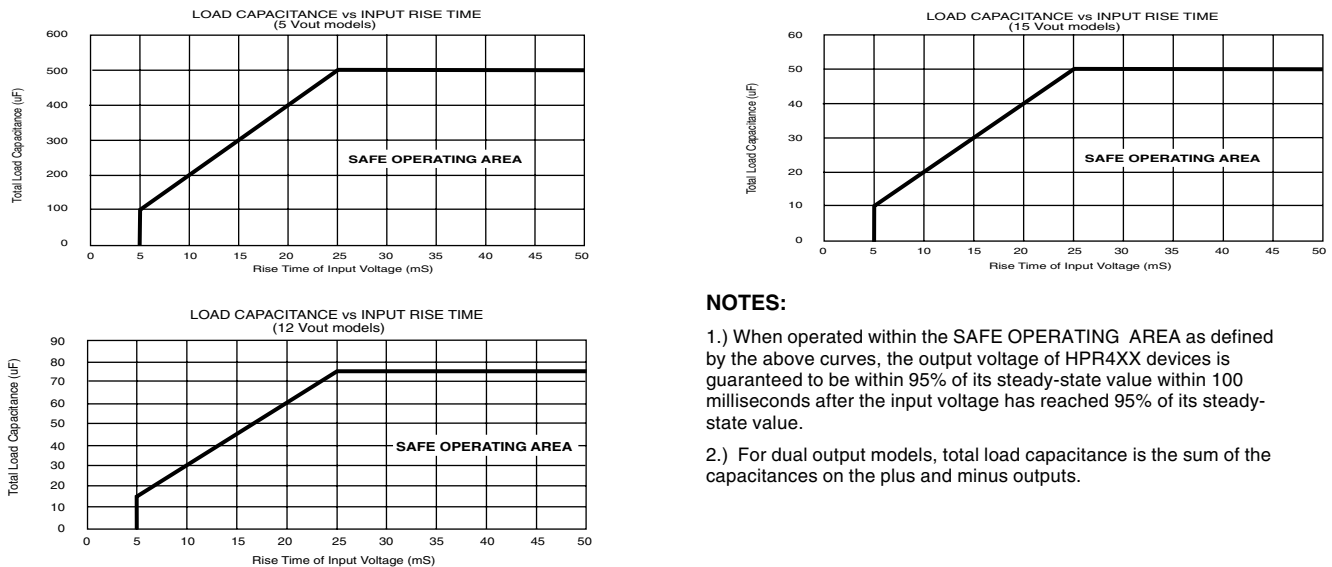
Device Family	HPR 4 XX /H
HPR Indicates DC/DC converter	
Model Number	
Selected from Table of Electrical Characteristics	
Screening Option	

TYPICAL PERFORMANCE CURVES

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



SAFE OPERATING AREA



NOTES:

- 1.) When operated within the SAFE OPERATING AREA as defined by the above curves, the output voltage of HPR4XX 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.