

DC/DC CONVERTERS

MINIATURE SIP, DIP AND SMD PACKAGES

FEATURES

- **LOW COST**
- **SINGLE-IN-LINE PACKAGE (SIP)**
- **INTERNAL INPUT AND OUTPUT FILTERING**
- **NON-CONDUCTIVE CASE**
- **HIGH OUTPUT POWER DENSITY:
10 WATTS/INCH³**
- **EXTENDED TEMPERATURE RANGE:
-25°C TO +85°C**
- **HIGH EFFICIENCY: TO 80%**

DESCRIPTION

The HPR1XX 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 HPR1XX Series with high frequency isolation amplifiers.

Reduced parts count and high efficiency add to the reliability of the HPR1XX Series. The high efficiency of the HPR1XX Series means less internal power dissipation, as low as 190mW. With reduced heat dissipation the HPR1XX Series can operate at higher

temperatures with no degradation. In addition, the high efficiency of the HPR1XX 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 a 1mA minimum load is needed to realize published specifications.

The HPR1XX 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.

ABSOLUTE MAXIMUM RATINGS

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

* NOTE Refer to Reflow Profile for SMD Models

ORDERING INFORMATION

	HPR	1XX	V/W	/H
Device Family _____				
HPR Indicates DC/DC Converter				
Model Number _____				
Selected from Table of Electrical Characteristics				
Package Option _____				
There is "no" package designator for the SIP package				
V = DIP Package				
W = SMD Package				
Screening Option _____				

ELECTRICAL SPECIFICATIONS

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

MODEL	NOMINAL INPUT VOLTAGE (VDC)	RATED OUTPUT VOLTAGE (VDC)	RATED OUTPUT CURRENT (mA)	INPUT CURRENT		REFLECTED RIPPLE CURRENT (mAp-p)	EFFICIENCY (%)
				MIN LOAD (mA)	RATED LOAD (mA)		
HPR100	5	5	150	20	216	10	69
HPR102	5	15	50	20	199	5	75
HPR103	5	± 5	± 75	20	208	5	70
HPR104	5	± 12	± 30	20	192	5	78
HPR105	5	± 15	± 25	20	190	5	79
HPR106	12	5	150	10	90	5	69
HPR107	12	12	62	10	81	5	77
HPR108	12	15	50	10	78	5	80
HPR109	12	± 5	± 75	10	87	5	72
HPR110	12	± 12	± 30	10	78	5	80
HPR111	12	± 15	± 25	10	78	5	80
HPR112	15	5	150	8	72	5	69
HPR116	15	± 12	± 30	8	63	5	80
HPR117	15	± 15	± 25	8	63	5	80
HPR118	24	5	150	8	44	15	70
HPR120	24	15	50	8	41	15	76
HPR121	24	± 5	± 75	8	41	15	76
HPR122	24	± 12	± 30	8	40	15	78
HPR123	24	± 15	± 25	8	40	15	79

Note Other input to output voltages may be available Please contact factory

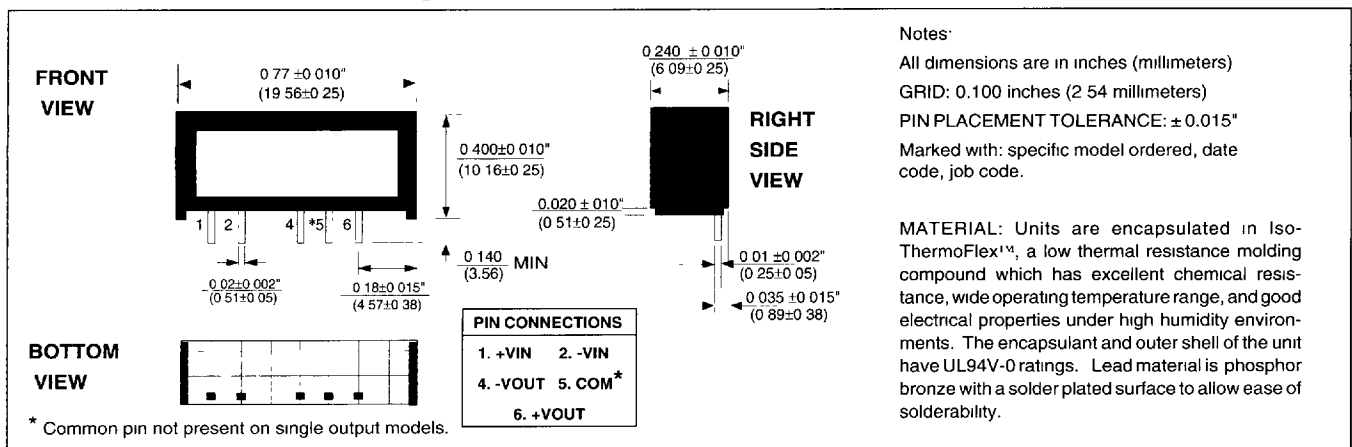
COMMON SPECIFICATIONS

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

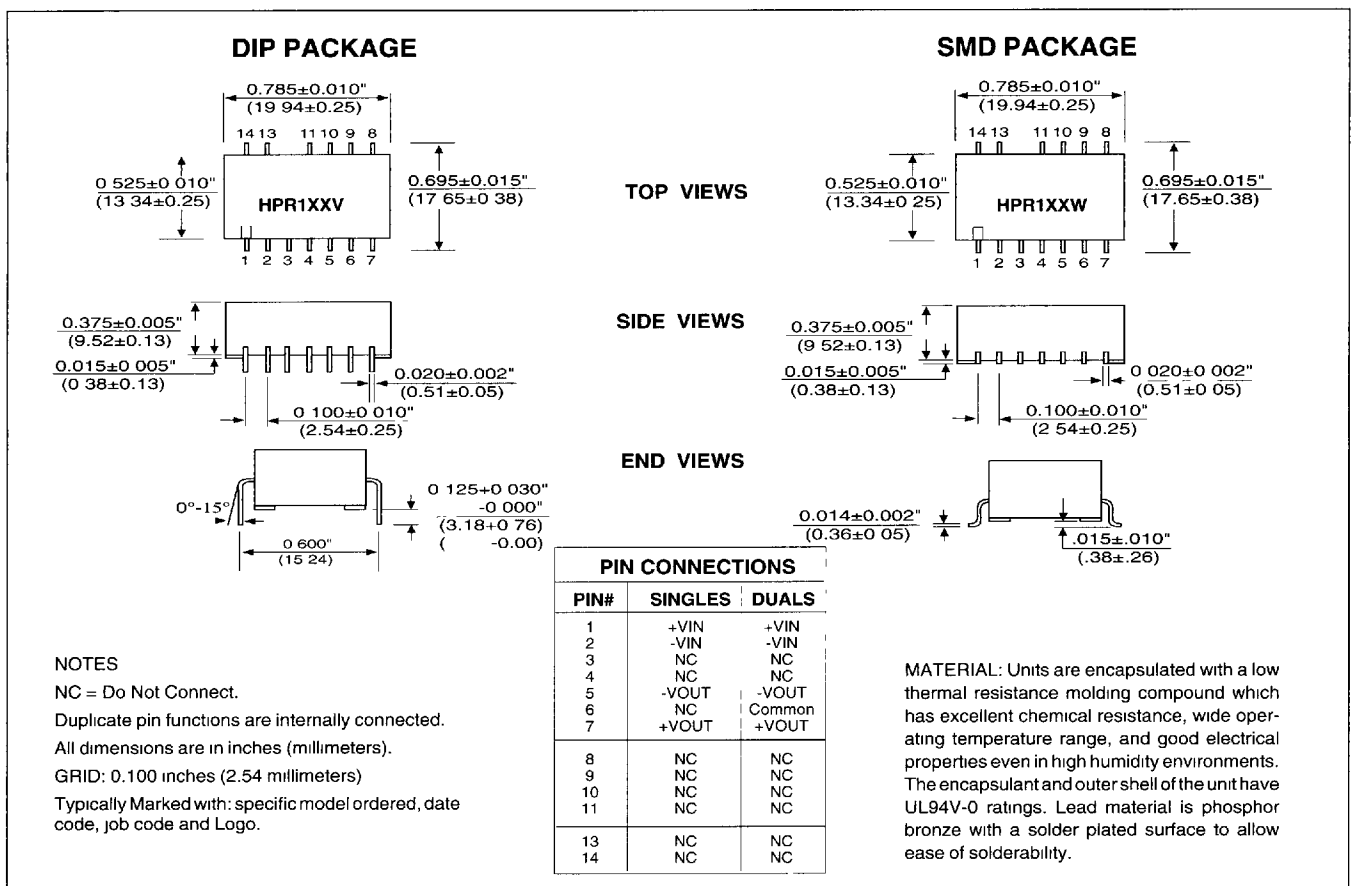
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT Voltage Range Voltage Rise Time		4.5	5	5.5	VDC
		10.8	12	13.2	VDC
		13.5	15	16.5	VDC
		21.6	24	26.4	VDC
		See Typical Performance Curves & Application Notes: "Capacitive Loading Effects on Start-Up of DC/DC Converters"			
ISOLATION Rated Voltage Test Voltage Resistance Capacitance Leakage Current	60 Hz, 10 Seconds	750			VDC
		750			Vpk
			10		GΩ
			25	100	pF
		$V_{ISO} = 240\text{VAC}, 60\text{Hz}$	2	8.5	μArms
OUTPUT Rated Power Voltage Setpoint Accuracy Ripple & Noise HPR103 Voltage Temperature Coefficient	Rated Load, Nominal V_{IN} BW = DC to 10MHz BW = 10Hz to 2MHz BW = DC to 10MHz 1mA Load, $V_{OUT} = 5\text{V}$ 1mA Load, $V_{OUT} = 12\text{V}$ 1mA Load, $V_{OUT} = 15\text{V}$		750	± 5	mW
			45		%
			30		mVp-p
			90		mVrms
					mVp-p
				7	VDC
				15	VDC
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		%/Vin
			10		%
			3		%
GENERAL Switching Frequency Frequency Change Package Weight MTTF per MIL-HDBK-217, Rev. E * Ground Benign Fixed Ground Naval Sheltered Airborne Uninhabited Fighter	Over Line and Load		170		kHz
			24		%
			2		g
	Circuit Stress Method $T_A = +25^{\circ}\text{C}$ $T_A = +35^{\circ}\text{C}$ $T_A = +35^{\circ}\text{C}$ $T_A = +35^{\circ}\text{C}$		7.9		MHr
			1.9		MHr
			1.2		MHr
			300		kHr
TEMPERATURE Specification Operation Storage		-25	+25	+85	$^{\circ}\text{C}$
		-40		+100	$^{\circ}\text{C}$
		-40		+110	$^{\circ}\text{C}$

★ For demonstrated MTTF results reference Power Convertibles' Reliability Report HPR105

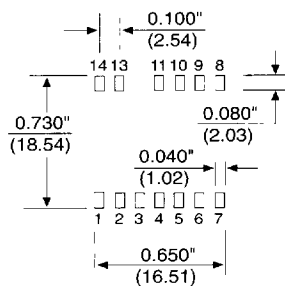
MECHANICAL "SIP" Package/Pinout



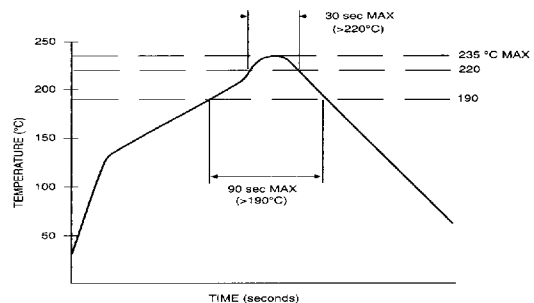
MECHANICAL Package/Pinout "V" and "W"



RECOMMENDED LAND PATTERN

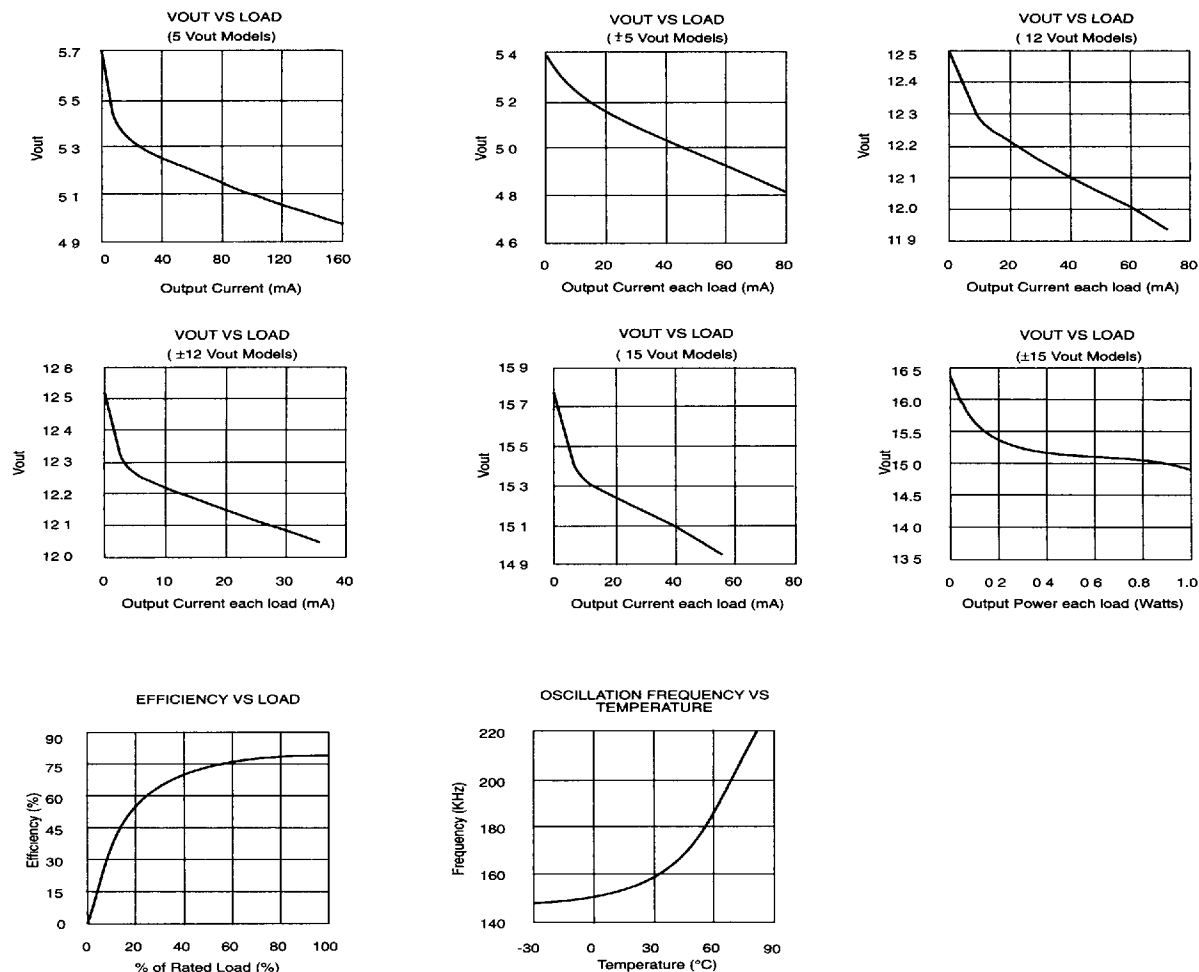


RECOMMENDED REFLOW PROFILE

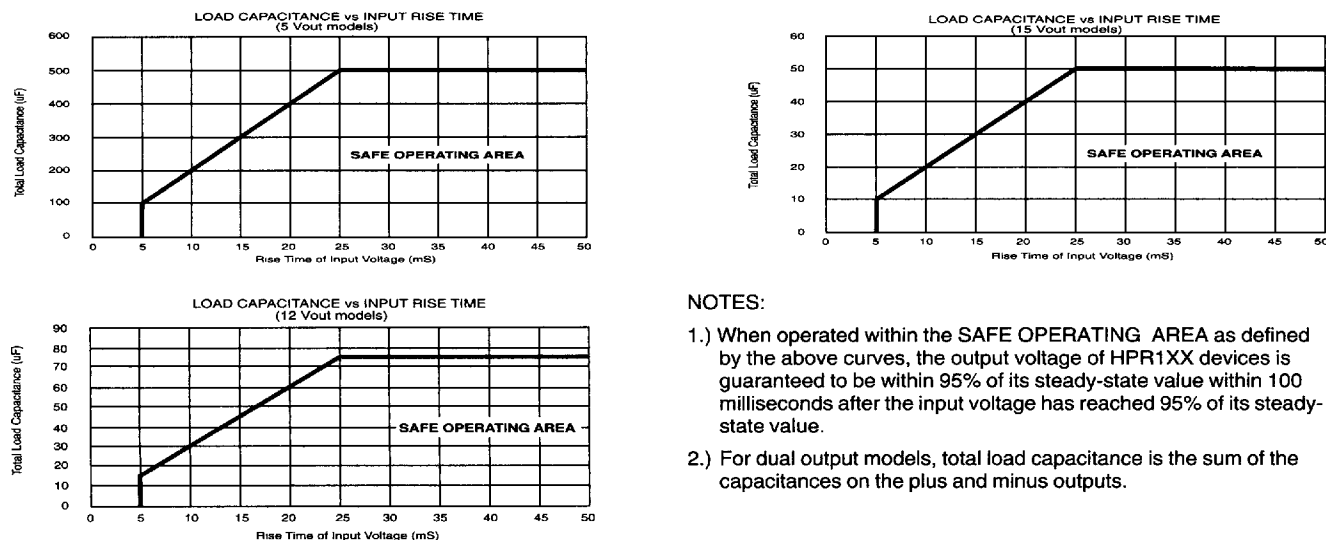


TYPICAL PERFORMANCE CURVES

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 HPR1XX 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.