



**HPR1XX SERIES**  
**0.75 WATTS**  
**UNREGULATED**

**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/INCH<sup>3</sup>
- 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/inch<sup>3</sup> 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.

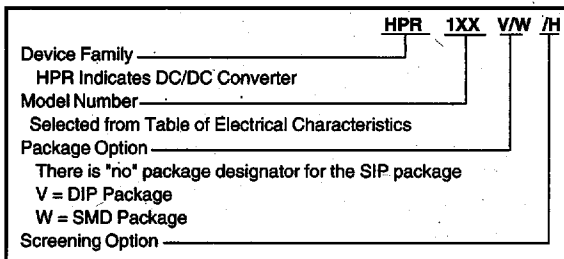
The HPR1XX Series provides the user low cost without sacrificing reliability. The use of surface mounted devices and advanced manufacturing technologies make it possible to offer premium performance and low cost.

**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**



# 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
HPR101	5	12	62	20	200	5	73
HPR102	5	15	50	20	199	5	75
HPR103	5	$\pm 5$	$\pm 75$	20	208	5	70
HPR104	5	$\pm 12$	$\pm 30$	20	192	5	78
HPR105	5	$\pm 15$	$\pm 25$	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	$\pm 5$	$\pm 75$	10	87	5	72
HPR110	12	$\pm 12$	$\pm 30$	10	78	5	80
HPR111	12	$\pm 15$	$\pm 25$	10	78	5	80
HPR112	15	5	150	8	72	5	69
HPR113	15	12	62	8	67	5	75
HPR114	15	15	50	8	63	5	80
HPR115	15	$\pm 5$	$\pm 75$	8	68	5	73
HPR116	15	$\pm 12$	$\pm 30$	8	63	5	80
HPR117	15	$\pm 15$	$\pm 25$	8	63	5	80
HPR118	24	5	150	8	44	15	70
HPR119	24	12	62	8	42	15	74
HPR120	24	15	50	8	41	15	76
HPR121	24	$\pm 5$	$\pm 75$	8	41	15	76
HPR122	24	$\pm 12$	$\pm 30$	8	40	15	78
HPR123	24	$\pm 15$	$\pm 25$	8	40	15	79

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

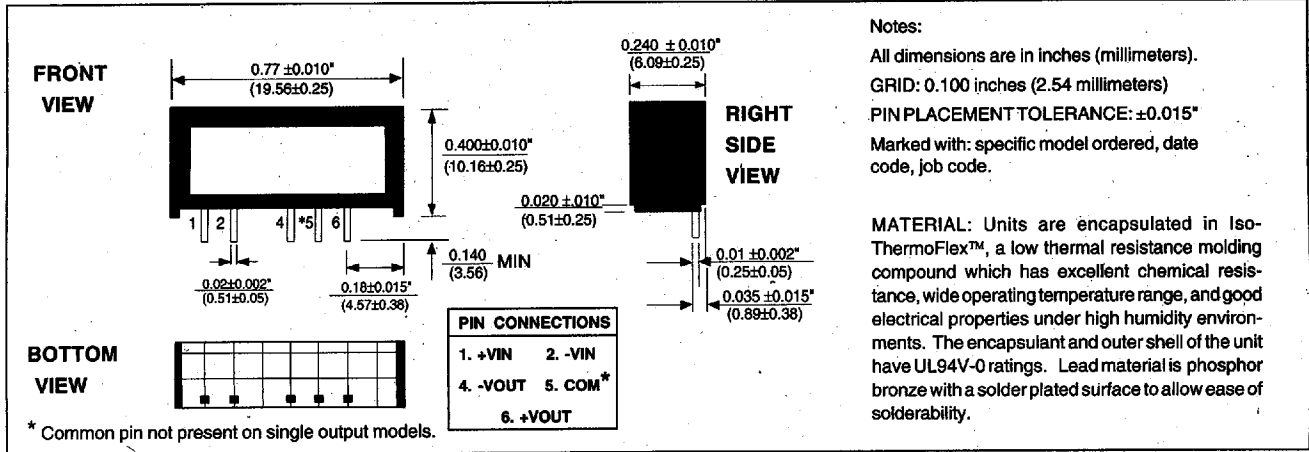
## COMMON SPECIFICATIONS

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

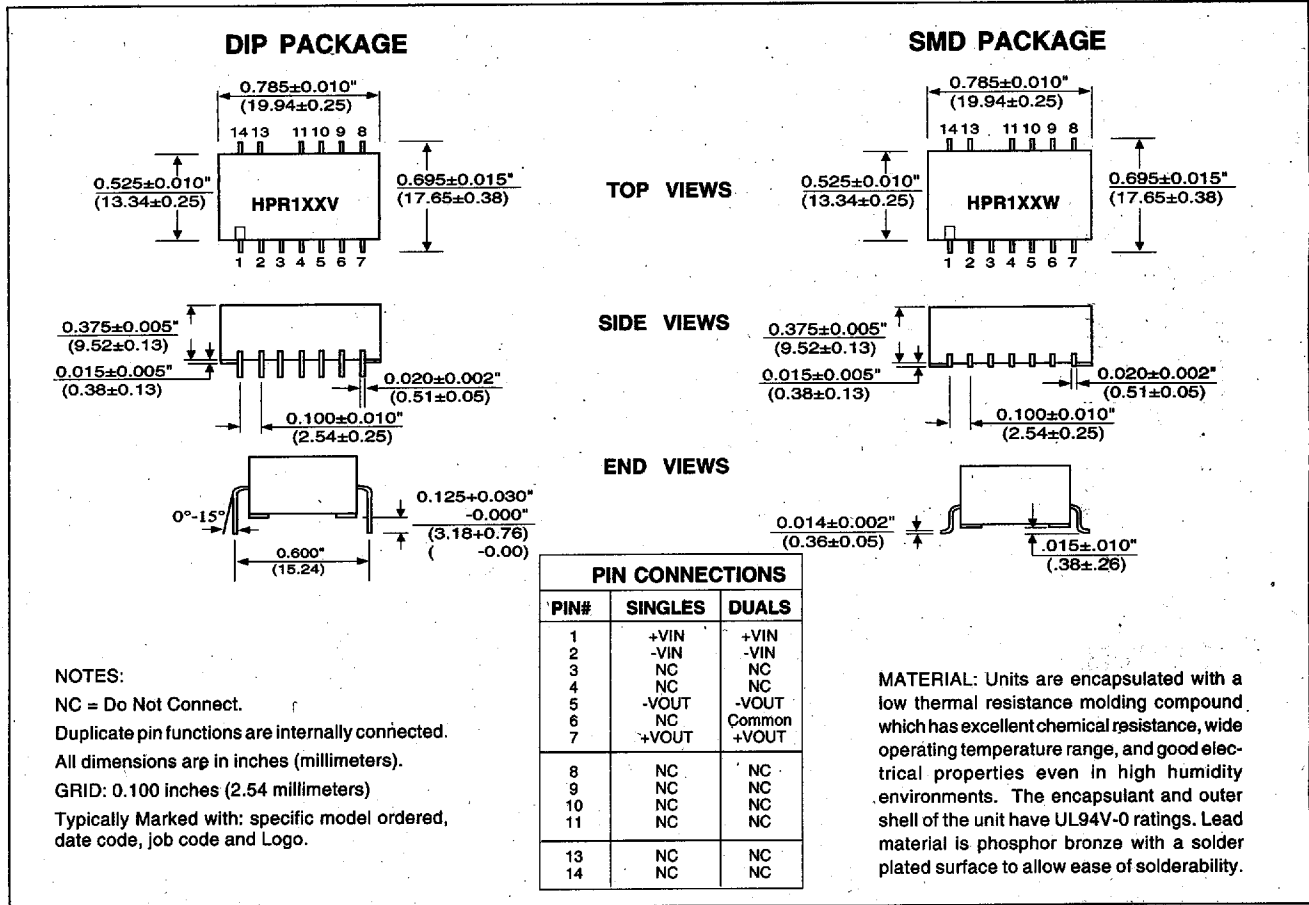
Parameter	Conditions	Min	Typ	Max	Units
<b>INPUT</b> Voltage Range		4.5 10.8 13.5 21.6	5 12 15 24	5.5 13.2 16.5 26.4	VDC VDC VDC VDC
Voltage Rise Time	See Typical Performance Curves & Application Notes: "Capacitive Loading Effects on Start-Up of DC/DC Converters"				
<b>ISOLATION</b> Rated Voltage Test Voltage Resistance Capacitance Leakage Current	60 Hz, 10 Seconds    $V_{ISO} = 240\text{VAC}, 60\text{Hz}$	750 750	10 25 2	100 8.5	VDC Vpk G $\Omega$ pF $\mu\text{Arms}$
<b>OUTPUT</b> 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 45 30 90   .01	$\pm 5$    7 15 18	mW % mVp-p mVrms mVp-p VDC VDC VDC %/Deg C
<b>REGULATION</b> 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		%/ $V_{in}$ % %
<b>GENERAL</b> 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  Circuit Stress Method $T_A = +25^\circ\text{C}$ $T_A = +35^\circ\text{C}$ $T_A = +35^\circ\text{C}$ $T_A = +35^\circ\text{C}$		170 24 2 7.9 1.9 1.2 300		kHz % g Mhr Mhr Mhr kHr
<b>TEMPERATURE</b> Specification Operation Storage		-25 -40 -40	+25	+85 +100 +110	$^\circ\text{C}$ $^\circ\text{C}$ $^\circ\text{C}$

\* For demonstrated MTTF results reference Power Convertibles Reliability Report HPR105

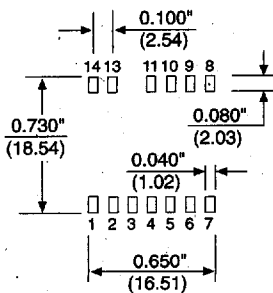
# MECHANICAL "SIP" Package/Pinout



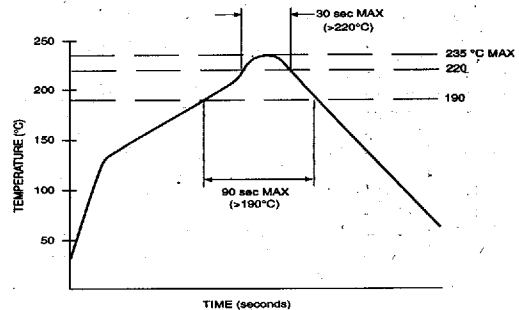
# MECHANICAL Package/Pinout "V" and "W"



## RECOMMENDED LAND PATTERN

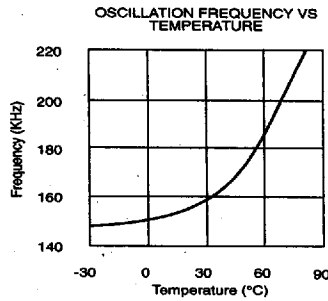
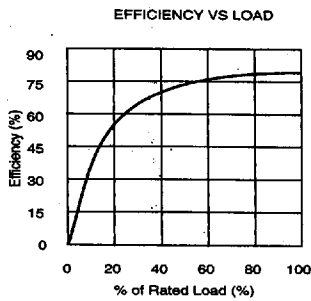
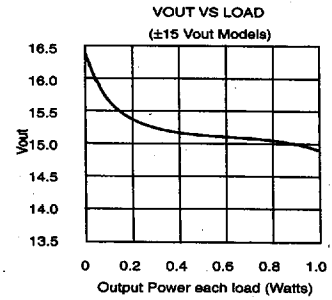
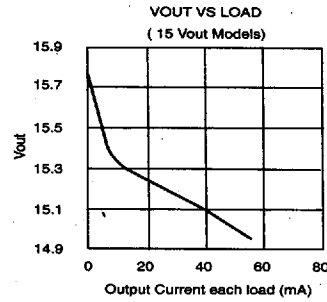
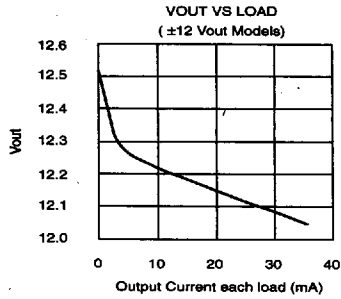
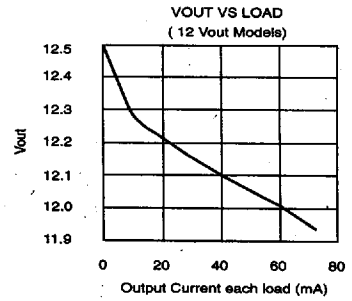
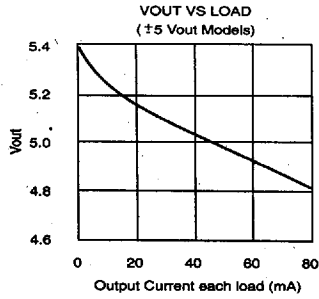
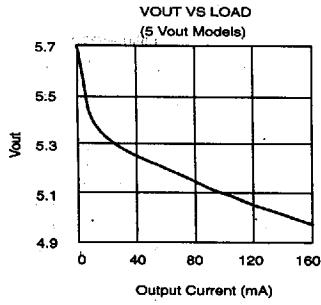


## RECOMMENDED REFLOW PROFILE

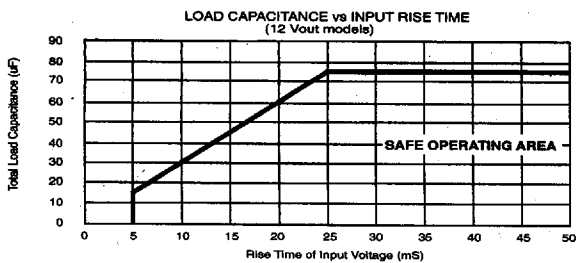
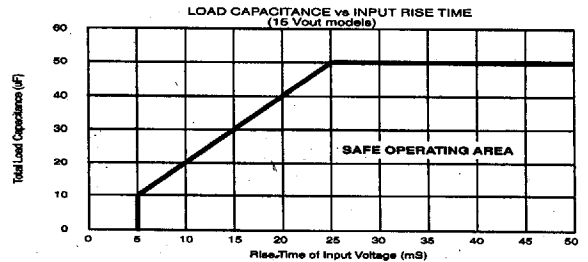
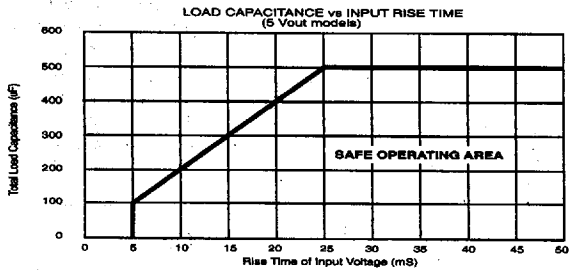


# TYPICAL PERFORMANCE CURVES

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.