POWER CONVERTIBLES™

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/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°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 MIN LOAD (mA)	INPUT CURRENT RATED LOAD (mA)	REFLECTED RIPPLE CURRENT (mAp-p)	EFFICIENCY (%)
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	±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
HPR113	15	12	62	8	67	5	75
HPR114	15	15	50	8	63	5	80
HPR115	15	±5	±75	8	68	5	73
HPR116	15	±12	±30	8	63	5	80
HPR117	15	±15	±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	±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.

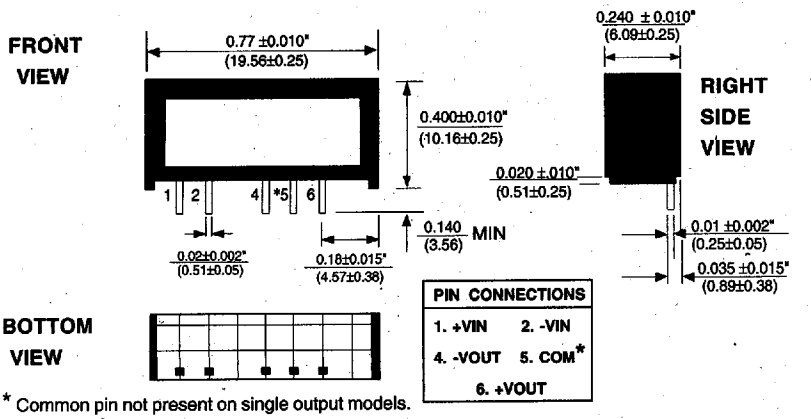
COMMON SPECIFICATIONS

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

Parameter	Conditions	Min	Typ	Max	Units
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
Voltage Rise Time	See Typical Performance Curves & Application Notes: "Capacitive Loading Effects on Start-Up of DC/DC Converters"				
ISOLATION					
Rated Voltage		750			VDC
Test Voltage	60 Hz, 10 Seconds	750			Vpk
Resistance			10		GΩ
Capacitance			25	100	pF
Leakage Current	V_{ISO}= 240VAC, 60Hz		2	8.5	µArms
OUTPUT					
Rated Power			750		mW
Voltage Setpoint Accuracy	Rated Load, Nominal V_{IN}			±5	%
Ripple & Noise	BW = DC to 10MHz		45		mVp-p
	BW =10Hz to 2MHz		30		mVrms
HPR103	BW = DC to 10MHz		90		mVp-p
Voltage	1mA Load, V_{OUT} = 5V			7	VDC
	1mA Load, V_{OUT} = 12V			15	VDC
	1mA Load, V_{OUT} = 15V			18	VDC
Temperature Coefficent			.01		%/Deg C
REGULATION					
Line Regulation	High Line to Low Line		1		%/%Vin
Load Regulation (5V out only)	Rated Load to 1mA Load		10		%
Load Regulation (All other Models)	Rated Load to 1mA Load		3		%
GENERAL					
Switching Frequency			170		kHz
Frequency Change	Over Line and Load		24		%
Package Weight *			2		g
MTTF per MIL-HDBK-217, Rev. E	Circuit Stress Method				
Ground Benign	T_A = +25°C		7.9		MHr
Fixed Ground	T_A = +35°C		1.9		MHr
Naval Sheltered	T_A = +35°C		1.2		MHr
Airborne Uninhabited Fighter	T_A = +35°C		300		kHr
TEMPERATURE					
Specification		-25	+25	+85	°C
Operation		-40		+100	°C
Storage		-40		+110	°C

* For demonstrated MTTF results reference Power Convertibles Reliability Report HPR105

MECHANICAL "SIP" Package/Pinout



PIN CONNECTIONS	
1. +VIN	2. -VIN
4. -VOUT	5. COM*
6. +VOUT	

* Common pin not present on single output models.

Notes:

All dimensions are in inches (millimeters).

GRID: 0.100 inches (2.54 millimeters)

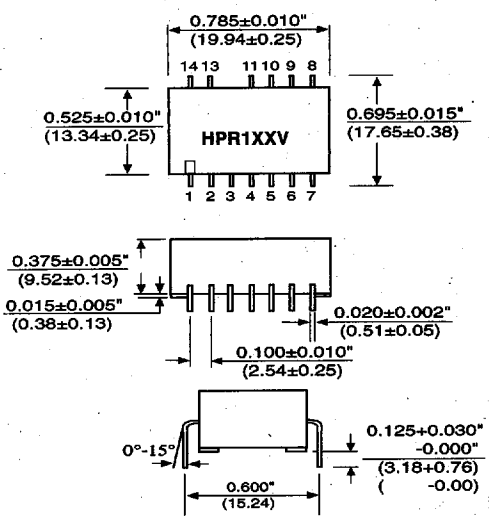
PIN PLACEMENT TOLERANCE: ±0.015"

Marked with: specific model ordered, date code, job code.

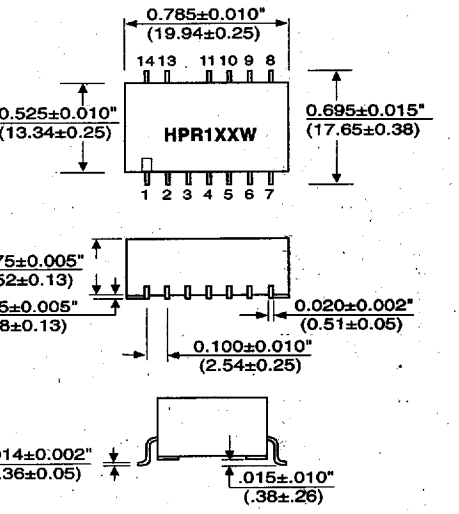
MATERIAL: Units are encapsulated in Iso-ThermoFlex™, a low thermal resistance molding compound which has excellent chemical resistance, wide operating temperature range, and good electrical properties under high humidity environments. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is phosphor bronze with a solder plated surface to allow ease of solderability.

MECHANICAL Package/Pinout "V" and "W"

DIP PACKAGE



SMD PACKAGE



TOP VIEWS

SIDE VIEWS

END VIEWS

PIN CONNECTIONS		
PIN#	SINGLES	DUALS
1	+VIN	+VIN
2	-VIN	-VIN
3	NC	NC
4	NC	NC
5	-VOUT	-VOUT
6	NC	Common
7	+VOUT	+VOUT
8	NC	NC
9	NC	NC
10	NC	NC
11	NC	NC
13	NC	NC
14	NC	NC

NOTES:

NC = Do Not Connect.

Duplicate pin functions are internally connected.

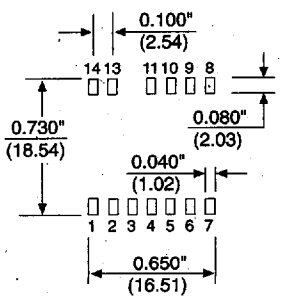
All dimensions are in inches (millimeters).

GRID: 0.100 inches (2.54 millimeters)

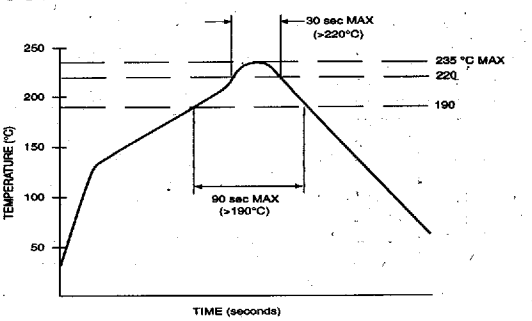
Typically Marked with: specific model ordered, date code, job code and Logo.

MATERIAL: Units are encapsulated with a low thermal resistance molding compound which has excellent chemical resistance, wide operating temperature range, and good electrical properties even in high humidity environments. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is phosphor bronze with a solder plated surface to allow ease of solderability.

RECOMMENDED LAND PATTERN

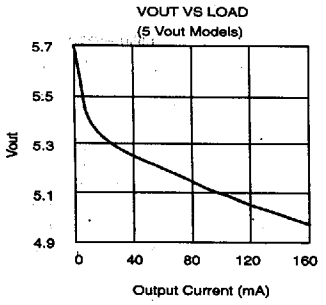


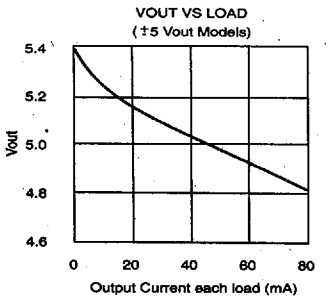
RECOMMENDED REFLOW PROFILE

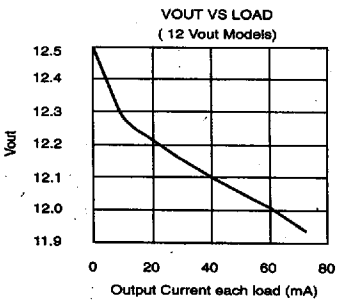


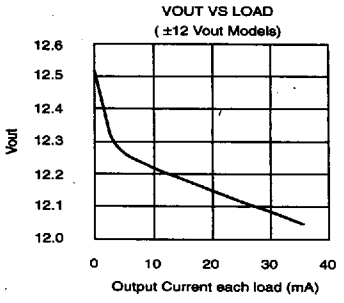
TYPICAL PERFORMANCE CURVES

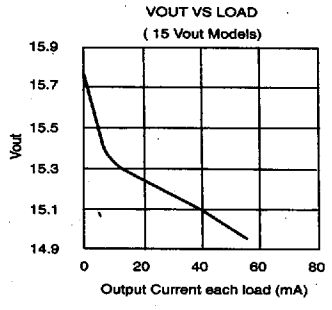
Specifications typical at T_A = +25°C, nominal input voltage, rated output current unless otherwise specified.

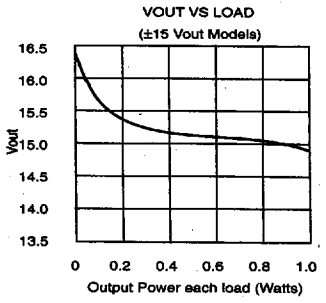


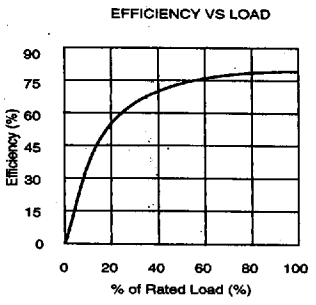


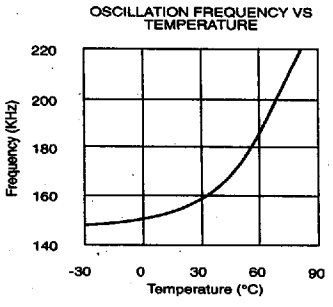




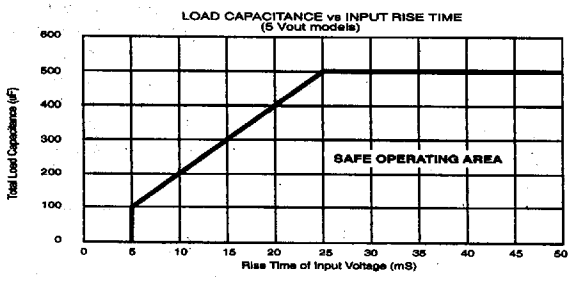


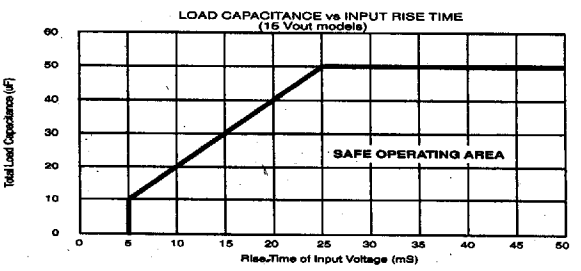


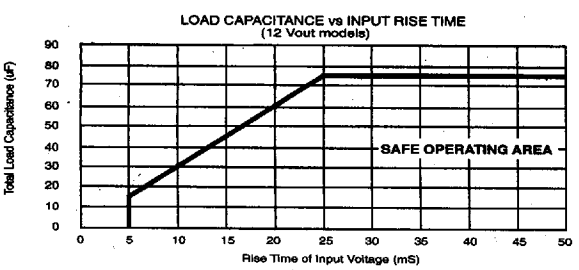




SAFE OPERATING AREA







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.