HIP SERIES

Programmable Module
HIGH OUTPUT VOLTAGE: 100 VDC to 500 VDC
HIGH POWER: TO 100 WATTS, ISOLATED
WIDE INTPUT RANGE: 10-20 Vdc and 18-36 Vdc

The **HIP Series** are 100 Watt, PCB mountable, High Voltage Converters with a size of 3"x2"x.5"ht.
The HIP Series modules are 10% to 100% output voltage programmable by means of a 0.5V to 5Vdc source. The HIP Series can be easily programmed by using an external potentiometer connected to the Vref Pin. Other programming voltages are available. Please contact factory for assistance. The Output can be programmed between 1-10% with a corresponding increase in linearity error.
These modules have an adjustable current limit though a current limit pin on the input side. External resistor or a voltage source connected to the pin will limit the maximum output current. By using the VPROG and ILIM pins, HIP modules can be used in a versatile rectangular power envelope with 10-100% programming on Vout and widely varying current limit.
A Voltage Monitor pin reference to -Out is provided. This pin shows 0 to 5V when the output voltage varies from 0 to 100%. The Monitor pin can be used for external output voltage protection circuit.
HIP Units are protected against Input Over/Under voltage, Output Short Circuit, and Over Temperature.

PHYSICAL CHARACTERISTICS:
Case Dimensions: LxWxH is 3" x 2" x 0.5"
Weight: 110 Grams typical
Full Epoxy Encapsulation for harsh environments
MILITARY OPTIONS AVAILABLE:
• Expanded Operating Temperature: -40°C to +85°C
• Selected Mil Std 883 Environmental Screening
Call 800-431-1064 to speak with an engineer for any additional requirements.

FEATURES:
• Wide Input Voltage Range: 15HIP Series 10-20Vdc; 28HIP Series 18-36 Vdc
• Input under and over voltage protection
• Programming Voltage: .5 to 5Vdc
• Internal Programming Voltage Limit: 5.2Vdc typical
• Voltage Monitor: 0 to 5V for 0 to 100% Vout
• Reference Voltage: 5Vdc +/- 4%, 7mA max.
• Linearity: <1% (10% to 100% Vout)
• Maximum Output Short Circuit Current: 130% Iout max. typical.
• Maximum Output Power: 100W
• Efficiency: 87% typical
• Internal Over Temperature Shutdown: 95°C, self resetting
• Line Regulation: <0.2% Vout
• Load Regulation: <0.5% Vout (for 10 to 100% Load change)
• Output Ripple: up to 0.5% Vout, peak-peak
• Fixed Frequency: 340kHz (typical)
• Stability: <0.005% / hr.
• Temperature Coefficient: <50 ppm/°C
• Operating Temperature Range: 0°C to +85°C baseplate
• Storage Temperature: -55°C to +125°C
• Isolation Input to Output: 3000VDC
• Isolation Input to Base Plate: 2100VDC
• Isolation Output to Base Plate: 2100VDC

APPLICATIONS: Automated Test Equipment, Telecom, Burn-in, Capacitor Charging, Piezo-electric driving.

15HIP SERIES

Wide Input Range: 10 - 20 VDC

50 Watt, Programmable

Pico Part Number	Output Voltage Range (V)	Nominal Output Current (mA)	Output Power Maximum (W)	Efficiency at Full Load Typical (%)	Regulation (Maximum)		Output Voltage Ripple Peak to Peak at Full Load (Vpp)	Output Voltage Setup Tolerance (%)	Price (US $)
					Line 10-20 Vin (%)	Load 10-100% Full Load (%)			
15HIP100	10-100	500	50	87	0.2	0.5	0.5	0.5	424.15
15HIP200	20-200	250	50	87	0.2	0.5	1.0	0.5	424.15
15HIP300	30-300	167	50	87	0.2	0.5	1.5	0.5	471.47
15HIP400	40-400	125	50	86	0.2	0.5	2.0	0.5	471.47
15HIP500	50-500	100	50	86	0.2	0.5	2.5	0.5	471.47

All Specifications are given under the following conditions: +25°C ambient, 15Vdc input at full load
10% of nominal load current is recommended at any time
Load Regulation given for 10 to 100% Load Change at nominal Vout
For expanded operating temperature or non-standard features, please consult the factory

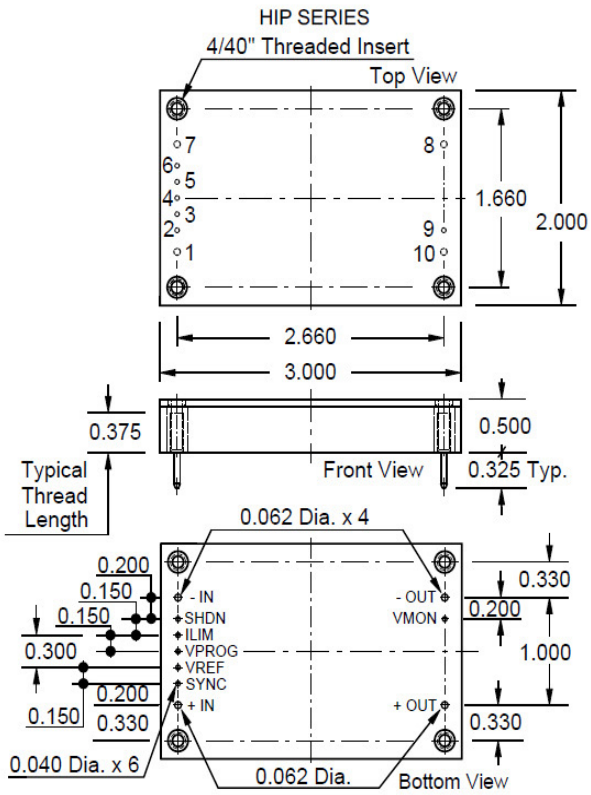
28HIP SERIES

Wide Input Range: 18 - 36V DC

100 Watt, Programmable

Pico Part Number	Output Voltage Range (V)	Nominal Output Current (mA)	Output Power Maximum (W)	Efficiency at Full Load Typical (%)	Regulation (Maximum)		Output Voltage Ripple Peak to Peak at Full Load (Vpp)	Output Voltage Setup Tolerance (%)	Price (US $)
					Line 18-36 Vin (%)	Load 10-100% Full Load (%)			
28HIP100 *	10-100	1000	100	88	0.2	0.5	0.5	0.5	424.15
28HIP200 *	20-200	500	100	88	0.2	0.5	1.0	0.5	424.15
28HIP300 *	30-300	333	100	88	0.2	0.5	1.5	0.5	471.47
28HIP400	40-400	188	75	88	0.2	0.5	2.0	0.5	471.47
28HIP500	50-500	150	75	88	0.2	0.5	2.5	0.5	471.47

All specifications are given under the following conditions: +25°C ambient, 28Vdc input voltage at full load
* For these 28HIP models, Pout max is linearly de-rated at 3.3W/V for input voltage lower than 21Vdc
5% of nominal load current is recommended at any time
Load Regulation is given for 10 - 100% Load Change at nominal Vout
For expanded operating temperature, or non-standard features, please consult factory



Notes: All Dimensions are in inches
Typical Weight: 110 Grams
The recommended torque for mounting screws is 3 to 5 In-Lbs.

PIN #	FUNCTION
1	-IN
2	SHDN
3	ILIM
4	VPROG
5	VREF
6	SYNC
7	+IN
8	+OUT
9	VMON
10	-OUT

PIN DESCRIPTION

Pin 1(-IN): Negative Input Voltage to the unit; 10-20V (15HIP Series) or 18-36V (28HIP Series). Inputs are UV/OV protected, non latched shut down.

Pin 2: (SHDN): When pulled below 1Vdc, will cause the unit to shut down. Non-latching.

Pin 3 (ILIM): Connecting this pin through a resistor to -IN will limit the maximum output current and short circuit current limit. For maximum current, leave the pin unconnected.

Pin 4 (VPROG): Programming Voltage, .5 to 5 Vdc controls the output within 10 to 100% Vout max. A programming voltage limiter is designed in to prevent the internal programming voltage from exceeding 5.2Vdc.

Pin 5 (VREF): 5Vref generated on the board. Range: 4.8Vdc to 5.20Vdc (+/- 4%). Current sourcing capability: <7mA.

Pin 6 (SYNC): used to synchronize multiple units to the highest frequency. Synchronization threshold is 1.4V.

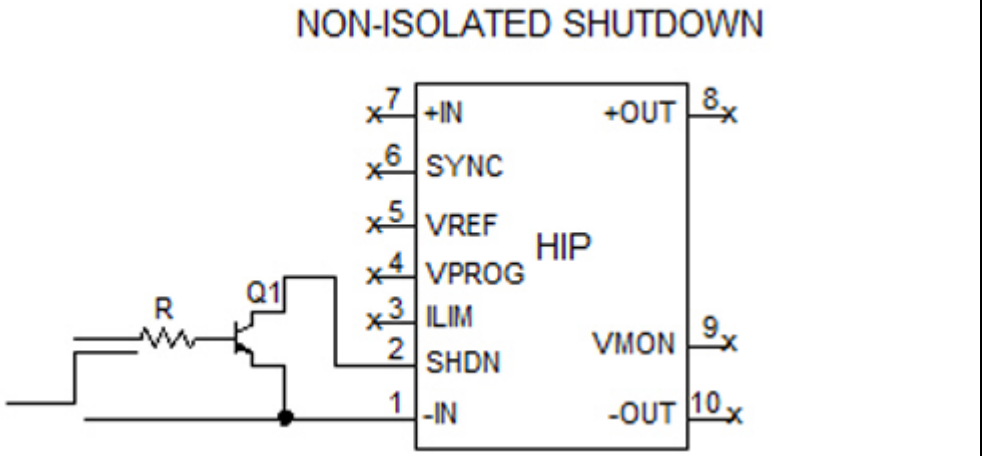
Pin 7 (+IN): Positive input voltage to the unit.

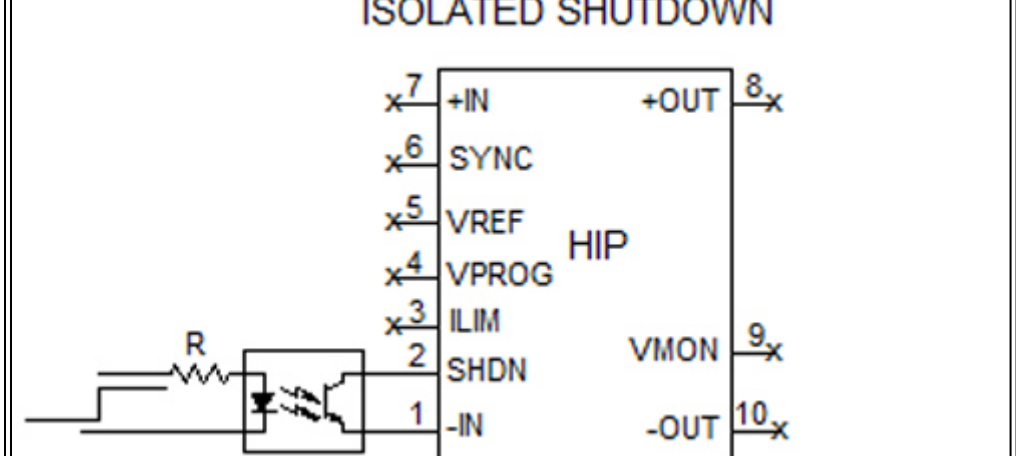
Pin 8 (+OUT): Positive output voltage. A 5% minimum load is recommended across the output to eliminate oscillations.

Pin 9 (VMON): Returns a voltage proportional to the actual output voltage within 0 to 5Vdc range. Useful to implement external output over voltage protection.

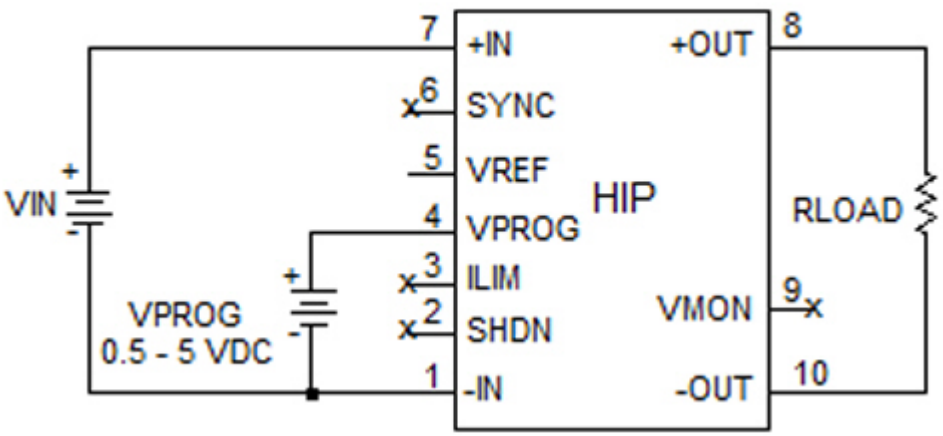
Pin 10 (-OUT): Negative Output Voltage.

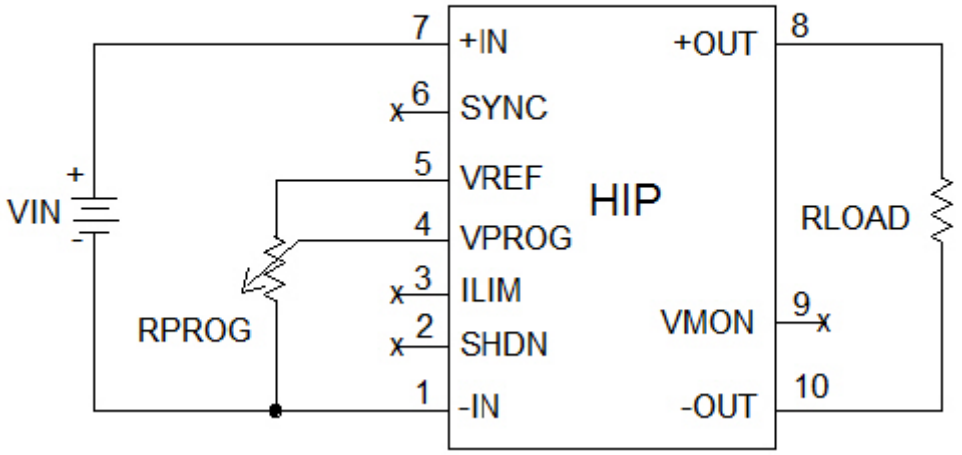
Remote Shutdown: Converter is turned off when Pin #2 (SHDN) is clamped to Pin #1 (-IN) within less than 1Vdc





VOLTAGE PROGRAMMING: A voltage source connected to the VPROG pin will program the output voltage linearly. .5V VPROG corresponds to 10% of Vout and 5V VPROG corresponds to Vout nominal. Exceeding 5V on this pin will increase the maximum output voltage up to 110% of nominal Vout and will be clamped internally.
Output can be programmed to less than 10% using the VPROG pin with a minimum of 5% nominal load current, but 1% linearity error is not guaranteed at this condition.

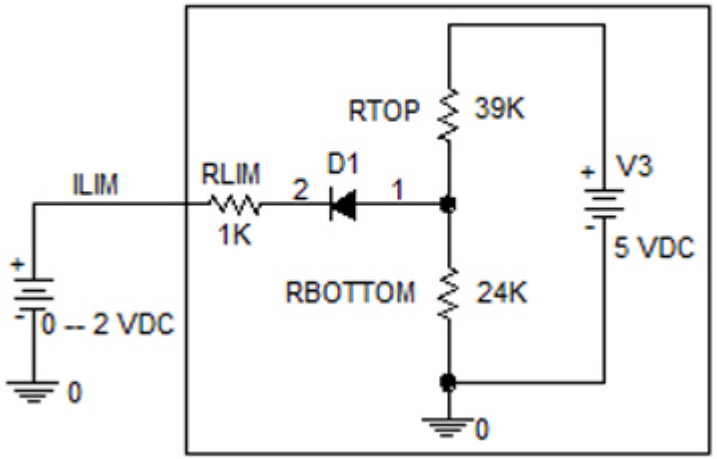




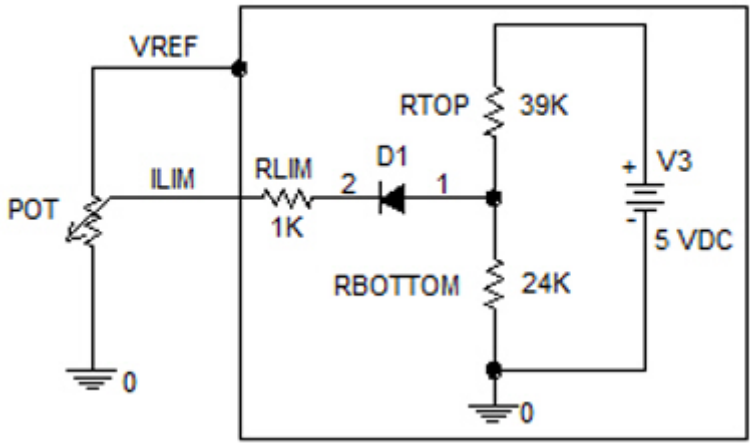
The VREF pin can be used to program the output using a potentiometer or resistor divider. The return path should be connected directly to -IN pin to decrease the programming error.

CURRENT LIMIT: ILIM Pin usually has 2V with respect to -IN when not connected. This allows the maximum Iout and short circuit current from the unit. If the actual current required by the unit is less than the nominal current, the unit can have a lower maximum Iout and short circuit current by reducing the voltage on ILIM pin linearly.

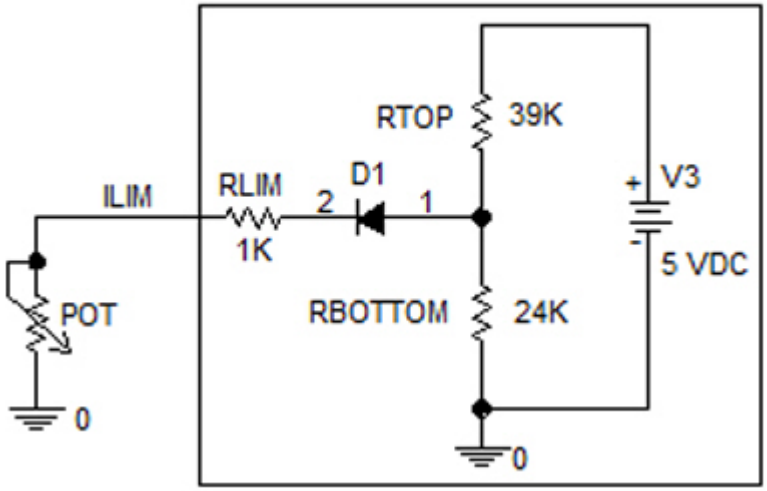
ILIM VOLTAGE SOURCE PROGRAMMING



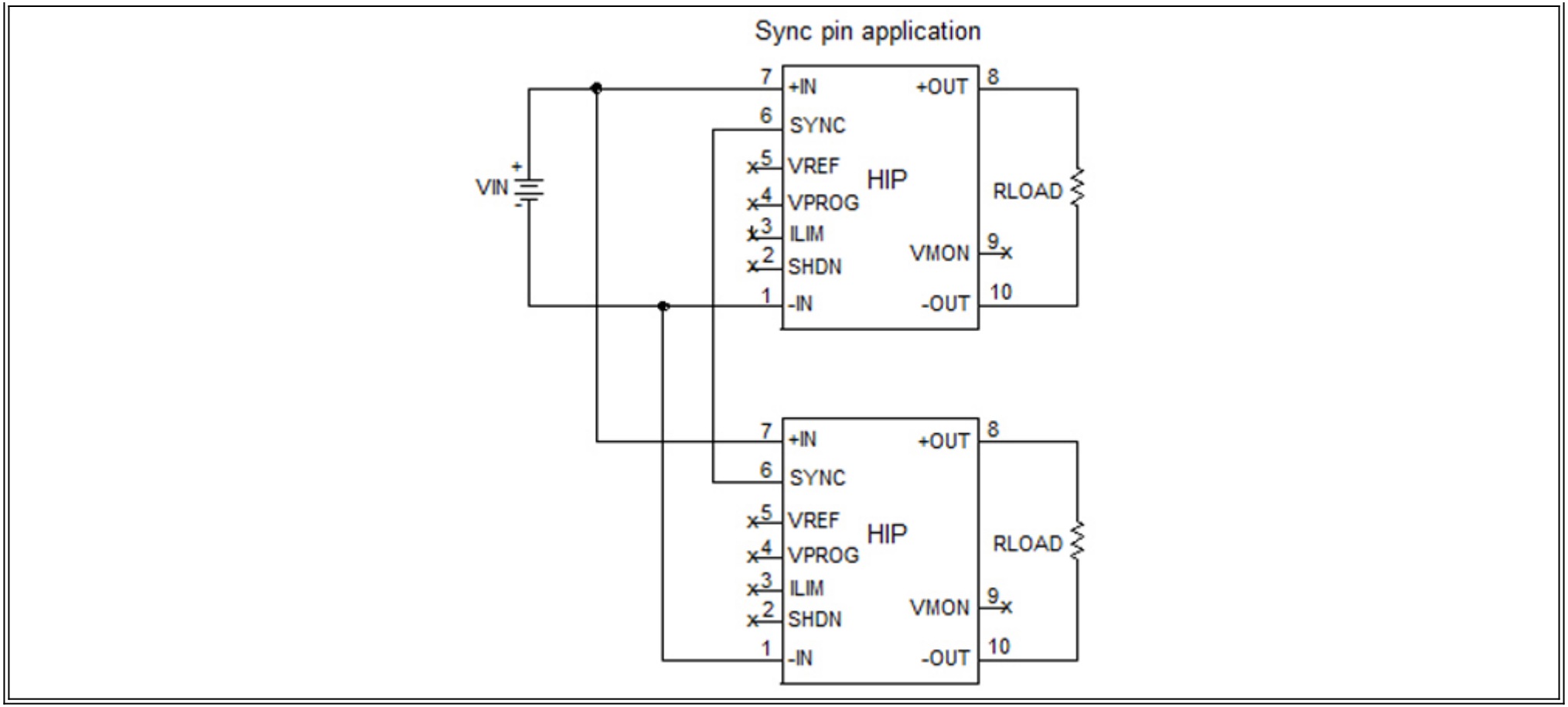
ILIM RESISTIVE DIVIDER PROGRAMING



ILIM RESISTOR PROGRAMMING



SYNCHRONIZATION: Two HIP units can be synchronized by connecting the SYNC pins in both units with a short connection. The unis will be synchronized to the highest switching frequency



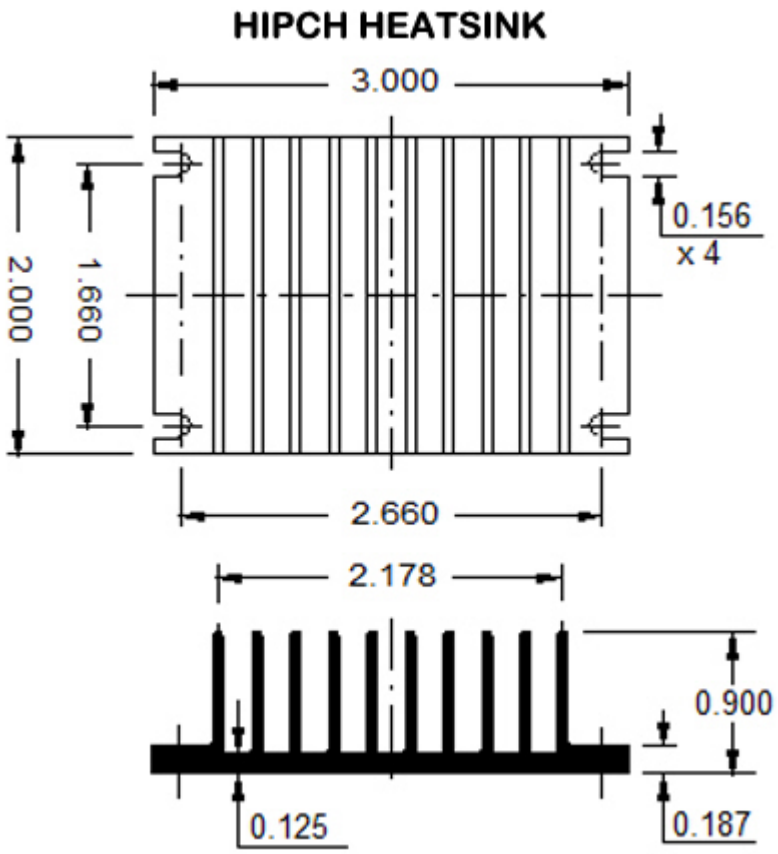
VMON:

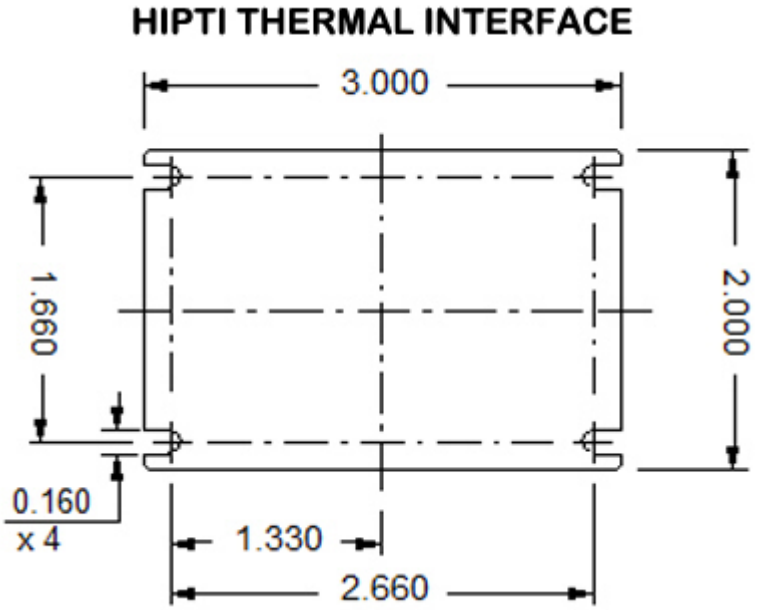
VMON pin shows a voltage proportional to the output voltage. When Vout is nominal, VMON returns 5V and when Vout is zero (0) the pin shows 0V with respect to -OUT. This pin can be used to monitor the output voltage indirectly and can be used for external output over voltage protection. The minimum input impedance for the interfacing circuit should be greater than 10 Kohms when connected to this pin.

HIP HEAT SINK, THERMAL INTERFACE

Thermal and Mechanical Specifications

	Thermal Resistance - Case to Air (°C/W)	
	Base Plate (No Heat Sink)	HIPCH Heat Sink
Free Air	6.8	4
200LFM	3.7	2.5
400LFM	2.5	1.2
600LFM	2	.9





TYPE HIPCH	$15.00 (USD)
TYPE HIPTI	$3.00 (USD)
NOTE: For additional Heat Sink options, consult factory	

PART HIPTI = Thermal Interface

Alloy Aluminum Substrate
Thermal Conductivity (BTU-in/hr sq.ft °F): 1530
Coefficient of Thermal Expansion (25-100°C, 10{to the neg.6th} in-in/°F): 13.1
Hardness, Brinnell B: 23
Endurance Limit, psi: 5000
Standard Thickness (inches): .002

For immediate engineering assistance or to place an order:
Call Toll Free: 800-431-1064

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