

HiQP SERIES

Miniature DC/DC Converters

Wide Input Range: 125 to 475 Vdc

50 Watt, Isolated, Regulated Output

High Efficiency, Low Ripple

Low Profile (2.5" x 1.55" x 0.5") - PCB Mountable

High Reliability DC-DC Converters

PRODUCT SELECTION		
		Operating Temperature (Base Plate)
HiQP	Standard	0°C to +70°C
HiQP-I	Industrial	-40°C to +95°C
HiQP-M	Military	-55°C to +95°C

The **HiQP Series** of high input voltage DC-DC Modules feature superior functionality and characteristics that make them suitable for high end applications.

Units in the **HiQP Series** provide wide input voltage range (125 to 475 Vdc) while maintaining tight output regulation along with low ripple and noise.

HiQP Series has a full range of designed-in protections: Overtemperature, Input Overvoltage, Output Overvoltage, and Output Current Limit.

HiQP Modules also feature: Remote Shutdown, Trim capability, Onboard Reference Voltage, and, for increased reliability, **do not** use OptoCouplers in the feed-back loop.

Load Share function provides a simple way for parallel operation, allowing for increased power with "N+1" redundancy.

All modules in **HiQP Series** are fitted with Input LC Filters to reduce reflected current ripple. Additionally, the **Soft -Start** function eliminates input inrush current and output voltage overshoot during start-up.

HiQP Series units are fully encapsulated for ruggedized operation.

PHYSICAL CHARACTERISTICS:

Case Dimensions: LxWxH is 2.5" x 1.55" x 0.5"
 Weight: 75 Grams typical
 Epoxy Encapsulation

FEATURES:

- Wide Input Voltage Range: 125Vdc to 475Vdc
- Output Voltage: 24Vdc to 200Vdc. 5 standard voltages.
Custom output voltages are also available.
- Line and Load Regulation: from 1% Vout
- Efficiency: Up to 90%
- Low Ripple
- Input Over Voltage Protection
- Input LC Filter
- Output Current Limit
- Output Overcurrent Protection: Typical 120% Vout
- Thermal Shutdown
- Trim Capability: +/-15% Vout
- 3V Onboard Reference
- Remote Shutdown
- Load Share Pin for parallel operation
- 4242Vdc In/Out Isolation
- Fully Encapsulated
- 0°C to +70°C Standard Operating Temperature.
 - Expanded Operating Temperature Ranges:
 - -40°C to +95°C for HiQP-I
 - -55°C to +95°C for HiQP-M
 - All all temperatures measured at Base Plate
- Units compliant by design with Mil Std 202:
 - Vibration - Method 204, Condition D
 - Shock - Method 213, Condition I
 - Humidity - Method 106
 - Altitude - Method 105, Condition D
- Optional Environmental Screening (selected Mil Std 883) available:
 - Stabilization Bake - Method 1008
 - Temperature Cycle - Method 1010, Condition B
 - Hi Temperature Full Power Burn In - Method 2015 used as a guide

Call 800-431-1064 to speak with an engineer for any additional requirements.

HiQP Series									
Wide Input Range: 125 to 475 VDC									
Operating Temperature 0 to +85°C Case									
Standard Models									
Pico Part Number	Input Voltage Range (V) *	Output Voltage (V)	Output Power Maximum (W)	Efficiency at Full Load Typical (%)	Regulation (Maximum)		Output Voltage Ripple Peak to Peak at Full Load (mVpp)	Output Voltage Setup Tolerance (%)	Price 1 -49 (US \$)
					Line 125-475 Vin (%)	Load 10-100% Full Load (%) ***			
HiQP24	125-475	24	50	86	0.25	1.25	350	1	183.01

HiQP28	125-475	28	50	86	0.25	1.25	375	1	196.15
HiQP48	125-475	48	50	85	0.25	1.75	400	1	209.35
HiQP100	125-475	100	50	88	0.3	1.6	600	1	260.16
HiQP200	125-475	200	50	89	0.1	1.5	750	1	322.57

*Nominal Input Voltage: 250 Vdc

**Proper thermal management to prevent exceeding Max. Base Plate Temperature is required (See application notes)

***2.5W minimum load required in order to prevent output to overshoot more than 2% Vout, nominal.

HiQP-I Series

Wide Input Range: 125 to 475 VDC

Operating Temperature -25°C to +85°C Case

Industrial Models

Pico Part Number	Input Voltage Range (V) *	Output Voltage (V)	Output Power Maximum (W)	Efficiency at Full Load Typical (%)	Regulation (Maximum)		Output Voltage Ripple Peak to Peak at Full Load (mVpp)	Output Voltage Setup Tolerance (%)	Price 1 -49 (US \$)
					Line 125-475 Vin (%)	Load 10-100% Full Load (%) ***			
HiQP24-I	125-475	24	50	86	0.25	1.25	350	1	224.52
HiQP28-I	125-475	28	50	86	0.25	1.25	375	1	294.27
HiQP-48I	125-475	48	50	85	0.25	1.75	400	1	314.03
HiQP100-I	125-475	100	50	88	0.3	1.6	600	1	390.24
HiQP200-I	125-475	200	50	89	0.1	1.5	750	1	483.86

*Nominal Input Voltage: 250 Vdc

**Proper thermal management to prevent exceeding Max. Base Plate Temperature is required (See application notes)

***2.5W minimum load required in order to prevent output to overshoot more than 2% Vout, nominal.

HiQP-M Series

Wide Input Range: 125 to 475 VDC

Operating Temperature -55°C to +85°C Case

Military Models

Pico Part Number	Input Voltage Range (V) *	Output Voltage (V)	Output Power Maximum (W)	Efficiency at Full Load Typical (%)	Regulation (Maximum)		Output Voltage Ripple Peak to Peak at Full Load (mVpp)	Output Voltage Setup Tolerance (%)	Price 1 -49 (US \$)
					Line 125-475 Vin (%)	Load 10-100% Full Load (%) ***			
HiQP24-M	125-475	24	50	86	0.25	1.25	350	1	362.36
HiQP28-M	125-475	28	50	86	0.25	1.25	375	1	388.44
HiQP48-M	125-475	48	50	85	0.25	1.75	400	1	414.51

HiQP100-M	125-475	100	50	88	0.3	1.6	600	1	515.12
HiQP200-M	125-475	200	50	89	0.1	1.5	750	1	638.69

*Nominal Input Voltage: 250 Vdc

**Proper thermal management to prevent exceeding Max. Base Plate Temperature is required (See application notes)

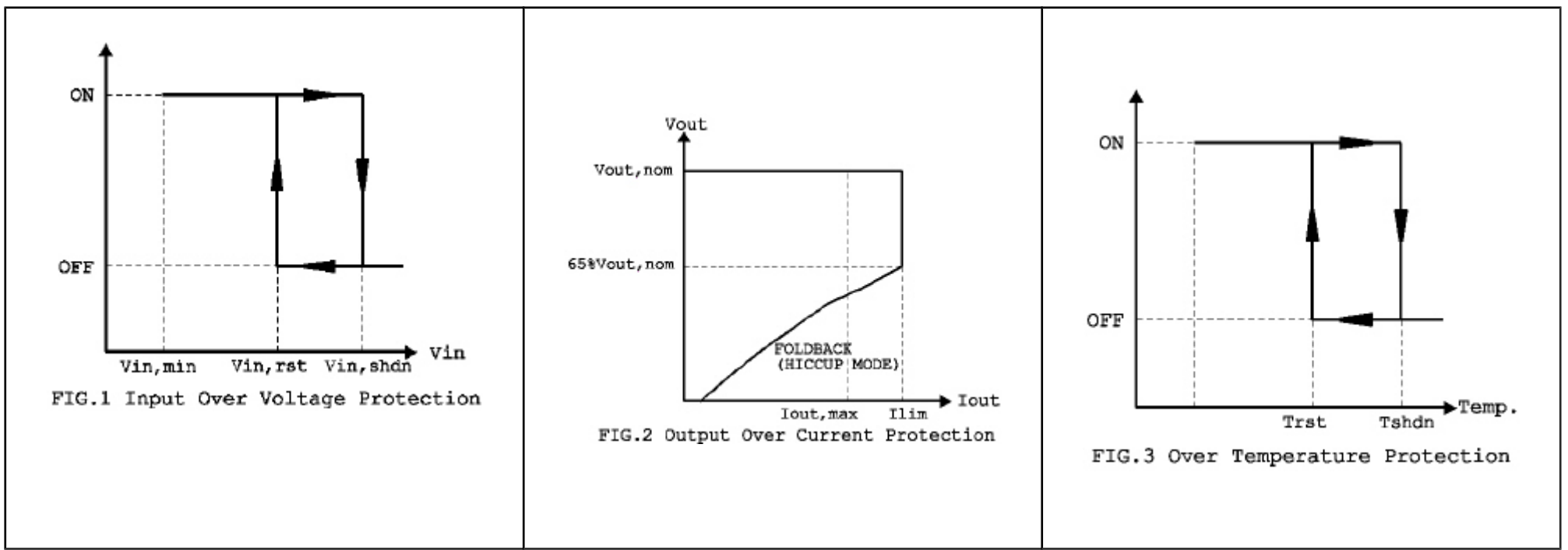
***2.5W minimum load required in order to prevent output to overshoot more than 2% Vout, nominal.

INPUT CHARACTERISTICS			
Parameter	Conditions	Value	Observations
Nominal Input Voltage		250Vdc	
Input Voltage Range	Min...Max	125...475Vdc	
Minimum Input Voltage	Max	125Vdc	For Start-up
Input Current in Short Circuit	Output Shorted, Max	8mA	
Input Current in Shut-Down	ShDn Enabled, Max	0.5mA	
Input reflected Ripple Current	Full Load, 20MHz	10%	of Iin, Typical

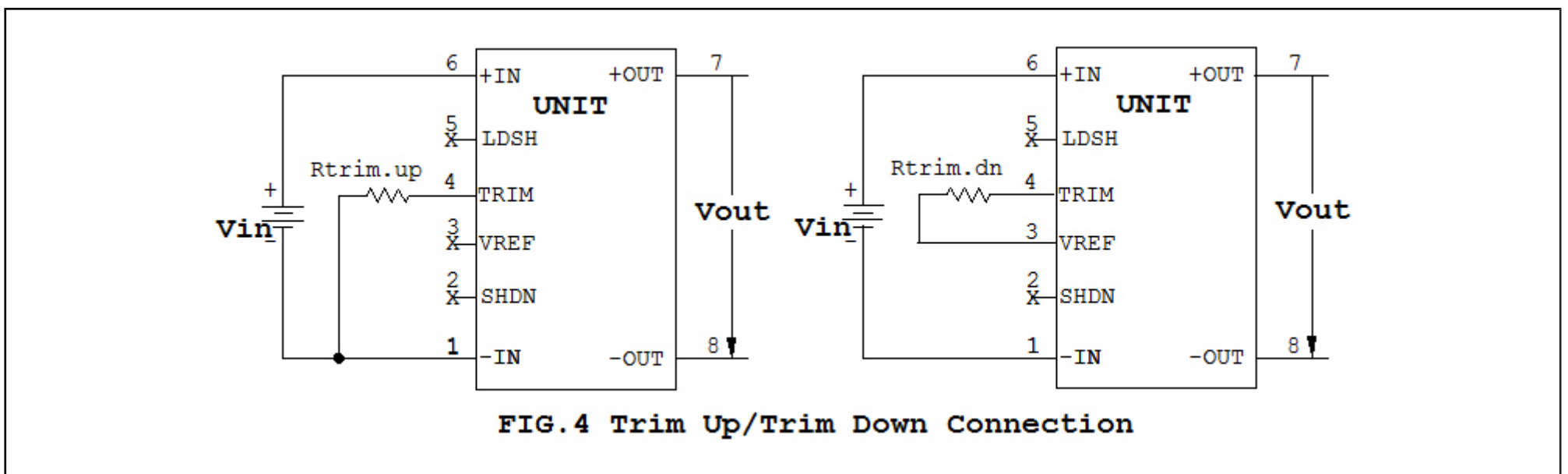
OUTPUT CHARACTERISTICS			
Parameter	Conditions	Value	Observations
Output Set Voltage	Vin, nominal and full load	1%	of Vout, nominal
Output Voltage Trim, min	Min...Max	-10...+10	of Vout, nominal

OTHER CHARACTERISTICS			
Parameter	Conditions	Value	Observations
Switching Frequency	Vin min to Vin Max and Full Load	80kHz to 110kHz	Variable with Line and Load
Reference Voltage	10mA Max Current	3V +/- 2%	Pin # 3
Minimum Load	Vin min to Vin Max	2.5 W	For Δ Vout <2% of Vout nominal

PROTECTION FUNCTIONS			
Parameter	Conditions	Value	Observations
Input Over Voltage	Shut-Down	525Vdc	Typical
	Restart	500Vdc	Typical
Input Under Voltage	Shut-Down	60Vdc	Typical
	Restart	107Vdc	Typical
Output Over-Voltage		120%	of Vout, Nominal, Typical
Output Current Limit (Ilim)	Output Overload/Short	120%	of Iout, Max., Typical
Output Voltage in Current Limit	Before Foldback	50%	of Vout, Nominal, Typical
Over Temperature (HiQP)	Shut-Down	95°C	Typical, Base Plate
	Restart	90°C	Typical, Base Plate
Over Temperature (HiQP-I, -M)	Shut-Down	110°C	Typical, Base Plate
	Restart	105°C	Typical, Base Plate

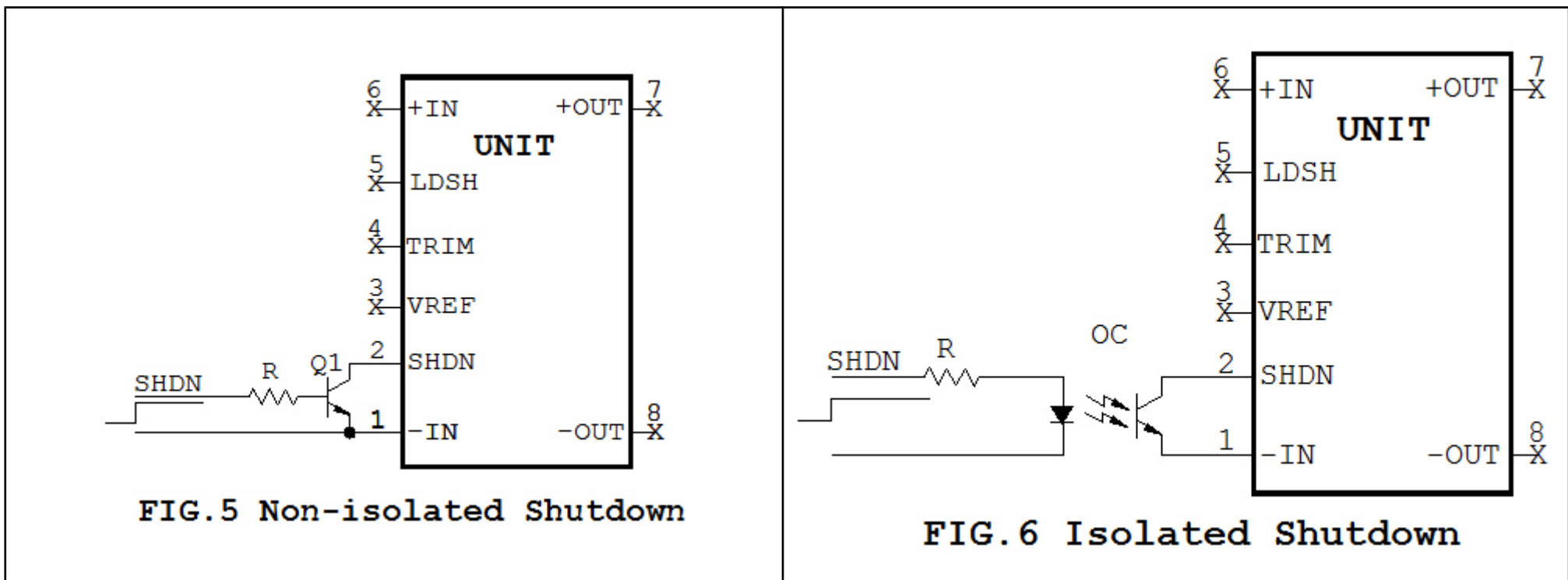


TRIM UP/TRIM DOWN FUNCTION								
	Rtrim Connected Between	Rtrim (kohm) vs. ΔV_{out} (typical)						
		1000	470	100	47	10	1	Short
TRIM UP	Pin # 4 and Pin # 1	+0.5%	+1%	+4%	7%	14%	+16%	+17%
TRIM DOWN	Pin # 4 and Pin # 3	-1%	-3%	-7%	-9%	-13%	-15%	-16%



REMOTE SHUT-DOWN FUNCTION

Remote Shutdown is enabled when Pin # 2 (SHDN) is pulled LOW (to Pin # 1) within less than 0.4V. Shut-Down Pini released or floating will allow for converter operation. The Shut-Down function can be used in applications requiring On/Off control. This may be done in different ways: Non-isolated control could be implemented by using a bipolar transistor, Mosfet, or a switch. Isolated operation would require a relay or an opto-coupler.



LOAD SHARE FUNCTION

Modules in HiQP Series have a designed-in circuit allowing for parallel operation of multiple converters. This function is enabled by connecting LDSH pins (Pin #5) of units to operate in parallel. The connection ensures active sharing of the load by paralleled converters. Beside increase power, Load Share function allows for true "N+1" redundancy.

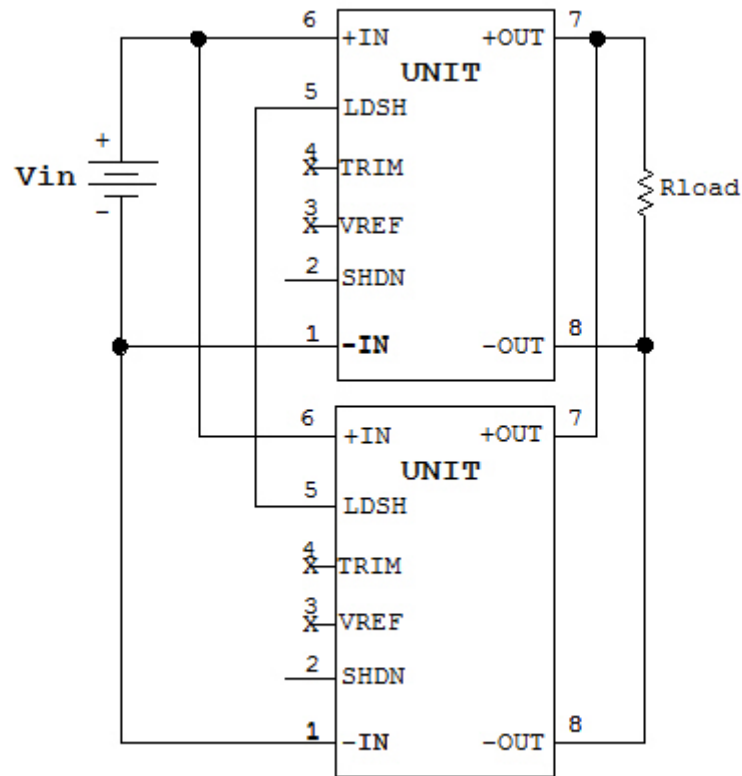
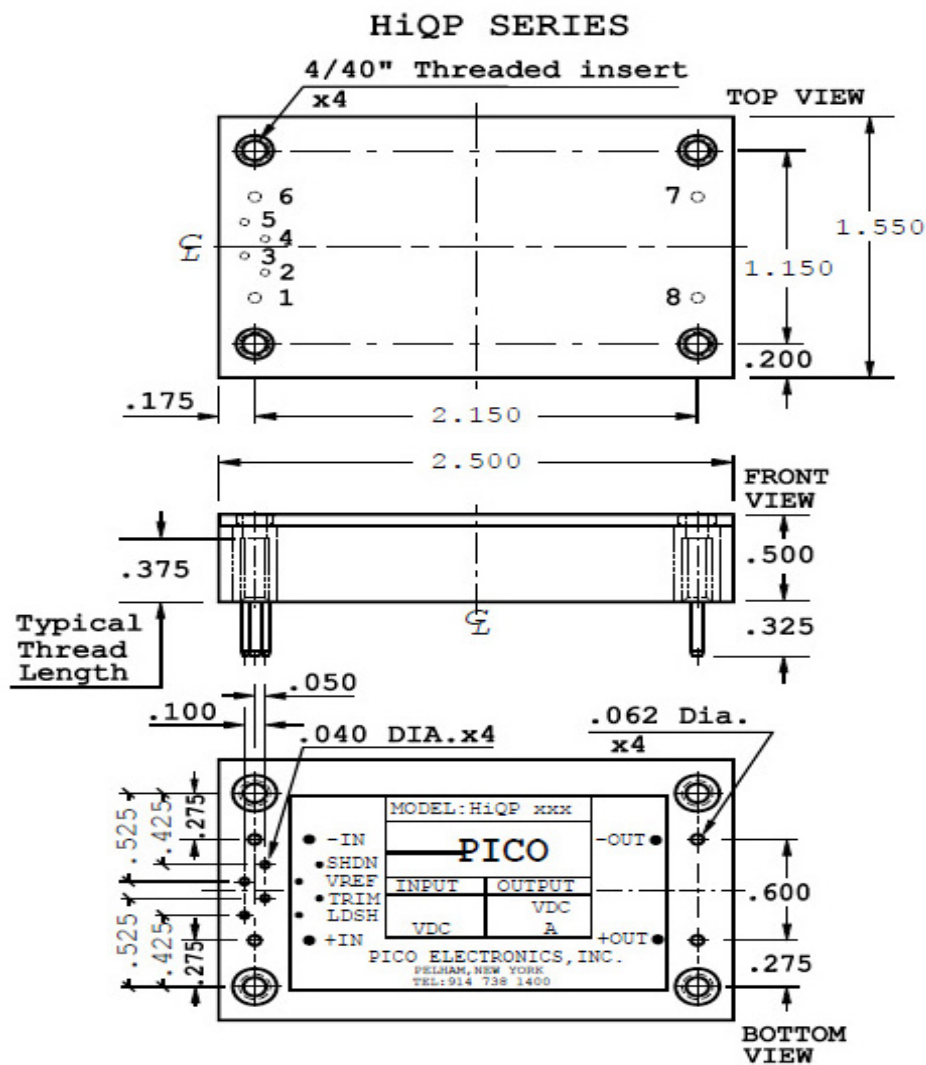


FIG.7 Parallel operation of 2 converters

ISOLATION CHARACTERISTICS			
Parameter	Conditions	Value	Observations
Isolation Test Voltage	Input to Output	4242Vdc	Min
	Input to Baseplate	2121Vdc	Min
	Output to Baseplate	1000Vdc	Min
Isolation Resistance		100Mohm	Min

THERMAL CHARACTERISTICS			
Parameter	Conditions	Value	Observations
Baseplate Operating Temperature	HiQP	0°C	Min
	HiQP-I	-40°C	Min
	HiQP-M	-55°C	Min
	HiQP	70°C	Max
	HiQP-I	95°C	Max
	HiQP-M	95°C	Max
Storage Temperature	Min	-55°C	Non-Operating
	Max	+125°C	
Thermal Impedance	Baseplate to Ambient Rth (b-a) Free Air	10°C/W	Typical

PIN	FUNCTION
1	-IN
2	SHDN
3	VREF
4	TRIM
5	LDSH
6	+IN
7	+OUT
8	-OUT



Note: The recommended torque for mounting screws is 3 to 5 In-Lbs.

Typical Weight: 75 Grams
Dimensions are in inches

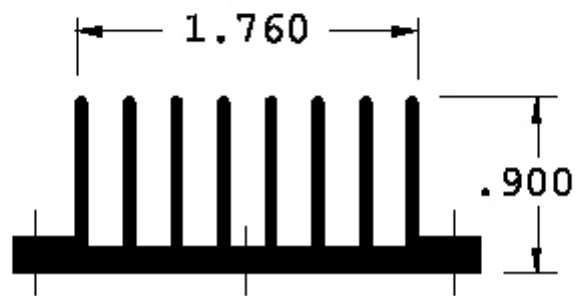
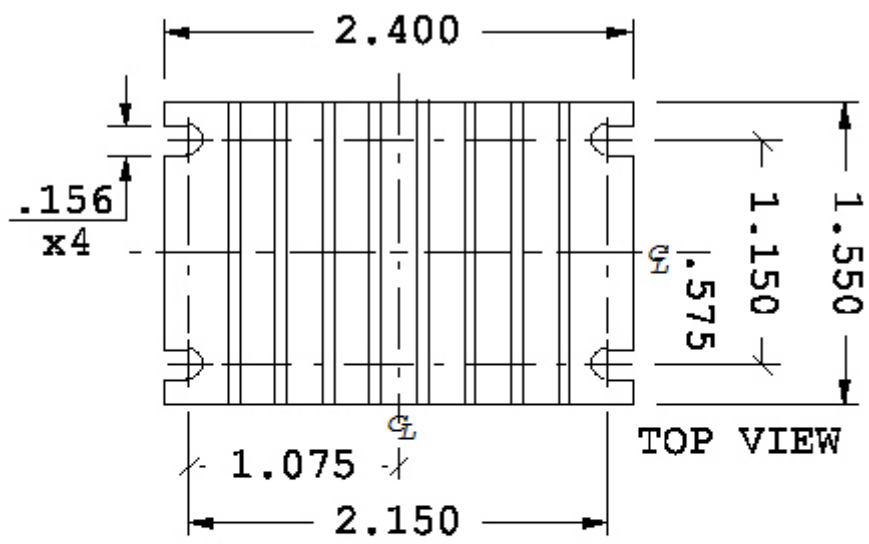
PIN DESCRIPTION:

- Pin # 1 (-IN):** Negative Input Voltage to the unit - 125-475Vdc. Units are Input OV protected, non-latched shut-down.
- Pin # 2 (SHDN):** When pulled below 0.4Vdc will cause the unit to shut down, non-latching. Leave unconnected if not used.
- Pin # 3 (VREF):** 3 Vref generated on board. Reference voltage tolerance: +/- 2%. Current sourcing capability: 10mA max.
- Pin # 4 (TRIM):** Connecting this pin through a resistor to -IN will increase Vout. Connecting it through a resistor to VREF will reduce Vout. Minimum adjusting range is: +/-10% of Vout nominal.
- Pin # 5 (LDSH):** By connecting together this pin on multiple paralleled modules, sourcing current in same load, it is ensured that output currents will be equally balanced. Useful for increased power and "N+1" redundant power systems.
- Pin # 6 (+IN):** Positive Input voltage to the unit.
- Pin # 7 (+Out):** Positive Output voltage. A minimum 10% load across the output is required in order to provide regulation. The output is clamped with Zener diodes at a 120% Vout (typical) to limit overshoot in case of no-load operation.
- Pin # 8 (-OUT):** Negative Output voltage.

QCH/QCV HEATSINKS and THERMAL INTERFACE Thermal and Mechanical Specifications

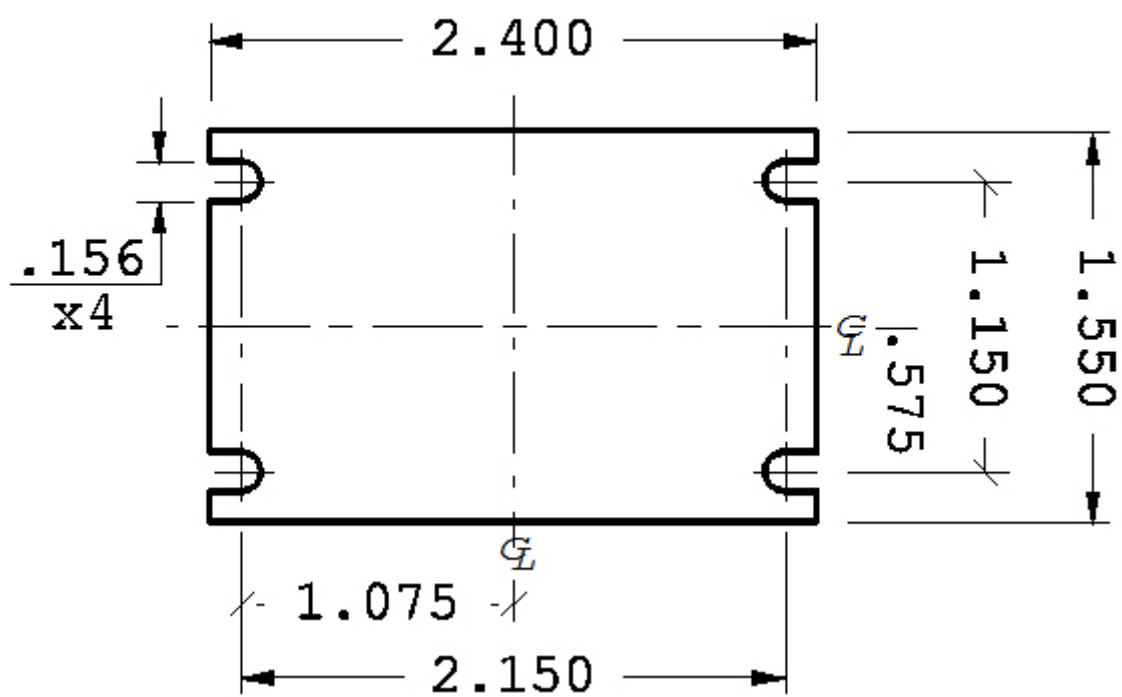
	Thermal Resistance: Case to Air [°C/W]	
	Baseplate (No Heatsink)	QCH Heatsink
Free Air	10	5.6
200 LFM	5.1	3
400 LFM	3.7	2.2
600 LFM	3.1	1.8
800 LFM	2.6	1.5
1000 LFM	2.2	1.3

QCH HEATSINK



Weight: 51.3 Grams approx.

QT1 THERMAL INTERFACE



PART TI = Thermal Interface

Alloy Aluminum Substrate

Thermal Conductivity (BTU-in/hr sq.ft. °F): 1530

Coefficient of Thermal Expansion (25-100°C, 10 {to the -6th} in-in/°F): 13.1

Hardness, Brinnell B: 23

Endurance Limit, pse: 5000

Standard Thickness (Inches): .002

For immediate engineering assistance or to place an order:

Call Toll Free: 800-431-1064

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