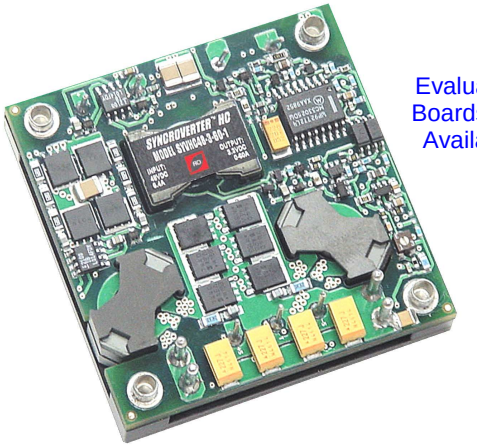
SYNCROVERTER™ HC

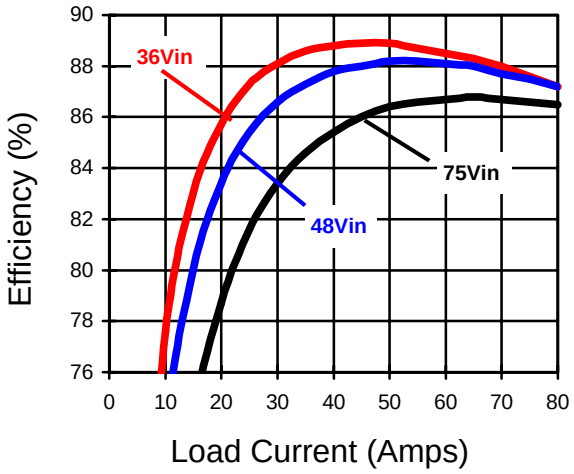
110W,125W,& 145W DC-DC CONVERTERS
MODELS: SYVHC48-1.8-60/70/80
DATA SHEET

- **INPUT:** **36 - 75Vdc**
- **OUTPUT:** **1.8Vdc @ 60, 70, or 80A**



Evaluation Boards Are Available

Efficiency



FEATURES

- High Efficiency: Over 88%
- High Power Density: 50 W/cu. in.
- Provisions for Heat Sink Attachment
- Optional Non-Shutdown Over Voltage Protection
- Recovers Automatically from all Protection Modes
- Trim Range: 80 to 110%
- Remote Sense
- Constant Frequency
- -40 to +100°C Operation
- Safety Agency Compliant
- Dual Output Pins for a Low Loss PCB Interface

MODEL SELECTION

Model Number	Input Voltage (Vdc)	Output Voltage (Vdc)	Output Current (A)
SYVHC48-1.8-80-1	36-75	1.8	80
SYVHC48-1.8-70-1	36-75	1.8	70
SYVHC48-1.8-60-1	36-75	1.8	60

See the last page for available options

DESCRIPTION

SYNCROVERTER HC DC-DC converters are ultra-high efficiency, high current modules packaged in a modified “half brick” package. Their isolated, fixed frequency, state-of-the-art design uses synchronous rectification, an integrated planar transformer, and a low loss multi-layer PCB to provide up to 80A of 1.8Vdc power. Their very high efficiency allows them to be operated in a typical application without a heat sink. The HC series includes an integral thermal interface to attach a high performance cooling system for more demanding environments.

RO Associates, Inc. Sunnyvale, CA 408 744-1450 fax:408 744-1521 email:sales@roassoc.com

SYNCROVERTER™ HC DC-DC Converters

SYVHC48-1.8-60/70/80-1

ABSOLUTE MAXIMUM RATINGS

Exceeding absolute maximum ratings may cause permanent damage and may reduce reliability

PARAMETER	MIN	MAX	UNITS	CONDITIONS
Continuous Input Voltage (+In to –In)	-0.3	75	Vdc	
Transient Input Voltage (+In to –In)	-0.3	80	Vdc	Up to 100ms
On/Off Voltage (On/Off to –In)	-0.3	40	Vdc	
Storage Temperature	-40	+125	°C	
Operating Temperature	-40	+100	°C	Baseplate
Soldering Temperature (Wave Solder)		+260	°C	< 5 sec.
Soldering Temperature (Hand Solder)		+390	°C	< 7 sec.

SPECIFICATIONS

Specifications apply with 48Vin, full load, 25°C unless indicated otherwise.

INPUT PARAMETERS	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage	36	48	75	Vdc	
Startup Voltage	33	34	35	Vdc	
Shut Down Voltage	30	31	32	Vdc	
Maximum Input Current			5.3	A	$36V_{in}$, 25°C
Input Ripple Rejection		60		dB	@120 Hz

OUTPUT PARAMETERS		MIN	TYP	MAX	UNITS	CONDITIONS
Voltage Set Point		1.78	1.80	1.82	Vdc	$48V_{in}$, 25°C, Full Load
Load Regulation			0.05	0.2	%	0 A to Full Load
Line Regulation			0.05	0.2	%	Over V_{in} Range
Voltage Drift w/Temperature				0.02	%/°C	-40 to +100 °C
Ripple			75	150	mV p-p	5 Hz to 20 MHz, C_{ext} = 10µF Tantalum + 1µF Ceramic
Rated Current	60A Model	0		60	A	
	70A Model	0		70		
	80A Model	0		80		
Output Power	60A Model			108	W	@ 1.8Vdc
	70A Model			126		
	80A Model			144		
Current Limit Inception		112	117	130	% F.L.	V_{out} = 95% V_{out} nominal
Short Circuit Current				150	% F.L.	V_{out} = 250mV
Transient Response Peak Deviation Settling Time			 100 50		 mV µsec	Load change from 50% to 75% full load Slew rate = 1A/µsec V_{out} within 1% V_{out} nominal
External Load Capacitance		0		10,000	µF	
Efficiency (see efficiency curve)			88		%	V_{in} = 48V, 60A Load, 25 °C Case

SYNCROVERTER™ HC DC-DC Converters
SYVHC48-1.8-60/70/80-1

SPECIFICATIONS (continued)

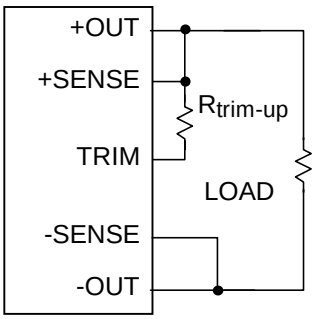
ISOLATION PARAMETERS	MIN	TYP	MAX	UNITS	CONDITIONS
Input/Output Isolation			1500	Vdc	
Input/Baseplate Isolation			1500	Vdc	
Output/Baseplate Isolation			500	Vdc	
Input-to-Output Capacitance		125		pF	
Input-to-Output Resistance	10			M Ohms	

MECHANICAL PARAMETERS	MIN	TYP	MAX	UNITS	CONDITIONS
Weight		94 (3.3)		g (oz.)	
Size		2.42 x 2.4 x 0.5		Inches	
Thermal Resistance, Case-to-Ambient		6.6		°C/W	Case Temperature = 100°C

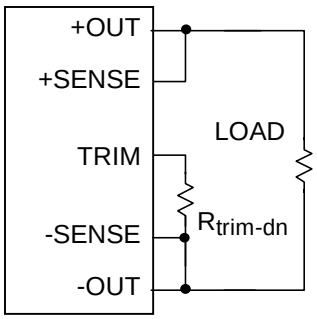
FEATURE PARAMETERS	MIN	TYP	MAX	UNITS	CONDITIONS
Trim Range	1.44		1.98	Vdc	
Over Voltage Protection					25°C Case
Shut Down Voltage	115		160	% V_{out}	
Auto-Restart Delay		150		msec	
Over Temperature Shut-down (Automatic Recovery)		105		°C	Case Temperature
Turn-On Time		25	60	msec	80% F.L., V_{out} Settled within 1%
Logic On/Off					
Logic Low	0.5			V	V_{out} = 0
On/Off Source Current		2		mA	@$V_{on/off}$ < 0.5V
Logic High			15	V	
On/Off Sink Current			50	µA	@$V_{on/off}$ = 15V
Logic Turn-On Time		12		msec	80% F.L., V_{out} Settled within 1%

TRIM CIRCUIT CONFIGURATIONS

TRIM-UP



TRIM-DOWN



TRIM RESISTOR CALCULATIONS
(Standard Trim)

$$R_{trim-up} = 10 \cdot \left(\frac{V_O(100+\Delta\%)}{1.225\Delta\%} - \frac{(100+1.1\cdot\Delta\%)}{\Delta\%} \right) \cdot k\Omega$$

$$R_{trim-dn} = 10 \cdot \left(\frac{100}{\Delta\%} - 1.1 \right) \cdot k\Omega$$

Where:

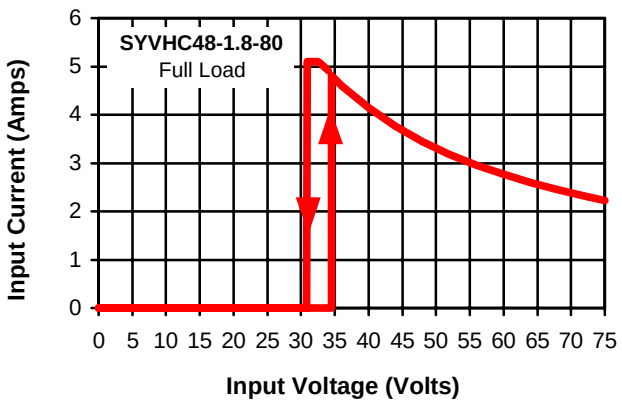
Vo = The nominal output voltage of the module with no trimming.

Δ% = The desired percentage change in the output (**Δ%** is always a positive number).

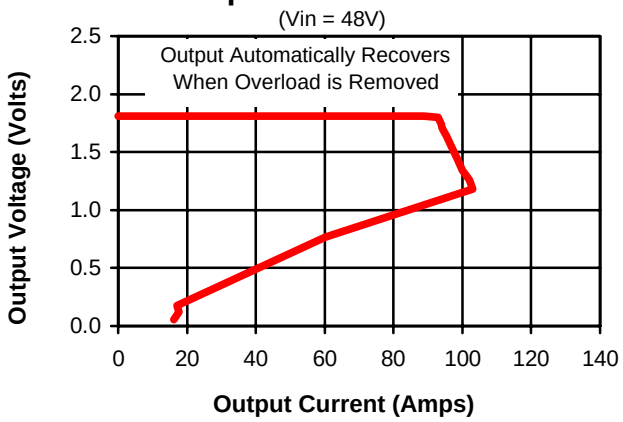
SYNCROVERTER™ HC DC-DC Converters

SYVHC48-1.8-60/70/80-1

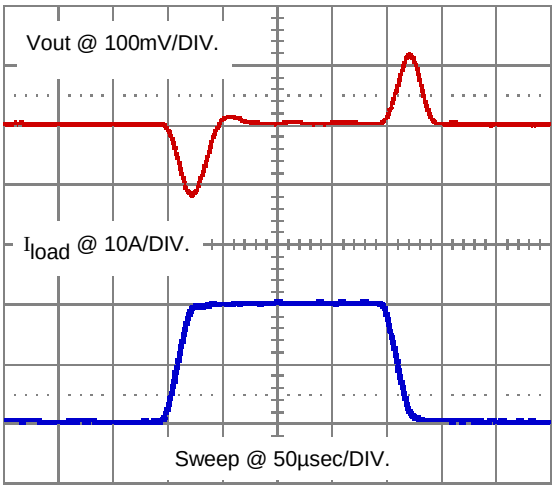
Input Characteristics



Output Characteristics

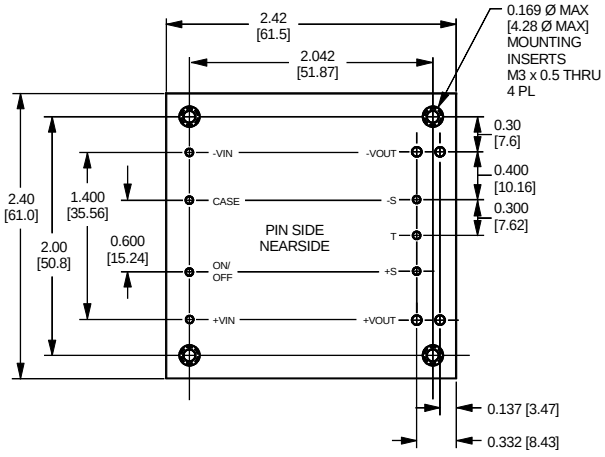


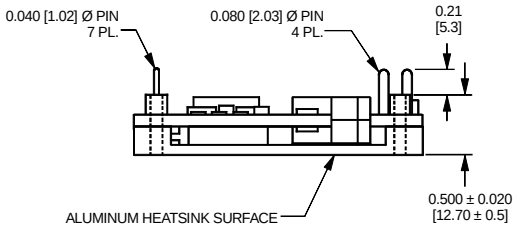
1.8V Transient Response



I_{out} = 40.0A – 60.0A – 40.0A
Current Slew Rate = 1 A/µsec

Outline Drawing





ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

TOLERANCES UNLESS SPECIFIED OTHERWISE:
x.xx in. ± 0.02 in. [x.x mm. ± 0.5 mm.]
x.xxx in. ± 0.010 in. [x.xx mm. ± 0.25 mm.]

Part Numbering Scheme

Converter Family	V_{in} (nom)		V_{out} (nom)		I_o (rated)		Options Code	Special Features
SYVHC	**48**	-	**1.8**	-	**80**	-	**1**	
SyncroVerter HC Series	48V nom. 36V - 75V		1.8V output		I_o rating = 80A		neg. logic (see below)	standard

The options code is the concatenation of the suffixes for the desired options.

Available Options

Negative Logic (1) – The On/Off pin must be held low to turn the module on. If it's left floating, the module turns off. The suffix for negative logic is "1". This is the standard logic configuration.

Positive Logic () – The On/Off pin must be high to turn the module on. If it's left floating, the module turns on. The positive logic suffix is "".

Alternate Pins (6) – Replaces the standard 0.200" thru-hole pins, with 0.145" thru-hole pins. The suffix for 0.145" pins is "6".

Alternate Trim (T)– The trim resistor is calculated using the industry standard equations. The alternate trim suffix is "T".

Ride-Thru OVP (R) – The protection circuits limit the output to the OVP level without shutting down. The ride-thru OVP suffix is "R".

(minimum quantities and extended lead-times may apply to orders of non-standard options)

RO Associates, Inc.
P.O.BOX 61419
Sunnyvale, CA 94088

www.roassoc.com
rev 040709
email:sales@roassoc.com

800-443-1450
408 744-1450
fax: 408 744-1521