

24/28V, 48V, 270/300V, 375V



Military 2nd Generation DC-DC Converters

Features

- ★ 24/28 and 270/300Vdc compliant to MIL-STD-704E
- ★ Single output: 2 – 48Vdc
- ★ MIL-STD-810 environments
- ★ Operating temperatures from -55°C to 100°C
- ★ ZVS/ZCS power architecture
- ★ Environmental stress screening
- ★ Programmable output: 10 to 110%
- ★ Power density: Up to 100W/in³
- ★ OVP and thermal shutdown
- ★ Input undervoltage lockout
- ★ Parallelable for increased power

Input Voltage

Nominal	Range	Transient	MIL Compliance
24V	18 – 36V	50V 100mS	MIL-STD-704E for 28Vin
48V	36 – 75V	100V 100mS	
300V	180 – 375V	400V 100mS	MIL-STD-704E for 270Vin
375V	250 – 425V	500V 100mS	

Part Numbering



For
Semi-Custom
Models
See p.35

Maxi Converter Example: V300A48M500AL
300Vin, maxi, 48Vout @ 500W, long pins

Mini Converter Example: V300B15M250AL
300Vin, mini, 15Vout @ 250W, long pins

Micro Converter Example: V300C24M150A
300Vin, micro, 24Vout @ 150W, short pins

V	300	A	48	M	500	A	L
Input Voltage		Package A = Maxi B = Mini C = Micro	Output Voltage	Product Grade H = -40°C to +100°C M = -55°C to +100°C	Output Power		Pin Style Blank = Short Solder L = Long Solder S = Short ModuMate ¹ N = Long ModuMate
							Baseplate Blank = Slotted 2 = Threaded 3 = Thru-hole

¹Compatible with InMate and SurfMate socketing systems.

24Vin Series		Output Power (Watts)		
Output Voltage (Vdc)		Maxi	Mini	Micro
2V		160	80	40
3.3V		264	132	75
5V		400	200	100
12V		400	200	100
15V		400	200	100
24V		400	200	100
28V		400	200	100
48V		400	200	100

300Vin Series		Output Power (Watts)		
Output Voltage (Vdc)		Maxi	Mini	Micro
2V		160	100	50
3.3V		264	150	75
5V		400	200	100
12V		500	250	150
15V		500	250	150
24V		500	250	150
28V		500	250	150
48V		500	250	150

48Vin Series		Output Power (Watts)		
Output Voltage (Vdc)		Maxi	Mini	Micro
2V		160	100	50
3.3V		264	150	75
5V		400	200	100
12V		500	250	150
15V		500	250	150
24V		500	250	150
28V		500	250	150
48V		500	250	150

375Vin Series		Output Power (Watts)		
Output Voltage (Vdc)		Maxi	Mini	Micro
2V		160	100	50
3.3V		264	150	75
5V		400	200	100
12V		600	300	150
15V		600	300	150
24V		600	300	150
28V		600	300	150
48V		600	300	150

Contact factory or see vicorpower.com for model number of units in red.

Product Highlights

Vicor's 2nd Generation DC-DC converters represent a quantum leap in the performance and flexibility of power components. With advanced power processing, control, and packaging technologies, power density has tripled while reducing the cost per Watt of processed power. A high level of silicon integration reduces parts count to less than a third of 1st Generation converters, increasing reliability.

Fully encapsulated, Vicor 2nd Generation modules utilize a proprietary spin fill process that assures complete, void free encapsulation making them suitable for the most harsh military environments. Two military grades (H & M) are available with temperatures to -55°C operating and -65°C storage. H & M-grade modules have been subjected to the environmental testing requirements of MIL-STD-810, MIL-S-901, and MIL-STD-202 and undergo 100% environmental stress screening.

General Specifications *(See vicorpower.com for model specific data sheets)*

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
Input Characteristics					
Undervoltage turn-on	24V	17.5	17.9	Vdc	
	48V	34.9	35.7	Vdc	
	300V	174.6	178.2	Vdc	
	375V	242.5	247.5	Vdc	
Undervoltage turn-off	24V	14.74	15.3	Vdc	
	48V	29.4	30.5	Vdc	
	300V	147.4	152.8	Vdc	
	375V	204.7	212.2	Vdc	
Overvoltage turn-off/on	24V	36.3	37.8	Vdc	
	48V	75.7	78.8	Vdc	
	300V	Not Included		Vdc	
	375V	429.2	446.3	467.5	Vdc
Output Characteristics					
Line regulation		±0.02	±0.20	%	Low line to high line; full load
Temperature regulation		±0.002	±0.005	%/°C	Over operating temperature range
Power sharing accuracy		±2	±5	%	10 to 100% of full load
Programming range	10		110	% Vnom	For trimming below 90% of nominal, a minimum load may be required.
Current limit		115		% Iout	Output voltage 95% of nominal
Short circuit current		115		% Iout	Output voltage < 250mV
Isolation Characteristics					
Isolation voltage (in to out)	3000			Vrms	Complies with reinforced insulation requirements
Isolation voltage (in to base)	1550			Vrms	Complies with basic insulation requirements
Isolation voltage (out to base)	500			Vrms	Complies with operational insulation requirements
Isolation resistance (in to out)		10		Megohms	
Thermal Characteristics					
Operating temperature (H-grade)	-40 to +100			°C	Baseplate
Storage temperature (H-grade)	-55 to +125			°C	
Operating temperature (M-grade)	-55 to +100			°C	Baseplate
Storage temperature (M-grade)	-65 to +125			°C	
Temperature limiting (typical)		115		°C	
Environmental Stress Screening					
See page 30 for details					

Control Functions - PC Pin

Module Enable/Disable. The module may be disabled by pulling PC below 2.3V with respect to the -Input. This may be done with an open collector transistor, relay, or optocoupler. Multiple converters may be disabled with a single transistor or relay either directly or via “OR’ing” diodes. See Figure 1.

Module Alarm. The module contains “watchdog” circuitry which monitors input voltage, operating temperature, and internal operating parameters. In the event that any of these parameters are outside of their allowable operating range, the module will shut down and PC will go low. PC will periodically go high and the module will check to see if the fault (as an example, overtemperature) has cleared. If the fault has not been cleared, PC will go low again and the cycle will restart. The SC pin will go low in the event of a fault and return to its normal state after the fault has been cleared. See Figures 2 and 3.

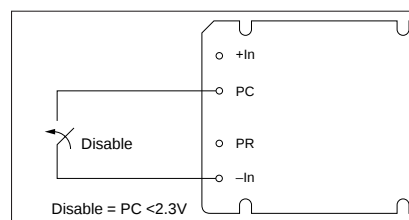


Figure 1 – Module enable/disable

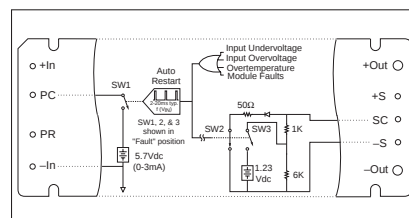


Figure 2 – PC/SC module alarm logic

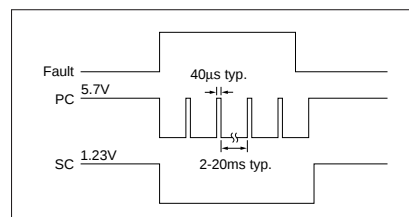


Figure 3 – PC/SC module alarm timing

Output Voltage Programming. The output voltage of the converter can be adjusted or programmed via fixed resistors, potentiometers, or voltage DACs. See Figures 4 and 5.

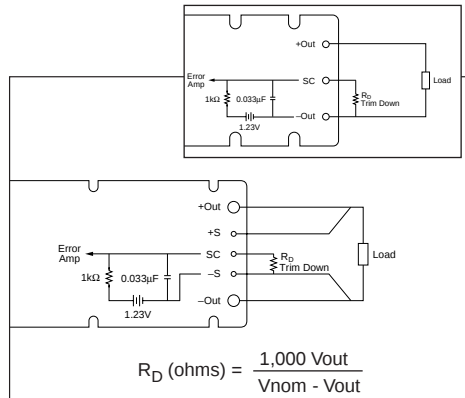


Figure 4 - Output voltage trim-down circuit (Micro inset)

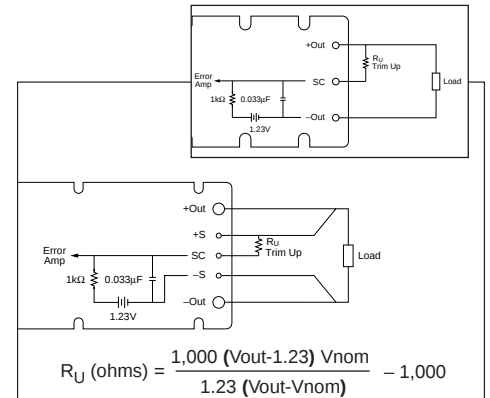


Figure 5 - Output voltage trim-up circuit (Micro inset)

Trim-Down.

1. This converter is not a constant power device – it has a constant current limit. Hence, available output power is reduced by the same percentage that output voltage is trimmed down. Do not exceed maximum rated output current.
2. The trim-down resistor must be connected to the -Sense pin (-Out pin on a micro).

Trim-Up.

1. The converter is rated for a maximum delivered power. To ensure that maximum rated power is not exceeded, reduce maximum output current by the same percentage increase in output voltage.
2. The trim-up resistor must be connected to the +Sense pin (+Out pin on a micro).
3. Do not trim the converter above maximum trim range (typically +10%) or the output overvoltage protection circuitry may be activated.

Control Functions - PR Pin

Note:

Please consult the appropriate Vicor Design Guide for additional information regarding the use of these products.

Parallel Operation.

The PR pin supports paralleling for increased power with N+1 (N+M) redundancy and phased array capability. Modules of the same input voltage, output voltage, and power level will current share if all PR pins are suitably interfaced.

Compatible interface architectures include:

DC coupled single-wire interface. All PR pins are directly connected to one

another. This interface supports current sharing but is not fault tolerant. Minus In pins must be tied to the same electric potential. See Figure 6.

AC coupled single-wire interface. All PR pins are connected to a single communication bus through 0.001μF (500V) capacitors. This interface supports current sharing and is fault tolerant except for the communication bus. See Figure 7.

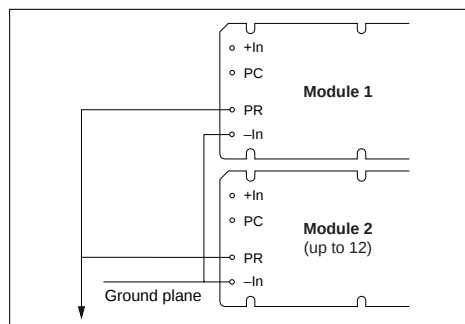


Figure 6 - DC coupled single-wire interface

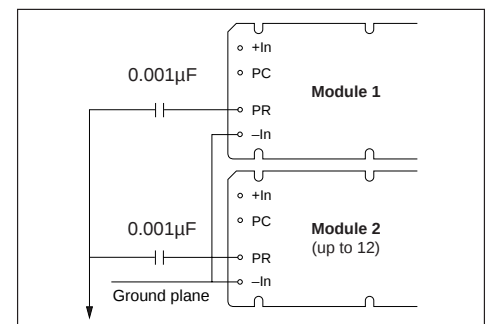
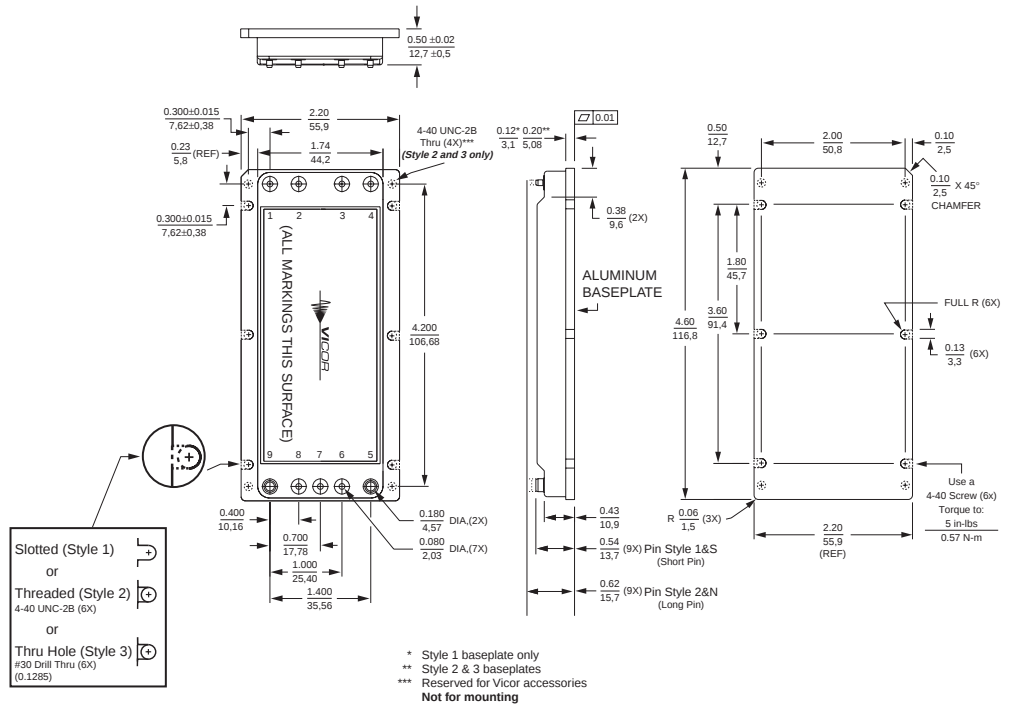


Figure 7 - AC coupled single-wire interface

Maxi

Converter Pins		
No.	Function	Label
1	+In	+
2	Primary Control	PC
3	Parallel	PR
4	-In	-
5	-Out	-
6	-Sense	-S
7	Secondary Control	SC
8	+Sense	+S
9	+Out	+

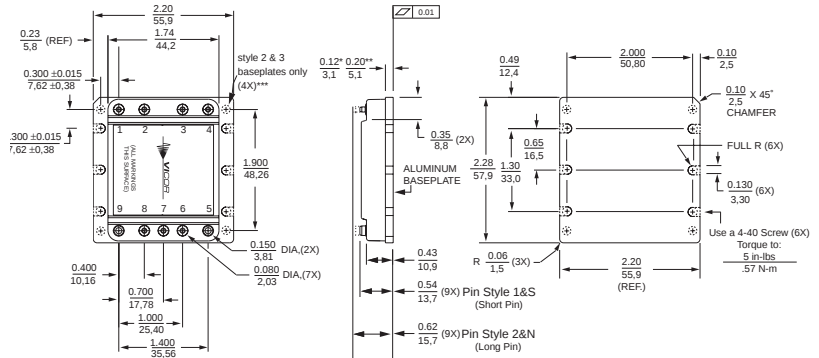
Pin Styles	
Tin/Lead Hot Solder Dip (Pin Style 1&2)	
Gold Plated Copper (Pin Style S&N)	



Mini

Converter Pins		
No.	Function	Label
1	+In	+
2	Primary Control	PC
3	Parallel	PR
4	-In	-
5	-Out	-
6	-Sense	-S
7	Secondary Control	SC
8	+Sense	+S
9	+Out	+

Pin Styles	
Tin/Lead Hot Solder Dip (Pin Style 1&2)	
Gold Plated Copper (Pin Style S&N)	



Micro

Converter Pins		
No.	Function	Label
1	+In	+
2	Primary Control	PC
3	Parallel	PR
4	-In	-
5	-Out	-
6	Secondary Control	SC
7	+Out	+

Pin Styles	
Tin/Lead Hot Solder Dip (Pin Style 1&2)	
Gold Plated Copper (Pin Style S&N)	

