VICOR

VI-ARM™
VI-ARMx1xx
VI-ARMBx2xx

Actual size:
2.28 x 1.45 x 0.5in
57,9 x 36,8 x 12,7mm

cⓊUs cTÜVus RoHS CE

Autoranging Rectifier Modules Up to 1500 Watts

Features & Benefits

- RoHS Compliant
  (with F or G pin option)
- Autoranging input
- Microprocessor controlled
- VI-ARM-C1:
  - 500W @ 90 – 132V_{AC}
    750W @ 180 – 264V_{AC}
- VI-ARMB-C2:
  - 750W @ 115V_{AC}
    1500W @ 230V_{AC}
- 96 – 98% efficiency
- 100°C baseplate (no derating)
- cULus, cTÜVus, CE Marked
- AC Bus OK, module enable
- Inrush limiting (no external circuitry)
- CE Marked

Typical Applications: systems requiring a rugged, full featured interface to the AC mains in the smallest possible package.

Product Highlights

The ARM (Autoranging Rectifier Module) is an AC front end module which provides autoranging line rectification and inrush current limiting. The ARM is available in either 500/750W or 750/1500W models in a quarter brick package measuring only 2.28" x 1.45" x 0.5".

The ARM interfaces directly with worldwide AC mains and may be used with Vicor 300V input DC-DC converters to realize an autoranging, high density, low profile switching power supply. The ARM includes a microcontroller that continuously monitors the AC line to control bridge/doubler operation. The user need only provide external capacitance to satisfy system hold-up requirements.

Vicor Micro series packaging technology offers flexible mounting options for various manufacturing processes. The ARM may be installed as a conventional leaded device for on-board applications, in-board for low profile, height restricted applications, socketed or surface mounted with optional ModuMate interconnect products.
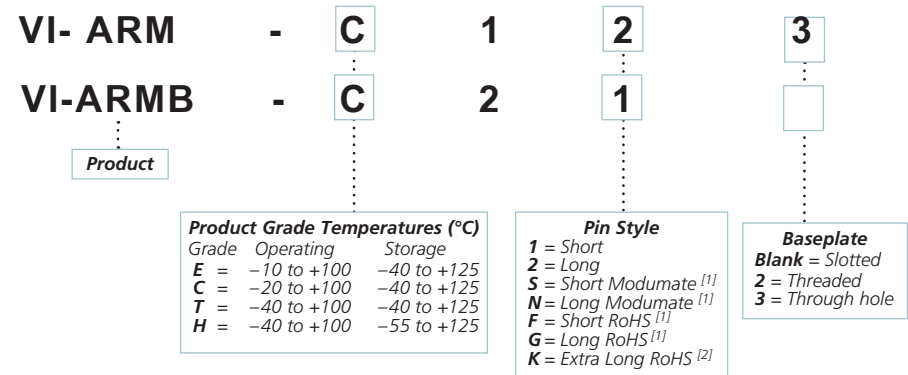
Absolute Maximum Ratings

Parameter	Rating	Unit	Notes
L to N	264	V_{AC}	
	280	V_{AC}	100ms
+OUT to –OUT	400	V_{DC}	
B OK to –OUT	16	V_{DC}	
EN to –OUT	16	V_{DC}	
Output power			
VI-ARM	500/750	Watts	115/230V
VI-ARMB	750/1500	Watts	115/230V See page 3 for derating
Mounting torque	4 – 6 (0.45 – 0.68)	in-lbs (N-m)	6 each, 4-40 screw
Operating temperature	–40 to +100	°C	H-Grade
Storage temperature	–55 to +125	°C	H-Grade
Pin soldering temperature	500 (260)	°F (°C)	<5sec; wave solder
	750 (390)	°F (°C)	<7sec; hand solder

Thermal Resistance Capacity

Parameter	Min	Typ	Max	Unit
Baseplate to sink				
flat, greased surface		0.24		°C/Watt
with thermal pad (P/N 16495)		0.3		°C/Watt
Baseplate to ambient				
free convection		15		°C/Watt
1000LFM		2.7		°C/Watt
Thermal capacity		48		Watt-sec/°C

Part Numbering

VI- ARM	-	C	1	2		3
VI-ARMB	-	C	2	1		

Product

Product Grade Temperatures (°C)

Grade	Operating	Storage
E	–10 to +100	–40 to +125
C	–20 to +100	–40 to +125
T	–40 to +100	–40 to +125
H	–40 to +100	–55 to +125

Pin Style
1 = Short
2 = Long
S = Short Modumate [1]
N = Long Modumate [1]
F = Short RoHS [1]
G = Long RoHS [1]
K = Extra Long RoHS [2]

Baseplate
Blank = Slotted
2 = Threaded
3 = Through hole

[1] Pin styles S, N, F & G are compatible with the ModuMate interconnect system for socketing and surface mounting
[2] Not intended for socket or Surfmate mounting

VI-ARM™
Page 1 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

VICOR

Electrical Characteristics

Electrical characteristics apply over the full operating range of input voltage, output load (resistive) and baseplate temperature, unless otherwise specified. All temperatures refer to the operating temperature at the center of the baseplate. Specifications apply for AC mains having up to 5% total harmonic distortion.

INPUT SPECIFICATIONS

Parameter	VI-ARM - 1			VI-ARMB - 2			Unit	Notes
	Min	Typ	Max	Min	Typ	Max		
Operating input voltage	90		132	90		132	V_{AC}	Autoranging (doubler mode)
	180		264	180		264	V_{AC}	Autoranging (bridge mode)
Input undervoltage			90			90	V_{AC}	No damage
Input surge withstand			280			280	V_{AC}	100ms
AC line frequency	47		63	47		63	Hz	C, E-Grade
	47		880	47		880	Hz	T & H-Grade
Input current, RMS	0		7.4	0		11.1	Amps	120V_{AC}
	0		5.4	0		7.2	Amps	240V_{AC}
Power factor		0.60			0.60			Dependent on line source impedence, holdup capacitance, and load
Inrush current			30			30	Amps	264V_{AC} peak line, cold start
Holdup Capacitance			1600			2400	µF	

OUTPUT SPECIFICATIONS

Parameter	VI-ARM - 1			VI-ARMB - 2			Unit	Notes
	Min	Typ	Max	Min	Typ	Max		
Output power	0		500	0		750	Watts	105 – 132V_{AC} (Fig. 1)
	0		750	0		1500	Watts	210 – 264V_{AC} (Fig. 2)
Efficiency								
120V_{AC}	94	96		94	96		%	
240 V_{AC}	96	98		96	98		%	
Output voltage	200		375	200		375	V_{DC}	90 – 264V_{AC}

CONTROL PIN SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
AC Bus OK (B OK)					
On-state resistance (low)			15	Ω	To negative output - bus normal
On-state current (low)			-50	mA	Bus normal
Off-state voltage	12	14	16	V_{DC}	Bus abnormal, 27kΩ internal pull up to 15V_{DC} (Fig. 12)
On-state threshold	235	240	245	V_{DC}	Output bus voltage
Off-state threshold	200	205	210	V_{DC}	Output bus voltage
Module Enable (EN)					
On-state resistance (low)			15	Ω	To negative output - converters are disabled
On-state current (low)			50	mA	
Off-state voltage	12	14	16	V_{DC}	150kΩ internal pull up to 15V_{DC} (Fig. 11)
On-state threshold	235	240	245	V_{DC}	Output bus voltage
Off-state threshold	185	190	195	V_{DC}	Output bus voltage
Over voltage shutdown	380	390	400	V_{DC}	
AC Bus OK - module enable, differential error*	12	14	16	V_{DC}	AC Bus OK and module enable thresholds track

* Tracking error between BUS OK and Enable thresholds

VI-ARM™
Page 2 of 11
Rev 4.9
06/2017
vicorpower.com
800 927.9474

Electrical Characteristics (Cont.)

SAFETY SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
Isolation voltage (IN to OUT)		None			Isolation provided by DC-DC converter(s)
Dielectric withstand (I/O to baseplate)	1,500			V_{RMS}	
Leakage current			100	µA	No filter

AGENCY APPROVALS

Safety Standards	Agency Markings	Notes
ARM1 xxx UL60950, EN60950, CSA 60950	cTÜVus	Baseplate earthed, fast acting line fuse, Bussman ABC10
	CE Marked	Low voltage directive
ARM2 xxx UL60950, EN60950, CSA 60950	cTÜVus	Baseplate earthed, fast acting line fuse, Bussman ABC15
	CE Marked	Low voltage directive

GENERAL SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Notes
MTBF		>1,000,000		hours	25˚C, ground benign
Baseplate material					Aluminum
Cover					Kapton insulated aluminum, plastic molded terminal blocks
Pin material					Copper, tin/lead solder dipped (solder pins) Gold plated nickel copper (Modumate and RoHS)
Weight		1.6 (45)		ounces (grams)	
Size		2.28 x 1.45 x 0.5 (57,9 x 36,8 x 12,7)		inches (mm)	

VI-ARMB DERATING
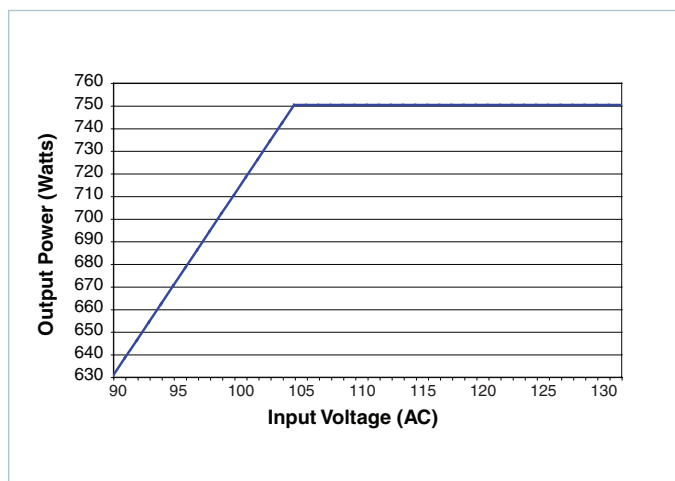
Figure 1 — 90 – 130V_{AC} ARMB output power rating
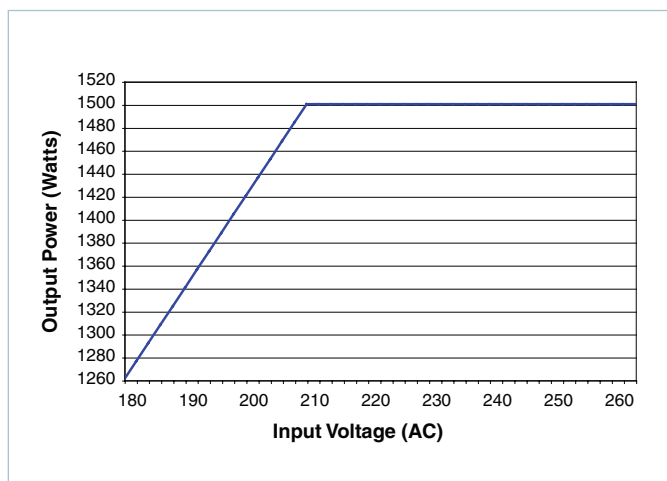
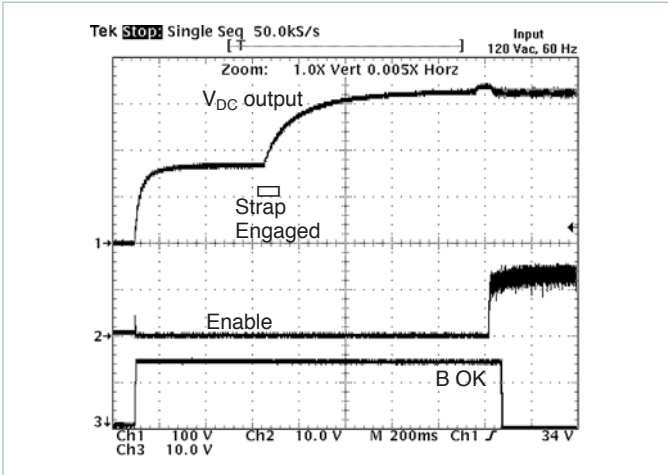*Figure 2 — 180 – 260V_{AC} ARMB output power rating*

VI-ARM™
Page 3 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

VICOR

Operating Characteristics

Figure 3 — *Start up at 120V$_{AC}$ input*
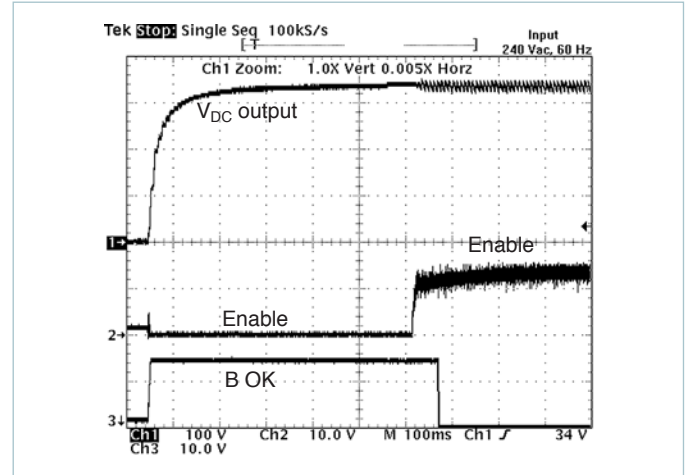
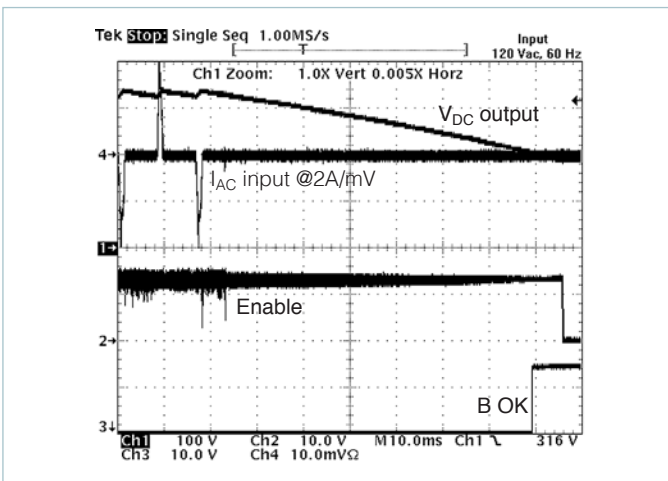**Figure 4** — *Start up at 240V$_{AC}$ input*

Figure 5 — *Power down, from 120V$_{AC}$*
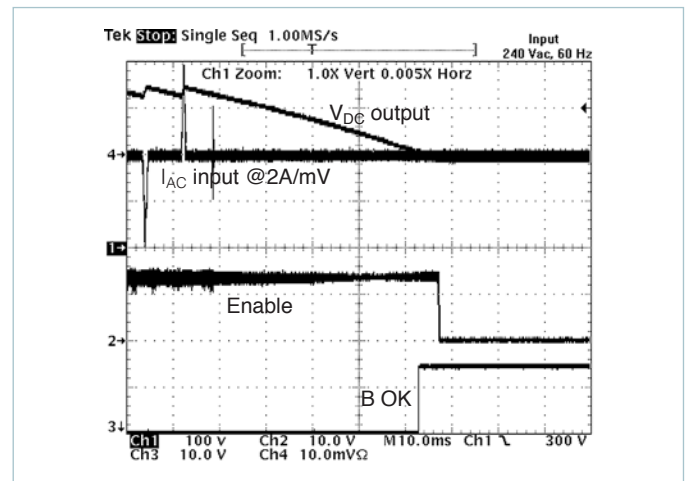
Figure 6 — *Power down, from 240V$_{AC}$*
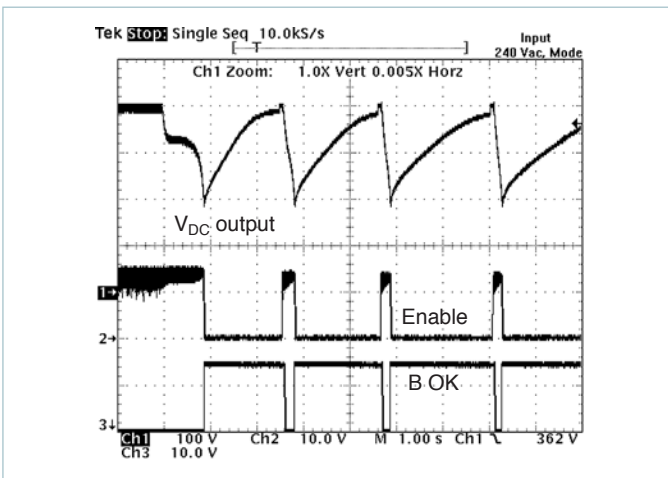
Figure 7 — *Output overvoltage protection 240V$_{AC}$ range*

VI-ARM™
Page 4 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

Application Note

The VI-ARM Autoranging Rectifier Module (ARM) provides an effective solution for the AC front end of a power supply designed with Vicor DC-DC converters. This high performance power system building block satisfies a broad spectrum of requirements and agency standards.

The ARM contains all of the power switching and control circuitry necessary for autoranging rectification, inrush current limiting, and overvoltage protection. This module also provides converter enable and status functions for orderly power up/down control or sequencing. To complete the AC front-end configuration, the user needs only to add holdup capacitors and a suitable input filter with transient protection.

Functional Description

Initial Conditions: The switch that bypasses the inrush limiting PTC (positive temperature coefficient) thermistor is open when power is applied, as is the switch that engages the strap for voltage doubling. (See Figure 8). In addition, the downstream DC-DC modules are disabled via the Enable (EN) line, and Bus-OK (B OK) is high.

Power-Up Sequence (See Figure 9):

1.1. Upon application of input power, the output bus capacitors begin to charge. The thermistor limits the charge current, and the exponential time constant is determined by the holdup capacitor value and the thermistor cold resistance. The slope (dV/dt) of the capacitor voltage approaches zero as the capacitors become charged to the peak of the AC line voltage.
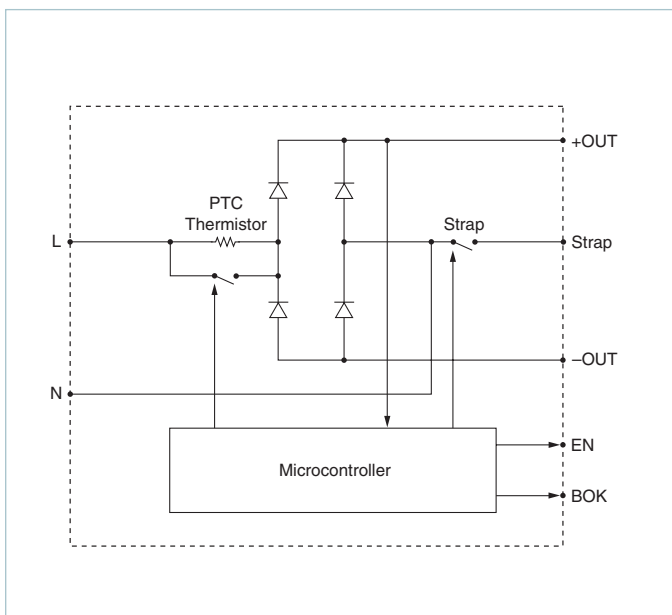
2.1. If the bus voltage is less than 200V as the slope nears zero, the voltage doubler is activated, and the bus voltage climbs exponentially to twice the peak line voltage.
If the bus voltage is greater than 200V, the doubler is not activated.

3.1. If the bus voltage is greater than 235V as the slope approaches zero, the inrush limiting thermistor is bypassed. Below 235V, the thermistor is not bypassed.

4.1. The converters are enabled ~150 milliseconds after the thermistor bypass switch is closed.

5.1. Bus-OK is asserted after an additional ~150 millisecond delay to allow the converter outputs to settle within specification.

Power-Down Sequence: (See Figure 9). When input power is turned off or fails, the following sequence occurs as the bus voltage decays:

1.2. Bus-OK is deasserted when the bus voltage falls below $205V_{DC}$ (Typ).

2.2. The converters are disabled when the bus voltage falls below $200V_{DC}$. If power is reapplied after the converters are disabled, the entire power-up sequence is repeated. If a momentary power interruption occurs and power is reestablished before the bus reaches the disable threshold, the power-up sequence is not repeated.
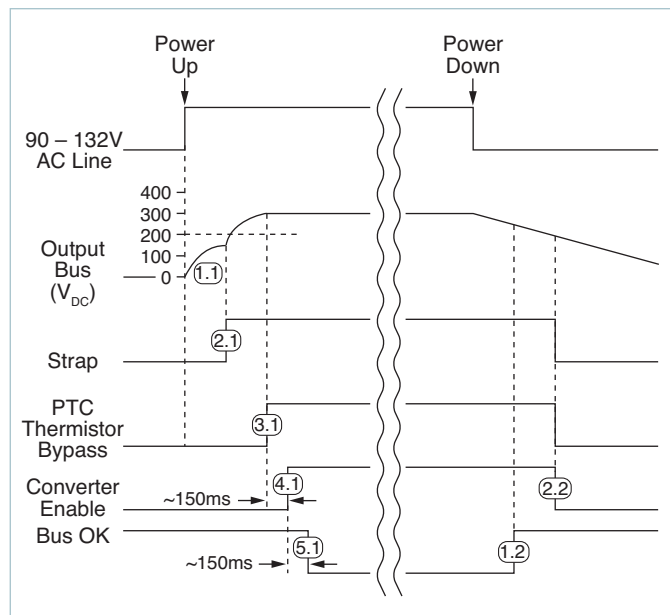

Figure 8 — Functional block diagram

Figure 9 — Timing diagram: power up/down sequence

VI-ARM™
Page 5 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

Application Notfe (Cont.)

Off-Line Power Supply Configuration

The ARM maintains the DC output bus voltage between 200 and $375V_{DC}$ over the entire universal input range, this being compatible with Vicor VI-260 series and VI-J60 series DC-DC converters, as well as Vicors Maxi, Mini, Micro 300V input Vicor converters. The ARM automatically switches to the proper rectification mode (doubled or undoubled) depending on the input voltage, eliminating the possibility of damage due to improper line connection. The VI-ARM-x1 is rated at 500W in the low range (90-$132V_{AC}$ input), and 750W in the high range ($180 – 264V_{AC}$ input). The VI-ARMB-x2 is rated for 750W and 1500W for the low and high input ranges respectively. Either of these modules can serve as the AC front end for any number and combination of compatible converters as long as the maximum power rating is not exceeded. See VI-ARMB derating curves. (Figures 1, and 2)

Strap (ST) Pin: In addition to input and output power pin connections, it is necessary to connect the Strap pin to the junction of the series holdup capacitors (C1, C2, Figure 10) for proper (autoranging) operation. Varistors across the capacitors provide input transient protection. The bleeder resistors (R1, R2, Figure 10) discharge the holdup capacitors when power is switched off.

Enable (EN) Pin: (See Figure 11) The Enable pin must be connected to the Gate-In or PC pin of all converter modules to disable the converters during power-up. Otherwise, the converters would attempt to start while the holdup capacitors were being charged through an un-bypassed thermistor, preventing the bus voltage from reaching the thermistor bypass threshold thus disabling the power supply. The Enable output (the drain of an N channel MOSFET) is internally pulled up to 15V through a $150k\Omega$ resistor.

A signal diode should be placed close to and in series with the PC/Gate-In pin of each converter to eliminate the possibility of control interference between converters. The Enable pin switches to the high state (15V) with respect to the negative output power pin to turn on the converters after the power-up inrush is over. The Enable function also provides input overvoltage protection for the converters by turning off the converters if the DC bus voltage exceeds $400V_{DC}$. The thermistor bypass switch opens if this condition occurs, placing the thermistor in series with the input voltage, which reduces the bus voltage to a safe level while limiting input current in case the varistors conduct. The thermistor bypass switch also opens if a fault or overload reduces the bus voltage to less than $180V_{DC}$.

CAUTION: There is no input to output isolation in the ARM, hence the –OUT of the ARM and thus the –In of the downstream DC-DC converter(s) are at a high potential. If it is necessary to provide an external enable/disable function by controlling the DC-DC converter's PC pin (referenced to the –IN) of the converter an opto-isolator or isolated relay should be employed.
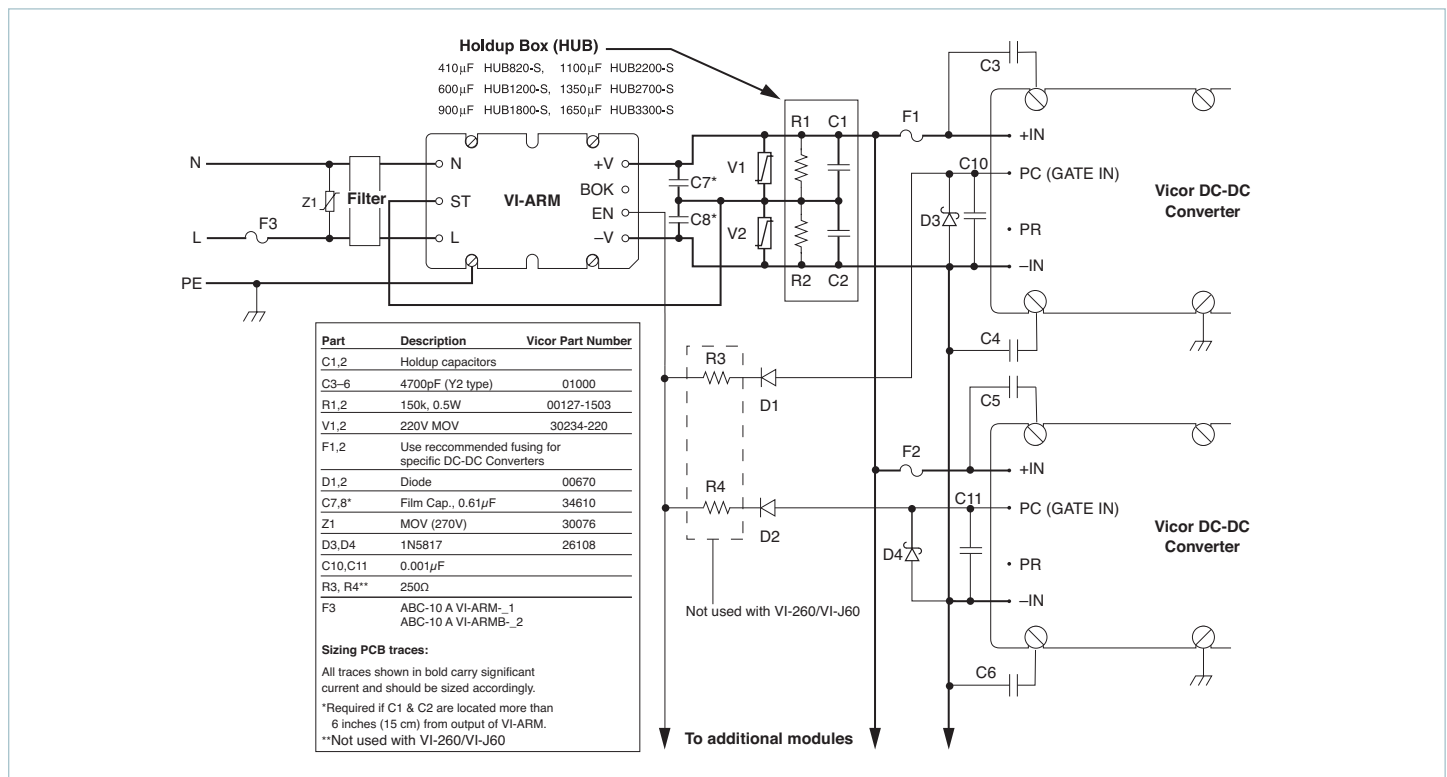

Figure 10 — Converter connections

VI-ARM™
Page 6 of 11

Rev 4.9
06/2017

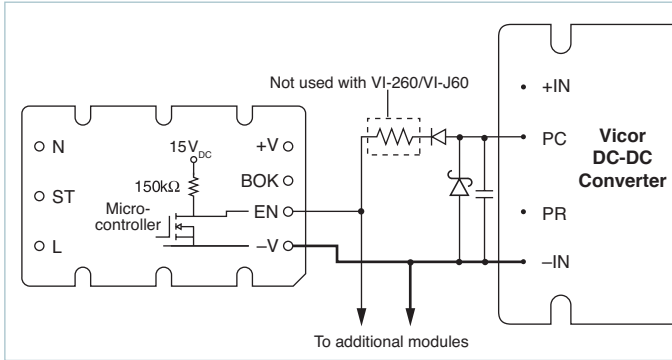vicorpower.com
800 927.9474

Application Note (Cont.)

Figure 11 — Enable (EN) function; See Fig. 8 for details
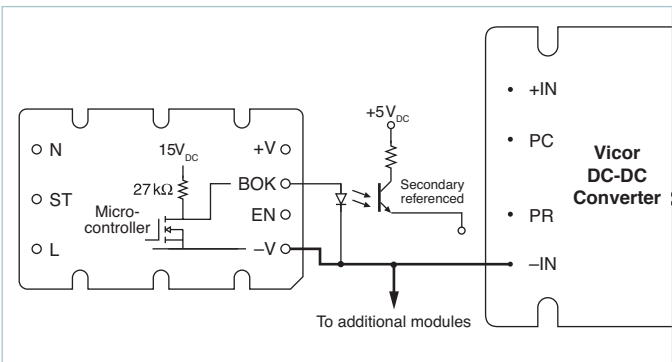
Figure 12 — Bus OK (B OK) isolated power status indicator

Low power filter connections

Part	Description	Vicor Part Number
C1	1.0µF	02573
C2, C3	4700pF (Y2 type)	03285
C4	0.15µF	03269
F1	10A Max	05147
L1, L2	27µH	32012
L3	2.2mH	32006
R1, R2	10Ω	
R3	150kΩ, 0.5W	
R4	2.2Ω	
Z1	MOV	30076

High power filter connections

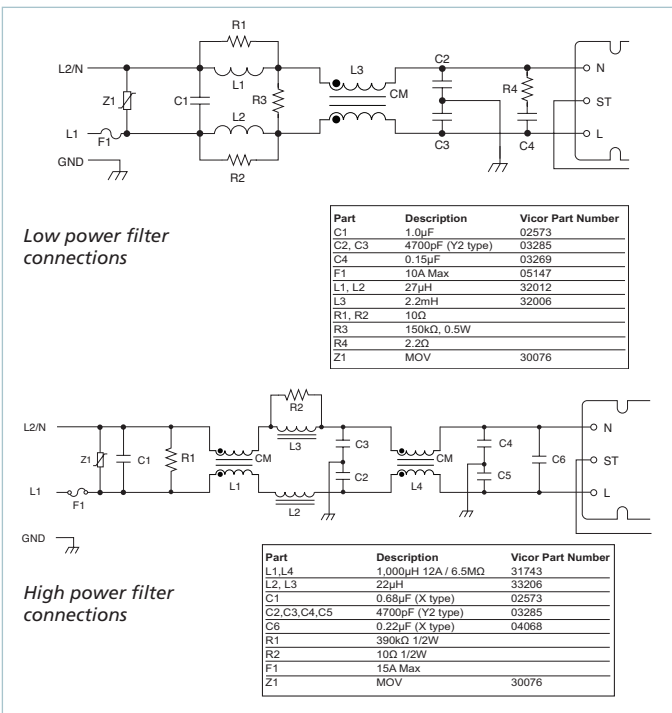| Part	Description	Vicor Part Number
L1,L4	1,000µH 12A / 6.5MΩ	31743
L2, L3	22µH	33206
C1	0.68µF (X type)	02573
C2,C3,C4,C5	4700pF (Y2 type)	03285
C6	0.22µF (X type)	04068
R1	390kΩ 1/2W	
R2	10Ω 1/2W	
F1	15A Max	
Z1	MOV	30076

Figure 13 — Filter connections

Bus-OK (B OK) Pin: (See Figure 12) The Bus-OK pin is intended to provide early-warning power fail information and is also referenced to the negative output pin.

Caution: There is no input-to-output isolation in the ARM. It is necessary to monitor Bus-OK via an optoisolator if it is to be used on the secondary (output) side of the converters. A line isolation transformer should be used when performing scope measurements. Scope probes should never be applied simultaneously to the input and output as this will destroy the module.

Filter: Two input filter recommendations are shown for low power VI-ARM-x1 and high power VI-ARMB-x2 (See Figure 13). Both filter configurations provide sufficient common mode and differential mode insertion loss in the frequency range between 100kHz and 30MHz to comply with the Level B conducted emissions limit.

Hold-up Capacitors: Hold-up capacitor values should be determined according to output bus voltage ripple, power fail hold-up time, and ride-through time. (See Figure 14). Many applications require the power supply to maintain output regulation during a momentary power failure of specified duration, i.e., the converters must hold-up or ride-through such an event while maintaining undisturbed output voltage regulation. Similarly, many of these same systems require notification of an impending power failure in order to allow time to perform an orderly shutdown.

The energy stored on a capacitor which has been charged to voltage V is:

$$\varepsilon = 1/2(CV^2) \qquad (1)$$

Where: ε = stored energy
C = capacitance
V = voltage across the capacitor

Energy is given up by the capacitors as they are discharged by the converters. The energy expended (the power-time product) is:

$$\varepsilon = P\Delta t = C(V_1^2 - V_2^2) / 2 \qquad (2)$$

Where: P = operating power
Δt = discharge interval
V_1 = capacitor voltage at the beginning of Δt
V_2 = capacitor voltage at the end of Δt

Rearranging Equation 2 to solve for the required capacitance:

$$C = 2P\Delta t / (V_1^2 - V_2^2) \qquad (3)$$

VI-ARM™
Page 7 of 11

Rev 4.9
06/2017

vicorpower.com
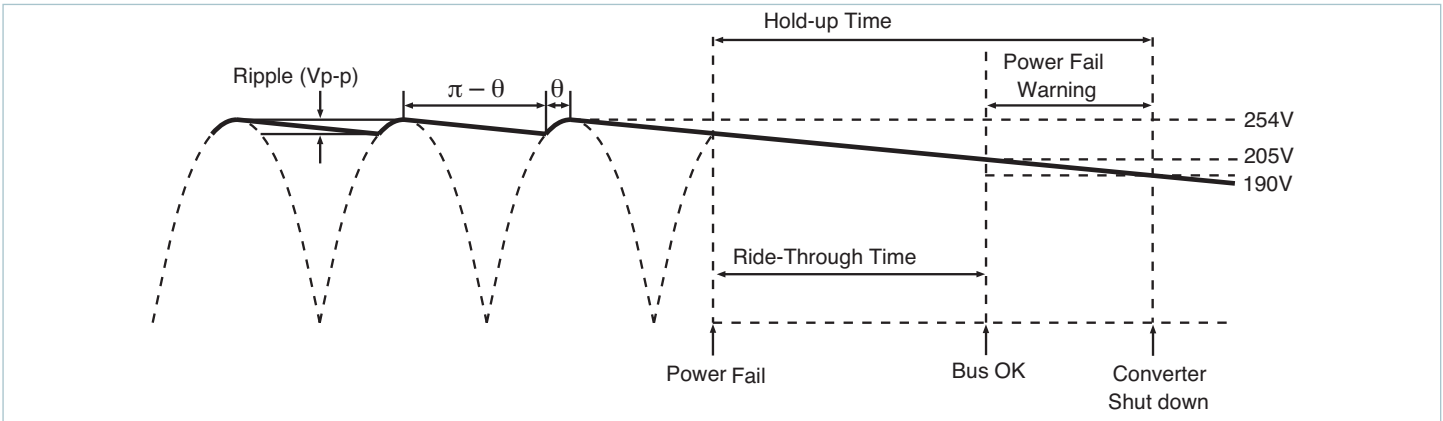800 927.9474

Application Note (Cont.)

Figure 14 — Hold-up time

The power fail warning time (Δt) is defined as the interval between (B OK) and converter shutdown (EN) as illustrated in Figure 12. The Bus-OK and Enable thresholds are 205V and 190V, respectively. A simplified relationship between power fail warning time, operating power, and bus capacitance is obtained by inserting these constants:

$$C = 2P\Delta t / (205^2 - 190^2)$$

$$C = 2P\Delta t / (5,925)$$

It should be noted that the series combination (C1, C2, Figure 10) requires each capacitor to be twice the calculated value, but the required voltage rating is reduced to 200V.

Allowable ripple voltage on the bus (or ripple current in the capacitors) may define the capacitance requirement. Consideration should be given to converter ripple rejection and resulting output ripple voltage.

For example, a converter whose output is 15V and nominal input is 300V will provide 56dB ripple rejection, i.e., 10Vp-p of input ripple will produce 15mVp-p of output ripple. (See Figure 18) Equation 3 is again used to determine the required capacitance. In this case, V1 and V2 are the instantaneous values of bus voltage at the peaks and valleys (see Figure 14) of the ripple, respectively. The capacitors must hold up the bus voltage for the time interval (Δt) between peaks of the rectified line as given by:

$$\Delta t = (\pi - \theta) / 2\pi f \qquad (4)$$

$$Where: \quad f = line\ frequency$$
$$\theta = rectifier\ conduction\ angle$$

The approximate conduction angle is given by:
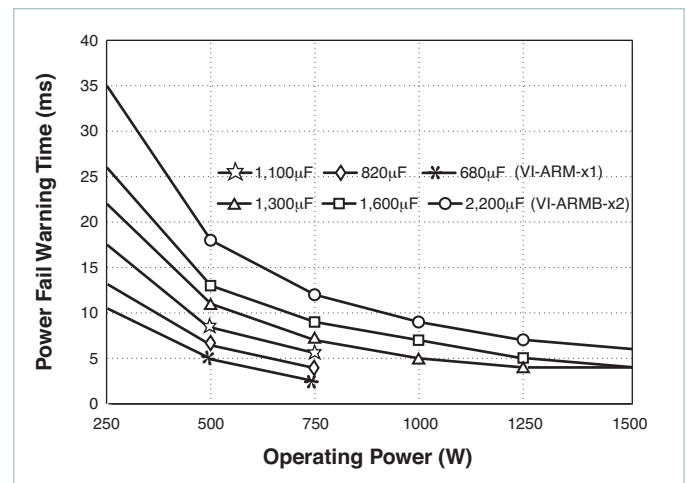
$$\theta = Cos^{-1}V_2/V_1 \qquad (5)$$

Figure 15 — Power fail warning time vs. operating power and total bus capacitance, series combination of C1, C2 (see Figure 10)
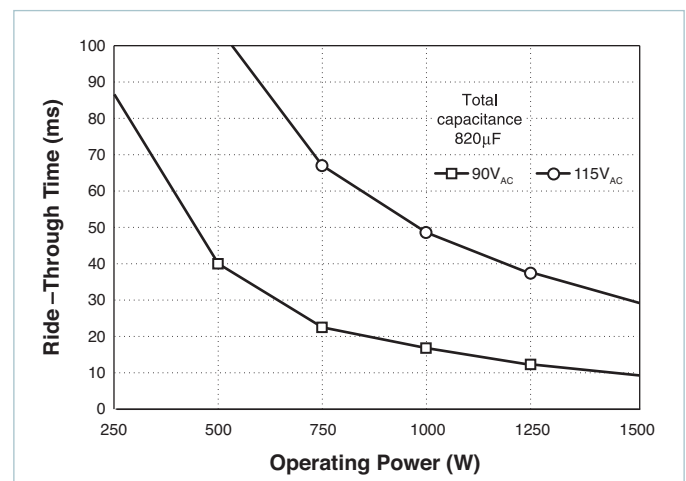

Figure 16 — Ride-through time vs. operating power

VI-ARM™
Page 8 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474
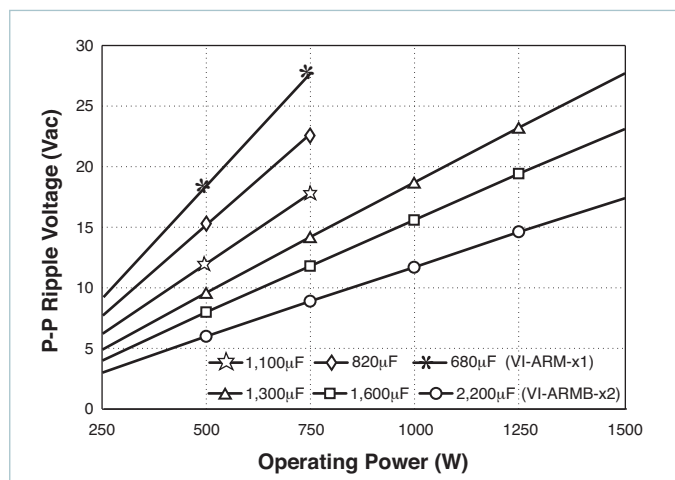
VICOR

Application Note (Cont.)

Figure 17 — Ripple voltage vs. operating power and bus capacitance, series combination of C1, C2 (see Figure 10)
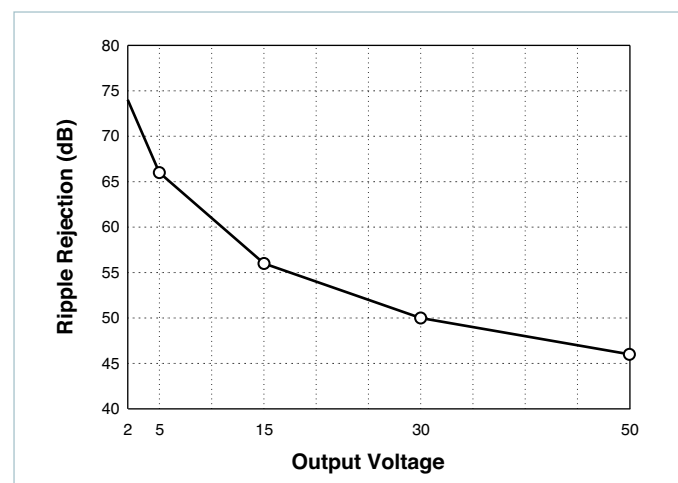

Figure 18 — Converter ripple rejection vs. output voltage (typical)

Another consideration in hold-up capacitor selection is their ripple current rating. The capacitors' rating must be higher than the maximum operating ripple current. The approximate operating ripple current (RMS) is given by:

$$I_{RMS} = 2P/V_{AC} \qquad (6)$$

Where: P = operating power level
V_{AC} = operating line voltage

Calculated values of bus capacitance for various hold-up time, ride-through time, and ripple voltage requirements are given as a function of operating power level in Figures 15, 16, and 17, respectively.

Example

In this example, the output required at the point of load is 12V_{DC} at 320W. Therefore, the output power from the ARM would be 375W (assuming a converter efficiency of 85%). The desired hold-up time is 9ms over an input range of 90 to 264V_{AC}.

Determining Required Capacitance for Power Fail Warning:
Figure 15 is used to determine hold-up capacitance for a given power fail warning time and power level, and shows that the total bus capacitance must be at least 820µF. Since two capacitors are used in series, each capacitor must be at least 1,640µF.

Note: The warning time is not dependent on line voltage. A hold-up capacitor calculator is available on the Vicor website, at vicorpower.com/hubcalc.

Determining Ride-through Time: Figure 16 illustrates ride-through time as a function of line voltage and output power, and shows that at a nominal line of 115V_{AC}, ride-through would be 68ms. Ride-through time is a function of line voltage.

Determining Ripple Voltage on the Hold-up Capacitors:
Figure 17 is used to determine ripple voltage as a function of operating power and bus capacitance, and shows that the ripple voltage across the hold-up capacitors will be 12V_{AC}.

Determining the Ripple on the Output of the DC-DC Converter: Figure 18 is used to determine the ripple rejection of the DC-DC converter and indicates a ripple rejection of approximately 60dB for a 12 Volt output. If the ripple on the bus voltage is 12V_{AC} and the ripple rejection of the converter is 60dB, the output ripple of the converter due to ripple on its input (primarily 120Hz) will be 12mVp-p.

Note: Maxi, Mini, Micro converters have greater ripple rejection then either VI-200s or VI-J00s.

For more information about designing an autoranging AC input power supply using the ARM and Vicor DC-DC converter modules, contact Vicor Applications Engineering at the nearest Vicor Technical Support Center (see back cover), or send an E-mail to: apps@vicorpower.com.

Storage

Vicor products, when not installed in customer units, should be stored in ESD safe packaging in accordance with ANSI/ESD S20.20, "Protection of Electrical and Electronic Parts, Assemblies and Equipment" and should be maintained in a temperature controlled factory/ warehouse environment not exposed to outside elements controlled between the temperature ranges of 15°C and 38°C. Humidity shall not be condensing, no minimum humidity when stored in an ESD compliant package.

VI-ARM™
Page 9 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

VICOR

Mechanical Drawings

Converter Pins		
No.	**Function**	**Label**
1	–OUT	–V
2	Enable	EN
3	Bus OK	B OK
4	+OUT	+V
5	Neutral	N
6	Strap	ST
7	Line	L

NOTES:
1. MATERIAL:
   BASE: 6000 SERIES ALUMINUM
   COVER: LCP, ALUMINUM 3003 H14
   PINS: RoHS PINS GOLD PLATE 30 MICRO INCH MIN; NON-RoHS
   PINS: TIN/LEAD 90/10 BRIGHT
2. DIMENSIONS AND VALUES IN BRACKETS ARE METRIC
3. MANUFACTURING CONTROL IS IN PLACE TO ENSURE THAT THE SPACING
   BETWEEN THE MODULES LABEL SURFACE TO THE PRINTED CIRCUIT BOARD
   OF THE APPLICATION RANGES FROM DIRECT CONTACT (ZERO), TO THE
   MAXIMUM GAP AS CALCULATED FROM THE TOLERANCE STACK-UP
   AND IS NOT SUBJECT NEGATIVE TOLERANCE ACCUMULATION

SLOTTED BASEPLATE

DIMENSIONS FOR ALL MODULE TYPES
ARE SHOWN ABOVE; VERSIONS AT RIGHT
SHOW DIMENSIONS THAT VARY

DETAIL 1
2:1

DIMENSION T	
SLOTTED-----------	.12 [3.1]
THRU & THREADED-	.20 [5.1]

DIMENSION L	
PIN SHORT - .55±.015 [14.0±.38]	
PIN LONG-- .63±.015 [16.0±.38]	
PIN EXTRA LONG---- .71±.015 [18.0±.38]	

4X- ONE IN EACH CORNER
(RESERVED FOR VICOR
ACCESSORIES)

6X #30 DRILL
THRU (.1285 DIA)

6X #4-40 UNC-2B
TAP THRU

THRU HOLE
BASEPLATE

THREADED
BASEPLATE

Module Outline

PCB THICKNESS   0.062 ±0.010 / 1,57 ±0,25

PLATED
THRU HOLE
DIA

INBOARD SOLDER MOUNT

SHORT PIN STYLE
0.094 ±0.003 / 2,39 ±0,08

ONBOARD SOLDER MOUNT

LONG PIN STYLE
0.094 ±0.003 / 2,39 ±0,08

*DENOTES TOL = ±0.003 / ±0,08

**PCB WINDOW

ALL MARKINGS
THIS SURFACE

ALUMINUM
BASEPLATE

PINS STYLES
SOLDER:TIN/LEAD PLATED
MODUMATE: GOLD PLATED COPPER
RoHS: GOLD PLATED COPPER

Unless otherwise specified, dimensions are in inches mm		
Decimals	**Tol.**	**Angles**
0.XX	±0.01	
	±0,25	±1°
0.XXX	±0.005	
	±0,127	

PCB Mounting Specifications

VI-ARM™
Page 10 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

Vicor's comprehensive line of power solutions includes high density AC-DC and DC-DC modules and accessory components, fully configurable AC-DC and DC-DC power supplies, and complete custom power systems.

Information furnished by Vicor is believed to be accurate and reliable. However, no responsibility is assumed by Vicor for its use. Vicor makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication. Vicor reserves the right to make changes to any products, specifications, and product descriptions at any time without notice. Information published by Vicor has been checked and is believed to be accurate at the time it was printed; however, Vicor assumes no responsibility for inaccuracies. Testing and other quality controls are used to the extent Vicor deems necessary to support Vicor's product warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Specifications are subject to change without notice.

Visit http://www.vicorpower.com/arm for the latest product information.

Vicor's Standard Terms and Conditions and Product Warranty

All sales are subject to Vicor's Standard Terms and Conditions of Sale, and Product Warranty which are available on Vicor's webpage (http://www.vicorpower.com/termsconditionswarranty) or upon request.

Life Support Policy

VICOR'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF VICOR CORPORATION. As used herein, life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness. Per Vicor Terms and Conditions of Sale, the user of Vicor products and components in life support applications assumes all risks of such use and indemnifies Vicor against all liability and damages.

Intellectual Property Notice

Vicor and its subsidiaries own Intellectual Property (including issued U.S. and Foreign Patents and pending patent applications) relating to the products described in this data sheet. No license, whether express, implied, or arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Interested parties should contact Vicor's Intellectual Property Department.

Vicor Corporation
25 Frontage Road
Andover, MA, USA 01810
Tel: 800-735-6200
Fax: 978-475-6715

email
Customer Service: custserv@vicorpower.com
Technical Support: apps@vicorpower.com

VI-ARM™
Page 11 of 11

Rev 4.9
06/2017

vicorpower.com
800 927.9474

VICOR