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Ripple Attenuator Modules

VI-RAM™/VE-RAM™



Ripple Attenuator Modules

Features & Benefits

- RoHS compliant (VE versions)
- Reduces output ripple to <3mVp-p
- Compatible with any VI-200/VI-J00 based product: 5 to 50V_{DC} output
- Full attenuation up to 20A
- No adjustments required
- 93 – 99% efficiency
- Converter sense, trim, overvoltage and overcurrent retained
- Size: 2.28" x 2.4" x 0.5" (57,9 x 61,0 x 12,7 mm)
- CE Mark

Product Highlights

Ripple attenuator modules may be connected to VI-200 or VI-J00 converters, FlatPACs, ComPACs or MegaModules, with output voltages from 5 – 50V, to limit output noise to less than 3mV peak-to-peak at loads up to 20A. Combining active and passive filtering, the VI-RAM attenuates both low frequency input power source fundamental and harmonics, as well as high frequency switching components in the frequency range of DC to 20MHz, while exhibiting efficiencies of 93-99%. No adjustments are required, and remote sense and output voltage trim features are retained.

A member of Vicor's high-power density, high performance, component-level power building blocks, the VI-RAM offers the power systems architect a single, flexible, component-level solution to almost any "clean power" problem. At the same time, the VI-RAM eliminates the space, efficiency, and weight penalties associated with linear power sources, and the stability, efficiency, and adjustment penalties associated with external "add on" filters for conventional switchers.

VI-RAM Specifications

Parameter	Min.	Typ.	Max.	Remarks
Output Noise & Ripple				
VI-200			3mVp-p	From 10% of full rated output current of the source converter to full load
VI-J00			10mVp-p	
Input Voltage Range	5V_{DC}		50V_{DC}	
Output Voltage Deviation		0.5%		From the output voltage of the VI-200 source to which the VI-RAM will be connected
Full Load Current			10A	E1, C1, I1 or M1
			20A	E2, C2, I2 or M2
Overload Current			30A	At max. operating baseplate temperature
DC Voltage Drop	0.34V_{DC}		0.41V_{DC}	Up to 10A
	0.34V_{DC}		0.44V_{DC}	Up to 20A
	0.34V_{DC}		0.75V_{DC}	Up to 30A (overload)
Dissipation = (DC voltage drop) x (Load current + 15mA)				
Isolation		500V_{RMS}		Input/Output to baseplate
Size		2.28" x 2.4" x 0.5" (57,9 x 61,0 x 12,7)		SlimMod and FinMod packages available
Weight				
E,C-Grade		3.0(85)		Ounces(Grams)
I,M-Grade	3.6(102)	3.7(105)	3.8(107)	

Electrical Considerations

Transient Response and Dynamic Range: Full rated noise attenuation will be maintained at the VI-RAM output for step load changes up to 10% of the rated output current of the source converter, with the VI-RAM exhibiting an underdamped output excursion of less than 10mVp-p. Some degradation in noise attenuation during the transient response period following the step may be exhibited for larger load changes. Adding output capacitance to the VI-RAM will improve the rejection over a larger dynamic range.

Sense Connection: Sense -IN and Sense -OUT connections are provided on the VI-RAM. Sense -IN connections must be connected to the corresponding sense connections on the Vicor converter. Sense -OUT pins on the VI-RAM must be connected between the VI-RAM power-output pins and the point of load.

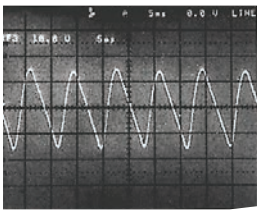
Output Load Characteristics: When used in combination with Vicor DC-DC converters, and with sense leads connected, the VI-RAM will be stable for any non-inductive load.

DC Voltage Drop: Below full load, the input to output DC Voltage Drop is controlled to be an essentially constant voltage which appears between the –IN and –OUT terminals. In overload the DC voltage drop will rise as current increases. A few tens of millivolts appears between the +IN and +OUT terminals. Care should be taken not to connect IN and OUT terminals (i.e. through scope probe returns, grounds, etc.), as attenuation will be adversely affected.

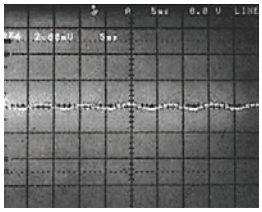
Product Grade Specifications

Parameter (Up to 10A) (Up to 20A)	VI-RAM-E1 VI-RAM-E2	VI-RAM-C1 VI-RAM-C2	VI-RAM-I1 VI-RAM-I2	VI-RAM-M1 VI-RAM-M2
Storage Temp.	-20°C to +105°C	-40°C to +105°C	-55°C to +105°C	-65°C to +105°C
Operating Temp. (Baseplate)	-10°C to +100°	-25°C to +100°C	-40°C to +100°C	-55°C to +100°C

Comparison of Input to Output Ripple (Typical)

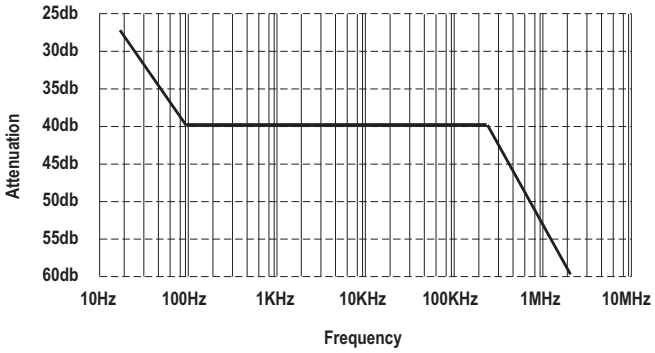


Input to the converter 10V/cm

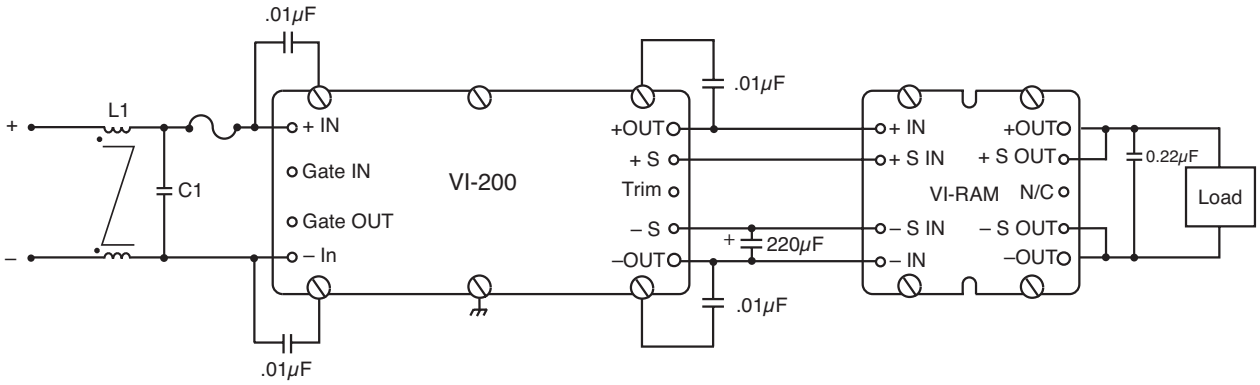


Output from the RAM 20mV/cm

Attenuation vs. Frequency (Typical)



Recommended Connection Diagram

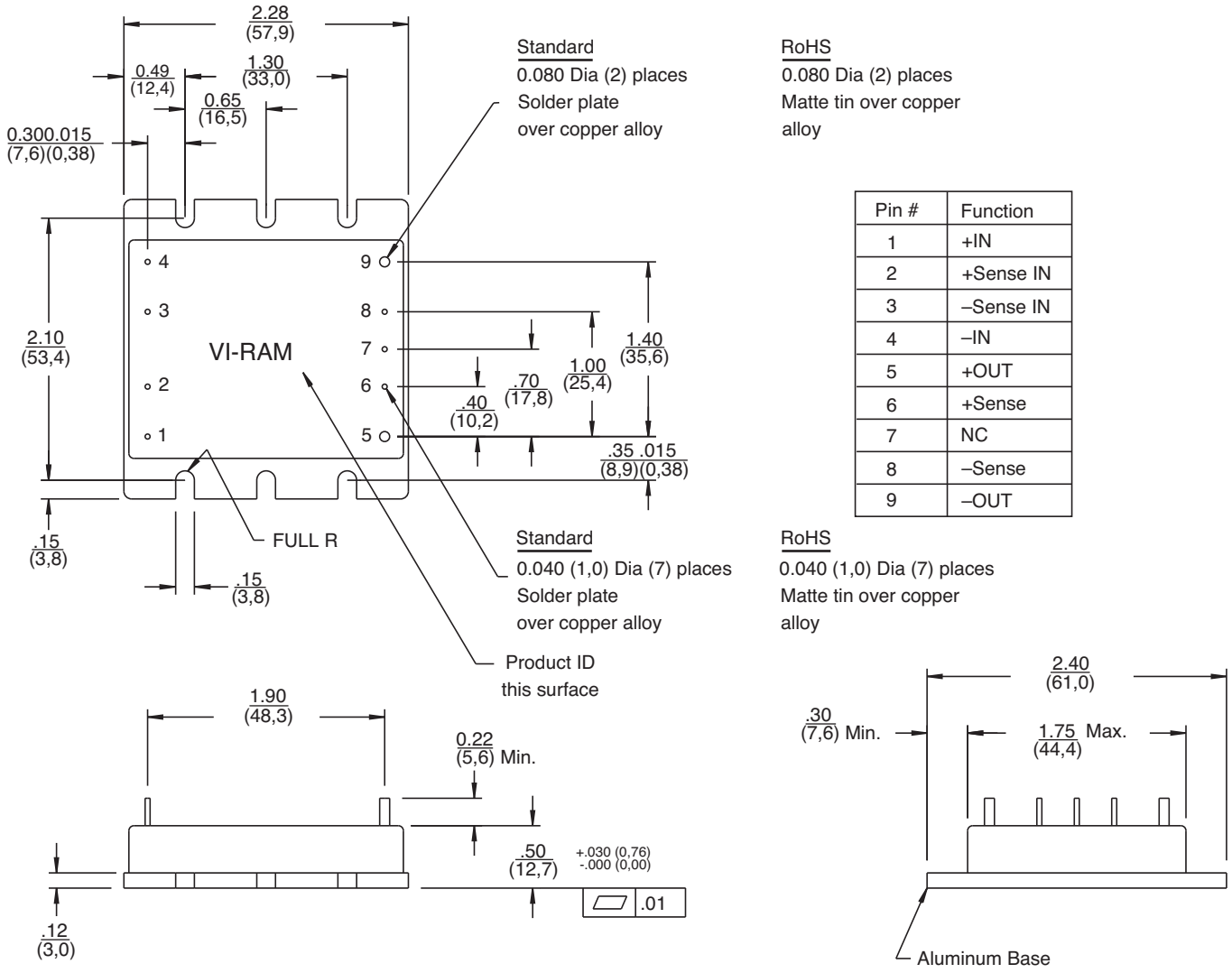


For important application information please refer to the Design Guide and Applications Manual for VI-200 and VI-J00 Family.

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.

Mechanical Drawing



Pin #	Function
1	+IN
2	+Sense IN
3	–Sense IN
4	–IN
5	+OUT
6	+Sense
7	NC
8	–Sense
9	–OUT

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