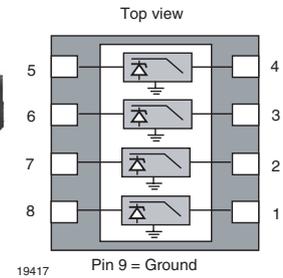
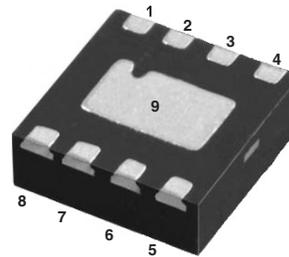




## 4-channel EMI Filter with ESD-Protection

### Features

- Ultra compact LLP70 package
- 4-channel EMI-Filter + ESD-protection
- Low leakage current
- Line resistance of 30, 50 or 100 Ohms
- Typical cut-off frequency 100 MHz
- ESD protection to IEC 61000-4-2 ± 30 kV (Air)
- ESD protection to IEC 61000-4-2 ± 30 kV (Contact)
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



19377

### Marking:



Square = Pin 1 marking

“9K” = Type Code for VEMI453A-HN2

“9L” = Type Code for VEMI455A-HN2

“9M” = Type Code for VEMI45AA-HN2

SD = Date Code (Example only)

### Mechanical Data

**Case:** LLP70-9A (plastic package).

Non magnetic

**Molding Compound Flammability Rating:**

UL 94 V-0

**Terminals:** High temperature soldering guaranteed:  
260 °C/10 sec. at terminals

**Weight:** 5 mg

**Packaging Codes/Options:**

GS18 = 10 k per 13" reel (8 mm tape), 10 k/box

GS08 = 3 k per 7" reel (8 mm tape), 15 k/box

### Absolute Maximum Ratings

Ratings at 25 °C, ambient temperature unless otherwise specified

Parameter	Symbol	Value	Unit
ESD Air Discharge per IEC 61000-4-2	$V_{ESD}$	± 30	kV
ESD Contact Discharge per IEC 61000-4-2	$V_{ESD}$	± 30	kV

### Thermal Characteristics

Ratings at 25 °C, ambient temperature unless otherwise specified

Parameter	Symbol	Value	Unit
Operating Temperature	$T_J$	- 40 to + 125	°C
Storage Temperature	$T_{STG}$	- 55 to + 150	°C

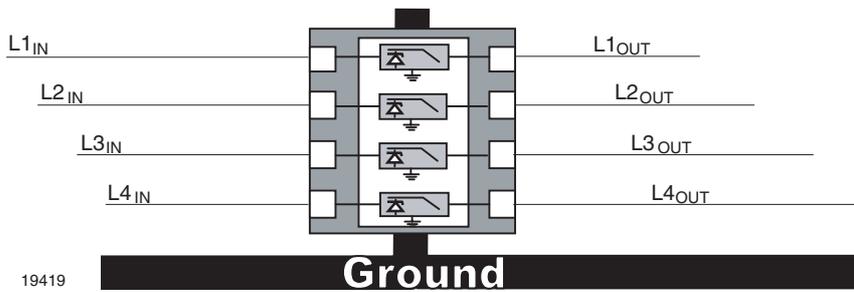
### Electrical Characteristics

( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise specified) valid for each single diode between Pin 1-8 and Pin 9

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage	at $I_R = 1\text{ }\mu\text{A}$ each Input to Pin 9	$V_{RWM}$	5			V
Max. Reverse current	at $V_R = 5\text{ V}$ each Input to Pin 9	$I_R$			1	$\mu\text{A}$
Max. Output Clamping voltage	at $I_{PP} = 4\text{ A}$ each Input to Pin 9 Acc. IEC 61000-4-5 measured at output pin	$V_C$			8	V
Max. Forward Clamping voltage	at $I_F = 4\text{ A}$ each Input to Pin 9 Acc. IEC 61000-4-5	$V_F$			4.5	V
Max. Peak pulse current	each Input to Pin 9 Acc. IEC 61000-4-5	$I_{PPM}$	- 4		4	A
Min. Reverse Breakdown Voltage	each Input to Pin 9 at $I_R = 1\text{ mA}$	$V_{BR}$	6.0			V
Input Capacitance	each Input to Pin 9 output not connected at $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$		60		pF
ESD-Immunity	each Input to Pin 9 10 pulses, both polarities Acc. IEC 6100-4-2 device not damaged	$V_{ESD}$		$\pm 30\text{ kV}$		V
Cut-off Frequency	Measured in a 50 Ohm system	$f_{3dB}$		100		MHz
Line Resistance VEMI453A-HN2	Measure between input and output; Pin 9 = not connected; $I_S = 10\text{ mA}$	$R_S$		30		$\Omega$
Line Resistance VEMI455A-HN2	Measure between input and output; Pin 9 = not connected; $I_S = 10\text{ mA}$	$R_S$		50		$\Omega$
Line Resistance VEMI45AA-HN2	Measure between input and output; Pin 9 = not connected; $I_S = 10\text{ mA}$	$R_S$		100		$\Omega$

## Application Note:

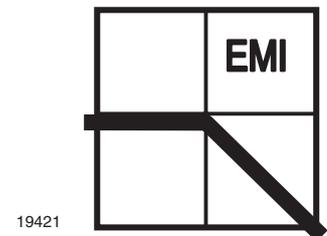
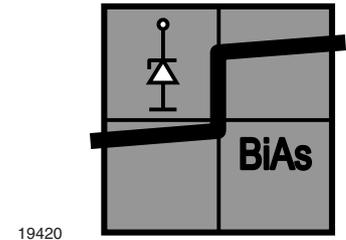
- a) With the **VEMI45xA-HN2** 4 different signal or data lines can be filtered and clamped to ground. Due to the different clamping levels in forward and reverse direction the clamping behavior is **Bidirectional** and **Asymmetric (BiAs)**.



The 4 independent EMI-Filter are placed between

- Pin 1 & Pin 8,
- Pin 2 & Pin 7,
- Pin 3 & Pin 6, and
- Pin 4 & Pin 5

They all are connected to a common ground Pin no. 9 on the backside of the package. Each filter is symmetrical so that all ports (Pin 1 - 8) can be used as Input or Output.

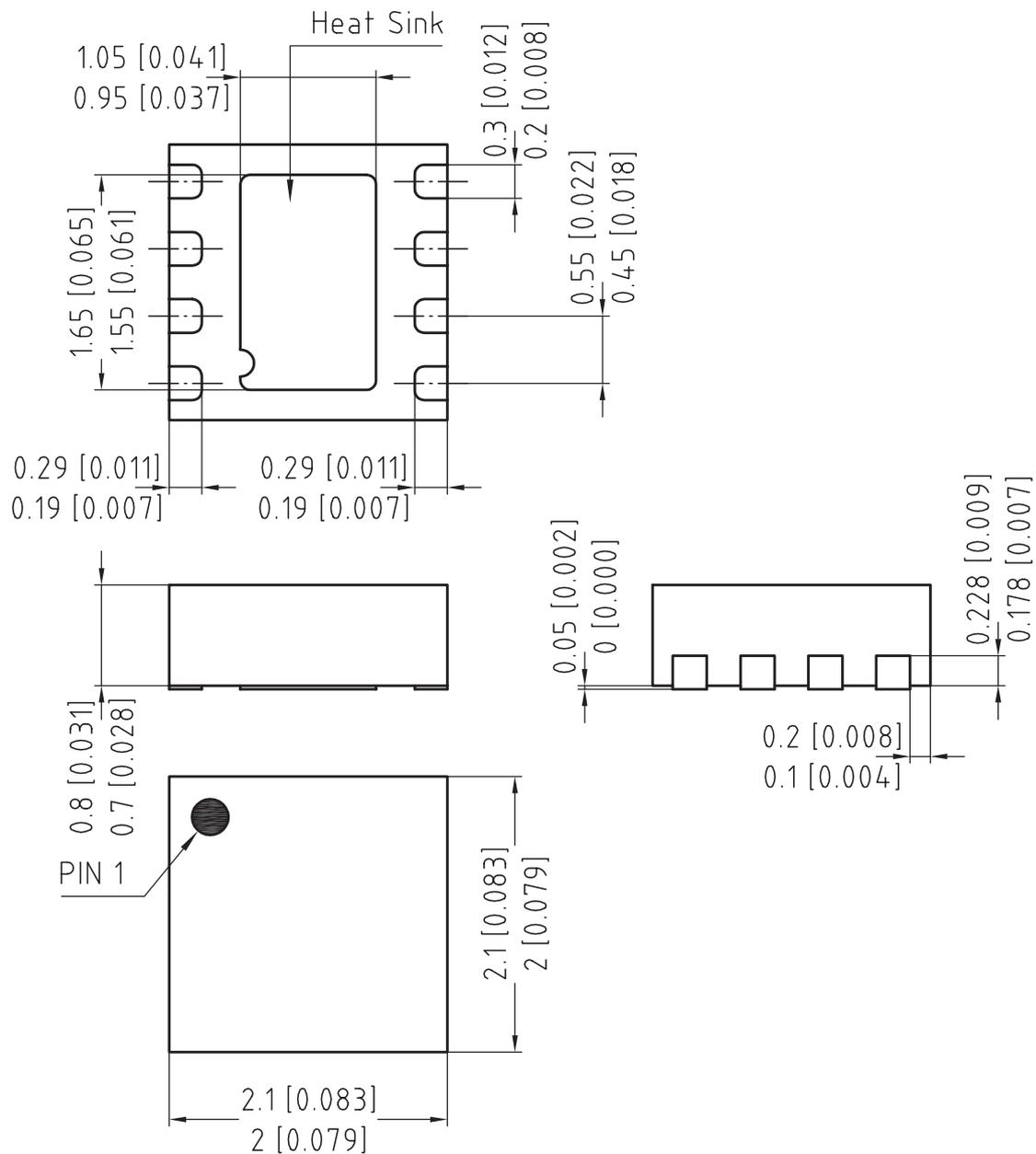


# VEMI453A-HN2, VEMI455A-HN2, VEMI45AA-HN2



Vishay Semiconductors

## Package Dimensions in mm (Inches)



19375



## Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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