



SFH6325/ SFH6326

Vishay Semiconductors

High Speed Optocoupler, Dual Channel, 1 MBd, Transistor Output

Features

- Isolation Test Voltage: 5300 V_{RMS}
- TTL Compatible
- Bit Rates: 1.0 MBit/s
- High Common-mode Transient Immunity
- Bandwidth 2.0 MHz
- Open-Collector Output

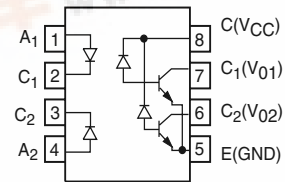
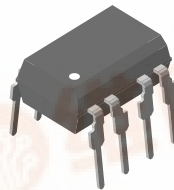
Agency Approvals

- UL - File No. E52744 System Code H or J

Description

The SFH6325/ SFH6326 are dual channel optocouplers with a GaAlAs infrared emitting diode, optically coupled with an integrated photo detector which consists of a photo diode and a high-speed transistor in a DIP-8 plastic package.

Signals can be transmitted between two electrically separated circuits up to frequencies of 2.0 MHz. The potential difference between the circuits to be coupled should not exceed the maximum permissible reference voltages.



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Order Information

Part	Remarks
SFH6325	CTR > 7.0 %, DIP-8
SFH6326	CTR > 19 %, DIP-8
SFH6325-X009	CTR > 7.0 %, SMD-8 (option 9)
SFH6326-X006	CTR > 19 %, DIP-8 400 mil (option 6)
SFH6326-X007	CTR > 19 %, SMD-8 (option 7)
SFH6326-X009	CTR > 19 %, SMD-8 (option 9)

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Stresses in excess of the absolute Maximum Ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute Maximum Rating for extended periods of the time can adversely affect reliability.

Input

T_{amb} = 25 °C

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V _R	4.5	V
Forward continuous current		I _F	25	mA
Peak forward current	t = 1.0 ms, duty cycle 50 %	I _{FM}	50	mA
Maximum surge forward current	t ≤ 1.0 μs, 300 pulses/s	I _{FSM}	1.0	A
Derate linearly from 25 °C			0.6	mW/°C
Power dissipation	T _{amb} ≤ 70 °C	P _{diss}	50	mW



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Output

Parameter	Test condition	Symbol	Value	Unit
Supply voltage		V_S	- 0.5 to 30	V
Output voltage		V_O	- 0.5 to 25	V
Collector output current		I_{CO}	8.0	mA
Derate linearly from 25 °C			1.33	mW/°C
Power dissipation	$T_{amb} \leq 70\text{ °C}$	P_{diss}	50	mW

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage	$t = 1.0\text{ s}$	V_{ISO}	5300	V_{RMS}
Pollution degree (DIN VDE 0109)			2	
Creepage			≥ 7.0	mm
Clearance			≥ 7.0	mm
Derate linearly from 25 °C			1.93	mW/°C
Total package dissipation		P_{tot}	145	mW
Comparative tracking index per DIN IEC112/VDE 0303 part 1, group IIIa per DIN VDE 6110			175	
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ °C}$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ °C}$	R_{IO}	$\geq 10^{11}$	Ω
Storage temperature range		T_{stg}	- 55 to + 125	°C
Ambient temperature range		T_{amb}	- 55 to + 100	°C
Soldering temperature	max. 10 s, DIP soldering: distance to seating plane $\geq 1.5\text{ mm}$	T_{sld}	260	°C

Electrical Characteristics

$T_{amb} = 25\text{ °C}$, unless otherwise specified

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

Input

$T_{amb} = 0 - 70\text{ °C}$ unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 16\text{ mA}$	V_F		1.6	1.9	V
Breakdown voltage	$I_R = 10\text{ }\mu\text{S}$	V_{BR}	4.5			V
Reverse current	$V_R = 4.5\text{ V}$	I_R		0.5	10	μA
Capacitance	$V_R = 0\text{ V}, f = 1.0\text{ MHz}$	C_O		125		pF
Temperature coefficient of forward voltage	$I_F = 16\text{ mA}$	$\Delta V_F / \Delta T_{amb}$		- 1.7		mV/°C



Output

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Logic low supply current	$I_F = 16 \text{ mA}$, $V_O = \text{open}$, $V_{CC} = 4.5 \text{ V}$		I_{CCL}		100	200	μA
Supply current logic high	$I_F = 0 \text{ mA}$, $V_O = \text{open}$, $V_{CC} = 15 \text{ V}$		I_{CCH}		0.01	4.0	μA
Logic low output voltage	$I_F = 16 \text{ mA}$, $V_{CC} = 4.5 \text{ V}$, $I_O = 1.1 \text{ mA}$,	SFH6325	V_{OL}		0.1	0.5	V
	$I_F = 16 \text{ mA}$, $V_{CC} = 4.5 \text{ V}$, $I_O = 3.0 \text{ mA}$	SFH6326	V_{OL}		0.1	0.5	V
Logic high output current	$I_F = 0 \text{ mA}$, $V_O = V_{CC} = 5.5 \text{ V}$		I_{OH}		3.0	500	nA
	$I_F = 0 \text{ mA}$, $V_O = V_{CC} = 15 \text{ V}$		I_{OH}			50	μA
Channel to channel ¹⁾ crosstalk	$I_F = 16 \text{ mA}$, $V_O = V_{CC} = 5.5 \text{ V}$		I_{OH-XT}			500	nA

Note: 1. To measure crosstalk, turn on the LED for channel 1 and the output current for channel 2 in logic high. Repeat for channel 2.

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Capacitance (input-output)	$f = 1.0 \text{ MHz}$	C_{IO}		0.6		pF

Current Transfer Ratio

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Current Transfer Ratio	$I_F = 16 \text{ mA}$, $V_{CC} = 4.5 \text{ V}$, $V_O = 0.4 \text{ V}$	SFH6325	CTR	5	16		%
		SFH6326	CTR	19	35		%
	$I_F = 16 \text{ mA}$, $V_{CC} = 4.5 \text{ V}$, $V_O = 0.5 \text{ V}$	SFH6325	CTR	5			%
		SFH6326	CTR	15			%

Switching Characteristics

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
High-low	$I_F = 16 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 4.1 \text{ k}\Omega$	SFH6325	t_{PHL}		0.3	1.5	μs
	$I_F = 16 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 1.9 \text{ k}\Omega$	SFH6326	t_{PHL}		0.2	0.8	μs
Low-high	$I_F = 16 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 4.1 \text{ k}\Omega$	SFH6325	t_{PLH}		0.6	1.5	μs
	$I_F = 16 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 1.9 \text{ k}\Omega$	SFH6326	t_{PLH}		0.5	0.8	μs

Common Mode Transient Immunity

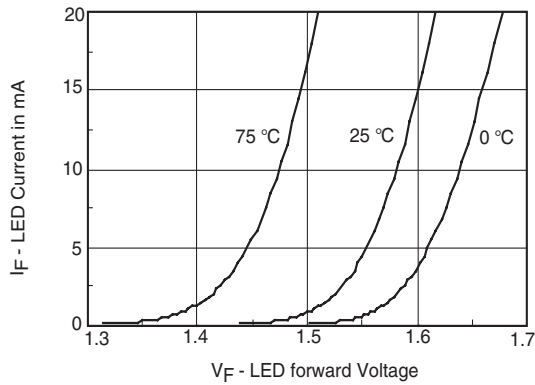
Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
CMTI at logic high level output	$I_F = 0 \text{ mA}$, $C_{CM} = 10 \text{ V}_{P-P}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 4.1 \text{ k}\Omega$	SFH6325	CM_H		1000		V/ μs
	$I_F = 0 \text{ mA}$, $C_{CM} = 10 \text{ V}_{P-P}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 1.9 \text{ k}\Omega$	SFH6326	CM_H		1000		V/ μs
CMTI at logic low level output	$I_F = 16 \text{ mA}$, $C_{CM} = 10 \text{ V}_{P-P}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 4.1 \text{ k}\Omega$	SFH6325	CM_L		1000		V/ μs
	$I_F = 16 \text{ mA}$, $C_{CM} = 10 \text{ V}_{P-P}$, $V_{CC} = 5.0 \text{ V}$, $R_L = 1.9 \text{ k}\Omega$	SFH6326	CM_L		1000		V/ μs

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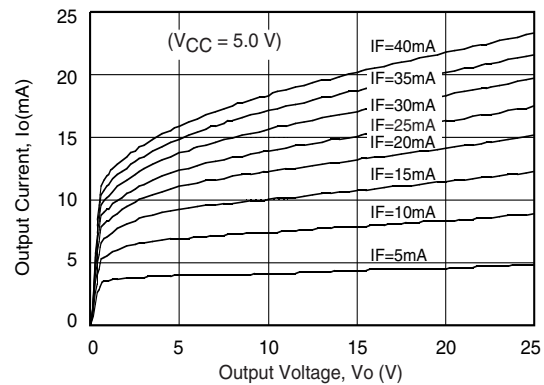


Typical Characteristics ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)



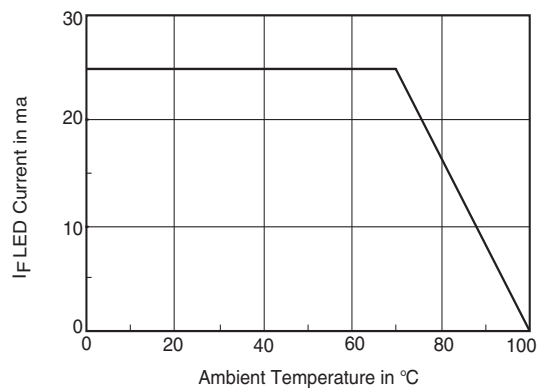
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Fig. 1 LED Forward Current vs. Forward Voltage



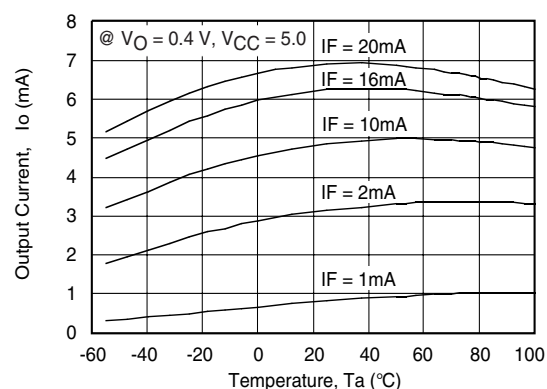
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Fig. 4 Output Current vs. Output Voltage



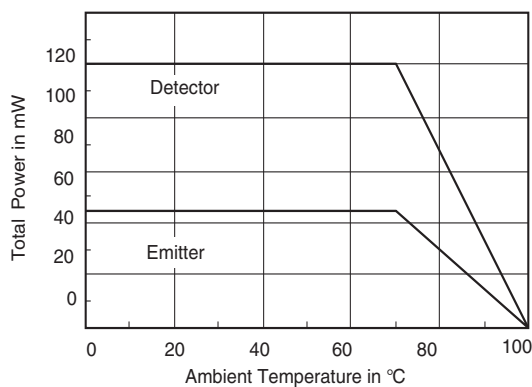
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Fig. 2 Permissible Forward LED Current vs. Temperature



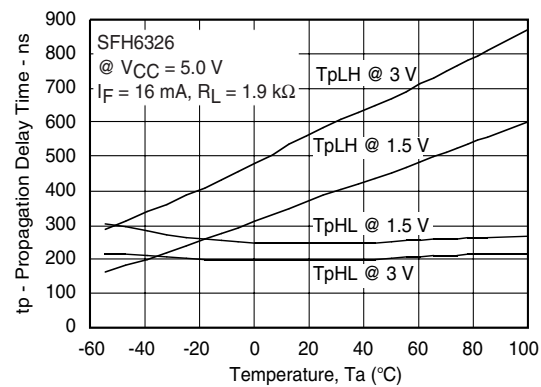
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Fig. 5 Output Current vs. Temperature



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Fig. 3 Permissible Power Dissipation vs. Temperature



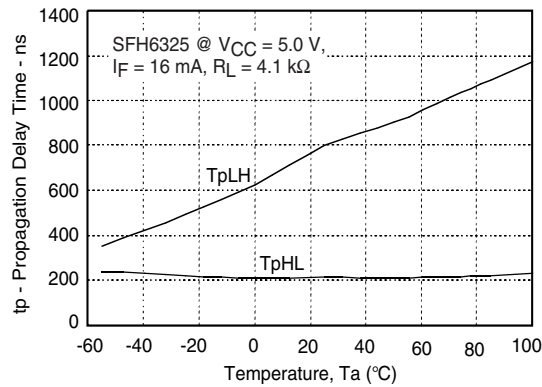
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Fig. 6 Propagation Delay vs. Temperature



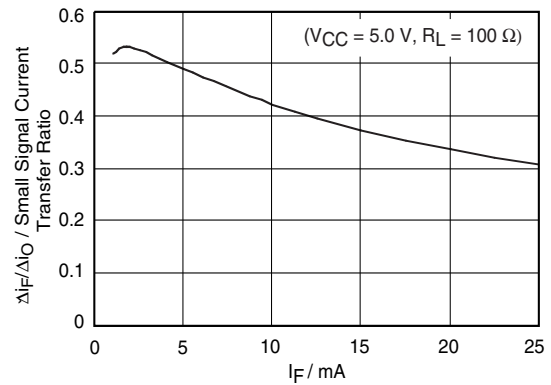
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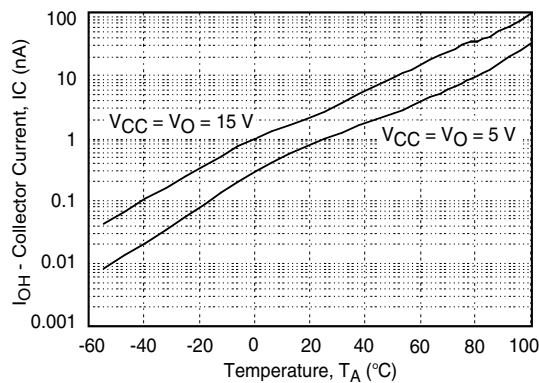
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Fig. 7 Propagation Delay vs. Temperature



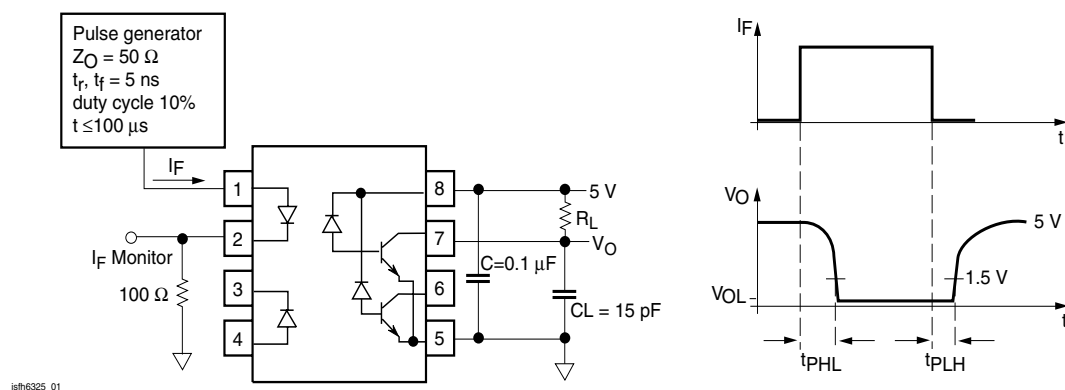
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Fig. 9 Small Signal Current Transfer Ratio vs. Quiescent Input Current



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Fig. 8 Logic High Output Current vs. Temperature



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Fig. 10 Switching Time and Test Circuit

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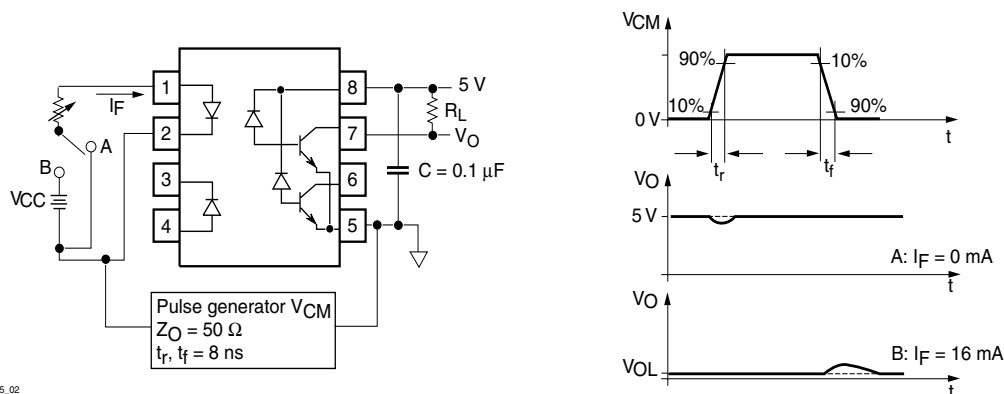
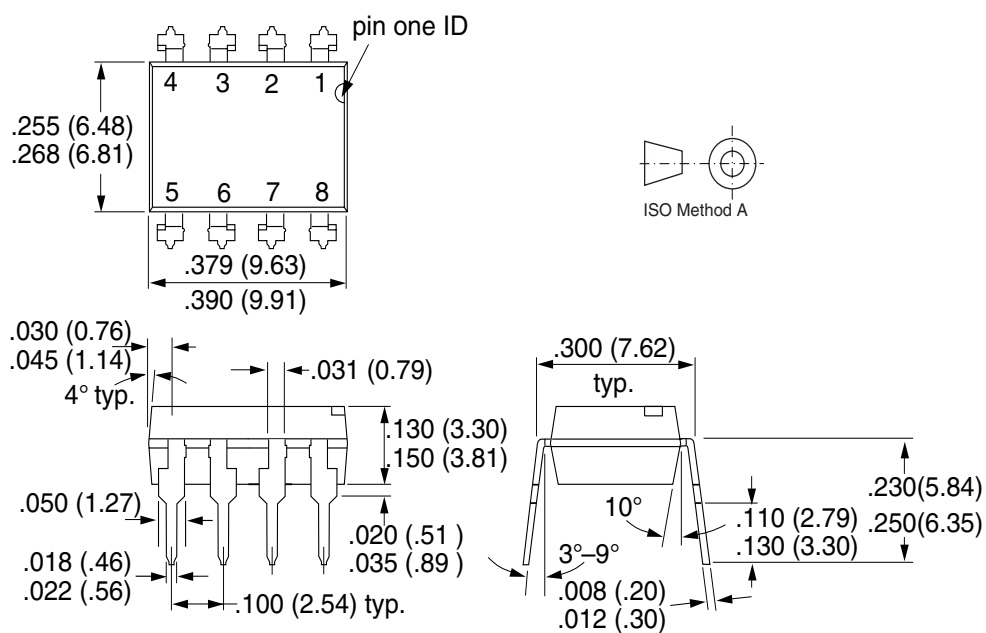


Fig. 11 Waveform and Test Circuit for Common-mode Transient Immunity

Package Dimensions in Inches (mm)

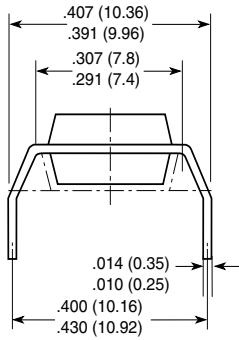




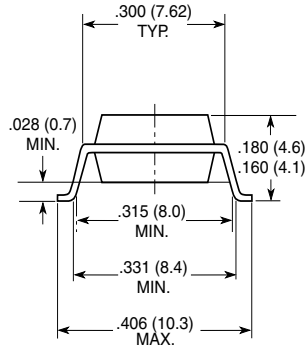
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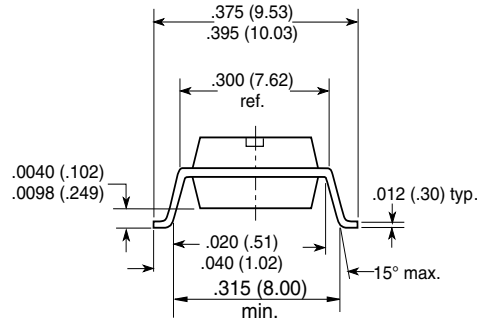
Option 6



Option 7



Option 9



18450

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.

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