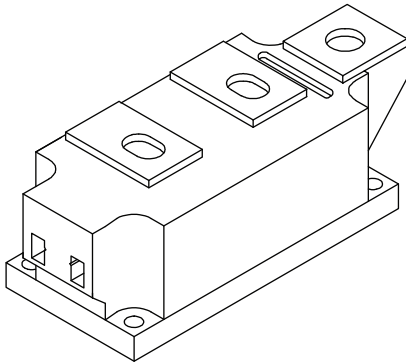


Fast Diodes, 460 A (SUPER MAGN-A-PAK Power Modules)



SUPER MAGN-A-PAK

FEATURES

- High power fast recovery diode series
- High current capability
- 3000 V_{RMS} isolating voltage with non-toxic substrate
- High surge capability
- High voltage ratings up to 2500 V
- Industrial standard package
- UL approved file E78996
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level



RoHS
COMPLIANT

PRODUCT SUMMARY

I _{F(AV)}	460 A
Type	Modules - Diode, Fast

TYPICAL APPLICATIONS

- Snubber for large GTO
- Snubber for large IGBT

MAJOR RATINGS AND CHARACTERISTICS

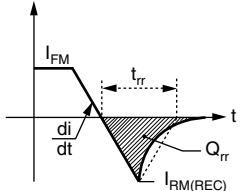
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}		460	A
	T _C	82	°C
I _{F(RMS)}		720	A
	T _C	82	°C
I _{FSM}	50 Hz	13 000	A
	60 Hz	13 800	
I ² t	50 Hz	845	kA ² s
	60 Hz	790	
I ² √t		8450	kA ² √s
V _{RRM}	Range	1600 to 2500	V
t _{rr}		4.0	μs
T _{Stg} , T _J	Range	- 40 to 150	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V _{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} MAXIMUM AT T _J MAXIMUM mA
VSKDL450..S20	16	1600	1700	50
	20	2000	2100	
	25	2500	2600	

FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		460	A
				82	°C
Maximum RMS forward current	$I_{F(RMS)}$	180° conduction, half sine wave at $T_C = 82\text{ °C}$		720	A
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	kA
		t = 8.3 ms			
		t = 10 ms	100 % V_{RRM} reappplied		
		t = 8.3 ms			
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reappplied		kA ² s
		t = 8.3 ms			
		t = 10 ms	100 % V_{RRM} reappplied		
		t = 8.3 ms			
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		8450	kA ² √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ maximum		1.16	V
High level value of threshold voltage	$V_{F(TO)2}$	(I $> \pi \times I_{F(AV)}$), $T_J = T_J$ maximum		1.62	
Low level value of forward slope resistance	r_{f1}	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ maximum		0.68	mΩ
High level value of forward slope resistance	r_{f2}	(I $> \pi \times I_{F(AV)}$), $T_J = T_J$ maximum		0.41	
Maximum forward voltage drop	V_{FM}	$I_{pk} = 1800\text{ A}$, $T_J = 25\text{ °C}$, $t_p = 10\text{ ms}$ sine pulse		2.20	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT $T_J = 25\text{ °C}$	TEST CONDITIONS			TYPICAL VALUES AT $T_J = 150\text{ °C}$			
	t_{rr} AT 25 % I_{RRM} (s)	I_{pk} SQUARE PULSE (A)	di/dt (A / s)	V_r (V)	t_{rr} AT 25 % I_{RRM} (s)	Q_{rr} (C)	I_r (A)	
S20	2.0	1000	100	- 50	4	400	180	

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
RMS insulation voltage	V_{INS}	t = 1 s		3000	V
Maximum peak reverse and off-state leakage current	I_{RRM}	$T_J = T_J$ maximum, rated V_{RRM} applied		50	mA



THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum operating junction and storage temperature range	T_J, T_{Stg}		- 40 to 150	°C
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.065	K/W
Maximum thermal resistance, case to heatsink	R_{thC-hs}		0.02	
Mounting torque $\pm 10\%$	SMAP to heatsink	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound.	6 to 8	Nm
	busbar to SMAP		12 to 15	
Approximate weight			1500	g
Case style		See dimensions - link at the end of datasheet	SUPER MAGN-A-PAK	

ΔR_{thJC} CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.009	0.006	$T_J = T_J$ maximum	K/W
120°	0.011	0.011		
90°	0.014	0.015		
60°	0.021	0.022		
30°	0.037	0.038		

Note

- The table above shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

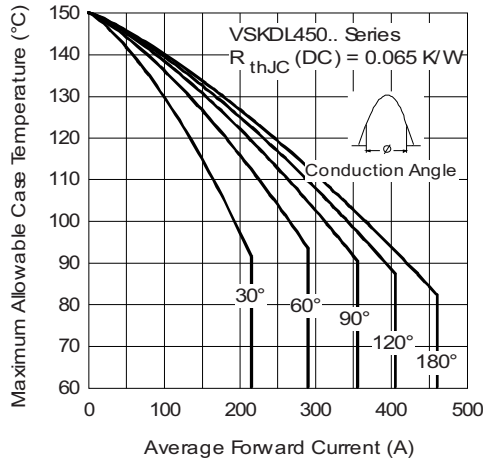


Fig. 1 - Current Ratings Characteristics

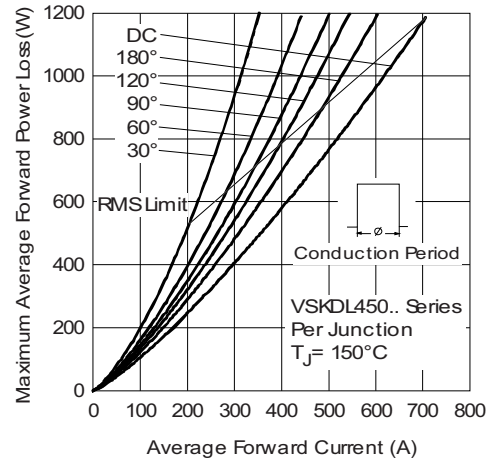


Fig. 4 - Forward Power Loss Characteristics

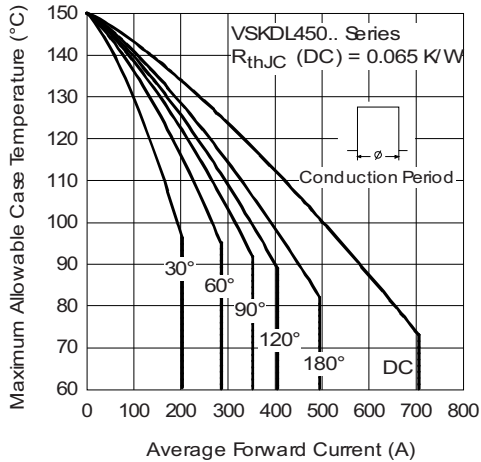


Fig. 2 - Current Ratings Characteristics

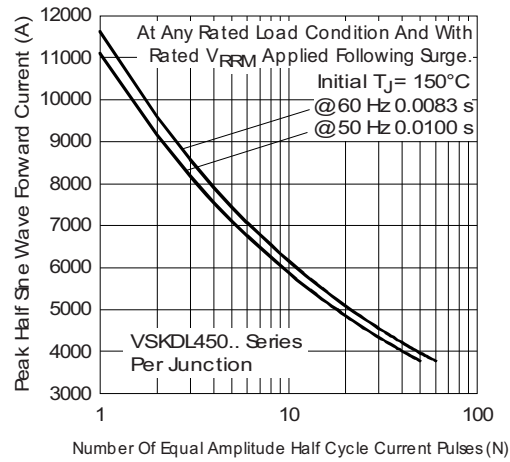


Fig. 5 - Maximum Non-Repetitive Surge Current

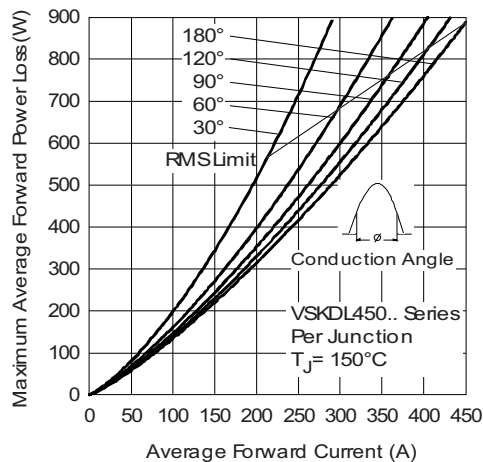


Fig. 3 - Forward Power Loss Characteristics

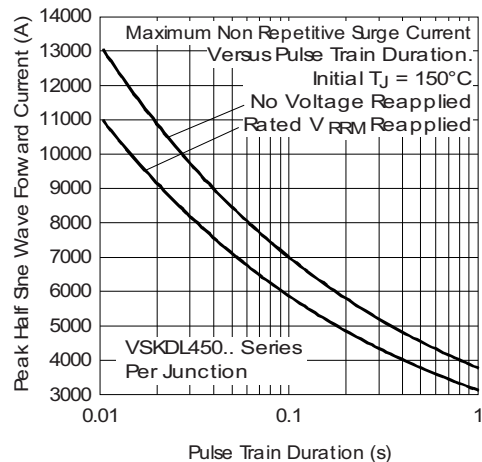


Fig. 6 - Maximum Non-Repetitive Surge Current



Fast Diodes, 460 A
(SUPER MAGN-A-PAK Power Modules)

Vishay Semiconductors

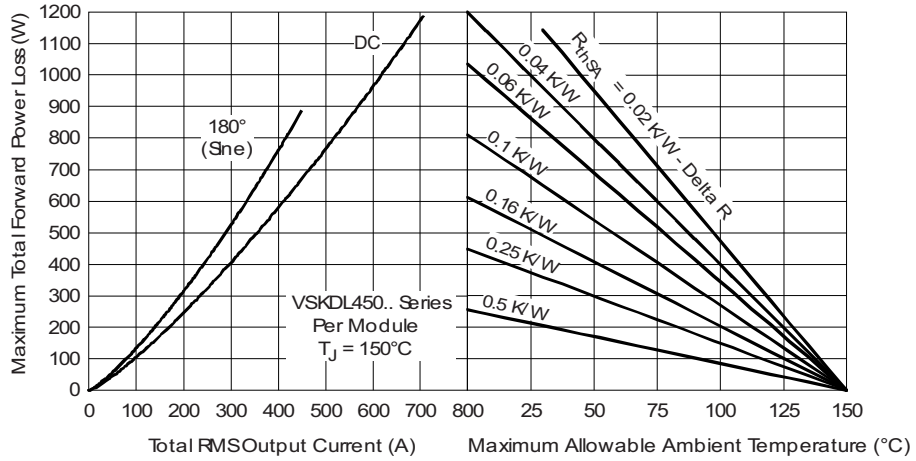


Fig. 7 - Forward Power Loss Characteristics

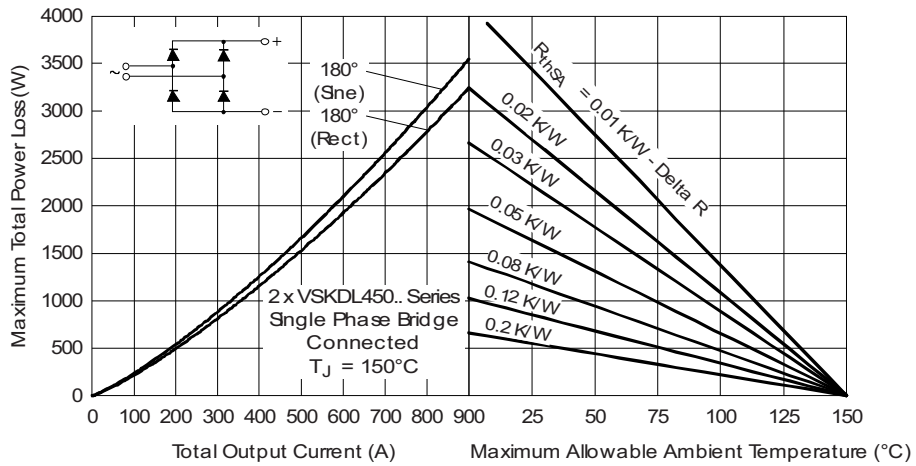


Fig. 8 - Forward Power Loss Characteristics

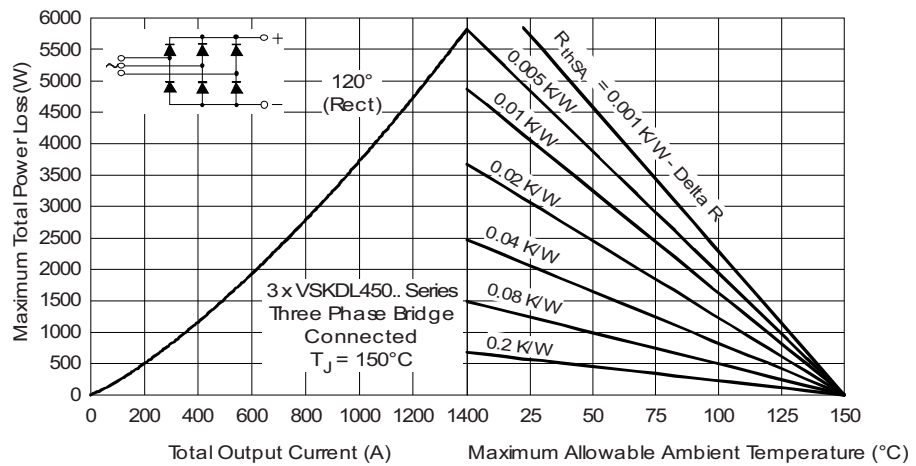


Fig. 9 - Forward Power Loss Characteristics

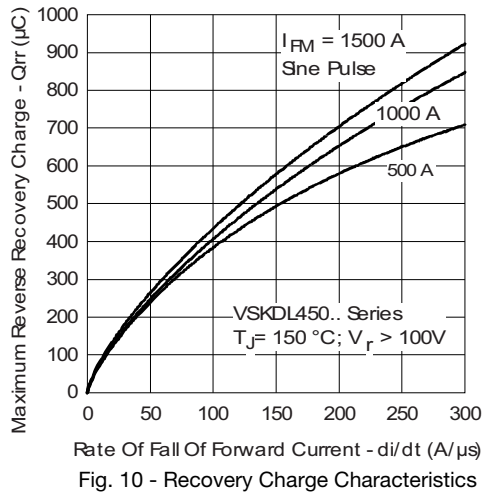


Fig. 10 - Recovery Charge Characteristics

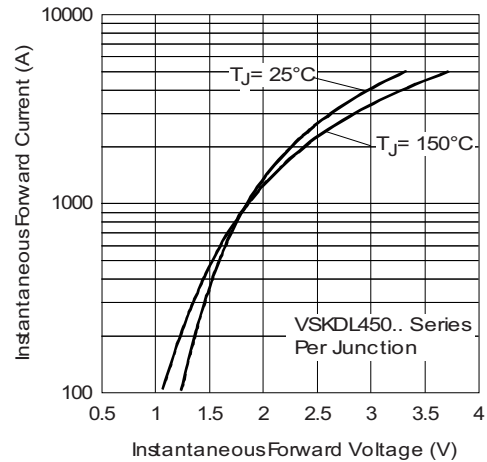


Fig. 12 - Forward Voltage Drop Characteristics

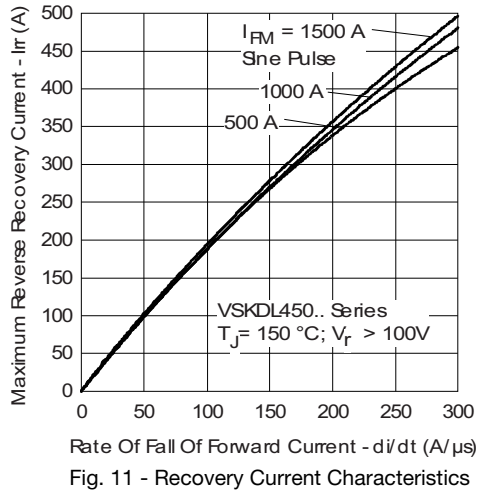


Fig. 11 - Recovery Current Characteristics

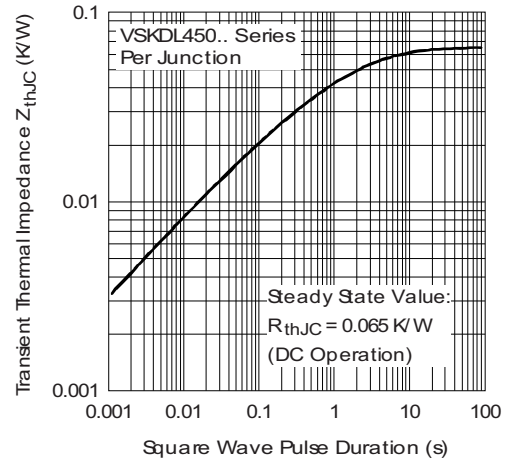


Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VSK	D	L	450	-	25	S20
	①	②	③	④		⑤	⑥

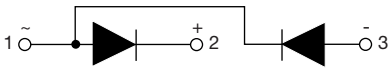
- 1** - Module type
- 2** - Circuit configuration:
D = 2 diodes in series (see Circuit Configuration table)
- 3** - Fast recovery
- 4** - Current rating
- 5** - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)
- 6** - t_{rr} code (see Recovery Characteristics table)



VSKDL450 Series

Fast Diodes, 460 A
(SUPER MAGN-A-PAK Power Modules)

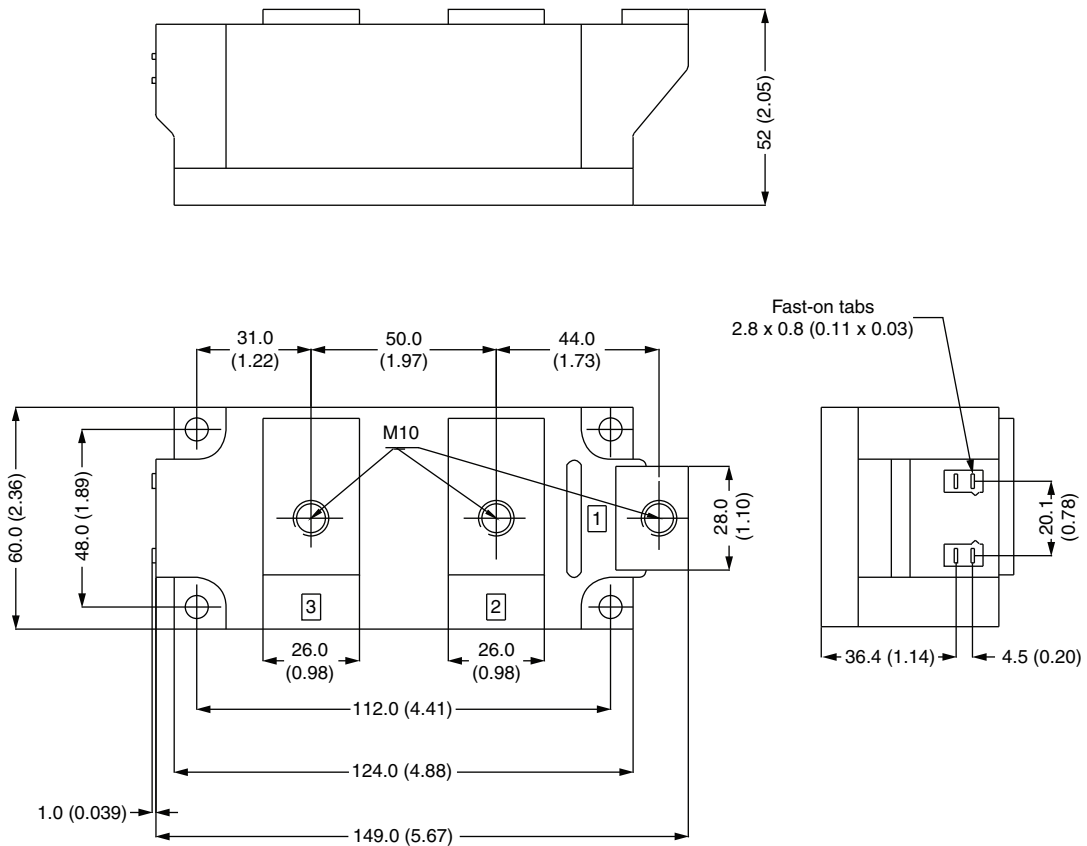
Vishay Semiconductors

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes doubler circuit	D	

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95088

Super MAGN-A-PAK Diode

DIMENSIONS in millimeters (inches)





Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.