

ADD-A-PAK Generation VII Power Modules Thyristor/Diode and Thyristor/Thyristor, 27 A



ADD-A-PAK


PRODUCT SUMMARY

$I_{T(AV)}$ or $I_{F(AV)}$	27 A
----------------------------	------

MECHANICAL DESCRIPTION

The ADD-A-PAK Generation VII, new generation of ADD-A-PAK module, combines the excellent thermal performances obtained by the usage of exposed direct bonded copper substrate, with advanced compact simple package solution and simplified internal structure with minimized number of interfaces.

FEATURES

- High voltage
- Industrial standard package
- UL approved file E78996 
- Low thermal resistance
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level



RoHS
COMPLIANT

BENEFITS

- Excellent thermal performances obtained by the usage of exposed direct bonded copper substrate
- Up to 1600 V
- High surge capability
- Easy mounting on heatsink

ELECTRICAL DESCRIPTION

These modules are intended for general purpose high voltage applications such as high voltage regulated power supplies, lighting circuits, temperature and motor speed control circuits, UPS and battery charger.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{T(AV)}$ or $I_{F(AV)}$	85 °C	27	A
$I_{O(RMS)}$	As AC switch	60	
I_{TSM} , I_{FSM}	50 Hz	400	
	60 Hz	420	
I^2t	50 Hz	800	kA ² s
	60 Hz	730	
$I^2\sqrt{t}$		8000	kA ² √s
V_{RRM}	Range	400 to 1600	V
T_{Stg}		- 40 to 125	°C
T_J			

VSKT26.., VSKH26.., VSKL26.., VSKN26.. Series



Vishay Semiconductors ADD-A-PAK Generation VII Power Modules
Thyristor/Diode and Thyristor/Thyristor, 27 A

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	V _{DRM} , MAXIMUM REPETITIVE PEAK OFF-STATE VOLTAGE, GATE OPEN CIRCUIT V	I _{RRM} , I _{DRM} AT 125 °C mA
VSK.26	04	400	500	400	15
	06	600	700	600	
	08	800	900	800	
	10	1000	1100	1000	
	12	1200	1300	1200	
	14	1400	1500	1400	
	16	1600	1700	1600	

ON-STATE CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current (thyristors)	I _{T(AV)}	180° conduction, half sine wave, T _C = 85 °C		27	
Maximum average forward current (diodes)	I _{F(AV)}				
Maximum continuous RMS on-state current, as AC switch	I _{O(RMS)}			60	A
Maximum peak, one-cycle non-repetitive on-state or forward current	I _{TSM} or I _{FSM}	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial T _J = T _J maximum	400
		t = 8.3 ms			420
		t = 10 ms	100 % V _{RRM} reappplied		335
		t = 8.3 ms			350
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reappplied	Initial T _J = T _J maximum	800
		t = 8.3 ms			730
		t = 10 ms	100 % V _{RRM} reappplied		560
		t = 8.3 ms			510
Maximum I ² √t for fusing	I ² √t (1)	t = 0.1 ms to 10 ms, no voltage reappplied T _J = T _J maximum		8000	A ² /s
Maximum value or threshold voltage	V _{T(TO)} (2)	Low level (3)	T _J = T _J maximum	0.86	V
		High level (4)		1.09	
Maximum value of on-state slope resistance	r _t (2)	Low level (3)	T _J = T _J maximum	9.58	mΩ
		High level (4)		7.31	
Maximum peak on-state or forward voltage	V _{TM}	I _{TM} = π × I _{T(AV)}	T _J = 25 °C	1.65	V
	V _{FM}	I _{FM} = π × I _{F(AV)}			
Maximum non-repetitive rate of rise of turned on current	di/dt	T _J = 25 °C, from 0.67 V _{DRM} , I _{TM} = π × I _{T(AV)} , I _g = 500 mA, t _r < 0.5 μs, t _p > 6 μs		150	A/μs
Maximum holding current	I _H	T _J = 25 °C, anode supply = 6 V, resistive load, gate open circuit		200	mA
Maximum latching current	I _L	T _J = 25 °C, anode supply = 6 V, resistive load		400	

Notes

- (1) I²t for time t_x = I²√t × √t_x
 (2) Average power = V_{T(TO)} × I_{T(AV)} + r_t × (I_{T(RMS)})²
 (3) 16.7 % × π × I_{AV} < I < π × I_{AV}
 (4) I > π × I_{AV}



VSKT26.., VSKH26.., VSKL26.., VSKN26.. Series

ADD-A-PAK Generation VII Power Modules Vishay Semiconductors
Thyristor/Diode and Thyristor/Thyristor, 27 A

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P_{GM}			10	W
Maximum average gate power	$P_{G(AV)}$			2.5	
Maximum peak gate current	I_{GM}			2.5	A
Maximum peak negative gate voltage	$-V_{GM}$			10	V
Maximum gate voltage required to trigger	V_{GT}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	4.0	
		$T_J = 25\text{ }^\circ\text{C}$		2.5	
		$T_J = 125\text{ }^\circ\text{C}$		1.7	
Maximum gate current required to trigger	I_{GT}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	270	mA
		$T_J = 25\text{ }^\circ\text{C}$		150	
		$T_J = 125\text{ }^\circ\text{C}$		80	
Maximum gate voltage that will not trigger	V_{GD}	$T_J = 125\text{ }^\circ\text{C}$, rated V_{DRM} applied		0.25	V
Maximum gate current that will not trigger	I_{GD}	$T_J = 125\text{ }^\circ\text{C}$, rated V_{DRM} applied		6	mA

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak reverse and off-state leakage current at V_{RRM} , V_{DRM}	I_{RRM} , I_{DRM}	$T_J = 125\text{ }^\circ\text{C}$, gate open circuit		15	mA
Maximum RMS insulation voltage	V_{INS}	50 Hz		3000 (1 min) 3600 (1 s)	V
Maximum critical rate of rise of off-state voltage	dV/dt	$T_J = 125\text{ }^\circ\text{C}$, linear to $0.67 V_{DRM}$		1000	V/ μs

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Junction operating and storage temperature range	T_J , T_{Stg}			- 40 to 125	$^\circ\text{C}$
Maximum internal thermal resistance, junction to case per leg	R_{thJC}	DC operation		0.76	$^\circ\text{C/W}$
Typical thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface flat, smooth and greased		0.1	
Mounting torque $\pm 10\%$	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.		4	Nm
	busbar			3	
Approximate weight				75	g
				2.7	oz.
Case style		JEDEC		TO-240AA compatible	

ΔR CONDUCTION PER JUNCTION											
DEVICES	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VSK.26..	0.212	0.258	0.330	0.466	0.72	0.166	0.276	0.357	0.482	0.726	$^\circ\text{C/W}$

Note

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

VSKT26..., VSKH26..., VSKL26..., VSKN26.. Series



Vishay Semiconductors ADD-A-PAK Generation VII Power Modules
Thyristor/Diode and Thyristor/Thyristor, 27 A

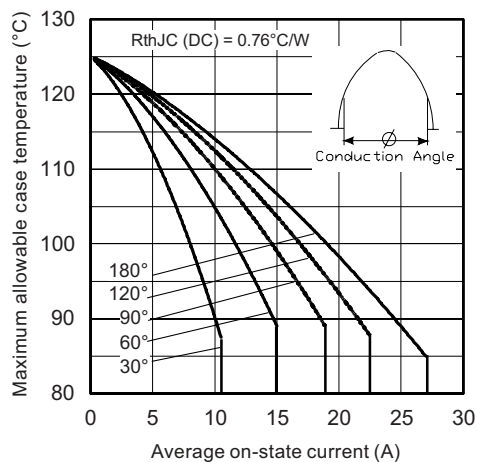


Fig. 1 - Current Ratings Characteristics

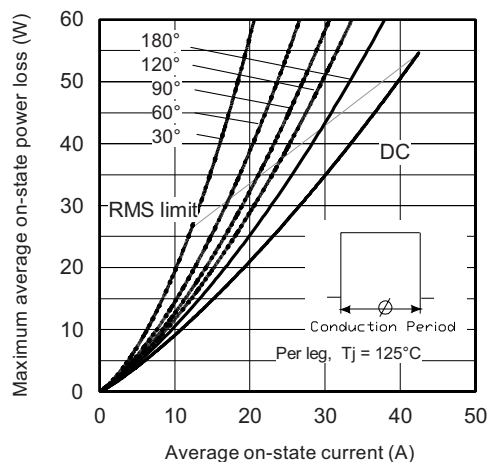


Fig. 4 - On-State Power Loss Characteristics

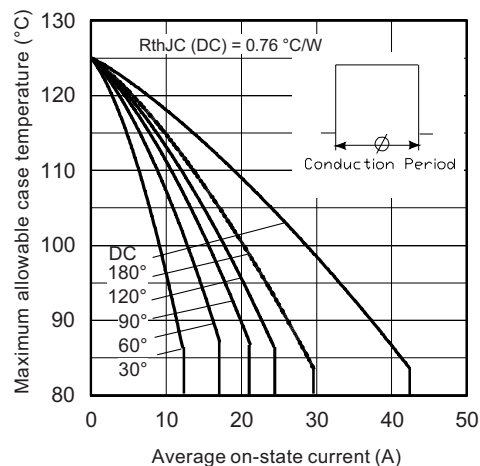


Fig. 2 - Current Ratings Characteristics

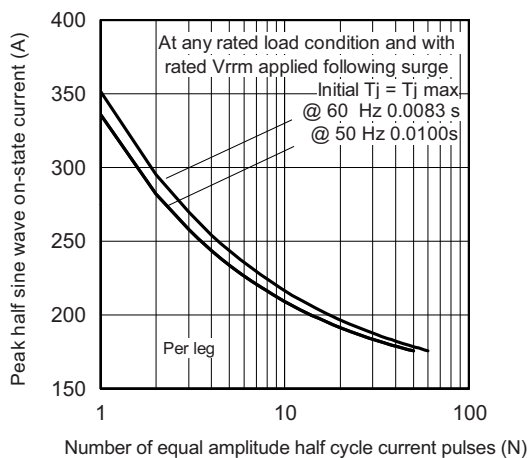


Fig. 5 - Maximum Non-Repetitive Surge Current

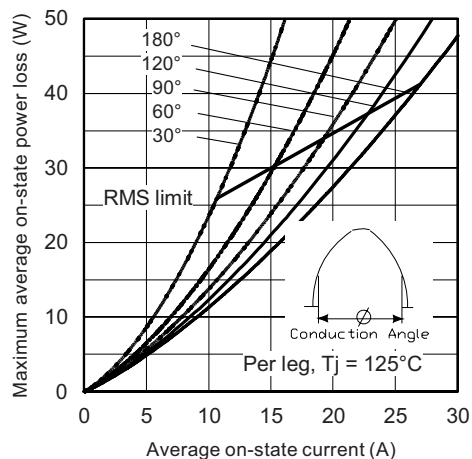


Fig. 3 - On-State Power Loss Characteristics

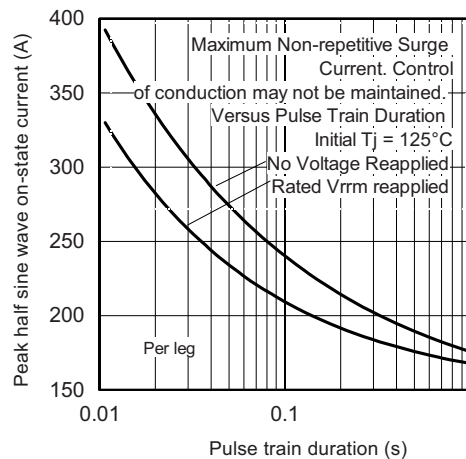


Fig. 6 - Maximum Non-Repetitive Surge Current



VSKT26.., VSKH26.., VSKL26.., VSKN26.. Series

ADD-A-PAK Generation VII Power Modules Vishay Semiconductors
Thyristor/Diode and Thyristor/Thyristor, 27 A

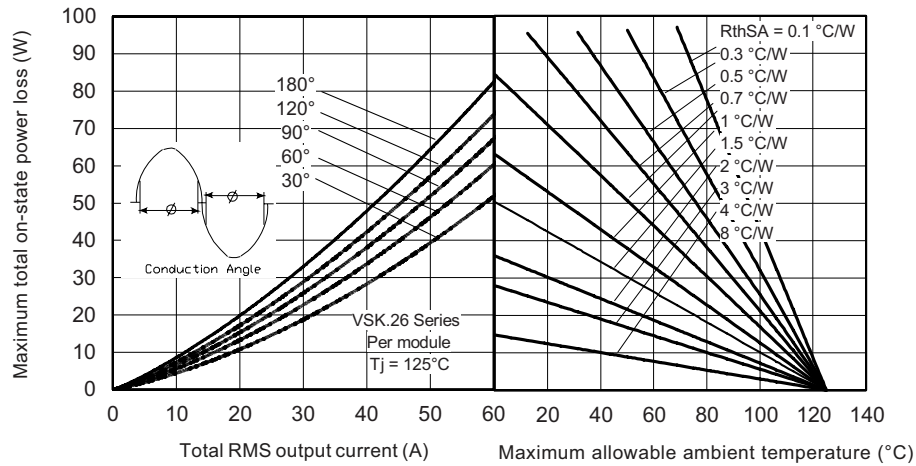


Fig. 7 - On-State Power Loss Characteristics

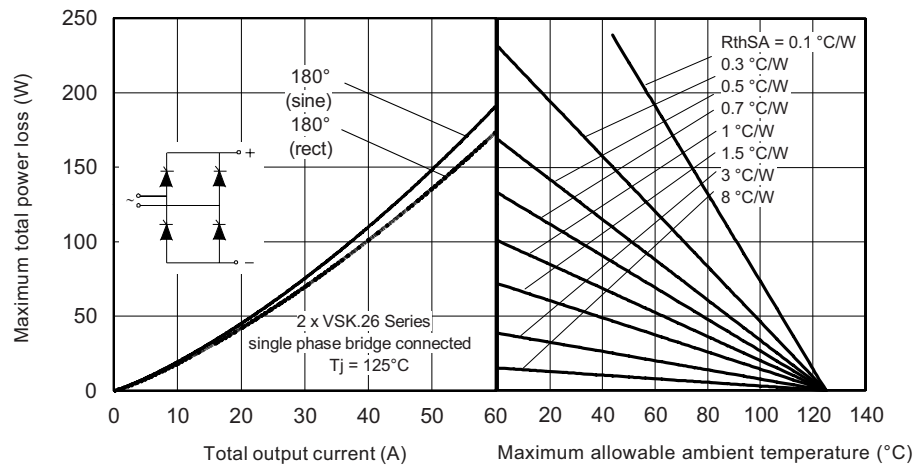


Fig. 8 - On-State Power Loss Characteristics

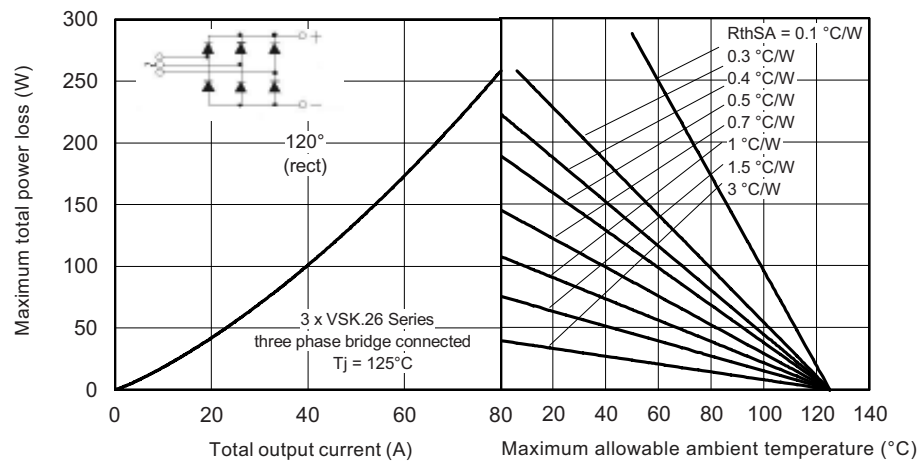


Fig. 9 - On-State Power Loss Characteristics

VSKT26..., VSKH26..., VSKL26..., VSKN26.. Series



Vishay Semiconductors ADD-A-PAK Generation VII Power Modules Thyristor/Diode and Thyristor/Thyristor, 27 A

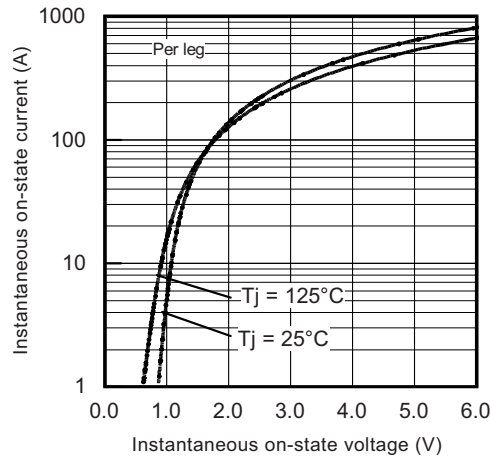


Fig. 10 - On-State Voltage Drop Characteristics

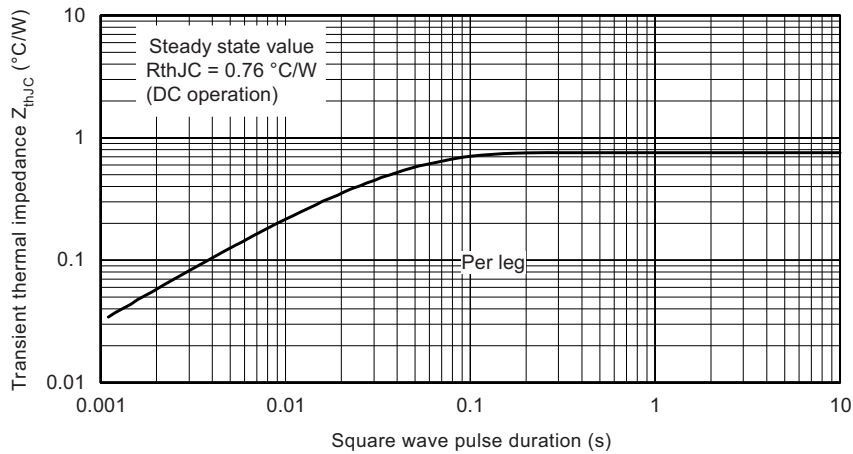


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

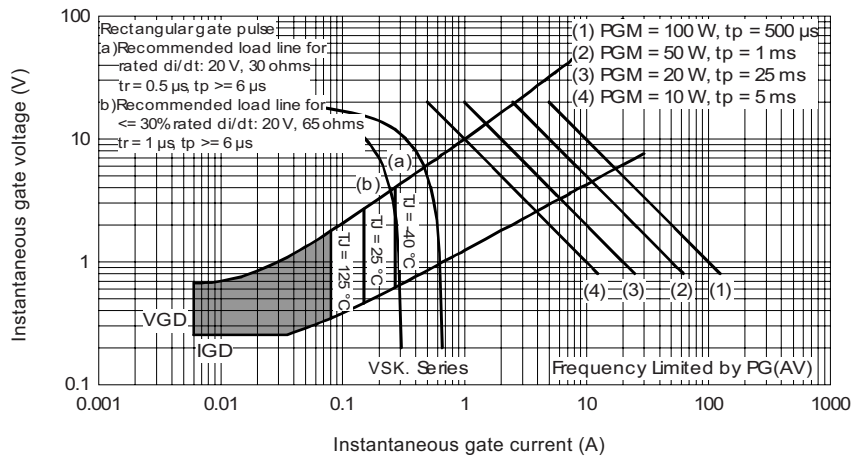


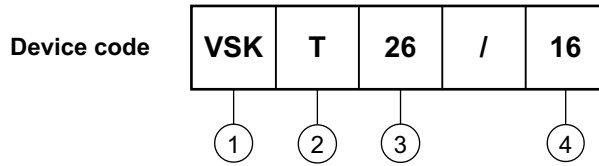
Fig. 12 - Gate Characteristics



VSKT26.., VSKH26.., VSKL26.., VSKN26.. Series

ADD-A-PAK Generation VII Power Modules Thyristor/Diode and Thyristor/Thyristor, 27 A Vishay Semiconductors

ORDERING INFORMATION TABLE

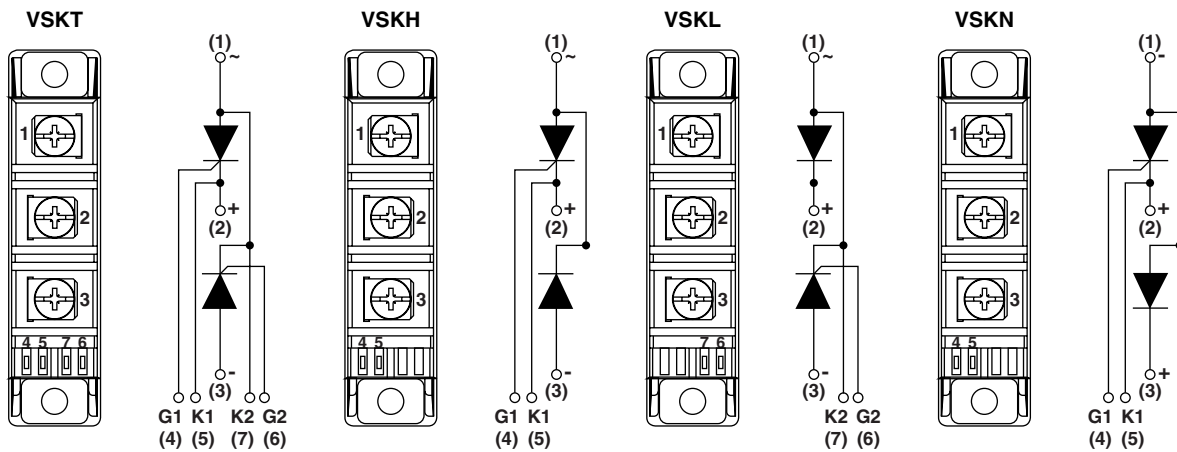


- 1** - Module type
- 2** - Circuit configuration (see end of datasheet)
- 3** - Current code (27 A)
- 4** - Voltage code (see Voltage Ratings table)

Note

- To order the optional hardware go to www.vishay.com/doc?95172

CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS

Dimensions

www.vishay.com/doc?95368



Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.