SUP40P10-43

Vishay Siliconix

P-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[c]	Q_g (Typ.)
- 100	0.043 at V_{GS} = - 10 V	- 36	54 nC
	0.048 at V_{GS} = - 4.5 V	- 34.4	

FEATURES

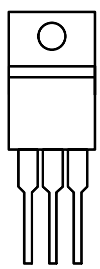
- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- LCD Inverter
  - Backlighting

TO-220AB

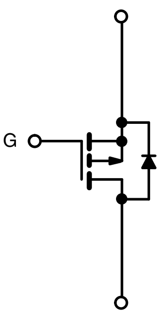


Drain connected to Tab

G D S

Top View

Ordering Information: SUP40P10-43-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)[c]	T_C = 25 °C	I_D	- 36	A
	T_C = 125 °C		- 16	
Pulsed Drain Current		I_{DM}	- 40	
Avalanche Current	L = 0.1 mH	I_{AS}	- 35	
Single Pulse Avalanche Energy[a]		E_{AS}	61	mJ
Power Dissipation	T_C = 25 °C	P_D	125[b]	W
	T_A = 25 °C		2.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient Free Air	R_{thJA}	62	°C/W
Junction-to-Case	R_{thJC}	1.0	

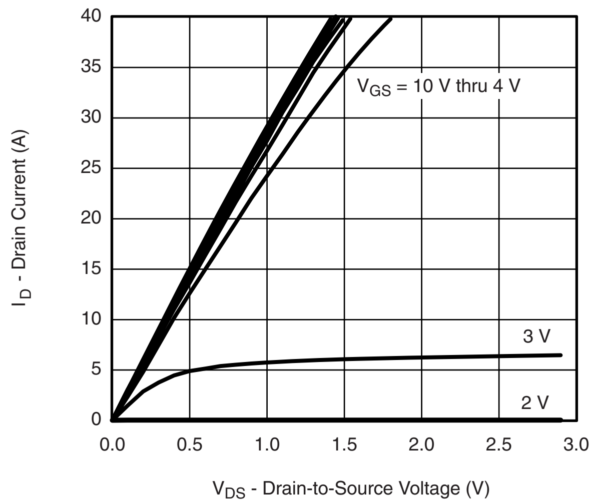
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 100			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = - 250 µA	- 1		- 3	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 109		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I_D = - 250 µA		5.9		mV/°C
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 100 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 100 V, V_{GS} = 0 V, T_J = 125 °C			- 50	
		V_{DS} = - 100 V, V_{GS} = 0 V, T_J = 150 °C			- 200	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 40			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 10 A		0.036	0.043	Ω
		V_{GS} = - 10 V, I_D = - 10 A, T_J = 125 °C			0.078	
		V_{GS} = - 10 V, I_D = - 10 A, T_J = 150 °C			0.088	
		V_{GS} = - 4.5 V, I_D = - 8 A		0.040	0.048	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 10 A		38		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 50 V, f = 1 MHz		4600		pF
Output Capacitance	C_{oss}			230		
Reverse Transfer Capacitance	C_{rss}			175		
Total Gate Charge[c]	Q_g	V_{DS} = - 50 V, V_{GS} = - 10 V, I_D = - 10 A		106	160	nC
		V_{DS} = - 50 V, V_{GS} = - 4.5 V, I_D = - 10 A		54	81	
Gate-Source Charge[c]	Q_{gs}			14		
Gate-Drain Charge[c]	Q_{gd}			26		
Gate Resistance	R_g	f = 1.0 MHz	0.8	4	8	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 50 V, R_L = 6.3 Ω I_D ≅ - 8 A, V_{GEN} = - 10 V, R_g = 1.0 Ω		15	25	ns
Rise Time[c]	t_r			20	30	
Turn-Off Delay Time[c]	$t_{d(off)}$			110	165	
Fall Time[c]	t_f			100	150	
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 50 V, R_L = 6.3 Ω I_D ≅ 8 A, V_{GEN} = - 4.5 V, R_g = 1.0 Ω		42	65	
Rise Time[c]	t_r			160	240	
Turn-Off Delay Time[c]	$t_{d(off)}$			100	150	
Fall Time[c]	t_f			100	150	
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				- 40	A
Pulsed Current	I_{SM}				- 40	A
Forward Voltage[a]	V_{SD}	I_F = - 10 A, V_{GS} = 0 V		- 0.8	- 1.5	V
Reverse Recovery Time	t_{rr}	I_F = - 8 A, dI/dt = 100 A/µs		60	90	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			- 5	- 7.5	A
Reverse Recovery Charge	Q_{rr}			150	225	nC

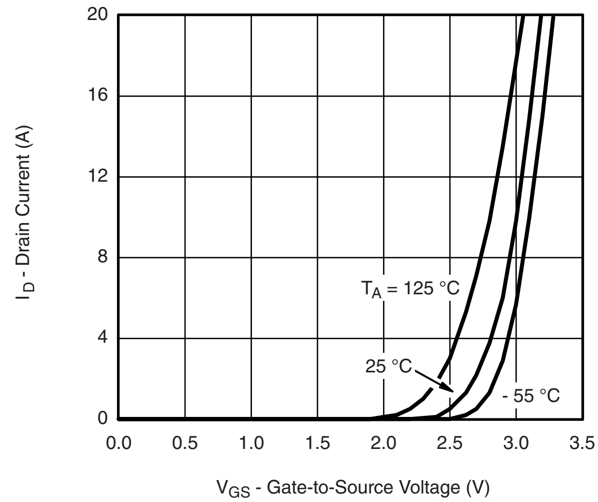
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

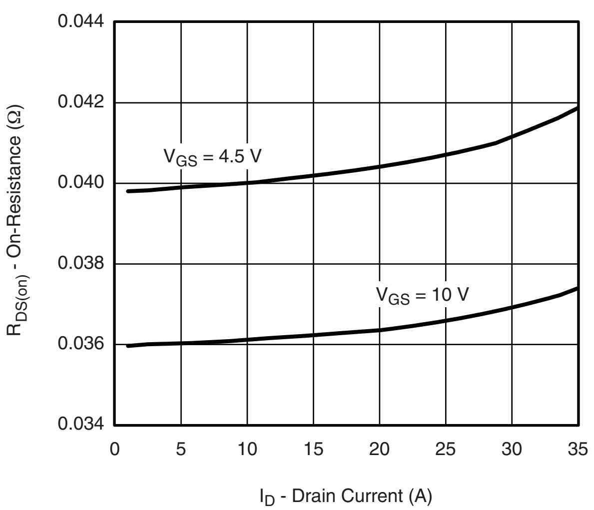
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



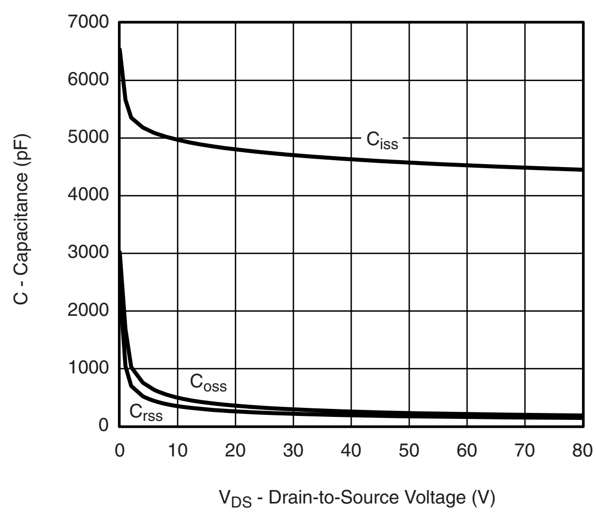
Output Characteristics



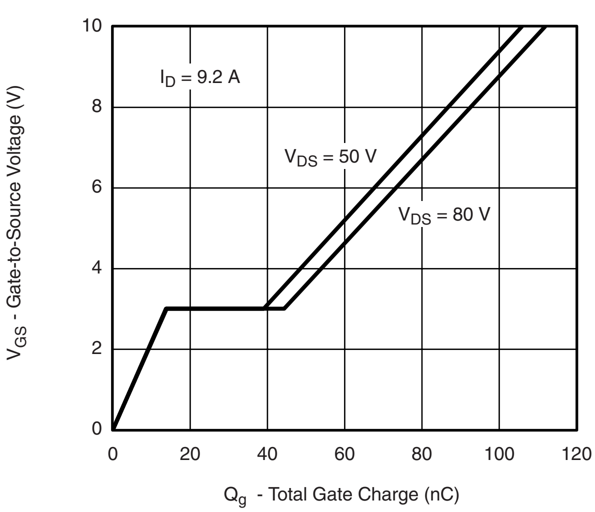
Transfer Characteristics



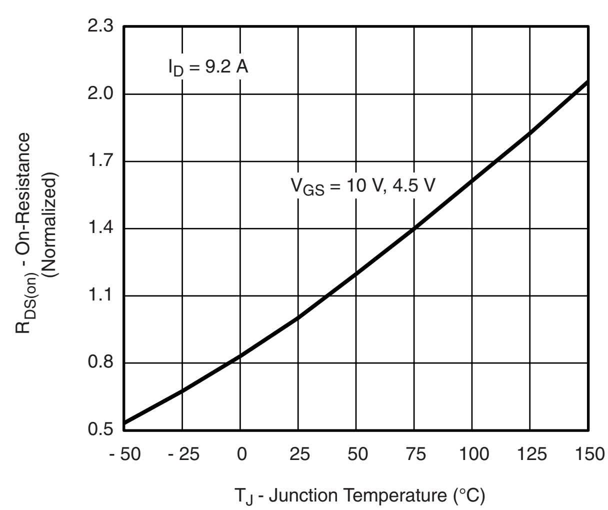
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

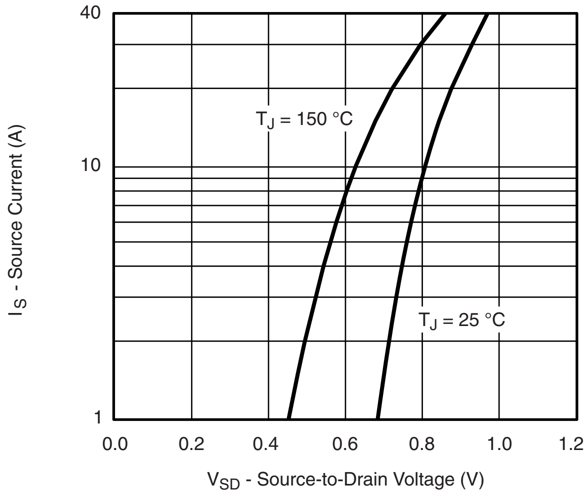


Gate Charge

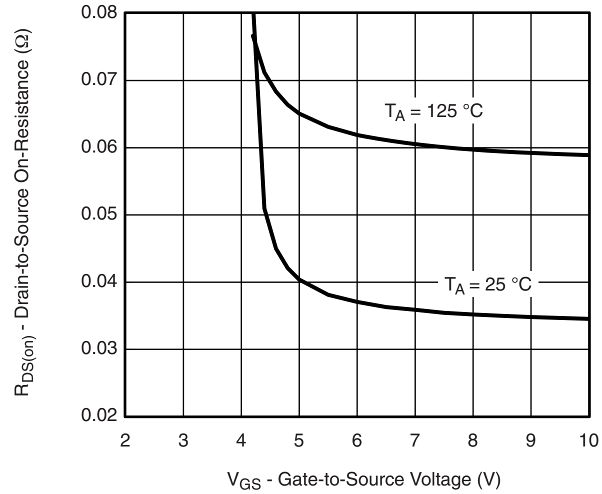


On-Resistance vs. Junction Temperature

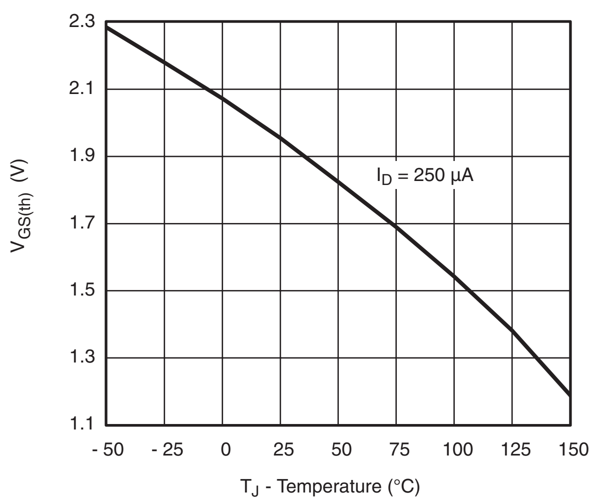
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



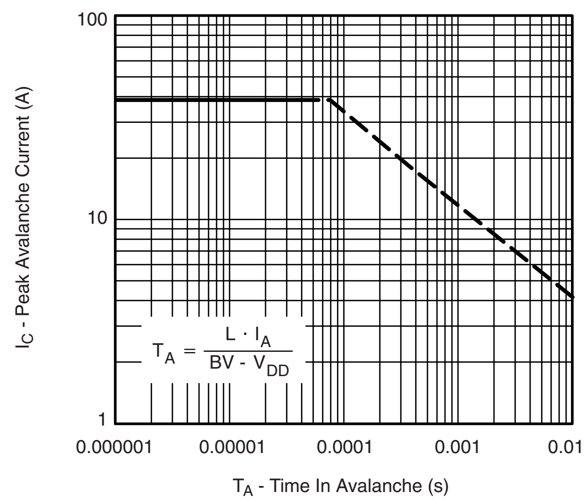
Source-Drain Diode Forward Voltage



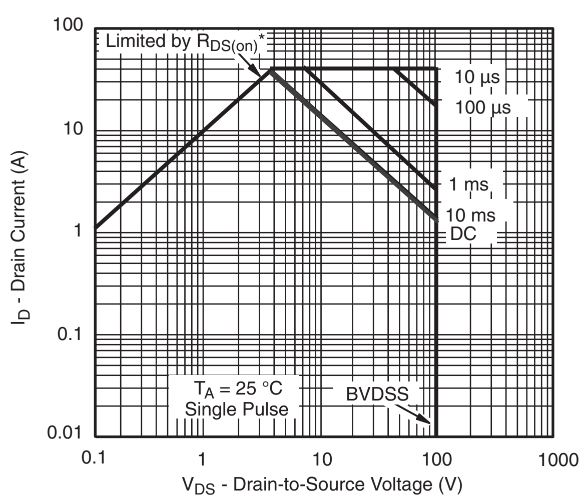
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



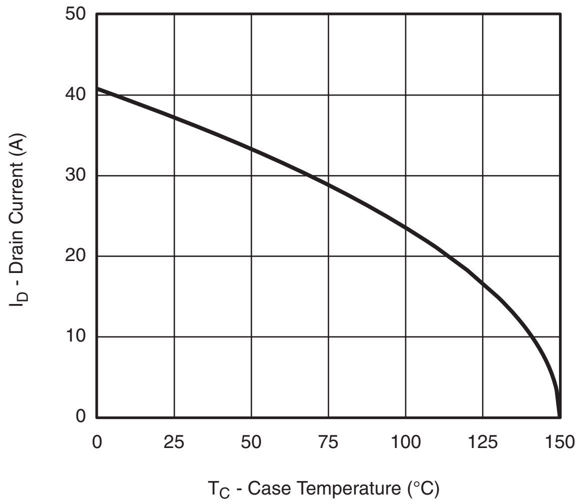
Single Pulse Avalanche Capability



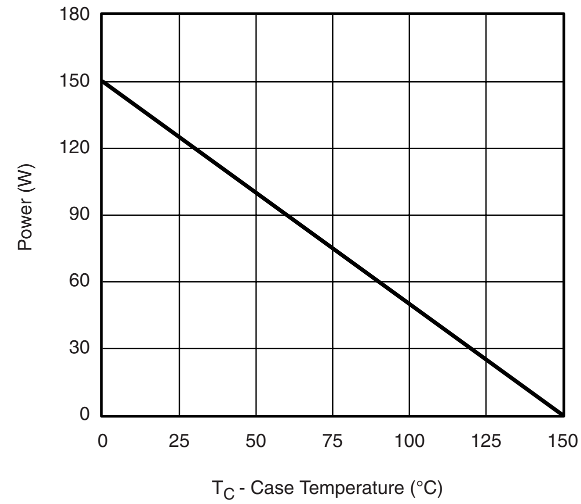
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

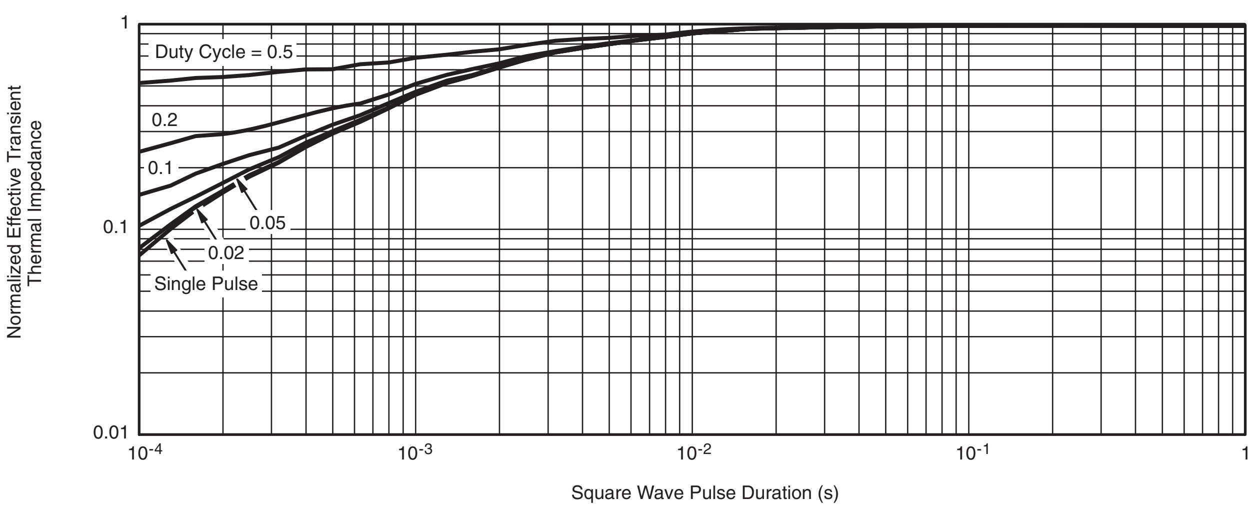


Current Derating*



Power Derating, Junction-to-Case

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?65458.

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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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. 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.