

P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ)
- 60	0.060 at $V_{GS} = - 10$ V	- 19	26
	0.077 at $V_{GS} = - 4.5$ V	- 16.8	

FEATURES

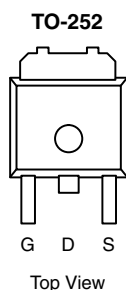
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



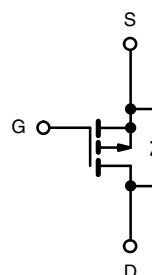
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- High Side Switch for Full Bridge Converter
- DC/DC Converter for LCD Display



Drain Connected to Tab



Ordering Information: SUD19P06-60-E3 (Lead (Pb)-free)

SUD19P06-60-GE3 (Lead (Pb)-free and Halogen free)

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise note)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D - 18.3	A
	$T_C = 125$ °C	- 8.19	
Pulsed Drain Current	I_{DM}	- 30	
Avalanche Current, Single Pulse	I_{AS}	- 22	
Repetitive Avalanche Energy, Single Pulse ^a	E_{AS}	24.2	mJ
Power Dissipation	$T_C = 25$ °C	P_D 38.5 ^c	W
	$T_A = 25$ °C	2.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^b	R_{thJA}	17	21	°C/W
		45	55	
Maximum Junction-to-Case	R_{thJC}	2.7	3.25	

Notes:

a. Duty cycle ≤ 1 %.

b. When mounted on 1" square PCB (FR-4 material).

c. See SOA curve for voltage derating.

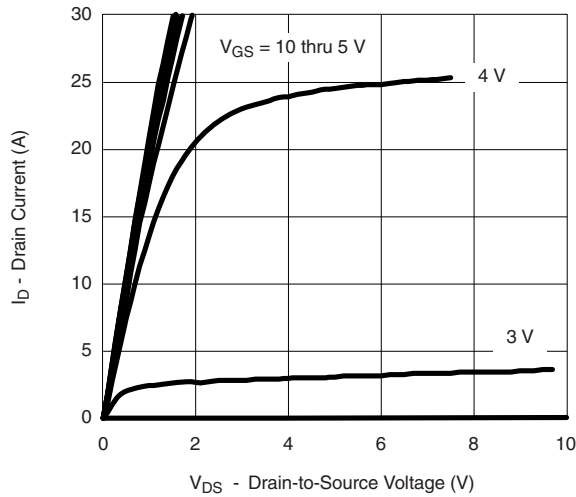
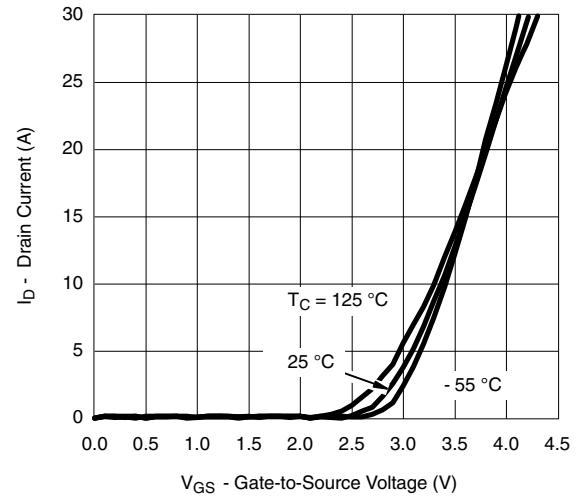
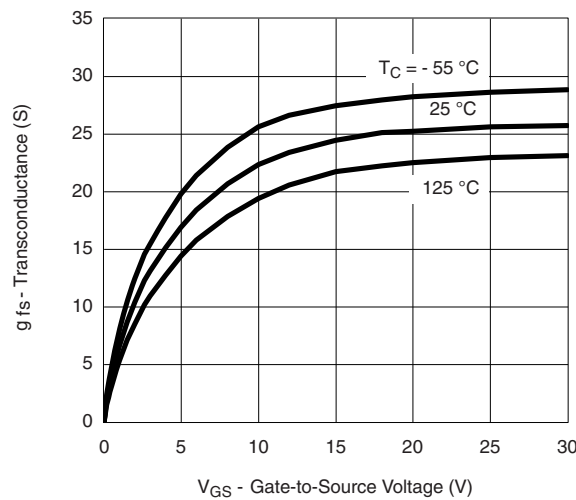
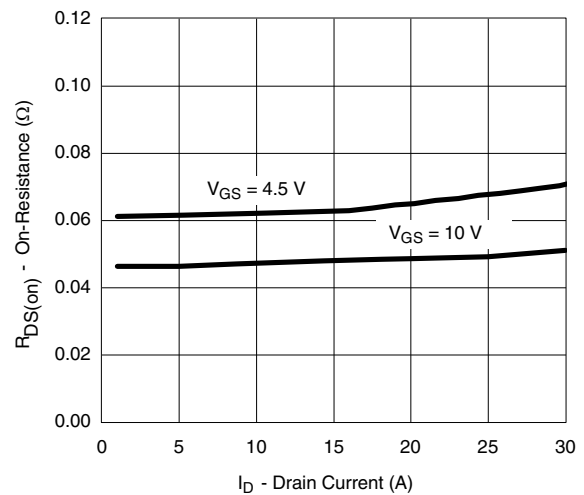
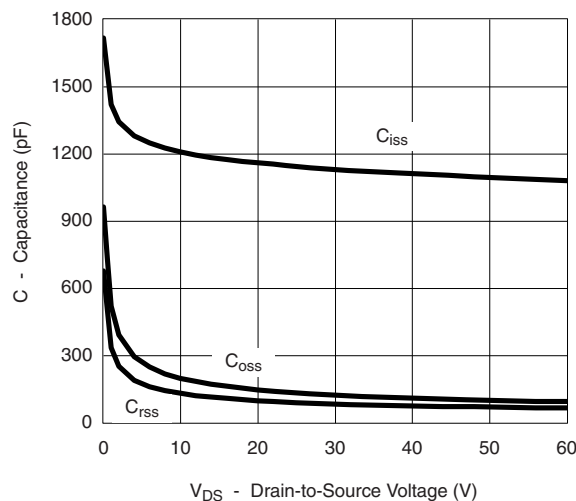
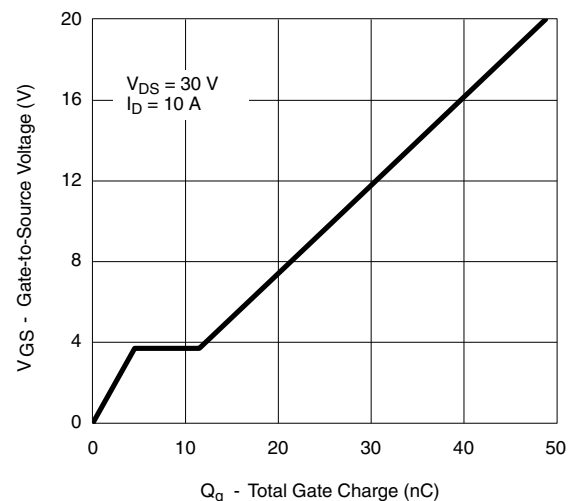
d. Based up on $T_C = 25$ °C.

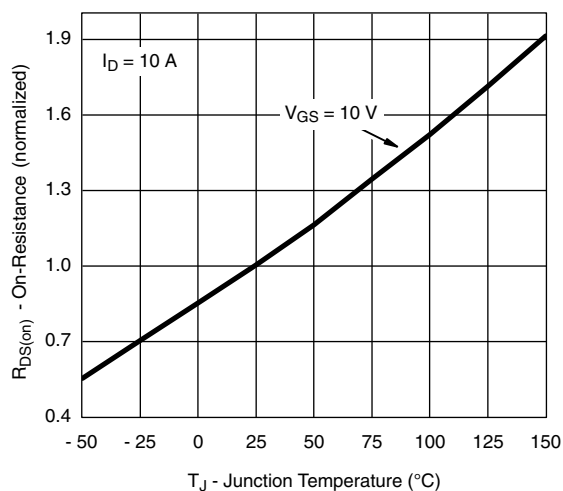
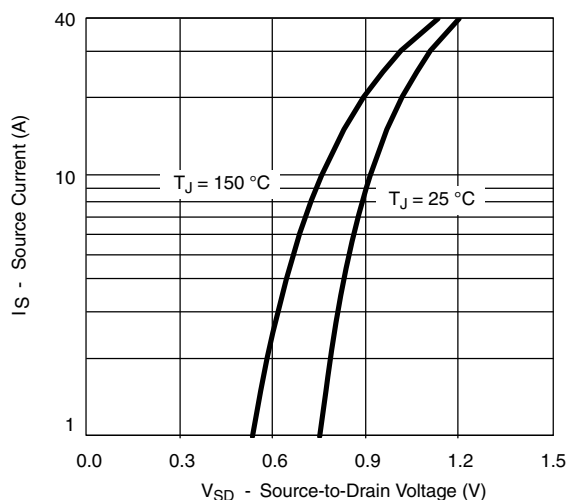
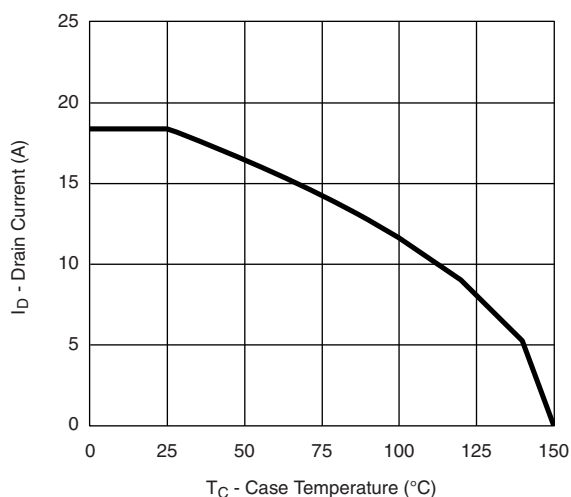
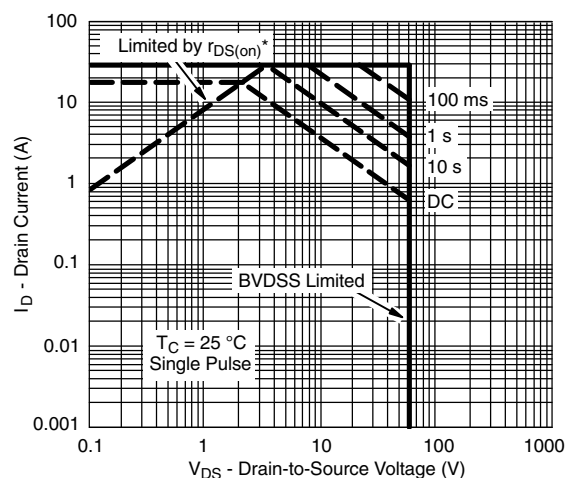
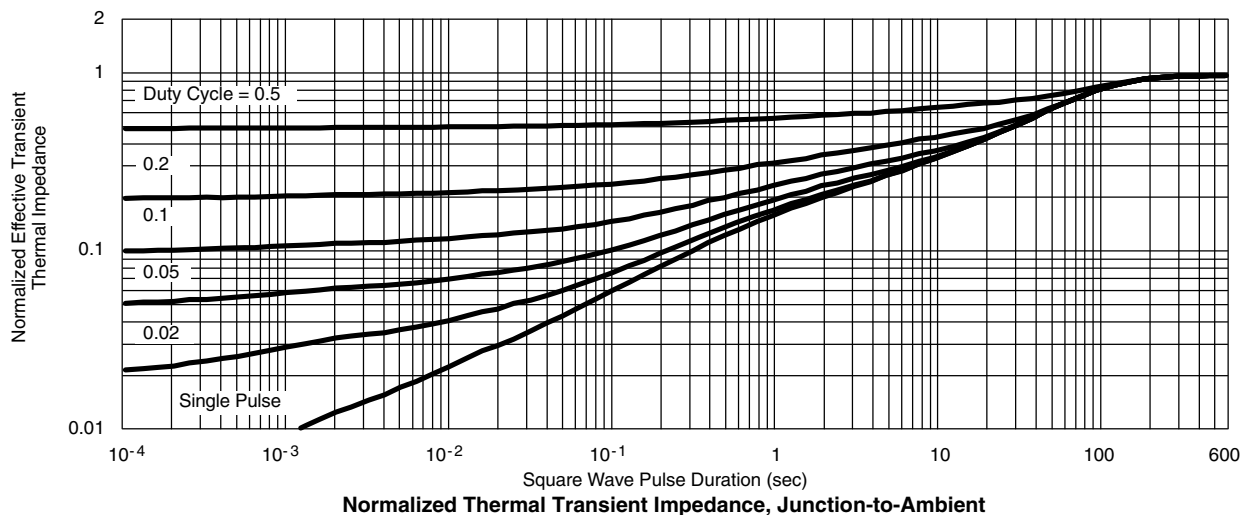
SPECIFICATIONS (T _J = 25 °C, unless otherwise note)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = - 250 μA	- 60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1		- 3	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 60 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 125 °C			- 50	
		V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 150 °C			- 125	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = - 5 V, V _{GS} = - 10 V	- 30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 10 A		0.048	0.060	Ω
		V _{GS} = - 10 V, I _D = - 10 A, T _J = 125 °C			0.102	
		V _{GS} = - 10 V, I _D = - 10 A, T _J = 150 °C			0.120	
		V _{GS} = - 4.5 V, I _D = - 5 A		0.061	0.077	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 10 A		22		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = - 25 V, f = 1 MHz		1140	1710	pF
Output Capacitance	C _{oss}			130		
Reverse Transfer Capacitance	C _{rss}			90		
Total Gate Charge ^c	Q _g	V _{DS} = - 30 V, V _{GS} = - 10 V, I _D = - 10 A		26	40	nC
Gate-Source Charge ^c	Q _{gs}			4.5		
Gate-Drain Charge ^c	Q _{gd}			7		
Gate Resistance	R _g	f = 1 MHz		7		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = - 30 V, R _L = 3 Ω I _D ≐ - 19 A, V _{GEN} = - 10 V, R _g = 2.5 Ω		8	15	ns
Rise Time ^c	t _r			9	15	
Turn-Off Delay Time ^c	t _{d(off)}			65	100	
Fall Time ^c	t _f			30	45	
Drain-Source Body Diode and Characteristics (T _C = 25 °C) ^b						
Continuous Current	I _S				- 30	A
Pulsed Current	I _{SM}				- 30	
Forward Voltage ^a	V _{SD}	I _F = - 19 A, V _{GS} = 0 V		- 1	- 1.5	V
Reverse Recovery Time	t _{rr}	I _F = - 19 A, di/dt = 100 A/μs		41	61	ns

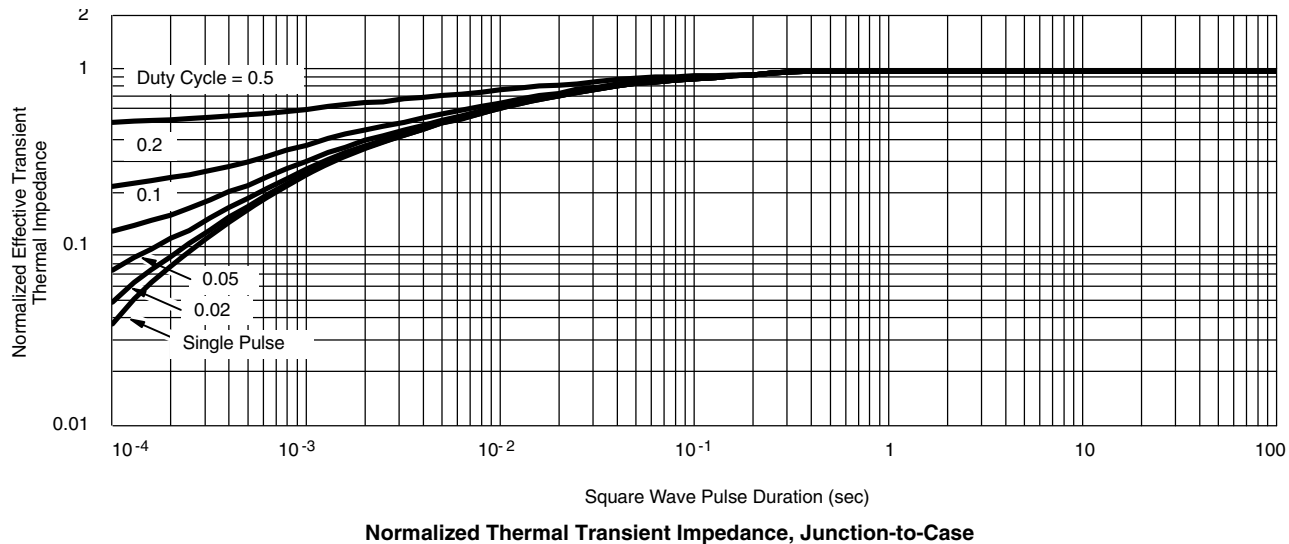
Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
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.

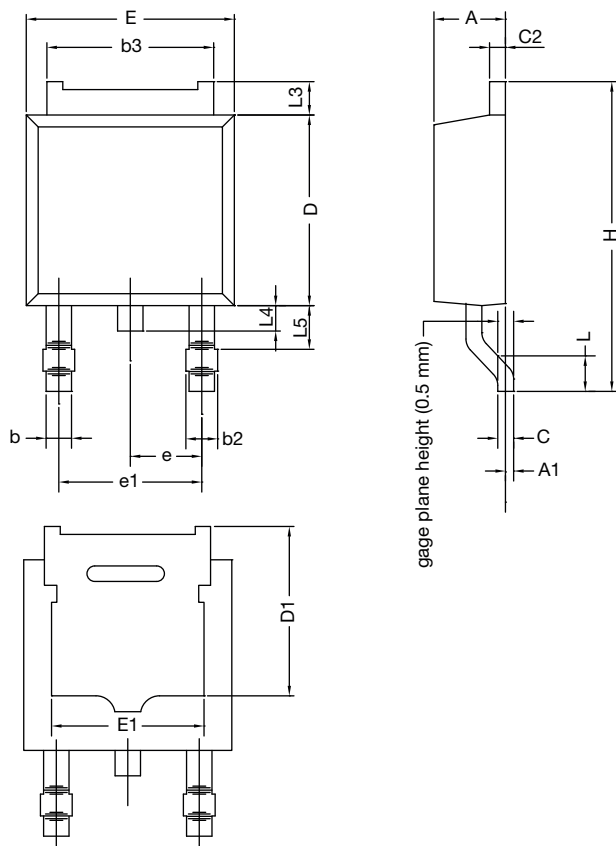
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****THERMAL RATINGS****Maximum Drain Current
vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Ambient**

THERMAL RATINGS


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?69253.

TO-252AA Case Outline

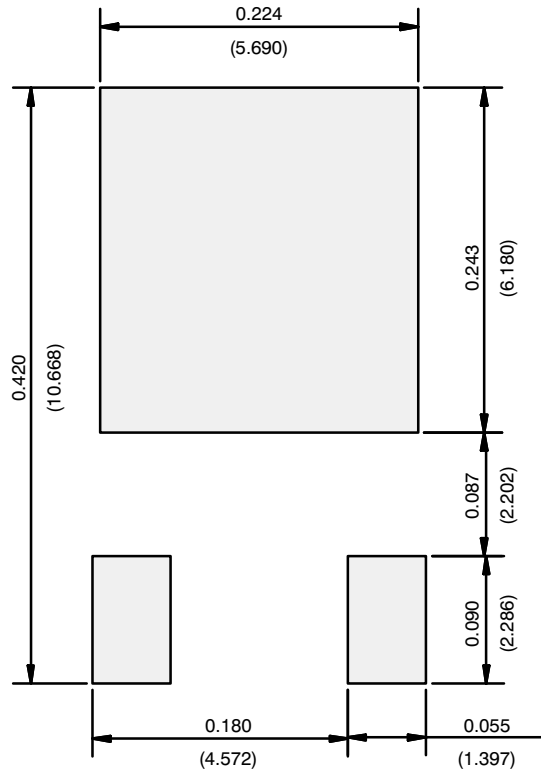


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T16-0236-Rev. P, 16-May-16 DWG: 5347				

Notes

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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. 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.