Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Insulated Gate Bipolar Transistor (Ultrafast Speed IGBT), 100 A

SOT-227

FEATURES

- Ultrafast: optimized for minimum saturation voltage and speed up to 30 kHz in hard switching, > 200 kHz in resonant mode
- Very low conduction and switching losses
- Fully isolate package (2500 $V_{AC/RMS}$)
- Very low internal inductance (≤ 5 nH typical)
- Industry standard outline
- UL approved file E78996
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT

BENEFITS

- Designed for increased operating efficiency in power conversion: UPS, SMPS, welding, induction heating
- Lower overall losses available at frequencies = 20 kHz
- Easy to assemble and parallel
- Direct mounting to heatsink
- Lower EMI, requires less snubbing
- Plug-in compatible with other SOT-227 packages

PRODUCT SUMMARY	
V_{CES}	600 V
$V_{CE(on)}$ (typical)	1.92 V
V_{GE}	15 V
I_C	100 A
Speed	8 kHz to 30 kHz
Package	SOT-227
Circuit	Single switch no diode

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter breakdown voltage	V_{CES}		600	V
Continuous collector current	I_C	T_C = 25 °C	200	A
		T_C = 100 °C	100	
Pulsed collector current	I_{CM}		400	
Clamped inductive load current	I_{LM}	V_{CC} = 80 % (V_{CES}), V_{GE} = 20 V, L = 10 μH, R_g = 2.0 Ω, see fig. 13a	400	
Gate to emitter voltage	V_{GE}		± 20	V
Reverse voltage avalanche energy	E_{ARV}	Repetitive rating; pulse width limited by maximum junction temperature	160	mJ
RMS isolation voltage	V_{ISOL}	Any terminal to case, t = 1 min	2500	V
Maximum power dissipation	P_D	T_C = 25 °C	500	W
		T_C = 100 °C	200	
Operating junction and storage temperature range	T_J, T_{Stg}		-55 to +150	°C
Mounting torque		6-32 or M3 screw	1.3 (12)	Nm (lbf.in)

THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction and storage temperature range	T_J, T_{Stg}		-55	-	150	°C/W
Thermal resistance, junction to case	R_{thJC}		-	-	0.25	
Thermal resistance case to heatsink	R_{thCS}	Flat, greased, surface	-	0.05	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.3 (11.5)	Nm (lbf.in)
Case style			SOT-227			

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Collector to emitter breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0 V, I_C = 250 μA	600	-	-	V
Emitter to collector breakdown voltage	$V_{(BR)ECS}$	V_{GE} = 0 V, I_C = 1.0 A Pulse width ≤ 80 μs; duty factor ≤ 0.1 %	18	-	-	V
Temperature coefficient of breakdown voltage	$\Delta V_{(BR)CES}/\Delta T_J$	V_{GE} = 0 V, I_C = 10 mA	-	0.38	-	V/°C
Collector to emitter saturation voltage	$V_{CE(on)}$	I_C = 100 A; V_{GE} = 15 V, See fig. 2, 5	-	1.60	1.9	V
		I_C = 200 A; V_{GE} = 15 V, See fig. 2, 5	-	1.92	-	
		I_C = 100 A, T_J = 150 °C; V_{GE} = 15 V, See fig. 2, 5	-	1.54	-	
Gate threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250 μA	3.0	-	6.0	V
Temperature coefficient of threshold voltage	$\Delta V_{GE(th)}/\Delta T_J$	V_{CE} = V_{GE}, I_C = 2.0 mA	-	-11	-	mV/°C
Forward transconductance	g_{fe}	V_{CE} = 100 V, I_C = 100 A Pulse width 5.0 μs, single shot	79	-	-	S
Zero gate voltage collector current	I_{CES}	V_{GE} = 0 V, V_{CE} = 600 V	-	-	1.0	mA
		V_{GE} = 0 V, V_{CE} = 600 V, T_J = 150 °C	-	-	10	
Gate to emitter leakage current	I_{GES}	V_{GE} = ± 20 V	-	-	± 250	nA

SWITCHING CHARACTERISTICS (T_J = 25 °C unless otherwise specified)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Total gate charge (turn-on)	Q_g	I_C = 100 A V_{CC} = 400 V V_{GE} = 15 V; See fig. 8	-	770	1200	nC
Gate-emitter charge (turn-on)	Q_{ge}		-	100	150	
Gate-collector charge (turn-on)	Q_{gc}		-	260	380	
Turn-on delay time	$t_{d(on)}$	T_J = 25 °C I_C = 100 A V_{CC} = 480 V V_{GE} = 15 V R_g = 2.0 Ω Energy losses include “tail” See fig. 9, 10, 14	-	54	-	ns
Rise time	t_r		-	79	-	
Turn-off delay time	$t_{d(off)}$		-	130	200	
Fall time	t_f		-	300	450	
Turn-on switching loss	E_{on}		-	0.98	-	mJ
Turn-off switching loss	E_{off}		-	3.48	-	
Total switching loss	E_{ts}		-	4.46	7.6	
Turn-on delay time	$t_{d(on)}$	T_J = 150 °C I_C = 100 A, V_{CC} = 480 V V_{GE} = 15 V, R_g = 2.0 Ω Energy losses include “tail” See fig. 10, 11, 14	-	56	-	ns
Rise time	t_r		-	75	-	
Turn-off delay time	$t_{d(off)}$		-	160	-	
Fall time	t_f		-	460	-	
Total switching loss	E_{ts}		-	7.24	-	mJ
Internal emitter inductance	L_E	Measured 5 mm from package	-	5.0	-	nH
Input capacitance	C_{ies}	V_{GE} = 0 V V_{CC} = 30 V f = 1.0 MHz; See fig. 7	-	16 500	-	pF
Output capacitance	C_{oes}		-	1000	-	
Reverse transfer capacitance	C_{res}		-	200	-	

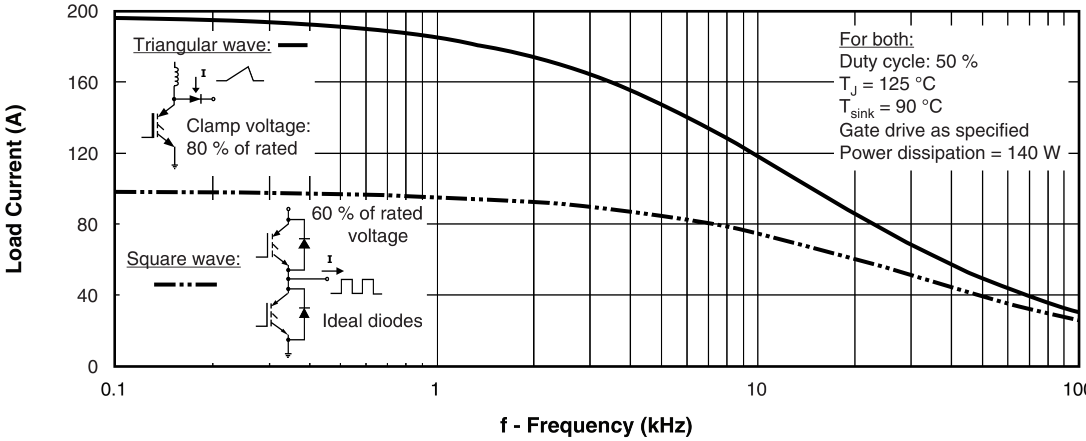


Fig. 1 - Typical Load Current vs. Frequency
(Load Current = I_{RMS} of Fundamental)

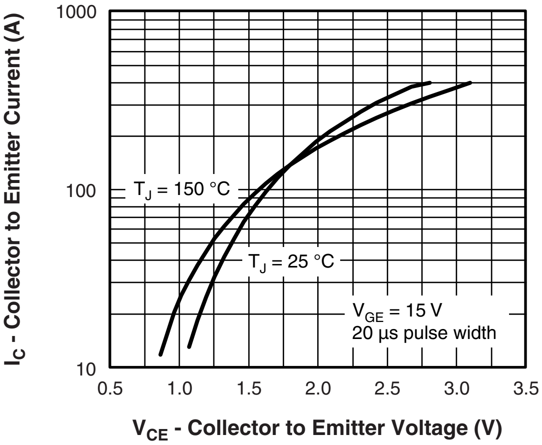


Fig. 2 - Typical Output Characteristics

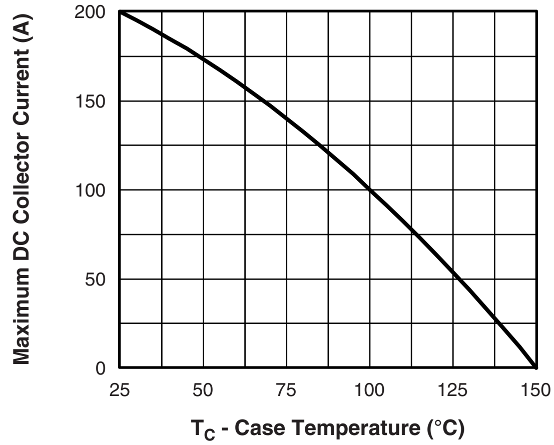


Fig. 4 - Maximum Collector Current vs. Case Temperature

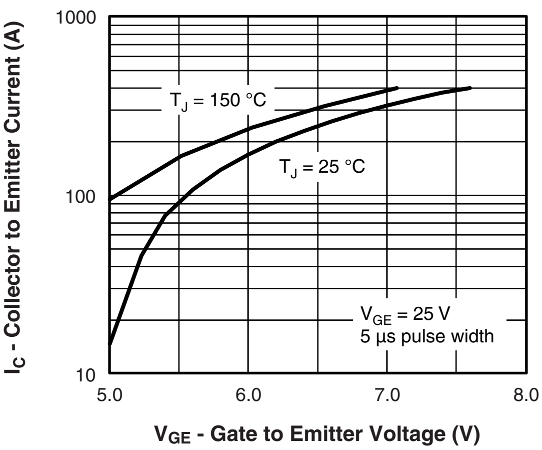


Fig. 3 - Typical Transfer Characteristics

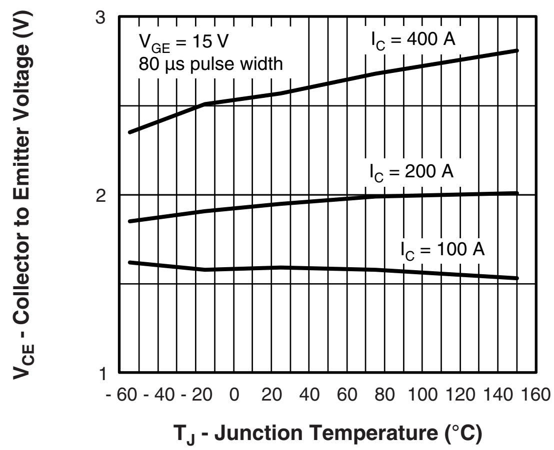


Fig. 5 - Typical Collector to Emitter Voltage vs. Junction Temperature

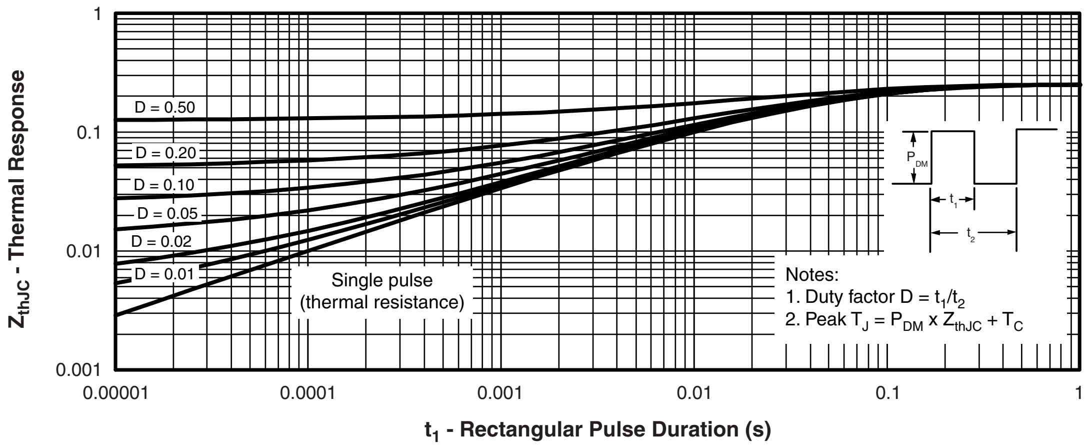


Fig. 6 - Maximum Effective Transient Thermal Impedance, Junction to Case

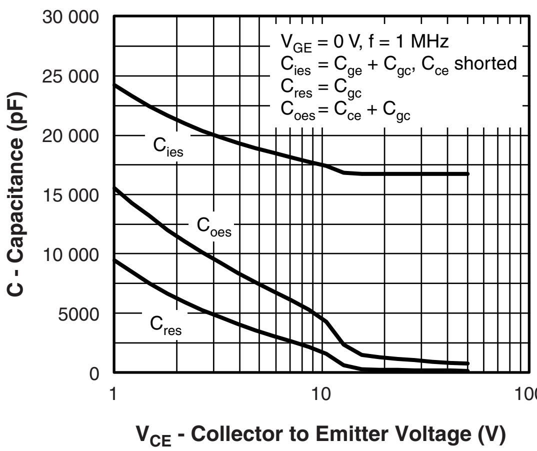


Fig. 7 - Typical Capacitance vs. Collector to Emitter Voltage

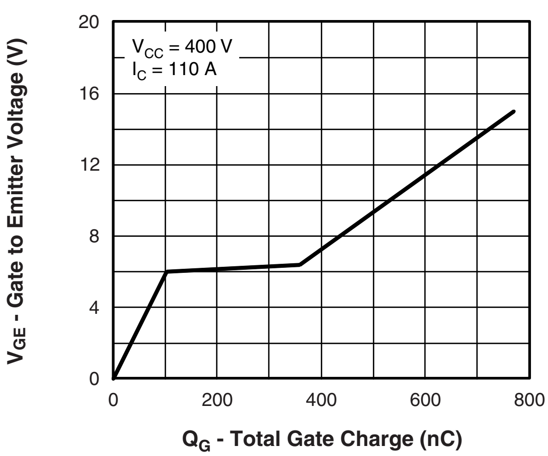


Fig. 8 - Typical Gate Charge vs. Gate to Emitter Voltage

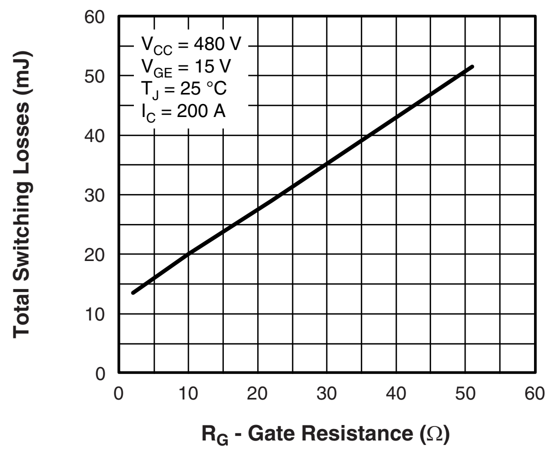


Fig. 9 - Typical Switching Losses vs. Gate Resistance

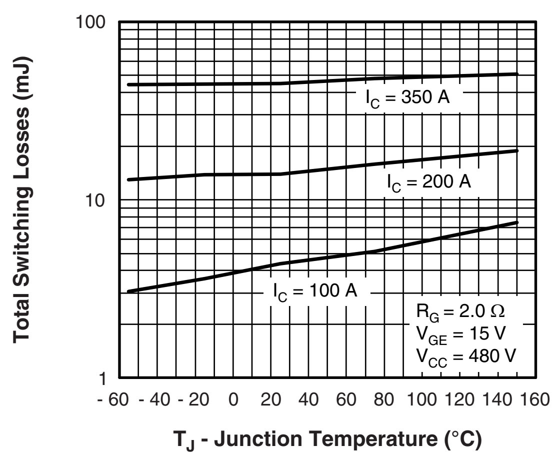


Fig. 10 - Typical Switching Losses vs. Junction Temperature

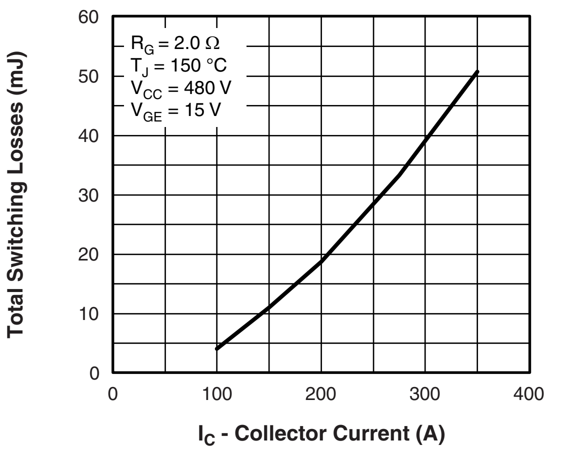
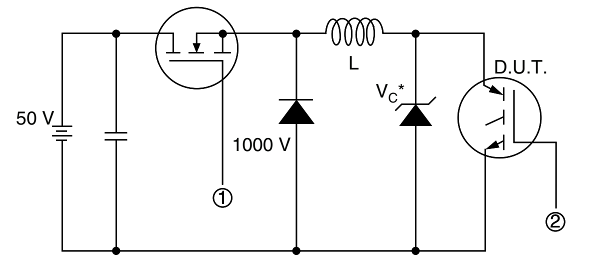


Fig. 11 - Typical Switching Losses vs. Collector Current



* Driver same type as D.U.T.; V_C = 80 % of V_{CE} (max)

Note: Due to the 50 V power supply, pulse width and inductor will increase to obtain rated I_d

Fig. 13a - Clamped Inductive Load Test Circuit

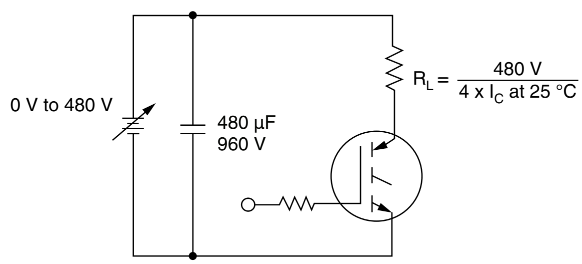


Fig. 13b - Pulsed Collector Current Test Circuit

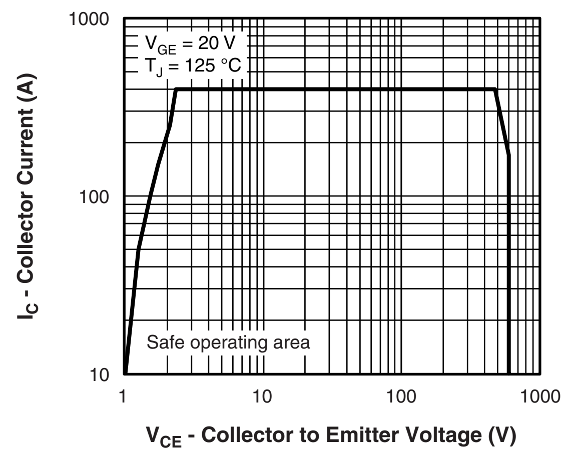
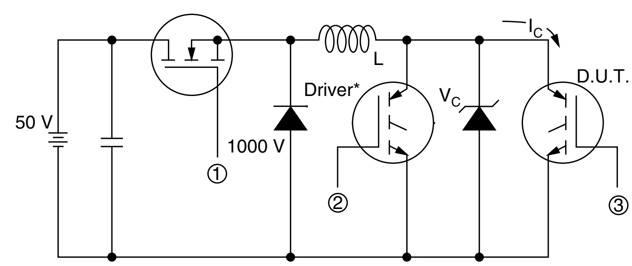


Fig. 12 - Turn-Off SOA



* Driver same type as D.U.T., V_C = 480 V

Fig. 14a - Switching Loss Test Circuit

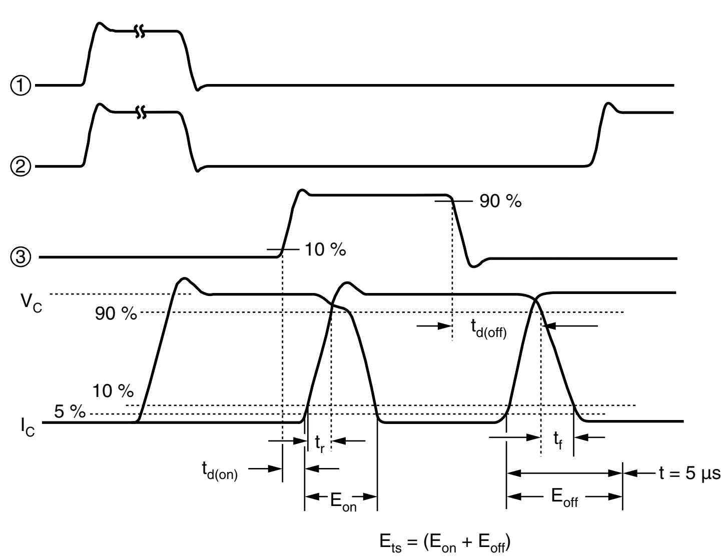


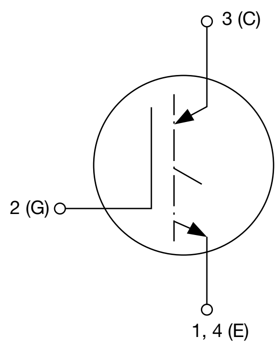
Fig. 14b - Switching Loss Waveforms

ORDERING INFORMATION TABLE

Device code	VS-	G	A	200	S	A	60	U	P
	1	2	3	4	5	6	7	8	9

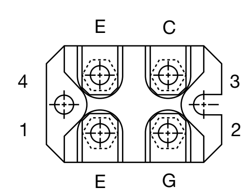
1 - Vishay Semiconductors product
2 - Insulated Gate Bipolar Transistor (IGBT)
3 - Generation 4, IGBT silicon, DBC construction
4 - Current rating (200 = 200 A)
5 - Single switch, no diode
6 - SOT-227
7 - Voltage rating (60 = 600 V)
8 - Speed/type (U = ultrafast)
9 -
- None = standard production
- P = lead (Pb)-free

CIRCUIT CONFIGURATION



n-channel

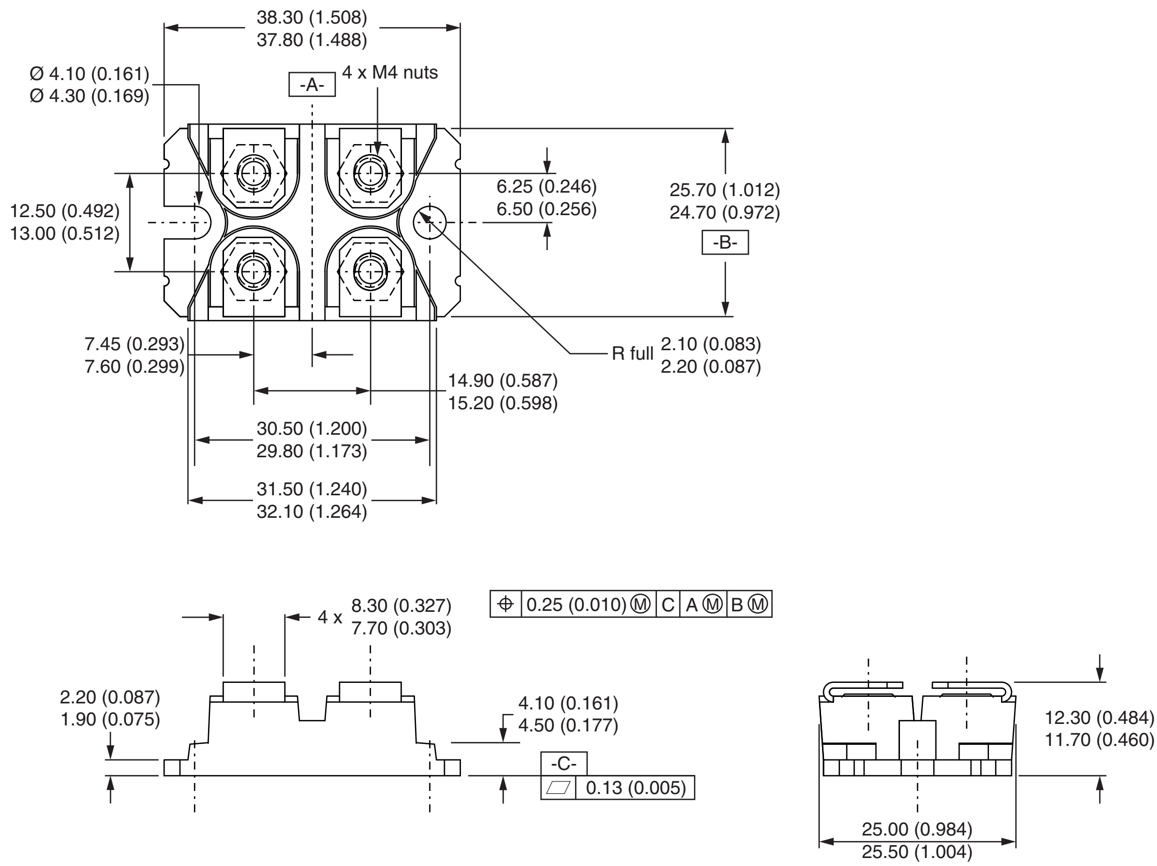
Lead assignment



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95425
Packaging information	www.vishay.com/doc?95423

SOT-227 Generation II

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter

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.