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.

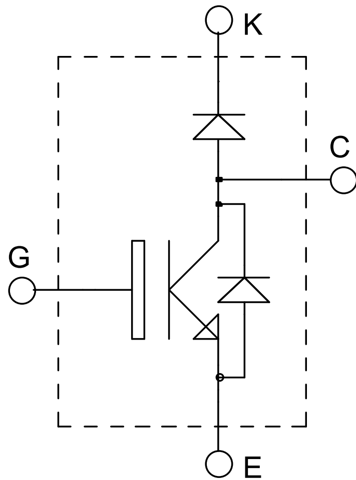
We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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

ISOTOP® Boost chopper
Trench + Field Stop IGBT3

V_{CES} = 1200V
I_C = 100A @ Tc = 80°C

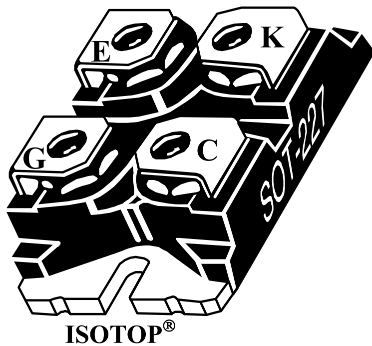


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction
- Brake switch

Features

- Trench + Field Stop IGBT3 Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - RBSOA and SCSOA rated
- ISOTOP® Package (SOT-227)
- Very low stray inductance
- High level of integration



ISOTOP®

Benefits

- Low conduction losses
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- RoHS Compliant

Absolute maximum ratings

Symbol	*Parameter*			*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Breakdown Voltage			1200	V
I_{C1}	Continuous Collector Current		T_C = 25°C	140	A
I_{C2}			T_C = 80°C	100	
I_{CM}	Pulsed Collector Current		T_C = 25°C	280	
V_{GE}	Gate – Emitter Voltage			±20	V
P_D	Maximum Power Dissipation		T_C = 25°C	480	W
IF_{AV}	Maximum Average Forward Current	Duty cycle=0.5	T_C = 80°C	27	A
IF_{RMS}	RMS Forward Current (Square wave, 50% duty)			34	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @ T_j = 25°C unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 1200V				5	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	V_{GE} =15V I_C = 100A	T_j = 25°C	1.4	1.7	2.1	V
			T_j = 125°C		2.0		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE}, I_C = 4mA		5.0		6.5	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = ±20V, V_{CE} = 0V				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f = 1MHz		7200		pF
C_{oes}	Output Capacitance			400		
C_{res}	Reverse Transfer Capacitance			300		
Q_G	Gate charge	V_{GE}=-8/15V, I_C=100A V_{CE}=600V		0.9		µC
$T_{d(on)}$	Turn-on Delay Time	Resistive Switching (25°C) V_{GE} = 15V V_{Bus} = 600V I_C = 100A R_G = 3.9Ω		260		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			420		
T_f	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) V_{GE} = 15V V_{Bus} = 600V I_C = 100A R_G = 3.9Ω		290		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			520		
T_f	Fall Time			90		
E_{on}	Turn-on Switching Energy			10		mJ
E_{off}	Turn-off Switching Energy			12		

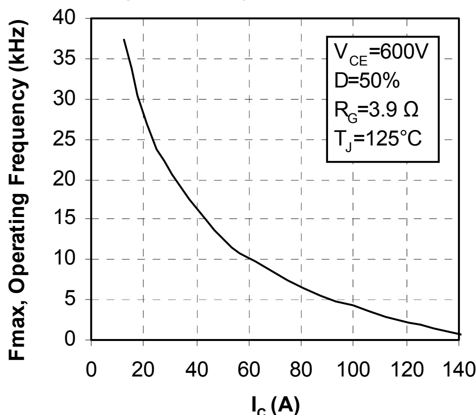
Chopper diode ratings and characteristics

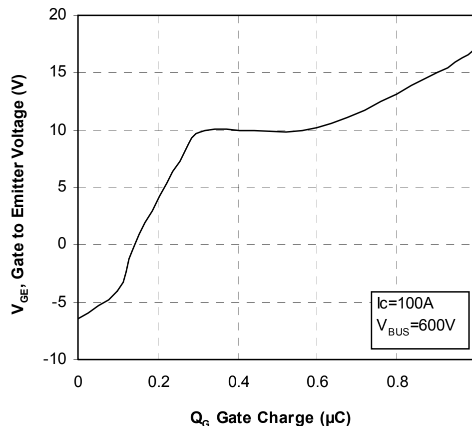
Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_F	Diode Forward Voltage	I_F = 30A			2.0	2.5	V
		I_F = 60A			2.3		
		I_F = 30A	T_j = 125°C		1.8		
I_{RM}	Maximum Reverse Leakage Current	V_R = 1200V	T_j = 25°C			250	µA
		V_R = 1200V	T_j = 125°C			500	
C_T	Junction Capacitance	V_R = 200V			32		pF
t_{rr}	Reverse Recovery Time	I_F=1A,V_R=30V di/dt =100A/µs	T_j = 25°C		31		ns
	Reverse Recovery Time	I_F = 30A V_R = 800V di/dt =200A/µs	T_j = 25°C		370		
			T_j = 125°C		500		
I_{RRM}	Maximum Reverse Recovery Current		T_j = 25°C		5		A
			T_j = 125°C		12		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		660		nC
			T_j = 125°C		3450		
t_{rr}	Reverse Recovery Time	I_F = 30A V_R = 800V di/dt =1000A/µs	T_j = 125°C		220		ns
Q_{rr}	Reverse Recovery Charge				4650		nC
I_{RRM}	Maximum Reverse Recovery Current				37		A

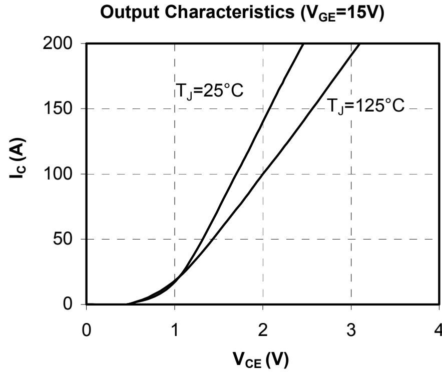
Thermal and package characteristics

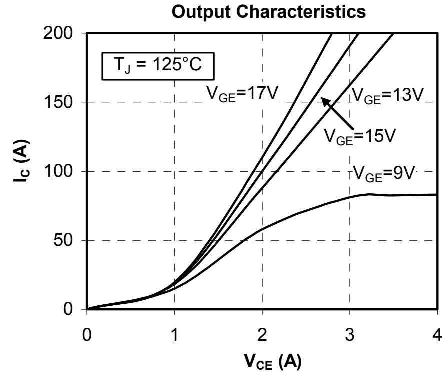
Symbol	*Characteristic*		*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.26	°C/W
		Diode			1.1	
R_{thJA}	Junction to Ambient (IGBT & Diode)				20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz		2500			V
T_J,T_{STG}	Storage Temperature Range		-55		150	°C
T_L	Max Lead Temp for Soldering:0.063" from case for 10 sec				300	
Torque	Mounting torque (Mounting = 8-32 or 4mm Machine and terminals = 4mm Machine)				1.5	N.m
Wt	Package Weight			29.2		g

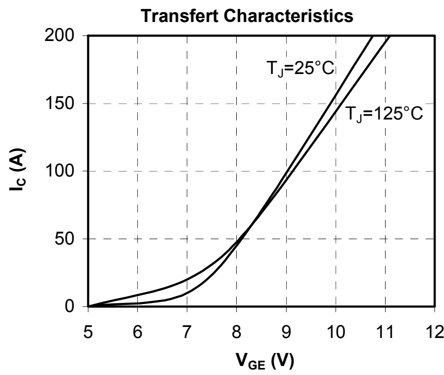
Typical IGBT Performance Curve

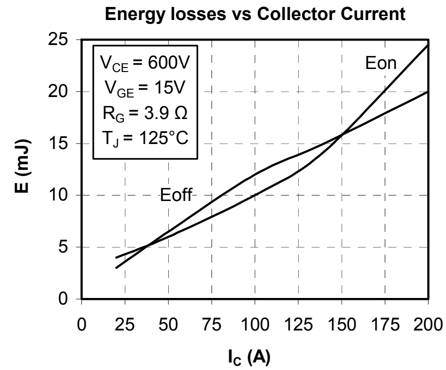


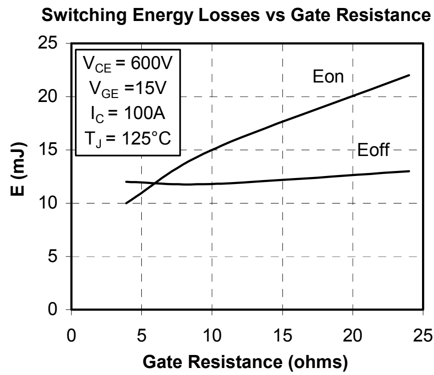


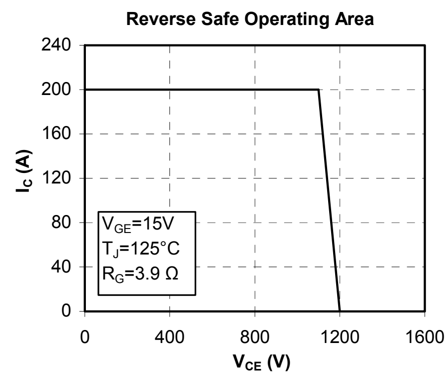

Output Characteristics (V_{GE}=15V)
T_J=25°C
T_J=125°C
I_C (A)
V_{CE} (V)

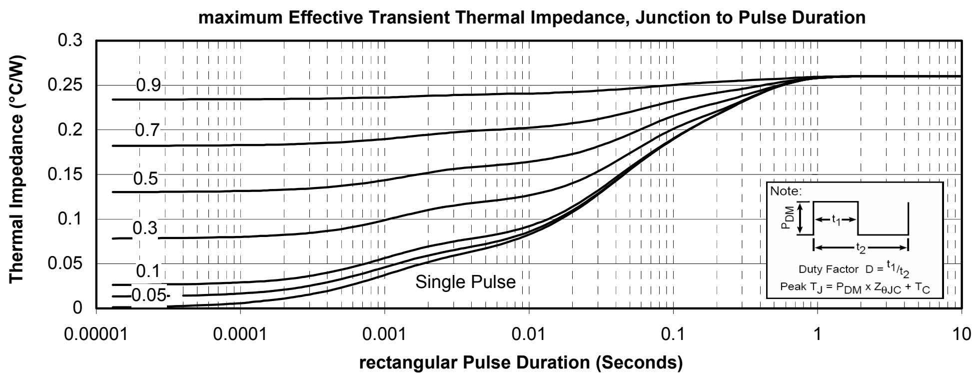

Output Characteristics
T_J = 125°C
V_{GE}=17V
V_{GE}=13V
V_{GE}=15V
V_{GE}=9V
I_C (A)
V_{CE} (A)


Transfert Characteristics
T_J=25°C
T_J=125°C
I_C (A)
V_{GE} (V)


Energy losses vs Collector Current
V_{CE} = 600V
V_{GE} = 15V
R_G = 3.9 Ω
T_J = 125°C
Eon
Eoff
E (mJ)
I_C (A)


Switching Energy Losses vs Gate Resistance
V_{CE} = 600V
V_{GE} =15V
I_C = 100A
T_J = 125°C
Eon
Eoff
E (mJ)
Gate Resistance (ohms)


Reverse Safe Operating Area
V_{GE}=15V
T_J=125°C
R_G=3.9 Ω
I_C (A)
V_{CE} (V)


maximum Effective Transient Thermal Impedance, Junction to Pulse Duration
Thermal Impedance (°C/W)
0.9
0.7
0.5
0.3
0.1
0.05
Single Pulse
Note:
Duty Factor D = t_1/t_2
Peak $T_J = P_{DM} \times Z_{\theta JC} + T_C$
rectangular Pulse Duration (Seconds)

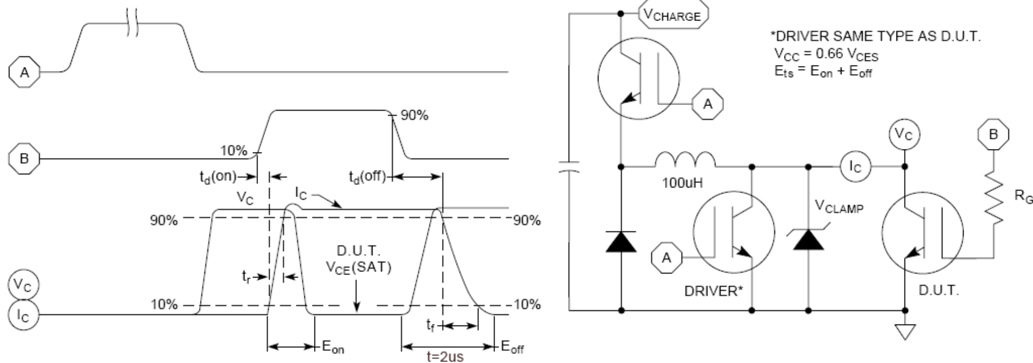


Figure 15, Switching Loss Test Circuit and Waveforms

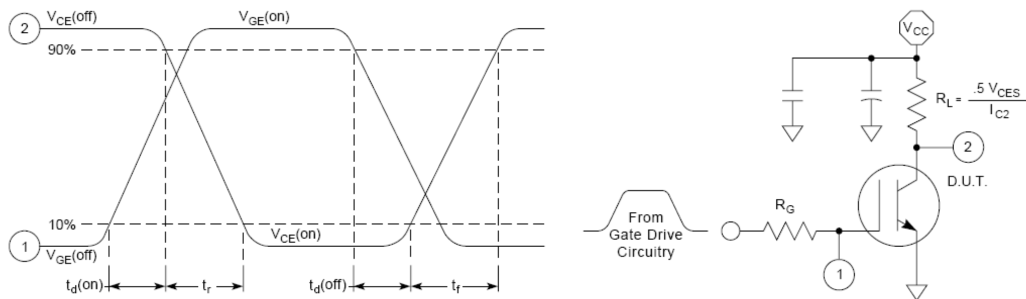


Figure 16, Resistive Switching Time Test Circuit and Waveforms

Typical Diode Performance Curve

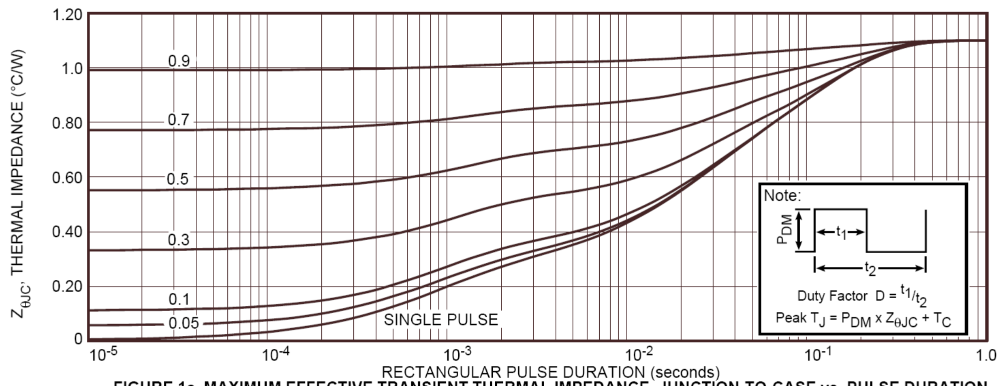


FIGURE 1a. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

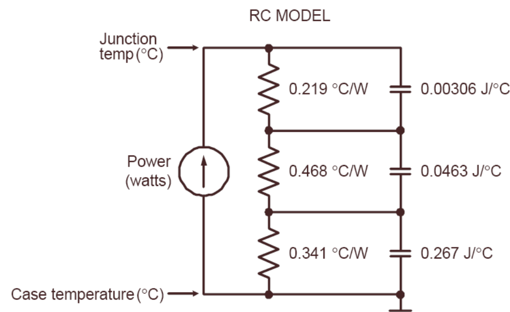


FIGURE 1b, TRANSIENT THERMAL IMPEDANCE MODEL

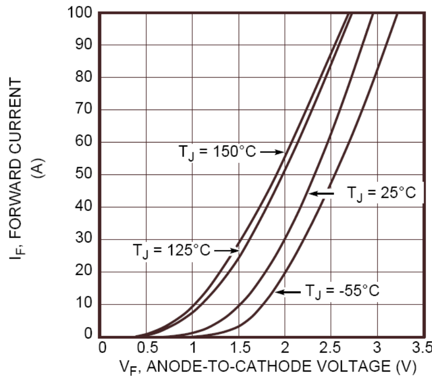


Figure 2. Forward Current *vs.* Forward Voltage

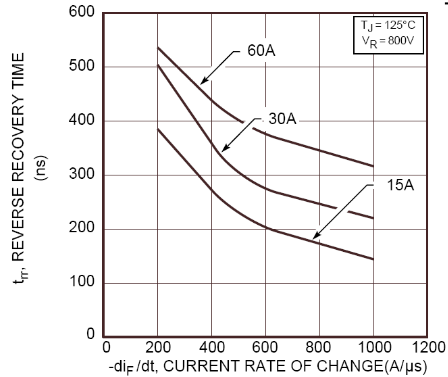


Figure 3. Reverse Recovery Time *vs.* Current Rate of Change

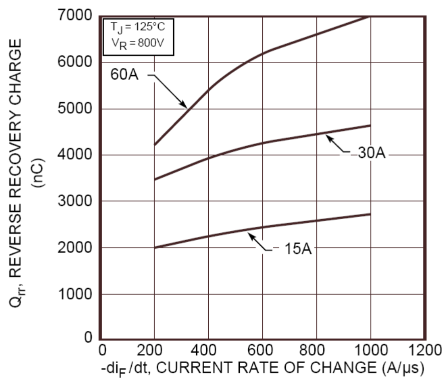


Figure 4. Reverse Recovery Charge *vs.* Current Rate of Change

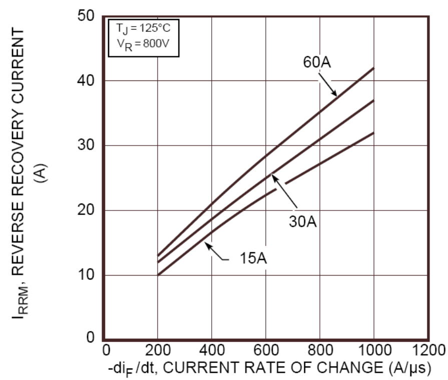


Figure 5. Reverse Recovery Current *vs.* Current Rate of Change

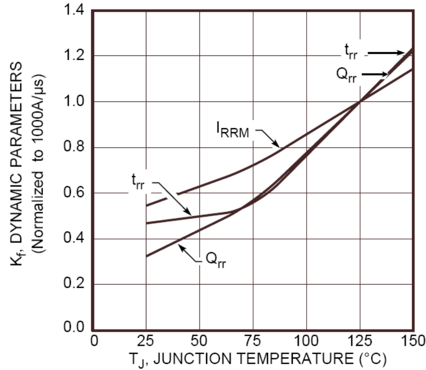


Figure 6. Dynamic Parameters *vs.* Junction Temperature

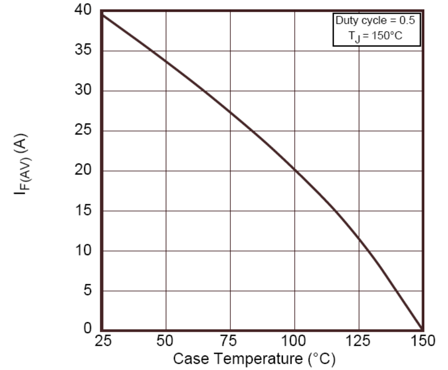


Figure 7. Maximum Average Forward Current *vs.* CaseTemperature

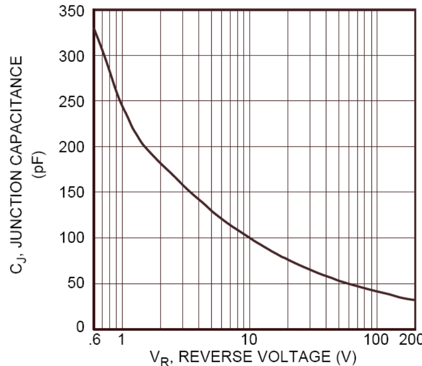


Figure 8. Junction Capacitance *vs.* Reverse Voltage

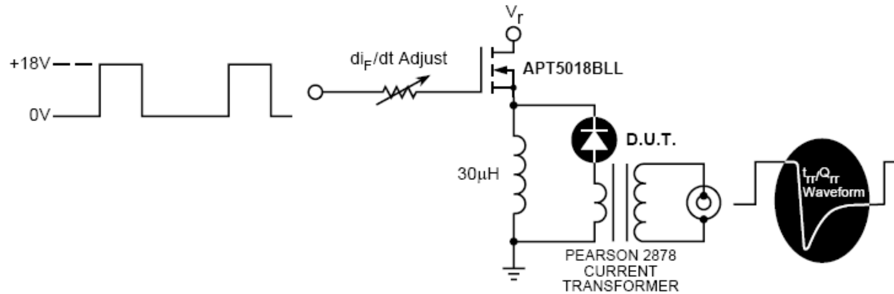


Figure 9. Diode Test Circuit

1. I_F - Forward Conduction Current
2. di_F/dt - Rate of Diode Current Change Through Zero Crossing.
3. I_{RRM} - Maximum Reverse Recovery Current.
4. t_{rr} - Reverse Recovery Time, measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through I_{RRM} and $0.25 \bullet I_{RRM}$ passes through zero.
5. Q_{rr} - Area Under the Curve Defined by I_{RRM} and t_{rr}.

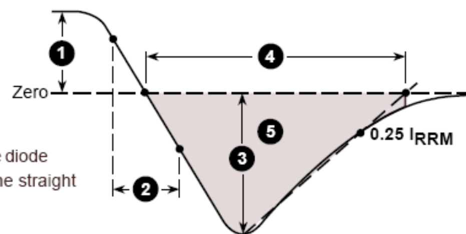
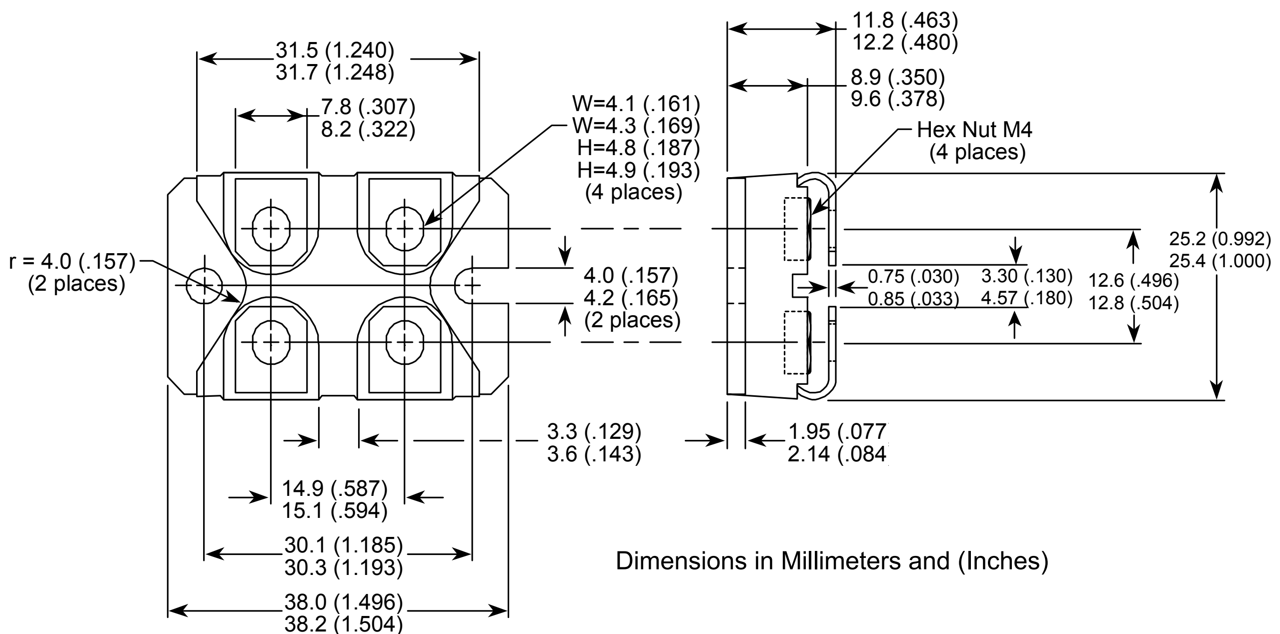


Figure 10, Diode Reverse Recovery Waveform and Definitions

SOT-227 (ISOTOP®) Package Outline



ISOTOP® is a registered trademark of ST Microelectronics NV

DISCLAIMER

The information contained in the document (unless it is publicly available on the Web without access restrictions) is PROPRIETARY AND CONFIDENTIAL information of Microsemi and cannot be copied, published, uploaded, posted, transmitted, distributed or disclosed or used without the express duly signed written consent of Microsemi. If the recipient of this document has entered into a disclosure agreement with Microsemi, then the terms of such Agreement will also apply. This document and the information contained herein may not be modified, by any person other than authorized personnel of Microsemi. No license under any patent, copyright, trade secret or other intellectual property right is granted to or conferred upon you by disclosure or delivery of the information, either expressly, by implication, inducement, estoppels or otherwise. Any license under such intellectual property rights must be approved by Microsemi in writing signed by an officer of Microsemi.

Microsemi reserves the right to change the configuration, functionality and performance of its products at anytime without any notice. This product has been subject to limited testing and should not be used in conjunction with life-support or other mission-critical equipment or applications. Microsemi assumes no liability whatsoever, and Microsemi disclaims any express or implied warranty, relating to sale and/or use of Microsemi products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Any performance specifications believed to be reliable but are not verified and customer or user must conduct and complete all performance and other testing of this product as well as any user or customers final application. User or customer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the customer's and user's responsibility to independently determine suitability of any Microsemi product and to test and verify the same. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the User. Microsemi specifically disclaims any liability of any kind including for consequential, incidental and punitive damages as well as lost profit. The product is subject to other terms and conditions which can be located on the web at http://www.microsemi.com/legal/tnc.asp

Life Support Application

Seller's Products are not designed, intended, or authorized for use as components in systems intended for space, aviation, surgical implant into the body, in other applications intended to support or sustain life, or for any other application in which the failure of the Seller's Product could create a situation where personal injury, death or property damage or loss may occur (collectively "Life Support Applications").
Buyer agrees not to use Products in any Life Support Applications and to the extent it does it shall conduct extensive testing of the Product in such applications and further agrees to indemnify and hold Seller, and its officers, employees, subsidiaries, affiliates, agents, sales representatives and distributors harmless against all claims, costs, damages and expenses, and attorneys' fees and costs arising, directly or directly, out of any claims of personal injury, death, damage or otherwise associated with the use of the goods in Life Support Applications, even if such claim includes allegations that Seller was negligent regarding the design or manufacture of the goods.

Buyer must notify Seller in writing before using Seller's Products in Life Support Applications. Seller will study with Buyer alternative solutions to meet Buyer application specification based on Sellers sales conditions applicable for the new proposed specific part.