



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



COPACK (Si IGBT/SiC SBD) SOT-227 Power Module

$V_{CES} = 1200V$
 $I_C = 60A @ T_C = 100^{\circ}C$
 $V_{CE(SAT)} = 2.0V$

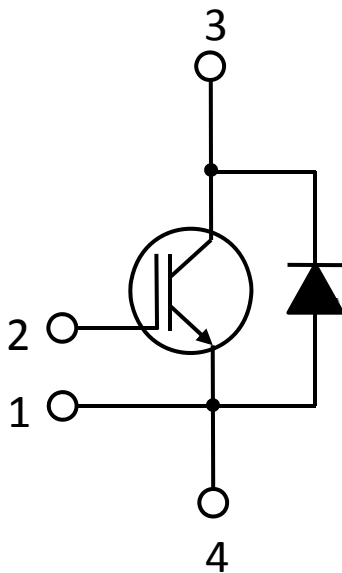


Features

- High speed switching IGBT
- Freewheeling diode with zero reverse recovery SiC SBDs
- Low collector to emitter saturation voltage
- Short circuit withstanding time (10 μs min.)
- Kelvin reference for stable gate driving
- High junction temperature operation
- Positive temperature coefficient for easy to parallel mounting

Applications

- Photo Voltaic Inverter
- Aerospace actuators
- Server Power supplies
- High voltage AC/DC Converter
- Inductive heating and welding machine



Benefits

- Outstanding power conversion efficiency at high switching frequency operation
- Low switching losses and Low EMI noises
- Very rugged and easy mount
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_f
- RoHS Compliant

Absolute Maximum Ratings ($T_J = 25^{\circ}C$ unless otherwise specified)

Parameters	Symbol	Conditions	Specifications	Units
Si IGBT				
Collector - Emitter Breakdown Voltage	V_{CES}		1200	V
Continuous Collector Current	I_C	$T_C = 25^{\circ}C$	120	A
		$T_C = 100^{\circ}C$	60	A

Gate-Emitter Voltage	V_{GES}		± 20	V
Pulsed Collector Current	ICM		180	A
SiC SBDs				
Maximum Reverse Voltage	V_{RRM}		1200	V
Average Forward Current	I_{DAV}	$T_j = 25^\circ\text{C}$	60	A
		$T_j = 150^\circ\text{C}$	30	A
Non-repetitive Forward Surge Current	I_{FSM}	$t=8.3\text{ ms}, T_j = 25^\circ\text{C}$	240	A
		$T=10\ \mu\text{s}, T_j = 25^\circ\text{C}$	600	A
COPACK Modules Thermal Properties				
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	680	W
		$T_C = 100^\circ\text{C}$	280	W
Operating Junction Temperature	T_j		-55 ~ 150	$^\circ\text{C}$
Storage Temperature	T_{STG}		-55 ~ 150	$^\circ\text{C}$

IGBT Electrical Characteristics ($T_j=25^\circ\text{C}$ unless otherwise specified)

Parameters	Symbol	Conditions	Min	Typ	Max	Units
OFF						
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}$	--	--	2	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE} = 0\text{V}, V_{GE} = 20\text{V}$	--	--	± 500	nA
ON						
Gate-Emitter Threshold Voltage	$V_{GE(TH)}$	$V_{GE} = V_{CE}, I_C = 60\text{mA}$	3.5	5.5	7.5	V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$V_{CE} = 15\text{V}, I_C = 60\text{A}, T_j = 25^\circ\text{C}$	--	2.0	2.5	V
		$V_{CE} = 15\text{V}, I_C = 60\text{A}, T_j = 125^\circ\text{C}$	--	2.3	--	V
DYNAMIC						
Input Capacitance	C_{IES}	$V_{CE} = 30\text{V}, V_{GE} = 0\text{V}, f = 1\text{ MHz}$	--	8000	--	pF
Output Capacitance	C_{OES}		--	210	--	pF
Reverse Transfer Capacitance	C_{RES}		--	144	--	pF
SWITCHING						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_C = 60\text{A}$ $R_G = 5\ \Omega, V_{GE} = 15\text{V}$ Inductive Load, $T_j = 25^\circ\text{C}$	--	45	--	ns
Rise Time	t_r		--	55	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	250	--	ns
Fall Time	t_f		--	70	--	ns
Turn-On Switching Energy Loss	E_{ON}		--	7.2	--	mJ
Turn-Off Switching Energy Loss	E_{OFF}		--	1.95	--	mJ

Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=60A$ $R_G=5\Omega, V_{GE}=15V$ Inductive Load, $T_J=125^\circ C$	--	40	--	ns
Rise Time	t_r		--	45	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	260	--	ns
Fall Time	t_f		--	150	--	ns
Turn-On Switching Energy Loss	E_{ON}		--	7.6	--	mJ
Turn-Off Switching Energy Loss	E_{OFF}		--	3.6	--	mJ
Total Gate Charge	Q_g	$V_{CC}=600V, I_C=60A$ $V_{GE}=15V$	--	340	--	nC
Gate-Emitter Charge	Q_{ge}		--	54	--	nC
Gate-Collector Charge	Q_{gc}		--	120	--	nC
Short Circuit Withstanding Time	t_{sc}	$V_{CC}=600V, V_{GE}=15V$ $T_J=125^\circ C$	--	--	10	μs

SiC Diode Rating and Characteristics ($T_J=25^\circ C$ unless otherwise specified)

Parameters	Symbol	Conditions	Min	Typ	Max	Units
Maximum peak repetitive reverse voltage	V_{RRM}		1200	--	--	V
Maximum Reverse Leakage Current	I_{RM}	$V_R=1200V, T_J=25^\circ C$	--	9	200	μA
		$V_R=1200V, T_J=150^\circ C$	--	1212	--	μA
Diode Forward Voltage	V_F	$I_F=30A, T_J=25^\circ C$	--	1.5	1.7	V
		$I_F=30A, T_J=150^\circ C$	--	2.3	--	V
Total Capacitive Charge	Q_C	$V_R=1200V, I_F < I_{F,max}$	--	105	--	nC
Switching Time	t_C	$di_F/dt = 200 A/\mu s, T_J = 175^\circ C$	--	--	10	ns
Total Capacitance	C	$V_R=1V, f=1MHz$	--	1800	--	pF
		$V_R=600V, f=1MHz$	--	105	--	pF
		$V_R=1200V, f=1MHz$	--	86	--	pF

Thermal and Package Characteristics ($T_J=25^\circ C$ unless otherwise specified)

Parameters	Symbol	Conditions	Min	Typ	Max	Units
Junction to Case Thermal Resistance	R_{THJC}	IGBT chip	--	--	0.35	$^\circ C/W$
		SiC SBD chip	--	--	0.65	$^\circ C/W$
Mounting Torque	M_d				1.5	N-m
Terminal Connection Torque	M_{dt}		1.3	--	1.5	N-m
Package Weight	W_t			32		g
Isolation Voltage	V_{ISOL}	$I_{ISOL} < 1mA, 50/60Hz, t=1min$	2500	V		

IGBT Characteristics per IGBT (2*30A die in parallel inside module)

Fig. 1 Output characteristics

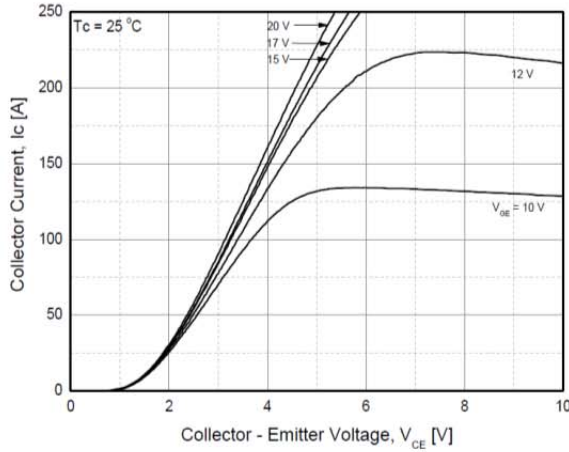


Fig. 2 Saturation voltage characteristics

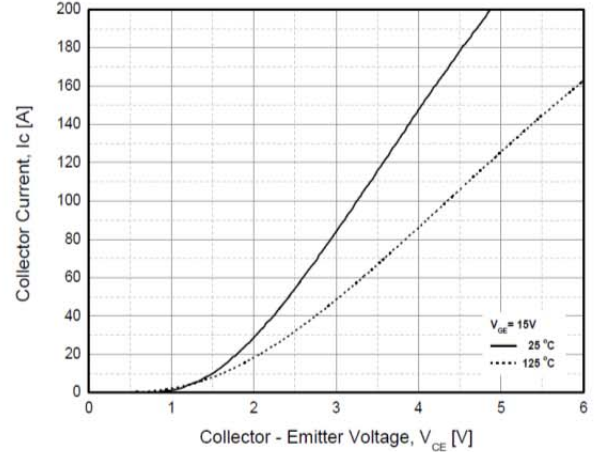


Fig. 3 Saturation voltage vs. collector current

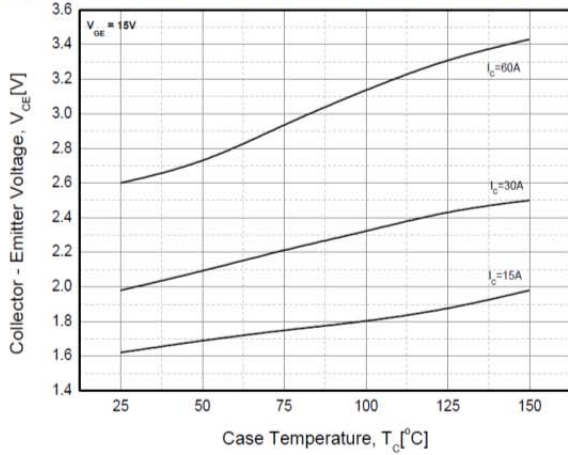


Fig. 4 Saturation voltage vs. gate bias

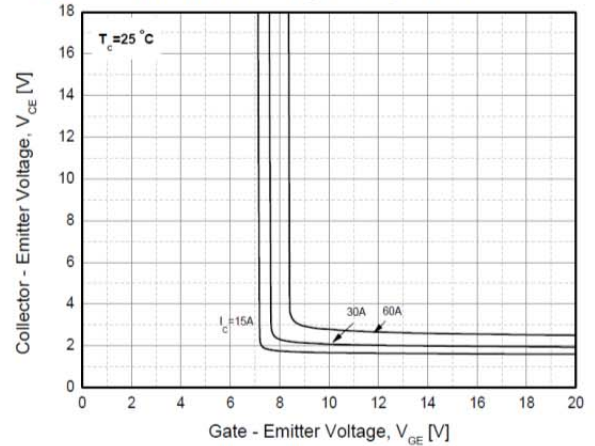


Fig. 5 Saturation voltage vs. gate bias

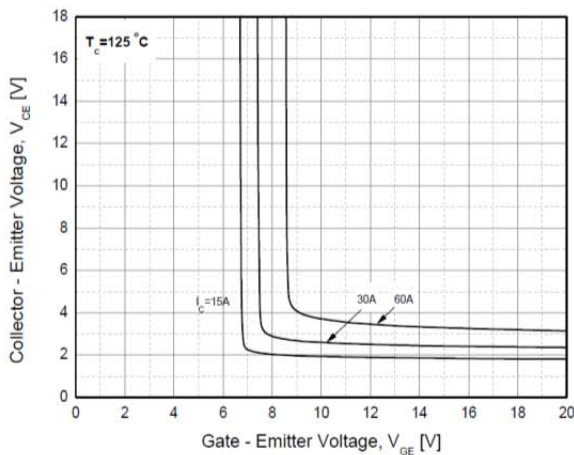


Fig. 6 Capacitance characteristics

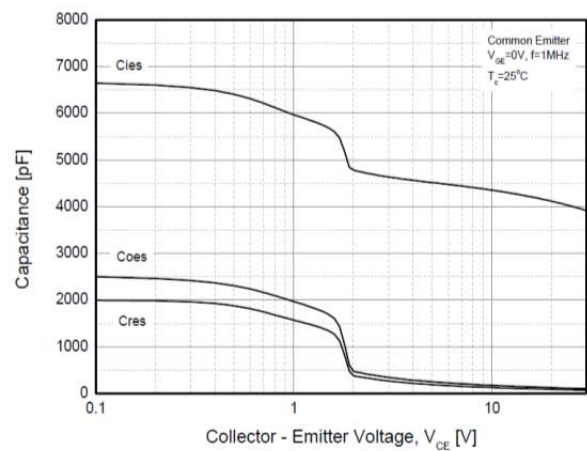


Fig. 7 Turn on time vs. gate resistance

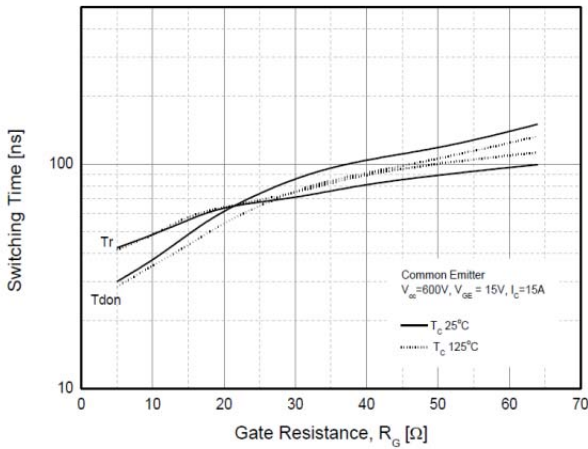


Fig. 8 Turn off time vs. gate resistance

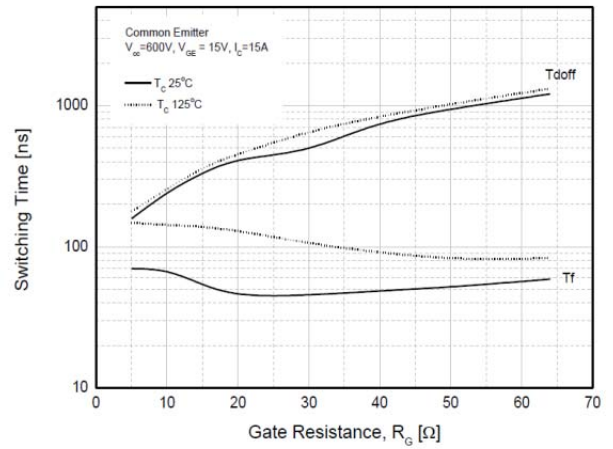


Fig. 9 Switching loss vs. gate resistance

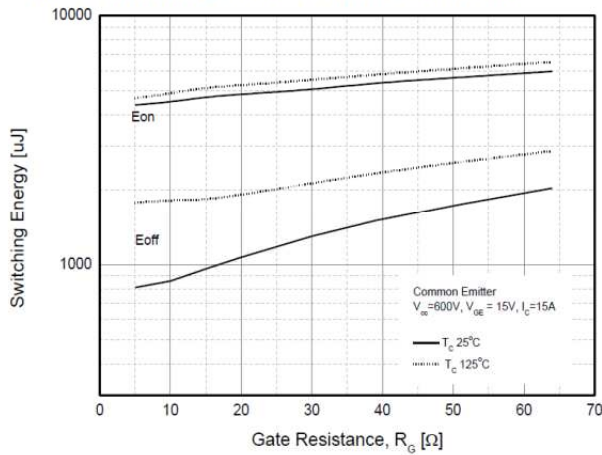


Fig. 10 Turn on time vs. collector current

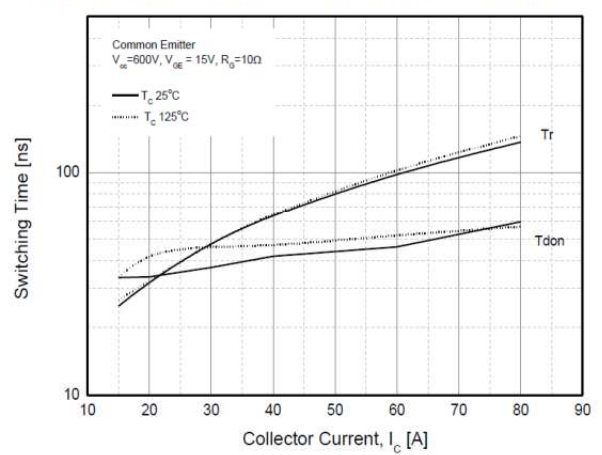


Fig. 11 Turn off time vs. collector current

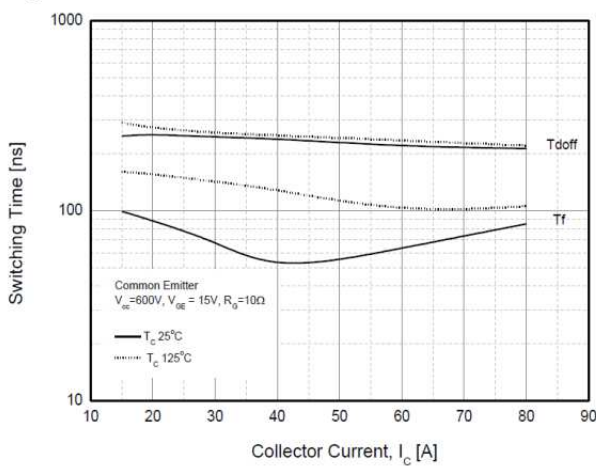


Fig. 12 Switching loss vs. collector current

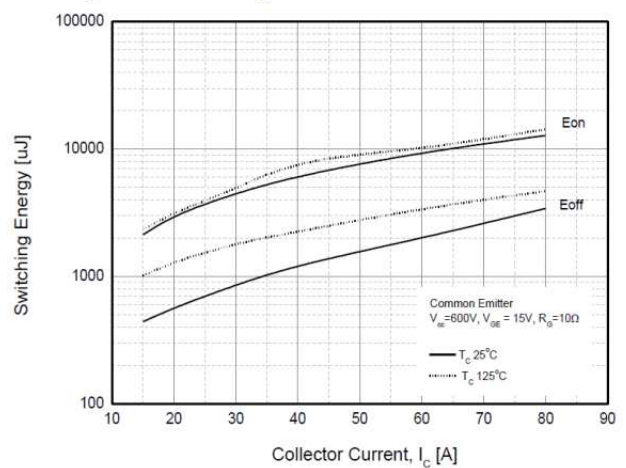


Fig. 13 Gate charge characteristics

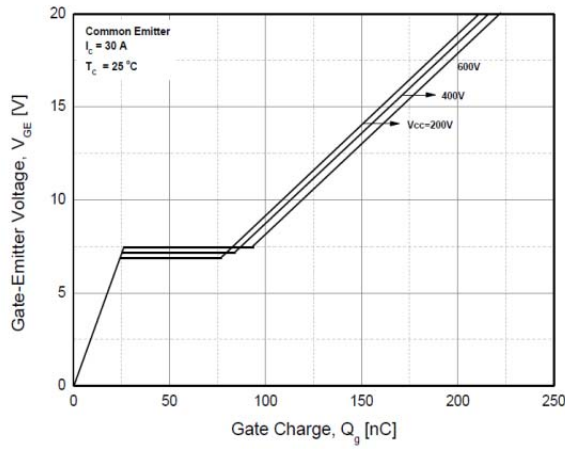


Fig. 14 SOA

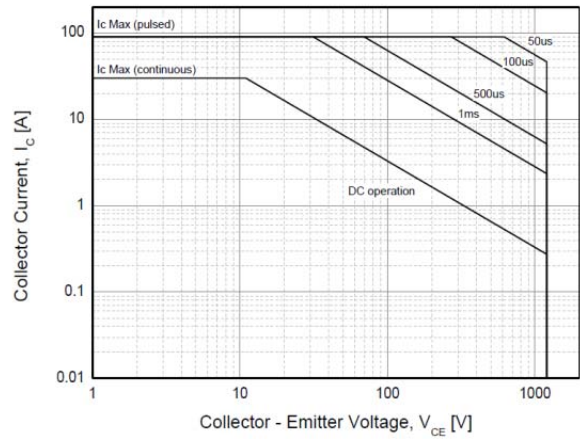


Fig. 15 RBSOA

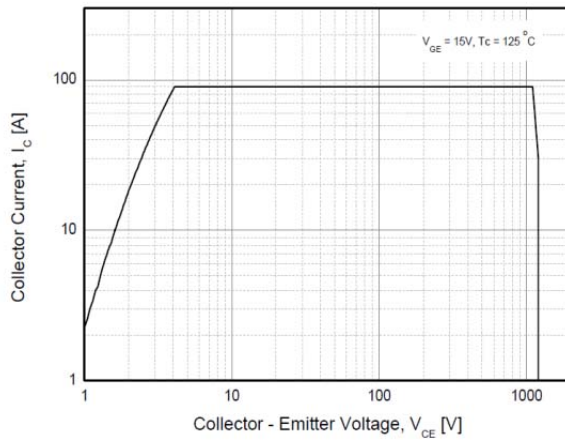
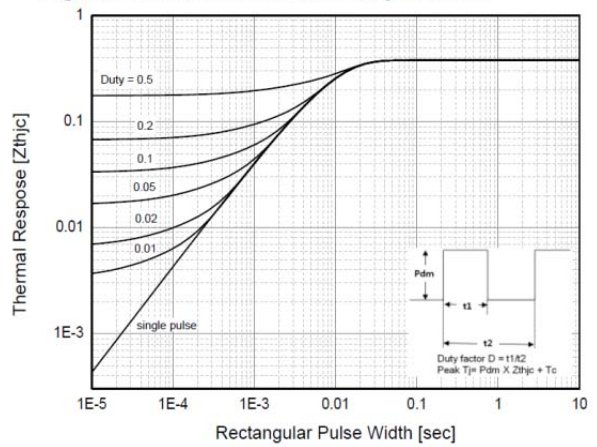


Fig. 16 Transient thermal impedance



SiC Freewheeling Diode Characteristics (2 * 15A dies in parallel)

Fig. 17 Forward Characteristics

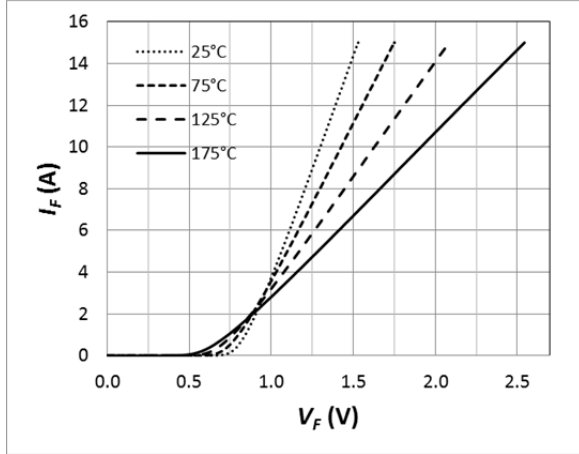


Fig. 18 Reverse Characteristics

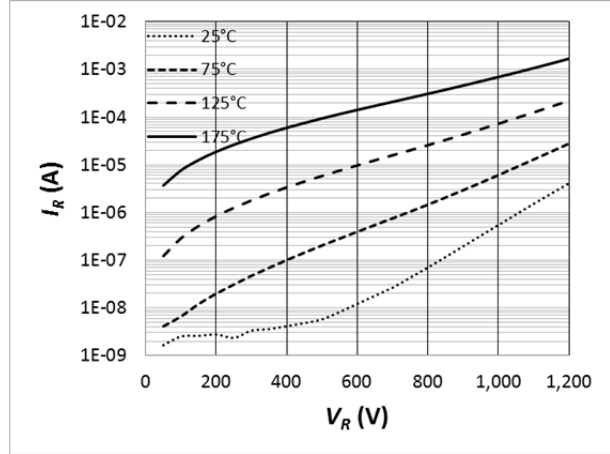


Fig. 19 Power Derating

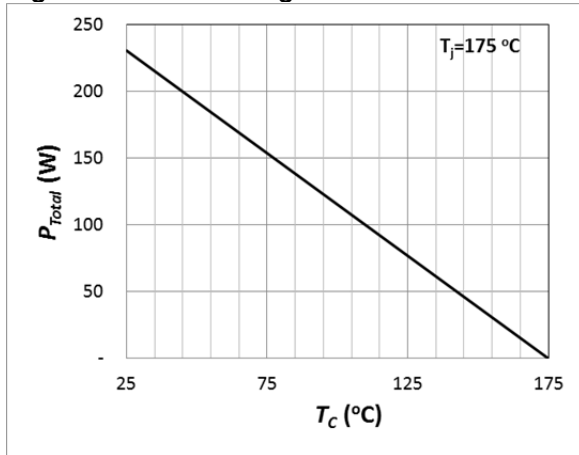


Fig. 20 Current Derating

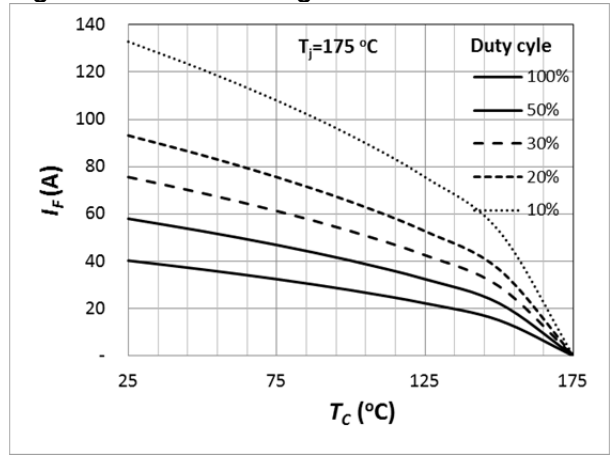


Fig. 21 Capacitance Curve

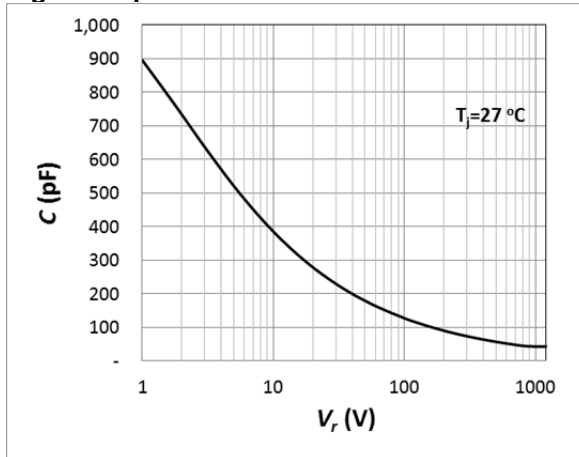
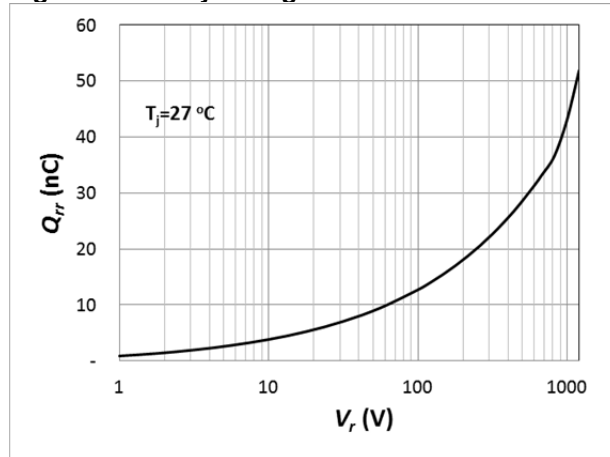
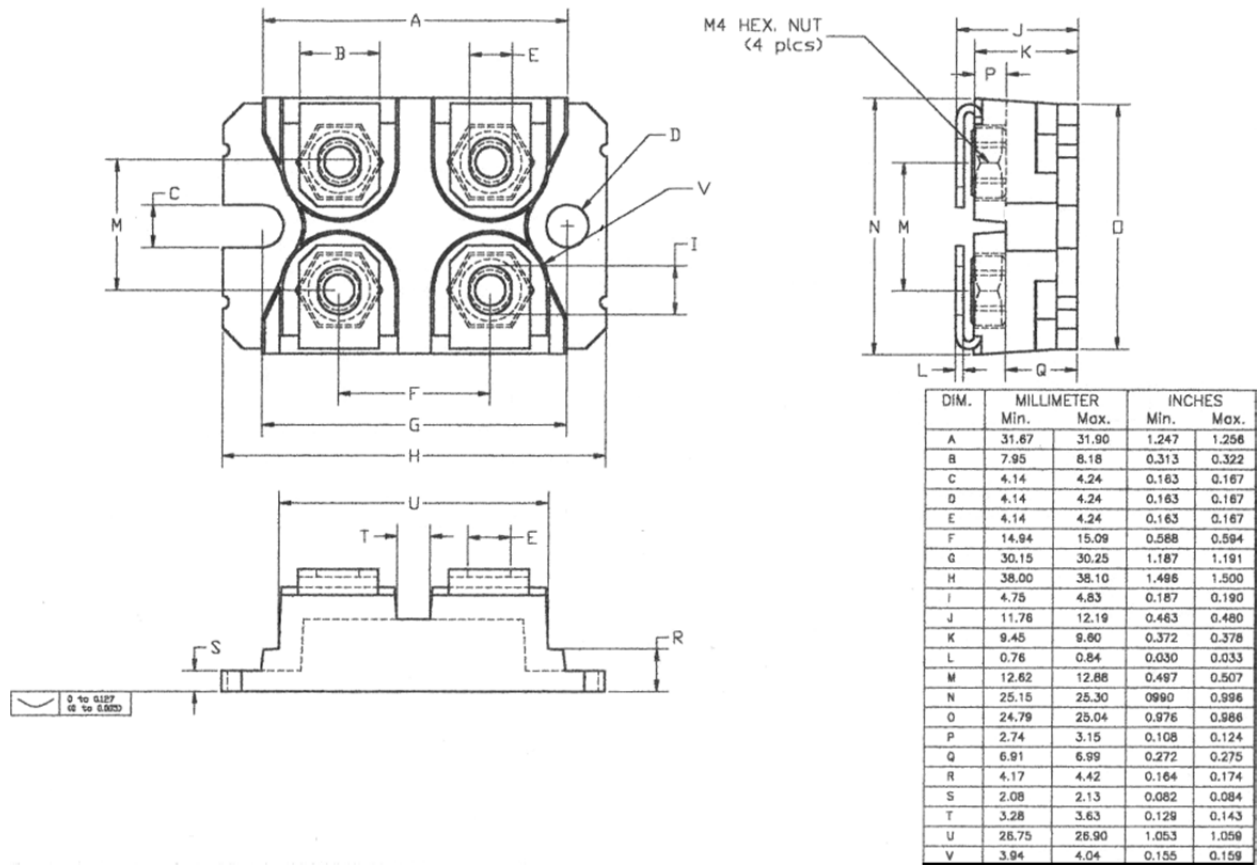


Fig. 22 Recovery Charge



SOT-227 Package Outline



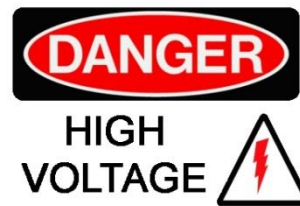
Revision History

Date	Revision	Notes
01/28/2016	1.0	Initial release

To obtain additional technical information or to place an order for this product, please contact us. The information in this datasheet is provided by Global Power Electronics, Inc. GPE reserves the right to make changes, corrections, modifications, and improvements without notice.

Global Power Technologies Group

20692 Prism Place
 Lake Forest, CA 92630
 TEL (949) 207-7500
 FAX (949) 613-7600
 E-mail: info@gptechnology.com
 Web site: www.gptechnology.com



Notes

- **RoHS Compliance**
The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of www.gptechgroup.com.
- **REACH Compliance**
REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact our office at GPTG Headquarters in Lake Forest, California to insure you get the most up-to-date REACH SVHC Declaration.
REACH banned substance information (REACH Article 67) is also available upon request.
- This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control.
- To obtain additional technical information or to place an order for this product, please contact us. The information in this datasheet is provided by Global Power Technologies Group. GPTG reserves the right to make changes, corrections, modifications, and improvements of datasheet without notice.