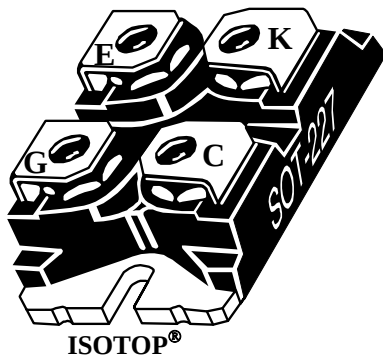
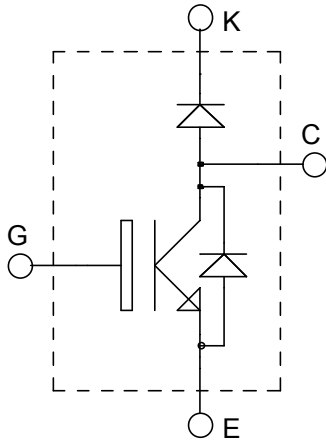


ISOTOP[®] Boost chopper NPT IGBT SiC chopper diode

$V_{CES} = 1200V$
 $I_C = 15A @ T_c = 90^\circ C$



Application

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

Features

- **Non Punch Through (NPT) Fast IGBT**
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 50 kHz
 - Low leakage current
 - RBSOA and SCSOA rated
- **Chopper SiC Schottky Diode**
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature Independent switching behavior
 - Positive temperature coefficient on VF
- ISOTOP[®] Package (SOT-227)
- Very low stray inductance
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- 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_C	Continuous Collector Current	$T_C = 25^\circ C$	30
		$T_C = 90^\circ C$	15
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	60
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	156
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	30A@1150V

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.
 See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V$ $V_{CE} = 1200V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			250 500	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 15A$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	2.5	3.2 4.0	3.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE2}$, $I_C = 1mA$		4		6	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	$V_{GE} = 0V$			1000		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$			150		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$			70		
Q_g	Total gate Charge	$V_{GE} = 15V$			99		nC
Q_{ge}	Gate – Emitter Charge	$V_{Bus} = 600V$			10		
Q_{gc}	Gate – Collector Charge	$I_C = 15A$			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)			60		ns
T_r	Rise Time	$V_{GE} = 15V$			50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600V$			315		
T_f	Fall Time	$I_C = 15A$ $R_G = 33\Omega$			30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)			60		ns
T_r	Rise Time	$V_{GE} = 15V$			50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600V$			356		
T_f	Fall Time	$I_C = 15A$ $R_G = 33\Omega$			40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15V$ $V_{Bus} = 600V$	$T_j = 125^\circ\text{C}$		1.2		mJ
E_{off}	Turn-off Switching Energy	$I_C = 15A$ $R_G = 33\Omega$	$T_j = 125^\circ\text{C}$		1		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V$; $V_{Bus} = 900V$ $t_p \leq 10\mu s$; $T_j = 125^\circ\text{C}$			90		A

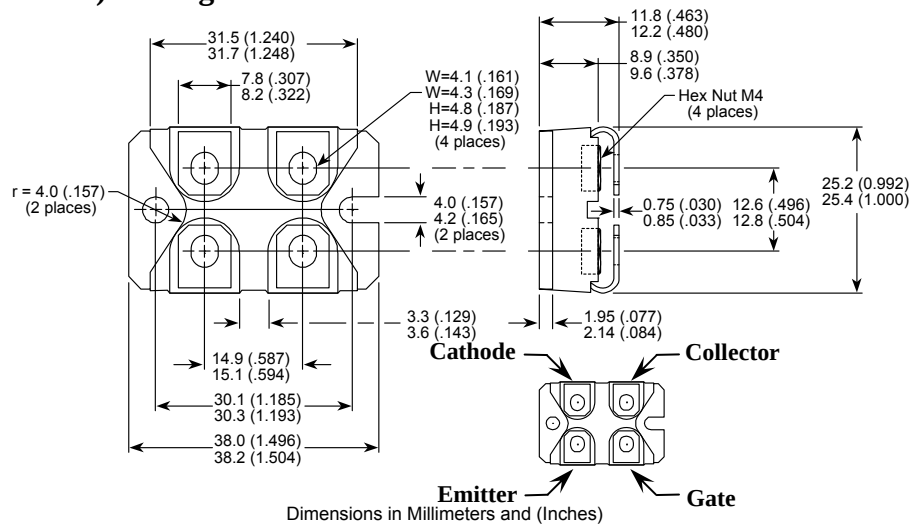
Chopper SiC diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$ $T_j = 175^\circ\text{C}$		32 56	200 1000	μA
I_F	DC Forward Current		$T_c = 125^\circ\text{C}$		10		A
V_F	Diode Forward Voltage	$I_F = 10A$	$T_j = 25^\circ\text{C}$ $T_j = 175^\circ\text{C}$		1.6 2.3	1.8 3	V
Q_C	Total Capacitive Charge	$I_F = 10A$, $V_R = 600V$ $di/dt = 500A/\mu s$			40		nC
C	Total Capacitance	$f = 1MHz$, $V_R = 200V$ $f = 1MHz$, $V_R = 400V$			96 69		pF

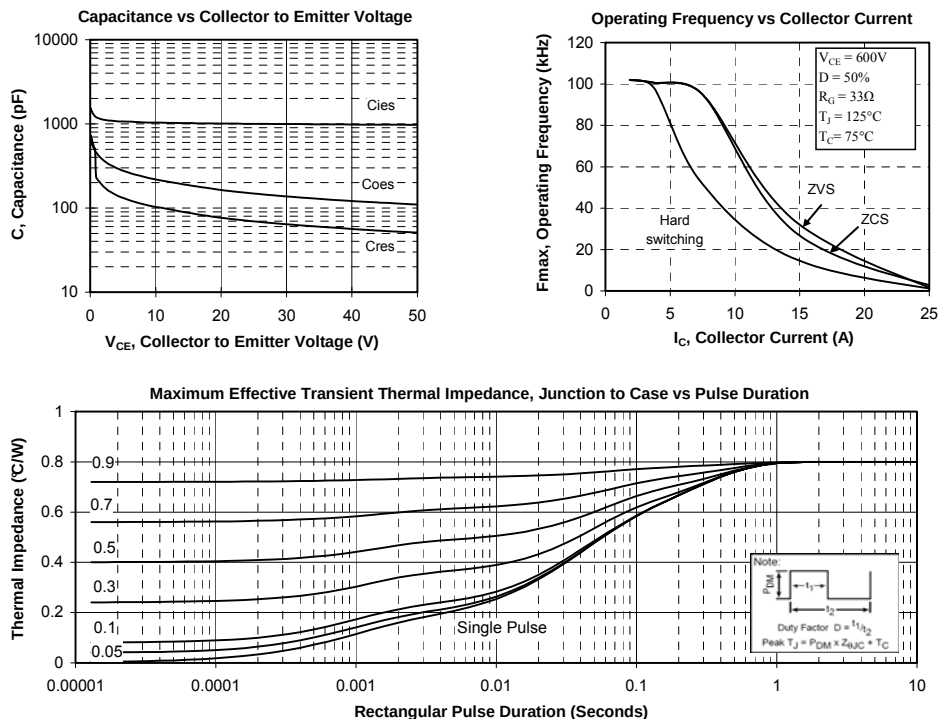
Thermal and package characteristics

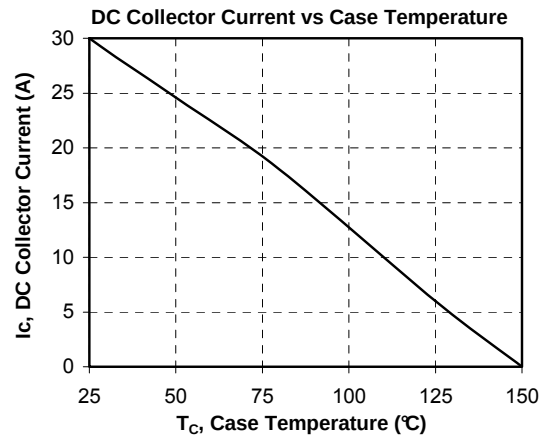
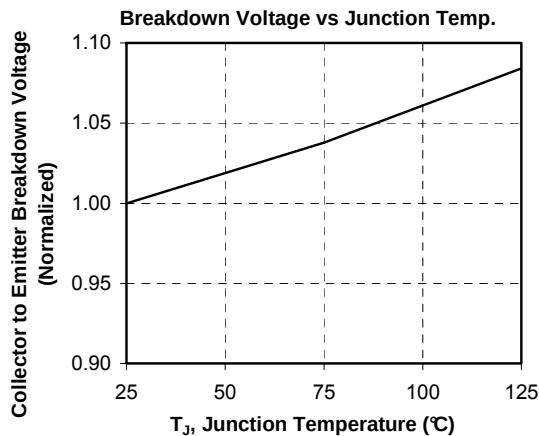
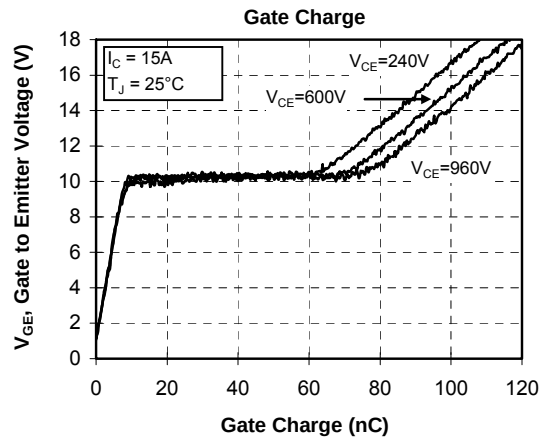
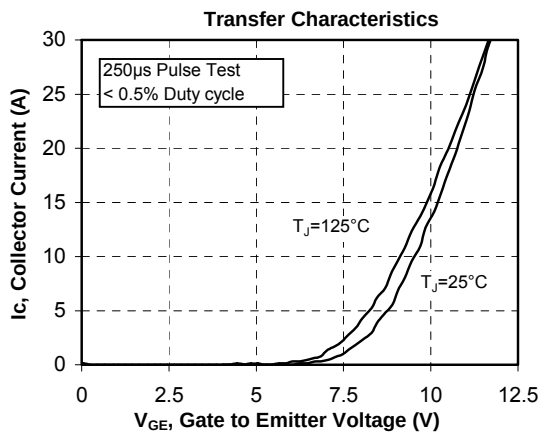
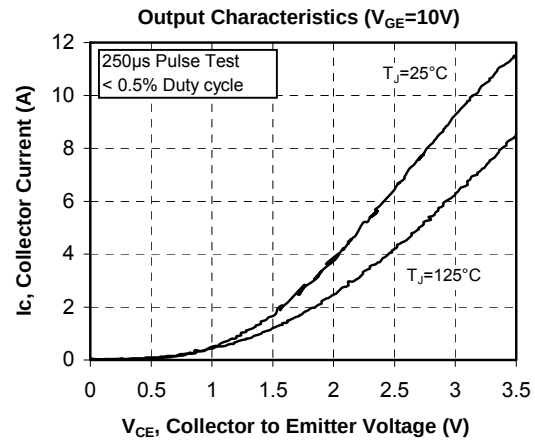
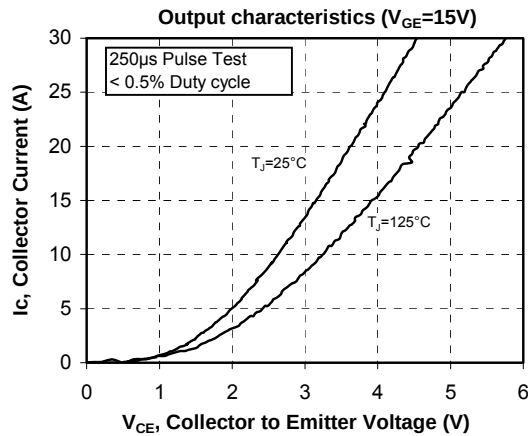
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.8	°C/W
		SiC chopper Diode		1.65	
R_{thJA}	Junction to Ambient (IGBT & Diode)			20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	2500			V
T_J, T_{STG}	Storage Temperature 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

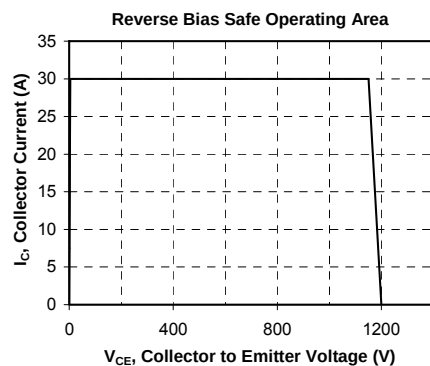
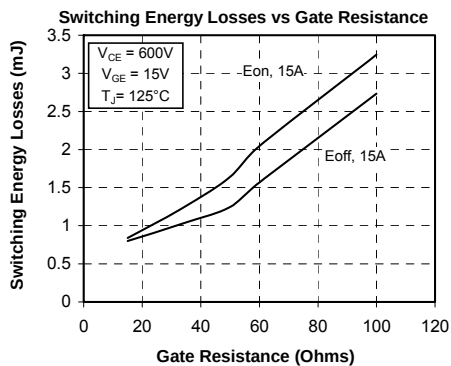
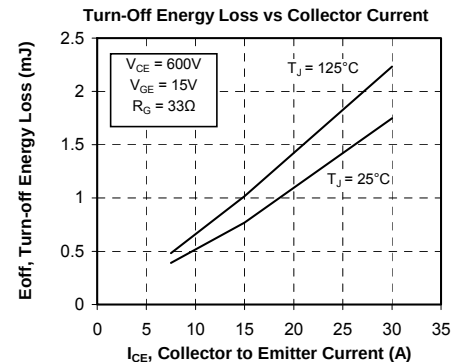
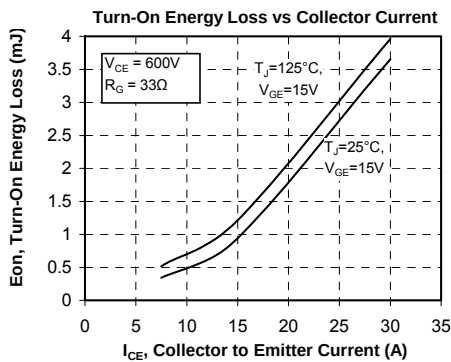
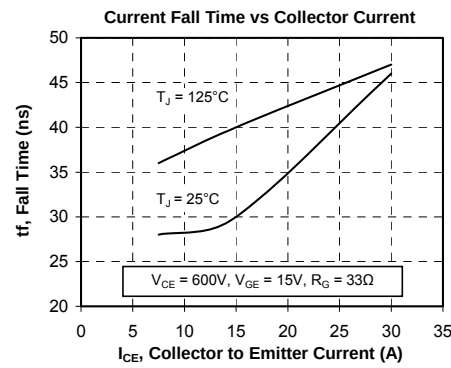
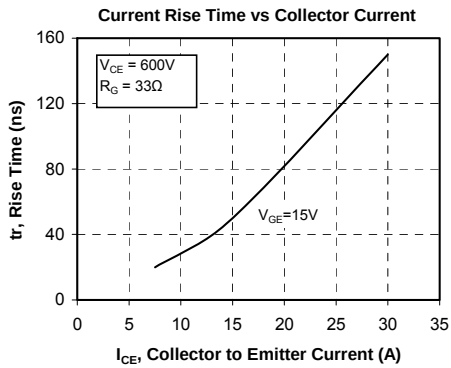
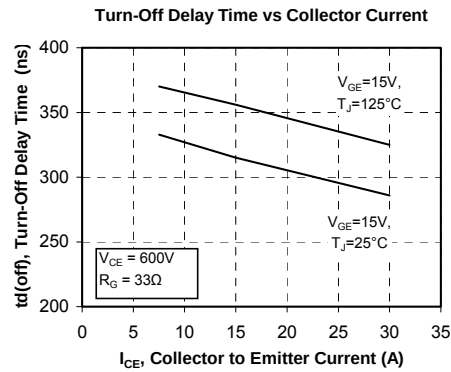
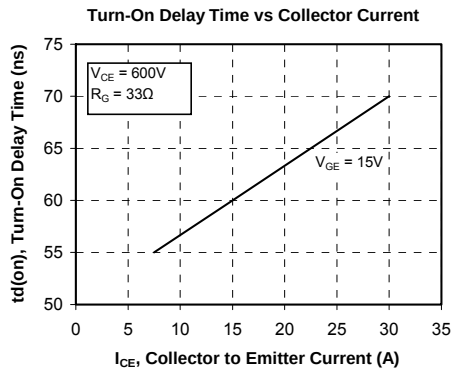
SOT-227 (ISOTOP®) Package Outline



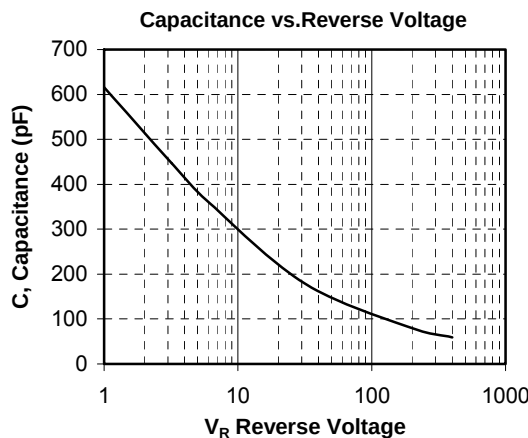
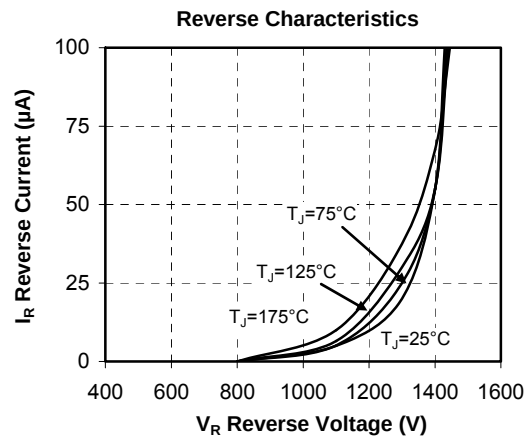
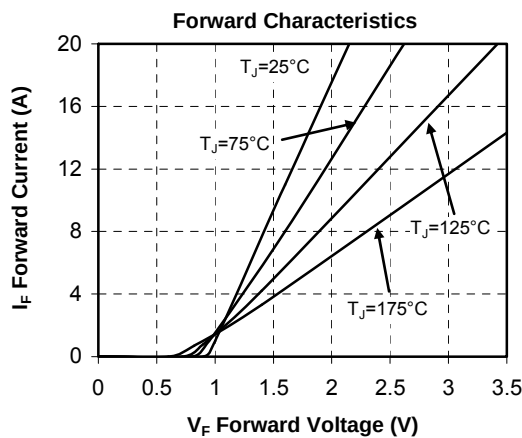
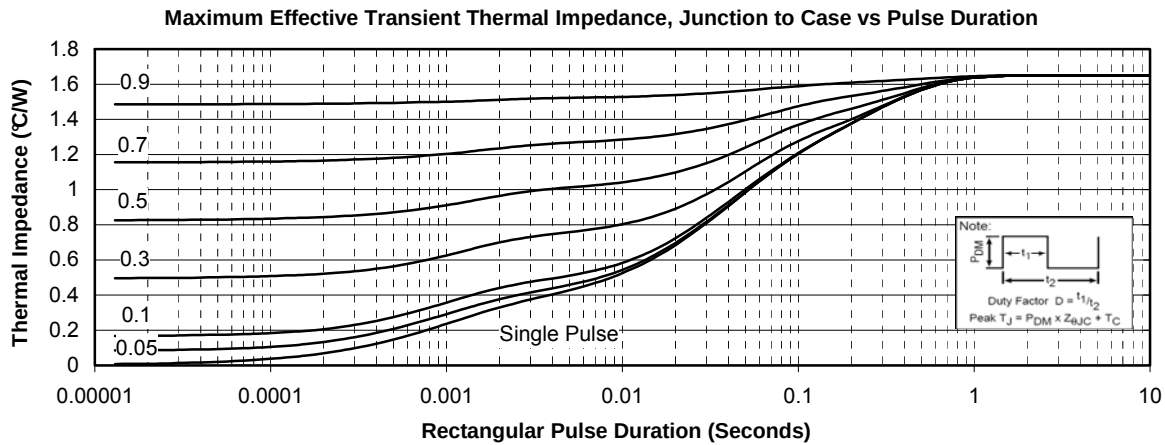
Typical IGBT Performance Curve







Typical SiC chopper diode Performance Curve



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Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.