

**ISOTOP[®] Boost chopper
Trench + Field Stop fast IGBT4
Power module**

**$V_{CES} = 1200V$
 $I_C = 25A @ T_c = 80^\circ C$**

Application

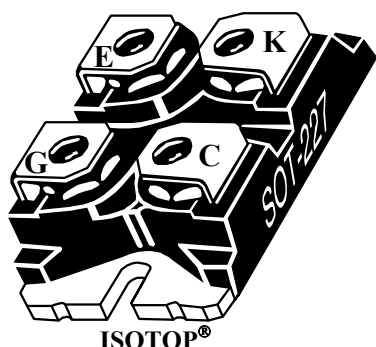
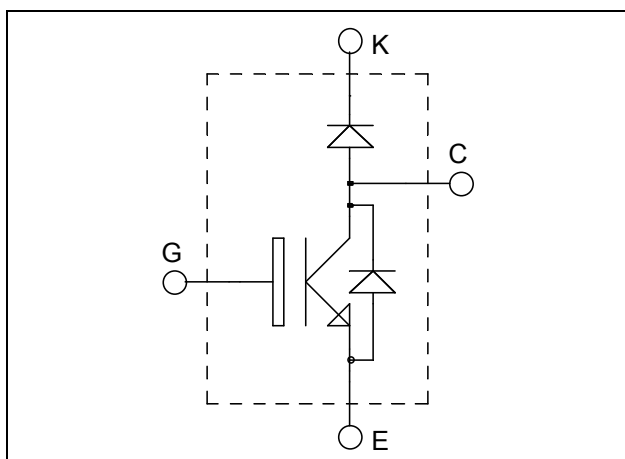
- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction
- Brake switch

Features

- **Trench + Field Stop Fast IGBT 4 Technology**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
 - Low leakage current
 - RBSOA and SCSOA rated
- **Boost 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

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



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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	50
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	170
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	50A @ 1100V

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			250	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 25A$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.7 2.6	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.8mA$	5.0	5.8	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	$V_{GE} = 0V$		1430		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		115		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		85		
Q_G	Gate charge	$V_{GE} = \pm 15V; V_{CE} = 600V$ $I_C = 25A$		0.2		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($25^\circ C$) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 25A$ $R_G = 20\Omega$		130		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			300		
T_f	Fall Time			45		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ($150^\circ C$) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 25A$ $R_G = 20\Omega$		150		ns
T_r	Rise Time			35		
$T_{d(off)}$	Turn-off Delay Time			350		
T_f	Fall Time			80		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 25A$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.2 1.8		mJ
E_{off}	Turn-off Switching Energy	$R_G = 20\Omega$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.5 2.2		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu s; T_j = 150^\circ C$		100		A

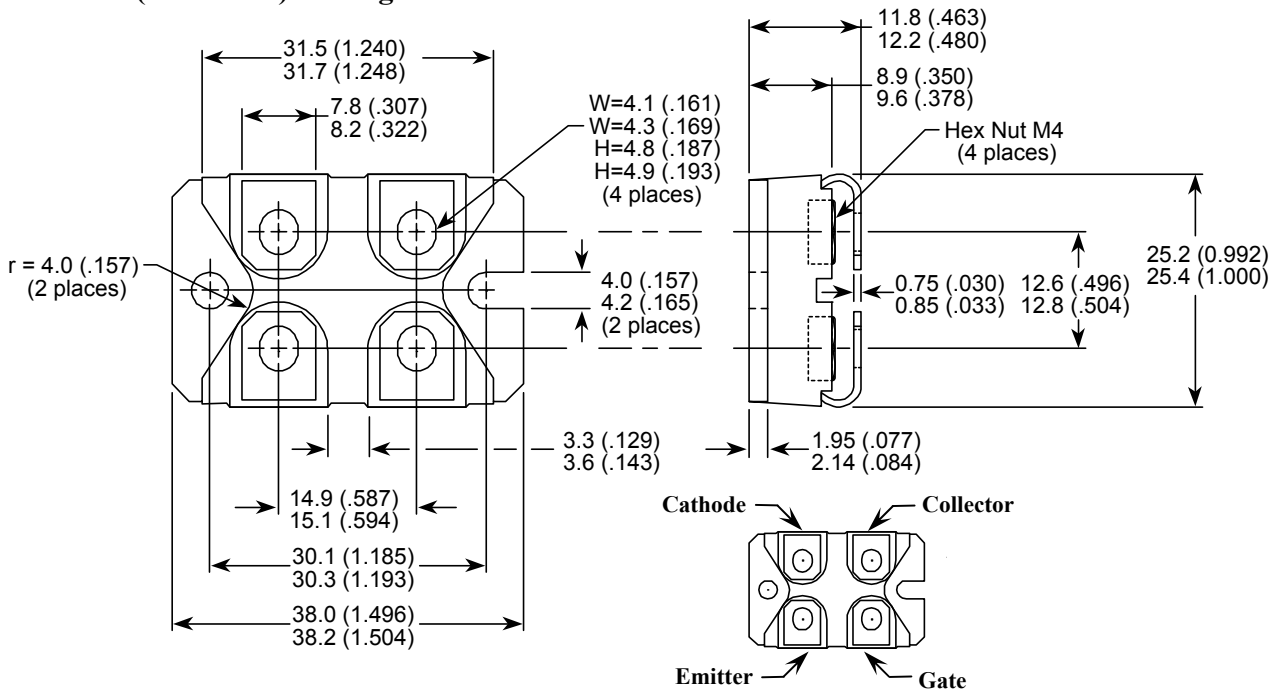
Chopper SiC diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$ $T_j = 175^\circ C$	70 200	500 700	μA
I_F	DC Forward Current		$T_c = 125^\circ C$	15		A
V_F	Diode Forward Voltage	$I_F = 15A$	$T_j = 25^\circ C$ $T_j = 175^\circ C$	1.5 2.2	1.8 3	V
Q_C	Total Capacitive Charge	$I_F = 15A, V_R = 600V$ $di/dt = 400A/\mu s$		100		nC
C	Total Capacitance	$f = 1MHz, V_R = 400V$ $f = 1MHz, V_R = 800V$		74 54		pF

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.9	°C/W
		SiC 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		175	°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

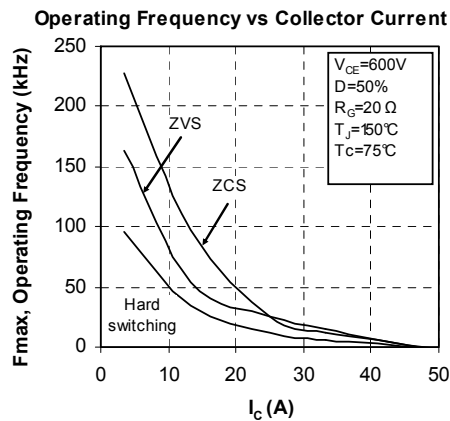
SOT-227 (ISOTOP®) Package Outline

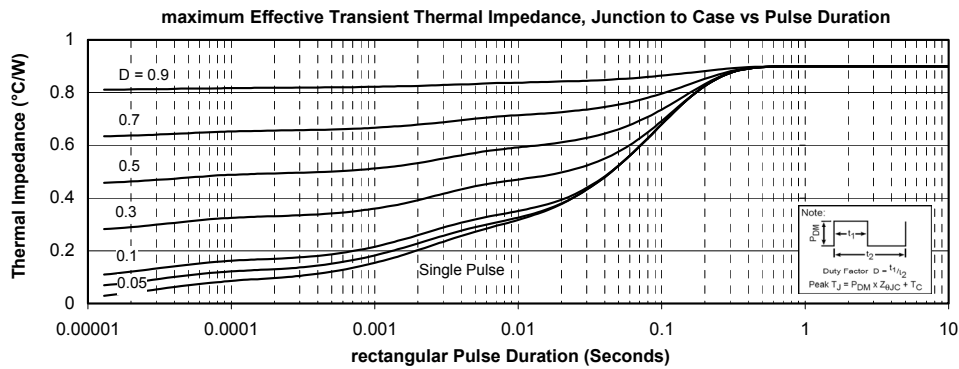
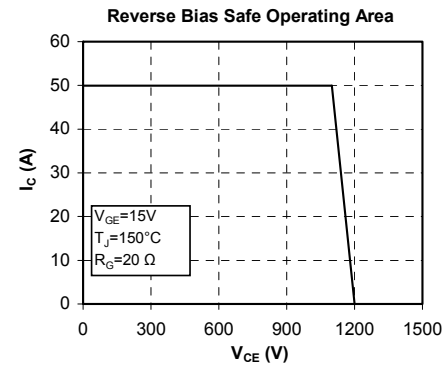
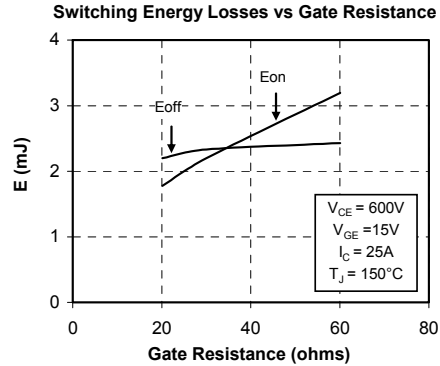
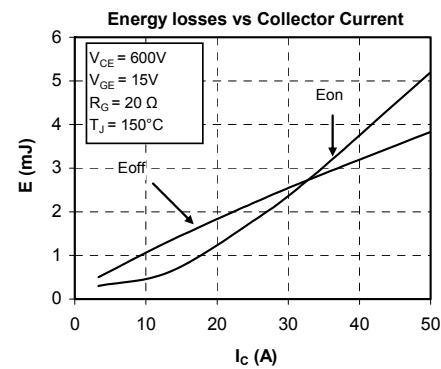
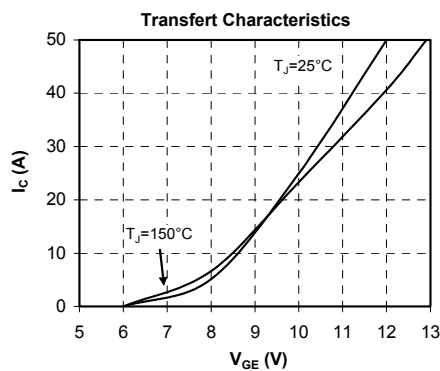
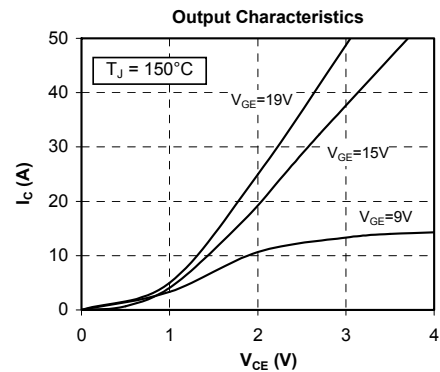
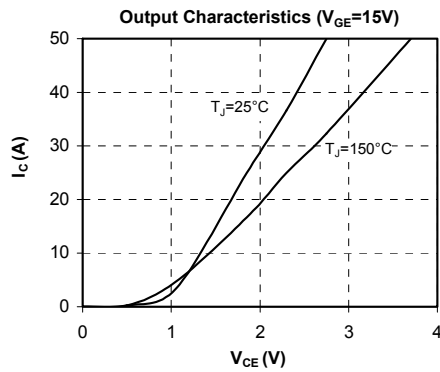


Dimensions in Millimeters and (Inches)

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Typical Performance Curve





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