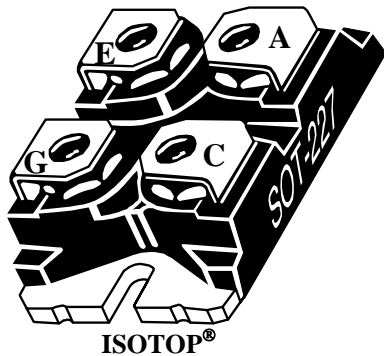
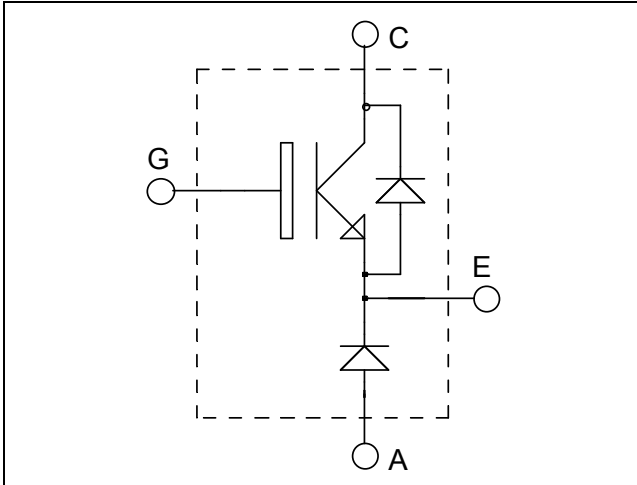


**ISOTOP<sup>®</sup> Buck chopper  
Trench + Field Stop IGBT4  
Power module**

**$V_{CES} = 1200V$   
 $I_C = 40A @ T_c = 80^{\circ}C$**



### Application

- AC and DC motor control
- Switched Mode Power Supplies

### Features

- Trench + Field Stop IGBT 4 Technology
  - Low voltage drop
  - Low leakage current
  - Low switching losses
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - RBSOA and SCSOA rated
- ISOTOP<sup>®</sup> Package (SOT-227)
- Very low stray inductance
- High level of integration

### 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
$I_C$	Continuous Collector Current	$T_C = 25^{\circ}C$	65
		$T_C = 80^{\circ}C$	40
$I_{CM}$	Pulsed Collector Current	$T_C = 25^{\circ}C$	70
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^{\circ}C$	220
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^{\circ}C$	70A @ 1100V

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://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	$V_{GE} = 0\text{V}, V_{CE} = 1200\text{V}$			250	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 35\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.85 2.25	2.25	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.2\text{mA}$	5.0	5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		1950		pF
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		155		
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		115		
$Q_G$	Gate charge	$V_{GE} = \pm 15\text{V}; V_{CE} = 600\text{V}$ $I_C = 35\text{A}$		0.27		$\mu\text{C}$
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{CE} = 600\text{V}$ $I_C = 35\text{A}$ $R_G = 12\Omega$		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 ( $150^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{CE} = 600\text{V}$ $I_C = 35\text{A}$ $R_G = 12\Omega$		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	$V_{GE} = \pm 15\text{V}$ $V_{CE} = 600\text{V}$ $I_C = 35\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	2.6 4		mJ
$E_{off}$	Turn-off Switching Energy	$R_G = 12\Omega$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	2 3		mJ
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 900\text{V}$ $t_p \leq 10\mu\text{s}; T_j = 150^\circ\text{C}$		140		A

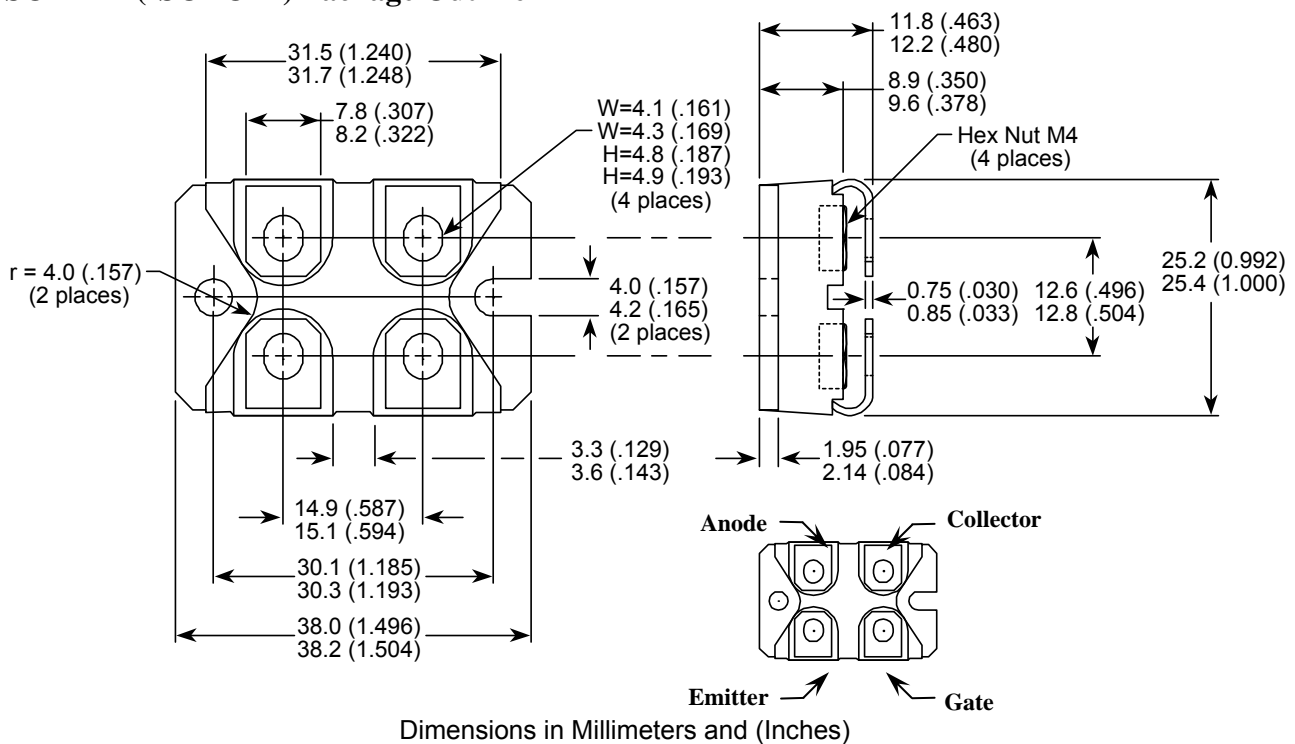
**Chopper diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$		100 500	$\mu\text{A}$
$I_F$	DC Forward Current		$T_c = 80^\circ\text{C}$	30		A
$V_F$	Diode Forward Voltage	$I_F = 30\text{A}$ $I_F = 60\text{A}$ $I_F = 30\text{A}$	$T_j = 125^\circ\text{C}$	2.6 3.2 1.8	3.1	V
$t_{rr}$	Reverse Recovery Time	$I_F = 30\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	300 380		ns
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	360 1700		nC

## Thermal and package characteristics

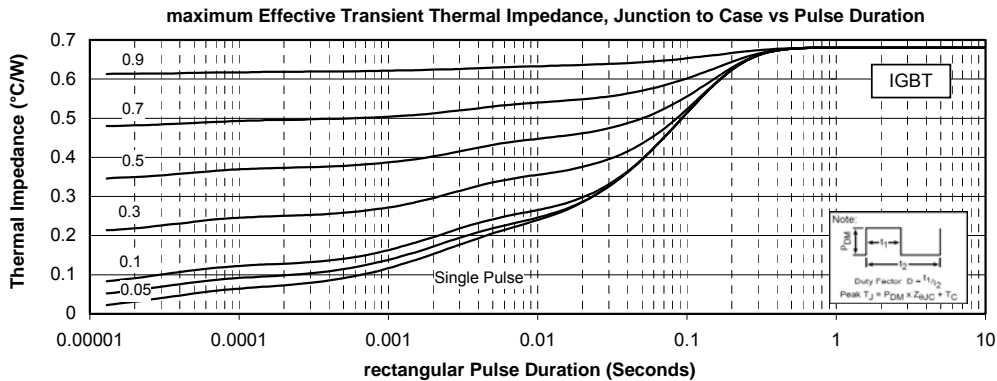
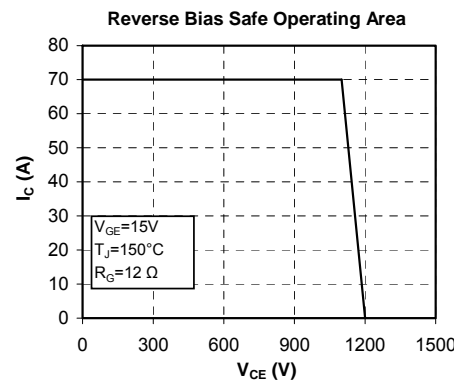
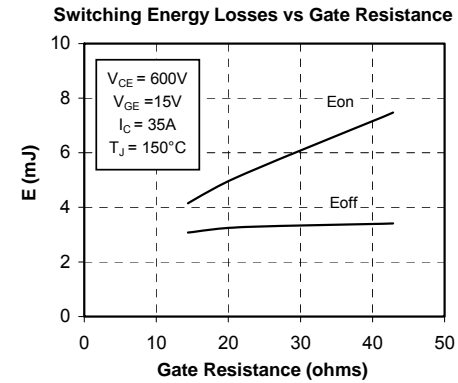
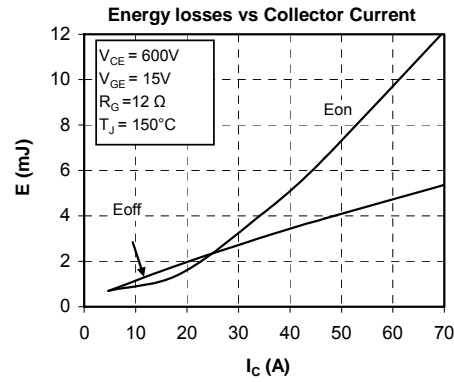
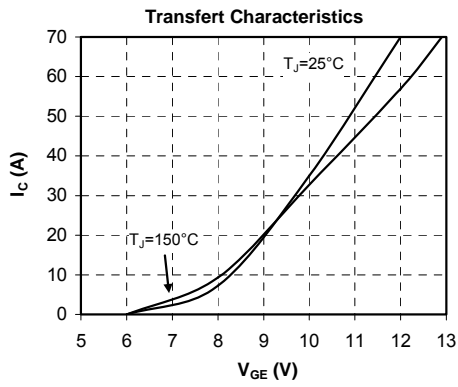
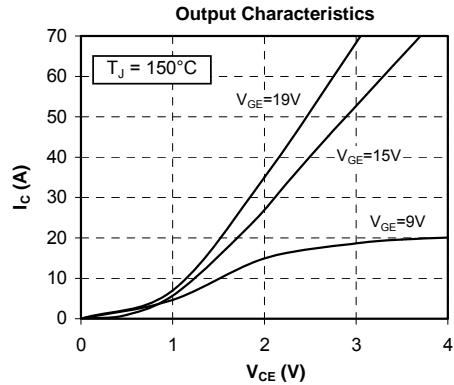
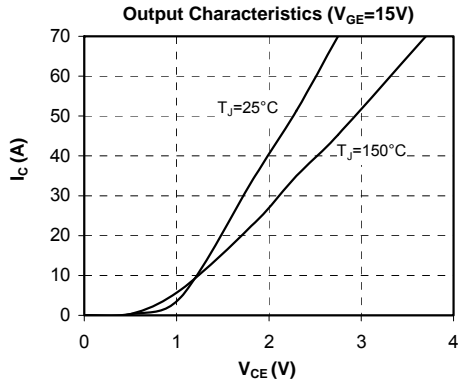
Symbol	Characteristic	Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case Thermal Resistance	IGBT		0.68	°C/W
		Diode		1.2	
$R_{thJA}$	Junction to Ambient (IGBT & Diode)			20	
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	2500			V
$T_J, T_{STG}$	Storage Temperature Range	-55		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

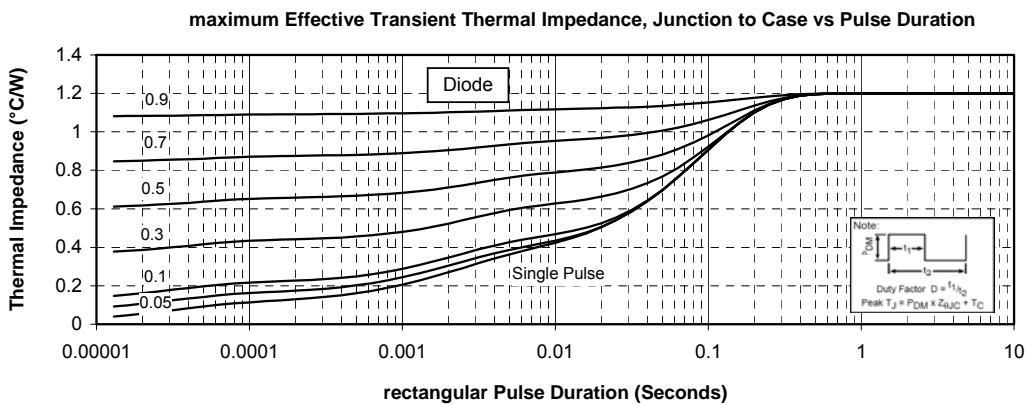
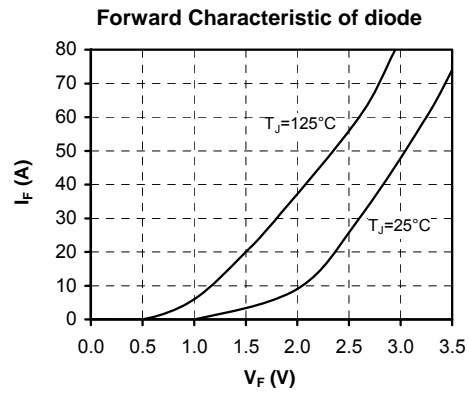
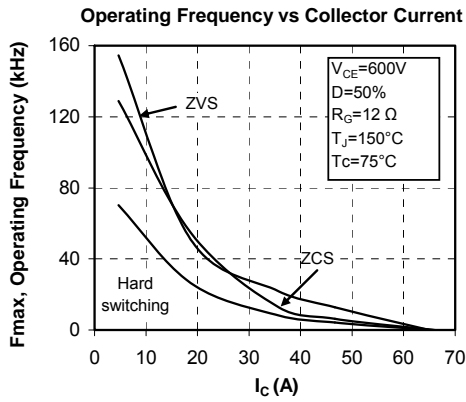
## SOT-227 (ISOTOP®) Package Outline



ISOTOP® is a registered trademark of ST Microelectronics NV

## Typical Performance Curve





Microsemi reserves the right to change, without notice, the specifications and information contained herein

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.