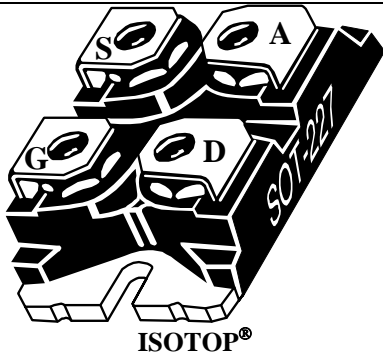
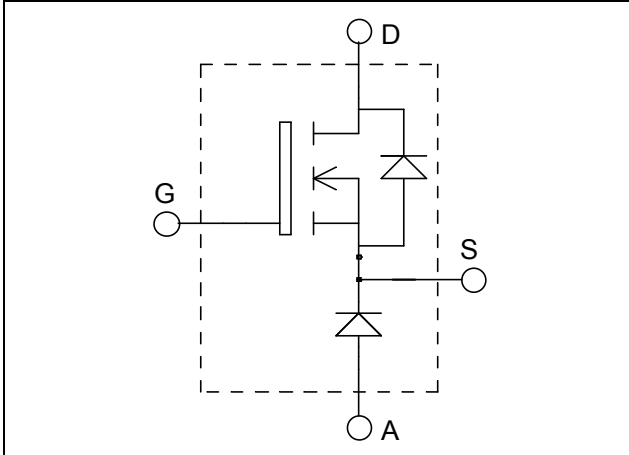


**ISOTOP<sup>®</sup> Buck chopper  
Super Junction MOSFET  
SiC chopper diode**

**$V_{DSS} = 900V$**   
 **$R_{DSon} = 120m\Omega \text{ max @ } T_j = 25^\circ C$**   
 **$I_D = 33A \text{ @ } T_c = 25^\circ C$**



### Application

- AC and DC motor control
- Switched Mode Power Supplies

### Features

- **COOLMOS<sup>®</sup>**  
Power Semiconductors
  - Ultra low  $R_{DSon}$
  - Low Miller capacitance
  - Ultra low gate charge
  - Avalanche energy rated
- **SiC Schottky Diode**
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature Independent switching behavior
  - Positive temperature coefficient on VF
- ISOTOP<sup>®</sup> 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
$V_{DSS}$	Drain - Source Breakdown Voltage	900	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	33
		$T_c = 80^\circ C$	25
$I_{DM}$	Pulsed Drain current	75	A
$V_{GS}$	Gate - Source Voltage	$\pm 20$	V
$R_{DSon}$	Drain - Source ON Resistance	120	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	290
$I_{AR}$	Avalanche current (repetitive and non repetitive)	8.8	A
$E_{AR}$	Repetitive Avalanche Energy	2.9	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1940	

**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
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 900V$			100	$\mu\text{A}$
		$T_j = 25^\circ\text{C}$		500		
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 26A$		100	120	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 3\text{mA}$	2.5	3	3.5	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V ; V_{DS} = 100V$ $f = 1\text{MHz}$		6.8		nF
$C_{oss}$	Output Capacitance			0.33		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 26A$		270		nC
$Q_{gs}$	Gate – Source Charge			32		
$Q_{gd}$	Gate – Drain Charge			115		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive Switching (<math>125^\circ\text{C}</math>)</b> $V_{GS} = 10V$ $V_{Bus} = 600V$ $I_D = 26A$ $R_G = 7.5\Omega$		70		ns
$T_r$	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			400		
$T_f$	Fall Time			25		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 10V ; V_{Bus} = 600V$ $I_D = 26A ; R_G = 7.5\Omega$		0.9		mJ
$E_{off}$	Turn-off Switching Energy			0.75		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 10V ; V_{Bus} = 600V$ $I_D = 26A ; R_G = 7.5\Omega$		1.3		mJ
$E_{off}$	Turn-off Switching Energy			0.85		

**SiC chopper diode ratings and characteristics**

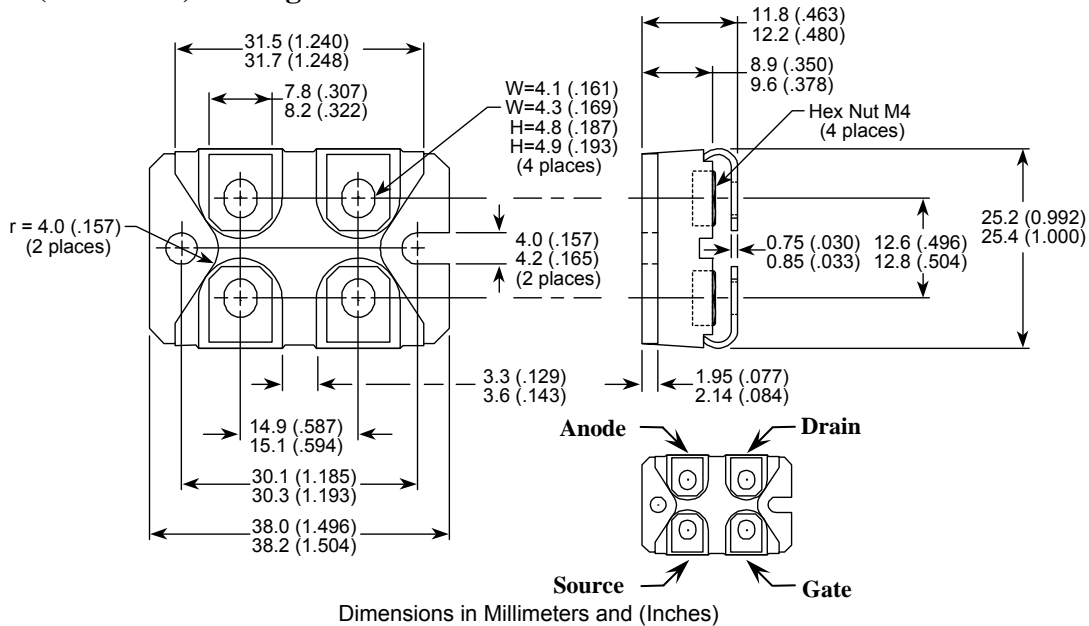
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V	
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$		32	200	$\mu\text{A}$
			$T_j = 175^\circ\text{C}$		56	1000	
$I_F$	DC Forward Current			10		A	
$V_F$	Diode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

## Thermal and package characteristics

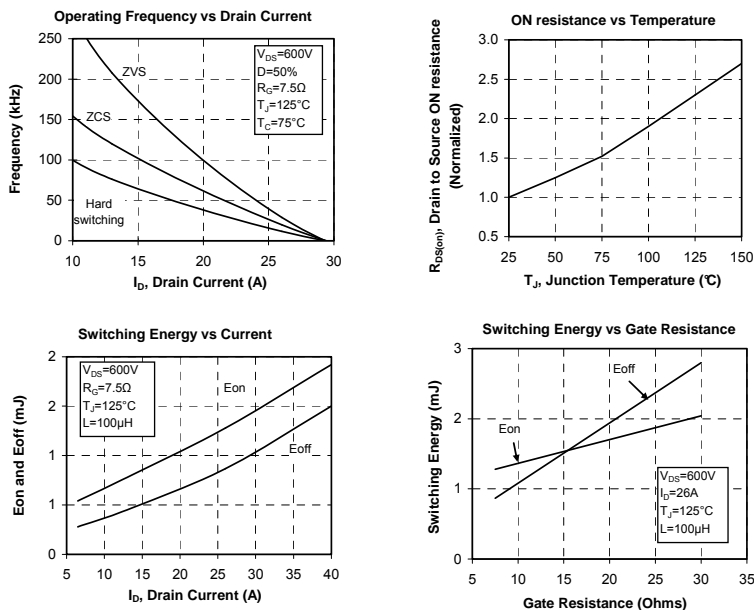
Symbol Characteristic

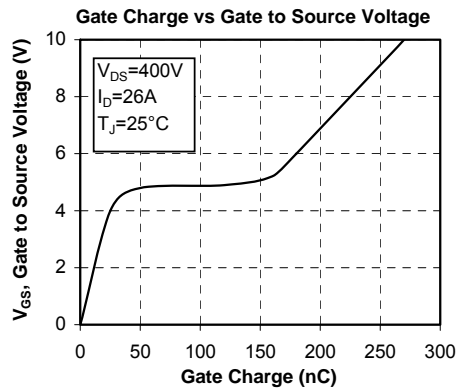
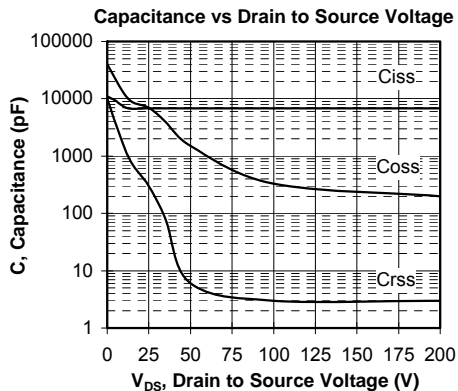
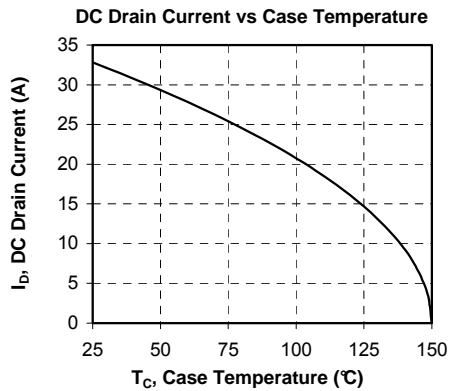
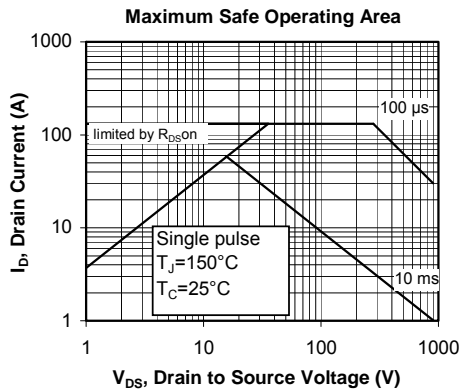
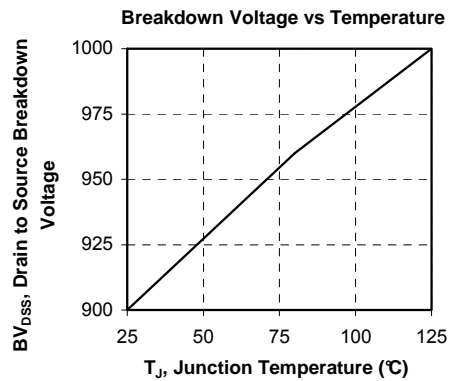
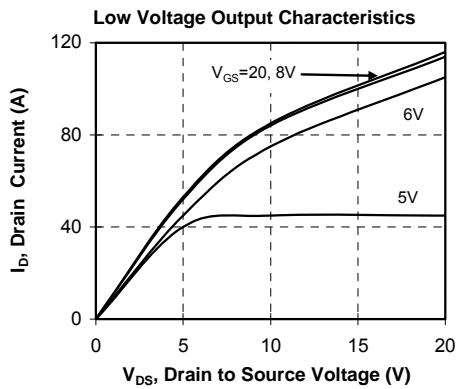
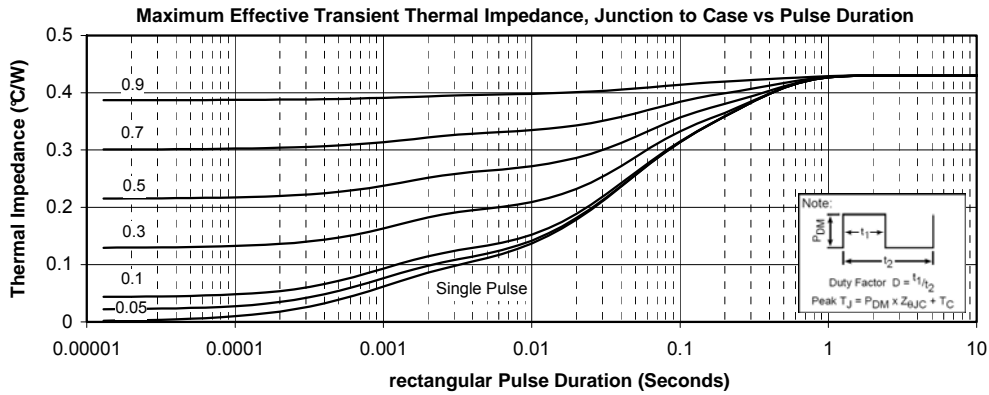
		Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case Thermal Resistance	CoolMOS		0.43	°C/W
		SiC Diode		1.65	
$R_{thJA}$	Junction to Ambient (IGBT & Diode)			20	
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	2500			V
$T_J, T_{STG}$	Storage Temperature Range	-40		150	°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

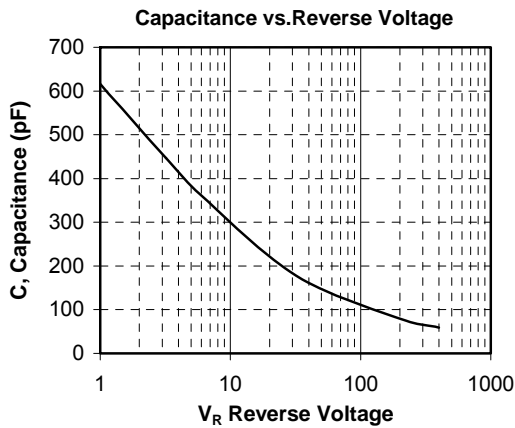
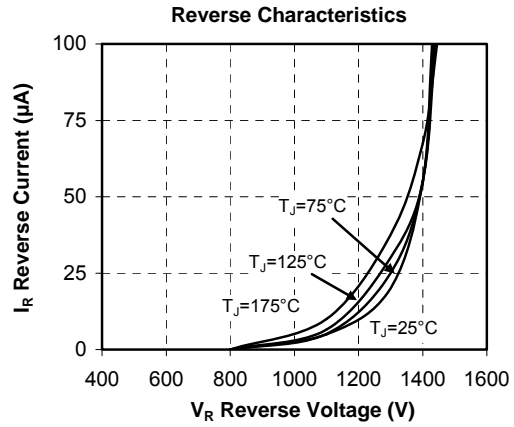
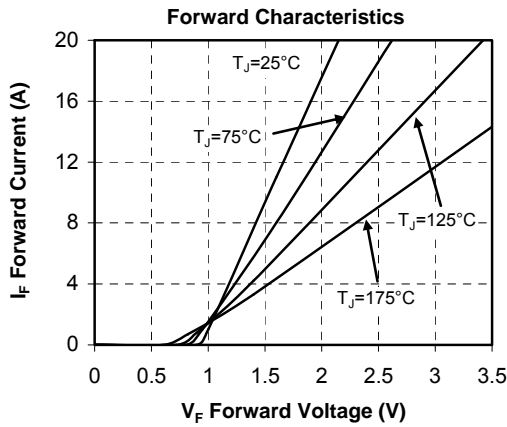
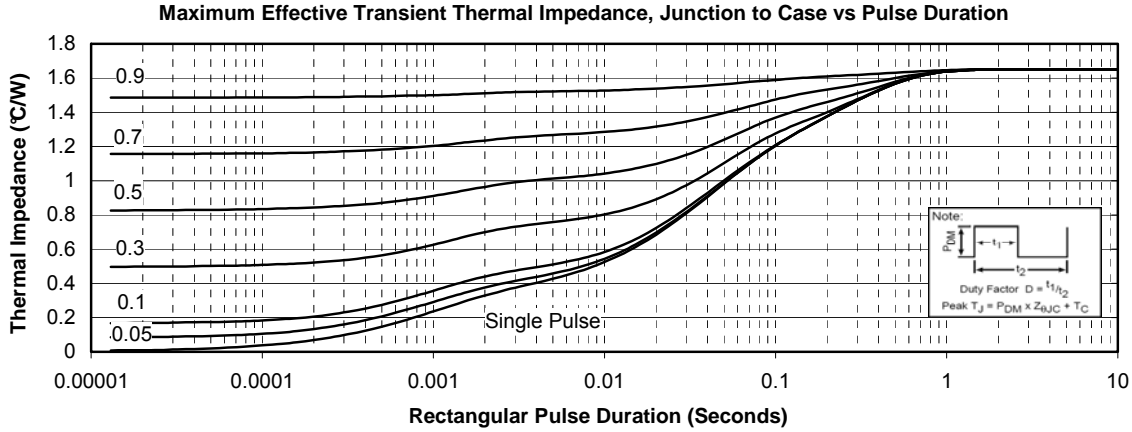


## Typical CoolMOS performance Curve





## Typical SiC Chopper diode performance Curve



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