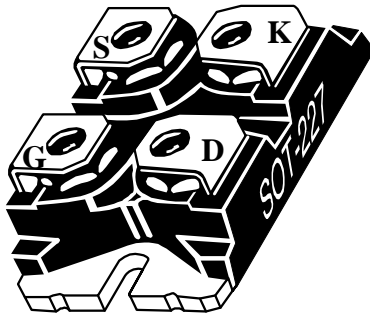
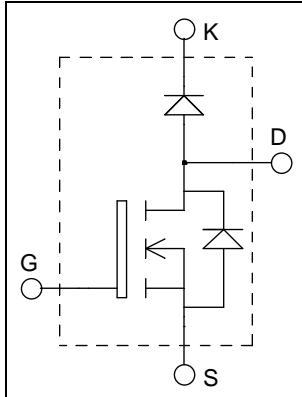


**ISOTOP[®] Boost chopper
Super Junction
MOSFET Power Module**

$V_{DSS} = 600V$
 $R_{DSon} = 45m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 50A \text{ @ } T_c = 25^\circ C$



Application

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

Features

- **COOLMOS[®]**
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[®] 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 TC of VCEsat
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	50
		$T_c = 80^\circ C$	38
I_{DM}	Pulsed Drain current	130	
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	45	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	290
I_{AR}	Avalanche current (repetitive and non repetitive)	15	A
E_{AR}	Repetitive Avalanche Energy	3	mJ
E_{AS}	Single Pulse Avalanche Energy	1900	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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	$V_{GS} = 0V, V_{DS} = 600V$ $T_j = 25^\circ\text{C}$			250	μA
		$V_{GS} = 0V, V_{DS} = 600V$ $T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 22.5A$		40	45	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 3\text{mA}$	2.1	3	3.9	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	$V_{GS} = 0V ; V_{DS} = 25V$ $f = 1\text{MHz}$		6.8		nF
C_{oss}	Output Capacitance			0.32		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 300V$ $I_D = 44A$		150		nC
Q_{gs}	Gate – Source Charge			34		
Q_{gd}	Gate – Drain Charge			51		
$T_{d(on)}$	Turn-on Delay Time	$T_j = 25^\circ\text{C}$ $V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 44A$ $R_G = 3.3\Omega$		30		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			100		
T_f	Fall Time			20		
E_{on}	Turn-on Switching Energy	$T_j = 25^\circ\text{C}$ $V_{GS} = 10V ; V_{Bus} = 400V$ $I_D = 44A ; R_G = 3.3\Omega$		405		μJ
E_{off}	Turn-off Switching Energy			520		
E_{on}	Turn-on Switching Energy	$T_j = 125^\circ\text{C}$ $V_{GS} = 10V ; V_{Bus} = 400V$ $I_D = 44A ; R_G = 3.3\Omega$		660		μJ
E_{off}	Turn-off Switching Energy			635		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -44A$		0.9	1.2	V
t_{rr}	Reverse Recovery Time	$I_S = -44A$ $V_R = 400V$ $di_s/dt = 100\text{A}/\mu\text{s}$		600		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		17	

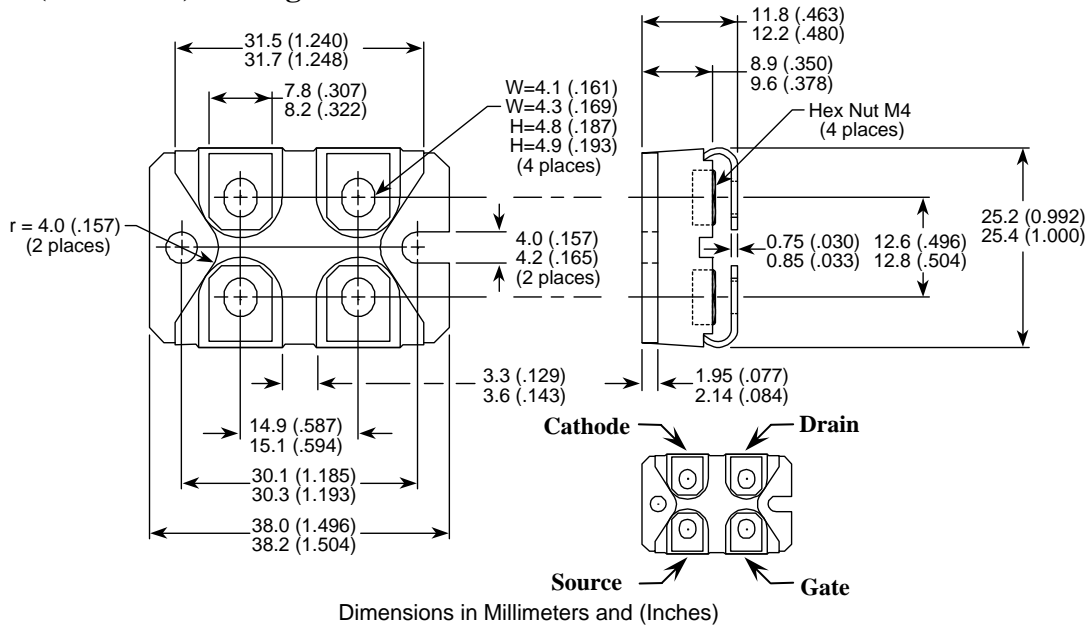
SiC chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ\text{C}$	100	400	μA
			$T_j = 175^\circ\text{C}$	200	2000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 125^\circ\text{C}$		20		A
V_F	Diode Forward Voltage	$I_F = 20A$	$T_j = 25^\circ\text{C}$	1.6	1.8	V
			$T_j = 175^\circ\text{C}$	2	2.4	
Q_C	Total Capacitive Charge	$I_F = 20A, V_R = 300V$ $di/dt = 800\text{A}/\mu\text{s}$		28		nC
Q	Total Capacitance	$f = 1\text{MHz}, V_R = 200V$		130		pF
		$f = 1\text{MHz}, V_R = 400V$		100		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	CoolMos		0.43	°C/W
		SiC Diode		1.4	
R _{thJA}	Junction to Ambient (IGBT & Diode)			20	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 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



“COOLMOS™ comprise a new family of transistors developed by Infineon Technologies AG. “COOLMOS” is a trademark of Infineon Technologies AG”.

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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 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.