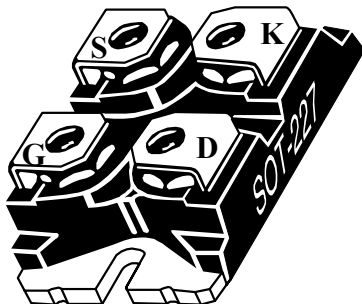
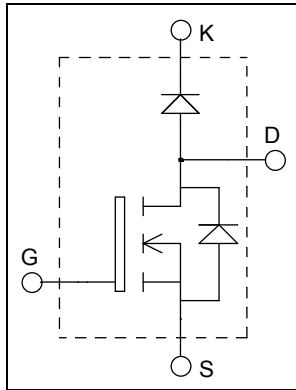


**ISOTOP<sup>®</sup> Boost chopper  
Super Junction  
MOSFET Power Module**

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



### Application

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

### 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 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	A
$V_{GS}$	Gate - Source Voltage	$\pm 20$	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	$V_{GS} = 0V, V_{DS} = 600V$			250	$\mu\text{A}$
		$V_{GS} = 0V, V_{DS} = 600V$	$T_j = 25^\circ\text{C}$		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		$\mu\text{J}$
$E_{off}$	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		$\mu\text{J}$
$E_{off}$	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	$I_S = -44A$ $V_R = 400V$ $di_S/dt = 100A/\mu\text{s}$				ns
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		600	
						$\mu\text{C}$

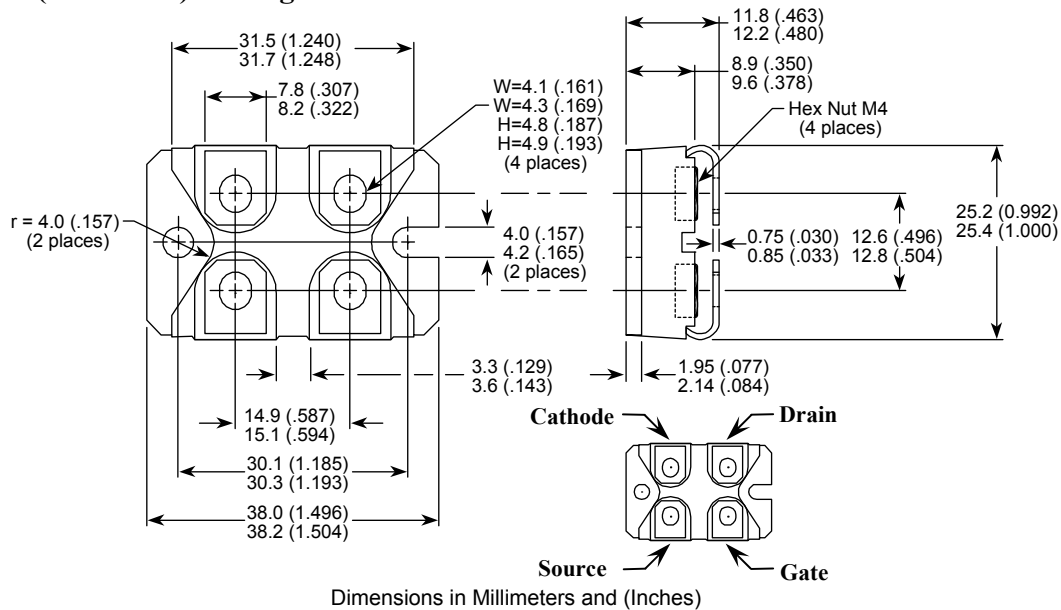
**SiC chopper diode ratings and characteristics**

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	$\mu\text{A}$
			$T_j = 175^\circ\text{C}$		200	2000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle		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	$I_F = 20A, V_R = 300V$ $di/dt = 800A/\mu\text{s}$		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 <sub>thJC</sub>	Junction to Case Thermal Resistance	CoolMos		0.43	°C/W
		SiC Diode		1.4	
R <sub>thJA</sub>	Junction to Ambient (IGBT & Diode)			20	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	2500			V
T <sub>J</sub> , T <sub>STG</sub>	Storage Temperature Range	-40		150	°C
T <sub>L</sub>	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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