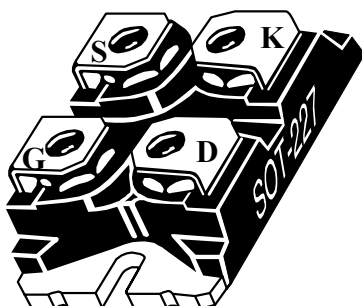
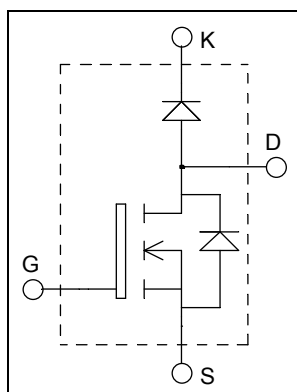


ISOTOP[®] Boost chopper Super Junction MOSFET Power Module

$V_{DSS} = 600V$

$R_{DSon} = 45m\Omega \text{ max @ } T_j = 25^\circ C$

$I_D = 50A \text{ @ } T_c = 25^\circ C$



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	A
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

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 600V$			250	μA
		$T_j = 25^\circ\text{C}$				
		$V_{GS} = 0V, V_{DS} = 600V$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 22.5A$		40	45	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 3mA$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA

Dynamic Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{iss}	Input Capacitance	$V_{GS} = 0V ; V_{DS} = 25V$ $f = 1MHz$		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	$I_S = -44A$ $V_R = 400V$ $T_j = 25^\circ\text{C}$		600		ns
Q_{rr}	Reverse Recovery Charge	$di_s/dt = 100A/\mu s$ $T_j = 25^\circ\text{C}$		17		μC

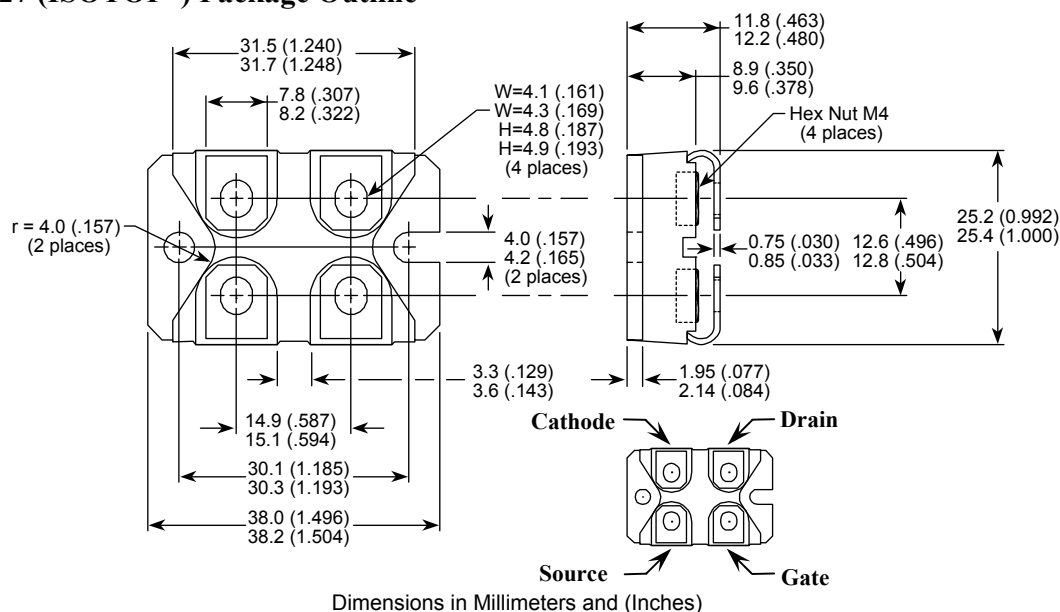
SiC chopper diode ratings and characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
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	$I_F = 20A, V_R = 300V$ $di/dt = 800A/\mu s$		28		nC
Q	Total Capacitance	$f = 1MHz, V_R = 200V$		130		pF
		$f = 1MHz, V_R = 400V$		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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