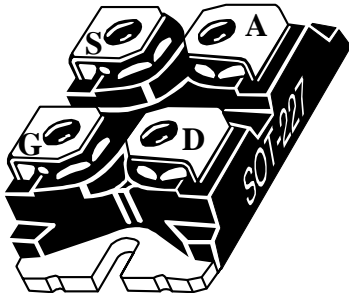
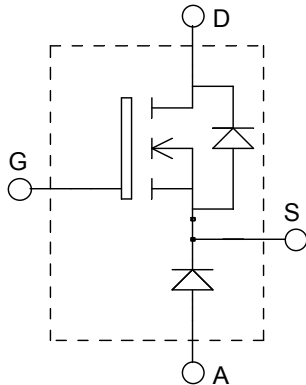


**ISOTOP[®] Buck chopper
Super Junction
MOSFET Power Module**

$V_{DSS} = 600V$
 $R_{DSon} = 45m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 52A \text{ @ } T_c = 25^\circ C$



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
- 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 V_{CEsat}
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	52
		$T_c = 80^\circ C$	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

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	$V_{GS} = 0V ; V_{DS} = 25V$ $f = 1\text{MHz}$		7.2		nF
C_{oss}	Output Capacitance			8.5		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 300V$ $I_D = 49A$		150		nC
Q_{gs}	Gate – Source Charge			34		
Q_{gd}	Gate – Drain Charge			51		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 49A$ $R_G = 5\Omega$		21		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			100		
T_f	Fall Time			45		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 10V ; V_{Bus} = 400V$ $I_D = 49A ; R_G = 5\Omega$		675		μJ
E_{off}	Turn-off Switching Energy			520		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 10V ; V_{Bus} = 400V$ $I_D = 49A ; R_G = 5\Omega$		1100		μJ
E_{off}	Turn-off Switching Energy			635		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -49A$		0.9	1.2	V
t_{rr}	Reverse Recovery Time	$I_S = -49A$ $V_R = 400V$ $di_s/dt = 100A/\mu\text{s}$		600		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		17	

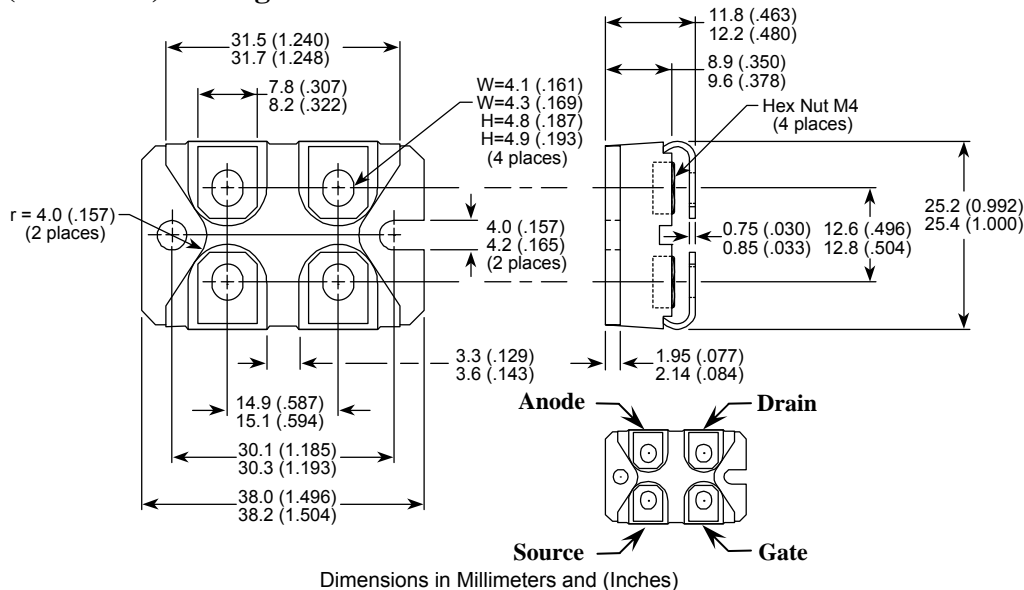
Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V_{RRM}	Max. Peak Repetitive Reverse Voltage		600			V	
V_F	Diode Forward Voltage	$I_F = 30A$		1.8	2.2	V	
		$I_F = 60A$		2			
		$I_F = 30A$	$T_j = 125^\circ C$		1.3		
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ C$		100	μA	
			$T_j = 125^\circ C$		500		
C_T	Junction Capacitance	$V_R = 200V$		36		pF	
t_{rr}	Reverse Recovery Time	$I_F = 1A, V_R = 30V$ $di/dt = 100A/\mu s$	$T_j = 25^\circ C$		22	ns	
				$T_j = 25^\circ C$			25
				$T_j = 125^\circ C$			160
I_{RRM}	Maximum Reverse Recovery Current	$I_F = 30A$ $V_R = 400V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$		3	A	
				$T_j = 125^\circ C$			6
				$T_j = 25^\circ C$			35
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$		480	nC	
				$T_j = 125^\circ C$			480
t_{rr}	Reverse Recovery Time	$I_F = 30A$	$T_j = 125^\circ C$		85	ns	
Q_{rr}	Reverse Recovery Charge	$V_R = 400V$			920	nC	
I_{RRM}	Maximum Reverse Recovery Current	$di/dt = 1000A/\mu s$			20	A	

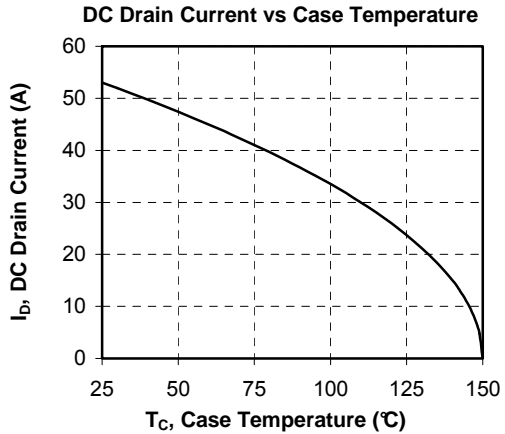
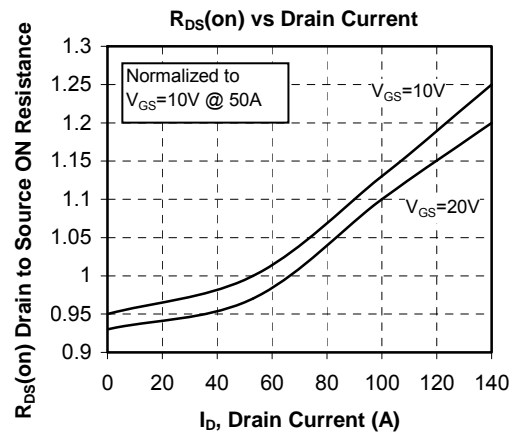
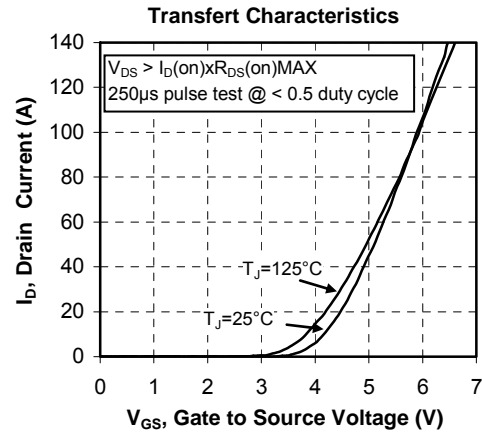
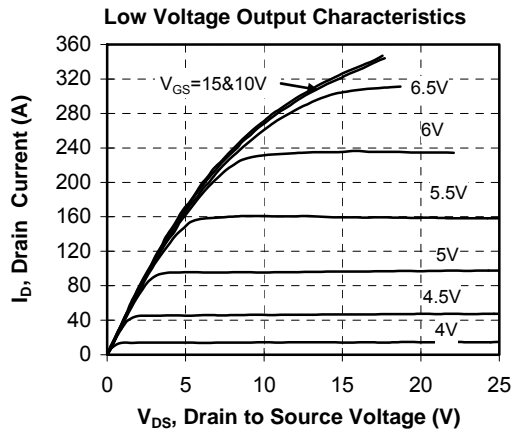
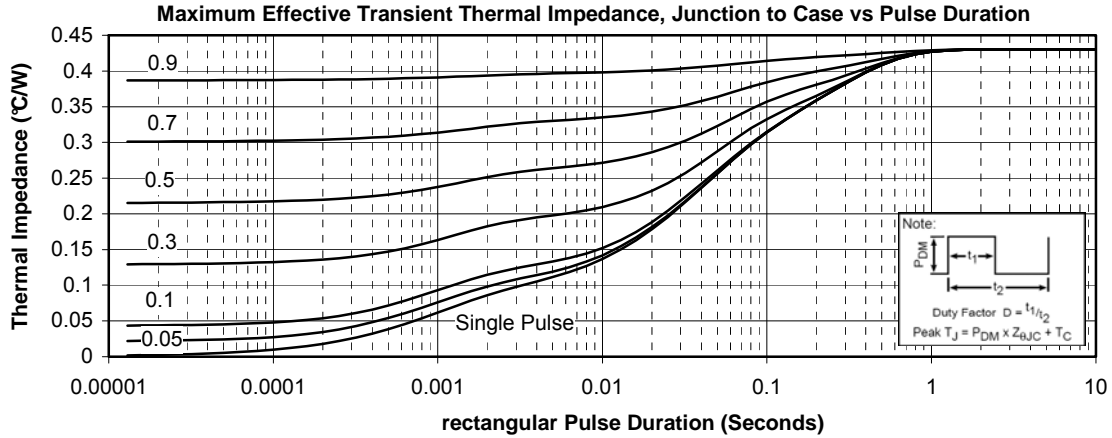
Thermal and package characteristics

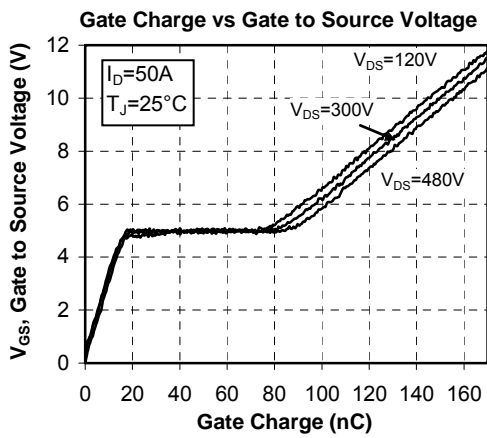
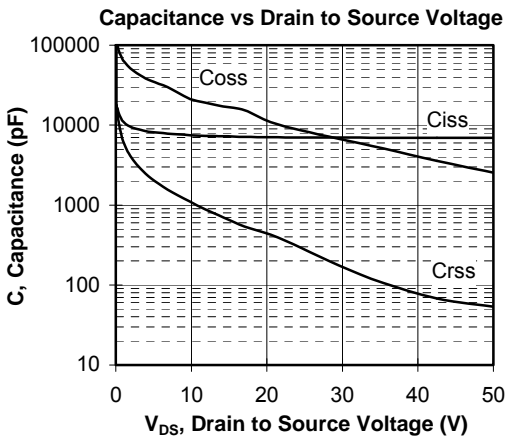
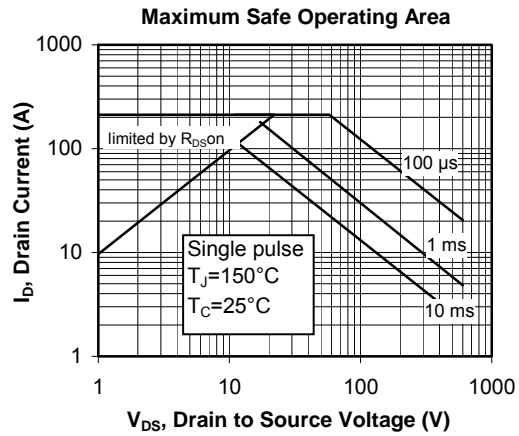
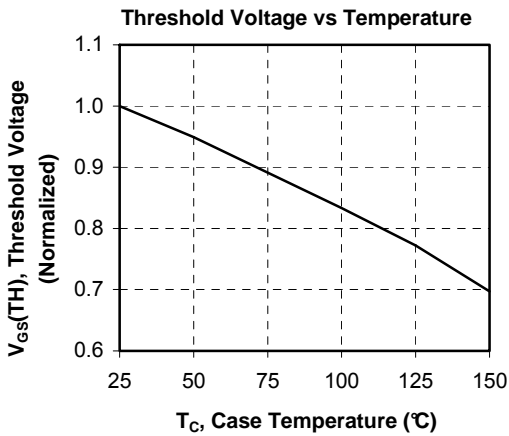
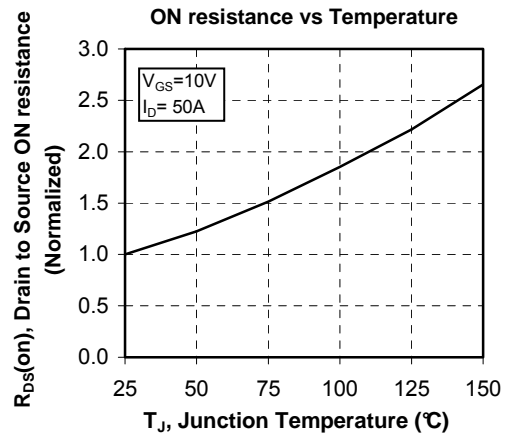
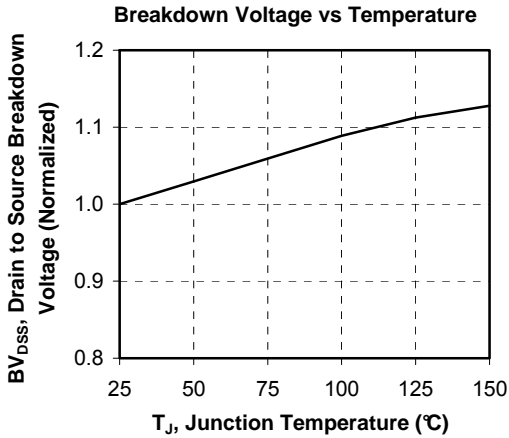
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	CoolMos		0.43	$^\circ C/W$
		Diode		1.1	
R_{thJA}	Junction to Ambient (IGBT & Diode)			20	$^\circ C/W$
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{isol} < 1mA$, 50/60Hz	2500			V
T_J, T_{STG}	Storage Temperature Range	-40		150	$^\circ C$
T_L	Max Lead Temp for Soldering: 0.063" from case for 10 sec			300	$^\circ C$
Torque	Mounting torque (Mounting = 8-32 or 4mm Machine and terminals = 4mm Machine)			1.5	N.m
Wt	Package Weight		29.2		g

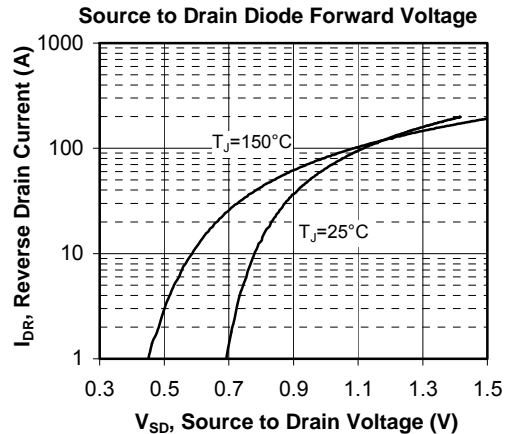
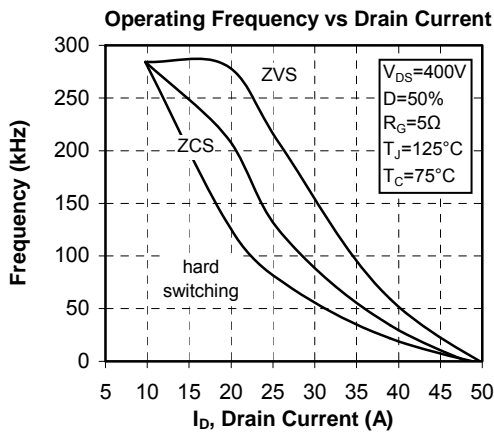
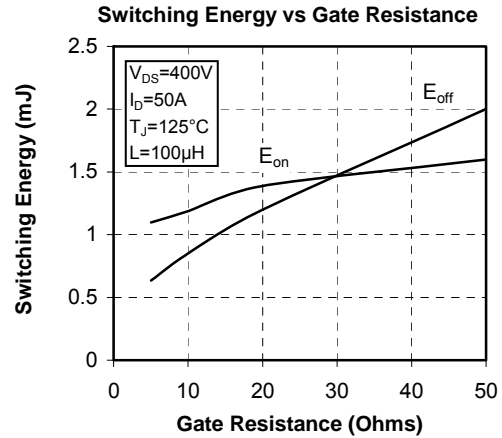
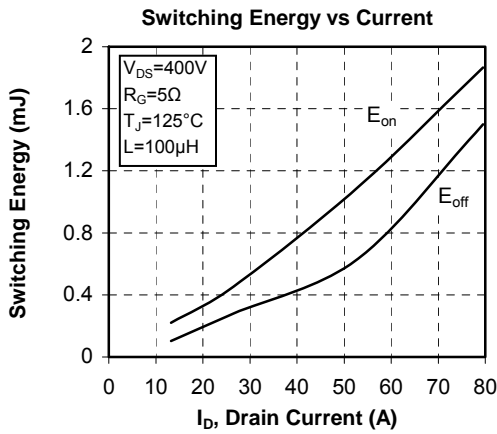
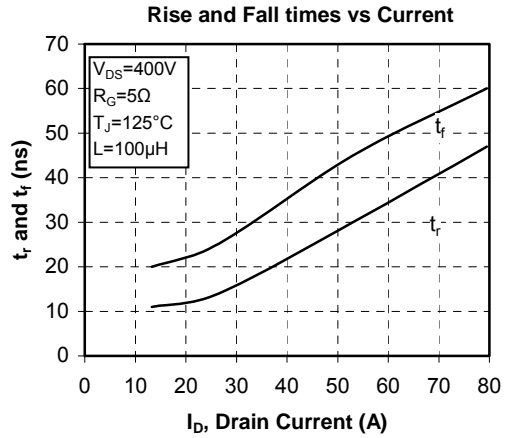
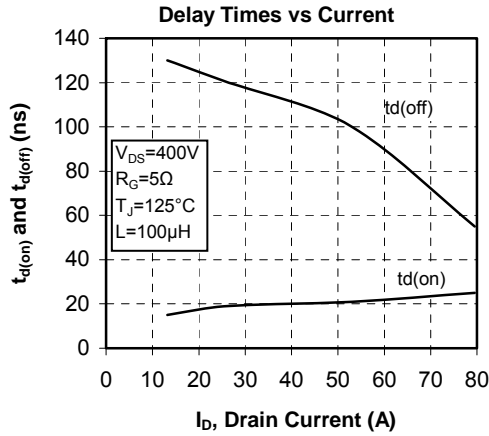
SOT-227 (ISOTOP[®]) Package Outline



Typical Performance Curve







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