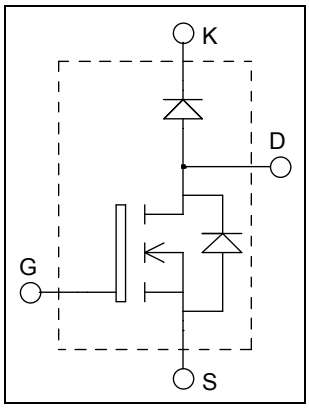
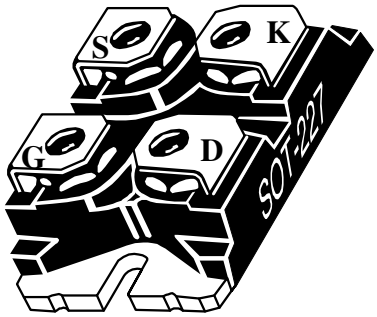
ISOTOP® Boost chopper
Super Junction MOSFET Power Module

V_{DSS} = 600V
R_{DSon} = 45mΩ max @ Tj = 25°C
I_D = 52A @ Tc = 25°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 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°C	52	A
		T_c = 80°C	38	
I_{DM}	Pulsed Drain current		130	
V_{GS}	Gate - Source Voltage		±20	V
R_{DSon}	Drain - Source ON Resistance		45	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	290	W
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 Handing Procedures Should Be Followed.

All ratings @ T_j = 25°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°C			250	µA
		V_{GS} = 0V,V_{DS} = 600V	T_j = 125°C			500	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 22.5A			40	45	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 3mA		2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±20 V, 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 = 1MHz			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 = 5Ω			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 = 5Ω			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 = 5Ω			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/µs	T_j = 25°C		600		ns
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		17		µC

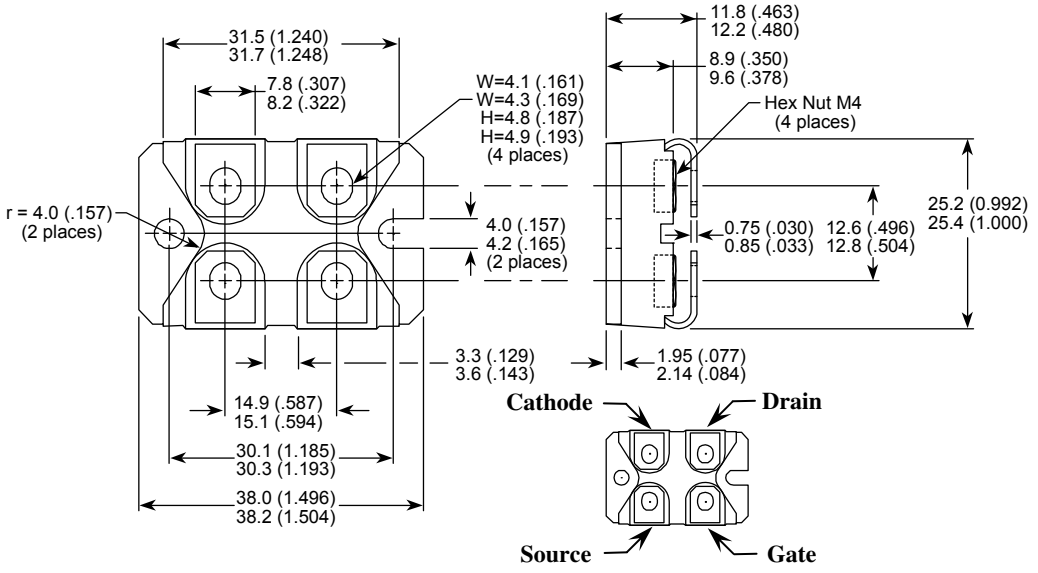
Chopper diode ratings and characteristics

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°C		1.3		
I_{RM}	Maximum Reverse Leakage Current	V_R = 600V	T_j = 25°C			100	µA
			T_j = 125°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/µs	T_j = 25°C		22		ns
	Reverse Recovery Time	I_F = 30A V_R = 400V di/dt =200A/µs	T_j = 25°C		25		
			T_j = 125°C		160		
I_{RRM}	Maximum Reverse Recovery Current		T_j = 25°C		3		A
			T_j = 125°C		6		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		35		nC
			T_j = 125°C		480		
t_{rr}	Reverse Recovery Time	I_F = 30A V_R = 400V di/dt =1000A/µs	T_j = 125°C		85		ns
Q_{rr}	Reverse Recovery Charge				920		nC
I_{RRM}	Maximum Reverse Recovery Current				20		A

Thermal and package characteristics

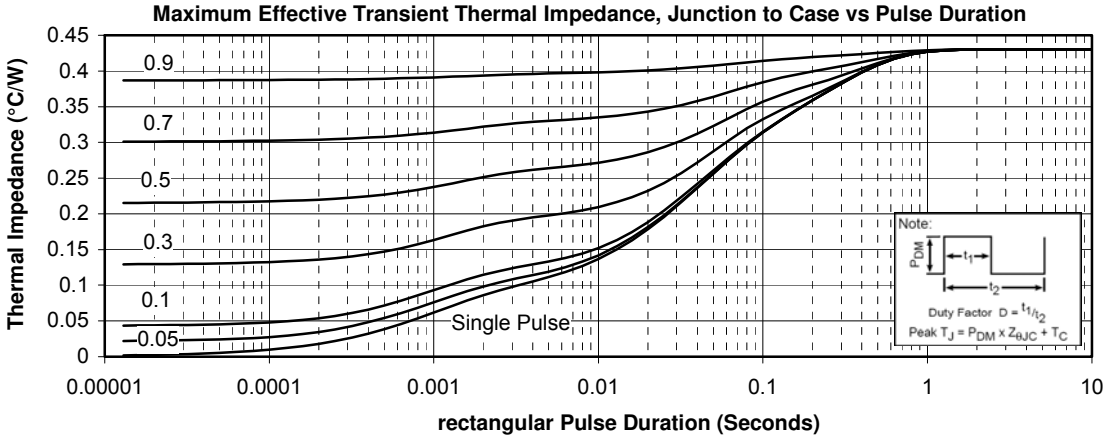
Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	CoolMos			0.43	°C/W
		Diode			1.1	
R_{thJA}	Junction to Ambient (IGBT & Diode)				20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz		2500			V
T_J,T_{STG}	Storage Temperature Range		-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

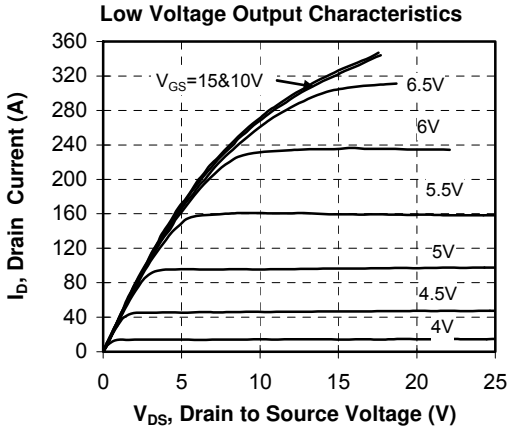
SOT-227 (ISOTOP®) Package Outline

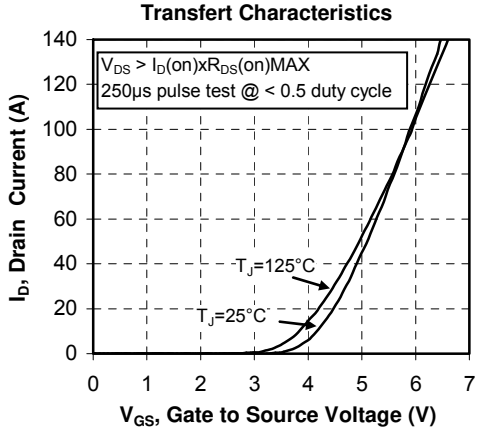


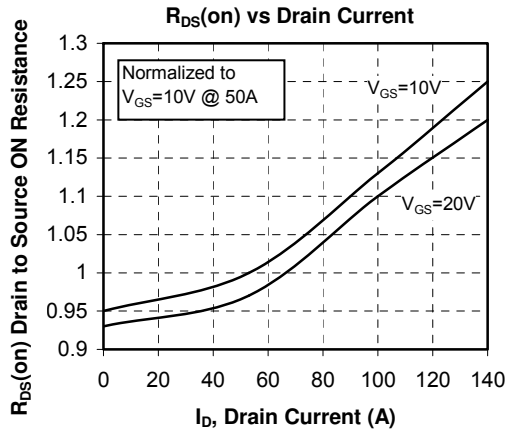
Dimensions in Millimeters and (Inches)

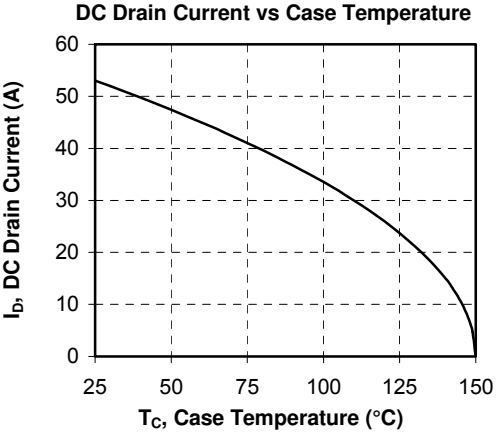
Typical Performance Curve



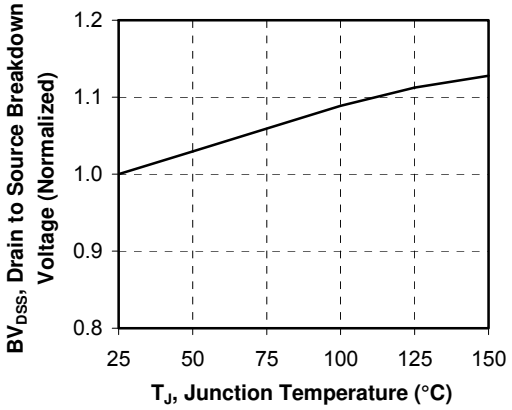




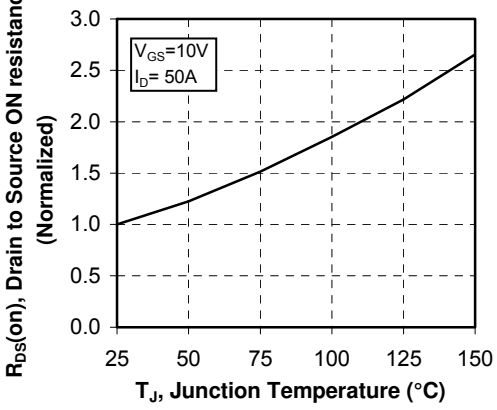




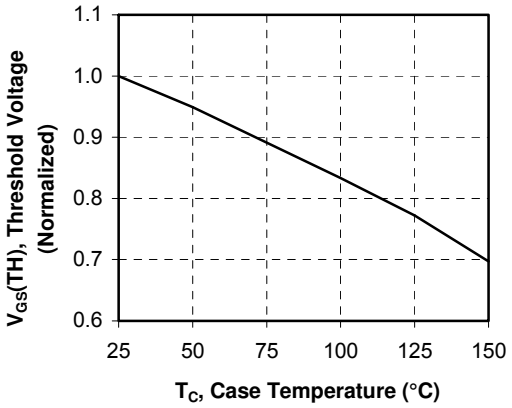
Breakdown Voltage vs Temperature



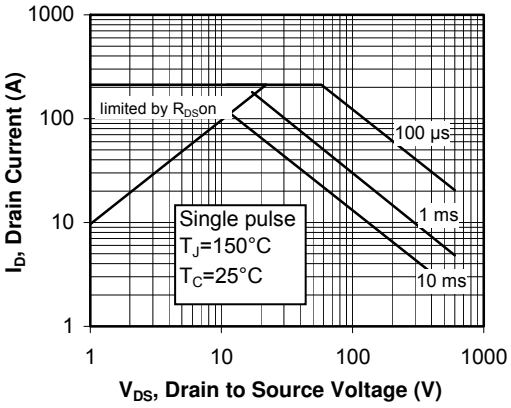
ON resistance vs Temperature



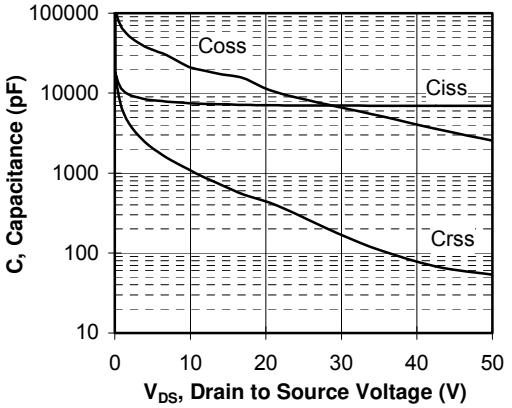
Threshold Voltage vs Temperature



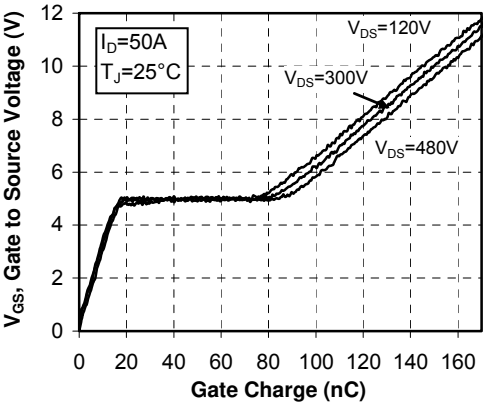
Maximum Safe Operating Area

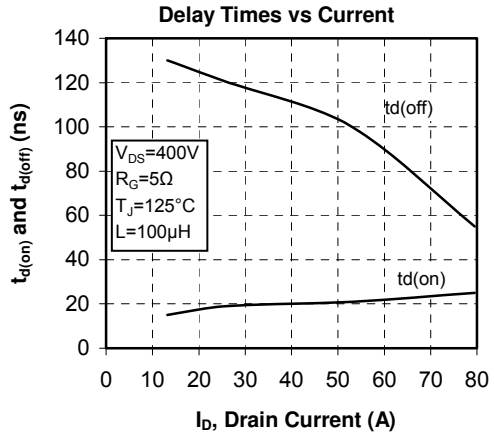


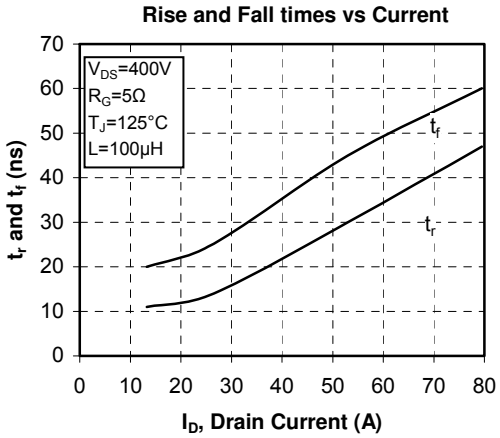
Capacitance vs Drain to Source Voltage

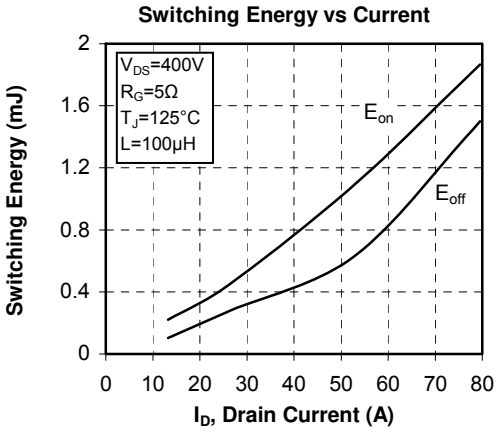


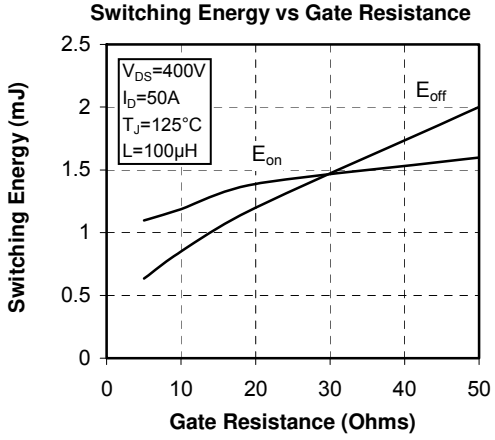
Gate Charge vs Gate to Source Voltage

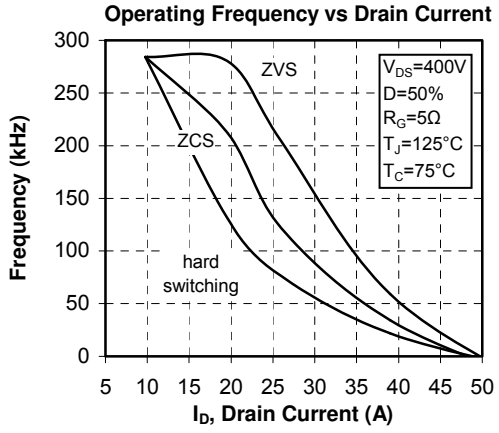


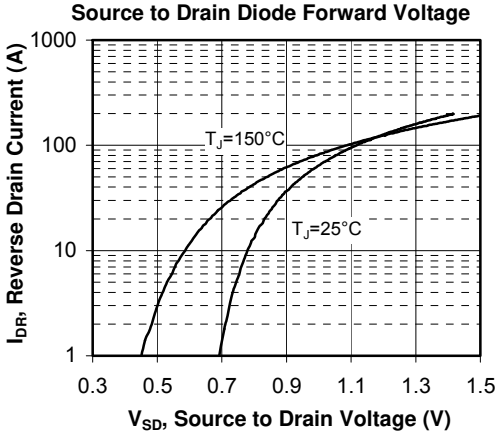












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