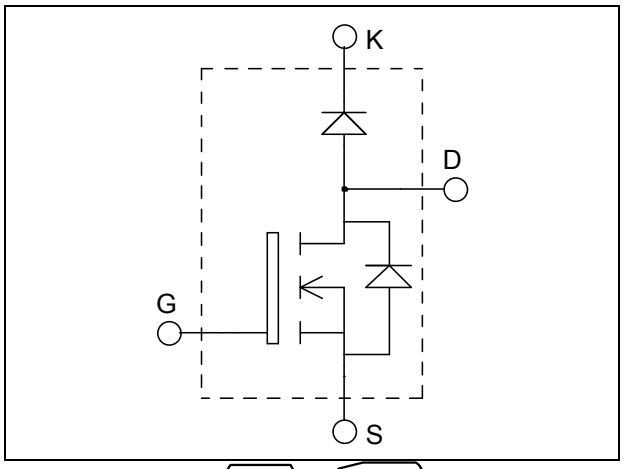
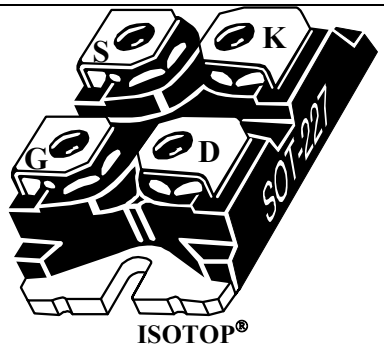
APT33N90JCCU2

ISOTOP® Boost chopper Super Junction MOSFET SiC chopper diode

V_{DSS} = 900V
R_{DSon} = 120mΩ max @ Tj = 25°C
I_D = 33A @ Tc = 25°C





ISOTOP®

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 T_C of V_{CEsat}
- RoHS Compliant

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{DSS}	Drain - Source Breakdown Voltage		900	V
I_D	Continuous Drain Current	T_c = 25°C	33	A
		T_c = 80°C	25	
I_{DM}	Pulsed Drain current		75	
V_{GS}	Gate - Source Voltage		±20	V
R_{DSon}	Drain - Source ON Resistance		120	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	290	W
I_{AR}	Avalanche current (repetitive and non repetitive)		8.8	A
E_{AR}	Repetitive Avalanche Energy		2.9	mJ
E_{AS}	Single Pulse Avalanche Energy		1940	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

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} = 900V	T_j = 25°C			100	µA
		V_{GS} = 0V,V_{DS} = 900V	T_j = 125°C		500		
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 26A			100	120	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 3mA		2.5	3	3.5	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} = 100V f = 1MHz		6.8		nF
C_{oss}	Output Capacitance			0.33		
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 400V I_D = 26A		270		nC
Q_{gs}	Gate – Source Charge			32		
Q_{gd}	Gate – Drain Charge			115		
$T_{d(on)}$	Turn-on Delay Time	**Inductive Switching (125°C)** V_{GS} = 10V V_{Bus} = 600V I_D = 26A R_G = 7.5Ω		70		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			400		
T_f	Fall Time			25		
E_{on}	Turn-on Switching Energy	**Inductive switching @ 25°C** V_{GS} = 10V ; V_{Bus} = 600V I_D = 26A ; R_G = 7.5Ω		0.9		mJ
E_{off}	Turn-off Switching Energy			0.75		
E_{on}	Turn-on Switching Energy	**Inductive switching @ 125°C** V_{GS} = 10V ; V_{Bus} = 600V I_D = 26A ; R_G = 7.5Ω		1.3		mJ
E_{off}	Turn-off Switching Energy			0.85		

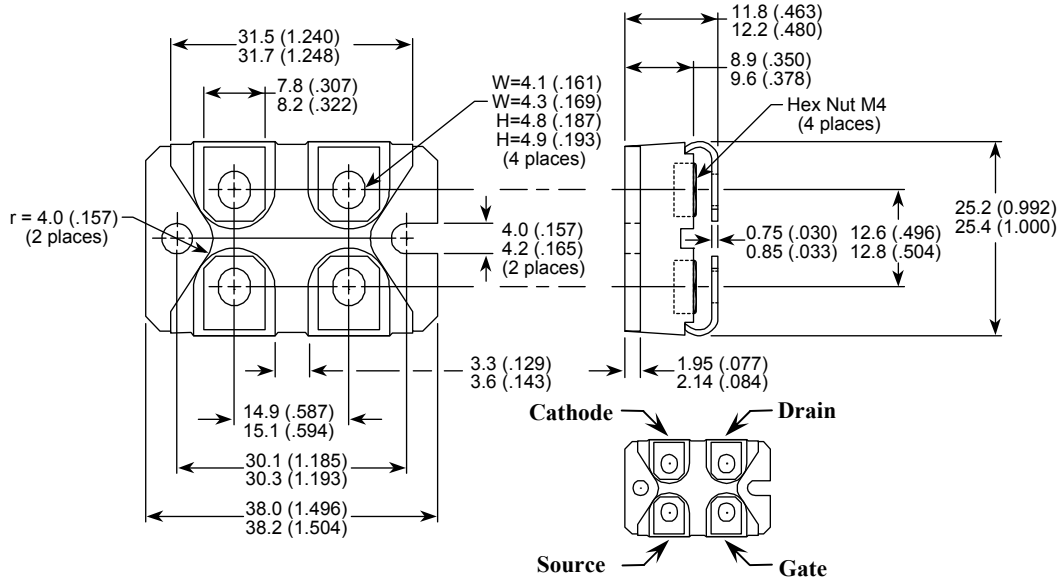
SiC chopper diode ratings and characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V
I_{RM}	Maximum Reverse Leakage Current	V_R=1200V	T_j = 25°C		32	200	µA
			T_j = 175°C		56	1000	
I_F	DC Forward Current		Tc = 100°C		10		A
V_F	Diode Forward Voltage	I_F = 10A	T_j = 25°C		1.6	1.8	V
			T_j = 175°C		2.3	3	
Q_C	Total Capacitive Charge	I_F = 10A, V_R = 600V di/dt =500A/µs			40		nC
C	Total Capacitance	f = 1MHz, V_R = 200V			96		pF
		f = 1MHz, V_R = 400V			69		

Thermal and package characteristics

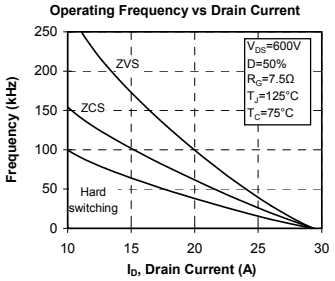
Symbol	*Characteristic*		*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance	CoolMOS			0.43	°C/W
		SiC Diode			1.65	
R_{thJA}	Junction to Ambient (IGBT & Diode)				20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz		2500			V
T_J,T_{STG}	Storage Temperature Range		-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

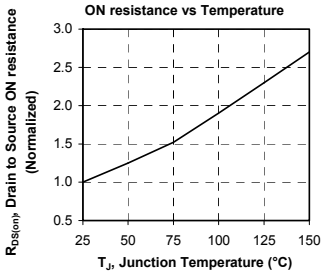
SOT-227 (ISOTOP®) Package Outline

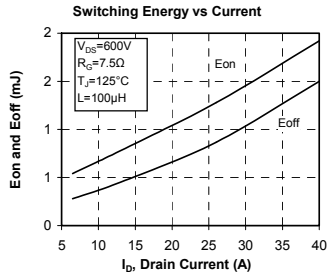


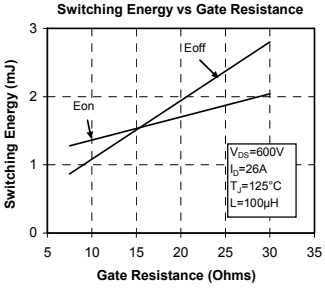
Dimensions in Millimeters and (Inches)

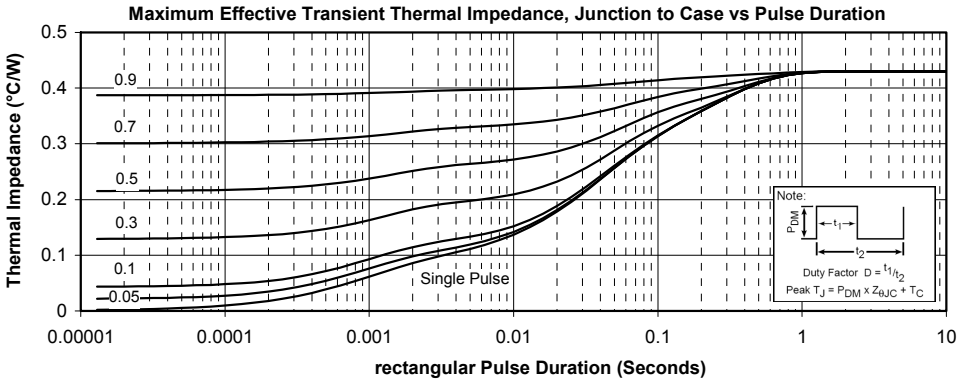
Typical CoolMOS performance Curve

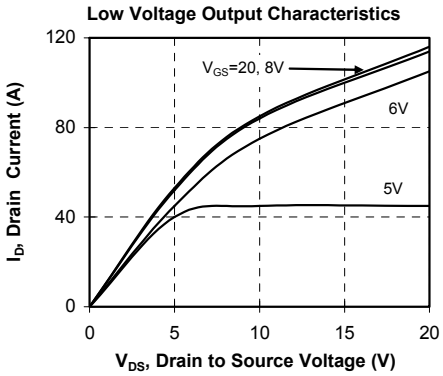


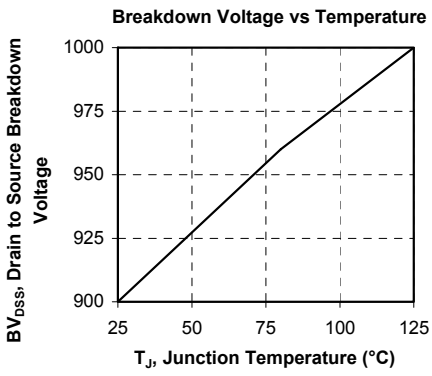


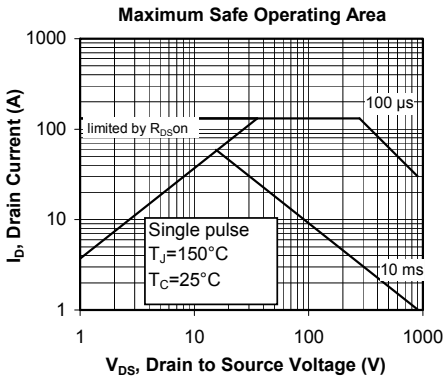


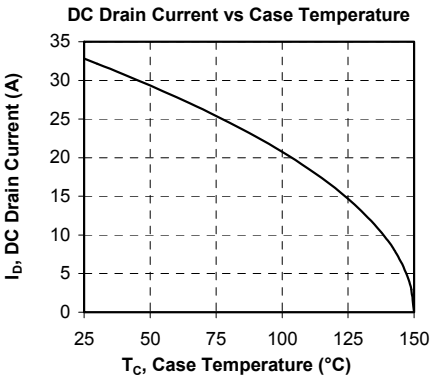


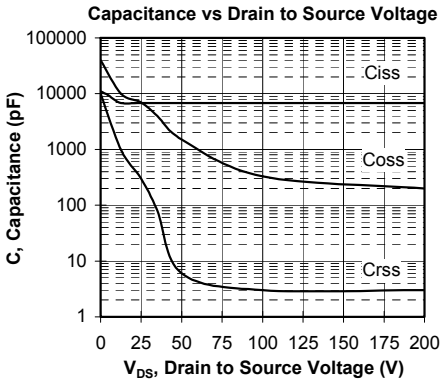


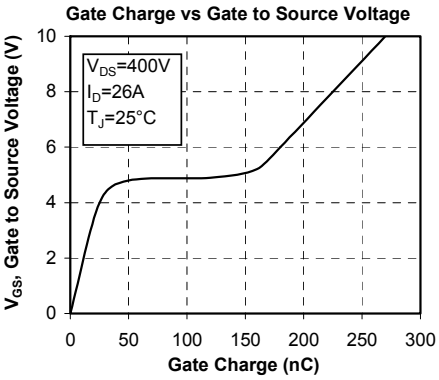




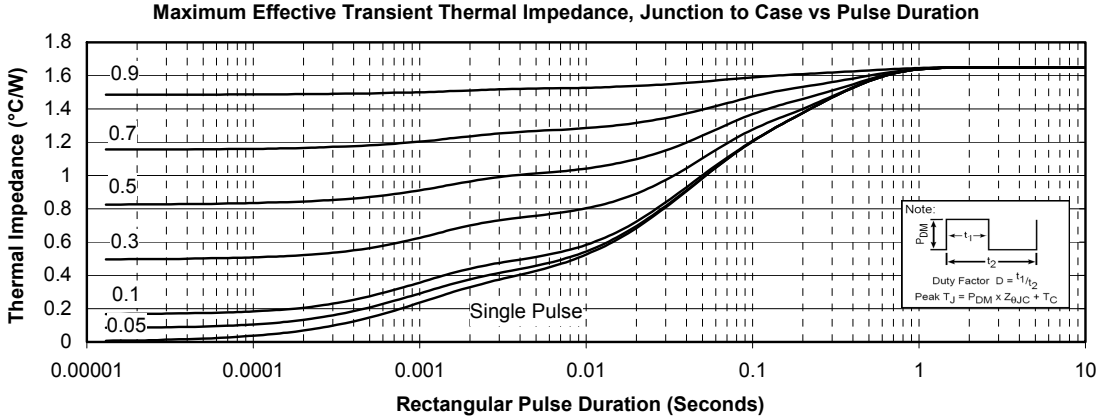


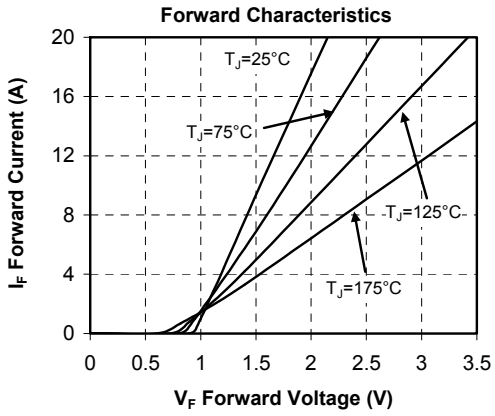


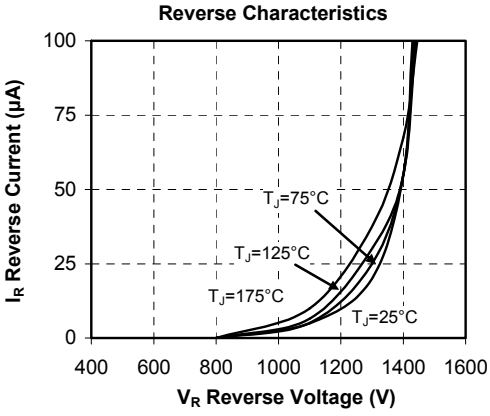


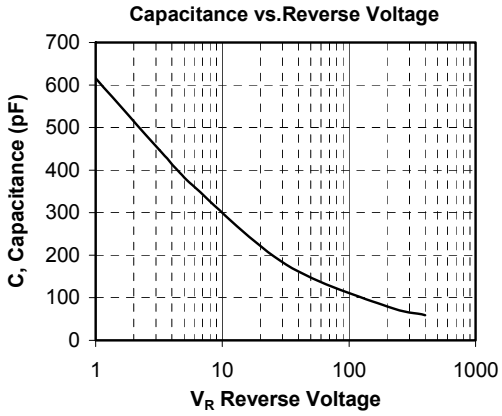


Typical SiC Chopper diode performance Curve









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