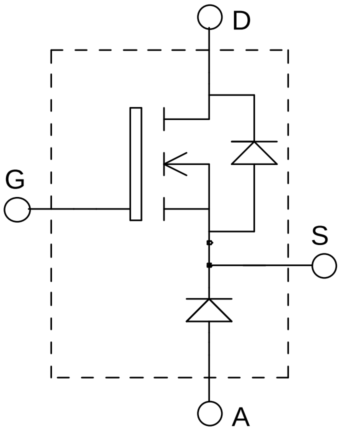
APT20M120JCU3

ISOTOP® Buck chopper
MOSFET + SiC chopper diode
Power module

V_{DSS} = 1200V
R_{DSon} = 560mΩ typ @ Tj = 25°C
I_D = 20A @ Tc = 25°C



Application

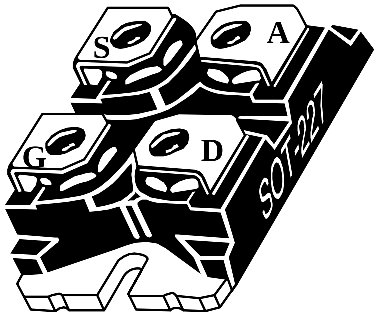
- AC and DC motor control
- Switched Mode Power Supplies

Features

- ***Power MOS 8™ MOSFET***
  - Low R_{DSon}
  - Low input and Miller capacitance
  - 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



ISOTOP®

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{DSS}	Drain - Source Breakdown Voltage		1200	V
I_D	Continuous Drain Current	T_c = 25°C	20	A
		T_c = 80°C	15	
I_{DM}	Pulsed Drain current		104	
V_{GS}	Gate - Source Voltage		±30	V
R_{DSon}	Drain - Source ON Resistance		672	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	543	W
I_{AR}	Avalanche current (repetitive and non repetitive)		14	A

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handing 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_{DS} =1200V V_{GS} = 0V	T_j = 25°C			100	µA
			T_j = 125°C			500	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 14A			560	672	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 2.5mA		3	4	5	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±30 V				±100	nA

Dynamic Characteristics

Symbol	*Characteristic*	*Test Conditions*	*Min*	*Typ*	*Max*	*Unit*
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1MHz		7736		pF
C_{oss}	Output Capacitance			715		
C_{rss}	Reverse Transfer Capacitance			92		
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 600V I_D = 14A		300		nC
Q_{gs}	Gate – Source Charge			50		
Q_{gd}	Gate – Drain Charge			140		
$T_{d(on)}$	Turn-on Delay Time	**Resistive switching @ 25°C** V_{GS} = 15V V_{Bus} = 800V I_D = 14A R_G = 2.2Ω		50		ns
T_r	Rise Time			31		
$T_{d(off)}$	Turn-off Delay Time			170		
T_f	Fall Time			48		

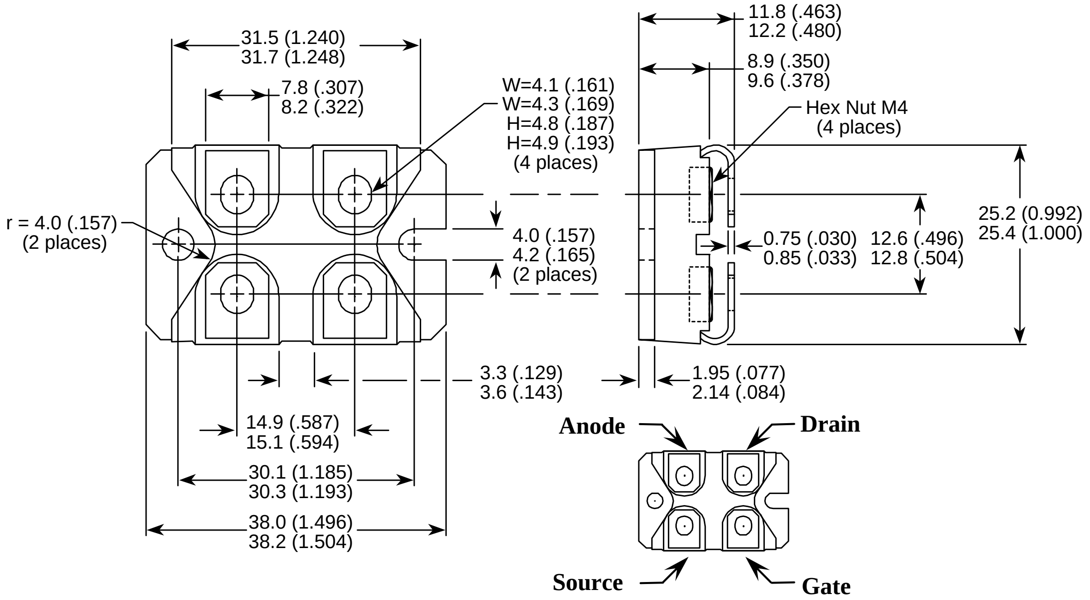
SiC chopper diode ratings and characteristics

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			80		nC
C	Total Capacitance	f = 1MHz, V_R = 200V			96		pF
		f = 1MHz, V_R = 400V			69		

Thermal and package characteristics

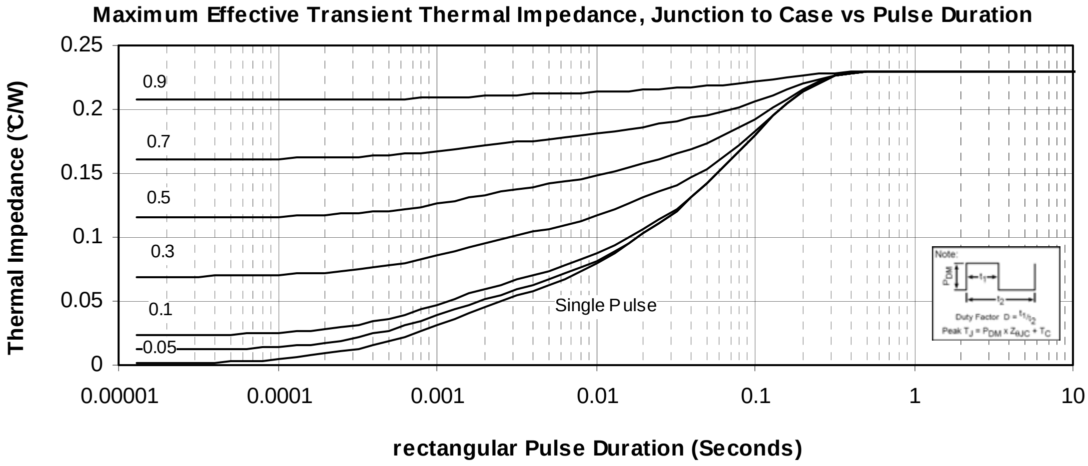
Symbol	*Characteristic*		*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance	Mosfet			0.23	°C/W
		SiC Diode			1.65	
R_{thJA}	Junction to Ambient (IGBT & Diode)				20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz		2500			V
T_J,T_{STG}	Storage Temperature 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

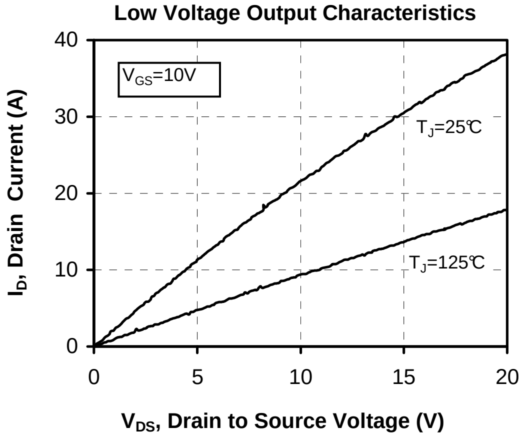
SOT-227 (ISOTOP$^{®}$) Package Outline



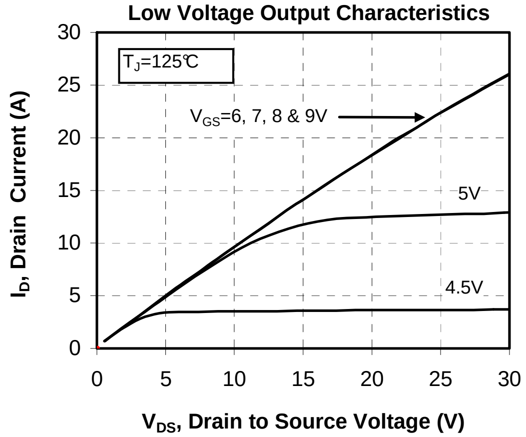
Dimensions in Millimeters and (Inches)

Typical Mosfet Performance Curve





Low Voltage Output Characteristics



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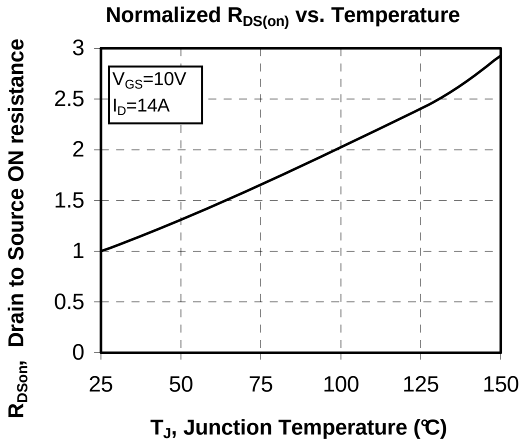
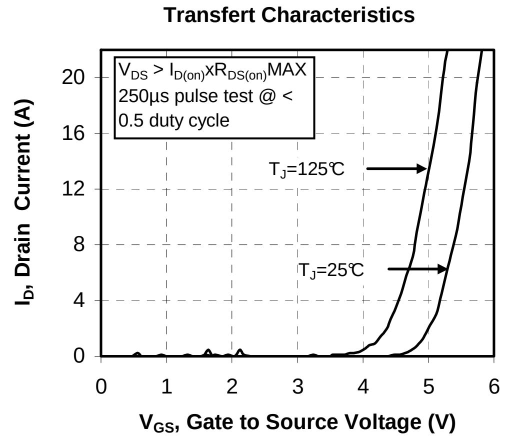
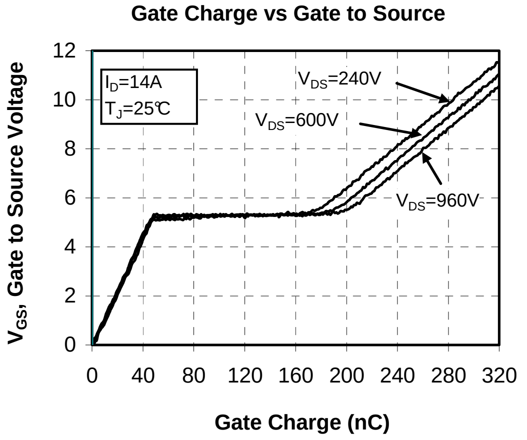


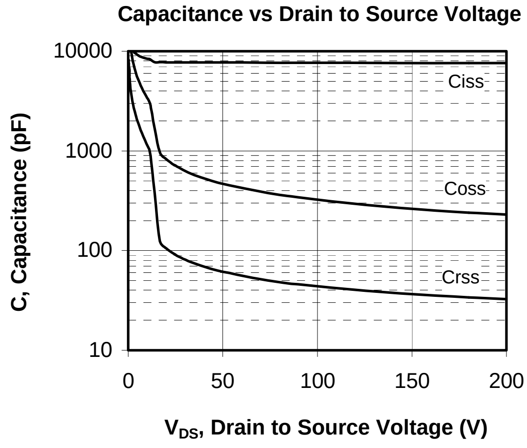
Normalized RDS(on) vs. Temperature



Transfert Characteristics

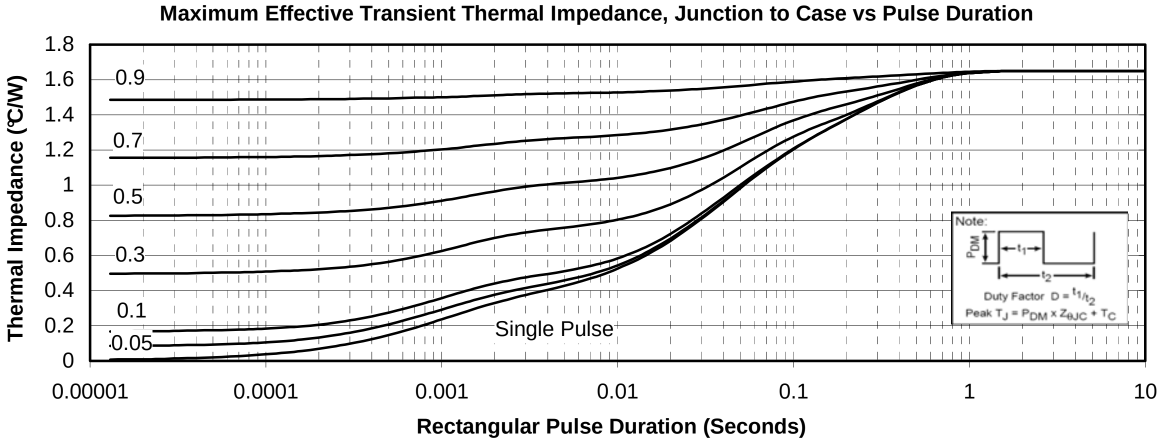


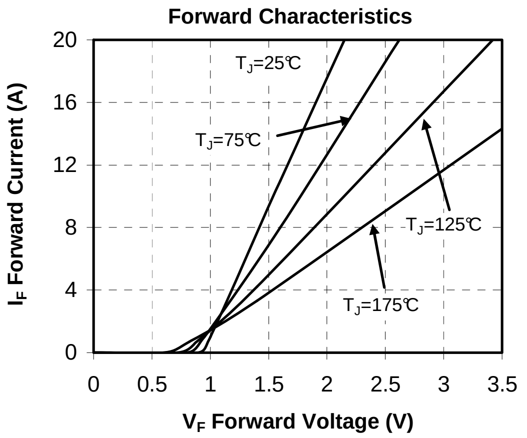
Gate Charge vs Gate to Source

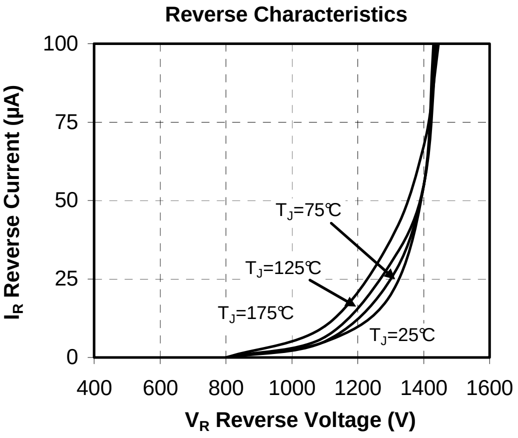


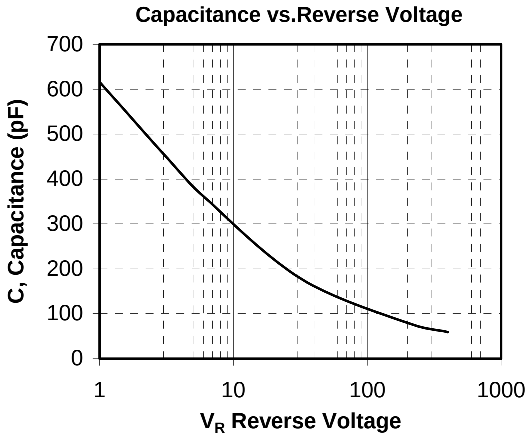
Capacitance vs Drain to Source Voltage

Typical SiC Diode Performance Curve









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