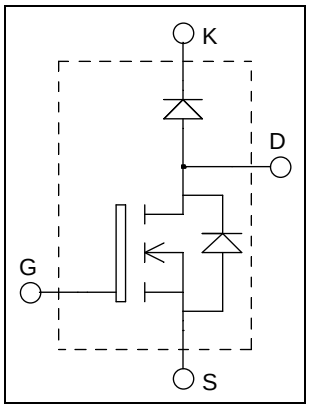
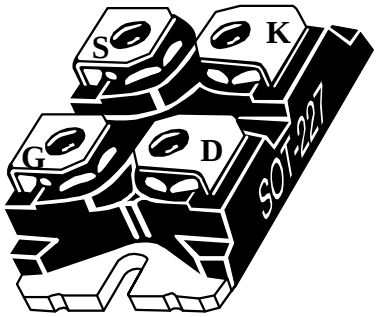
APT50N60JCCU2

ISOTOP® Boost chopper
Super Junction
MOSFET Power Module

V_{DSS} = 600V
R_{DSon} = 45mΩ max @ Tj = 25°C
I_D = 50A @ 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
- ***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°C	50	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			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	**Tj=25°C** V_{GS} = 10V V_{Bus} = 400V I_D = 44A R_G = 3.3Ω			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	**Tj=25°C** V_{GS} = 10V ; V_{Bus} = 400V I_D = 44A ; R_G = 3.3Ω			405		µJ
E_{off}	Turn-off Switching Energy				520		
E_{on}	Turn-on Switching Energy	**Tj=125°C** V_{GS} = 10V ; V_{Bus} = 400V I_D = 44A ; R_G = 3.3Ω			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 di_S/dt = 100A/µs	T_j = 25°C		600		ns
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		17		µC

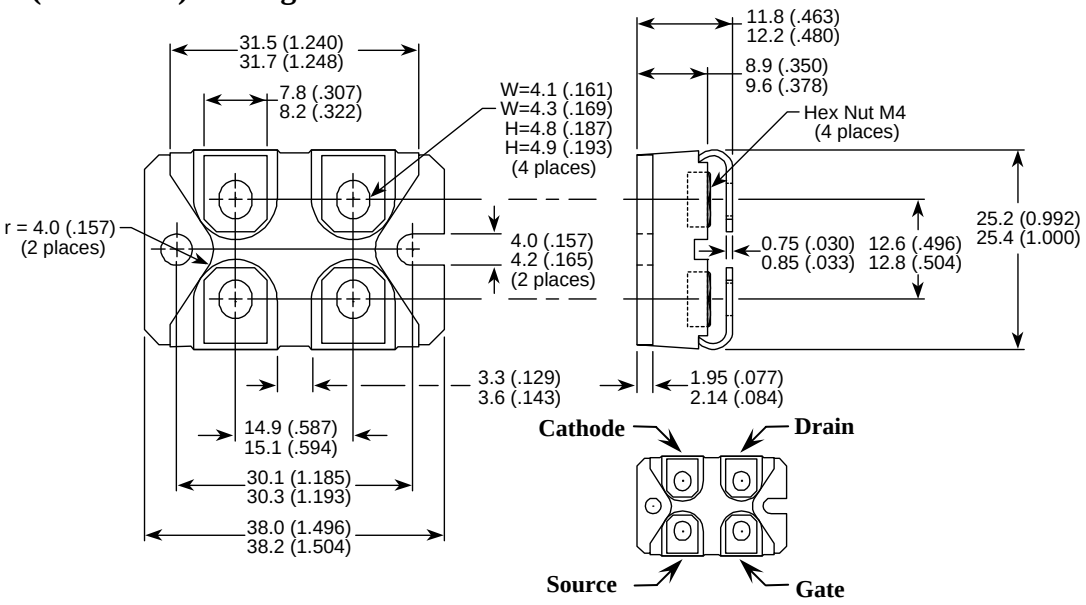
SiC chopper diode ratings and characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I_{RM}	Maximum Reverse Leakage Current	V_R=600V	T_j = 25°C		100	400	µA
			T_j = 175°C		200	2000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	Tc = 125°C		20		A
V_F	Diode Forward Voltage	I_F = 20A	T_j = 25°C		1.6	1.8	V
			T_j = 175°C		2	2.4	
Q_C	Total Capacitive Charge	I_F = 20A, V_R = 300V di/dt =800A/µs			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



Dimensions in Millimeters and (Inches)

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