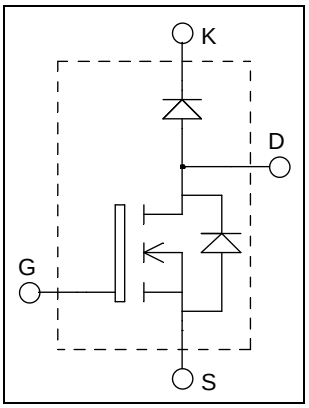
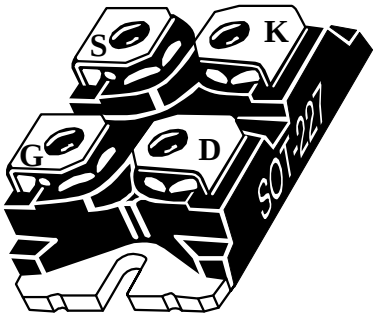
APT58M50JU2

ISOTOP® Boost chopper MOSFET Power Module

V_{DSS} = 500V
R_{DSon} = 65mΩ Max @ Tj = 25°C
I_D = 58A @ Tc = 25°C





Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction
- Brake switch

Features

- Power MOS 8™ MOSFETs
  - Low R_{DSon}
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- 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		500	V
I_D	Continuous Drain Current	T_c = 25°C	58	A
		T_c = 80°C	43	
I_{DM}	Pulsed Drain current		270	
V_{GS}	Gate - Source Voltage		±30	V
R_{DSon}	Drain - Source ON Resistance		65	mΩ
P_D	Maximum Power Dissipation	T_c = 25°C	543	W
I_{AR}	Avalanche current (repetitive and non repetitive)		42	A

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_{DS} = 500V, V_{GS} = 0V	T_j = 25°C			250	µA
			T_j = 125°C			1000	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 42A				65	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		10800		pF
C_{oss}	Output Capacitance			1164		
C_{rss}	Reverse Transfer Capacitance			148		
Q_g	Total gate Charge	V_{GS} = 10V V_{Bus} = 250V I_D = 42A		340		nC
Q_{gs}	Gate – Source Charge			75		
Q_{gd}	Gate – Drain Charge			155		
$T_{d(on)}$	Turn-on Delay Time	**Resistive switching @ 25°C** V_{GS} = 15V V_{Bus} = 333V I_D = 42A R_G = 2.2Ω		60		ns
T_r	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			155		
T_f	Fall Time			50		

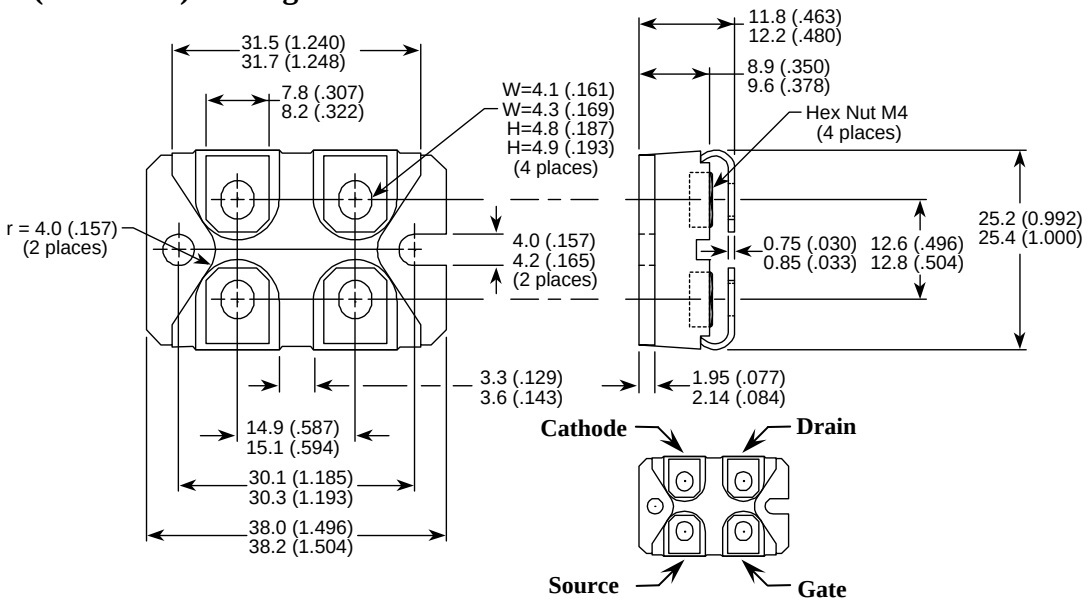
Chopper diode ratings and characteristics

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			25	µA
			T_j = 125°C			500	
I_F	DC Forward Current		Tc = 90°C		30		A
V_F	Diode Forward Voltage	I_F = 30A			1.8	2.2	V
		I_F = 60A			2.2		
		I_F = 30A	T_j = 125°C		1.5		
t_{rr}	Reverse Recovery Time	I_F = 30A V_R = 400V di/dt =200A/µs	T_j = 25°C		25		ns
			T_j = 125°C		160		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		35		nC
			T_j = 125°C		480		

Thermal and package characteristics

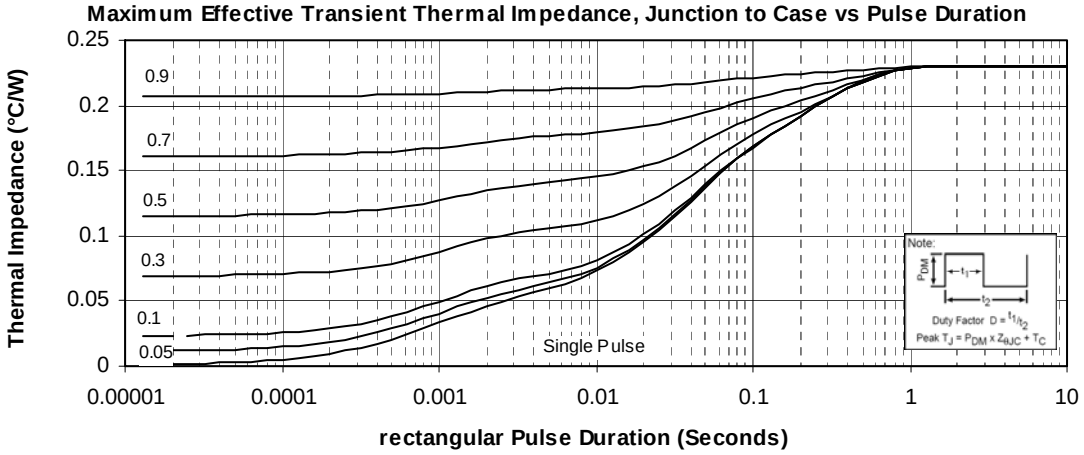
Symbol	*Characteristic*		*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance	Mosfet			0.23	°C/W
		Diode			1.05	
R_{thJA}	Junction to Ambient (IGBT & Diode)				20	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz		2500			V
T_J,T_{STG}	Storage Temperature 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

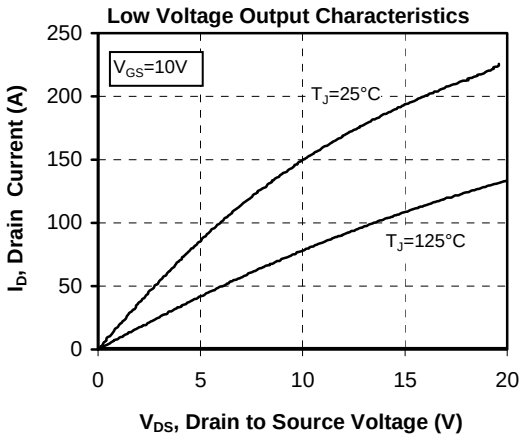
SOT-227 (ISOTOP®) Package Outline

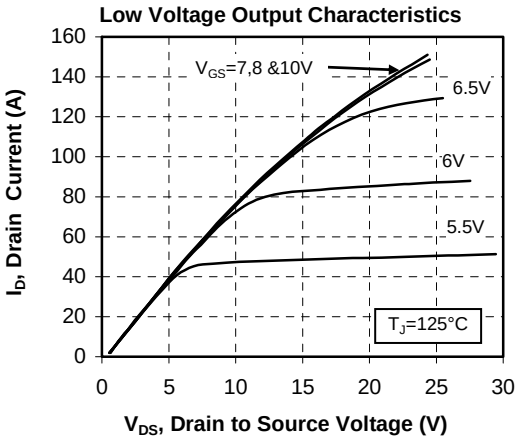


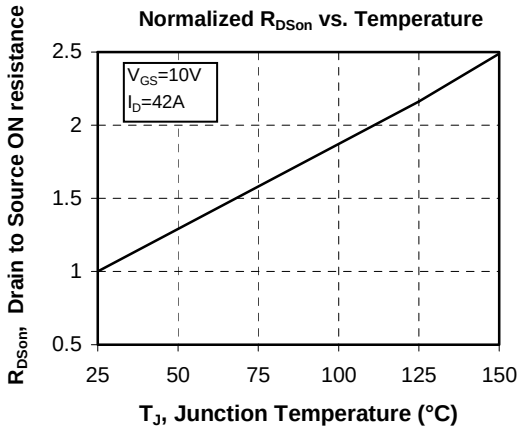
Dimensions in Millimeters and (Inches)

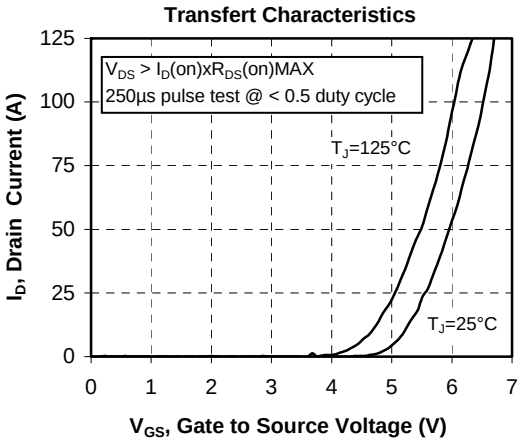
Typical Mosfet Performance Curve

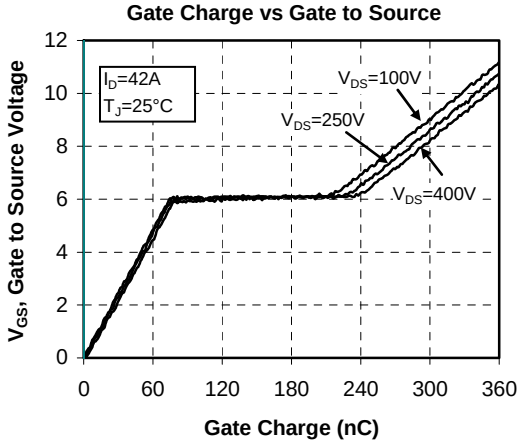


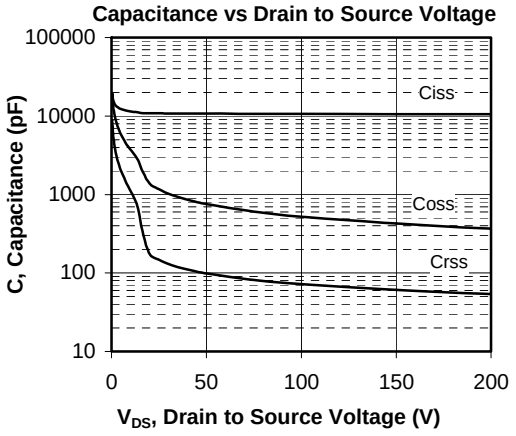

Low Voltage Output Characteristics
V_{GS}=10V
T_J=25°C
T_J=125°C
I_D, Drain Current (A)
V_{DS}, Drain to Source Voltage (V)


Low Voltage Output Characteristics
V_{GS}=7,8 &10V
6.5V
6V
5.5V
T_J=125°C
I_D, Drain Current (A)
V_{DS}, Drain to Source Voltage (V)

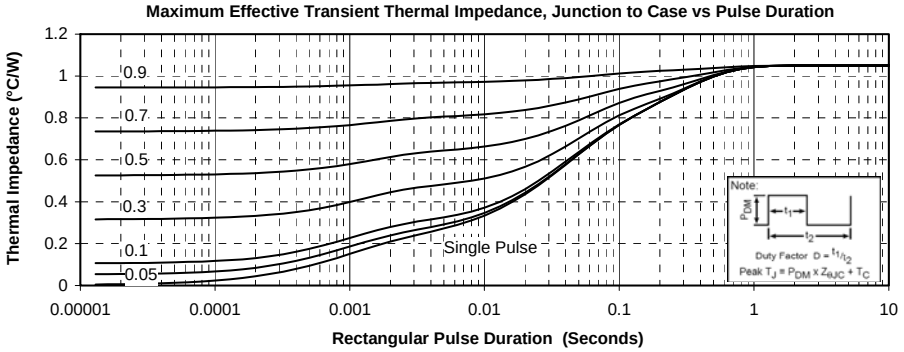

Normalized R_{DSon} vs. Temperature
V_{GS}=10V
I_D=42A
R_{DSon}, Drain to Source ON resistance
T_J, Junction Temperature (°C)

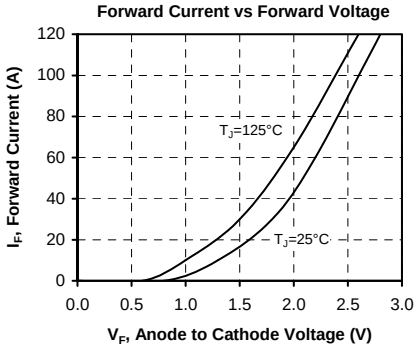

Transfert Characteristics
V_{DS} > I_D(on)xR_{DS}(on)MAX
250µs pulse test @ < 0.5 duty cycle
T_J=125°C
T_J=25°C
I_D, Drain Current (A)
V_{GS}, Gate to Source Voltage (V)

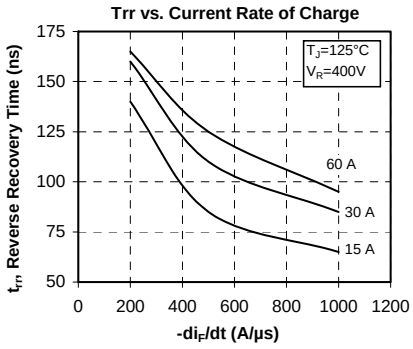

Gate Charge vs Gate to Source
I_D=42A
T_J=25°C
V_{DS}=100V
V_{DS}=250V
V_{DS}=400V
V_{GS}, Gate to Source Voltage
Gate Charge (nC)

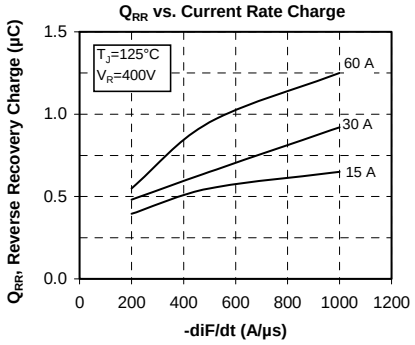

Capacitance vs Drain to Source Voltage
Ciss
Coss
Crss
C, Capacitance (pF)
V_{DS}, Drain to Source Voltage (V)

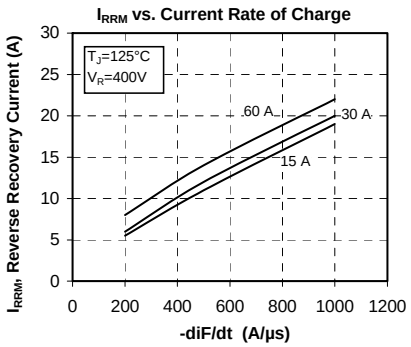
Typical Diode Performance Curve

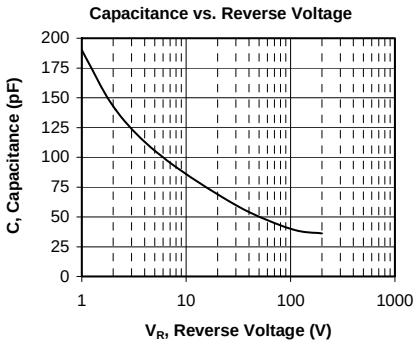


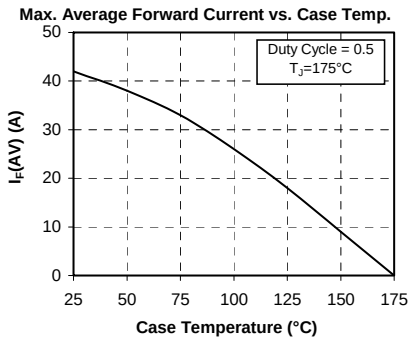












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Microsemi's products are covered by one or more of U.S patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522
5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.