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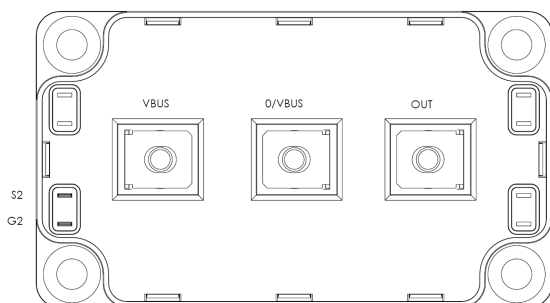
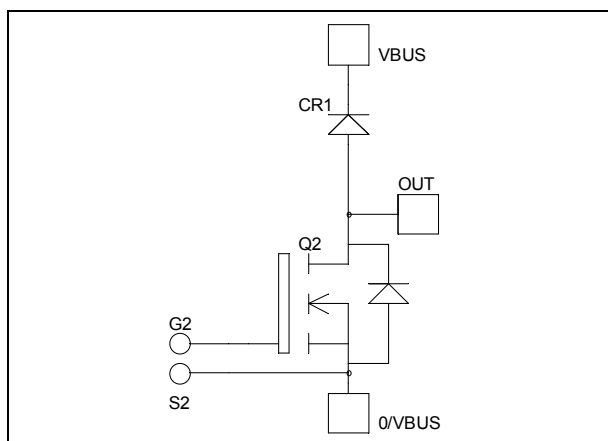
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## Boost chopper MOSFET Power Module

 $V_{DSS} = 100V$ 
 $R_{DSon} = 2.25m\Omega \text{ typ @ } T_j = 25^\circ C$ 
 $I_D = 495A \text{ @ } T_c = 25^\circ C$ 


### Application

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

### Features

- Power MOS V<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration

### Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	100	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	495
		$T_c = 80^\circ C$	370
$I_{DM}$	Pulsed Drain current	1900	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	2.5	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
$I_{AR}$	Avalanche current (repetitive and non repetitive)	100	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3000	



**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://www.microsemi.com)

**All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified**

### Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 100V$ $T_j = 25^\circ\text{C}$			400	$\mu\text{A}$
		$V_{GS} = 0V, V_{DS} = 80V$ $T_j = 125^\circ\text{C}$			2000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 200A$		2.25	2.5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10\text{mA}$	2		4	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 400$	nA

### Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		40		nF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		15.7		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		5.9		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 50V$ $I_D = 400A$		1360		nC
$Q_{gs}$	Gate – Source Charge			240		
$Q_{gd}$	Gate – Drain Charge			720		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 400A$ $R_G = 1.25\Omega$		160		ns
$T_r$	Rise Time			240		
$T_{d(off)}$	Turn-off Delay Time			500		
$T_f$	Fall Time			160		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 400A, R_G = 1.25\Omega$		2.2		mJ
$E_{off}$	Turn-off Switching Energy			2.41		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 400A, R_G = 1.25\Omega$		2.43		mJ
$E_{off}$	Turn-off Switching Energy			2.56		

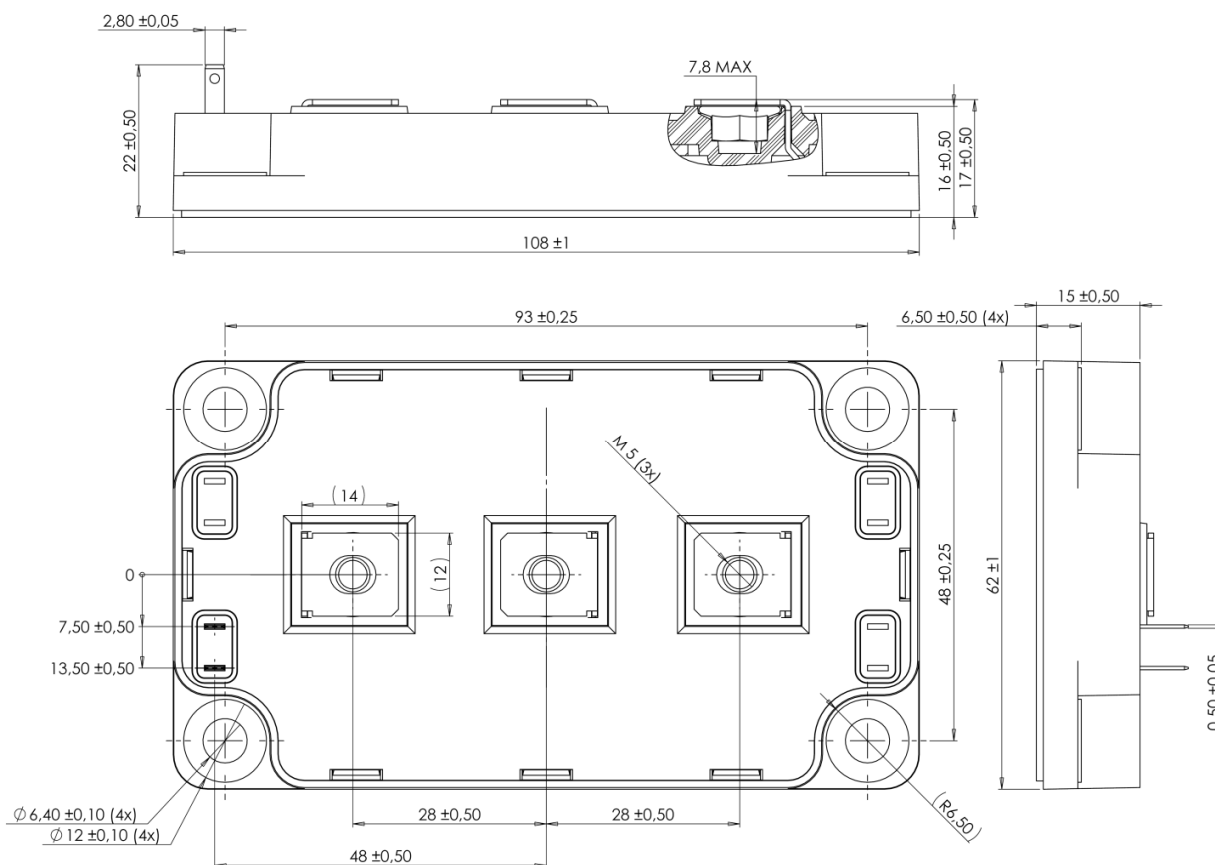
### Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V <sub>RRM</sub>	Maximum Peak Repetitive Reverse Voltage			200			V
I <sub>RM</sub>	Maximum Reverse Leakage Current	V <sub>R</sub> =200V	T <sub>j</sub> = 25°C			750	μA
			T <sub>j</sub> = 125°C			1000	
I <sub>F</sub>	DC Forward Current		T <sub>c</sub> = 80°C		400		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 400A			1		V
		I <sub>F</sub> = 800A			1.4		
		I <sub>F</sub> = 400A	T <sub>j</sub> = 125°C		0.9		
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 400A V <sub>R</sub> = 133V di/dt =800A/μs	T <sub>j</sub> = 25°C		60		ns
			T <sub>j</sub> = 125°C		110		
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>j</sub> = 25°C		800		nC
			T <sub>j</sub> = 125°C		3360		



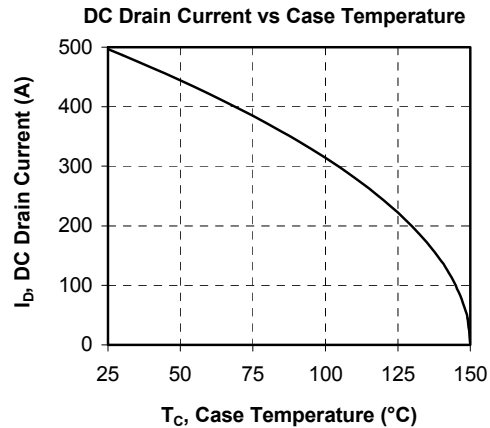
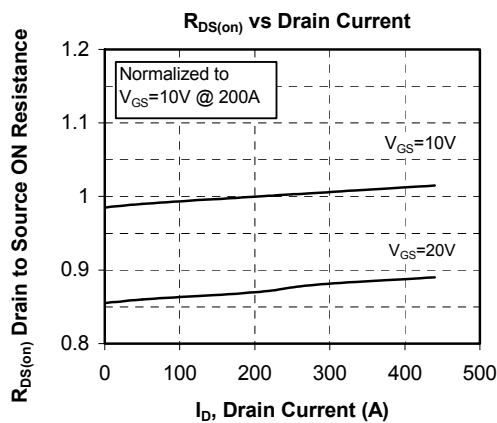
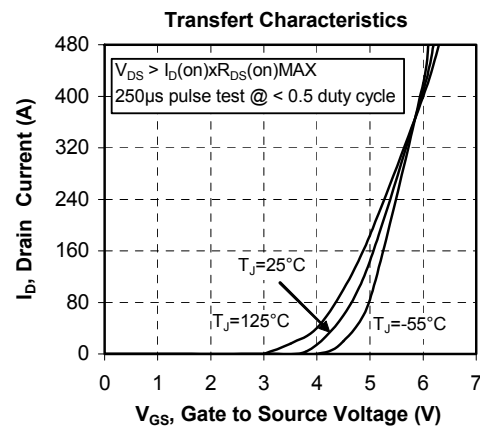
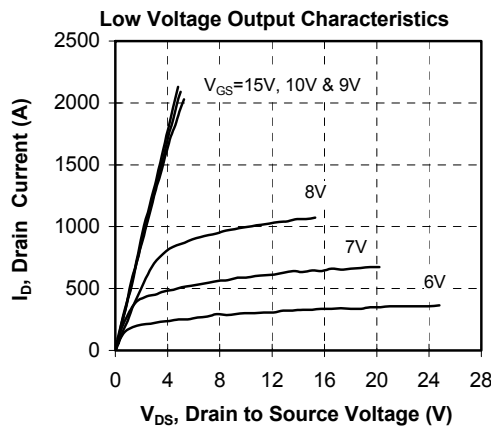
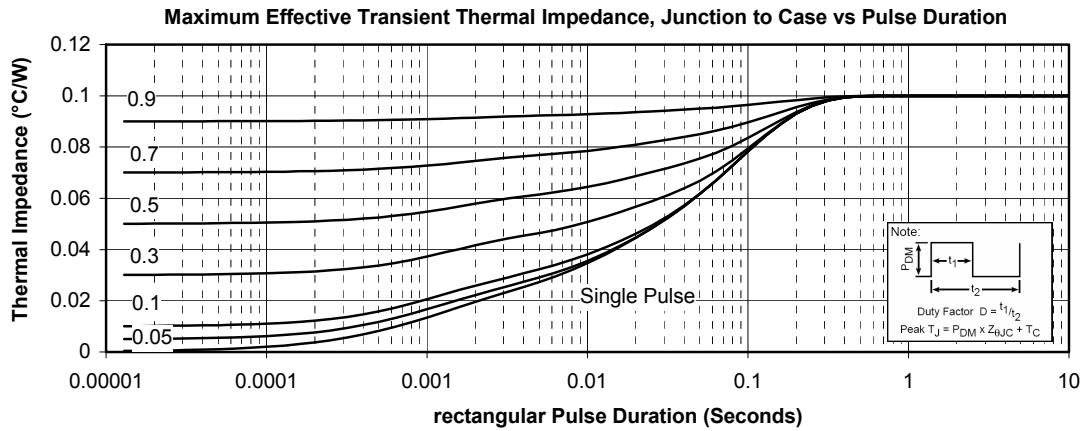
**Thermal and package characteristics**

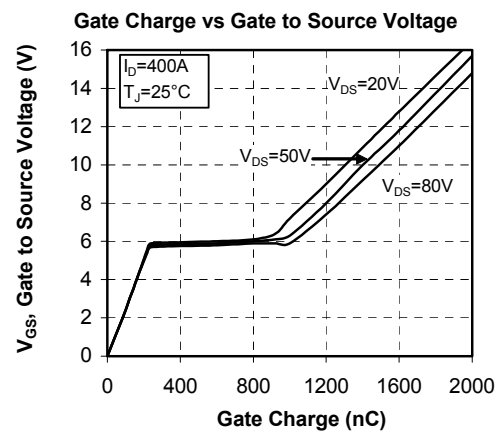
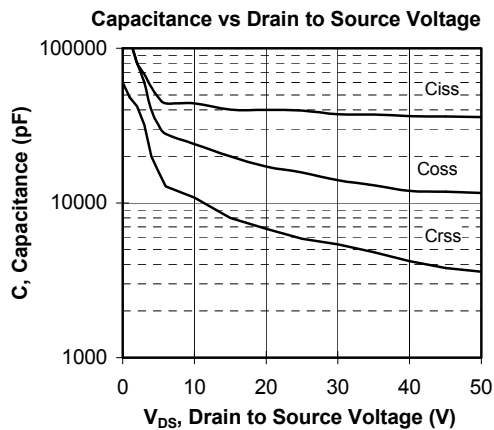
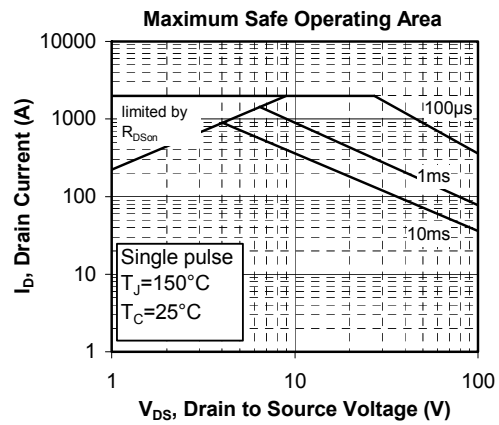
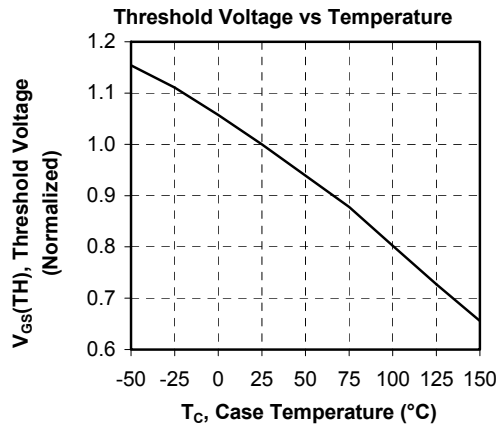
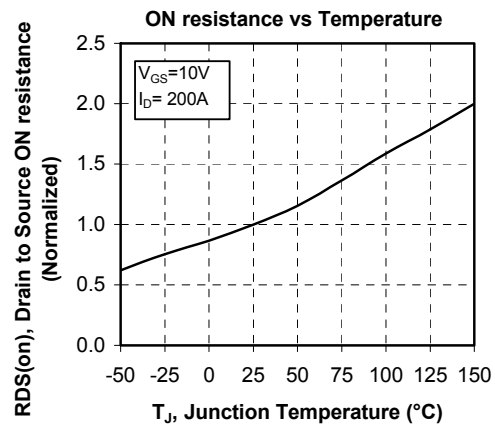
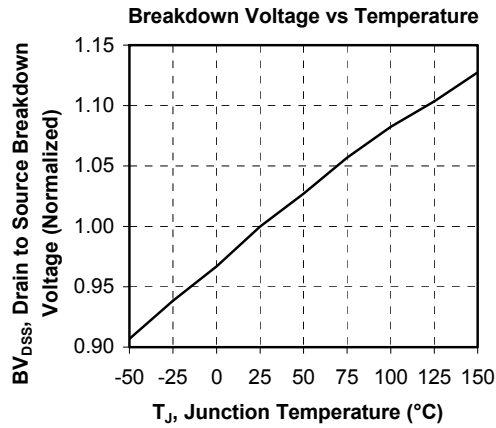
Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	Transistor			0.1	°C/W
		Diode			0.14	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz		4000			V
T <sub>J</sub>	Operating junction temperature range		-40		150	°C
T <sub>STG</sub>	Storage Temperature Range		-40		125	
T <sub>C</sub>	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink M6	3		5	N.m
		For terminals M5	2		3.5	
Wt	Package Weight				300	g

**SP6 Package outline (dimensions in mm)**


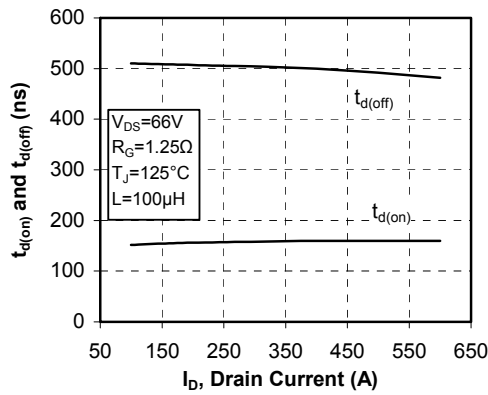
See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve

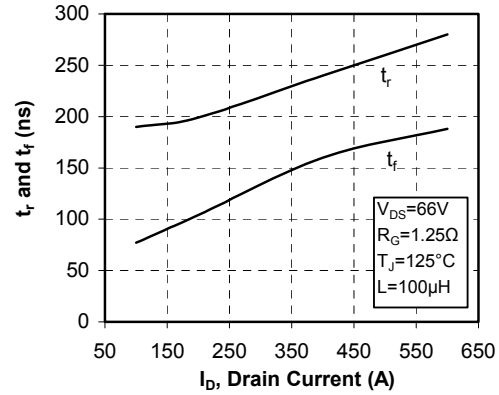




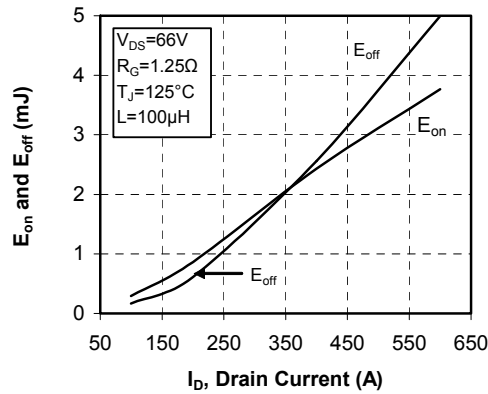
Delay Times vs Current



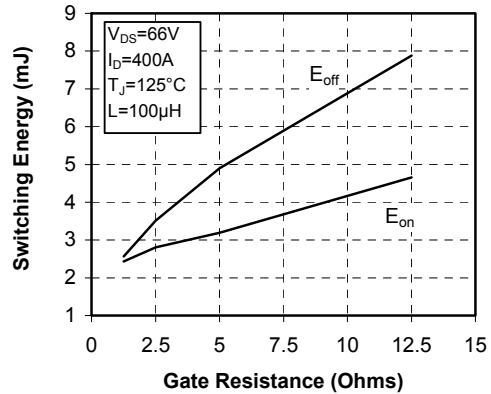
Rise and Fall times vs Current



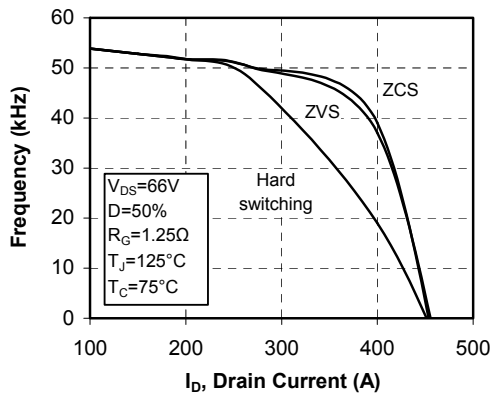
Switching Energy vs Current



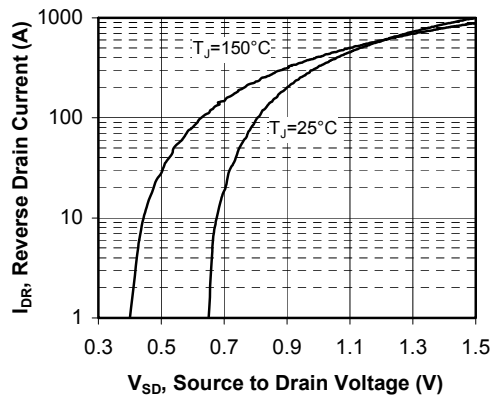
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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