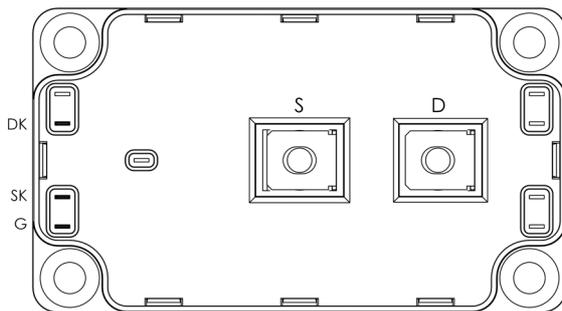
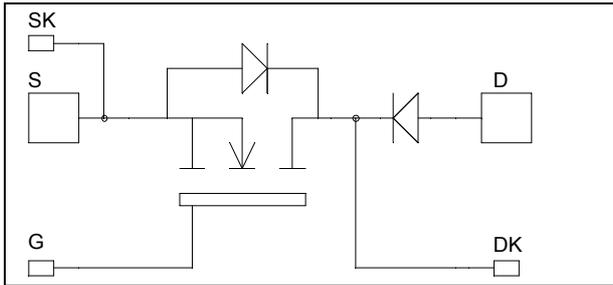


*Single switch  
with Series diodes  
MOSFET Power Module*

$V_{DSS} = 1200V$   
 $R_{DSon} = 70m\Omega$  typ @  $T_j = 25^\circ C$   
 $I_D = 171A$  @  $T_c = 25^\circ C$



### Application

- Zero Current Switching resonant mode

### Features

- Power MOS 7<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
- AlN substrate for improved thermal performance

### 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	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	171
		$T_c = 80^\circ C$	126
$I_{DM}$	Pulsed Drain current	684	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	80	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	5000
$I_{AR}$	Avalanche current (repetitive and non repetitive)	24	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3200	

**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 <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1200V			1.5	mA
		T <sub>j</sub> = 25°C				
		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1000V			6	
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 85.5A		70	80	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 30mA	3		5	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V			±600	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V f = 1MHz		43.5		nF
C <sub>oss</sub>	Output Capacitance			6.6		
C <sub>rss</sub>	Reverse Transfer Capacitance			1.2		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V V <sub>Bus</sub> = 600V I <sub>D</sub> = 171A		1650		nC
Q <sub>gs</sub>	Gate – Source Charge			192		
Q <sub>gd</sub>	Gate – Drain Charge			1074		
T <sub>d(on)</sub>	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V V <sub>Bus</sub> = 800V I <sub>D</sub> = 171A R <sub>G</sub> = 0.8Ω		20		ns
T <sub>r</sub>	Rise Time			17		
T <sub>d(off)</sub>	Turn-off Delay Time			245		
T <sub>f</sub>	Fall Time			62		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 800V I <sub>D</sub> = 171A, R <sub>G</sub> = 0.8Ω		7.6		mJ
E <sub>off</sub>	Turn-off Switching Energy			6.9		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 800V I <sub>D</sub> = 171A, R <sub>G</sub> = 0.8Ω		13.8		mJ
E <sub>off</sub>	Turn-off Switching Energy			8.5		

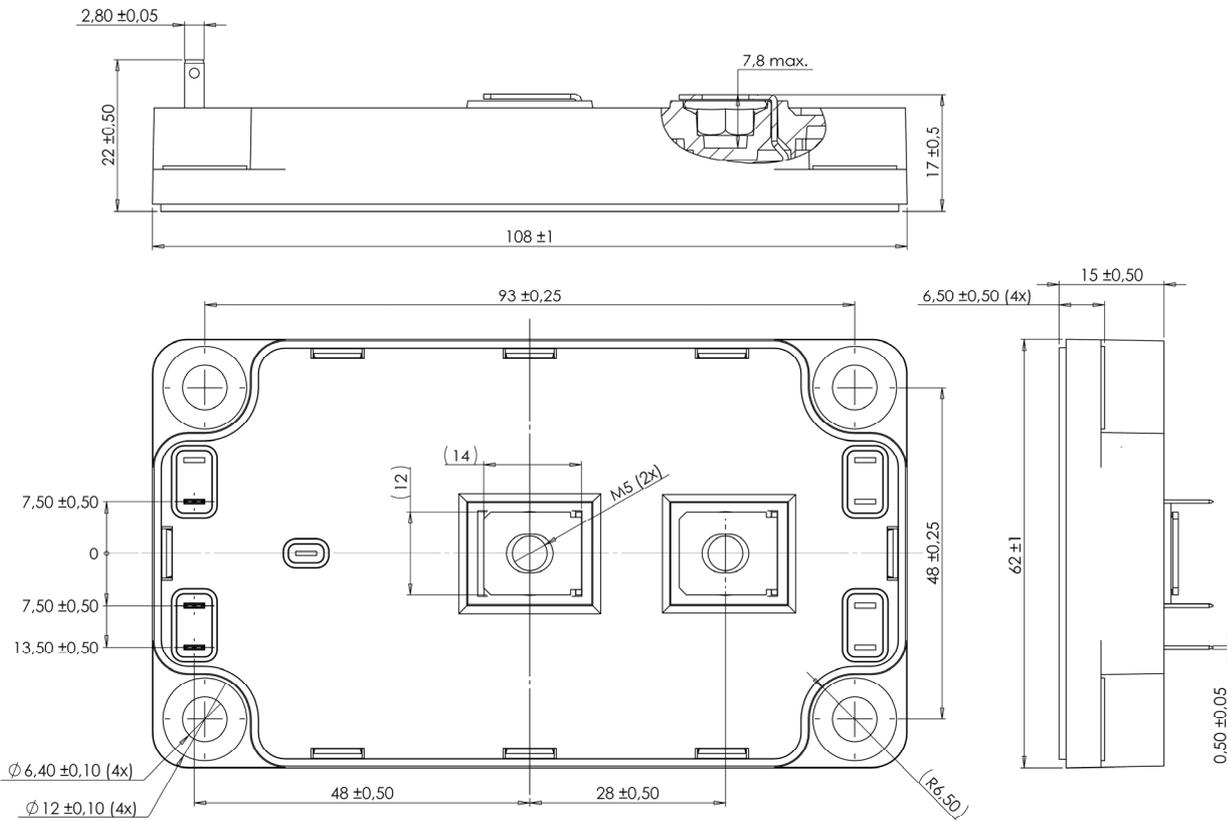
**Series diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	Maximum Repetitive Reverse Voltage		1200			V
I <sub>RM</sub>	Maximum Reverse Leakage Current	V <sub>R</sub> = 1200V	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> = 70°C		240		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 240A		2	2.5	V
		I <sub>F</sub> = 480A		2.3		
		I <sub>F</sub> = 240A	T <sub>j</sub> = 125°C	1.8		
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 240A V <sub>R</sub> = 800V di/dt = 800A/μs	T <sub>j</sub> = 25°C		400	ns
			T <sub>j</sub> = 125°C		470	
Q <sub>rr</sub>	Reverse Recovery Charge		T <sub>j</sub> = 25°C		4.8	μC
			T <sub>j</sub> = 125°C		16	

## Thermal and package characteristics

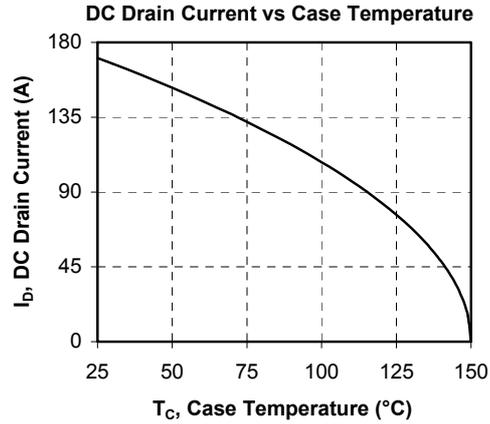
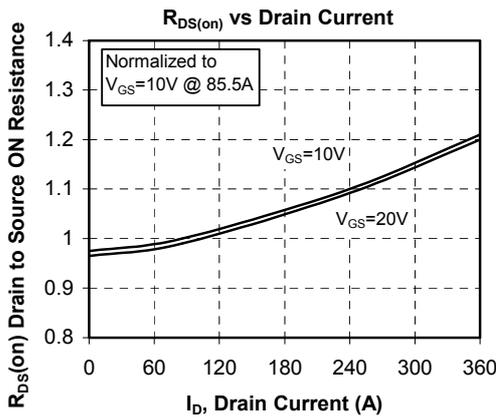
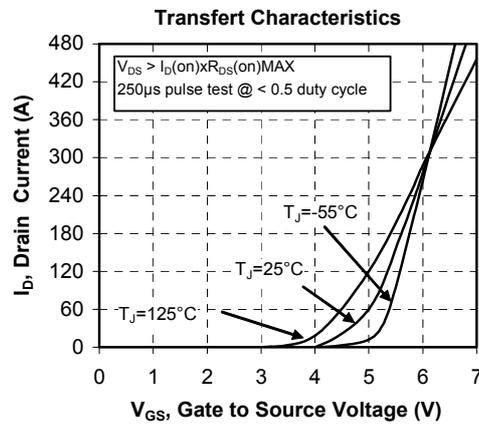
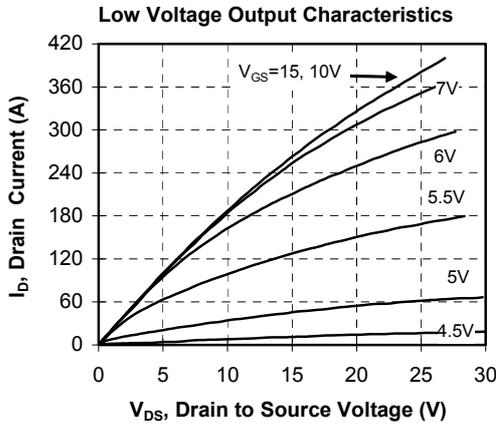
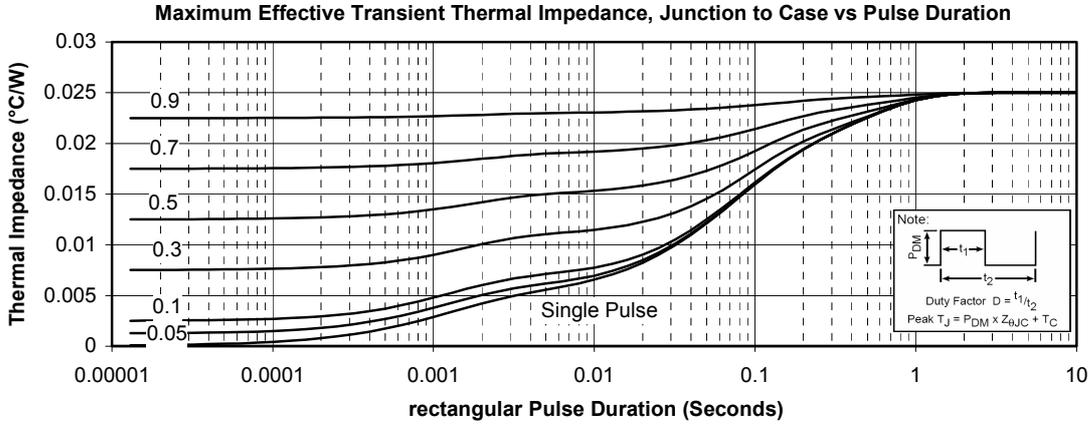
Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case Thermal Resistance	Transistor		0.025	°C/W	
		Series diode		0.23		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</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	

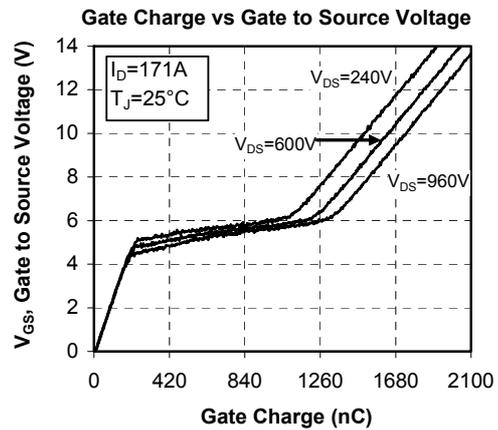
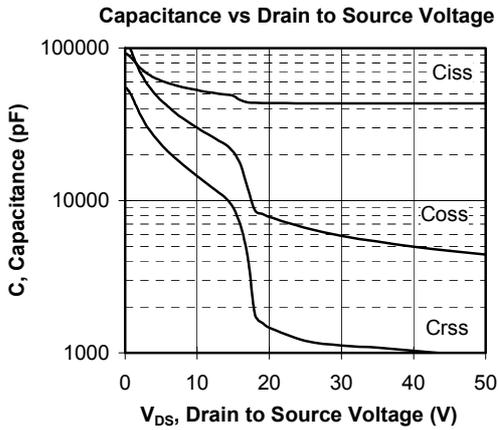
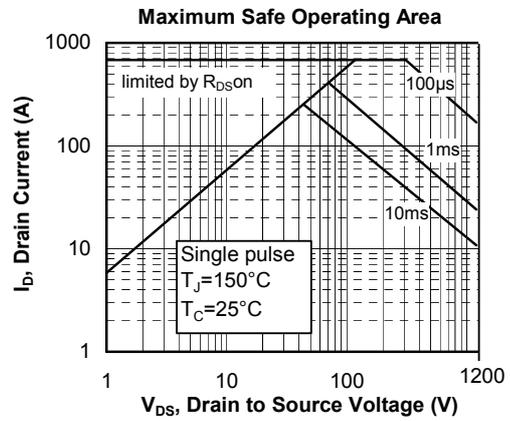
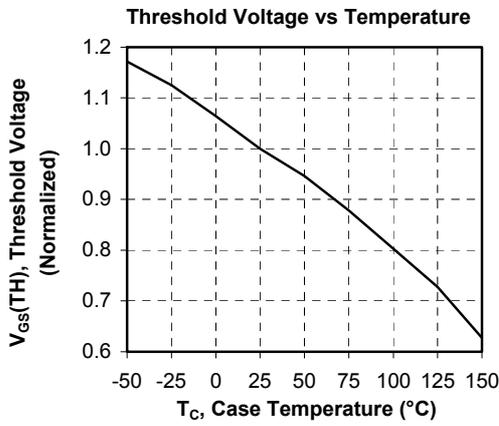
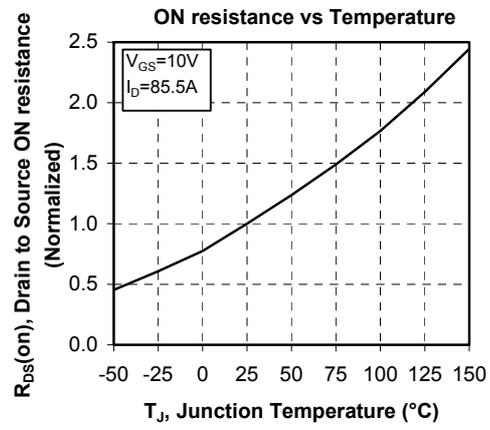
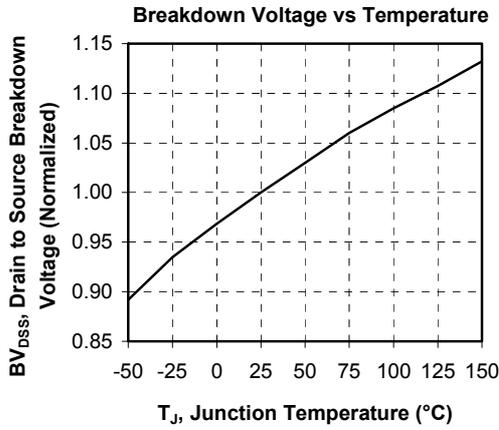
## SP6 Package outline (dimensions in mm)

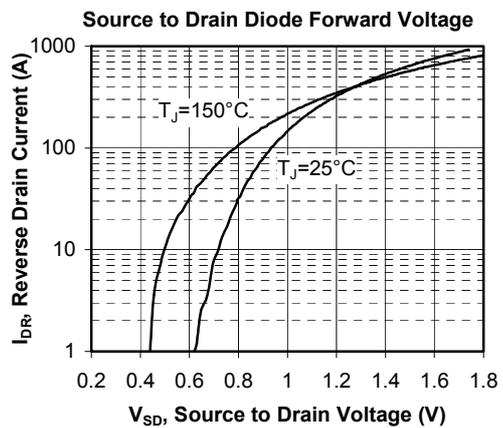
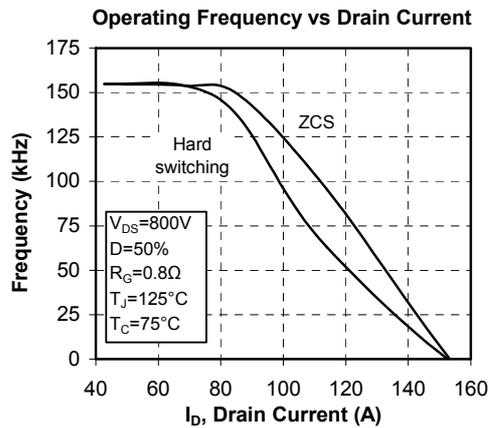
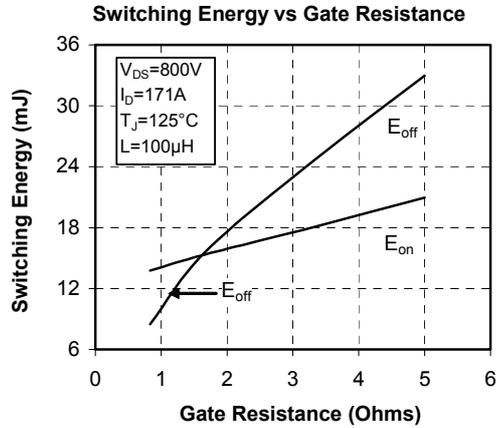
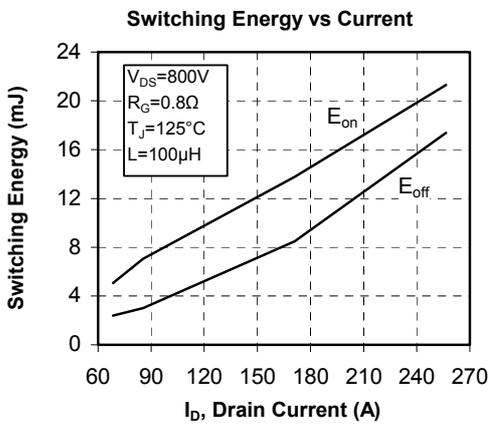
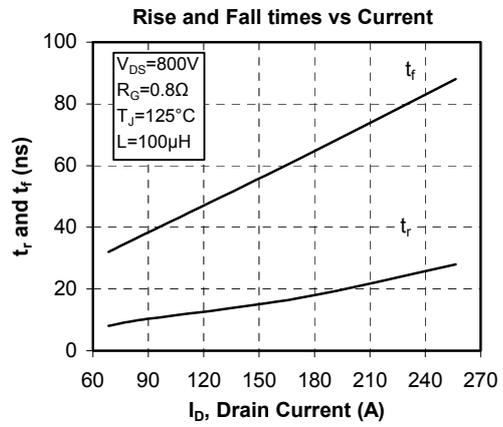
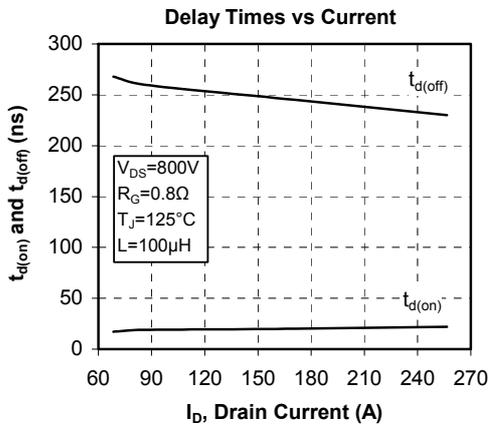


See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve







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