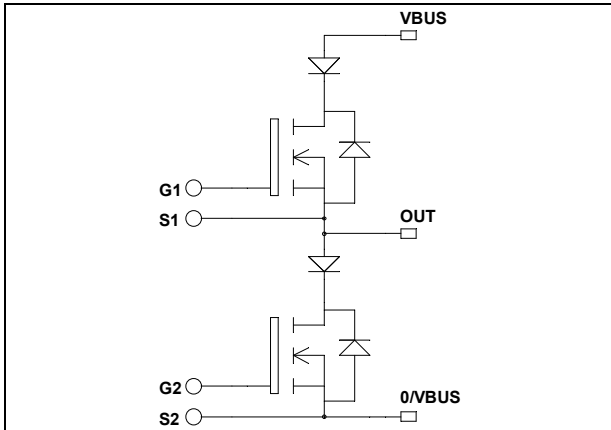


*Phase leg  
with Series diodes  
MOSFET Power Module*

**$V_{DSS} = 1200V$**   
 **$R_{DSon} = 200m\Omega$  typ @  $T_j = 25^\circ C$**   
 **$I_D = 50A$  @  $T_c = 25^\circ C$**



**Application**

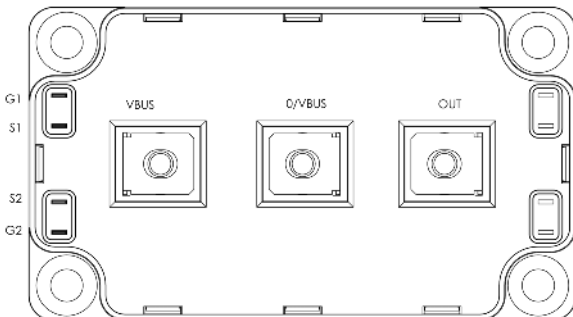
- Zero Current Switching resonant mode

**Features**

- Power MOS 7<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic reverse diode
  - 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	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	50
		$T_c = 80^\circ C$	37
$I_{DM}$	Pulsed Drain current	200	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	240	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
$I_{AR}$	Avalanche current (repetitive and non repetitive)	12	A
$E_{AR}$	Repetitive Avalanche Energy	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1300	

**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
		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1000V	T <sub>j</sub> = 25°C		6	
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 25A		200	240	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 6mA	3		5	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V			±450	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		15.2		nF
C <sub>oss</sub>	Output Capacitance			2.2		
C <sub>rss</sub>	Reverse Transfer Capacitance			0.42		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V V <sub>Bus</sub> = 600V I <sub>D</sub> = 50A		600		nC
Q <sub>gs</sub>	Gate – Source Charge			84		
Q <sub>gd</sub>	Gate – Drain Charge			390		
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> = 50A R <sub>G</sub> = 0.8Ω		10		ns
T <sub>r</sub>	Rise Time			10		
T <sub>d(off)</sub>	Turn-off Delay Time			68		
T <sub>f</sub>	Fall Time			36		
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> = 50A, R <sub>G</sub> = 0.8Ω		2.79		mJ
E <sub>off</sub>	Turn-off Switching Energy			0.6		
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> = 50A, R <sub>G</sub> = 0.8Ω		5.6		mJ
E <sub>off</sub>	Turn-off Switching Energy			0.81		

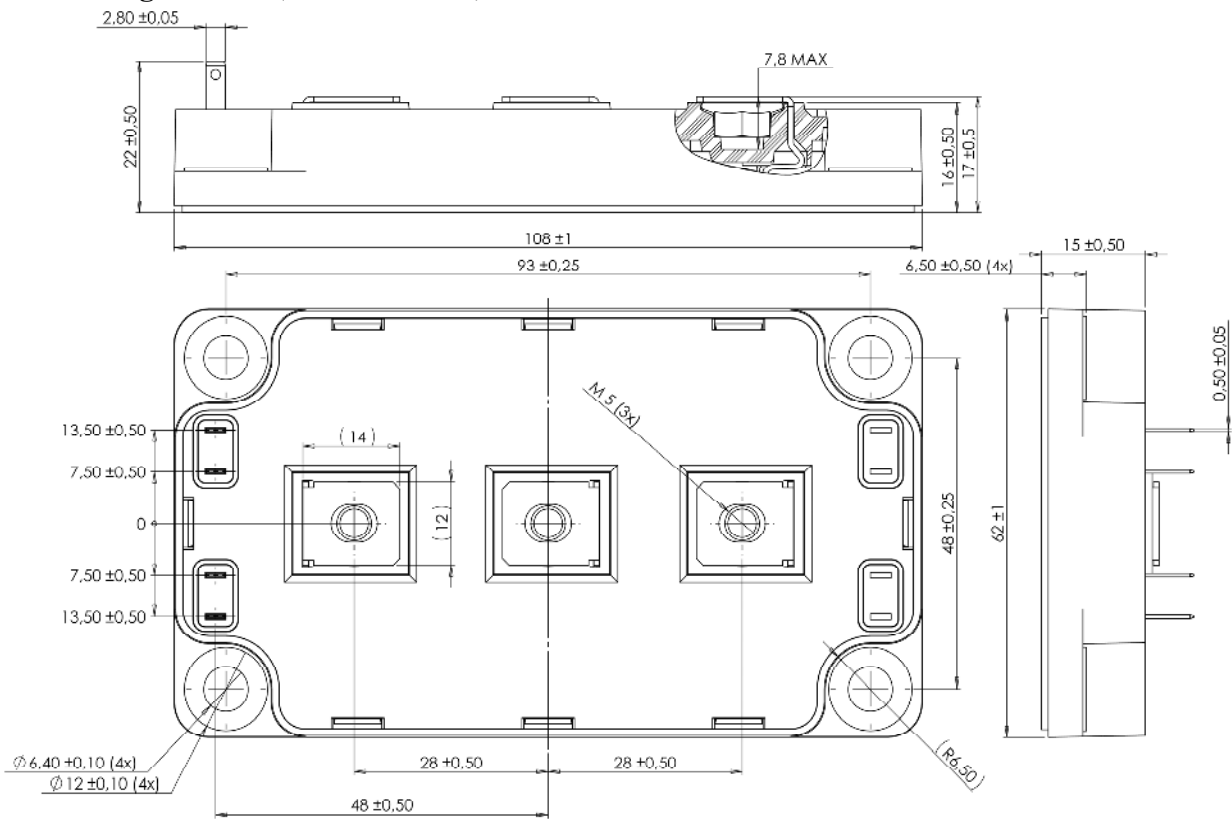
**Series diode ratings and characteristics**

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		250	μA
			T <sub>j</sub> = 125°C		600	
I <sub>F</sub>	DC Forward Current			120		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 120A		2	2.5	V
		I <sub>F</sub> = 240A		2.3		
		I <sub>F</sub> = 120A	T <sub>j</sub> = 125°C		1.8	
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 120A V <sub>R</sub> = 800V di/dt = 400A/μs	T <sub>j</sub> = 25°C		400	ns
			T <sub>j</sub> = 125°C		470	
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> = 120A V <sub>R</sub> = 800V di/dt = 400A/μs	T <sub>j</sub> = 25°C		2.4	μC
			T <sub>j</sub> = 125°C		8	

## Thermal and package characteristics

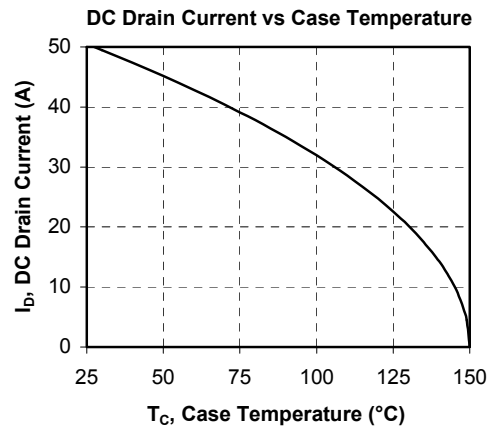
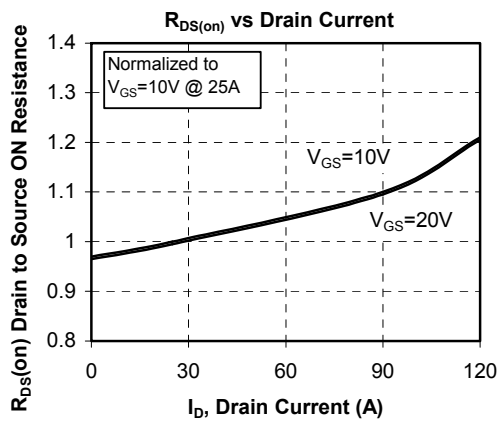
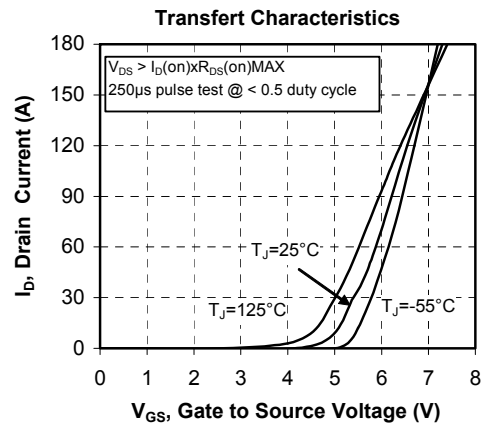
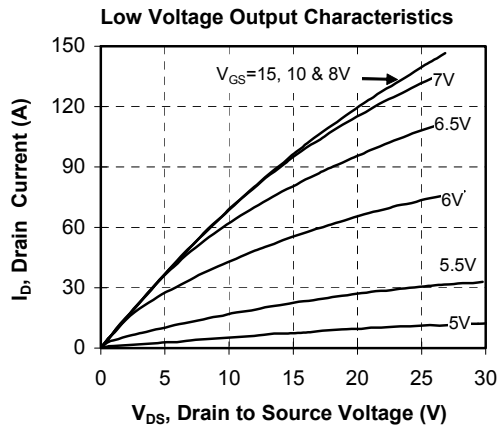
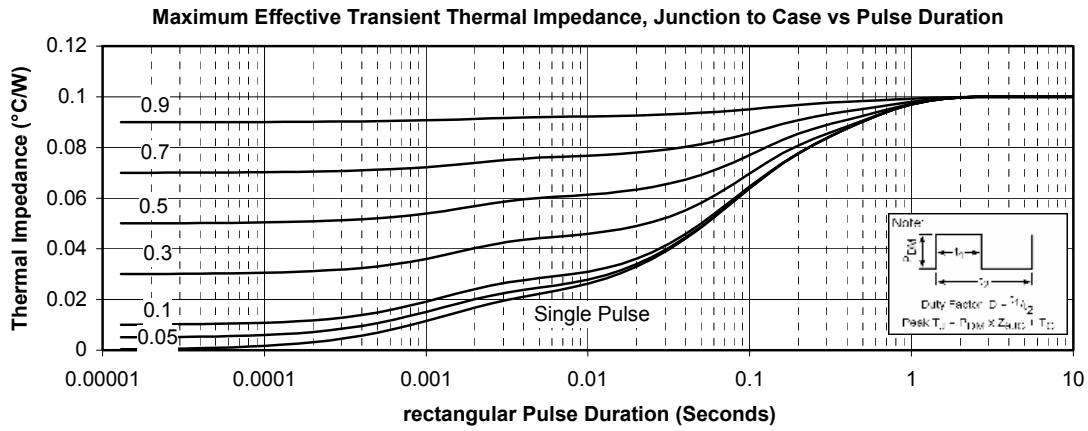
Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	Transistor			0.1	°C/W
		Series diode			0.46	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T <sub>J</sub>	Operating junction temperature range		-40		150	°C
T <sub>STG</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

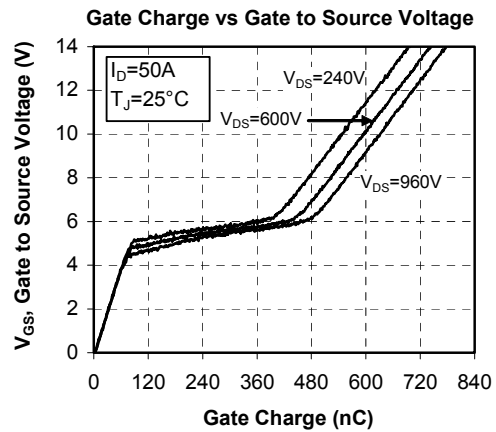
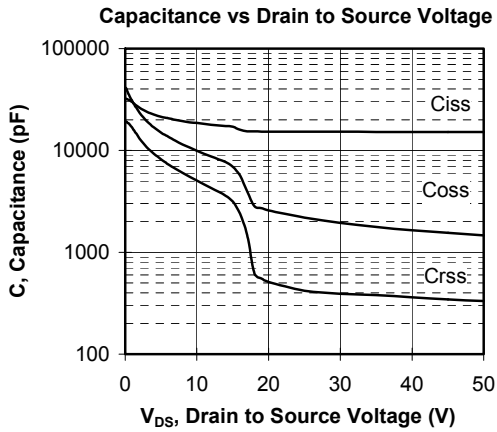
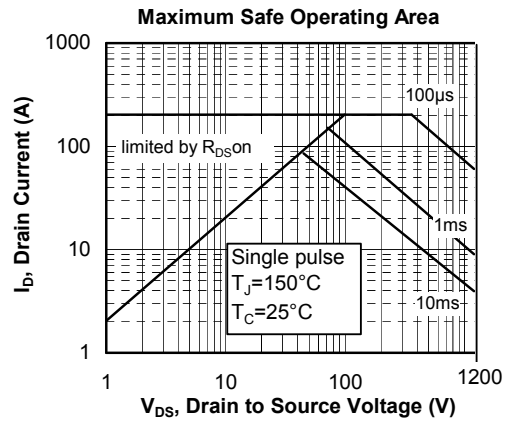
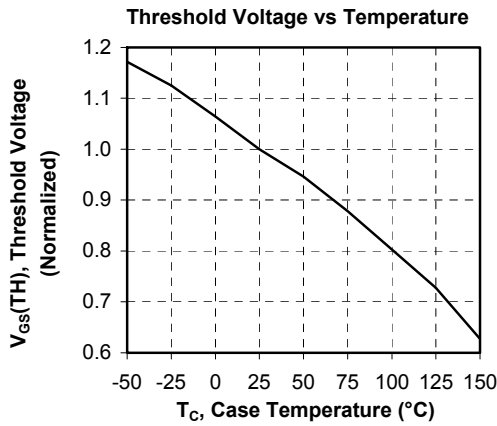
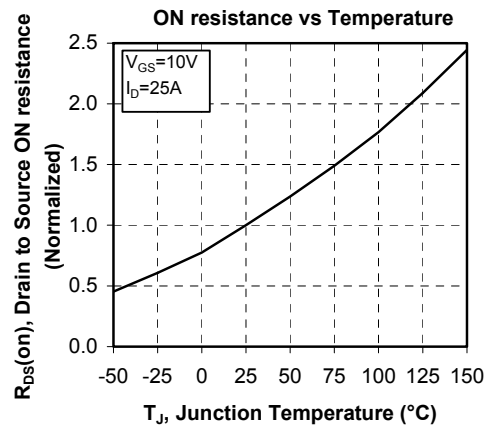
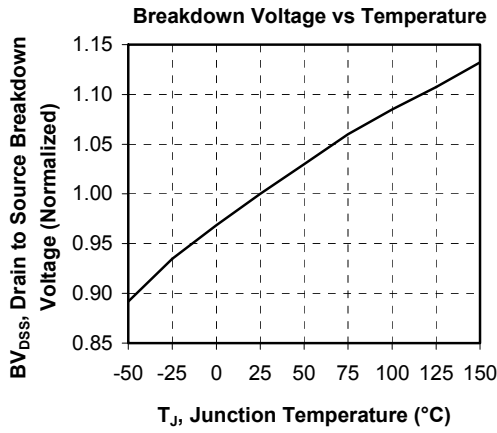
## SP6 Package outline (dimensions in mm)

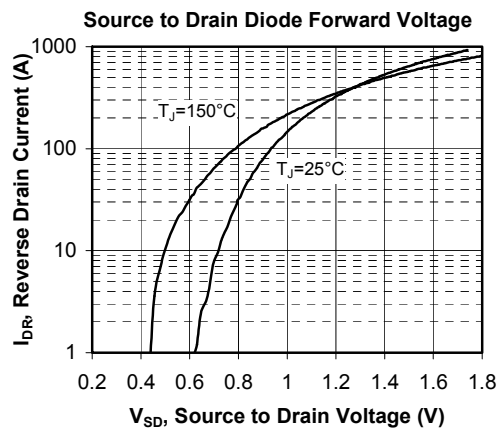
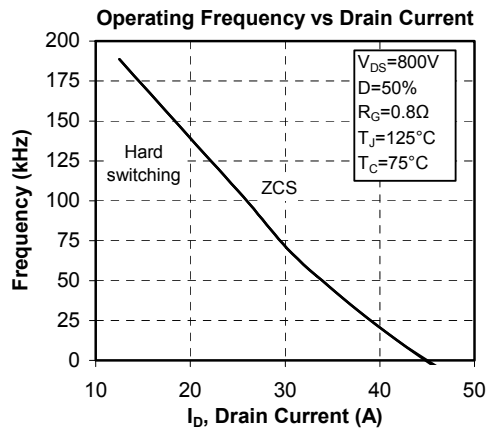
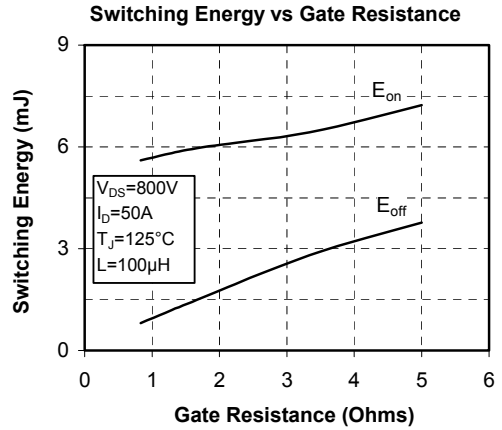
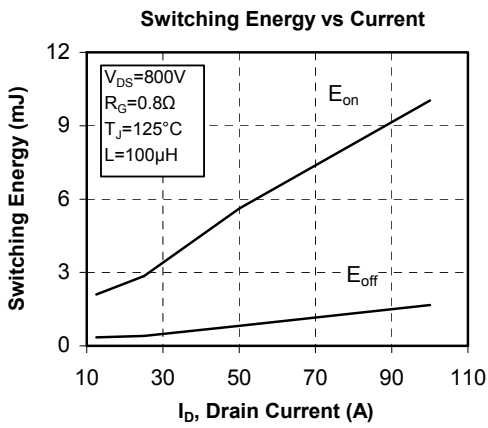
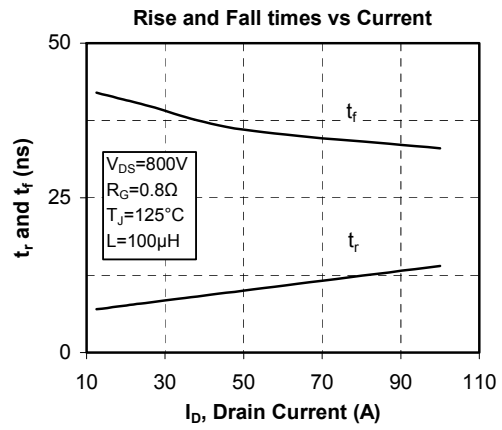
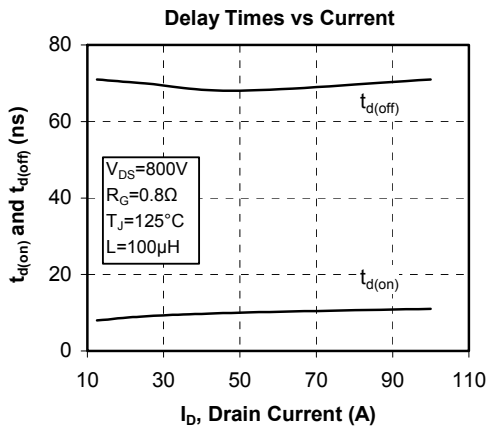


See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve







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