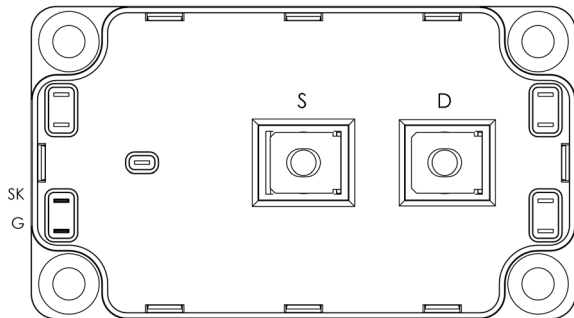
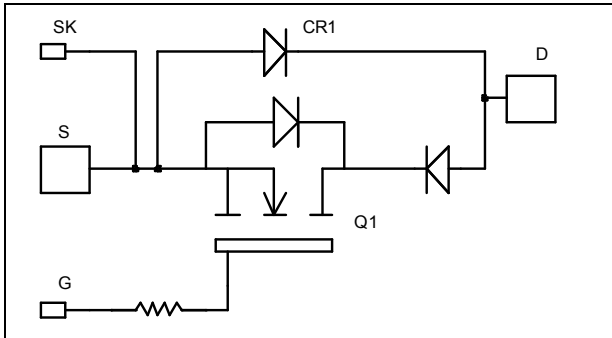


Single switch  
Series & parallel diodes  
MOSFET Power Module

$V_{DSS} = 1200V$   
 $R_{DSon} = 100m\Omega \text{ typ @ } T_j = 25^\circ C$   
 $I_D = 116A \text{ @ } T_c = 25^\circ C$



### Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

### 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
- AIN substrate for MOSFET 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

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

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	116
		$T_c = 80^\circ C$	86
$I_{DM}$	Pulsed Drain current	464	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	120	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	3290
$I_{AR}$	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)

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1200V$			1	mA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 58A$		100	120	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 20mA$	3		5	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	$V_{GS} = 0V$		28.9		nF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		4.4		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		0.8		
$Q_g$	Total gate Charge	$V_{GS} = 10V$		1100		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 600V$		128		
$Q_{gd}$	Gate – Drain Charge	$I_D = 116A$		716		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V$ $V_{Bus} = 800V$ $I_D = 116A$ $R_G = 1.2\Omega$		20		ns
$T_r$	Rise Time			17		
$T_{d(off)}$	Turn-off Delay Time			245		
$T_f$	Fall Time			62		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> $V_{GS} = 15V, V_{Bus} = 800V$ $I_D = 116A, R_G = 1.2\Omega$		5		mJ
$E_{off}$	Turn-off Switching Energy			4.6		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V, V_{Bus} = 800V$ $I_D = 116A, R_G = 1.2\Omega$		9.2		mJ
$E_{off}$	Turn-off Switching Energy			5.6		
$R_{thJC}$	Junction to Case Thermal Resistance				0.038	°C/W

**Series diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1000			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1000V$			750	$\mu A$
$I_F$	DC Forward Current	$T_c = 80°C$		240		A
$V_F$	Diode Forward Voltage	$I_F = 240A$		2	2.5	V
		$I_F = 480A$		2.2		
		$I_F = 240A, T_j = 125°C$		1.7		
$t_{rr}$	Reverse Recovery Time	$I_F = 240A$ $V_R = 667V$	$T_j = 25°C$	280		ns
			$T_j = 125°C$	350		
$Q_{rr}$	Reverse Recovery Charge	$di/dt = 800A/\mu s$	$T_j = 25°C$	3.04		$\mu C$
			$T_j = 125°C$	14.4		
$R_{thJC}$	Junction to Case Thermal Resistance				0.23	°C/W

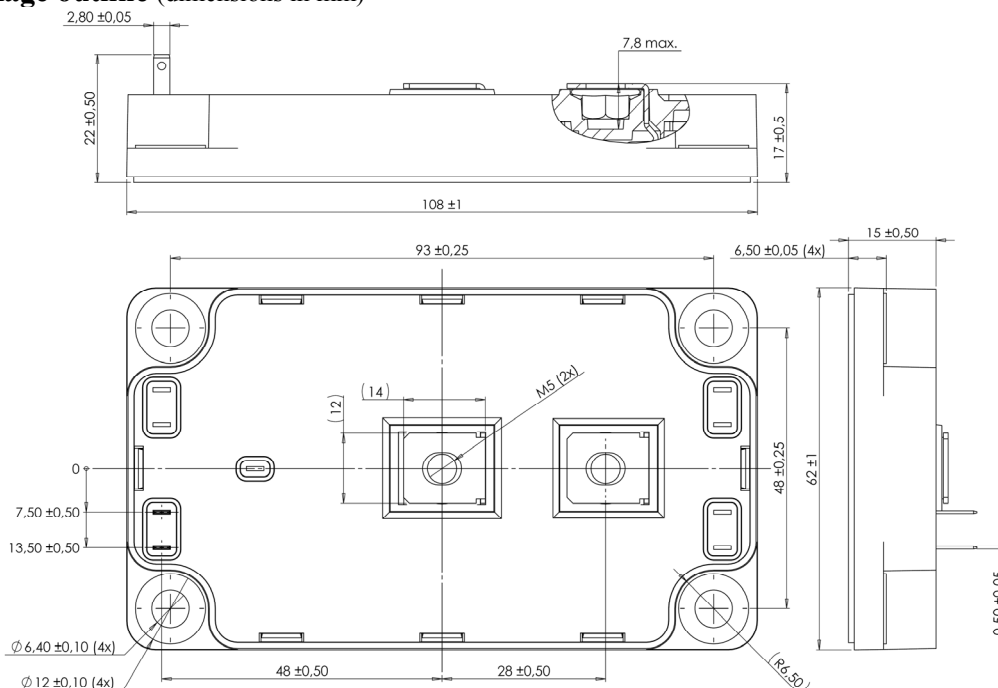
## Parallel diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage			1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200V$				250	$\mu A$
$I_F$	DC Forward Current	$T_c = 80^\circ C$			180		A
$V_F$	Diode Forward Voltage	$I_F = 180A$			2.5	3.5	V
		$I_F = 360A$			3		
		$I_F = 180A$	$T_j = 125^\circ C$		1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 180A$ $V_R = 800V$ $di/dt = 600A/\mu s$	$T_j = 25^\circ C$		265		ns
			$T_j = 125^\circ C$		350		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 180A$ $V_R = 800V$ $di/dt = 600A/\mu s$	$T_j = 25^\circ C$		1.7		$\mu C$
			$T_j = 125^\circ C$		8.6		
$R_{thJC}$	Junction to Case Thermal Resistance					0.32	$^\circ C/W$

## Thermal and package characteristics

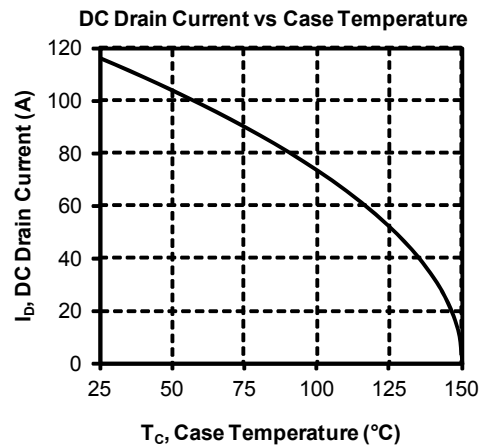
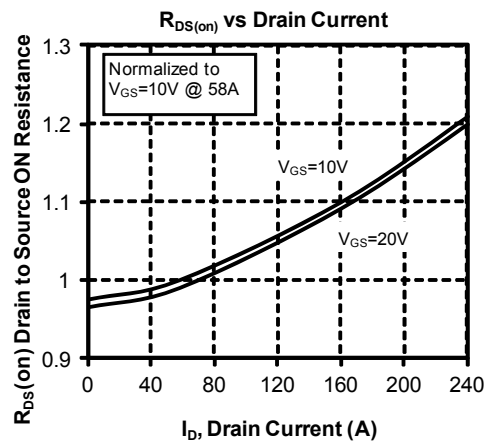
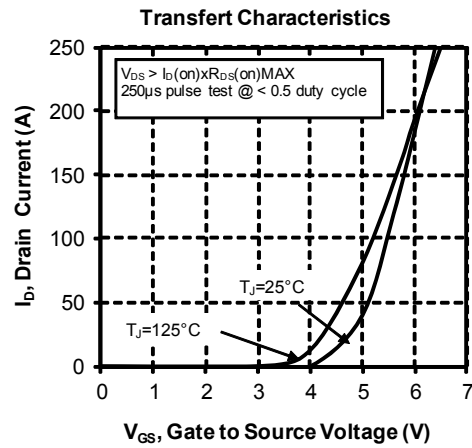
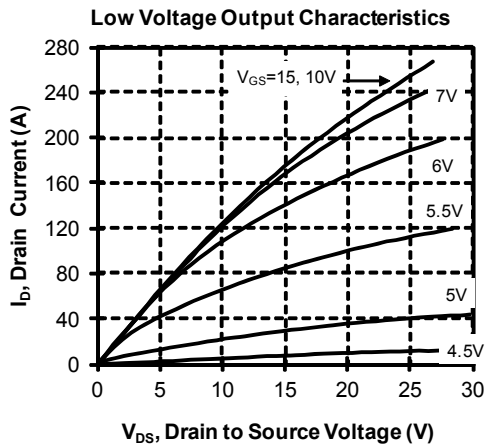
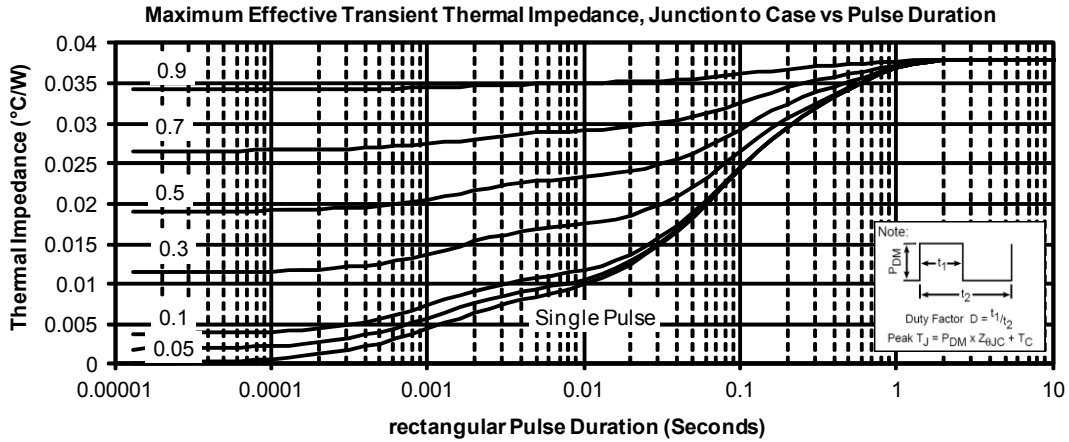
Symbol	Characteristic	Min	Max	Unit		
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
$T_J$	Operating junction temperature range	-40	150	$^\circ C$		
$T_{JOP}$	Recommended junction temperature under switching conditions	-40	$T_{jmax} - 25$			
$T_{STG}$	Storage Temperature Range	-40	125			
$T_C$	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

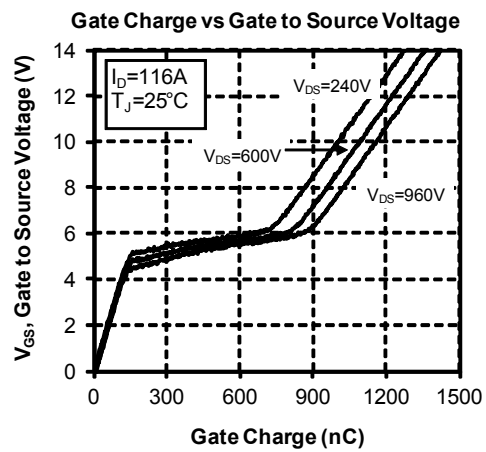
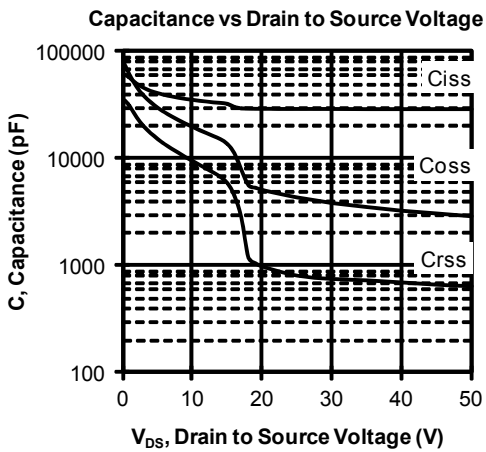
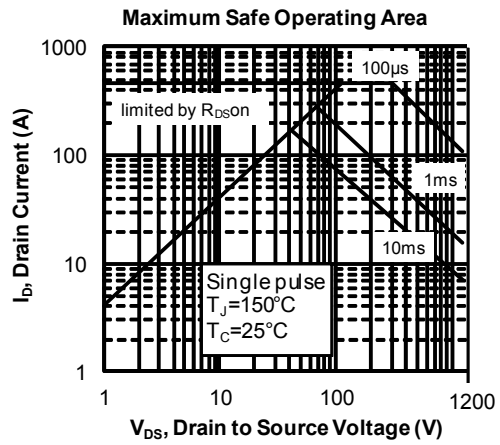
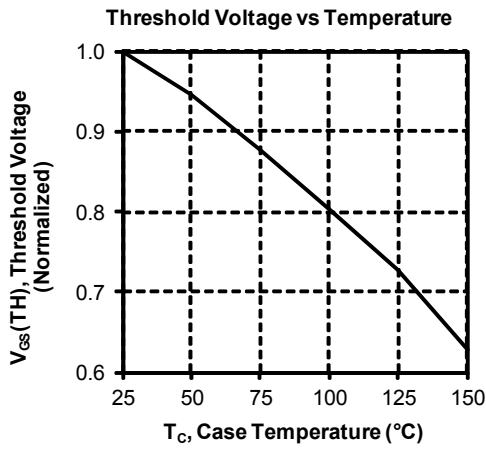
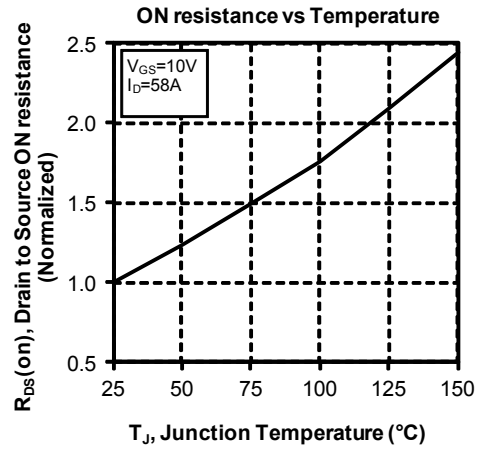
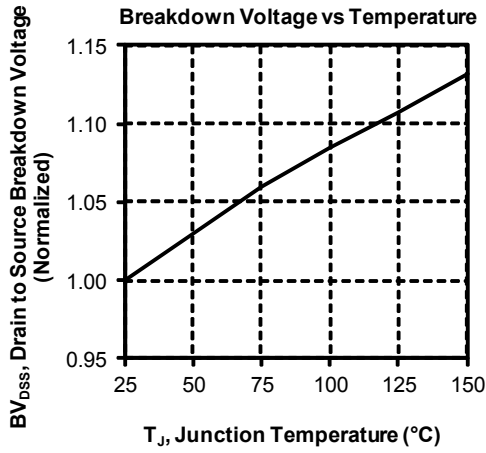
## SP6 Package outline (dimensions in mm)

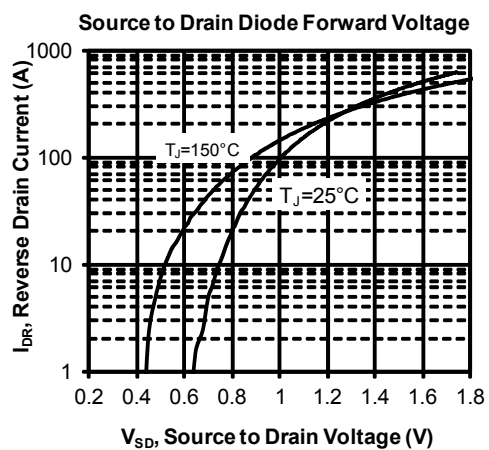
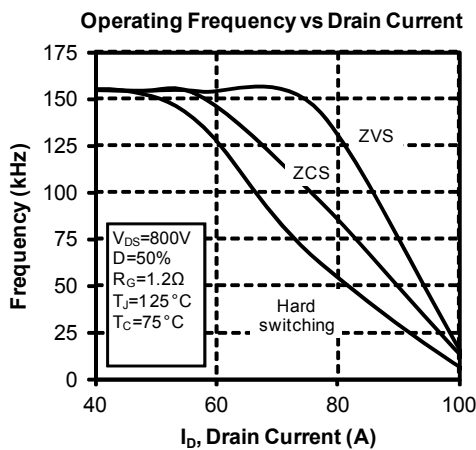
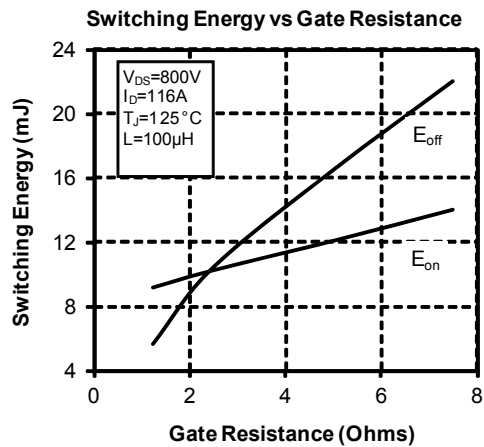
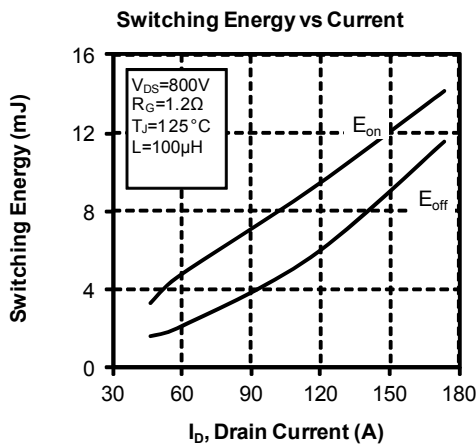
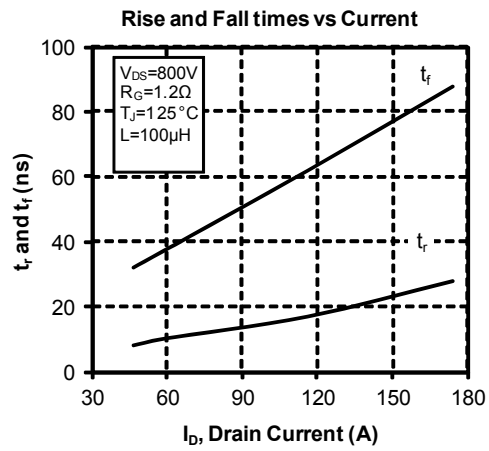
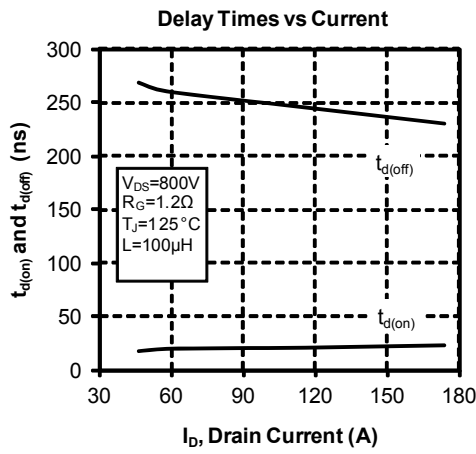


See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve







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