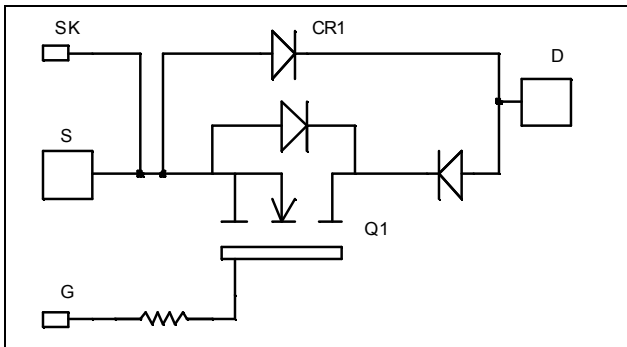


Single switch Series & parallel diodes MOSFET Power Module

$$V_{DSS} = 1200V$$

$$R_{DSon} = 100m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 116A \text{ @ } T_c = 25^\circ C$$

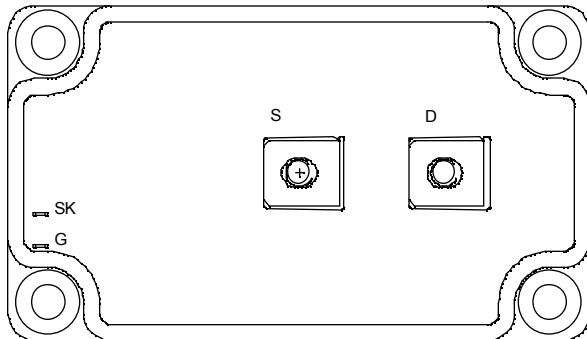


Application

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

Features

- Power MOS 7[®] 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 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

Absolute maximum ratings

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

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

Electrical Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}, V_{DS} = 1200\text{V}$			1	mA
		$V_{GS} = 0\text{V}, V_{DS} = 1000\text{V}$			3	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 58\text{A}$		100	120	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 20\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$			± 400	nA

Dynamic Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		28.9		nF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		4.4		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.8		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		1100		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 600\text{V}$		128		
Q_{gd}	Gate – Drain Charge	$I_D = 116\text{A}$		716		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 116\text{A}$ $R_G = 1.2\Omega$		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	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 800\text{V}$ $I_D = 116\text{A}, R_G = 1.2\Omega$		5		mJ
E_{off}	Turn-off Switching Energy			4.6		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 800\text{V}$ $I_D = 116\text{A}, R_G = 1.2\Omega$		9.2		mJ
E_{off}	Turn-off Switching Energy			5.6		

Series diode ratings and characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 200\text{V}$	$T_j = 25^\circ\text{C}$		350	μA
			$T_j = 125^\circ\text{C}$		600	
I_F	DC Forward Current	$T_c = 80^\circ\text{C}$		120		A
V_F	Diode Forward Voltage	$I_F = 120\text{A}$		1.1	1.15	V
		$I_F = 240\text{A}$		1.4		
		$I_F = 120\text{A}$	$T_j = 125^\circ\text{C}$	0.9		
t_{rr}	Reverse Recovery Time	$I_F = 120\text{A}$ $V_R = 133\text{V}$ $di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	31		ns
			$T_j = 125^\circ\text{C}$	60		
Q_{rr}	Reverse Recovery Charge	$I_F = 120\text{A}$ $V_R = 133\text{V}$ $di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	120		nC
			$T_j = 125^\circ\text{C}$	500		

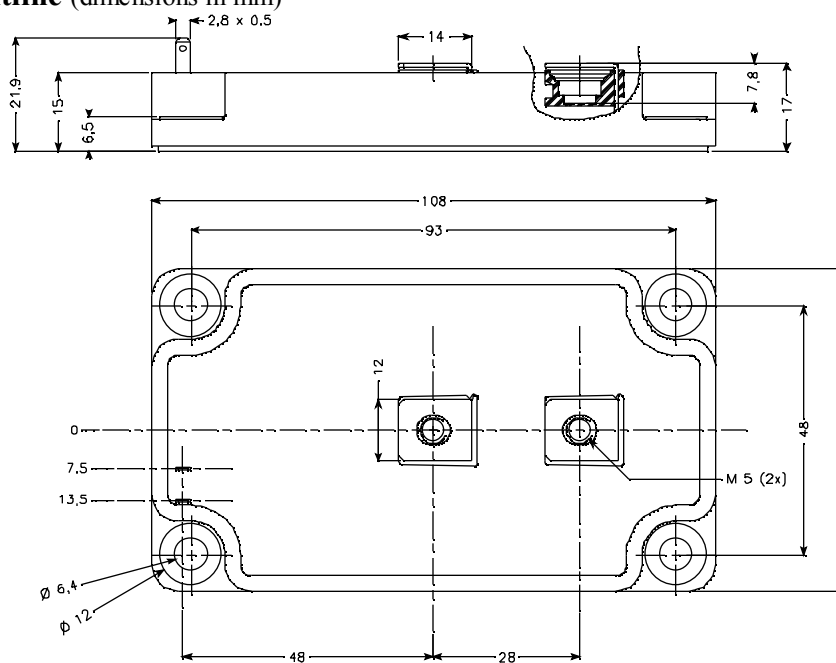
Parallel diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$			250	μA
			$T_j = 125^\circ C$			750	
I_F	DC Forward Current		$T_c = 80^\circ C$		180		A
V_F	Diode Forward Voltage	$I_F = 180A$			2.5	3	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		$T_j = 25^\circ C$		3.6		μC
			$T_j = 125^\circ C$		12		

Thermal and package characteristics

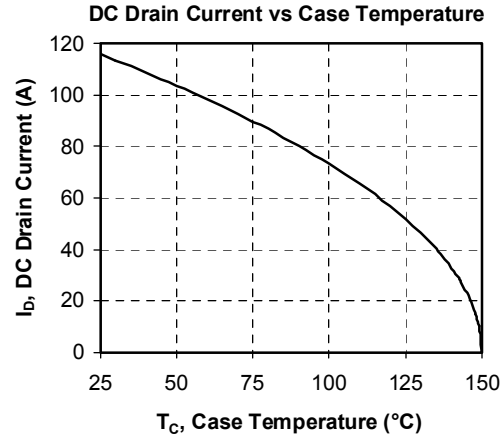
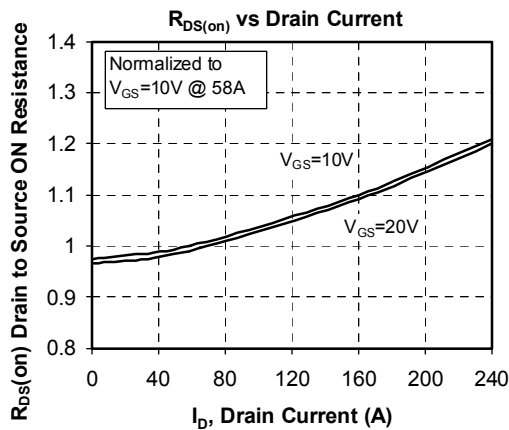
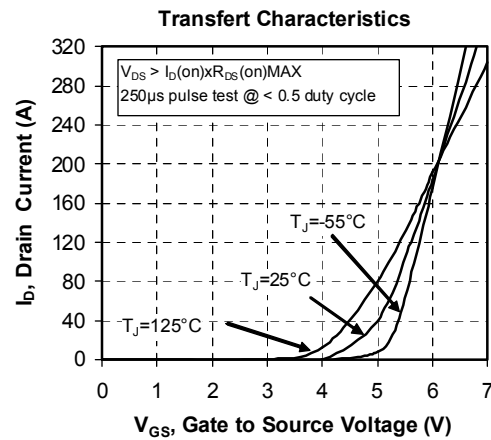
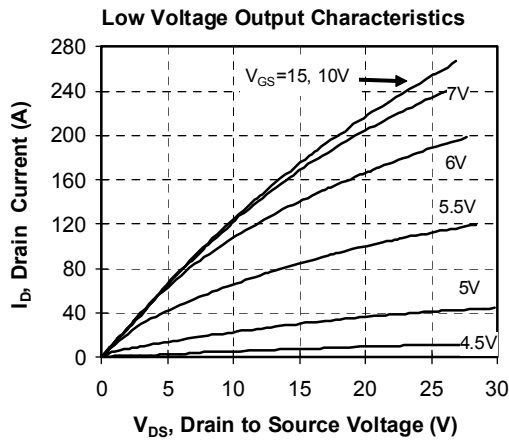
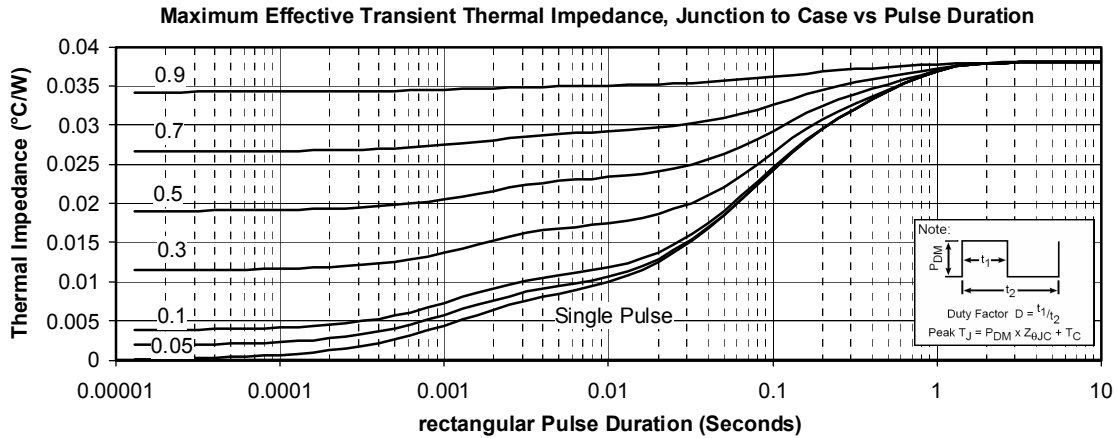
Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	Transistor				0.038	$^\circ C/W$
		Series diode				0.46	
		Parallel diode				0.32	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1 \text{ min}$, $I_{isol} < 1mA$, 50/60Hz			2500			V
T_j	Operating junction temperature range			-40		150	$^\circ C$
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					280	g

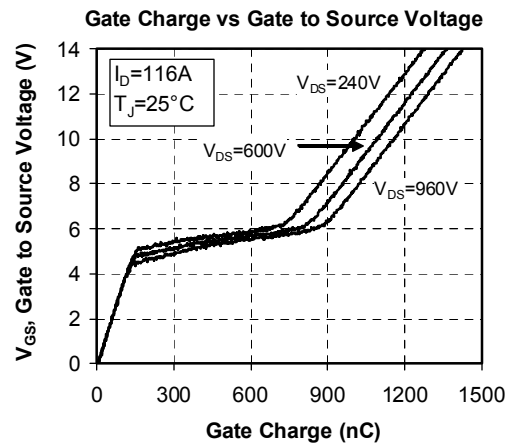
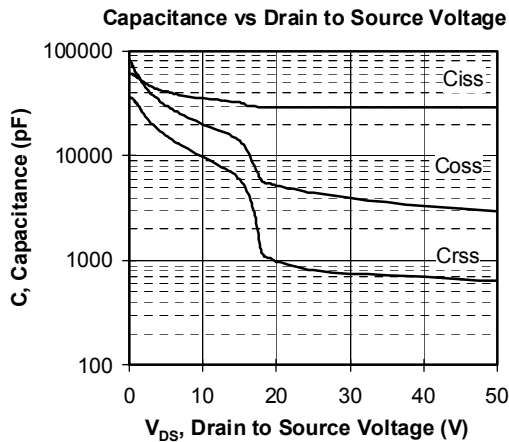
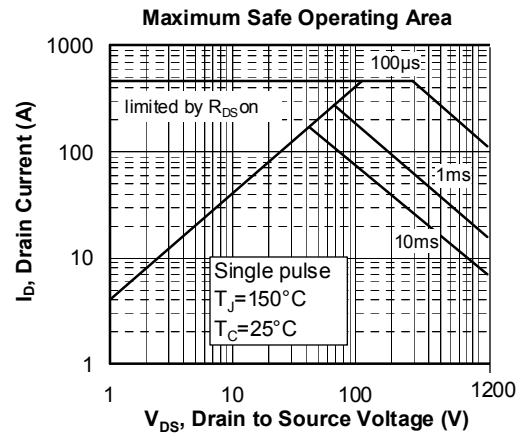
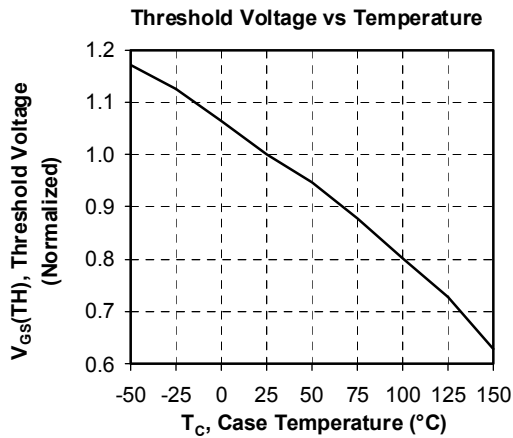
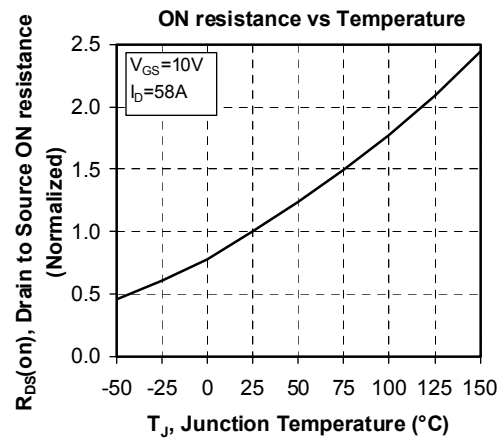
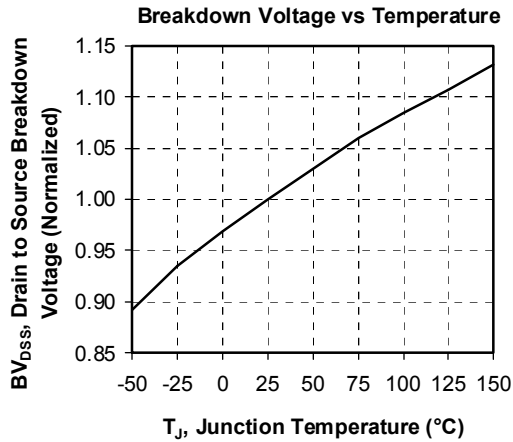
SP6 Package outline (dimensions in mm)

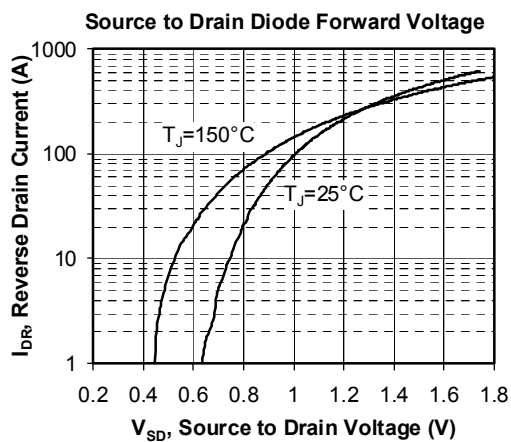
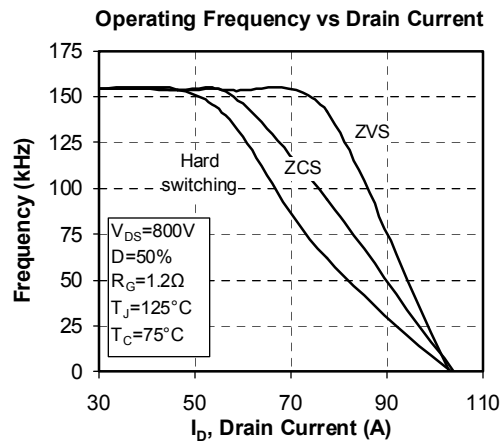
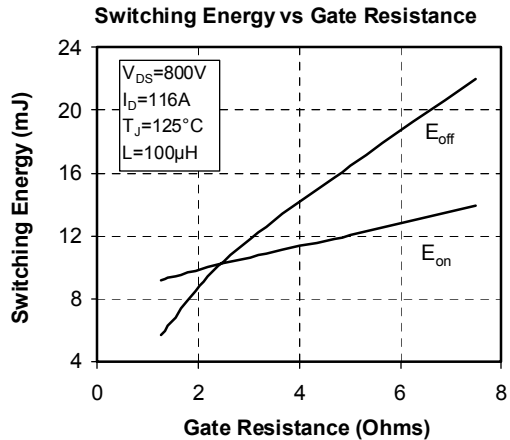
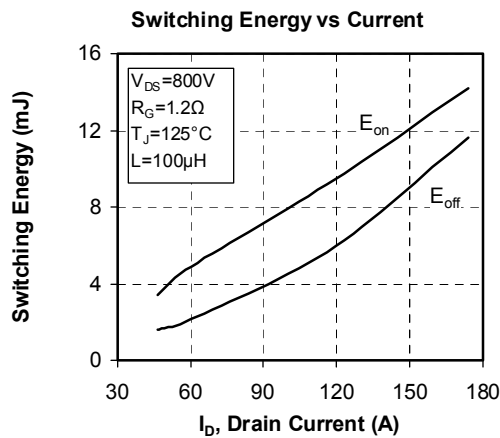
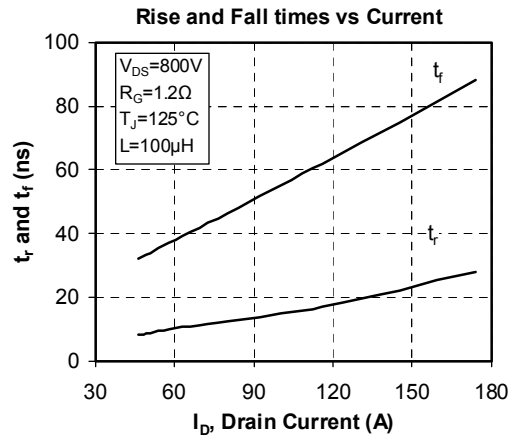
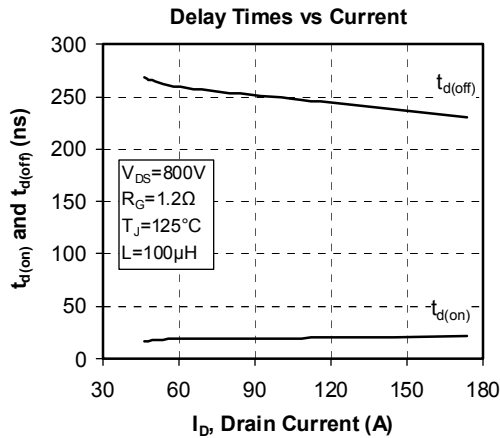


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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