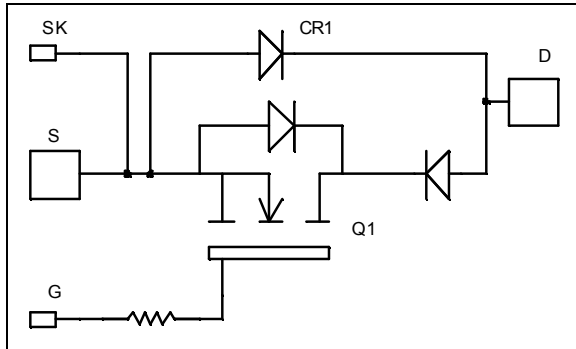


*Single switch
Series & parallel diodes
MOSFET Power Module*

$V_{DSS} = 1000V$
 $R_{DSon} = 65m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 145A$ @ $T_c = 25^\circ C$

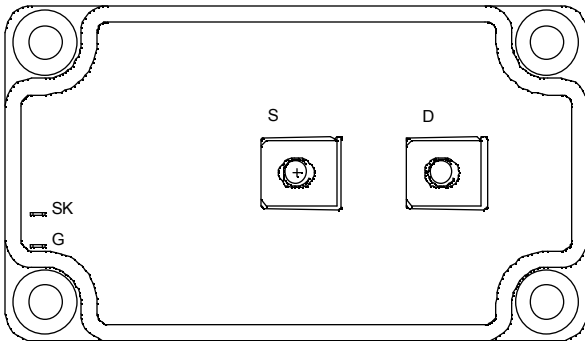


Application

- 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 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	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	145
		$T_c = 80^\circ C$	110
I_{DM}	Pulsed Drain current	580	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	78	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	3250
I_{AR}	Avalanche current (repetitive and non repetitive)	30	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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}, V_{DS} = 1000\text{V}$			400	μA
		$V_{GS} = 0\text{V}, V_{DS} = 800\text{V}$			2	mA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 72.5\text{A}$		65	78	$\text{m}\Omega$
$V_{GS(th)}$	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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		28.5		nF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		5.08		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.9		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 500\text{V}$ $I_D = 145\text{A}$		1068		nC
Q_{gs}	Gate – Source Charge			136		
Q_{gd}	Gate – Drain Charge			692		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15\text{V}$ $V_{Bus} = 500\text{V}$ $I_D = 145\text{A}$ $R_G = 0.75\Omega$		18		ns
T_r	Rise Time			14		
$T_{d(off)}$	Turn-off Delay Time			140		
T_f	Fall Time			55		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 670\text{V}$ $I_D = 145\text{A}, R_G = 0.75\Omega$		4.8		mJ
E_{off}	Turn-off Switching Energy			2.9		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 670\text{V}$ $I_D = 145\text{A}, R_G = 0.75\Omega$		8		mJ
E_{off}	Turn-off Switching Energy			3.9		

Series diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
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			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	

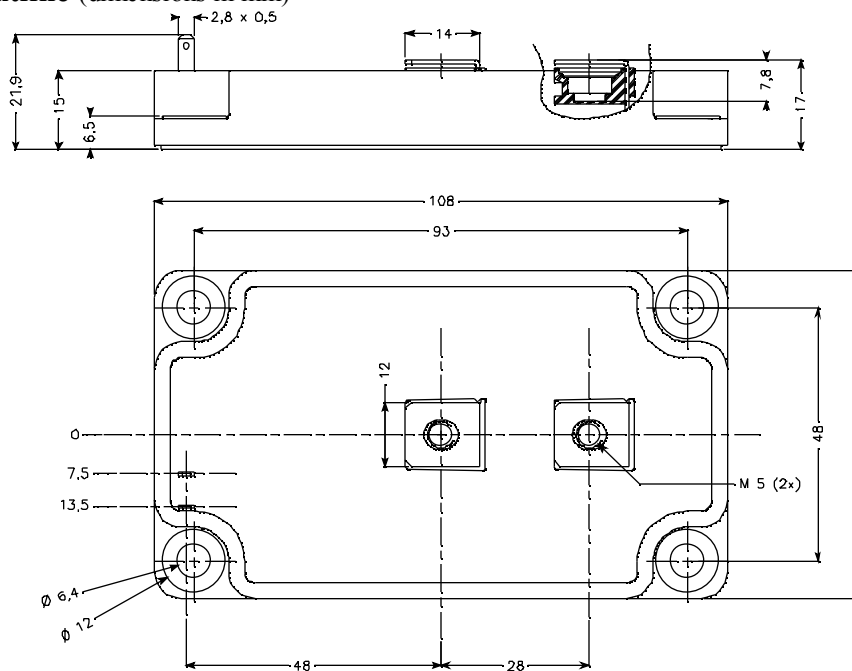
Parallel diode ratings and characteristics

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

Thermal and package characteristics

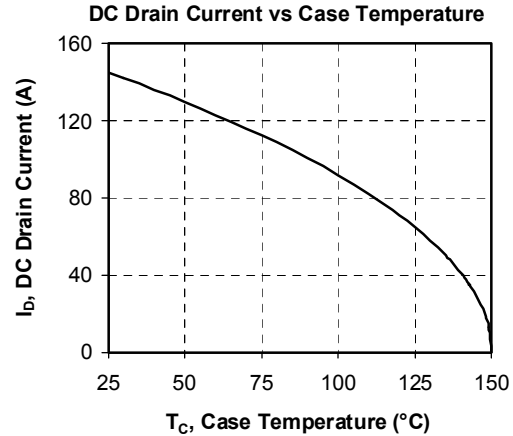
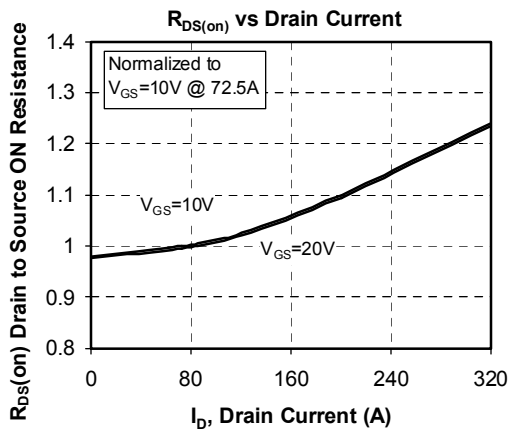
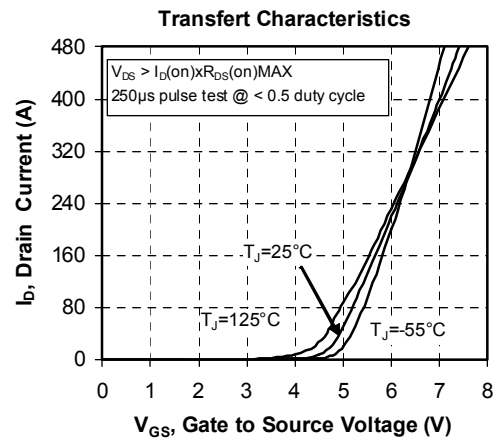
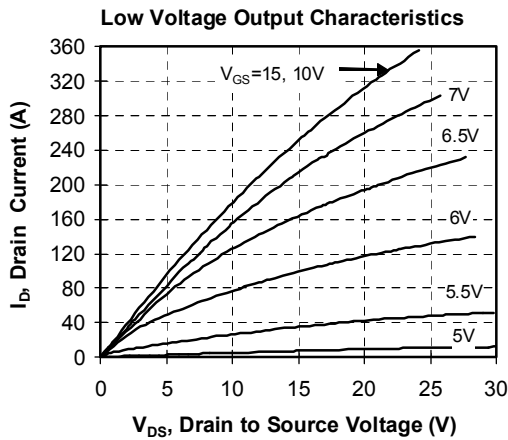
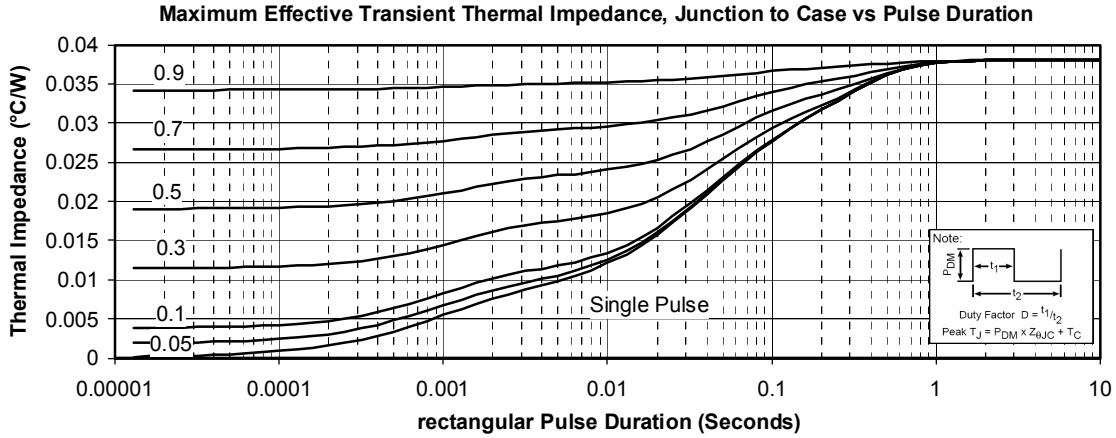
Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	Transistor				0.038	$^\circ C/W$
		Series diode				0.46	
		Parallel diode				0.23	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{sol} < 1mA$, 50/60Hz			2500			V
T_J	Operating junction temperature 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

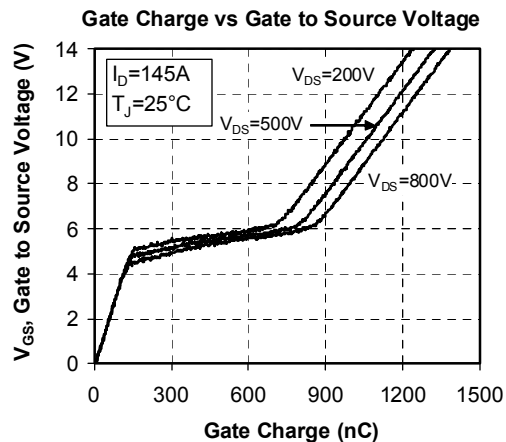
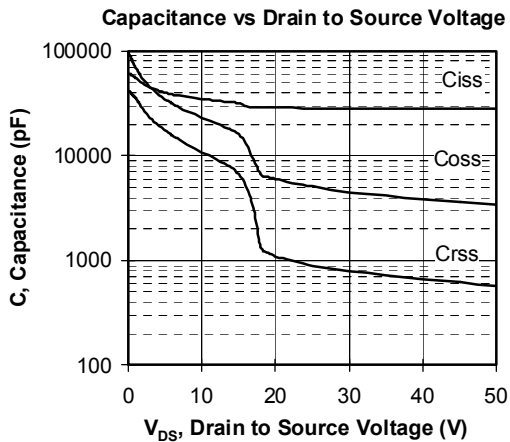
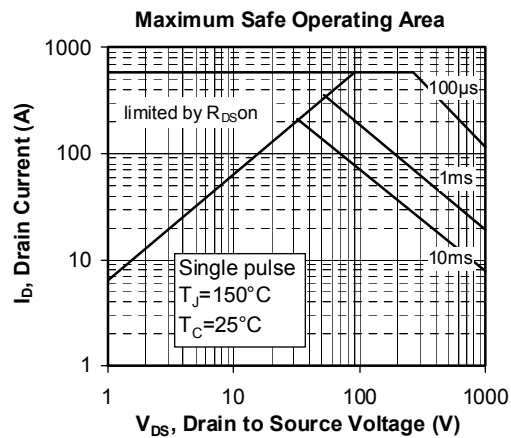
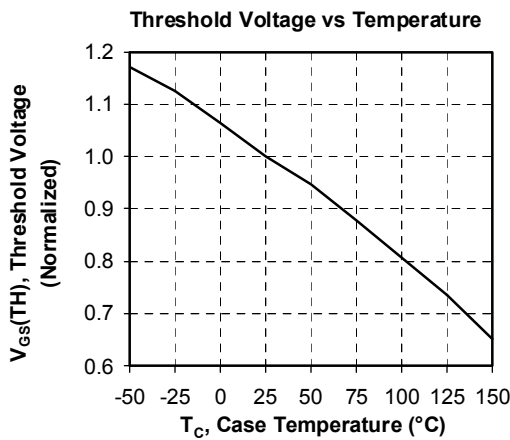
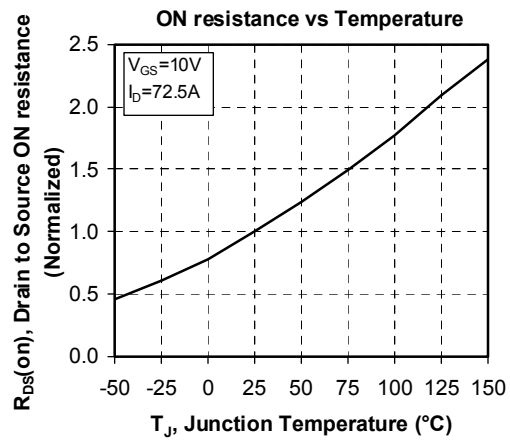
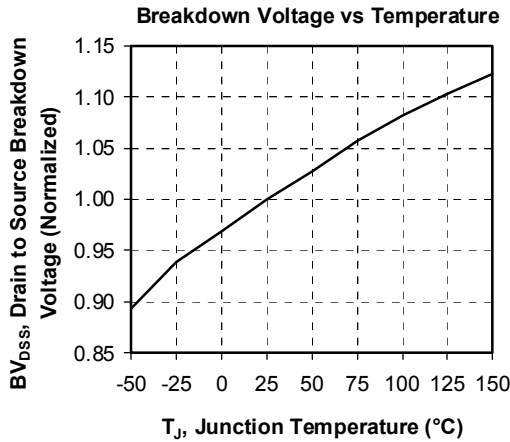
SP6 Package outline (dimensions in mm)

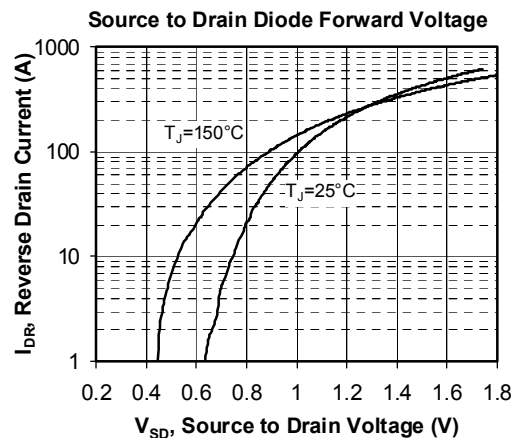
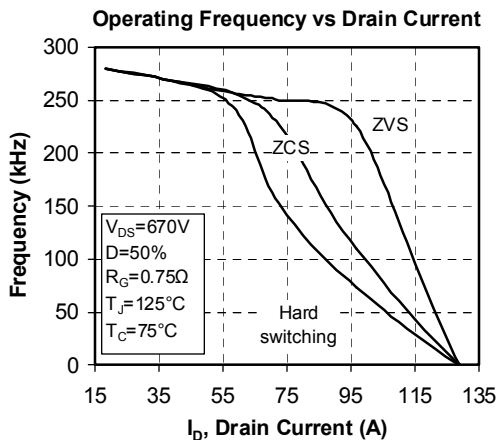
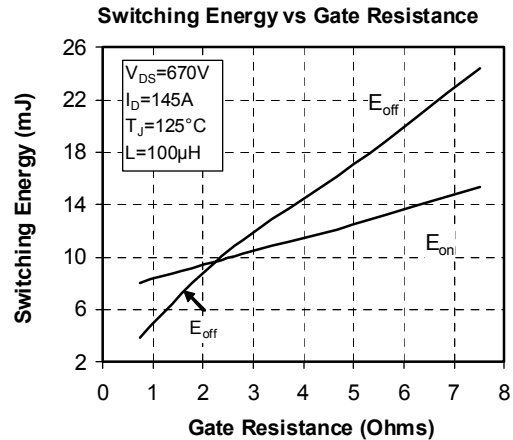
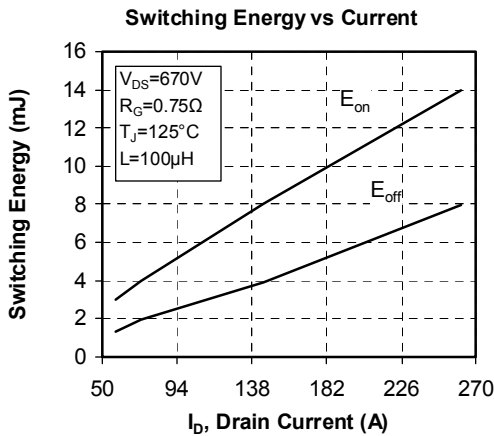
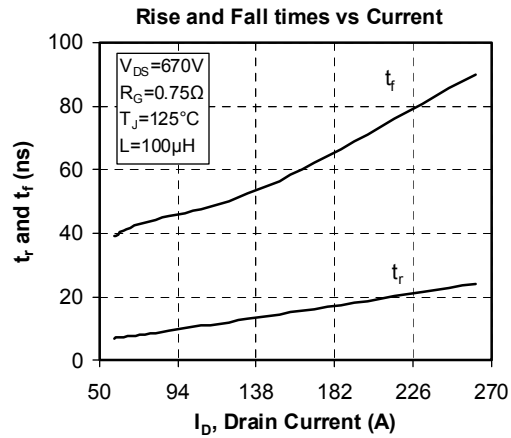
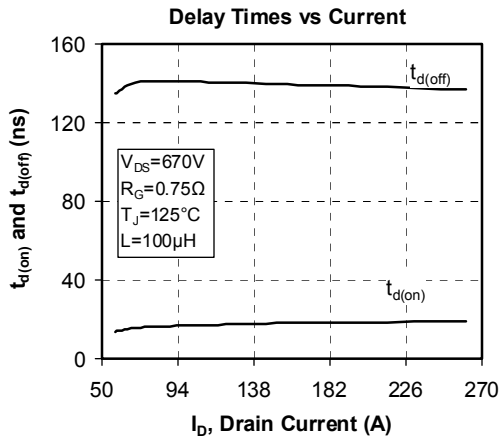


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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