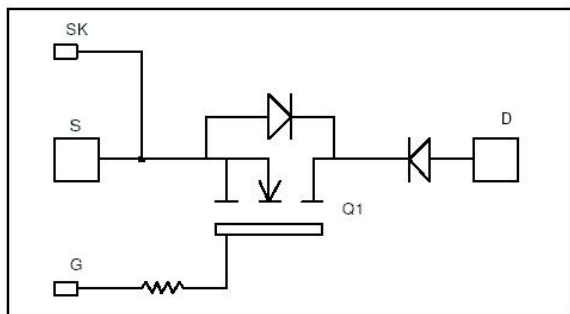


Single switch with Series diode MOSFET Power Module

$$V_{DSS} = 1000V$$

$$R_{DSon} = 65m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 145A \text{ @ } T_c = 25^\circ C$$



Application

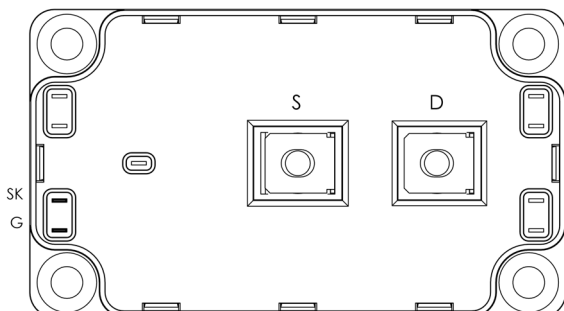
- Zero Current Switching resonant mode

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	A
I_{DM}	Pulsed Drain current	580	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	78	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 3250	W
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	$V_{GS} = 0V, V_{DS} = 1000V$ $T_j = 25^\circ\text{C}$			400	μA
		$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 125^\circ\text{C}$			2	mA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 72.5A$		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	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 400	nA

Dynamic Characteristics

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

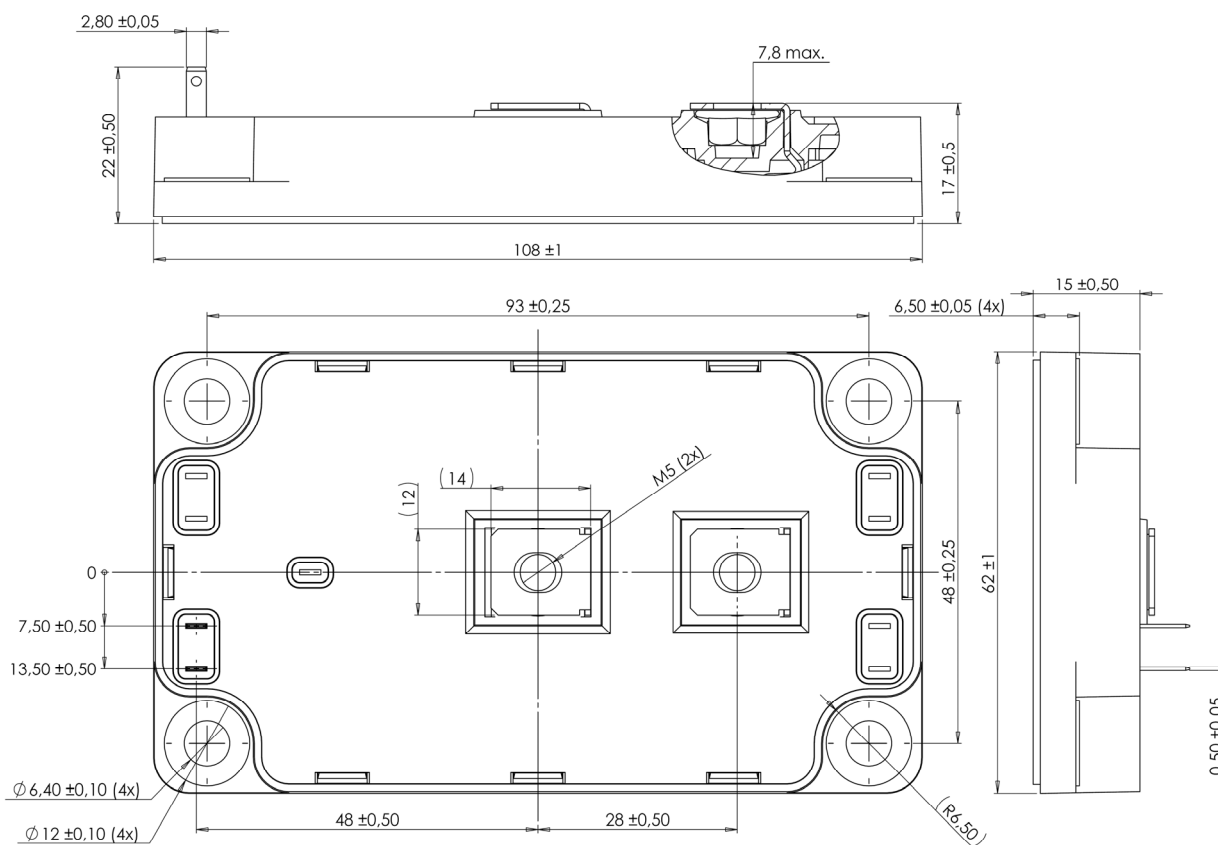
Series diode ratings and characteristics

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

Thermal and package characteristics

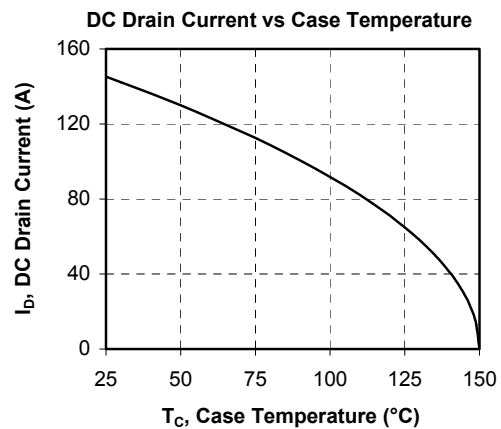
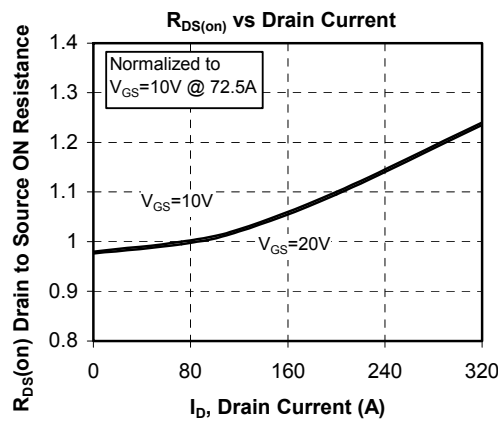
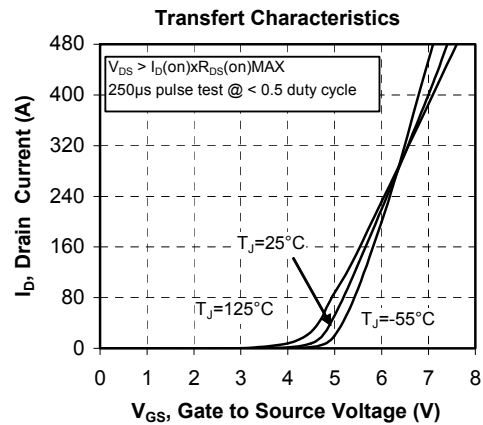
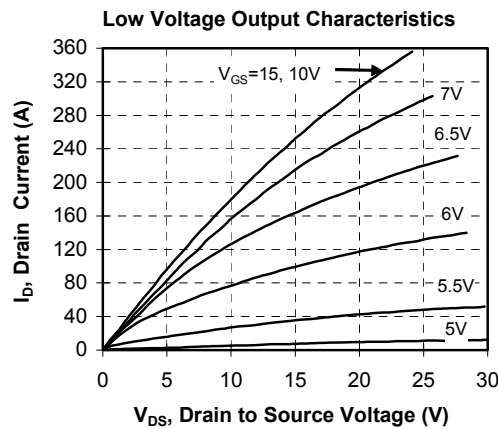
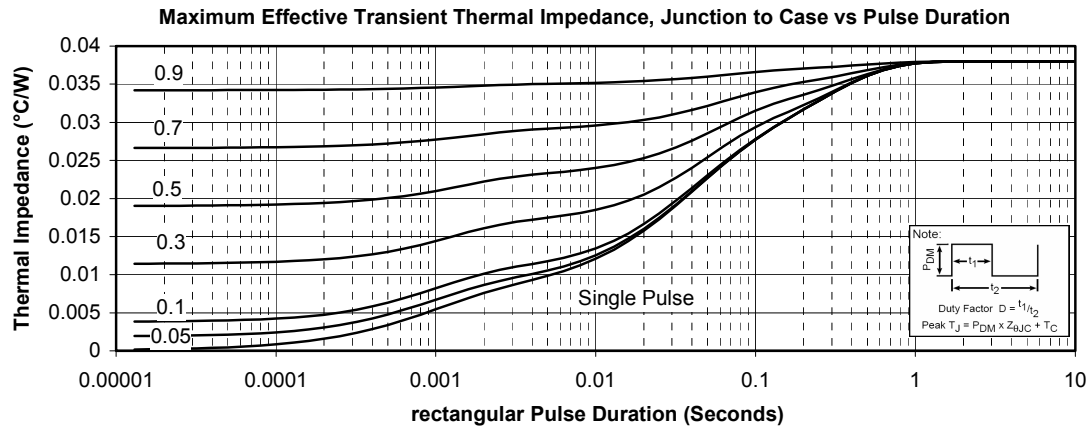
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.038	°C/W
		Series diode			0.23	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To Heatsink	M6	3	5	N.m
		For teminals	M5	2	3.5	
Wt	Package Weight				300	g

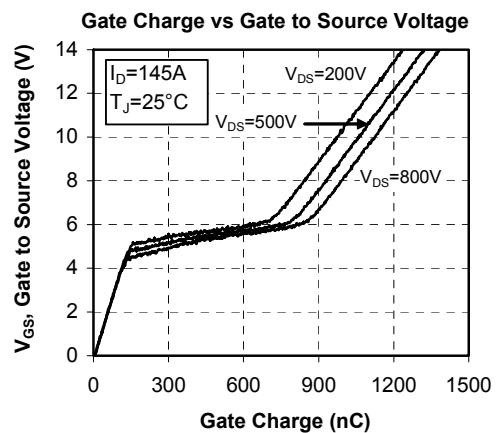
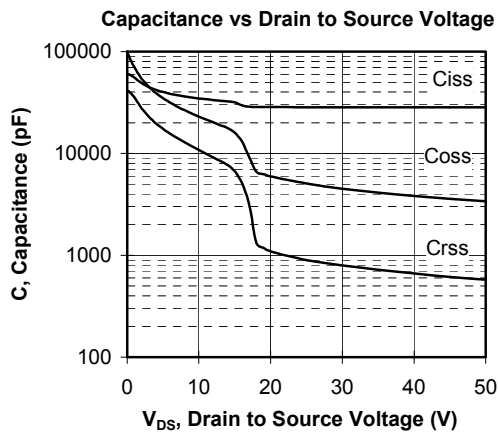
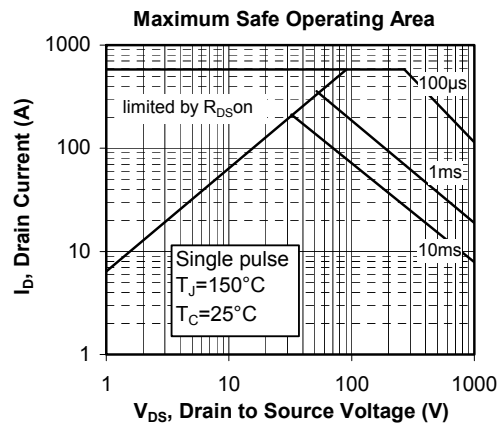
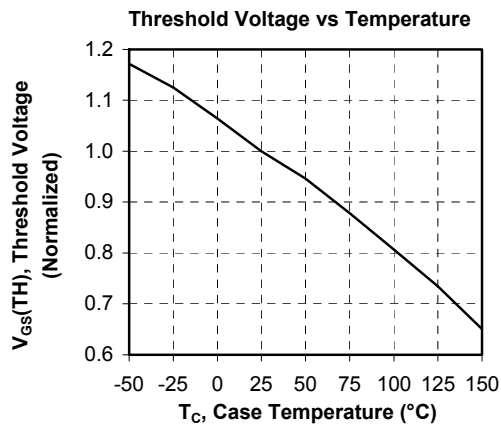
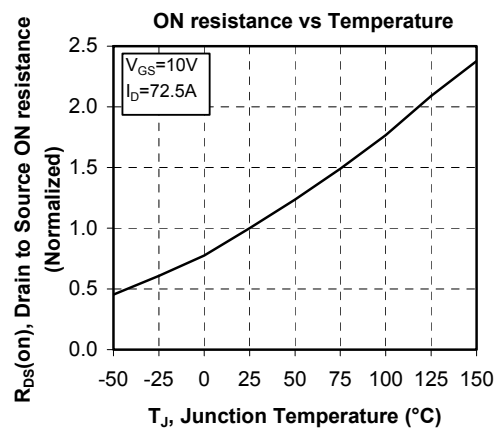
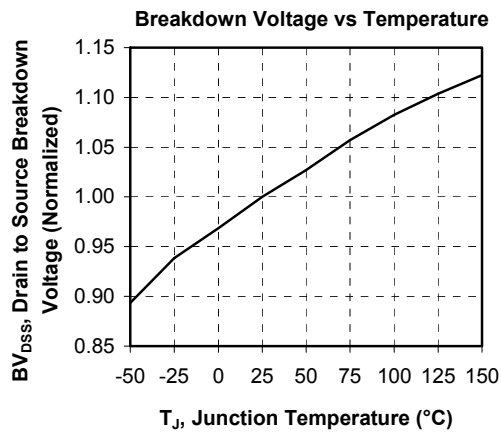
SP6 Package outline (dimensions in mm)

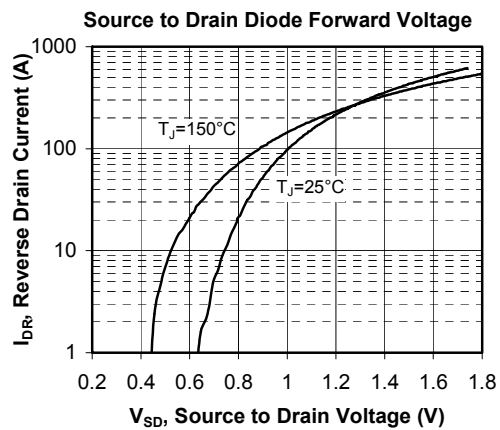
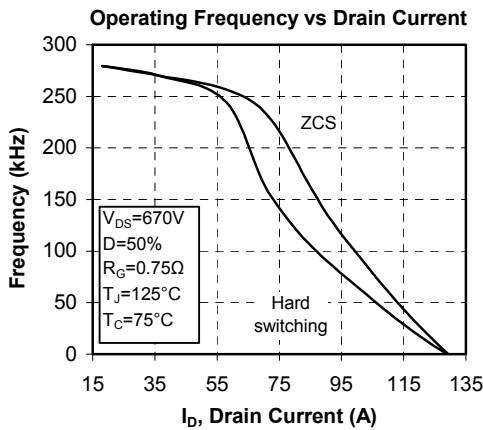
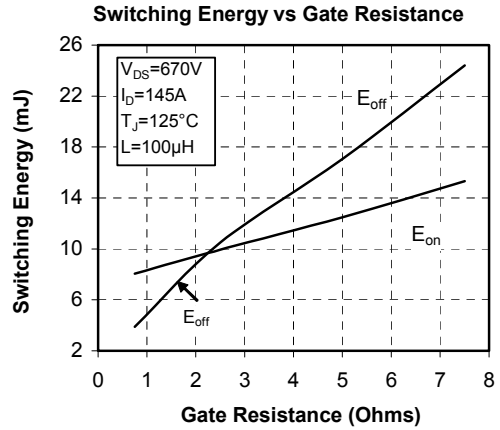
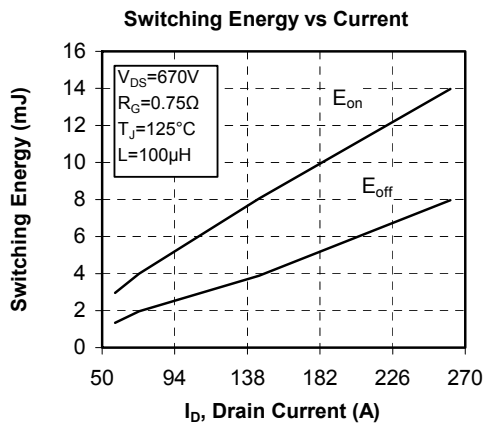
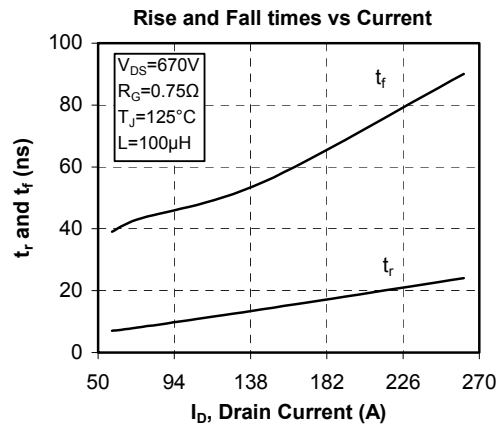
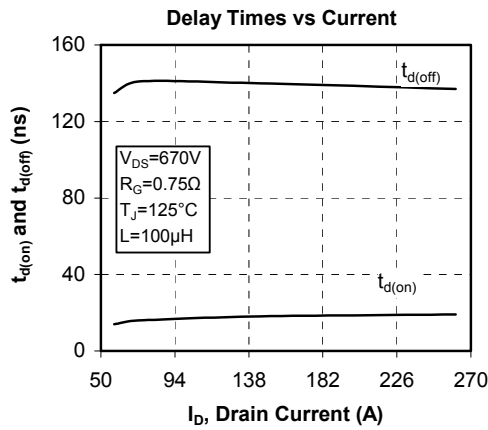


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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