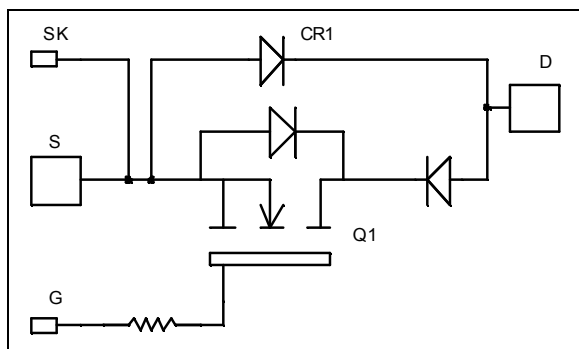


Single switch Series & parallel diodes MOSFET Power Module

$$V_{DSS} = 1000V$$

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

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



Application

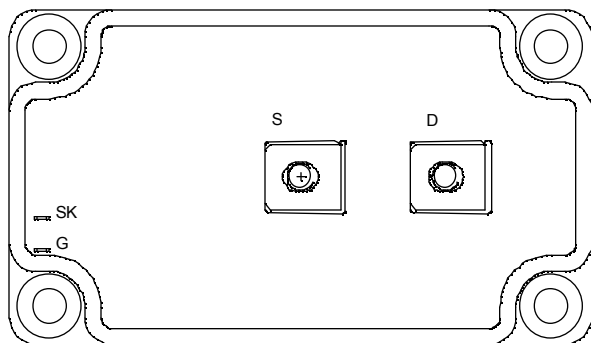
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	580	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	78	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	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	$V_{GS} = 10V$			1068		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 500V$			136		
Q_{gd}	Gate – Drain Charge	$I_D = 145A$			692		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$			18		ns
T_r	Rise Time	$V_{Bus} = 500V$			14		
$T_{d(off)}$	Turn-off Delay Time	$I_D = 145A$			140		
T_f	Fall Time	$R_G = 0.75\Omega$			55		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C			4.8		mJ
E_{off}	Turn-off Switching Energy	$V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 145A, R_G = 0.75\Omega$			2.9		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C			8		mJ
E_{off}	Turn-off Switching Energy	$V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 145A, R_G = 0.75\Omega$			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	$V_R = 200V$	$T_j = 25^\circ\text{C}$			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	$I_F = 120A$			1.1	1.15	V
		$I_F = 240A$			1.4		
		$I_F = 120A$	$T_j = 125^\circ\text{C}$		0.9		
t_{rr}	Reverse Recovery Time	$I_F = 120A$ $V_R = 133V$ $di/dt = 400A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		31		ns
			$T_j = 125^\circ\text{C}$		60		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		120		nC
			$T_j = 125^\circ\text{C}$		500		

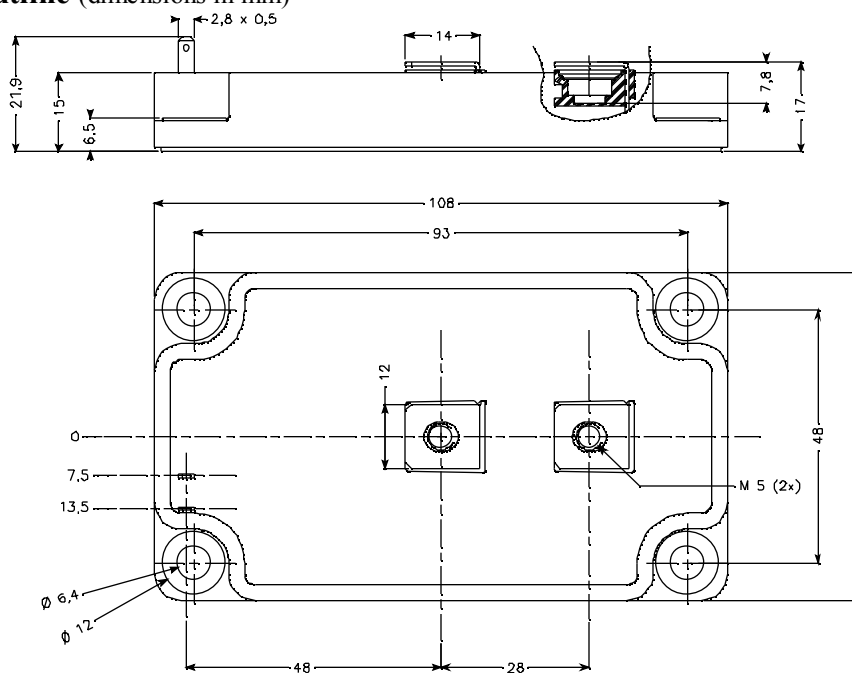
Parallel diode ratings and characteristics

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	$I_F = 240A$ $V_R = 667V$ $di/dt = 800A/\mu s$	$T_j = 25^{\circ}C$		280		ns
			$T_j = 125^{\circ}C$		350		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^{\circ}C$		3.04		μC
			$T_j = 125^{\circ}C$		14.4		

Thermal and package characteristics

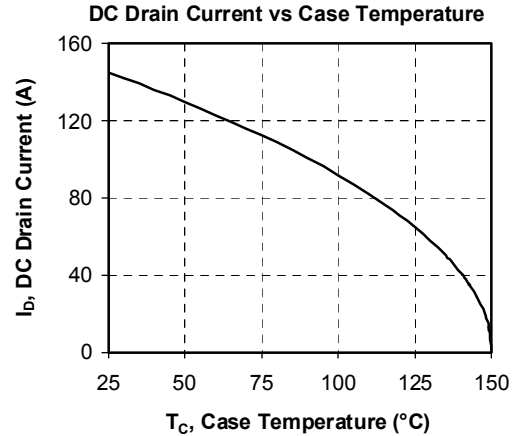
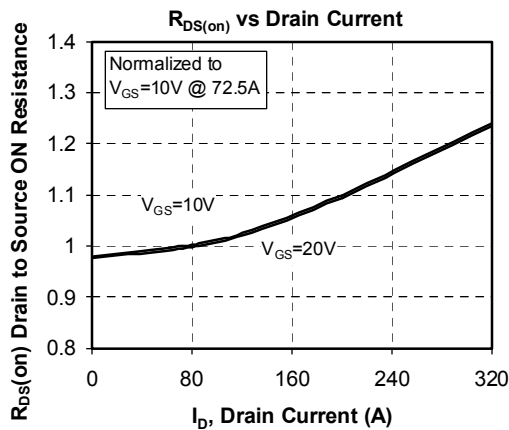
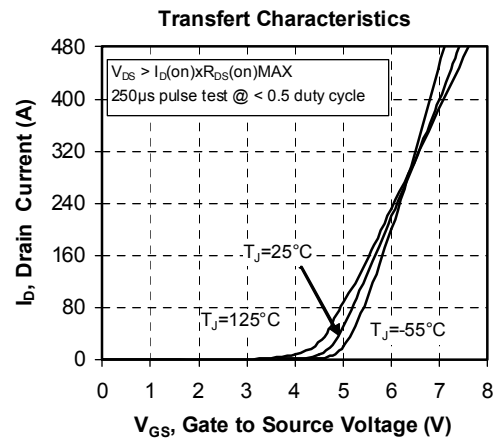
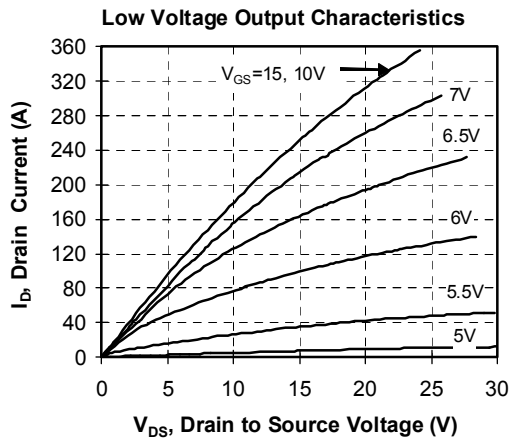
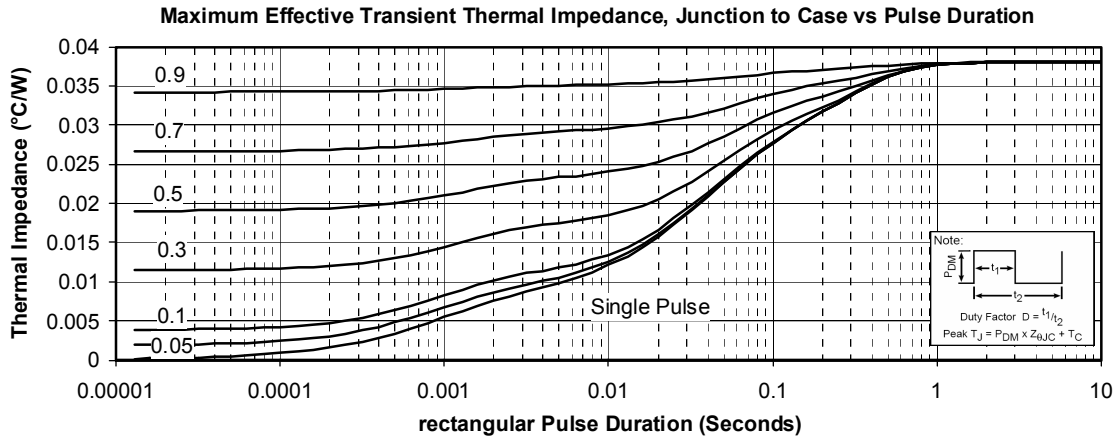
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.038	°C/W
		Series diode			0.46	
		Parallel diode			0.23	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I sol<1mA, 50/60Hz		2500			V
T _J	Operating junction temperature range		-40		150	°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				280	g

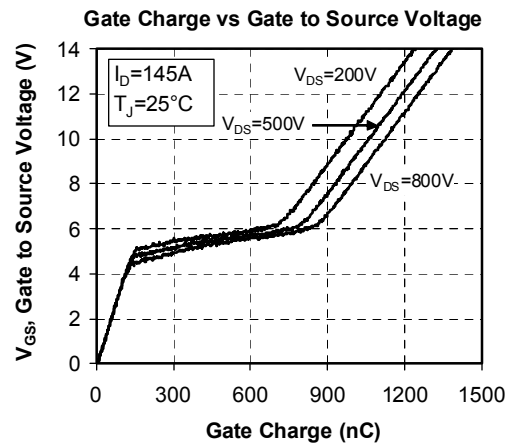
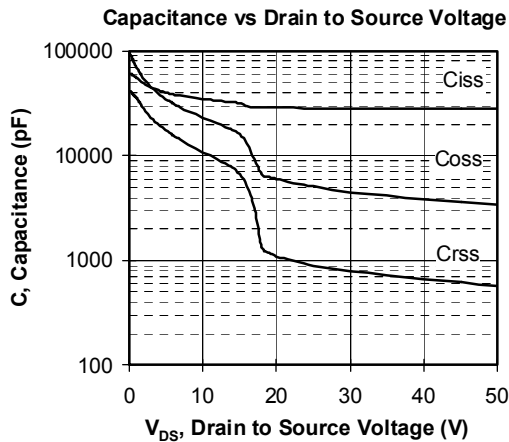
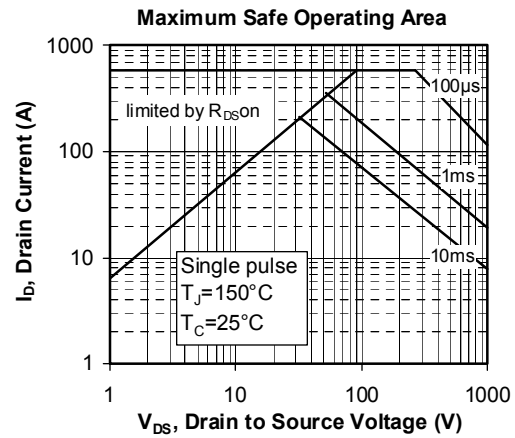
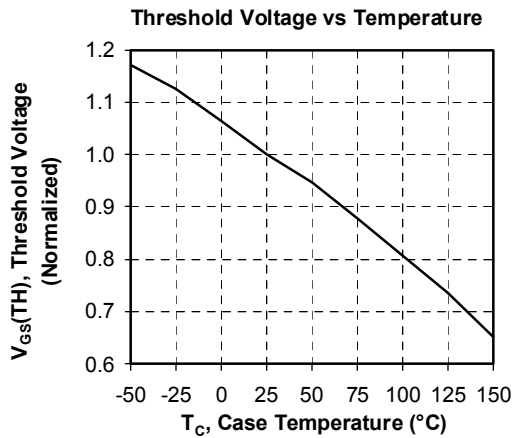
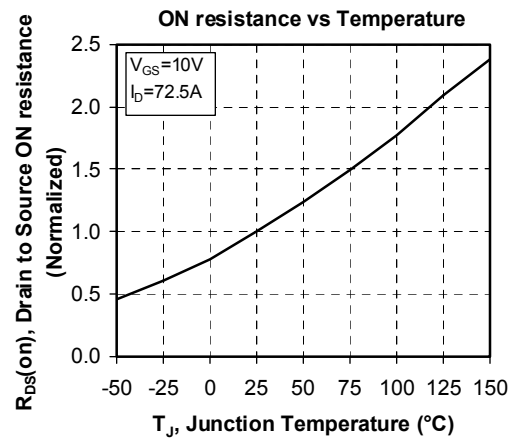
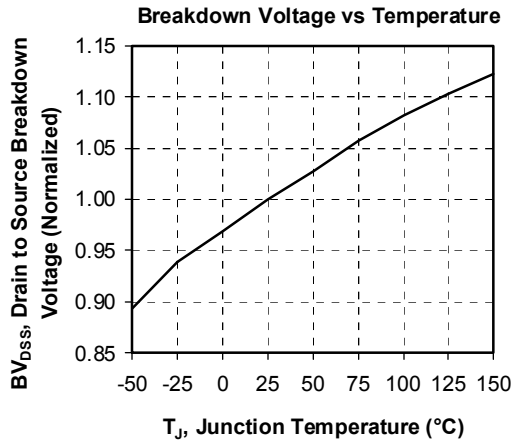
SP6 Package outline (dimensions in mm)

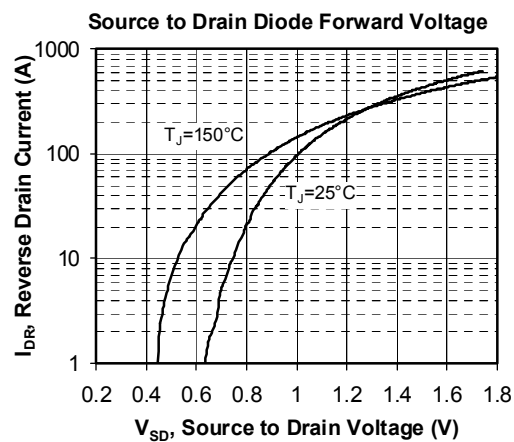
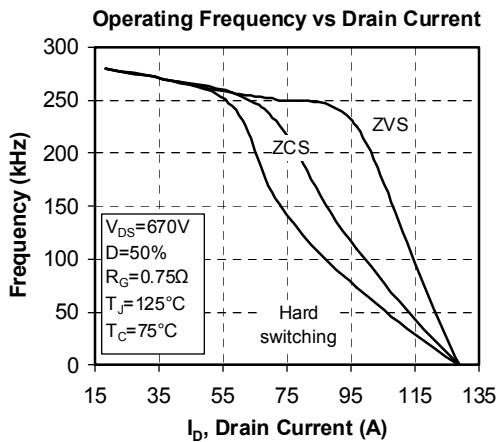
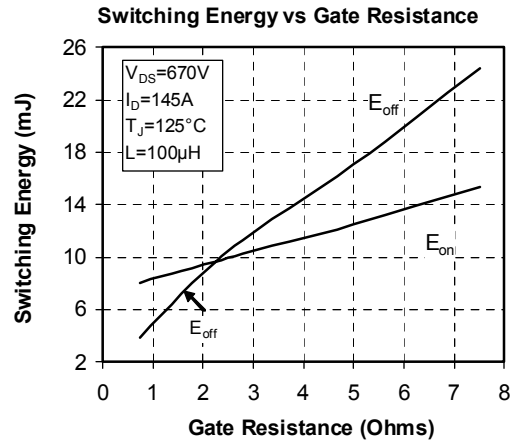
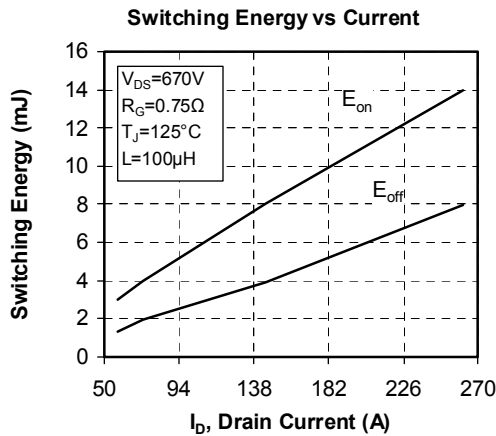
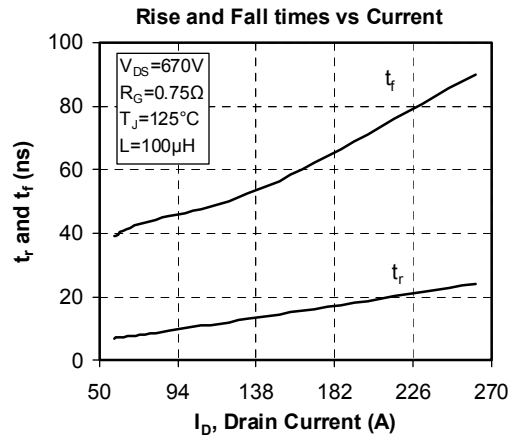
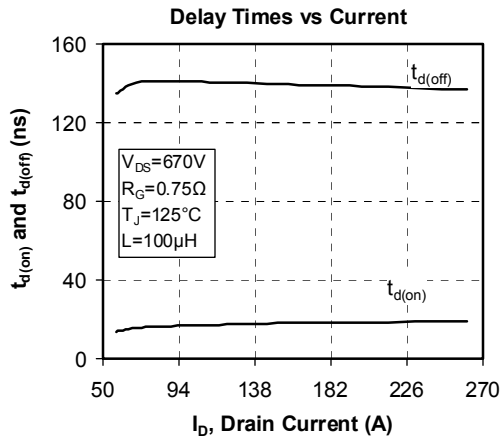


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331