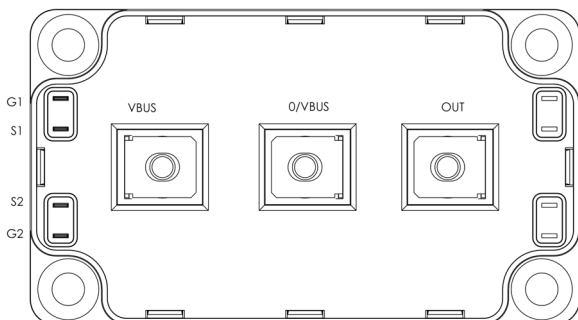
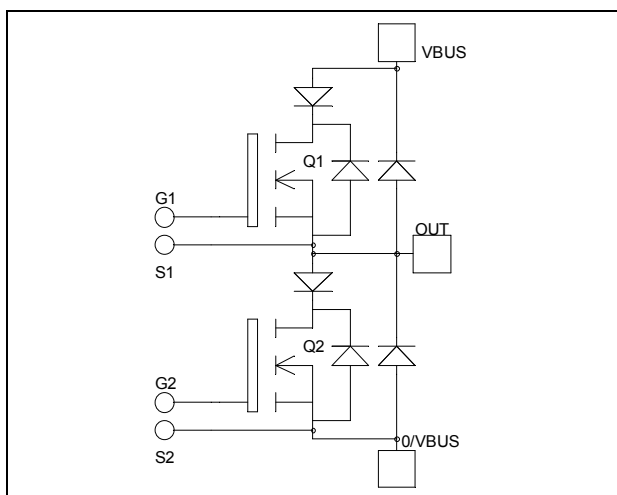


*Phase leg
Series & parallel diodes
MOSFET Power Module*

$$V_{DSS} = 500V$$

$$R_{DSon} = 24m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 150A \text{ @ } T_c = 25^\circ C$$



Application

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

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration

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	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	600	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	28	m Ω
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	30	mJ
E_{AS}	Single Pulse Avalanche Energy	1300	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$			500	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 75A$		24	28	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 6mA$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		19.6		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		4.2		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.3		
Q_g	Total gate Charge	$V_{GS} = 10V$		434		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250V$		120		
Q_{gd}	Gate – Drain Charge	$I_D = 150A$		216		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 150A$ $R_G = 0.8\Omega$		10		ns
T_r	Rise Time			17		
$T_{d(off)}$	Turn-off Delay Time			50		
T_f	Fall Time			41		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 150A, R_G = 0.8\Omega$		1.9		mJ
E_{off}	Turn-off Switching Energy			1.5		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 150A, R_G = 0.8\Omega$		3.3		mJ
E_{off}	Turn-off Switching Energy			1.7		
R_{thJC}	Junction to Case Thermal Resistance				0.1	°C/W

Series diode ratings and characteristics

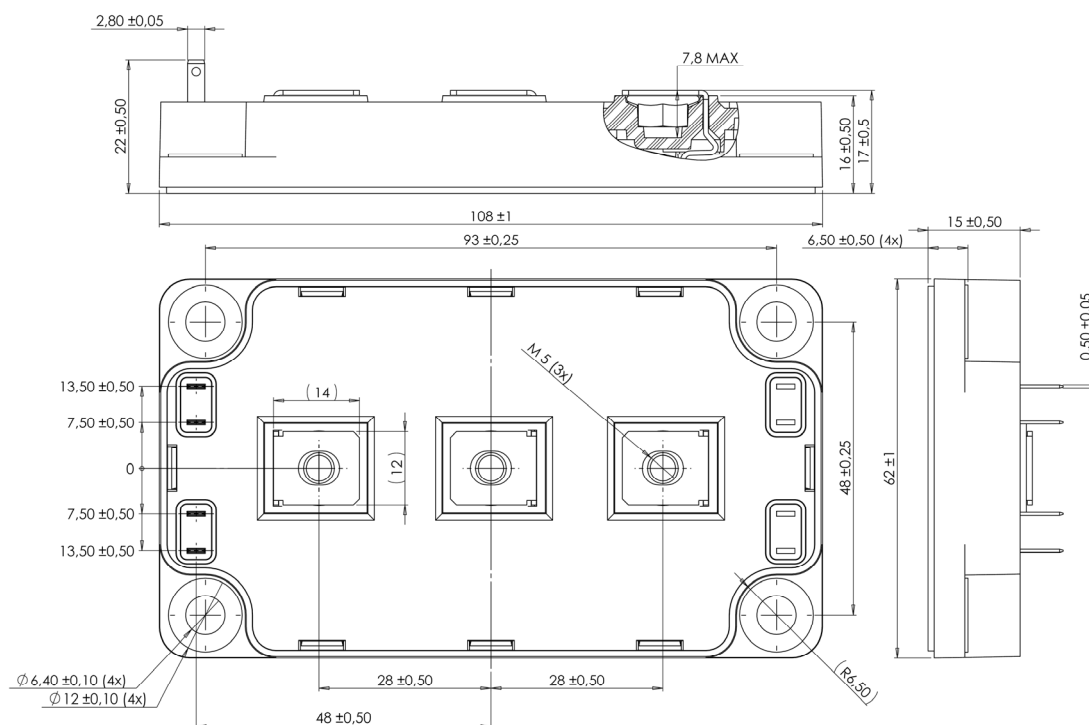
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RM}	Maximum Reverse Leakage Current	V _R =600V				150	μA
I _F	DC Forward Current		T _c = 80°C		200		A
V _F	Diode Forward Voltage	I _F = 200A V _{GE} = 0V	T _j = 25°C		1.6	2	V
			T _j = 150°C		1.5		
t _{rr}	Reverse Recovery Time	I _F = 200A V _R = 300V di/dt =2800A/μs	T _j = 25°C		125		ns
			T _j = 150°C		220		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		9.4		μC
			T _j = 150°C		19.8		
E _r	Reverse Recovery Energy		T _j = 25°C		2.2		mJ
			T _j = 150°C		4.8		
R _{thJC}	Junction to Case Thermal Resistance					0.39	°C/W

Parallel diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage			600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$				350	μA
I_F	DC Forward Current		$T_c = 70^\circ C$		120		A
V_F	Diode Forward Voltage	$I_F = 120A$			1.6	1.8	V
		$I_F = 240A$			1.9		
		$I_F = 120A$	$T_j = 125^\circ C$		1.4		
t_{rr}	Reverse Recovery Time	$I_F = 120A$ $V_R = 400V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$		130		ns
			$T_j = 125^\circ C$		170		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$		440		nC
			$T_j = 125^\circ C$		1840		
R_{thJC}	Junction to Case Thermal Resistance					0.46	$^\circ C/W$

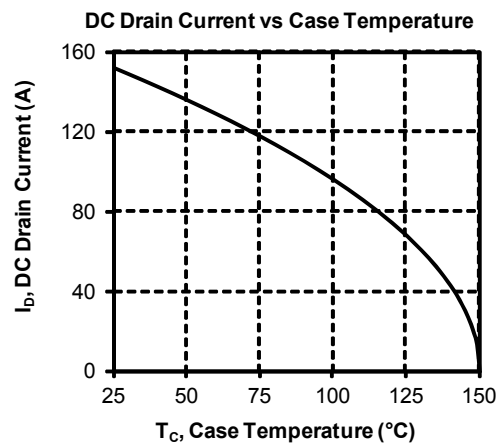
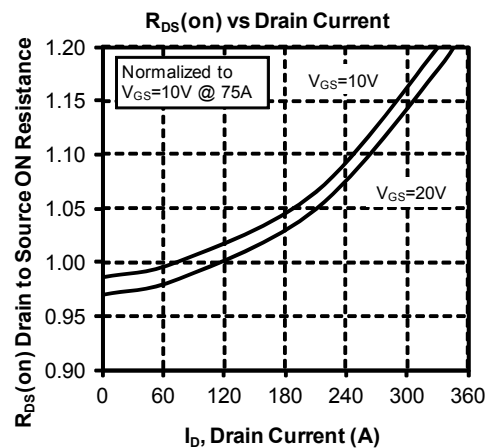
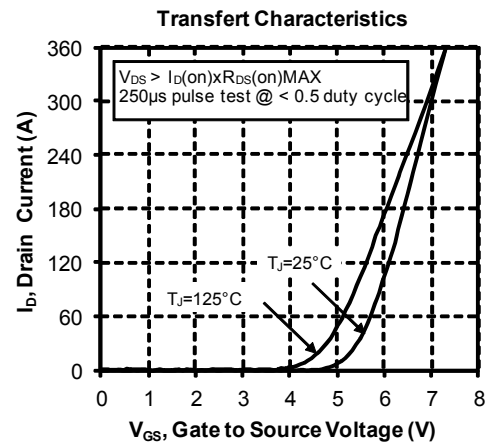
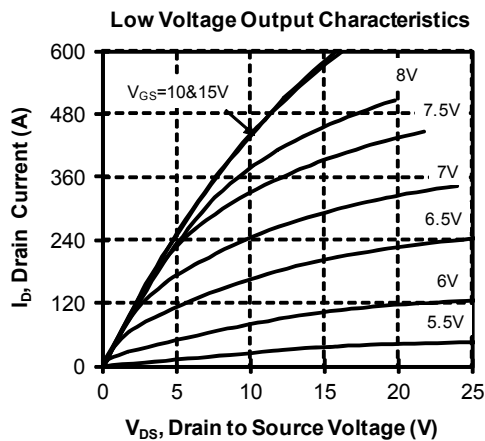
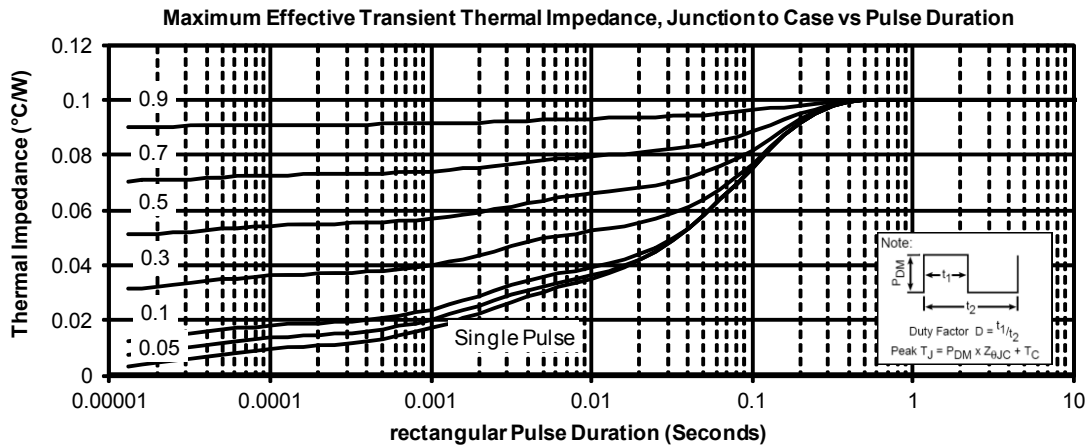
Thermal and package characteristics

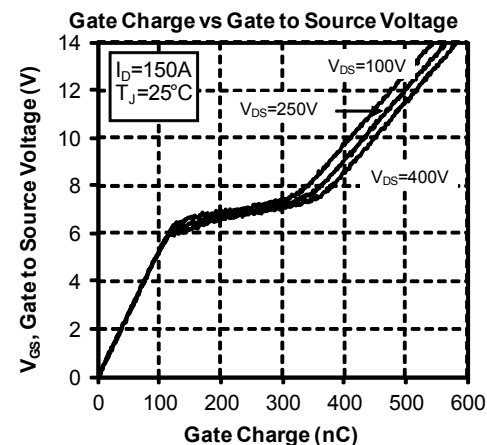
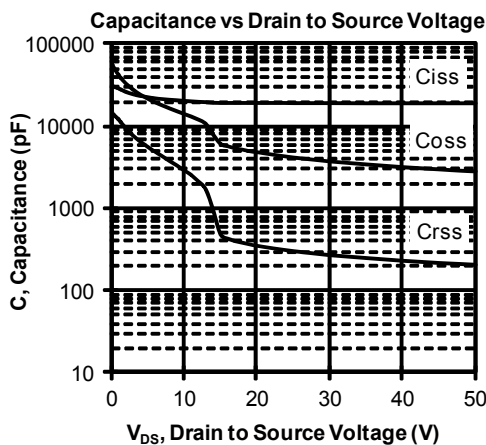
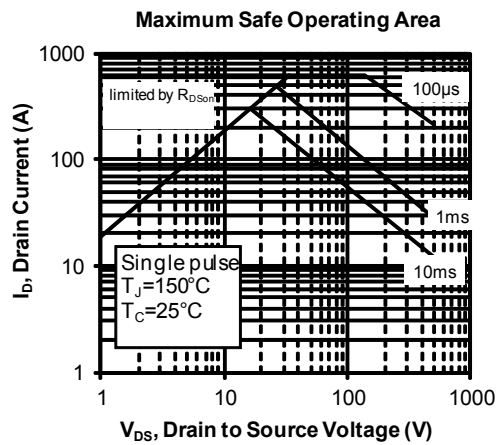
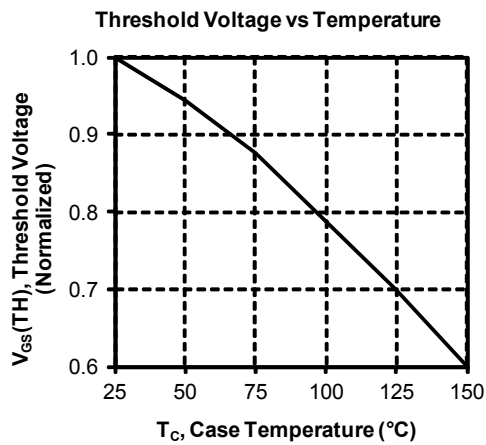
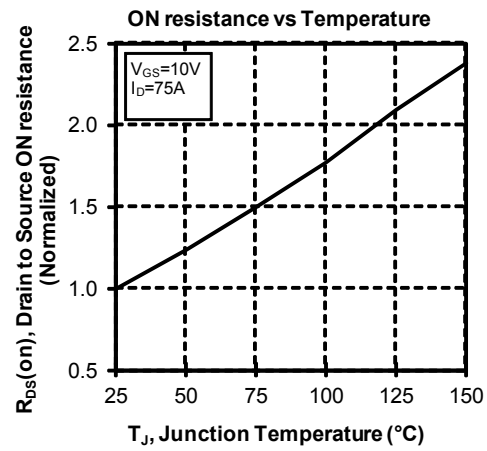
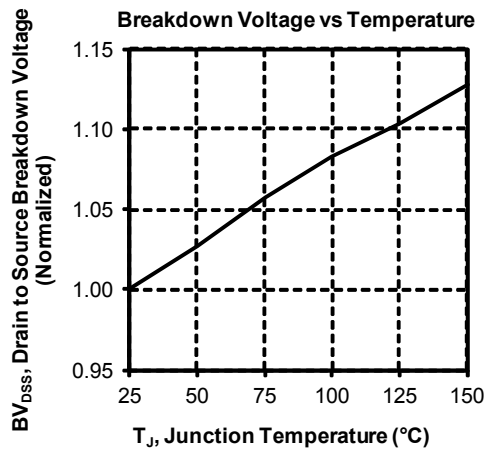
Symbol	Characteristic			Min	Max	Unit
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, 50/60Hz			4000		V
T_J	Operating junction temperature range			-40	150	$^\circ C$
T_{JOP}	Recommended junction temperature under switching conditions			-40	$T_{jmax} - 25$	
T_{STG}	Storage Temperature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

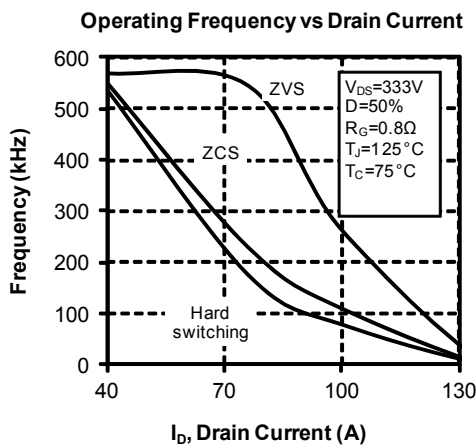
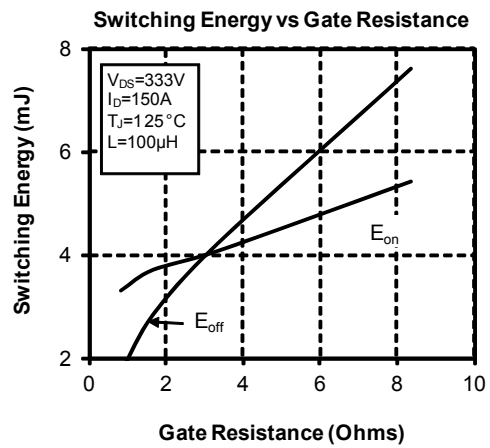
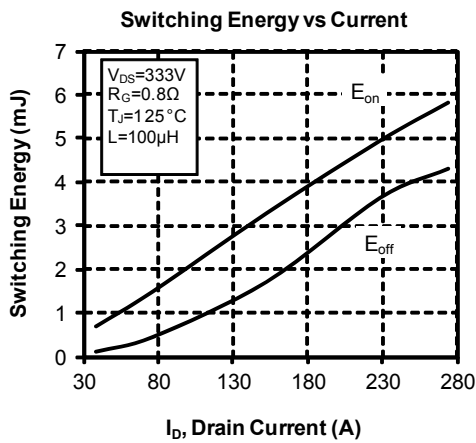
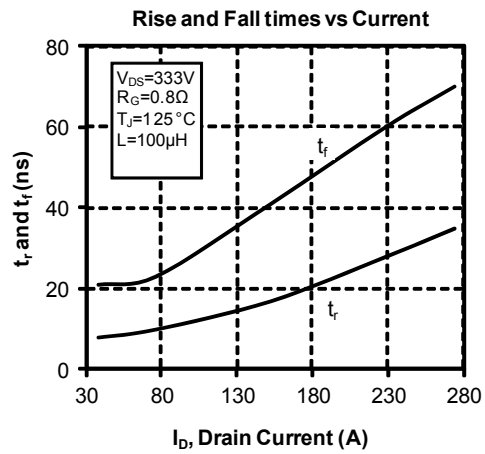
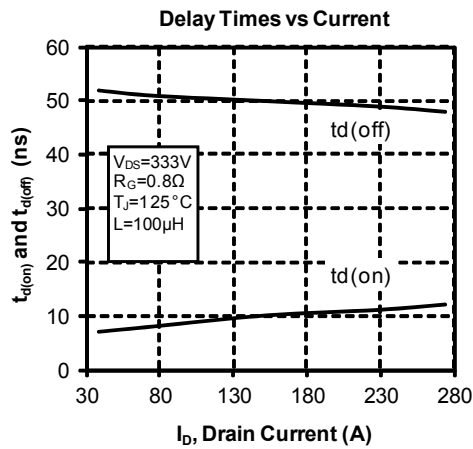
SP6 Package outline (dimensions in mm)


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

Typical Performance Curve







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