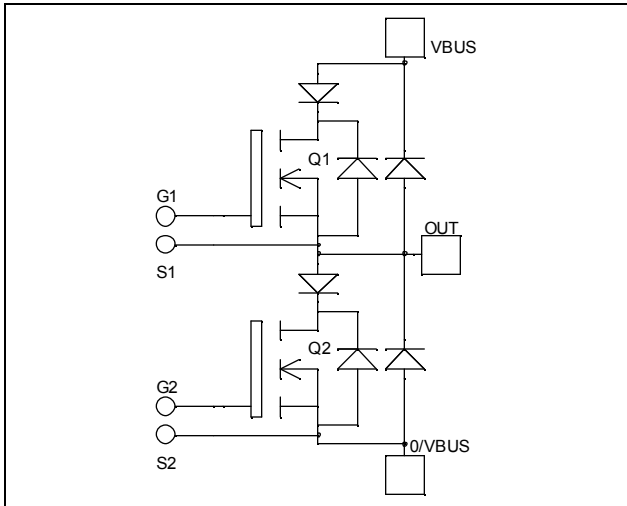


Phase leg
Series & parallel diodes
MOSFET Power Module

$V_{DSS} = 1200V$
 $R_{DSon} = 200m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 50A$ @ $T_c = 25^\circ C$


Application

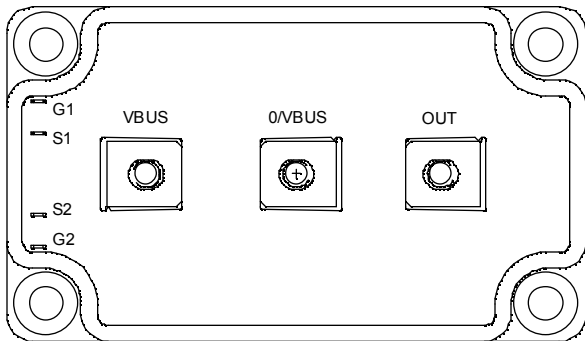
- Motor control
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

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


Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	50
		$T_c = 80^\circ C$	37
I_{DM}	Pulsed Drain current	200	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	240	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
I_{AR}	Avalanche current (repetitive and non repetitive)	12	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

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	$V_{GS} = 0\text{V}, V_{DS} = 1200\text{V}$			1.5	mA
		$V_{GS} = 0\text{V}, V_{DS} = 1000\text{V}$			6	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 25\text{A}$		200	240	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 6\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$			± 450	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		15.2		nF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		2.2		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.42		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		600		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 600\text{V}$		84		
Q_{gd}	Gate – Drain Charge	$I_D = 50\text{A}$		390		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 50\text{A}$ $R_G = 0.8\Omega$		10		ns
T_r	Rise Time			10		
$T_{d(off)}$	Turn-off Delay Time			68		
T_f	Fall Time			36		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 800\text{V}$ $I_D = 50\text{A}, R_G = 0.8\Omega$		2.79		mJ
E_{off}	Turn-off Switching Energy			0.6		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 800\text{V}$ $I_D = 50\text{A}, R_G = 0.8\Omega$		5.6		mJ
E_{off}	Turn-off Switching Energy			0.81		

Series diode ratings and characteristics

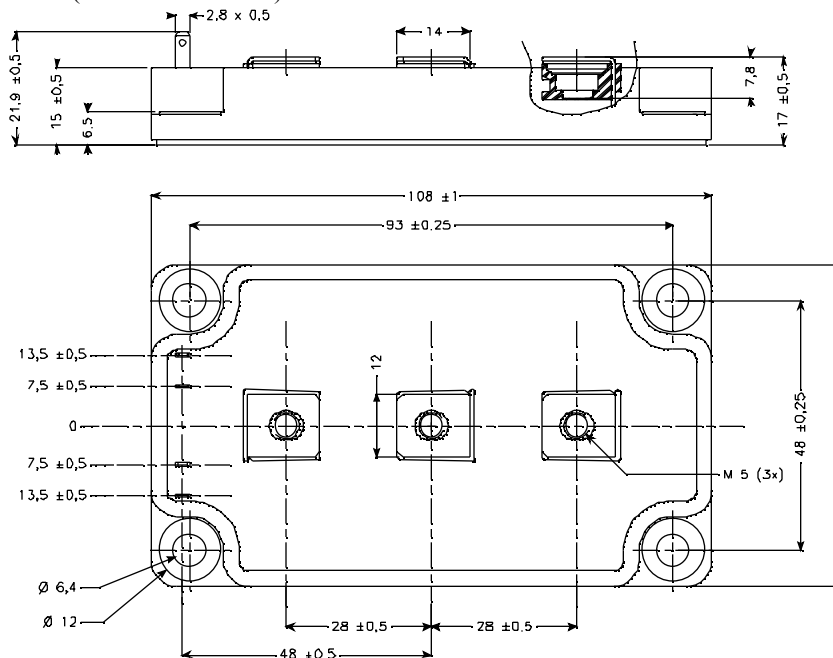
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 200\text{V}$	$T_j = 25^\circ\text{C}$		350	μA
			$T_j = 125^\circ\text{C}$		600	
I_F	DC Forward Current			60		A
V_F	Diode Forward Voltage	$I_F = 60\text{A}$		1.1	1.15	V
		$I_F = 120\text{A}$		1.4		
		$I_F = 60\text{A}$	$T_j = 125^\circ\text{C}$		0.9	
t_{rr}	Reverse Recovery Time	$I_F = 60\text{A}$ $V_R = 133\text{V}$ $di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		24	ns
			$T_j = 125^\circ\text{C}$		48	
Q_{rr}	Reverse Recovery Charge	$I_F = 60\text{A}$ $V_R = 133\text{V}$ $di/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		66	nC
			$T_j = 125^\circ\text{C}$		300	

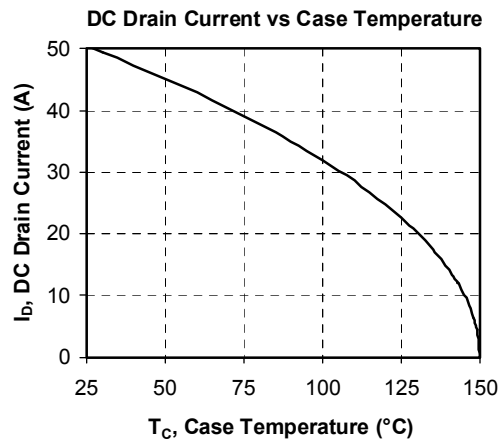
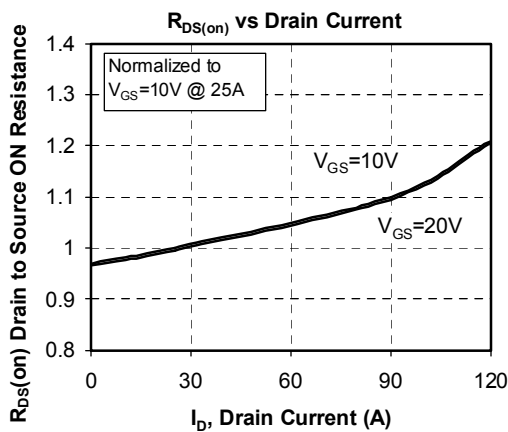
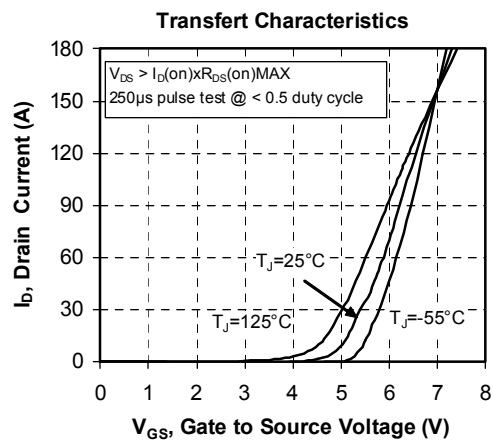
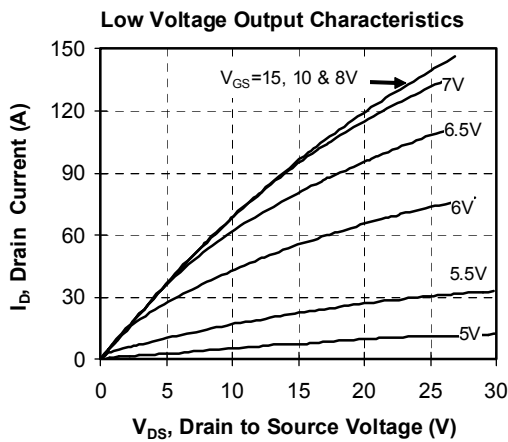
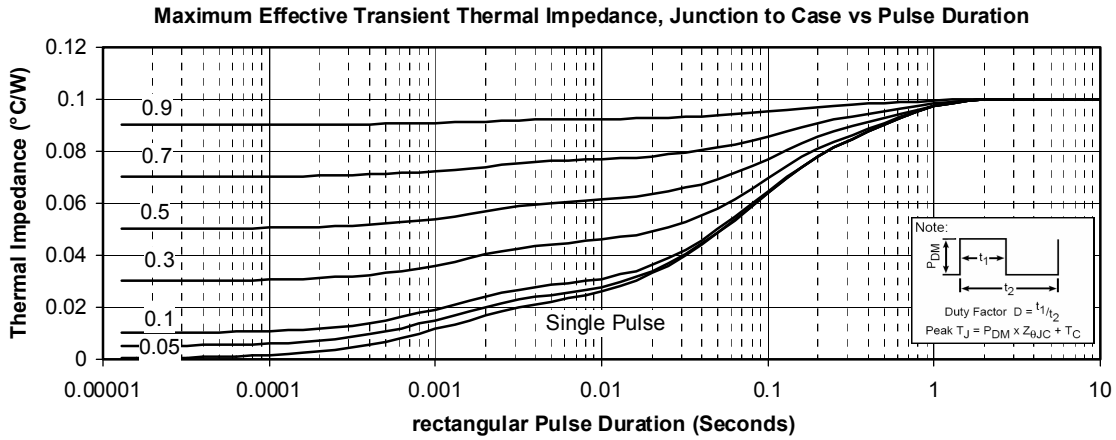
Parallel diode ratings and characteristics

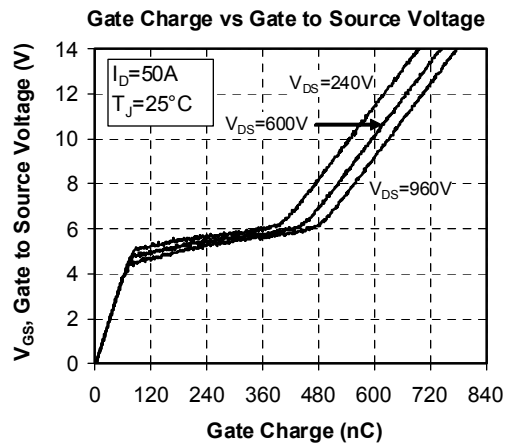
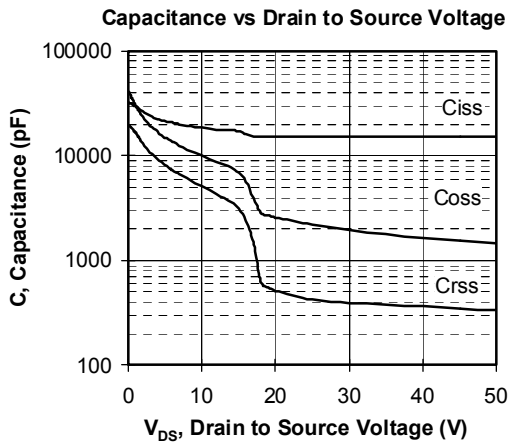
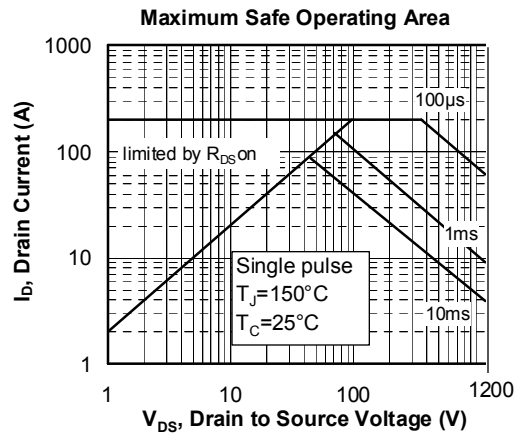
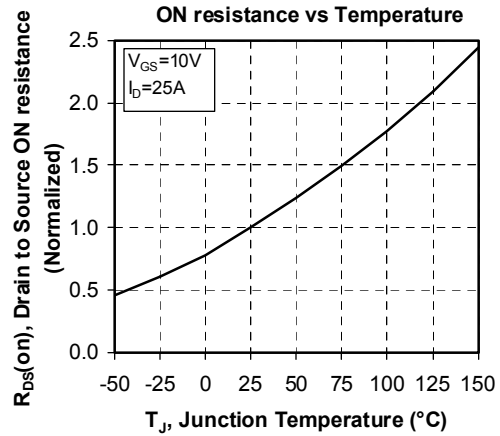
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$		350	μA
			$T_j = 125^\circ C$		600	
I_F	DC Forward Current			120		A
V_F	Diode Forward Voltage	$I_F = 120A$		2	2.5	V
		$I_F = 240A$		2.3		
		$I_F = 120A$	$T_j = 125^\circ C$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$	400		ns
			$T_j = 125^\circ C$	470		
Q_{rr}	Reverse Recovery Charge	$I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$	2.4		μC
			$T_j = 125^\circ C$	8		

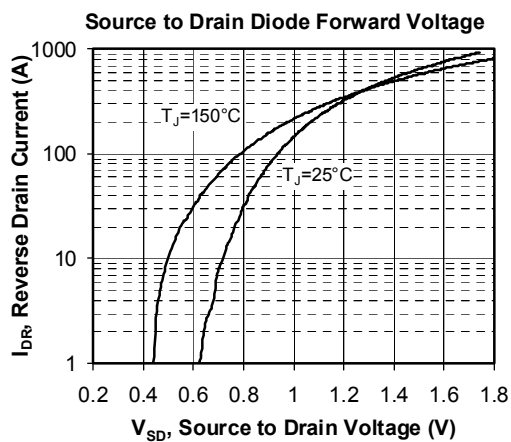
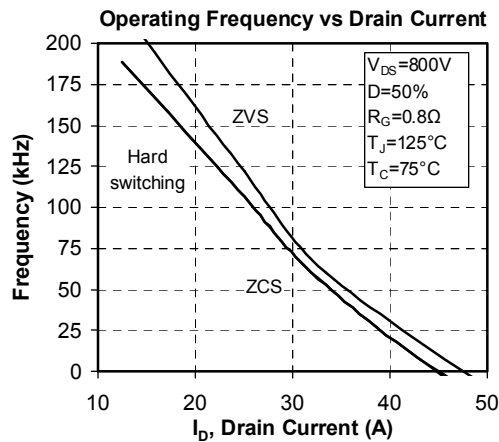
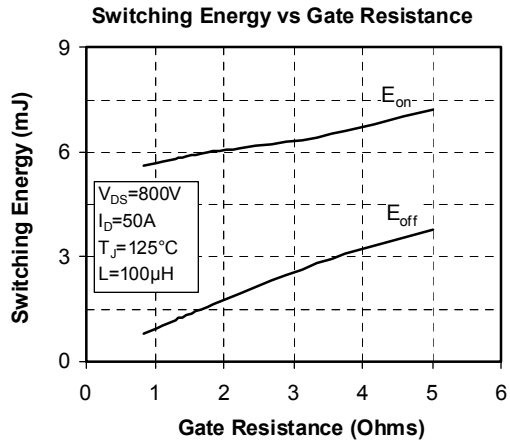
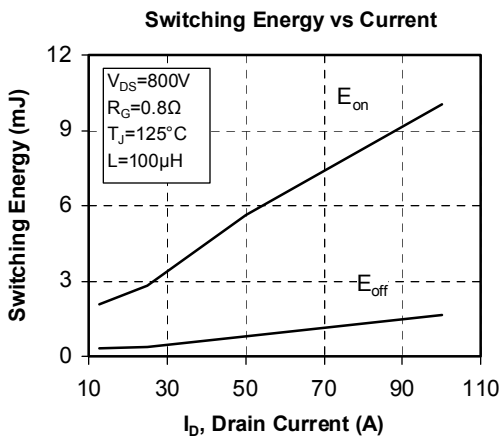
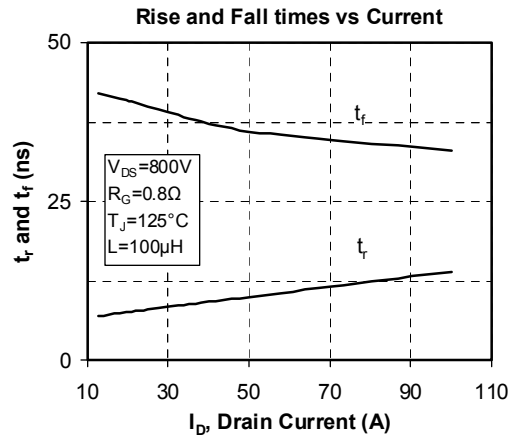
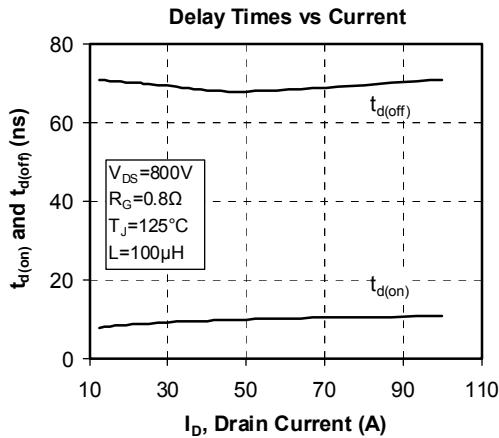
Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case Thermal Resistance	Transistor		0.1	$^\circ C/W$	
		Series diode		0.65		
		Parallel diode		0.46		
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ 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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