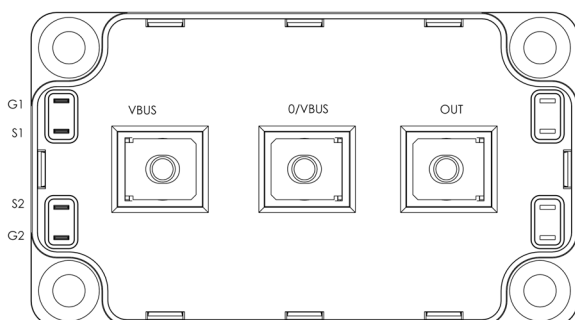
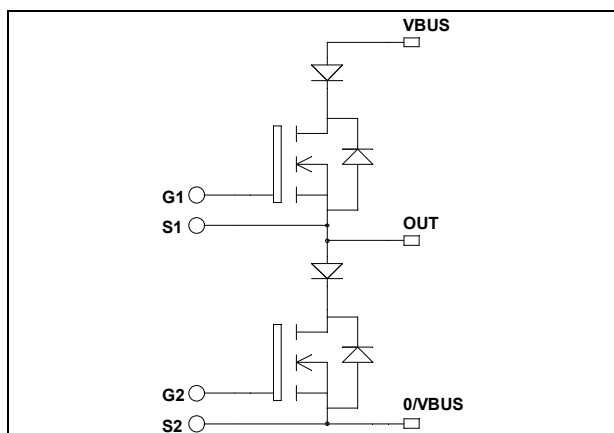


## Phase leg with Series diodes MOSFET Power Module

$$V_{DSS} = 1200V$$

$$R_{DSon} = 200m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 50A \text{ @ } T_c = 25^\circ C$$



### Application

- Zero Current Switching resonant mode

### Features

- Power MOS 7<sup>®</sup> 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	A
$I_{DM}$	Pulsed Drain current	200	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	240	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$ 1250	W
$I_{AR}$	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](http://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	$V_{GS} = 0V, V_{DS} = 1200V$ $T_j = 25^\circ\text{C}$			1.5	mA
		$V_{GS} = 0V, V_{DS} = 1000V$ $T_j = 125^\circ\text{C}$			6	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 25A$		200	240	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 6mA$	3		5	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 450$	nA

**Dynamic Characteristics**

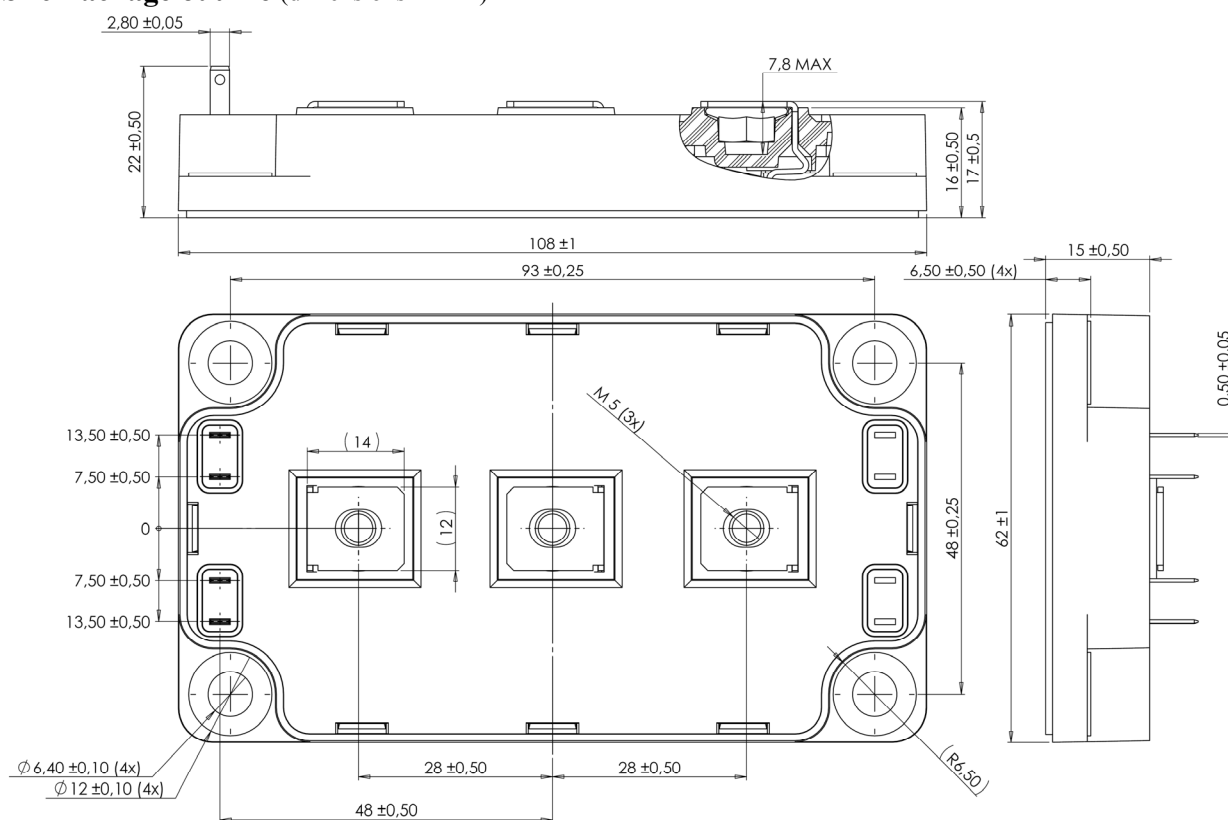
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$		15.2		nF
$C_{oss}$	Output Capacitance			2.2		
$C_{rss}$	Reverse Transfer Capacitance			0.42		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 600V$ $I_D = 50A$		600		nC
$Q_{gs}$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

**Series diode ratings and characteristics**

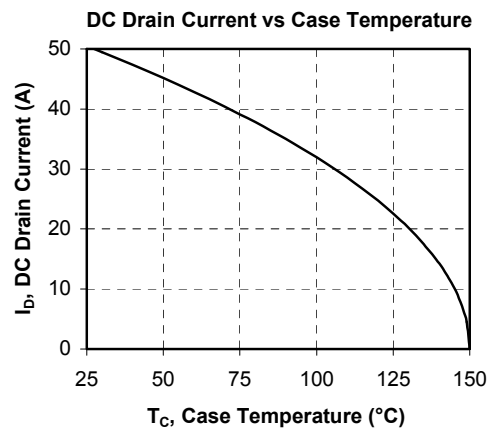
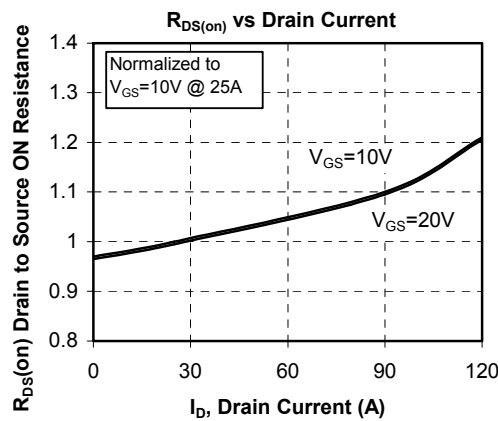
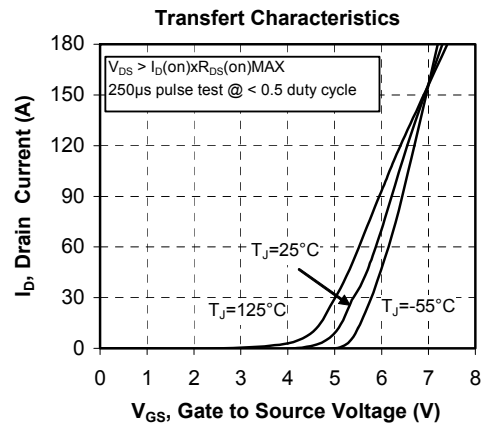
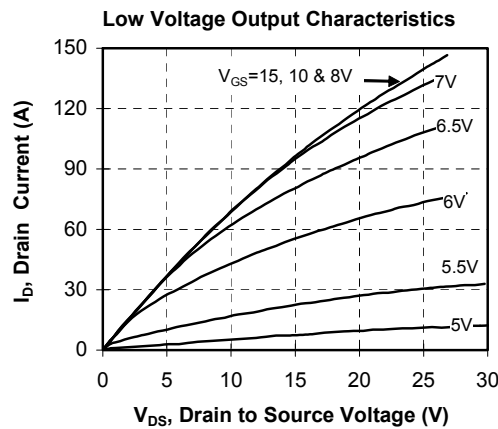
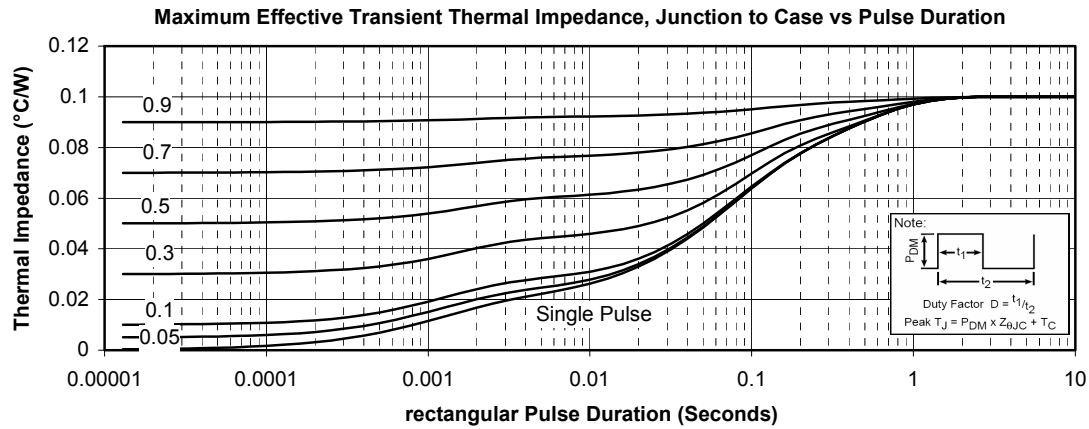
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$		250	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		600	
$I_F$	DC Forward Current	$T_c = 70^\circ\text{C}$		120		A
$V_F$	Diode Forward Voltage	$I_F = 120A$		2	2.5	V
		$I_F = 240A$		2.3		
		$I_F = 120A$ $T_j = 125^\circ\text{C}$		1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	400		ns
			$T_j = 125^\circ\text{C}$	470		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	2.4		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$	8		

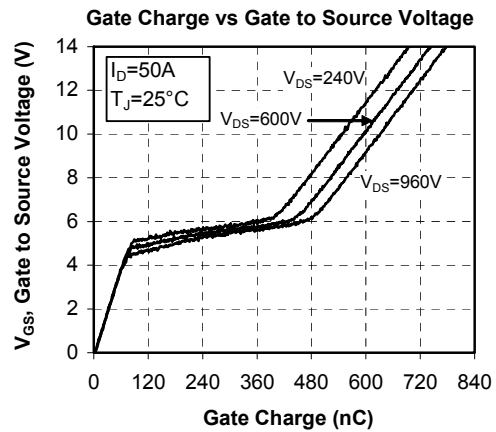
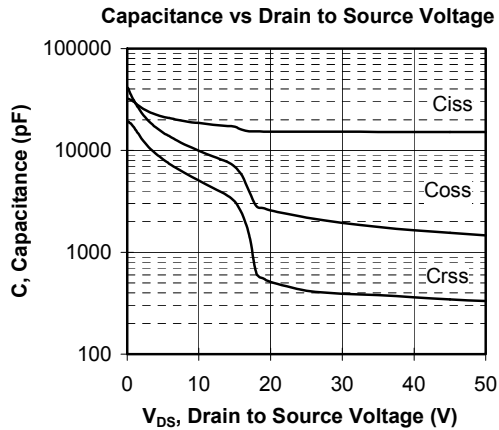
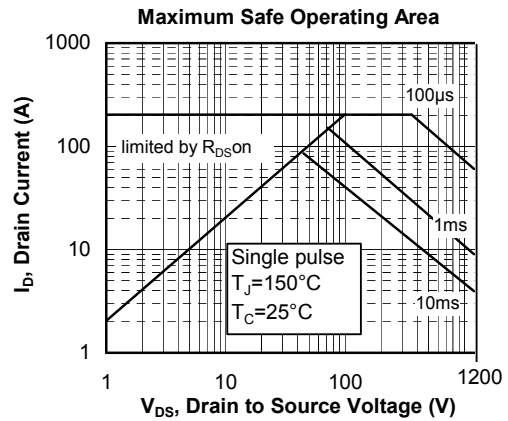
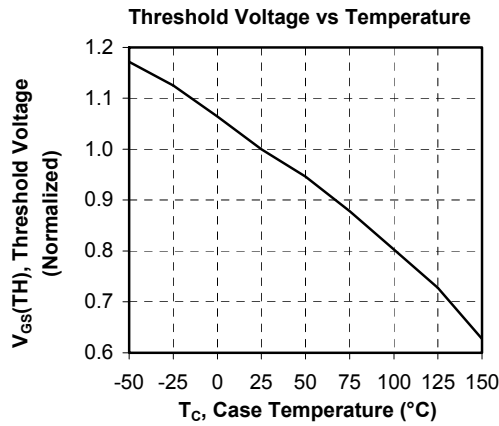
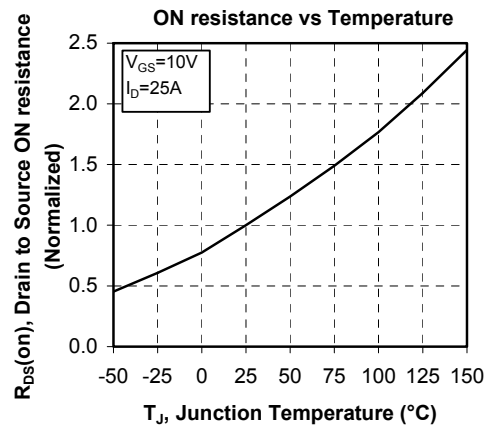
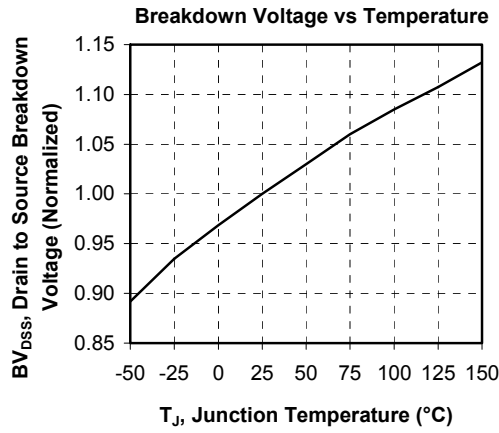
**Thermal and package characteristics**

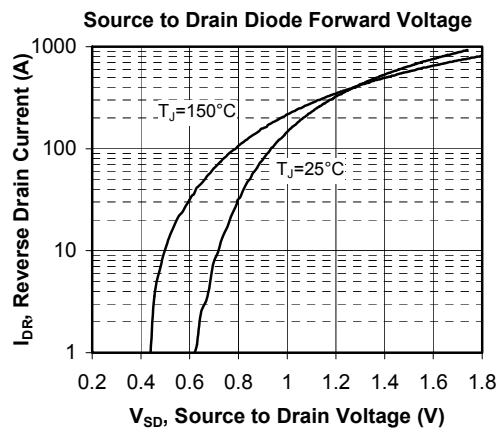
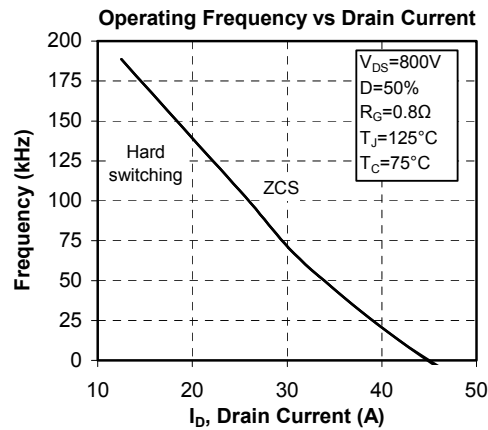
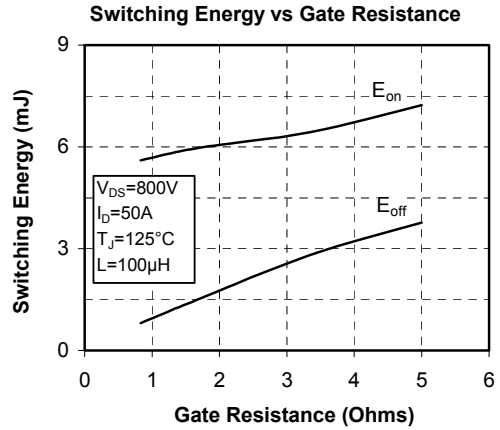
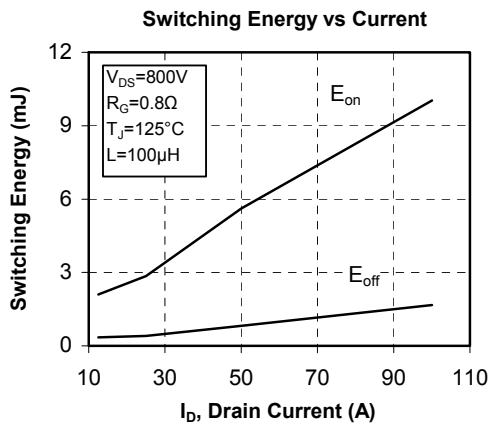
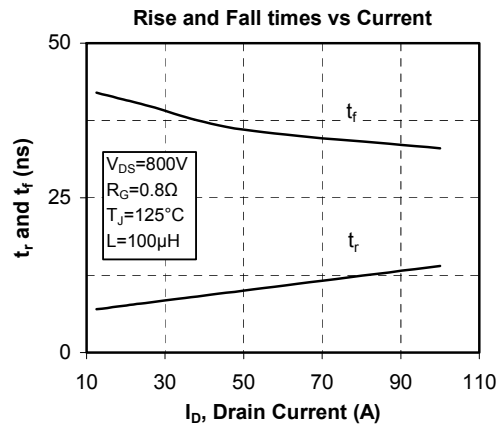
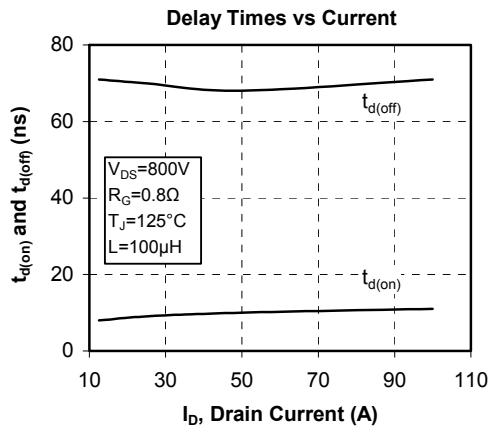
Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	Transistor			0.1	°C/W
		Series diode			0.46	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T <sub>J</sub>	Operating junction temperature range		-40		150	°C
T <sub>STG</sub>	Storage Temperature Range		-40		125	
T <sub>C</sub>	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](http://www.microsemi.com)

**Typical Performance Curve**






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