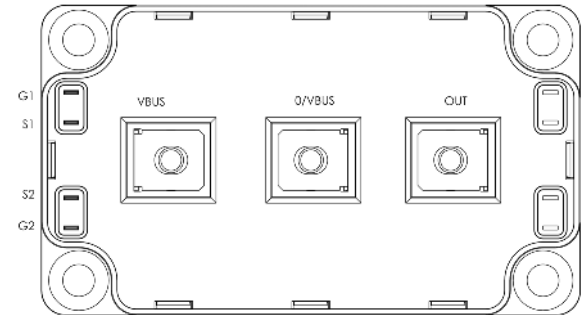
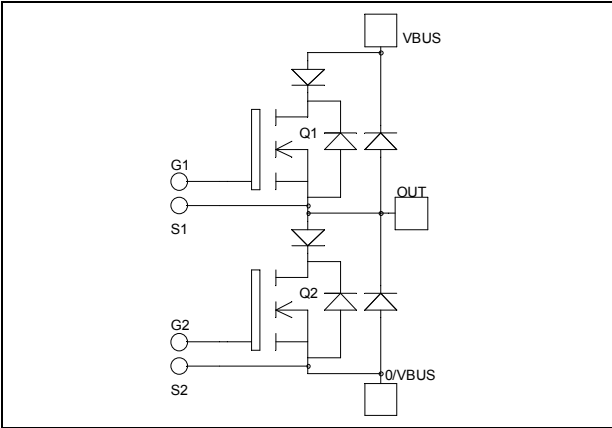


Phase leg  
Series & SiC parallel diodes  
MOSFET Power Module

**$V_{DSS} = 1000V$**   
 **$R_{DSon} = 130m\Omega$  typ @  $T_j = 25^\circ C$**   
 **$I_D = 65A$  @  $T_c = 25^\circ C$**



**Application**

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

**Features**

- **Power MOS 7<sup>®</sup> MOSFETs**
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- **Parallel SiC Schottky Diode**
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature Independent switching behavior
  - Positive temperature coefficient on VF
- 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	1000	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	65
		$T_c = 80^\circ C$	49
$I_{DM}$	Pulsed Drain current	240	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	156	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
$I_{AR}$	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](http://www.microsemi.com)

**Electrical Characteristics**

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1000V	T <sub>j</sub> = 25°C			600	μA
		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 800V	T <sub>j</sub> = 125°C			2	mA
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 32.5A			130	156	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 6mA		3		5	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V				±450	nA

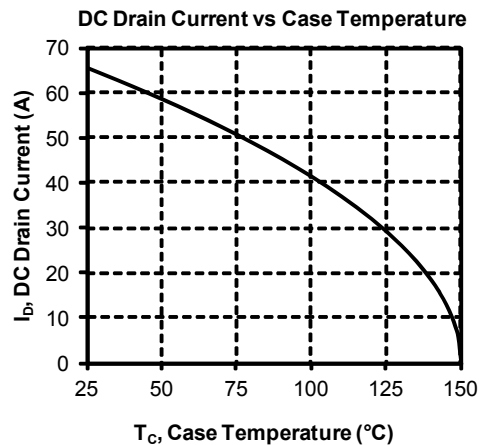
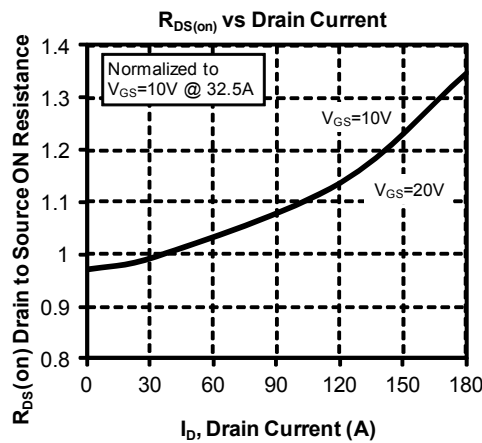
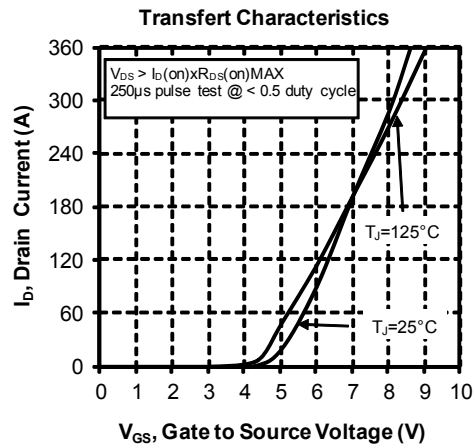
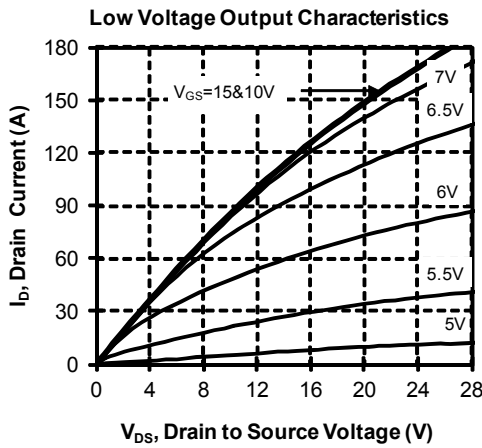
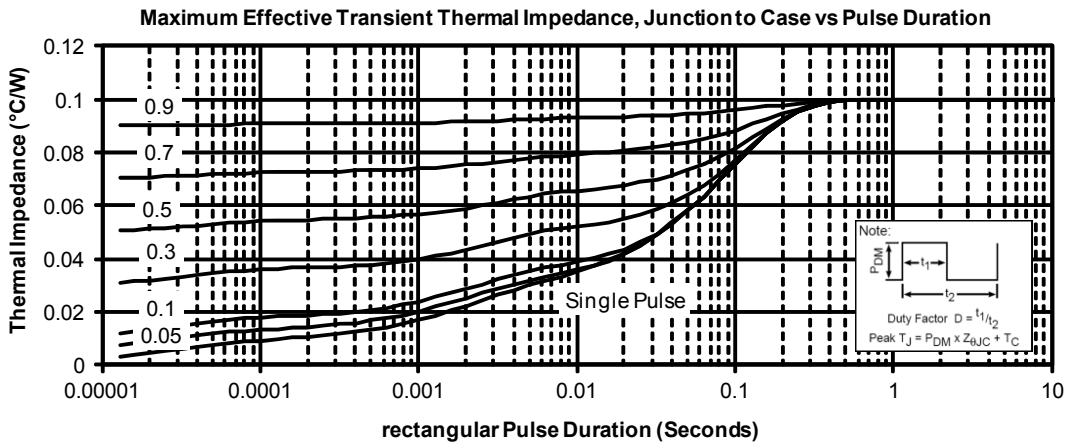
**Dynamic Characteristics**

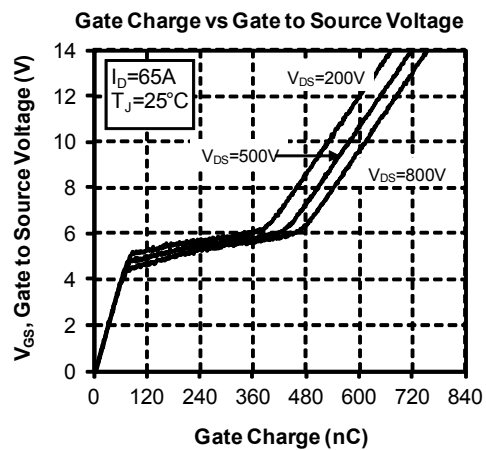
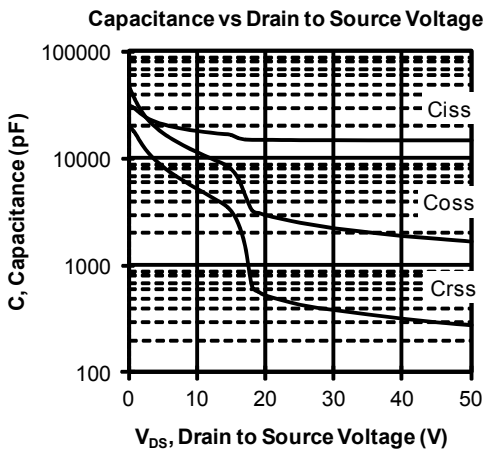
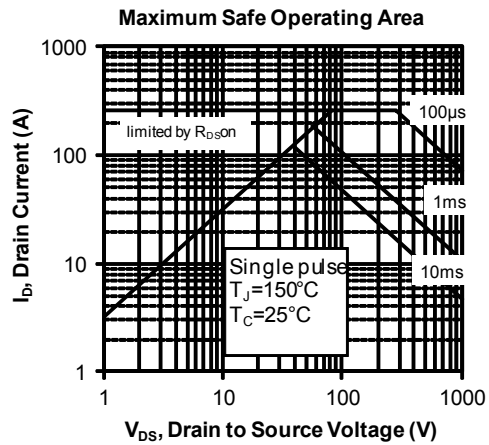
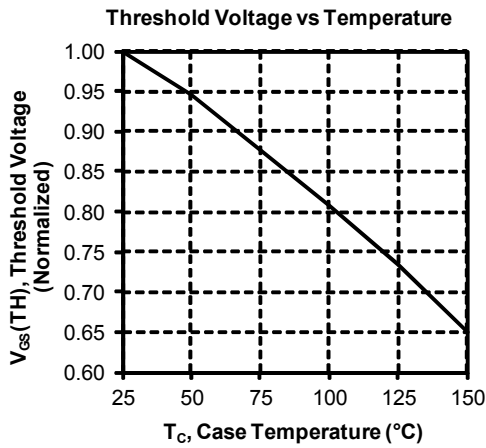
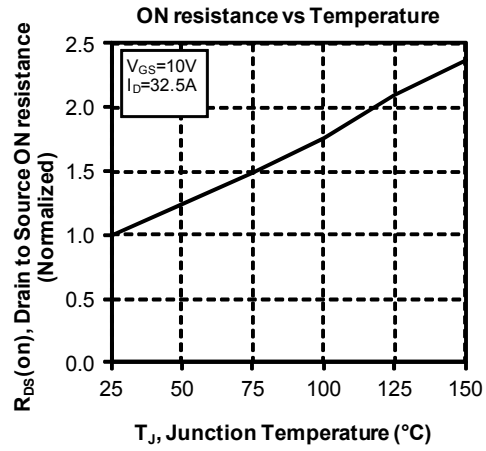
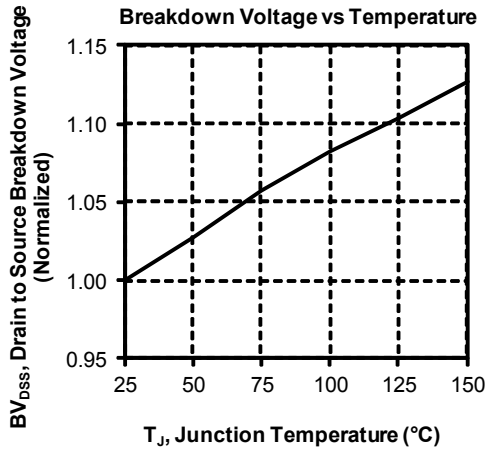
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		15.2		nF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		2.6		
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1MHz		0.42		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V		562		nC
Q <sub>gs</sub>	Gate – Source Charge	V <sub>Bus</sub> = 500V		75		
Q <sub>gd</sub>	Gate – Drain Charge	I <sub>D</sub> = 65A		363		
T <sub>d(on)</sub>	Turn-on Delay Time	<b>Inductive switching @125°C</b>		9		ns
T <sub>r</sub>	Rise Time	V <sub>GS</sub> = 15V		9		
T <sub>d(off)</sub>	Turn-off Delay Time	V <sub>Bus</sub> = 667V		50		
T <sub>f</sub>	Fall Time	I <sub>D</sub> = 65A R <sub>G</sub> = 0.5Ω		24		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b>		1278		μJ
E <sub>off</sub>	Turn-off Switching Energy	V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 667V I <sub>D</sub> = 65A, R <sub>G</sub> = 0.5Ω		462		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b>		2671		μJ
E <sub>off</sub>	Turn-off Switching Energy	V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 667V I <sub>D</sub> = 65A, R <sub>G</sub> = 0.5Ω		570		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.1	°C/W

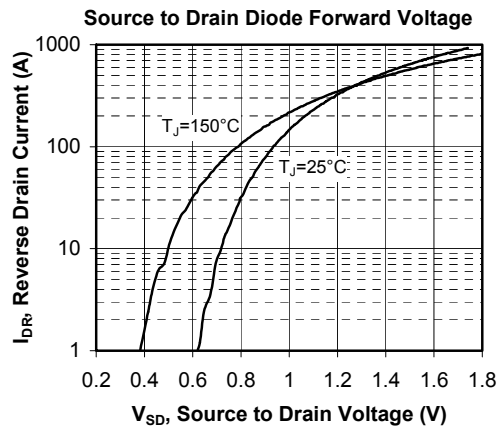
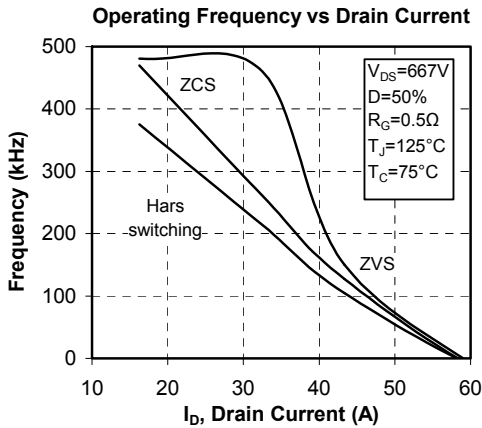
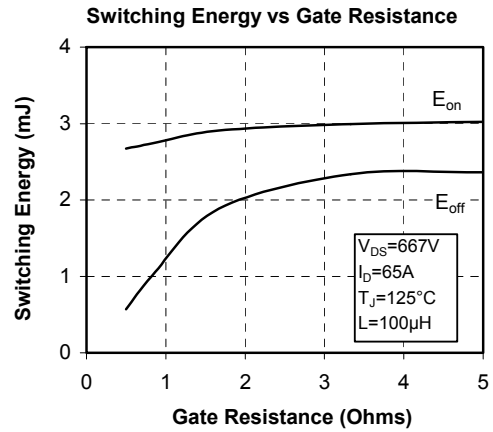
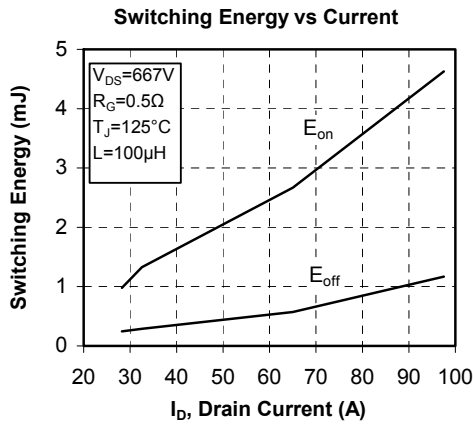
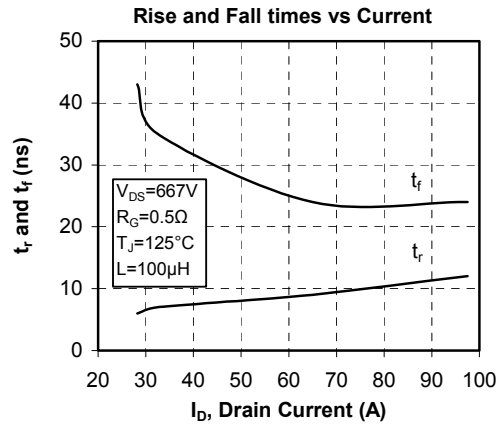
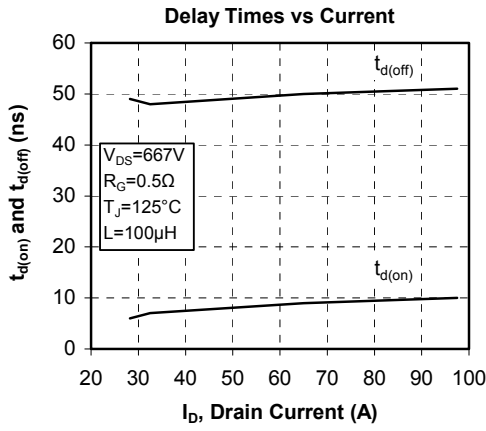
**Series diode ratings and characteristics**

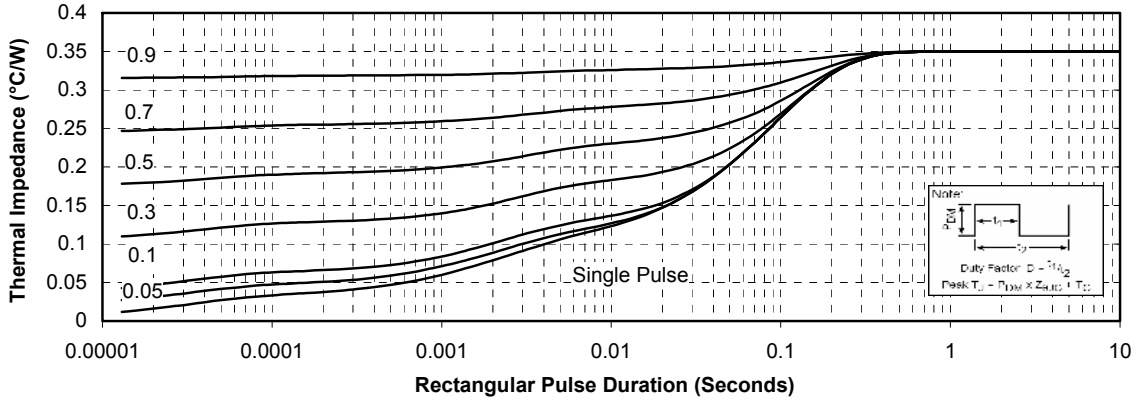
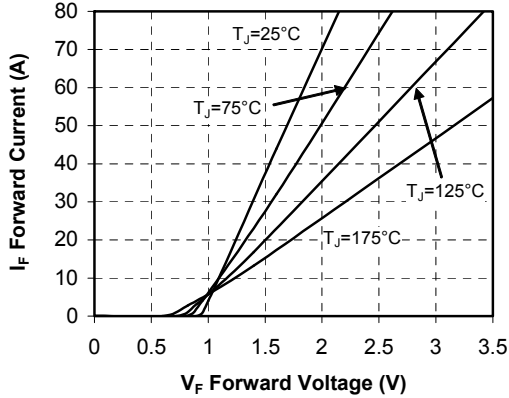
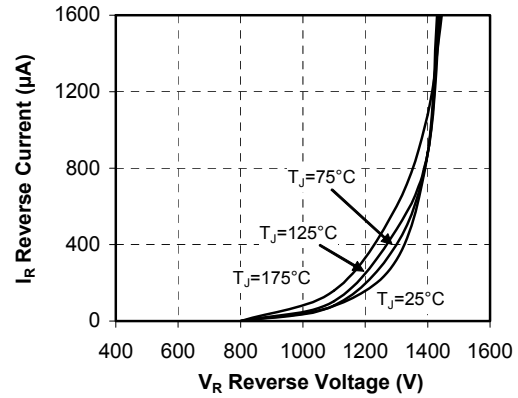
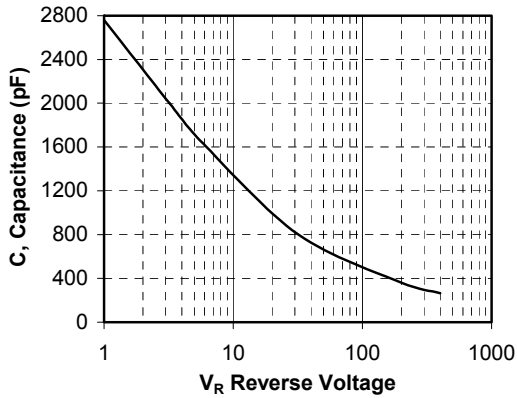
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V <sub>RRM</sub>	Maximum Repetitive Reverse Voltage		1000			V
I <sub>RM</sub>	Maximum Reverse Leakage Current	V <sub>R</sub> = 1000V			350	μA
I <sub>F</sub>	DC Forward Current	T <sub>c</sub> = 100°C		120		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 120A		1.9	2.5	V
		I <sub>F</sub> = 240A		2.2		
		I <sub>F</sub> = 120A	T <sub>j</sub> = 125°C	1.7		
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 120A V <sub>R</sub> = 667V	T <sub>j</sub> = 25°C	280		ns
			T <sub>j</sub> = 125°C	350		
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt = 400A/μs	T <sub>j</sub> = 25°C	1520		nC
			T <sub>j</sub> = 125°C	7200		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.46	°C/W



**Typical MOSFET Performance Curve**






**Typical SiC Diode Performance Curve**
**Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration**

**Forward Characteristics**

**Reverse Characteristics**

**Capacitance vs. Reverse Voltage**


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