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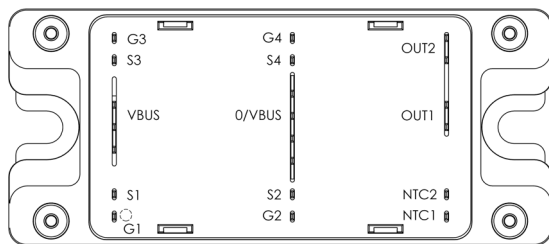
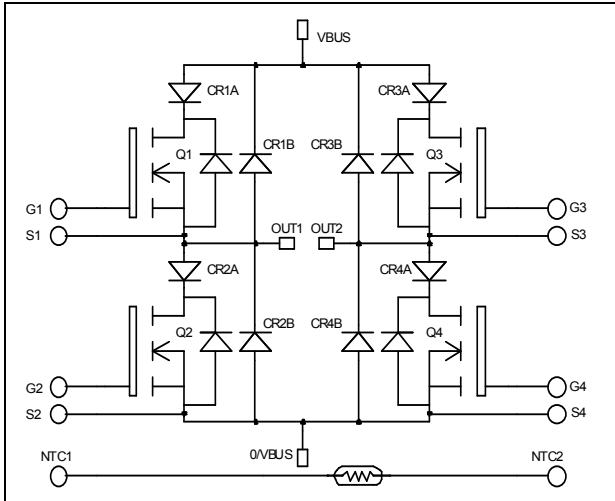
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**Full bridge Series & SiC parallel diodes
MOSFET Power Module**

$V_{DSS} = 1000V$
 $R_{DSon} = 450m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 18A$ @ $T_c = 25^\circ C$



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
 - Avalanche energy rated
- **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
 - Lead frames for power connections
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- 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	$T_c = 25^\circ C$	18
		$T_c = 80^\circ C$	14
I_{DM}	Pulsed Drain current	72	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	540	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	357
I_{AR}	Avalanche current (repetitive and non repetitive)	18	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	2500	

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} = 1000V			100	μA
		V _{GS} = 0V, V _{DS} = 800V			500	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 9A		450	540	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 2.5mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0V			±100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1MHz		4350		pF
C _{oss}	Output Capacitance			715		
C _{rss}	Reverse Transfer Capacitance			120		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 500V I _D = 18A		154		nC
Q _{gs}	Gate – Source Charge			26		
Q _{gd}	Gate – Drain Charge			97		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 667V I _D = 18A R _G = 5Ω		10		ns
T _r	Rise Time			12		
T _{d(off)}	Turn-off Delay Time			121		
T _f	Fall Time			35		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 667V I _D = 18A, R _G = 5Ω		383		μJ
E _{off}	Turn-off Switching Energy			380		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 667V I _D = 18A, R _G = 5Ω		627		μJ
E _{off}	Turn-off Switching Energy			451		
R _{thJC}	Junction to Case Thermal Resistance				0.35	°C/W

Series 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			250	μA
I _F	DC Forward Current	T _c = 85°C		30		A
V _F	Diode Forward Voltage	I _F = 30A		1.9	2.3	V
		I _F = 60A		2.2		
		I _F = 30A	T _j = 125°C		1.7	
t _{rr}	Reverse Recovery Time	I _F = 30A V _R = 667V di/dt = 200A/μs	T _j = 25°C		290	ns
			T _j = 125°C		390	
Q _{rr}	Reverse Recovery Charge	I _F = 30A V _R = 667V di/dt = 200A/μs	T _j = 25°C		670	nC
			T _j = 125°C		2350	
R _{thJC}	Junction to Case Thermal Resistance				1.2	°C/W

Parallel SiC diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I _{RRM}	Maximum Reverse Leakage Current	V _R =1200V		T _j = 25°C 100 T _j = 175°C 200	400 2000	μA
I _F	DC Forward Current			T _C = 100°C 10		A
V _F	Diode Forward Voltage	I _F = 10A		T _j = 25°C 1.6 T _j = 175°C 2.6	1.8 3.0	V
Q _C	Total Capacitive Charge	I _F = 10A, V _R = 1200V di/dt = 800A/μs		56		nC
Q	Total Capacitance	f = 1MHz, V _R = 200V f = 1MHz, V _R = 400V		90 66		pF
R _{thJC}	Junction to Case Thermal Resistance				1.5	°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	°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	M5	2.5	4.7	N.m
Wt	Package Weight				160	g

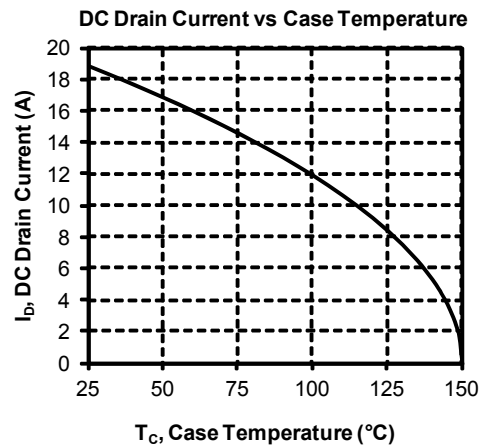
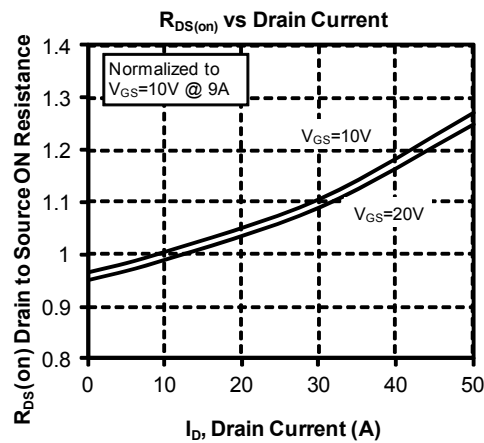
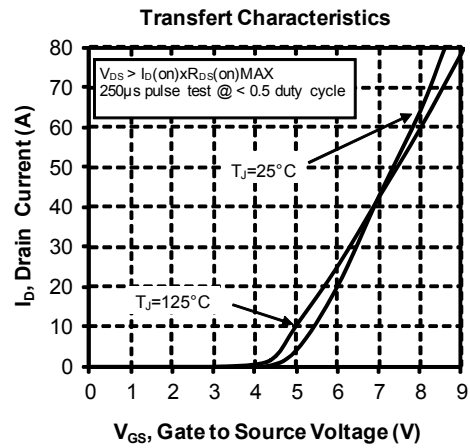
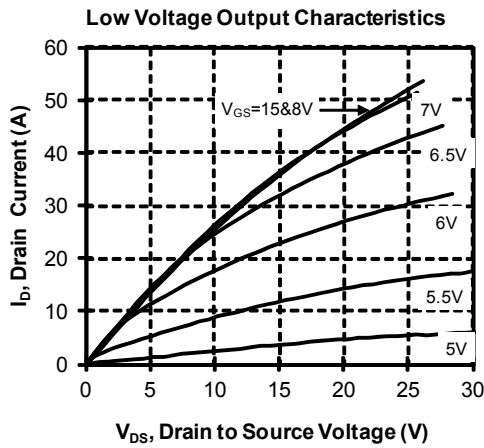
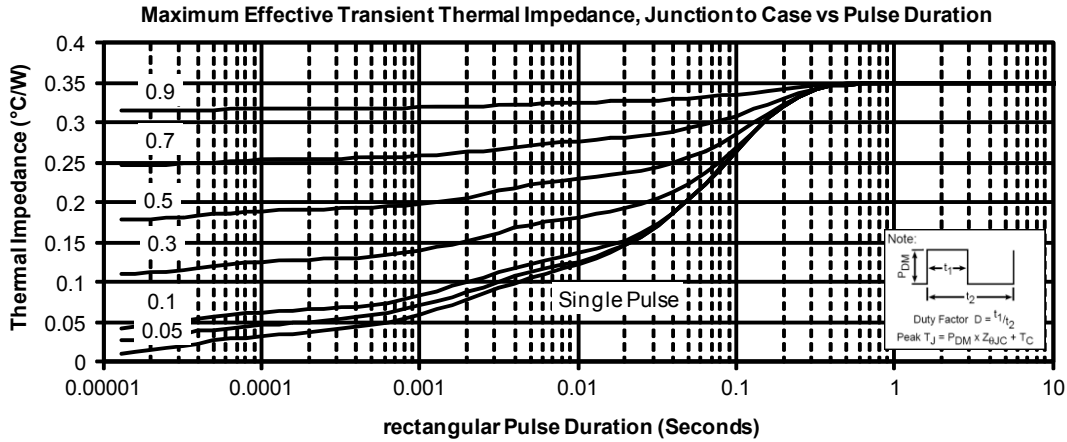
Temperature sensor NTC (see application note APT0406 on www.microsemi.com).

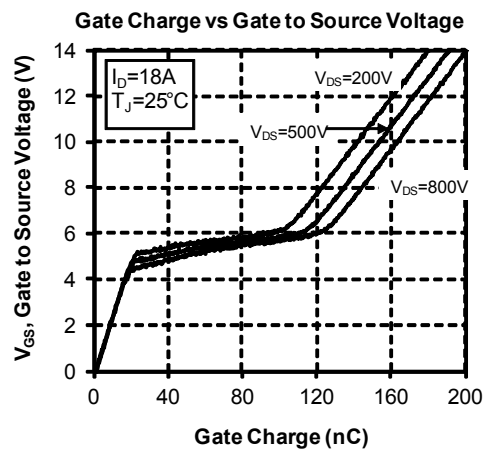
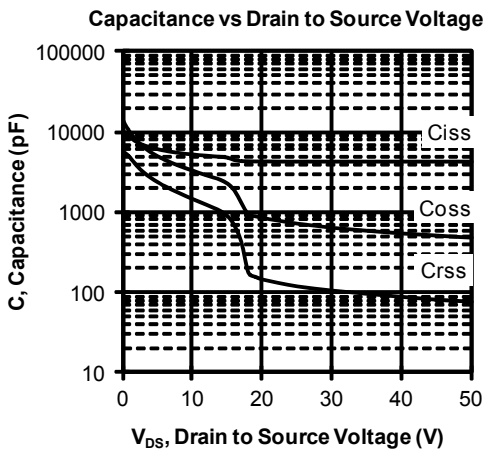
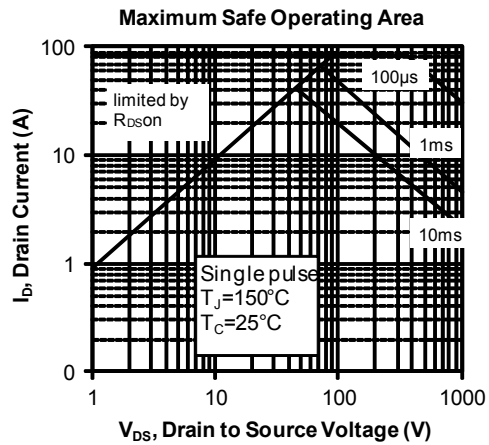
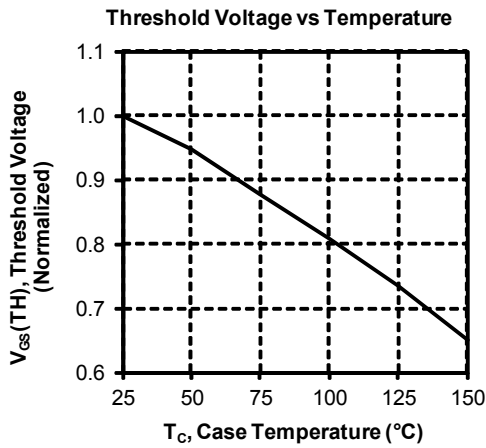
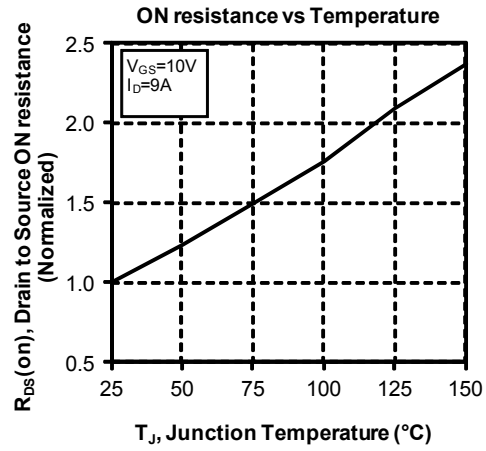
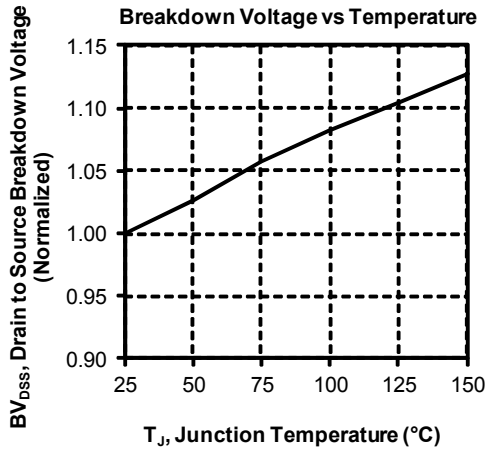
Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B		T _C =100°C	4		%

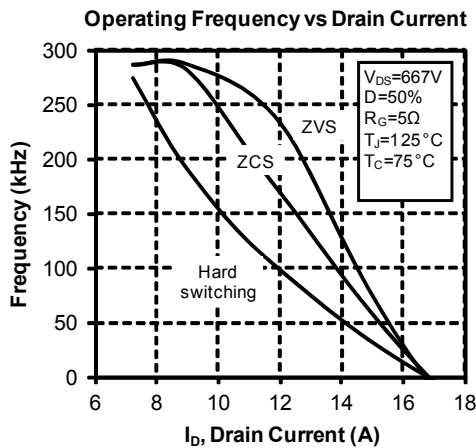
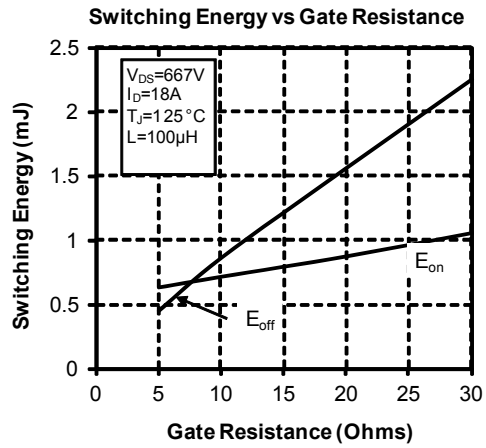
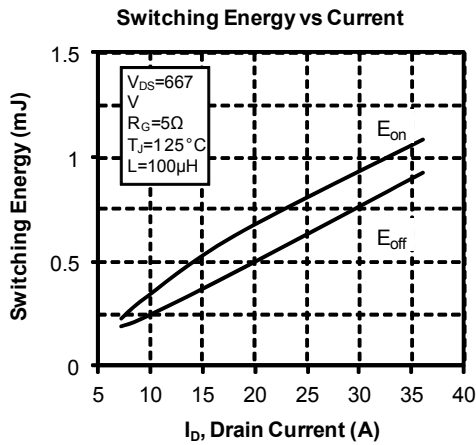
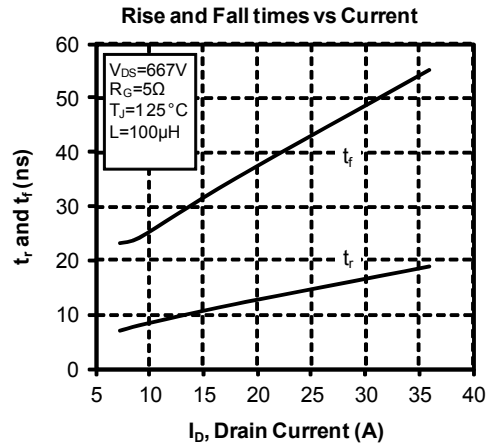
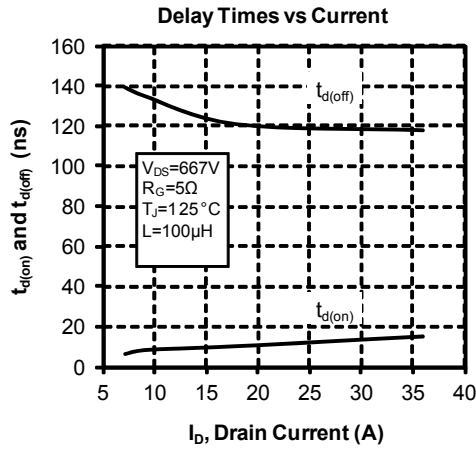
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

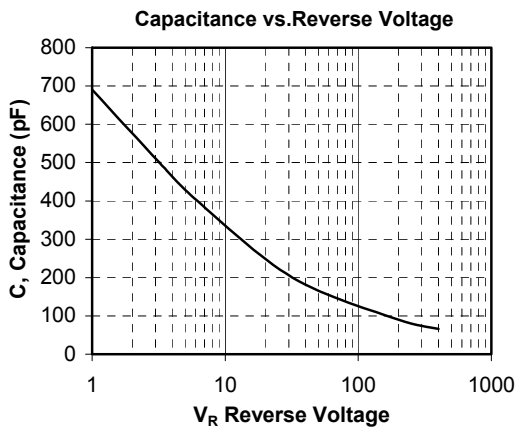
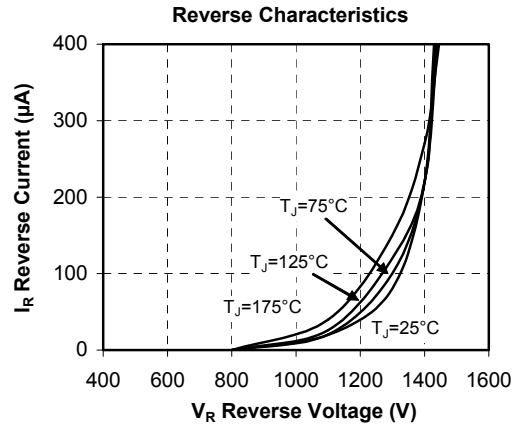
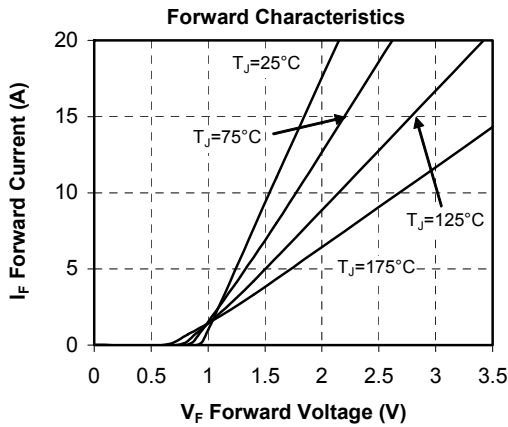
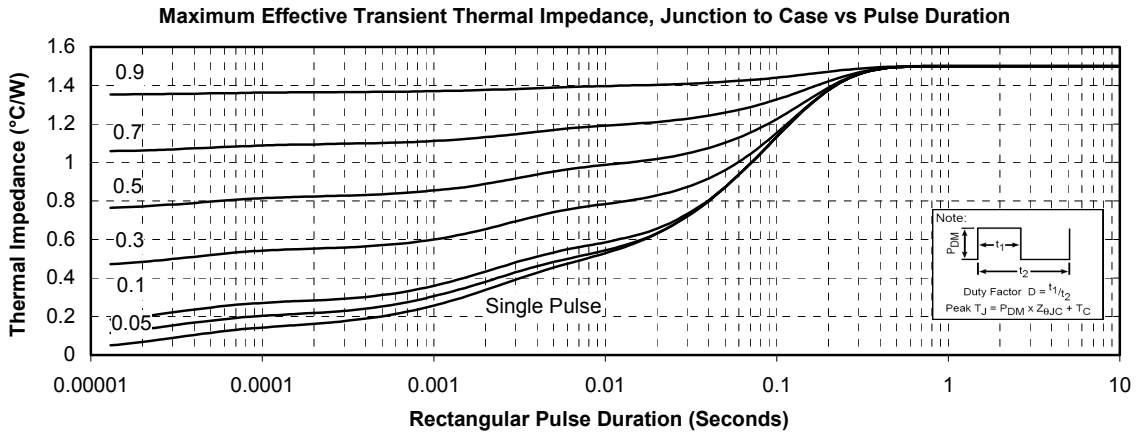
Typical MOSFET Performance Curve







Typical SiC Diode Performance Curve



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