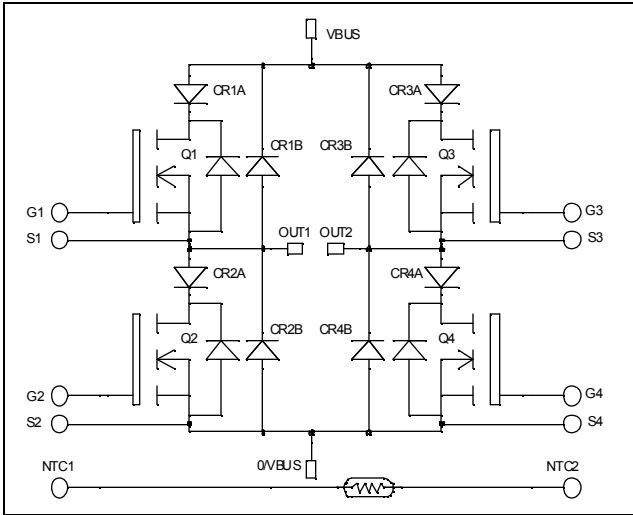


**Full bridge
Series & SiC parallel diodes
MOSFET Power Module**

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

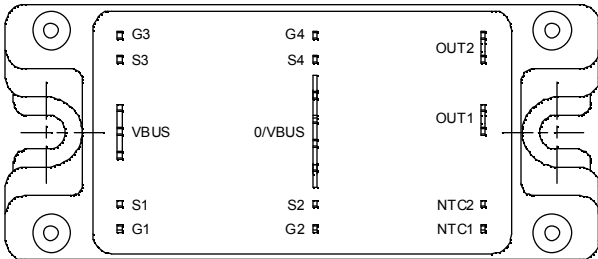


Application

- 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

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	450	m Ω
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.

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain - Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	1000			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}, V_{DS} = 1000\text{V}$			100	μA
		$V_{GS} = 0\text{V}, V_{DS} = 800\text{V}$			500	
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 10\text{V}, I_D = 9\text{A}$			450	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	3		5	V
I_{GSS}	Gate - Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		4350		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		715		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		120		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		154		nC
Q_{gs}	Gate - Source Charge	$V_{Bus} = 500\text{V}$		26		
Q_{gd}	Gate - Drain Charge	$I_D = 18\text{A}$		97		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 667\text{V}$ $I_D = 18\text{A}$ $R_G = 5\Omega$		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 $V_{GS} = 15\text{V}, V_{Bus} = 667\text{V}$ $I_D = 18\text{A}, R_G = 5\Omega$		383		μJ
E_{off}	Turn-off Switching Energy ❶			380		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 667\text{V}$ $I_D = 18\text{A}, R_G = 5\Omega$		627		μJ
E_{off}	Turn-off Switching Energy ❶			451		

❶ In accordance with JEDEC standard JESD24-1.

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	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$	100	400	μA
			$T_j = 150^\circ\text{C}$	200	2000	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle		10		A
V_F	Diode Forward Voltage	$I_F = 10\text{A}$	$T_j = 25^\circ\text{C}$	1.6	1.8	V
			$T_j = 175^\circ\text{C}$	2.6	3.0	
Q_C	Total Capacitive Charge	$I_F = 10\text{A}, V_R = 600\text{V}$ $di/dt = 800\text{A}/\mu\text{s}$		28		nC
Q	Total Capacitance	$f = 1\text{MHz}, V_R = 200\text{V}$		90		pF
		$f = 1\text{MHz}, V_R = 400\text{V}$		66		

Series diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	$T_c = 85^\circ\text{C}$		30		A
V_F	Diode Forward Voltage	$I_F = 30\text{A}$			1.1	1.15	V
		$I_F = 60\text{A}$			1.4		
		$I_F = 30\text{A}$	$T_j = 125^\circ\text{C}$		0.9		
t_{rr}	Reverse Recovery Time	$I_F = 30\text{A}$ $V_R = 133\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		24		ns
			$T_j = 125^\circ\text{C}$		48		
Q_{rr}	Reverse Recovery Charge	$I_F = 30\text{A}$ $V_R = 133\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		33		nC
			$T_j = 125^\circ\text{C}$		150		

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case	Transistor		0.35	$^\circ\text{C}/\text{W}$	
		Series diode		1.2		
		Parallel diode		1.5		
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1\text{ min}$, $I_{isol} < 1\text{mA}$, 50/60Hz	2500			V	
T_J	Operating junction temperature range	-40		150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-40		125		
T_C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To Heatsink	M5		4.7	N.m
Wt	Package Weight				160	g

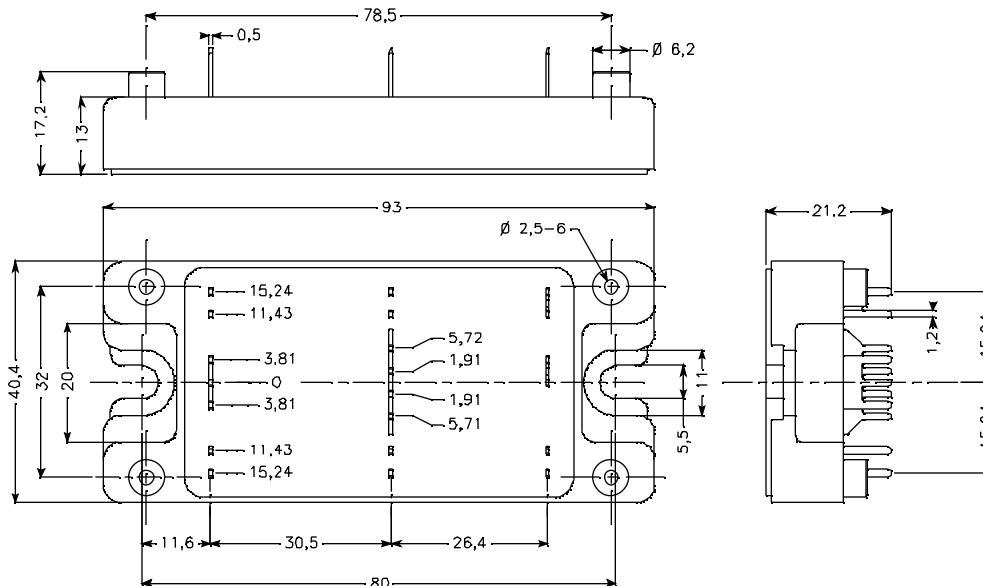
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		68		$\text{k}\Omega$
$B_{25/85}$	$T_{25} = 298.16\text{ K}$		4080		K

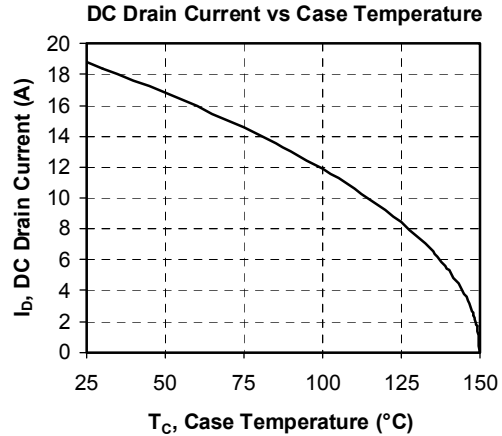
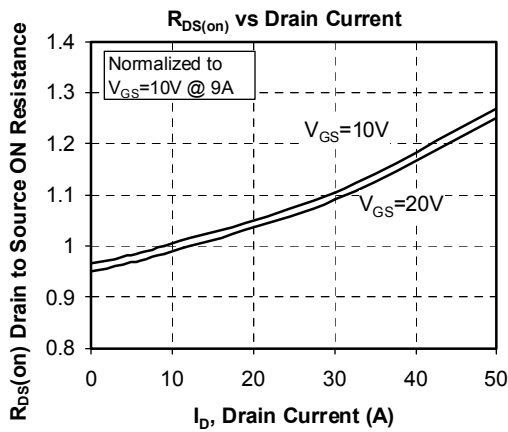
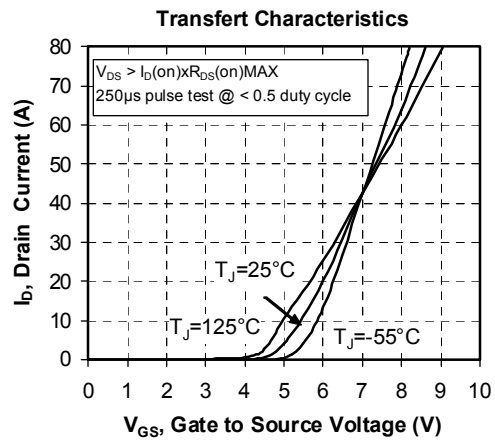
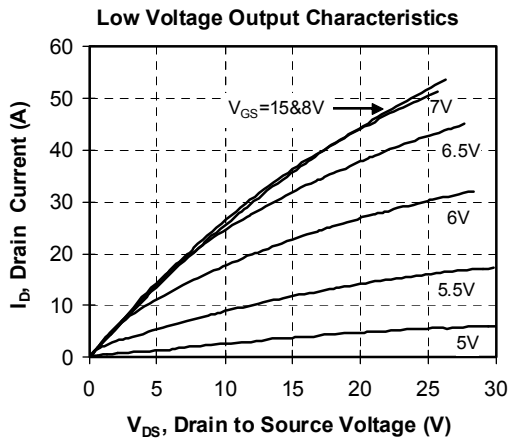
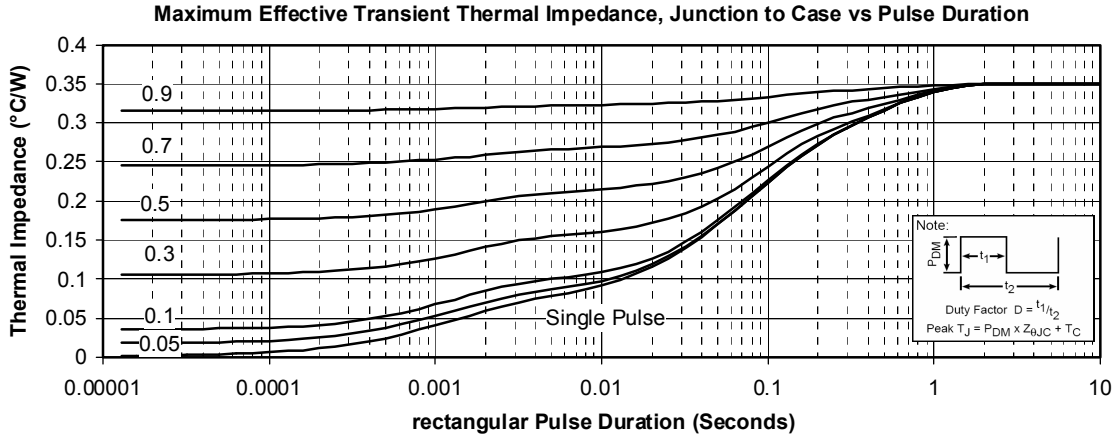
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

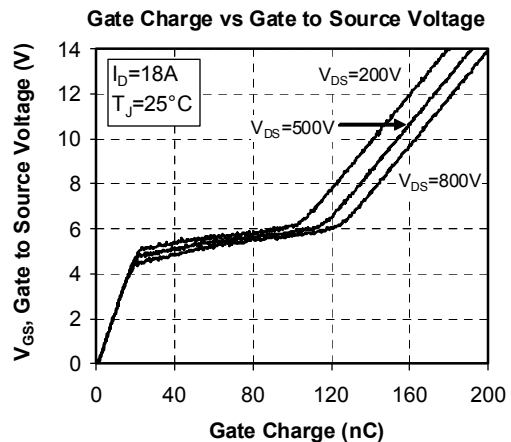
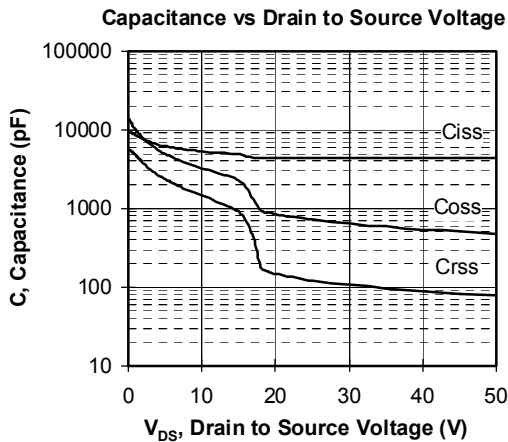
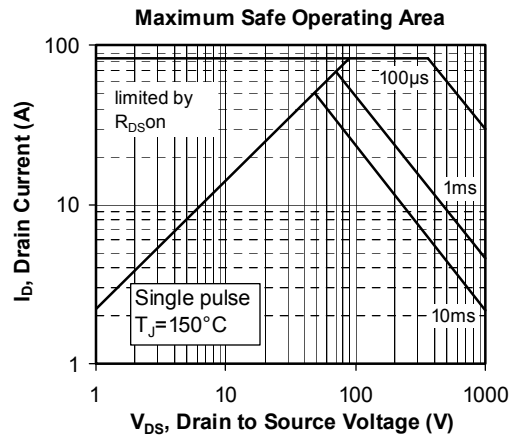
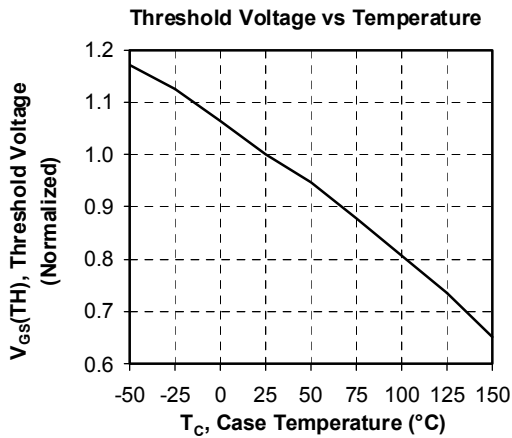
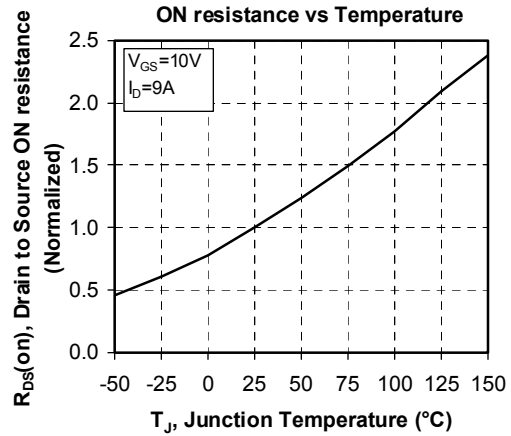
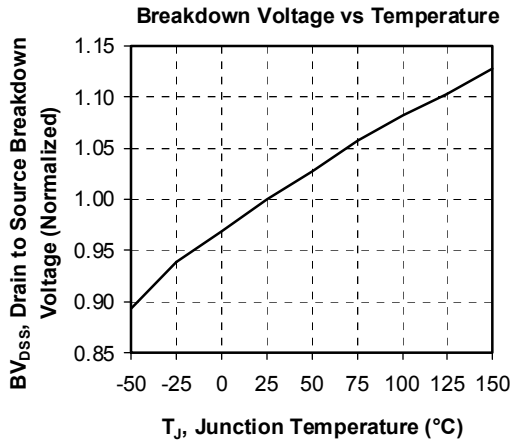
T: Thermistor temperature
 R_T : Thermistor value at T

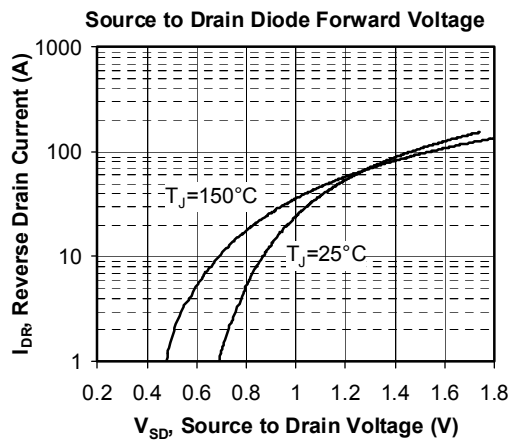
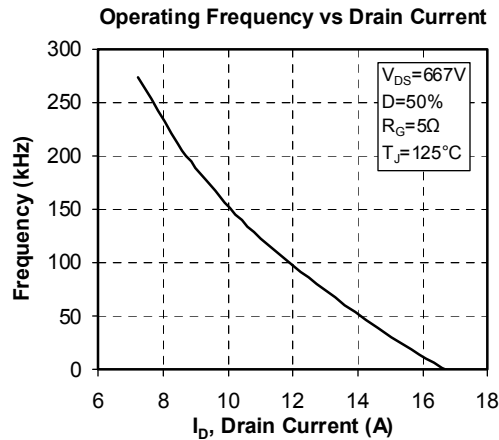
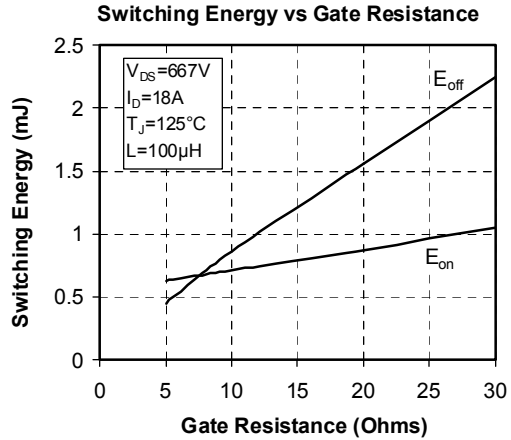
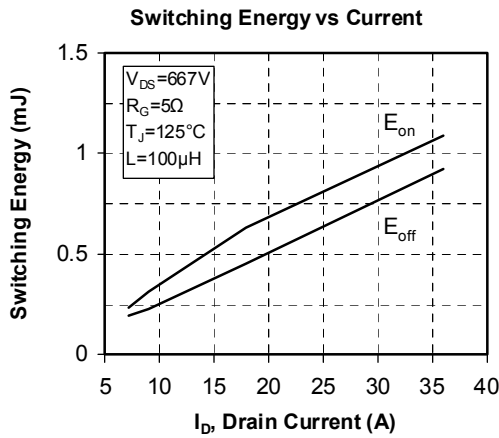
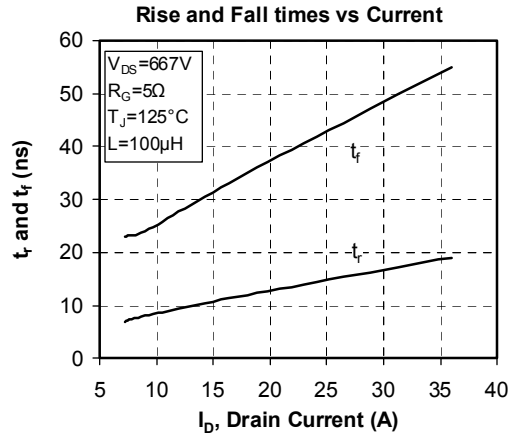
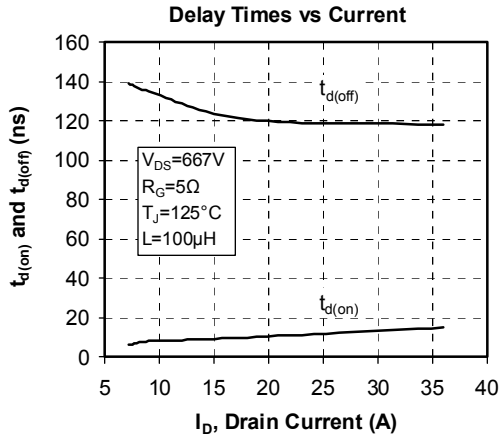
Package outline



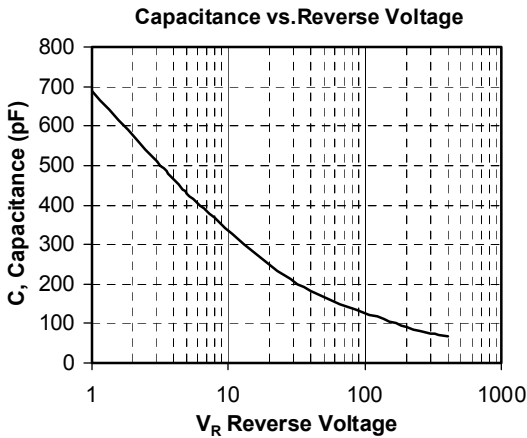
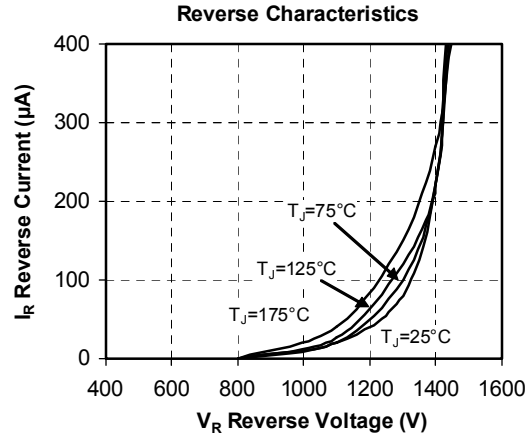
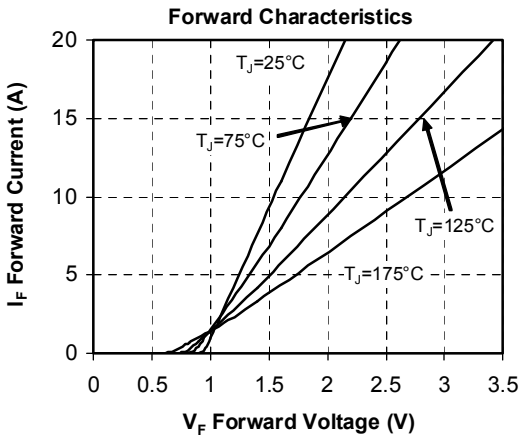
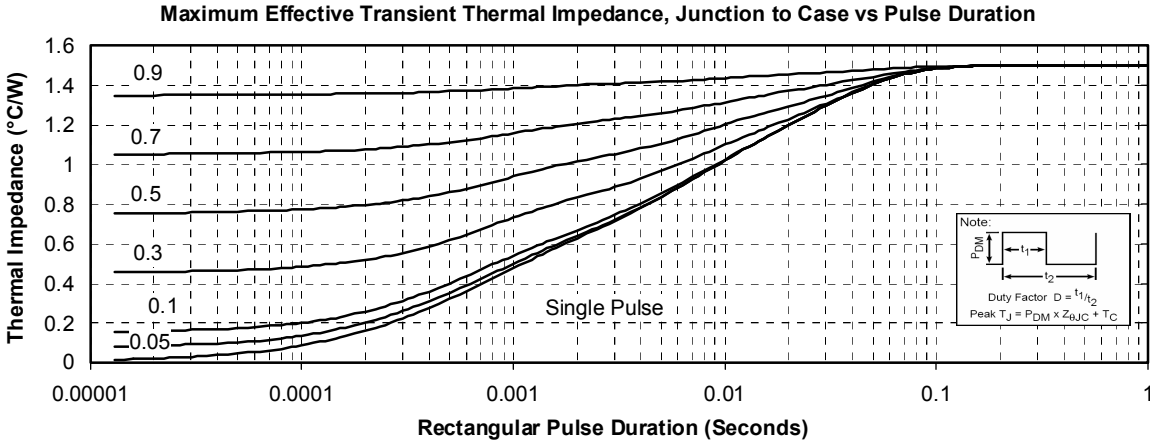
Typical MOSFET Performance Curve







Typical SiC Diode Performance Curve



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