

High Temperature Silicon Carbide Power Schottky Diode

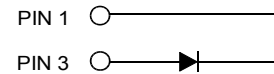
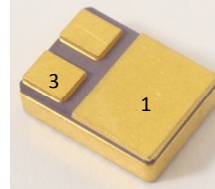
V_{RRM}	=	650 V
V_F	=	1.7 V
I_F	=	5 A
Q_C	=	20 nC

Features

- 650 V Schottky rectifier
- 250 °C maximum operating temperature
- Zero reverse recovery charge
- Superior surge current capability
- Positive temperature coefficient of V_F
- Temperature independent switching behavior
- Lowest figure of merit Q_C/I_F
- Available screened to Mil-PRF-19500

Package

- RoHS Compliant



Advantages

- High temperature operation
- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Industry's lowest reverse recovery charge
- Industry's lowest device capacitance
- Ideal for output switching of power supplies
- Best in class reverse leakage current at operating temperature

Applications

- Down Hole Oil Drilling, Geothermal Instrumentation
- High Temperature DC/DC Converters
- High Temperature Motor and Servo Drives
- High Temperature Inverters
- High Temperature Actuator Control
- Military Power Supplies
- Ideal for Aerospace and Defense Applications

Maximum Ratings at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		650	V
Continuous forward current	I_F	$T_C \leq 225\text{ °C}$	4.3	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 225\text{ °C}$	8	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	32	A
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ }\mu\text{s}$	120	A
I^2t value	$\int i^2 dt$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	5	A ² S
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	163	W
Operating and storage temperature	T_j, T_{slg}		-55 to 250	°C

Electrical Characteristics at $T_j = 250\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 5\text{ A}$, $T_j = 25\text{ °C}$		1.65		V
		$I_F = 5\text{ A}$, $T_j = 210\text{ °C}$		2.5		
Reverse current	I_R	$V_R = 650\text{ V}$, $T_j = 25\text{ °C}$		0.12	5	μA
		$V_R = 650\text{ V}$, $T_j = 250\text{ °C}$		7.5	30	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $dI_F/dt = 200\text{ A}/\mu\text{s}$ $T_j = 210\text{ °C}$		20		nC
Switching time	t_s	$V_R = 400\text{ V}$ $V_R = 400\text{ V}$		< 25		ns
Total capacitance	C	$V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ °C}$		274		pF
		$V_R = 400\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ °C}$		31		
		$V_R = 800\text{ V}$, $f = 1\text{ MHz}$, $T_j = 25\text{ °C}$		29		

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	1.38	°C/W
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Mechanical Properties

Mounting torque	M	0.6	Nm
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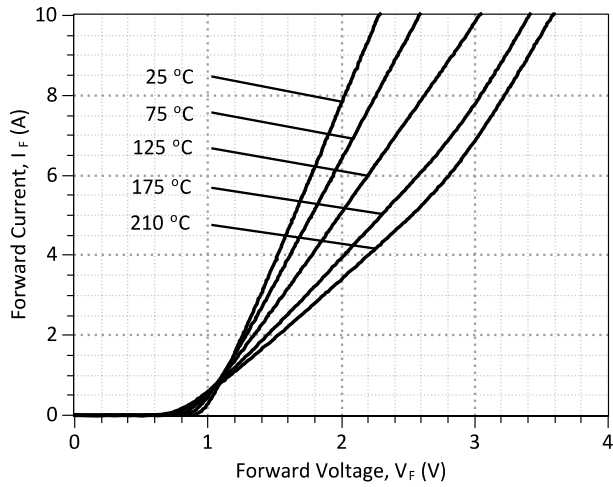


Figure 1: Typical Forward Characteristics

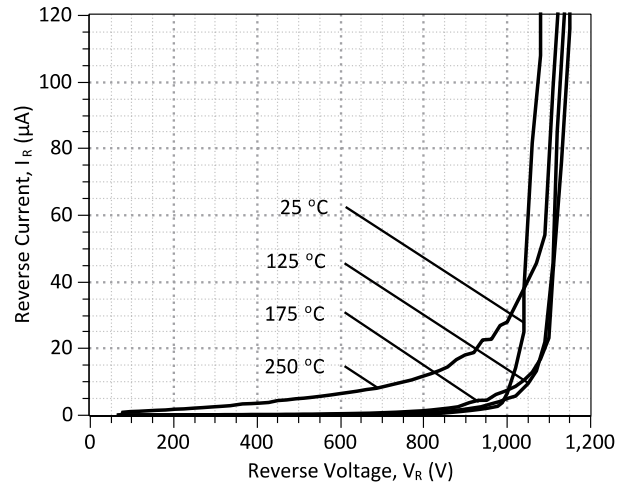


Figure 2: Typical Reverse Characteristics

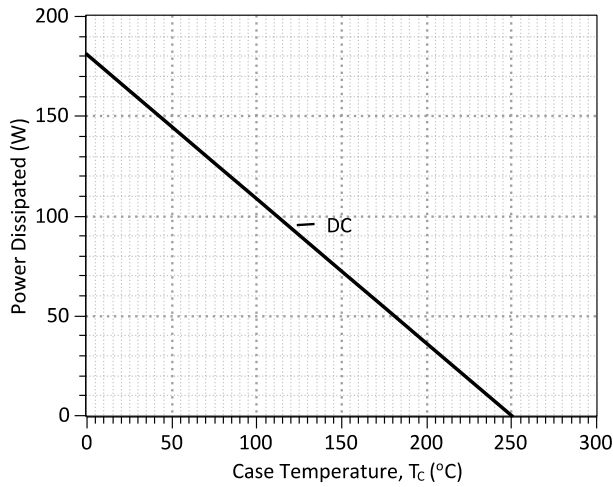
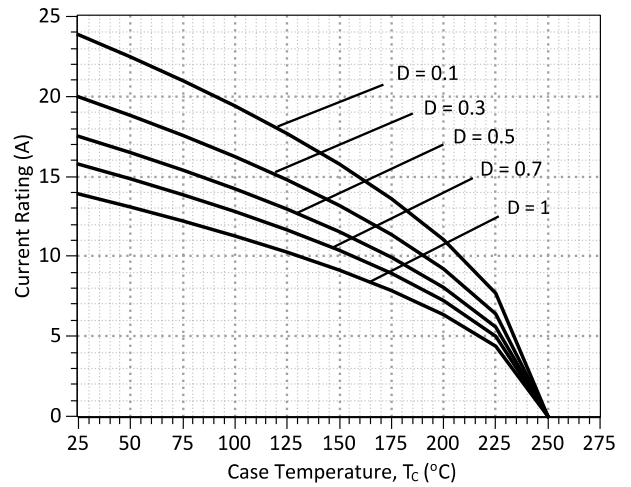


Figure 3: Power Derating Curve



**Figure 4: Current Derating Curves ($D = t_p/T$, $t_p = 400 \mu s$)
(Considering worst case Z_{th} conditions)**

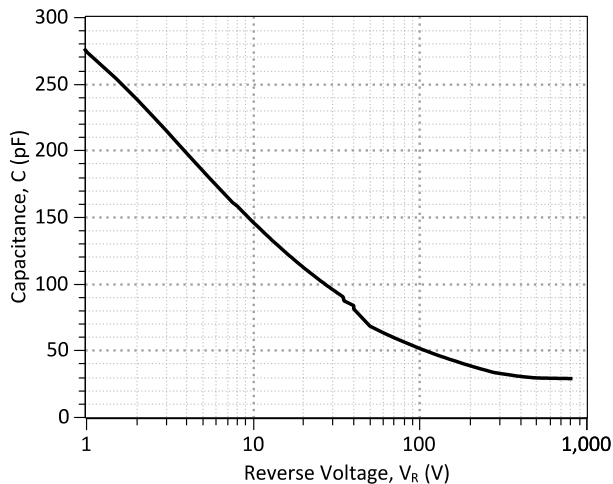


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

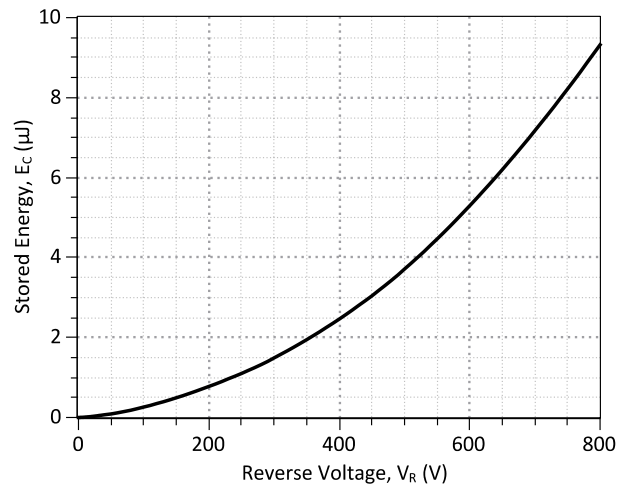


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

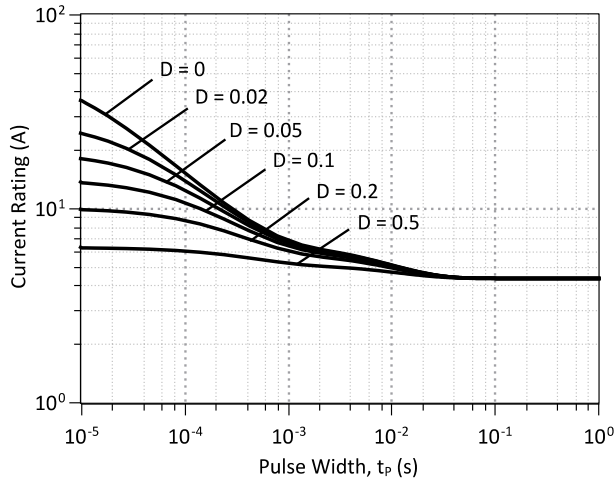


Figure 7: Current vs Pulse Duration Curves at $T_c = 225\text{ }^\circ\text{C}$

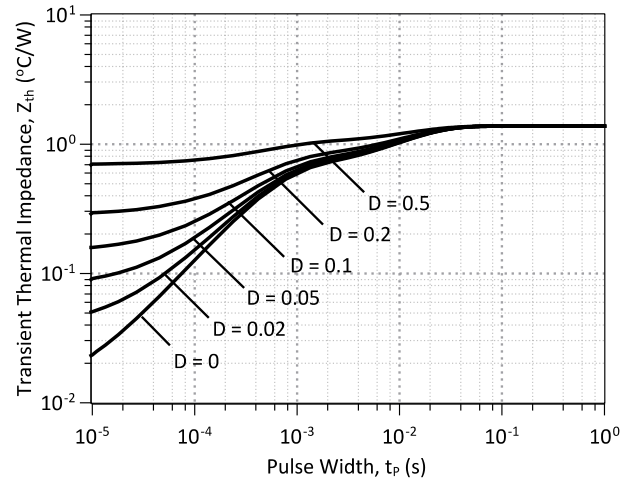
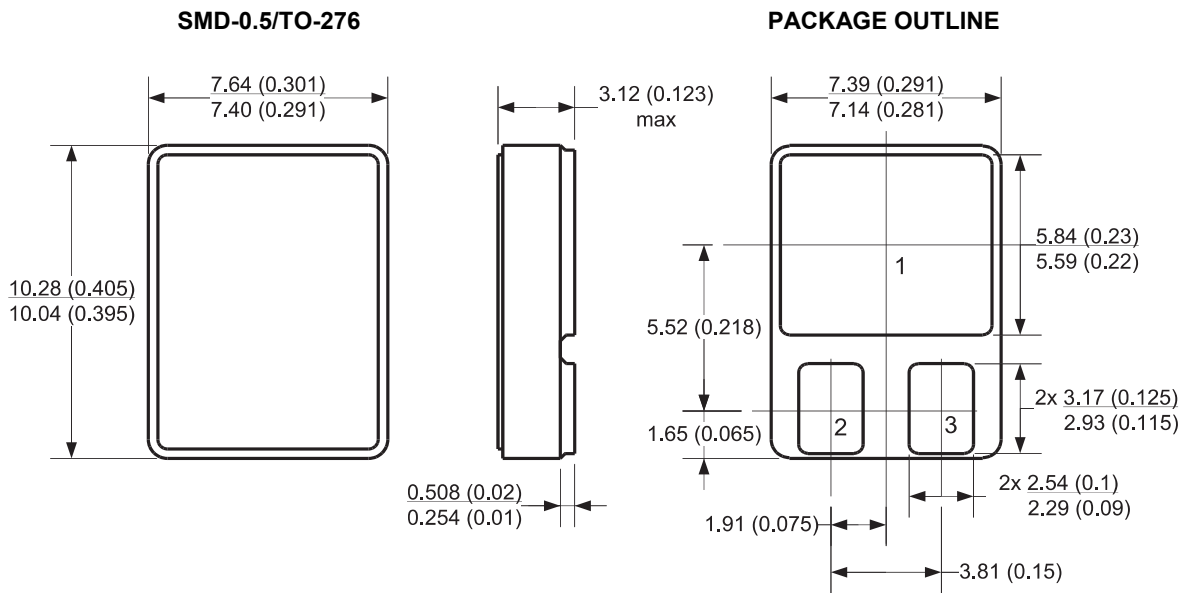


Figure 8: Transient Thermal Impedance

Package Dimensions:



NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BRACKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS

Revision History

Date	Revision	Comments	Supersedes
2012/04/24	0	Initial release	

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