

Silicon Carbide Power Schottky Diode

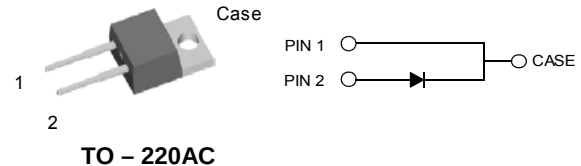
V_{RRM}	=	1200 V
I_F	=	20 A
Q_C	=	112 nC

Features

- 1200 V Schottky rectifier
- 175 °C maximum operating temperature
- Temperature independent switching behavior
- Superior surge current capability
- Positive temperature coefficient of V_F
- Extremely fast switching speeds
- Superior figure of merit Q_C/I_F

Package

- RoHS Compliant



Advantages

- Improved circuit efficiency (Lower overall cost)
- Low switching losses
- Ease of paralleling devices without thermal runaway
- Smaller heat sink requirements
- Low reverse recovery current
- Low device capacitance
- Low reverse leakage current at operating temperature

Applications

- Power Factor Correction (PFC)
- Switched-Mode Power Supply (SMPS)
- Solar Inverters
- Wind Turbine Inverters
- Motor Drives
- Induction Heating
- Uninterruptible Power Supply (UPS)
- High Voltage Multipliers

Maximum Ratings at $T_J = 175\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values	Unit
Repetitive peak reverse voltage	V_{RRM}		1200	V
Continuous forward current	I_F	$T_C \leq 145\text{ °C}$	20	A
RMS forward current	$I_{F(RMS)}$	$T_C \leq 145\text{ °C}$	35	A
Surge non-repetitive forward current, Half Sine Wave	$I_{F,SM}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	140	A
		$T_C = 145\text{ °C}$, $t_p = 10\text{ ms}$	125	
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}$, $t_p = 10\text{ }\mu\text{s}$	650	A
I^2t value	$\int i^2 dt$	$T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$	98	A^2S
		$T_C = 145\text{ °C}$, $t_p = 10\text{ ms}$	78	
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	306	W
Operating and storage temperature	T_J, T_{stg}		-55 to 175	°C

Electrical Characteristics at $T_J = 175\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode forward voltage	V_F	$I_F = 20\text{ A}$, $T_J = 25\text{ °C}$		1.9	2	V
		$I_F = 20\text{ A}$, $T_J = 175\text{ °C}$		2.6		
Reverse current	I_R	$V_R = 1200\text{ V}$, $T_J = 25\text{ °C}$		163	480	μA
		$V_R = 1200\text{ V}$, $T_J = 175\text{ °C}$		455	1000	
Total capacitive charge	Q_C	$I_F \leq I_{F,MAX}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $T_J = 175\text{ °C}$	$V_R = 400\text{ V}$	69		nC
			$V_R = 960\text{ V}$	112		
Switching time	t_s		$V_R = 400\text{ V}$ $V_R = 960\text{ V}$	< 49		ns
Total capacitance	C	$V_R = 1\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25\text{ °C}$		968		pF
		$V_R = 400\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25\text{ °C}$		76		
		$V_R = 1000\text{ V}$, $f = 1\text{ MHz}$, $T_J = 25\text{ °C}$		62		

Thermal Characteristics

Thermal resistance, junction - case	R_{thJC}	0.49	°C/W
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Mechanical Properties

Mounting torque	M	0.6	Nm
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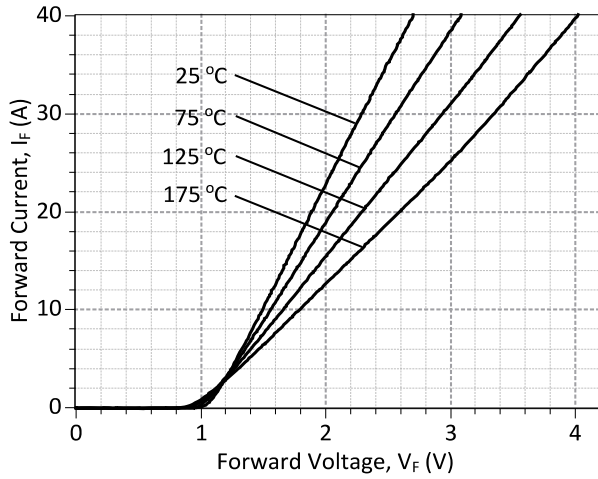


Figure 1: Typical Forward Characteristics

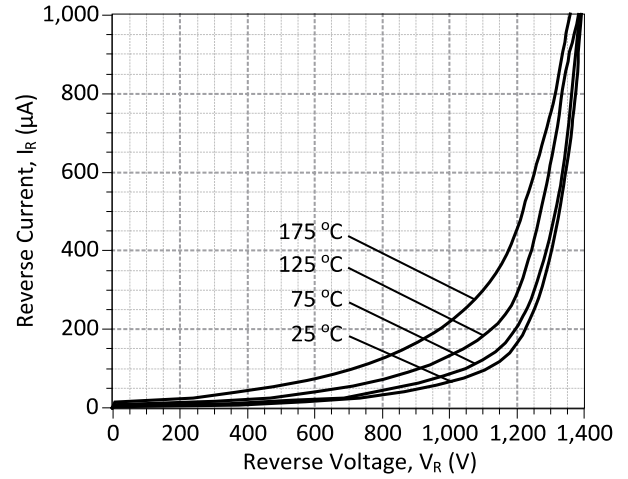


Figure 2: Typical Reverse Characteristics

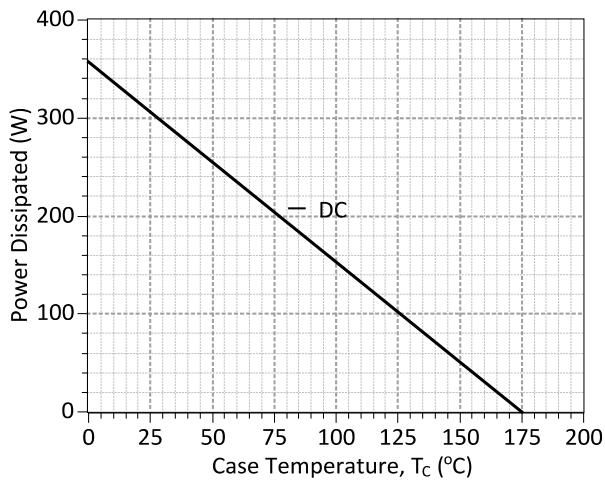
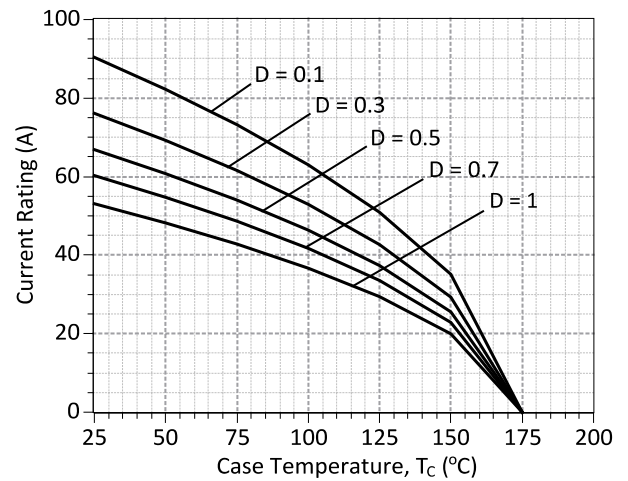


Figure 3: Power Derating Curve



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

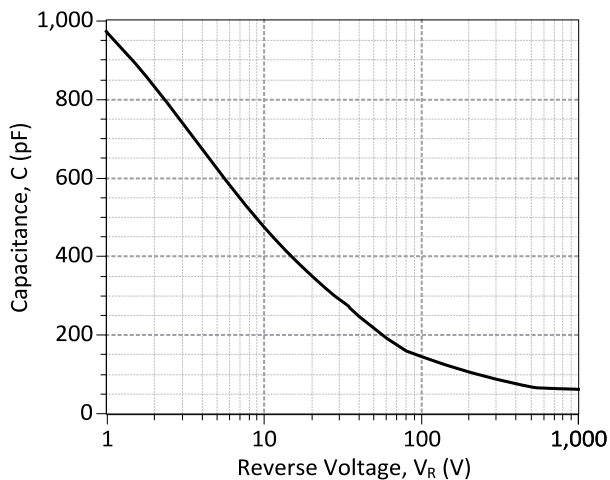


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

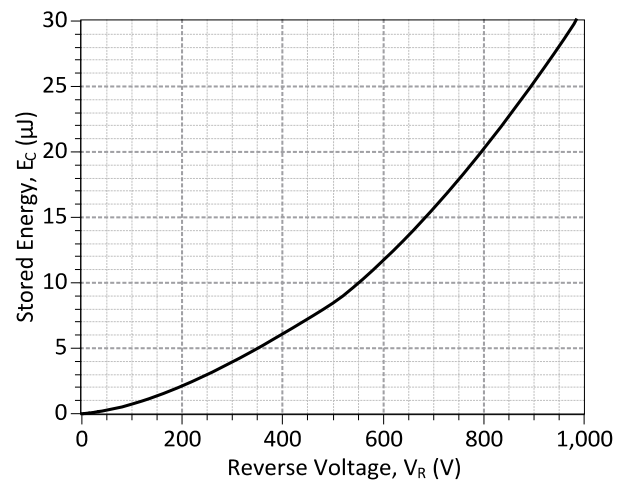


Figure 6: Typical Switching Energy vs Reverse Voltage Characteristics

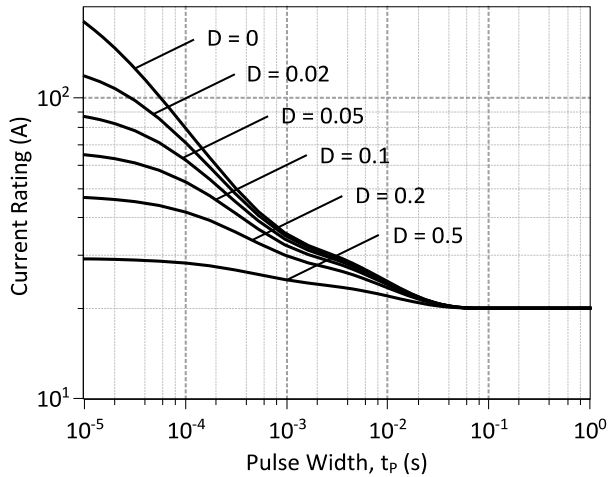


Figure 7: Current vs Pulse Duration Curves at $T_c = 145\text{ }^{\circ}\text{C}$

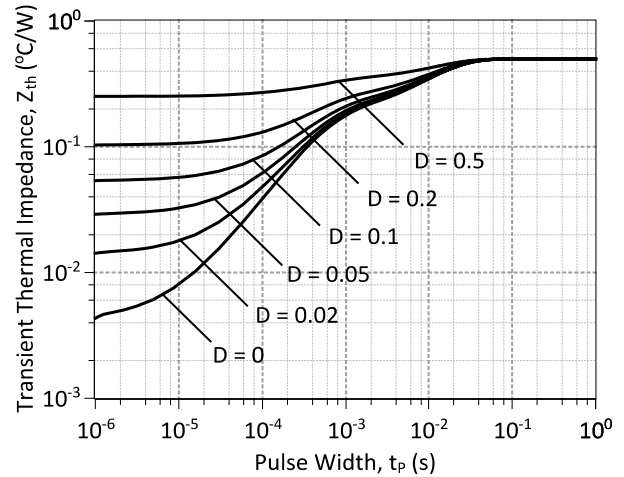
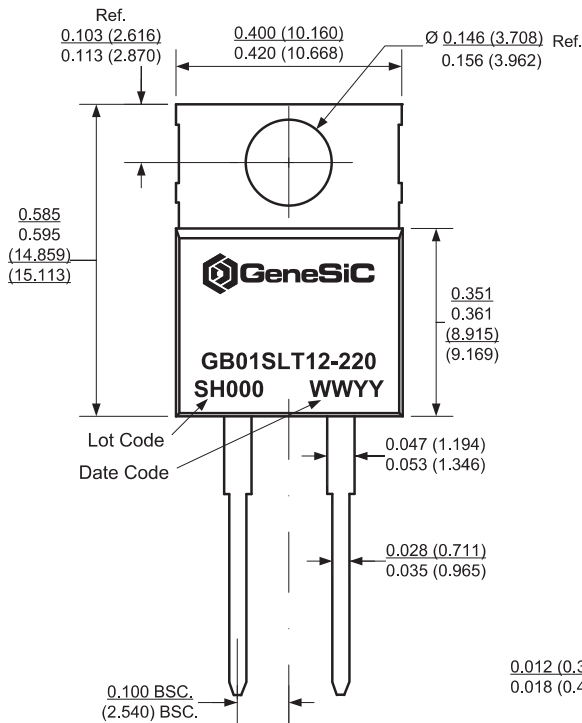


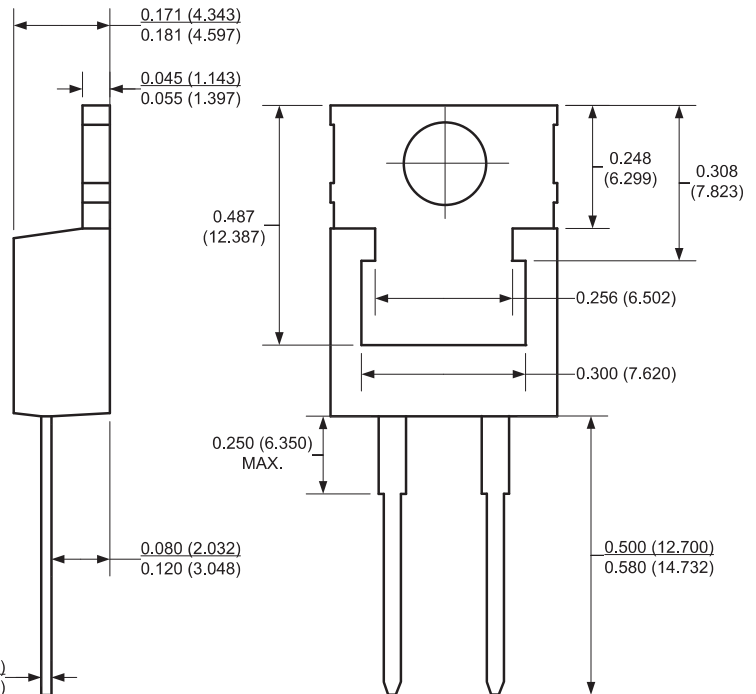
Figure 8: Transient Thermal Impedance

Package Dimensions:

TO-220AC



PACKAGE OUTLINE



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
2012/02/02	1	Second generation release	
2010/12/14	0	Initial release	

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