GC10MPS12-252

1200 V SiC MPS™ Diode

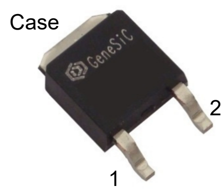
Silicon Carbide Schottky Diode

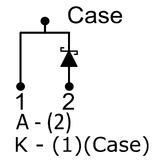
V_{RRM}	=	1200 V
$I_{F\ (Tc\ =\ 135°C)}$	=	25 A
Q_C	=	40 nC

Features

- High Avalanche (UIS) Capability
- Enhanced Surge Current Capability
- Superior Figure of Merit Q_C/I_F
- Low Thermal Resistance
- 175 °C Maximum Operating Temperature
- Temperature Independent Switching Behavior
- Positive Temperature Coefficient of V_F
- Extremely Fast Switching Speeds

Package





TO-252-2L

Advantages

- Low Standby Power Losses
- Improved Circuit Efficiency (Lower Overall Cost)
- Low Switching Losses
- Ease of Paralleling without Thermal Runaway
- Smaller Heat Sink Requirements
- Low Reverse Recovery Current
- Low Device Capacitance
- Low Reverse Leakage Current

Applications

- Boost Diode in Power Factor Correction (PFC)
- Switched Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Motor Drives
- Freewheeling / Anti-parallel Diode in Inverters
- Solar Inverters
- LED and HID Lighting
- AC-DC Converters & Auxiliary Power Supplies

Absolute Maximum Ratings (At T_C = 25 °C Unless Otherwise Stated)

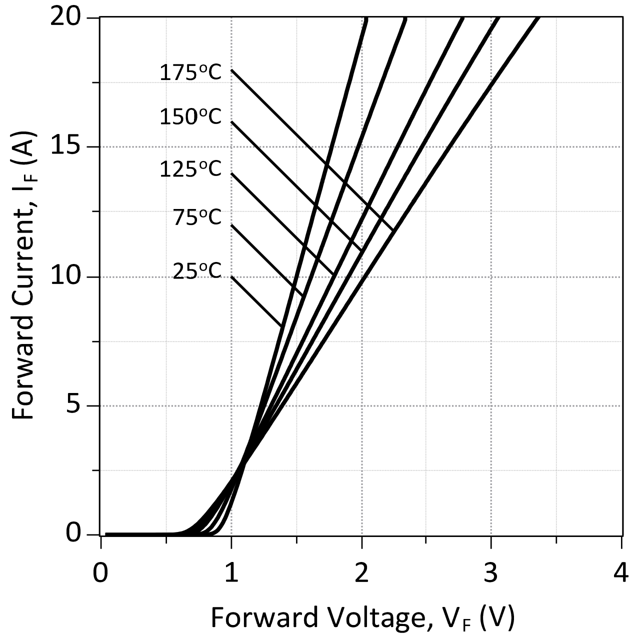
Parameter	Symbol	Conditions	Values	Unit
Repetitive Peak Reverse Voltage	V_{RRM}		1200	V
Continuous Forward Current	I_F	T_C = 25 °C, D = 1	50	A
		T_C = 135 °C, D = 1	25	
		T_C = 166 °C, D = 1	10	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms	82	A
		T_C = 150 °C, t_P = 10 ms	66	
Repetitive Peak Forward Surge Current, Half Sine Wave	$I_{F,RM}$	T_C = 25 °C, t_P = 10 ms	50	A
		T_C = 150 °C, t_P = 10 ms	34	
Non-Repetitive Peak Forward Surge Current	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	780	A
i^2t Value	$\int i^2\,dt$	T_C = 25 °C, t_P = 10 ms	33.7	A^2s
Non-Repetitive Avalanche Energy	E_{AS}	L = 2.2 mH, I_{AS} = 10 A	110	mJ
Diode Ruggedness	dV/dt	V_R = 0 ~ 960 V	100	V/ns
Power Dissipation	P_{tot}	T_C = 25 °C	341	W
Operating and Storage Temperature	T_j , T_{stg}		-55 to 175	°C

Electrical Characteristics

Parameter	Symbol	Conditions		Values Min.	Values Typ.	Values Max.	Unit
Diode Forward Voltage	V_F	I_F = 10 A, T_j = 25 °C			1.5	1.8	V
		I_F = 10 A, T_j = 175 °C			2	2.4	
Reverse Current	I_R	V_R = 1200 V, T_j = 25 °C			1	10	μA
		V_R = 1200 V, T_j = 175 °C			3	36	
Total Capacitive Charge	Q_C	$I_F \le I_{F,MAX}$ dI_F/dt = 200 A/μs T_j = 175 °C	V_R = 400 V		27		nC
			V_R = 800 V		40		
Switching Time	t_s		V_R = 400 V		< 10		ns
			V_R = 800 V				
Total Capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C			660		pF
		V_R = 800 V, f = 1 MHz, T_j = 25 °C			50		

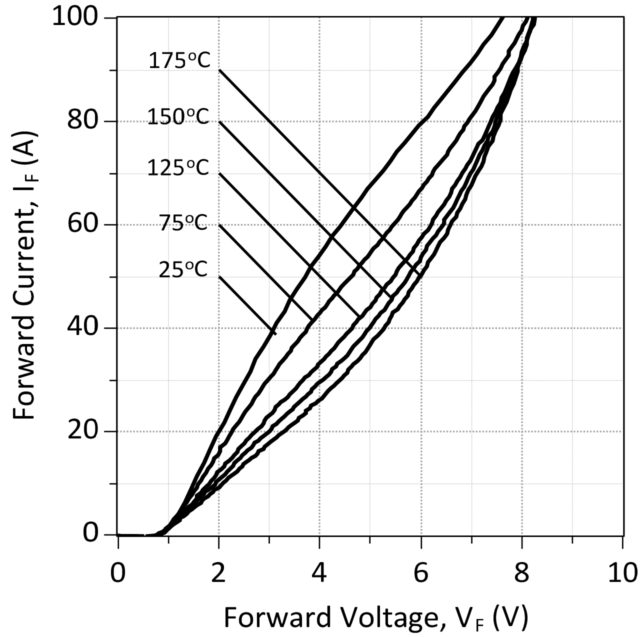
Thermal / Mechanical Characteristics

Thermal Resistance, Junction - Case	R_{thJC}	0.4	°C/W
Weight	W_T	0.3	g



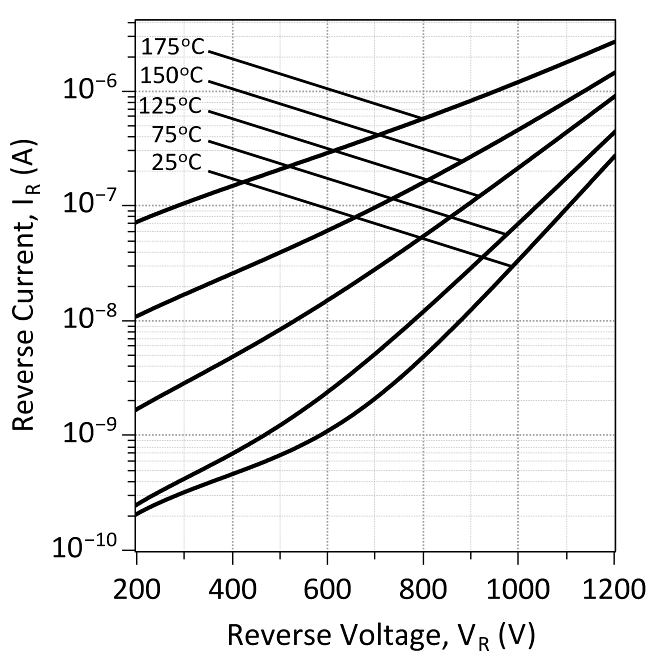
$I_F = f(V_F, T_j)$; t_P = 10 µs

Figure 1: Typical Forward Characteristics



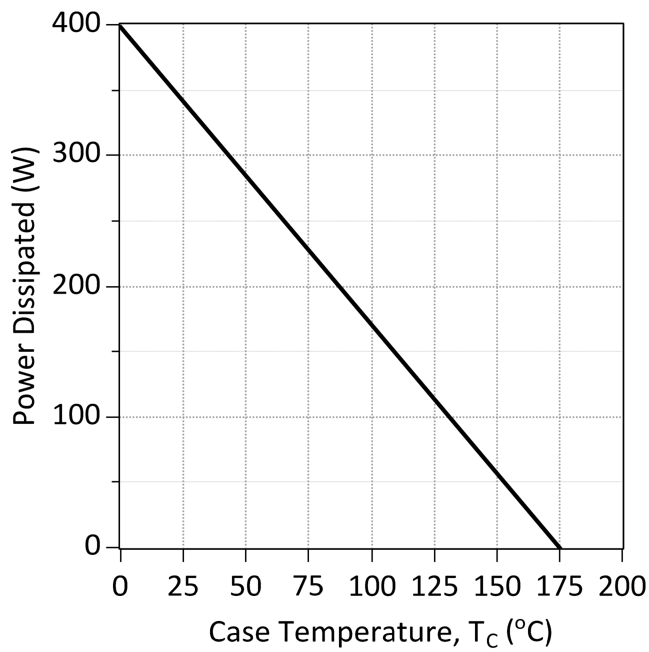
$I_F = f(V_F, T_j)$; t_P = 10 µs

Figure 2: Typical High Current Forward Characteristics



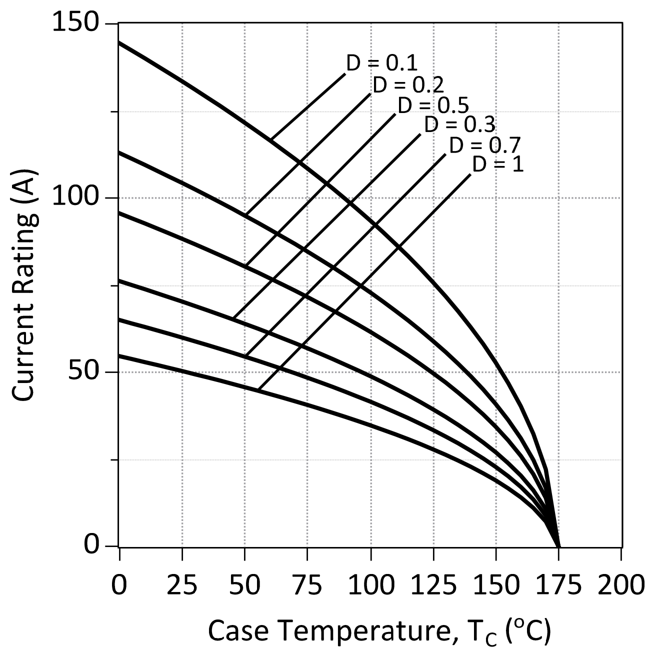
$I_R = f(V_R, T_j)$

Figure 3: Typical Reverse Characteristics



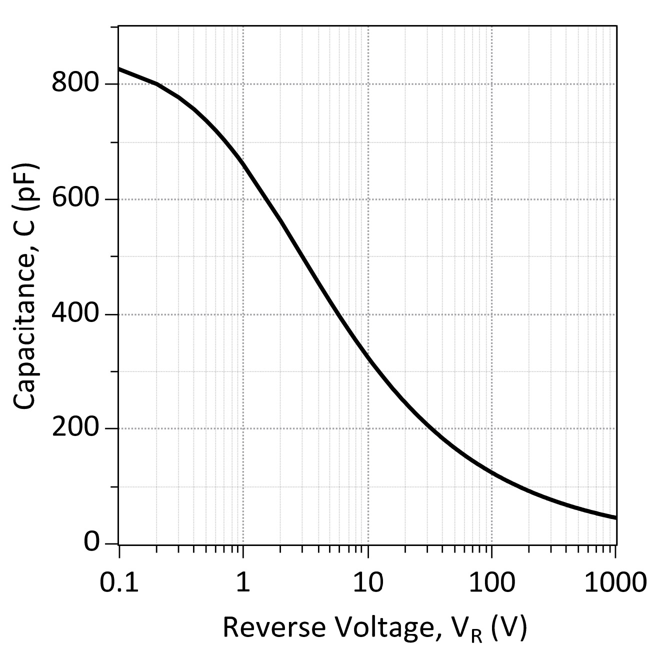
$P_{tot} = f(T_C)$

Figure 4: Power Derating Curve



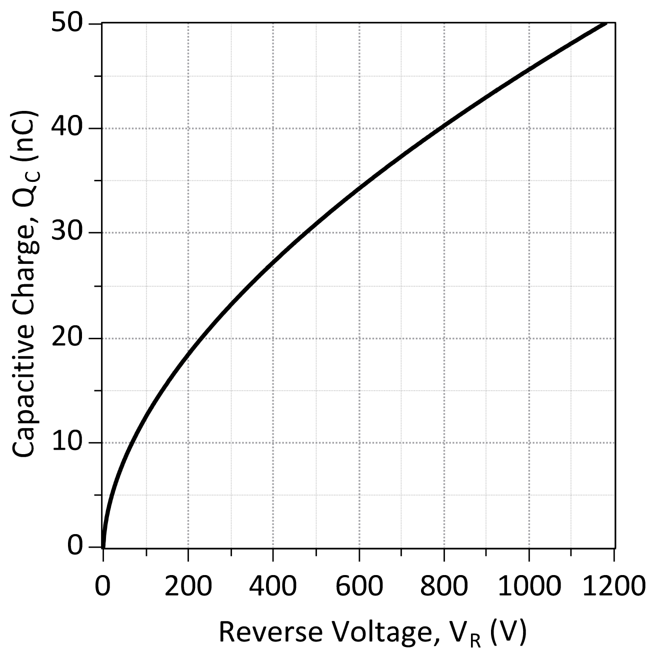
$I_F = f(T_C)$; $D = t_P/T$, $t_P = 10\ \mu s$

Figure 5: Current Derating Curves



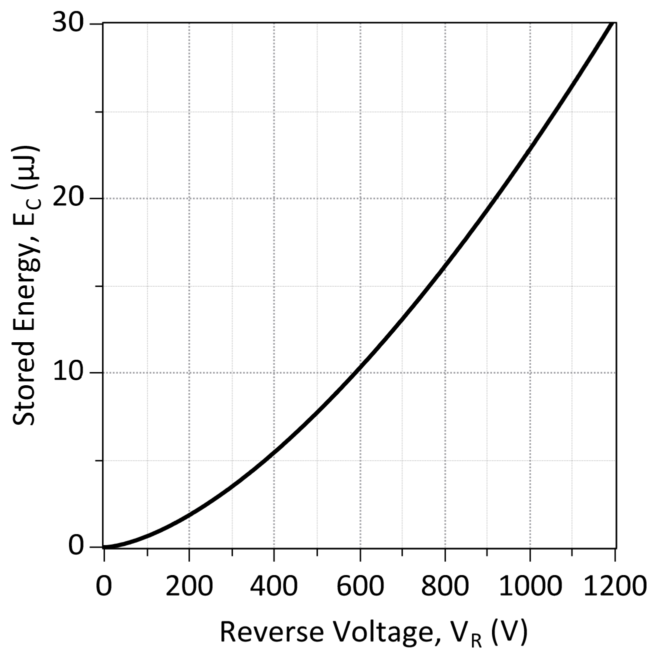
$C = f(V_R)$; $T_j = 25\ °C$; $f = 1\ MHz$

Figure 6: Typical Junction Capacitance vs Reverse Voltage Characteristics



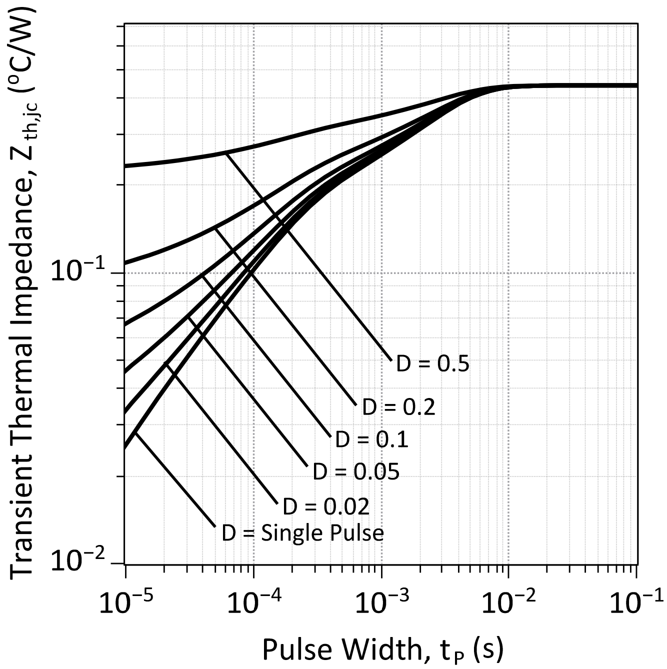
$Q_c = f(V_R)$; $T_j = 25\ °C$; $f = 1\ MHz$

Figure 7: Typical Capacitive Charge vs Reverse Voltage Characteristics



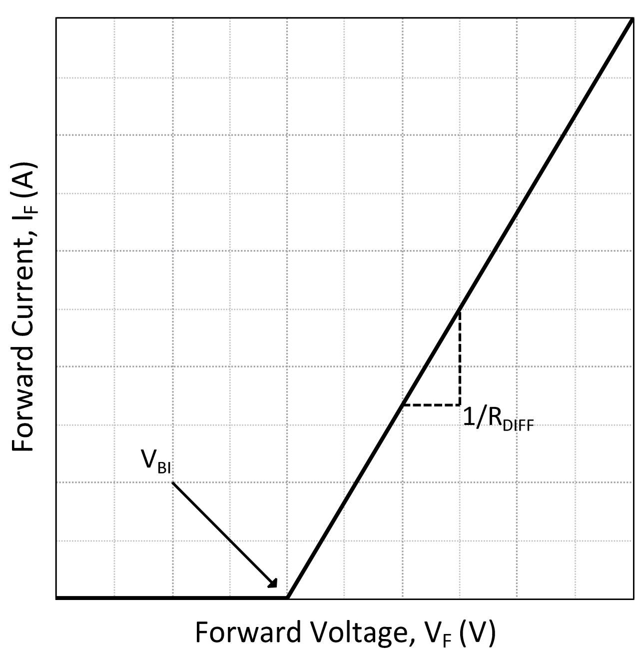
$E_C = f(V_R)$; $T_j = 25\ °C$; $f = 1\ MHz$

Figure 8: Typical Capacitive Energy vs Reverse Voltage Characteristics



$Z_{th,jc} = f(t_P,D)$; $D = t_P/T$

Figure 9: Transient Thermal Impedance



$I_F = f(V_F, T_j)$

Figure 10: Forward Curve Model

$I_F = (V_F - V_{BI})/R_{DIFF}$ (A)

Built-In Voltage (V_{BI}):

$V_{BI}(T_j) = m{*}T_j + n$ (V)

m = -1.55e-03, n = 1.01

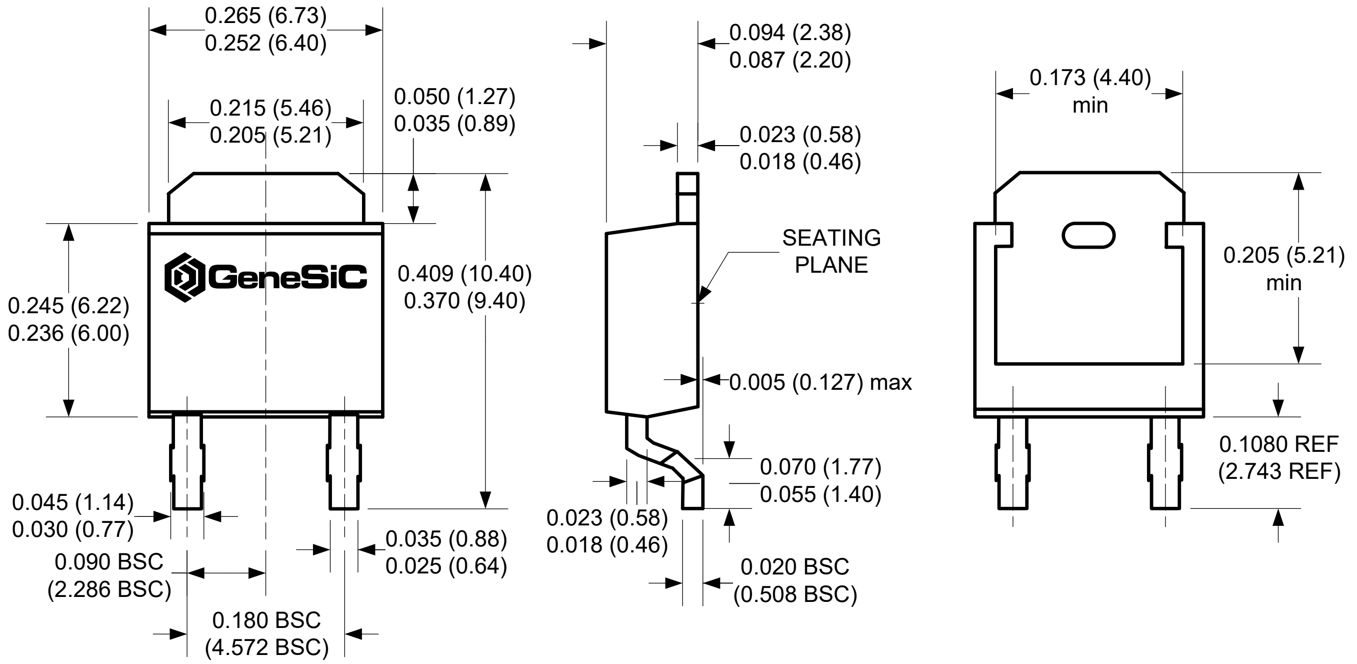
Differential Resistance (R_{DIFF}):

$R_{DIFF}(T_j) = a{*}T_j^2 + b{*}T_j + c$ (Ω);

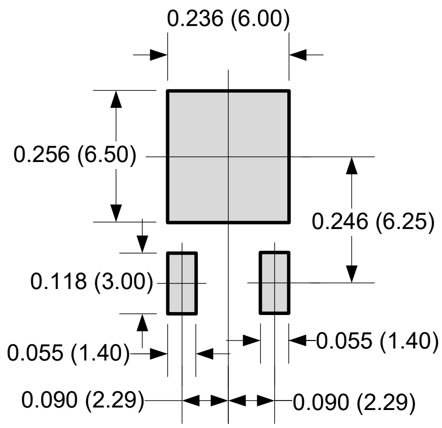
a = 1.26e-06, b = 2.11e-04, c = 0.0447

Package Dimensions

TO-252-2L **Package Outline**



Recommended Solder Pad Layout



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

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your GeneSiC representative.

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This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control systems.

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