GB02SLT12-252
1200V 2A SiC Schottky MPS™ Diode

GeneSiC™
SEMICONDUCTOR

Silicon Carbide Schottky Diode

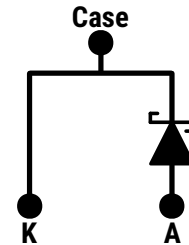|		
V_{RRM}	=	1200 V
$I_{F(T_C = 165°C)}$	=	2 A
Q_C	=	11 nC

Features

- Low V_F for High Temperature Operation
- Enhanced Surge and Avalanche Robustness
- Superior Figure of Merit Q_C/I_F
- Low Thermal Resistance
- Low Reverse Leakage Current
- Temperature Independent Fast Switching
- Positive Temperature Coefficient of V_F
- High dV/dt Ruggedness

Package

Case (K)

Case

TO-252-2

K   A

RoHS

REACH

Advantages

- Improved System Efficiency
- High System Reliability
- Optimal Price Performance
- Reduced Cooling Requirements
- Increased System Power Density
- Zero Reverse Recovery Current
- Easy to Parallel without Thermal Runaway
- Enables Extremely Fast Switching

Applications

- High Voltage Sensing
- Solar Inverters
- Electric Vehicles
- High Frequency Converters
- Battery Chargers
- AC/DC Power Supplies
- Anti-Parallel / Free-Wheeling Diode
- LED and HID Lighting

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

Parameter	Symbol	Conditions	Values	Unit	Note
Repetitive Peak Reverse Voltage	V_{RRM}		1200	V	
Continuous Forward Current	I_F	T_C = 100°C, D = 1	6	A	Fig. 4
		T_C = 135°C, D = 1	5		
		T_C = 165°C, D = 1	2		
Non-Repetitive Peak Forward Surge Current, Half Sine Wave	$I_{F,SM}$	T_C = 25°C, t_P = 10 ms	20	A	
		T_C = 150°C, t_P = 10 ms	16		
Repetitive Peak Forward Surge Current, Half Sine Wave	$I_{F,RM}$	T_C = 25°C, t_P = 10 ms	12	A	
		T_C = 150°C, t_P = 10 ms	8		
Non-Repetitive Peak Forward Surge Current	$I_{F,MAX}$	T_C = 25°C, t_P = 10 µs	100	A	
i²t Value	$\int i^2 dt$	T_C = 25°C, t_P = 10 ms	2.0	A²s	
Non-Repetitive Avalanche Energy	E_{AS}	L = 18.0 mH, I_{AS} = 2 A	36	mJ	
Diode Ruggedness	dV/dt	V_R = 0 ~ 960 V	200	V/ns	
Power Dissipation	P_{TOT}	T_C = 25°C	58	W	Fig. 3
Operating and Storage Temperature	T_j , T_{stg}		-55 to 175	°C	

Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit	Note
			Min.	Typ.	Max.		
Diode Forward Voltage	V_F	I_F = 2 A, T_j = 25°C		1.5	1.8	V	Fig. 1
		I_F = 2 A, T_j = 175°C		1.9			
Reverse Current	I_R	V_R = 1200 V, T_j = 25°C		1	5	µA	Fig. 2
		V_R = 1200 V, T_j = 175°C		3			
Total Capacitive Charge	Q_C	$I_F \leq I_{F,MAX}$ dI_F/dt = 200 A/µs	V_R = 400 V	7		nC	Fig. 7
			V_R = 800 V	11			
Switching Time	t_S		V_R = 400 V	< 10		ns	
			V_R = 800 V				
Total Capacitance	C	V_R = 1 V, f = 1MHz		122		pF	Fig. 6
		V_R = 800 V, f = 1MHz		7			

Thermal/Package Characteristics

Parameter	Symbol	Conditions	Values			Unit	Note
			Min.	Typ.	Max.		
Thermal Resistance, Junction - Case	R_{thJC}			2.59		°C/W	Fig. 9
Weight	W_T			0.3		g	

GeneSiC
SEMICONDUCTOR

Figure 1: Typical Forward Characteristics

175°C
150°C
125°C
75°C
25°C

Forward Current, I_F (A) vs Forward Voltage, V_F (V)
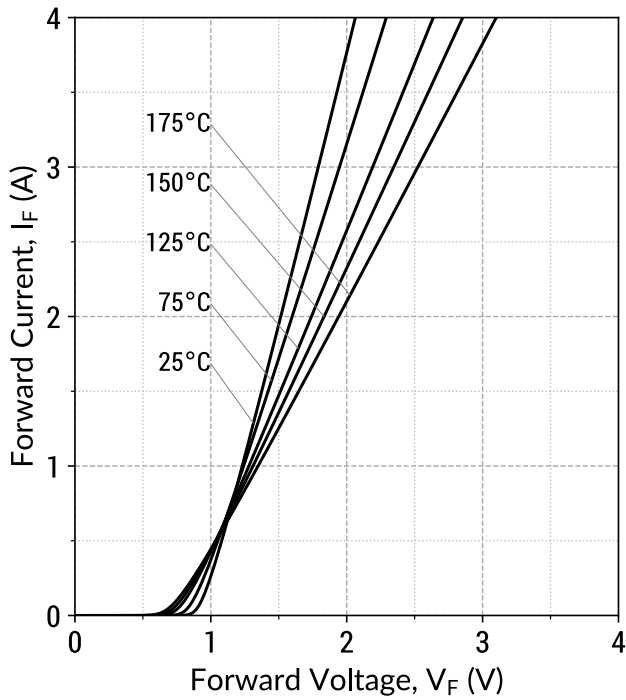
$I_F = f(V_F, T_j)$; t_P = 250 µs

Figure 2: Typical Reverse Characteristics

175°C
150°C
125°C
75°C
25°C

Reverse Current, I_R (A) vs Reverse Voltage, V_R (V)
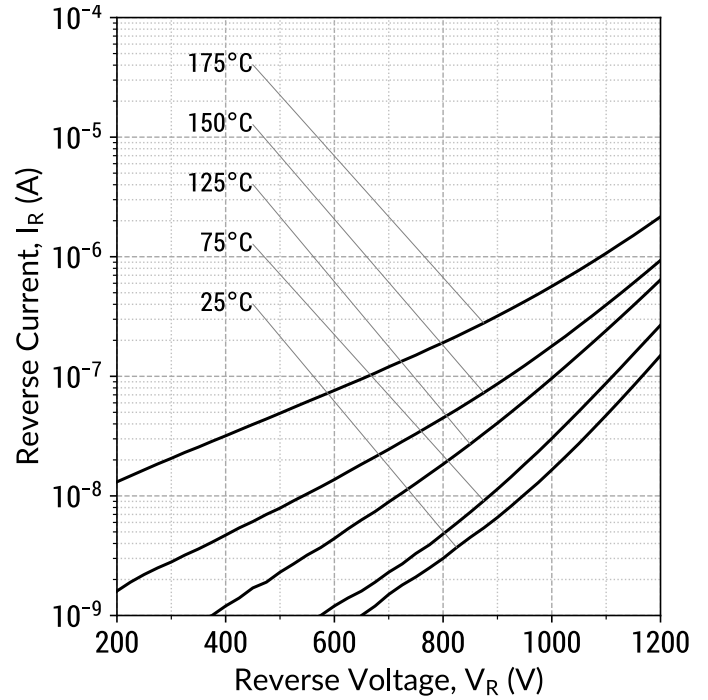
$I_R = f(V_R, T_j)$

Figure 3: Power Derating Curves

Power Dissipated (W) vs Case Temperature, T_C (°C)
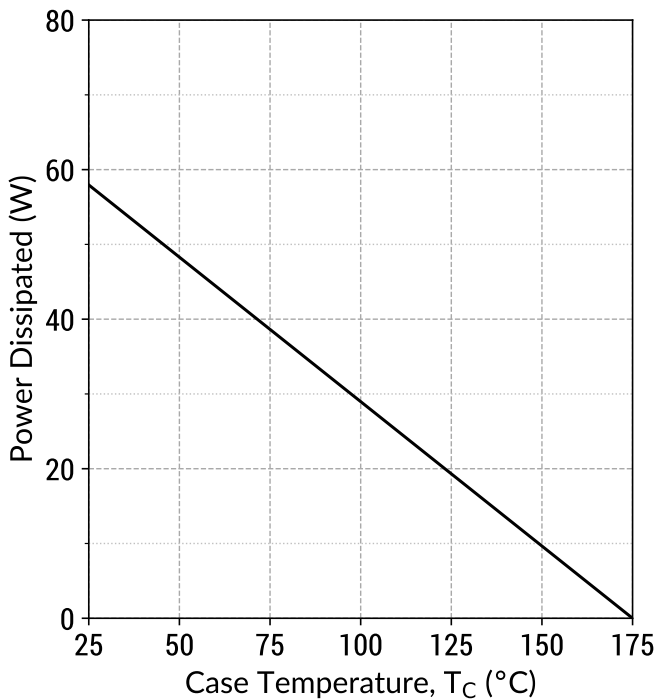
$P_{TOT} = f(T_C)$; T_j = 175°C

Figure 4: Current Derating Curves (Typical V_F)

D = 0.1
D = 0.2
D = 0.3
D = 0.5
D = 0.7
D = 1
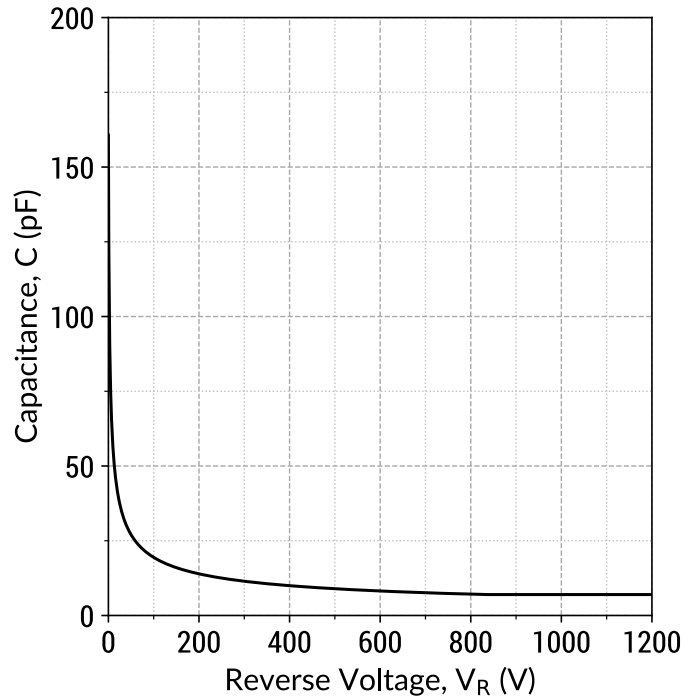
Current Rating (A) vs Case Temperature, T_C (°C)
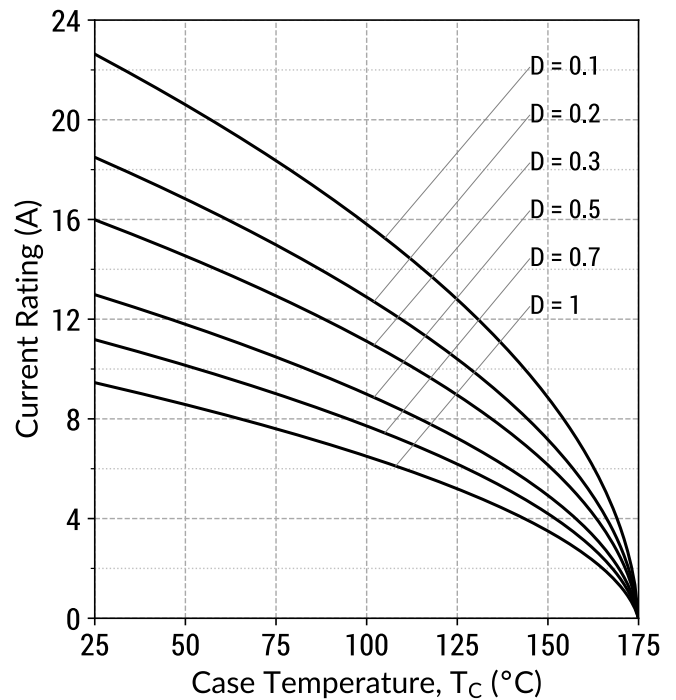
$I_F = f(T_C)$; D = t_P/T; T_j ≤ 175°C; f_{SW} > 10kHz

Figure 5: Current Derating Curves (Maximum V_F)
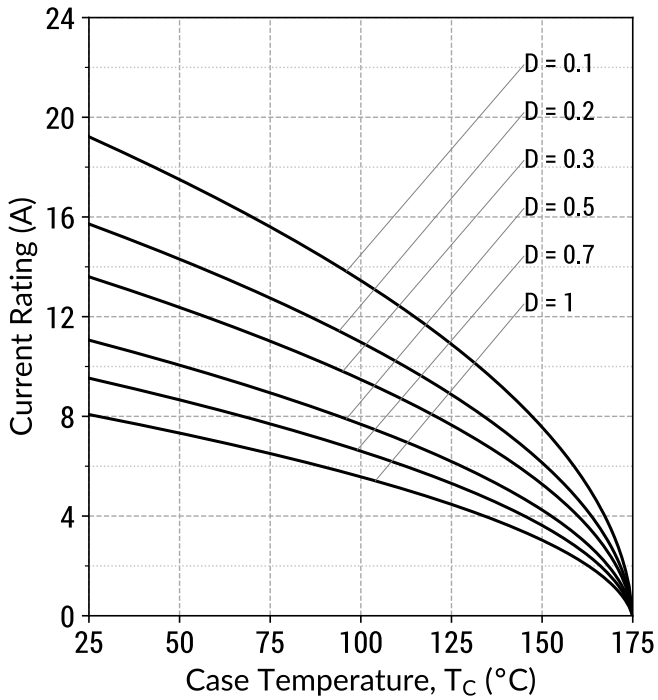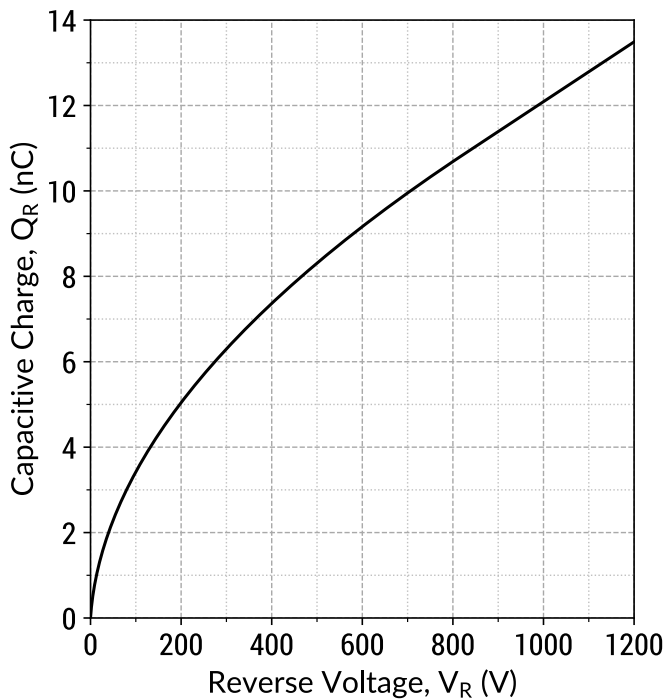

$I_F = f(T_C)$; $D = t_P/T$; $T_j \leq 175°C$; $f_{SW} > 10kHz$

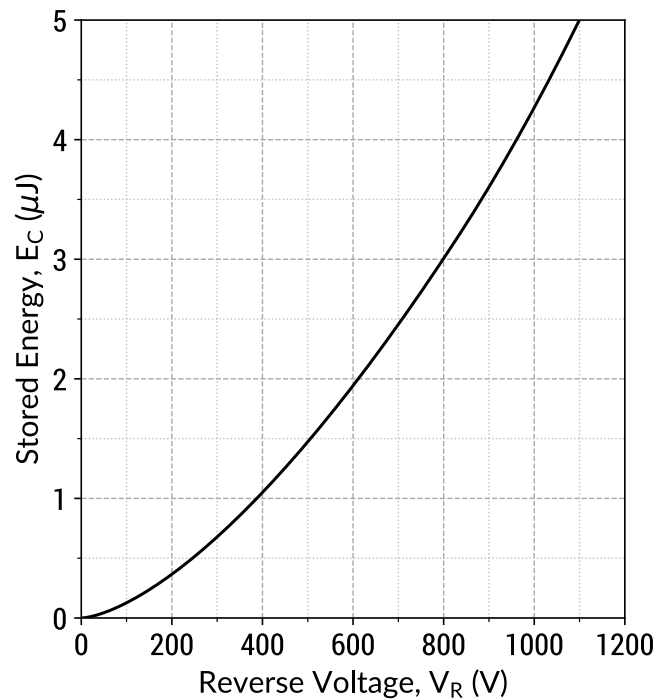**Figure 6: Typical Junction Capacitance vs Reverse Voltage Characteristics**

$C = f(V_R)$; $f = 1MHz$

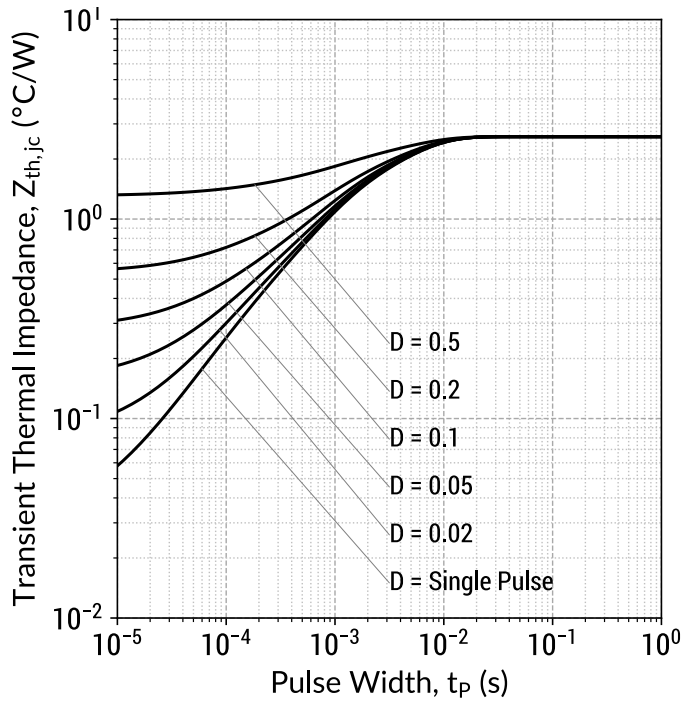**Figure 7: Typical Capacitive Charge vs Reverse Voltage Characteristics**

$Q_C = f(V_R)$; $f = 1MHz$

Figure 8: Typical Capacitive Energy vs Reverse Voltage Characteristics

$E_C = f(V_R)$; $f = 1MHz$

Figure 9: Transient Thermal Impedance

D = 0.5
D = 0.2
D = 0.1
D = 0.05
D = 0.02
D = Single Pulse

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

Figure 10: Forward Curve Model

$1/R_{DIFF}$

V_{BI}

Forward Voltage, V_F (V)

$I_F = f(V_F,T_j)$

Forward Curve Model Equation:

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

Built-In Voltage (V_{BI}):

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

m = -0.00123 (V/°C)

n = 0.995 (V)

Differential Resistance (R_{DIFF}):

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

a = 5.96e-06 (Ω/°C²)

b = 0.000846 (Ω/°C)
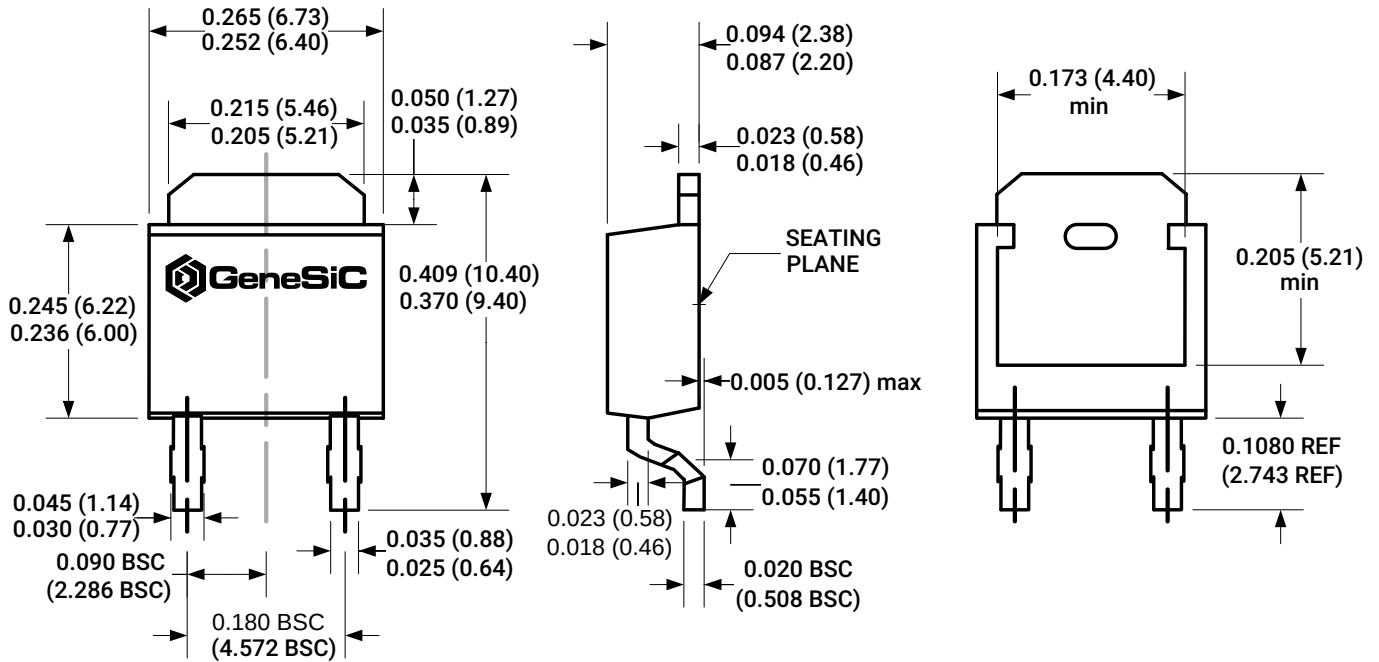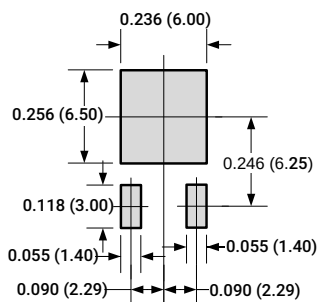
c = 0.251 (Ω)

Forward Power Loss Equation:

$P_{LOSS} = V_{BI}(T_j) \times I_{AVG} + R_{DIFF}(T_j) \times I_{RMS}^2$

Package Dimensions

TO-252-2 Package Outline

0.265 (6.73)
0.252 (6.40)

0.215 (5.46)
0.205 (5.21)

0.050 (1.27)
0.035 (0.89)

0.245 (6.22)
0.236 (6.00)

0.409 (10.40)
0.370 (9.40)

0.045 (1.14)
0.030 (0.77)

0.035 (0.88)
0.025 (0.64)

0.090 BSC
(2.286 BSC)

0.180 BSC
(4.572 BSC)

0.094 (2.38)
0.087 (2.20)

0.023 (0.58)
0.018 (0.46)

SEATING PLANE

0.005 (0.127) max

0.070 (1.77)
0.055 (1.40)

0.023 (0.58)
0.018 (0.46)

0.020 BSC
(0.508 BSC)

0.173 (4.40) min

0.205 (5.21) min

0.1080 REF
(2.743 REF)

Recommended Solder Pad Layout

0.236 (6.00)

0.256 (6.50)

0.246 (6.25)

0.118 (3.00)

0.055 (1.40)

0.055 (1.40)

0.090 (2.29)

0.090 (2.29)

Package View

Case (K)

Case (K)

K

A
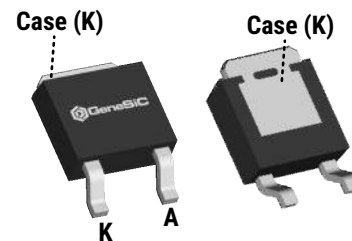
NOTE

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

GeneSiC™
SEMICONDUCTOR

Compliance

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 (RoHS 2), as adopted by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863. RoHS Declarations for this product can be obtained from your GeneSiC representative.

REACH Compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a GeneSiC representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

Disclaimer

GeneSiC Semiconductor, Inc. reserves right to make changes to the product specifications and data in this document without notice. GeneSiC disclaims all and any warranty and liability arising out of use or application of any product. No license, express or implied to any intellectual property rights is granted by this document.

Unless otherwise expressly indicated, GeneSiC products are not designed, tested or authorized for use in life-saving, medical, aircraft navigation, communication, air traffic control and weapons systems, nor in applications where their failure may result in death, personal injury and/or property damage.

Related Links

- SPICE Models: https://www.genesicsemi.com/sic-schottky-mps/GB02SLT12-252/GB02SLT12-252_SPICE.zip
- PLECS Models: https://www.genesicsemi.com/sic-schottky-mps/GB02SLT12-252/GB02SLT12-252_PLECS.zip
- CAD Models: https://www.genesicsemi.com/sic-schottky-mps/GB02SLT12-252/GB02SLT12-252_3D.zip
- Evaluation Boards: https://www.genesicsemi.com/technical-support
- Reliability: https://www.genesicsemi.com/reliability
- Compliance: https://www.genesicsemi.com/compliance
- Quality Manual: https://www.genesicsemi.com/quality

Revision History

- Rev 21/Jul: Updated with most recent test data
- Supersedes: Rev 19/Apr, Rev 20/Apr, Rev 20/Aug

www.genesicsemi.com/sic-schottky-mps/

Rev 21/Jul
Copyright© 2021 GeneSiC Semiconductor Inc.
All Rights Reserved.

Published by GeneSiC Semiconductor, Inc.
43670 Trade Center Place Suite 155, Dulles, VA 20166; USA
Page 7 of 7