

# GB50MPS17-247

1700V SiC MPS™ Diode

Silicon Carbide Power  
Schottky Diode



$V_{RRM}$	=	1700 V
$I_F (T_C = 135^\circ\text{C})$	=	134 A
$Q_C$	=	544 nC

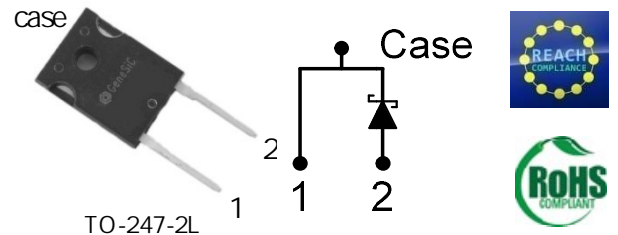
## Features

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

## Advantages

- Low Standby Power Losses
- 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

## Package



## 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

## Absolute Maximum Ratings

Parameter	Symbol	Conditions	Values	Unit
Repetitive Peak Reverse Voltage	$V_{RRM}$		1700	V
Continuous Forward Current	$I_F$	$T_C = 25^\circ\text{C}, D = 1$	269	A
		$T_C = 135^\circ\text{C}, D = 1$	134	
		$T_C = 168^\circ\text{C}, D = 1$	50	
Diode Ruggedness	$dV/dt$	$V_R = 0 \sim 960\text{V}$	100	V/ $\mu\text{s}$
Power Dissipation	$P_{tot}$	$T_C = 25^\circ\text{C}$	2400	W
Operating and Storage Temperature	$T_j, T_{stg}$		-55 to 175	°C

## Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Diode Forward Voltage	$V_F$	$I_F = 50\text{A}, T_j = 25^\circ\text{C}$		1.5	1.8	V
		$I_F = 50\text{A}, T_j = 175^\circ\text{C}$		2.3	2.7	
Reverse Current	$I_R$	$V_R = 1700\text{V}, T_j = 25^\circ\text{C}$		5	70	$\mu\text{A}$
		$V_R = 1700\text{V}, T_j = 175^\circ\text{C}$		40	475	
Total Capacitive Charge	$Q_C$	$I_F = I_{F,MAX}$ $dI_F/dt = 200\text{A}/\mu\text{s}$ $T_j = 175^\circ\text{C}$	$V_R = 400\text{V}$	365		nC
			$V_R = 800\text{V}$	544		
Switching Time	$t_s$		$V_R = 400\text{V}$	< 10		ns
Total Capacitance	$C$	$V_R = 1\text{V}, f = 1\text{MHz}, T_j = 25^\circ\text{C}$	$V_R = 800\text{V}, f = 1\text{MHz}, T_j = 25^\circ\text{C}$	5967		pF
				399		

## Thermal /Mechanical Characteristics

Thermal Resistance, Junction - Case	$R_{thJC}$	0.063	°C/W
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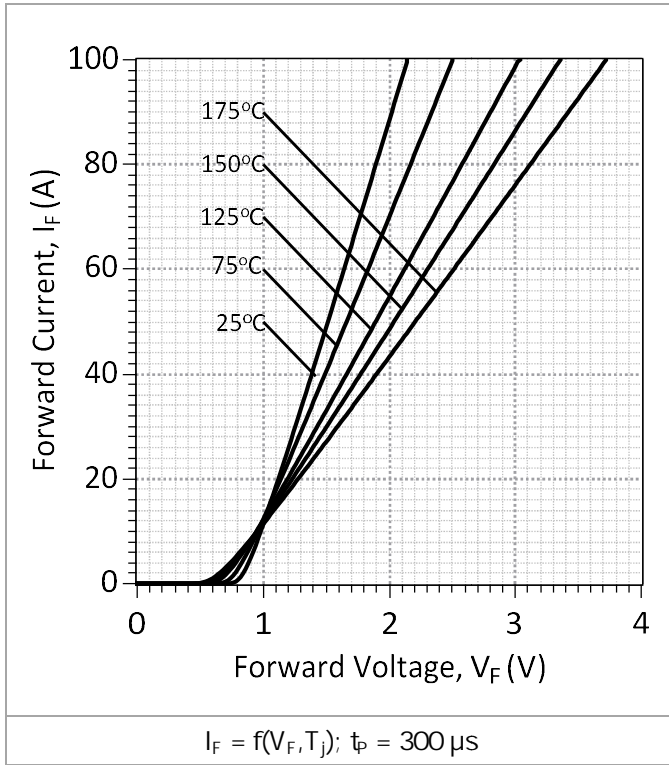


Figure 1: Typical Forward Characteristics

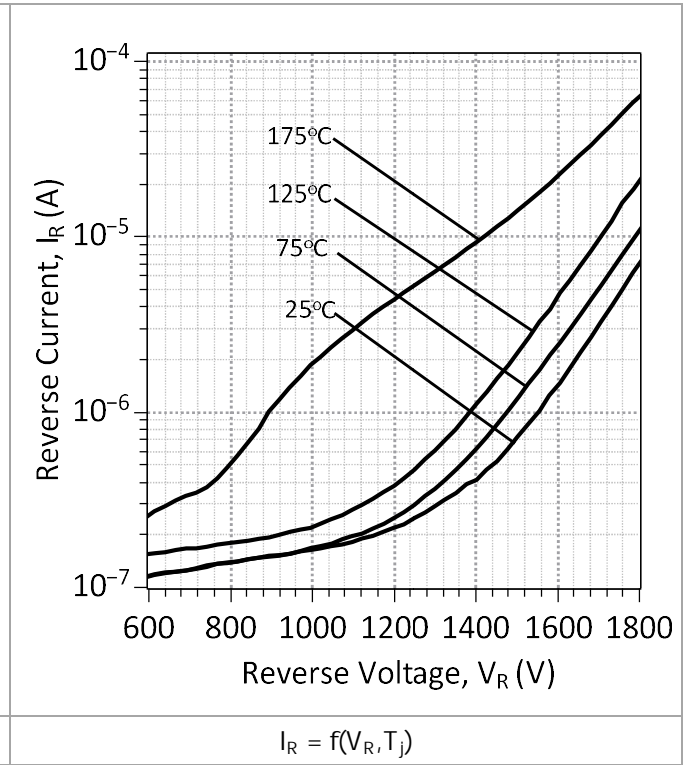


Figure 2: Typical Reverse Characteristics

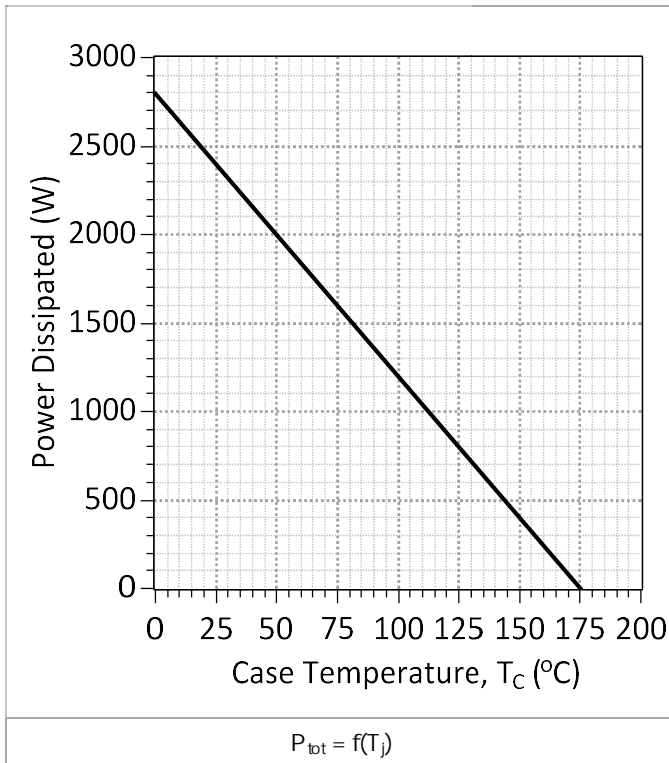


Figure 3: Power Derating Curve

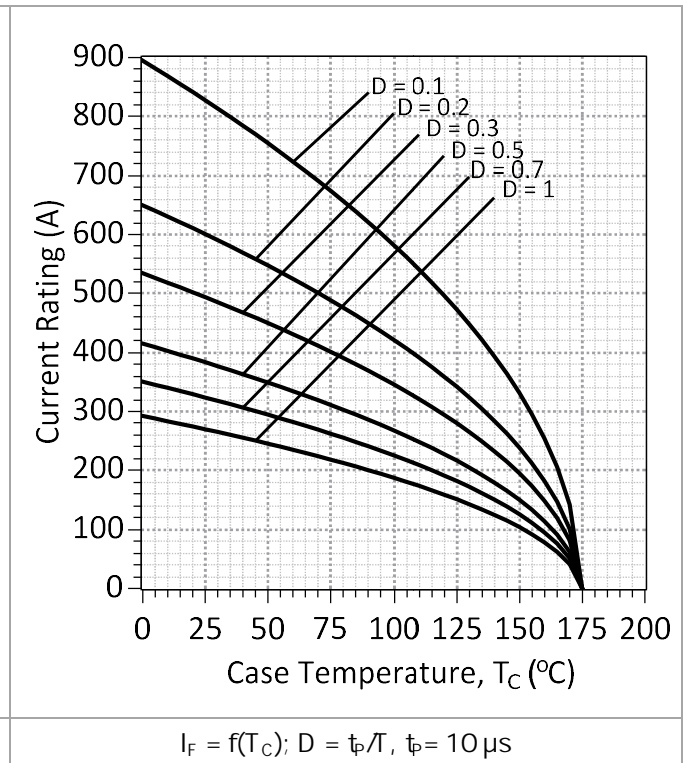


Figure 4: Current Derating Curves

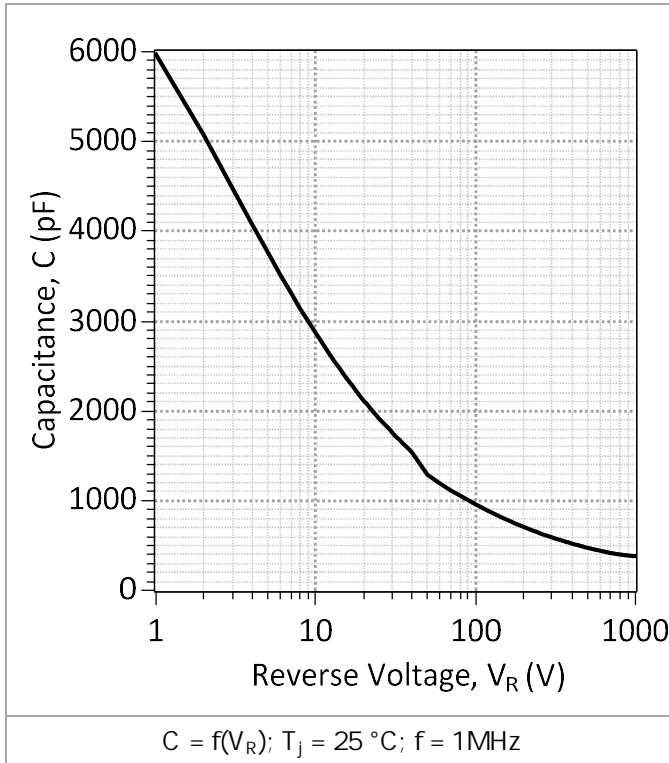


Figure 5: Typical Junction Capacitance vs Reverse Voltage Characteristics

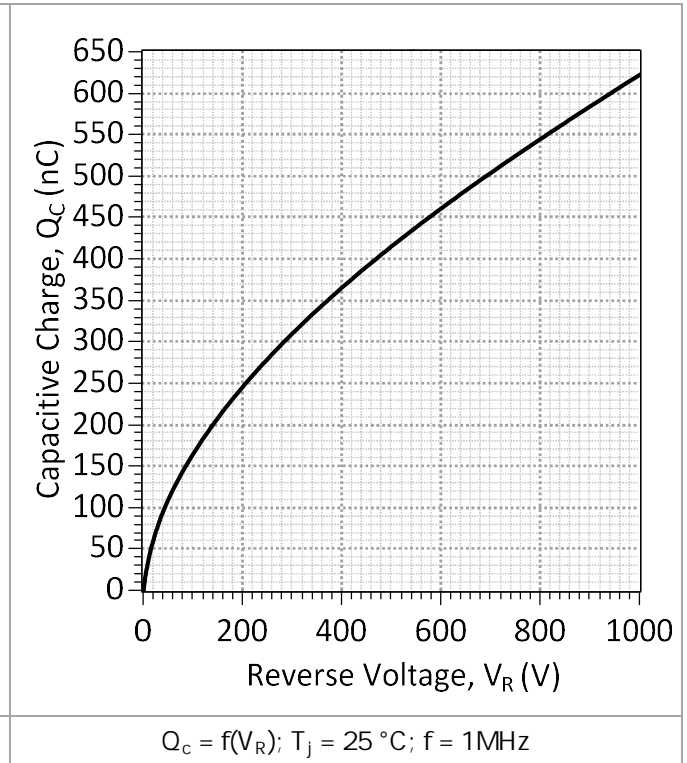


Figure 6: Typical Capacitive Charge vs. Reverse Voltage Characteristics

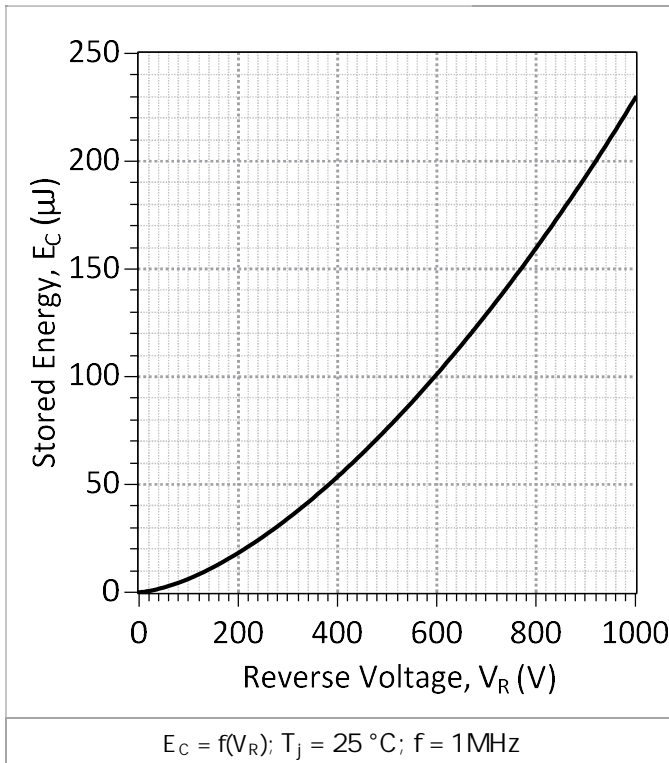


Figure 7: Typical Capacitive Energy vs. Reverse Voltage Characteristics

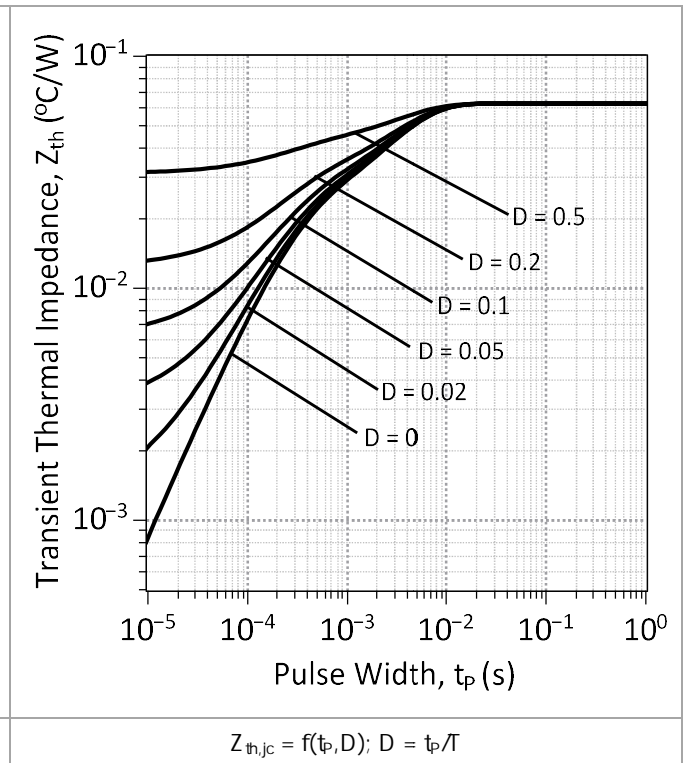


Figure 8: Transient Thermal Impedance

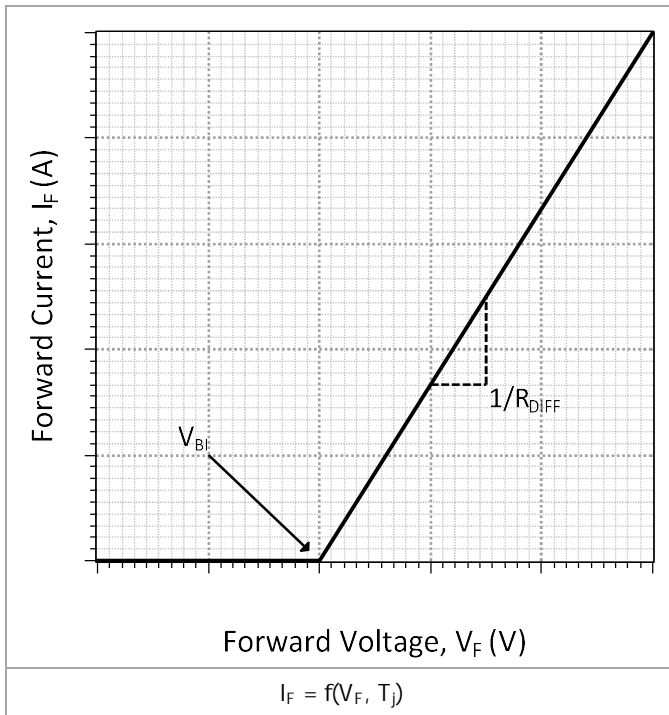


Figure 10: Forward Curve Model

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

Built-In Voltage ( $V_{BI}$ ):

$$V_{BI}(T_j) = m \cdot T_j + b,$$

$$m = -1.29e-03, b = 0.913$$

Differential Resistance ( $R_{DIFF}$ ):

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

$$a = 1.20e-04, b = 1.77e-02, c = 3.96$$

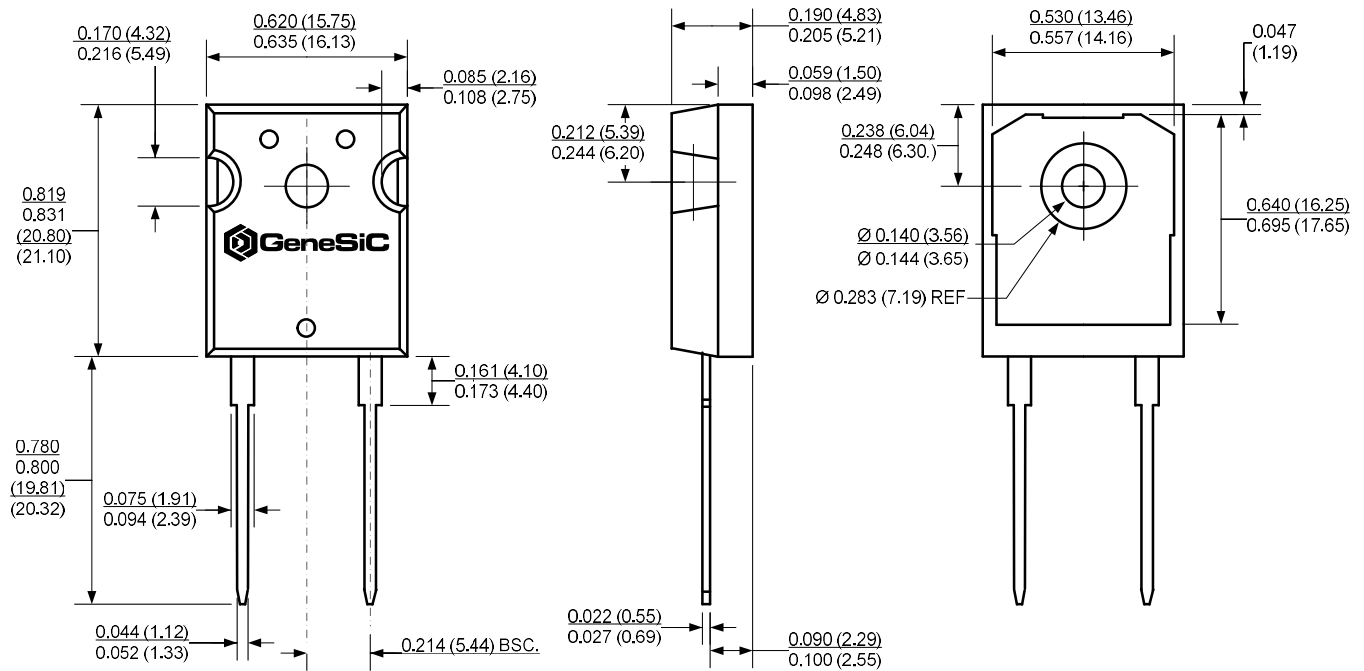
GB50MPS17-247  
1700V SiC MPST™ Diode



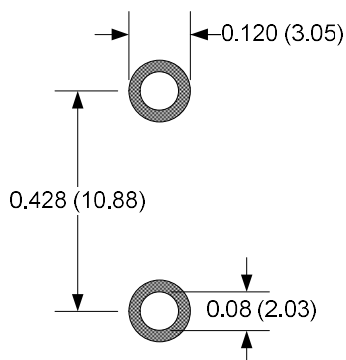
Package Dimensions:

TO-247-2L

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

# GB50MPS17-247

## 1700V SiC MPS™ Diode



### 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.

### 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.

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.

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.

### Related Links

Soldering Document: <http://www.genesicsemi.com/quality/quality-manual/>

Tin-whisker Report: <http://www.genesicsemi.com/quality/compliance/>

Reliability Report: <http://www.genesicsemi.com/quality/reliability/>

SPICE Model Parameters

This is a secure document. Please copy this code from the SPICE model PDF file on our website ([http://www.genesicsemi.com/sic\\_rectifiers\\_diodes/merged\\_pin\\_schottky/GB50MPS17-247\\_SPICE.pdf](http://www.genesicsemi.com/sic_rectifiers_diodes/merged_pin_schottky/GB50MPS17-247_SPICE.pdf)) into LTSPICE (version 4) software for simulation of the GB50MPS17-247.

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*      GeneSi C Semi conductor Si C MPS™ Rectifier
*      Revision: 1.1
*      Date: February-2018
*****
**      TO-247-2 package
*****
.SUBCKT GB50MPS17 A K Case
L_anode      A      AD      6.5n
D1           AD      Case    GB50MPS17
L_cathode    K      Case    6.5n
.ENDS
*****
.SUBCKT GB50MPS17 ANODE KATHODE
D1 ANODE KATHODE GB50MPS17_SCHOTTKY
.MODEL GB50MPS17_SCHOTTKY D
+ IS      4.27E-14      RS      0.0124
+ N       1             IKF     500
+ EG      1.2           XTI     2
+ TRS1    0.005434     TRS2   2.717E-05
+ CJO     8.32E-9      VJ      0.879
+ M       0.438        FC      0.5
+ TT      1.00E-10     BV      1700
+ IBV     5E-06        VPK     1700
+ IAVE    50           TYPE    SiC_MPS™
+ MFG     GeneSi C_Semi
.ENDS
* End of GB50MPS17-247 SPICE Model
*****
* This model is provided "AS IS, WHERE IS, AND WITH NO WARRANTY OF ANY KIND
* EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED
* WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE."

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