GB2X100MPS12-227

1200 V SiC MPS™ Diode

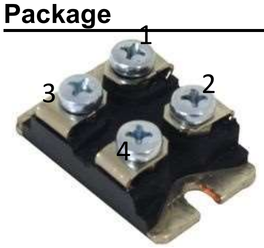
Silicon Carbide Power Schottky Diode

V_{RRM}	=	1200 V
$I_{F\ (Tc\ =\ 132°C)}$	=	200 A*
Q_C	=	1114n C*

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/I_F

Package



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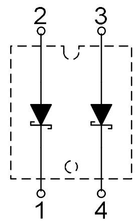


Advantages

- 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

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 (Per Leg)	V_{RRM}		1200	V
Continuous Forward Current (Per Leg/ Per Device)	I_F	T_C = 25 °C, D = 1 T_C = 132 °C, D = 1	204/408 100/200	A
Non-Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg)	$I_{F,SM}$	T_C = 25 °C, t_P = 10 ms T_C = 150 °C, t_P = 10 ms	700 550	A
Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg)	$I_{F,RM}$	T_C = 25 °C, t_P = 10 ms T_C = 150 °C, t_P = 10 ms	400 260	A
Non-Repetitive Peak Forward Surge Current (Per Leg)	$I_{F,max}$	T_C = 25 °C, t_P = 10 µs	1800	A
I^2t Value (Per Leg)	$\int i^2\ dt$	T_C = 25 °C, t_P = 10 ms	600	A^2s
Non-Repetitive Avalanche Energy (Per Leg)	E_{AS}	L = 0 mH, I_{AV} = 90 A, V_{DD} = 60 V	800	mJ
Diode Ruggedness (Per Leg)	dV/dt	V_R = 0 ~ 960 V	100	V/µs
Power Dissipation (Per Leg/Per Device)	P_{tot}	T_C = 25 °C	770/1540	W
Operating and Storage Temperature	T_j , T_{stg}		-55 to 175	°C

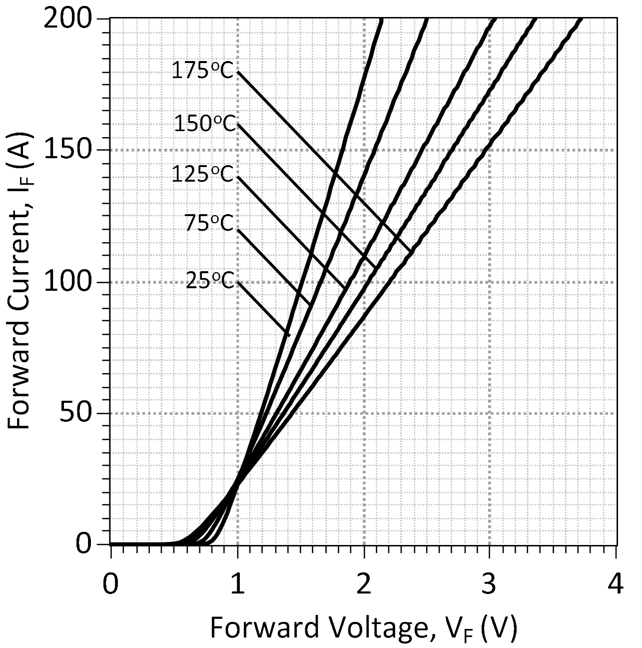
Electrical Characteristics (Per Leg)

Parameter	Symbol	Conditions		Values min.	Values typ.	Values max.	Unit
Diode Forward Voltage	V_F	I_F = 100 A, T_j = 25 °C I_F = 100 A, T_j = 175 °C			1.5 2.3	1.8 2.7	V
Reverse Current	I_R	V_R = 1200 V, T_j = 25 °C V_R = 1200 V, T_j = 175 °C			10 80	140 950	µA
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 V_R = 800 V		374 557		nC
Switching Time	t_s		V_R = 400 V V_R = 800 V		< 10		ns
Total Capacitance	C	V_R = 1 V, f = 1 MHz, T_j = 25 °C V_R = 800 V, f = 1 MHz, T_j = 25 °C			6110 409		pF

Thermal / Mechanical Characteristics

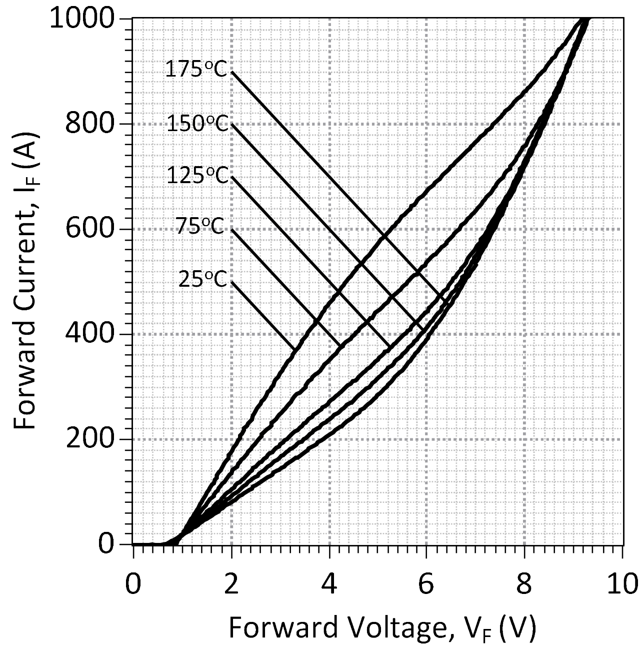
Parameter	Symbol	Values	Unit
Thermal Resistance, Junction – Case (Per Leg)	R_{thJC}	0.19	°C/W

* Per Device, ** Per Leg



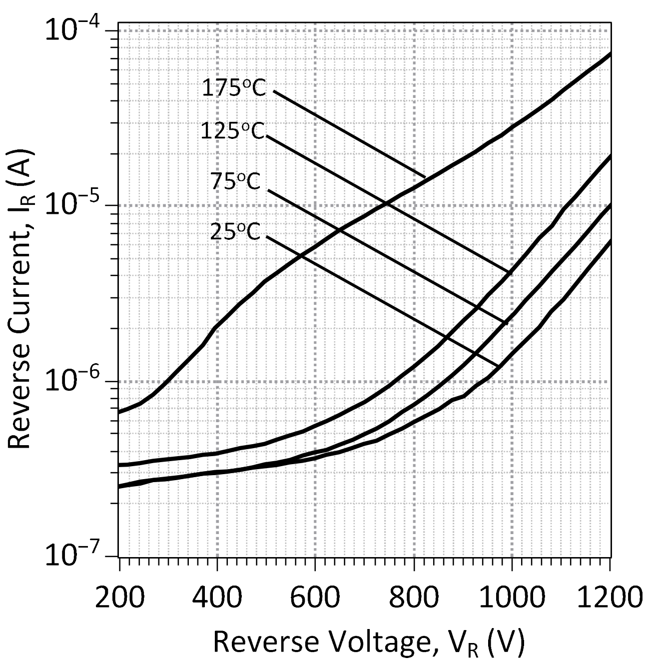
$I_F = f(V_F, T_j)$; t_P = 300 µs

Figure 1: Typical Forward Characteristics (Per Leg)



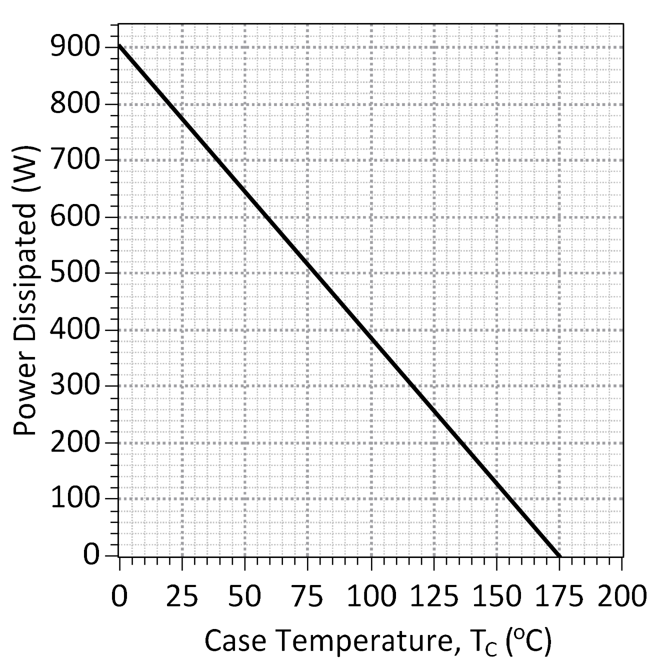
$I_F = f(V_F, T_j)$; t_P = 300 µs

Figure 2: Typical High Current Forward Characteristics (Per Leg)



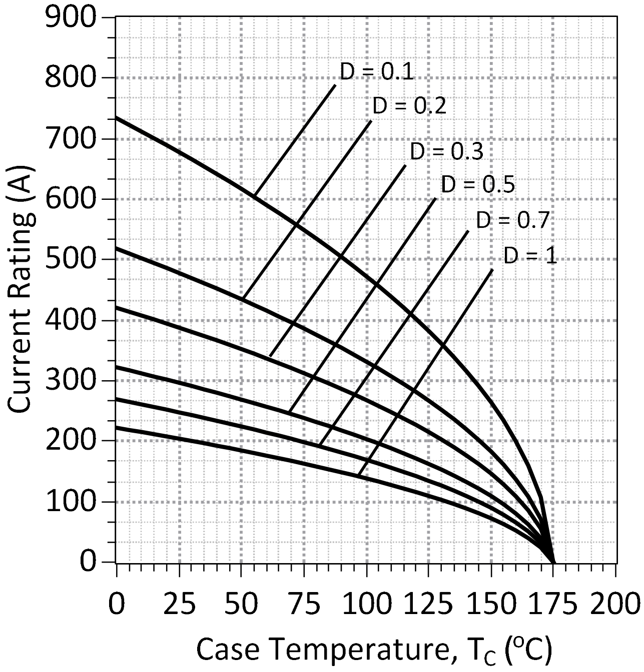
$I_R = f(V_R, T_j)$

Figure 3: Typical Reverse Characteristics (Per Leg)



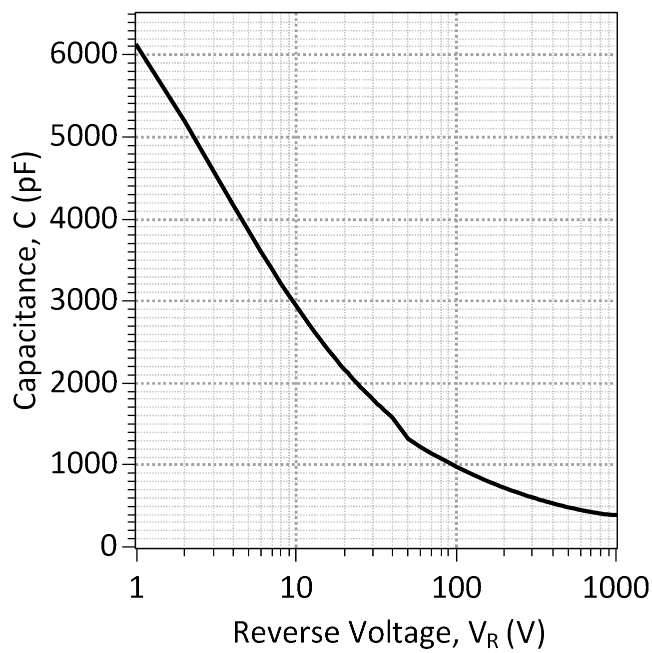
$P_{tot} = f(T_j)$

Figure 4: Power Derating Curve (Per Leg)



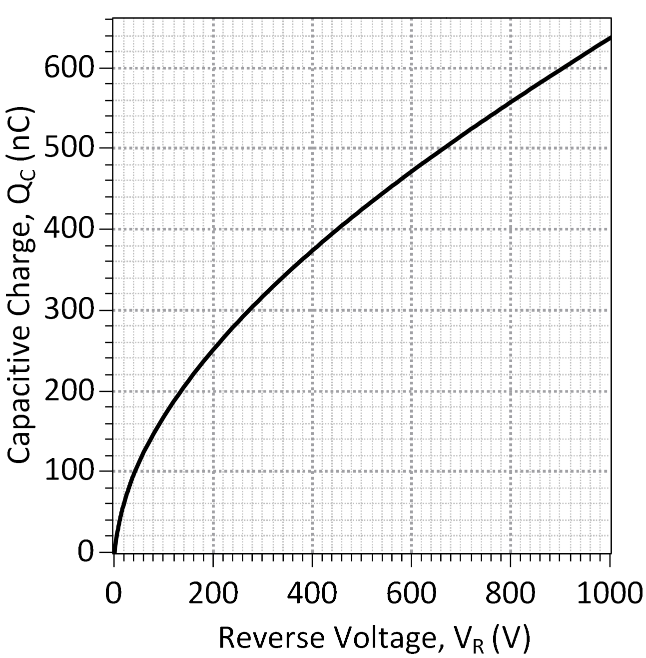
$I_F = f(T_C)$; $D = t_P/T$, $t_P = 10$ µs

Figure 5: Current Derating Curves (Per Leg)



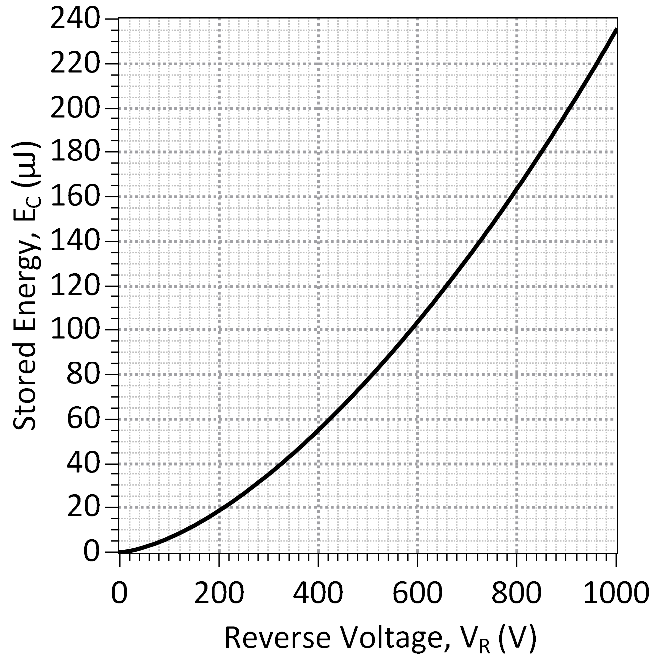
$C = f(V_R)$; $T_j = 25$ °C; f = 1MHz

Figure 6: Typical Junction Capacitance vs Reverse Voltage Characteristics (Per Leg)



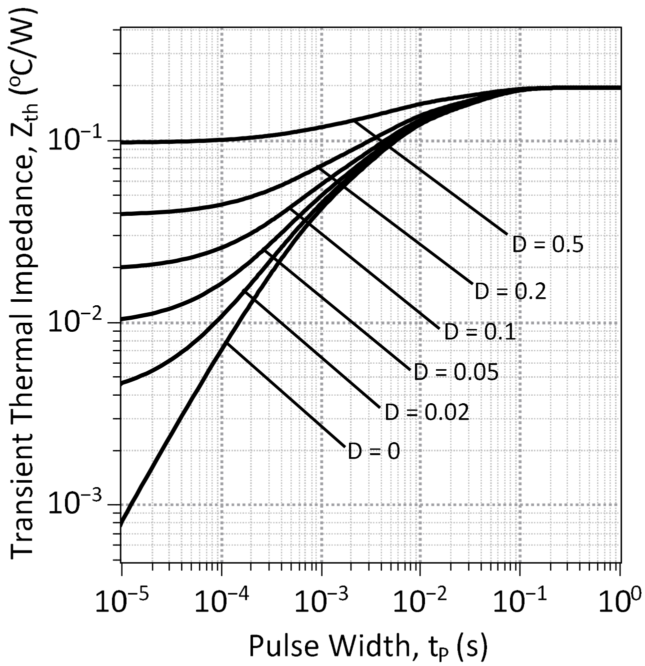
$Q_c = f(V_R)$; $T_j = 25$ °C; f = 1MHz

Figure 7: Typical Capacitive Charge vs. Reverse Voltage Characteristics (Per Leg)



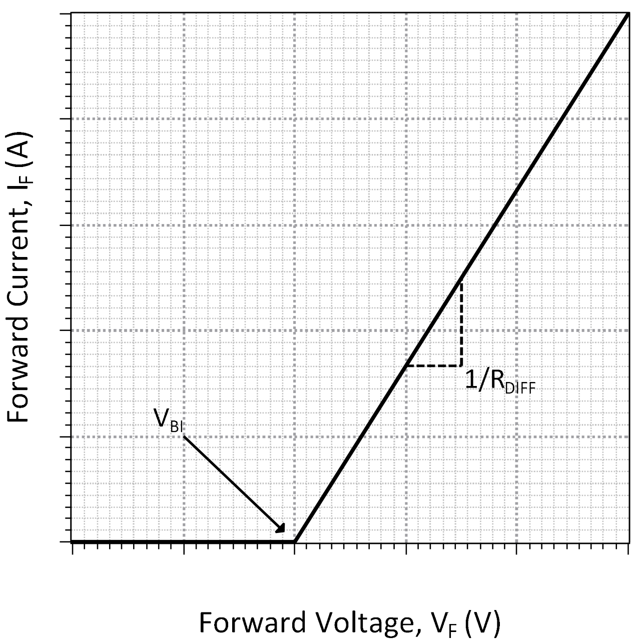
$E_C = f(V_R)$; $T_j = 25$ °C; f = 1MHz

Figure 8: Typical Capacitive Energy vs. Reverse Voltage Characteristics (Per Leg)



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

Figure 9: Transient Thermal Impedance (Per Leg)



$I_F = f(V_F, T_j)$

$I_F = (V_F – V_{BI})/R_{DIFF}$

Built-In Voltage (V_{BI}):

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

m = -1.31e-03, b = 0.912

Differential Resistance (R_{DIFF}):

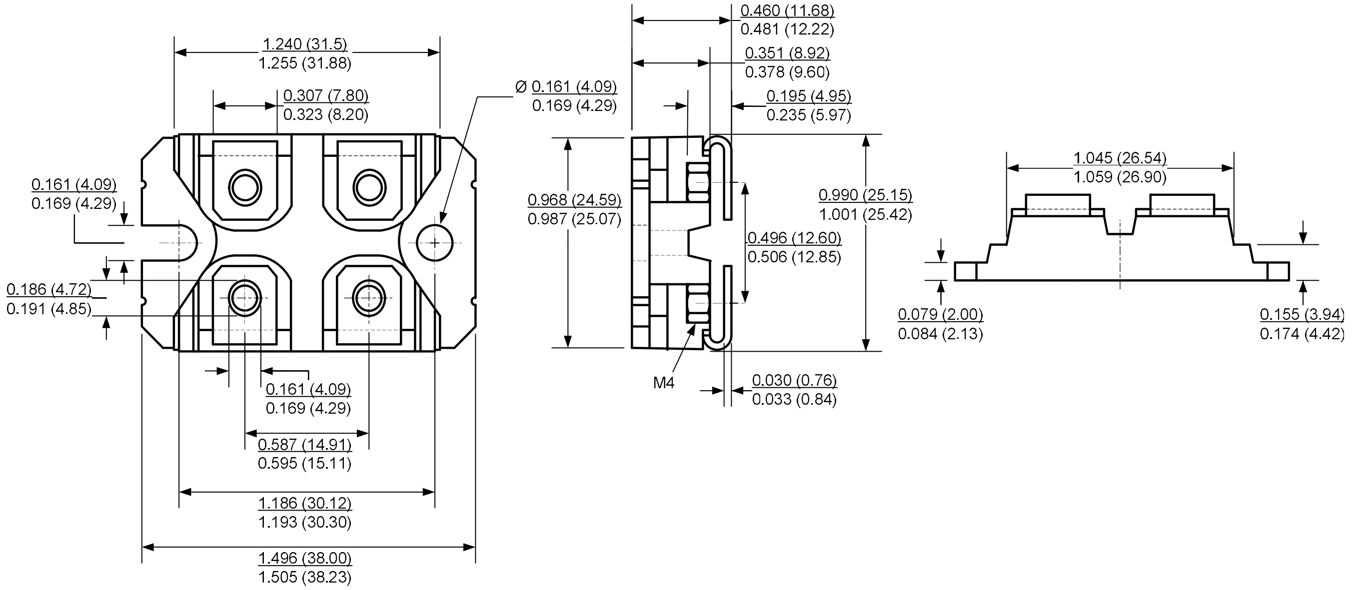
$R_{DIFF}(T_j) = a*T_j^2 + b*T_j + c$ (Ω);

a = 5.84e-05, b = 9.71e-03, c = 2.01

Figure 10: Forward Curve Model (Per Leg)

Package Dimensions:

SOT-227 **PACKAGE OUTLINE**



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.

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.

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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/GB2X100MPS12-227_SPICE.pdf) into LTSPICE (version 4) software for simulation of the GB2X100MPS12-227.

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*     GeneSiC Semiconductor SiC MPS™ Rectifier
*     Revision: 1.1
*     Date: February-2018
***************************************************************************
**          SOT-227 package
***************************************************************************
.SUBCKT GB2X100MPS12 A K Case
L_anode     A      AD      10n
D1          AD     Case    GB2X100MPS
L_cathode   K      Case    10n
.ends
***************************************************************************
.SUBCKT GB2X100MPS12 ANODE KATHODE
D1 ANODE KATHODE GB2X100MPS12_SCHOTTKY
.MODEL GB2X100MPS12_SCHOTTKY D
+ IS       8.72E-15        RS         0.0062
+ N        1               IKF        500
+ EG       1.2             XTI        2
+ TRS1     0.005434        TRS2       2.717E-05
+ CJO      8.52E-9         VJ         0.879
+ M        0.438           FC         0.5
+ TT       1.00E-10        BV         1200
+ IBV      10E-06          VPK        1200
+ IAVE     100             TYPE       SiC_MPS™
+ MFG      GeneSiC_Semi
.ENDS
* End of GB2X100MPS12-227 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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