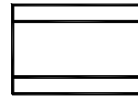


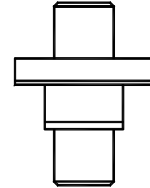
# Microwave packaged high-temperature 4HSiC pin diode

## Features

- ➔ Voltage Ratings to 600 Volts
- ➔ Designed for HF and Microwave Kilowatt Switches
- ➔ Low Loss and Distortion Levels
- ➔ Rugged, Hermetically Sealed Packaging



**FOSiC-C400**  
**FOSiC-C600**



**FOSiC-D400**  
**FOSiC-D600**

## Description

High-voltage 4HSiC pin diodes utilize modern semiconductor and packaging technology that assures high operating temperature, low loss, low distortion, and reliable performance in kilowatt switch applications at a frequencies up to 40 GHz.

The 4HSiC pin diodes offer improved performance characteristics in various microwave semiconductor applications. These advantages result from the inherent semiconductor material properties of 4HSiC including high operating temperature, low resistance and fast switching speed. Low I-region carrier concentration results in near zero bias voltages.

High-voltage 4HSiC diode chips are SiO<sub>2</sub> passivated and protected by high-temperature polyimide lacquer. The high-temperature polyimide lacquer covers the mesastructure and all exposed junctions.

Low loss in modulators, switches and phase shifter circuits (up to 40 GHz) is achievable as a result of low parasitic series resistance in the conducting and non-conducting state.

## Electrical Specification @ +25 °C

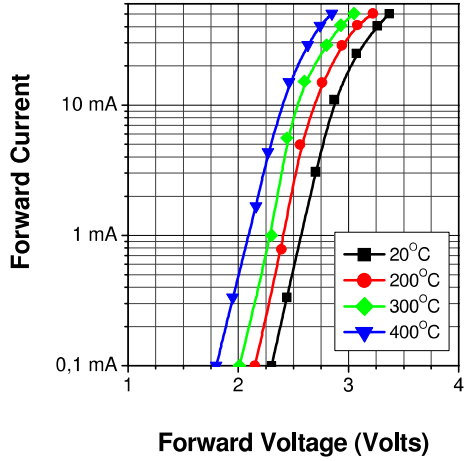
Model	Maximum Forward R <sub>s</sub> @ 40 mA, 1 MHz (Ohms)	Capacitance @1 MHz - 40 Volts Maximum (pF)	Minimum Reverse Voltage V <sub>B</sub> @ 10 μA (Volts)	Nominal Switching <sup>1</sup> Speed (ns)	Carrier <sup>2</sup> Lifetime (ns)
<b>FOSiC-C400</b>	5.0	0.50	300	25.0	15.0
<b>FOSiC-C600</b>	5.0	0.50	600	25.0	15.0
<b>FOSiC-D400</b>	4.0	0.70	300	25.0	15.0
<b>FOSiC-D600</b>	4.0	0.70	600	25.0	15.0

Notes:

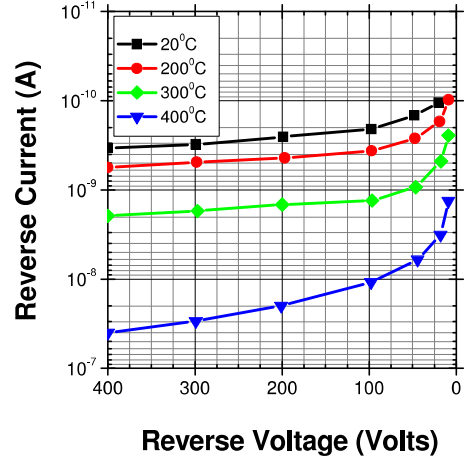
1. Switching speed is measured between 2 dB and 20 dB loss in a shunt mounted 5.0 GHz switch.
2. Carrier lifetime is measured at 10 mA using stored charge measurements.

# Typical Performance Curves

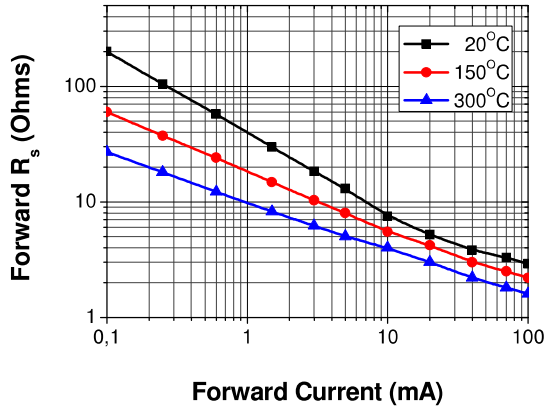
Forward Current VS Forward Voltage



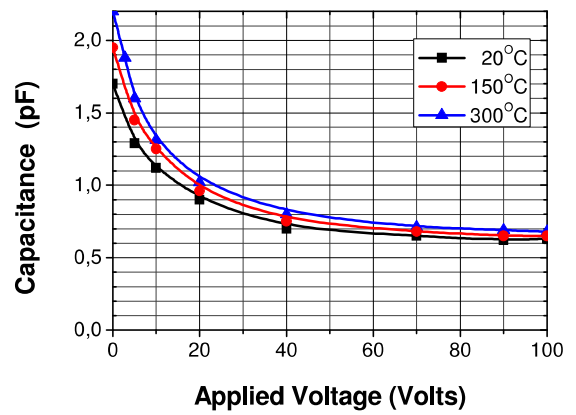
Reverse Current VS Reverse Voltage (FOSiC-D400)



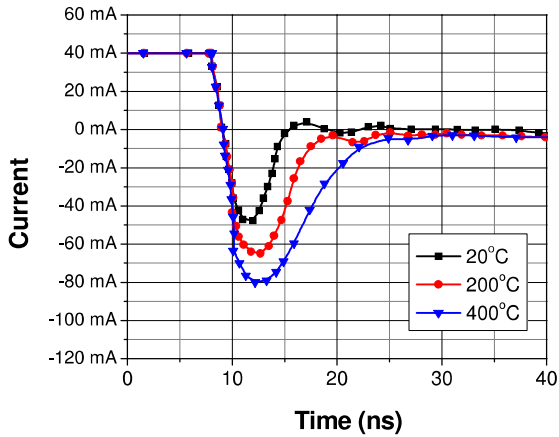
Forward Resistance VS Forward Current (FOSiC-D600)



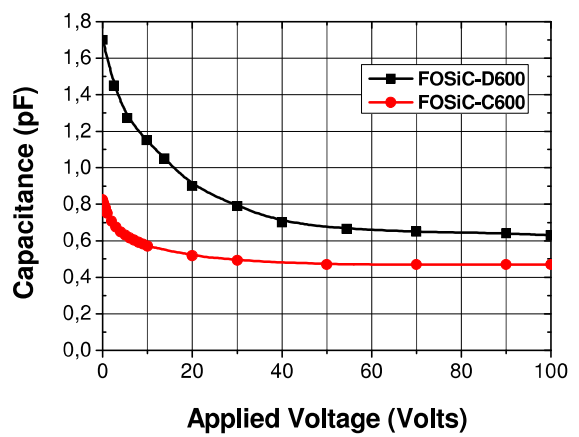
Capacitance Voltage Characteristics (FOSiC-D600)



Switching transient process



Capacitance Voltage Characteristics @ +25 °C



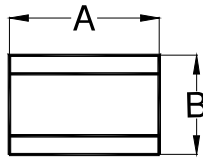
## Maximum Ratings

Parameter	Absolute Maximum
Temperature	
Operating	-65 °C to +300 °C
Storage	-65 °C to +400 °C
Voltage	Breakdown Voltage
Power Dissipation	1000 mW @ +25 °C

## Packaging

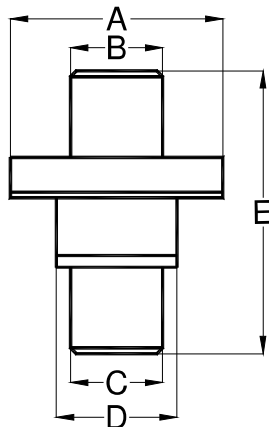
New metal-ceramic packages have been developed for the high-voltage 4HSiC pin diode series. They are designed to withstand high operating temperature, kilowatt microwave power levels, extremely high voltages and currents, and to be compatible with the semiconductor chip and RF circuitry. The 4HSiC pin diode chip is bonded to the package at the temperature 450 °C and the anode gold ribbon is bonded to the chip by thermocompression at a temperature exceeding 350 °C. The packages are sealed using a diffusion welding technique.

### Pill



Dim	Millimeters	
	Min.	Max.
A	1.20	1.25
B	0.70	0.80

### Stud



Dim	Millimeters	
	Min.	Max.
A	3.44	3.7
B		1.55
C	1.54	1.6
D	2.08	2.2
E		4.9

## Applications

4HSiC high-voltage pin diodes are designed to be used as high power switching elements in pulse kilowatt HF and microwave applications. They assure a switching time of the microwave signal of 25÷30 ns and operation at package temperatures up to 300 °C. Pin diodes electrical and thermal properties assure predictable low loss, high power handling, and low distortion level. Some typical applications are as follows:

1. Microwave modulator
2. Phase shifter circuits
3. Filter Switches
4. Antenna Couplers