

# Agilent HSCH-9101/9201/9251 GaAs Beam Lead Schottky Barrier Diodes

## Data Sheet

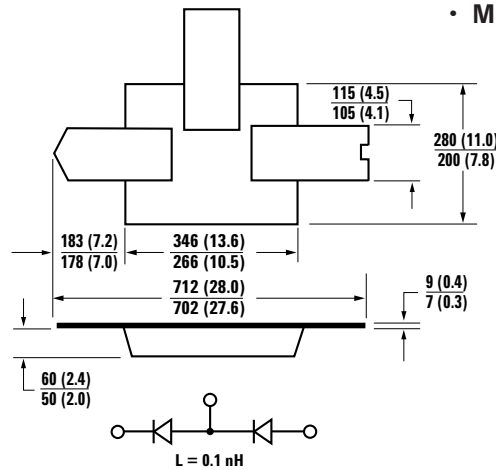
### Features

- Gold tri-metal system for improved reliability
- Low capacitance
- Low series resistance
- High cutoff frequency
- Polyimide passivation
- Multiple configurations

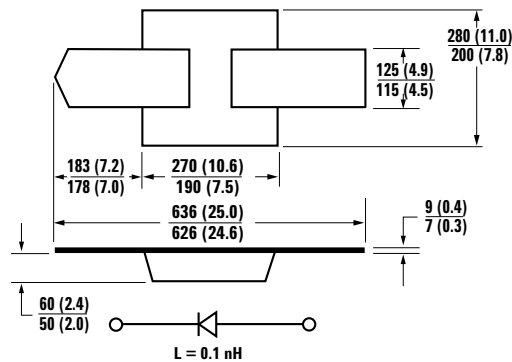
### Description

The HSCH-9101 single, the HSCH-9201 series pair, and the HSCH-9251 anti-parallel pair are advanced gallium arsenide Schottky barrier diodes. These devices are fabricated utilizing molecular beam epitaxy (MBE) manufacturing techniques and feature rugged construction and consistent electrical performance. A polyimide coating provides scratch protection and resistance to contamination.

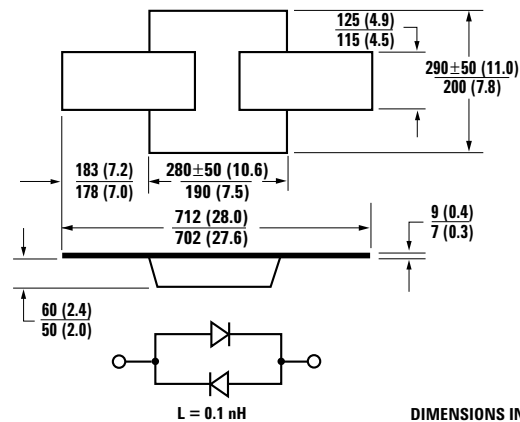
HSCH-9201



HSCH-9101



HSCH-9251 Junction Side Up



DIMENSIONS IN  $\mu\text{m}$  (1/1000 inch)



### Applications

This line of Schottky diodes is optimized for use in mixer applications at millimeter wave frequencies. Some suggested mixer types are single ended and single balanced for the single and series pair. The anti-parallel pair is ideal for harmonic mixers.

### Assembly Techniques

Diodes are ESD sensitive. ESD preventive measures must be employed in all aspects of storage, handling, and assembly.

Diode ESD precautions, handling considerations, and bonding methods are critical factors in successful diode performance and reliability.

Agilent application note #55, "Beam Lead Diode Bonding and Handling Procedures" provides basic information on these subjects.

### Maximum Ratings

Power Dissipation at  $T_{LEAD} = 25^{\circ}C$  ..... 75 mW per junction  
 Measured in an infinite heat sink derated linearly  
 to zero at maximum rated temperature  
 Operating Temperature .....  $-65^{\circ}C$  to  $+150^{\circ}C$   
 Storage Temperature .....  $-65^{\circ}C$  to  $+150^{\circ}C$   
 Mounting Temperature .....  $235^{\circ}C$  for 10 seconds  
 Minimum Lead Strength ..... 6 grams

### Electrical Specifications at $T_A = 25^{\circ}C$

Symbol	Parameters and Test Conditions	Units	Part Number								
			HSCH-9101			HSCH-9201			HSCH-9251		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
$C_j^{[1]}$	Junction Capacitance $V_R = 0 V, f = 1 MHz$	pF		0.040	0.050		0.040	0.050		0.040	
$\Delta C_j^{[1]}$	Junction Capacitance Variation $V_R = 0 V, f = 1 MHz$	pF					0.005	0.010			
$R_s^{[2]}$	Series Resistance	W			6			6			6
$V_{F1}$	Forward Voltage $I_f = 1 mA$	mV		700	800		700	800		700	800
$V_{F10}$	Forward Voltage $I_f = 10 mA$	mV		800	850		800	850		800	850
$\Delta V_F$	Forward Voltage Variation $I_f = 1 mA$ and $10 mA$	mV						15			15
$V_{BR}$	Reverse Breakdown Voltage $V_R = V_{BR}$ measure $I_R \leq 10 \mu A$ (per junction)	V	4.5			4.5					

#### Notes:

1. Junction capacitance is determined by measuring total device capacitance and subtracting the calculated parasitic capacitance (0.035 pF).
2. Series resistance is determined by measuring the dynamic resistance and subtracting the calculated junction resistance of  $6\Omega$ .

## Typical Parameters

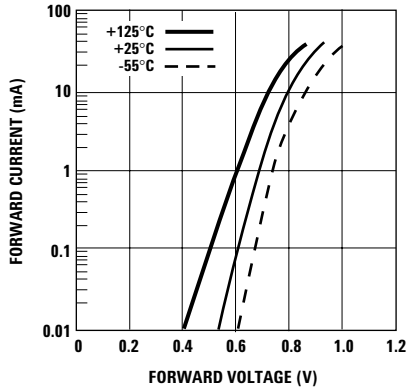


Figure 1. Typical Forward Characteristics for HSCH-9101, HSCH-9201, and HSCH-9251.

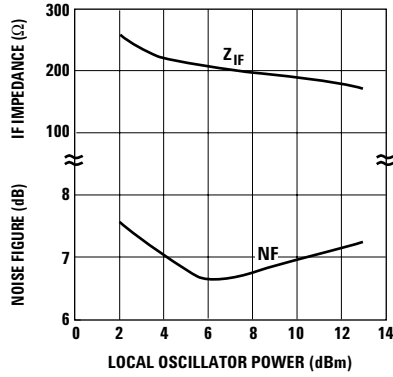


Figure 2. Typical Noise Figure and I.F. Impedance vs. Local Oscillator Power, for HSCH-9101 and HSCH-9201.

## SPICE Parameters

Parameter	Units	HSCH-9XXX
$B_V$	V	5
$C_{J0}$	pF	0.04
$E_G$	eV	1.43
$I_{BV}$	A	10E-5
$I_S$	A	1.6 x 10E-13
N		1.20
$R_S$	$\Omega$	5
$P_B$	V	0.7
$P_T$		2
M		0.5

This data sheet contains a variety of typical and guaranteed performance data. The information supplied should not be interpreted as a complete list of circuit specifications. In this data sheet the term *typical* refers to the 50th percentile performance. For additional information contact your local Agilent Technologies sales representative.

*www.semiconductor.agilent.com*

Data subject to change.

Copyright © 2001 Agilent Technologies, Inc.

Obsoletes 5965-8851E

October 18, 2001

5988-1897EN



**Agilent Technologies**