GaAs Beam Lead Schottky Barrier Diodes

Technical Data

HSCH-9101
HSCH-9201
HSCH-9251

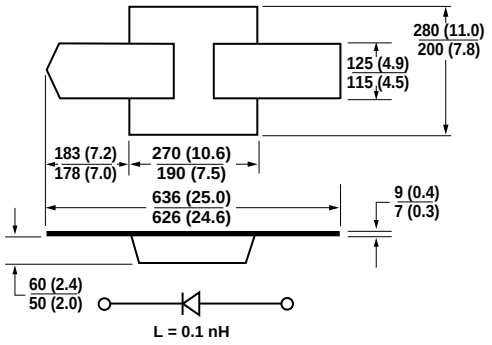
Features

- **Gold Tri-Metal System**
  For Improved Reliability
- **Low Capacitance**
- **Low Series Resistance**
- **High Cutoff Frequency**
- **Polyimide Passivation**
- **Multiple Configurations**

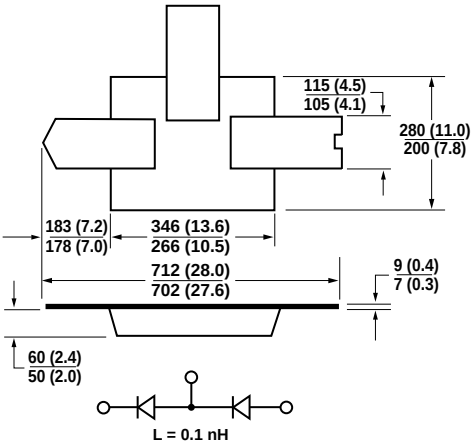
Description

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-9101

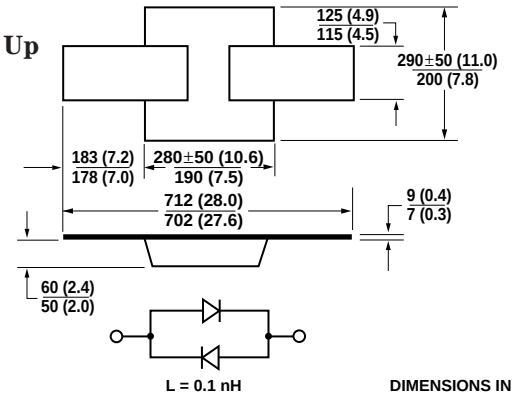


HSCH-9201



HSCH-9251

Junction Side Up



DIMENSIONS IN μm (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

Thermocompression bonding is recommended. Welding or conductive epoxy may also be used. For additional information see Application Note 979, "The Handling and Bonding of Beam Lead Devices Made Easy," or Application Note 992, "Beam Lead Attachment Methods," or Application Note 993, "Beam Lead Device Bonding to Soft Substrates."

GaAs diodes are ESD sensitive. Proper precautions should be used when handling these devices.

Maximum Ratings

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

Electrical Specifications at T_A = 25°C

Part Number			HSCH-9101			HSCH-9201			HSCH-9251		
Symbol	**Parameters and Test Conditions**	**Units**	**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	
ΔC_j[1]	Junction Capacitance Difference V_R = 0 V, f = 1 MHz	pF					0.005	0.010			
R_S[2]	Series Resistance	Ω			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
ΔV_F	Forward Voltage Difference I_F = 1 mA and 10 mA	mV						15			15
V_{BR}	Reverse Breakdown Voltage $V_R = V_{BR}$ measure $I_R \leq$ 10 μA (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 Ω.

Typical Parameters

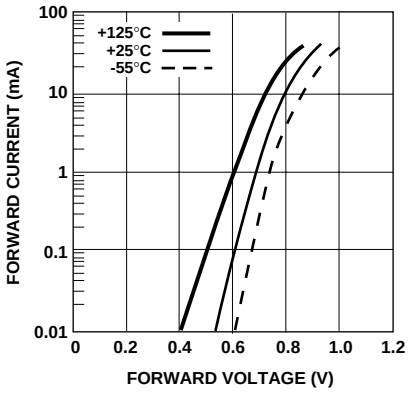


Figure 1. Typical Forward Characteristics for HSCH-9101, HSCH-9201, and HSCH-9251.

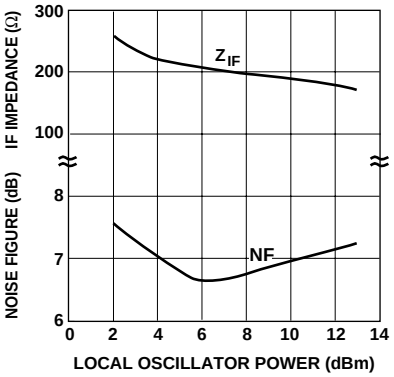


Figure 2. Typical Noise Figure and I.F. Impedance vs. Local Oscillator Power, for HSCH-9101 and HSCH-9201.

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	1.6x10E-13
N		1.20
R_S	Ω	5
P_B	V	0.7
P_T		2
M		0.5