



# THE DATASHEET OF HSCH-5314





### Maximum Ratings

Pulse Power Incident at  $T_A = 25^\circ\text{C}$  ..... 1 W  
 Pulse Width = 1 ms,  $D_u = 0.001$   
 CW Power Dissipation at  $T_A = 25^\circ\text{C}$  ..... 150 mW  
*Measured in an infinite heat sink derated linearly  
 to zero at maximum rated temperature*  
 $T_{OPR}$  – Operating Temperature Range .....  $-65^\circ\text{C}$  to  $+175^\circ\text{C}$   
 $T_{STG}$  – Storage Temperature Range .....  $-65^\circ\text{C}$  to  $+200^\circ\text{C}$   
 Minimum Lead Strength ..... 4 grams pull on any lead  
 Diode Mounting Temperature .....  $+350^\circ\text{C}$  for 10 sec. max.

These diodes are ESD sensitive. Handle with care to avoid static discharge through the diode.

Table IA. Electrical Specifications for RF Tested Diodes at  $T_A = 25^\circ\text{C}$

Part Number HSCH-	Barrier	Max. Noise Figure NF (dB)	$I_F$ Impedance $Z_{IF} (\Omega)$		Max. SWR	Min. Break-down Voltage $V_{BR} (V)$	Max. Dynamic Resistance $R_D (\Omega)$	Max. Total Capacitance $C_T (pF)$	Max. Forward Voltage $V_F (mV)$	Max. Leakage Current $I_R (nA)$
			Min.	Max.						
5314	Medium	7.2 at 16 GHz	200	400	1.5:1	4	16	0.15	500	100
5340	Low	7.5 at 26 GHz	150	350			20	0.10	375	400
Test Conditions			DC Load Resistance - $0 \Omega$ LO Power = 1 mW $I_F = 30 \text{ MHz}$ , 1.5 dB NF			$I_R \leq 10 \mu\text{A}$	$I_F = 5 \text{ mA}$	$V_R = 0 \text{ V}$ $f = 1 \text{ MHz}$	$I_F = 1 \text{ mA}$	$V_R = 1 \text{ V}$

\*Minimum batch size 20 units.

**Note:**

1.  $C_T = C_J + 0.02 \text{ pF}$  (fringing cap).

Table IB. Electrical Specifications for DC Tested Diodes at  $T_A = 25^\circ\text{C}$

Part Number HSCH-	Batch* Matched HSCH-	Barrier	Minimum Breakdown Voltage $V_{BR}$ (V)	Maximum Dynamic Resistance $R_D$ ( $\Omega$ )	Maximum Total Capacitance $C_T$ (pF)	Maximum Forward Voltage $V_F$ (mV)	Maximum Leakage Current $I_R$ (nA)
5312 5310		Medium	4	16 20	0.15 0.10	500	100
5332 5330	5331	Low	4	16 20	0.15 0.10	375	400
Test Conditions	$\Delta V_F \leq 15$ mV @ 5 mA		$I_R \leq 10$ $\mu\text{A}$	$I_F = 5$ mA	$V_R = 0$ V $f = 1$ MHz	$I_F = 1$ mA	$V_R = 1$ V

\*Minimum batch size 20 units.

### Typical Detector Characteristics at $T_A = 25^\circ\text{C}$

#### Medium Barrier and Low Barrier (DC Bias)

Parameter	Symbol	Typical Value	Units	Test Conditions
Tangential Sensitivity	TSS	-54	dBm	20 $\mu\text{A}$ Bias, $R_L = 100$ k $\Omega$ Video Bandwidth = 2 MHz $f = 10$ GHz
Voltage Sensitivity	$\gamma$	6.6	mV/ $\mu\text{W}$	
Video Resistance	$R_V$	1400	$\Omega$	

#### Low Barrier (Zero Bias)

Parameter	Symbol	Typical Value	Units	Test Conditions
Tangential Sensitivity	TSS	-44	dBm	Zero Bias, $R_L = 10$ M $\Omega$ Video Bandwidth = 2 MHz $f = 10$ GHz
Voltage Sensitivity	$\gamma$	10	mV/ $\mu\text{W}$	
Video Resistance	$R_V$	1.8	M $\Omega$	

### SPICE Parameters

Parameter	Units	HSCH-5312 HSCH-5314	HSCH-5310	HSCH-5330 HSCH-5340	HSCH-5332
$B_V$	V	5	5	5	5
$C_{J0}$	pF	0.13	0.09	0.09	0.13
$E_G$	eV	0.69	0.69	0.69	0.69
$I_{BV}$	A	10E-5	10E-5	10E-5	10E-5
$I_S$	A	3 x 10E-10	3 x 10E-10	4 x 10E-8	4 x 10E-8
N		1.08	1.08	1.08	1.08
$R_S$	$\Omega$	9	13	13	9
$P_B$	V	0.65	0.65	0.5	0.5
$P_T$		2	2	2	2
M		0.5	0.5	0.5	0.5

## Typical Parameters

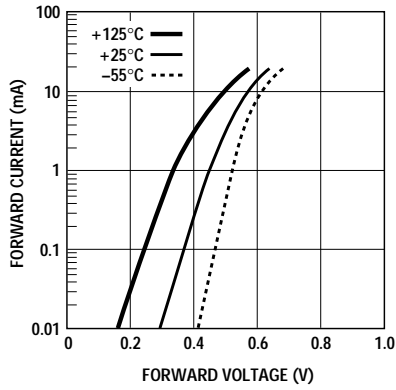


Figure 1. Typical forward characteristics for medium barrier beam lead diodes. HSCH-5310 series.

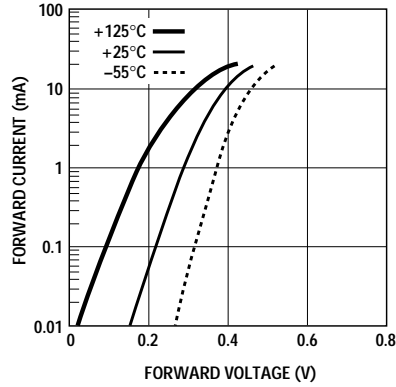


Figure 2. Typical forward characteristics for low barrier beam lead diodes. HSCH-5330, -5340 series.

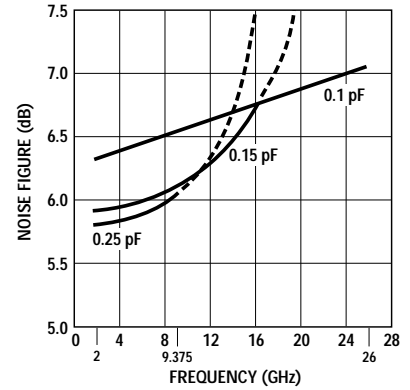


Figure 3. Typical noise figure vs. frequency.

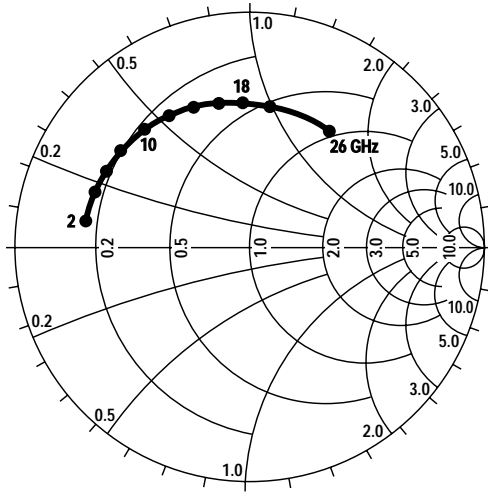


Figure 4. Typical admittance characteristics with 1 mA self bias. HSCH-5340.

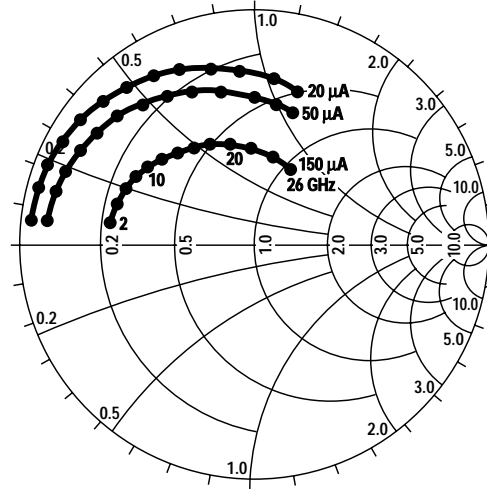


Figure 5. Typical admittance characteristics with external bias. HSCH-5340.

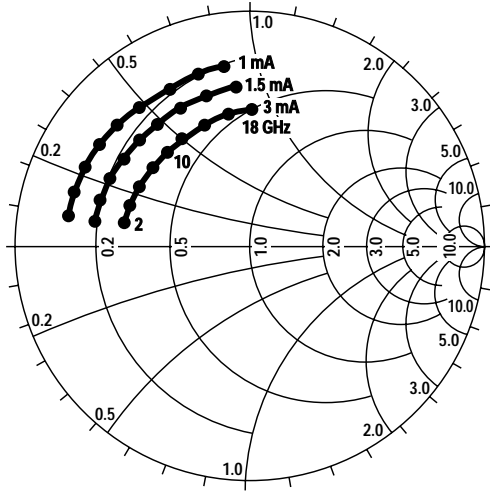


Figure 6. Typical admittance characteristics with self bias. HSCH-5314.

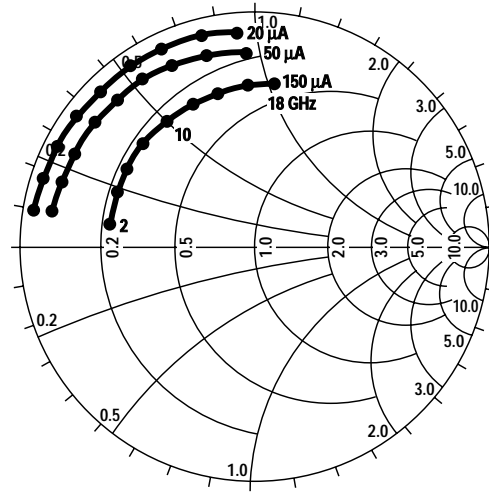
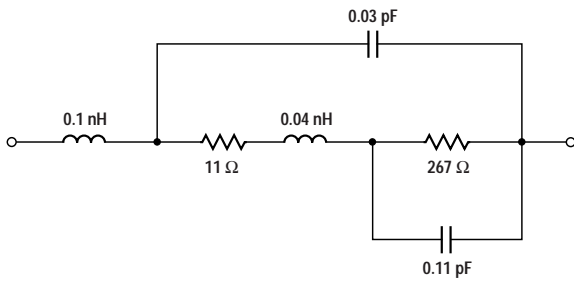


Figure 7. Typical admittance characteristics with external bias. HSCH-5314.

### Models for Each Beam Lead Schottky Diode

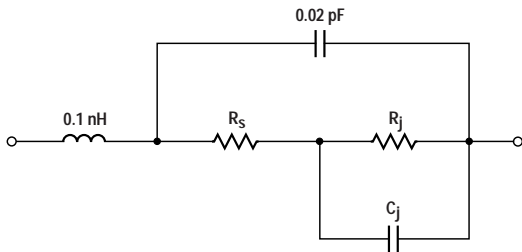
#### HSCH-5340

##### 1 mA Self Bias



#### Other HSCH-53xx

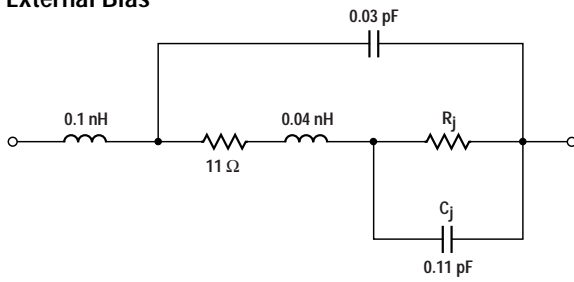
##### Self Bias



Part Numbers	1.0 mA Self Bias			1.5 mA Self Bias			3.0 mA Self Bias		
	$R_S$ ( $\Omega$ )	$R_J$ ( $\Omega$ )	$C_J$ (pF)	$R_S$ ( $\Omega$ )	$R_J$ ( $\Omega$ )	$C_J$ (pF)	$R_S$ ( $\Omega$ )	$R_J$ ( $\Omega$ )	$C_J$ (pF)
HSCH-5314	5.0	393	0.11	5.2	232	0.11	5.0	150	0.12

## HSCH-5340

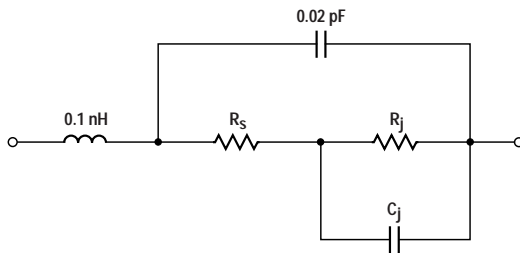
### External Bias



Part Numbers	20 $\mu$ A DC Bias		50 $\mu$ A DC Bias		150 $\mu$ A DC Bias	
	$R_j$ ( $\Omega$ )	$C_j$ (pF)	$R_j$ ( $\Omega$ )	$C_j$ (pF)	$R_j$ ( $\Omega$ )	$C_j$ (pF)
HSCH-5340	1300	0.09	560	0.09	187	0.10

## Other HSCH-53xx

### External Bias



Part Numbers	20 $\mu$ ADC Bias			50 $\mu$ ADC Bias			150 $\mu$ ADC Bias		
	$R_s$ ( $\Omega$ )	$R_j$ ( $\Omega$ )	$C_j$ (pF)	$R_s$ ( $\Omega$ )	$R_j$ ( $\Omega$ )	$C_j$ (pF)	$R_s$ ( $\Omega$ )	$R_j$ ( $\Omega$ )	$C_j$ (pF)
HSCH-5314	2.8	1300	0.11	4.7	520	0.12	2.7	180	0.13

For product information and a complete list of distributors, please go to our website: [www.avagotech.com](http://www.avagotech.com)

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