Surface Mount Microwave Schottky Mixer Diodes

Technical Data

HSMS-8101 Single
HSMS-8202 Pair
HSMS-8205 Pair
HSMS-8207 Quad

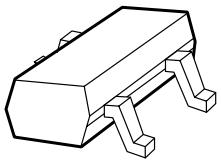
Features

- **Optimized for use at 10-14 GHz**
- **Low Capacitance**
- **Low Conversion Loss**
- **Low RD**
- **Low Cost Surface Mount Plastic Package**

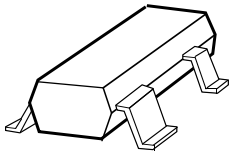
Description/Applications

These low cost microwave Schottky diodes are specifically designed for use at X/Ku-bands and are ideal for DBS and VSAT downconverter applications. They are available in SOT-23 and SOT-143 standard package configurations.

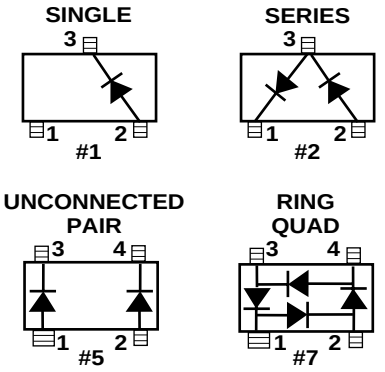
Plastic SOT-23 Package



Plastic SOT-143 Package



Package Lead Code Identification (Top View)



Absolute Maximum Ratings[1], T_A = +25°C

Symbol	Parameter	Unit	Min.	Max.
P_T	Total Device Dissipation[2]	mW	—	75
P_{IV}	Peak Inverse Voltage	V	—	4
T_J	Junction Temperature	°C	—	+150
T_{STG}, T_{op}	Storage and Operating Temperature	°C	-65	+150

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2. Measured in an infinite heat sink at T_{CASE} = 25°C. Derate linearly to zero at 150°C per diode.

DC Electrical Specifications, T_A = 25°C

				HSMS-8101		HSMS-8202		HSMS-8205		HSMS-8207	
Symbol	**Parameters and Test Conditions**		**Units**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
V_{BR}	Breakdown Voltage	I_R = 10 µA	V	4		4		4		4	
C_T	Total Capacitance	V_R = 0 V, f = 1 MHz	pF		0.26		0.26		0.26		0.26
ΔC_T	Capacitance Difference	V_R = 0 V, f = 1 MHz	pF		—		0.04		0.04		0.04
R_D	Dynamic Resistance	I_F = 5 mA	Ω		14		14		14		14
ΔR_D	Dynamic Resistance Difference	I_F = 5 mA	Ω		—		2		2		2
V_F	Forward Voltage	I_F = 1 mA	mV	250	350	250	350	250	350	250	350
ΔV_F	Forward Voltage Difference	I_F = 1 mA	mV		—		20		20		20
	Lead Code			1		2		5		7	
	Package Marking Code in White			R1		2R		R5		R7	

RF Electrical Parameters, T_A = 25°C

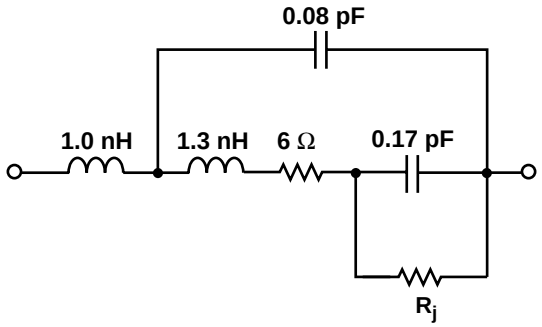
Symbol	Parameter	Units	Typical
L_c	Conversion Loss at 12 GHz	dB	6.3
Z_{IF}	IF Impedance	Ω	150
SWR	SWR at 12 GHz		1.2

Note:
DC Load Resistance = 0 Ω; LO Power = 1 mW.

SPICE Parameters

I_S = 4.6 E-8	E_G = 0.69	TT = 0
R_S = 6	C_{JO} = 0.18 E-12	
N = 1.09	$P_B(V_J)$ = 0.5	
B_V = 7.3	M = 0.5	
I_{BV} = 10E-5	FC = 0.5	

Linear Equivalent Circuit



Self Bias

	1 mA	2.5 mA
R_j	263	142

Typical Performance, T_C = 25°C

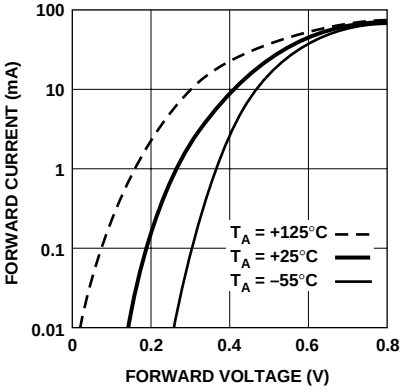


Figure 1. Typical Forward Current vs. Forward Voltage at Three Temperatures.

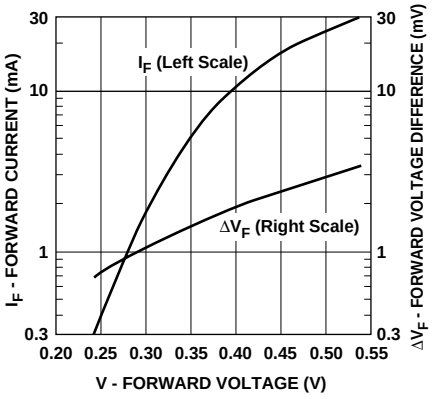


Figure 2. Typical VF Match, HSMS-820X Pairs and Quads.

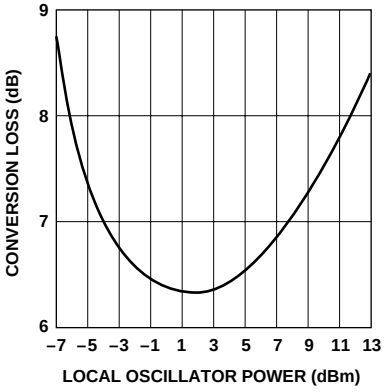


Figure 3. Typical Conversion Loss vs. Local Oscillator Power.

Ordering Information

Specify part number followed by option. For example:

H SMS-8101 #X XX

- XX — Bulk or Tape and Reel Option
- #X — Profile: Low = L
- SMS-8101 — Part Number
- SMS — Surface Mount Schottky
- H — Hewlett-Packard

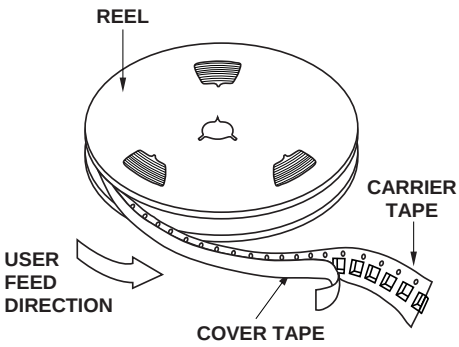
Profile Option Descriptions

#L30 = Bulk

#L31 = 3K pc. Tape and Reel, Device Orientation Figures 4, 5

Tape and Reeling conforms to Electronic Industries RS-481, "Taping of Surface Mounted Components for Automated Placement."

Device Orientation



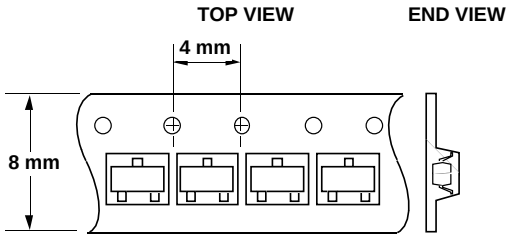


Figure 4. Option L31 for SOT-23 Packages.

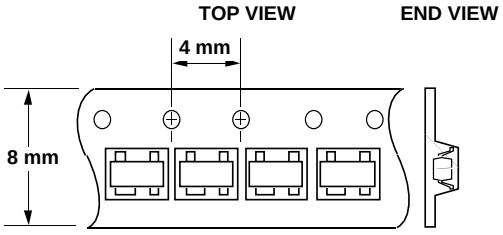
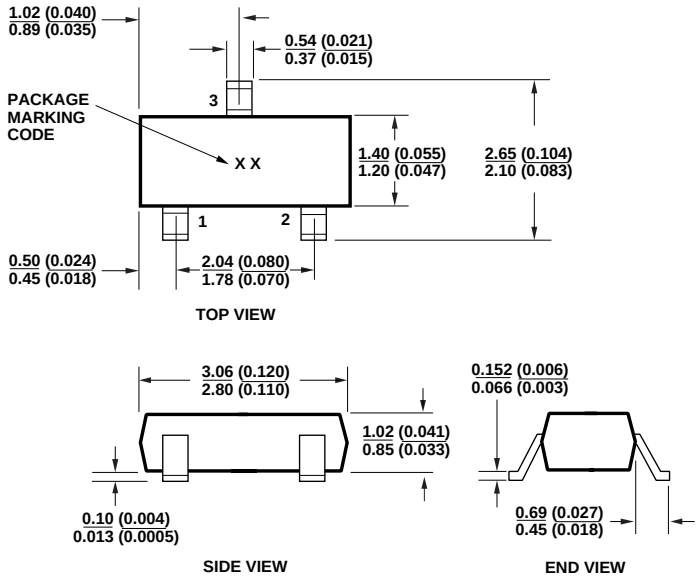


Figure 5. Option L31 for SOT-143 Packages.

Package Characteristics

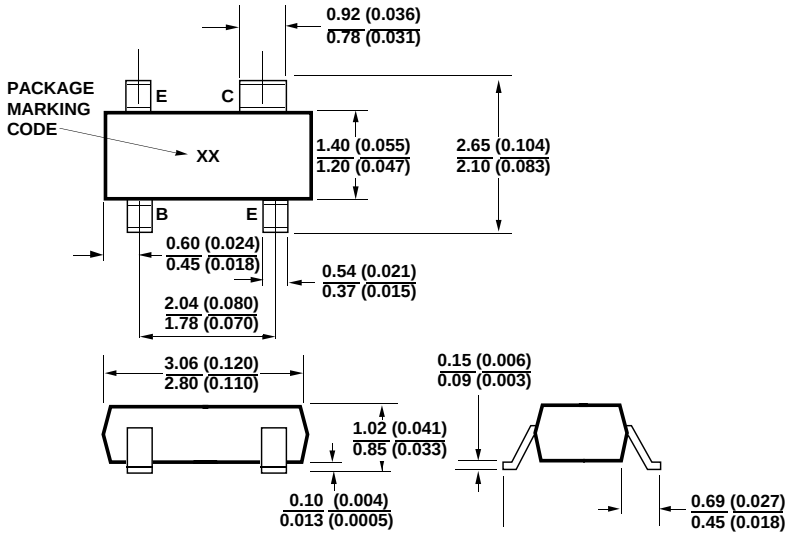
Lead Material ..... Alloy 42
Lead Finish ..... Tin-Lead 85-15%
Maximum Soldering Temperature ..... 260°C for 5 seconds
Minimum Lead Strength ..... 2 pounds pull
Typical Package Inductance ..... 2 nH
Typical Package Capacitance ..... 0.08 pF (opposite leads)

Package Dimensions
Outline 23 (SOT-23)



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline 143 (SOT-143)



DIMENSIONS ARE IN MILLIMETERS (INCHES)