DATA SHEET

Surface Mount Mixer and Detector Schottky Diodes

Features

- Designed for high-volume commercial applications
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C[1] per JEDEC J-STD-020
- Tight parameter distribution
- Available as singles, pairs and dual pairs
- Available in tape and reel packaging

Description

These low-cost, surface mountable, plastic packaged, silicon mixer Schottky diodes are designed for RF and microwave mixers and detectors. They include low barrier diodes and zero-bias detectors, combining Skyworks advanced semiconductor technology with low-cost packaging techniques. All diodes are 100% DC tested and deliver tight parameter distribution, minimizing performance variability. They are available in SC-70, SC-79, SC-88, SOD-323, SOT-23, SOT-143, and LGA packages. Wiring configurations include singles, common cathode, series pairs, unconnected pairs and dual series pairs. Applications include low noise receivers used in high-sensitivity ID tags, wireless systems, and radio designs. They may be used at frequencies to 10 GHz. SPICE model parameters are included as a design tool.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

Absolute Maximum Ratings

Characteristic	Value
Reverse voltage (V_R)	Rated V_B
Forward current - steady state (I_F)	50 mA
Power dissipation (P_D)	75 mW
Storage temperature (T_{ST})	-65 °C to +150 °C
Operating temperature (T_{OP})	-65 °C to +150 °C
Junction temperature (T_J)	150 °C
Soldering temperature	260 °C for 5 seconds
Electrostatic Discharge (ESD) Human Body Mode (HBM)	Class 0
Electrostatic Discharge (ESD) Charged Device Model (CDM)	Class C4

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

1. SOT-143 (-015) MSL to be defined.

				
Single	Single	Single	Common Cathode	Series Pair
SC-79	SOD-323	SOT-23		SOT-23
				SMS1546-005 Marking: SG2
				SMS1546-005LF Marking: XG2
♦SMS7621-079 Marking: Cathode		**SMS7621-001** Marking: SH1		**♦SMS7621-005** Marking: SH2
♦SMS7621-079LF Marking: Cathode		**SMS7621-001LF** Marking: XH1		**♦SMS7621-005LF** Marking: XH2
♦SMS7630-079 Marking: Anode	**SMS7630-011** Marking: SD	**SMS7630-001** Marking: SD1		**SMS7630-005** Marking: SD2
♦SMS7630-079LF Marking: Anode	**SMS7630-011LF** Marking: XD	**SMS7630-001LF** Marking: XD1		**SMS7630-005LF** Marking: XD2
L_S = 0.7 nH	L_S = 1.5 nH	L_S = 1.5 nH		L_S = 1.5 nH
			SC-70	SC-70
			SMS7621-074 Marking: SH3	**SMS7621-075** Marking: SH2
			SMS7621-074LF Marking: XH3	**SMS7621-075LF** Marking: XH2
			L_S = 1.4 nH	L_S = 1.4 nH

				
Reverse Series Pair	Unconnected Pair	Reverse Unconnected Pair	Unconnected Pair	Dual Series Pair
SOT-23	SOT-143	SOT-143	LGA	SC-88
♦SMS7621-006 Marking: SH8	**SMS7621-015** Marking: SH7		**SMS7621-517** **Lead (Pb)-Free** Marking: H	
♦SMS7621-006LF Marking: XH8	**SMS7621-015LF** Marking: XH7			**SMS7621-081LF** Marking: XHQ
♦SMS7630-006 Marking: SD8		**♦SMS7630-020** Marking: SD0	**SMS7630-517** **Lead (Pb)-Free** Marking: D	
♦SMS7630-006LF Marking: XD8		**♦SMS7630-020LF** Marking: XD0		
L_S = 1.5 nH	L_S = 1.5 nH	L_S = 1.5 nH	L_S = 0.6 nH	L_S = 1.8 nH

LF denotes lead (Pb)-free, RoHS-compliant packaging option as an alternative to our standard tin/lead (Sn/Pb) packaging.

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Electrical Specifications at 25 °C (Per Junction)

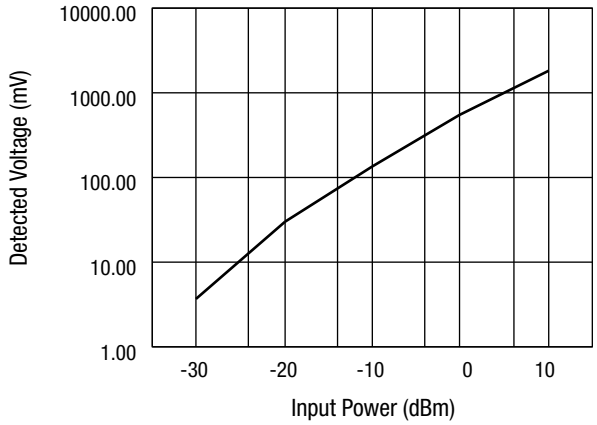
Low Barrier Mixer and Detectors

Part Number	Barrier	V_B @ 10 µA (V)	C_T @ 0 V (pF)	V_F @ 1 mA (mV)	Pair Configuration ΔV_F @ 1 mA (mV)	R_T* (Ω)
		Min.	Max.		Max.	Max.
SMS1546 Series	Low	2	0.5	200–270	10	8 @ 10 mA
SMS7621 Series	Low	2	0.26	260–320	10	18 @ 5 mA

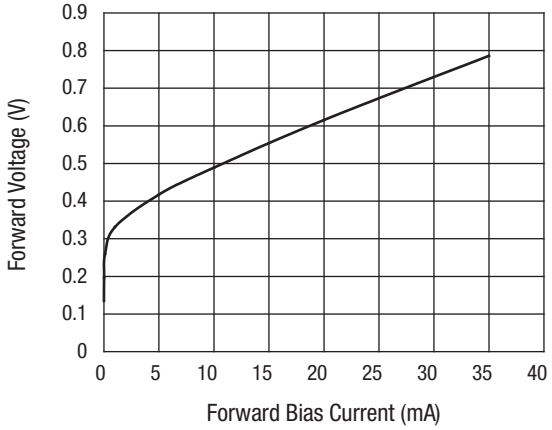
*R_T is the slope resistance.

Zero-Bias Detectors

Part Number	V_B @ 100 µA (V)	C_T @ 0.15 V (pF)	V_F @ 0.1 mA (mV)	V_F @ 1 mA (mV)	Pair Configuration ΔV_F @ 1 mA (mV)	R_V (Ω)
	Min.	Max.			Max.	Typ.
SMS7630 Series	1	0.3	60–120	135–240	10	5000



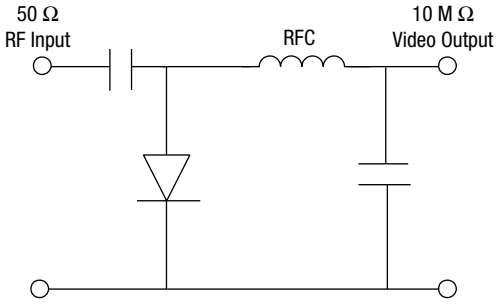
Typical Detector Characteristics @ 1.8 GHz



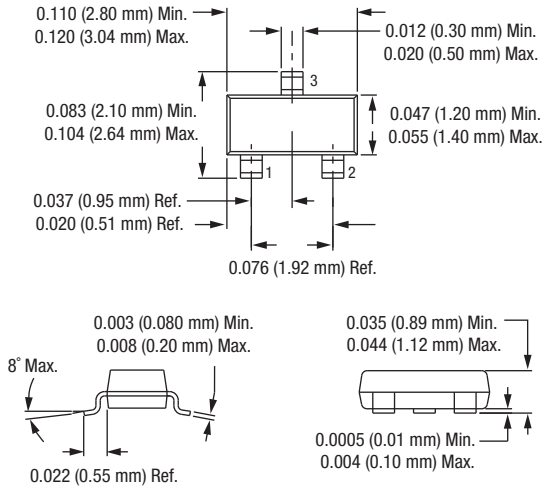
SMS7621-081LF Forward Voltage vs. Forward Bias Current

SPICE Model Parameters (Per Junction)

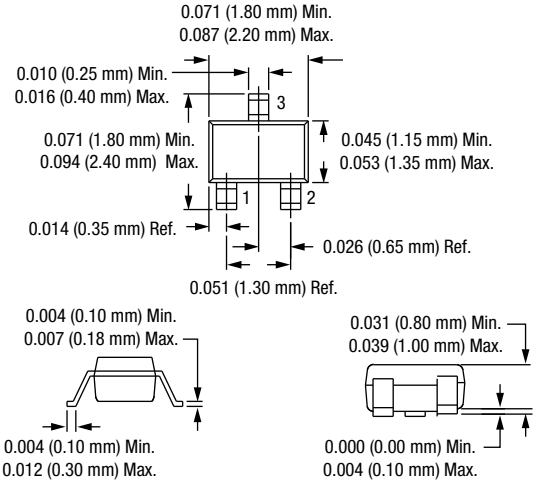
Parameter	Unit	SMS1546	SMS7621	SMS7630
IS	A	3E-7	4E-8	5E-06
R_S	Ω	4	12	20
N		1.04	1.05	1.05
TT	s	1E-11	1E-11	1E-11
C_{J0}	pF	0.38	0.1	0.14
M		0.36	0.35	0.4
E_G	eV	0.69	0.69	0.69
XTI		2	2	2
F_C		0.5	0.5	0.5
B_V	V	3	3	2
I_{BV}	A	1E-5	1E-5	1E-4
V_J	V	0.51	0.51	0.34



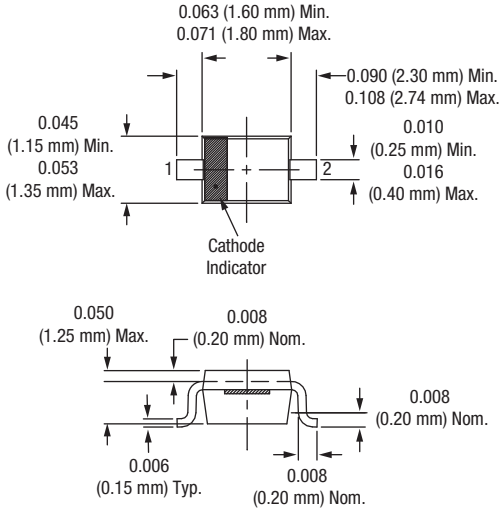
SOT-23



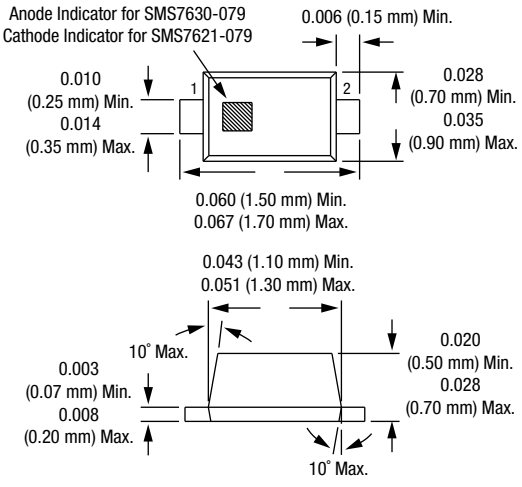
SC-70



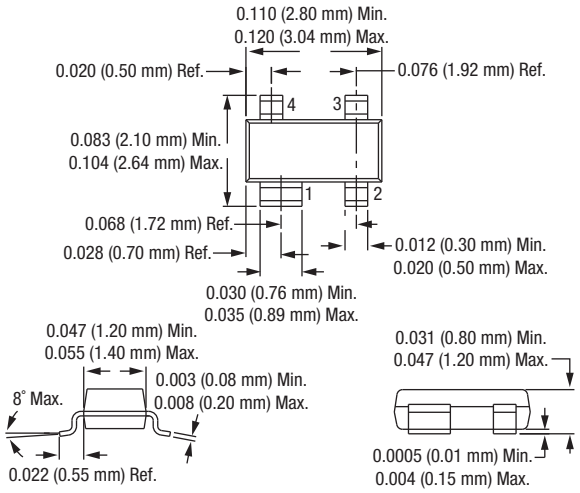
SOD-323



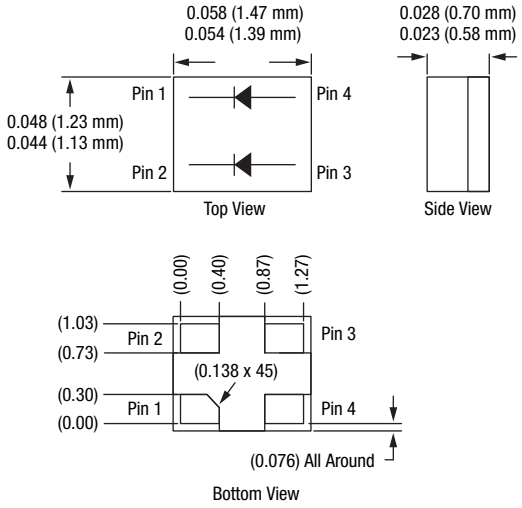
SC-79



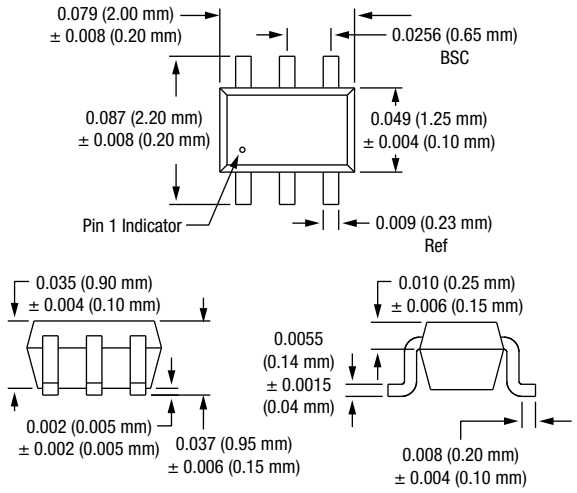
SOT-143



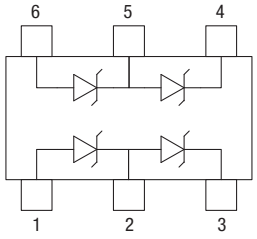
LGA (-517)



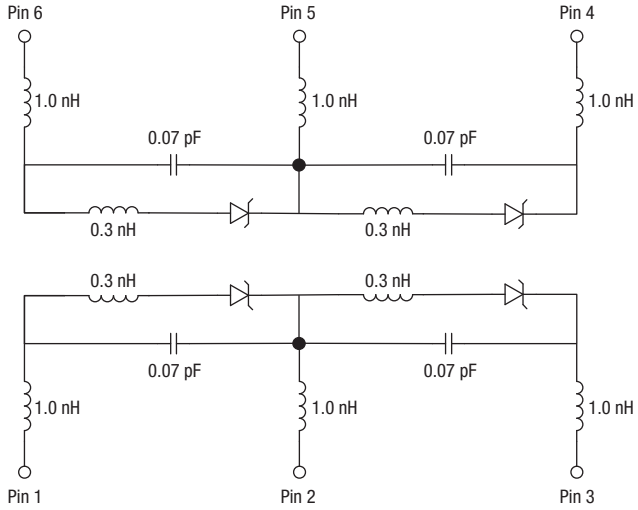
SC-88



SMS7621-081LF Pin Out (Top View)



SMS7621-081LF Equivalent Circuit



Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

Tape and Reel Information

Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.