

DATA SHEET

Surface Mount Mixer and Detector Schottky Diodes

Features

- Designed for high-volume commercial applications
- Available lead (Pb)-free MSL-1 @ 250 °C per JEDEC J-STD-020
- Tight parameter distribution
- Available as singles and 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, SOD-323, SOT-23, SOT-143, and LGA packages. Wiring configurations include singles, common cathode, series pairs and unconnected pairs. Applications include low noise receivers used in high sensitivity ID tags, wireless systems, radio designs and may be used at frequencies to 10 GHz. SPICE model parameters are included as a design tool.

NEW Skyworks offers lead (Pb)-free “environmentally friendly” packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).



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

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, Electrostatic Discharge (ESD) 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.

DATA SHEET • SURFACE MOUNT MIXER AND DETECTOR SCHOTTKY DIODES

Single	Single	Single	Common Cathode	Series Pair	Reverse Series Pair	Unconnected Pair	Reverse Unconnected Pair	Unconnected Pair
SC-79	SOD-323	SOT-23		SOT-23	SOT-23	SOT-143	SOT-143	LGA
				SMS1546-005 Marking: SG2				
				SMS1546-005LF Marking: XG2				
SMS7621-079 Marking: Cathode		SMS7621-001 Marking: SH1		SMS7621-005 Marking: SH2	SMS7621-006 Marking: SH8	SMS7621-015 Marking: SH7		SMS7621-517 Lead (Pb)-Free Marking: H
SMS7621-079LF Marking: Cathode		SMS7621-001LF Marking: XH1		SMS7621-005LF Marking: XH2	SMS7621-006LF Marking: XH8	SMS7621-015LF Marking: XH7		
SMS7630-079 Marking: Anode	SMS7630-011 Marking: SD	SMS7630-001 Marking: SD1		SMS7630-005 Marking: SD2	SMS7630-006 Marking: SD8		SMS7630-020 Marking: SD0	SMS7630-517 Lead (Pb)-Free Marking: D
SMS7630-079LF Marking: Anode	SMS7630-011LF Marking: XD	SMS7630-001LF Marking: XD1		SMS7630-005LF Marking: XD2	SMS7630-006LF Marking: XD8		SMS7630-020LF Marking: XD0	
$L_S = 0.7 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 1.5 \text{ nH}$		$L_S = 1.5 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 1.5 \text{ nH}$	$L_S = 0.6 \text{ nH}$
			SC-70	SC-70	SC-70			
			SMS7621-074 Marking: SH3	SMS7621-075 Marking: SH2				
			SMS7621-074LF Marking: XH3	SMS7621-075LF Marking: XH2				
				SMS7630-075 Marking: SD2				
				SMS7630-075LF Marking: XD2				
			$L_S = 1.4 \text{ nH}$	$L_S = 1.4 \text{ nH}$				

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

Electrical Specifications at 25 °C (Per Junction)

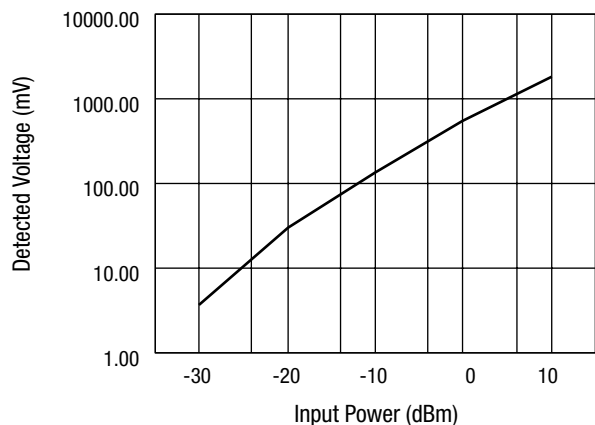
Low Barrier Mixer and Detectors

Part Number	Barrier	$V_B @ 10 \mu\text{A} \text{ (V)}$	$C_T @ 0 \text{ V} \text{ (pF)}$	$V_F @ 1 \text{ mA} \text{ (mV)}$	Pair Configuration (b) $V_F @ 1 \text{ mA} \text{ (mV)}$	$R_T^* @ 10 \text{ mA} \text{ (}\Omega\text{)}$
		Min.	Typ.			
SMS1546 Series	Low	2	0.50	200–270	10	8
SMS7621 Series	Low	2	0.25	260–320	10	18

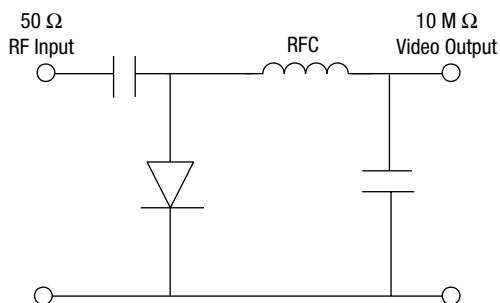
* R_T is the slope resistance.

Zero Bias Detectors

Part Number	$V_B @ 100 \mu\text{A} \text{ (V)}$	$C_T @ 0.15 \text{ V} \text{ (pF)}$	$V_F @ 0.1 \text{ mA} \text{ (mV)}$	$V_F @ 1 \text{ mA} \text{ (mV)}$	Pair Configuration (b) $V_F @ 1 \text{ mA} \text{ (mV)}$	$R_V \text{ (}\Omega\text{)}$
	Min.	Typ.				
SMS7630 Series	1.0	0.30	60–120	135–240	10	5000



Typical Detector Characteristics @ 1.8 GHz



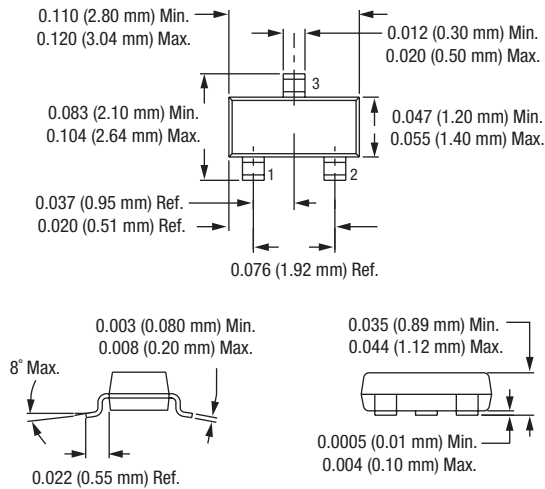
SPICE Model Parameters (Per Junction)

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	0.10	0.14
M		0.36	0.35	0.40
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

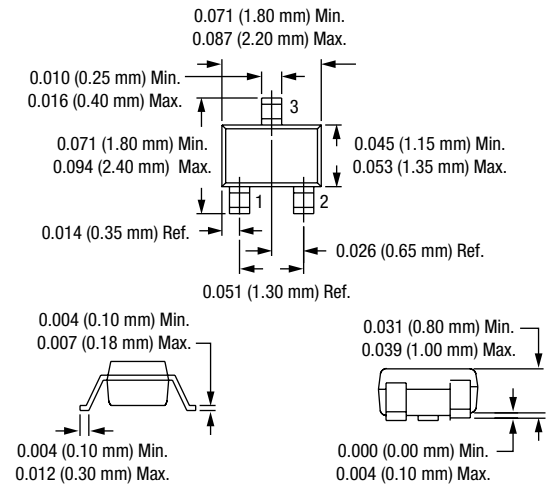
Recommended Solder Reflow Profiles

Refer to the “Recommended Solder Reflow Profile” Application Note.

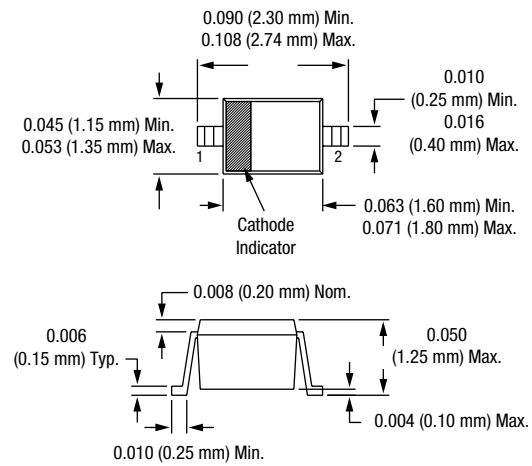
SOT-23



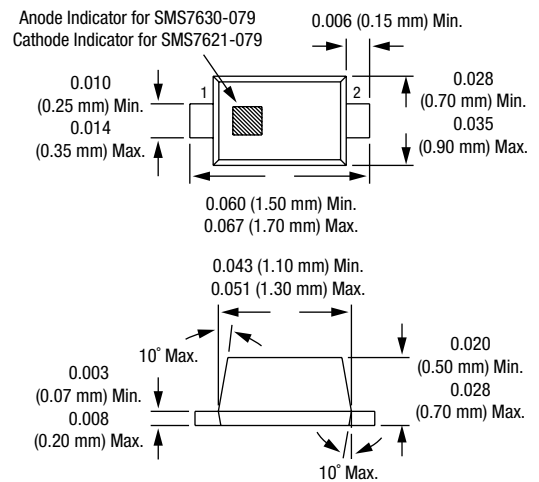
SC-70



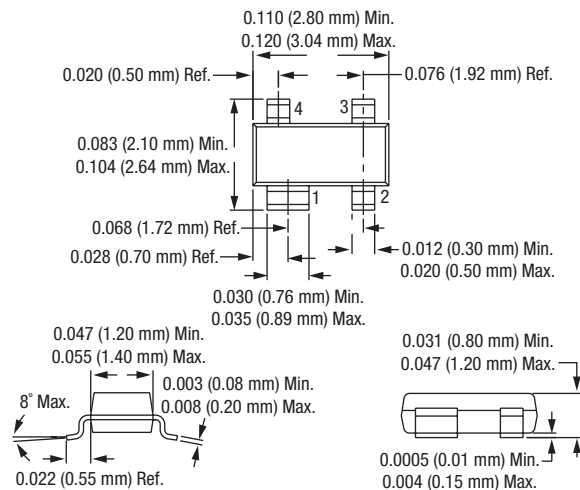
SOD-323



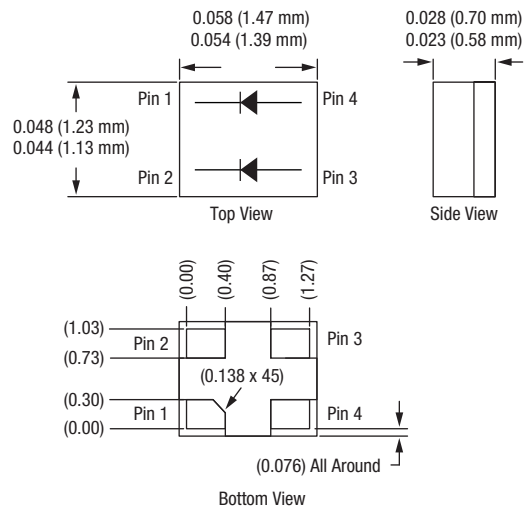
SC-79



SOT-143



LGA (-517)



Copyright © 2002, 2003, 2004, 2005, Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products. These materials are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials. Skyworks may make changes to its documentation, products, specifications and product descriptions at any time, without notice. Skyworks makes no commitment to update the information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from future changes to its documentation, products, specifications and product descriptions.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by or under this document. Except as may be provided in Skyworks Terms and Conditions of Sale for such products, Skyworks assumes no liability whatsoever in association with its documentation, products, specifications and product descriptions.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED OR OTHERWISE, RELATING TO SALE AND/OR USE OF SKYWORKS PRODUCTS INCLUDING WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. SKYWORKS FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THESE MATERIALS WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

The following are trademarks of Skyworks Solutions, Inc.: Skyworks®, the Skyworks logo, and Breakthrough Simplicity®. Product names or services listed in this publication are for identification purposes only, and may be trademarks of Skyworks or other third parties. Third-party brands and names are the property of their respective owners. Additional information, posted at www.skyworksinc.com, is incorporated by reference.