Schottky Detector Diodes

Schottky Detector Diodes

Rev. V3

Features

- Wide Selection of Packages for Stripline, Coaxial, and Waveguide Detectors
- Chip Diodes Available
- Both P and N Type Diodes
- Excellent Sensitivity Through Ka-Band
- Low 1/F Noise

Description

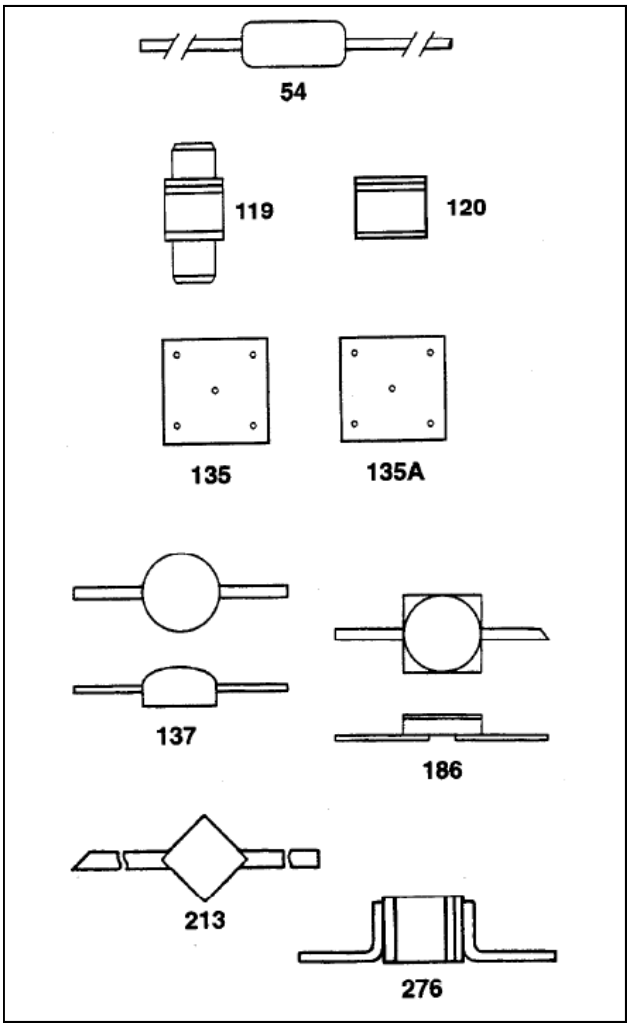
This family of low capacitance Schottky diodes is designed to give superior performance in video detectors and power monitors from 100 MHz through 40 GHz. They have low junction capacitance and repeatable video impedance. These diodes are available in a wide range of ceramic, stripline and axial lead packages and as bondable chips. Both P and N type diodes are offered.

Applications

Detectors and power monitors in stripline, coaxial and waveguide circuits through 40 GHz.

Case Styles

(See appendix for complete dimensions)



Maximum Ratings

Temperature Ratings Storage Operating Temperature	-65°C to +150°C (Case Styles 54, 119, 120, 135, 135A, 186, 276) -65°C to +125°C (Case Styles 137, 213)
Power Ratings @ 25°C Maximum Peak Incident RF Power Maximum CW RF Power Derate Linearity to Zero at 150°C	S-X Band 1 Watt - 1 microsecond maximum pulse length Ku-K Band 0.5 W - 1 microsecond maximum pulse length S-X Band 150 mW (maximum) Ku-K Band 100 mW (maximum)
Solder Temperature For case styles 54, 119, 186, 276 For case style 120 For case styles 137 and 213	230°C for 5 seconds, 1 mm from package 200°C for 5 seconds 150°C for 5 seconds, 1 mm from package

Packaged N Type Silicon Schottky Detector Diodes

These low barrier packaged detector diodes are suitable for use in stripline, waveguide, and coaxial detectors. They feature high sensitivity and low l/f noise. These diodes are listed by increasing test frequency, grouped by packages style and decreasing Tss. Other case styles than those specified may be available.

Specifications @ T_A = +25°C

Model Number [1]	Case Style	Test Frequency (GHz)	Maximum[2,3] Tang. Signal Sensitivity T_{SS} (dBm)	Video Impedance [3,4] Range Min./Max. (k Ohms)
MA40053	54	3	-55	1/2
MA40064	119	3	-55	1/2
MA40202	54	10	-55	1/2
MA40201	119	10	-55	1/2
MA40207	120	10	-55	1/2
MA40205	119	16	-52	1/2
MA40215	120	16	-52	1/2
MA40268	120	36	-49	1/2

Notes:
1. Schottky barrier junction diodes are thermocompression bonded in case style 119 and 120. Case style 54 uses pressure contacts. The standard case style is given for each model number. Other case styles may be available.
2. The video amplifier bandwidth is 1 MHz and the nominal amplifier noise figure is 3 dB. DC Impedance is 10 k ohms. The DC bias is 20 µA.
3. RF Power = 30 dBm. The DC forward bias is +20 µA.
4. Measured at the indicated test frequency and at -30 dBm RF power.

N Type Silicon Schottky Detector Diodes

These low barrier packaged detector diodes are suitable got use in striping applications. They feature high sensitivity, and low l/f noise. These diodes are listed by increasing frequency, and grouped by package style and $T_{SS.}$ Case styles other than those specified may be available. For additional information, contact the factory.

Model Number	Case Style	Test Frequency (GHz)	Minimum[1] Tang. Signal Sensitivity T_{SS} (dBm)	Video Impedance [2] Range Min./Max. (K Ohms)
MA40261	186	3	-55	1/2
MA40143	213	3	-50	1/2
MA40108	137	10	-52	1/2
MA40070	137	10	-50	1/2
MA40264	186	10	-55	1/2
MA40147	213	10	-55	1/2
MA40207-276	276	10	-55	1/2
MA40215-276	276	16	-52	1/2

Packaged P Type Silicon Schottky Detector Diodes

This series of low barrier P type detector diodes has good voltage sensitivity and low l/f noise than similar capacitance N type Schottky diodes. They are listed by case style.

Specifications @ T_A = +25°C

Model Number	Case Style	Test Frequency (GHz)	Minimum[1] Tang. Signal Sensitivity T_{SS} (dBm)	Video Impedance [2] Range Min./Max. (Ohms)	Minimum [2] Sensitivity (mV/mW)
MA40252	54	10	-55	1.2/1.8	5000
MA40251	119	10	-55	1.2/1.8	5000
MA40257	120	10	-55	1.2/1.8	5000
MA40257-276	276	10	-55	1.2/1.8	5000

Notes:
1. The video amplifier bandwidth is 1 MHz and the noise figure is 3 dB. The Input Impedance is 10 k Ohms and DC Bias is 20 µA.
2. Pinc = -30 dBm. The DC forward bias is +20 µA.

N Type Silicon Schottky Chip

Detector Diodes

These low barrier N type chip detector diodes are suitable for use in microstrip applications. They feature sensitivity, and low l/f noise. These diodes are listed by increasing frequency.

Model Number	Case Style	Test Frequency (GHz)	Nominal [1,5] T_{SS} (dBm)	Minimum Reverse Voltage V_R (Volts)	Nominal [3] Forward Voltage (Volts)	Nominal [4] Total Capacitance (pF)
MA40220	135	10.0	-52	2.0	0.3	0.12
MA40222	135	16.0	-52	2.0	0.3	0.09

P Type Silicon Schottky Chip

Detector Diodes

These low barrier P type chip detector diodes are suitable for use in microstrip or stripline circuits. These diodes are listed by increasing test frequency.

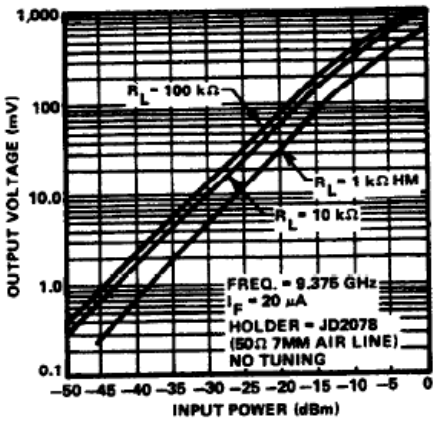
Model Number	Case Style	Test Frequency (GHz)	Nominal [1,5] T_{SS} (dBm)	Minimum Reverse Voltage V_R (Volts)	Nominal [3] Forward Voltage (Volts)	Nominal [4] Total Capacitance (pF)
MA40270	135A	10.0	-52	4.0	0.4	0.12
MA40272	135A	16.0	-52	4.0	0.4	0.09

Notes:

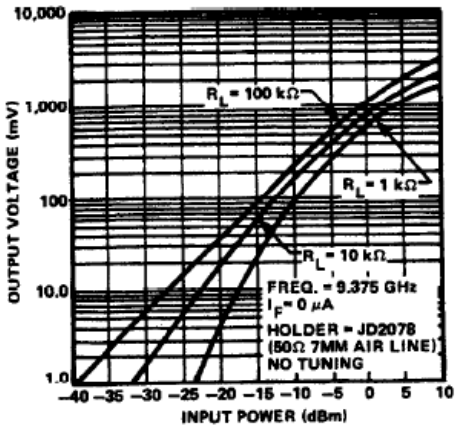
1. The video amplifier bandwidth is 1 MHz and the noise figure is 3 dB. Impedance is 10 k Ohms and DC Bias is +20 µA. Wafers are evaluated on a sample basis for T_{SS}.
2. Voltage rating is measured at 10 µA reverse bias current.
3. Forward voltage is measured at a forward current of 1 mA.
4. Capacitance is measured at 0 V and 1 MHz.
5. RF power = -30 dBm. The DC forward bias is +20 µA. Measured at the indicated test frequency and at -30 dBm RF power with R_L = 10 k Ohms and DC forward bias +20 µA

Typical Performance Curves

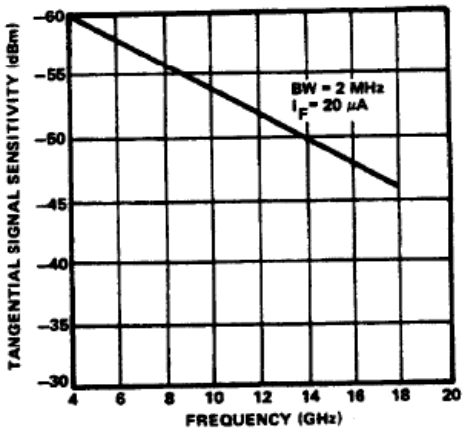
Nominal Output Voltage at X-Band (With Forward Bias)



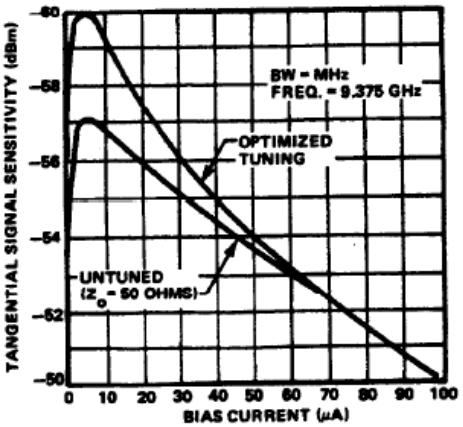
Nominal Output Voltage at X-Band (With Zero Bias)



Nominal Tangential Signal Sensitivity vs. Frequency



Nominal Tangential Signal Sensitivity vs. Bias Current at X-Band



Nominal Video Impedance vs. Bias Current