

# Schottky Detector Diodes

V 2.00

## 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

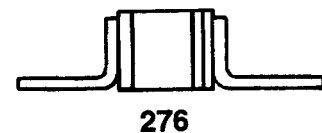
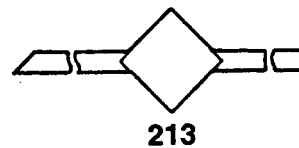
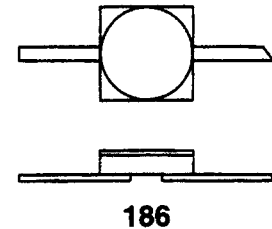
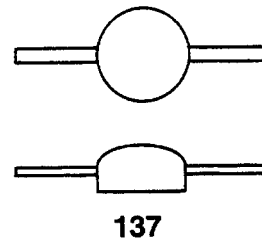
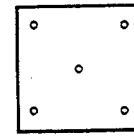
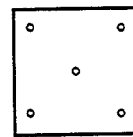
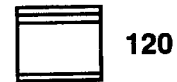
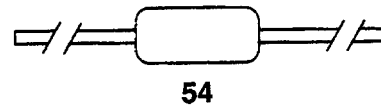
## Description

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

|   |   |
|---|---|
| <b>Temperature Ratings</b><br><b>Storage Operating Temperature</b>  | -65°C to +150°C<br>(Case styles 54, 119, 120, 135, 135A, 186, 276)<br>-65°C to +125°C (Case styles 137, 213)      |
| <b>Power Ratings at 25°C</b><br><b>Maximum Peak Incident RF Power</b>   | S-X Band 1 Watt-1 microsecond<br>maximum pulse length<br><br>Ku-K Band 0.5W-1 microsecond<br>maximum pulse length |
| <b>Maximum CW RF Power</b><br><b>Derate Linearly to Zero at 150°C</b>   | S-X Band 150 mW (maximum)<br>Ku-K band 100 mW (maximum)   |
| <b>Solder Temperature Ratings</b><br><b>For case styles 54, 119, 186, 276</b><br><b>For case style 120</b><br><b>For case style 137 and 213</b> | 230°C for 5 seconds, 1 mm from package<br>200°C for 5 seconds<br>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 1/f noise. These diodes are listed by increasing test frequency, grouped by packaged style and decreasing T<sub>SS</sub>. Other case styles than those specified may be available.

Specifications @ T<sub>A</sub> = +25°C

| Model <sup>1</sup><br>Number | Case Style | Test Frequency<br>(GHz) | Maximum <sup>2,3</sup><br>Tang. Signal<br>Sensitivity T <sub>SS</sub><br>(dBm) | Video Impedance <sup>3,4</sup><br>Range<br>Min./Max.<br>(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  $\mu$ A.  
3. RF Power = 30 dBm. The dc forward bias is + 20  $\mu$ A.  
4. Measured at the indicated test frequency and at -30 dBm RF power

Specifications Subject to Change Without Notice.

## N Type Silicon Schottky Detector Diodes

These low barrier packaged detector diodes are suitable for use in stripping applications. They feature high sensitivity, and low 1/f noise. These diodes are listed by increasing frequency, and grouped by package style and T<sub>ss</sub>. Case styles other than those specified may be available. For additional information, contact the factory.

| Model Number | Case Style | Test Frequency (GHz) | Minimum <sup>1</sup> Tang. Signal Sensitivity T <sub>SS</sub> (dBm) | Video Impedance <sup>2</sup> 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 lower 1/f noise than similar capacitance N type Schottky diodes. They are listed by case style.

### Specifications @ T<sub>A</sub> = +25°C

| Model Number | Case Style | Test Frequency (GHz) | Minimum <sup>1</sup> Tang. Sig. Sens. T <sub>SS</sub> (dBm) | Video Impedance <sup>2</sup> Range Min./Max. (Ohms) | Minimum <sup>2</sup> 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:

- 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  $\mu$ A.
- P<sub>inc</sub> = -30 dBm. The DC forward bias is +20  $\mu$ A.

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### 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 1/f noise. These diodes are listed by increasing frequency.

| Model Number | Case Style | Test Frequency (GHz) | Nominal <sup>1,5</sup><br>T <sub>SS</sub> (dBm) | Minimum Reverse Voltage V <sub>R</sub> (Volts) | Nominal <sup>3</sup><br>Forward Voltage (Volts) | Nominal <sup>4</sup><br>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.

#### Specifications @ T<sub>A</sub> = 25°C

| Model Number | Case Style | Test Frequency (GHz) | Minimum <sup>2</sup><br>Reverse Voltage V <sub>R</sub> (Volts) | Nominal <sup>1,5</sup><br>T <sub>SS</sub> (dBm) | Nominal <sup>3</sup><br>Forward Voltage (Volts) | Nominal <sup>4</sup><br>Total Capacitance (pF) |
|--------------|------------|----------------------|--|---|---|--|
| MA40270      | 135A       | 10.0                 | 4.0  | - 52  | 0.4   | 0.12   |
| MA40272      | 135A       | 16.0                 | 4.0  | - 52  | 0.4   | 0.09   |

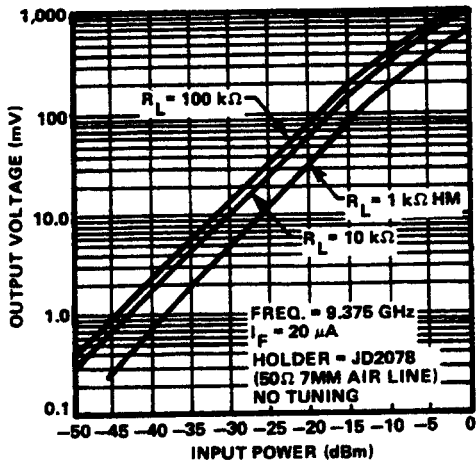
#### Notes:

- 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<sub>SS</sub>.
- Voltage rating is measured at 10 μA reverse bias current.
- Forward voltage is measured at a forward current of 1 mA.
- Capacitance is measured at 0 V and 1 MHz.
- 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<sub>L</sub> = 10 k Ohms and DC forward bias +20 μA.

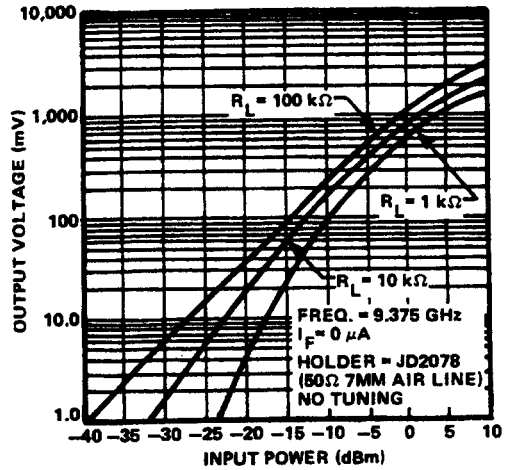
Specifications Subject to Change Without Notice.

Typical Performance Curves

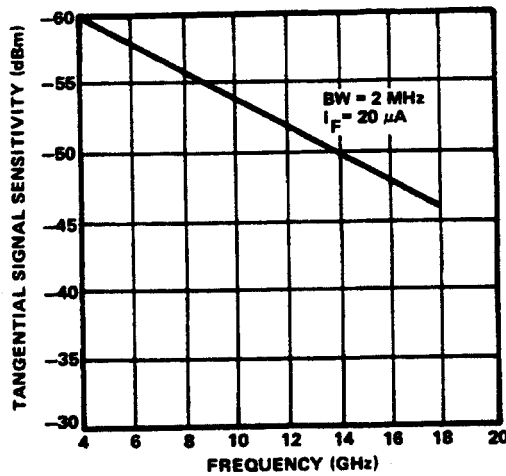
NOMINAL OUTPUT VOLTAGE AT X-BAND  
(WITH FORWARD BIAS)



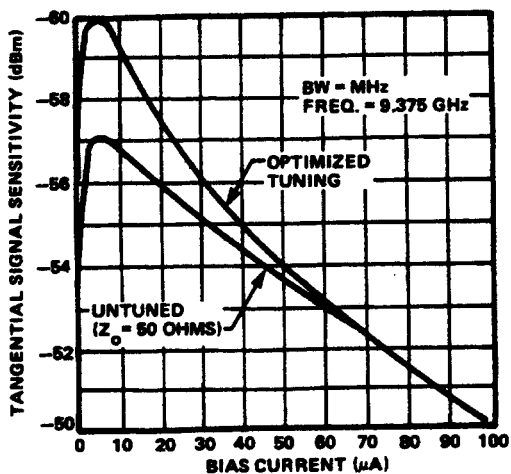
NOMINAL OUTPUT VOLTAGE AT X-BAND  
(WITH ZERO BIAS)



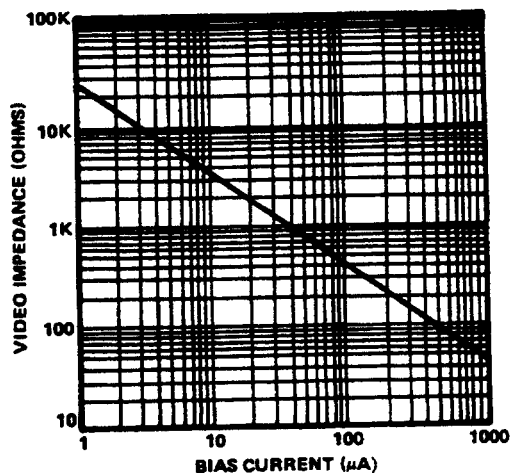
NOMINAL TANGENTIAL SIGNAL  
SENSITIVITY vs FREQUENCY



NOMINAL TANGENTIAL SIGNAL  
SENSITIVITY vs BIAS CURRENT AT X-BAND



NOMINAL VIDEO IMPEDANCE vs BIAS CURRENT



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