

# Zero Bias Detector Diodes

V 2.00

## Features

- Can Be Used Without External DC Bias
- Exhibit Uniform  $R_v$  Characteristics
- High Voltage Sensitivity
- Available in Packages, Chips and Beam Leads

## Description

This family of Zero Bias Detector (ZBD) diodes is designed for use in video detectors and power monitors eliminating the need to provide external DC bias to the diode.

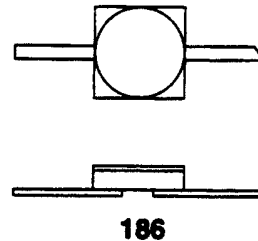
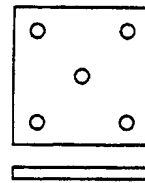
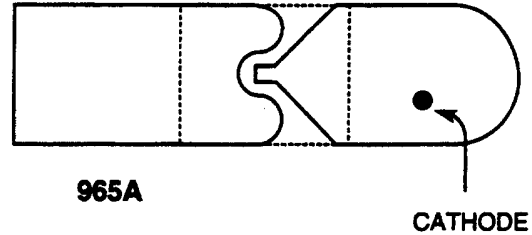
These diodes offer good output sensitivity and low junction capacitance.

M/A-COM's Zero Bias Detector diodes are available in two hermetic packages, and as bondable chips and beam leads. This series of diodes are offered with video impedances of 0.5 to 15 k Ohms at zero bias.

## Applications

This series of diodes is useful as video detectors and power monitors through K-band and do not require external DC bias.

## Case Styles (See appendix for complete dimensions)



Specifications Subject to Change Without Notice.

Schottky ZBD Beam Lead Diodes  
(Case Style 965A)

Model Number	Test Frequency Band	Minimum <sup>2</sup> T <sub>SS</sub> (-dBm)	Minimum <sup>2</sup> E <sub>o</sub> , mV	R <sub>v</sub> <sup>3,4,5</sup> (k Ohms)	
				(Minimum)	(Maximum)
MA40186	X	48	2	0.5	1.0
MA40186B	X	50	8	2.0	5.0
MA40186C	X	52	10	5.0	10.0
MA40187D	Ku	49	8	10.0	15.0

## Silicon Packaged and Chip ZBD Diodes

Model <sup>1</sup> Number	Case Style	Minimum <sup>2,6</sup> T <sub>SS</sub> (-dBm)	Minimum <sup>2,6</sup> E <sub>o</sub> , mV	R <sub>v</sub> <sup>3,4,5</sup> (k Ohms)	
				(Minimum)	(Maximum)
MA4E929	119	46	2	0.5	1.0
MA4E929A	119	48	5	1.0	2.0
MA4E929B	119	50	8	2.0	5.0
MA4E929C	119	50	10	5.0	10.0
MA4E929D	119	50	10	10.0	15.0
MA4E931A	135A	52	8	1.0	2.0
MA4E931C	135A	56	15	5.0	10.0
MA4E932	186	47	3	0.5	1.0
MA4E932A	186	48	5	1.0	2.0
MA4E932B	186	50	8	2.0	5.0
MA4E932C	186	50	10	5.0	10.0
MA4E932D	186	50	10	10.0	15.0

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

<b>Maximum Ratings</b>	
<b>Temperature Ratings:</b> Operating and Storage Temperature	-65°C to +150°C
<b>Power Ratings:</b> Maximum Peak Incident RF Power  Maximum Peak CW RF Power Both ratings at 25°C. Derate linearly to zero at maximum operating temperature.	0.5 Watts for 1 µsec maximum  100 mW
<b>Solder Temperature Ratings:</b> For case style 54, 186  For case style 119	230°C for 5 sec (1mm from package)  200°C for 5 sec (maximum)

## Notes:

- Schottky barrier diodes are thermocompression bonded in case styles 119 and 186. Case style 135A is a bondable chip. Other case styles may be available. For additional information, contact the factory. To order chip parts add 135A as the suffix to the part number, i.e., MA4E929A-135A. Only the MA4E929 series is available as a chip.
- Test conditions:  
For T<sub>SS</sub>: Video Bandwidth = 1 MHz  
Noise Amplifier = 3.5 dB  
Test Frequency: X-Band = 10 GHz  
Ku-Band = 16 GHz  
Voltage Sensitivity: PIN = -30 dBm  
R<sub>L</sub> = 1 M (Ohms)  
Test Frequency = as stated
- Higher R<sub>v</sub> values are available on request. Contact the factory.
- The nominal junction capacitance values are as follows:  
Diodes with R<sub>v</sub> ~0.5 to 2.0 k Ohms, C<sub>j</sub> ~0.30 pF (maximum)  
Diodes with R<sub>v</sub> ~2.0 to 5.0 k Ohms, C<sub>j</sub> ~0.25 pF (maximum)  
Diodes with R<sub>v</sub> ~5.0 to 15.0 k Ohms, C<sub>j</sub> ~0.20 pF (maximum)
- The nominal R<sub>s</sub> is ~30 Ohms maximum.
- Test frequency band is X-Band.

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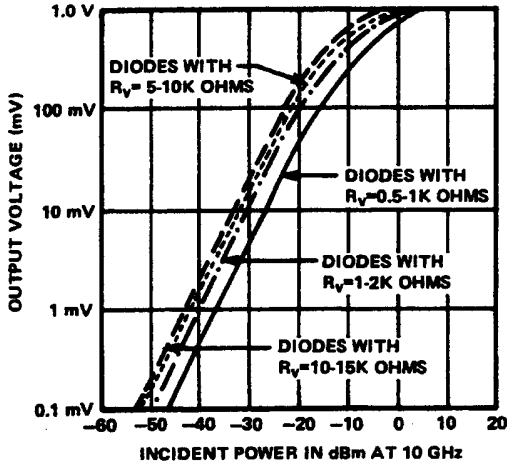
M/A-COM, Inc.

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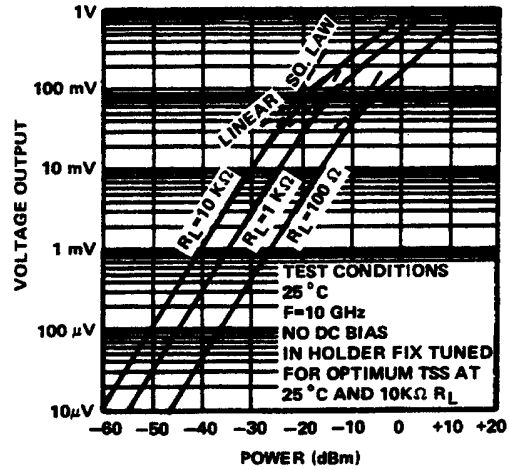
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Typical Performance Curves

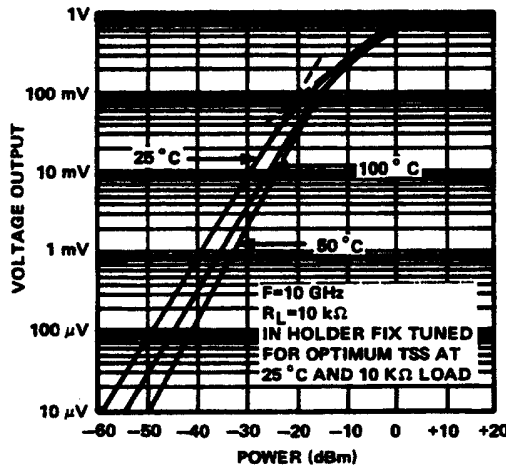
ZERO BIAS SCHOTTKY DETECTOR DIODE NOMINAL OUTPUT VOLTAGE AT 25°C AND 10 GHz WITH A FIXED TUNED HOLDER AN  $R_L = 10K$  OHMS.



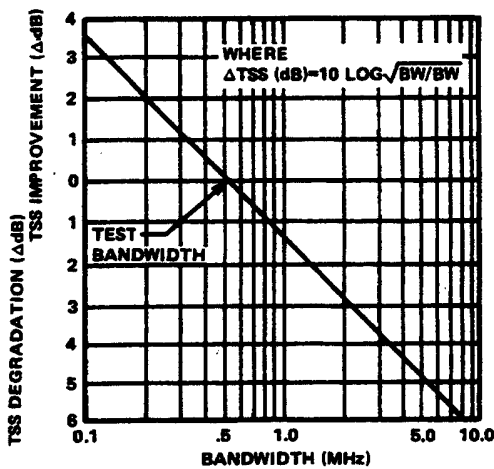
ZERO BIAS SCHOTTKY DETECTOR VOLTAGE SENSITIVITY FOR DIODES WITH 2-8K OHM VIDEO IMPEDANCE.



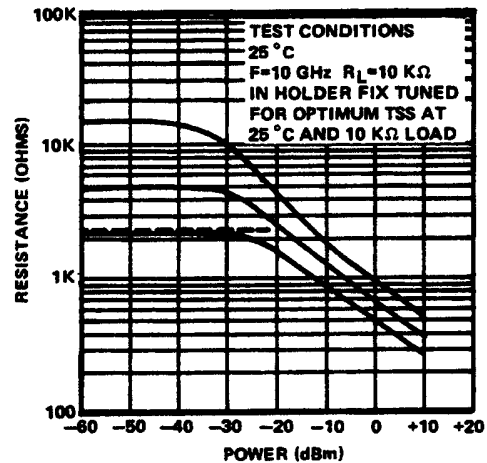
ZERO BIAS SCHOTTKY DETECTOR VOLTAGE SENSITIVITY CHARACTERISTICS UNDER TEMP FOR DIODE WITH 2-8K OHM VIDEO IMPEDANCE.



TSS CONVERSION FOR BANDWIDTHS OTHER THAN TEST BANDWIDTH.



ZERO BIAS SCHOTTKY DETECTOR DYNAMIC RESISTANCE (RV) vs POWER FOR DIODES OF DIFFERENT IMPEDANCE RANGES.



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