

# Ceramic Packaged Schottky Mixer Diodes

V 2.00

## Features

- Choice of Three Available Packages
- Can Be Screened to JANTXV Levels

## Description

Three families of ceramic packaged Schottky diodes are offered. All parts are thermal compression bonded. The low barrier diodes require the least local oscillator drive. Medium barrier diodes are best for normal L.O. drive. High barrier diodes are most useful for high dynamic range mixers and/or upconverters.

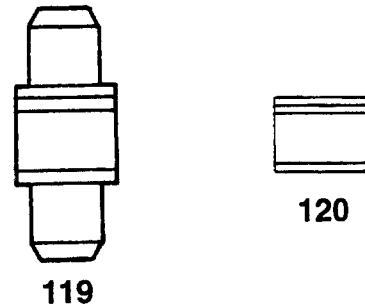
## Applications

Waveguide and coaxial mixers and upconverters from 100 MHz to 26 GHz.

## Ceramic Packaged Schottky Barrier Mixer Diodes

These ceramic packaged Schottky Barrier Mixer Diodes are intended for use in waveguide and coaxial mixers. Each of these diodes is listed by barrier height, test frequency, and grouped by packaged style and noise figure. Other electrical specifications or custom packaging are available upon request at a nominal charge.

## Case Styles



## Specifications @ $T_A = +25^\circ\text{C}$

### Low Barrier Mixer Diodes

Low barrier mixer diodes are the best choice for applications where the local oscillator drive level is between -3 dBm and +3 dBm per diode.

Model Number	Case Style <sup>1</sup>	Test Frequency (GHz)	Maximum <sup>2</sup> Noise Figure (dB)	Maximum <sup>3</sup> SWR	$Z_{IF}$ Range <sup>4</sup> Min./Max. (Ohms)
MA40018	119	3.000	5.5	1.5	125/250
MA40100	119	9.375	6.0	1.5	250/450
MA40105	120	9.375	6.0	1.5	250/450
MA40110	119	16.000	6.5	1.5	250/450
MA40115	120	16.000	6.5	1.5	250/450
MA4E913	119	24.000	7.5	1.5	200/500
MA4E914	120	24.000	7.5	1.5	200/500

### Notes:

1. The standard case style is given for each model number.
2. Test conditions are as follows:  
 $P_{LO} = 10$  mW (Low or Medium Barrier)  
 $P_{LO} = 2$  mW (High Barrier)  
 $F_{IF} = 30$  MHz  
 $N_{IF} = 1.5$  dB (minimum)  
 $R_L = 22$  Ohms

3. SWR is tested at a peak power of 1 mW for low and medium barrier and 2 mW for high barrier  $R_L = 22$  Ohms.
4.  $I_F$  impedance is measured by modulating the specified test frequency with a 1000 Hz signal.  $R_L = 22$  Ohms and an incident power level of 1.0 mW for low and medium barrier diodes, and 2 mW for high barrier diodes.

Specifications Subject to Change Without Notice.

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## Medium Barrier Mixer Diodes

Medium barrier diodes are the best choice for applications where the local oscillator drive level is between 0 dBm and +6 dBm per diode.

### Specifications @ $T_A = +25^\circ\text{C}$

Model Number	Case Style <sup>1</sup>	Test Frequency (GHz)	Maximum <sup>2</sup> Noise Figure (dB)	Maximum <sup>3</sup> SWR	$Z_{IF}$ Range <sup>4</sup> Min./Max. (Ohms)
MA40051G	3	3.000	5.5	1.5	350/450
MA40021	119	3.000	5.5	1.5	125/250
MA40071E	3	9.375	7.5	2.0	300/500
MA40150	119	9.375	6.0	1.5	250/450
MA40155	120	9.375	6.0	1.5	250/450
MA40160	119	16.000	6.5	1.5	250/450
MA40165	120	16.000	6.5	1.5	250/450
MA4E919	119	24.000	7.5	1.5	200/500
MA4E920	120	24.000	7.5	1.5	200/500

## High Barrier Mixer Diodes

High barrier diodes are the best choice for applications where the local oscillator drive level is between +6 dBm and +15 dBm per diode.

### Specifications @ $T_A = +25^\circ\text{C}$

Model Number	Case Style <sup>1</sup>	Test Frequency (GHz)	Maximum <sup>2</sup> Noise Figure (dB)	Maximum <sup>3</sup> SWR	$Z_{IF}$ Range <sup>4</sup> Min./Max. (Ohms)
MA40055	119	3.000	5.5	1.5	125/250
MA4E180	119	9.375	6.0	1.5	250/450
MA4E185	120	9.375	6.0	1.5	250/450
MA4E188	119	16.000	6.5	1.5	250/450
MA4E190	120	16.000	6.5	1.5	250/450
MA4E925	119	24.000	7.5	1.5	200/500
MA4E926	120	24.000	7.5	1.5	200/500

#### Notes:

1. The standard case style is given for each model number.

2. Test conditions are as follows:

$P_{LO} = 10$  mW (Low or Medium Barrier)

$P_{LO} = 2$  mW (High Barrier)

$F_{IF} = 30$  MHz

$N_{IF} = 1.5$  dB (minimum)

$R_L = 22$  Ohms

3. SWR is tested at a peak power of 1 mW for low and medium barrier and 2 mW for high barrier  $R_L = 22$  Ohms.

4.  $I_F$  impedance is measured by modulating the specified test frequency with a 1000 Hz signal.  $R_L = 22$  Ohms and an incident power level of 1.0 mW for low and medium barrier diodes, and 2 mW for high barrier diodes.

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## Environmental Ratings

All ceramic packaged Schottky mixer diodes in case 119 and 120 can be screened to TX or TXV levels.

### Screened Diodes MIL-STD19500

Inspection	Method (MIL-STD-750)	Condition
Internal Visual	2073	See note
High Temperature Life (Stabilization Bake)	1032	T = 24 hours, T <sub>A</sub> = +150°C
Thermal Shock	1051	20 cycles -65°C to +125°C T extreme > 10 minutes
Constant Acceleration	2006	20,000 G's, Y1 direction
Fine Leak	1071	H
Gross Leak	1071	C or E
Electrical		See note
HTRB	1038	T <sub>A</sub> = +150°C V <sub>R</sub> = 80% V <sub>B</sub> T=48 hours minimum
Pre-Burn-In Electrical		See note
Burn-In		1038 Condition B T <sub>A</sub> = +25°C I <sub>pk</sub> = 10 mA T = 96 hours minimum
Final Electricals and Delta		See note

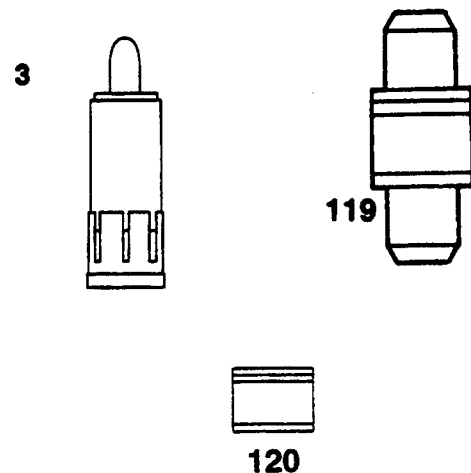
**Note:**

Conditions and details of test depend on the specific model number. Information available from the factory on request.

## Maximum Ratings

<b>Temperature Ratings</b> Storage Temperature Operating Temperature	-65°C to +150°C -65°C to +150°C
<b>Power Ratings</b> Maximum Incident Peak RF Power	S-X Band 1 Watt for 1 μs maximum Ku - K Band 0.5 Watt for 1 μs maximum
Maximum CW RF Power	S Band 200 mW C-X Band 150 mW Ku-K Band 100 mW
Maximum Solder Temperature	235°C for 5 seconds (Case Style 119) 200°C for 5 seconds (Case Style 120)

## Case Styles (See appendix for complete dimensions)



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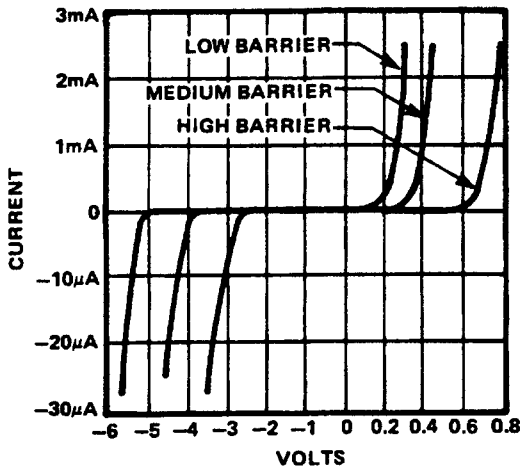
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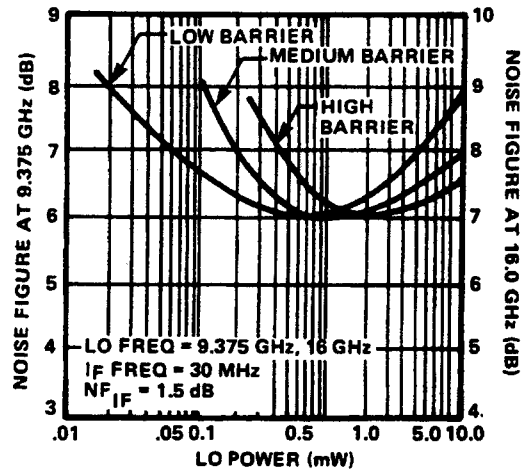
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Typical Performance Curves

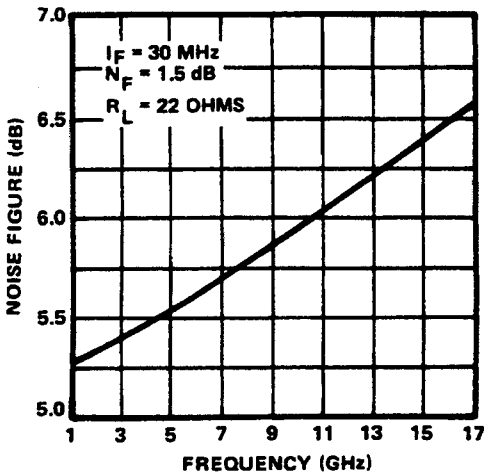
1-V CHARACTERISTICS vs BARRIER HEIGHTS FOR SCHOTTKY MIXER DIODES



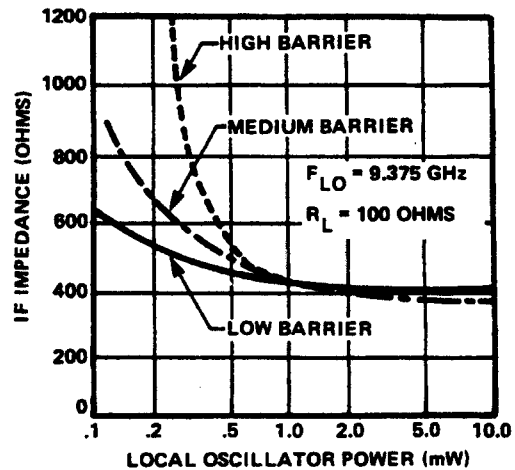
SCHOTTKY BARRIER NOISE FIGURE vs LO POWER



NOMINAL NOISE FIGURE vs FREQUENCY



NOMINAL IF IMPEDANCE vs LOCAL OSCILLATOR DRIVE



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