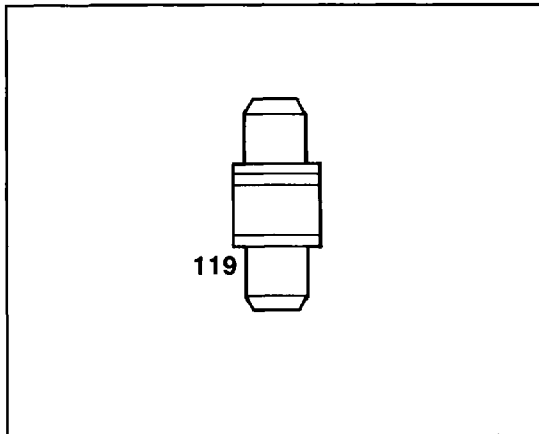


# Ceramic Packaged Silicon Schottky Mixer Diodes

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## Description

Three families of ceramic packaged silicon 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.

## Features

- LARGE CHOICE OF AVAILABLE PACKAGES
- CAN BE SCREENED TO JANTXV LEVELS
- UNIFORM RF CHARACTERISTICS

## Applications

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

# Ceramic Packaged Silicon 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.

## 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.

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

Model Number <sup>1</sup>	Case Style <sup>2</sup>	Test Frequency (GHz)	Maximum <sup>3</sup> Noise Figure (dB)	Maximum <sup>4</sup> SWR	Z <sub>IF</sub> Range <sup>5</sup> Min./Max. (Ohms)
MA40018	119	3.000	5.5	1.5	125-250
MA40017	119	3.000	6.0	1.5	125-250
MA40016	119	3.000	6.5	1.5	125-250
MA40100	119	9.375	6.0	1.5	250-450
MA40101	119	9.375	6.5	1.5	250-450
MA40102	119	9.375	7.0	2.0	250-450
MA40105	120	9.375	6.0	1.5	250-450
MA40106	120	9.375	6.5	1.5	250-450
MA40107	120	9.375	7.0	2.0	250-450
MA40110	119	16.000	6.5	1.5	250-450
MA40111	119	16.000	7.0	2.0	250-450
MA40115	120	16.000	6.5	1.5	250-450
MA40116	120	16.000	7.0	2.0	250-450
MA4E913	119	24.000	7.5	1.5	200-500
MA4E910	119	24.000	8.0	2.0	200-500
MA4E914	120	24.000	7.5	1.5	200-500
MA4E911	120	24.000	8.0	2.0	200-500

### NOTES

- All mixer diodes are available as matched pairs and can be ordered by adding the suffix "M" to the basic model number. Bin matching is available upon request. The matching criteria is as follows:  
 $\Delta NF = 0.3$  dB maximum  
 $\Delta Z_{IF} = 25$  ohms maximum.
- The standard case style is given for each model number. For other case styles, contact the factory. The maximum solder temperature for all cases, except 120 and 276 is  $230^\circ\text{C}$  for 5 seconds. For case styles 120 and 276, the maximum solder temperature is  $200^\circ\text{C}$  for 5 seconds.

- Test conditions are as follows:

$P_{LO} = 1.0$  mW (Low or Medium Barrier)  
 $P_{LO} = 2.0$  mW (High Barrier)  
 $F_{IF} = 30$  MHz  
 $N_{IF} = 1.5$  dB (minimum)  
 $R_L = 22$  ohms

- SWR is tested at a peak power of 1.0 mW for low and medium barrier and 2.0 mW for high barrier.  $R_L = 22$  ohms.
- IF 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 2.0 mW for high barrier diodes.

# Medium Barrier Mixer Diodes

Medium barrier diodes are the best choice for applications where the local oscillator drive level is between 0 dBm and +10 dBm per diode.

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

Model Number <sup>1</sup>	Case Style <sup>2</sup>	Test Frequency (GHz)	Maximum <sup>3</sup> Noise Figure (dB)	Maximum <sup>4</sup> SWR	Z <sub>IF</sub> Range <sup>5</sup> Min./Max. (Ohms)
MA40051G	3	3.000	5.5	1.5	350-450
MA40051F	3	3.000	6.0	1.5	350-450
MA40051E	3	3.000	7.0	2.0	300-500
MA40021	119	3.000	5.5	1.5	125-250
MA40020	119	3.000	6.0	1.5	125-250
MA40019	119	3.000	6.5	1.5	125-250
MA40071H	3	9.375	6.0	1.5	250-450
MA40071G	3	9.375	6.5	1.5	325-475
MA40071F	3	9.375	7.0	1.5	325-475
MA40071E	3	9.375	7.5	2.0	300-500
MA40150	119	9.375	6.0	1.5	250-450
MA40151	119	9.375	6.5	1.5	250-450
MA40152	119	9.375	7.0	2.0	250-450
MA40155	120	9.375	6.0	1.5	250-450
MA40156	120	9.375	6.5	1.5	250-450
MA40157	120	9.375	7.0	2.0	250-450
MA40160	119	16.000	6.5	1.5	250-450
MA40161	119	16.000	7.0	2.0	250-450
MA40165	120	16.000	6.5	1.5	250-450
MA40166	120	16.000	7.0	2.0	250-450
MA4E919	119	24.000	7.5	1.5	200-500
MA4E916	119	24.000	8.0	2.0	200-500
MA4E920	120	24.000	7.5	1.5	200-500
MA4E917	120	24.000	8.0	2.0	200-500

\* See notes on previous page.

### Case Styles

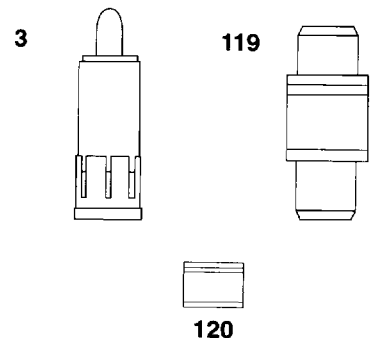
### MAXIMUM RATINGS

#### TEMPERATURE RATINGS

Storage Temperature -65°C to +150°C  
Operating Temperature -65°C to +150°C

#### POWER RATINGS

**Maximum Incident Peak RF Power** S-X Band 1 Watt for 1  $\mu\text{s}$  maximum  
Ku - K Band 0.5 Watt for 1  $\mu\text{s}$  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



\* Except ODS 120 which has a maximum solder temperature for 200°C for 5 seconds.

## 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 <sup>1</sup>	Case Style	Test Frequency (GHz)	Maximum <sup>3</sup> Noise Figure (dB)	Maximum <sup>4</sup> SWR	Z <sub>IF</sub> Range <sup>5</sup> Min./Max. (Ohms)
MA40055	119	3.000	5.5	1.5	125-250
MA40023	119	3.000	6.0	1.5	125-250
MA40022	119	3.000	6.5	1.5	125-250
MA40050	3	9.375	6.5	1.5	325-475
MA4E180	119	9.375	6.0	1.5	250-450
MA4E181	119	9.375	6.5	1.5	250-450
MA4E182	119	9.375	7.0	2.0	250-450
MA4E185	120	9.375	6.0	1.5	250-450
MA4E186	120	9.375	6.5	1.5	250-450
MA4E187	120	9.375	7.0	2.0	250-450
MA4E188	119	16.000	6.5	1.5	250-450
MA4E189	119	16.000	7.0	2.0	250-450
MA4E190	120	16.000	6.5	1.5	250-450
MA4E191	120	16.000	7.0	2.0	250-450
MA4E925	119	24.000	7.5	1.5	200-500
MA4E922	119	24.000	8.0	2.0	200-500
MA4E926	120	24.000	7.5	1.5	200-500
MA4E923	120	24.000	8.0	2.0	200-500

\* See notes on previous page.

### ENVIRONMENTAL RATINGS

All Ceramic Packaged Silicon Schottky Mixer diodes can be screened to TX or TXV levels.

#### Screened Diodes MIL-STD-19500

Inspection	Method (MIL-STD-750)	Condition
Internal Visual	2073	See note
High Temperature Life (Stabilization Bake)	1032	T = 24 hours, $T_A = 150^\circ\text{C}$
Thermal Shock	1051	20 cycles - $65^\circ\text{C}$ to $+125^\circ\text{C}$ 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	$T_A = +150^\circ\text{C}$ $V_R = 80\% V_b$ T = 48 hours minimum
Pre-Burn-In Electrical		See note
Burn-In	1038	Condition B $T_A = +25^\circ\text{C}$ $I_{pk} = 10 \text{ mA}$ T = 96 hours minimum
Final Electricals and Delta PDA		See note Less than 10%

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

# Typical Performance Curves

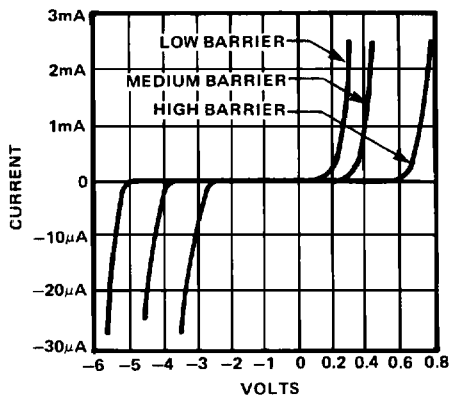


FIGURE 1. I-V Characteristics vs. Barrier Heights for Schottky Mixer Diodes

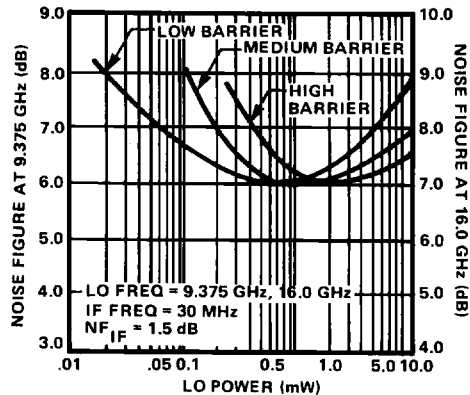


FIGURE 2. Schottky Barrier Noise Figure vs. LO Power

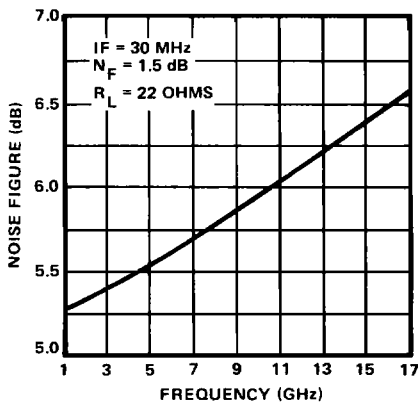


FIGURE 3. Nominal Noise Figure vs. Frequency

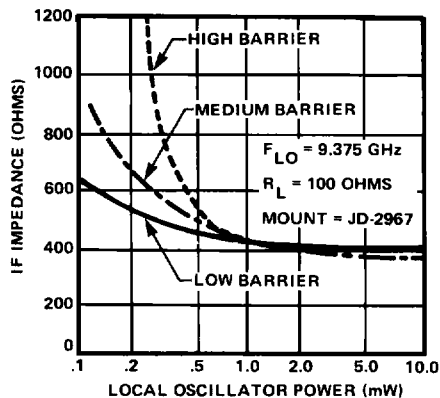


FIGURE 4. Nominal IF Impedance vs. Local Oscillator Drive