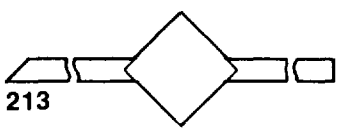
Stripline Packaged Silicon Schottky Mixer Diodes



Features

- **LARGE CHOICE OF AVAILABLE PACKAGES**
- **UNIFORM RF CHARACTERISTICS**
- **SCREENING TO JANTXV LEVEL AVAILABLE**
- **LOW, MEDIUM AND HIGH BARRIER DIODES**

Description

Three families of stripline packaged mixer diodes are offered in a wide range of packages. These diodes have low noise figure through 26 GHz. The three families are:

Low Barrier diodes for minimum LO drive.

Medium Barrier diodes for normal LO drive.

High Barrier diodes for maximum dynamic range and upconverters.

Applications

Stripline and microstrip mixers from 100 MHz.

Upconverters.

Stripline Packaged Silicon Schottky Mixer Diodes

These stripline packaged Schottky barrier mixer diodes are suitable for use in stripline and microstrip mixers. Each family of diodes is listed by barrier height, increasing frequency capability, and grouped according to package style and noise figure.

The forward I-V characteristics of Schottky diodes are dependent on the barrier voltage of the metal. The barrier voltage affects the local oscillator requirement for optimum RF performances. M/A-COM Semiconductor Products Inc., offers low, medium and high barrier Schottky mixer diodes.

Electrical characteristics and packaging other than the standard specifications listed, are available upon request at nominal charge. For more information, contact the factory.

Specifications @ $T_A = 25°C$

Low Barrier Stripline Packaged Schottky Diodes

Low barrier diodes normally are most satisfactory for use in balanced mixers where the local oscillator drive level is between 0.5 dBM and +3 dBM per diode.

Model[1] Number	Case Style[2]	Test Frequency (GHz)	Maximum[3] Noise Frequency (dB)	Maximum[4] SWR (Volts)	Z_{IF} Range[5] Min./Max. (Ohms)
MA40033	137	6.000	5.5	1.5	200-500
MA40034	137	6.000	6.0	1.5	200-500
MA40035	137	6.000	7.0	2.0	200-500
MA40036	213	6.000	5.5	1.5	200-500
MA40037	213	6.000	6.0	2.0	200-500
MA40038	213	9.375	7.0	1.5	200-500
MA40080	137	9.375	6.0	1.5	200-500
MA40078	137	9.375	6.5	1.5	250-450
MA40076	137	9.375	7.0	2.0	250-450
MA40126	186	9.375	6.0	1.5	250-450
MA40127	186	9.375	6.5	2.0	250-450
MA40128	186	9.375	7.0	1.5	250-450
MA40083	213	9.375	6.0	1.5	250-450
MA40079	213	9.375	6.5	1.5	200-500
MA40077	213	9.375	7.0	2.0	200-500
MA40105-276	276	9.375	6.0	1.5	250-450
MA40106-276	276	9.375	6.5	1.5	250-450
MA40107-276	276	9.375	7.0	2.0	250-450
MA40115-276	276	16.000	6.5	2.0	250-450
MA40116-276	276	16.000	7.0	2.0	250-450
MA4E911-276	276	24.000	8.0	2.0	200-500
MA4E914-276	276	24.000	7.5	1.5	200-500

Specifications (Cont'd)

Medium Barrier Stripline Schottky Diodes

Medium barrier diodes are normally most satisfactory for use in balanced mixers where the local oscillator drive level is between +0 dBM and +10 dBM per diode.

Model[1] Number	Case[2] Style	Test Frequency (GHz)	Maximum[3] Noise Figure (dB)	Maximum[4] SWR (Volts)	Z_{IF} Range[5] Min./Max. (Ohms)
MA40032	137	6.000	5.5	1.5	200-500
MA40031	137	6.000	6.0	1.5	200-500
MA40030	137	6.000	7.0	1.5	200-500
MA40048	213	6.000	5.5	1.5	200-500
MA40047	213	6.000	6.0	1.5	200-500
MA40046	213	6.000	7.0	1.5	200-500
MA40088	137	9.375	6.0	1.5	200-500
MA40086	137	9.375	6.5	1.5	200-500
MA40084	137	9.375	7.0	2.0	200-500
MA40176	186	9.375	6.0	1.5	250-450
MA40177	186	9.375	6.5	1.5	250-450
MA40178	186	9.375	7.0	2.0	250-450
MA40089	213	9.375	6.0	1.5	200-500
MA40087	213	9.375	6.5	1.5	200-500
MA40085	213	9.375	7.0	2.0	200-500
MA40155-276	276	9.375	6.0	1.5	250-450
MA40156-276	276	9.375	6.5	1.5	250-450
MA40157-276	276	9.375	7.0	2.0	250-450
MA40165-276	276	16.000	6.5	1.5	250-450
MA40166-276	276	16.000	7.0	2.0	250-450
MA4E920-276	276	24.000	7.5	1.5	200-500
MA4E917-276	276	24.000	8.0	2.0	200-500

MAXIMUM RATINGS

TEMPERATURE RANGE

Operating	**(case style 186, 276)**	−65°C to +150°C
	(case style 137, 213)	−65°C to +125°C
Storage	**(case style 186, 276)**	−65°C to +150°C
	(case style 137, 213)	−65°C to +125°C

INCIDENT POWER RATINGS

Maximum Peak RF Incident Power	C-X Band 1 Watt for 1 microsecond maximum Ku-K Band 0.5 Watt for 1 microsecond maximum
Maximum CW RF Incident Power	C-X Band 150 mW Ku-K Band 100 mW

SOLDER TEMPERATURE RATINGS

(case style 137, 213)	200°C for 5 seconds, 1 mm from package
(case style 186, 276)	225°C for 5 seconds, 1 mm from package

Specifications (Cont'd)

High Barrier Stripline Schottky Diodes

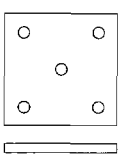
High barrier diodes are normally most satisfactory for use in balanced mixers where the local oscillator drive level is between +6 dBM and +15 dBM per diode.

Model[1] Number	Case Style[2]	Test Frequency (GHz)	Maximum[3] Noise Figure (dB	Maximum[4] SWR (Volts)	Z_{IF} Range[5] Min./Max. (Ohms)
MA40045	137	6.000	5.5	1.5	200-500
MA40044	137	6.000	6.0	1.5	200-500
MA40039	137	6.000	7.0	2.0	200-500
MA40060	213	6.000	5.5	1.5	200-500
MA40057	213	6.000	6.0	1.5	200-500
MA40056	213	6.000	7.0	2.0	200-500
MA40095	137	9.375	6.0	1.5	250-450
MA40093	137	9.375	6.5	1.5	250-450
MA40091	137	9.375	7.0	2.0	250-450
MA4E197	186	9.375	6.0	1.5	250-450
MA4E198	186	9.375	6.5	1.5	250-450
MA4E199	186	9.375	7.0	2.0	250-450
MA40096	213	9.375	6.0	1.5	250-450
MA40094	213	9.375	6.5	1.5	250-450
MA40092	213	9.375	7.0	2.0	250-450
MA4E185-276	276	9.375	6.0	1.5	250-450
MA4E186-276	276	9.375	6.5	1.5	250-450
MA4E187-276	276	9.375	7.0	2.0	250-450
MA4E190-276	276	16.000	6.5	1.5	250-450
MA4E191-276	276	16.000	7.0	2.0	250-450
MA4E926-276	276	24.000	7.5	1.5	200-500
MA4E923-276	276	24.000	8.0	2.0	200-500

NOTES:

1. All mixer diodes are available as matched pairs and can be ordered by adding the suffix "M" to the diode model number. Bin matching is available upon request. The matching criteria is as follows:
   Nf = 0.3 dB maximum Zif = 25 ohms maximum
2. The maximum solder temperature is 230°C for 5 seconds. Case styles other than those indicated are available on request. Consult the factory.
3. Test conditions for noise figure:
   P_{LO} = 1 mW (for low and medium barrier)
   P_{LO} = 2 mW (for high barrier)
   F_{IF} = 30 MHz
   N_{IF} = 1.5 dB (minimum)
   R_L = 22 ohms
4. SWR for low and medium barrier diodes is tested at LO power of 1.0 mW. High barrier diodes are tested at a LO power level of 2.0 mW. RL = 22 ohms.
5. IF impedance is measured by modulating the specified test frequency with a 1000 Hz signal. RL = 22 ohms. Low and medium barrier diodes are tested at an incident power level of 1.0 mW. High barrier diodes are tested at an incident power level of 2.0 mW.

Case Styles



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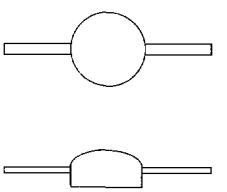

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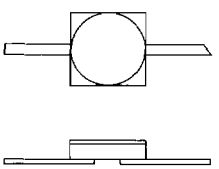

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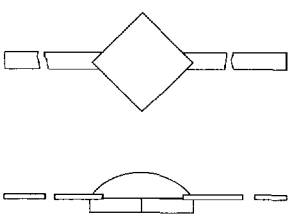

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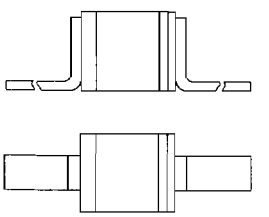

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Specifications (Cont'd)

All stripline 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°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_A = +150°C, V_r = 80% V_b, T = 48 hours minimum
Pre Burn-In Electrical		See note
Burn-in	1038	Condition B, T_A = +25°C, I_{pk} = 10 mA, T = 96 hours minimum
Final Electricals and Delta		See note
PDA		Less than 10%

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

Typical Performance Curves

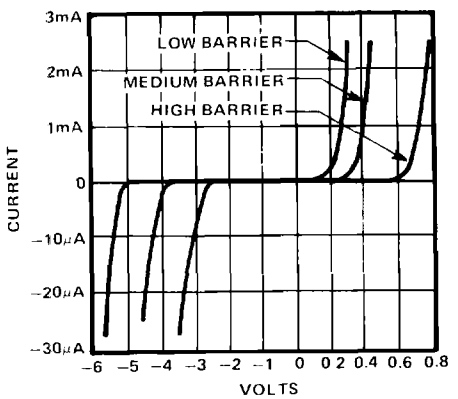

FIGURE 1. Nominal I-V Characteristics and Barrier Heights for Schottky Mixer Diodes

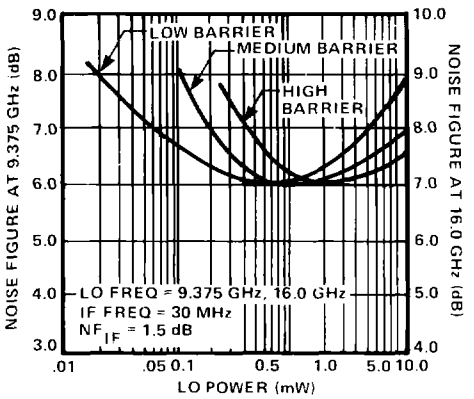

FIGURE 2. Nominal Schottky Barrier Noise Figure vs. LO Power

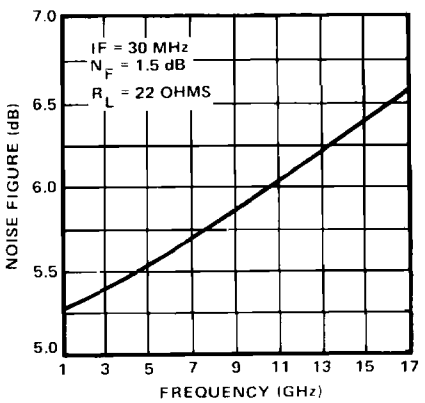

FIGURE 3. Nominal Noise Figure vs. Frequency

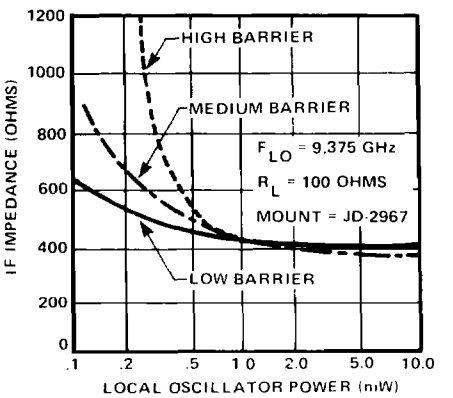

FIGURE 4. Nominal IF Impedance vs. Local Oscillator Drive