

# Schottky Barrier Packaged and Beam Lead Tees

## MA4E20, MA4E970 Series

V3.00

### Features

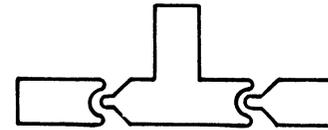
- Small Physical Size for Microstrip Mounting
- High Reliability
- Closely Matched Junctions for High Isolation
- Three Diode Barrier Heights are Available
- Minimum Parasitics for Broadband Designs

### Description

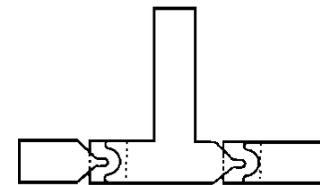
Each Schottky barrier beam lead Tee consists of two closely matched diodes connected in the classic Tee configuration. The diodes are formed monolithically to assure close matching of electrical characteristics such as capacitance, forward voltage and series resistance. The silicon that originally connected the diodes on the wafer is removed. The beam lead construction assures minimum parasitic capacitance, connecting lead inductance and permits the interconnection of the diodes into Tees at the wafer level.

Three barrier levels are available allowing different levels of local oscillator drive power. The L series features a low barrier for applications which have low available local oscillator power. Both medium barrier (M series) and high barrier (H series) devices are available for applications with higher drive levels. The RF and local oscillator frequencies can range up to 18 GHz with selection of an appropriate junction capacitance. Each series is available in three case styles which are compatible with microstrip or stripline assembly techniques. The 270 case style is hermetically sealed and is suggested for harsh environments or for military or high reliability circuits. The 272 case style is a low cost plastic enclosure similar in case style. The beam lead case styles 271 and 1012 are designed for maximum bandwidth. The case style 271 is a forward tee and the 1012 is a reverse tee. The case style 1000 is the smallest stripline package and has the lowest parasitic capacitance and inductance.

### Case Styles



271

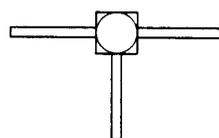


1012

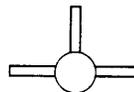
### Absolute Maximum Ratings at 25°C

Parameter	Absolute Maximum
<b>Operating and Storage Temperature Range</b>	-65°C to +150°C (Case Style 270, 271 and 1012) -65°C to +125°C (Case Styles 272, 1000)
<b>Maximum Power Dissipation (derate linearly to zero allowable dissipation at 150°C)</b>	75 mW/junction
<b>Soldering Temperature</b>	235°C for 10 sec. (Case Style 270) 150°C for 5 sec. (Case Styles 271, 272)
<b>Beam Strength</b>	2g (Case Style 271, 1012)

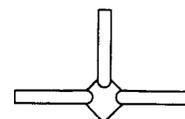
### Case Styles (See appendix for complete dimensions.)



270



272



1000

Specifications Subject to Change Without Notice.

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## Electrical Specifications at 25°C

### Schottky Tees

Model <sup>5,7</sup> Number	Barrier Height	Suggested Frequency (Hz)	Maximum <sup>1</sup> Junction Capacitance C <sub>j</sub> (pF)	Maximum <sup>1</sup> Junction Capacitance Difference ΔC <sub>j</sub> (pF)	Maximum <sup>3</sup> Resistance R <sub>S</sub> (Ohms)	Nominal <sup>2</sup> Forward Voltage V <sub>F</sub> (Volts)	Maximum <sup>2</sup> Forward Voltage Match V <sub>F</sub> (Volts)	Nominal Noise Figure NF (dB)	Minimum <sup>4</sup> Reverse Voltage V <sub>R</sub>
MA4E201L	Low	S	0.50	0.10	7	0.25	0.015	6.0	2
MA4E204L	Low	C-X	0.35	0.10	10	0.27	0.015	6.5	2
MA4E207L	Low	Ku	0.20	0.05	12	0.30	0.015	7.5	2
MA4E201M	Medium	S	0.50	0.10	7	0.35	0.015	6.0	3
MA4E204M	Medium	C-X	0.35	0.10	10	0.37	0.015	6.5	3
MA4E207M	Medium	Ku	0.20	0.05	12	0.40	0.015	7.5	3
MA4E201H	High	S	0.50	0.10	7	0.55	0.015	6.0	5
MA4E204H	High	C-X	0.35	0.10	10	0.57	0.015	6.5	5
MA4E207H	High	Ku	0.20	0.05	12	0.60	0.015	7.5	5

### Schottky Reverse Tees

Model <sup>6,7</sup> Number	Barrier Height	Frequency (Hz)	Maximum <sup>1</sup> Junction Capacitance C <sub>j</sub> (pF)	Maximum <sup>1</sup> Junction Capacitance Difference ΔC <sub>j</sub> (pF)	Maximum <sup>3</sup> Resistance R <sub>S</sub> (Ohms)	Nominal <sup>2</sup> Forward Voltage V <sub>F</sub> (Volts)	Maximum <sup>2</sup> Forward Voltage Match V <sub>F</sub> (Volts)	Nominal Noise Figure NF (dB)	Minimum <sup>4</sup> Reverse Voltage V <sub>R</sub>
MA4E974L	Low	S	0.50	0.10	7	0.25	0.015	6.0	2
MA4E975L	Low	C-X	0.35	0.10	10	0.27	0.015	6.5	2
MA4E976L	Low	Ku	0.20	0.05	12	0.30	0.015	7.5	2
MA4E974M	Medium	S	0.50	0.10	7	0.25	0.015	6.0	3
MA4E975M	Medium	C-X	0.35	0.10	10	0.27	0.015	6.5	3
MA4E976M	Medium	Ku	0.20	0.05	12	0.30	0.015	7.5	3
MA4E974H	High	S	0.50	0.10	7	0.25	0.015	6.0	4
MA4E975H	High	C-X	0.35	0.10	10	0.27	0.015	6.5	4
MA4E976H	High	Ku	0.20	0.05	12	0.30	0.015	7.5	4

#### Notes:

- C<sub>j</sub> and ΔC<sub>j</sub> are measured at V<sub>R</sub> = 0 volts and f = 1.0 MHz.
- V<sub>F</sub> is measured at I<sub>F</sub> = 1.0 mA.
- Series resistance, R<sub>S</sub>, is determined by subtracting the junction resistance, R<sub>J</sub>, from the measured value of 10 mA dynamic (slope) resistance, R<sub>T</sub>:  

$$R_S = R_T - R_J \text{ Ohms}$$
 Junction resistance is computed from the following equation:  

$$R_J = 26/I_F \text{ Ohms}$$

$$I_F = 10 \text{ mA}$$

$$I_F \text{ is the forward bias current in mA.}$$

- Reverse voltage is measured at I<sub>R</sub> = 10 μA.
- The standard case styles for the forward tee series is 271, and the Schottky beam lead tees are 270, 271, 272 and 1000.
- The standard case style for the reverse tee series of diodes is case style 1012. Tees are available in case styles 270, 272 and 1000.
- To order parts specify the package as a suffix, i.e., MA4E201L-270 is a low barrier tee in case style 270.

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