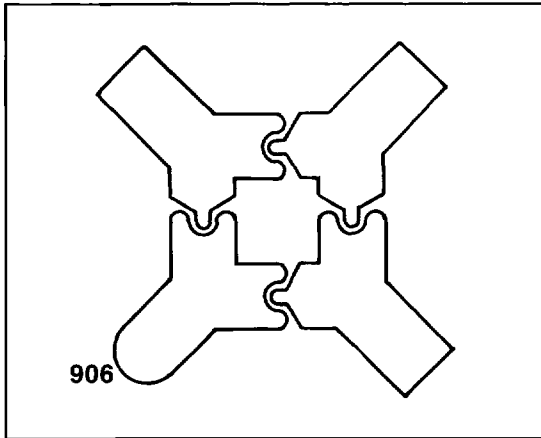




MA4E400 Series

# Schottky Barrier Beam-Lead and Packaged Bridge Quads



## Description

Each Schottky barrier diode quad consists of four closely matched diodes connected in a bridge configuration. The four diodes are formed monolithically to assure close matching of electrical characteristics, namely capacitance, forward voltage and series resistance. The silicon which originally connected the diodes in slice form is etched away so that each individual diode is in beam-lead form. The beam-lead construction assures minimum junction capacitance, minimum connection lead inductance and permits the interconnection of the diodes into the bridge configuration at the wafer level.

Three barrier height levels are available. The MA4E400L series features a low barrier for lower power applications. The MA4E400M and MA4E400H series feature medium and high barriers respectively. The RF frequencies can range up to 18.0 GHz with selection of an appropriate junction capacitance.

## Features

- SMALL PHYSICAL SIZE FOR MICROSTRIP MOUNTING
- HIGH RELIABILITY
- CLOSELY MATCHED JUNCTIONS FOR HIGH ISOLATION
- LOW, MEDIUM AND HIGH BARRIER DIODES AVAILABLE TO MATCH RF POWER
- DEVICES 100% TESTED
- MINIMUM PARASITICS FOR BROADBAND DESIGNS

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

Model Number	Barrier Height	Band	Junction <sup>1,2</sup> Capacitance $C_J$ (pF)		Maximum <sup>4</sup> Junction Capacitance Difference $\Delta C_J$ (pF)	Maximum <sup>2</sup> Resistance $R_T$ (Ohms)	Typical <sup>4</sup> Forward Voltage $V_F$ (Volts)	Maximum Forward Voltage Difference $\Delta V_F$ (Volts)	Minimum <sup>5</sup> Breakdown Voltage $V_B$ (Volts)
			Min.	Max.					
MA4E402L	Low	S	0.30	0.60	0.10	7	0.250	0.020	2.0
MA4E401L	Low	C-X	0.15	0.40	0.10	10	0.270	0.020	2.0
MA4E400L	Low	Ku	0.05	0.25	0.05	12	0.300	0.020	2.0
MA4E402M	Medium	S	0.30	0.60	0.10	7	0.350	0.020	3.0
MA4E401M	Medium	C-X	0.15	0.40	0.10	10	0.370	0.020	3.0
MA4E400M	Medium	Ku	0.05	0.25	0.05	12	0.410	0.020	3.0
MA4E402H	High	S	0.30	0.60	0.10	7	0.550	0.020	5.0
MA4E401H	High	C-X	0.15	0.40	0.10	10	0.570	0.020	5.0
MA4E400H	High	Ku	0.05	0.25	0.05	12	0.610	0.020	5.0

**NOTES:**

- $C_J$  is measured across diagonal leads at  $V_R = 0\text{V}$  and  $F = 1.0\text{ MHz}$ .
- $C_T = C_J + C_P$  is the package capacitance.
- Series resistance,  $R_S$ , is determined by subtracting the junction resistance,  $R_J$ , from the measured value of 10 mA dynamic (slope) resistance,  $R_T$ .

$$R_S = R_T - R_J \text{ Ohms}$$

Junction resistance is computed from the following equation:

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

$I_F$  is the forward bias current in mA.

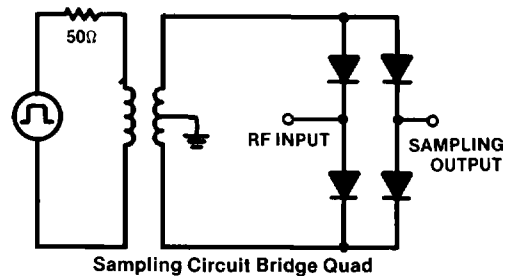
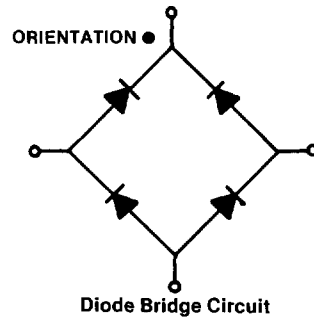
- $\Delta C_J$  is measured across adjacent quad leads at  $V_R = 0\text{V}$  and  $F = 1.0\text{ MHz}$ .
- $V_B$  is measured at  $I_R = 10\ \mu\text{A}$

## Applications

These beam-lead Schottky dual barrier bridge quads are primarily used in sampling and modulator applications. The small case sizes and minimal electrical parasitics are well suited for miniature broadband components.

High speed switching, a necessary sampling requirement, is accomplished with the Schottky diode. Schottky diodes, which are majority carrier devices under normal operating conditions, have switching speeds in the picosecond range. The four closely matched junctions assure high inherent isolation between the signal and sampler pulse circuits.

The different barrier heights enable the designer to select a device with a high enough barrier so that the rf signal input to the sampler is not large enough to cause the diodes in the bridge to conduct. The diode circuit configuration is shown at the right.



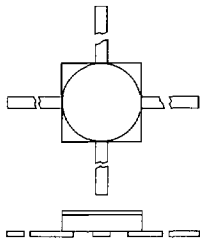
## MAXIMUM RATINGS

<b>Operating and Storage Temperature Range of Junctions</b>	- 65°C to + 150°C
<b>Maximum Power Dissipation (derate linearly to zero allowable dissipation at 150°C)</b>	75 mW/junction
<b>Beam Strength (Case Style 906)</b>	2g

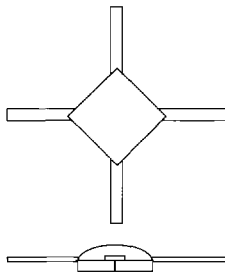
## Ordering Information

Case styles are specified by adding the case style number as a suffix to the basic part number. For example, an MA4E402L-228 is a low barrier bridge quad housed in the 228 case style.

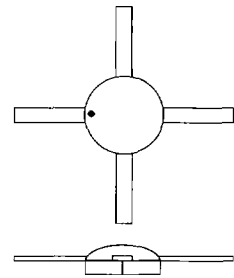
## Case Styles



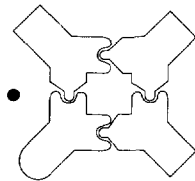
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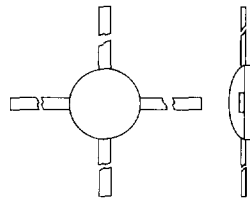
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