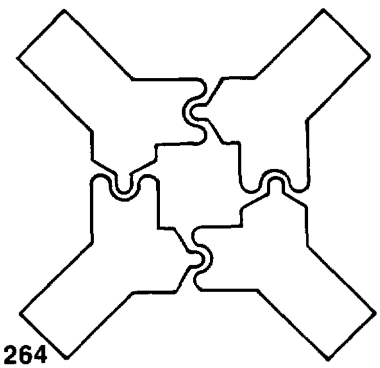
Schottky Barrier Beam-Lead and Packaged Ring Quads

For Double Balanced Mixers up to 18 GHz



Description

Single Barrier Ring Quads
Each Schottky barrier diode quad consists of four closely matched diodes connected in a ring configuration. The four diodes are formed monolithically to assure close matching of electrical characteristics: 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 rings at the wafer level.

Dual Barrier Ring Quads
Each dual barrier ring quad consists of eight Schottky diodes connected in a ring configuration. Each arm of the quad consists of two high barrier Schottky diodes. The structure is formed monolithically to assure close matching of electrical characteristics.

Features

- SMALL PHYSICAL SIZE FOR MICROSTRIP MOUNTING
- HIGH RELIABILITY
- CLOSELY MATCHED JUNCTION FOR HIGH ISOLATION
- HIGH BARRIERS FOR LO POWER LEVELS UP TO +27 dBm
- DEVICES 100% TESTED
- MINIMUM PARASITICS FOR BROADBAND DESIGNS

M/A-COM's ring quads are available in five case styles which are compatible with microstrip assembly techniques. The 226 case style is hermetically sealed and should be used in either harsh environments or very high reliability situations. The 228 case style is a low-cost package close to the physical size of the 226 case style. The smaller case style, 227, is physically smaller than the others and should be used for either high frequency or maximum bandwidth applications. Case style 905, designed specifically for broadest bandwidth, features unpackaged beam-lead quads.

Specifications @ TA = 25°C

Model Number	Case Style	Freq. Band	Maximum[1] Capacitance C_j (pF)	Maximum[1] Capacitance Difference ΔC_T (pF)	Typical[2] Forward Voltage V_F (Volts)	Maximum[2] Forward Voltage Difference ΔV_F (Volts)	Maximum[3] Series Resistance R_S (Ohms)
Low Barrier Ring Quads							
MA40430	226	L-S	0.55	0.10	.250	.020	7
MA40431	227	L-S	0.40	0.10	.250	.020	7
MA40432	228	L-S	0.50	0.10	.250	.020	7
MA40439	228	L-S	0.50	0.20	.250	.020	7
MA40433	226	C	0.30	0.05	.270	.020	10
MA40434	227	C	0.30	0.10	.270	.020	10
MA40437	264	C-X	0.25	0.10	.270	.020	10
MA40435	227	X	0.20	0.05	.300	.020	12
MA40436	227	Ku	0.15	0.05	.300	.020	12
MA40438	264	X-Ku	0.15	0.05	.300	.020	12
MA40284	963	X-Ku	0.10	0.05	.310	.020	18
Medium Barrier Ring Quads							
MA40440	226	L-S	0.50	0.10	.350	.020	7
MA40441	227	L-S	0.45	0.10	.350	.020	7
MA40442	228	L-S	0.50	0.10	.350	.020	7
MA40449	228	L-S	0.50	0.20	.350	.020	7
MA40443	226	C	0.30	0.05	.370	.020	10
MA40444	227	C	0.30	0.10	.370	.020	10
MA40445	228	C	0.30	0.10	.370	.020	10
MA40448	264	C-X	0.25	0.10	.370	.020	10
MA40446	227	X	0.20	0.05	.410	.020	12
MA40447	227	Ku	0.15	0.05	.410	.020	12
MA40450	264	X-Ku	0.15	0.05	.410	.020	12
MA40285	963	X-Ku	0.10	0.05	.410	.020	18
High Barrier Ring Quads							
MA40490	226	L-S	0.50	0.10	.550	.020	7
MA40491	227	L-S	0.45	0.10	.550	.020	7
MA40492	228	L-S	0.50	0.10	.550	.020	7
MA40499	228	L-S	0.50	0.20	.550	.020	7
MA40493	226	C	0.30	0.05	.570	.020	10
MA40494	227	C	0.30	0.10	.570	.020	10
MA40495	228	C	0.30	0.10	.570	.020	10
MA40487	264	C-X	0.25	0.10	.570	.020	12
MA40496	227	X	0.20	0.05	.610	.020	12
MA40497	227	Ku	0.15	0.05	.610	.020	12
MA40488	264	X-Ku	0.15	0.05	.610	.020	12
MA40286	963	X-Ku	0.10	0.05	.610	.020	18

Notes: see top of next page

Specifications @ TA = 25°C (Cont'd)

NOTES:

1. C_T is measured across diagonal contacts. ΔC_T is measured across adjacent contacts. Capacitance is measured at zero bias and 1 MHz.
2. V_F and ΔV_F are measured across adjacent contacts at I_F - 1.0mA.
3. Series resistance, R_S, is determined by subtracting the junction resistance, R_J, from the measured value of dynamic (slope) resistance, R_D:

   $R_S = R_D - R_J$ ohms

   Junction resistance is computed from:

   $R_J = 26/I_F$ ohms

   I_F is the forward current in mA.

Dual High Barrier Beam-Lead Ring Quads

Model Number	Frequency Band	Junction Capacitance C_J (pF) Min.	Max.	Maximum[3] Junction Capacitance Difference ΔC_J (pF)	Typical[2] Resistance R_T (Ω)	Typical[4] Forward Voltage V_F (V)	Maximum[4] Forward Voltage Difference ΔV_F (V)
MA40482	S	0.20	0.30	0.10	14	1.10	0.020
MA40483	X	0.12	0.20	0.10	20	1.14	0.020
MA40484	Ku	0.05	0.12	0.05	24	1.21	0.020

NOTES:

1. C_J is measured across diagonal leads at V_R = 0V and F = 1.0 MHz. C_J is comprised of the capacitance of two diode junctions in series.
2. R_S is the diode series resistance which is the dynamic resistance, R_T, minus the junction resistance, R_J. The junction resistance is $R_J = 26/I_F$ is the DC bias current expressed in milliamperes. R_T is measured for I_F = 10 mA and the junction resistance, R_J, is subtracted from R_T to determine R_S. R_S is measured across adjacent quad leads and it is comprised of the series resistance of two diode junctions in series.
3. ΔC_J is measured across adjacent quad leads at V_R = 0V and F = 1.0 MHz.
4. V_F and ΔV_F are measured across adjacent quad leads at I_F = 1.0 mA. V_F is comprised of the forward voltage of two diode junctions in series.

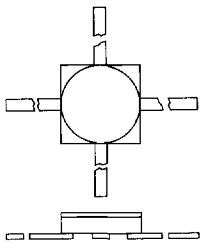
MAXIMUM RATINGS

Operating and Storage Temperature Range of Junctions	−65°C to +150°C
Maximum Power Dissipation (derate linearly to zero allowable dissipation at 150°C)	75 mW/junction
Soldering Temperature	235°C for 10 sec.
Beam Strength	2g (Case Styles 264 and 905)

Ordering Information

The model number for Ring Quads includes the case style. The case style for the dual barrier ring quad is specified by adding the case style number to the basic part number. For example, the MA40482-226 is the S-Band device in the 226 package.

Case Styles



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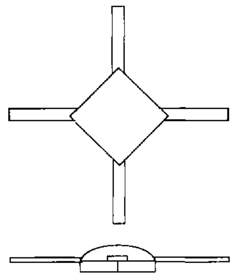

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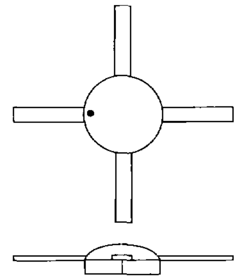

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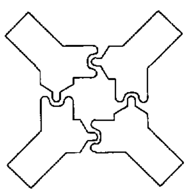

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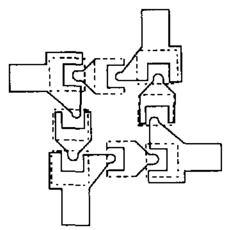
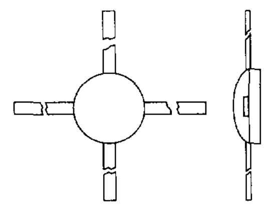


905



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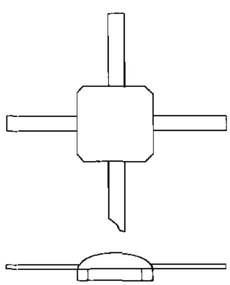

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