Schottky Barrier Beam Lead and Packaged Ring Quads

V3.00

Features

- Small Physical Size for Microstrip Mounting
- High Reliability
- Closely Matched Junctions for High Isolation
- High Barriers for LO Power Levels up to +27 dBm
- Minimum Parasitics for Broadband Designs

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 beam lead construction assures minimum junction capacitance, minimum connection lead inductance and permits the interconnection of the diodes into rings at the wafer level.

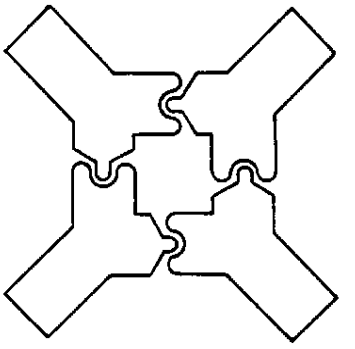
Dual Barrier Ring Quads

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. They are available in the low cost 1008 package.

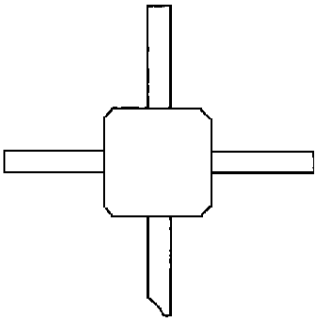
Medium Barrier Cross-Over Quads

M/A-COM's ring quads are available in beam lead form and five stripline 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 high reliability military systems. The 228 case style is a low-cost package of similar size to the 226 case style. Case style 227 is suggested for either high frequency or wide bandwidth applications. Case style 963 has the lowest parasitics and is suggested for widest bandwidth applications. Case style 1008 is a low cost moderate frequency package used in many double balanced mixers through 2 GHz.

Case Styles



264



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North America: Tel. (800) 366-2266 Fax (800) 618-8883 ■ Asia/Pacific: Tel. +81 (03) 3226-1671 Fax +81 (03) 3226-1451 ■ Europe: Tel. +44 (1344) 869 595 Fax +44 (1344) 300 020

Specifications @ T_A = +25°C

Model[4] Number	Frequency Band	Maximum 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	L-S	0.55	0.10	0.25	0.02	7
MA40431	L-S	0.40	0.10	0.25	0.02	7
MA40432	L-S	0.50	0.10	0.25	0.02	7
MA40439	L-S	0.50	0.20	0.25	0.02	7
MA40433	C	0.30	0.05	0.27	0.02	10
MA40437	C-X	0.25	0.10	0.27	0.02	10
MA40435	X	0.20	0.05	0.30	0.02	12
MA40284	X-Ku	0.10	0.05	0.31	0.02	18
Medium Barrier Ring Quads						
MA40440	L-S	0.50	0.10	0.35	0.02	7
MA40442	L-S	0.50	0.10	0.35	0.02	7
MA40449	L-S	0.50	0.20	0.35	0.02	7
MA40443	C	0.30	0.05	0.37	0.02	10
MA40444	C	0.30	0.10	0.37	0.02	10
MA40446	X	0.20	0.05	0.41	0.02	12
MA40447	Ku	0.15	0.05	0.41	0.02	12
MA40450	X-Ku	0.15	0.05	0.41	0.02	12
MA40285	X-Ku	0.10	0.05	0.41	0.02	18
High Barrier Ring Quads						
MA40490	L-S	0.50	0.10	0.55	0.02	7
MA40499	L-S	0.50	0.20	0.55	0.02	7
MA40493	C	0.30	0.05	0.57	0.02	10
MA40496	X	0.20	0.05	0.61	0.02	12
MA40497	Ku	0.15	0.05	0.61	0.02	12
MA40286	X-Ku	0.10	0.05	0.61	0.02	18

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 mA.
3. Series resistance, R_S, is determined by subtracting the junction resistance, R_j, from the measured value of dynamic (slope) resistance, R_T:
   $R_S = R_T - R_j$ Ohms
   Junction resistance is computed from:
   $R_j = 26/I_F$ Ohms
   I_F is the forward current in mA.
4. All of these parts are available in case styles 226, 227, 228, 264, 963 and 1008. To order add case style as suffix i.e., MA40430-1008.

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Specifications @ T_A = +25° C (Cont'd)

Dual High Barrier Beam Lead Ring Quads

Model[5] 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

Notes:

1. CJ is measured across diagonal leads at V_R = 0V and f = 1 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 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.
5. All of these parts are available in case styles 226, 228, 264, 963 and 1008. To order add case style as suffix to the part number, i.e., MA40482-1008.

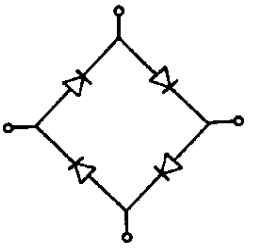
Medium Barrier Crossover Quads

Model Number	Case Style	Frequency Band	Total[1] Capacitance C_T (pF)	Maximum[1] Total Capacitance Difference ΔC_T (pF)	Maximum[2] Series Resistance R_S (Ohms)	Typical[3] Forward Voltage V_F (Volts)	Maximum[3] Forward Voltage Difference ΔV_F (Volts)
MA40472	1008	L	1.20	0.10	7	0.330	0.020
MA40471	1008	S	0.60	0.10	7	0.350	0.020

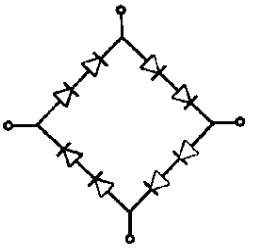
Notes:

1. C_T and ΔC_T are measured across adjacent leads 1-4 and 2-3 at V_R = 0V and f = 1 MHz.
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 $R_j = 26/I_F$ where 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 form R_T to determine R_S. R_S is calculated across leads 1-2, 2-4, 3-4 and 1-3. ($R_S = R_T - R_j$)
3. V_F and ΔV_F are measured across adjacent leads at I_F = 1 mA.

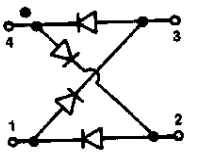
SINGLE BARRIER RING QUAD CIRCUIT TOP VIEW PACKAGED



DUAL BARRIER RING QUAD CIRCUIT TOP VIEW



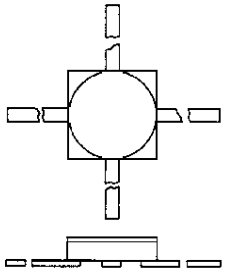
CROSS-OVER QWUAD CIRCUIT TOP VIEW PACKAGED



Absolute Maximum Ratings at 25°C

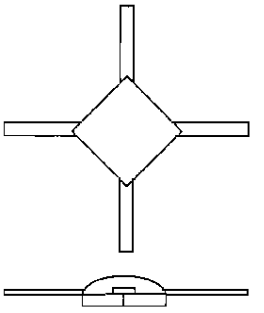
Parameter	Absolute Maximum
Operating and Storage Temperature Range of Junctions	-65°C to +150°C (Case Style 226) -65°C to +125°C (Case Style 227, 228, 963, 1008)
Maximum Power Dissipation (derate linearly to zero allowable dissipation at 150°C)	75 mW/junction
Soldering Temperature (Plastic Packages)	235°C for 10 sec. (Case Style 226) 150°C for 5 sec. (Case Styles 227, 228, 963, 1008)
Beam Strength	2g (Case Styles 264 and 905)

Case Styles (See appendix for complete dimensions.)



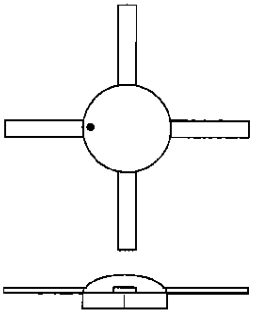
226

(Hermetic Ceramic Package)



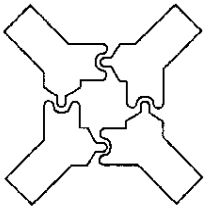
227

(Plastic Encapsulation)



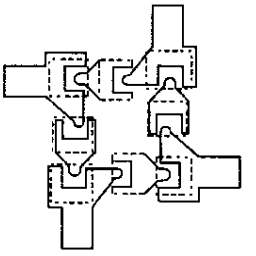
228

(Plastic Encapsulation)



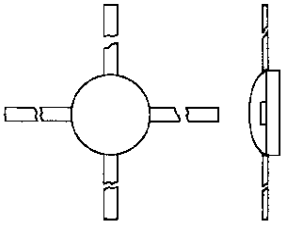
264

(Beam Lead)



905

(Dual Barrier Beam Lead)



963

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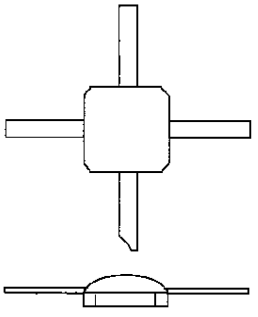

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