

Silicon Beamless Schottky Diodes: Pairs and Quads

Applications

- Microwave MIC assembly and automated high volume manufacturing lines
- Mixers

Features

- Mechanically rugged design
- Three barrier heights for optimized mixer performance
- Wide product range:
Series pair, ring, bridge, and eight-diode rings
- Use in ring or crossover designs in double balanced mixers
- Virtually any LO requirement can be met with choice of barrier height
- 100% DC tested on water
- Available on film frame or wafer pack
- For RoHS and other product compliance information, see the [Skyworks Certificate of Conformance](#).

Description

The Skyworks beamless diode family is designed for a high degree of device reliability in both commercial and industrial uses. The diodes are designed to offer high performance as well as achieving price sensitive cost targets for commercial systems.

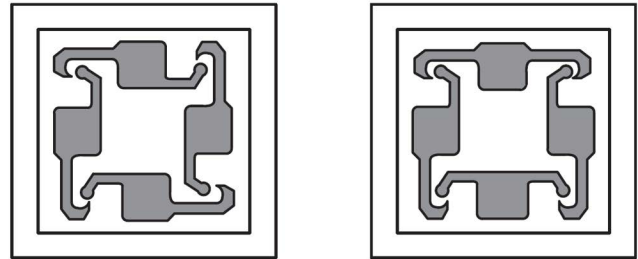
Assembly and Handling Procedure

The process flow for assembly is:

- Die attach or encapsulation with non-conductive epoxy
- Wire bond

Die Attach Methods

All leadless chips are compatible with both eutectic and conductive epoxy die attach methods. Eutectic



processes use Sn/Au or Sn/Pb solder. Non-conductive die attach is recommended.

Packing Methods

- Gel pak
- Wafer on film frame (rejects are marked with ink)
 - Diced, ready for pick and place
 - Unsawn, whole wafer, 7-mil thick, maximum

Wire Bonding

Two methods can be used to connect wire, ribbon, or wire mesh to the chips:

- Thermocompression
- Ball-bonding

Skyworks recommends use of pure gold wire.

Electrical and Physical Specifications

Absolute maximum ratings for the beamless Schottky diodes are provided in Table 1. Electrical specifications are noted in Table 2. SPICE model parameters are defined in Table 3, typical bonding configuration is illustrated in Figure 1.

Table 1. Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
Peak inverse voltage	PIV		V_B	–
Supply current	I_{MAX}		50	mA/V
Power dissipation (CW)	P_{DISS}		75	mW/junction
Storage temperature	T_{STG}	–65	+175	°C
Operating temperature	T_{OP}	–65	+150	°C
Electrostatic discharge: Human Body Model (HBM), Class 0	ESD		< 250	V

1. Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 2. Electrical Specifications (Per Junction)¹

Part Number	Band	Barrier	V _F I _F = 1.0 mA (mV)		ΔV _F I _F = 1.0 mA (mV)	C _J ² V _R = 0 V, f = 1 MHz (pF)		R _S I _F = 5 mA (Ω)	V _B @ 10 μA (V)	Outline Drawing Number
			Min	Max	Max	Min	Max	Max	Min	
Ring Quad ³										
DMF3926-000	S	Low	200	260	10	0.30	0.50	5	—	551-002
DMJ3928-000	S	High	500	600	10	0.30	0.50	5	—	551-002
DMF3942-000	X	Low	250	310	10	0.15	0.30	8	—	551-002
DME3943-000	X	Medium	325	425	10	0.15	0.30	8	—	551-002
DMJ3944-000	X	High	550	650	10	0.15	0.30	8	—	551-002
Bridge Quad ³										
DMF3929-000	S	Low	200	260	10	0.30	0.50	5	2	551-004
DME3930-000	S	Medium	300	400	10	0.30	0.50	5	3	551-004
DMJ3931-000	S	High	500	600	10	0.30	0.50	5	4	551-004
DMF4102-000	X	Low	250	310	10	0.15	0.3	14	2	551-004
DME4101-000	X	Medium	325	425	10	0.15	0.3	14	3	551-004
DMJ4103-000	X	High	550	650	10	0.15	0.3	14	4	551-004

Table 2. Electrical Specifications (Per Junction)¹ (Continued)

Part Number	Band	Barrier	V _F I _F = 1.0 mA (mV)		ΔV _F I _F = 1.0 mA (mV)	C _J ² V _R = 0 V, f = 1 MHz (pF)		R _S I _F = 5 mA (Ω)	V _B @ 10 μA (V)	Outline Drawing Number
			Min	Max	Max	Min	Max	Max	Min	
Series Pair ³										
DMF3932-000	S	Low	200	260	10	0.30	0.50	5	2	551-012
DME3933-000	S	Medium	300	400	10	0.30	0.50	5	3	551-012
DMJ3934-000	S	High	500	600	10	0.30	0.50	5	4	551-012
Back-to-Back Ring Series Pair ³										
DMF3935-000	S	Low	200	260	10	0.30	0.50	5	—	551-056
DME3936-000	S	Medium	300	400	10	0.30	0.50	5	—	551-056
DMJ3937-000	S	High	500	600	10	0.30	0.50	5	—	551-056
Octoquad Ring ⁴										
DMF3938-000	S-X	Low	400	520	15	0.15	0.30	16	—	556-020
DME3939-000	S-X	Medium	600	800	15	0.15	0.30	16	—	556-020
DMJ3940-000	S-X	High	1000	1200	15	0.15	0.30	16	—	556-020
Back-to-Back Crossover Quad, to 6 GHz										
DMF3945-000	S	Low	200	260	15	0.30	0.50	5	—	588-065
DME3946-000	S	Medium	300	400	15	0.30	0.50	5	—	588-065
DMJ3947-000	S	High	525	625	15	0.30	0.50	5	—	588-065

1. Performance is guaranteed only under the conditions listed in this table.
2. C_J represents total capacitance. Maximum C_J unbalance @ 0 V, 1 MHz = 0.25 pF.
3. Matching criteria V_F @ 1 mA ≤ 15 mV available for matched sets.
4. Matching criteria V_F @ 1 mA ≤ 20 mV available for matched sets.

Table 3. SPICE Model Parameters (Per Junction)

Part Number Prefix	I _S (A)	R _S (Ω)	N	T _T (s)	C _{JO} (pF)	M	E _G (eV)	V _J (V)	X _{TI}	F _C	B _V (V)	I _{BV} (A)
DMF3926	2.5 x 10 ⁻⁷	4	1.04	1 x 10 ⁻¹¹	0.42	0.32	0.69	0.51	2	0.5	2	1 x 10 ⁻⁵
DME3927 Discontinued												
DMJ3926	9.0 x 10 ⁻¹³	4	1.04	1 x 10 ⁻¹¹	0.39	0.42	0.69	0.84	2	0.5	3	1 x 10 ⁻⁵
DMF4102	1.1 x 10 ⁻⁷	6	1.04	1 x 10 ⁻¹¹	0.22	0.32	0.69	0.495	2	0.5	2	1 x 10 ⁻⁵
DME4101	2.4 x 10 ⁻⁹	6	1.04	1 x 10 ⁻¹¹	0.20	0.37	0.69	0.595	2	0.5	3	1 x 10 ⁻⁵
DMJ4103	8.5 x 10 ⁻¹³	6	1.04	1 x 10 ⁻¹¹	0.20	0.42	0.69	0.800	2	0.5	4	1 x 10 ⁻⁵

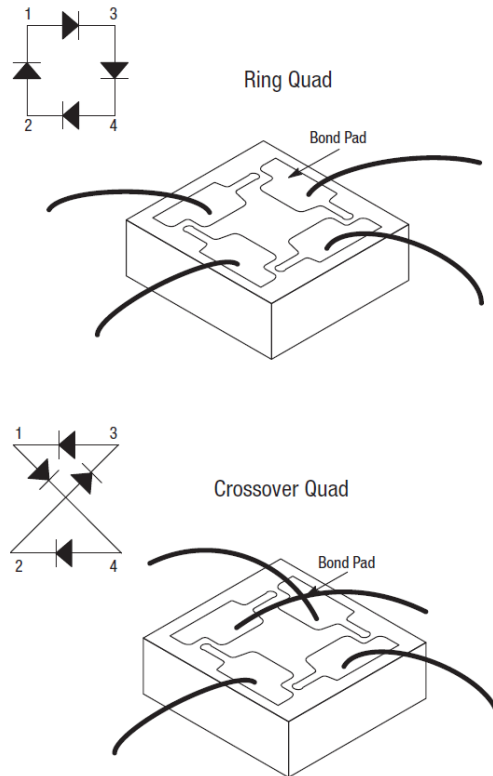


Figure 1. Typical Bonding Configuration

Package Information

Skyworks silicon beamless Schottky diodes are provided in Gel paks and on film frame. Package dimensions are provided in Figures 2 through 7.

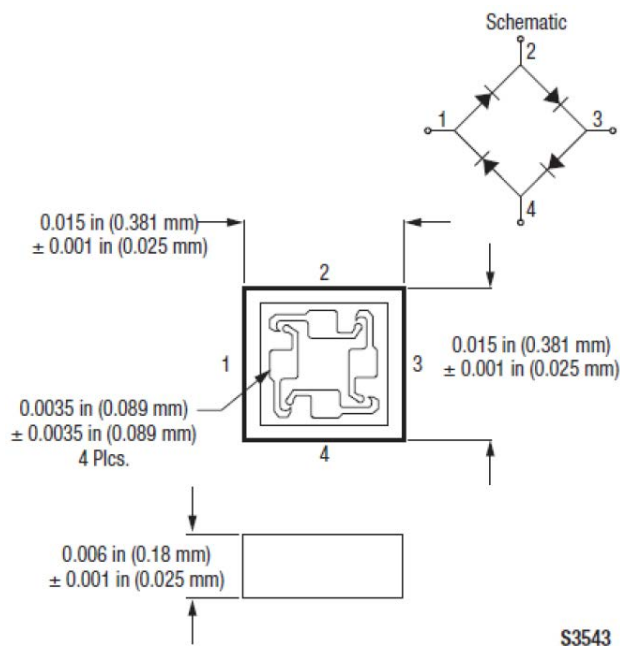


Figure 2. 551-002 Package Dimensions

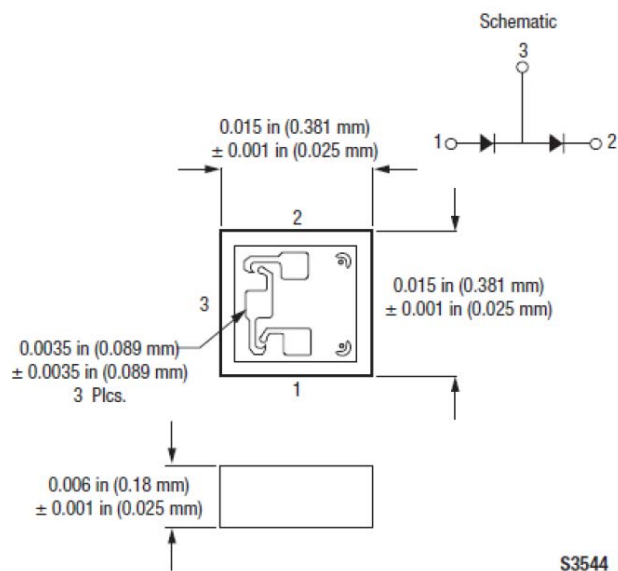


Figure 3. 551-012 Package Dimensions

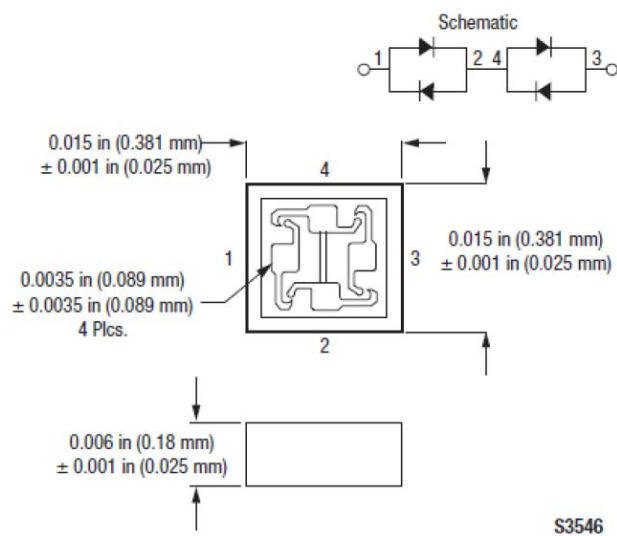


Figure 4. 551-056 Package Dimensions

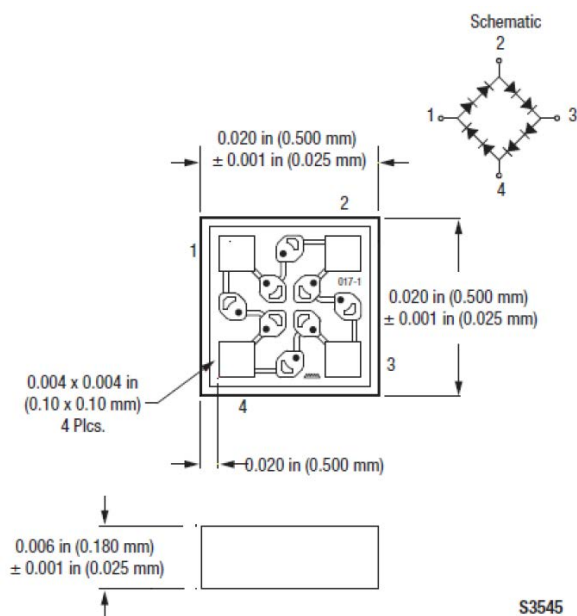


Figure 5. 556-020 Package Dimensions

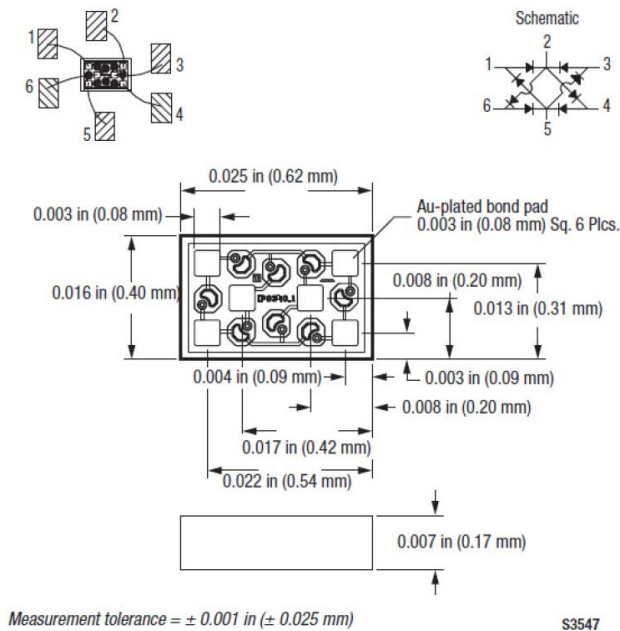


Figure 6. 588-065 Package Dimensions

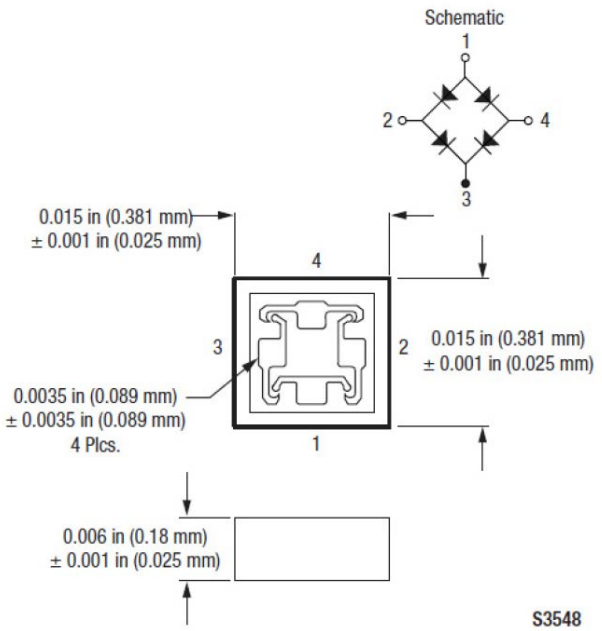


Figure 7. 551-004 Package Dimensions

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