DATA SHEET

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 waffle pack

Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.

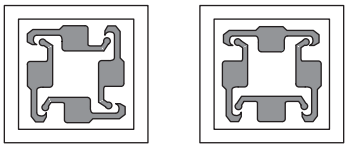
Description

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 the utmost in performance as well as achieving price sensitive cost targets for commercial systems.

Assembly and Handling Procedure

The process flow for assembly is:

- Die attach using nonconductive epoxy
- Wire bond
- Encapsulation (nonconductive epoxy)



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. Nonconductive die attach is recommended.

Packing Methods

1. Gel pak
2. 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
- Ballbonding

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.

A typical bonding configuration is illustrated in Figure 1.

Table 1. Absolute Maximum Ratings (Note 1)

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

Note 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.

***CAUTION**: Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.*

Table 2. Electrical Specifications (Per Junction) (1 of 2) (Note 1)

Part Number	Band	Barrier	V_F I_F = 1.0 mA (mV)		ΔV_F I_F = 1.0 mA (mV)	C_J (Note 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 (Note 3)										
DMF3926-000	S	Low	200	260	10	0.30	0.50	5	–	551-002
DME3927-000	S	Medium	300	400	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 (Note 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
Series Pair (Note 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 (Note 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

Table 2. Electrical Specifications (Per Junction) (2 of 2) (Note 1)

Part Number	Band	Barrier	V_F I_F = 1.0 mA (mV)		ΔV_F I_F = 1.0 mA (mV)	C_J (Note 2) V_R = 0 V, f = 1 MHz (pF)		R_S I_F = 5 mA (Ω)	V_S @ 10 µA (V)	Outline Drawing Number
			Min	Max	Max	Min	Max	Max	Min	
Octoquad Ring (Note 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

Note 1. Performance is guaranteed only under the conditions listed in this table.

Note 2: Cj represents total capacitance. Maximum Cj unbalance @ 0 V, 1 MHz = 0.25 pF.

Note 3: Matching criteria Vf @ 1 mA ≤ 15 mV available for matched sets.

Note 4: Matching criteria Vf @ 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)	XTI	F_C	B_V (V)	I_{BV} (A)
DMF3926	2.5×10^{-7}	4	1.04	1×10^{-11}	0.42	0.32	0.69	0.51	2	0.5	2	1×10^{-5}
DME3927	1.3×10^{-9}	4	1.04	1×10^{-11}	0.39	0.34	0.69	0.65	2	0.5	3	1×10^{-5}
DMJ3926	9.0×10^{-13}	4	1.04	1×10^{-11}	0.39	0.42	0.69	0.84	2	0.5	3	1×10^{-5}
DMF4102	1.1×10^{-7}	6	1.04	1×10^{-11}	0.22	0.32	0.69	0.495	2	0.5	2	1×10^{-5}
DME4101	2.4×10^{-9}	6	1.04	1×10^{-11}	0.20	0.37	0.69	0.595	2	0.5	3	1×10^{-5}
DMJ4103	8.5×10^{-13}	6	1.04	1×10^{-11}	0.20	0.42	0.69	0.800	2	0.5	4	1×10^{-5}

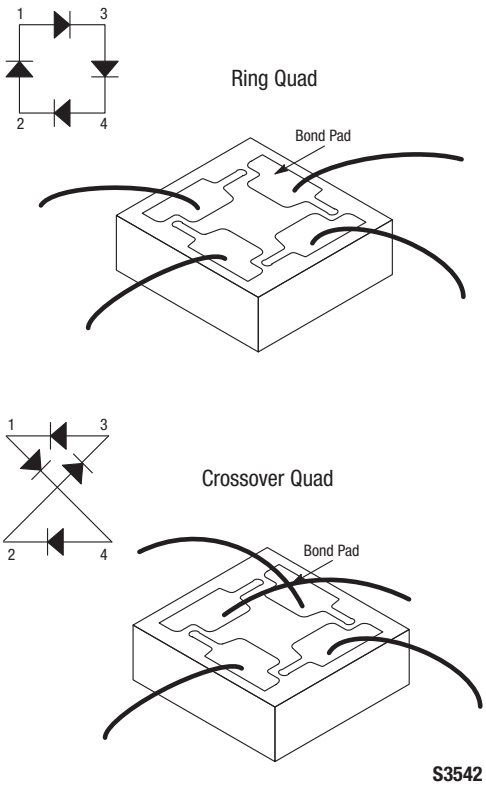


Figure 1. Typical Bonding Configuration

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.

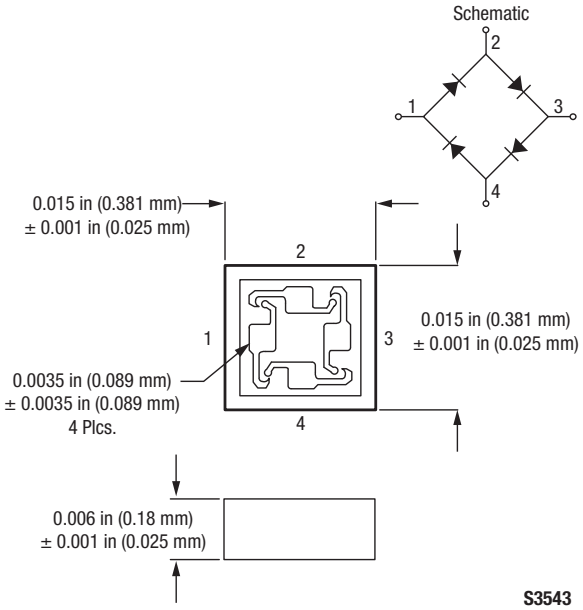


Figure 2. 551-002 Package Dimensions

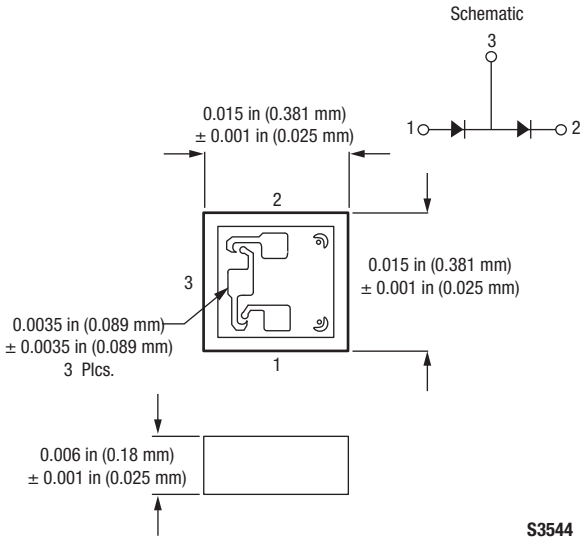


Figure 3. 551-012 Package Dimensions

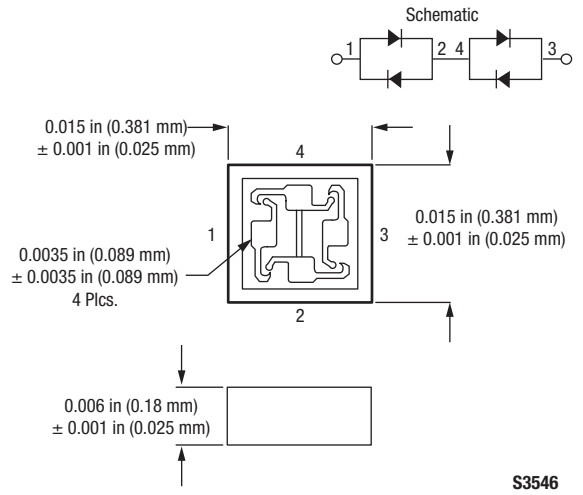


Figure 4. 551-056 Package Dimensions

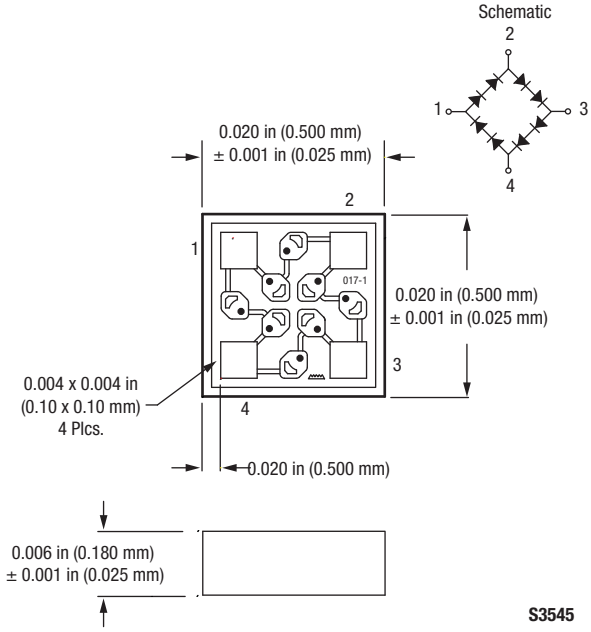


Figure 5. 556-020 Package Dimensions

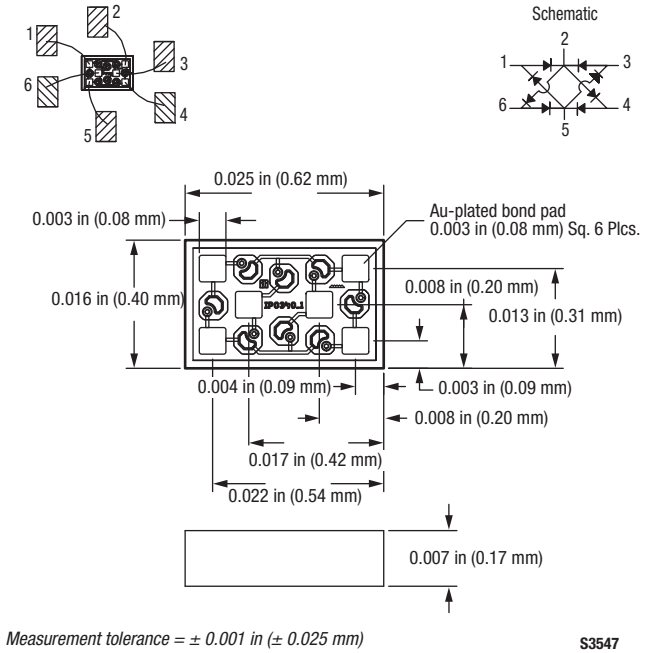


Figure 6. 588-065 Package Dimensions

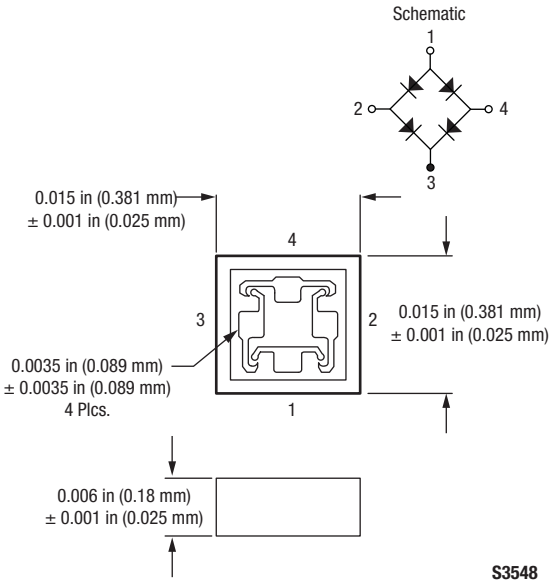


Figure 7. 551-004 Package Dimensions