

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.

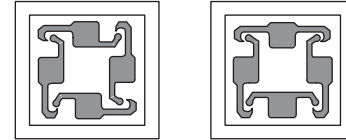
Description

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

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

Note 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 _{J0} (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 | 1.3 x 10 ⁻⁹ | 4 | 1.04 | 1 x 10 ⁻¹¹ | 0.39 | 0.34 | 0.69 | 0.65 | 2 | 0.5 | 3 | 1 x 10 ⁻⁵ |
| 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 |

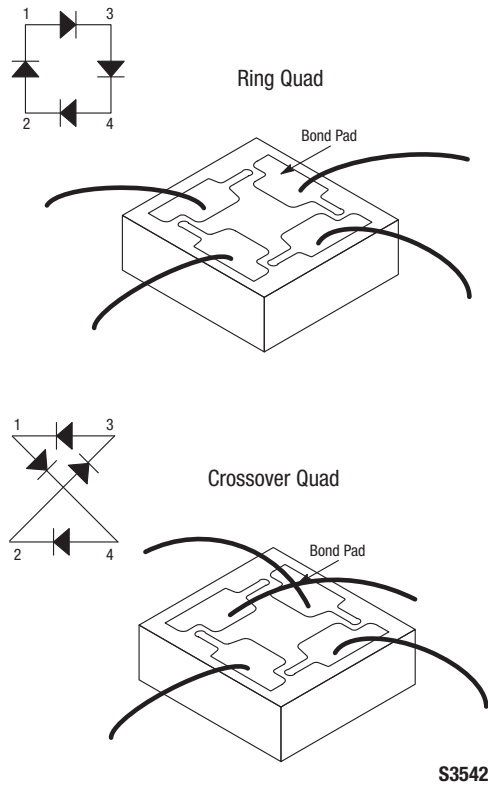


Figure 1. Typical Bonding Configuration

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.

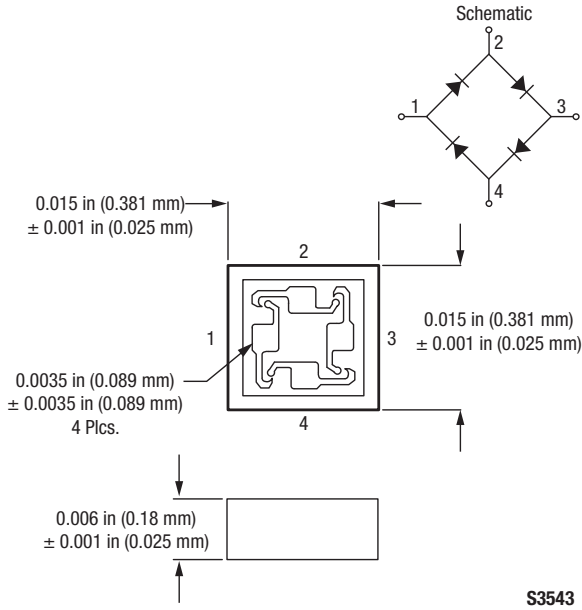


Figure 2. 551-002 Package Dimensions

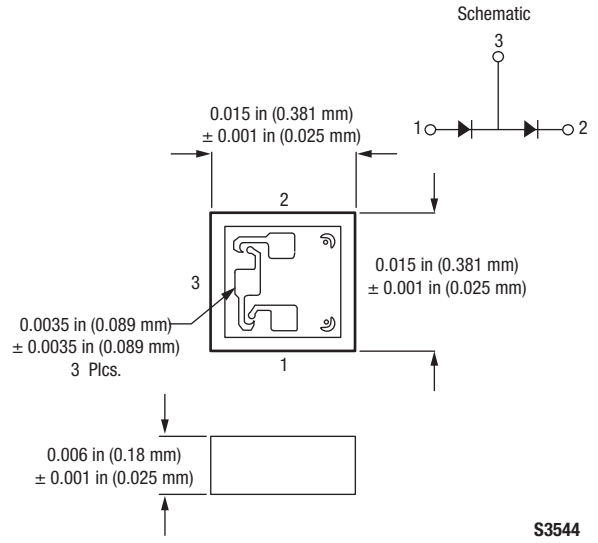


Figure 3. 551-012 Package Dimensions

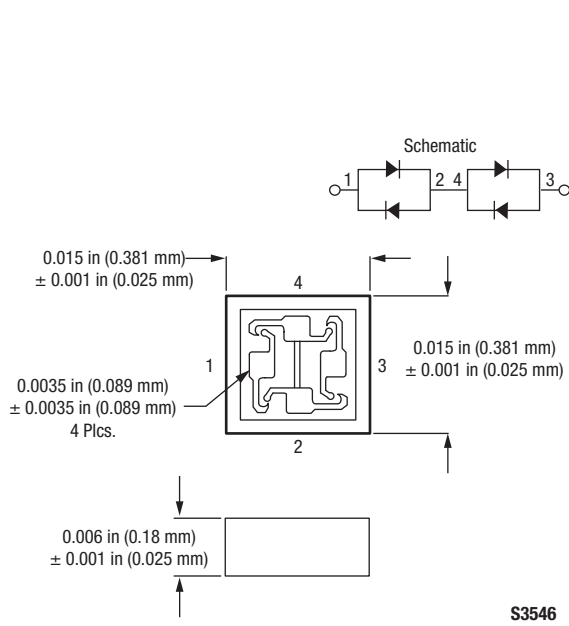


Figure 4. 551-056 Package Dimensions

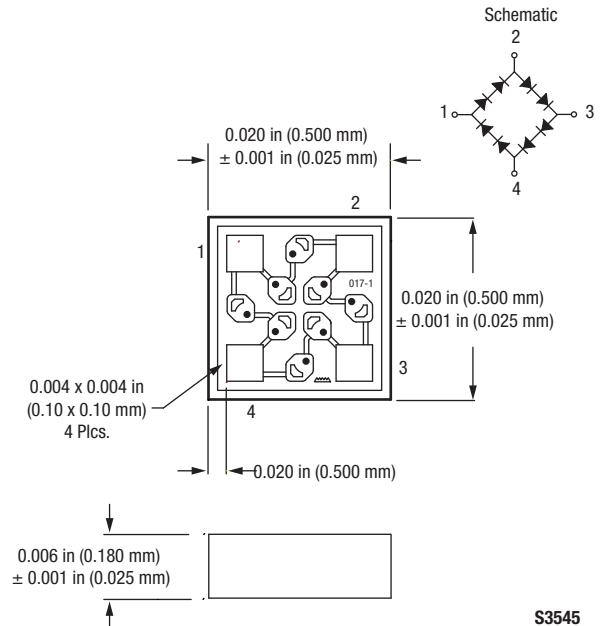


Figure 5. 556-020 Package Dimensions

DATA SHEET • SILICON BEAMLESS SCHOTTKY DIODES

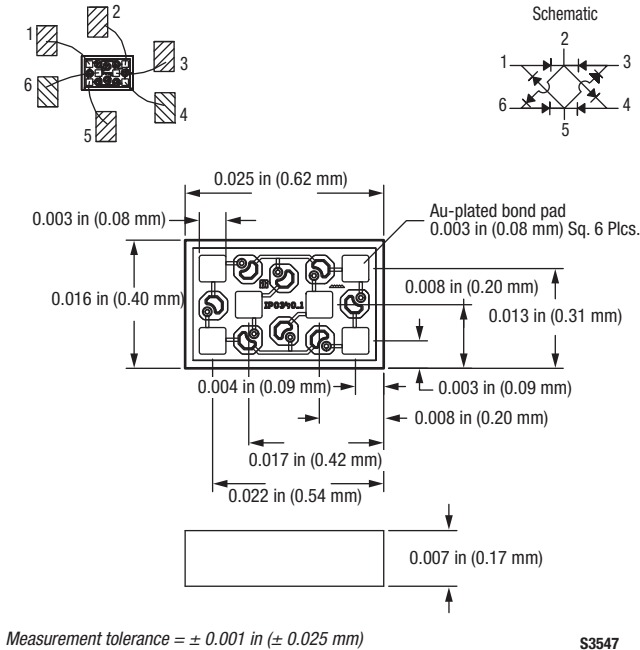


Figure 6. 588-065 Package Dimensions

S3547

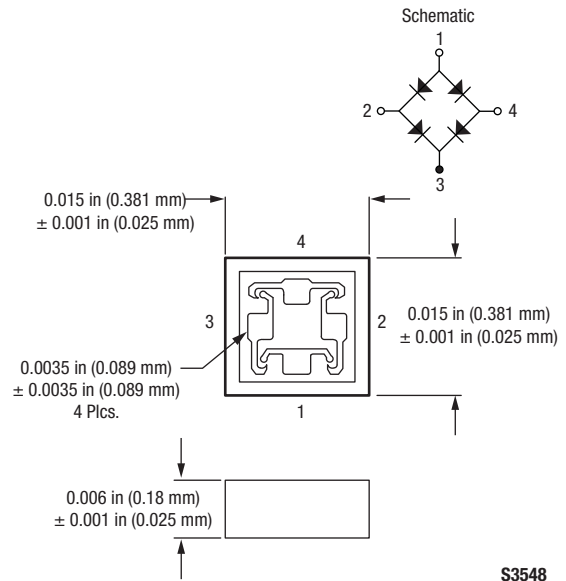


Figure 7. 551-004 Package Dimensions

S3548

Copyright © 2002-2009, 2011, 2012-2014 Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of stated published specifications or parameters.

Skyworks and the Skyworks symbol are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.