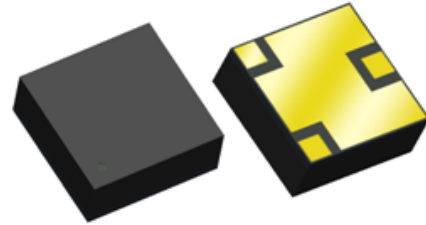


Applications

- Splits SDARS & GPS Signals
- Automotive

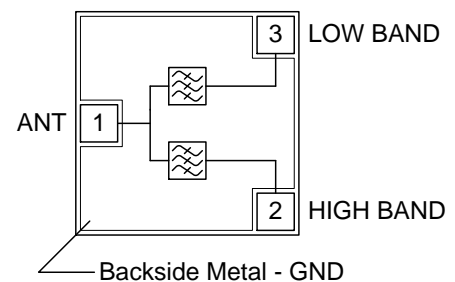


3 Pin 3 x 3 mm Leadless LGA Package

Product Features

- GPS/ SDARS Diplexer
- Size : 3.0 X 3.0 X 1.2 mm
- Laminate Based Over-Molded Module
- No external matching required for 50 Ω operation

Functional Block Diagram



Top View

General Description

The TQM2M9016 splits SDARS and GPS signals from a single automotive antenna. This diplexer is housed in a 3.0 x 3.0 x 1.2 mm laminate based over-molded module.

The TQM2M9016 provides excellent insertion loss for both the GPS and SDARS signals while effectively protecting each band from the other. This diplexer is designed to match natively to 50 Ω . No external matching is required.

Pin Configuration

| Pin # | Label |
|----------------|-----------|
| 1 | ANT |
| 2 | HIGH BAND |
| 3 | LOW BAND |
| Backside Metal | GND |

Ordering Information

| Part No. | Description |
|---------------|---------------------|
| TQM2M9016 | GPS/ SDARS Diplexer |
| TQM2M9016-EVB | Evaluation Board |

Standard T/R size = 2500 pieces on a 13" reel.

Absolute Maximum Ratings

| Parameter | Rating |
|-------------------------------------|---------------|
| Storage Temperature | -40 to 150 °C |
| RF Input Power, CW, 50 Ω, T = 25 °C | +10 dBm |

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

| Parameter | Min | Typ | Max | Units |
|-----------------------|-----|-----|------|-------|
| Operating Temp. Range | -40 | | +100 | °C |

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Caution: Pin 2 and pin 4 have an internal DC blocking capacitor. Pin 6 does not contain an internal DC blocking capacitor. Do not apply DC voltage to pin 6 (low band port).

Electrical Specifications – Low Band (GPS)

Test conditions unless otherwise specified: Temp.=+25 °C, Network analyzer power level set to -25 dBm

| Parameter | Conditions | Min | Typ | Max | Units |
|-----------------|-------------------|-------|-------|-------|-------|
| Frequency Range | | 1.574 | 1.575 | 1.577 | GHz |
| Insertion Loss | | - | 0.6 | 0.9 | dB |
| Return Loss | | 12 | 20 | - | dB |
| Attenuation | 2.320 - 2.345 GHz | 20 | 40 | - | dB |
| Impedance | | - | 50 | - | Ω |

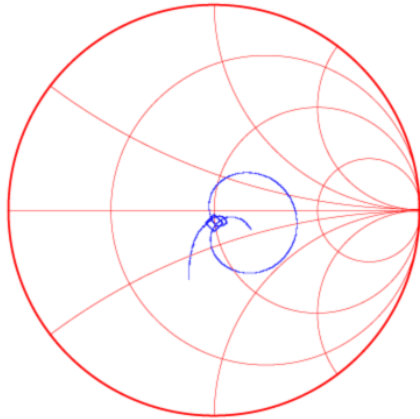
Electrical Specifications – High Band (SDARS)

Test conditions unless otherwise specified: Temp.=+25 °C, Network analyzer power level set to -25 dBm

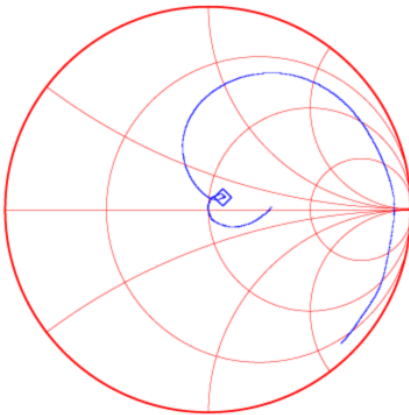
| Parameter | Conditions | Min | Typ | Max | Units |
|-----------------|-------------------|------|------|-------|-------|
| Frequency Range | | 2.32 | 2.33 | 2.345 | GHz |
| Insertion Loss | | - | 0.8 | 1.0 | dB |
| Return Loss | | 12 | 20 | - | dB |
| Attenuation | 1.574 – 1.577 GHz | 20 | 31 | - | dB |
| Impedance | | - | 50 | - | Ω |

Device Characterization Data

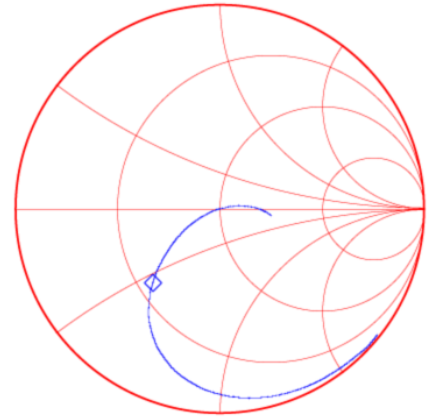
Input Response



Low Band Response



High Band Response



S-Parameter Data

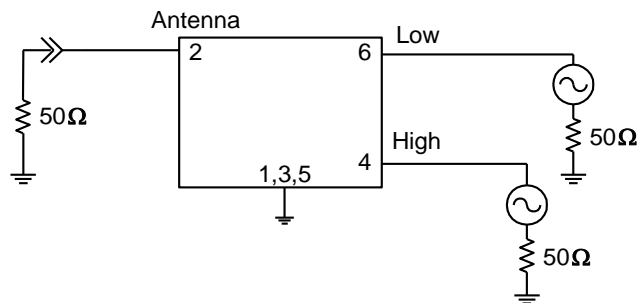
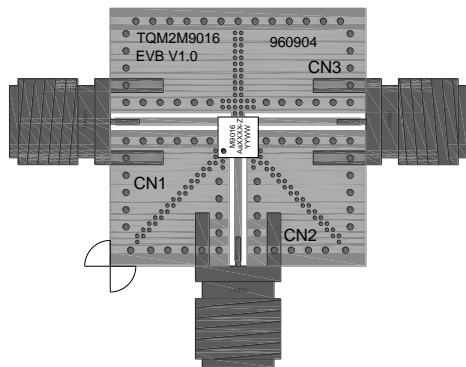
Test Conditions: Temp. = 25 °C, Network analyzer power level set to -25 dBm

| Freq (MHz) | S11 (dB) | S11 (ang) | S12 (dB) | S12 (ang) | S13 (dB) | S13 (ang) |
|------------|----------|-----------|----------|-----------|----------|-----------|
| 1574 | -24.02 | -86.3 | -0.58 | -113.7 | -43.99 | -147.7 |
| 1578 | -24.38 | -87.3 | -0.59 | -114.3 | -42.49 | -143.3 |
| 2320 | -19.41 | -99.2 | -33.67 | -108.3 | -0.79 | 124.6 |
| 2346 | -20.11 | -103.8 | -30.50 | -99.6 | -0.76 | 121.2 |

| Freq (MHz) | S21 (dB) | S21 (ang) | S22 (dB) | S22 (ang) | S23 (dB) | S23 (ang) |
|------------|----------|-----------|----------|-----------|----------|-----------|
| 1574 | -0.58 | -113.7 | -20.48 | 37.8 | -36.42 | 41.4 |
| 1578 | -0.58 | -114.3 | -20.69 | 39.5 | -36.04 | 45.2 |
| 2320 | -33.68 | -108.5 | -0.84 | 4.2 | -31.14 | -15.8 |
| 2346 | -30.48 | -99.6 | -0.81 | 0.9 | -29.21 | -8.4 |

| Freq (MHz) | S31 (dB) | S31 (ang) | S32 (dB) | S32 (ang) | S33 (dB) | S33 (ang) |
|------------|----------|-----------|----------|-----------|----------|-----------|
| 1574 | -44.06 | -148.1 | -36.43 | 41.1 | -0.38 | -67.2 |
| 1578 | -42.50 | -143.0 | -36.08 | 44.9 | -0.38 | -67.6 |
| 2320 | -0.79 | 124.6 | -31.12 | -15.9 | -19.65 | -151.5 |
| 2346 | -0.74 | 121.2 | -29.19 | -8.5 | -21.11 | -155.9 |

TQM2M9016-EVB



The board material is ½ oz Cu Top layer, .0075 Taconic TLY-5A dielectric, ½ oz Cu middle layer, FR4 dielectric, ½ oz Cu Bottom layer. Finished board thickness to be .062 +/- .004

Bill of Material – TQM2M9016-EVB

| Reference Des. | Value | Description | Manuf. | Part Number |
|----------------|-------|--------------------|------------------|---------------|
| U1 | n/a | GPS/SDARS Diplexer | TriQuint | TQM2M9016 |
| CN1, CN2, CN3 | n/a | SMA connector | Radiall USA Inc. | 9602-1111-018 |

Typical Performance – Low Band 1574 – 1577 MHz (GPS)

Test conditions: Temp. = 25 °C, Network analyzer power level set to -25 dBm

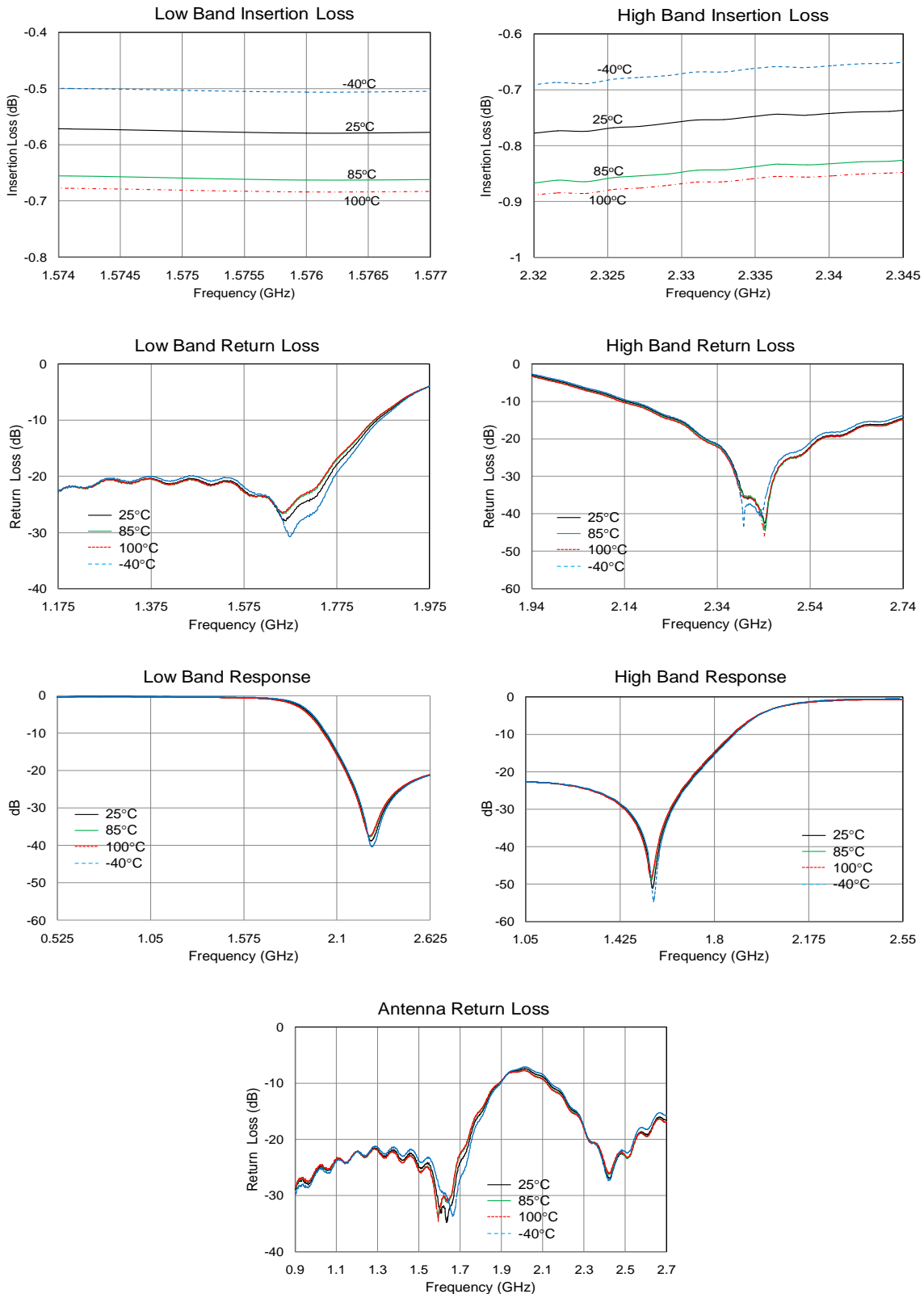
| Parameter | Typical Value | | | | Units |
|---|---------------|------|------|------|-------|
| Temperature | -40 | +25 | +85 | +100 | °C |
| Insertion Loss | 0.51 | 0.58 | 0.67 | 0.68 | dB |
| Return Loss | 20 | 20.5 | 20.7 | 20.7 | dB |
| High Band Attenuation (2.320 – 2.345 GHz) | 45.5 | 43 | 40.7 | 40.3 | dB |

Typical Performance – High Band 2320 – 2345 MHz (SDARS)

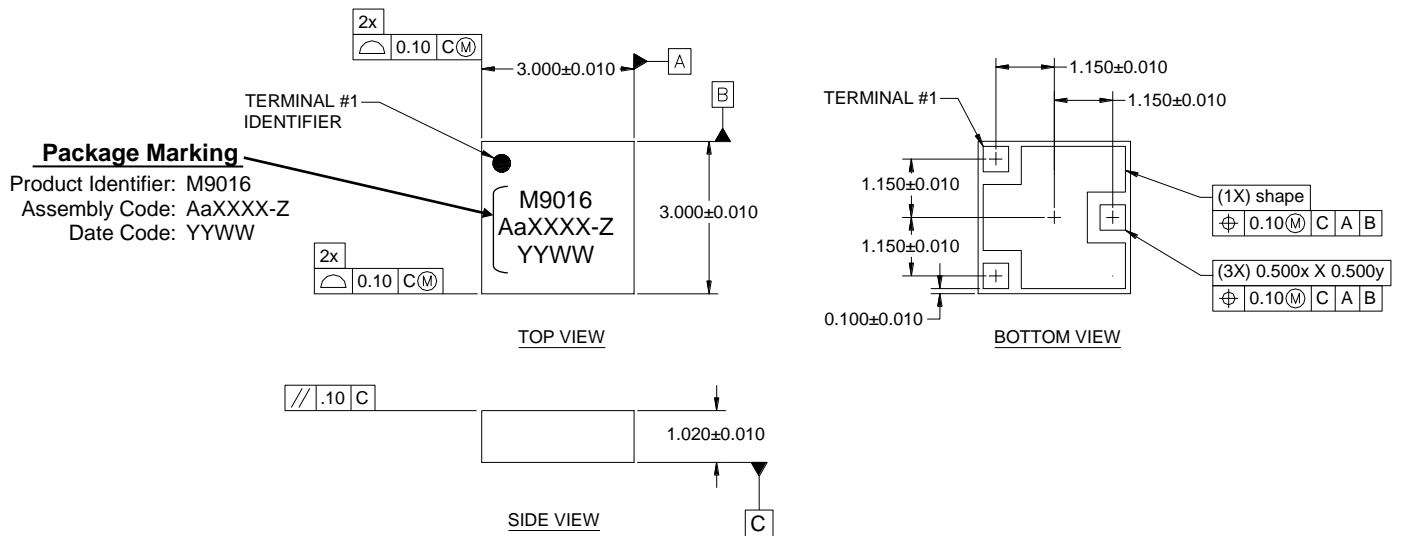
Test conditions: Temp. = 25 °C, Network analyzer power level set to -25 dBm

| Parameter | Typical Value | | | | Units |
|--|---------------|------|------|------|-------|
| Temperature | -40 | +25 | +85 | +100 | °C |
| Insertion Loss | 0.7 | 0.78 | 0.87 | 0.89 | dB |
| Return Loss | 19.6 | 19.7 | 20 | 20 | dB |
| Low Band Attenuation (1.574 – 1.577 GHz) | 31.5 | 30.5 | 29.7 | 29.7 | dB |

Typical Performance – TQM2M9016-EVB



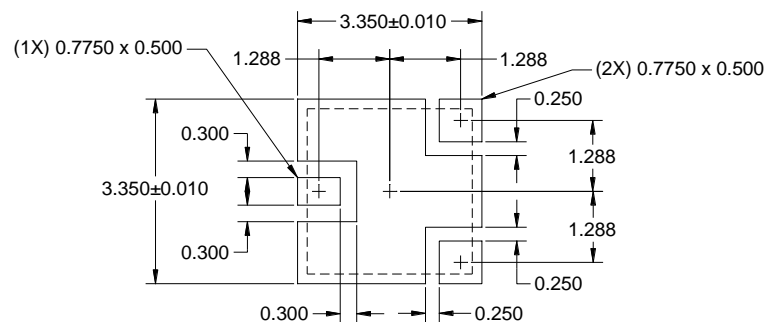
Package Marking and Dimensions



Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. Except where noted, this part outline conforms to JEDEC standard MO-270, Issue B (Variation DAE) for extra thin profile, fine pitch, internal stacking module (ISM).
3. Dimension and tolerance formats conform to ASME Y14.4M-1994.
4. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

PCB Mounting Pattern



Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. Use 1 oz. copper minimum for top and bottom layer metal.
3. Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating: Class 3B

Value: ≥ 8000 V

Test: Human Body Model (HBM)

Standard: JEDEC Standard JS-001-2012

ESD Rating: Class C3

Value: ≥ 1000 V

Test: Charged Device Model (CDM)

Standard: JEDEC Standard JESD22-C101F

ESD Rating: Class C

Value: ≥ 400 V

Test: Machine Model (MM)

Standard: JEDEC Standard JESD22-A115

MSL Rating

MSL Rating: Level 3

Test: 260°C convection reflow

Standard: JEDEC Standard IPC/JEDEC J-STD-020

Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes.

Package contact plating: Ni / Au

RoHS Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

Web: www.triquint.com

Email: info-sales@triquint.com

Tel: +1.407.886.8860

Fax: +1.407.886.7061

For technical questions and application information: **Email:** sjcappliations.engineering@triquint.com

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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А