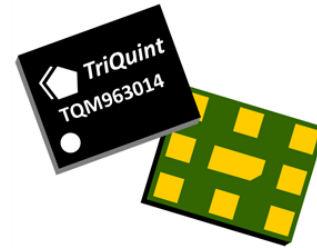


### Applications

- CDMA/LTE handset, data card & mobile router applications using the extension PCS band (Band Class 14) / BC1 / B25

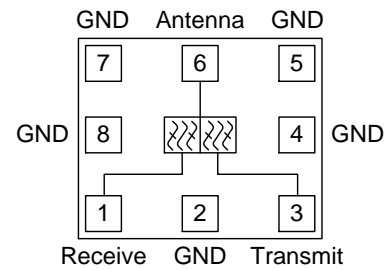


8 Pin 2.6 x 2.1 x 0.88 mm

### Product Features

- Excellent Triple Beat Performance: -88 dBc
- Highly Selective BAW Duplexer Achieving Low Insertion Loss Over Full Bandwidth & Operating Conditions.
- Rx Isolation Of +50 dB Minimum & GPS Rejection Of >40 dB Eliminating The Need For A Transmit Filter
- Single-Ended (SE) 50 Ω Receive & Transmit Ports
- Performance -10 °C to +85 °C
- RoHS Compliant, Pb-Free Module Package

### Functional Block Diagram



Top View

### General Description

The TQM963014 is a high-performance Bulk Acoustic Wave (BAW) duplexer designed to meet the strict CDMA/LTE requirements for use in the PCS extension band, known as Band Class 14 (BC14), BC1, and B25.

TQM963014 is specifically designed to meet the high performance expectations of insertion loss, isolation and triple beat for CDMA systems over the extended bandwidth of BC14/BC1/B25 applications under all operating conditions. Due to the exceptional receive isolation & GPS rejection performance, no transmit SAW filter is required.

The TQM963014 uses common module packaging techniques to achieve the industry standard 2.5 x 2.0 x 0.9 mm footprint. The duplexer exhibits excellent power handling capabilities.

### Pin Configuration

Pin #	Label
1	Receive
3	Transmit
6	Antenna
8	N/C (internal to GND)
2,4,5,7,9	Ground*

\*See application section for details on optimal grounding.

### Ordering Information

Part No.	Description
TQM963014	BC14/BC1/B25 BAW Duplexer
TQM963014-EVB	Evaluation Board

Standard T/R size = 2,500 pieces on a 7" reel.

## Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85 °C
Input Power, operating (CW, 5000 hr Ta=+50 °C)	+29 dBm

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

## Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
T <sub>CASE</sub>	-40		+85	°C

The duplexer will function over the recommended range without degradation in reliability or permanent change in performance.

## Electrical Specifications<sup>(1,2)</sup>: TX – Antenna

Parameter	Conditions	-40 °C		-10 °C		+25 °C		+85 °C		Units	
		Min	Max	Max	Min	Min	Typ	Max	Min		Max
Insertion Loss	1850 – 1915 MHz (B25)		2.6		2.5		1.8	3.0		3.8	dB
Return Loss	1850 – 1915 MHz (Antenna Port)	8.9		9		9	12		9		dB
	1850 – 1915 MHz (Tx Port)	10.9		11		11	15		11		
Attenuation	10 – 728 MHz	30		30		30	42		30		dB
	728 – 768 MHz	30		30		30	43		30		
	869 – 894 MHz	35		35		35	46		35		
	1565 – 1587 MHz (GPS)	40		43		43	50		43		
	1597 – 1606 MHz (Glonass)	42		45		45	51		45		
	1606 – 1680 MHz	30		30		30	44		30		
	1930 – 1995 MHz (B25 Rx)	38		44		44	53		44		
	2110 – 2155 MHz (AWS Rx)	34		35		35	39		35		
	2400 – 2500 MHz (ISM)	26		28		28	30		28		
	3700 – 3830 MHz (2 f <sub>0</sub> )	20		20		20	26		20		
	5150 – 5350 MHz (WiFi)	14		15		15	24		15		
	5550 – 5745 MHz (3 f <sub>0</sub> )	15		15		15	22		15		
	7390 – 7670 MHz (4 f <sub>0</sub> )	9		10		10	21		10		
Amplitude Variation <sup>(4)</sup>	1850 – 1915 MHz (B25)		0.8		0.8		0.7	1.0		1.7	dB <sub>p-p</sub>

Electrical Specifications<sup>(1,2)</sup> : RX – Antenna

Parameter	Conditions	-40 °C		-10 °C		+25 °C		+85 °C		Units	
		Min	Max	Max	Min	Min	Typ	Max	Min		Max
Insertion Loss	1930 – 1995 MHz (B25)		5.6		4.3		2.2	4.0		3.5	dB
Return Loss	1930 – 1995 MHz (Antenna Port)	8.9		9		9	11		9		dB
	1930 – 1995 MHz (Rx Port)	8.9		9		9	11		9		
Attenuation	817 – 849 MHz (BC0 Tx)	20		20		20	32		20		dB
	1850 – 1915 MHz (B25 Tx)	45		45		45	63		45		
	2400 – 2484 MHz (ISM band)	30		30		30	43		30		
	2484 – 8000 MHz	24		25		25	47		25		
Amplitude Variation <sup>(4)</sup>	1930 – 1995 MHz (B25)		1,8		1.8		1.3	1.5		1.1	dB <sub>p-p</sub>
Linearity Triple Beat Test <sup>(6)</sup>	Ratio of CW jammer to triple beat product at Rx port						-88 <sup>(5)</sup>	-79			dBc

Electrical Specifications<sup>(1,2)</sup> : TX – RX

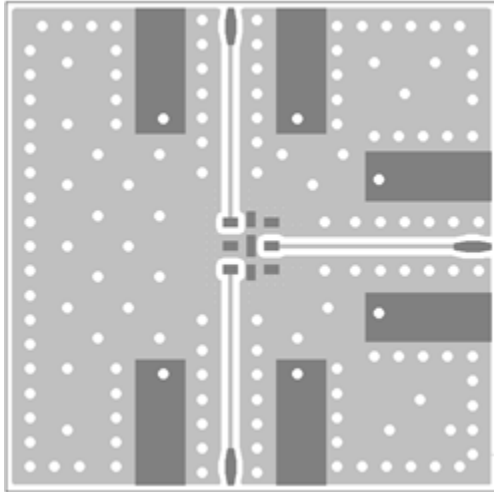
Parameter	Conditions	-40 °C		-10 °C		+25 °C		+85 °C		Units	
		Min	Max	Max	Min	Min	Typ	Max	Min		Max
Isolation	1850 – 1915 MHz (B25)	52.5		53		53	62		51		dB
	1930 – 1995 MHz (B25)	47		50		50	54		50		
	1574 – 1577 MHz (GPS)	40		40		40	56		40		
	3700 – 3830 MHz (2 f <sub>o</sub> )	53		53		53	64		53		
	5540 – 5745 MHz (3 f <sub>o</sub> )	49		49		49	59		49		

Notes:

- All specifications are based on the TriQuint schematic for the main reference design shown on page 4.
- In production, devices will be tested at room temperature to a guard-banded specification to ensure electrical compliance over temperature.
- Typical values are averages over specified band, unless otherwise noted.
- Integrated over any 1.25MHz channel within band.
- Worst case over specified frequencies.
- Test conditions defined as follow: Tx port: two CW tones at fTx and fTx+1MHz and +21.5 dBm each measured at the DUT antenna port; Antenna port: CW jammer at fRx=fTx+80 MHz and -30 dBm. Triple Beat Ratio is defined as the ratio of CW jammer to triple-beat product at Rx port for fTx=1851 MHz, 1882 MHz and 1913 MHz.

**Reference Design – 50 Ω SE Input, 50 Ω SE Output**

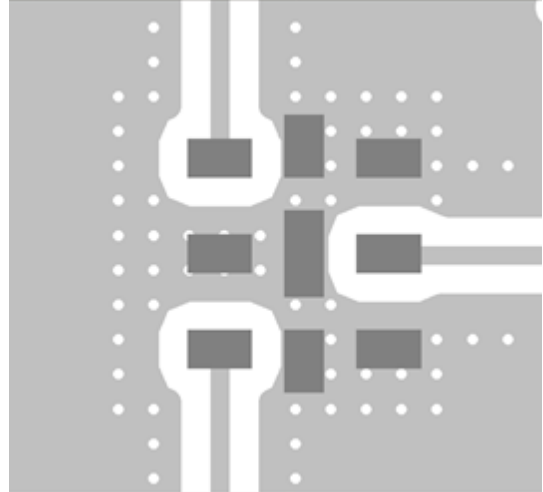
**PC Board**



Notes:

1. Top, middle & bottom layers: 1 oz copper
2. Substrates: FR4 dielectric, .031" thick
3. Finish plating: Nickel: 3-8 μm thick, Gold: .03-.2μm thick
4. Hole plating: Copper min .0008 μm thick

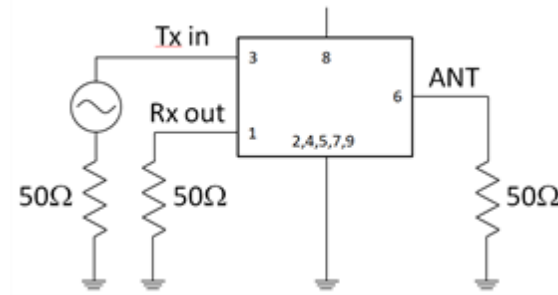
**PCB routing detail**



Notes:

1. Light grey indicates metalized area
2. Dark grey indicates pad areas
3. This footprint represents a recommendation only
4. For solder pad recommendation see mechanical information

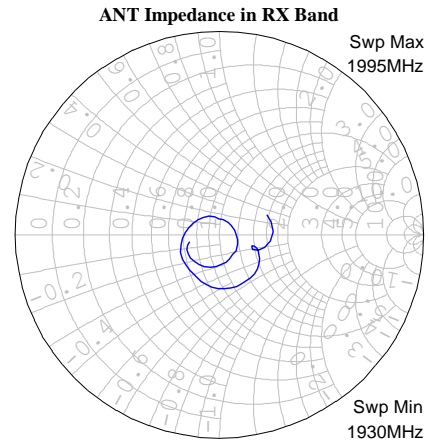
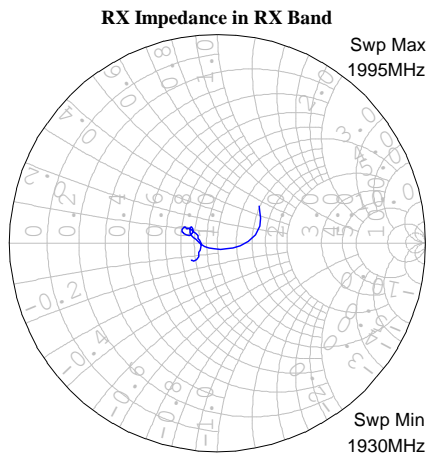
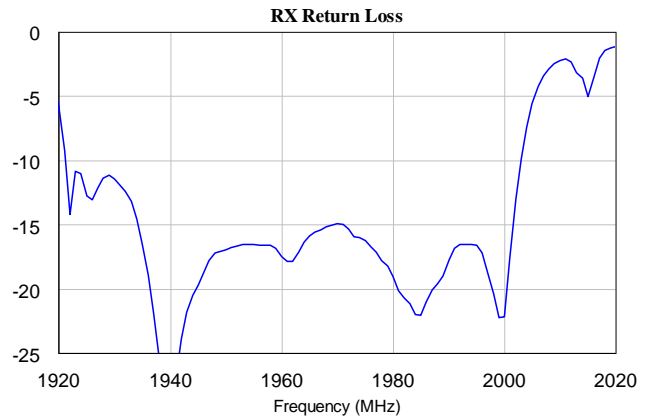
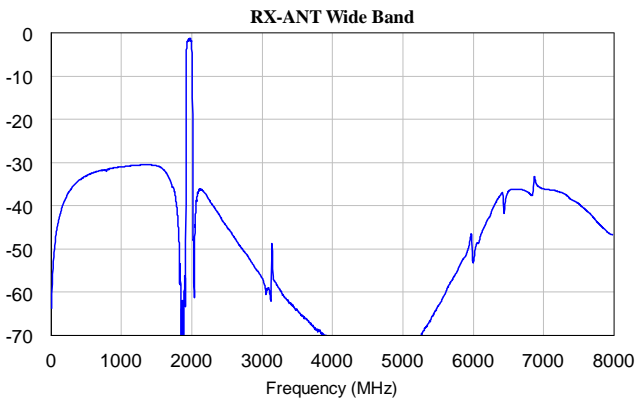
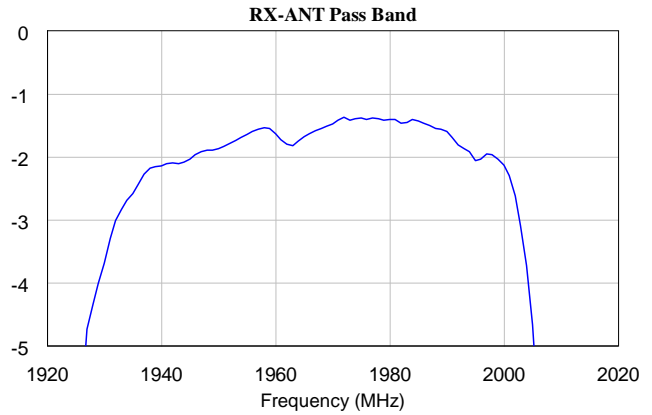
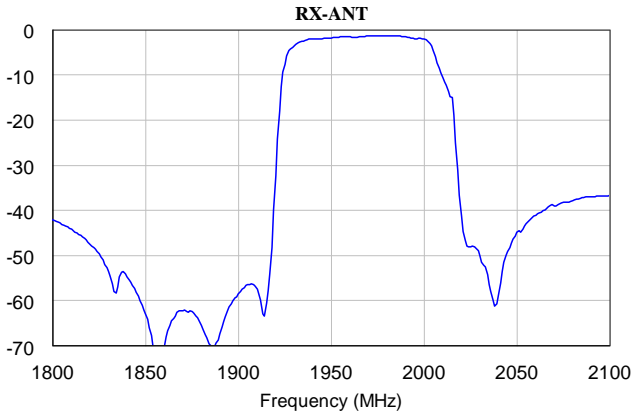
**Schematic**



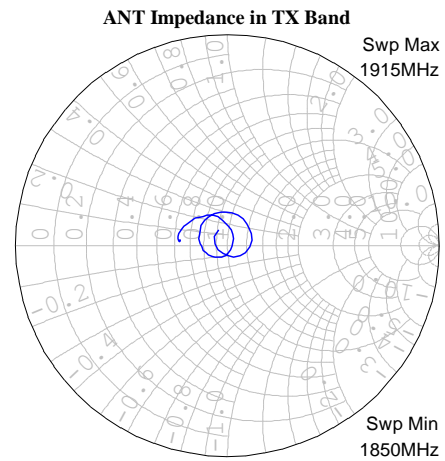
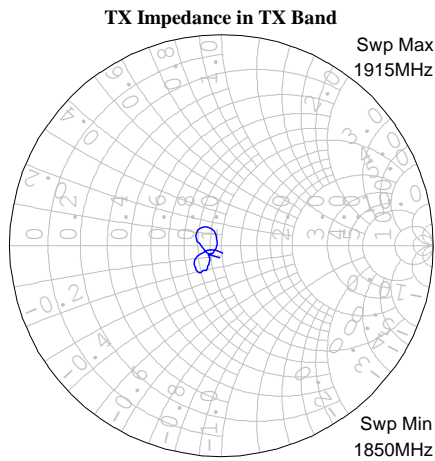
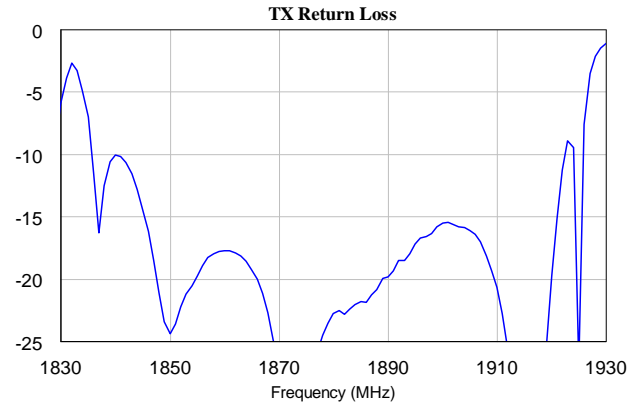
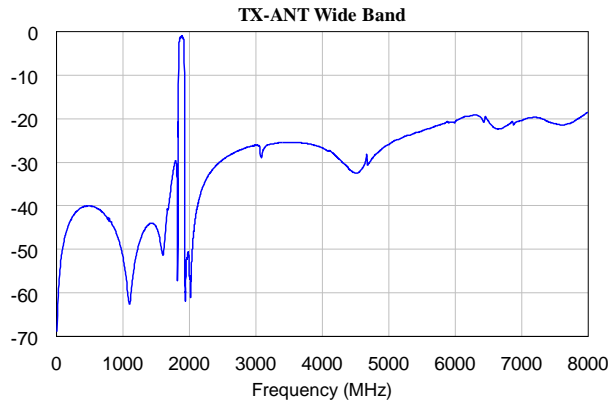
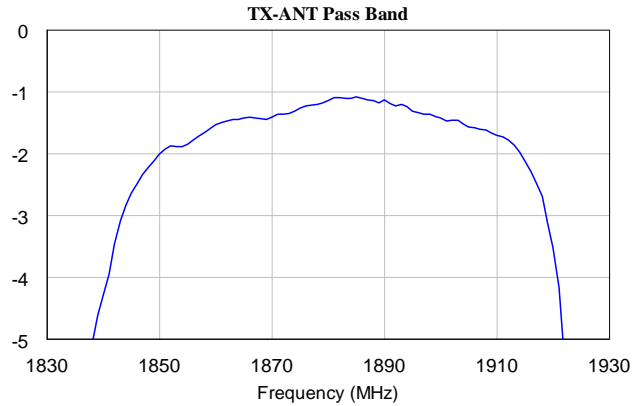
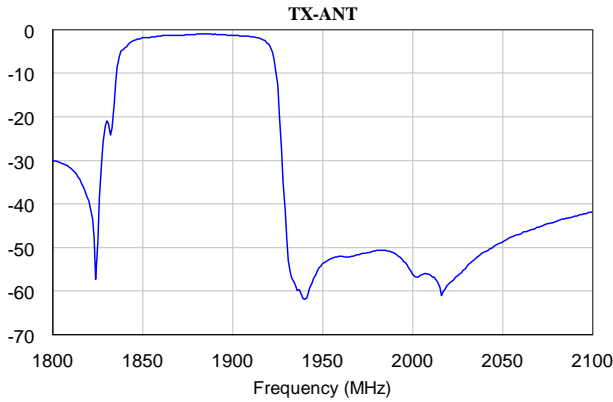
Note:

1. Pin 8 can be connected to ground or left floating

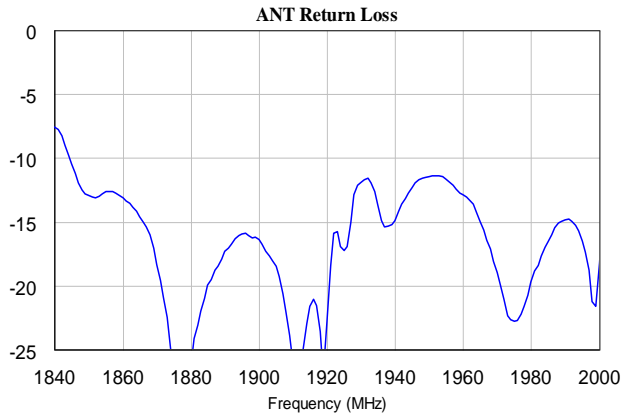
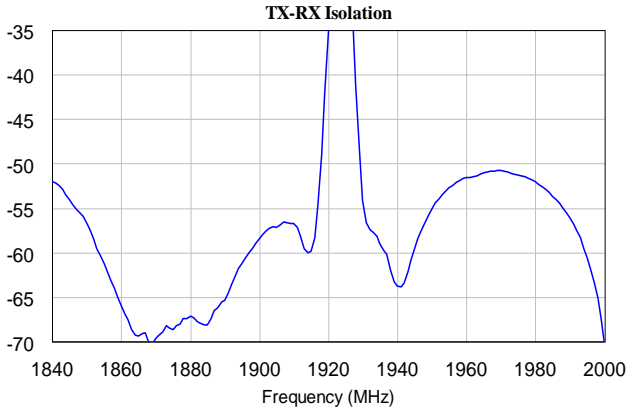
## Typical RX Performance (At Room Temperature)



## Typical TX Performance (At Room Temperature)



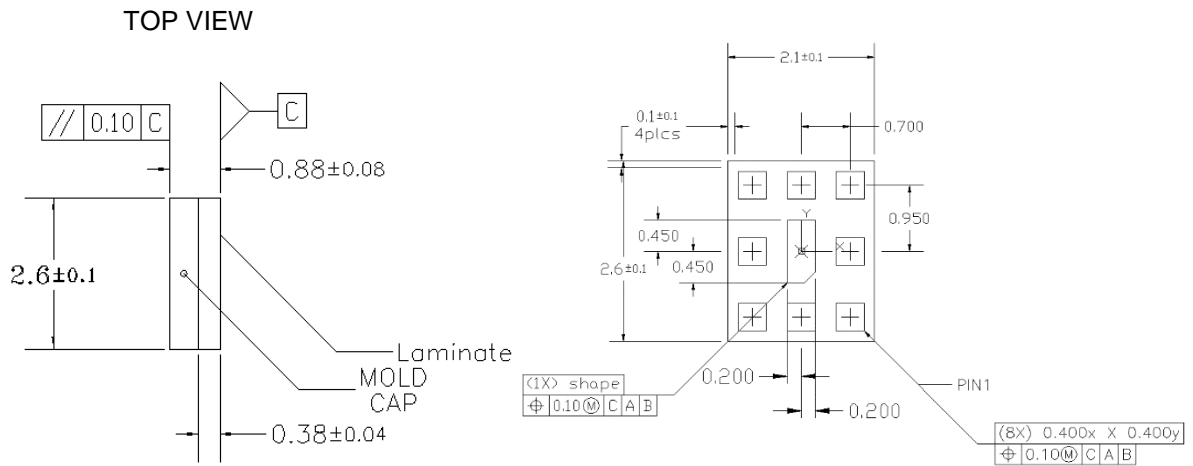
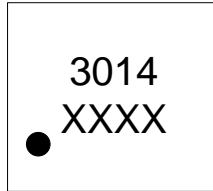
**Isolation And Antenna Return Loss (At Room Temperature)**



**Mechanical Information**

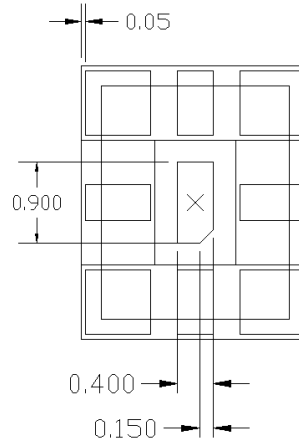
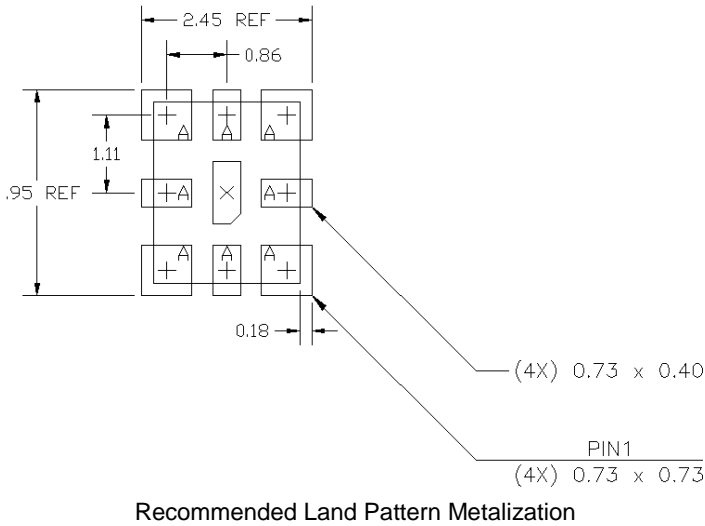
**Package Marking and Dimensions**

Marking: Part number – 3014  
 Lot Code – XXXX





PCB Mounting Pattern

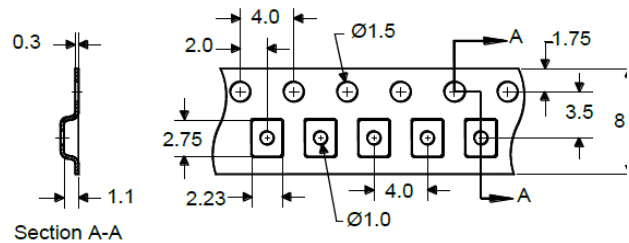
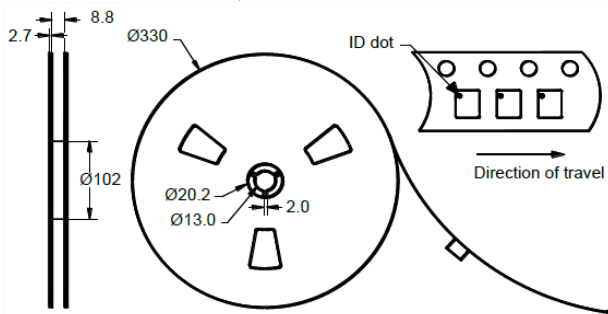


Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation. We recommend a 0.35mm (#80/.0135") diameter bit for drilling via holes and a final plated thru diameter of 0.25 mm (0.10").
3. Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

Tape and Reel Information

Standard T/R size = 2,500 units/reel. All dimensions are in millimeters



## Product Compliance Information

### ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Class: 1B  
Volt. Range:  $\geq 500\text{ V}$  to  $< 1000\text{ V}$   
Test: Human Body Model (HBM)  
Standard: EDA / JEDEC Standard JS-001-2012

ESD Class: C  
Volt. Range:  $\geq 400\text{ V}$   
Test: Charged Device Model (CDM)  
Standard: JEDEC Standard JESD22-C101F

### MSL Rating

MSL Rating: Level 3  
Test:  $260\text{ }^\circ\text{C}$  convection reflow  
Standard: JEDEC Standard IPC/JEDEC J-STD-020

### Solderability

Compatible with both lead-free ( $260\text{ }^\circ\text{C}$  maximum reflow temperature) and tin/lead ( $245\text{ }^\circ\text{C}$  maximum reflow temperature) soldering processes.

Contact plating: TBD

### 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 ( $\text{C}_{15}\text{H}_{12}\text{Br}_4\text{O}_2$ ) Free
- PFOS Free

## Contact Information

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

Web: [www.triquint.com](http://www.triquint.com) Tel: 877-800-8584  
Email: [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

For information about the merger of RFMD and TriQuint as Qorvo:

Web: [www.qorvo.com](http://www.qorvo.com)

For technical questions and application information:

Email: [fl.product.engineering@triquint.com](mailto:fl.product.engineering@triquint.com)

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