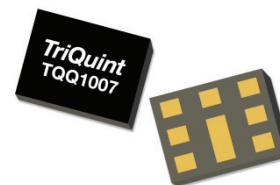


Applications

- LTE Handsets
- Data Cards
- Mobile Routers



8-Pin 1.8 mm x 1.4 mm x 0.73 mm Package

Product Features

- Performance Optimized For Wi-Fi Co-existence
- High B38 Attenuation: >11 dB Typ.
- Optimized for Low Insertion Loss:
 - Tx Band, 2500 – 2570 MHz: 2.5 dB Typ.
 - Rx Band, 2620 – 2690 MHz: 2.3 dB Typ.
- Tx-Rx Isolation > 55 dB Over Temp for Best Sensitivity With Envelope Tracking
- Single-Ended (SE) 50 Ohm Receive & Transmit Ports
- Compact Form-Factor: 1.8 mm x 1.4 mm
- RoHS Compliant, Pb-Free

General Description

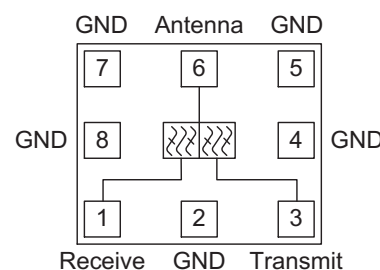
The TQQ1007 is a compact, high-performance duplexer module optimized to meet stringent LTE requirements for use in Band 7 applications.

TQQ1007 is designed to provide 40 dB attenuation in the Wi-Fi band which is a must-have to enable Wi-Fi co-existence.

TQQ1007 is built up on TriQuint's high performance Bulk Acoustic Wave (BAW) technology to enable LTE applications demanding high power handling, stringent linearity requirements, and low insertion loss along with meeting the critical OOB attenuation and isolation specifications.

The TQQ1007 uses TriQuint's unique Wafer-Level-Packaging (WLP) techniques to enable a compact 1.8 mm x 1.4 mm x 0.73 mm footprint.

Functional Block Diagram



Top View

Pin Configuration

Pin #	Label
1	Receive
3	Transmit
6	Antenna
4, 5, 7, 8	GND (Ground*)
2, Backside Center Pad	GND (Ground*)

*See application section for details on optimal grounding.

Ordering Information

Part No.	Description
TQQ1007	B7 BAW Duplexer
TQQ1007-EVB	Evaluation Board

Standard T/R size = 2500 pieces on a 7" reel.

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85 °C
RF Input Power (CW, 50 Ω, T = +25 °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 _{CASE}	-20		+85	°C

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

Electrical Specifications⁽¹⁾ Antenna-Transmit

Parameter	Conditions	-20°C		+25°C	+85°C		Units
		Min	Max	Typ	Min	Max	
Insertion Loss See Note 3	2500 – 2510 MHz		3.90			3.35	dB
	2510 – 2560 MHz			2.50			dB
	2560 – 2570 MHz		2.55			3.55	dB
VSWR	2500 – 2570 MHz (Ant Port)		2:1	1.5:1		2:1	-
	2500 – 2570 MHz (Tx Port)		2.1:1	1.5:1		2.1:1	-
Attenuation	50 – 1565 MHz	47		52	47		dB
	1574.42 – 1576.42 MHz	50		55	50		dB
	1577 – 1585 MHz	50		55	50		dB
	2402.5 – 2451.5 MHz (Ch1 – 7) See Note 2	39		43	38		dB
	2437.5 – 2461.5 MHz (Ch8 – 9) See Note 2	38		43	38		dB
	2447.5 – 2476.5 MHz (Ch10 – 12) See Note 2	37		42	37		dB
	2462.5 – 2481.5 MHz (Ch13) See Note 2	37		42	30		dB
	2595 – 2620 MHz (B38)	9		16	14		dB
	5000 – 5140 MHz (H2)	30		35	30		dB

Electrical Specifications⁽¹⁾ Antenna–Receive

Parameter	Conditions	–20 °C		+25 °C	+85 °C		Units
		Min	Max	Typ	Min	Max	
Insertion Loss	2620 – 2690 MHz See Note 3		3.5	2.3		3.4	dB
VSWR	2620 – 2690 MHz (Ant Port)		2.1:1	1.8:1		2.1:1	-
	2620 – 2690 MHz (Rx Port)		2:1	1.5:1		2:1	-
Attenuation	50 – 2380 MHz	35		40	35		dB
	2380 – 2450 MHz	41.5		48	43		dB
	2450 – 2484 MHz	48		53	48		dB
	2500 – 2570 MHz	48		53	48		dB
	4900 – 5950 MHz	27		32	27		dB
	2775 – 6000MHz	21		26	21		dB

Electrical Specifications⁽¹⁾ Transmit–Receive

Parameter	Conditions	–20 °C		+25 °C	+85 °C		Units
		Min	Max	Typ	Min	Max	
Isolation	2620 – 2690 MHz (Rx)	55		58	55		dB
	2500 – 2570 MHz (Tx)	55		57	55		dB

Notes:

1. All specifications are based on the TriQuint schematic for the main reference design.
2. Integrated over a 19 MHz
3. Typical IL values are integrated over 6 RB (1.4 MHz)

Not for New Designs. Consider QM23007 as an Alternative

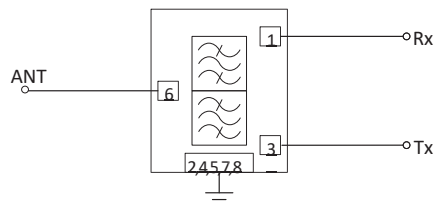


RFMD + TriQuint = Qorvo

TQQ1007

Band 7 BAW Duplexer

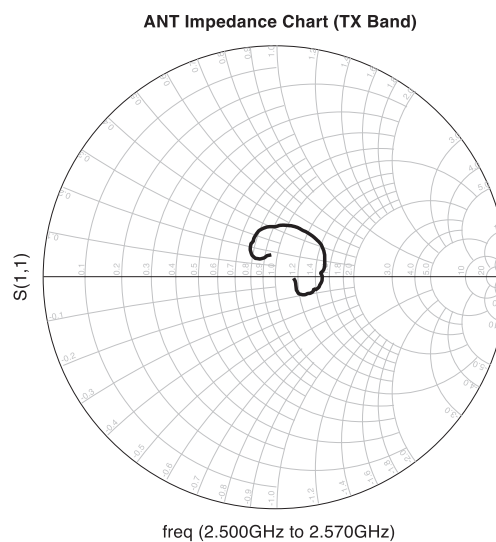
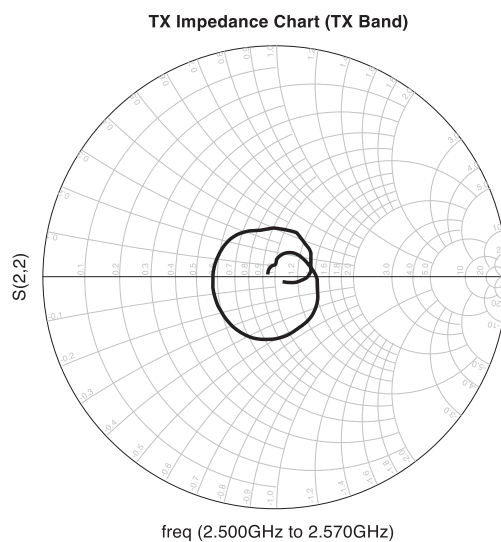
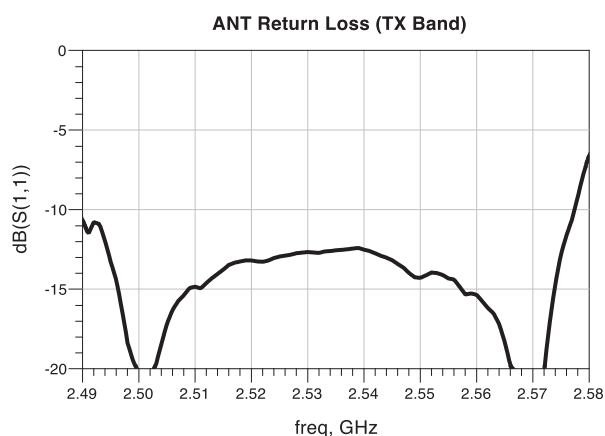
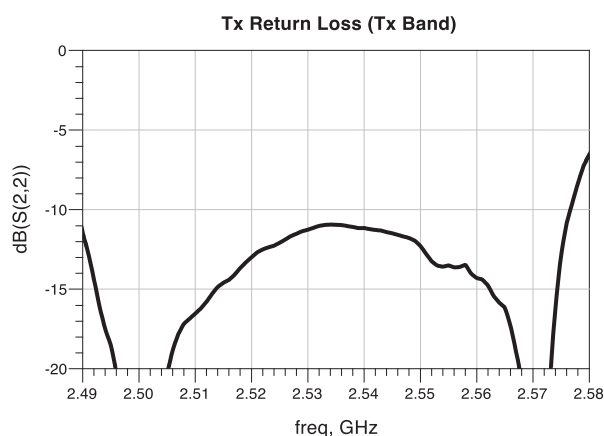
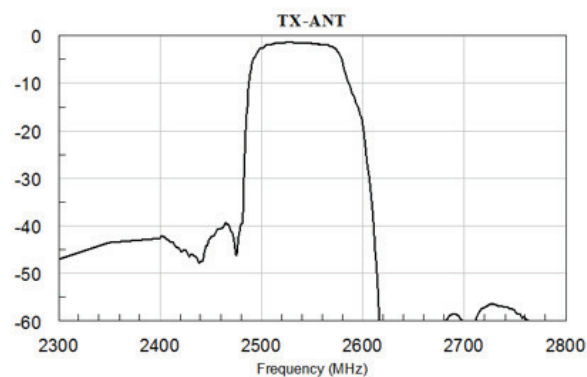
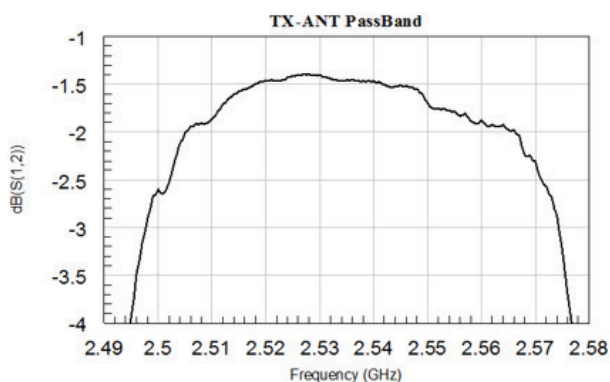
TQQ1007-Schematic



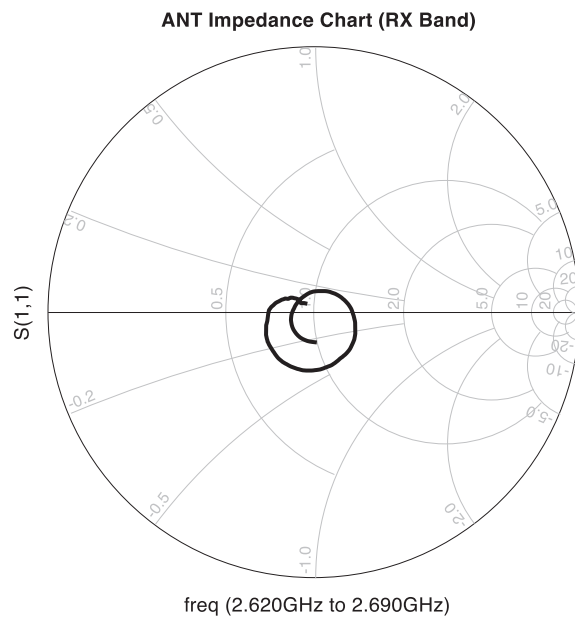
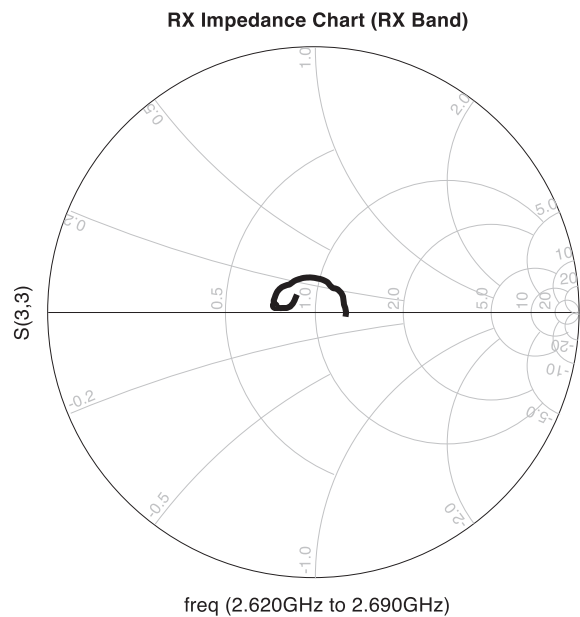
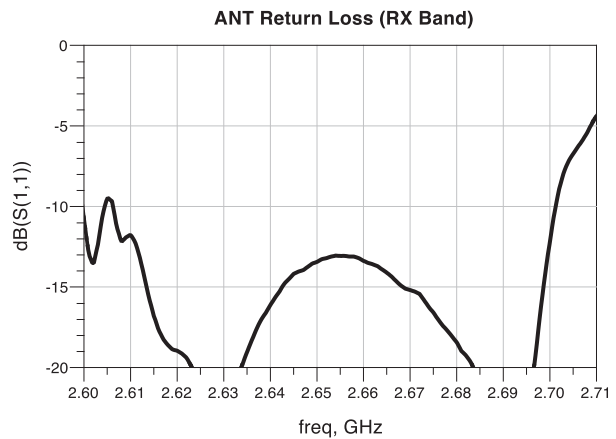
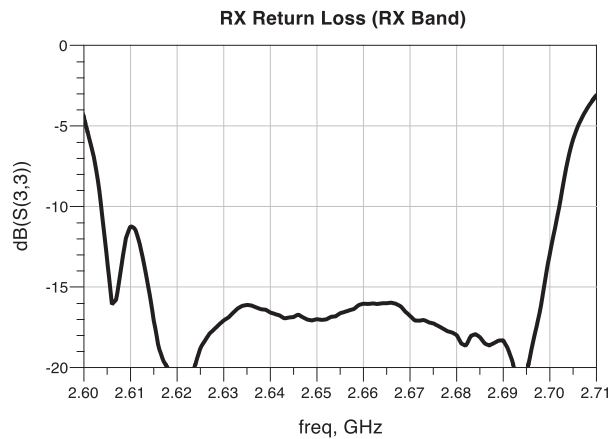
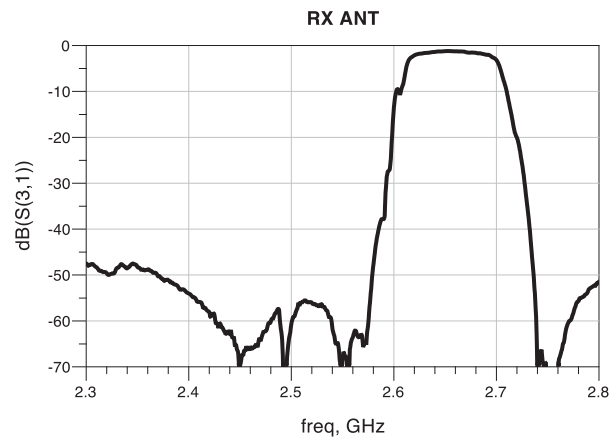
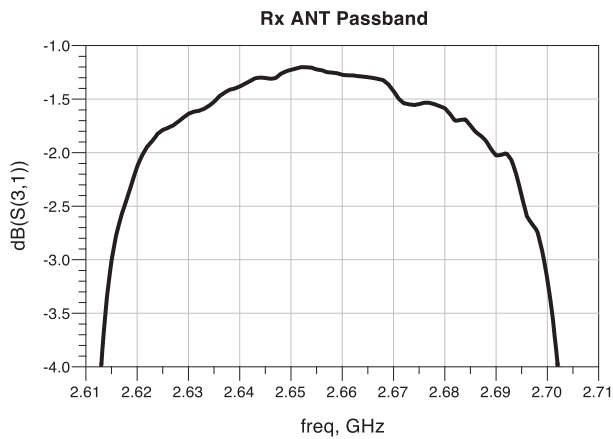
Bill of Material – TQQ1007-EVB

Reference Des.	Value	Description	Manuf.	Part Number
U1	N/A	B7 BAW Duplexer	TriQuint	TQQ1007
PCB	N/A	4-layer		

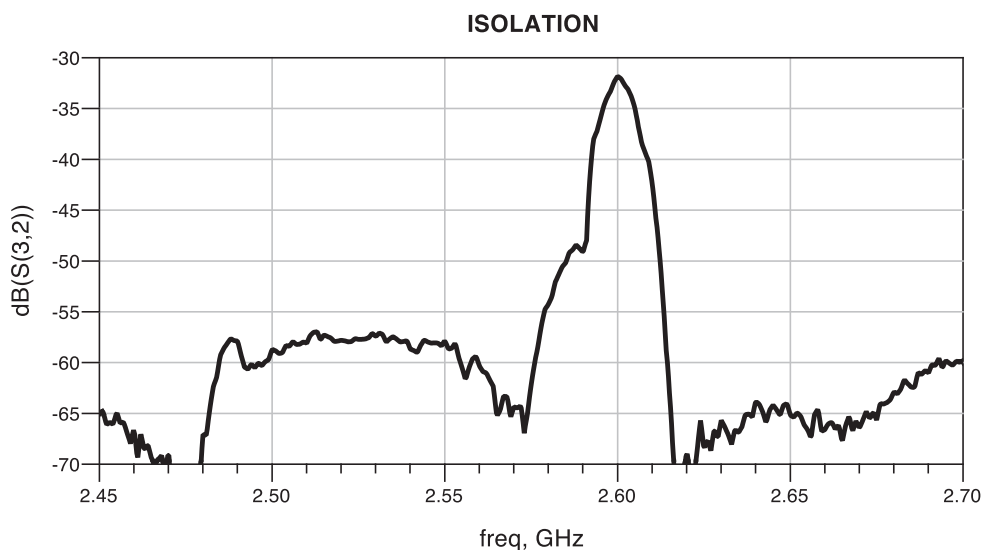
Performance Plots: Transmit Path at +25 °C



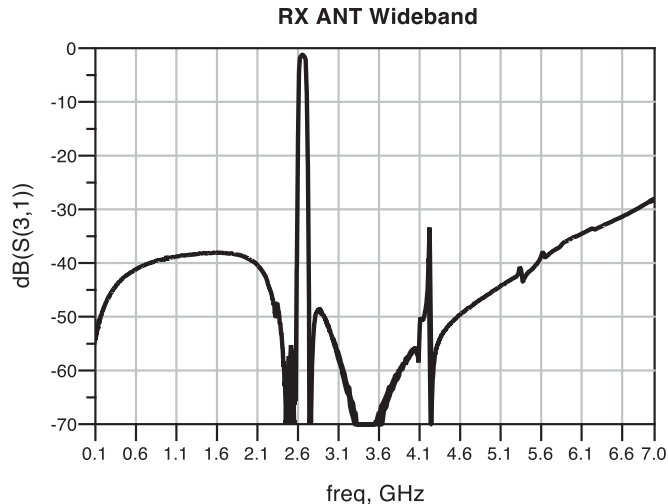
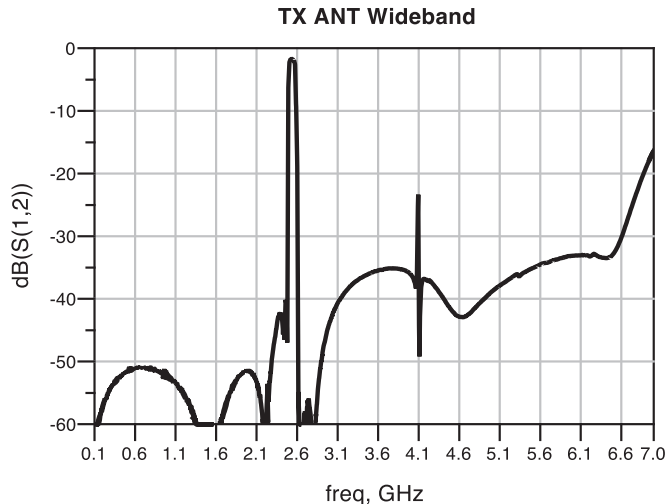
Performance Plots: Receive Path at +25 °C



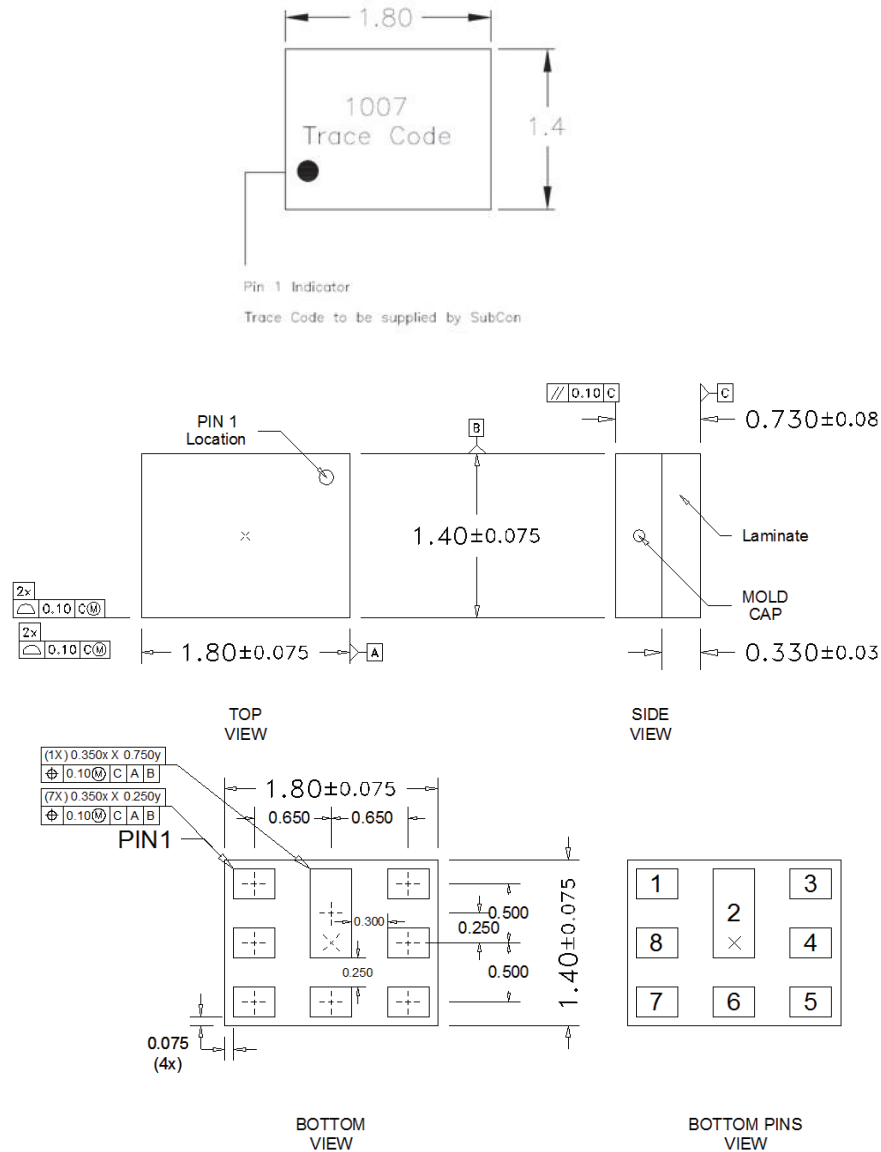
Performance Plots: Tx-Rx Isolation at +25 °C



Performance Plots: Tx & Rx Wideband at +25 °C



Package Marking, and Dimensions



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS

DECIMAL ANGULAR
X.X ± 0.1 ± 1°
X.XX ± 0.05
X.XXX ± 0.025

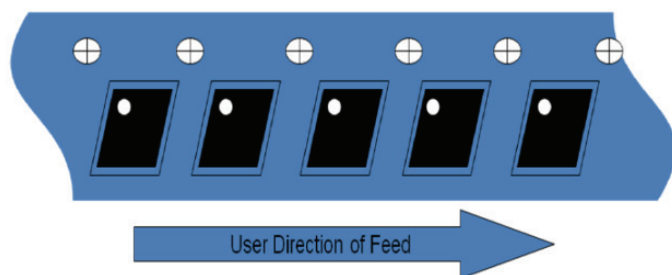
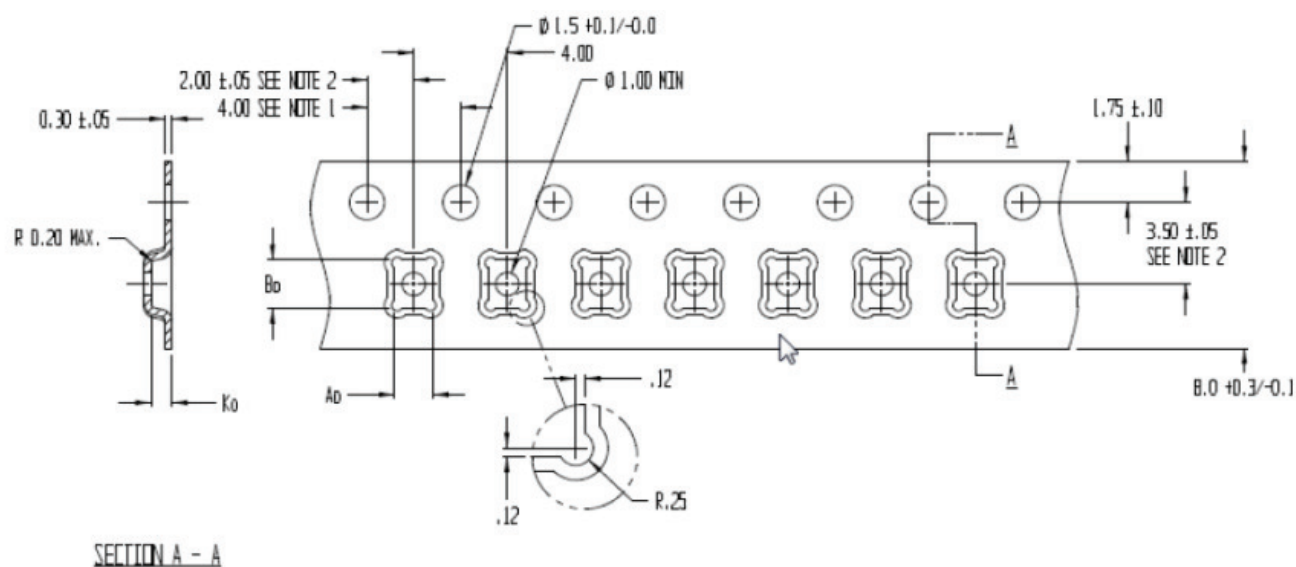
NOTES:

1. All dimensions are in millimeters. Angles are in degrees.
2. Except where noted, this part outline conforms to JEDEC standard MO-220, Issue E (Variation VGGC) for thermally enhanced plastic very thin fine pitch quad flat no lead package (QFN).
3. Dimension and tolerance formats conform to ASME Y14.4M-1994.

Tape and Reel Information

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

CAVITY (mm)				DISTANCE BETWEEN CENTERLINE (mm)		CARRIER TAPE (mm)	COVER TAPE (mm)
Length (A0)	Width (B0)	Depth (K0)	Pitch (P1)	Length direction (P2)	Width Direction (F)	Width (W)	Width (W)
1.66	2.06	.90	4.0	2.00	3.50	8.0	5.4



Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating: Class 1B
Test: Human Body Model (HBM)
Standard: JEDEC Standard JS-001

ESD Rating: Class C3
Test: Charged Device Model (CDM)
Standard: JEDEC Standard JESD22-C101

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: TBD

RoHS Compliance

This part is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

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 information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

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TQQ1030

Band 30 BAW Duplexer

Product Description

The TQQ1030 is a compact, high-performance duplexer module optimized to meet the stringent OOB attenuation requirements along with excellent insertion loss performance, which is a key enabler to co-banding.

The TQQ1030 is built up on Qorvo's high performance NoDrift™ Bulk Acoustic Wave (BAW) technology in order to allow meeting stringent OOB attenuation requirements over temperature extremes.

The TQQ1030 uses Qorvo's unique Wafer-Level-Packaging (WLP) techniques to enable a compact 1.8 mm x 1.4 mm x 0.73 mm Typ footprint.



8 Pin: 1.8 mm x 1.4 mm x 0.73 mm Package

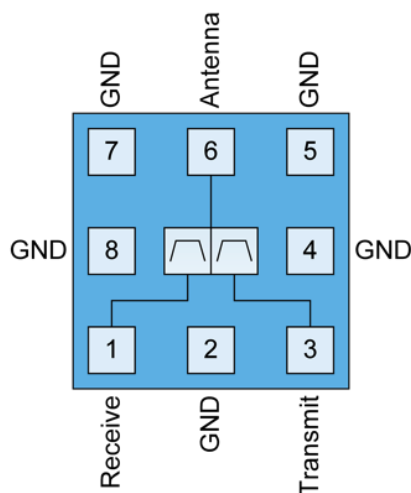
Key Features

- Compact form-factor: 1.8 mm x 1.4 mm
- Insertion loss – Enabling true co-banding
 - Tx band, 2305 – 2315 MHz: 1.7 dB Typ
 - Rx band, 2350 – 2360 MHz: 1.9 dB Typ
- Best in class close OOB attenuation across Temp
- High ISM band rejection
- Single-ended (SE) 50 Ohm receive & transmit ports
- RoHS compliant, Pb-free

Applications

- LTE handsets, data cards & mobile routers

Functional Block Diagram



Top View

Ordering Information

Part Number	Description
TQQ1030	B30 BAW Duplexer
TQQ1030-EVB	Evaluation Board

Standard T/R size = 2500 pieces on a 7" reel.

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85 °C
RF Input Power applied to pin 3 (CW, 50 Ω , 55 °C, 5000hrs)	+30 dBm
RF Input Power applied to pin 3 (Instantaneous)	+36 dBm

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

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Unit
T _{CASE}	-20		+90	°C

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

Electrical Specifications¹ Antenna – Transmit

Unless otherwise noted: Operating Temp. = -20 °C to +90 °C.

Parameter	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	2305 – 2315 MHz	–	1.7	2.3	dB
Amplitude Ripple	2305 – 2315 MHz	–	0.2	0.9	dB
Group Delay	2300 – 2315 MHz	–	31	40	ns
VSWR (in/out)	2305 – 2315 MHz	–	1.3:1	2:1	–
ANT Impedance		–	50//5.1 nH ²	–	Ohms
Tx Impedance		–	50	–	Ohms
Attenuation	1225 –1250 MHz	40	44	–	dB
	1559 –1563 MHz	40	44	–	
	1565.42 –1573.374 MHz	40	44	–	
	1573.3 –1577.466 MHz	40	44	–	
	1577.466 –1585.42 MHz	40	44	–	
	1597.5515 –1605.886 MHz	40	44	–	
	2200 – 2288 MHz	10 ³	18	–	
	2288 – 2292 MHz	7	13	–	
	2292 – 2296 MHz	3	8	–	
	2320 – 2324 MHz	2	3	–	
	2324 – 2328 MHz	3	7	–	
	2328 – 2332 MHz	6.5	10	–	
	2332 – 2350 MHz	10 ³	19	–	
	2350 – 2360 MHz	47	53	–	
	2400 – 2485 MHz	40	48	–	
	4610 – 4630 MHz	35	40	–	
	4900 – 5950 MHz	20	24	–	
	6915 – 6945 MHz	30	35	–	

Notes:

1. All specifications are based on the Qorvo schematic for the main reference design.
2. Matching value based on simulation results.
3. Relative rejection to max insertion loss

Electrical Specifications¹ Receive

Parameter	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	2350 – 2360 MHz	–	1.9	2.8	dB
Amplitude Ripple	2350 – 2360 MHz	–	0.2	0.9	
Group Delay	2350 – 2360 MHz	–	34	40	ns
VSWR (in/out)	2350 – 2360 MHz	–	1.3:1	2:1	–
ANT Impedance		–	50/5.1 nH ²	–	Ohms
Rx Impedance		–	50	–	Ohms
Attenuation	699 – 716 MHz	40	45	–	dB
	824 – 849 MHz	40	45	–	
	1710 – 1755 MHz	35	40	–	
	1850 – 1910 MHz	35	41	–	
	2305 – 2315 MHz	50	57	–	
	2327 – 2337 MHz	10	18	–	
	2336.2 – 2341.3 MHz	3	7	–	
	2400 – 6000 MHz	32	40	–	
	2400 – 2500 MHz	40	45	–	
	4900 – 5950 MHz	30	35	–	

Notes:

1. All specifications are based on the Qorvo schematic for the main reference design.
2. Matching value based on simulation results.

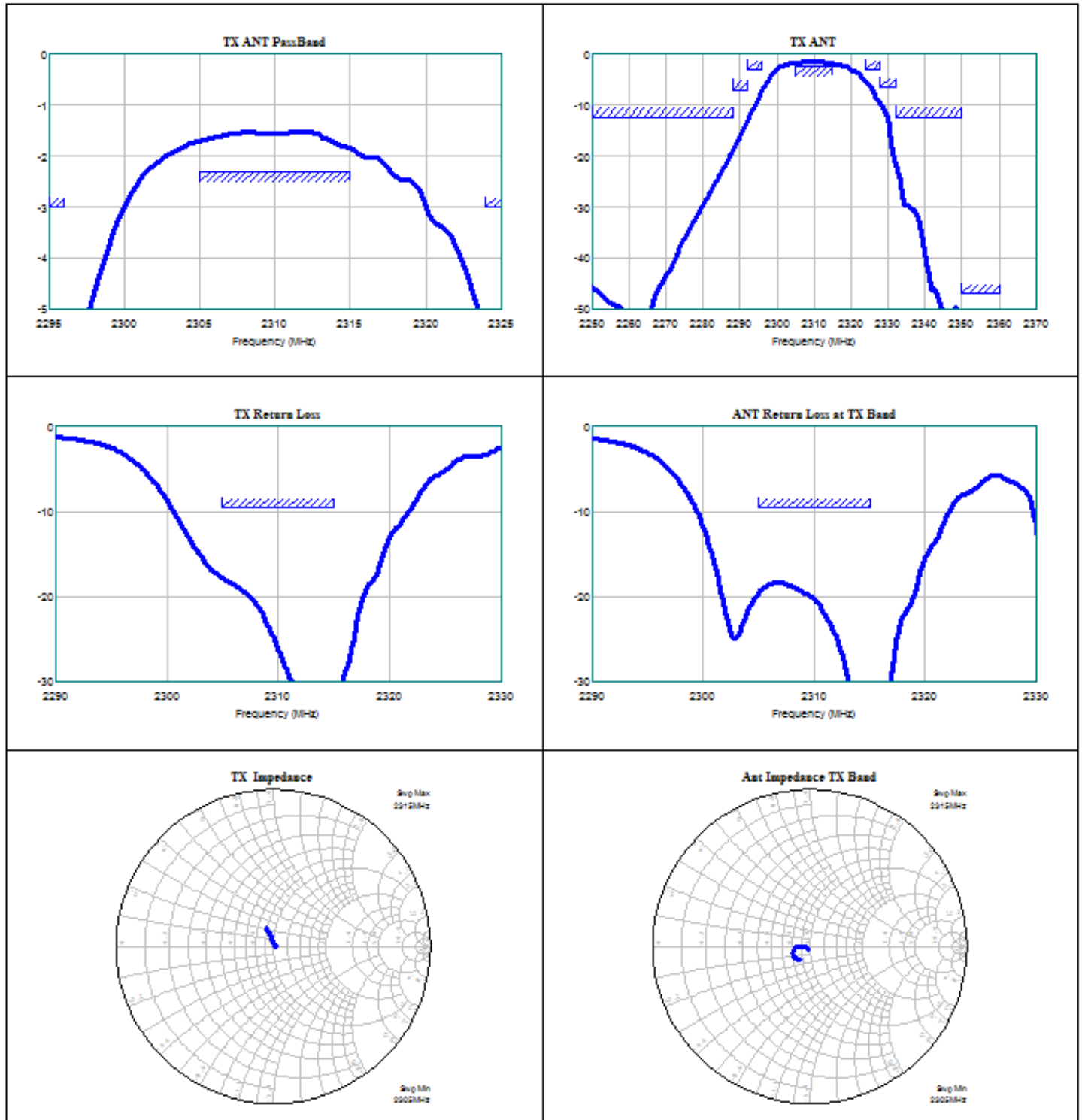
Electrical Specifications¹ - Isolation

Parameter	Condition	Min.	Typ.	Max.	Unit
Isolation	2305 – 2315 MHz	55	58	–	dB
	2350 – 2360 MHz	52	57	–	dB
	1574 – 1577 MHz	50	54	–	dB

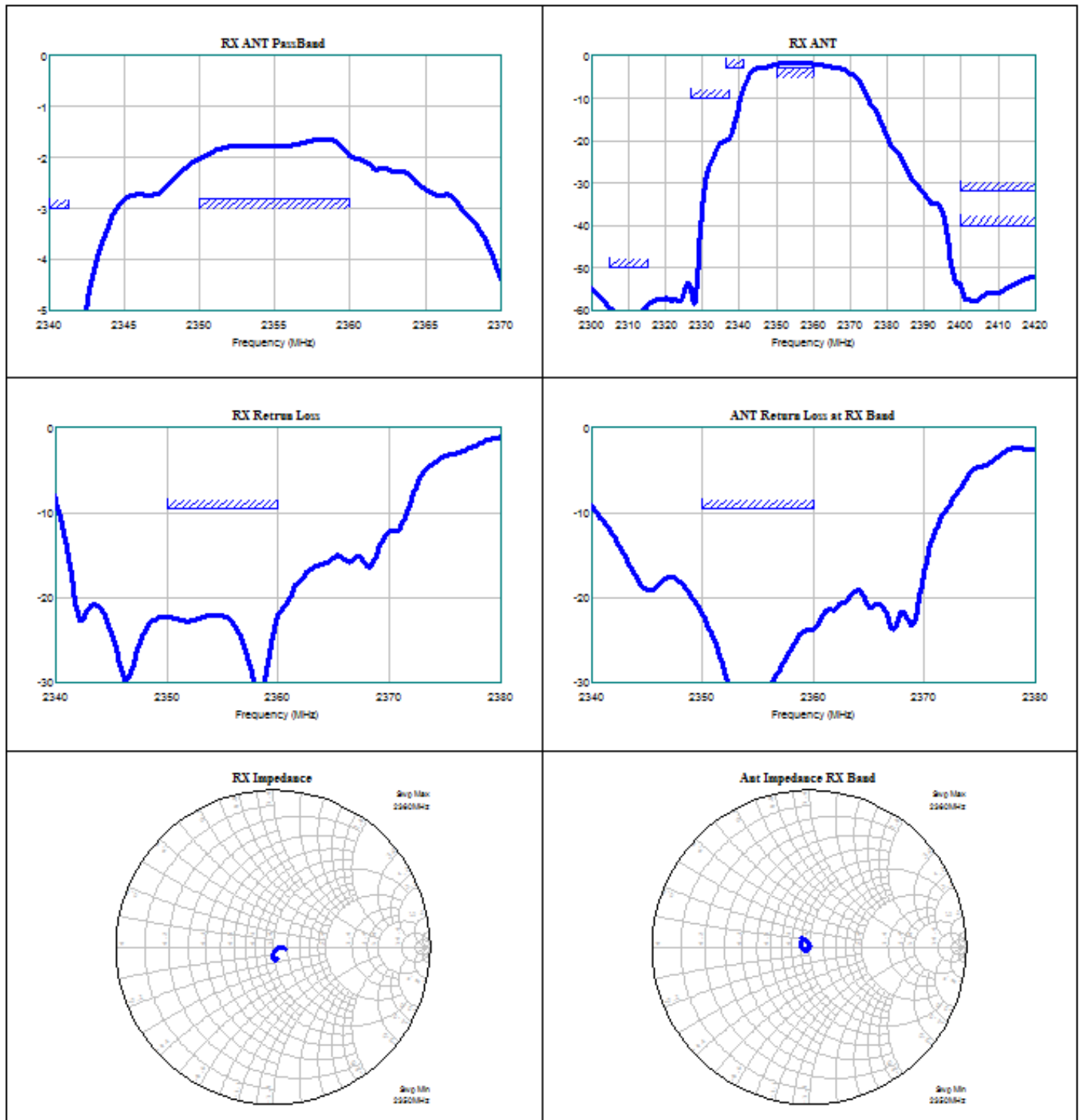
Notes:

1. All specifications are based on the Qorvo schematic for the main reference design.

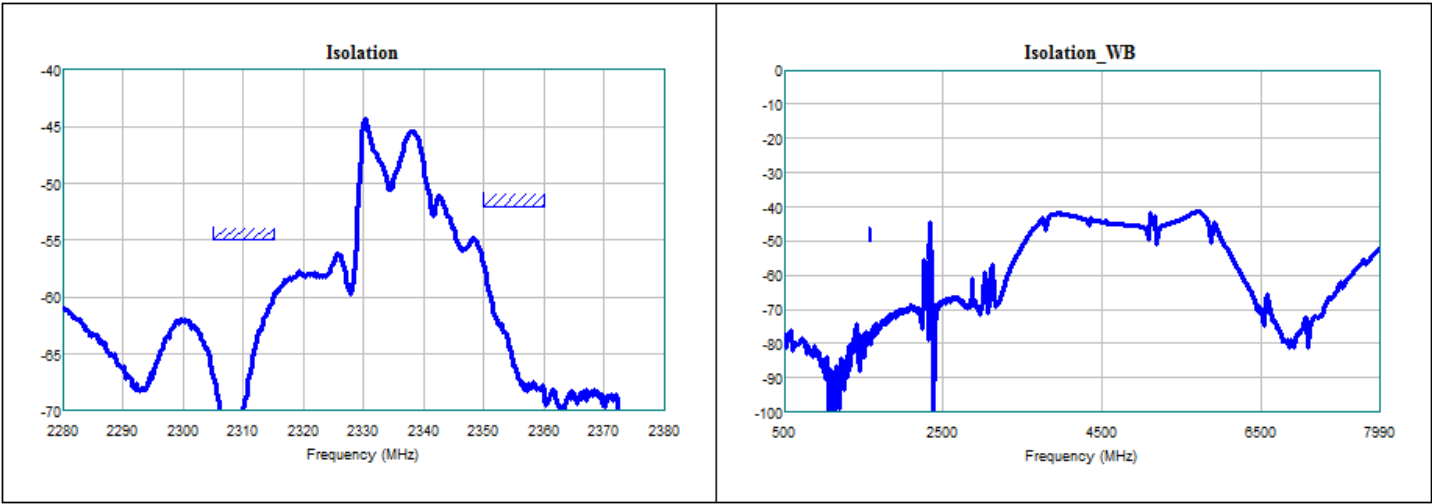
Transmit Performance Plots – Temp = 25 °C



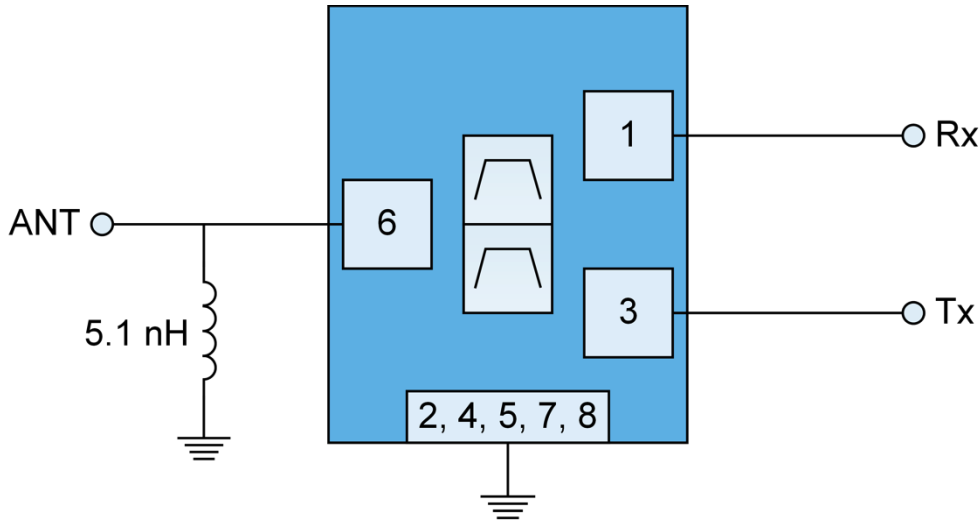
Receive Performance Plots – Temp = 25 °C



Isolation Plots – Temp = 25 °C



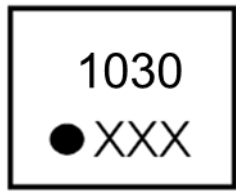
Schematic



Bill of Materials – EVB

Reference Des.	Value	Description	Manuf.	Part Number
U1	N/A	B30 BAW Duplexer	Qorvo	TQQ1030
U2	5.1 nH	Shunt Inductor at ANT	Murata	LQP03TN5N1H02

Package, Marking, and Dimensions

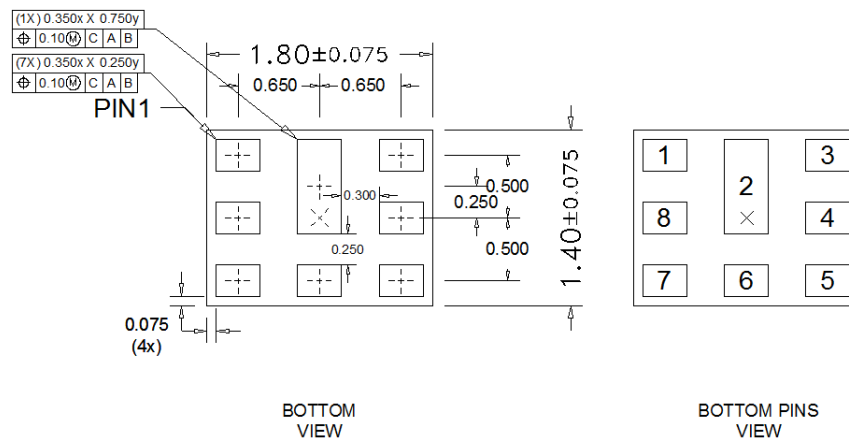
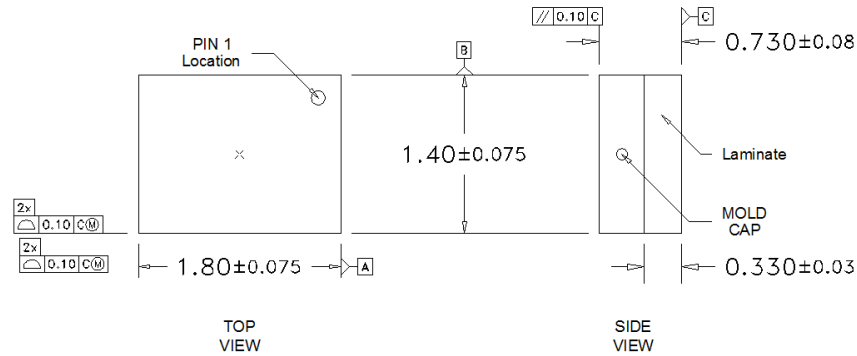


Line 1: Product name

1030

Line 2: Assembly Lot Code#

XXX = Qorvo assembly number (3 characters only, starting from right side)



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS

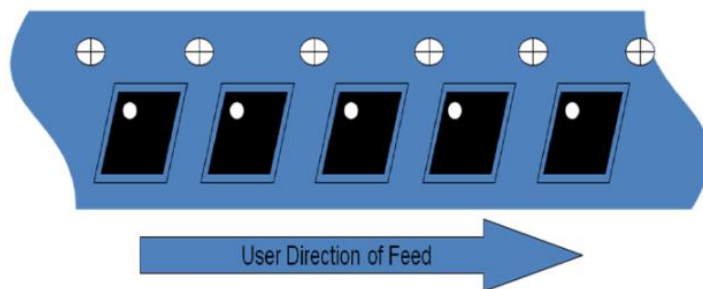
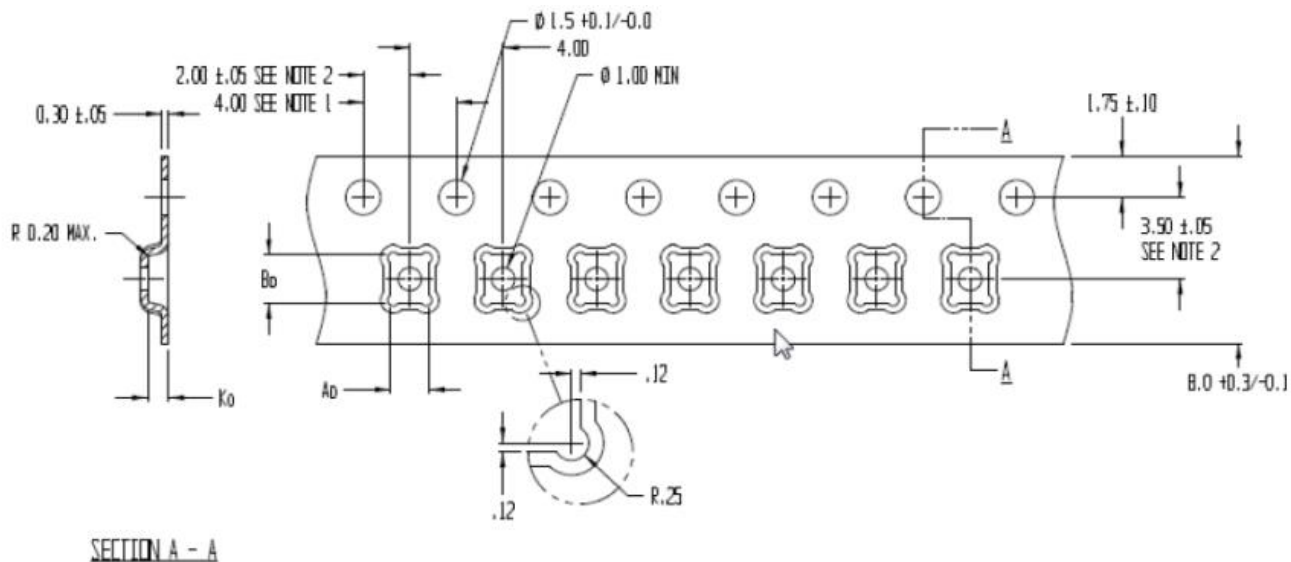
DECIMAL	ANGULAR
X.X ± 0.1	±1°
X.XX ± 0.05	
X.XXX ± 0.025	

- Notes:
1. All dimensions are in millimeters. Angles are in degrees.
 2. Except where noted, this part outline conforms to JEDEC standard MO-220, Issue E (Variation VGGC) for thermally enhanced plastic very thin fine pitch quad flat no lead package (QFN).
 3. Dimension and tolerance formats conform to ASME Y14.4M-1994

Tape and Reel Information

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

Cavity (mm)				Distance Between Centerline (mm)		Carrier Tape (mm)	Cover Tape (mm)
Length (A0) ± 0.05	Width (B0) ± 0.05	Depth (K0) ± 0.05	Pitch (P1)	Length Direction (P2)	Width Direction (F)	Width (W)	Width (W)
1.60	2.0	0.95	4.0	2.00	3.50	8.0	5.4



Handling Precautions

PARAMETER	RATING	STANDARD
ESD – Human Body Model (HBM)	Class 1B	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!

ESD sensitive device

Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes.
Package lead plating: Plated Au over Ni

RoHS Compliance

This part is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

This product also has the following attributes:

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



REVISION HISTORY

Revision	Description
Rev J	Updated Power Handling from +29dBm to +30dBm, Converted to Qorvo template

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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