

### Product Overview

The QPQ1270 is a high-performance, Bulk Acoustic Wave (BAW) duplexer designed for Band 7 uplink and downlink applications.

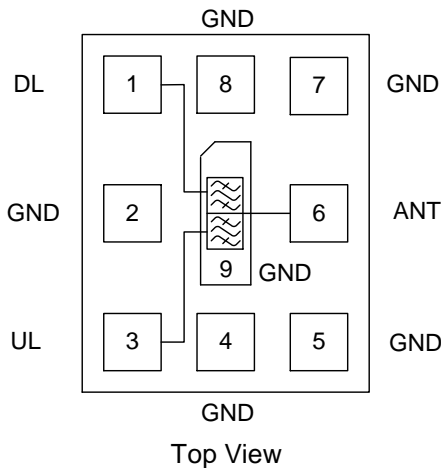
The QPQ1270 provides low insertion loss and high rejection, making it an ideal choice for small cells. This duplexer is housed in a compact RoHs compliant 2.00 mm x 2.50 mm x 1.015 mm surface mount package.

The QPQ1270 is part of Qorvo’s extensive portfolio of RF BAW and SAW filters.



9 Pad 2.00 mm x 2.50 mm x 1.015 mm SMP

### Functional Block Diagram



### Pin Configuration

Pin No.	Label	Function
1	DL	Downlink Input
2, 4, 5, 7, 8, 9	GND	Ground
3	UL	Uplink Output
6	ANT	Antenna Port

### Key Features

- 70 MHz Bandwidth – Band 7 UL/DL
- Low Insertion Loss
- High Out of Band Attenuation
- Small 2.00 mm x 2.50 mm x 1.015 mm Surface Mount Package (SMP)
- Wide Temperature Range with Guaranteed specifications: - 40 °C to + 95 °C
- High Operating Temperature: +105 °C
- High Power Rating: 30 dBm on DL at +95 °C
- No External Matching Required
- RoHS Compliant, Pb-Free



### Applications

- Base Stations Infrastructure
- Small Cells
- Repeaters
- LTE Dongles
- General Purpose Wireless

### Ordering Information

Part No.	Description
QPQ1270TR7	7" Taped Reel with 2500 pieces
QPQ1270EVB	Assembled Evaluation Board

### Absolute Maximum Ratings <sup>(1)</sup>

Parameter	Rating
Storage Temperature	-40 to +125°C
Operating Temperature <sup>(2)</sup>	-40 to +105°C

Notes:

1. Operation of this device outside the parameter ranges given may cause permanent damage.
2. Device will function but it is not guaranteed to meet electrical specifications

### Minimum Lifetime Ratings

Conditions	Rating
+30 dBm at Pin 1 (DL to ANT), 2620-2690 MHz, FD-LTE, 5 MHz, 16 QAM, 25 RB, PAR 8 dB, +95°C	>87,600 hours
+30 dBm at Pin 6 (ANT to UL), 2500-2570 MHz, FD-LTE, 5 MHz, 16 QAM, 25 RB, PAR 8 dB, +85°C	>87,600 hours

### Electrical Specifications – Uplink <sup>(3)</sup>

Test conditions unless otherwise noted: Temp = -20°C to +85°C

Parameter	Conditions	Min	Typ <sup>(7)</sup>	Max	Units
Center Frequency		–	2535	–	MHz
Average Insertion Loss <sup>(4)</sup>	2500 – 2505 MHz (-20°C to +35°C) 2500 – 2505 MHz (+35°C to +85°C) 2505 – 2565 MHz 2565 – 2570 MHz	–	2.4 2.4 1.6 2.1	3.6 3.3 2.0 3.2	dB
Amplitude Variation <sup>(5)</sup>	2500 – 2570 MHz	–	1.3	3.0	dB
Group Delay Variation <sup>(6)</sup>	2500 – 2570 MHz (over any 5 MHz)	–	4.3	20	ns p-p
Phase Ripple <sup>(6)</sup>	2500 – 2570 MHz (over any 5 MHz)	–	1.1	8	° p-p
Return Loss	Antenna Port (2500 – 2570 MHz) Uplink Port (2500 – 2570 MHz)	8.3 8.3	11.2 11.6	–	dB
Attenuation <sup>(8)</sup>	100 – 700 MHz 700 – 960 MHz 960 – 1805 MHz 1805 – 1880 MHz 1880 – 2110 MHz 2110 – 2170 MHz 2170 – 2300 MHz 2300 – 2400 MHz 2402 – 2474 MHz 2474 – 2480 MHz 2590 – 2620 MHz 2620 – 2690 MHz 2690 – 3400 MHz 3400 – 3800 MHz 3800 – 5150 MHz 5150 – 6000 MHz	30 40 30 43 25 45 25 45 40 7 10 54 25 30 15 25	58 53 48 51 52 54 52 51 55 38 18 56 42 42 45 54	–	dB
WiFi Attenuation <sup>(9)</sup>	2401 – 2473 MHz (WiFi Channel 1 to 11)	48	58	–	dB
Source/Load Impedance <sup>(10)</sup>	Single-ended	–	50	–	Ω

Notes:

3. All specifications are based on the Qorvo schematic for the main reference design.
4. Average Insertion Loss is calculated by averaging |S21| in dB for each measured point within defined frequency range.
5. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency range.
6. This is defined as the worst difference between a peak and adjacent valley within defined frequency range.
7. Typical values are based on average measurements of 12 devices at room temperature.
8. Relative to zero dB.
9. Data is an integrated channel measurement from 2412 MHz to 2462 MHz with a 22 MHz channel width and 5 MHz step size (802.11b).
10. This is the optimum impedance in order to achieve the performance shown.

### Electrical Specifications – Downlink <sup>(1)</sup>

Test conditions unless otherwise noted: Temp = -20 °C to +85 °C

Parameter	Conditions	Min	Typ <sup>(5)</sup>	Max	Units
Center Frequency		–	2655	–	MHz
Average Insertion Loss <sup>(2)</sup>	2620 – 2625 MHz 2625 – 2685 MHz 2685 – 2690 MHz	–	2.3 1.8 2.1	3.0 2.2 3.0	dB
Amplitude Variation <sup>(3)</sup>	2620 – 2690 MHz	–	1.0	1.8	dB
Group Delay Variation <sup>(4)</sup>	2620 – 2690 MHz (over any 5 MHz)	–	4.1	20	ns p-p
Phase Ripple <sup>(4)</sup>	2620 – 2690 MHz (over any 5 MHz)	–	1.1	8	° p-p
Return Loss	Antenna Port (2620 – 2690 MHz) Downlink Port (2620 – 2690 MHz)	9.1 8.3	12.2 10.8	–	dB
Attenuation <sup>(6)</sup>	100 – 960 MHz 960 – 1710 MHz 1710 – 1920 MHz 1920 – 1980 MHz 1980 – 2300 MHz 2300 – 2400 MHz 2400 – 2484 MHz 2485 – 2570 MHz (5MHz averaging) <sup>(8)</sup> 2570 – 2585 MHz 2585 – 2595 MHz 2715 – 2725 MHz 2725 – 2800 MHz 2800 – 3400 MHz 3400 – 3800 MHz 3800 – 5150 MHz 5150 – 5400 MHz 5400 – 6000 MHz	35 30 45 46 30 57 57 55 25 5 5 25 30 30 20 40 30	63 53 53 52 53 60 60 60 51 30 25 58 58 52 45 62 62	–	dB
2 <sup>nd</sup> Harmonic at ANT	P <sub>in</sub> = +27 dBm into DL (2620-2690)	–	67	–	dBc
IMD3L at Uplink	2 Tone of P <sub>in</sub> = +24 dBm into DL port	–	101	–	dBc
IMD5L at Uplink	2 Tone of P <sub>in</sub> = +24 dBm into DL port	–	157	–	dBc
Source/Load Impedance <sup>(7)</sup>	Single-ended	–	50	–	Ω

### Electrical Specifications – Isolation <sup>(1)</sup>

Test conditions unless otherwise specified: Temp = -20 °C to +85 °C

Parameter	Conditions <sup>(1, 2)</sup>	Min	Typ <sup>(5)</sup>	Max	Unit
Isolation <sup>(8)</sup>	2500 – 2560 MHz	57	61	-	dB
	2560 – 2570 MHz	54	59		
	2620 – 2690 MHz	57	59		

Notes:

- All specifications are based on the Qorvo schematic for the main reference design.
- Average Insertion Loss is calculated by averaging |S<sub>21</sub>| in dB for each measured point within defined frequency range.
- Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency range.
- This is defined as the worst difference between a peak and adjacent valley within defined frequency range.
- Typical values are based on average measurements of 12 devices at room temperature.
- Relative to zero dB.
- This is the optimum impedance in order to achieve the performance shown.
- Data is the integrated loss value with respect to zero dB of the linear s-parameter over 5MHz range.

### Electrical Specifications – Uplink <sup>(1)</sup>

Test conditions unless otherwise noted: Temp = -40 °C to +95 °C

Parameter	Conditions	Min	Typ <sup>(5)</sup>	Max	Units
Center Frequency		–	2535	–	MHz
Average Insertion Loss <sup>(2)</sup>	2500 – 2505 MHz (-40 °C to +35°C)	–	2.4	3.8	dB
	2500 – 2505 MHz (+35 °C to +95°C)		2.4	3.3	
	2505 – 2565 MHz		1.6	2.2	
	2565 – 2570 MHz		2.1	3.4	
Amplitude Variation <sup>(3)</sup>	2500 – 2570 MHz	–	1.3	3.2	dB
Group Delay Variation <sup>(4)</sup>	2500 – 2570 MHz (over any 5 MHz)	–	4.3	22	ns p-p
Phase Ripple <sup>(4)</sup>	2500 – 2570 MHz (over any 5 MHz)	–	1.1	9	° p-p
Return Loss	Antenna Port (2500 – 2570 MHz)	8.3	11.2	–	dB
	Uplink Port (2500 – 2570 MHz)	8.3	11.6		
Attenuation <sup>(6)</sup>	100 – 700 MHz	30	58	–	dB
	700 – 960 MHz	40	53		
	960 – 1805 MHz	30	48		
	1805 – 1880 MHz	43	51		
	1880 – 2110 MHz	25	52		
	2110 – 2170 MHz	45	54		
	2170 – 2300 MHz	25	51		
	2300 – 2400 MHz	45	51		
	2402 – 2474 MHz	38	55		
	2474 – 2480 MHz	5	38		
	2590 – 2620 MHz	9	18		
	2620 – 2690 MHz	53	56		
	2690 – 3400 MHz	25	42		
	3400 – 3800 MHz	30	42		
3800 – 5150 MHz	15	45			
5150 – 6000 MHz	25	54			
WiFi Attenuation <sup>(7)</sup>	2401 – 2473 MHz (WiFi Channel 1 to 11)	47	58	–	dB
Source/Load Impedance <sup>(8)</sup>	Single-ended	–	50	–	Ω

Notes:

- All specifications are based on the Qorvo schematic for the main reference design.
- Average Insertion Loss is calculated by averaging |S<sub>21</sub>| in dB for each measured point within defined frequency range.
- Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency range.
- This is defined as the worst difference between a peak and adjacent valley within defined frequency range.
- Typical values are based on average measurements of 12 devices at room temperature.
- Relative to zero dB.
- Data is an integrated channel measurement from 2412 MHz to 2462 MHz with a 22 MHz channel width and 5 MHz step size (802.11b).
- This is the optimum impedance in order to achieve the performance shown.

### Electrical Specifications – Downlink <sup>(1)</sup>

Test conditions unless otherwise noted: Temp = -40 °C to +95 °C

Parameter	Conditions	Min	Typ <sup>(5)</sup>	Max	Units
Center Frequency		–	2655	–	MHz
Average Insertion Loss <sup>(2)</sup>	2620 – 2625 MHz 2620 – 2665 MHz 2665 – 2690 MHz	–	2.3 1.8 2.1	3.0 2.3 3.2	dB
Amplitude Variation <sup>(3)</sup>	2620 – 2690 MHz	–	0.8	2.0	dB
Group Delay Variation <sup>(4)</sup>	2620 – 2690 MHz (over any 5 MHz)	–	4.1	21	ns p-p
Phase Ripple <sup>(4)</sup>	2620 – 2690 MHz (over any 5 MHz)	–	1.1	9	° p-p
Return Loss	Antenna Port (2620 – 2690 MHz)	9.0	12.2	–	dB
	Uplink Port (2620 – 2690 MHz)	8.3	12.1		
Attenuation <sup>(6)</sup>	100 – 960 MHz	35	63	–	dB
	960 – 1710 MHz	30	53		
	1710 – 1920 MHz	45	53		
	1920 – 1980 MHz	46	52		
	1980 – 2300 MHz	30	53		
	2300 – 2400 MHz	56	60		
	2400 – 2484 MHz	56	60		
	2485 – 2570 MHz (5MHz averaging) <sup>(8)</sup>	54	60		
	2570 – 2585 MHz	24	51		
	2585 – 2595 MHz	4	30		
	2715 – 2725 MHz	4	25		
	2725 – 2800 MHz	24	58		
	2800 – 3400 MHz	30	58		
	3400 – 3800 MHz	30	52		
3800 – 5150 MHz	20	45			
5150 – 5400 MHz	40	62			
5400 – 6000 MHz	30	62			
2 <sup>nd</sup> Harmonic at ANT	P <sub>in</sub> = +27 dBm into DL (2620-2690)	–	67	–	dBc
IMD3L at Uplink	2 Tone of P <sub>in</sub> = +23 dBm into DL port	–	101	–	dBc
IMD5L at Uplink	2 Tone of P <sub>in</sub> = +23 dBm into DL port	–	157	–	dBc
Source/Load Impedance <sup>(7)</sup>	Single-ended	–	50	–	Ω

### Electrical Specifications – Isolation <sup>(1)</sup>

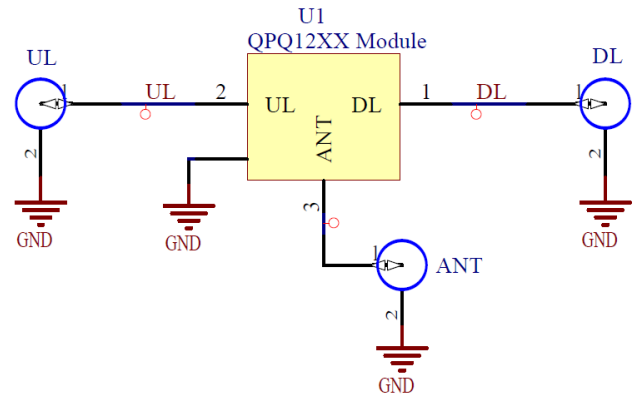
Test conditions unless otherwise specified: Temp = -40 °C to +95 °C

Parameter	Conditions <sup>(1, 2)</sup>	Min	Typ <sup>(5)</sup>	Max	Unit
Isolation <sup>(8)</sup>	2500 – 2560 MHz	56	61	-	dB
	2560 – 2570 MHz	53	59		
	2620 – 2690 MHz	56	59		

Notes:

1. All specifications are based on the Qorvo schematic for the main reference design.
2. Average Insertion Loss is calculated by averaging |S<sub>21</sub>| in dB for each measured point within defined frequency range.
3. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency range.
4. This is defined as the worst difference between a peak and adjacent valley within defined frequency range.
5. Typical values are based on average measurements of 12 devices at room temperature.
6. Relative to zero dB.
7. This is the optimum impedance in order to achieve the performance shown.
8. Data is the integrated loss value with respect to zero dB of the linear s-parameter over 5MHz range.

### Evaluation Board and Schematic – QPQ1270EVB

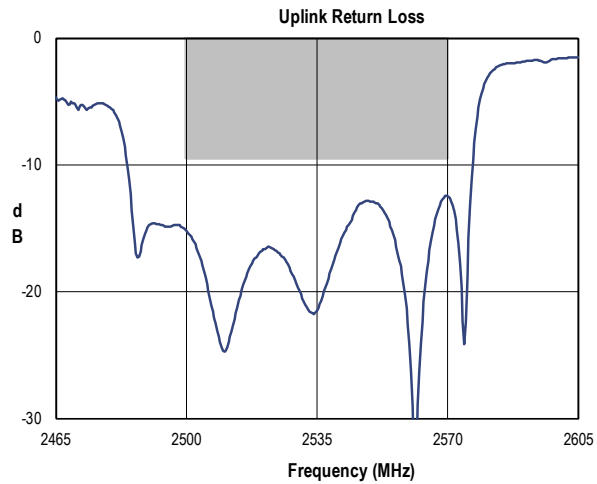
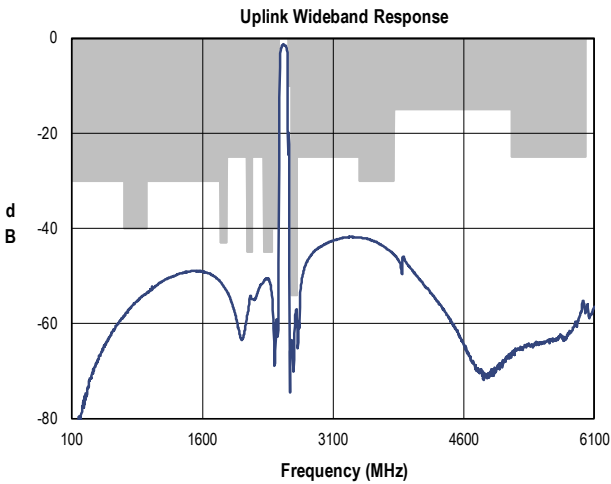
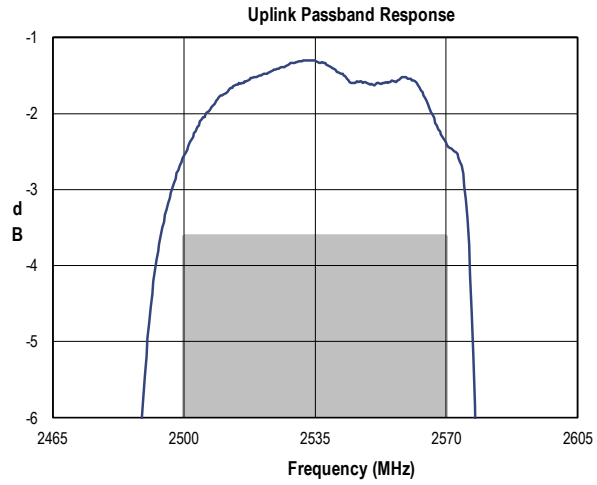
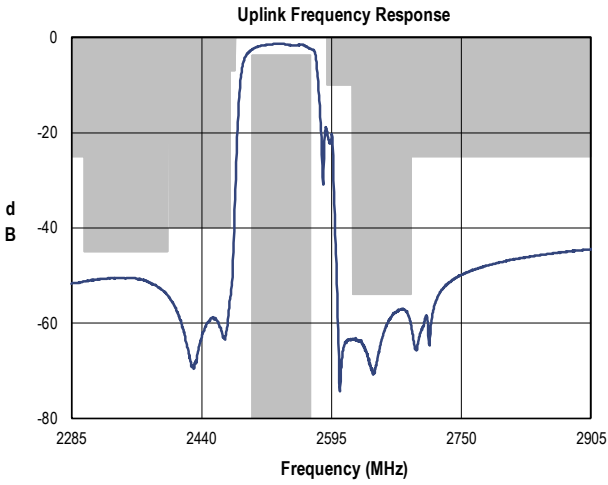


### Bill of Material – QPQ1270EVB

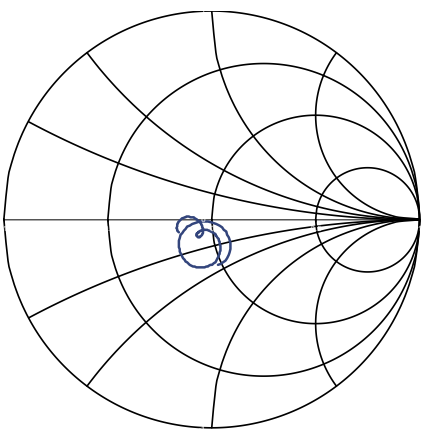
Ref. Des.	Value	Description	Manufacturer	Part Number
U1	–	Duplexer, Band7, BAW	Qorvo	QPQ1270
SMA	–	Connector, SMA	Radiall	9602-1111-018
PCB	–	Printed Circuit Board, Evaluation	Qorvo	283666

### De-embedded Performance Plots Uplink

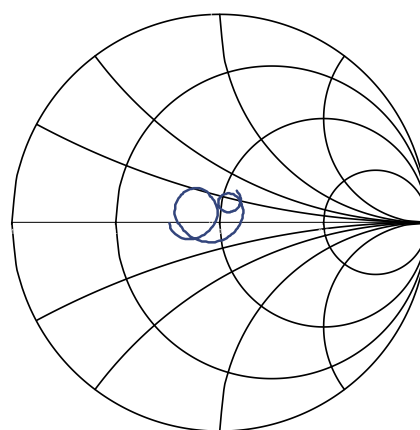
Test conditions unless otherwise noted: Temp= +25°C



Uplink Path - Ant Port Impedance

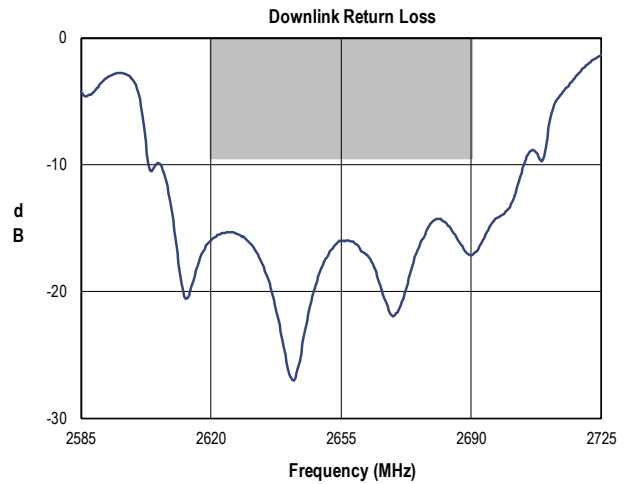
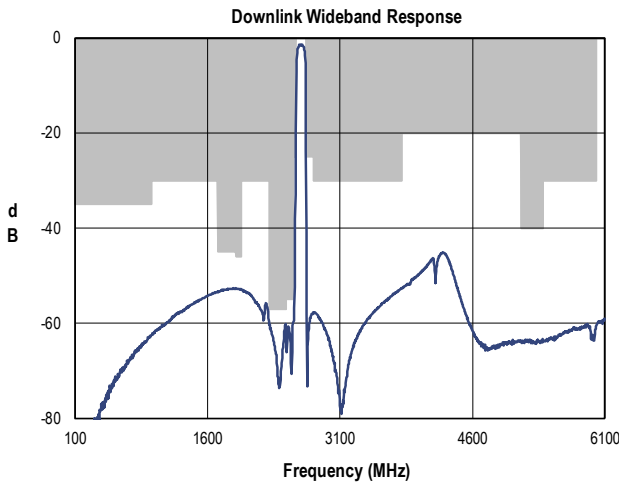
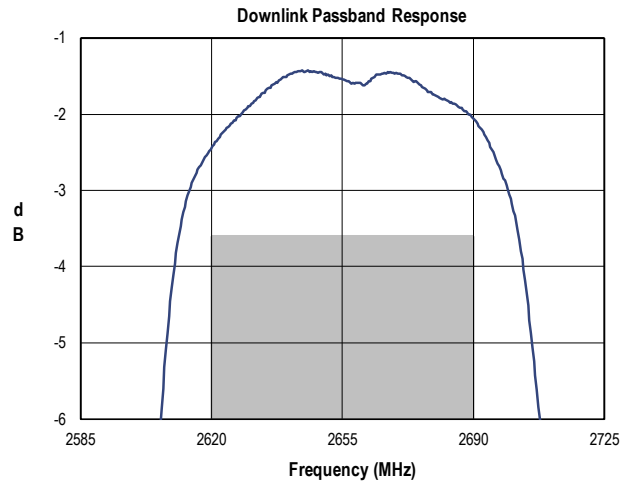
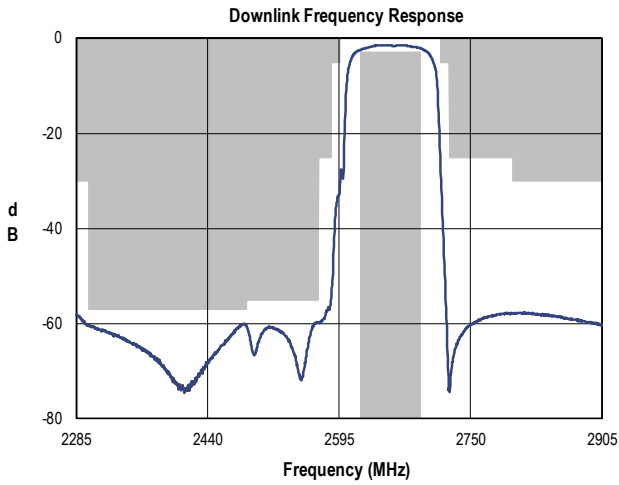


Uplink Port Impedance

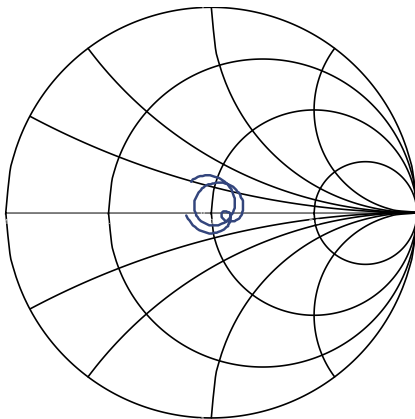


### De-embedded Performance Plots Downlink

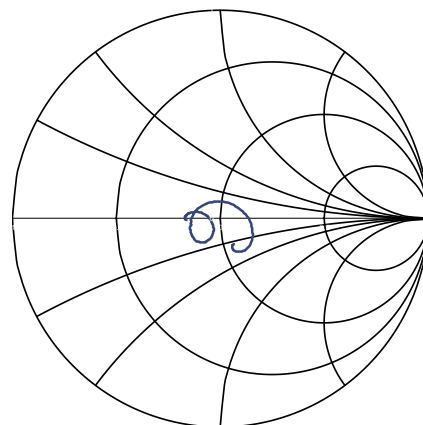
Test conditions unless otherwise noted: Temp= +25°C



Downlink Path - Ant Port Impedance

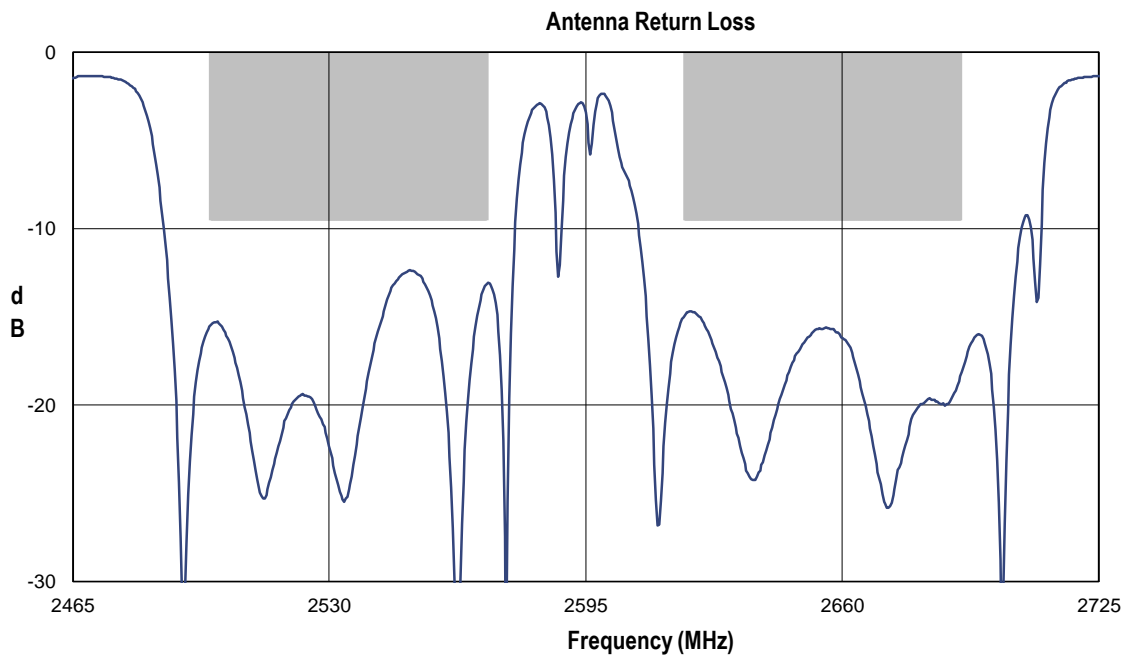
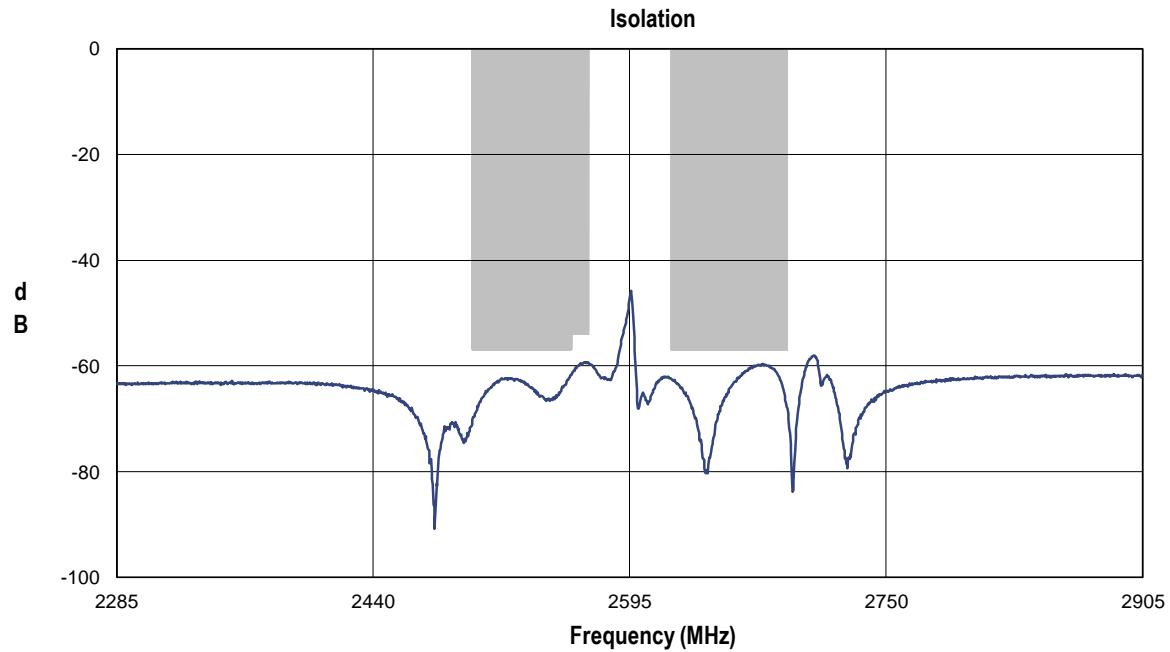


Downlink Port Impedance

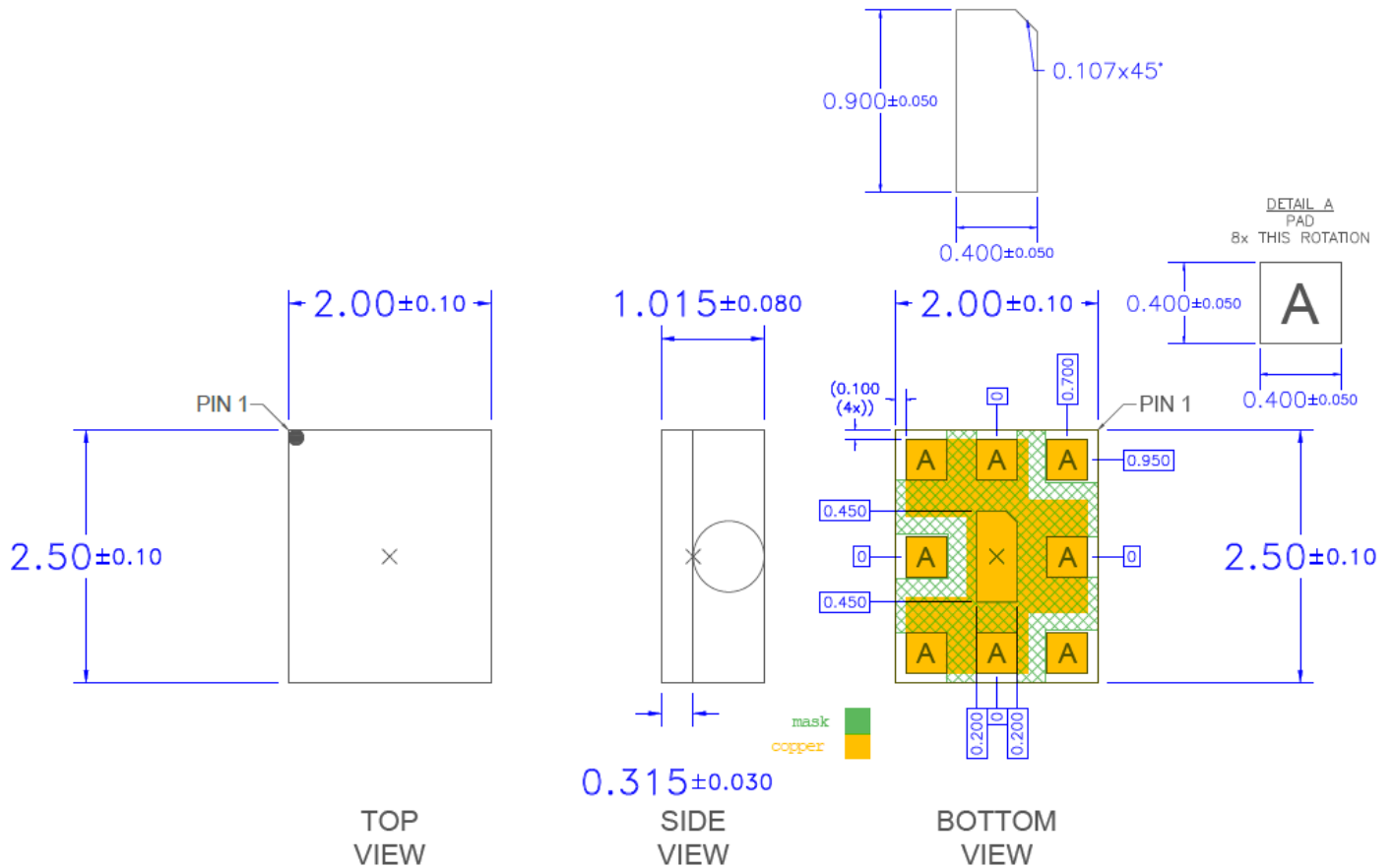


## De-embedded Performance Plots Isolation

Test conditions unless otherwise noted: Temp= +25°C



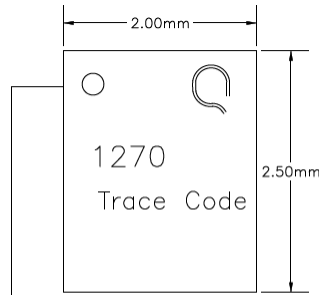
### Package Dimensions



**Notes:**

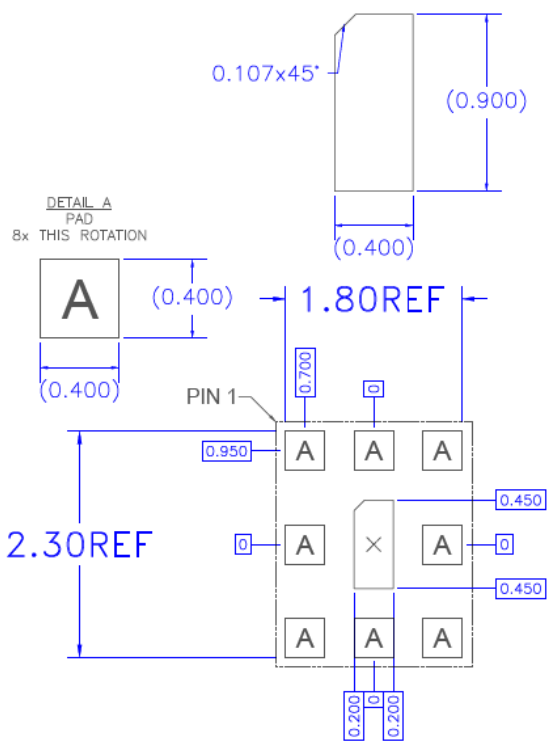
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

## Package Marking

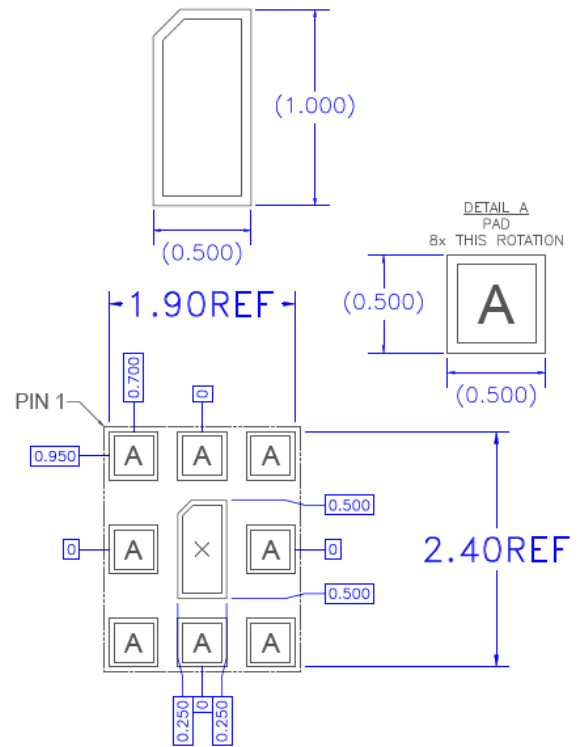


Line 1: Pin 1 dot + logo use Q5D  
 Line 2: Part number  
 Line 3: 4-digit Short trace code.

## PCB Mounting Pattern



**RECOMMENDED  
LAND PATTERN**



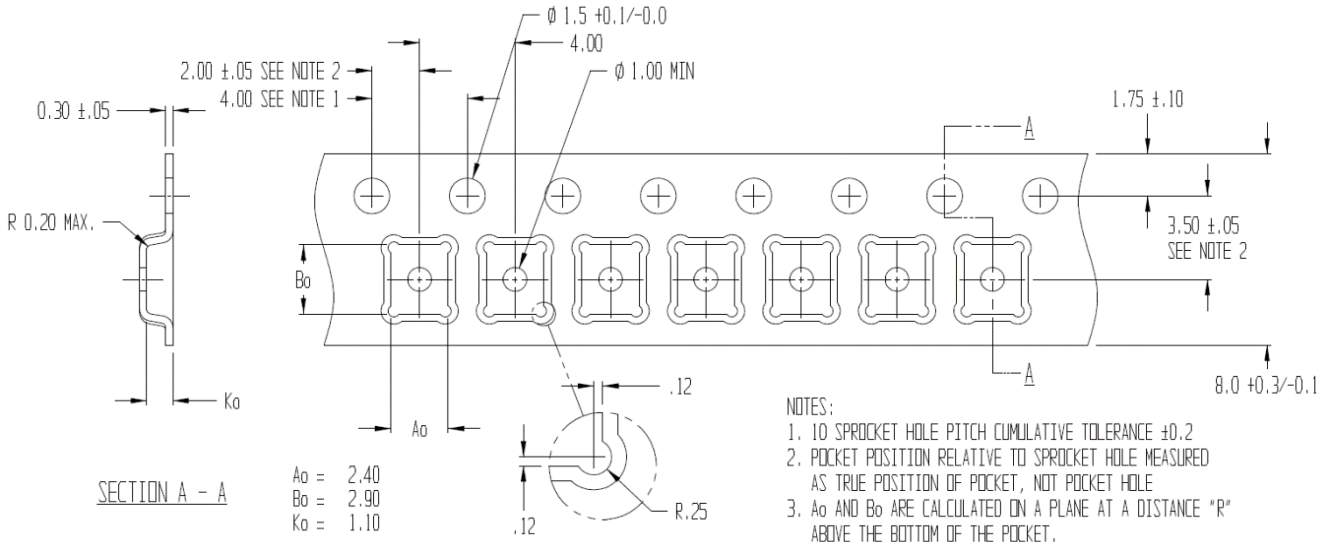
**RECOMMENDED  
LAND PATTERN MASK**

**Notes:**

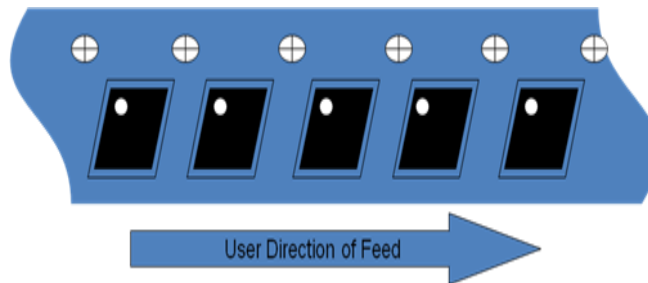
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the Qorvo evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

### Tape and Reel Information – Carrier and Cover Tape Dimensions

Tape and reel specifications for this part are also available on the Qorvo website.  
Standard T/R size = 2500 pieces on a 7" reel.



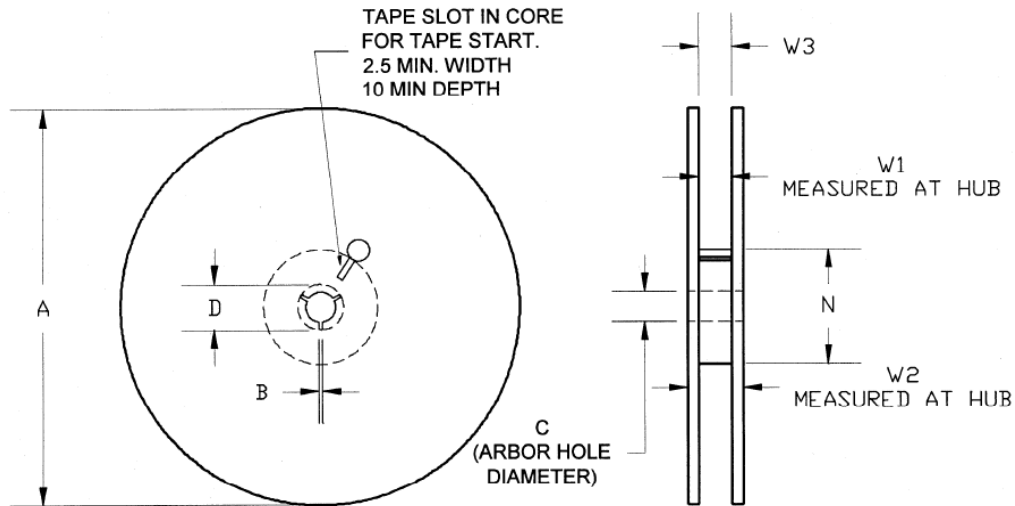
Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.094	2.40
	Width	B0	0.114	2.90
	Depth	K0	0.043	1.10
	Pitch	P1	0.157	4.00
Centerline Distance	Cavity to Perforation - Length Direction	P2	0.079	2.00
	Cavity to Perforation - Width Direction	F	0.138	3.50
Cover Tape	Width	C	0.213	5.40
Carrier Tape	Width	W	0.315	8.00



## Tape and Reel Information – Reel Dimensions

Tape and reel specifications for this part are also available on the Qorvo website.

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



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	6.969	177.0
	Thickness	W2	0.559	14.2
	Space Between Flange	W1	0.346	8.8
Hub	Outer Diameter	N	2.283	58.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.787	20.0

## Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C2b	ESDA / JEDEC JS-002-2014
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 temp.) and tin/lead (245°C max. reflow temp.) soldering processes. Solder profiles available upon request.

Contact Plating: NiAu (*Thickness: Ni 5.0±3.0 μm; Au 0.1 μm min.*)

## RoHS Compliance

This part is compliant with 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 (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free
- SVHC Free



## Contact Information

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

**Web:** [www.qorvo.com](http://www.qorvo.com)      **Tel:** 1-844-890-8163

**Email:** [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

For technical questions and application information:

**Email:** [appsupport@qorvo.com](mailto:appsupport@qorvo.com)

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