

Applications

- Usable Bandwidth of 69 MHz (CH1-11)
- High-power WLAN Access Points and Small Cells
- Band-edge filtering of WiFi signal emissions at 2390 MHz and 2483.5 MHz
- WiFi bandpass filter that enables the coexistence of 4G (LTE/TD-LTE) & WiFi signals
- ISM band applications such as Smart Meters
- Portable Hotspots and Mobile Routers

Product Features

- Industry leading small size: 1.70 x 1.30 x 0.46 mm
- Performance over - 40 to + 95° C
- High Rejection at 2390 MHz, 2483.5 MHz, B38/B40/B7/B41
- Ceramic chip-scale Package (CSP)
- Hermetically sealed
- RoHS compliant, Pb-free

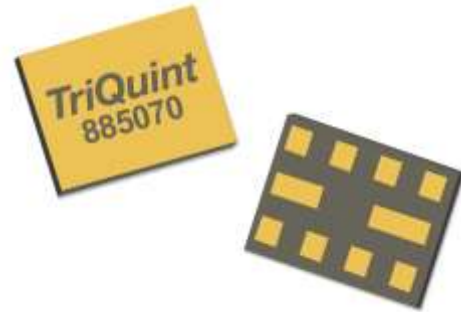


General Description

The 885070 is a high-performance, high power Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the WiFi band and high rejection in the band-edge and adjacent LTE /TD-LTE bands.

The 885070 enables coexistence of WiFi and LTE signals within the same device or in close proximity to one another. Its unique power handling capability allows for implementation into high performance high power access points and small cell base stations.

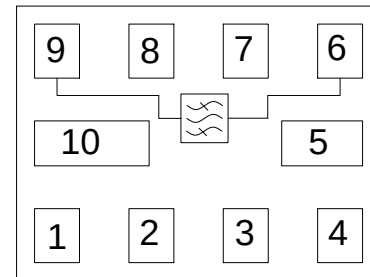
The 885070 uses common module packaging techniques to achieve the industry standard 1.7 x 1.32 x 0.46 mm footprint. The filter exhibits industry leading power handling capabilities up to 1 W.



CSP-1713 package: 1.70 x 1.30 x 0.46 mm

Functional Block Diagram

Top View



Pin Configuration

Pin No.	Label
9	Input
6	Output
1,2,3,4,5,7,8,10	Case Ground

Ordering Information

Part No.	Description
885070	Packaged part
885070-EVB	Evaluation board

Standard T/R size = 10,000 units/reel

Applications

- Usable Bandwidth of 74 MHz (CH1-12)
- High-power WLAN Access Points and Small Cells
- Band-edge filtering of WiFi signal emissions at 2390 MHz and 2483.5 MHz
- WiFi bandpass filter that enables the coexistence of 4G (LTE/TD-LTE) & WiFi signals
- ISM band applications such as Smart Meters
- Portable Hotspots and Mobile Routers

Product Features

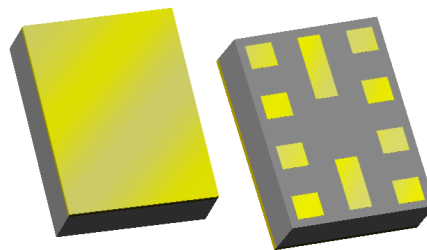
- Industry leading small size: 1.70 x 1.30 x 0.46 mm
- Performance over -40 to +95°C
- High Rejection at 2390 MHz, 2483.5 MHz, B38/B40/B7/B41
- Ceramic chip-scale Package (CSP)
- Hermetically sealed
- RoHS compliant, Pb-free 

General Description

The 885135 is a high-performance, high power Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the WiFi band and high rejection in the band-edge and adjacent LTE /TD-LTE bands.

The 885135 enables coexistence of WiFi and LTE signals within the same device or in close proximity to one another. Its unique power handling capability allows for implementation into high performance high power access points and small cell base stations.

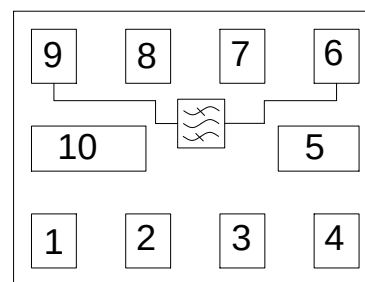
The 885135 uses common module packaging techniques to achieve the industry standard 1.7 x 1.32 x 0.46 mm footprint. The filter exhibits industry leading power handling capabilities up to 1 W.



CSP-1713 package: 1.70 x 1.30 x 0.46 mm

Functional Block Diagram

Top View



Pin Configuration

Pin No.	Label
9	Input
6	Output
1,2,3,4,5,7,8,10	Case Ground

Ordering Information

Part No.	Description
885135	Packaged part
885135-EVB	Evaluation board

Standard T/R size = 15,000 units/reel

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature ⁽¹⁾	-55 to +125 °C
Operating Temperature	-40 to +95 °C

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

Electrical Specifications ⁽¹⁾

Conditions unless otherwise noted: Device Temperature = -40 °C to +95 °C.

Parameter ⁽²⁾	Conditions	Min	Typ ⁽³⁾	Max	Units
Insertion Loss ⁽⁴⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.2	1.7	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.9	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3-9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.8	1.1	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.9	1.3	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	1.7	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.3	2.8	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.7	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3-9)		0.4	0.8	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.3	0.7	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.5	1.1	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	3.5	
Input/Output VSWR	2402.5 – 2476.5 MHz	-	1.5 ⁽⁶⁾	2.0 ⁽⁶⁾	-
Attenuation	100 – 2300 MHz	22	23	-	dB
	2300 – 2370 MHz ⁽⁵⁾	20	25		
	2370 – 2390 MHz ⁽⁵⁾	16	19		
	2483.5 – 2500 MHz ⁽⁵⁾ (-20 °C to +25 °C)	6	20		
	2483.5 – 2500 MHz ⁽⁵⁾ (+25 °C to +95 °C)	15	20		
	2500 – 2520 MHz ⁽⁵⁾	24	33		
	2520 – 2570 MHz ⁽⁵⁾	29	32		
	2570 – 2620 MHz ⁽⁵⁾	26	28		
	2620 – 2690 MHz ⁽⁵⁾	25	28		
	4800 – 5000 MHz	25	29		
Source/Load Impedance ⁽⁷⁾		-	50	-	Ω

Notes:

1. In production, devices will be tested at room temperature to a guard-banded specification to ensure electrical compliance over temperature
2. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
3. Only at +25 °C.
4. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
5. Data is the integrated value of the linear s-parameter over a 5 MHz range at the specified temperature.
6. An external impedance matching network with ± 3 % tolerance will be necessary to achieve the stated specifications.
7. This is the optimum impedance in order to achieve the performance shown

Electrical Specifications ⁽¹⁾

Conditions unless otherwise noted: Device Temperature = -30 °C to +85 °C.

Parameter ⁽²⁾	Conditions	Min	Typ ⁽³⁾	Max	Units
Insertion Loss ⁽⁴⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.2	1.6	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.9	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.8	1.1	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.9	1.3	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	1.6	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.3	2.6	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.7	1.1	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.4	0.8	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.3	0.7	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.5	1.1	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	3.1	
Input/Output VSWR	2402.5 – 2476.5 MHz	-	1.5 ⁽⁶⁾	2.0 ⁽⁶⁾	-
Attenuation	100 – 2300 MHz	22	23	-	dB
	2300 – 2370 MHz ⁽⁵⁾	20	25		
	2370 – 2390 MHz ⁽⁵⁾	16	19		
	2483.5 – 2500 MHz ⁽⁵⁾ (-20 °C to +25 °C)	6	20		
	2483.5 – 2500 MHz ⁽⁵⁾ (+25 °C to +85 °C)	15	20		
	2500 – 2520 MHz ⁽⁵⁾	24	33		
	2520 – 2570 MHz ⁽⁵⁾	29	32		
	2570 – 2620 MHz ⁽⁵⁾	26	28		
	2620 – 2690 MHz ⁽⁵⁾	25	28		
	4800 – 5000 MHz	25	29		
Source/Load Impedance ⁽⁷⁾		-	50	-	Ω

Notes:

1. In production, devices will be tested at room temperature to a guard-banded specification to ensure electrical compliance over temperature
2. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
3. Only at +25 °C.
4. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
5. Data is the integrated value of the linear s-parameter over a 5 MHz range at the specified temperature.
6. An external impedance matching network with ± 3 % tolerance will be necessary to achieve the stated specifications.
7. This is the optimum impedance in order to achieve the performance shown

Electrical Specifications ⁽¹⁾

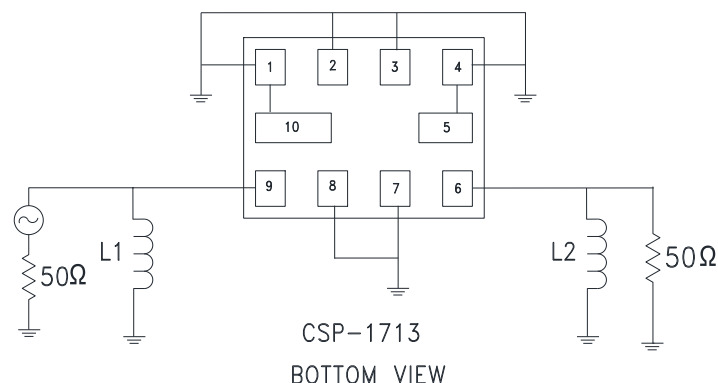
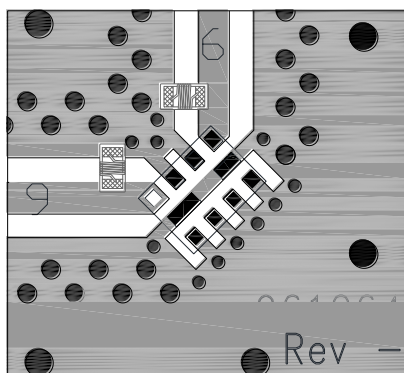
Conditions unless otherwise noted: Device Temperature = 0 °C to +70 °C.

Parameter ⁽²⁾	Conditions	Min	Typ ⁽³⁾	Max	Units
Insertion Loss ⁽⁴⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)		1.2	1.5	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.9	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.8	1.0	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.9	1.2	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	1.5	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)		1.3	2.3	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.7	1.1	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.4	0.7	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.3	0.6	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		0.5	1.3	
	2457.5 – 2476.5 MHz (WiFi Ch. 12)		1.1	2.6	
Input/Output VSWR	2402.5 – 2471.5 MHz	-	1.5 ⁽⁶⁾	2.0 ⁽⁶⁾	-
Attenuation	100 – 2300 MHz	22	23	-	dB
	2300 – 2370 MHz ⁽⁵⁾	20	25		
	2370 – 2390 MHz ⁽⁵⁾	16	19		
	2483.5 – 2500 MHz ⁽⁵⁾ (0 °C to +25 °C)	9	20		
	2483.5 – 2500 MHz ⁽⁵⁾ (+25 °C to +70 °C)	15	20		
	2500 – 2520 MHz ⁽⁵⁾	23	33		
	2520 – 2570 MHz ⁽⁵⁾	30	32		
	2570 – 2620 MHz ⁽⁵⁾	26	28		
	2620 – 2690 MHz ⁽⁵⁾	25	28		
	4800 – 5000 MHz	25	29		
Source/Load Impedance ⁽⁷⁾		-	50	-	Ω

Notes:

1. In production, devices will be tested at room temperature to a guard-banded specification to ensure electrical compliance over temperature
2. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
3. Only at +25 °C.
4. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
5. Data is the integrated value of the linear s-parameter over a 5 MHz range at the specified temperature.
6. An external impedance matching network with $\pm 3\%$ tolerance will be necessary to achieve the stated specifications.
7. This is the optimum impedance in order to achieve the performance shown

Evaluation Board



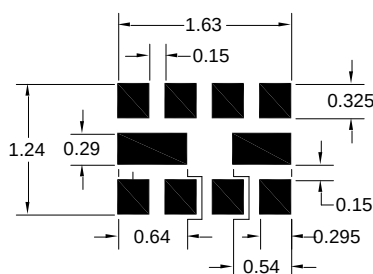
Notes:

1. Matching component values shown are for the specified TriQuint evaluation board. Value adjustment may be required in end user product circuits depending on component manufacturer and PCB material.
2. PCB: .500 x.500 x .062; Construction: ½ oz Cu Top Layer; TLY-5A (.0075) ½ oz Cu Middle Layer, FR4; ½ oz Cu Bottom Layer. (dimensions are in inches)

Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
L1	15 nH	Chip Inductor, 0402, ± 3 %	Murata	LQW15AN15NH00
L2	15 nH	Chip Inductor, 0402, ± 3 %	Murata	LQW15AN15NH00
SMA	N/A	SMA connector	Radiall USA	9602-1111-018
PCB	N/A	3-layer	Multiple	961064

PCB Mounting Pattern

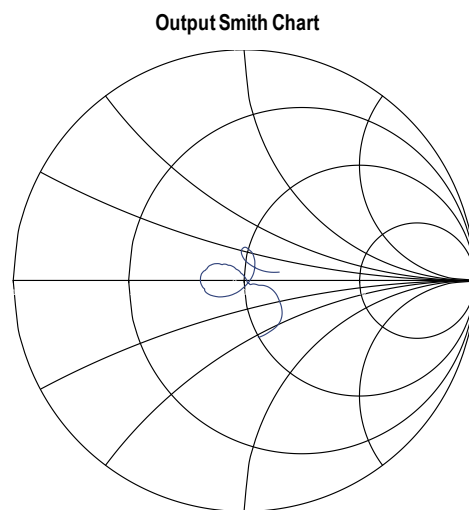
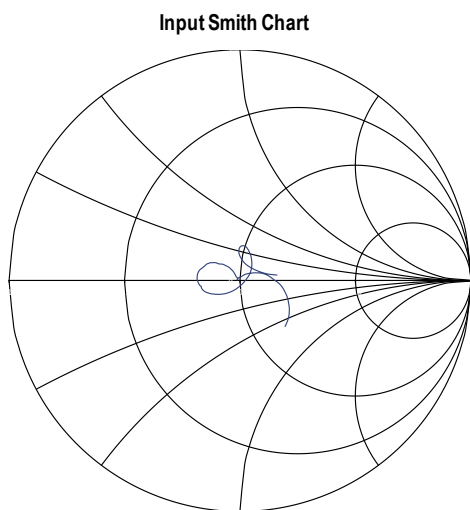
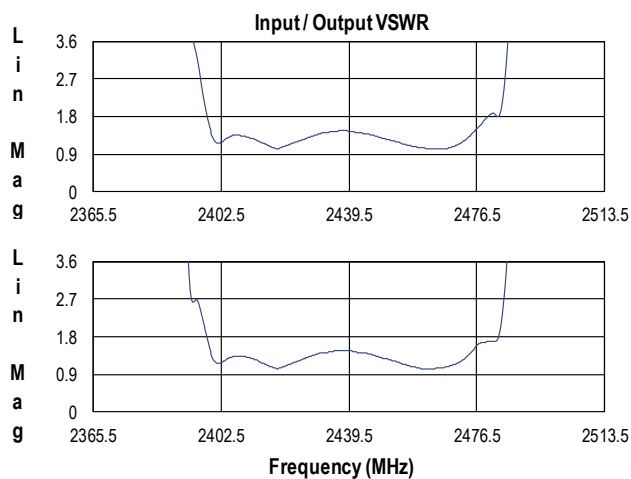
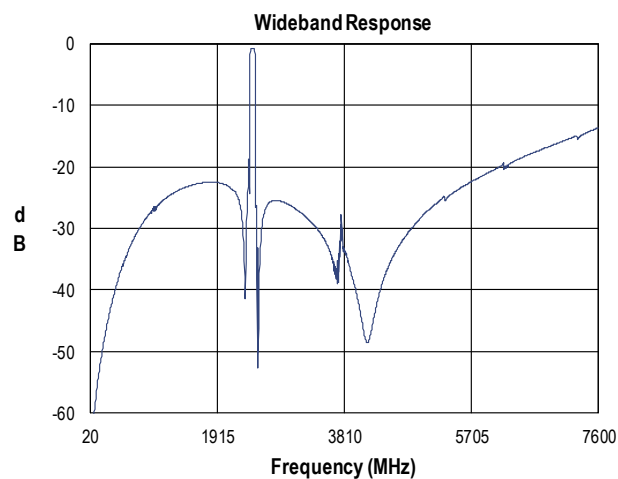
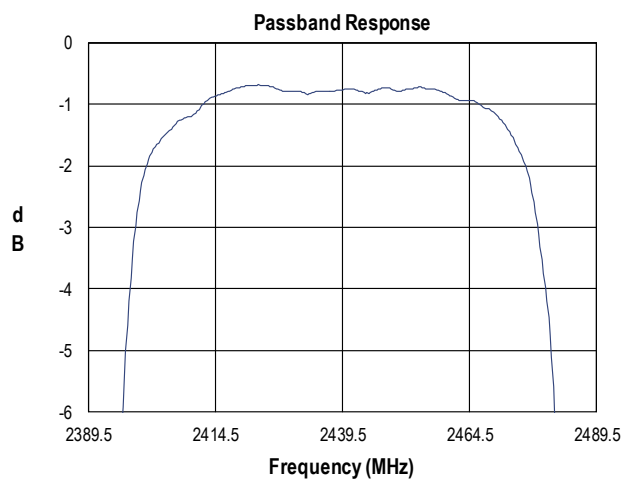
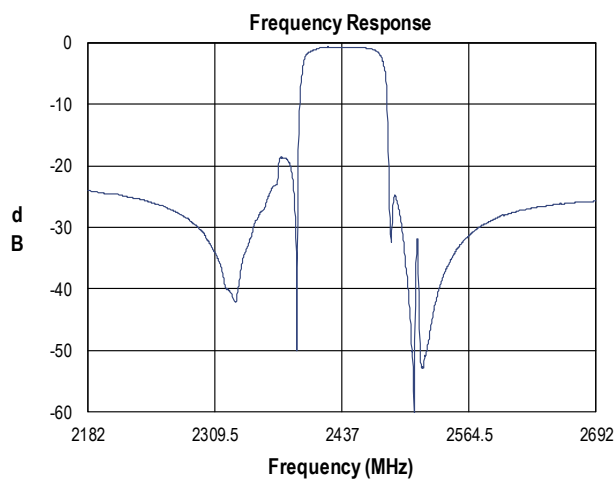


Notes:

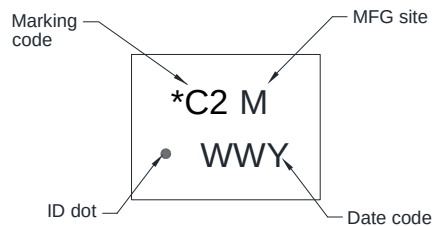
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the TriQuint evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

Performance Plots

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



Package Information, Marking and Dimensions



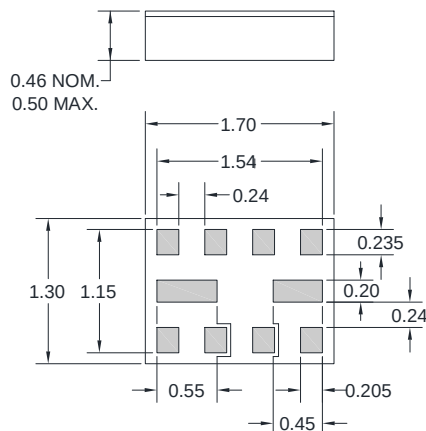
Package Style: CSP-1713
Dimensions: 1.7 x 1.3 x 0.50 mm

Package for Surface Mount Technology
Terminations: *Au* plating 0.5 - 1.0 μm , over a 2-6 μm *Ni* Plating
Approximate weight 3.96 mg

All dimensions shown are nominal in millimeters.
Unless otherwise specified all tolerances are $\pm 0.05\text{mm}$ except length and width that are specified as $\pm 0.1\text{mm}$

The Marking Code is correlated with the Part Number
M=Manufacturing Site Code (Blank for Apopka, C for Costa Rica)

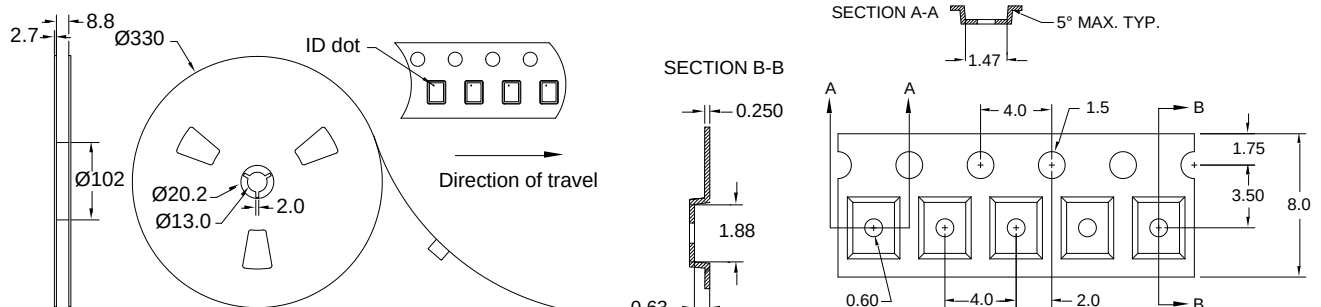
The Date Code consists of:
WW = 2 digit week
Y=The last digit of the year



Notes:

1. All dimensions shown are typical in millimeters
2. An asterisk (*) in front of the marking code indicates prototype.

Tape and Reel information



Standard T/R size=15,000 units/reel. All dimensions are in millimeters.

Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

MSL Rating

Not applicable. Hermetic package.

Solderability

Compatible with the latest version of J-STD-020, lead free solder, 260°C

Refer to [Soldering Profile](#) for recommended guidelines.

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:

- 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:

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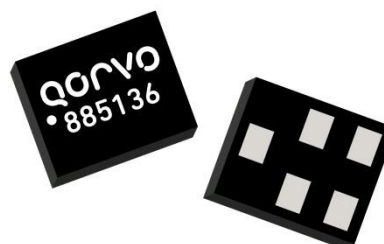
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General Description

The 885136 is a high-performance, high power Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the WiFi band and high rejection in the band-edge and adjacent LTE /TD-LTE bands.

The 885136 enables coexistence of WiFi and LTE signals within the same device or in close proximity to one another. Its unique power handling capability allows for implementation into high performance high power access points and small cell base stations.

The 885136 uses common module packaging techniques to achieve the industry standard 1.1 x 0.9 x 0.50 mm footprint.



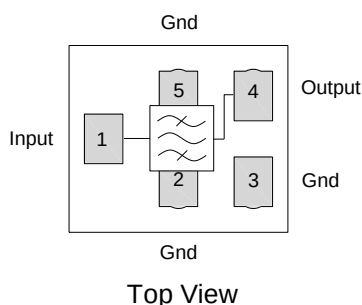
1.1 X 0.9 X 0.50 mm

Product Features

- Industry leading small size: 1.1 x 0.9 x 0.50 mm
- Performance over -40 to +95°C
- High Rejection at 2390 MHz, 2483.5 MHz, B38/B40/B7/B41
- Single Ended Operation
- RoHS Compliant, Pb-Free



Functional Block Diagram



Pin Configuration - Single Ended

Pin No.	Label
1	Input
4	Output
2,3,5	Ground

Applications

- Usable Bandwidth of 69 MHz (CH1-11)
- High-power WLAN Access Points and Small Cells
- Band-edge filtering of WiFi signal emissions at 2390 MHz and 2483.5 MHz
- WiFi bandpass filter that enables the coexistence of 4G (LTE/TD-LTE) & WiFi signals
- ISM band applications such as Smart Meters
- Portable Hotspots and Mobile Routers

Ordering Information

Part No.	Description
885136	Packaged Part
885136-EVB	Evaluation board

Standard T/R size = 15,000 units/reel

Absolute Maximum Ratings

Parameter	Rating ⁽¹⁾
Storage Temperature	-40 to +125 °C
Operating Temperature	-40 to +105 °C
Max RF Signal, CW, 25 °C, 20msec	+39 dBm

Note:

(1) Exceeding any one or a combination of the Maximum Rating conditions may cause permanent damage to the device. Extended application of Maximum Rating conditions to the device may reduce device reliability.

Minimum Lifetime Ratings

Conditions ⁽¹⁾	Rating
+30 dBm, +85 °C	>300K Hrs.
+27 dBm, +95 °C	>1.1M Hrs.
+25 dBm, +105 °C	>2.9M Hrs.

Note:

(1) Average input power using a WLAN OFDM signal applied to Pin 1 only at the specified ambient temperature (power handling and nonlinear characteristics are not symmetric). Signal modulation was 802.11n, MCS7, PAR = 10 dB, 100% duty cycle.

Electrical Specifications ⁽¹⁾

Test conditions unless otherwise noted: ⁽²⁾ Temp= -40 °C to +95 °C

Parameter ⁽³⁾	Conditions	Min	Typ ⁽⁴⁾	Max	Units
Insertion Loss ⁽⁵⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.2	1.7	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		1.0	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.9	1.2	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	1.6	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.5	3.0	dB p-p
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.8	1.5	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.5	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.5	1.2	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	3.5	
Absolute Attenuation ⁽⁶⁾	100 – 2300 MHz	20	23	-	dB
	2300 – 2370 MHz ⁽⁶⁾	25	28		
	2370 – 2390 MHz ⁽⁶⁾	25	31		
	2483.5 – 2500 MHz ⁽⁶⁾	15	24		
	2500 – 2520 MHz ⁽⁶⁾	20	25		
	2520 – 2570 MHz ⁽⁶⁾	25	31		
	2570 – 2620 MHz ⁽⁶⁾	24	28		
	2620 – 2690 MHz ⁽⁶⁾	23	27		
	4800 – 5000 MHz	28	31		
Input/Output VSWR ⁽⁷⁾	2402.5 – 2471.5 MHz	-	1.5	2.0:1	-
Source Impedance ⁽⁸⁾	single-ended	-	50	-	Ω
Load Impedance ⁽⁸⁾	single-ended	-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 5.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances..
4. Only at 25 °C.
5. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
6. Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature.
7. An external impedance matching network with ±3 % tolerance will be necessary to achieve the stated specifications.
8. This is the optimum impedance in order to achieve the performance shown.

Electrical Specifications ⁽¹⁾

Test conditions unless otherwise noted: ⁽²⁾ Temp= -30 °C to +85 °C

Parameter ⁽³⁾	Conditions	Min	Typ ⁽⁴⁾	Max	Units
Insertion Loss ⁽⁵⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.2	1.6	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		1.0	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.9	1.2	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	1.6	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.5	2.8	dB p-p
	2407.5 – 2426.5 MHz (WiFi Ch.2)	-	0.8	1.4	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)	-	0.5	1.0	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.5	1.2	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	3.0	
Absolute Attenuation ⁽⁶⁾	100 – 2300 MHz	20	23	-	dB
	2300 – 2370 MHz ⁽⁶⁾	25	28		
	2370 – 2390 MHz ⁽⁶⁾	28	31		
	2483.5 – 2500 MHz ⁽⁶⁾	20	25		
	2500 – 2520 MHz ⁽⁶⁾	20	25		
	2520 – 2570 MHz ⁽⁶⁾	25	31		
	2570 – 2620 MHz ⁽⁶⁾	24	28		
	2620 – 2690 MHz ⁽⁶⁾	23	27		
	4800 – 5000 MHz	28	31		
Input/Output VSWR ⁽⁷⁾	2402.5 – 2471.5 MHz	-	1.5	1.8:1	-
Source Impedance ⁽⁸⁾	single-ended	-	50	-	Ω
Load Impedance ⁽⁸⁾	single-ended	-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 5.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances..
4. Only at 25 °C.
5. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
6. Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature.
7. An external impedance matching network with ±3 % tolerance will be necessary to achieve the stated specifications.
8. This is the optimum impedance in order to achieve the performance shown.

Electrical Specifications ⁽¹⁾

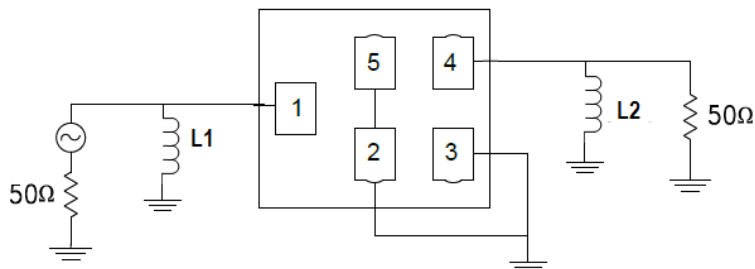
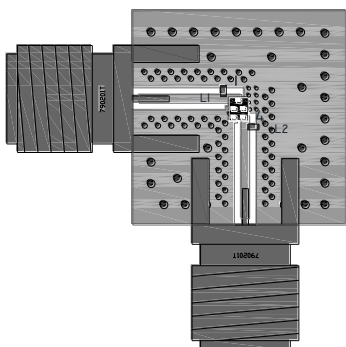
Test conditions unless otherwise noted: ⁽²⁾ Temp= 0 °C to +70 °C

Parameter ⁽³⁾	Conditions	Min	Typ ⁽⁴⁾	Max	Units
Insertion Loss ⁽⁵⁾	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.2	1.5	dB
	2407.5 – 2426.5 MHz (WiFi Ch.2)		1.0	1.2	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)		0.8	1.1	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.9	1.1	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	1.5	
Amplitude Variation	2402.5 – 2421.5 MHz (WiFi Ch.1)	-	1.5	2.5	dB p-p
	2407.5 – 2426.5 MHz (WiFi Ch.2)		0.8	1.3	
	2412.5 – 2461.5 MHz (WiFi Ch.3 - 9)	-	0.5	1.0	
	2447.5 – 2466.5 MHz (WiFi Ch.10)		0.5	1.0	
	2452.5 – 2471.5 MHz (WiFi Ch.11)		1.0	2.5	
Absolute Attenuation ⁽⁶⁾	100 – 2300 MHz	20	23	-	dB
	2300 – 2370 MHz ⁽⁶⁾	25	28		
	2370 – 2390 MHz ⁽⁶⁾	28	31		
	2483.5 – 2500 MHz ⁽⁶⁾	20	25		
	2500 – 2520 MHz ⁽⁶⁾	20	25		
	2520 – 2570 MHz ⁽⁶⁾	25	31		
	2570 – 2620 MHz ⁽⁶⁾	24	28		
	2620 – 2690 MHz ⁽⁶⁾	23	27		
	4800 – 5000 MHz	28	31		
Input/Output VSWR ⁽⁷⁾	2402.5 – 2471.5 MHz	-	1.5	1.8:1	-
Source Impedance ⁽⁸⁾	single-ended	-	50	-	Ω
Load Impedance ⁽⁸⁾	single-ended	-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 5.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances..
4. Only at 25 °C.
5. Data is the integrated value of the linear s-parameter over a 19 MHz range in the indicated band at the specified temperature.
6. Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature.
7. An external impedance matching network with $\pm 3\%$ tolerance will be necessary to achieve the stated specifications.
8. This is the optimum impedance in order to achieve the performance shown.

Evaluation Board – 885136-EVB



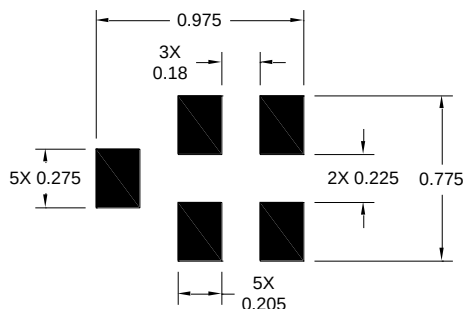
Notes:

1. Matching component values shown are for the specified Qorvo evaluation board. Value adjustment may be required in end user product circuits depending on component manufacturer and PCB material.
2. Top, middle & bottom layers: 1 oz. copper. Substrates: FR4 dielectric 0.31" thick. Finish plating: Nickel: 3-8 μm thick, Gold: 0.03 - 0.2 μm thick. Hole plating: Copper min .0008 μm thick.

Bill of Material – 885136-EVB

Reference Des.	Value	Description	Manuf.	Part Number
U1	-	2437 MHz BAW Filter	Qorvo	885136
L1	15nH	0201 chip Inductor, $\pm 3\%$	Murata	LQP03TN15NH02
L2	15nH	0201 chip Inductor, $\pm 3\%$	Murata	LQP03TN15NH02
SMA	-	SMA connector	Radiall	9602-1111-018
PCB	-	3-layer	Qorvo	961094-04

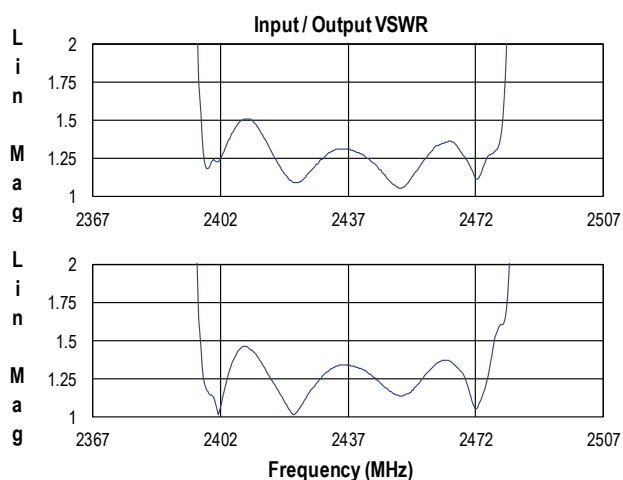
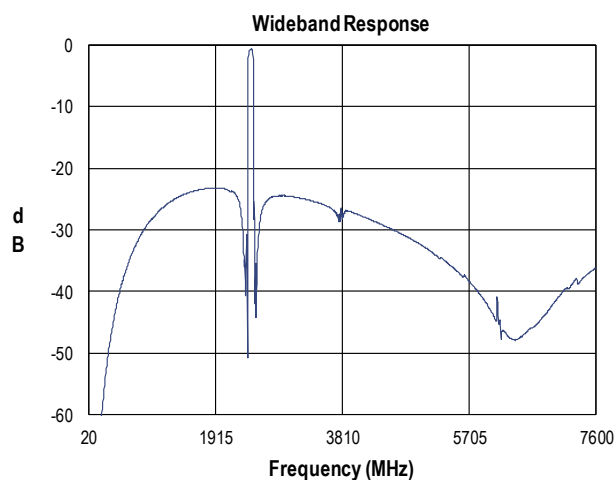
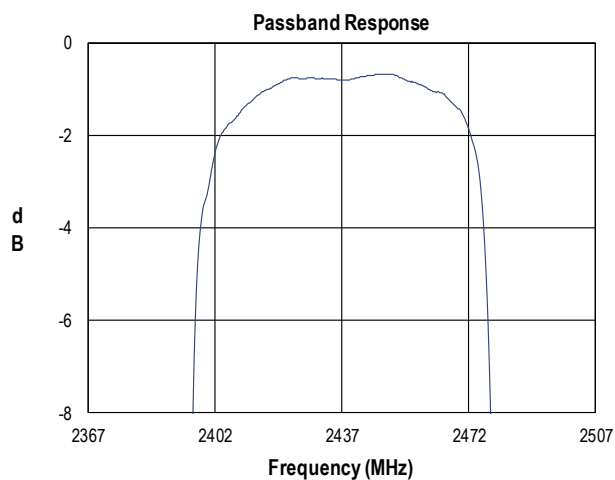
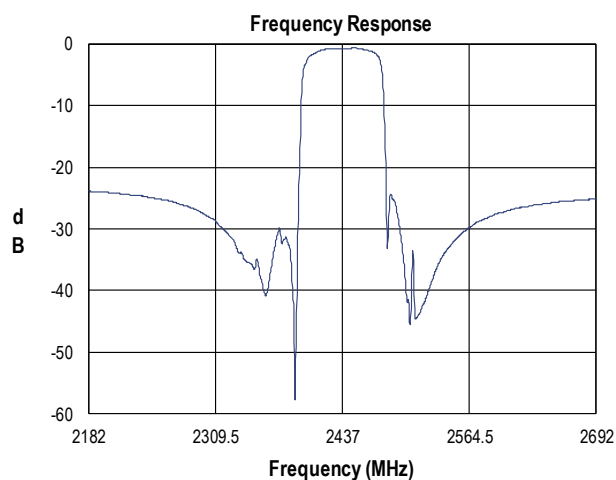
PCB Mounting Pattern



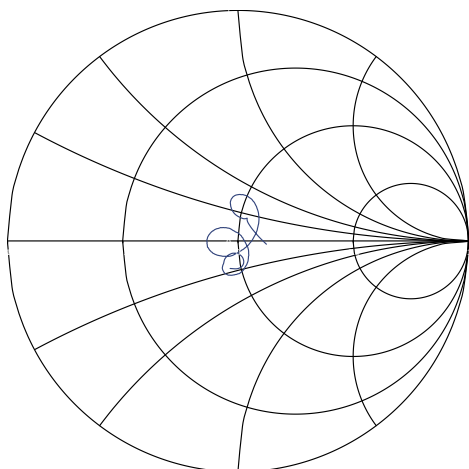
Notes:

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.

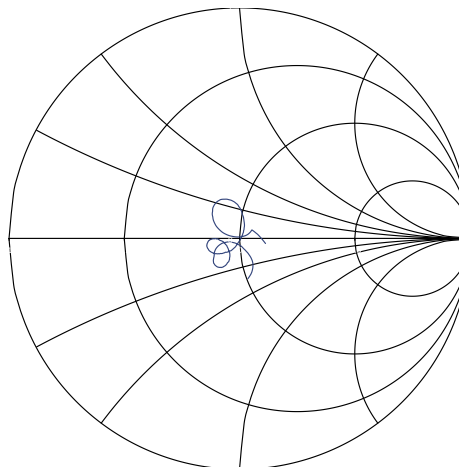
Performance Plots



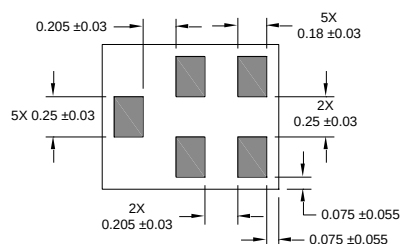
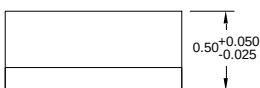
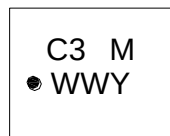
Input Smith Chart



Output Smith Chart



Package Information



Package Style: ULC1109A
Dimensions: 1.1 x 0.9 x 0.50 mm

Package for Surface Mount Technology
Terminations: Au plating 0.5 - 1.0µm, over a 2- 6µm Ni Plating
Approximate weight 1.37mg

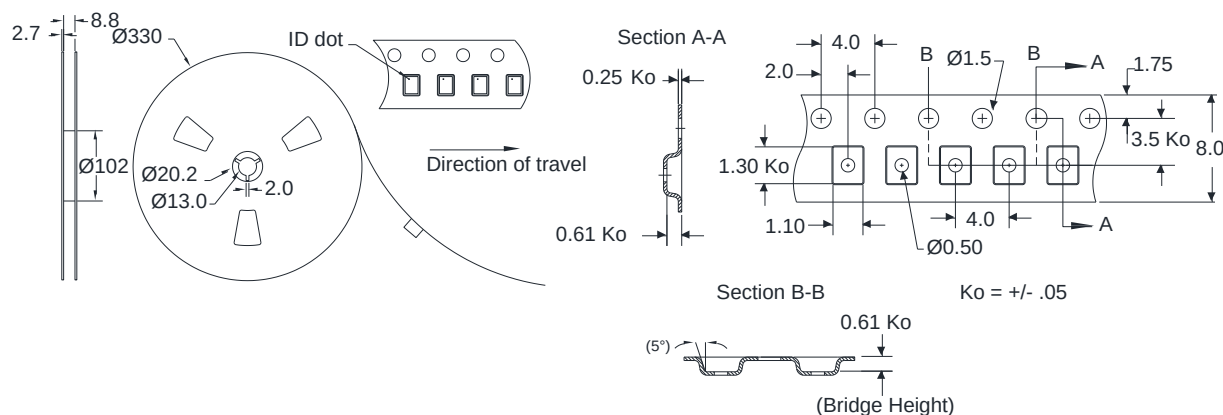
The date code consists of: M = manufacturing site code WW = 2 digit week and Y = last digit of year.

Notes:

1. All dimensions shown are typical in millimeters.
2. An asterisk (*) in front of the marking code indicates prototype.

Tape and Reel information

Standard T/R size = 15,000 units/reel. All dimensions are in millimeters



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1C	ESDA / JEDEC JS-001
ESD – Charge Device Model (CDM)	Class C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	Level 3	JEDEC Standard 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.

Refer to [Soldering Profile](#) for recommended guidelines

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 (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free
- Qorvo Green



Contact Information

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

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Tel: 1-844-890-8163
Email: customer.support@qorvo.com

For technical questions and application information: Email: flapplication.engineering@qorvo.com

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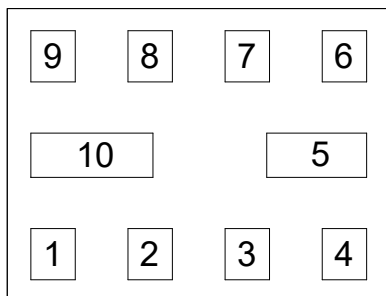
General Description

The 885137 is a high-performance Bulk Acoustic Wave (BAW) filter module designed to meet the strict LTE requirements for use in LTE from 699–2400 MHz and 2496–2690 MHz and WLAN requirements.

885137 is specifically designed to meet the high performance expectations of insertion loss and rejection for LTE and WLAN systems under all operating conditions. 885137 allows diplexing the Cellular path and a filtered WiFi path to one antenna port.

The 885137 uses common module packaging techniques to achieve the industry standard 1.7 x 1.3 x 0.46 mm footprint.

Functional Block Diagram

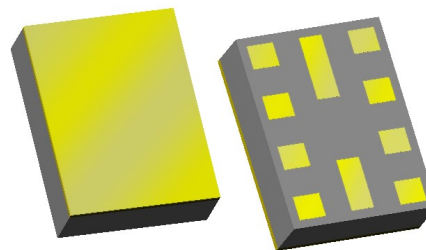


Top View

Pin Configuration - Single Ended

Pin No.	Label
1	RF3
4	RF2
6	SMD# 1 to RF2
7	SMD# 2 to RF1, SMD# 4 to Ground
9	RF1 (ANT)
2,3,5,8,10	Ground

*Note: See Evaluation Board section page 11 for details on optimal grounding



CSP-1713 package: 1.70 x 1.30 x 0.46 mm

Product Features

- Diplexer is formed with WiFi Bandpass and Band stop filters.
- Highly selective BAW filters achieving low insertion loss and high attenuation over full bandwidth and operating conditions
- Rejection in WLAN band of 10 dB minimum
- Single antenna port, diplexing
- Performance -40 to +95 °C
- RoHS compliant, Pb-free module package



Applications

- Usable Bandwidth of 79 MHz (CH1 – 13)
- For WLAN coexistence to B7, B38, B40 and B41 LTE applications
- LTE gateways, data cards and routers
- WiFi antenna extractor circuits.
- High-power WLAN Access Points and Small Cells
- 2.4 GHz ISM applications
- Wi-Fi Set Top Box, Gateways and Routers-

Ordering Information

Part No.	Description
885137	15,000 units/reel (standard)
885137-EVB	Evaluation board

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature ⁽¹⁾	-55 to +150 °C
Operating Temperature ⁽²⁾	-20 to +85 °C
RF Input Power	
RF2 (Cell Port)	+25 dBm
RF3 (WiFi Port)	+20 dBm

Notes:

1. Operation of this device outside the parameter ranges given may cause permanent damage.
2. Specifications are not guaranteed over all operating conditions.
3. TD-SCDMA, LTE continuous; simultaneously TX power presence at RF2 and RF3.

Electrical Specifications ⁽¹⁾

Operating Temp = -40 to +95°C, Characteristic Impedance [Z₀] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell)(S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	699 – 960 MHz	-	1.3	2.3	dB
	1574 – 1615 MHz		0.8	0.9	
	1710 – 2170 MHz		1.0	1.3	
	2300 – 2370 MHz		1.9	3.2	
	2370 – 2377.5 MHz		2.5	4.7	
	2496 – 2510 MHz		2.0	3.7	
	2510 – 2570 MHz		1.0	1.5	
	2570 – 2690 MHz		1.0	1.4	
Amplitude Variation (within any 20 MHz)	2300 – 2370 MHz	-	0.4	1.3	dB p-p
	2496 – 2510 MHz		1.1	2.8	
	2510 – 2570 MHz		0.3	0.7	
VSWR (In/Out)	2300 – 2370 MHz	-	1.4	2.0	-
	2496 – 2510 MHz		1.9	3.1	
	2510 – 2570 MHz		1.4	2.4	
	2570 – 2690 MHz		1.4	2.0	

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.

Electrical Specifications ⁽¹⁾

Operating Temp = -40 to +95°C, Characteristic Impedance [Z0] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell) (S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Attenuation ⁽⁶⁾	2402 – 2478.64 MHz ⁽⁴⁾	15	18	-	dB
	2478.64 – 2482 MHz ⁽⁴⁾	13	18		
	2402.5 – 2421.5 MHz (ISM Ch 1) ⁽⁵⁾	20	25		
	2407.5 – 2426.5 MHz (ISM Ch 2) ⁽⁵⁾	17	22		
	2412.5 – 2431.5 MHz (ISM Ch 3) ⁽⁵⁾	16	20		
	2417.5 – 2436.5 MHz (ISM Ch 4) ⁽⁵⁾	16	19		
	2422.5 – 2441.5 MHz (ISM Ch 5) ⁽⁵⁾	16	19		
	2427.5 – 2446.5 MHz (ISM Ch 6) ⁽⁵⁾	16	19		
	2432.5 – 2451.5 MHz (ISM Ch 7) ⁽⁵⁾	16	20		
	2437.5 – 2456.5 MHz (ISM Ch 8) ⁽⁵⁾	17	21		
	2442.5 – 2461.5 MHz (ISM Ch 9) ⁽⁵⁾	17	23		
	2447.5 – 2466.5 MHz (ISM Ch 10) ⁽⁵⁾	21	26		
	2452.5 – 2471.5 MHz (ISM Ch 11) ⁽⁵⁾	24	27		
	2457.5 – 2476.5 MHz (ISM Ch 12) ⁽⁵⁾	19	26		
	2462.5 – 2481.5 MHz (ISM Ch 13) ⁽⁵⁾	17	22		

RF2 to RF3 Isolation (Cell - WiFi) (S23)

Attenuation ⁽⁶⁾	2300 – 2370 MHz	41	49	-	dB
	2402 – 2482 MHz ⁽⁴⁾	17	19		
	ISM CH 1 – 13 ⁽⁵⁾	17	20		
	2570 – 2690 MHz ⁽⁴⁾	42	45		
	2496 – 2500 MHz	13	28		
	2500 – 2510 MHz	25	44		
	2510 – 2570 MHz	49	53		
	2370 – 2400 MHz	12	16		

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Electrical Specifications ⁽¹⁾

Operating Temp = -40 to +95°C, Characteristic Impedance [ZO] = 50 Ω. (Unless otherwise noted)

RF1 to RF3 (Ant- WiFi) (S13)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	2402 – 2480 MHz	-	2.6	4.2	dB
	2402 – 2475.81 MHz ⁽⁴⁾		2.4	3.4	
	2475.81 – 2480 MHz ⁽⁴⁾		2.4	4.3	
	ISM CH 1 – 12 ⁽⁵⁾		1.8	2.3	
	ISM CH 13 ⁽⁵⁾		1.8	2.7	
Amplitude Variation	2402 – 2480 MHz	-	1.5	3.1	dB p-p
	2402 – 2480 MHz (within any 20 MHz)		1.3	2.7	
Attenuation ⁽⁶⁾	10 – 1549 MHz	44	45	-	dB
	1549 – 1615 MHz	44	45		
	1710 – 1990 MHz	41	42		
	2110 – 2170 MHz	40	42		
	2300 – 2370 MHz	46	48		
	2496 – 2500 MHz	12	25		
	2500 – 2570 MHz	22	39		
	2570 – 2690 MHz	42	44		
VSWR (In/Out)	2402 – 2480 MHz	-	1.7	2.6	-

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Electrical Specifications ⁽¹⁾

Operating Temp = -30 to +85°C, Characteristic Impedance [Z0] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell) (S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	699 – 960 MHz	-	1.3	2.3	dB
	1574 – 1615 MHz		0.8	0.9	
	1710 – 2170 MHz		1.0	1.2	
	2300 – 2370 MHz		1.9	3.1	
	2370 – 2377.5 MHz		2.5	4.6	
	2496 – 2510 MHz		2.0	3.6	
	2510 – 2570 MHz		1.0	1.5	
Amplitude Variation (within any 20 MHz)	2300 – 2370 MHz	-	0.4	1.3	dB p-p
	2496 – 2510 MHz		1.1	2.7	
	2510 – 2570 MHz		0.3	0.7	
VSWR (In/Out)	2300 – 2370 MHz	-	1.4	2.0	-
	2496 – 2510 MHz		1.9	3.0	
	2510 – 2570 MHz		1.4	2.3	
	2570 – 2690 MHz		1.4	2.0	

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.

Electrical Specifications ⁽¹⁾

Operating Temp = -30 to +85°C, Characteristic Impedance [Z₀] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell) (S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Attenuation ⁽⁶⁾	2402 – 2478.64 MHz ⁽⁴⁾	15	18		dB
	2478.64 – 2482 MHz ⁽⁴⁾	14	18		
	2402.5 – 2421.5 MHz (ISM Ch 1) ⁽⁵⁾	20	25		
	2407.5 – 2426.5 MHz (ISM Ch 2) ⁽⁵⁾	17	22		
	2412.5 – 2431.5 MHz (ISM Ch 3) ⁽⁵⁾	16	20		
	2417.5 – 2436.5 MHz (ISM Ch 4) ⁽⁵⁾	16	19		
	2422.5 – 2441.5 MHz (ISM Ch 5) ⁽⁵⁾	16	19		
	2427.5 – 2446.5 MHz (ISM Ch 6) ⁽⁵⁾	16	19	-	
	2432.5 – 2451.5 MHz (ISM Ch 7) ⁽⁵⁾	16	20		
	2437.5 – 2456.5 MHz (ISM Ch 8) ⁽⁵⁾	17	21		
	2442.5 – 2461.5 MHz (ISM Ch 9) ⁽⁵⁾	17	23		
	2447.5 – 2466.5 MHz (ISM Ch 10) ⁽⁵⁾	21	26		
	2452.5 – 2471.5 MHz (ISM Ch 11) ⁽⁵⁾	24	27		
	2457.5 – 2476.5 MHz (ISM Ch 12) ⁽⁵⁾	19	26		
	2462.5 – 2481.5 MHz (ISM Ch 13) ⁽⁵⁾	17	22		

RF2 to RF3 Isolation (Cell - WiFi) (S23)

Attenuation ⁽⁶⁾	2300 – 2370 MHz	41	49		dB
	2402 – 2482 MHz ⁽⁴⁾	17	19		
	ISM CH 1 – 13 ⁽⁵⁾	17	20		
	2570 – 2690 MHz ⁽⁴⁾	42	45		
	2496 – 2500 MHz	13	28	-	
	2500 – 2510 MHz	26	44		
	2510 – 2570 MHz	49	53		
	2370 – 2400 MHz	12	16		

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Electrical Specifications ⁽¹⁾

Operating Temp = -30 to +85°C, Characteristic Impedance [ZO] = 50 Ω. (Unless otherwise noted)

RF1 to RF3 (Ant- WiFi) (S13)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	2402 – 2480 MHz	-	2.6	4.0	dB
	2402 – 2475.81 MHz ⁽⁴⁾		2.4	3.4	
	2475.81 – 2480 MHz ⁽⁴⁾		2.4	4.1	
	ISM CH 1 – 12 ⁽⁵⁾		1.8	2.2	
	ISM CH 13 ⁽⁵⁾		1.8	2.6	
Amplitude Variation	2402 – 2480 MHz	-	1.5	2.9	dB p-p
	2402 – 2480 MHz (within any 20 MHz)		1.3	2.6	
Attenuation ⁽⁶⁾	10 – 1549 MHz	44	45	-	-
	1549 – 1615 MHz	44	45		
	1710 – 1990 MHz	41	42		
	2110 – 2170 MHz	40	42		
	2300 – 2370 MHz	46	48		
	2496 – 2500 MHz	12	25		
	2500 – 2570 MHz	23	39		
	2570 – 2690 MHz	42	44		
VSWR (In/Out)	2402 – 2480 MHz	-	1.7	2.5	-

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Electrical Specifications ⁽¹⁾

Operating Temp = 0 to +70 °C, Characteristic Impedance [ZO] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell) (S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	699 – 960 MHz	-	1.3	2.3	dB
	1574 – 1615 MHz		0.8	0.9	
	1710 – 2170 MHz		1.0	1.2	
	2300 – 2370 MHz		1.9	3.0	
	2370 – 2377.5 MHz		2.5	4.4	
	2496 – 2510 MHz		2.0	3.3	
	2510 – 2570 MHz		1.0	1.5	
	2570 – 2690 MHz		1.0	1.3	
Amplitude Variation (within any 20 MHz)	2300 – 2370 MHz	-	0.4	1.2	dB p-p
	2496 – 2510 MHz		1.1	2.3	
	2510 – 2570 MHz		0.3	0.6	
VSWR (In/Out)	2300 – 2370 MHz	-	1.4	2.0	-
	2496 – 2510 MHz		1.9	2.9	
	2510 – 2570 MHz		1.4	2.3	
	2570 – 2690 MHz		1.4	2.0	

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.

Electrical Specifications ⁽¹⁾

Operating Temp = 0 to +70 °C, Characteristic Impedance [Z0] = 50 Ω. (Unless otherwise noted)

RF1 to RF2 (Ant- Cell) (S12)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Attenuation ⁽⁶⁾	2402 – 2478.64 MHz ⁽⁴⁾	15	18		dB
	2478.64 – 2482 MHz ⁽⁴⁾	14	18		
	2402.5 – 2421.5 MHz (ISM Ch 1) ⁽⁵⁾	21	25		
	2407.5 – 2426.5 MHz (ISM Ch 2) ⁽⁵⁾	17	22		
	2412.5 – 2431.5 MHz (ISM Ch 3) ⁽⁵⁾	16	20		
	2417.5 – 2436.5 MHz (ISM Ch 4) ⁽⁵⁾	16	19		
	2422.5 – 2441.5 MHz (ISM Ch 5) ⁽⁵⁾	16	19		
	2427.5 – 2446.5 MHz (ISM Ch 6) ⁽⁵⁾	16	19	-	
	2432.5 – 2451.5 MHz (ISM Ch 7) ⁽⁵⁾	16	20		
	2437.5 – 2456.5 MHz (ISM Ch 8) ⁽⁵⁾	17	21		
	2442.5 – 2461.5 MHz (ISM Ch 9) ⁽⁵⁾	18	23		
	2447.5 – 2466.5 MHz (ISM Ch 10) ⁽⁵⁾	22	26		
	2452.5 – 2471.5 MHz (ISM Ch 11) ⁽⁵⁾	24	27		
	2457.5 – 2476.5 MHz (ISM Ch 12) ⁽⁵⁾	20	26		
	2462.5 – 2481.5 MHz (ISM Ch 13) ⁽⁵⁾	17	22		

RF2 to RF3 Isolation (Cell - WiFi)(S23)

Attenuation ⁽⁶⁾	2300 – 2370 MHz	41	49		dB
	2402 – 2482 MHz ⁽⁴⁾	17	19		
	ISM CH 1 – 13 ⁽⁵⁾	17	20		
	2570 – 2690 MHz ⁽⁴⁾	42	45		
	2496 – 2500 MHz	14	28		
	2500 – 2510 MHz	27	44		
	2510 – 2570 MHz	49	53		
	2370 – 2400 MHz	12	16		

Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Electrical Specifications ⁽¹⁾

Operating Temp = 0 to +70 °C, Characteristic Impedance [Z0] = 50 Ω. (Unless otherwise noted)

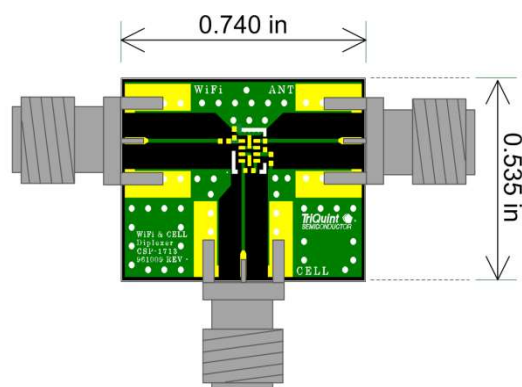
RF1 to RF3 (Ant- WiFi) (S13)

Parameter ⁽³⁾	Conditions	Min	Typ ⁽²⁾	Max	Units
Insertion Loss	2402 – 2480 MHz	-	2.6	3.8	dB
	2402 – 2475.81 MHz ⁽⁴⁾		2.4	3.3	
	2475.81 – 2480 MHz ⁽⁴⁾		2.4	3.8	
	ISM CH 1 – 12 ⁽⁵⁾		1.8	2.2	
	ISM CH 13 ⁽⁵⁾		1.8	2.5	
Amplitude Variation	2402 – 2480 MHz	-	1.5	2.7	dB p-p
	2402 – 2480 MHz (within any 20 MHz)		1.3	2.4	
Attenuation ⁽⁶⁾	10 – 1549 MHz	44	45	-	-
	1549 – 1615 MHz	44	45		
	1710 – 1990 MHz	41	42		
	2110 – 2170 MHz	41	42		
	2300 – 2370 MHz	46	48		
	2496 – 2500 MHz	12	25		
	2500 – 2570 MHz	26	39		
	2570 – 2690 MHz	42	44		
VSWR (In/Out)	2402 – 2480 MHz	1	1.7	2.4	-

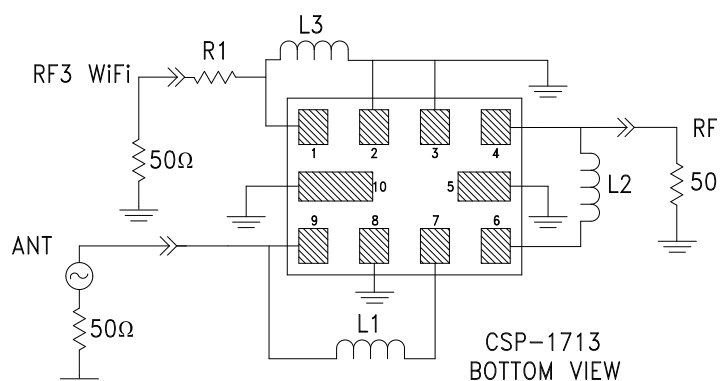
Notes:

1. All specifications are based on the Qorvo schematic for the reference design shown on page 11.
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into design to account the variations due to temperature drift and manufacturing tolerances.
4. Data is the integrated value of the linear s-parameter over a 1 MHz range in the indicated band.
5. Data is the integrated value of the linear s-parameter over 19 MHz range in the indicated band.
6. Reference to zero dB.

Evaluation Board



Schematic



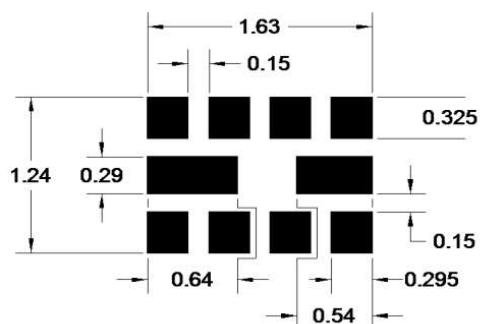
Notes:

- This is the optimum impedance in order to achieve the performance shown.
PCB: 0.75 x 0.75 x 0.063; Construction: 1 OZ Cu Top, Middle and Bottom Layers; Material in between middle and top layer: TLY-5A (.0075); Material in between mid-bottom layers: FR4. (Dimensions are in inches)

Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
U1	n/a	Diplexer	TriQuint	885137
L1	3.2 nH	3.2 nH $\pm$ 0.1 nH; 0201 SMD	Murata	LQP03TN3N2B02
L2	3.6 nH	3.6 nH $\pm$ 0.1 nH; 0201 SMD	Murata	LQP03TN3N6B02
L3	6.2 nH	6.2 nH $\pm$ 3 %; 0201 SMD	Murata	LQP03TN6N2H02
R1	0 Ω	0.0 Ohm 1/20 W jumper; 0201	Panasonic	ERJ1GN0R00C
SMA	N/A	SMA connector	Radiall	9602-1111-018
PCB	n/a	Printed Circuit Board	TriQuint	961009

PCB Mounting Pattern

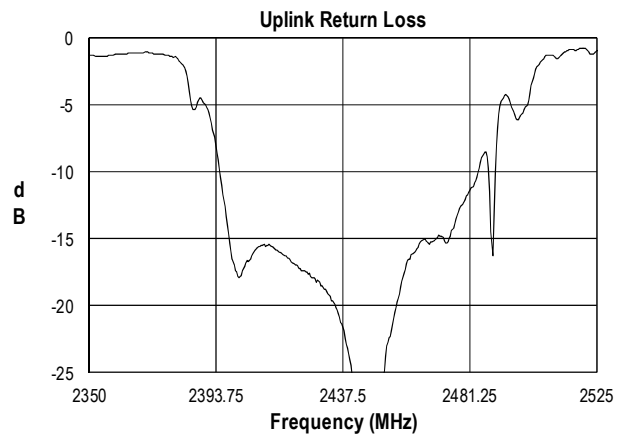
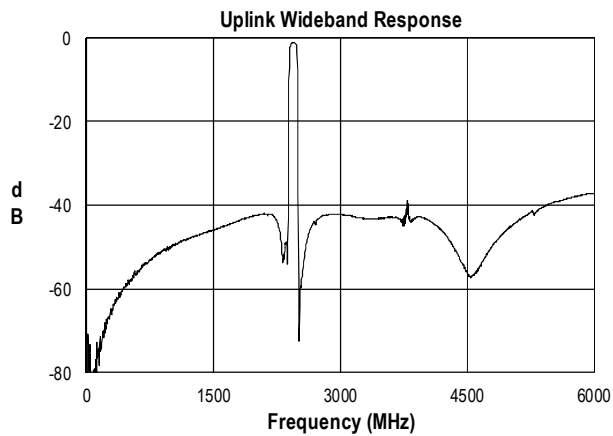
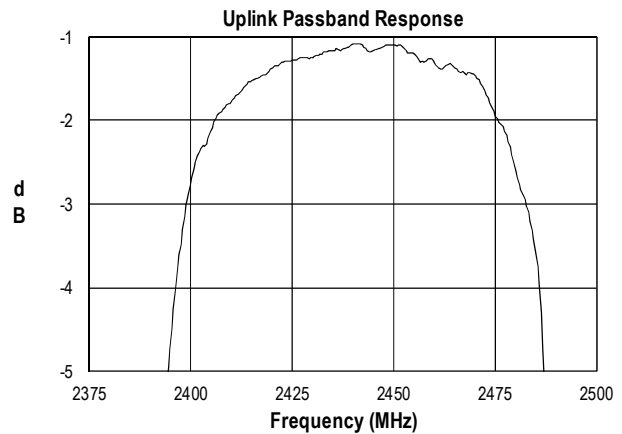
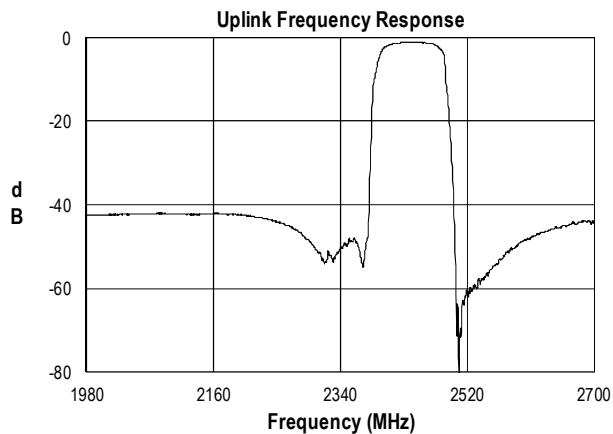


Notes:

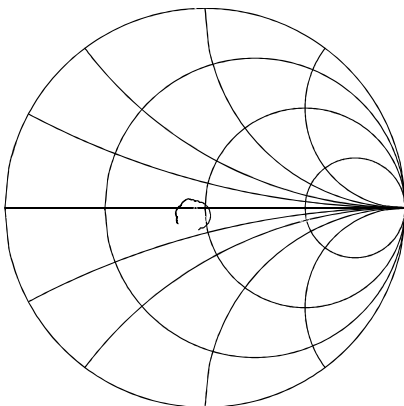
- All dimensions are in millimeters. Angles are in degrees.
- This drawing specifies the mounting pattern used on the TriQuint evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes

Performance Plots – RF1 to RF3 (ANT-WiFi) (S13)

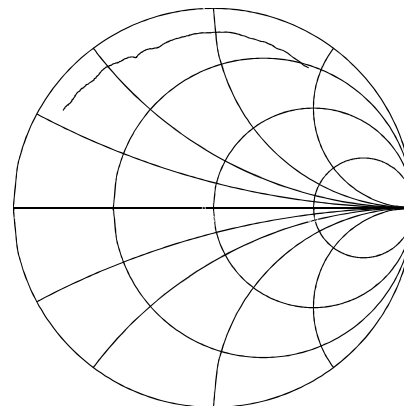
Test conditions unless otherwise noted: Temp= +25 °C



Uplink Path - Antenna Port Impedance

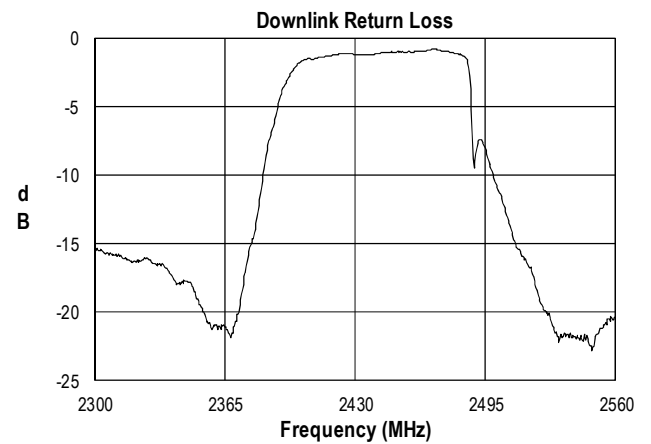
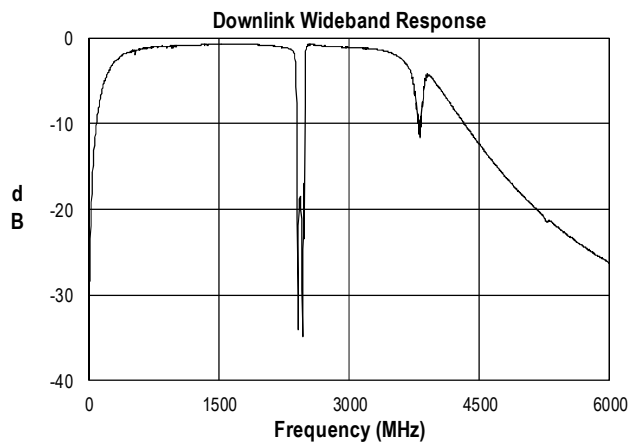
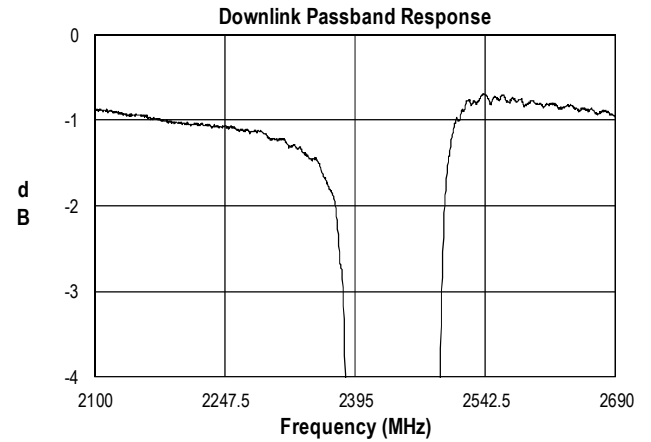
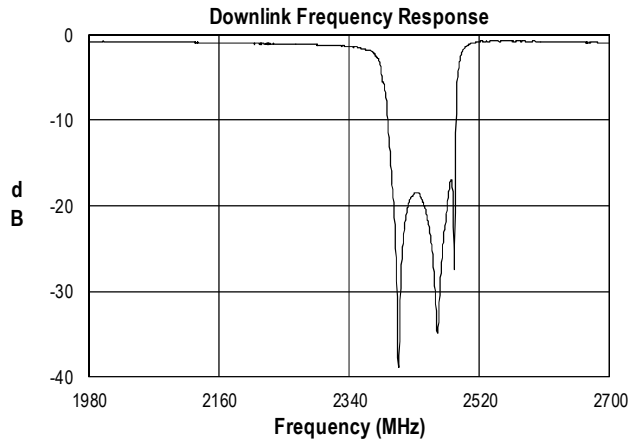


Uplink Port Impedance

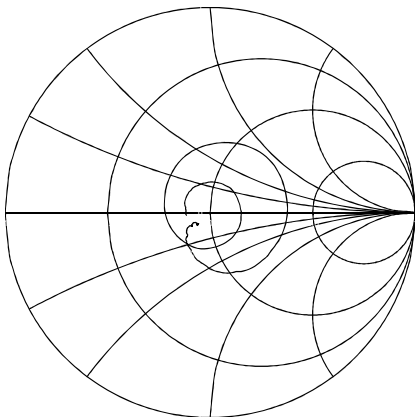


Performance Plots- RF1 to RF2 (ANT- Cell) (S12)

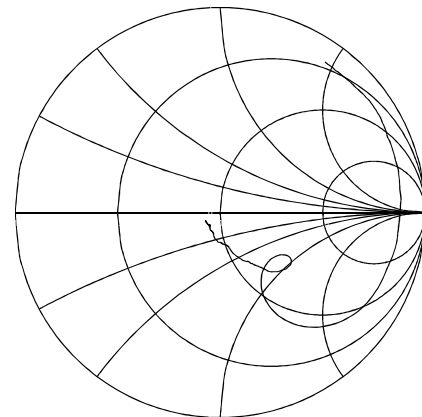
Test conditions unless otherwise noted: Temp= +25 °C



Downlink Path - Antenna Port Impedance

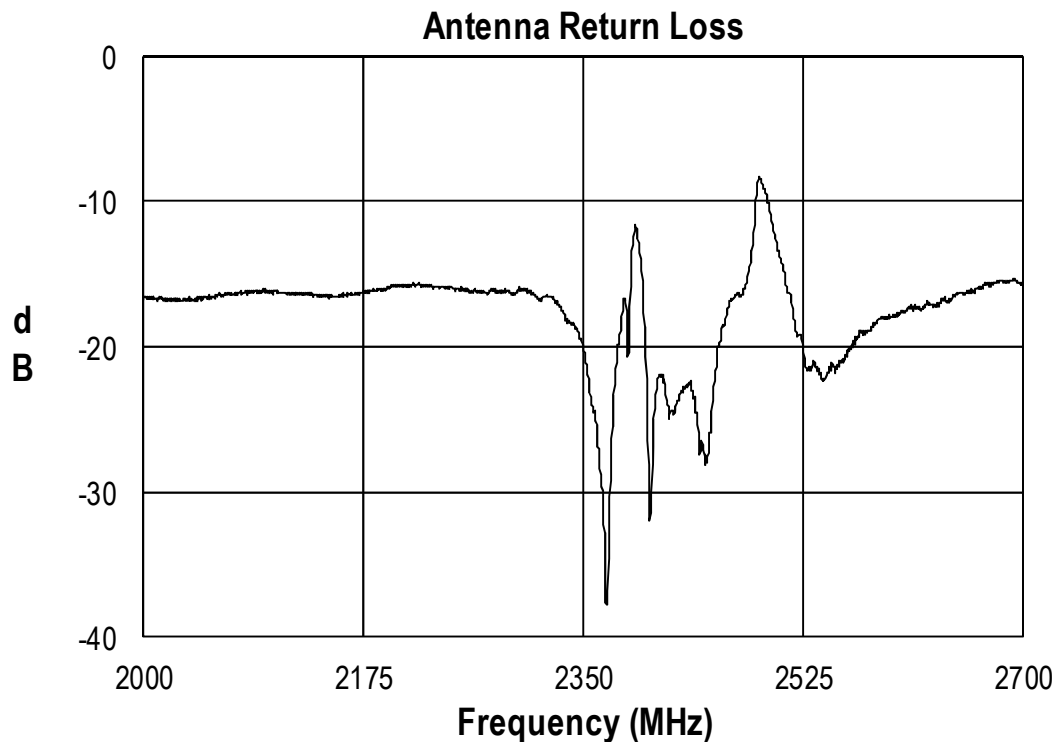
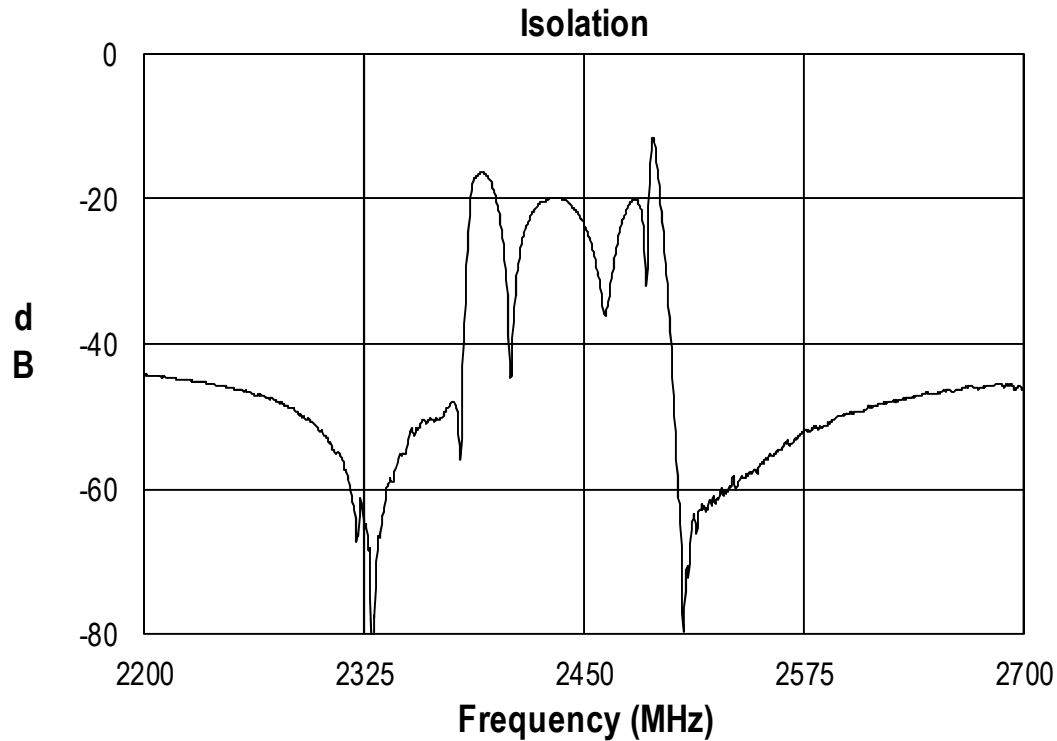


Downlink Port Impedance

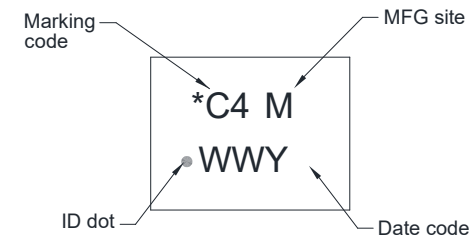


Performance Plots - RF2 to RF3 (Cell - WiFi) (S23)

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



Package Information, Marking and Dimensions

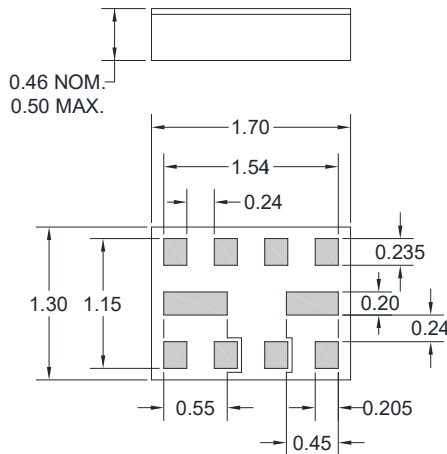


Package Style: CSP-1713
Dimensions: 1.7 x 1.3 x 0.50 mm

Package for Surface Mount Technology
Terminations: Au plating 0.5 - 1.0 μm , over a 2-6 μm Ni Plating
Approximate weight 3.96 mg

All dimensions shown are nominal in millimeters.
Unless otherwise specified all tolerances are $\pm 0.05\text{mm}$ except length and width that are specified as $\pm 0.1\text{mm}$

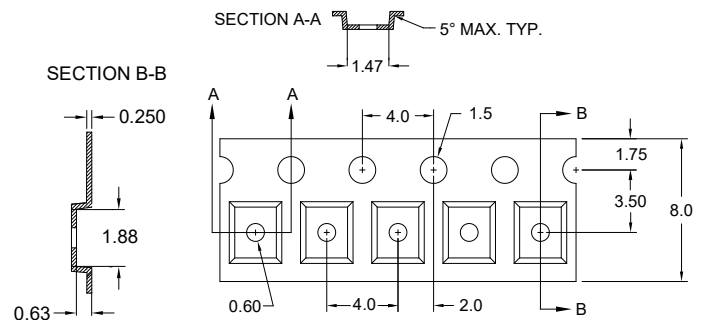
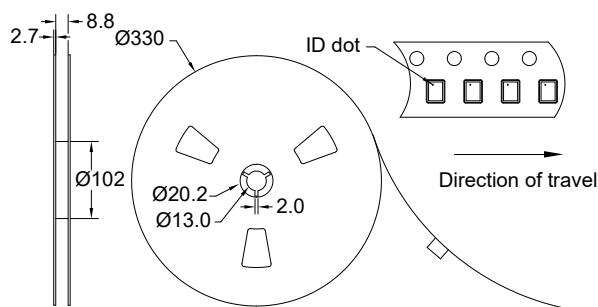
The Marking Code is correlated with the Part Number
M=Manufacturing Site Code (Blank for Apopka, C for Costa Rica)
The Date Code consists of:
WW = 2 digit week
Y=The last digit of the year



- Notes:
1. All dimensions shown are typical in millimeters
 2. An asterisk (*) in front of the marking code indicates prototype.

Tape and Reel information

Standard T/R size = 15,000 units/reel. All dimensions are in millimeters



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	ESDA / JEDEC JS-001
ESD – Machine Model (MM)	Class B	JEDEC Standard JESD22-A115
MSL – Moisture Sensitivity Level	Not applicable. Hermetic package	



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.

Refer to [Soldering Profile](#) for recommended guidelines

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
- Qorvo Green



Contact Information

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

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QPQ1903

Wi-Fi UNII1-2a bandBoost Filter

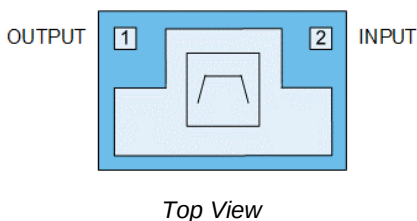
Product Overview

The Qorvo® QPQ1903 is an high-performance, high power, Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi UNII1-2a band and high near-in rejection in the UNII2c-3 band.

The filter module is specifically designed to enable industry leading capacity performance in Wi-Fi applications that result in higher power capability in more Wi-Fi channels than systems with no or traditional filter solutions. End users will see a better capability to deliver features that take advantage of sub-banding the 5GHz Wi-Fi spectrum in use cases such as tri-radio Wi-Fi mesh applications.

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits.

Functional Block Diagram



Top View



3 Pad 1.7 x 1.1 mm Laminate Package

Key Features

- 5170-5330 MHz
- Low Insertion Loss in Wi-Fi UNII1-2a bands
- High Rejection in Wi-Fi UNII2c-3 bands
- Extended temperature performance from -20 to +95 °C
- High power handling to +28dBm averaged Input Power
- Integrated match

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Ordering Information

Part Number	Description
QPQ1903SB	Sample bag with 5 pieces
QPQ1903SR	7" reel with 100 pieces
QPQ1903TR13	13" reel with 10,000 pieces
QPQ1903EVB	Assembled Evaluation Board

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B (500V)	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (1000V)	ANSI/ESD/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: Bussed Ni/Au

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

Contact Information

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

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Email: customer.support@qorvo.com

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QPQ1904

Wi-Fi bandBoost BAW Filter

Product Overview

The Qorvo® QPQ1904 is an high-performance, high power, Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi UNII2c-3 band and high near-in rejection in the UNII1-2a band.

The filter module is specifically designed to enable industry leading capacity performance in Wi-Fi applications that result in higher power capability in more Wi-Fi channels than systems with no or traditional filter solutions. End users will see a better capability to deliver features that take advantage of sub-banding the 5GHz Wi-Fi spectrum in use cases such as tri-radio Wi-Fi mesh applications.

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits



3 Pad 1.7x1.1mm Laminate Package

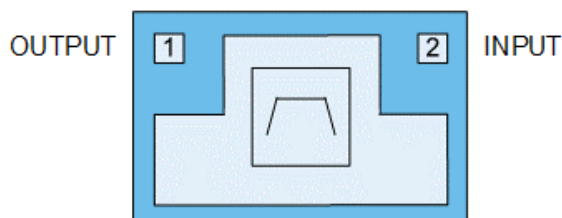
Key Features

- 5490-5835 MHz
- Low Insertion Loss in Wi-Fi UNII2c-3 bands
- High rejection in Wi-Fi UNII1-2a bands
- Extended temperature performance from -20 to +95 °C
- High power handling to +28dBm averaged Input Power

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Functional Block Diagram



Top View

Ordering Information

Part Number	Description
QPQ1904SB	Sample bag with 5 pieces
QPQ1904SR	7" reel with 100 pieces
QPQ1904TR13	13" reel with 10,000 pieces
QPQ1904EVB01	Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Conditions	Rating
Operating Case Temperature	No damage	-40 to 125 °C
Storage Temperature		-40 to 125 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device.

Minimum Lifetime Ratings

Parameter	Conditions	Rating
Power Handling MTTF >1M hours, +95°C	HT20 802.11n MCS0 signal, 10dB PAR, applied to Pin 2	+28 dBm

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T _{OPERATING} *	-20		+95	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions. * T_{OPERATING} is temperature at the package ground

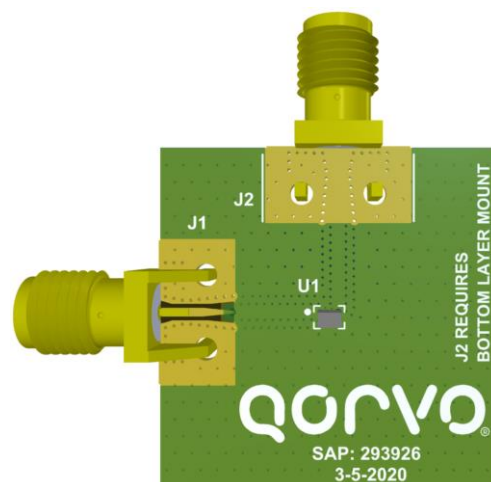
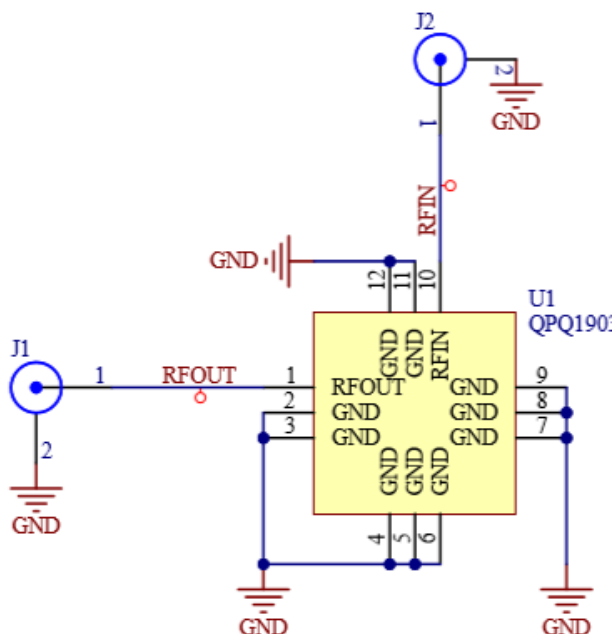
Electrical Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
(INPUT-OUTPUT) ⁽¹⁾⁽²⁾	Unless otherwise noted: Typ. T = 25°C				
Insertion Loss ⁽³⁾	f = 5490-5835 MHz	-	1.6	2.0	dB
Amplitude Variation	f = 5490-5835 MHz (20MHz BW Channel)	-	0.47	0.76	dB
	f = 5490-5835 MHz (40MHz BW Channel)	-	0.82	1.3	dB
	f = 5490-5835 MHz (80MHz BW Channel)	-	1.19	1.8	dB
	f = 5490-5835 MHz (160MHz BW Channel)	-	1.36	2.1	dB
Rejection	f = 30-2400 MHz	30	34		dB
	f = 2400-2500 MHz	30	34		dB
	f = 2400-3000 MHz	29	34		dB
	f = 3400-3800 MHz	29	34		dB
	f = 3800-4900 MHz	29	34		dB
	f = 5170-5330 MHz	55	59		dB
	f = 7200-7500 MHz	40	50		dB
	f = 10300-11800 MHz	30	46		dB
INPUT VSWR	f = 5490-5835 MHz		1.6:1		Mag
OUTPUT VSWR	f = 5490-5835 MHz		1.6:1		Mag
2 nd and 3 rd Harmonics	P _{IN} = +28 dBm		-55		dBm/MHz
	P _{IN} = +30 dBm		-55		dBm/MHz

Notes:

- 1) All specifications are based on the QPQ1904 Applications Circuit
- 2) Pin 2 must be used for input. The large signal performance of this filter, such as power handling, may not be symmetric.
- 3) Integrated IL referenced to 0dB. 345MHz bandwidth

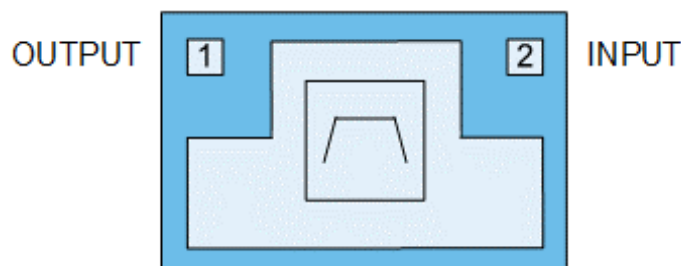
Evaluation Board Schematic



Bill of Material

Ref. Des.	Value	Description	Manuf.	Part number
-	-	Printed Circuit Board		
U1	-	Wi-Fi BAW Filter	Qorvo	QPQ1904

Pin Configuration and Description

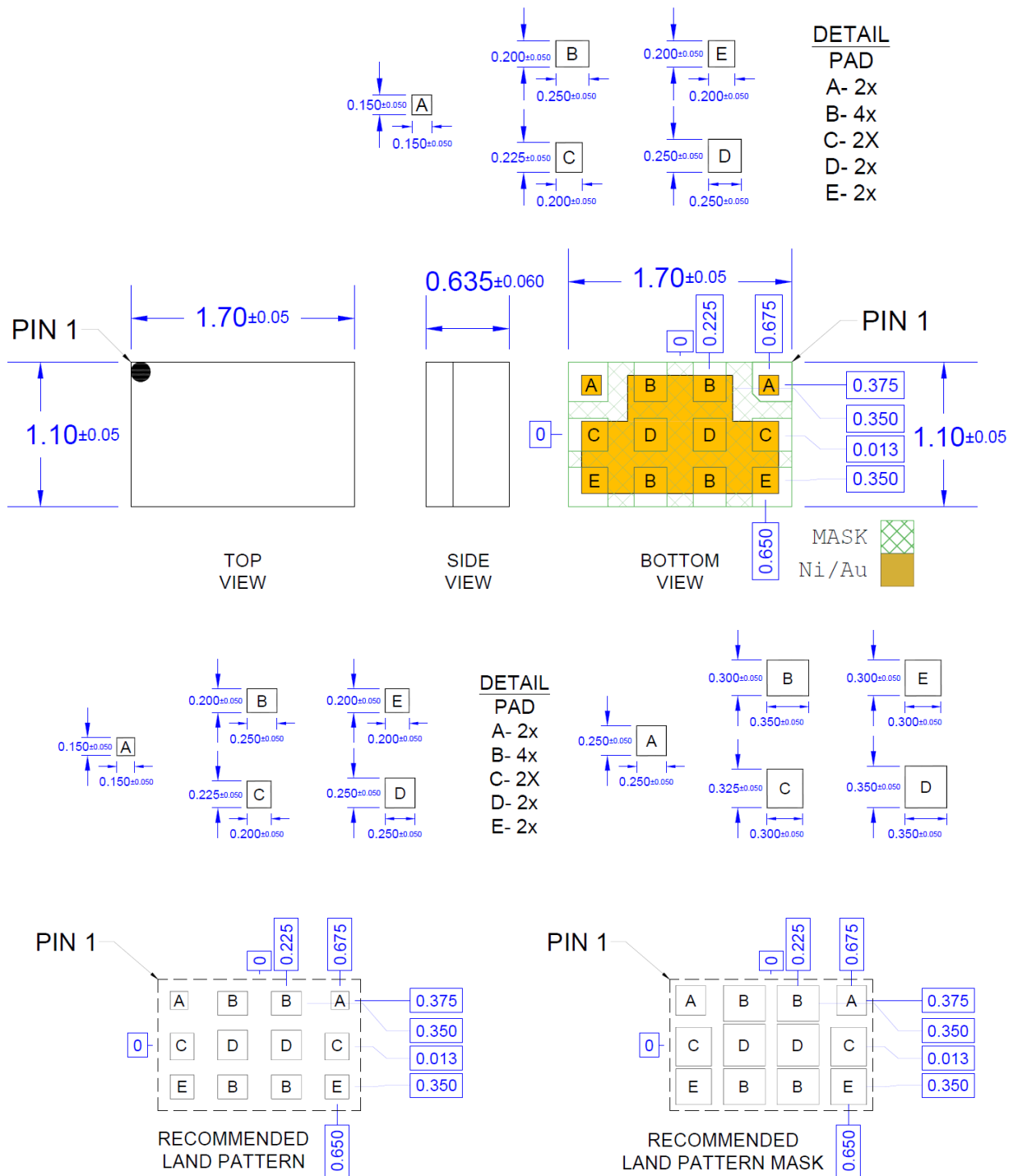


Top View

Pin Number	Label	Description
1	OUTPUT	RF output. Internally matched to 50 Ω .
2	INPUT	RF input. Internally matched to 50 Ω .
-	GND	Ground connection.

Mechanical Information

Dimensions and PCB Mounting Pattern



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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	TBD	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	TBD	ANSI/ESD/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: Bussed Ni/Au

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



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QPQ1905

Wi-Fi/IoT bandBoost Filter

Product Overview

The Qorvo® QPQ1905 is an high-performance, high power, Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi band (Channels 1-2) and high near-in rejection in the 2.4GHz higher frequency channels.

The filter module is specifically designed to enable unique use cases where sub-dividing usable channels within the available Wi-Fi spectrum becomes an advantage. End users will see a capability to deliver Wi-Fi in channels 1 or 2 while providing rejection in higher frequencies to allow simultaneous use of Wi-Fi, Zigbee, Thread or BLE channels.

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits



2 Pad 1.6x2.0mm Laminate Package

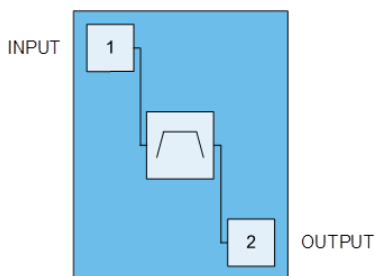
Key Features

- 2402-2427 MHz
- Low Insertion Loss in Wi-Fi Channels 1-2
- High rejection in the lower band Wi-Fi (CH10-11), Zigbee, Thread or Bluetooth channels. Extended temperature performance from 0 to +90 °C
- High power handling to +28dBm averaged Input Power

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Functional Block Diagram



Top View

Ordering Information

Part Number	Description
QPQ1905SB	Sample bag with 5 pieces
QPQ1905SR	7" reel with 100 pieces
QPQ1905TR13	13" reel with 10,000 pieces
QPQ1905EVB-01	Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Conditions	Rating
Operating Case Temperature	No damage	-40 to 105 °C
Storage Temperature		-40 to 125 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device.

Minimum Lifetime Ratings

Parameter	Conditions	Rating
MTTF >1M hours, +90°C	802.11n MCS0 signal, 10dB PAR, applied to Pin 1	+28 dBm

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T _{OPERATING} *	0		+90	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions. * T_{OPERATING} is temperature at the package ground

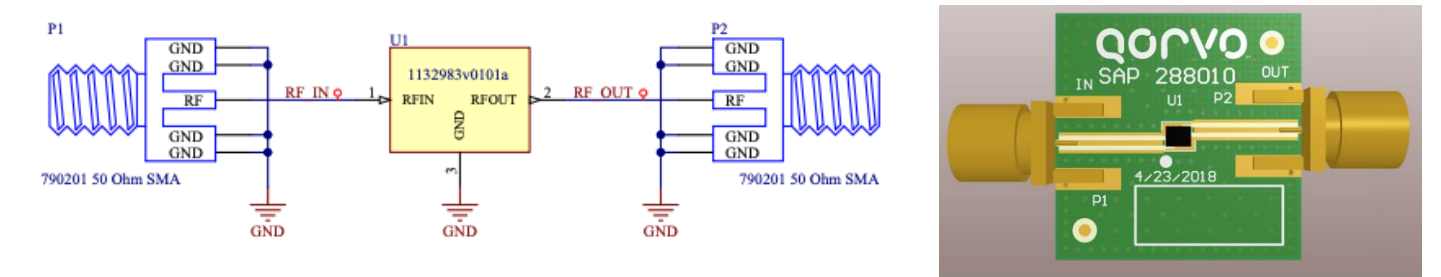
Electrical Specifications

Parameter (INPUT-OUTPUT) ⁽¹⁾⁽⁵⁾	Conditions	Min.	Typ.	Max.	Units
Unless otherwise noted: Typ. T = 45°C					
Insertion Loss ⁽²⁾	f = 2402.5-2421.5 MHz (CH1)	-	1.0	2.6	dB
	f = 2407.5-2426.5 MHz (CH2)	-	1.1	3.6	dB
Amplitude Variation	f = 2402.5-2421.5 MHz (CH1)	-	0.3	1.0	dB
	f = 2407.5-2426.5 MHz (CH2)	-	0.7	2.0	dB
INPUT VSWR	f = 2402.5-2421.5 MHz (CH1)		1.2:1	1.9:1	
	f = 2407.5-2426.5 MHz (CH2)		1.3:1	1.9:1	
OUTPUT VSWR	f = 2402.5-2421.5 MHz (CH1)		1.2:1	1.9:1	
	f = 2407.5-2426.5 MHz (CH2)		1.3:1	1.9:1	
INPUT Return Loss	f = 2402.5-2421.5 MHz (CH1)		19.6		dB
	f = 2407.5-2426.5 MHz (CH2)		18.7		dB
OUTPUT Return Loss	f = 2402.5-2421.5 MHz (CH1)		21.5		dB
	f = 2407.5-2426.5 MHz (CH2)		19.2		dB
Attenuation	f = 2447.5 – 2466.5 MHz (CH10) ⁽³⁾⁽⁴⁾	49	60	-	dB
	f = 2452.5 – 2471,5 MHz (CH11) ⁽³⁾⁽⁴⁾	48	59	-	dB

Notes:

- 1) All specifications are based on the QPQ1905 Applications Circuit
- 2) Data is the integrated value of the linear s-parameter over 19 MHz channel
- 3) Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature
- 4) T = +25 to +65°C
- 5) Pin 1 must be used for input. The large signal performance of this filter, such as power handling, may not be symmetric.

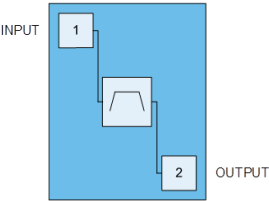
Evaluation Board Schematic



Bill of Material

Ref. Des.	Value	Description	Manuf.	Part number
-	-	Printed Circuit Board		
U1	-	Wi-Fi Bandedge BAW Filter	Qorvo	QPQ1905

Pin Configuration and Description

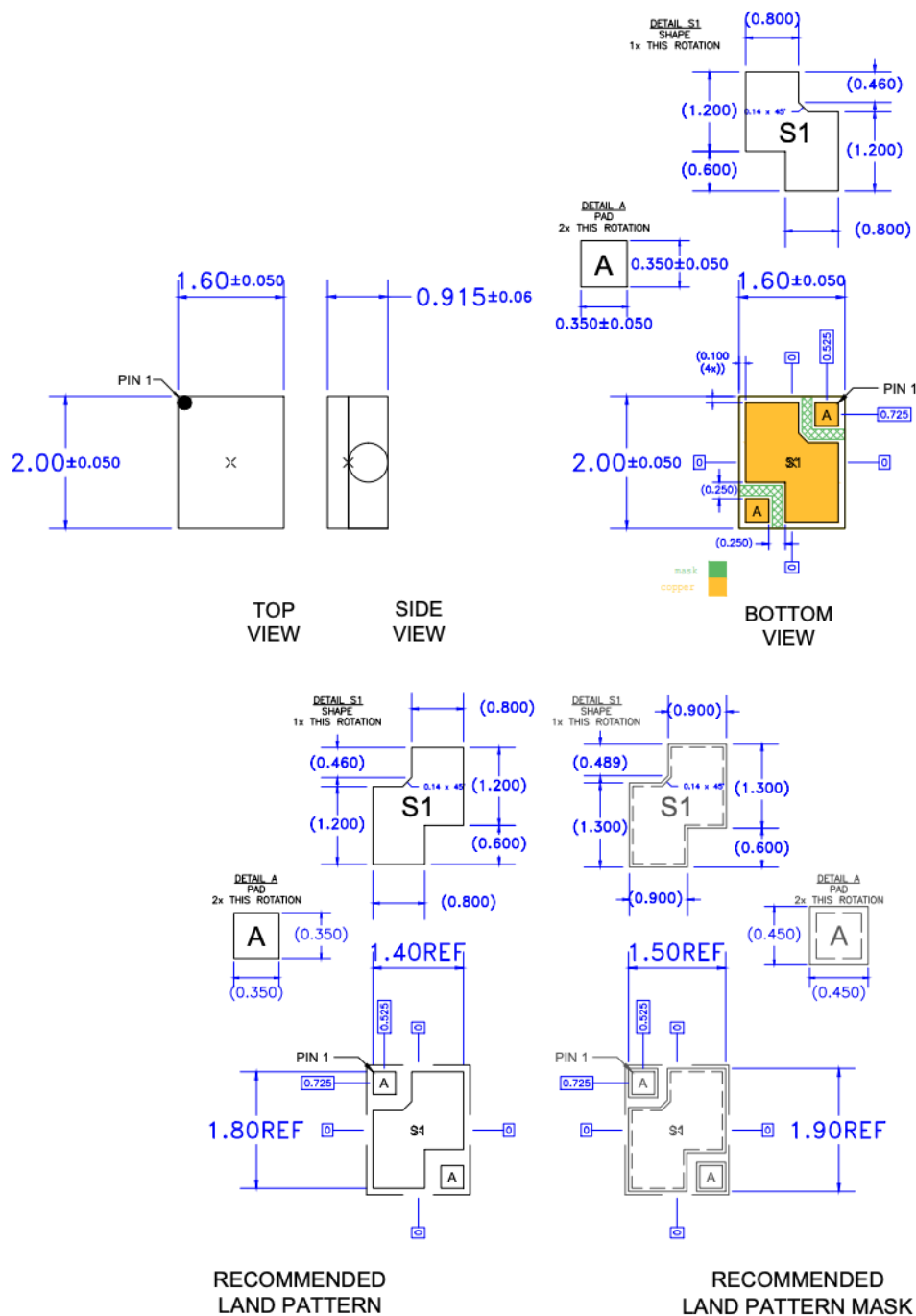


Top View

Pin Number	Label	Description
1	INPUT	RF input. Internally matched to 50 Ω.
2	OUTPUT	RF bi-directional port. Internally matched to 50 Ω
Backside Paddle	-	Ground connection.

Mechanical Information

Dimensions and PCB Mounting Pattern



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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B (500V)	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (1000V)	ANSI/ESD/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: Electrolytic 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



Contact Information

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QPQ1906

Wi-Fi/IoT bandBoost Filter

Product Overview

The Qorvo® QPQ1906 is an high-performance, high power, Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi band (Channels 10-11) and high near-in rejection in the 2.4GHz lower frequency channels.

The filter module is specifically designed to enable unique use cases where sub-dividing usable channels within the available Wi-Fi spectrum becomes an advantage. End users will see a capability to deliver Wi-Fi in channels 10 or 11 while providing rejection in lower frequency channels to allow simultaneous use of Wi-Fi, Zigbee, Thread or BLE channels.

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits



2 Pad 1.6x2.0mm Laminate Package

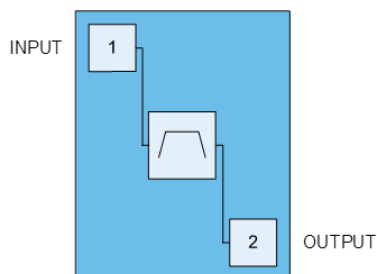
Key Features

- 2447-2472 MHz
- Low Insertion Loss in Wi-Fi Channels 10-11
- High rejection in the lower band Wi-Fi (CH1-2), Zigbee, Thread or Bluetooth channels.
- Extended temperature performance from 0 to +90 °C
- High power handling to +28dBm averaged Input Power

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Functional Block Diagram



Top View

Ordering Information

Part Number	Description
QPQ1906SB	Sample bag with 5 pieces
QPQ1906SR	7" reel with 100 pieces
QPQ1906TR13	13" reel with 10,000 pieces
QPQ1906EVB-01	Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Conditions	Rating
Operating Case Temperature	No damage	-40 to 105 °C
Storage Temperature		-40 to 125 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device.

Minimum Lifetime Ratings

Parameter	Conditions	Rating
MTTF >1M hours, +90°C	802.11n MCS0 signal, 10dB PAR, applied to Pin 1	+28 dBm

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T _{OPERATING} *	0		+90	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions. * T_{OPERATING} is temperature at the package ground

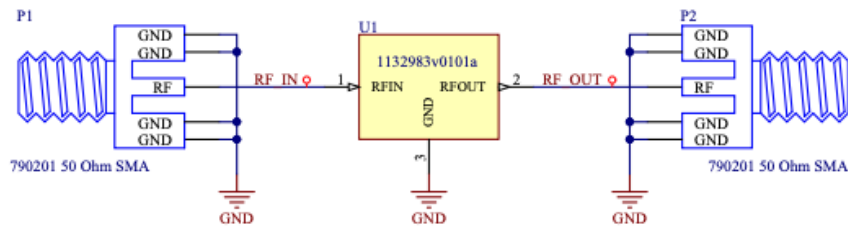
Electrical Specifications

Parameter (INPUT-OUTPUT) ⁽¹⁾⁽⁵⁾	Conditions	Min.	Typ.	Max.	Units
Unless otherwise noted: Typ. T = 45°C					
Insertion Loss ⁽²⁾	f = 2447.5-2466.5 MHz (CH10)	-	1.2	2.6	dB
	f = 2452.5-2471.5 MHz (CH11)	-	1.1	1.9	dB
Amplitude Variation	f = 2447.5-2466.5 MHz (CH10)	-	0.8	1.5	dB
	f = 2452.5-2471.5 MHz (CH11)	-	0.4	1.1	dB
INPUT VSWR	f = 2447.5-2466.5 MHz (CH10)		1.5:1	2:1	
	f = 2452.5-2471.5 MHz (CH11)		1.7:1	2:1	
OUTPUT VSWR	f = 2447.5-2466.5 MHz (CH10)		1.5:1	2.2:1	
	f = 2452.5-2471.5 MHz (CH11)		1.5:1	2:1	
INPUT Return Loss	f = 2447.5-2466.5 MHz (CH10)		13		dB
	f = 2452.5-2471.5 MHz (CH11)		11		dB
OUTPUT Return Loss	f = 2447.5-2466.5 MHz (CH10)		14		dB
	f = 2452.5-2471.5 MHz (CH11)		14		dB
Attenuation	f = 2402.5-2421.5 MHz (CH1) ⁽³⁾⁽⁴⁾	48	58	-	dB
	f = 2407.5-2426.5 MHz (CH2) ⁽³⁾⁽⁴⁾	50	57	-	dB

Notes:

- 1) All specifications are based on the QPQ1906 Applications Circuit
- 2) Data is the integrated value of the linear s-parameter over 19 MHz channel
- 3) Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature
- 4) T = +25 to +65°C
- 5) Pin 1 must be used for input. The large signal performance of this filter, such as power handling, may not be symmetric.

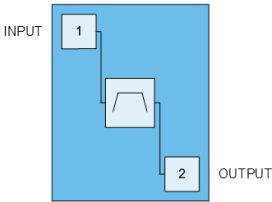
Evaluation Board Schematic



Bill of Material

Ref. Des.	Value	Description	Manuf.	Part number
-	-	Printed Circuit Board		
U1	-	Wi-Fi Bandedge BAW Filter	Qorvo	QPQ1906

Pin Configuration and Description

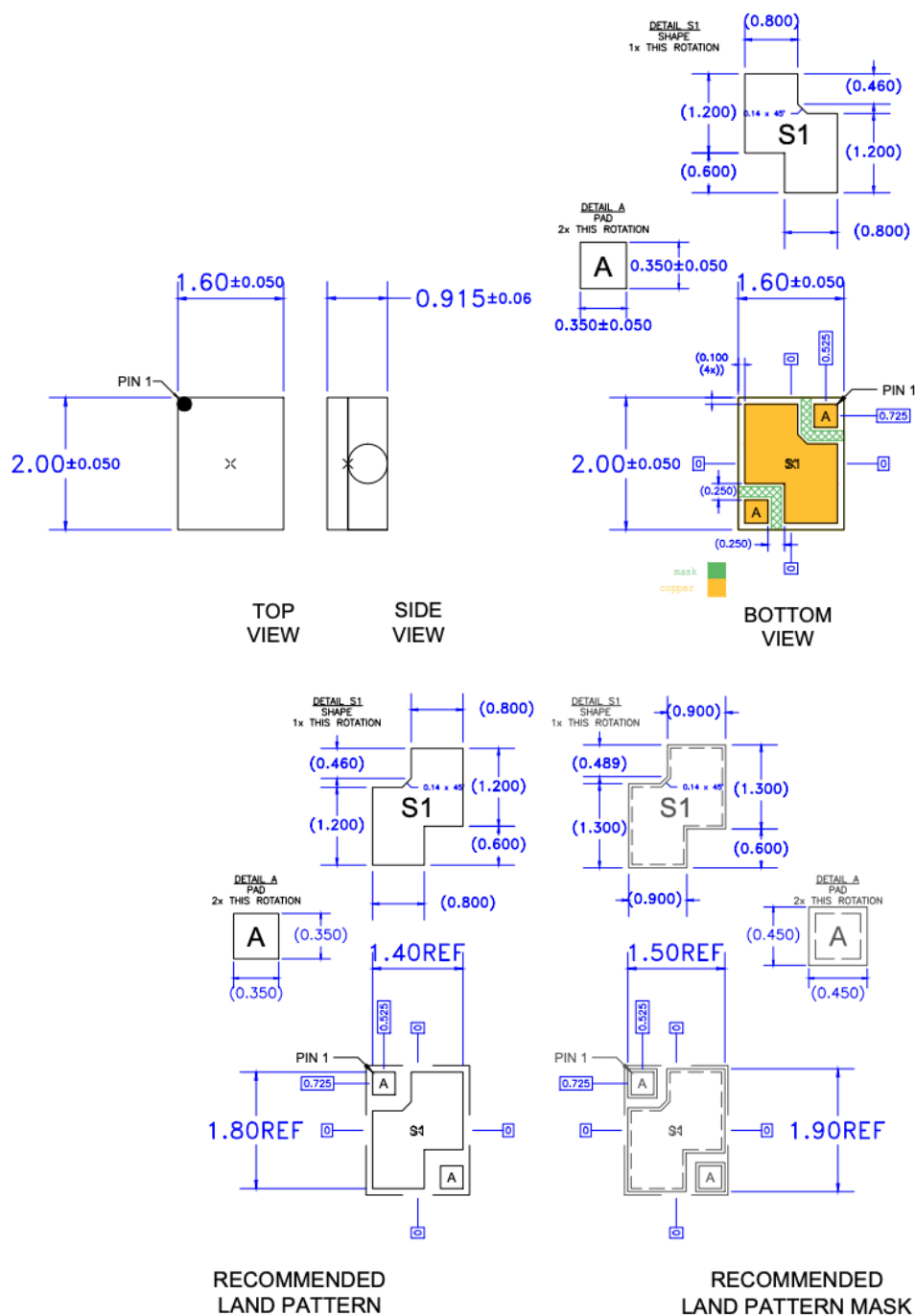


Top View

Pin Number	Label	Description
1	INPUT	RF input. Internally matched to 50 Ω.
2	OUTPUT	RF bi-directional port. Internally matched to 50 Ω
Backside Paddle	-	Ground connection.

Mechanical Information

Dimensions and PCB Mounting Pattern



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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1C (1000V)	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (1000V)	ANSI/ESD/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: Electroless Ni/Electroless Pd/Immersion Au (ENEPIG)

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



Contact Information

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QPQ1907

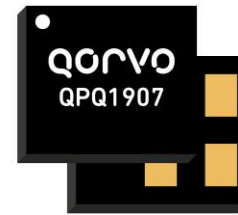
Wi-Fi/LTE coexBoost BAW Filter

Product Overview

The QPQ1907 is a high-performance, high power Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi band and high near-in rejection in the 2.6GHz bands.

QPQ1907 is specifically designed to enable coexistence of Wi-Fi and LTE signals within the same device or in close proximity to one another..

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits

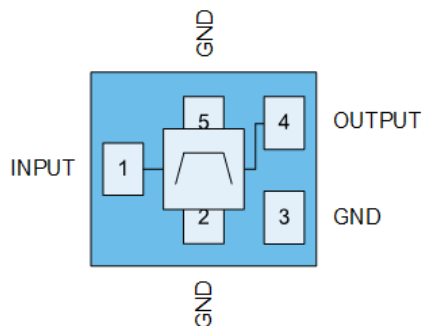


5 Pad 1.4 x 1.2 mm Laminate Package

Key Features

- 2447-2472 MHz
- Low loss in Wi-Fi band with extended upper corner for inclusion of Bluetooth
- High Rejection in LTE bands especially B7/B41
- Extended Temperature performance over -20 to +95 °C
- Self matched to Single Ended 50Ohm operation
- High power handling to +28dBm averaged Input Power

Functional Block Diagram



Top View

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Ordering Information

Part Number	Description
QPQ1907SB	Sample bag with 5 pieces
QPQ1907SR	7" reel with 100 pieces
QPQ1907TR13-10K	13" reel with 10,000 pieces
QPQ1907EVB-01	Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Conditions	Rating
Operating Case Temperature	No damage	-40 to 105 °C
Storage Temperature		-40 to 125 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device.

Minimum Lifetime Ratings

Parameter	Conditions	Rating
MTTF >1M hours, +95°C	802.11n MCS7 OFDM signal, 10dB PAR, applied to Pin 1	+28 dBm

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T _{OPERATING} *	-20		+95	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions. * T_{OPERATING} is temperature at the package ground

Electrical Specifications

Parameter (INPUT-OUTPUT) ⁽¹⁾	Conditions	Min.	Typ.	Max.	Units
Unless otherwise noted: Typ. T = 35°C					
Insertion Loss ⁽²⁾	f = 2402.5-2421.5 MHz (CH1)	-	1.5	2.2	dB
	f = 2407.5-2426.5 MHz (CH2)	-	1.3	1.6	dB
	f = 2412.5-2471.5 MHz (CH3-11)	-	0.8	1.3	dB
	f = 2457.5-2476.5 MHz (CH12)	-	1.0	1.5	dB
	f = 2462.5-2481.5 MHz (CH13)	-	1.4	2.2	dB
Amplitude Ripple	f = 2402.5-2421.5 MHz (CH1)	-	0.7	1.5	dB
	f = 2407.5-2426.5 MHz (CH2)	-	0.4	0.7	dB
	f = 2412.5-2471.5 MHz (CH3-11)	-	0.4	1.1	dB
	f = 2457.5-2476.5 MHz (CH12)	-	0.4	0.7	dB
	f = 2462.5-2481.5 MHz (CH13)	-	0.7	1.5	dB
INPUT VSWR	f = 2402.5-2481.5 MHz		1.5:1	1.8:1	dB
OUTPUT VSWR	f = 2402.5-2481.5 MHz		1.5:1	2.0:1	dB
Attenuation	f = 925-960 MHz	34	36	-	dB
	f = 1559-1606 MHz	34	46	-	dB
	f = 2110-2170 MHz	44	48	-	dB
	f = 2300-2370 MHz ⁽³⁾	38	45	-	dB
	f = 2500-2505 MHz ⁽³⁾⁽⁴⁾	30	39	-	dB
	f = 2500-2505 MHz ⁽³⁾⁽⁵⁾	10	39	-	dB
	f = 2505-2570 MHz ⁽³⁾⁽⁴⁾	43	62	-	dB
	f = 2505-2570 MHz ⁽³⁾⁽⁵⁾	40	62	-	dB
	f = 2570-2620 MHz ⁽³⁾	48	55	-	dB
	f = 2620-2690 MHz ⁽³⁾	48	52	-	dB

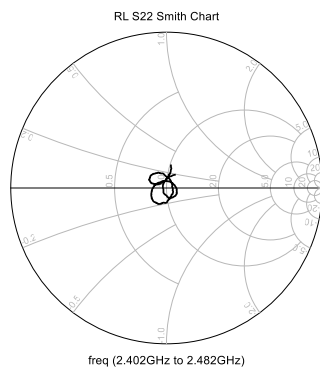
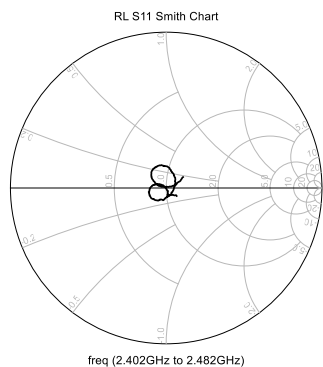
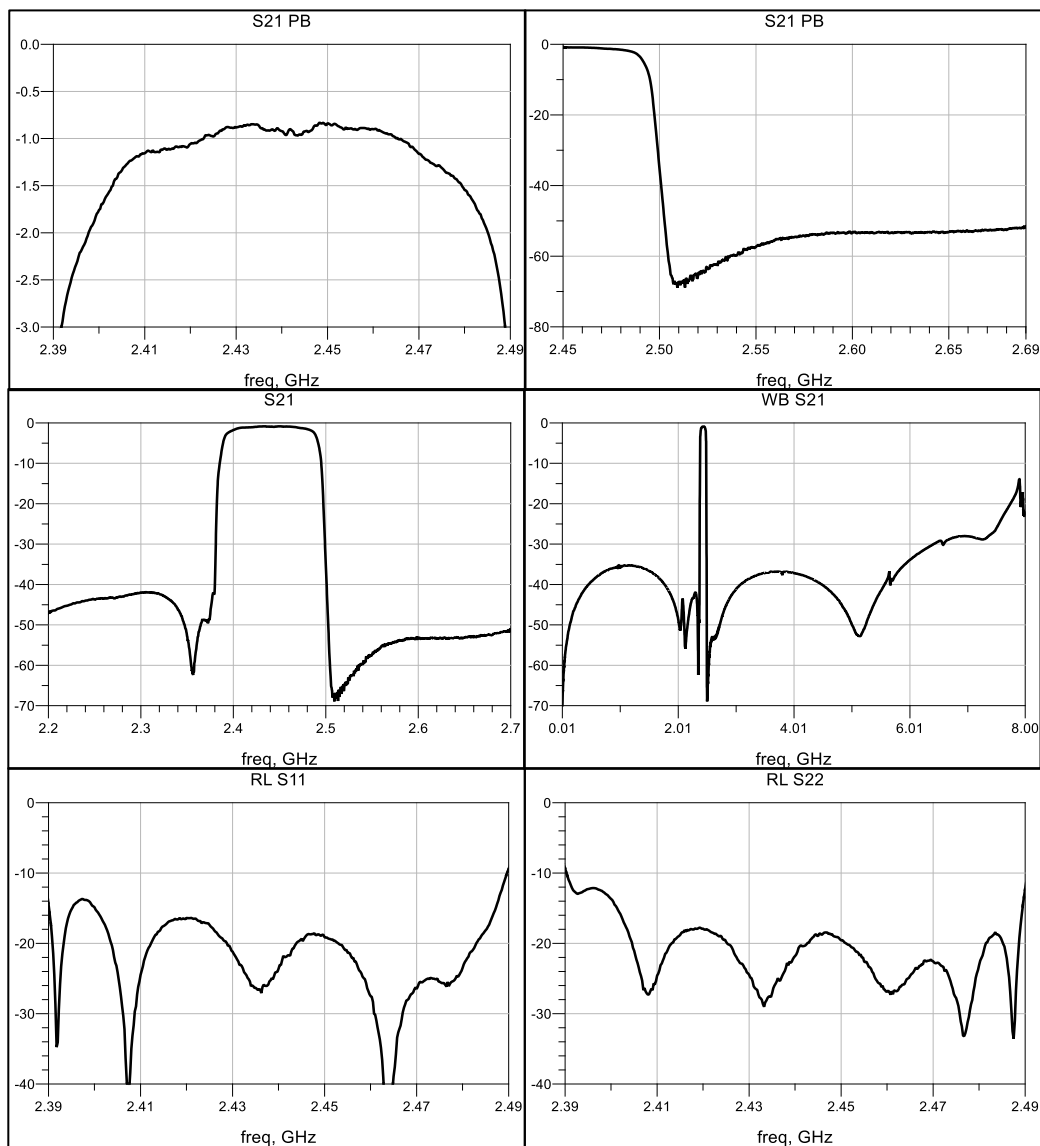
Parameter	Conditions	Min.	Typ.	Max.	Units
	$f = 4800\text{--}5000\text{ MHz}$	37	43	-	dB
	$f = 7200\text{--}7500\text{ MHz}$	7	21	-	dB

Notes:

- 1) All specifications are based on the QPQ1907 Applications Circuit
- 2) Data is the integrated value of the linear s-parameter over 19 MHz channel
- 3) Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature
- 4) $T = +25\text{ to }+95^{\circ}\text{C}$
- 5) $T = -20\text{ to }+25^{\circ}\text{C}$
- 6) Pin 1 must be used for input. The large signal performance of this filter, such as power handling, may not be symmetric.

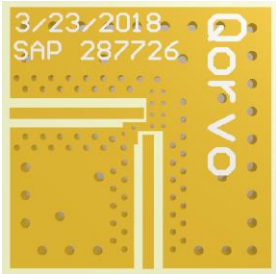
Performance Plots – QPQ1907EVB-01

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





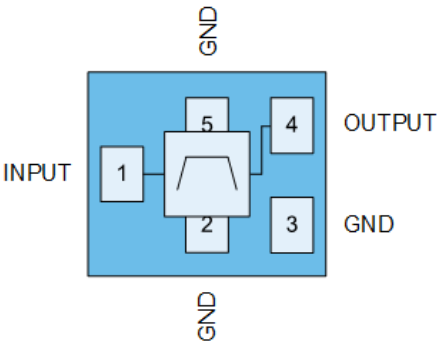
Evaluation Board



Bill of Material

Ref. Des.	Value	Description	Manuf.	Part number
-	-	Printed Circuit Board		
U1	-	Wi-Fi/LTE coexBoost BAW Filter	Qorvo	QPQ1907

Pin Configuration and Description

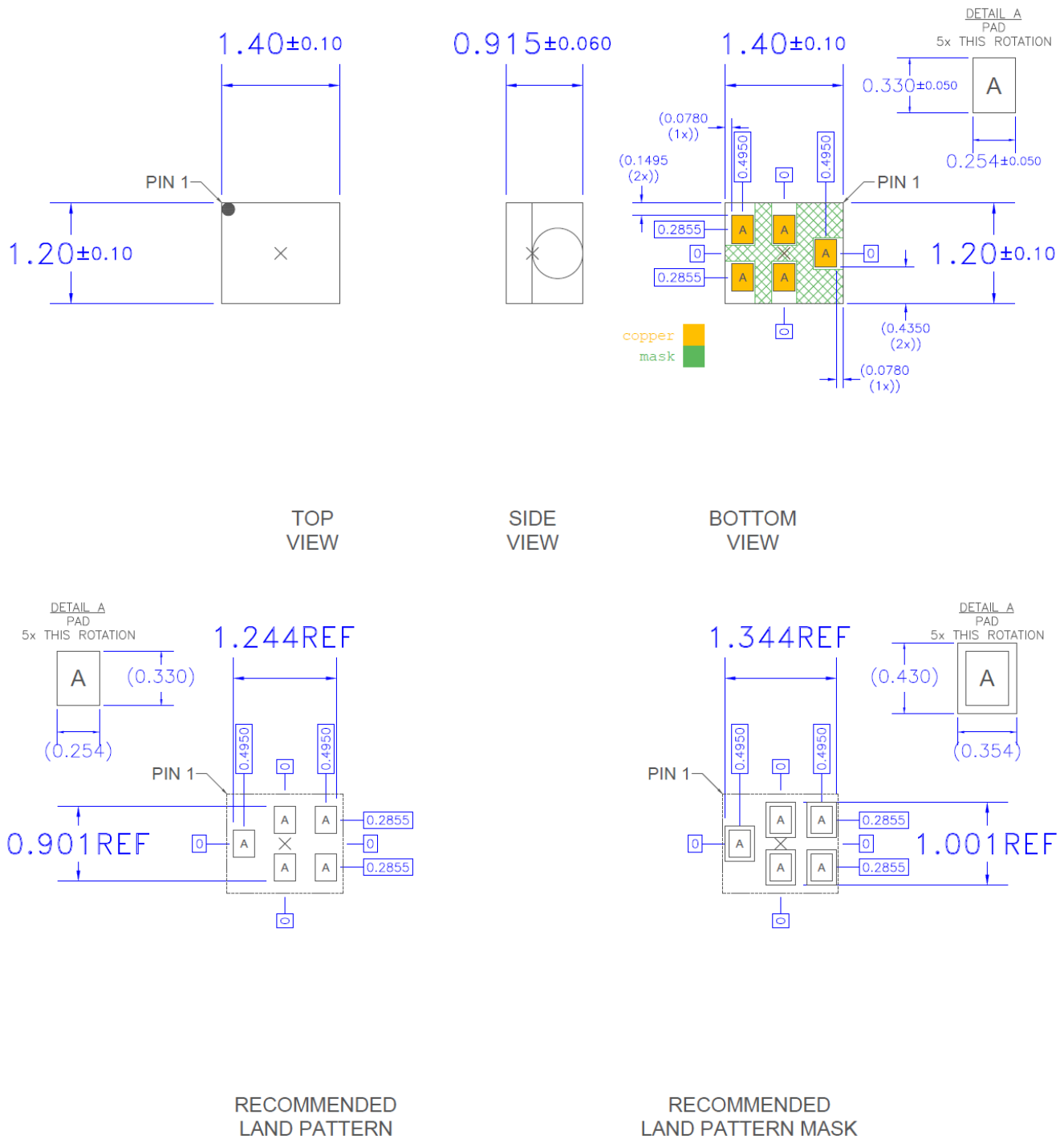


Top View

Pin Number	Label	Description
1	INPUT	RF input. Internally matched to 50 Ω.
2	GND	Ground connection.
3	GND	Ground connection.
4	OUTPUT	RF bi-directional port. Internally matched to 50 Ω
5	GND	Ground connection.

Mechanical Information

Dimensions and PCB Mounting Pattern



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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B (500V)	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (1000V)	ANSI/ESD/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: Au (0.5-1.0µm) over Ni (2- 6µm)

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



Contact Information

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

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QPQ1909

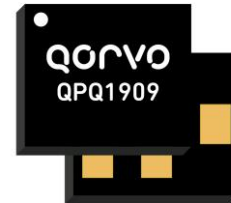
Wi-Fi edgeBoost BAW Filter

Product Overview

The Qorvo® QPQ1909 is an high-performance, high power, Bulk Acoustic Wave (BAW) band-pass filter with extremely steep skirts, simultaneously exhibiting low loss in the Wi-Fi band (Channels 1-14) and high near-in rejection in the 2.4GHz bands.

The filter module is specifically designed to enable industry leading bandedge performance in Wi-Fi applications that result in higher regulatory power capability in more Wi-Fi channels than systems with no or traditional filter solutions. End users will see a better capability to deliver Quality of Service (QoS) features at a system level. With Channels 1-14 enabled, users can accommodate any regulatory region needed by the end product

Using common module packaging techniques to achieve the industry standard footprint while negating as many external passive placements to help end users ease of integration into their circuits



5 Pad 1.4x1.2mm Laminate Package

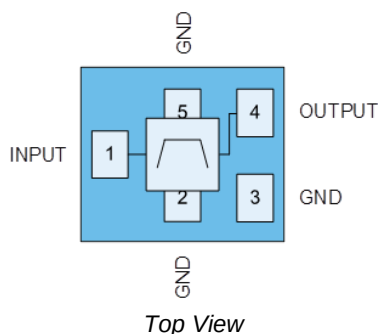
Key Features

- 2402-2494 MHz
- Low Insertion Loss in Wi-Fi Channels 1-14
- Increased bandedge compliance for more Wi-Fi channels
- Extended temperature performance from 0 to +90 °C
- High power handling to +30dBm averaged Input Power

Applications

- Access Points
- Wireless Routers
- Residential Gateways
- Customer Premise Equipment
- Internet of Things

Functional Block Diagram



Ordering Information

Part Number	Description
QPQ1909SB	Sample bag with 5 pieces
QPQ1909SR	7" reel with 100 pieces
QPQ1909TR13	13" reel with 10,000 pieces
QPQ1909EVB-01	Assembled Evaluation Board

Absolute Maximum Ratings

Parameter	Conditions	Rating
Operating Case Temperature	No damage	-40 to 105 °C
Storage Temperature		-40 to 125 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device.

Minimum Lifetime Ratings

Parameter	Conditions	Rating
Power Handling MTTF >1M hours, +90°C	802.11n MCS0 signal, 10dB PAR, applied to Pin 1	+30 dBm

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T _{OPERATING} *	0		+90	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions. * T_{OPERATING} is temperature at the package ground

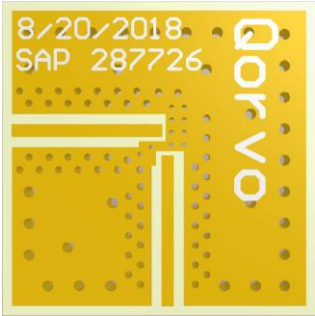
Electrical Specifications

Parameter (INPUT-OUTPUT) ⁽¹⁾⁽⁴⁾	Conditions	Min.	Typ.	Max.	Units
Unless otherwise noted: Typ. T = 45°C					
Insertion Loss ⁽²⁾	f = 2402.5-2421.5 MHz (CH1)	-	1.2	2.0	dB
	f = 2407.5-2426.5 MHz (CH2)	-	1.0	1.5	dB
	f = 2412.5-2476.5 MHz (CH3-12)	-	0.9	1.5	dB
	f = 2462.5-2481.5 MHz (CH13)	-	0.8	1.5	dB
	f = 2474.5-2493.5 MHz (CH14)	-	1.0	2.0	dB
Amplitude Variation	f = 2402.5-2421.5 MHz (CH1)	-	1.3	4.7	dB
	f = 2407.5-2426.5 MHz (CH2)	-	0.6	2.0	dB
	f = 2412.5-2476.5 MHz (CH3-12)	-	0.4	1.4	dB
	f = 2462.5-2481.5 MHz (CH13)	-	0.3	0.8	dB
	f = 2474.5-2493.5 MHz (CH14)	-	0.6	2.1	dB
INPUT VSWR	f = 2402.5-2493.5 MHz		1.5:1	2.8:1	
OUTPUT VSWR	f = 2402.5-2493.5 MHz		1.5:1	2.7:1	
INPUT Return Loss	f = 2402.5-2493.5 MHz		14		dB
OUTPUT Return Loss	f = 2402.5-2493.5 MHz		14		dB
Attenuation	f = 1900 – 2300 MHz ⁽³⁾	17	20	-	dB
	f = 2300 – 2390 MHz ⁽³⁾	19	26	-	dB

Notes:

- 1) All specifications are based on the QPQ1909 Applications Circuit
- 2) Data is the integrated value of the linear s-parameter over 19 MHz channel
- 3) Data is the integrated value of the linear s-parameter over 5 MHz range at the specified temperature
- 4) Pin 1 must be used for input. The large signal performance of this filter, such as power handling, may not be symmetric.

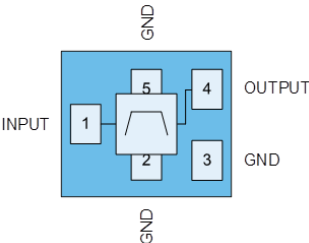
Evaluation Board Schematic



Bill of Material

Ref. Des.	Value	Description	Manuf.	Part number
-	-	Printed Circuit Board		
U1	-	Wi-Fi Bandedge BAW Filter	Qorvo	QPQ1909

Pin Configuration and Description

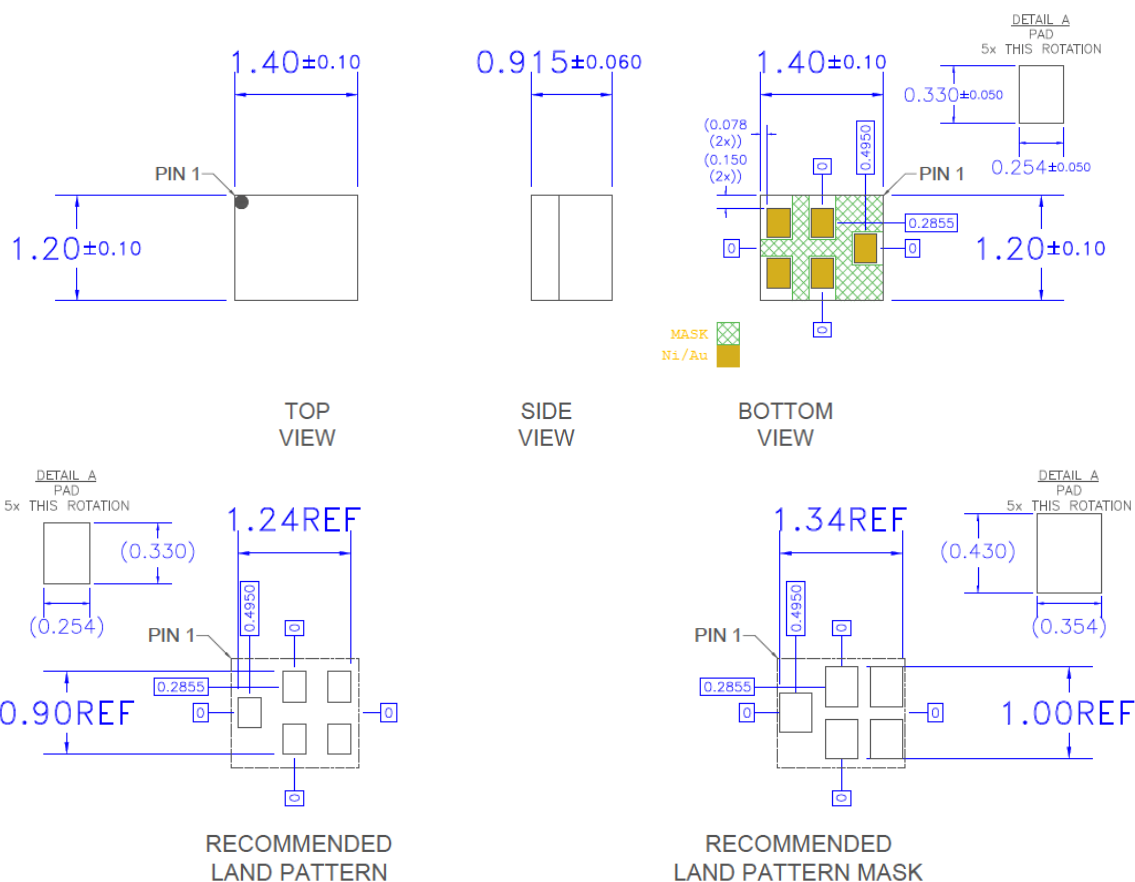


Top View

Pin Number	Label	Description
1	INPUT	RF input. Internally matched to 50 Ω .
2	GND	Ground connection.
3	GND	Ground connection.
4	OUTPUT	RF bi-directional antenna port. Internally matched to 50 Ω .
5	GND	Ground connection.

Mechanical Information

Dimensions and PCB Mounting Pattern



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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B (500V)	ANSI/ESD/JEDEC JS-001
ESD – Charged Device Model (CDM)	Class C3 (1000V)	ANSI/ESD/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: Electroless Ni/Electroless Pd/Immersion Au (ENEPIG)

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



Contact Information

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

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Email: customer.support@qorvo.com

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