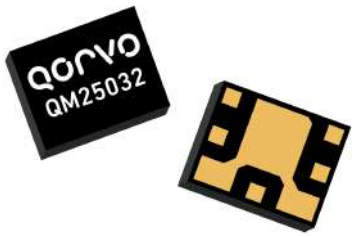
QM25032

Band 1/3 Multiplexer



6 Pin 2.5 x 2.0 x 0.54mm leadless SMT package

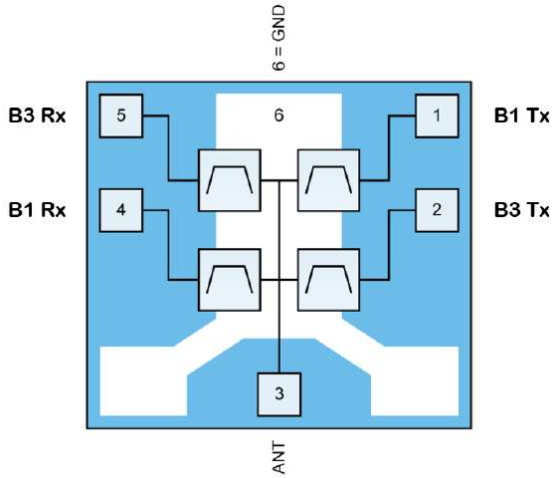
Product Overview

The QM25032 is the latest band 1 + band 3 multiplexer using Qorvo's patented technology to optimize performance required in today's handsets.

The QM25032 is designed to ensure minimal transmit insertion loss in all bands being multiplexed without loading each other while providing high cross-isolation which is critical to ensure good receive performance. Additionally, the QM25032 is capable of supporting higher power levels to overcome additional front-end losses in today's handsets.

The QM25032 uses common module packaging techniques to enable a compact 2.5 mm x 2.0 mm footprint.

Functional Block Diagram



Bottom View

Key Features

- Compact Form-Factor: 2.5mm x 2.0mm x 0.6mm
- Minimizes PA current drain with excellent TX IL
- Improved RX sensitivity with low RX IL
- Single-Ended
- RoHS Compliant, Pb-Free Module Package

Applications

- LTE/NR Mobile Products
  - Handsets
  - Datacards
- Carrier Aggregation

Ordering Information

Part Number	Description
QM25032EVB	Evaluation Board
QM25032SB	5pc sample bag
QM25032SR	100pcs on 7" reel
QM25032TR13	10,000pcs on 13" reel

Absolute Maximum Ratings

Parameter	Conditions		Rating
Storage Temperature			-40 to +85°C
RF Input Power (Pin1, Pin2)	CW	+55°C for 5k hours	+31 dBm
	FDD_UL_CP-OFDM_QPSK_5M_1RB@23		+29.5 dBm
	FDD_UL_CP-OFDM_QPSK_5M_1RB@24		+28 dBm
Peak RF Input Power (Pin 1, Pin2)	CW, Max duration 500 ms		+34.5 dBm

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

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T_{CASE}	-30		85	°C

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

Electrical Specifications[1] Band 1 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1920 – 1980 MHz	-	1.3[2]	2.3	dB
VSWR (TX Port)	1920 – 1980 MHz	-	1.6:1	2:1	-
VSWR (ANT Port)			1.5:1	2:1	
Attenuation	1495.9 – 1510.9 MHz	45	58	-	dB
	1559 – 1680 MHz	45	58	-	
	1805 – 1880 MHz	48	60	-	
	2010 – 2025 MHz	15[3]	20	-	
	2110 – 2170 MHz	50	69	-	
	2400 – 2500 MHz	45	61	-	
	3640 – 3960 MHz	40	59	-	
	4900 – 5180 MHz	30	53	-	
	5180 – 5900 MHz	12	22	-	

Notes:
1. All specifications include expected temperature, process guardbands, and are based on application circuit schematic
2. Typical specified as mathematical average over frequency range at room temp
3. Operating Temp = +15 °C to +85 °C

Electrical Specifications[1] Band 1 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2110 – 2170 MHz	-	1.2[2]	2.2	dB
VSWR (RX Port)	2110 – 2170 MHz	-	1.6:1	2:1	-
VSWR (ANT Port)			1.5:1	2:1	
Attenuation	1447 – 1463 MHz	40	48	-	dB
	1710 – 1785 MHz	48	54	-	
	1920 – 1980 MHz	49	56	-	
	2400 – 2500 MHz	50	62	-	
	4900 – 5180 MHz	30	53	-	
	5180 – 5900 MHz	25	53	-	

Notes:
1. All specifications include expected temperature, process guardbands, and are based on application circuit schematic
2. Typical specified as mathematical average over frequency range at room temp

Electrical Specifications[1] Band 3 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1710 – 1785 MHz	-	1.3[2]	3[3]	dB
VSWR (TX Port)	1710 – 1785 MHz	-	1.5:1	2:1[4]	-
VSWR (ANT Port)			1.3:1	2:1[4]	
Attenuation	1559 – 1605 MHz	40	49	-	dB
	1805 – 1880 MHz	47[4]	60	-	
	2110 – 2170 MHz	50	62	-	
	2400 – 2500 MHz	42	46	-	
	3420 – 3570 MHz	25	39	-	
	4900 – 5180 MHz	18	31	-	
	5180 – 5900 MHz	18	25	-	

Notes:
1. All specifications include expected temperature, process guardbands, and are based on application circuit schematic
2. Typical specified as mathematical average over frequency range at room temp
3. Operating Temp = −30 °C to +25 °C
4. Operating Temp = +25 °C to +85 °C

Electrical Specifications[1] Band 3 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1805 – 1880 MHz	-	1.3[2]	3.2[3]	dB
VSWR (RX Port)	1805 – 1880 MHz	-	1.5:1	2:1	-
VSWR (ANT Port)			1.4:1	2:1	
Attenuation	1710 – 1785 MHz	40	57	-	dB
	1920 – 1980 MHz	48	53	-	
	2400 – 2500 MHz	40	52	-	
	4900 – 5180 MHz	40	51	-	
	5180 – 5900 MHz	30	54	-	

Notes:
1. All specifications include expected temperature, process guardbands, and are based on application circuit schematic
2. Typical specified as mathematical average over frequency range at room temp
3. Operating Temp = +25 °C to +85 °C

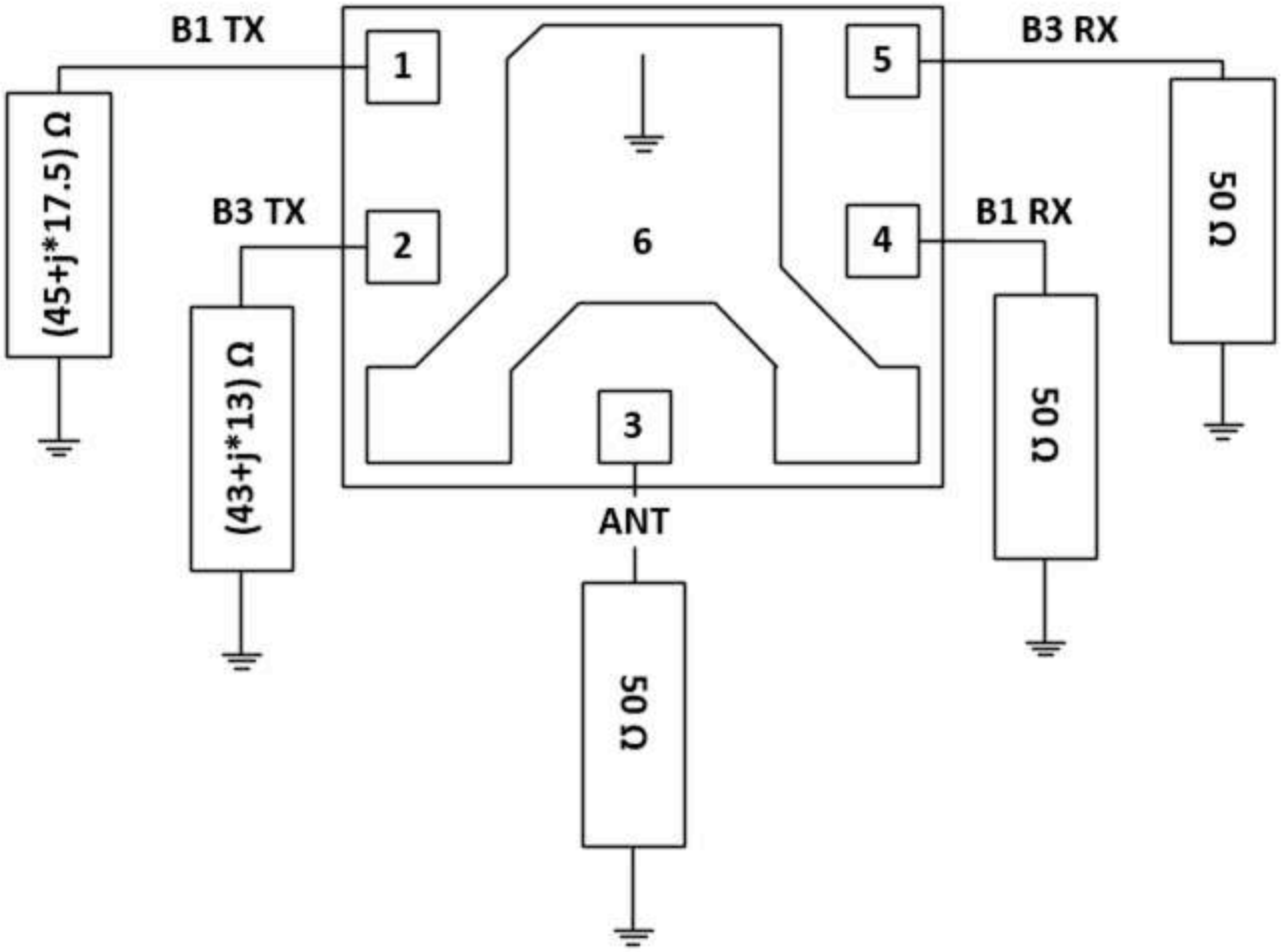
Electrical Specifications[1] Isolation

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
B3 TX-RX Isolation in B3 RX	1805 – 1880 MHz	55[2]	62	-	dB
B3 TX-RX Isolation in B3 TX	1710 – 1785 MHz	55	59	-	
B1 TX-RX Isolation in B1 RX	2110 – 2170 MHz	55	69	-	
B1 TX-RX Isolation in B1 TX	1920 – 1980 MHz	50	59	-	
B1 TX to B3 RX Isolation in B3 RX	1805 – 1880 MHz	55	61	-	
B1 TX to B3 RX Isolation in B1 TX	1920 – 1980 MHz	52	55	-	
B3 TX to B1 RX Isolation in B3 TX	1710 – 1785 MHz	53	57	-	
B3 TX to B1 RX Isolation in B1 RX	2110 – 2170 MHz	55	64	-	

Notes:
1. All specifications include expected temperature, process guardbands, and are based on application circuit schematic
2. Integrated over 5MHz Bandwidth

Application Circuit Schematic



Note:

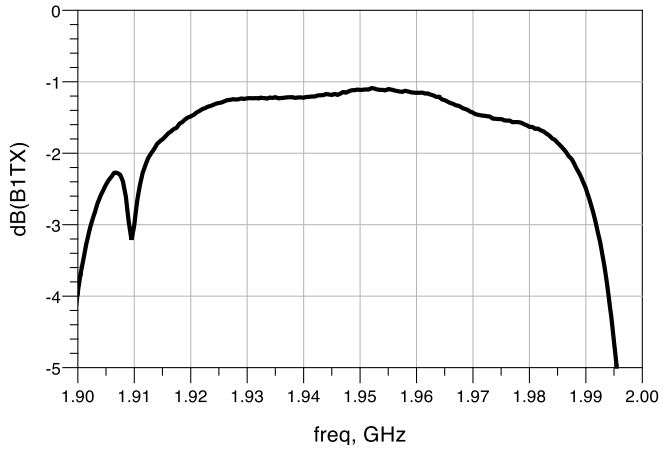
B1 TX (pin 1) and B3 TX (pin 2) are terminated with complex impedance to provide flexible matching options for optimizing TX performance between PA and QM25032. All other ports are matched to 50 ohm impedance

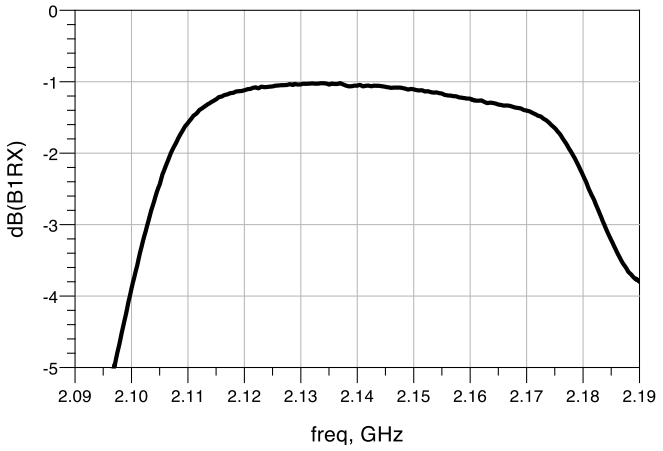
Bill of Materials

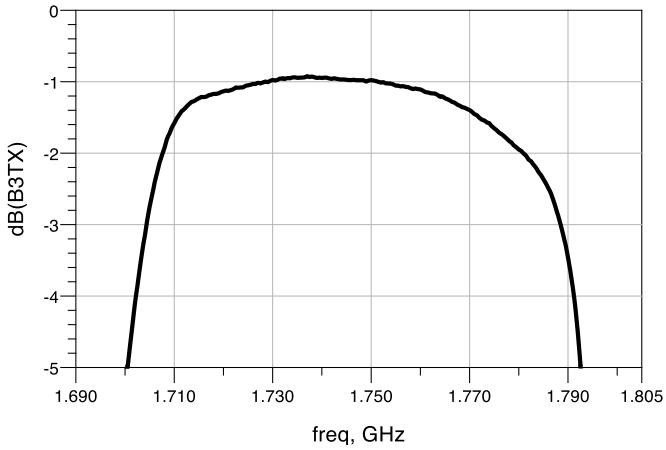
Ref. Des.	Value	Description	Manuf.	Part number
U1	N/A	Band 1/3 Multiplexer	Qorvo	QM25032
PCB	N/A	4-layer Printed Circuit Board		

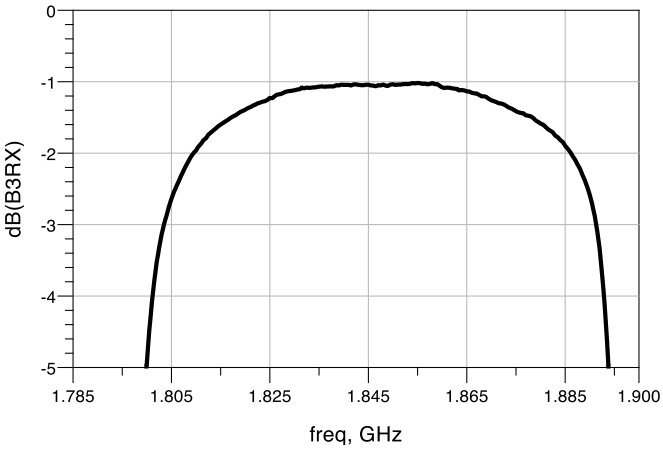
Performance Plots – Passband

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









Performance Plots – Narrowband

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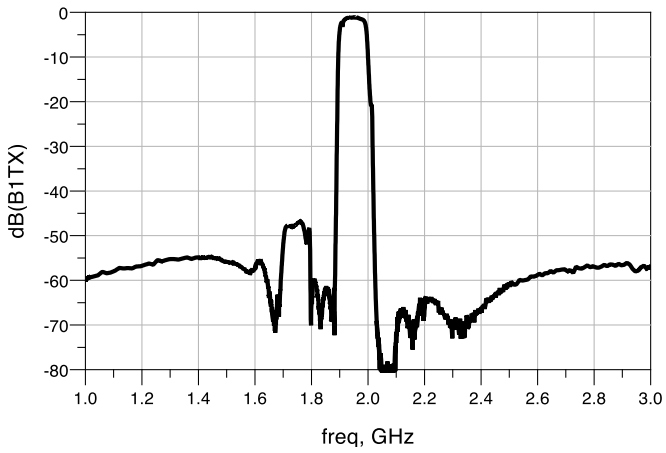
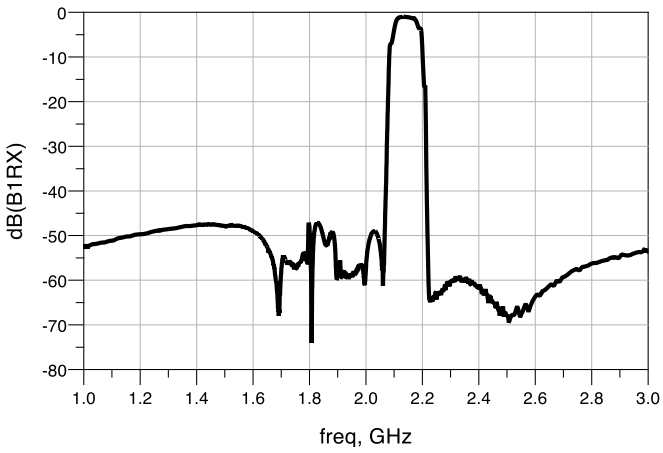
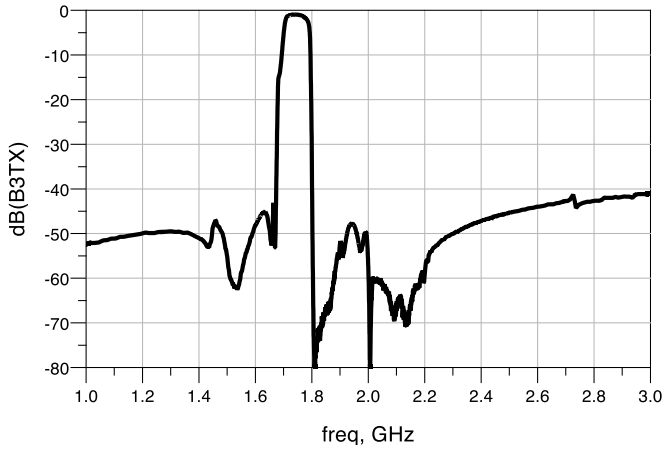
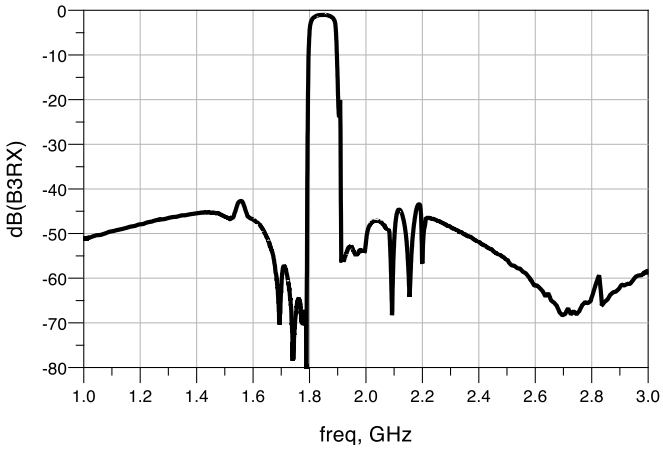


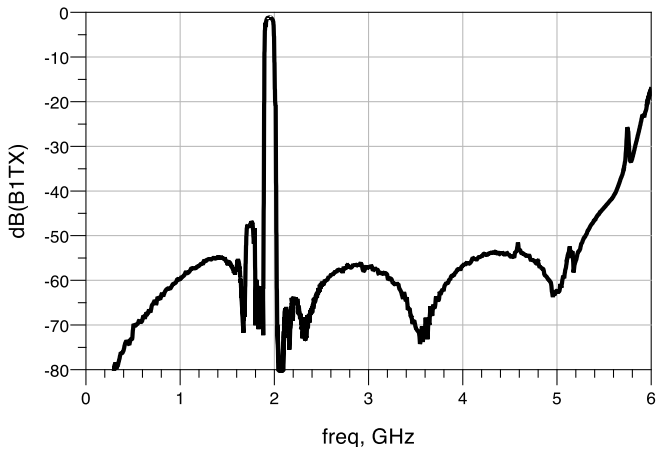


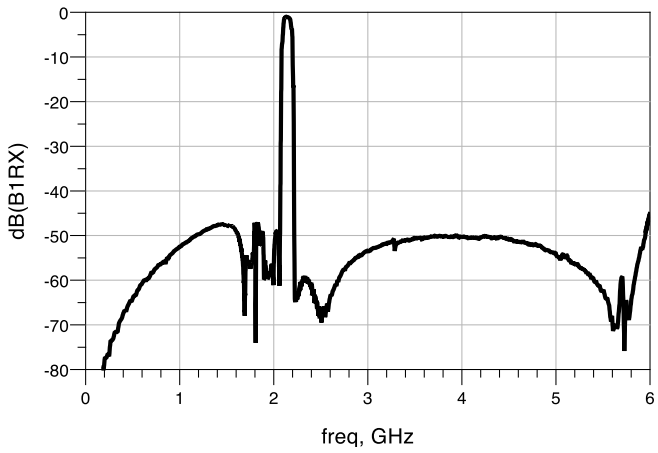


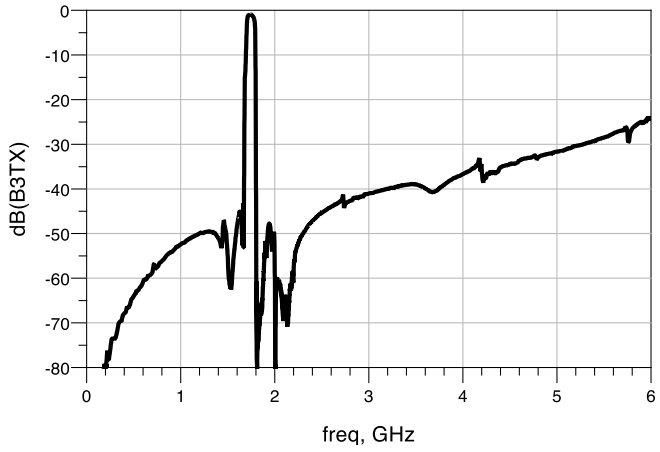


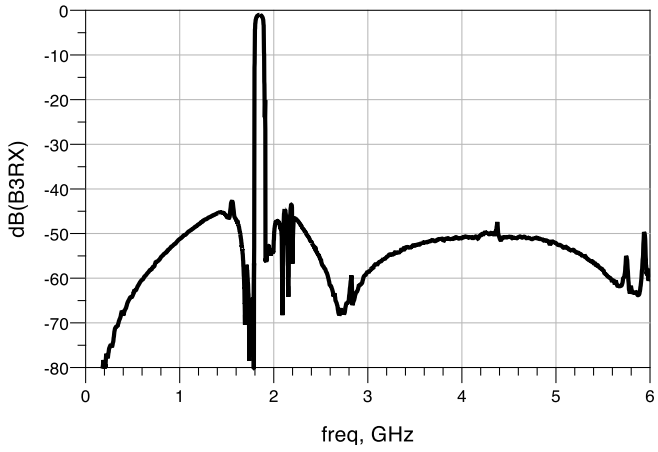
Performance Plots – Wideband

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



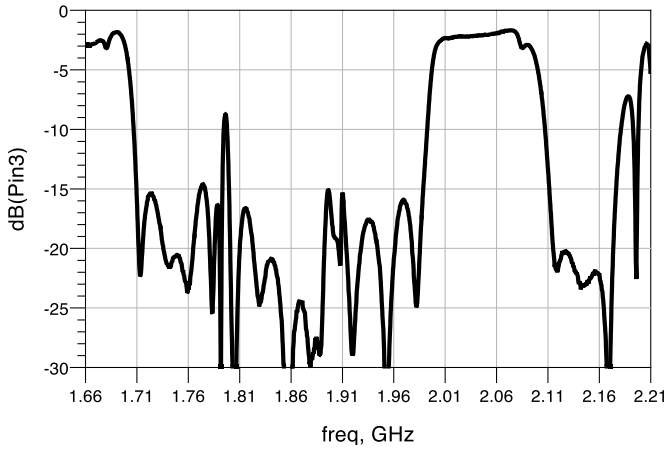


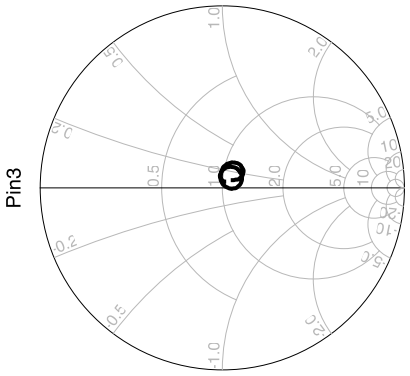




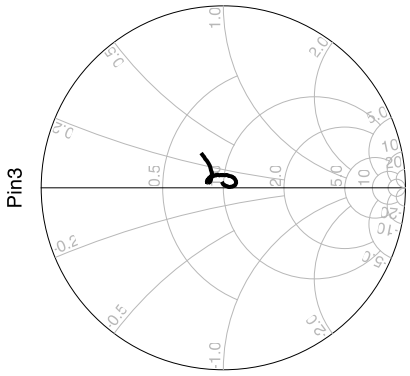
Performance Plots – ANT Port Return Loss/Impedance

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

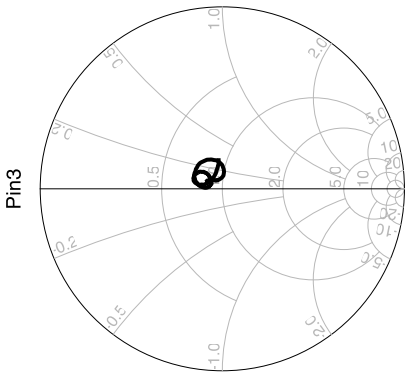




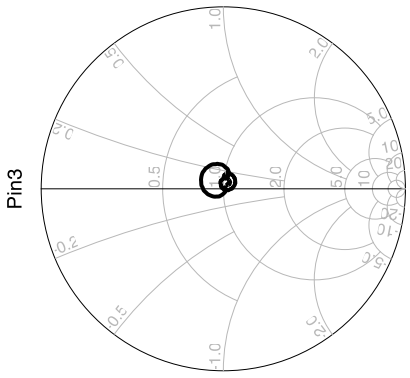
freq (1.920GHz to 1.980GHz)



freq (2.110GHz to 2.170GHz)



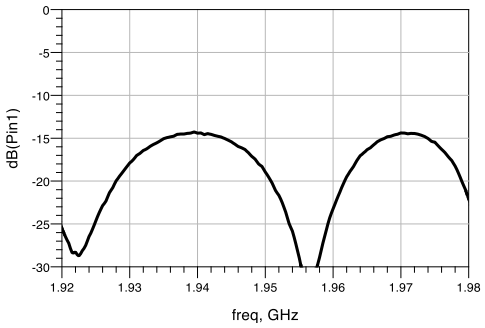
freq (1.710GHz to 1.785GHz)

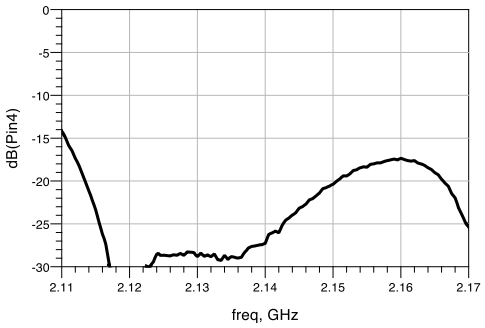


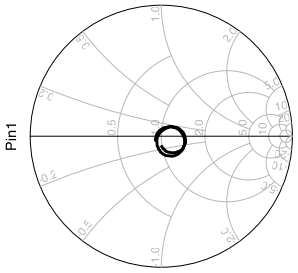
freq (1.805GHz to 1.880GHz)

Performance Plots – TX & RX Return Loss/Impedance

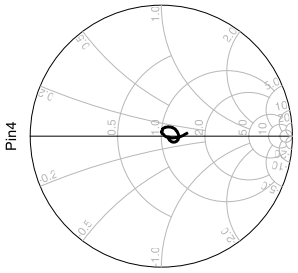
Test conditions unless otherwise noted: Temp. = +25 °C



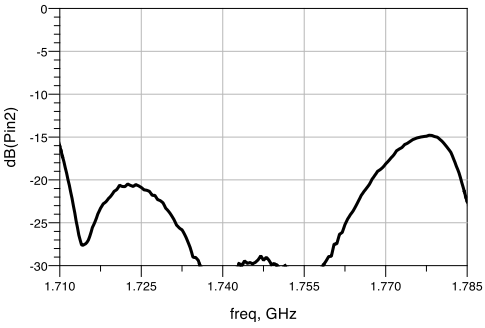


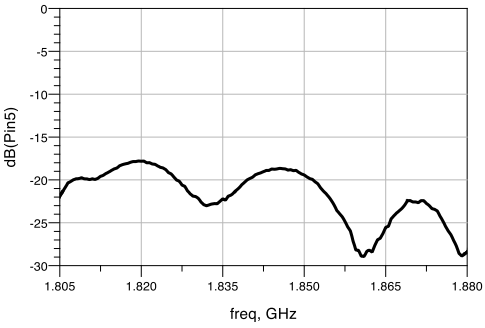


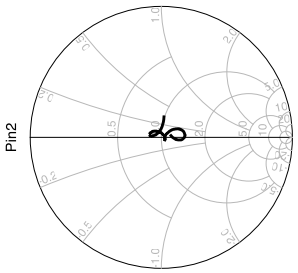
freq (1.920GHz to 1.980GHz)



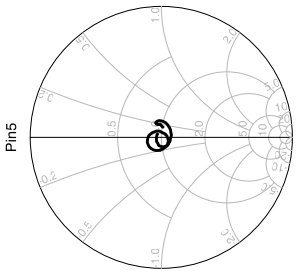
freq (2.110GHz to 2.170GHz)







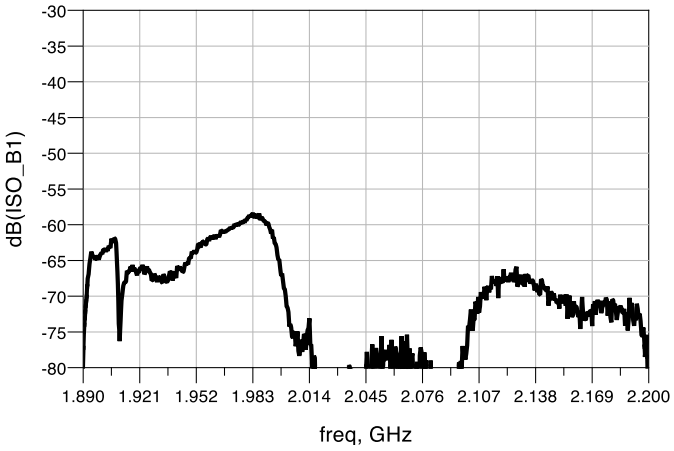
freq (1.710GHz to 1.785GHz)

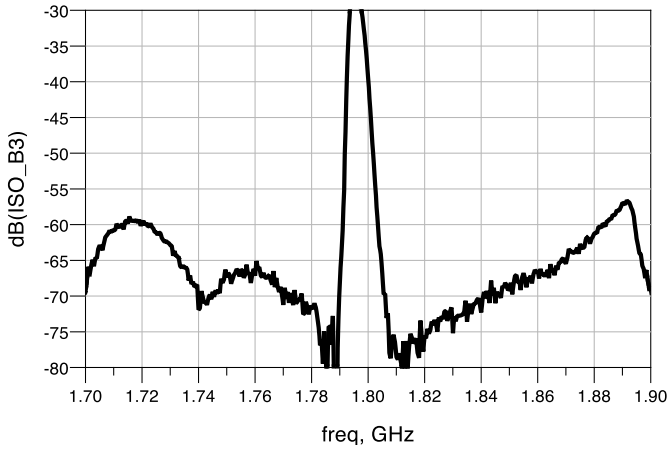


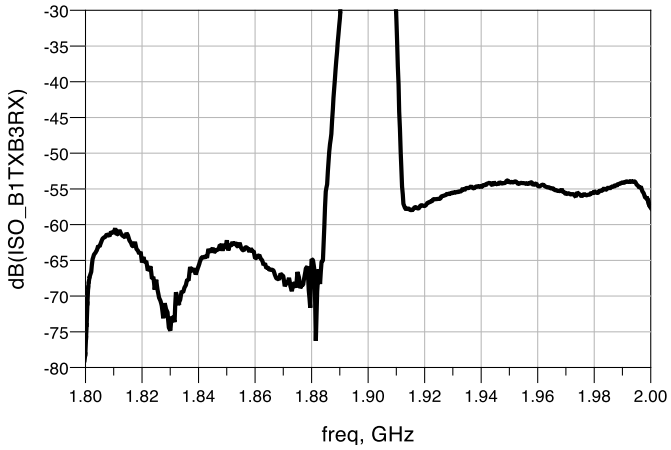
freq (1.805GHz to 1.880GHz)

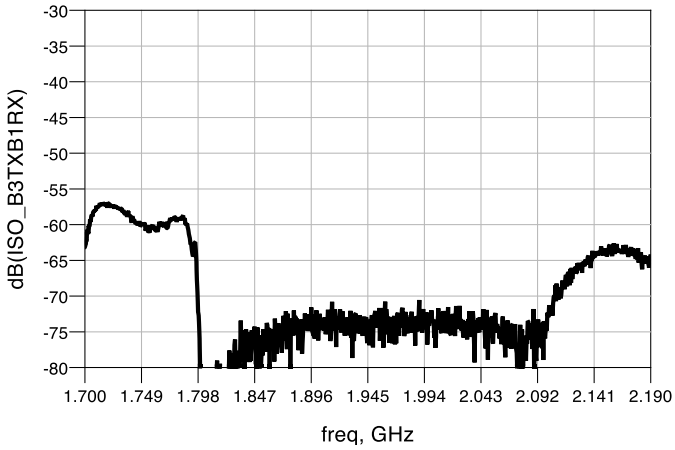
Performance Plots – Isolation

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

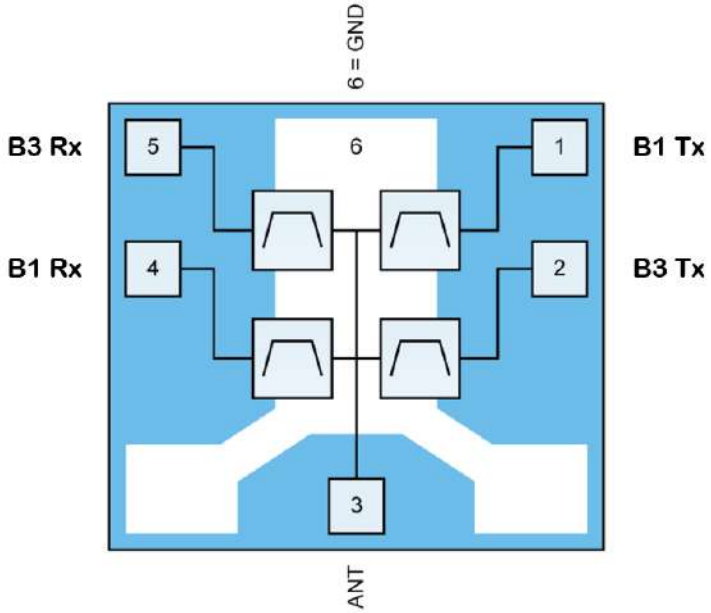








Pin Configuration and Description



Bottom View

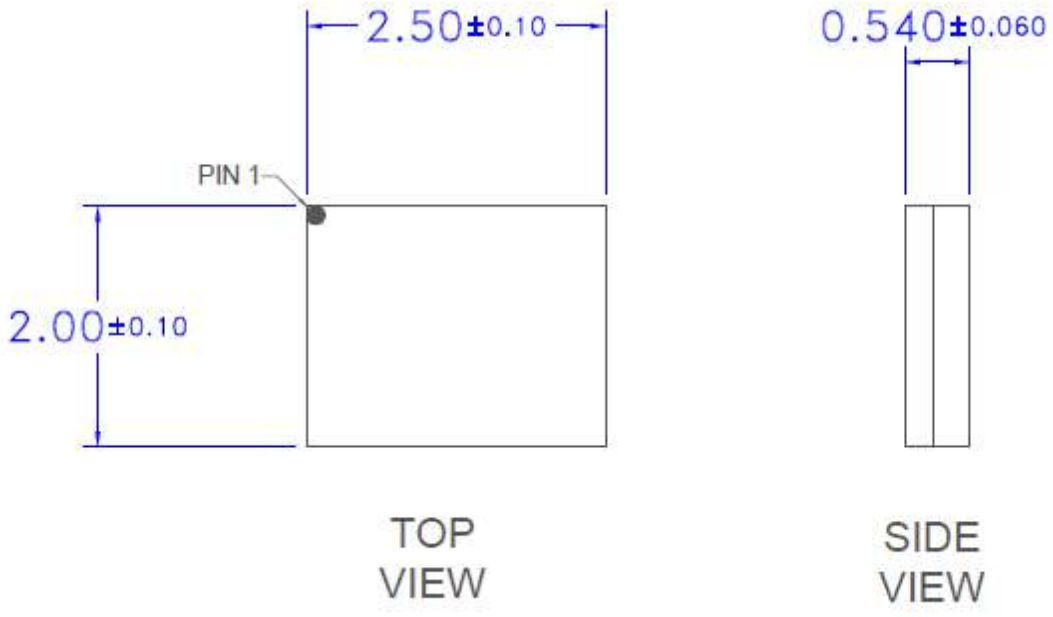
Pin Number	Label	Description
1	B1 TX	Band 1 Transmit Port
2	B3 TX	Band 3 Transmit Port
3	ANT	Band 1/3 Antenna Port
4	B1 RX	Band 1 Receive Port
5	B3 RX	Band 3 Receive Port
6	GND	Package Ground

Package Marking and Dimensions

Package Marking Diagram

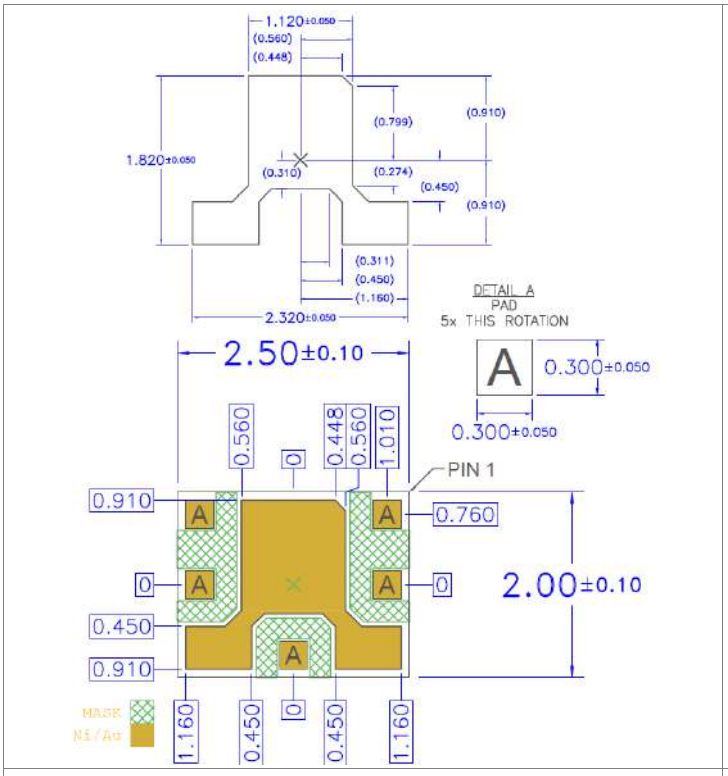
Pin 1 Indicator
Qorvo Logo - Use Q5D
Trace Code to be assigned by SubCon
5M is the Product Code; YYYY is the trace code

Package Outline Dimension Drawing

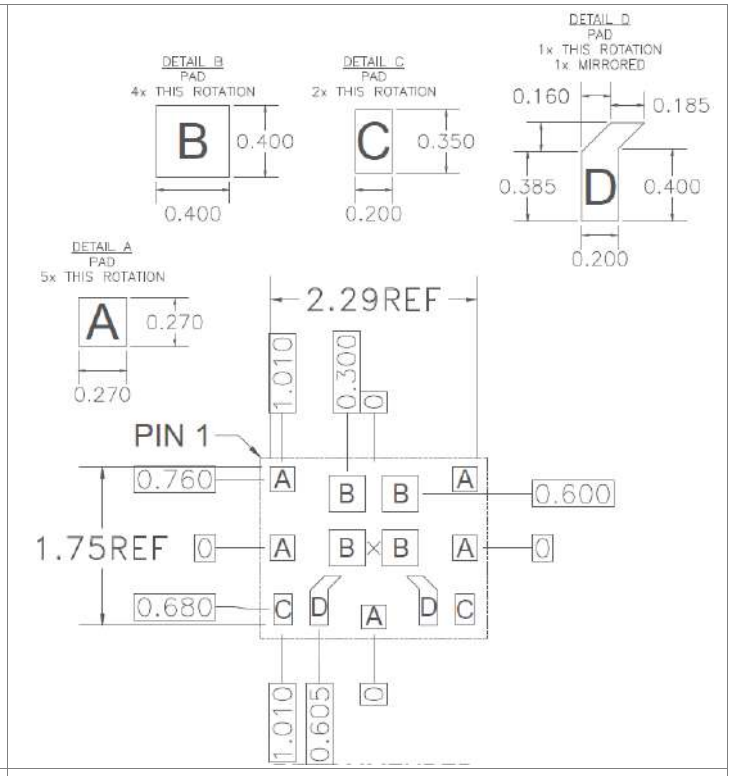


Notes:
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012

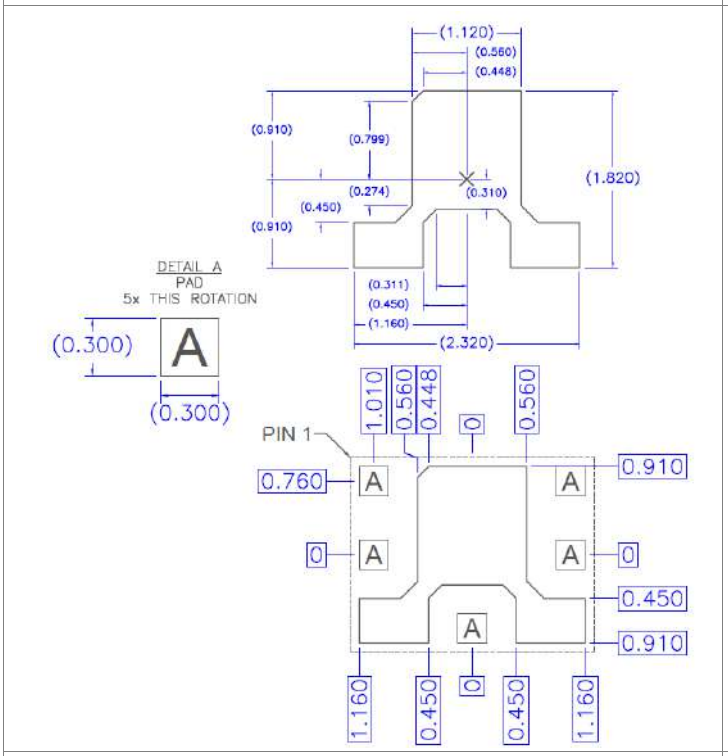
Mechanical Information



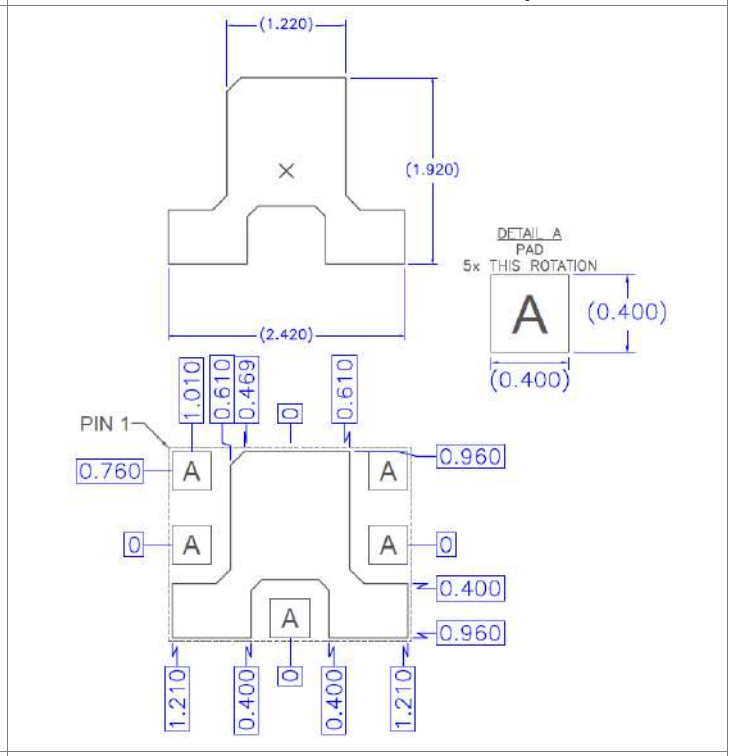
Pin Dimensions - Bottom View



Recommended Solder Stencil– Top View



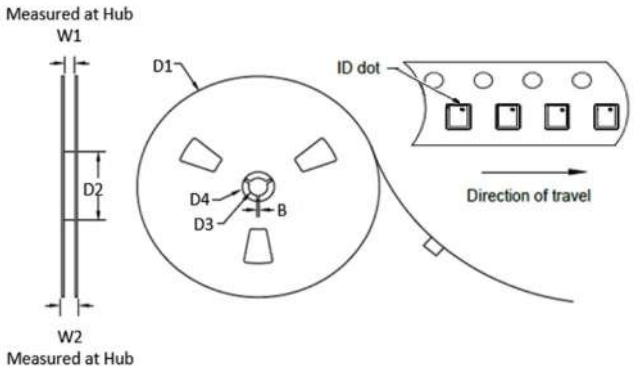
Recommended Land Pattern – Top View

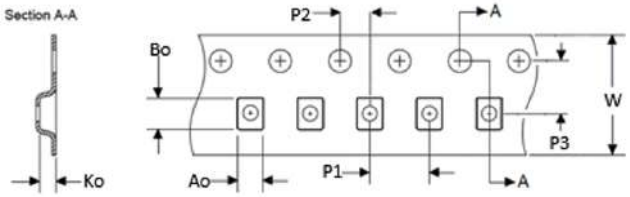


Recommended Land Pattern Mask – Top View

ES France - Département RF & Hyperfréquences - 127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 60 - Fax. 01 47 01 16 22 - e-mail: hyper@es-france.com - Site Web: www.es-france.com

Tape and Reel Information – Carrier and Cover tape Dimensions





Feature	Measure	Symbol	Size (mm)
Flange	Diameter	D1	330.0
	Thickness	W2	14.2
	Space Between Flange	W1	8.8
Hub	Outer Diameter	D2	102.0
	Arbor Hole Diameter	D3	13.0
	Key Slit Width	B	2.0
	Key Slit Diameter	D4	20.2

Feature	Measure	Symbol	Size (mm)
Cavity	Length	Ao	2.20
	Width	Bo	2.70
	Depth	Ko	1.0
	Pitch	P1	4.0
Centerline Distance	Cavity to Perforation (Length)	P2	2.0
	Cavity to Perforation (Width)	P3	3.5
Carrier Tape	Width	W	8.0

(Unless otherwise specified, all dimension tolerances per EIA-481)

Handling Precautions

PARAMETER	RATING	STANDARD
ESD – Human Body Model (HBM)	1C	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity Level	MSL3	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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free

Revision History

REVISION	DATE (YYYYMMDD)	NOTES
E	20200219	Initial Production Release
F	20210222	Updated Power Ratings Specs
G	20210318	Updated Power Ratings Specs

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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QM26001

Band 1/3/7 Multiplexer

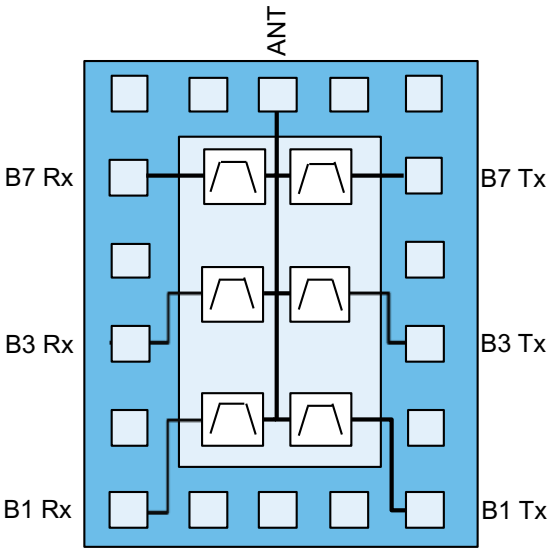
Product Overview

The QM26001 is a compact, high-performance multiplexer module fabricated using a patented technology with performance optimized to enable carrier aggregation of bands 1, 3, and 7 for LTE/NR.

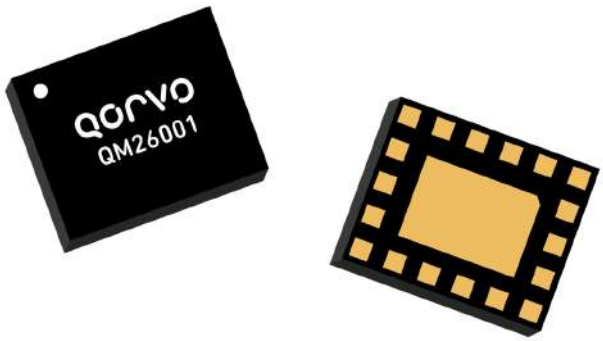
The QM26001 leverages the high-Q properties to ensure minimal transmit insertion loss in all bands being multiplexed without loading each other. The QM26001 module has also been designed with high cross-isolation which is critical to ensure good receive performance.

The QM26001 uses unique Wafer Level Packaging (WLP) techniques to enable a compact 2.6mm x 3.2mm x 0.8mm footprint.

Functional Block Diagram



Bottom View



19 Pin 2.6 x 3.2mm leadless SMT package

Key Features

- Compact Form-Factor: 2.6mm x 3.2mm
- Minimizes PA current drain with excellent TX IL
- Improved RX sensitivity with low RX IL
- Single-Ended
- RoHS Compliant, Pb-Free Module Package

Applications

- LTE/NR Mobile Products
  - Handsets
  - Datacards
- Carrier Aggregation

Ordering Information

Part Number	Description
QM26001TR13	13 inch reel of 5k pieces
QM26001SR	Sample reel of 100 pieces
QM26001SB	Sample bag of 5 pieces
QM26001EVB	Evaluation Board (EVB)

Absolute Maximum Ratings

Parameter	Pin	Conditions	Rating	Units
Storage Temperature			-40 to +90	°C
RF Input Power	6, 8, or 10	CW, +55°C for 5k hours	+31	dBm
Peak RF Input Power	6, 8, or 10	Max duration 500ms	+36.5	dBm

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

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T_{CASE}	-30		+85	°C

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

Electrical Specifications[1] Band 1 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1920 MHz – 1980 MHz	-	1.88[2]	3.1	dB
VSWR (TX Port)	1920 MHz – 1980 MHz	-	1.4:1	2:1[3]	-
VSWR (ANT Port)			1.4:1	2:1	
Attenuation	600 MHz – 1000 MHz	44	60	-	dB
	1452 MHz – 1496 MHz	44	57	-	
	1559 MHz – 1606 MHz	44	60	-	
	1805 MHz – 1880 MHz	46	61	-	
	2110 MHz – 2170 MHz	50	60	-	
	2400 MHz – 2500 MHz	45	67	-	
	2620 MHz – 2690 MHz	50	70	-	
	3840 MHz – 3960 MHz	35	72	-	
	4900 MHz – 5940 MHz	30	60	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Specified from -15°C to +85°C

Electrical Specifications[1] Band 1 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2110 MHz – 2170 MHz	-	1.86[2]	3	dB
VSWR (RX Port)	2110 MHz – 2170 MHz	-	1.4:1	2:1	-
VSWR (ANT Port)			1.4:1	2:1	
Attenuation	600 MHz – 1000 MHz	40	55	-	dB
	1710 MHz – 1785 MHz	48	61	-	
	1920 MHz – 1980 MHz	48	59	-	
	2400 MHz – 2500 MHz	45	69	-	
	2500 MHz – 2570 MHz	48	66	-	
	4900 MHz – 5150 MHz	27	35	-	
	5150 MHz – 5950 MHz	35	41	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature

Electrical Specifications[1] Band 3 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1710 MHz – 1785 MHz	-	1.85[2]	3.5	dB
VSWR (TX Port)	1710 MHz – 1785 MHz	-	1.3:1	2:1	-
VSWR (ANT Port)			1.3:1	2:1	
Attenuation	600 MHz – 1000 MHz	40	50	-	dB
	1452 MHz – 1496 MHz	40	44	-	
	1559 MHz – 1606 MHz	45	56	-	
	1805 MHz – 1880 MHz	50[3]	62	-	
	2110 MHz – 2170 MHz	45	56	-	
	2400 MHz – 2500 MHz	40	56	-	
	2620 MHz – 2690 MHz	45	64	-	
	3420 MHz – 3570 MHz	40	65	-	
	4900 MHz – 5900 MHz	30	43	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Specified from +25°C to +85°C

Electrical Specifications[1] Band 3 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1805 MHz – 1880 MHz	-	1.87[2]	3.9[3]	dB
VSWR (RX Port)	1805 MHz – 1880 MHz	-	1.6:1	2:1	-
VSWR (ANT Port)			1.5:1	2:1	
Attenuation	600 MHz – 1000 MHz	40	52	-	dB
	1710 MHz – 1785 MHz	44	60	-	
	1920 MHz – 1980 MHz	45	58	-	
	2400 MHz – 2500 MHz	45	53	-	
	2500 MHz – 2570 MHz	45	63	-	
	4900 MHz – 5950 MHz	35	62	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Integrated over any 5MHz bandwidth

Electrical Specifications[1] Band 7 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2500 MHz – 2570 MHz	-	1.67[2]	3.4[3]	dB
VSWR (TX Port)	2500 MHz – 2570 MHz	-	1.5:1	2:1	-
VSWR (ANT Port)	2500 MHz – 2570 MHz	-	1.4:1	2:1	
Attenuation	600 MHz – 1000 MHz	35	47	-	dB
	1452 MHz – 1496 MHz	35	49	-	
	1559 MHz – 1606 MHz	35	55	-	
	1805 MHz – 1880 MHz	45	53	-	
	2110 MHz – 2170 MHz	45	52	-	
	2402.5 MHz – 2471.5 MHz[4] WiFi CH1-11	44	46	-	
	2457.5 MHz – 2476.5 MHz[4] WiFi CH12	36	46	-	
	2620 MHz – 2690 MHz	45	61	-	
	4900 MHz – 5900 MHz	28	31	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Specified from +25°C to +85°C
4. Each channel integrated over 19MHz

Electrical Specifications[1] Band 7 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2620 MHz – 2690 MHz	-	1.6[2]	2.7	dB
VSWR (RX Port)	2620 MHz – 2690 MHz	-	1.5:1	2:1	-
VSWR (ANT Port)	2620 MHz – 2690 MHz	-	1.6:1	2:1	
Attenuation	600 MHz – 1000 MHz	40	53	-	dB
	1710 MHz – 1785 MHz	45	55	-	
	1920 MHz – 1980 MHz	45	58	-	
	2400 MHz – 2500 MHz	40	55	-	
	2500 MHz – 2570 MHz	45	59	-	
	4900 MHz – 5950 MHz	30	53	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature

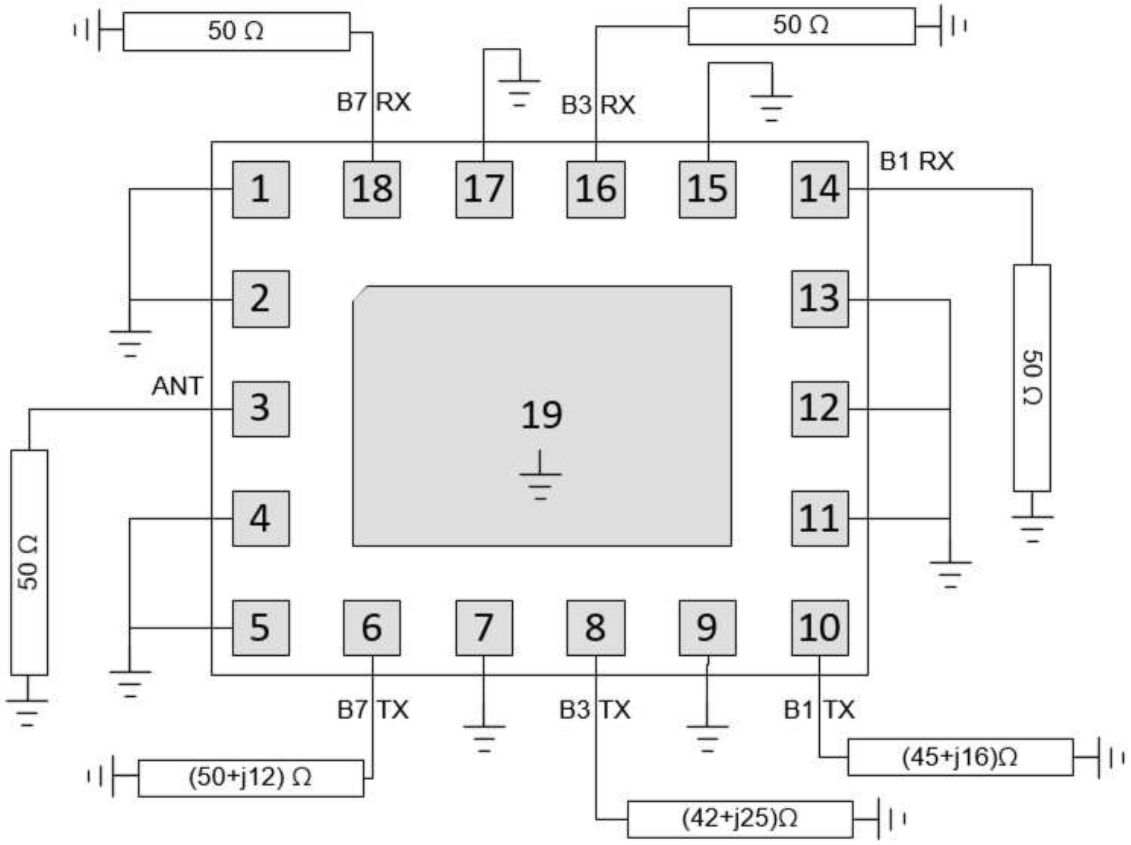
Electrical Specifications[1] Isolation

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
TX-RX Isolation in B1 RX	2110 MHz – 2170 MHz	55	60	-	dB
TX-RX Isolation in B1 TX	1920 MHz – 1980 MHz	55	59	-	
TX-RX Isolation in B3 RX	1805 MHz – 1880 MHz	55[2][3]	59	-	
TX-RX Isolation in B3 TX	1710 MHz – 1785 MHz	55[3]	62	-	
TX-RX Isolation in B7 TX	2500 MHz – 2570 MHz	55	61	-	
TX-RX Isolation in B7 RX	2620 MHz – 2690 MHz	55	63	-	
B1 TX to B3 RX Isolation in B3 RX	1805 MHz – 1880 MHz	55	58	-	
B1 TX to B3 RX Isolation in B1 TX	1920 MHz – 1980 MHz	55	64	-	
B3 TX to B1 RX Isolation in B3 TX	1710 MHz – 1785 MHz	55	63	-	
B3 TX to B1 RX Isolation in B1 RX	2110 MHz – 2170 MHz	55	57	-	
B1 TX to B7 RX Isolation in B1 TX	1920 MHz – 1980 MHz	55	60	-	
B1 TX to B7 RX Isolation in B7 RX	2620 MHz – 2690 MHz	55	69	-	
B7 TX to B1 RX Isolation in B7 TX	2500 MHz – 2570 MHz	55	66	-	
B7 TX to B1 RX Isolation in B1 RX	2110 MHz – 2170 MHz	55	62	-	
B3 TX to B7 RX Isolation in B3 TX	1710 MHz – 1785 MHz	55	57	-	
B3 TX to B7 RX Isolation in B7 RX	2620 MHz – 2690 MHz	55	66	-	
B7 TX to B3 RX Isolation in B7 TX	2500 MHz – 2570 MHz	55	62	-	
B7 TX to B3 RX Isolation in B3 RX	1805 MHz – 1880 MHz	55[3]	57	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Specified from +25°C to +85°C
3. Integrated over any 5MHz bandwidth

Application Circuit Schematic



Note:

B1 TX (pin 10), B3 TX (pin 8), and B7 TX (pin 6) are terminated with complex impedance to provide flexible matching options for optimizing TX performance between PA and QM26001. All other ports are matched to 50 ohm impedance

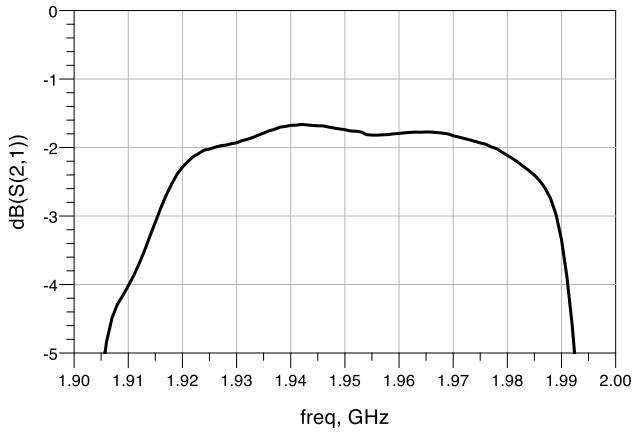
Bill of Materials

Ref. Des.	Value	Description	Manuf.	Part number
U1	N/A	Band 1/3/7 Multiplexer	Qorvo	QM26001
PCB	N/A	4-layer Printed Circuit Board		

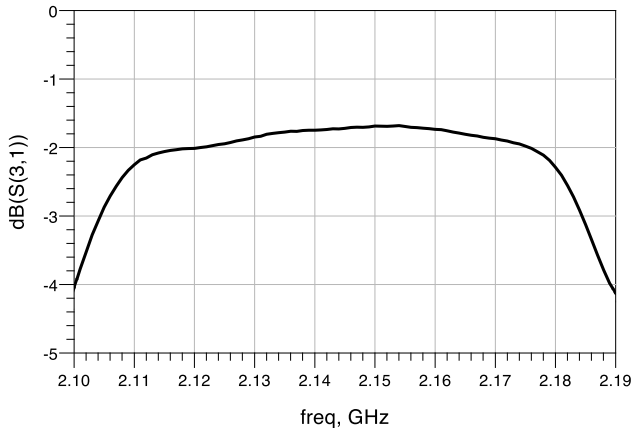
Performance Plots – Pass Band

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

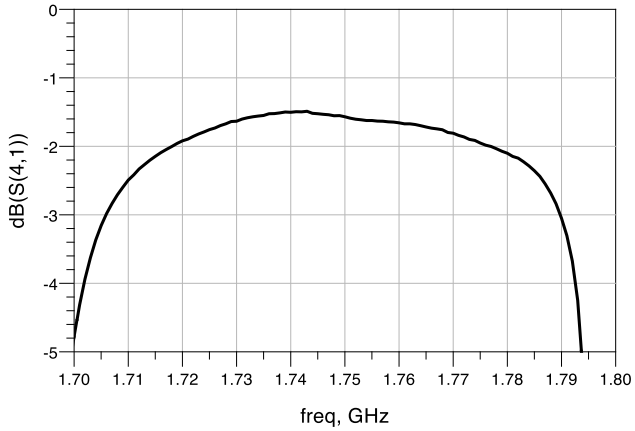
B1 TX



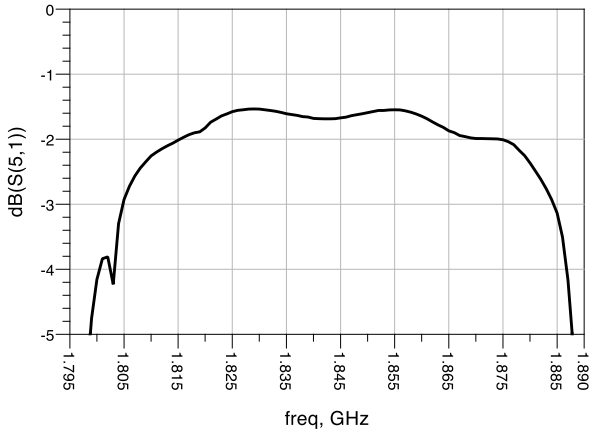
B1 RX



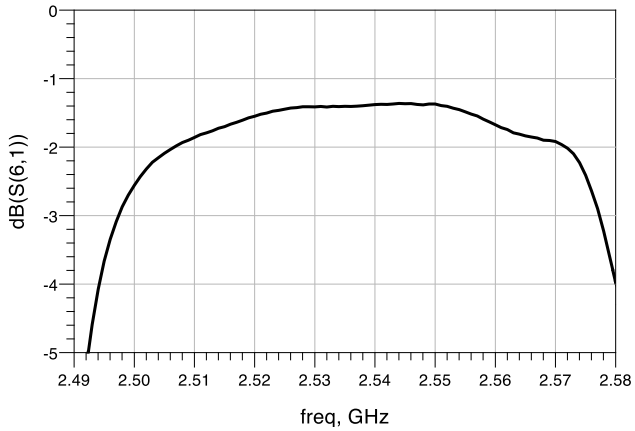
B3 TX



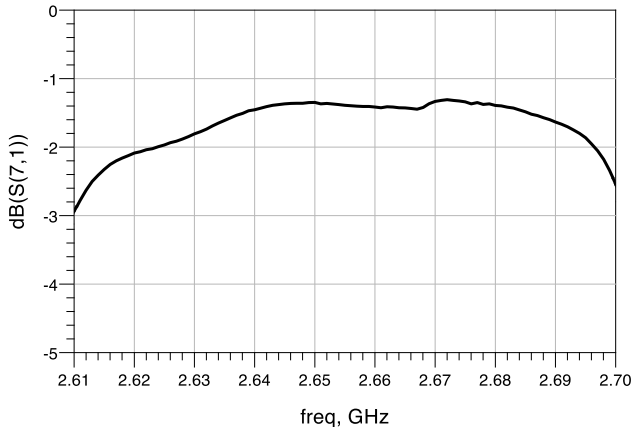
B3 RX



B7 TX



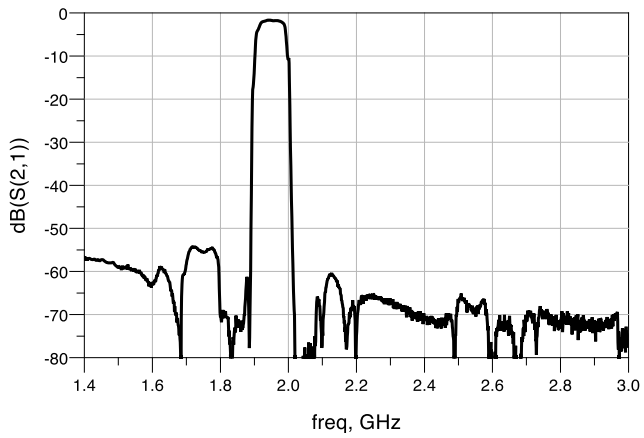
B7 RX



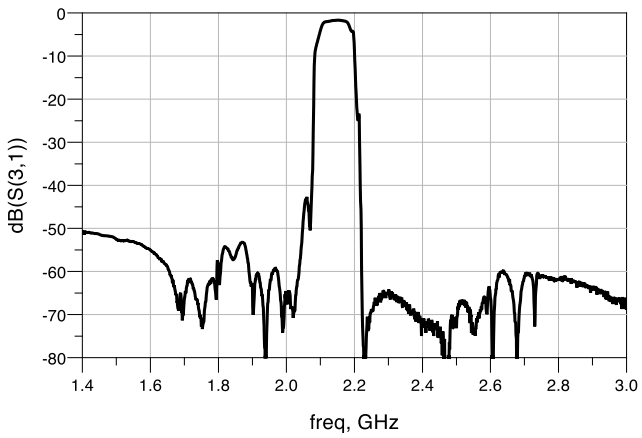
Performance Plots – Narrow Band

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

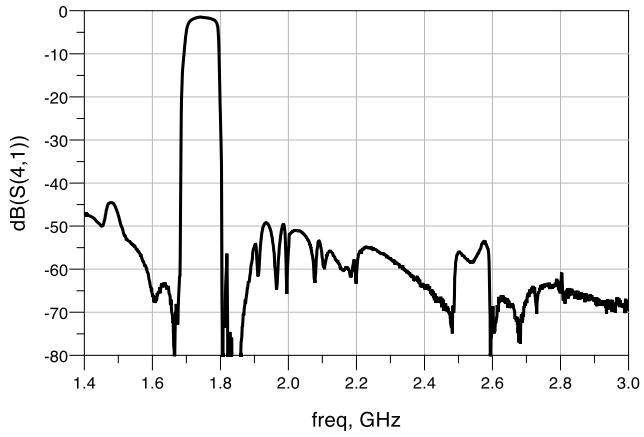
B1 TX NB



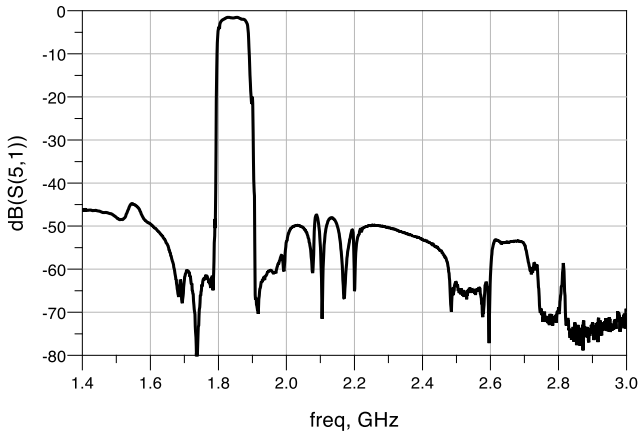
B1 RX NB



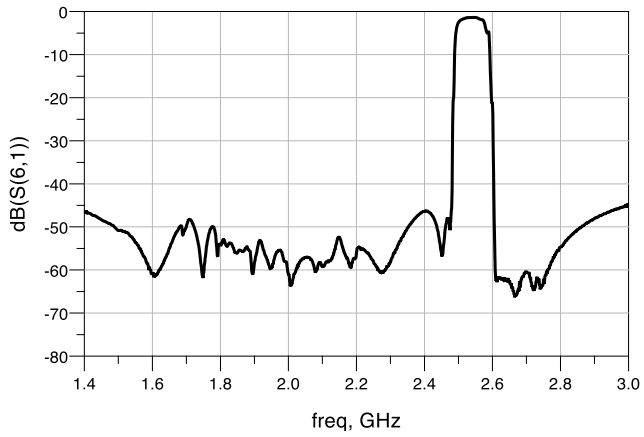
B3 TX NB



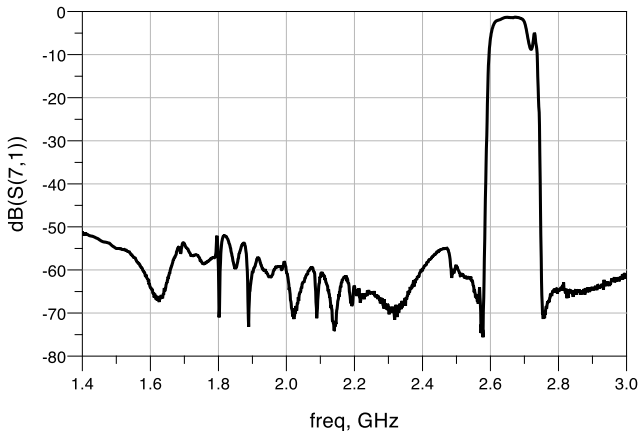
B3 RX NB



B7 TX NB



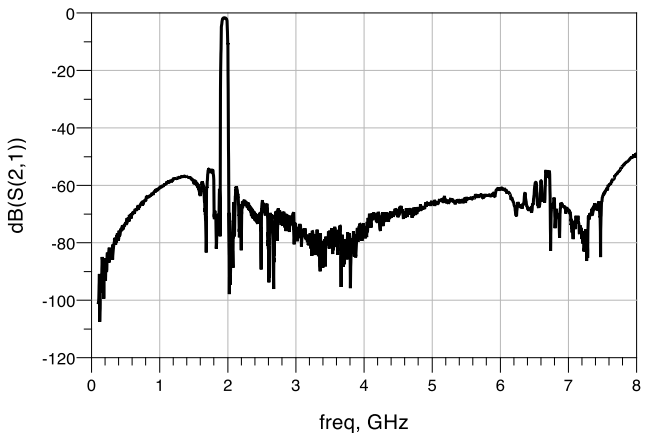
B7 RX NB



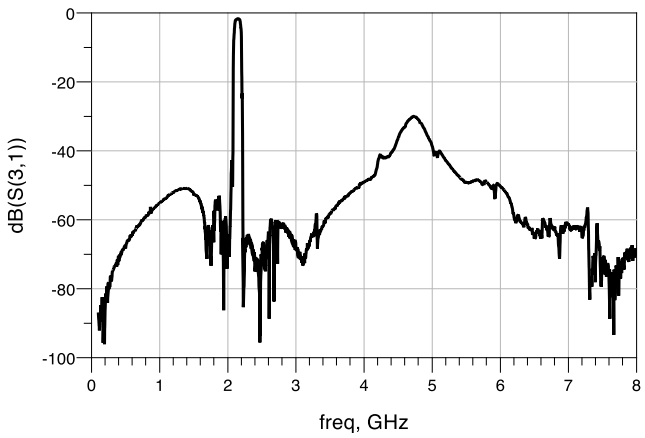
Performance Plots – Wide Band

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

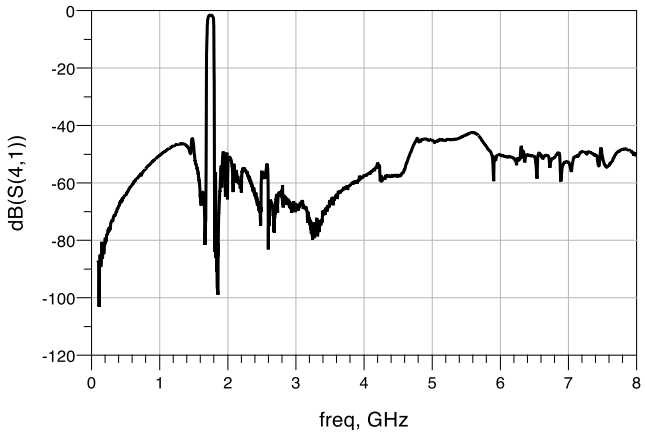
B1 TX WB



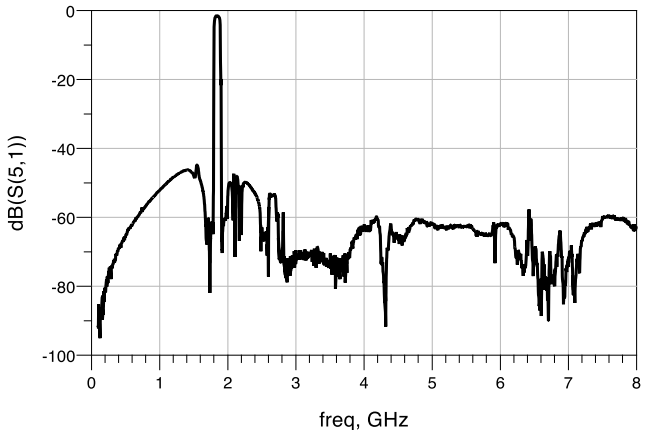
B1 WB



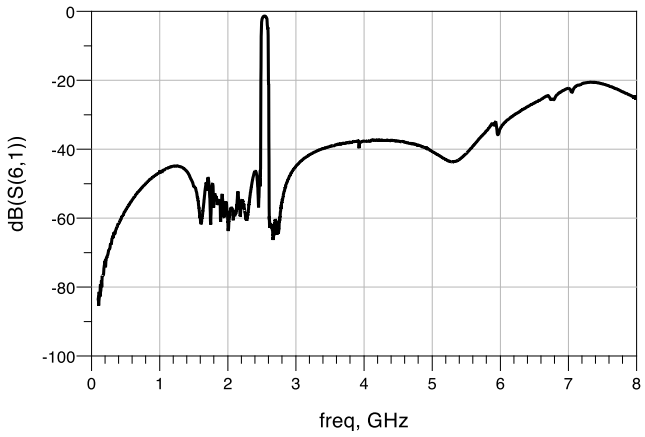
B3 TX WB



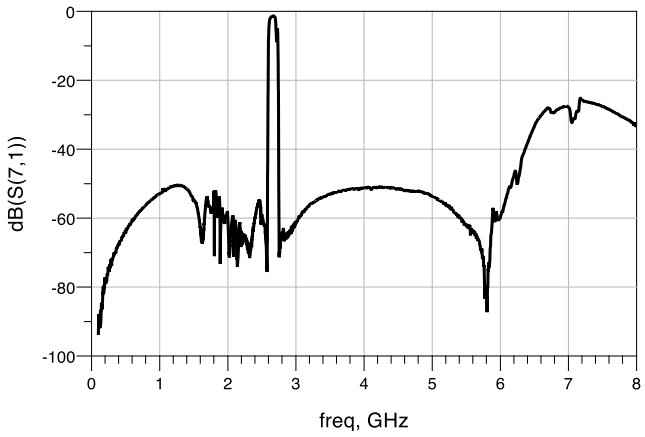
B3 RX WB



B7 TX WB

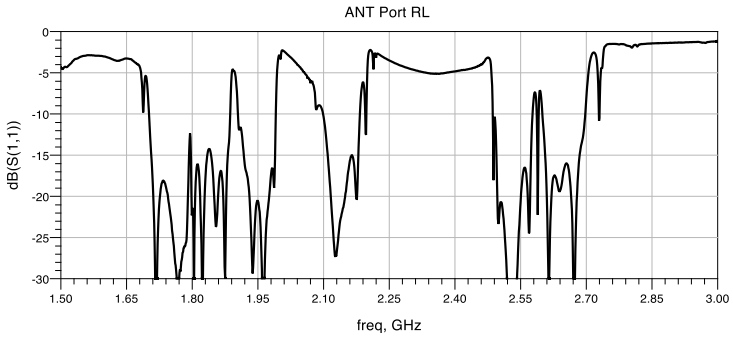


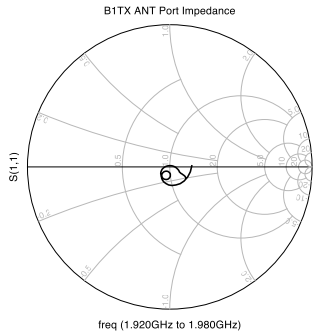
B7 RX WB

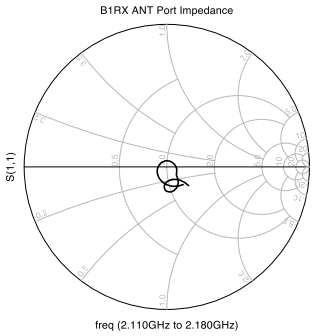


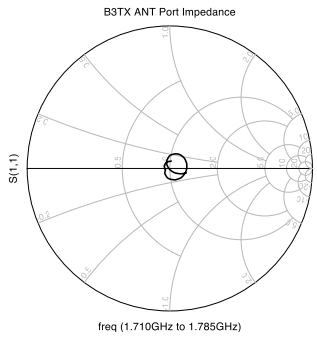
Performance Plots – ANT Port Return Loss/Impedance

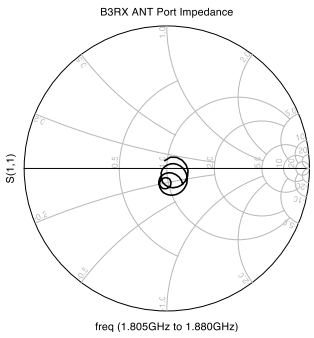
Test conditions unless otherwise noted: Temp. = +25 °C

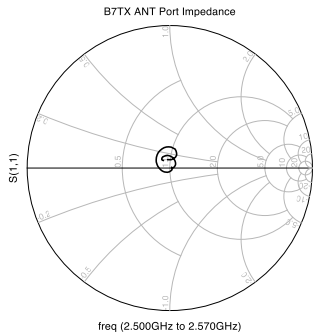


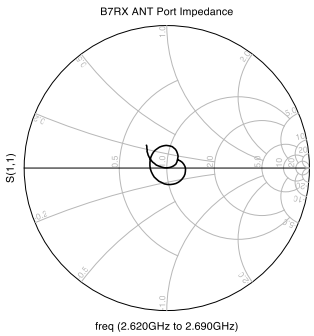






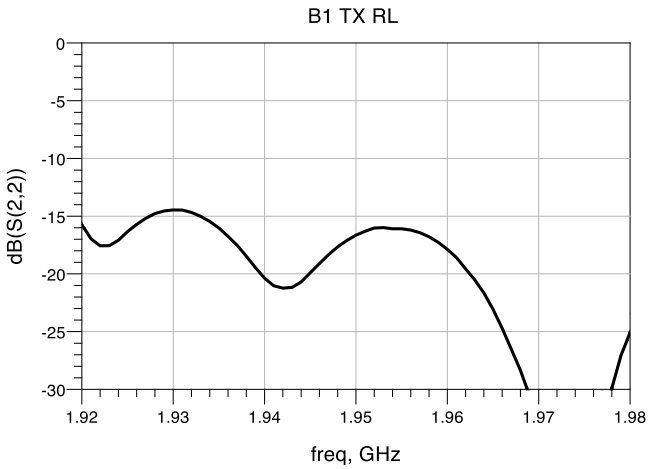


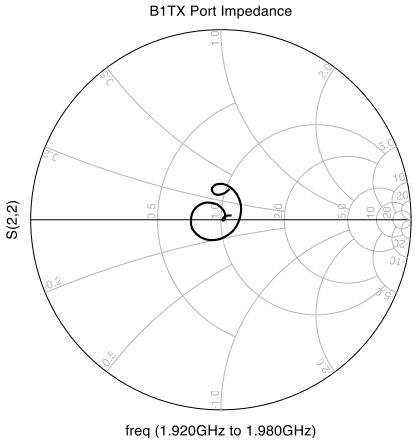


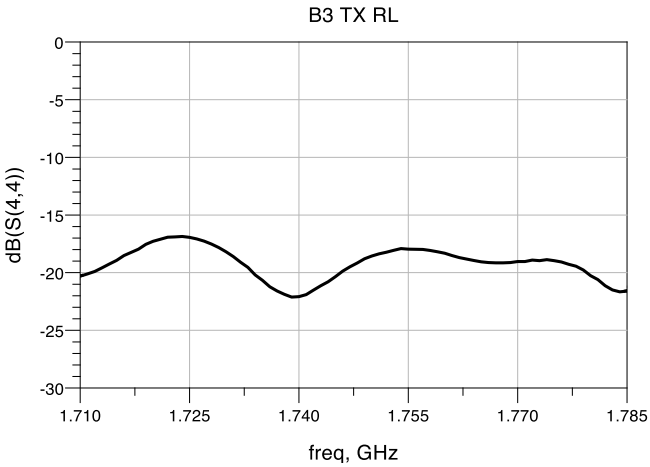


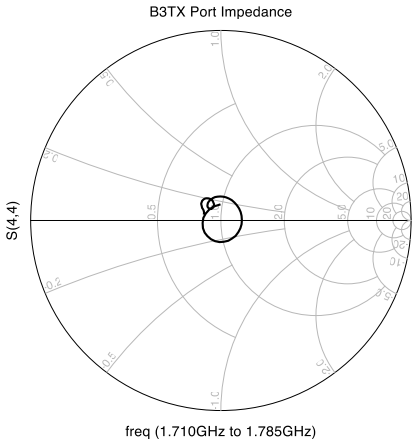
Performance Plots – TX Port Return Loss/Impedance

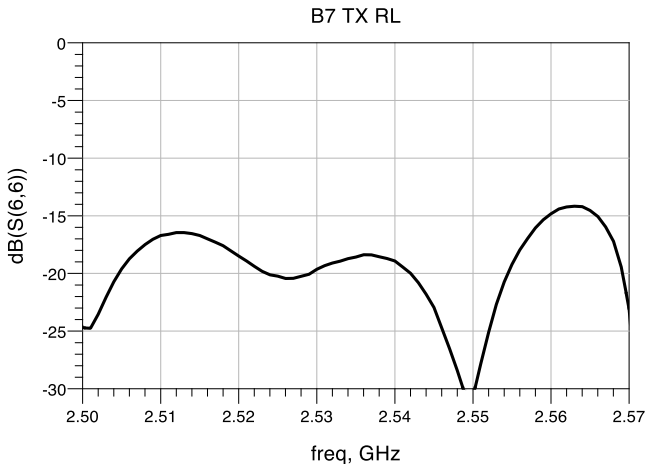
Test conditions unless otherwise noted: Temp. = +25 °C

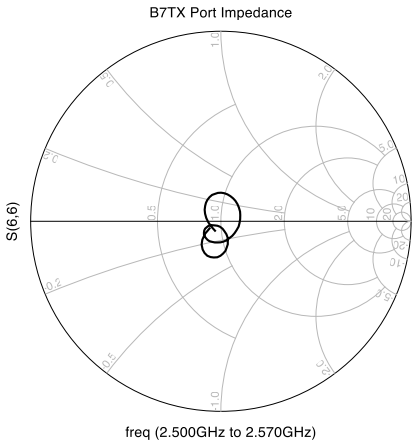






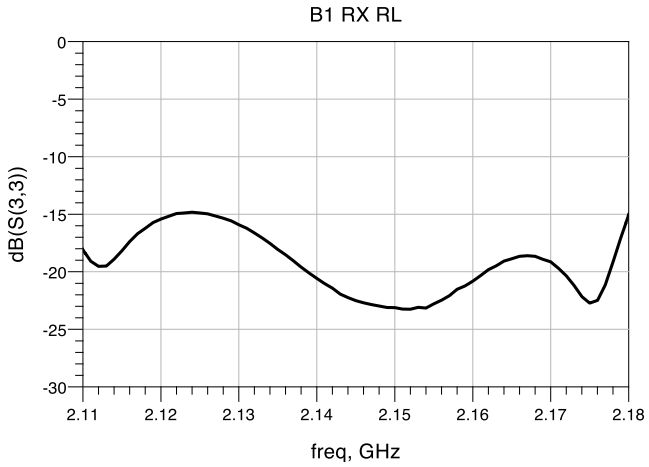


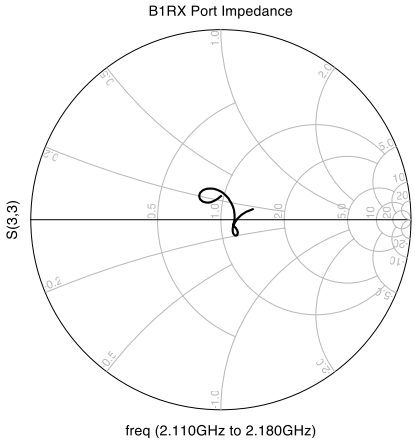


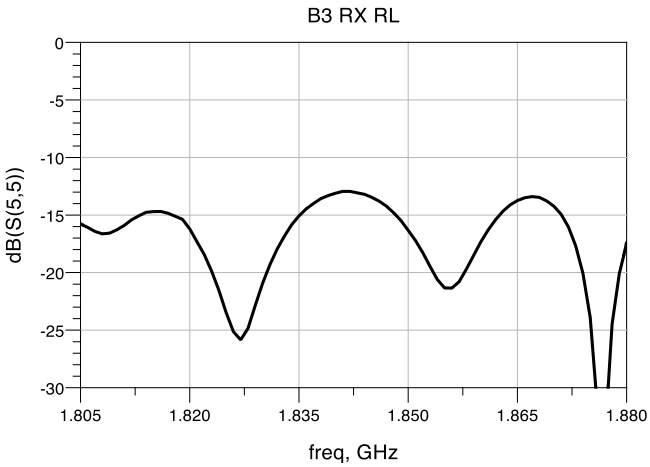


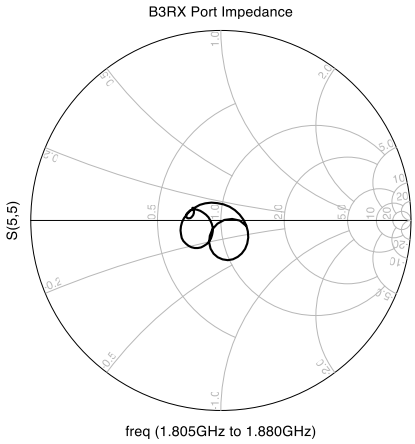
Performance Plots – RX Port Return Loss/Impedance

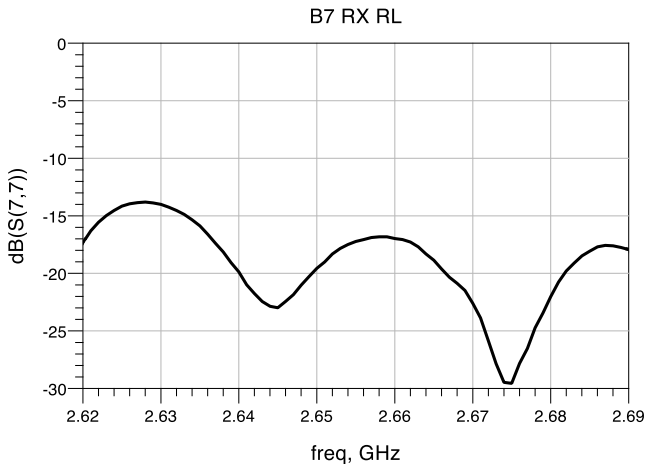
Test conditions unless otherwise noted: Temp. = +25 °C

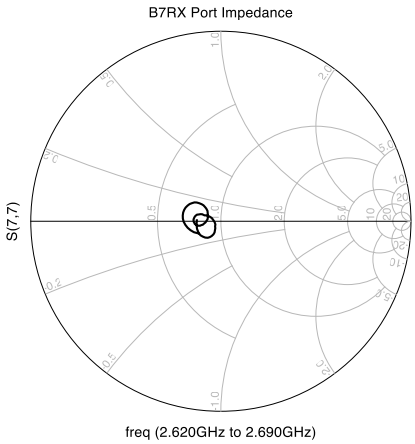








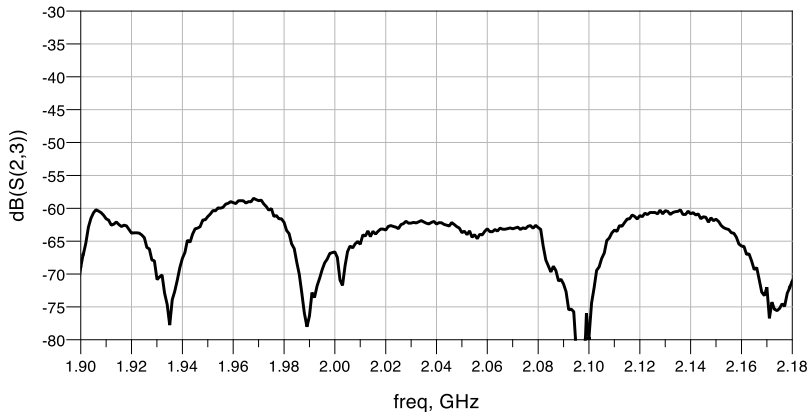




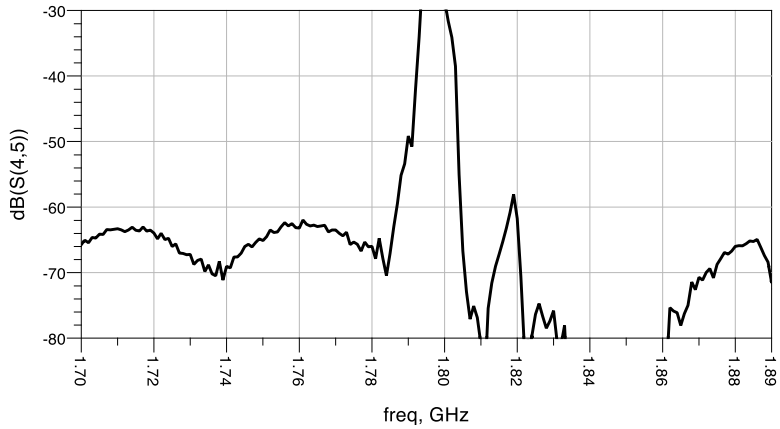
Performance Plots – Isolation

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

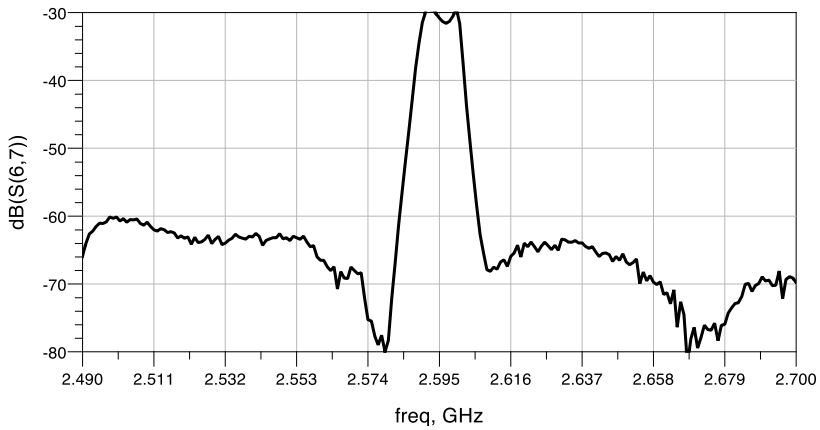
B1 TX/RX ISO



B3 TX/RX ISO



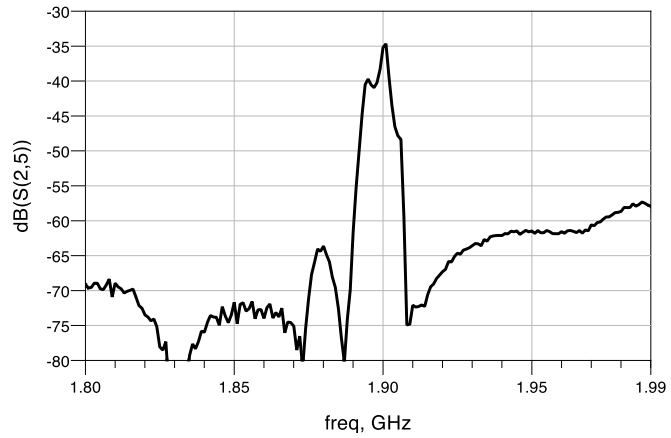
B7 TX/RX ISO



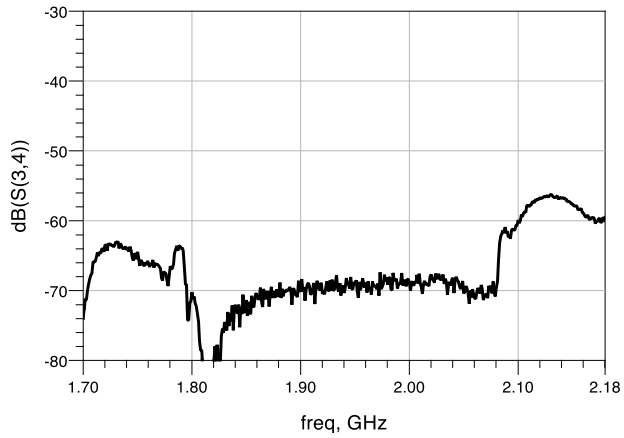
Performance Plots – Cross-Isolation

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

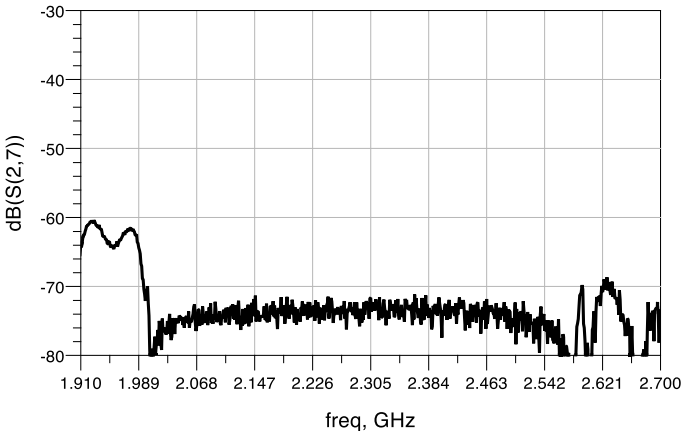
B1 TX - B3RX Cross-ISO



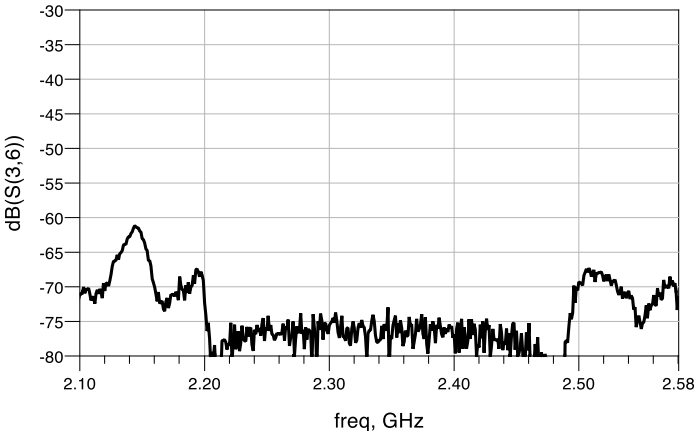
B1RX - B3TX Cross-ISO



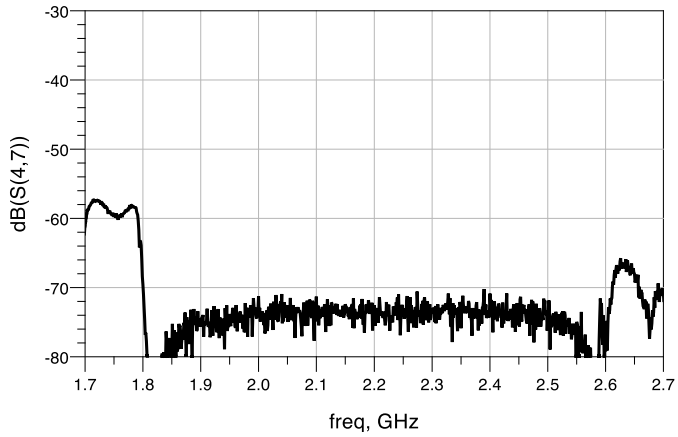
B1TX - B7RX Cross-ISO



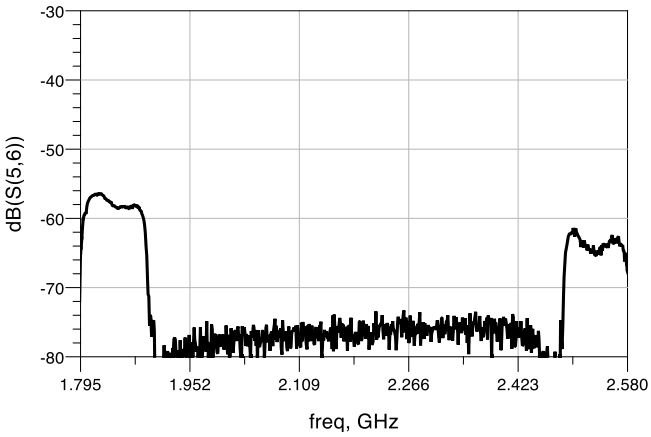
B1RX - B7TX Cross-ISO



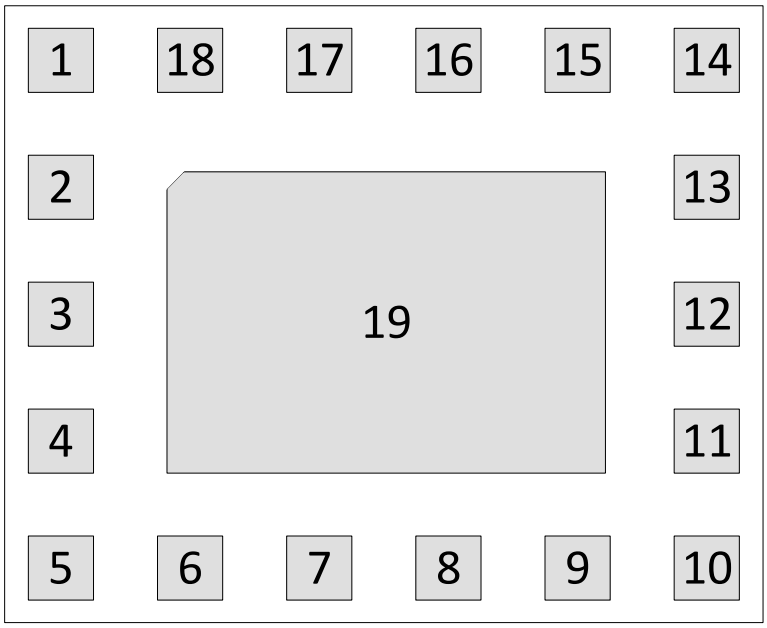
B3TX -B7RX Cross-ISO



B3RX-B7TX Cross-ISO



Pin Configuration and Description

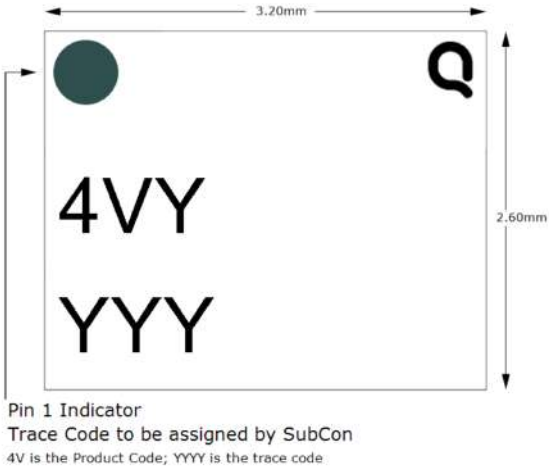


Top View

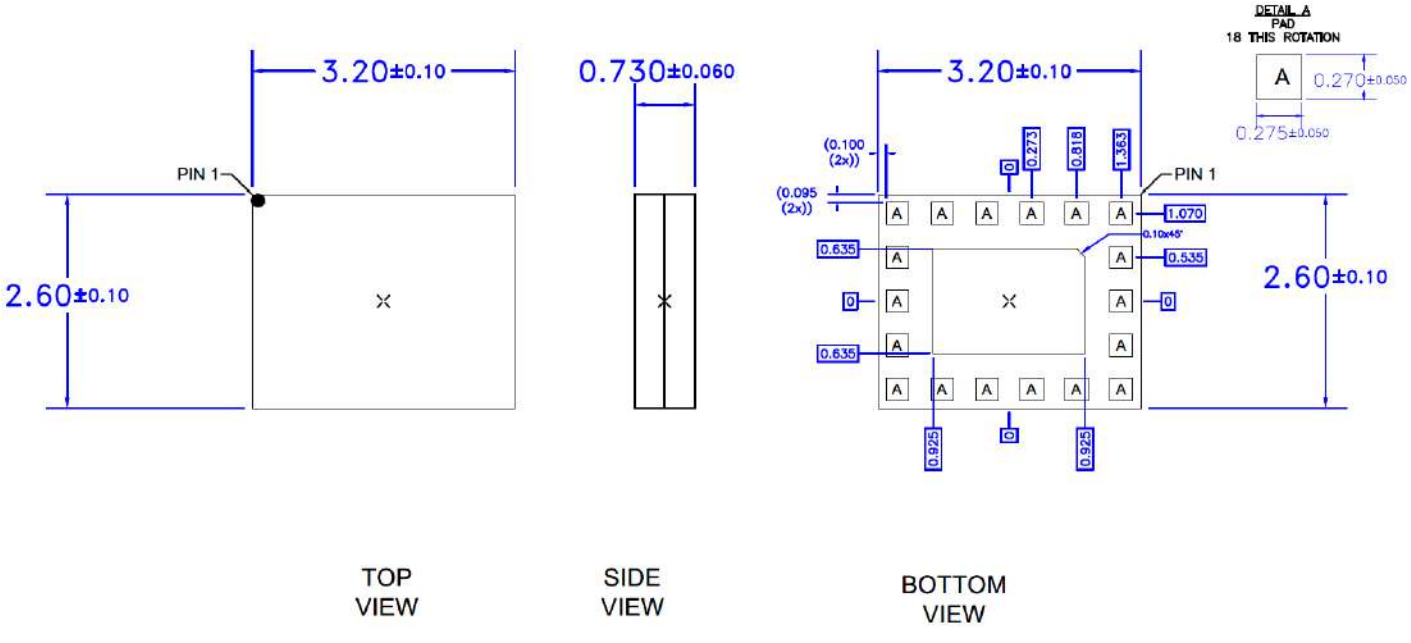
Pin Number	Label	Description
3	ANT	Band 1/3/7 Antenna Port
6	B7 TX	Band 7 Transmit Port
8	B3 TX	Band 3 Transmit Port
10	B1 TX	Band 1 Transmit Port
14	B1 RX	Band 1 Receive Port
16	B3 RX	Band 3 Receive Port
18	B7 RX	Band 7 Receive Port
1,2,4,5,7,9,11, 12,13,15,17,19	GND	Package Ground

Package Marking and Dimensions

Package Marking Diagram

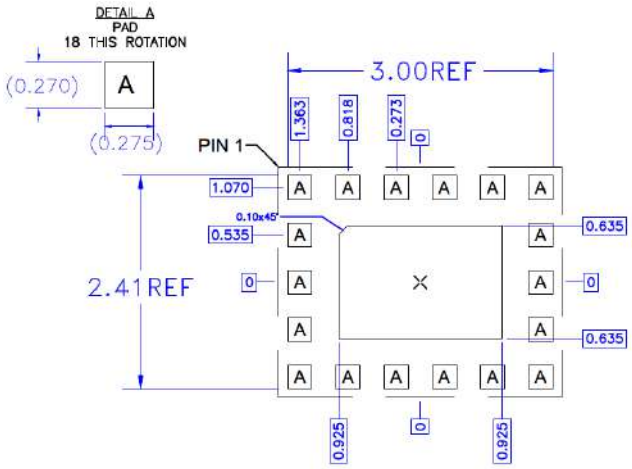
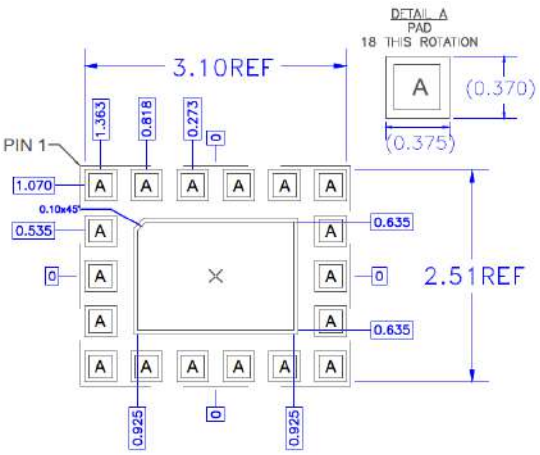


Package Outline Dimension Drawing



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

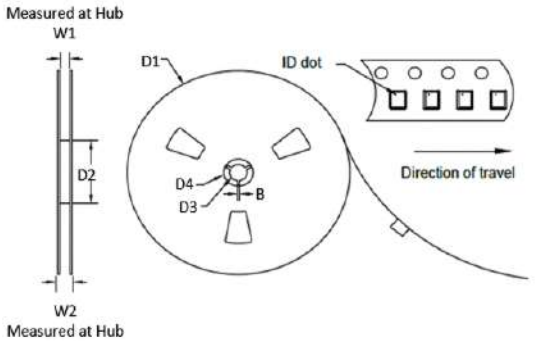
Mechanical Information

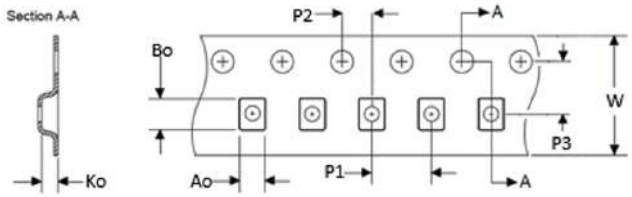
Recommended Land Pattern – Top View	Recommended Land Pattern Mask – Top View
	

RECOMMENDED
LAND PATTERN

RECOMMENDED
LAND PATTERN MASK

Tape and Reel Information – Carrier and Cover tape Dimensions





Feature	Measure	Symbol	Size (mm)
Flange	Diameter	D1	330.0
	Thickness	W2	18.2
	Space Between Flange	W1	12.8
Hub	Outer Diameter	D2	102.0
	Arbor Hole Diameter	D3	13.0
	Key Slit Width	B	2.0
	Key Slit Diameter	D4	20.2

Feature	Measure	Symbol	Size (mm)
Cavity	Length	Ao	2.8
	Width	Bo	3.5
	Depth	Ko	1.16
	Pitch	P1	4.0
Centerline Distance	Cavity to Perforation (Length)	P2	2.0
	Cavity to Perforation (Width)	P3	5.5
Carrier Tape	Width	W	12.0

(Unless otherwise specified, all dimension tolerances per EIA-481)

Handling Precautions

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

Caution!

ESD sensitive device

Solderability

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

Package lead plating: 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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free

REVISION HISTORY

Revision	Date	Description
A	04182018	Initial Document
B	01212019	Updated specifications
C	04162019	Updated Ordering Information, AMR, Tape/Reel and Handling
D	05142019	Updated specifications
E	22012020	Updated Part Marking diagram

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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QM26003

Band 1/3/n41 Pentaplexer

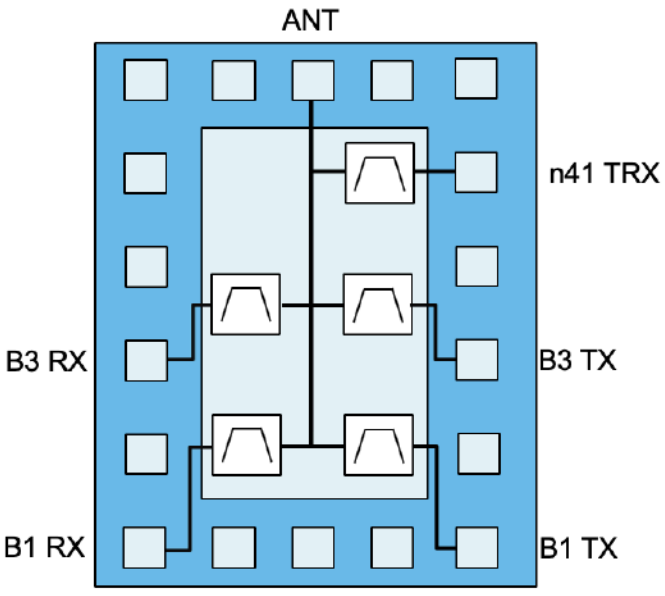
Product Overview

The QM26003 is a compact, high-performance filter module designed to meet the strict performance requirements of B1+B3+n41 carrier aggregation.

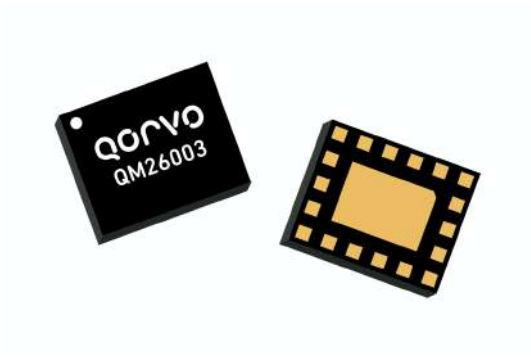
The QM26003 leverages Qorvo's patented technology to ensure minimal insertion loss in all bands being multiplexed while maintaining the high cross-isolation which is critical to ensure good receive sensitivity performance ensuring the best overall performance. In addition, the QM26003 is capable of supporting higher power levels to overcome additional front-end losses seen in today's handsets.

The QM26003 uses common module packing techniques to achieve a compact 3.2mm x 2.6mm footprint.

Functional Block Diagram



Bottom View



19 Pin 3.2mm x 2.6mm leadless SMT package

Key Features

- Compact Form-Factor: 3.2mm x 2.6mm
- Minimizes PA current drain with excellent TX IL
- Improved RX sensitivity with low RX IL
- Supports high power handling on FDD/TDD TX Filters
- Single-Ended
- RoHS Compliant, Pb-Free Module Package

Applications

- LTE/NR Mobile Products
  - Handsets
  - Datacards
- n41 PC2 (2496 MHz to 2690 MHz)
- Carrier Aggregation

Ordering Information

Part Number	Description
QM26003EVB	Evaluation Board (EVB)
QM26003SB	Sample bag of 5 pieces
QM26003SR	Sample reel of 100 pieces
QM26003TR13	13 inch reel of 10k pieces

Absolute Maximum Ratings

Parameter	Pin	Conditions	Rating	Units
Storage Temperature			-40 to +90	°C
RF Input Power	Pins 8 and 10	CW, 100% Duty Cycle, +55°C for 5k hours	+31	dBm
	Pin 6	CW, 40% Duty Cycle, +55°C for 5k hours	+32.5	dBm
Peak RF Input Power	Pins 8, and 10	Max duration 200ms	+35	dBm
	Pin 6	Max duration 200ms	+36	dBm

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

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
T_{CASE}	-30		+85	°C

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

Electrical Specifications[1] Band 1 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1920 MHz – 1925 MHz	-	1.6[2]	2.5	dB
	1925 MHz – 1980 MHz	-	1.9[2]	2.9	
VSWR (TX Port)	1920 MHz – 1980 MHz	-	1.4:1	2.0:1	-
VSWR (ANT Port)			1.34:1	2.0:1	
Attenuation	600 MHz – 1000 MHz	50	62	-	dB
	1452 MHz – 1496 MHz	45	56	-	
	1559 MHz – 1606 MHz	45	56	-	
	1805 MHz – 1880 MHz	50	62	-	
	2110 MHz – 2170 MHz	45	59	-	
	2400 MHz – 2500 MHz	50	69	-	
	2496 MHz – 2515 MHz	60	70	-	
	2515 MHz – 2675 MHz	52	60	-	
	2675 MHz – 2690 MHz	52	60	-	
	2620 MHz – 2690 MHz	52	60	-	
	3840 MHz – 3960 MHz	50	65	-	
	3400 MHz – 4200 MHz	40	50	-	
	4500 MHz – 4600 MHz	37	45	-	
	4900 MHz – 5940 MHz	15	19	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature

Electrical Specifications[1] Band 1 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2110 MHz – 2170 MHz	-	1.8[2]	2.9[3]	dB
VSWR (RX Port)	2110 MHz – 2170 MHz	-	1.75:1	2.0:1	-
VSWR (ANT Port)			1.34:1	2.0:1	
Attenuation	600 MHz – 1000 MHz	50	56	-	dB
	1710 MHz – 1785 MHz	45	56	-	
	1920 MHz – 1980 MHz	45	55	-	
	2400 MHz – 2500 MHz	50	62	-	
	2500 MHz – 2570 MHz	55	66	-	
	2496 MHz – 2515 MHz	50	65	-	
	2515 MHz – 2675 MHz	45	61	-	
	2675 MHz – 2690 MHz	45	60	-	
	4900 MHz – 5150 MHz	25	33	-	
	5150 MHz – 5950 MHz	13	21	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Specified from -15°C to +55°C

Electrical Specifications[1] Band 3 Transmit - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1710 MHz – 1780 MHz	-	1.34[2]	3	dB
	1780 MHz – 1785 MHz	-	2.2[2]	3.6[3]	
VSWR (TX Port)	1710 MHz – 1715 MHz	-	1.76:1	2.0:1[4]	-
	1715 MHz – 1785 MHz	-	1.5:1	2.0:1[3]	
VSWR (ANT Port)	1710 MHz – 1715 MHz	-	1.7:1	2.0:1[4]	
	1715 MHz – 1785 MHz	-	1.7:1	2.0:1	
Attenuation	600 MHz – 1000 MHz	47	54	-	dB
	1452 MHz – 1496 MHz	40	45	-	
	1559 MHz – 1606 MHz	45	53	-	
	1805 MHz – 1880 MHz	47	59	-	
	2110 MHz – 2170 MHz	45	51	-	
	2400 MHz – 2500 MHz	45	55	-	
	2496 MHz – 2515 MHz	40	55	-	
	2515 MHz – 2675 MHz	40	53	-	
	2675 MHz – 2690 MHz	40	54	-	
	2620 MHz – 2690 MHz	45	53	-	
	3400 MHz – 3800 MHz	40	50	-	
	3420 MHz – 3570 MHz	45	60	-	
	3800 MHz – 4200 MHz	15	30	-	
	4500 MHz – 4600 MHz	15	21	-	
	4800 MHz – 4900 MHz	21	29	-	
	4900 MHz – 5900 MHz	12	24	-	

Notes:

1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Specified from -30°C to +55°C
4. Specified from +25°C to +85°C

Electrical Specifications[1] Band 3 Antenna - Receive

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	1805 MHz – 1820 MHz	-	1.9[2]	3.2	dB
	1820 MHz – 1880 MHz	-	1.5[2]	2.9	
VSWR (RX Port)	1805 MHz – 1880 MHz	-	1.7:1	2.0:1	-
VSWR (ANT Port)			1.56:1	2.0:1	
Attenuation	600 MHz – 1000 MHz	45	54	-	dB
	1710 MHz – 1785 MHz	45	60	-	
	1920 MHz – 1980 MHz	45	55	-	
	2400 MHz – 2500 MHz	40	60	-	
	2500 MHz – 2570 MHz	40	61	-	
	2496 MHz – 2515 MHz	40	61	-	
	2515 MHz – 2675 MHz	50	62	-	
	2675 MHz – 2690 MHz	55	63	-	
	4900 MHz – 5950 MHz	25	37	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature

Electrical Specifications[1] Band n41 - Antenna

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	2496 MHz – 2515 MHz	-	2.7[2]	3.6	dB
	2515 MHz – 2520 MHz	-	2.4[2]	3.3	
	2575 MHz – 2675 MHz	-	1.9[2]	3.1	
	2675 MHz – 2690 MHz	-	2.4[2]	3.6	
VSWR (TX/RX Port)	2496 MHz – 2515 MHz	-	1.47:1	2.0:1	-
	2515 MHz – 2675 MHz	-	1.53:1	2.0:1	
	2675 MHz – 2690 MHz	-	1.51:1	2.0:1	
VSWR (ANT Port)	2496 MHz – 2515 MHz	-	1.76:1	2.0:1	-
	2515 MHz – 2675 MHz	-	1.92:1	2.2:1	
	2675 MHz – 2690 MHz	-	1.92:1	2.2:1	
Attenuation	617 MHz – 960 MHz	35	40	-	dB
	1166.22 MHz – 1254 MHz	35	40	-	
	1559.052 MHz – 1605.89 MHz	45	51	-	
	1710 MHz – 1785 MHz	55	60	-	
	1805 MHz – 1880 MHz	55	61	-	
	1880 MHz – 1920 MHz	55	62	-	
	1920 MHz – 1990 MHz	55	62	-	
	2110 MHz – 2170 MHz	49	58	-	
	2403 MHz – 2421 MHz[3] WiFi CH1	25	37	-	
	2408 MHz – 2426 MHz[3] WiFi CH2	30	38	-	dB
	2413 MHz – 2436 MHz[3] WiFi CH3-4	30	41	-	dB
	2423 MHz – 2441 MHz[3] WiFi CH5	30	38	-	dB
	2428 MHz – 2466 MHz[3] WiFi CH6-10	30	36	-	dB
	2453 MHz – 2471 MHz[3] WiFi CH11	9.5	32	-	dB
	3300 MHz – 3800 MHz	21	27	-	dB
	3800 MHz – 4200 MHz	29	35	-	dB
	4400 MHz – 5000 MHz	30	37	-	dB
	5030 MHz – 5350 MHz	30	35	-	dB
	5150 MHz – 5850MHz	30	35	-	dB

1. All specifications are based on the Qorvo schematic for the main reference design
2. Typical specified as average at room temperature
3. Each channel integrated over 18MHz

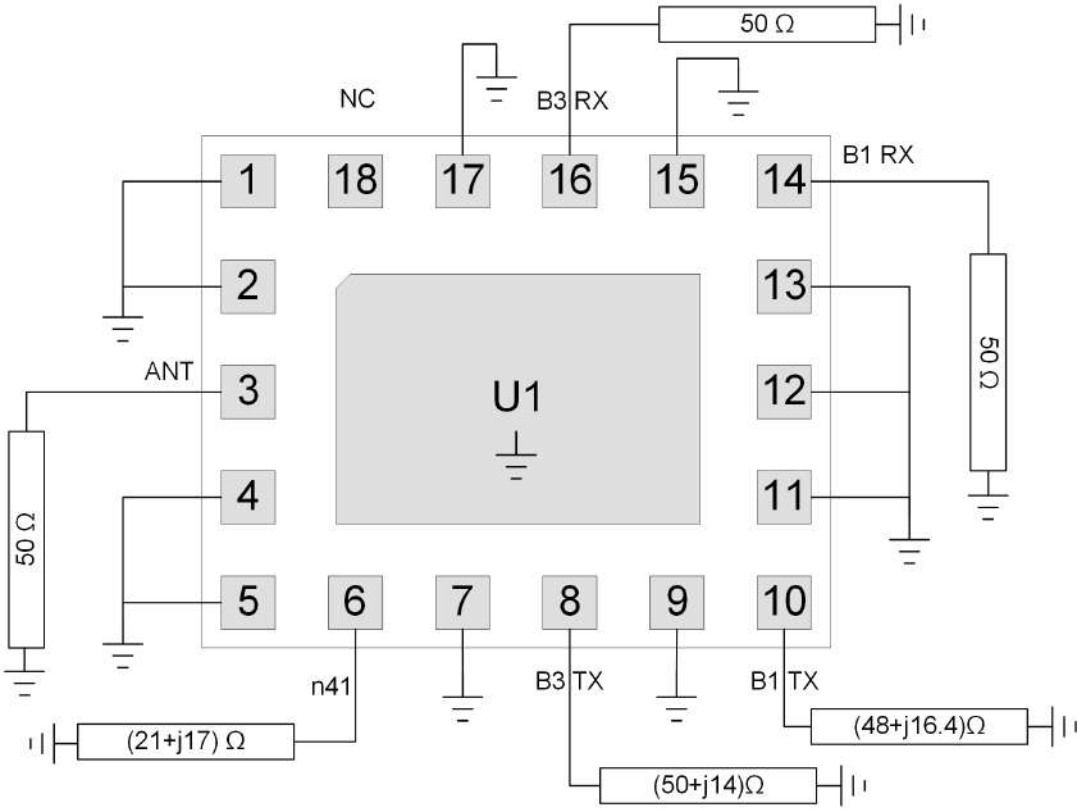
Electrical Specifications[1] Isolation

Unless Otherwise Noted: Operating Temp = −30 °C to +85 °C

Parameter	Conditions	Min.	Typ.	Max.	Units
TX-RX Isolation in B1 RX	2110 MHz – 2170 MHz	55	60	-	dB
TX-RX Isolation in B1 TX	1920 MHz – 1980 MHz	52	59	-	
TX-RX Isolation in B3 RX	1805 MHz – 1880 MHz	55	61	-	
TX-RX Isolation in B3 TX	1710 MHz – 1785 MHz	55[2]	61	-	
B1 TX to B3 RX Isolation in B3 RX	1805 MHz – 1880 MHz	55	64	-	
B1 TX to B3 RX Isolation in B1 TX	1920 MHz – 1980 MHz	54	58	-	
B3 TX to B1 RX Isolation in B3 TX	1710 MHz – 1785 MHz	50	57	-	
B3 TX to B1 RX Isolation in B1 RX	2110 MHz – 2170 MHz	50	53	-	
B1 TX to B41 Isolation in B1 TX	1920 MHz – 1980 MHz	55	63	-	
B1 TX to B41 Isolation in B41	2496 MHz – 2690 MHz	55	61	-	
B3 TX to B41 Isolation in B3 TX	1710 MHz – 1785 MHz	53	57	-	
B3 TX to B41 Isolation in B41	2496 MHz – 2690 MHz	49	52	-	

Notes:
1. All specifications are based on the Qorvo schematic for the main reference design
2. Specified from -30°C to +55°C

Application Circuit Schematic



Top View

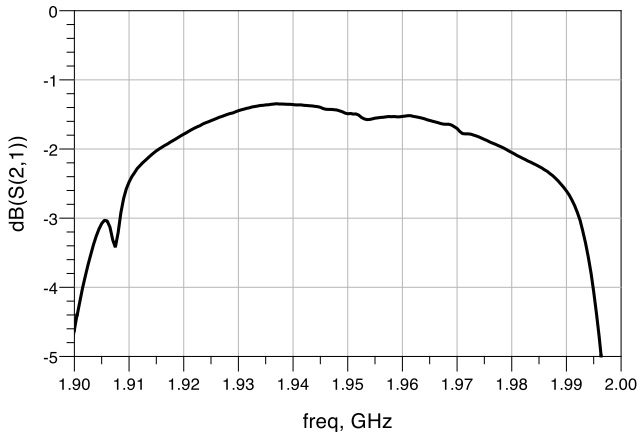
Bill of Materials

Ref. Des.	Value	Description	Manuf.	Part number
U1	N/A	Band 1/3/n41 Pentaplexer	Qorvo	QM26003
PCB	N/A	4-layer Printed Circuit Board		

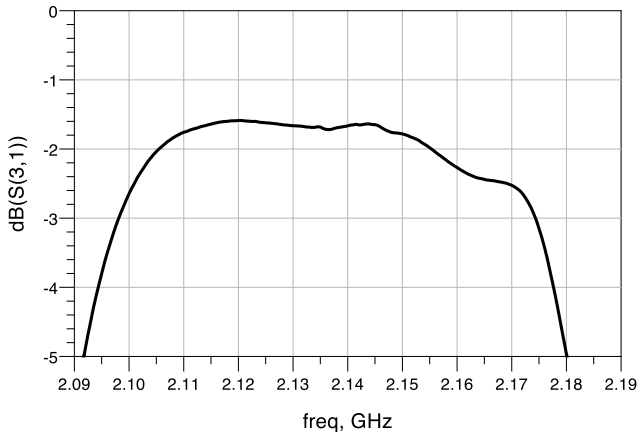
Simulated Performance Plots – Pass Band

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

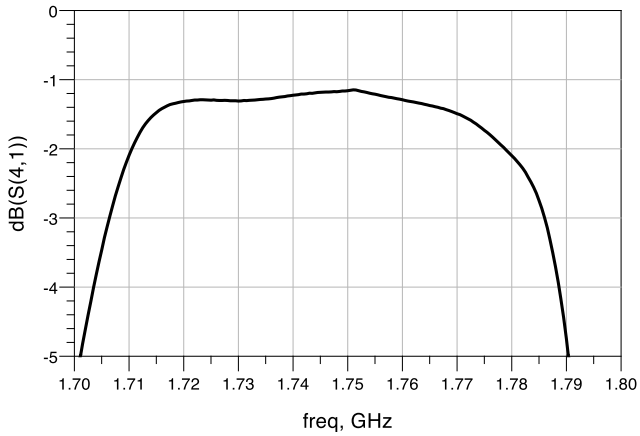
B1 TX Pass Band



B1 RX Pass Band

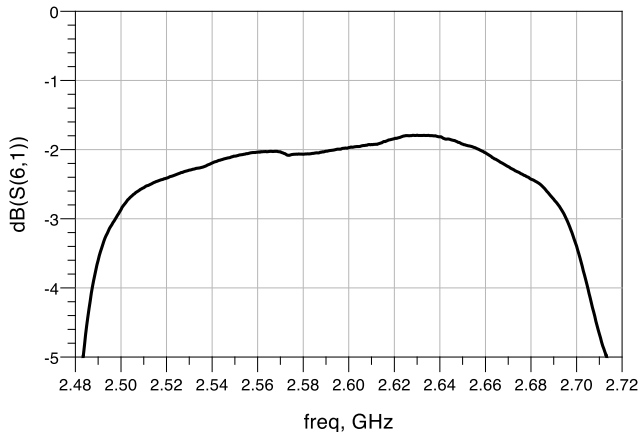


B3 TX Pass Band



B3 RX Pass Band

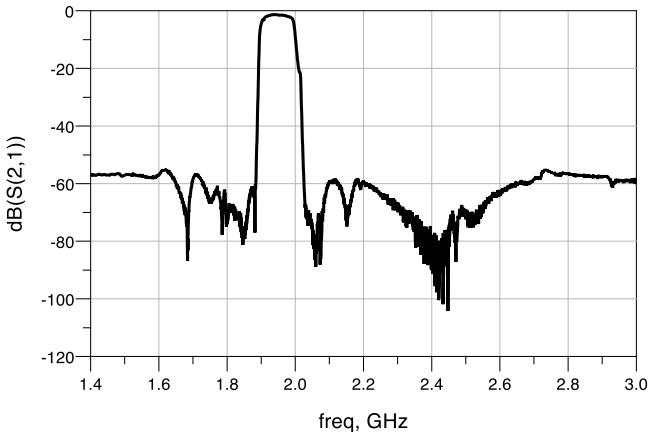
B41 Pass Band



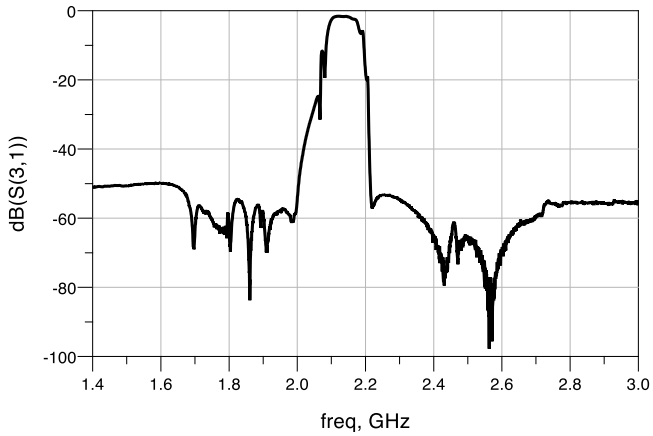
Simulated Performance Plots – Narrow Band

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

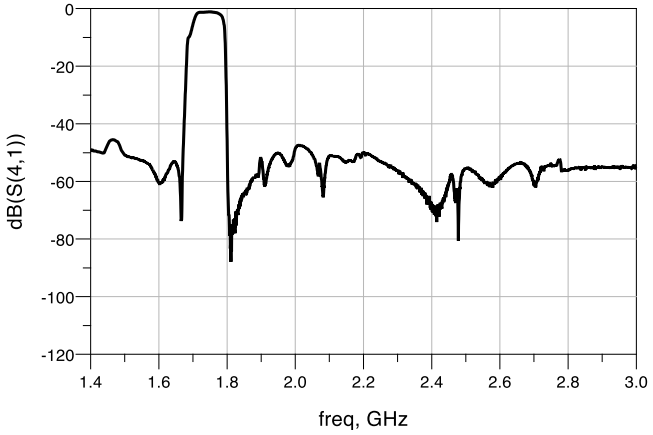
B1 TX Narrow Band



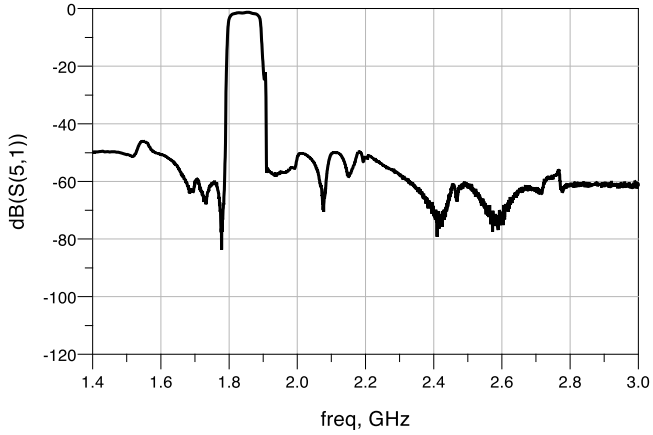
B1 RX Narrow Band



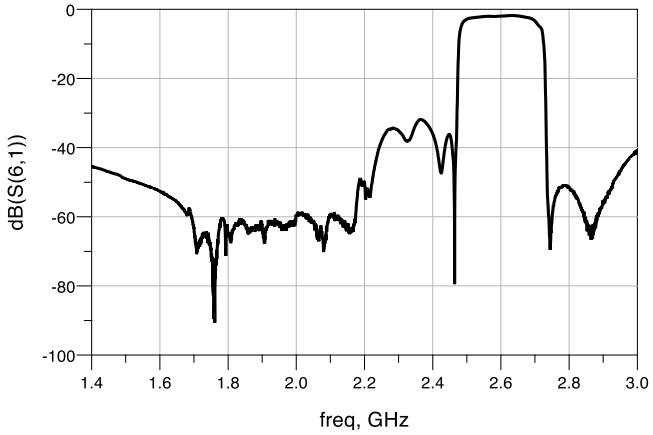
B3 TX Narrow Band



B3 RX Narrow Band



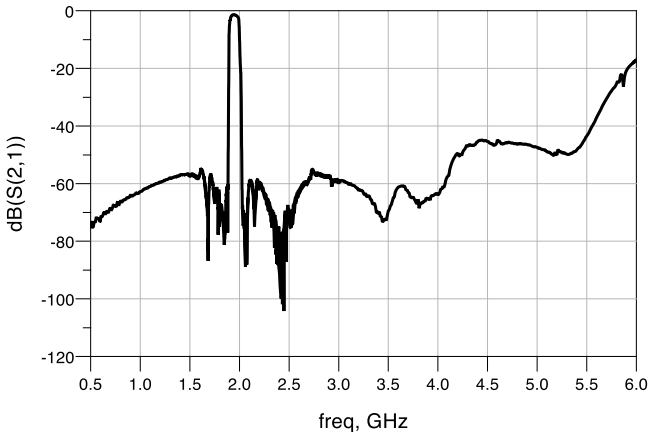
B41 Narrow Band



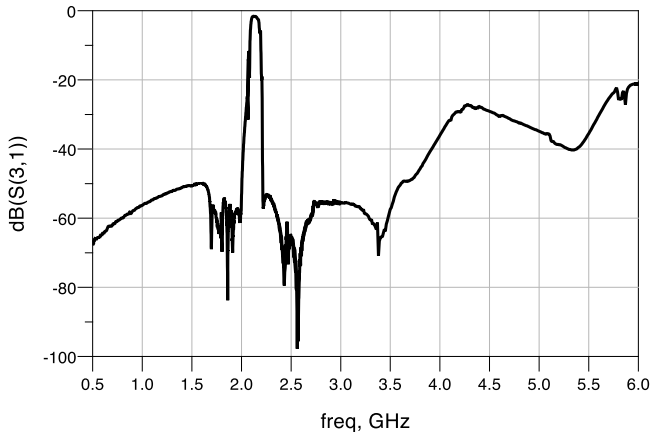
Simulated Performance Plots – Wide Band

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

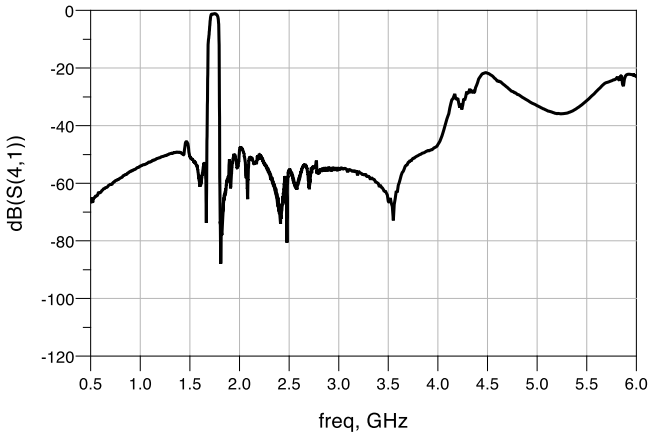
B1 TX Wide Band



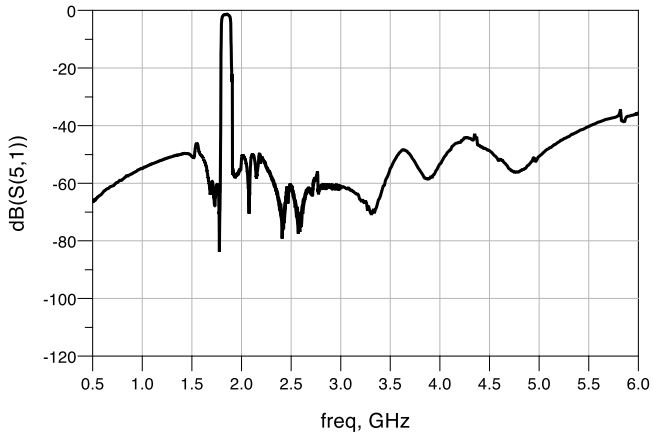
B1 RX Wide Band



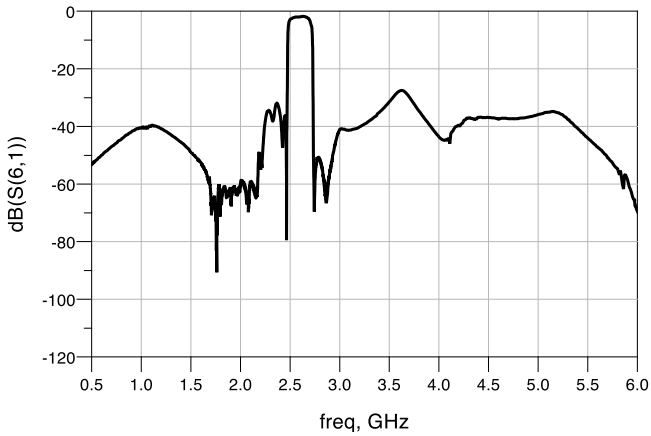
B3 TX Wide Band



B3 RX Wide Band

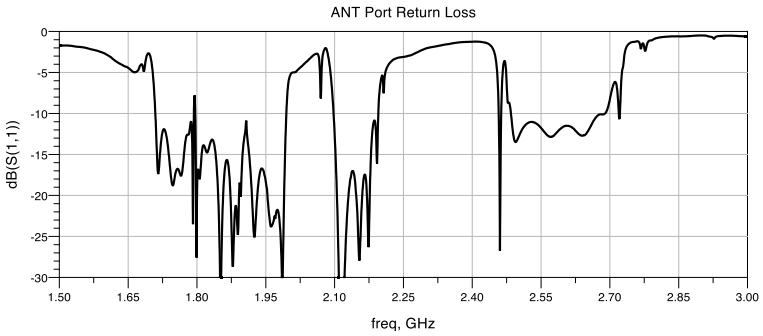


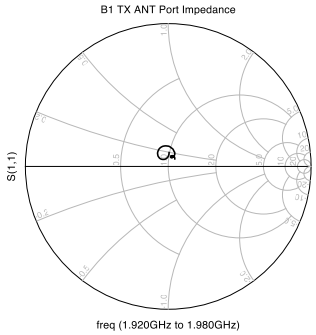
B41 Wide Band

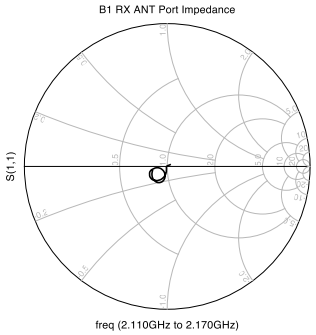


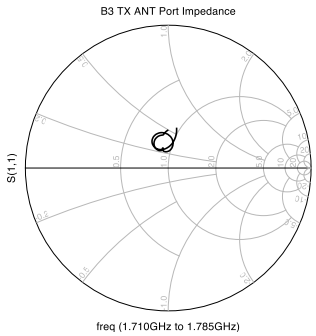
Simulated Performance Plots – ANT Port Return Loss/Impedance

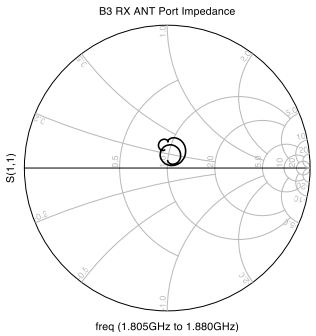
Test conditions unless otherwise noted: Temp. = +25 °C

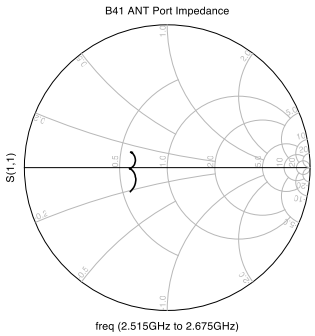






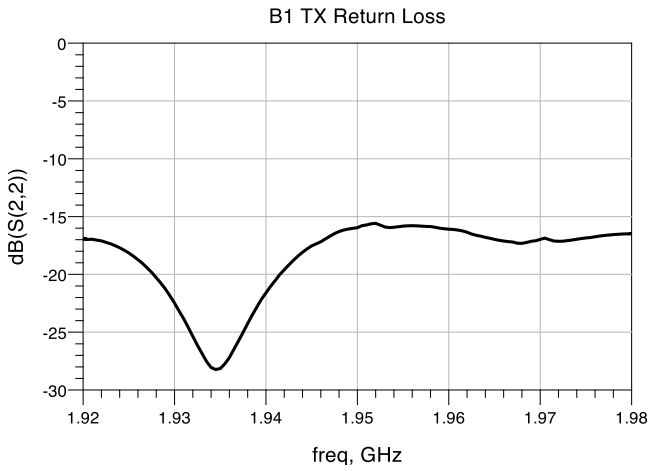


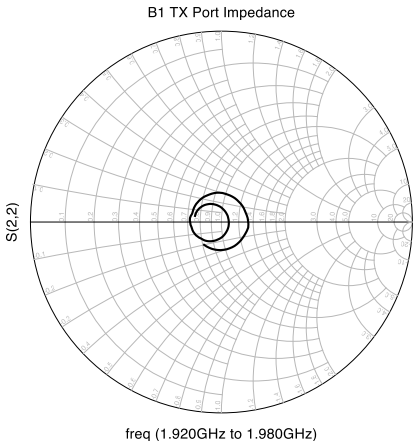


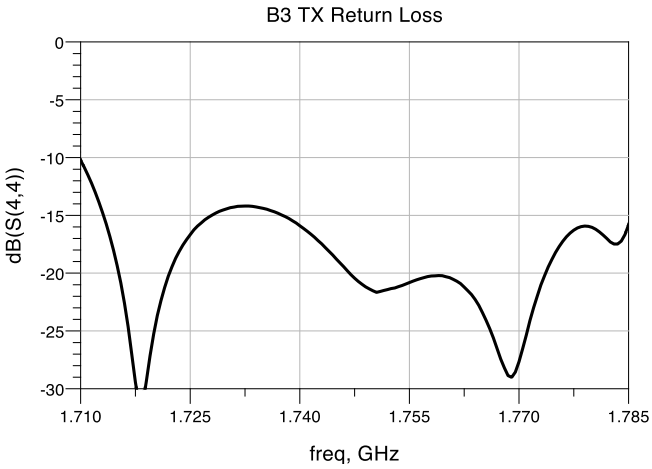


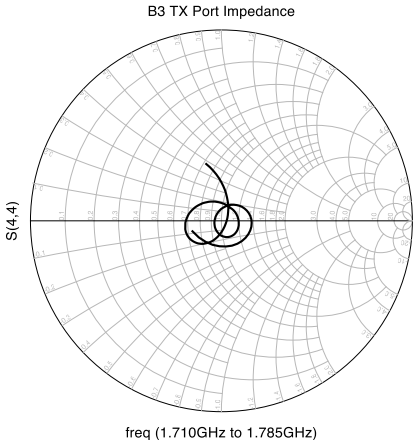
Simulated Performance Plots – TX Port Return Loss/Impedance

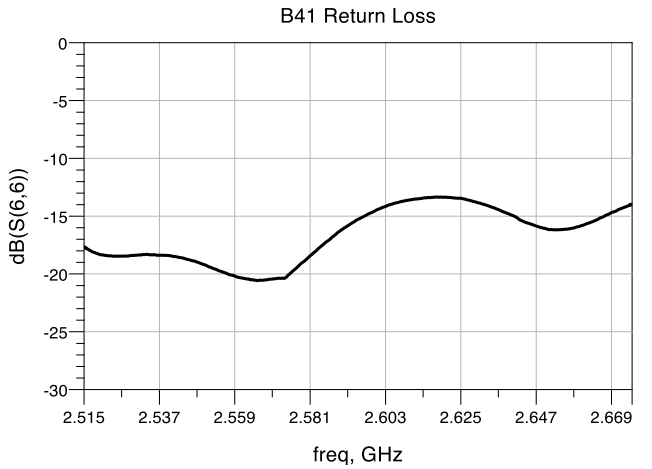
Test conditions unless otherwise noted: Temp. = +25 °C

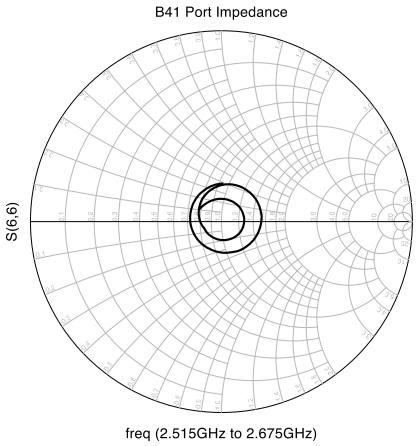






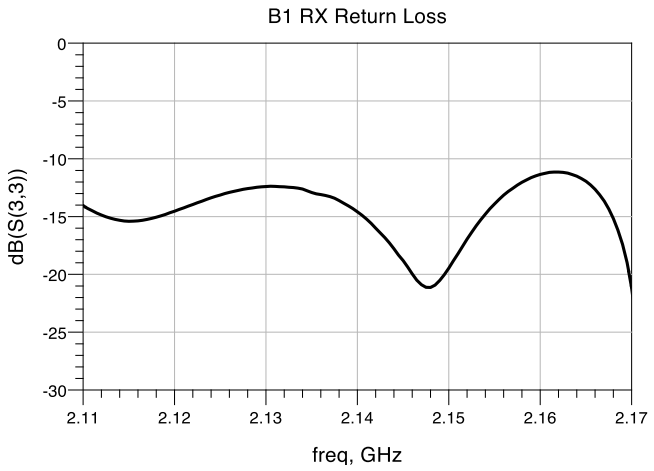


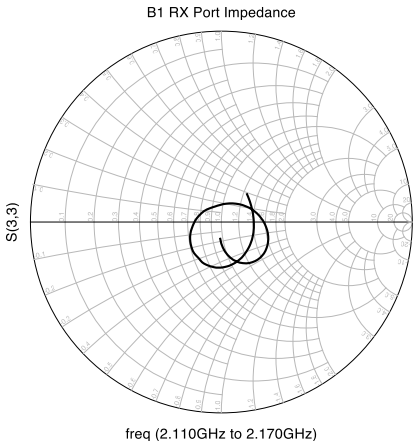


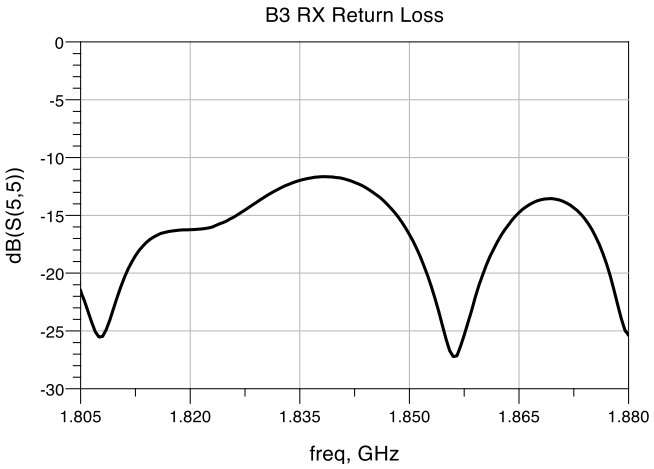


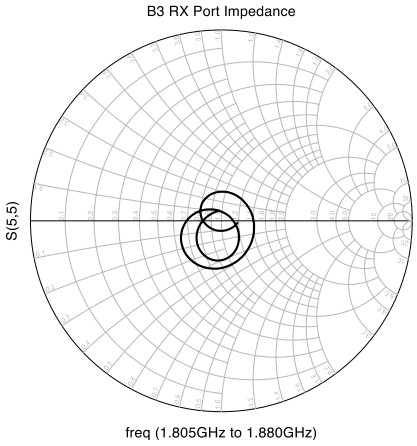
Simulated Performance Plots – RX Port Return Loss/Impedance

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



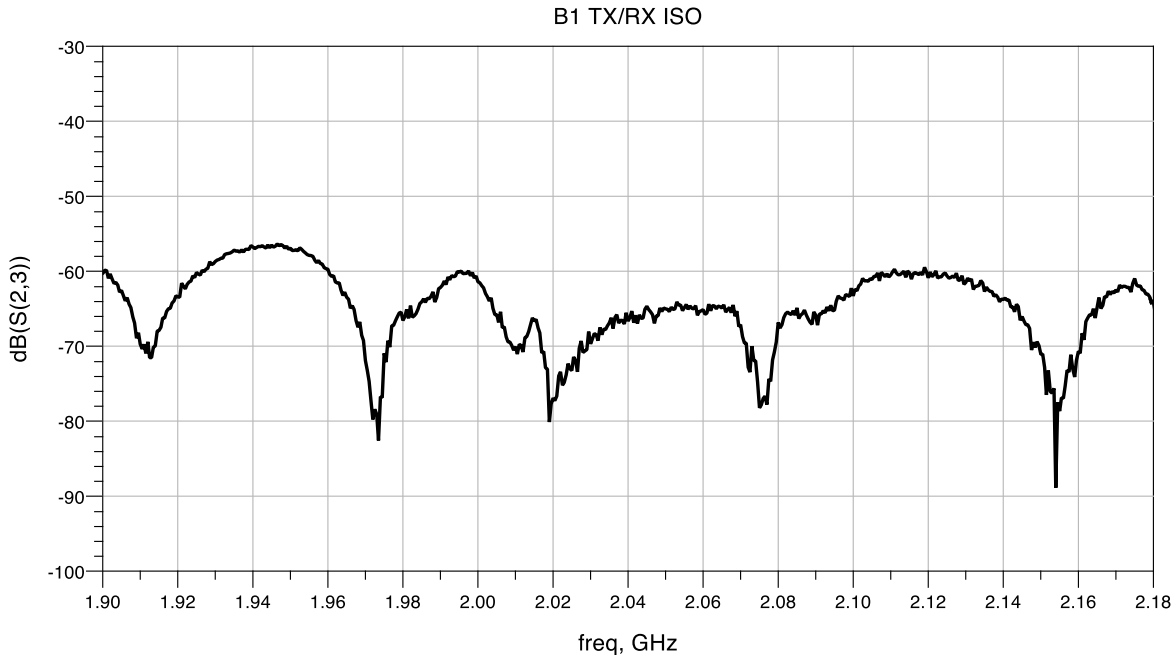


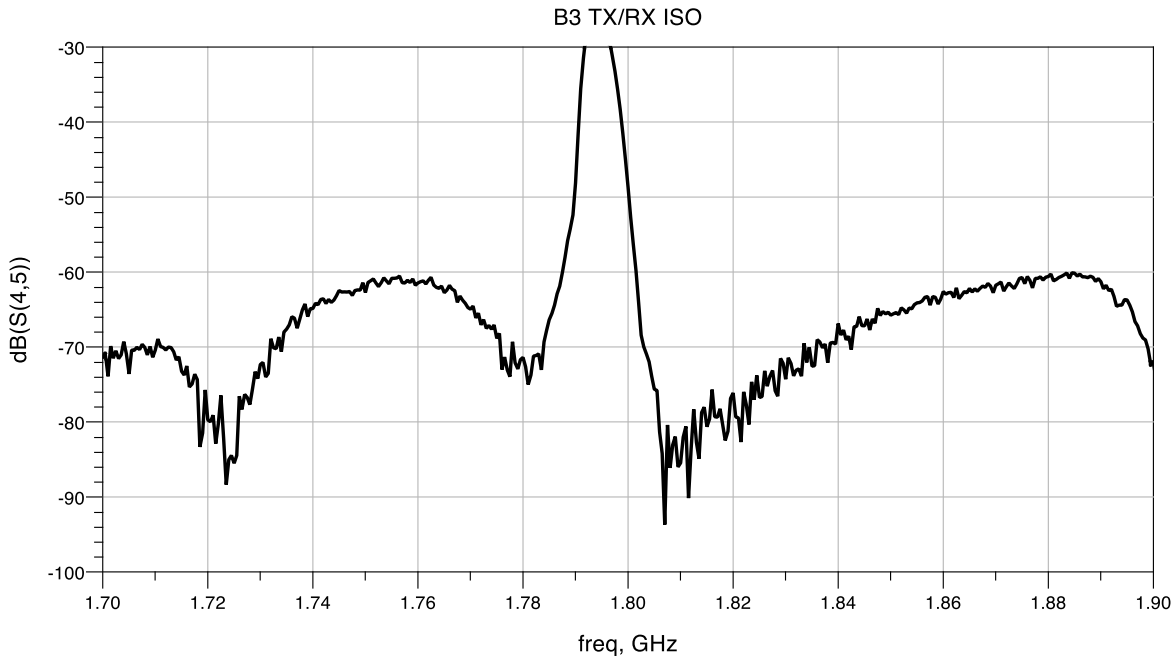




Simulated Performance Plots – Isolation

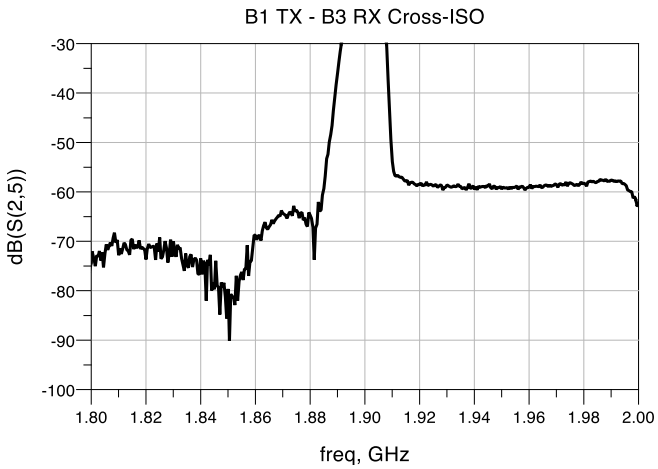
Test conditions unless otherwise noted: Temp. = +25 °C

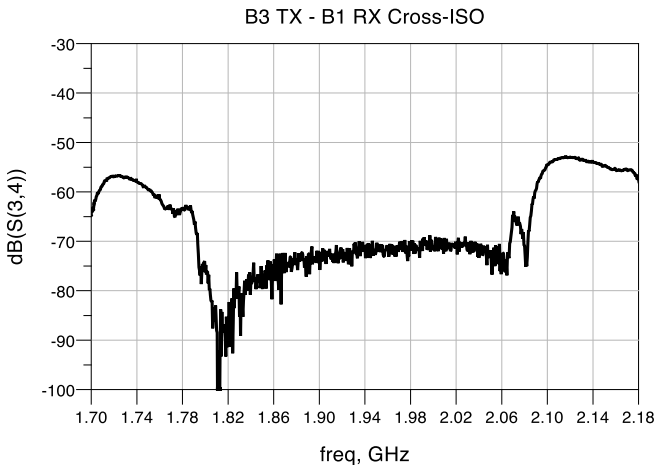


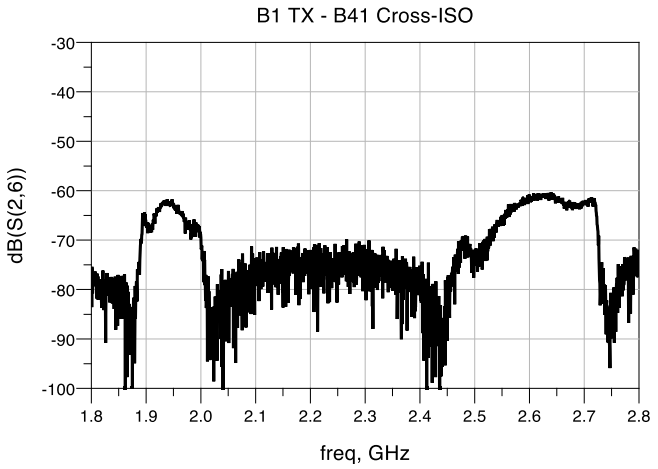


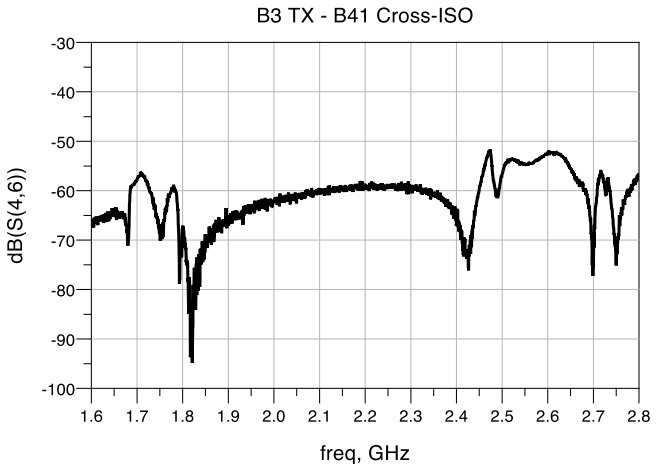
Simulated Performance Plots – Cross-Isolation

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

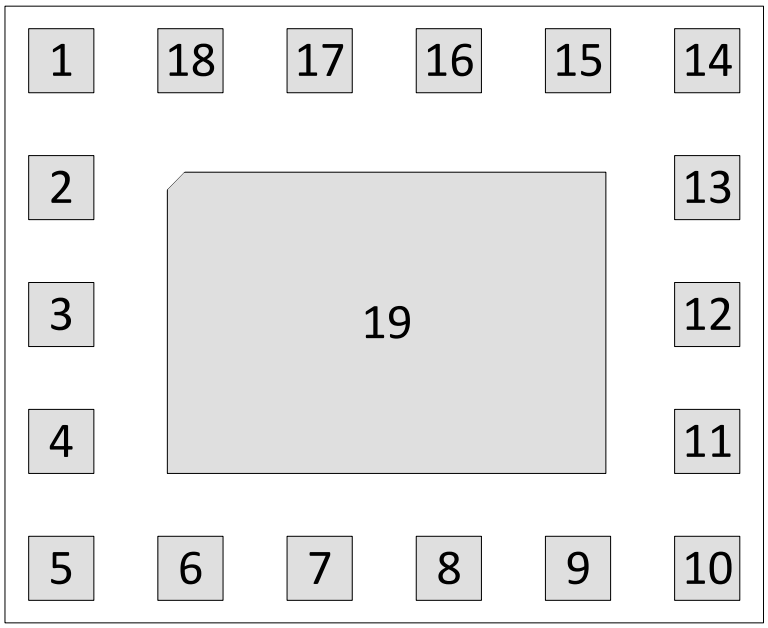








Pin Configuration and Description



Top View

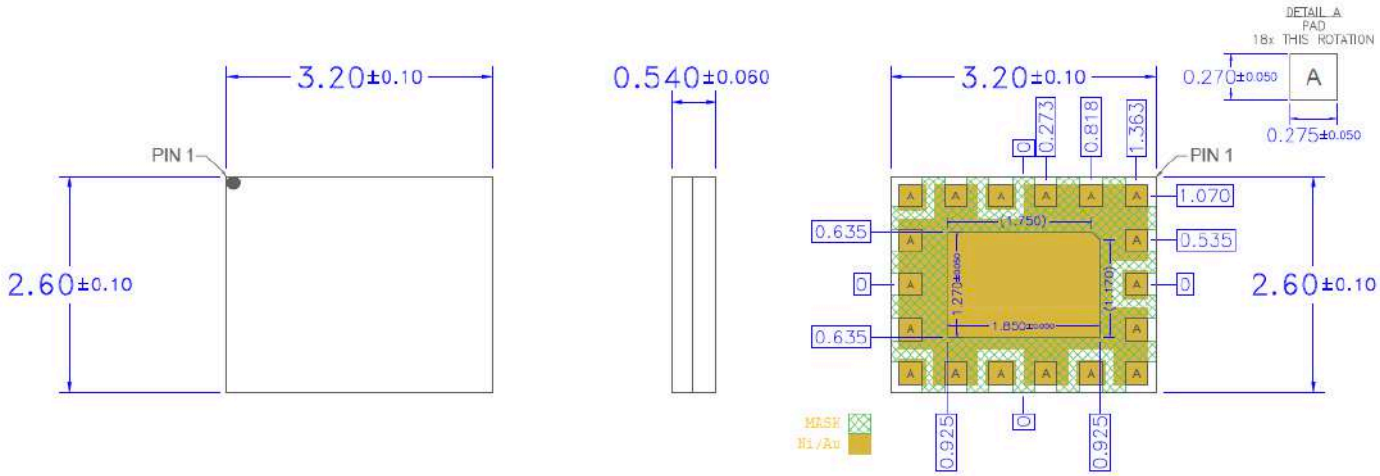
Pin Number	Label	Description
3	ANT	Band 1/3/n41 Antenna Port
6	n41 TX/RX	Band n41 Transmit/Receive Port
8	B3 TX	Band 3 Transmit Port
10	B1 TX	Band 1 Transmit Port
14	B1 RX	Band 1 Receive Port
16	B3 RX	Band 3 Receive Port
18	NC	No Connect
1,2,4,5,7,9,11, 12,13,15,17	GND	Ground
19	GND	Package Ground

Package Marking and Dimensions

Package Marking Diagram

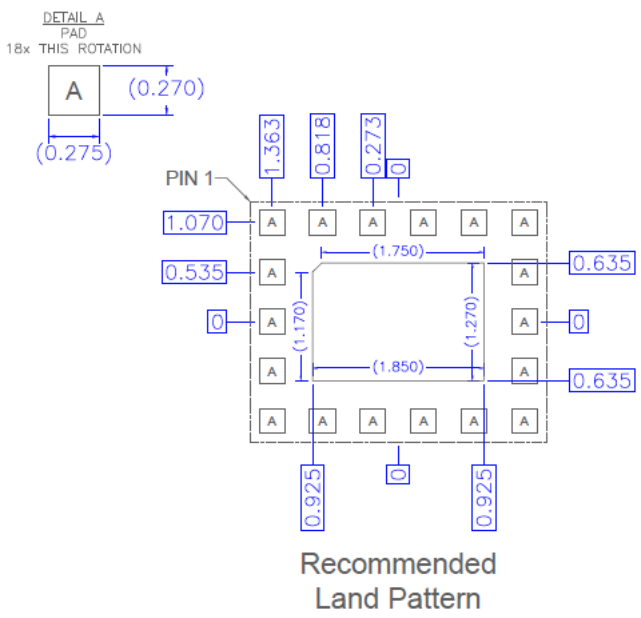
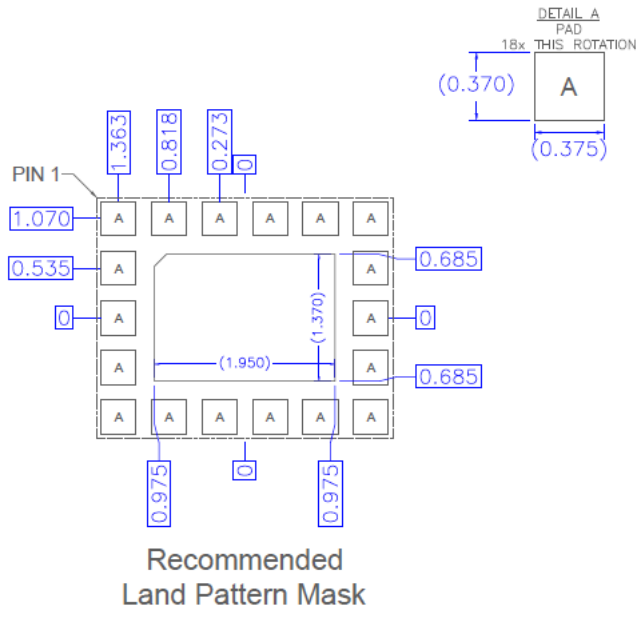
Pin 1 Indicator
Qorvo Logo - Use Q5D
Trace Code to be assigned by SubCon

Package Outline Dimension Drawing

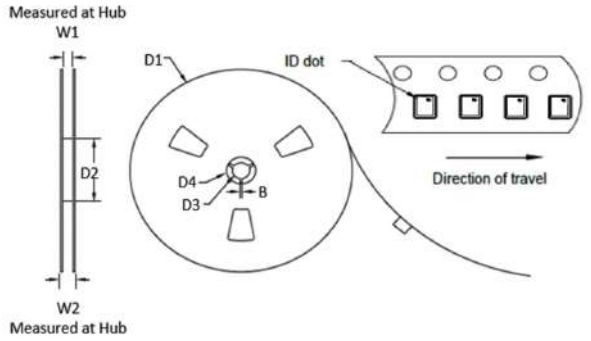


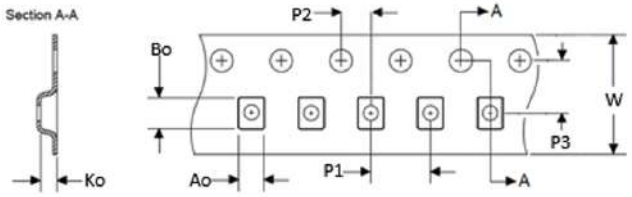
Notes:
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012

Mechanical Information

Recommended Land Pattern – Top View	Recommended Land Pattern Mask – Top View
	

Tape and Reel Information – Carrier and Cover tape Dimensions





Feature	Measure	Symbol	Size (mm)
Flange	Diameter	D1	330.0
	Thickness	W2	18.4(max)
	Space Between Flange	W1	12.4(min)
Hub	Outer Diameter	D2	102.0
	Arbor Hole Diameter	D3	13.0
	Key Slit Width	B	2.0
	Key Slit Diameter	D4	20.2

Feature	Measure	Symbol	Size (mm)
Cavity	Length	Ao	2.8
	Width	Bo	3.5
	Depth	Ko	1.0
	Pitch	P1	4.0
Centerline Distance	Cavity to Perforation (Length)	P2	2.0
	Cavity to Perforation (Width)	P3	5.5
Carrier Tape	Width	W	12.0

(Unless otherwise specified, all dimension tolerances per EIA-481)

Handling Precautions

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

Caution!

ESD sensitive device

Solderability

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

Package lead plating: 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.

- Lead-free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free
- Qorvo Green

REVISION HISTORY

Revision	Date (MMDDYYYY)	Description
C	02122021	Initial Production Release

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

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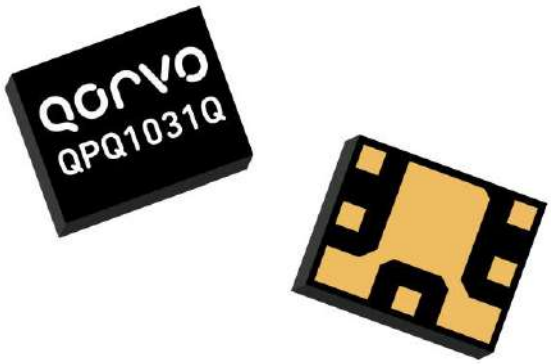
QPQ1031Q
Band 1/3 Multiplexer

Product Overview

The QPQ1031Q is a compact, high-performance multiplexer module fabricated using a patented LowDrift™ BAW technology with performance optimized to enable carrier aggregation of LTE bands 1 & 3.

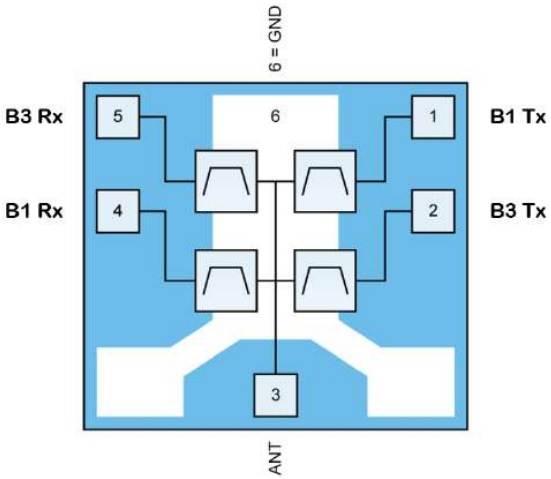
The QPQ1031Q leverages the high-Q properties of the LowDrift™ BAW technology to ensure minimal transmit insertion loss in all bands being multiplexed without loading each other. The QPQ1031Q module has also been designed with high cross-isolation which is critical to ensure good receive performance.

The QPQ1031Q uses unique Wafer Level Packaging (WLP) techniques to enable a compact 2.5 mm x 2.0 mm footprint.



6 Pin 2.5 x 2.0 x 0.685mm leadless SMT package

Functional Block Diagram



Bottom View

Key Features

- Qualified to AEC-Q200 Grade 3
- Industry leading compact form-factor: 2.5mm x 2.0mm
- Minimizes PA current drain with excellent TX IL
- Improved RX sensitivity with low RX IL
- Single-Ended (SE) Ant, TRx Ports
- RoHS Compliant, Pb-Free Module Package

Applications

- LTE Telematics Units
- Carrier Aggregation

Ordering Information

Part Number	Description
QPQ1031QSR	Sample reel of 100 pieces
QPQ1031QTR13	13 inch reel of 2500 pieces
QPQ1031QEVB	Evaluation Board (EVB)
QPQ1031QPCK	Fully Assembled EVB + Sample Bag with 5 pieces

Absolute Maximum Ratings

Parameter	Conditions	Rating
Storage Temperature		–40 to +100°C
RF Input Power, B1, Pin 1	CW, 1920 – 1980MHz, 25 °C	+38 dBm
RF Input Power, B3, Pin 2	CW, 1710 – 1785MHz, 25 °C	+36.5 dBm

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

Recommended Operating Conditions(1)

Parameter	Min.	Typ.	Max.	Units
Tambient(2)	-40		+85	°C

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

[2] Case temperature allows 10˚C max rise over Ambient

Minimum Lifetime Ratings

Conditions	Rating
RF CW input signal of 31dBm in the 1920 MHz – 1980 MHz at max temp of 85°C	87.6 KHrs
RF CW input signal of 31dBm in the 1710 MHz – 1785 MHz at max temp of 85°C	87.6 KHrs

Electrical Specifications[1] Band 1 Uplink - Antenna

UNLESS OTHERWISE NOTED: OPERATING TEMP = −40 °C to +85 °C

PARAMETER	CONDITIONS	MIN.	TYP[2]	MAX.	UNITS
Insertion Loss	1950 MHz		1.6[3]		dB
	1920 – 1980 MHz		2.0[4]	2.6	
VSWR (Uplink Port)	1920 – 1980 MHz		1.9	2.5	Ratio
VSWR (ANT Port)			1.6	2.3	
Attenuation[5]	1495.9 – 1510.9 MHz	31	55		dB
	1559 – 1605 MHz	41	56		
	1605.8 – 1680 MHz	45	52		
	1805 – 1880 MHz	49	62		
	2010 – 2025 MHz	10	49		
	2110 – 2170 MHz	53	65		
	2400 – 2500 MHz	39	63		

Notes:

1. Recommended EVB schematic/layout/BOM/PCB should be followed in order to achieve specified performance.
2. Data at 25 °C
3. Insertion Loss of the linear s-parameter at specified frequency
4. Integrated Insertion Loss over every 5MHz sliding windows
5. Absolute Attenuation referenced to 0 dB between specified frequency range

Electrical Specifications[1] Band 1 Antenna - Downlink

UNLESS OTHERWISE NOTED: OPERATING TEMP = −40 °C to +85 °C

Parameter	Conditions	Min.	TYP[2]	Max.	Units
Insertion Loss	2140 MHz		1.6[3]		dB
	2110 – 2170 MHz		1.8[4]	2.5	
VSWR (Downlink Port)	2110 – 2170 MHz		1.5	2.2	Ratio
VSWR (ANT Port)			1.4	2.2	
Attenuation[5]	1447 – 1463 MHz	47	51	-	dB
	1710 - 1785 MHz	48	56	-	
	1757.5 – 1832.5 MHz	44	51	-	
	1920 – 1980 MHz	43	58	-	
	2400 – 2500 MHz	41	59	-	

Notes:

1. Recommended EVB schematic/layout/BOM/PCB should be followed in order to achieve specified performance.
2. Data at 25 °C
3. Insertion Loss of the linear s-parameter at specified frequency
4. Integrated Insertion Loss over every 5MHz sliding windows
5. Absolute Attenuation referenced to 0 dB between specified frequency range

Electrical Specifications[1] Band 3 Antenna – Uplink

UNLESS OTHERWISE NOTED: OPERATING TEMP = −40 °C to +85 °C

Parameter	Conditions	Min.	TYP[2]	Max.	Units
Insertion Loss	1747.5 MHz		1.8[3]		dB
	1710 – 1785 MHz		2.8[4]	4.2	
VSWR (Uplink Port)	1710 – 1785 MHz		1.8	2.4	Ratio
VSWR (ANT Port)			1.5	1.9	
Attenuation[5]	1565 – 1586 MHz	49	57		dB
	1805 – 1880 MHz	48	62		
	2110 – 2170 MHz	47	58		
	2400 – 2500 MHz	35	50		

Notes:

1. Recommended EVB schematic/layout/BOM/PCB should be followed in order to achieve specified performance.
2. Data at 25 °C
3. Insertion Loss of the linear s-parameter at specified frequency
4. Integrated Insertion Loss over every 5MHz sliding windows
5. Absolute Attenuation referenced to 0 dB between specified frequency range

Electrical Specifications[1] Band 3 Antenna – Downlink

UNLESS OTHERWISE NOTED: OPERATING TEMP = −40 °C to +85 °C

Parameter	Conditions	Min.	TYP[2]	Max.	Units
Insertion Loss	1842.5 MHz		1.8[3]		dB
	1805 – 1880 MHz		2.5[4]	3.4	
VSWR (Downlink Port)	1805 – 1880 MHz		1.5	2.2	Ratio
VSWR (ANT Port)			1.4	1.8	
Attenuation[5]	1710 – 1785 MHz	51	55		dB
	1920 – 1980 MHz	52	55		
	2015 – 2075 MHz	45	48		
	2400 – 2500 MHz	45	48		

Notes:

1. Recommended EVB schematic/layout/BOM/PCB should be followed in order to achieve specified performance.
2. Data at 25 °C
3. Insertion Loss of the linear s-parameter at specified frequency
4. Integrated Insertion Loss over every 5MHz sliding windows
5. Absolute Attenuation referenced to 0 dB between specified frequency range

Electrical Specifications[1] Isolation

Unless Otherwise Noted: Operating Temp = −40 °C to +85 °C

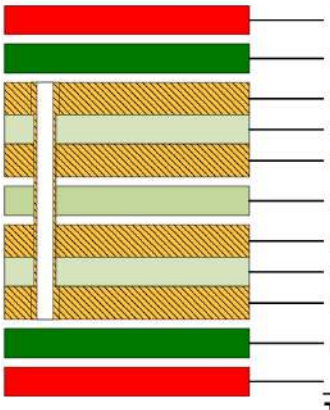
Parameter	Conditions	Min.	TYP[2]	Max.	Units
TX-RX Isolation in B3 RX	1805 – 1808 MHz, B3 Tx Isolation in B3 Rx [3]	55	65		dB
	1805 – 1880 MHz, B3 Tx Isolation in B3 Rx	44	64		
TX-RX Isolation in B3 TX	1710 – 1785 MHz, B3 Rx Isolation in B3 Tx	52	56		
TX-RX Isolation in B1 RX	2110 – 2170 MHz, B1 Tx Isolation in B1 Rx	59	66		
TX-RX Isolation in B1 TX	1920 – 1980 MHz, B1 Rx Isolation in B1 Tx	50	64		
B1 TX to B3 RX Isolation in B3 RX	1805 – 1870 MHz	48	64		
	1870 – 1880 MHz	43	64		
B1 TX to B3 RX Isolation in B1 TX	1920 – 1980 MHz	52	56		
B3 TX to B1 RX Isolation in B3 TX	1710 – 1785 MHz	50	58		
B3 TX to B1 RX Isolation in B1 RX	2110 – 2170 MHz	56	65		

Notes:

1. Recommended EVB schematic/layout/BOM/PCB should be followed in order to achieve specified performance.
2. Data at 25 °C
3. Integrated over 2.7MHz BW

Evaluation Board PCB Information

LAYER STACK LEGEND

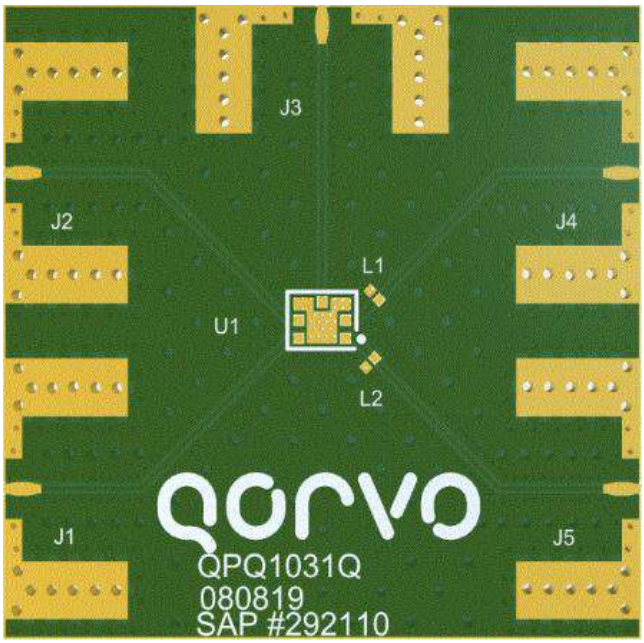


Material	Layer	Thickness	Dielectric Material	Type
	Silkscreen Top			Legend
Surface Material	Soldermask Top	0.0008in	Taiyo PSR400	Solder Mask
Copper	**Metal 1 Top**	**0.0014in**		**Signal**
Core		*0.0039in*	*FR-408HR*	*Dielectric*
Copper	**Signal Layer 1**	**0.0014in**		**Signal**
Prepreg		*0.0270in*	*FR-408HR*	*Dielectric*
Copper	**Signal Layer 2**	**0.0014in**		**Signal**
Core		*0.0039in*	*FR-408HR*	*Dielectric*
Copper	**Metal 4 Bottom**	**0.0014in**		**Signal**
Surface Material	Bottom Solder 1	0.0008in	Taiyo PSR400	Solder Mask
	Bottom Overlay 1			Legend

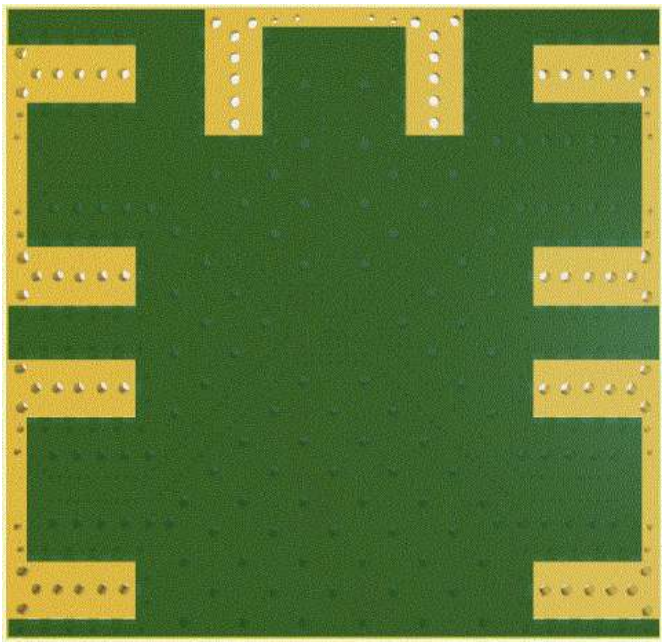
Total thickness: 0.0420in

Evaluation Board

TOP



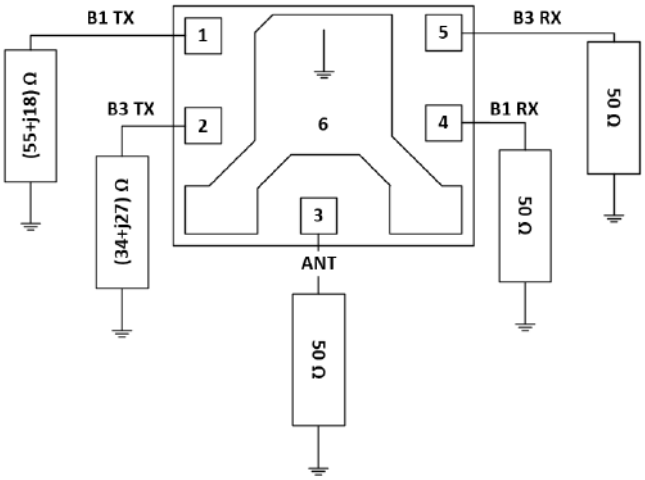
BOTTOM



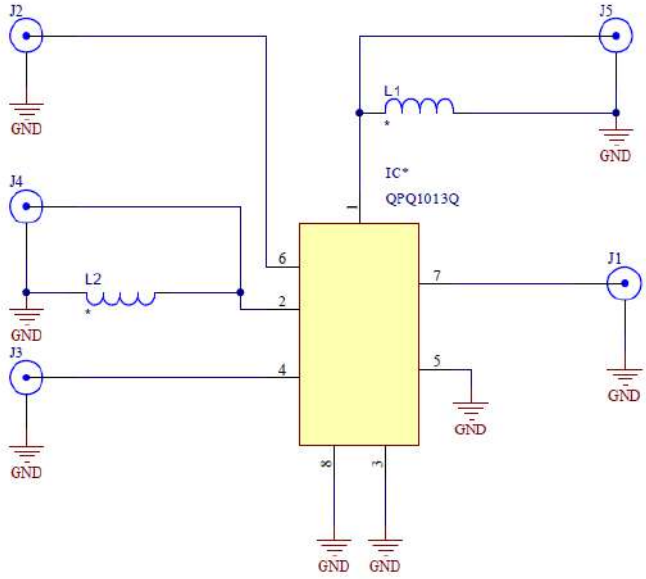
Evaluation Board BOM

Item No	Material#	Rev	Qty	Ref Des	Description
50	292211	A	1		QPQ1031Q-4000 EVB PCB
30	268171		1	L2	IND, 6.8nH, 3%, T/F, HI-Q, 0201
20	273892	A	1	L1	IND, 13nH, 3%, T/F, HI-Q, 0201
10	281934	A	5	J1,J2,J3,J4,J5	CONN, RF COAXIAL, EDGE MNT, SMA

Application Circuit Schematic



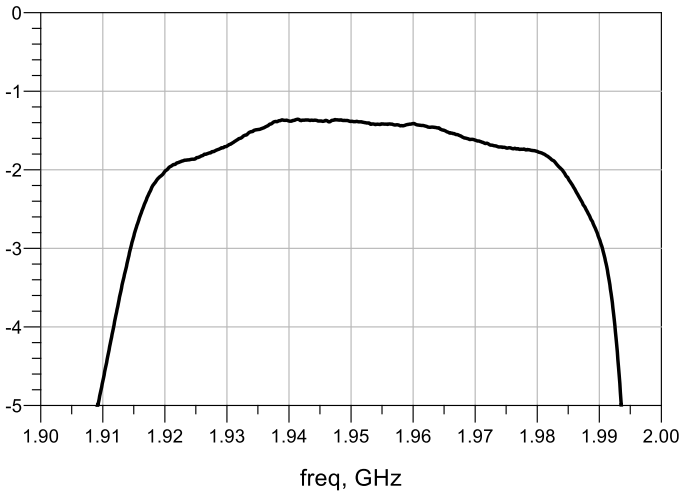
Note : B1 TX (pin 1) and B3 TX (pin 2) are terminated with complex impedance to provide flexible matching options for optimizing TX performance between PA and QPQ1031Q. All other ports are matched to 50 ohm impedance.



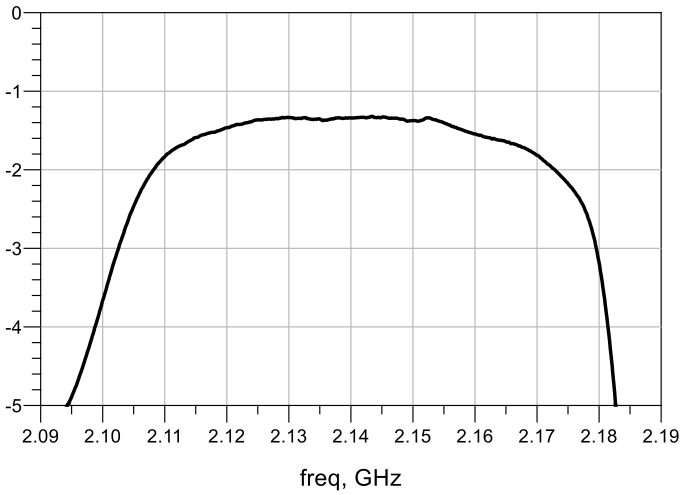
Performance Plots – Passband

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

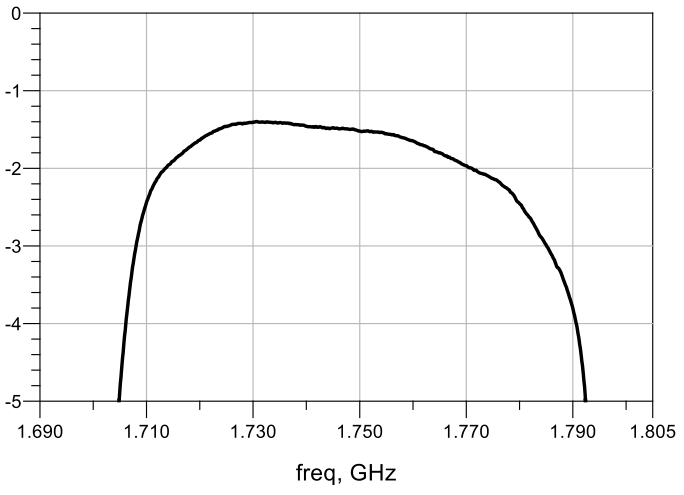
B1 TX Passband



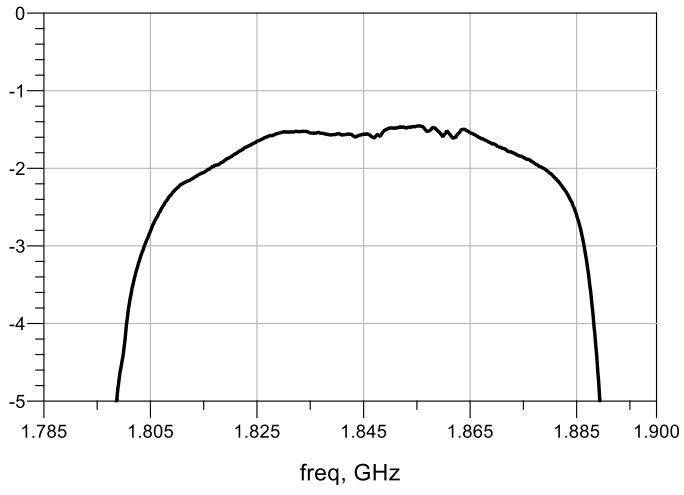
B1 RX Passband



B3 TX Passband



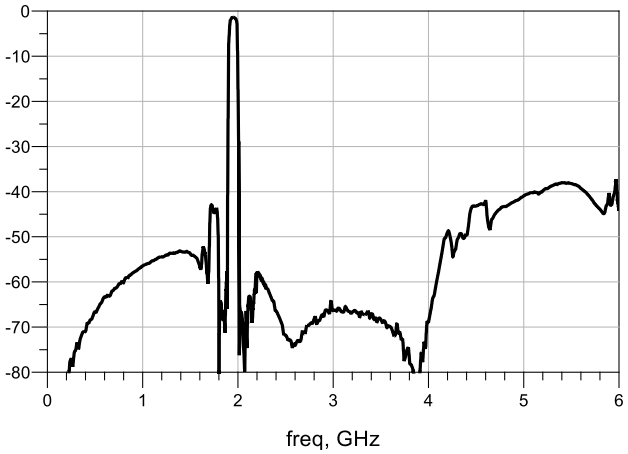
B3 RX Passband



Performance Plots – TX & RX Wideband

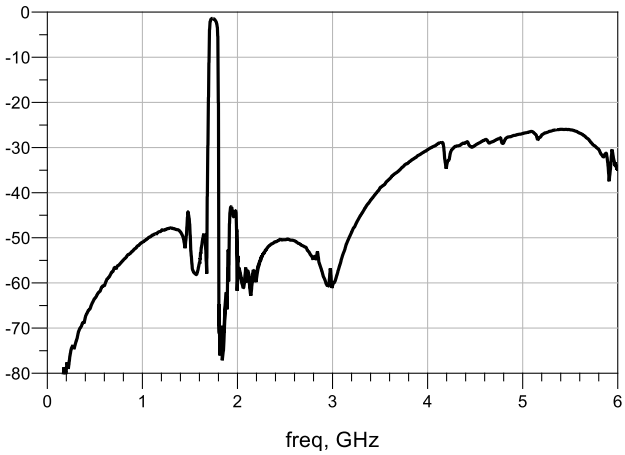
Test conditions unless otherwise noted: Temp. = +25 °C

B1 TX Wideband

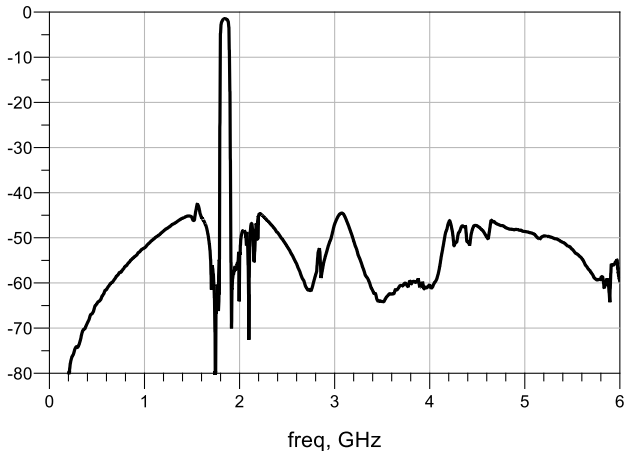


B1 RX Wideband

B3 TX Wideband



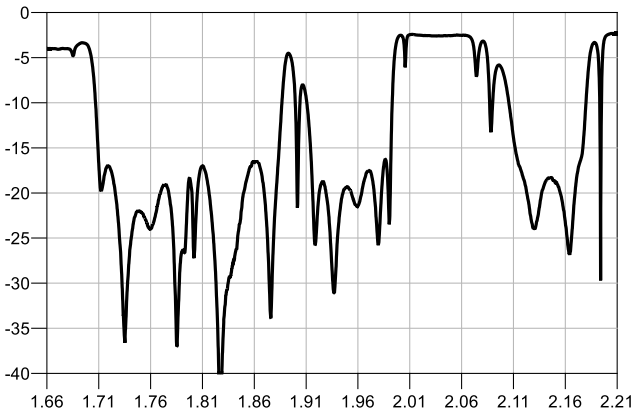
B3 RX Wideband



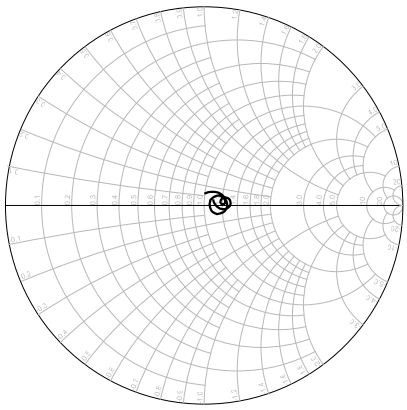
Performance Plots – ANT Port Return Loss/Impedance

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

ANT Port Return Loss

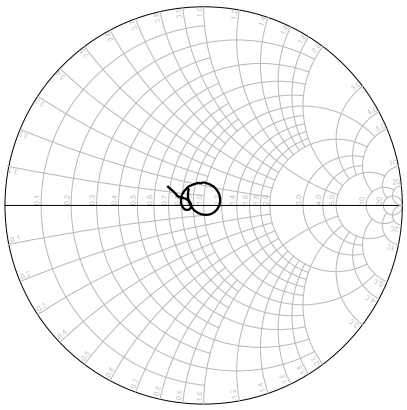


B1 TX ANT Port Impedance



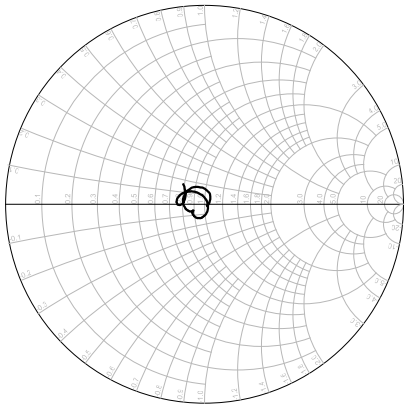
freq (1.920GHz to 1.980GHz)

B1 RX ANT Port Impedance



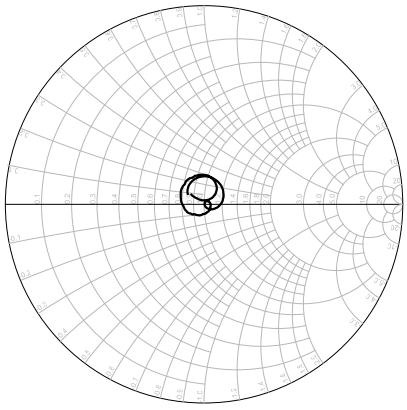
freq (2.110GHz to 2.170GHz)

B3 TX ANT Port Impedance



freq (1.710GHz to 1.785GHz)

B3 RX ANT Port Impedance

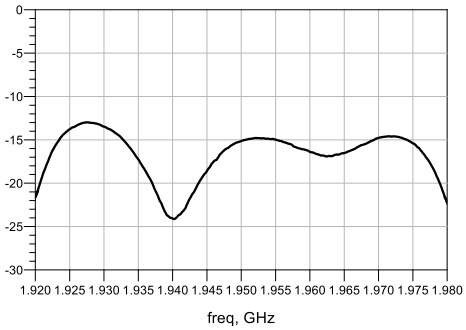


freq (1.805GHz to 1.880GHz)

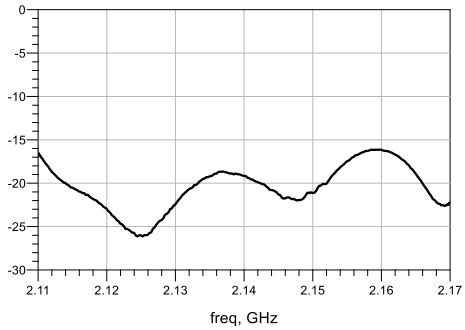
Performance Plots – Return Loss/Impedance

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

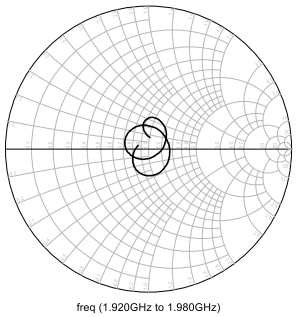
B1 TX Return Loss



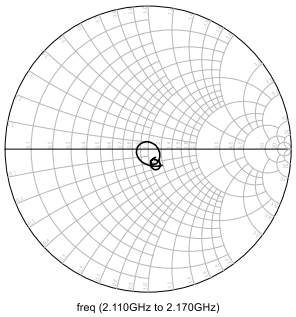
B1 RX Return Loss



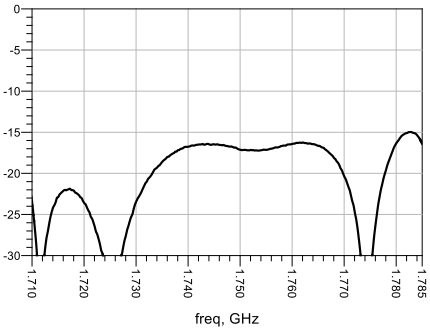
B1 TX Port Impedance



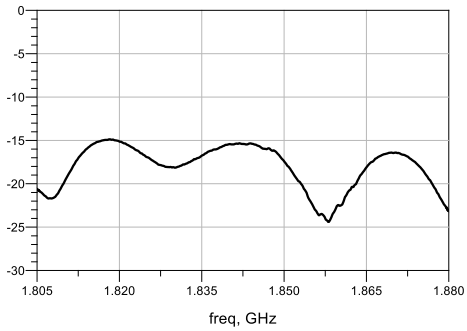
B1 RX Port Impedance



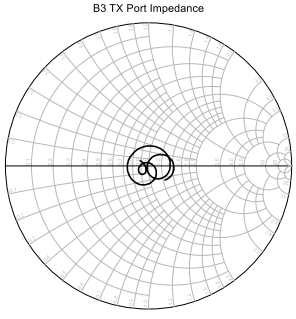
B3 TX Return Loss



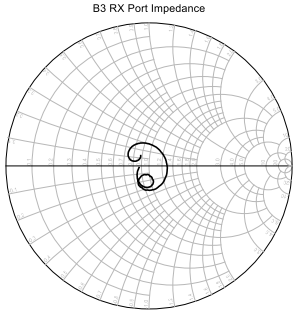
B3 RX Return Loss



B3 TX Port Impedance



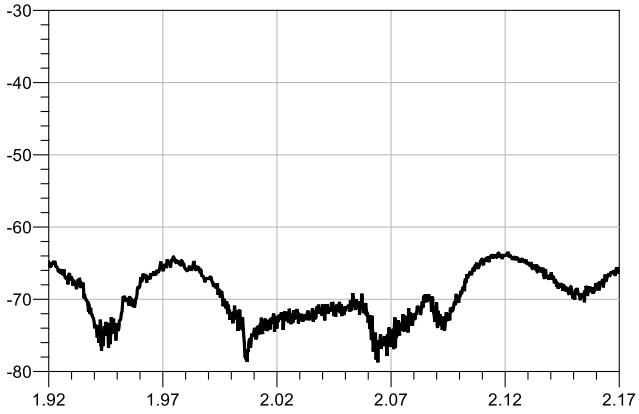
B3 RX Port Impedance



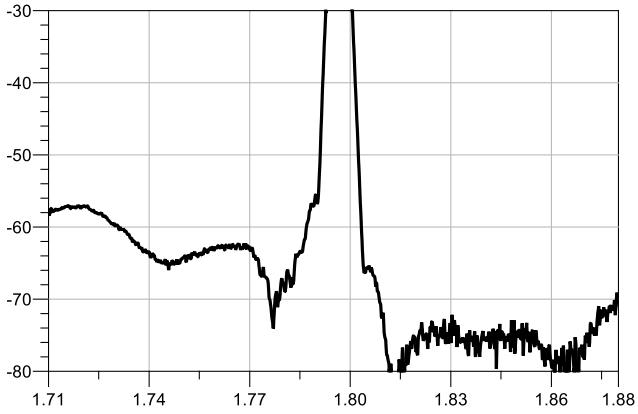
Performance Plots – Isolation

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

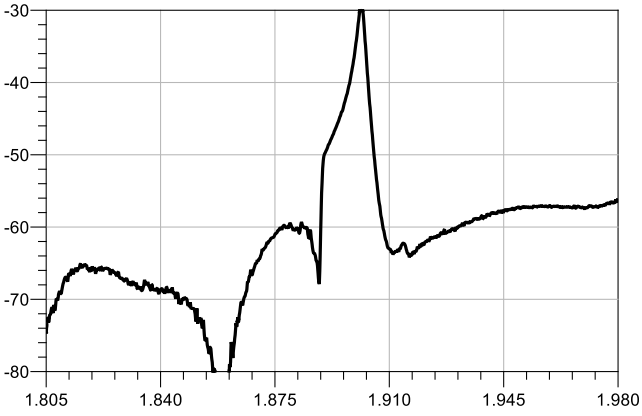
B1 TX-RX Isolation



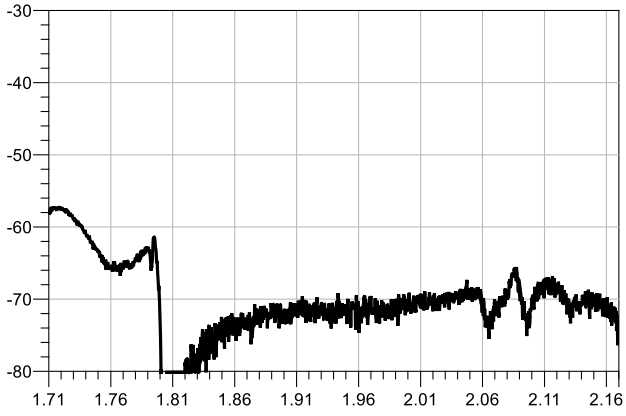
B3 TX-RX Isolation



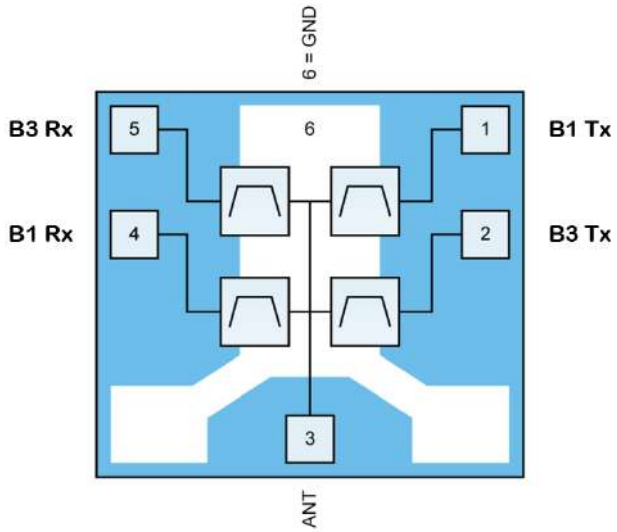
B1 TX - B3 RX Cross-Isolation



B3 TX - B1 RX Cross-Isolation



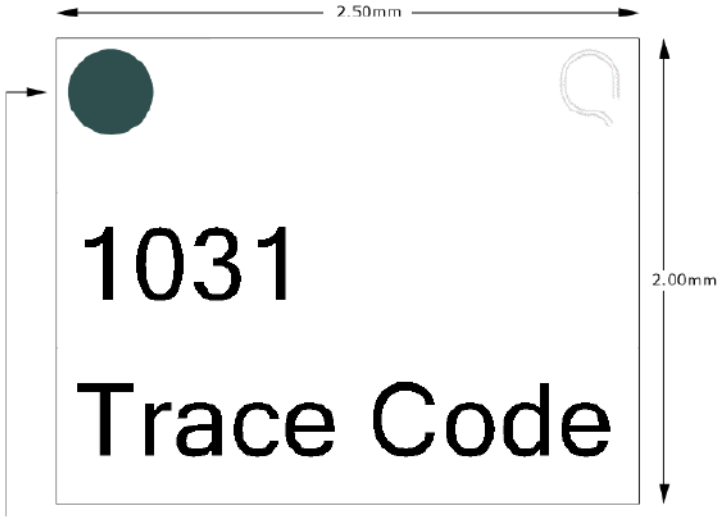
Pin Configuration and Description



Bottom View

Pin Number	Label	Description
1	B1 TX	Band 1 Transmit Port
2	B3 TX	Band 3 Transmit Port
3	ANT	Band 1/3 Antenna Port
4	B1 RX	Band 1 Receive Port
5	B3 RX	Band 3 Receive Port
6	GND	Package Ground

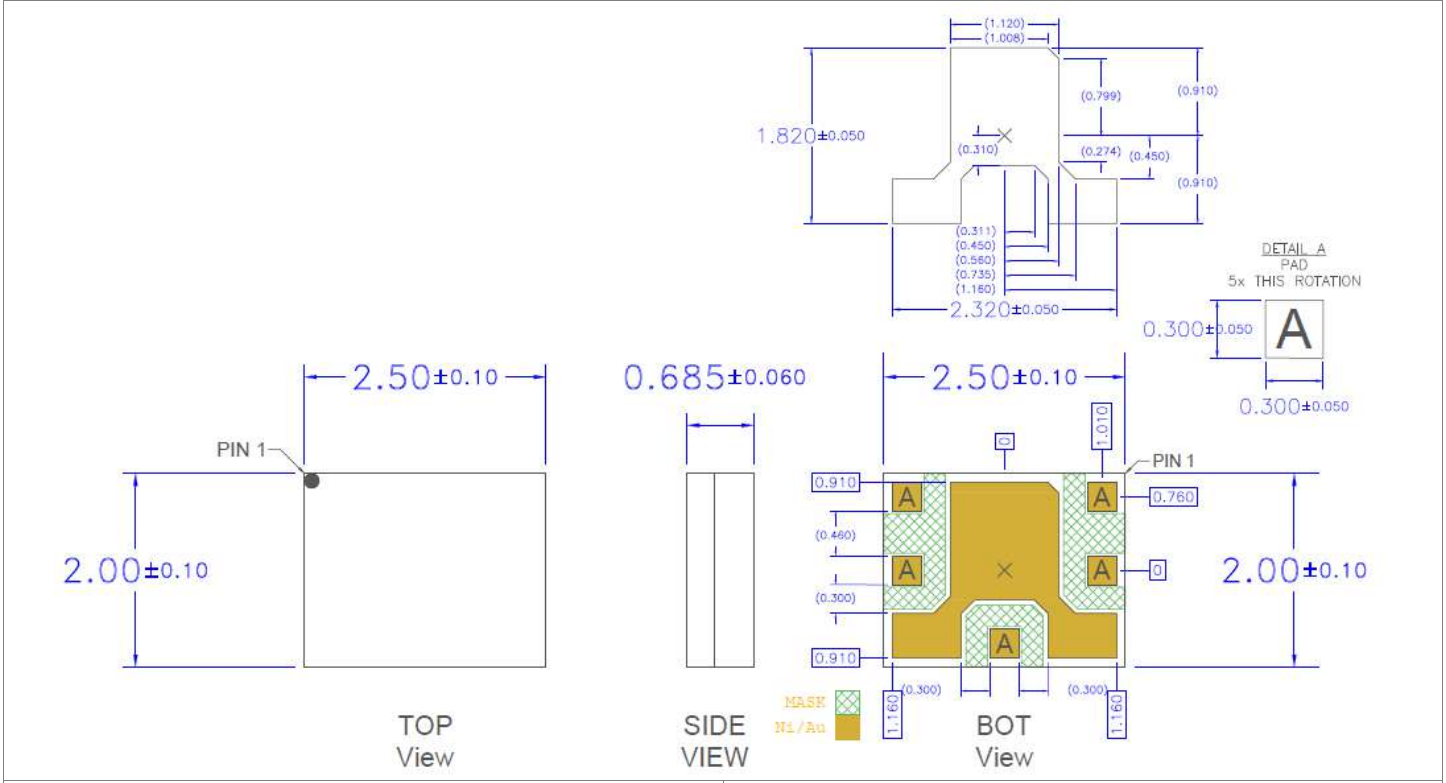
Marking Diagram

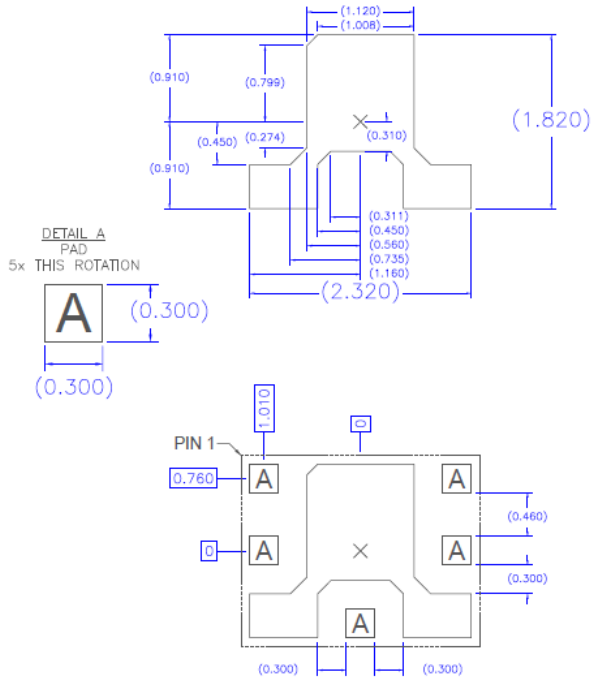


Pin 1 Indicator
Qorvo Logo - Use Q5D
Trace Code to be assigned by SubCon

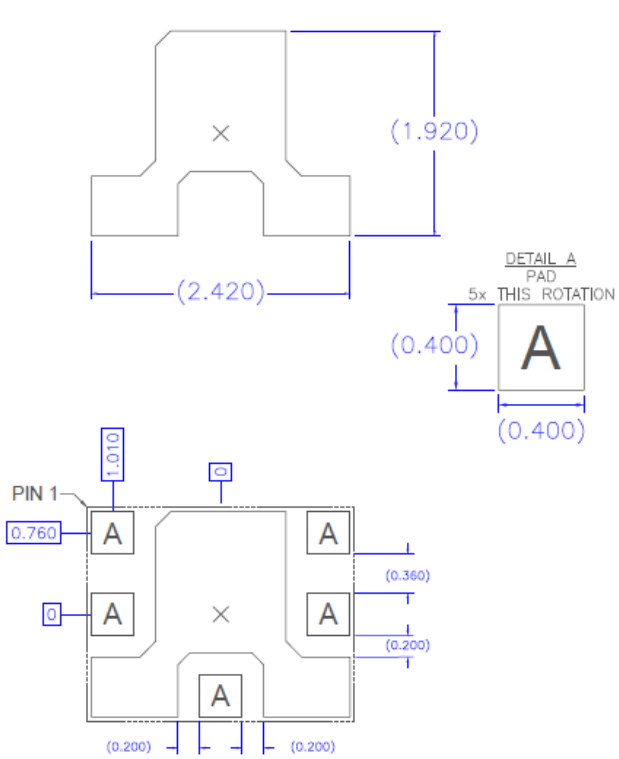
Package Outline Drawings

Package Outline Dimension Drawing



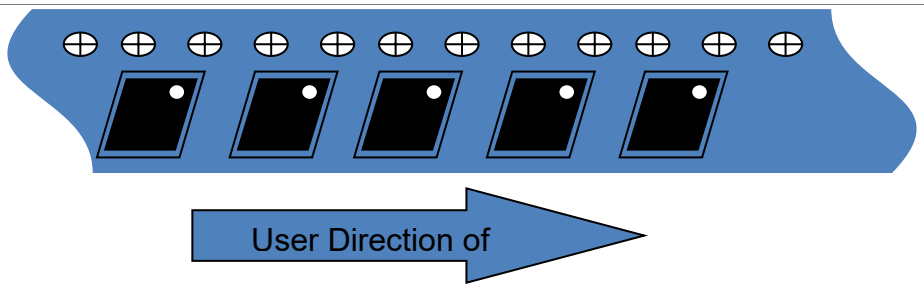


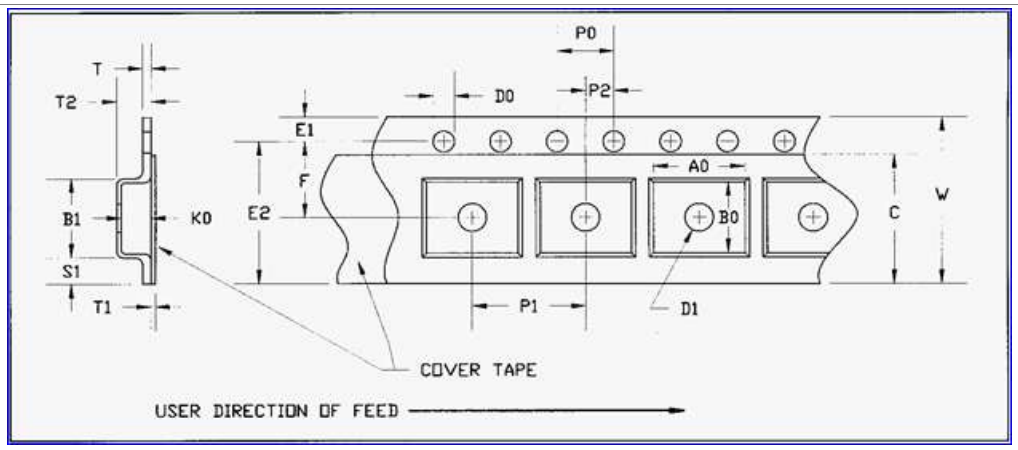
Recommended Land Pattern



Recommended Land Pattern Mask

Tape and Reel Information – Carrier and Cover tape Dimensions

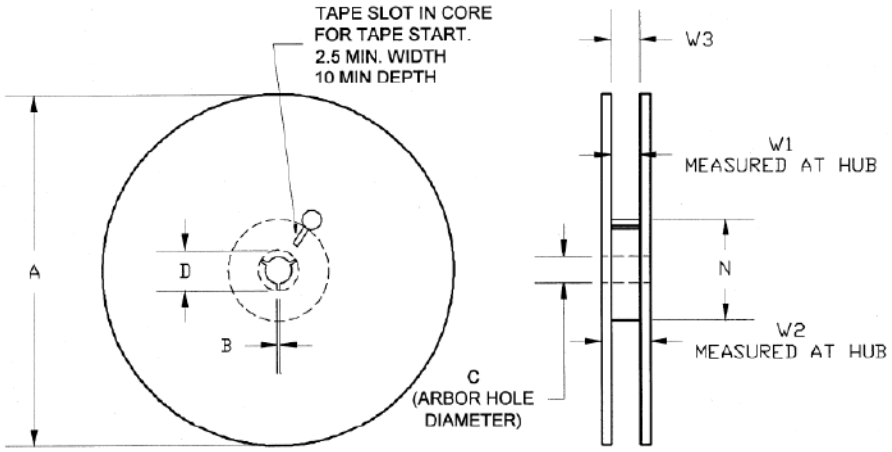




Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.087	2.20
	Width	B0	0.106	2.70
	Depth	K0	0.043	1.10
	Pitch	P1	0.157	4.0
Centerline Distance	Cavity to Perforation - Length Direction	P2	0.079	2.0
	Cavity to Perforation - Width Direction	F	0.138	3.50
Cover Tape	Width	C	0.213	5.40
Carrier Tape	Width	W	0.315	8.0

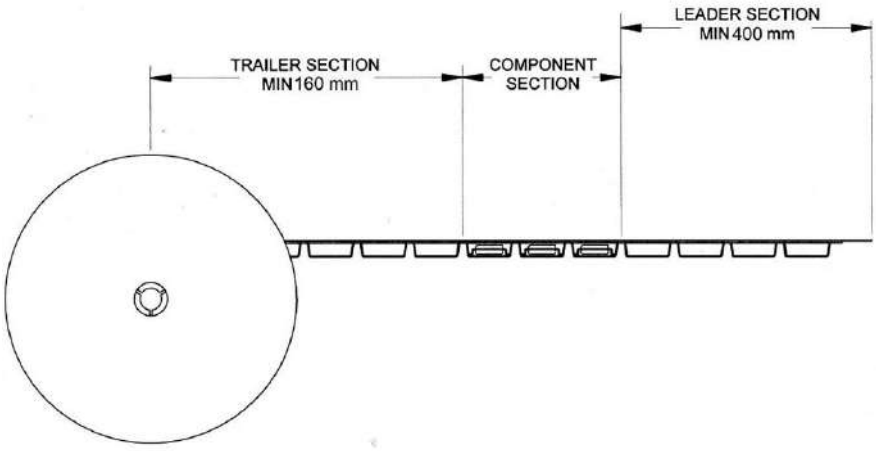
Tape and Reel Information – Reel Dimensions

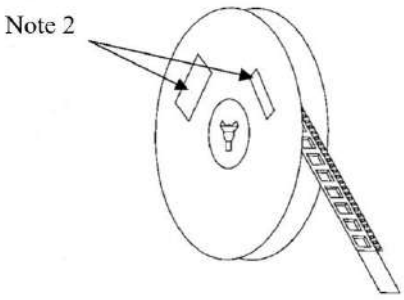
Packaging reels are used to prevent damage to devices during shipping and storage, loaded carrier tape is typically wound onto a plastic take-up reel. The reel size is 13" diameter. The reels are made from high-impact injection-molded polystyrene (HIPS), which offers mechanical and ESD protection to packaged devices.



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	12.992	330.0
	Thickness	W2	0.559	14.2
	Space Between Flange	W1	0.346	8.8
Hub	Outer Diameter	N	4.016	102.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.795	20.2

Tape and reel specifications for this part are also available on the Qorvo website.
Standard T/R size = 5000 pieces on a 13” reel.





Notes:

1. Empty part cavities at the trailing and leading ends are sealed with cover tape. See EIA 481
2. Labels are placed on the flange opposite the sprockets in the carrier tape.

Handling Precautions

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

Caution!

ESD sensitive device

Solderability

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

Package lead plating: 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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free
- PFOS Free

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Tél. 01 47 95 99 60 - Fax. 01 47 01 16 22 - e-mail: hyper@es-france.com - Site Web: www.es-france.com

REVISION HISTORY

Revision	Description	DATE
A	• Updated spec table, plots and EVB information • Updated specifications based on product yield analysis	
B	• Added EVB details • Updated package marking drawing • General formatting updates	
C	• Updated Specification • Added EVB Information	
D	• Updated Typical Specification to align with PRD •	Aug 20, 2020

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

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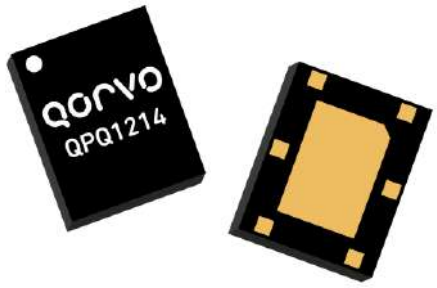
QPQ1214

LTE B12/B13 Triplexer Filter Module

Product Overview

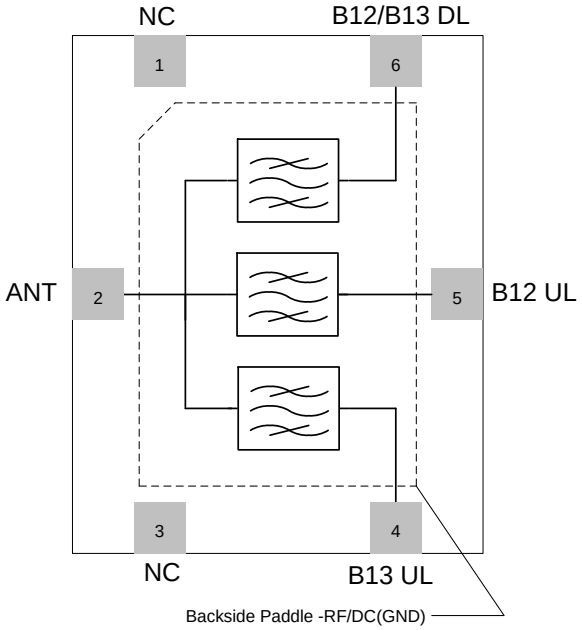
QPQ1214 is a SAW based triplexer filter module. This module was specifically designed in a 4x5 mm package. It is comprised of three SAW dies and passive SMT components.

QPQ1214 exhibits industry leading mid-band rejections for LTE bands 12 and 13 based on utilization of Qorvo's proprietary temperature compensated process technology that reduces the temperature coefficient of frequency for SAW devices by almost 50%.



6 Pin 4x5 mm leadless SMT Package

Functional Block Diagram



Top View

Key Features

- Temperature compensated SAW
- Usable Bandwidth 17 MHz at 707.5 MHz
- Usable Bandwidth 27 MHz at 742.5 MHz
- Usable Bandwidth 11 MHz at 782.0 MHz
- Internally Matched for 50 Ohm Operation
- Small Size: 4.00 x 5.00 x 1.06 mm
- Surface Mount Device
- RoHS compliant, Pb-free

Applications

- Networks Repeater
- Base station infrastructure
- Wireless devices
- Cellular small cells

Pin Configuration

Pin No.	Label	Function
1, 3	NC	No Connection
2	ANT	Antenna Port
4	B13 UL	Band 13 Up Link Port
5	B12 UL	Band 12 Up Link Port
6	B12/B13 DL	Band 12 and 13 Down Link Port

Ordering Information

Part No.	Description
QPQ1214TR13	2500pcs on a 13" reel
QPQ1214EVB	Evaluation board

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to 85°C
Operation Temperature	+25 to 70°C

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

Minimum Lifetime Ratings

Conditions	Rating
RF Input Power (1) (B13UL), Pin 4	10,000 Hrs
RF Input Power (1) (B12UL), Pin 5	10,000 Hrs
RF Input Power (1) (B12/B13DL), Pin 6	10,000 Hrs

(1) Input Power: CW, 30 dBm, @ +55 °C

Electrical Specifications (1) (2) (3) – B12 UL (699-716MHz) BPF

Operating Temperature Range: +25 to +70°C.

Parameter	Conditions	Min	Typ. (4)	Max	Units
Center Frequency [fo]			707.5		MHz
Insertion Loss	699 MHz – 716 MHz	-	-	3.0	dB
Amplitude Variation (1)	699 MHz – 716 MHz	-	1.0	1.5	dB
Absolute Attenuation (5)	10 MHz – 500 MHz	30	35	-	dB
	722.5 MHz – 729 MHz (6)	18	22	-	dB
	729 MHz – 787 MHz	38	43	-	dB
	787 MHz – 894 MHz	30	35	-	dB
	1400 MHz – 2155 MHz	30	37	-	dB
Input / Output Return Loss	699 MHz – 716 MHz	10	13	-	dB
Temperature Coefficient		-	-25	-	ppm/ºC
Load/Source Impedance		-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic shown on page 10.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure compliance over temperature.
3. Electrical margin has been built into the design to account for variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature.
5. Attenuation is referenced to ZERO dB
6. Describes the absolute attenuation over the defined frequency range at +25°C only

Electrical Specifications (1) (2) (3) – B12/B13 DL (729-756MHz) BPF

Operating Temperature Range: +25 to +70°C.

Parameter	Conditions	Min	Typ. (4)	Max	Units
Center Frequency [fo]			742.5		MHz
Insertion Loss	729 MHz – 756 MHz	-	-	3.0	dB
Amplitude Variation	729 MHz – 756 MHz	-	1.0	1.5	dB
Absolute Attenuation (5)	10 MHz – 699 MHz	30	35	-	dB
	699 MHz – 716 MHz	35	39	-	dB
	716 MHz – 722.5 MHz (6)	18	22	-	dB
	766.5 MHz – 777 MHz (6)	20	30	-	dB
	777 MHz – 787 MHz	35	40	-	dB
	824 MHz – 894 MHz	25	30	-	dB
	1400 MHz – 2155 MHz	30	42	-	dB
	2184 MHz – 2271 MHz	35	47	-	dB
Input / Output Return Loss	729 MHz – 756 MHz	10	13	-	dB
Temperature Coefficient		-	-25	-	ppm/ºC
Load/Source Impedance		-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic shown on page 10.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure compliance over temperature.
3. Electrical margin has been built into the design to account for variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature.
5. Attenuation is referenced to ZERO dB
6. Describes the absolute attenuation over the defined frequency range at +25°C only

Electrical Specifications (1) (2) (3) – B13UL (777-787MHz) BPF

Operating Temperature Range: +25 to +70°C.

Parameter	Conditions	Min	Typ. (4)	Max	Units
Center Frequency [fo]			782.0		MHz
Insertion Loss	777 MHz – 787 MHz	-	-	3.0	dB
Amplitude Variation	777 MHz – 787 MHz	-	0.5	0.9	dB
Absolute Attenuation (5)	10 MHz – 500 MHz	35	40	-	dB
	699 MHz – 756 MHz	38	42	-	dB
	756 MHz – 766.5 MHz (6)	20	34	-	dB
	817 MHz – 894 MHz	35	40	-	dB
	1400 MHz – 1600 MHz	35	39	-	dB
	1600 MHz – 2155 MHz	25	30	-	dB
Input / Output Return Loss	777 MHz – 787 MHz	10	13	-	dB
Temperature Coefficient		-	-25	-	ppm/ºC
Load/Source Impedance		-	50	-	Ω

Notes:

1. All specifications are based on the Qorvo schematic shown on page 10.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure compliance over temperature.
3. Electrical margin has been built into the design to account for variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature.
5. Attenuation is referenced to ZERO dB
6. Describes the absolute attenuation over the defined frequency range at +25°C only

Electrical Specifications (1) (2) (3) – Output Isolation

Operating Temperature Range: +25 to +70°C.

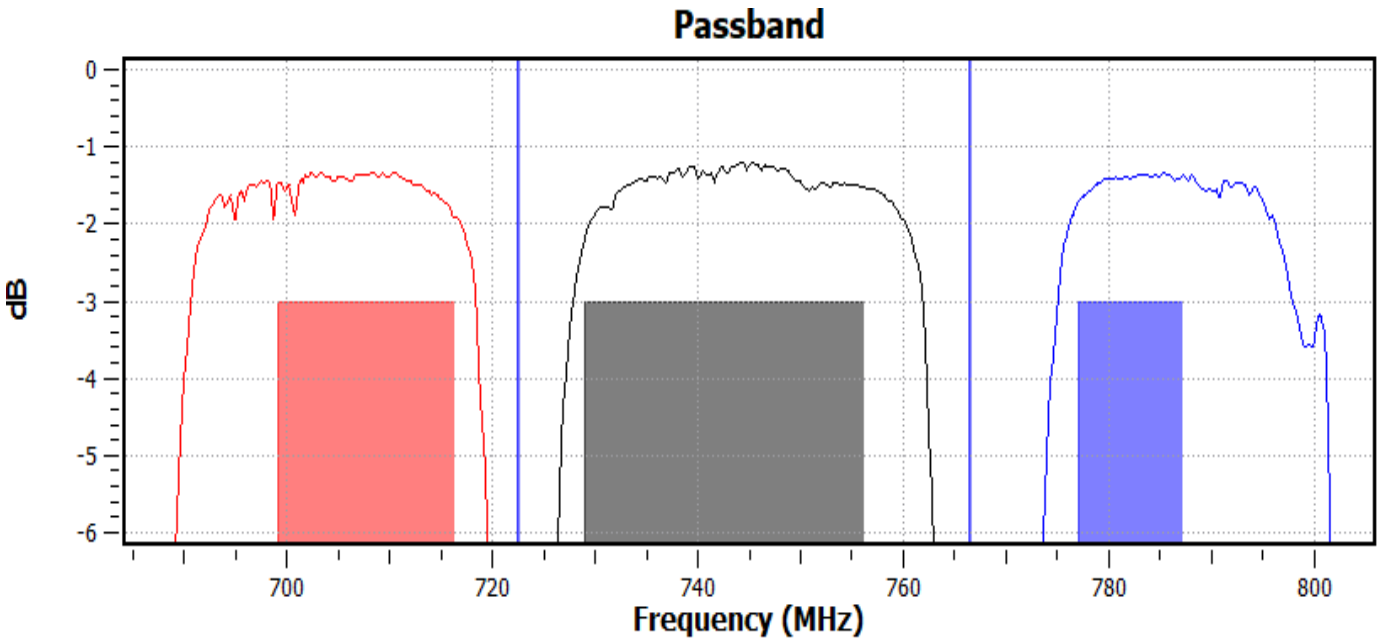
Parameter	Conditions	Min	Typ. (4)	Max	Units
B12UL - B12/B13 DL	699 MHz – 716 MHz	42	44	-	dB
	716 MHz – 729 MHz	43	45	-	
	729 MHz – 756 MHz	43	45	-	
	756 MHz – 777 MHz	40	43	-	
	777 MHz – 787 MHz	45	50	-	
B12UL – B13UL	699 MHz – 716 MHz	40	45	-	dB
	716 MHz – 729 MHz	40	45	-	
	729 MHz – 756 MHz	42	45	-	
	756 MHz – 777 MHz	39	42	-	
	777 MHz – 787 MHz	38	41	-	
B12/B13 DL – B13UL	699 MHz – 716 MHz	50	54	-	dB
	716 MHz – 729 MHz	45	48	-	
	729 MHz – 756 MHz	45	48	-	
	756 MHz – 777 MHz	45	48	-	
	777 MHz – 787 MHz	45	48	-	

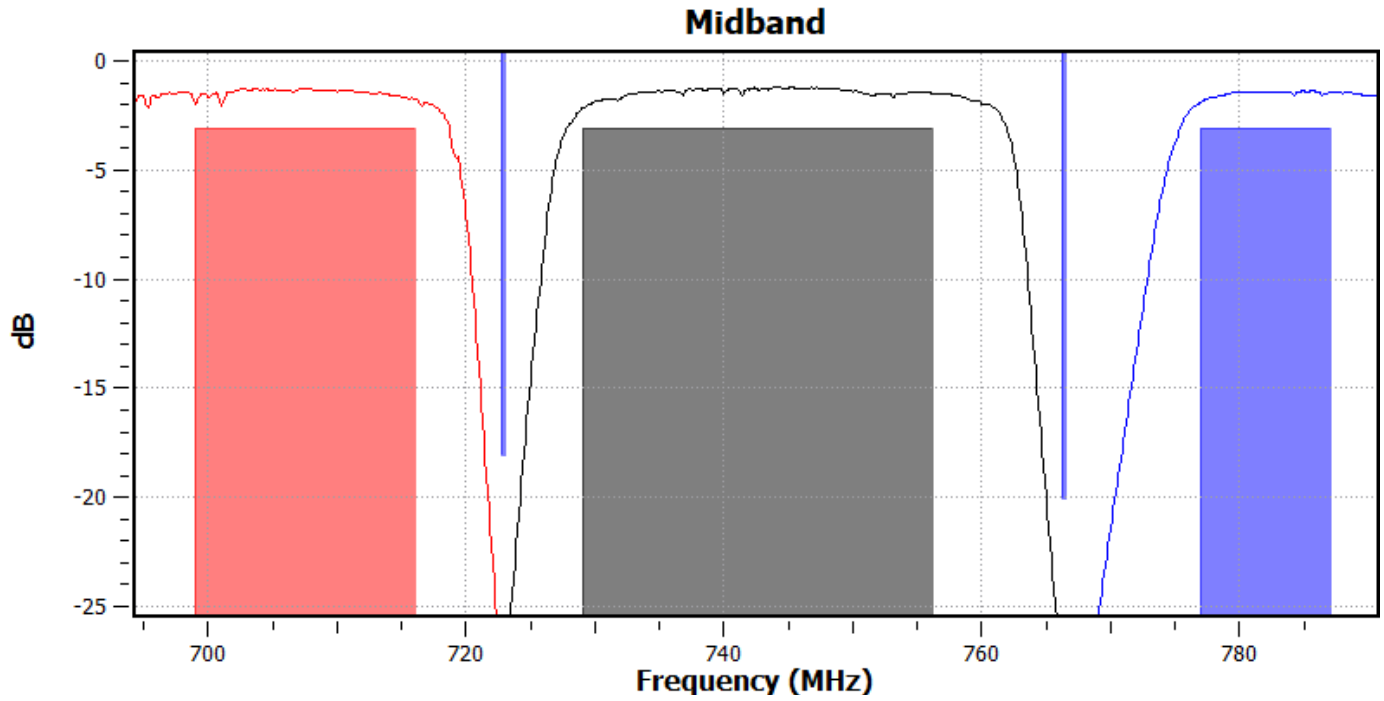
Notes:

1. All specifications are based on the Qorvo schematic shown on page 10.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure compliance over temperature.
3. Electrical margin has been built into the design to account for variations due to temperature drift and manufacturing tolerances.
4. Typical values are based on average measurements at room temperature.

Performance Plots

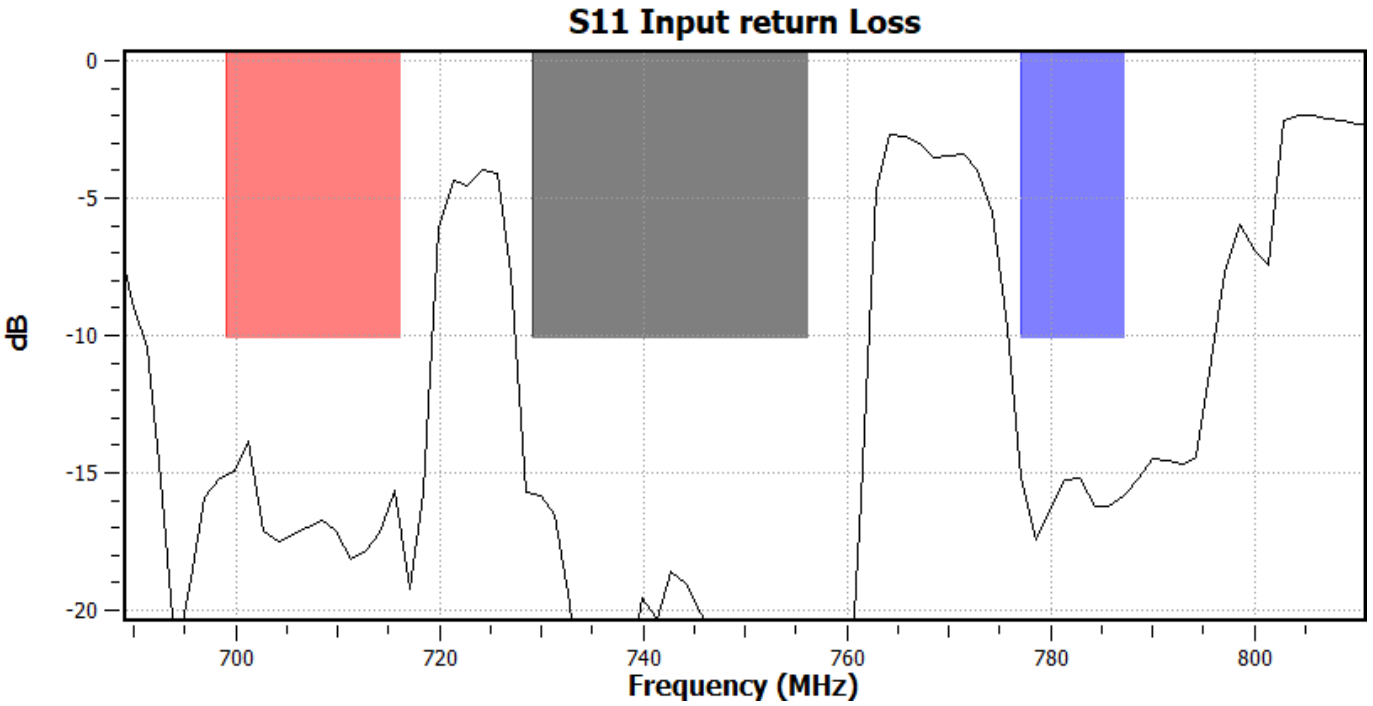
Test conditions unless otherwise noted: Temp= +25°C

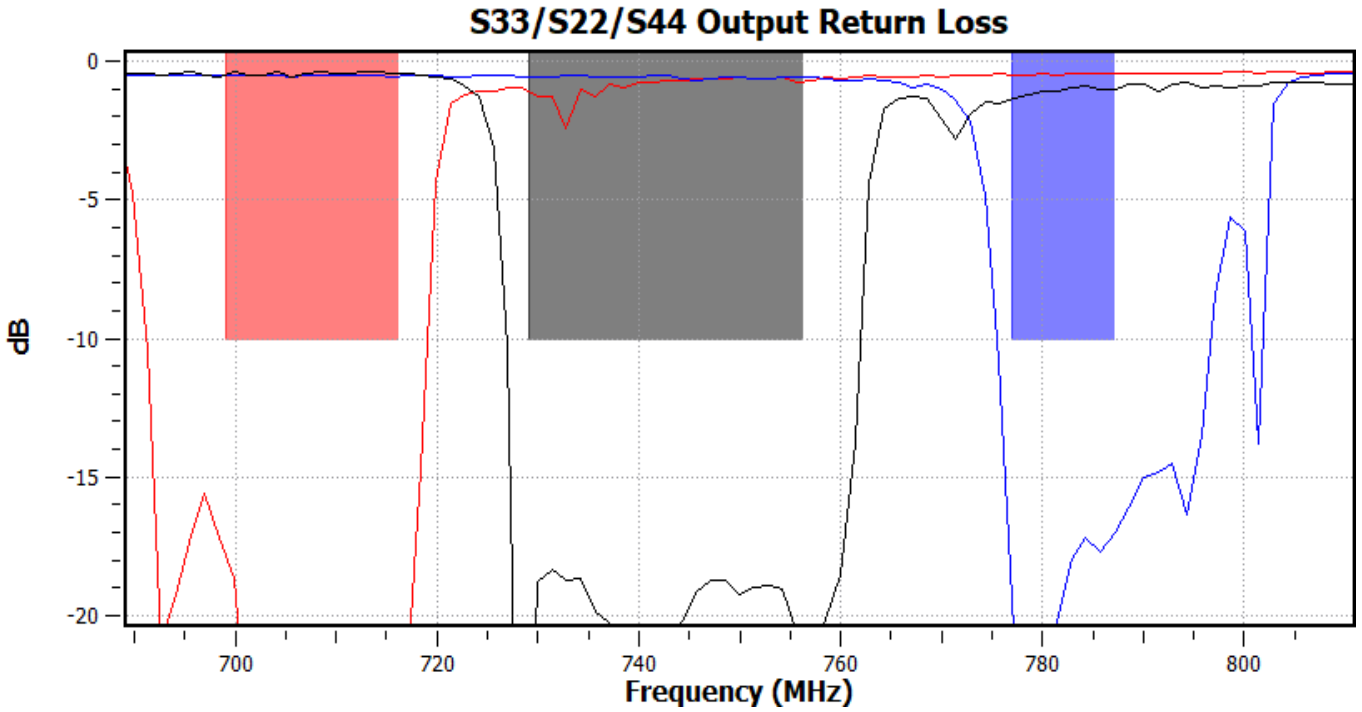




Performance Plots

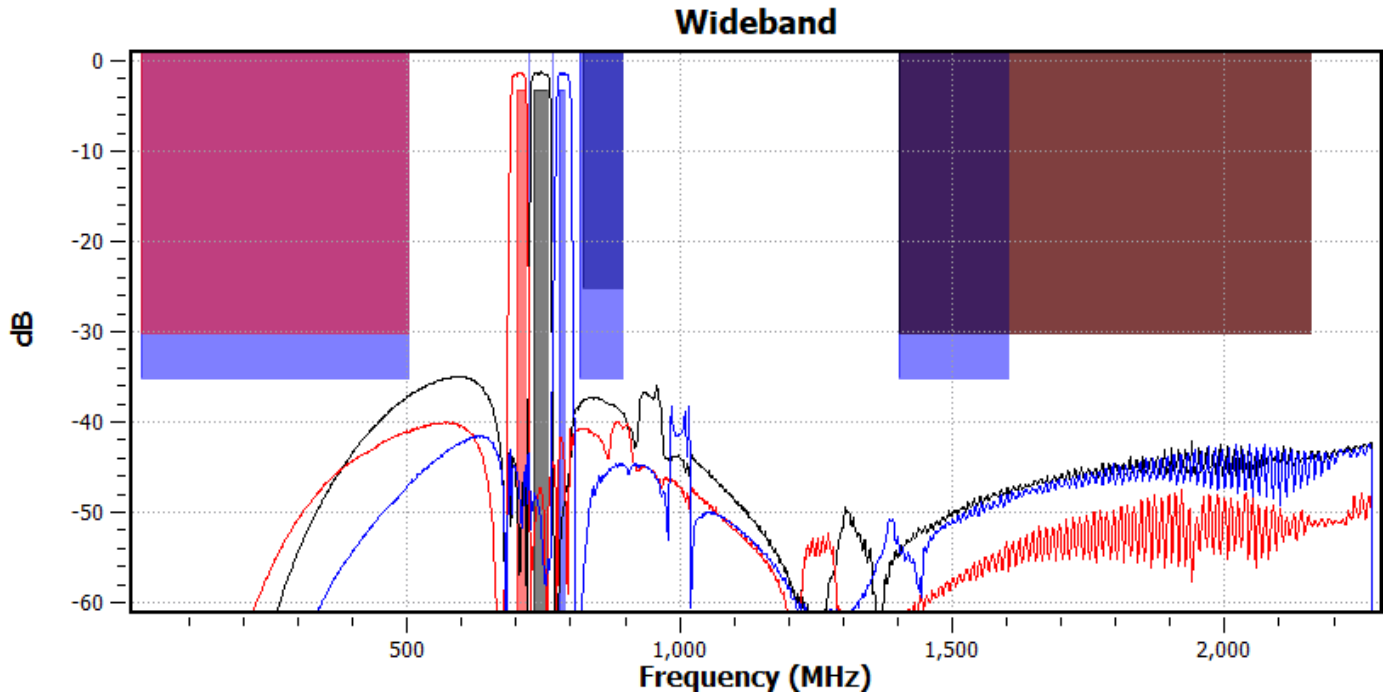
Test conditions unless otherwise noted: Temp= +25°C

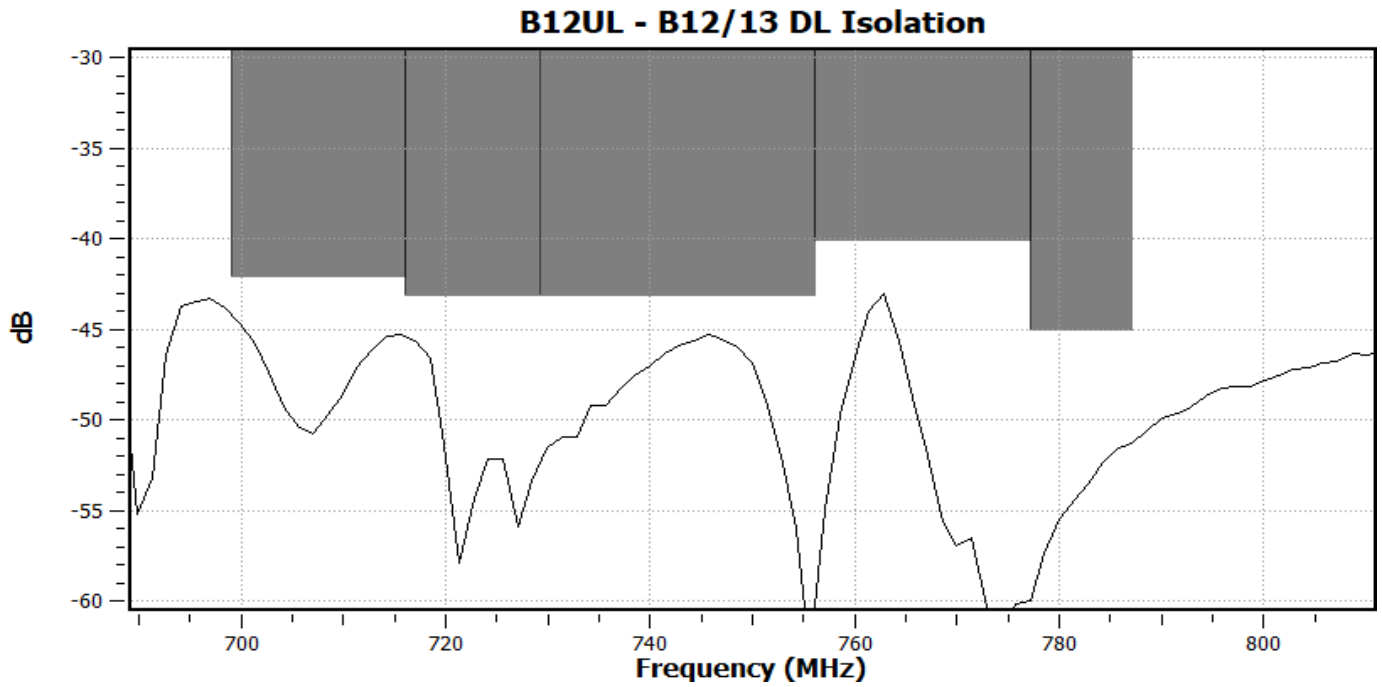




Performance Plots

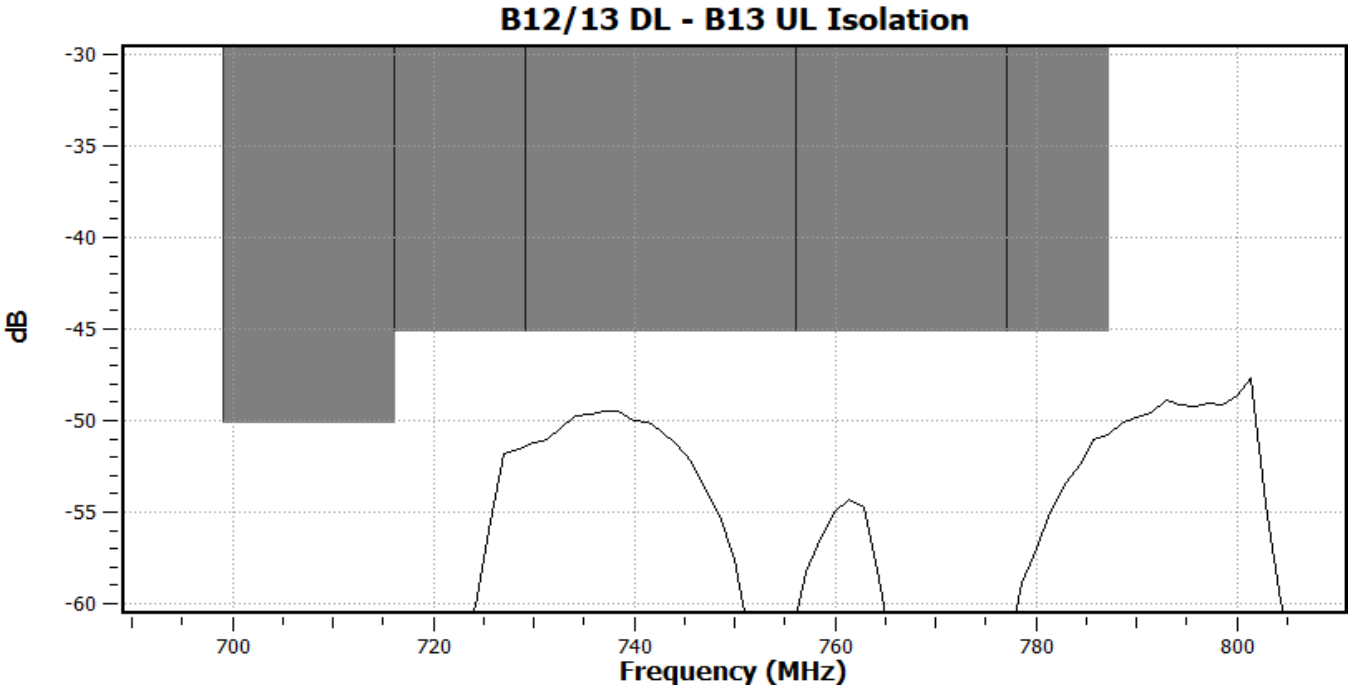
Test conditions unless otherwise noted: Temp= +25°C

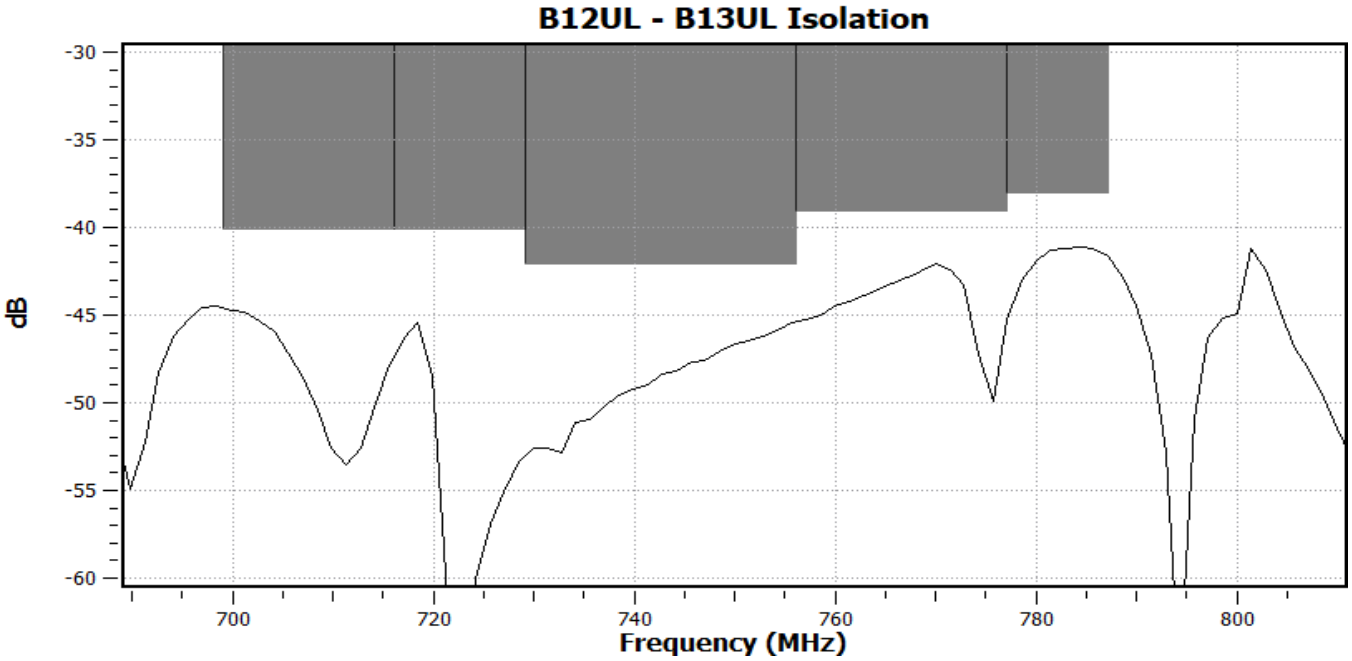




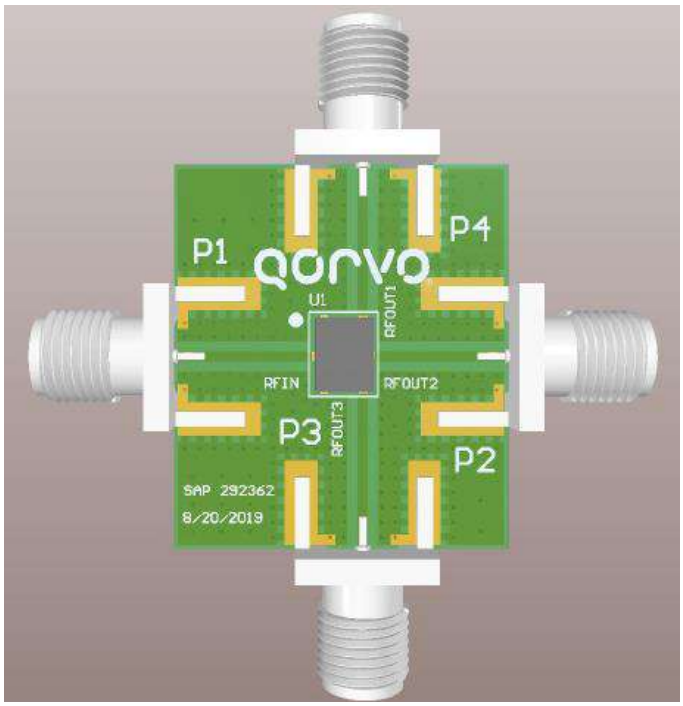
Performance Plots

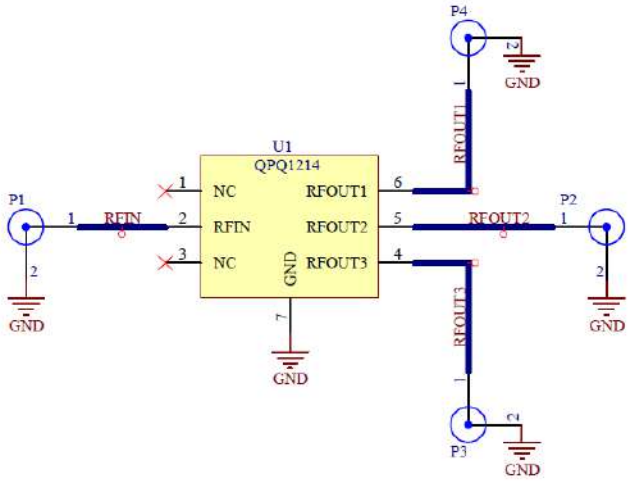
Test conditions unless otherwise noted: Temp= +25°C





QPQ1214-PCB Evaluation Board





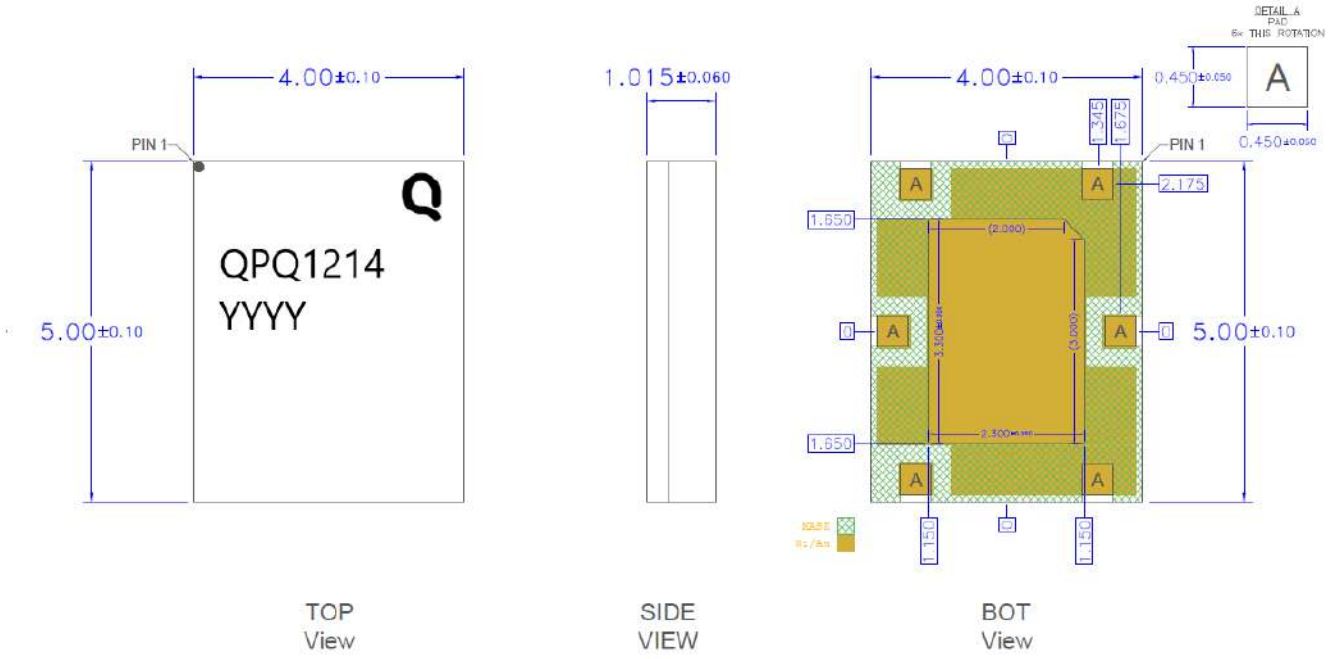
Note: Blocking capacitors are required on any ports where a DC voltage may be present.

Bill of material - QPQ1214EVB

Reference Des.	Value	Description	Manuf.	Part Number
U1	-	Band 12/13 Triplexer High Power	Qorvo	QPQ1214
PCB	-	Printed Circuit Board	Various	
J1, J2, J3, J4	-	SMA Edge Connector	Various	

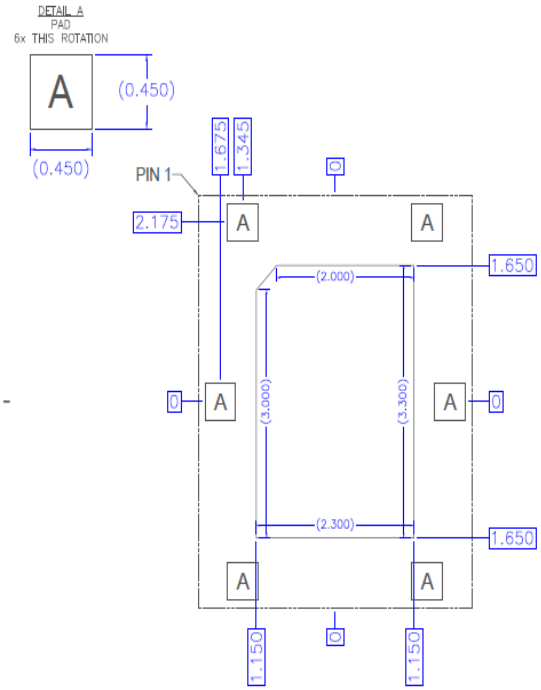
Package Marking and Dimensions

Marking:
4-digit Part number: 1214
4-digit Trace code: YYYY

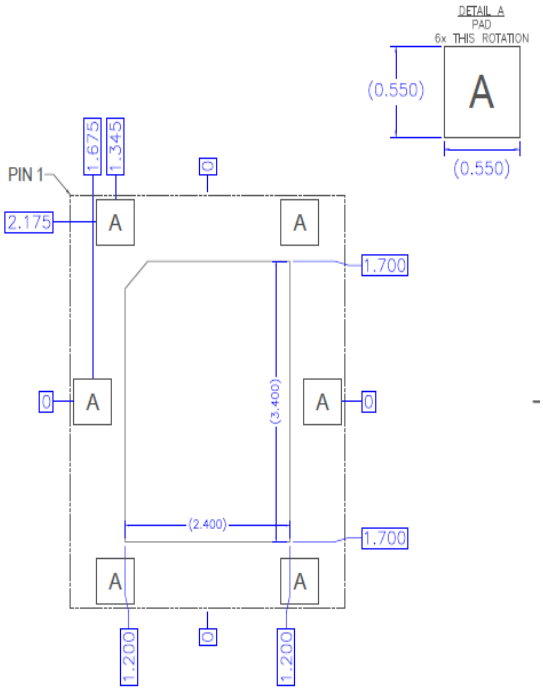


Notes:
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

PCB Mounting Pattern



Recommended
Land Pattern

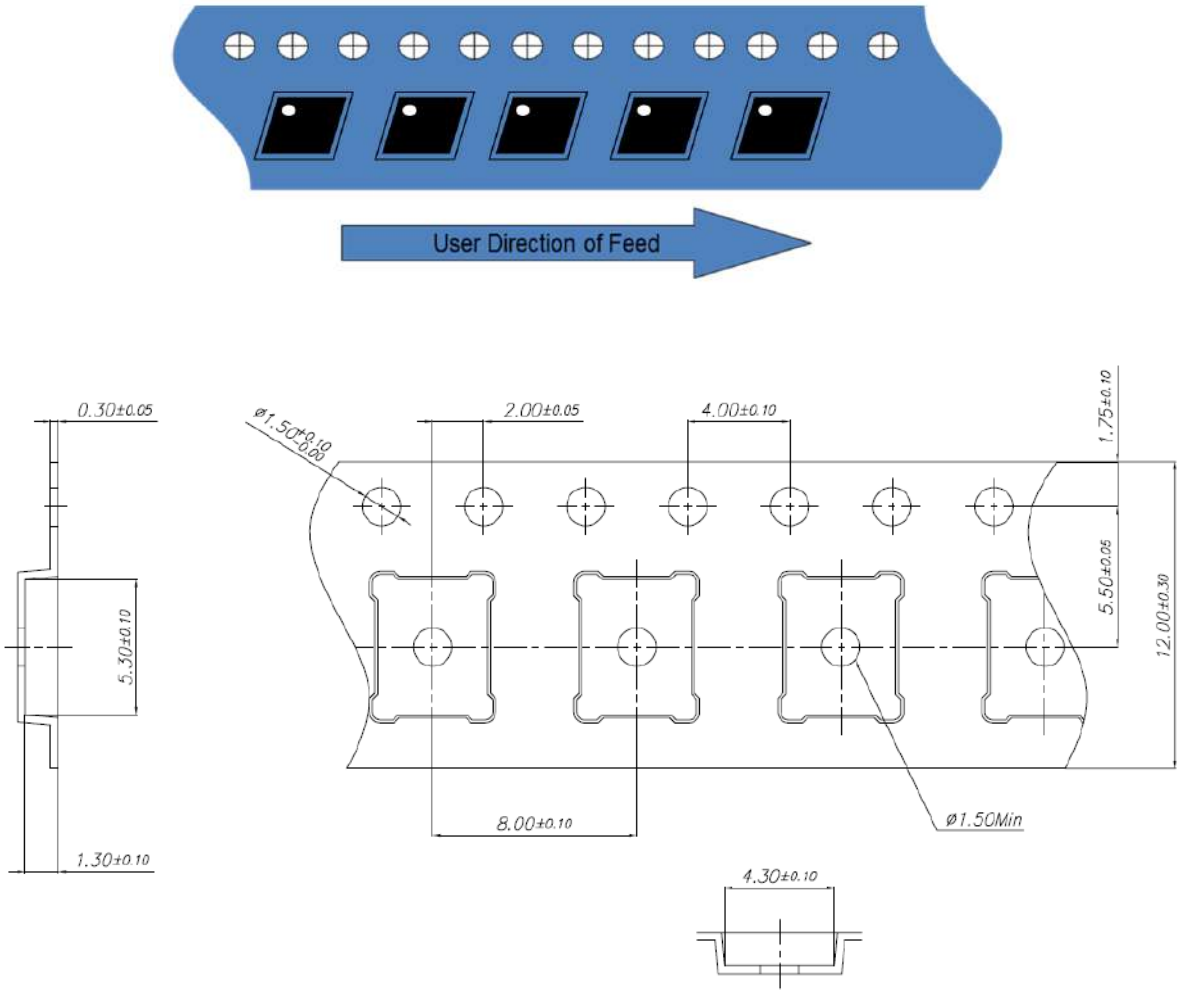


Recommended
Land Pattern Mask

Notes:

1. All dimensions are in millimeters.
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



Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.169	4.30
	Width	B0	0.209	5.30
	Depth	K0	0.051	1.30
	Pitch	P1	0.315	8.00
Centerline Distance	Cavity to Perforation - Length Direction	P2	0.079	2.00
	Cavity to Perforation - Width Direction	F	0.217	5.50
Cover Tape	Width	C	0.362	9.20
Carrier Tape	Width	W	0.472	12.00

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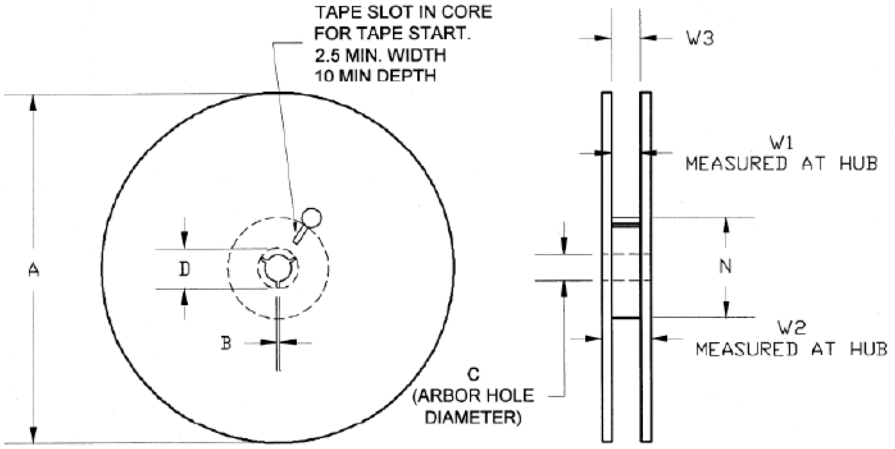
Tél. 01 47 95 99 60 - Fax. 01 47 01 16 22 - e-mail: hyper@es-france.com - Site Web: www.es-france.com

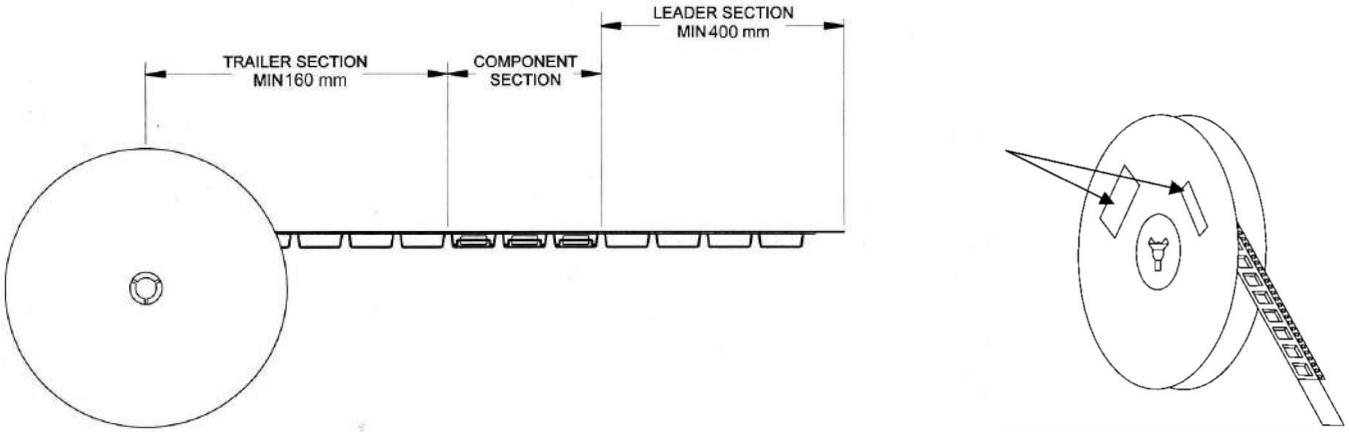
Tape and Reel Information – Reel Dimensions (13”)

Standard T/R size = 2,500 pieces on a 13” reel.



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	12.992	330.0
	Thickness	W2	0.717	18.2
	Space Between Flange	W1	0.504	12.8
Hub	Outer Diameter	N	4.016	102.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.787	20.0

Tape and Reel Information – Tape Length and Label Placement

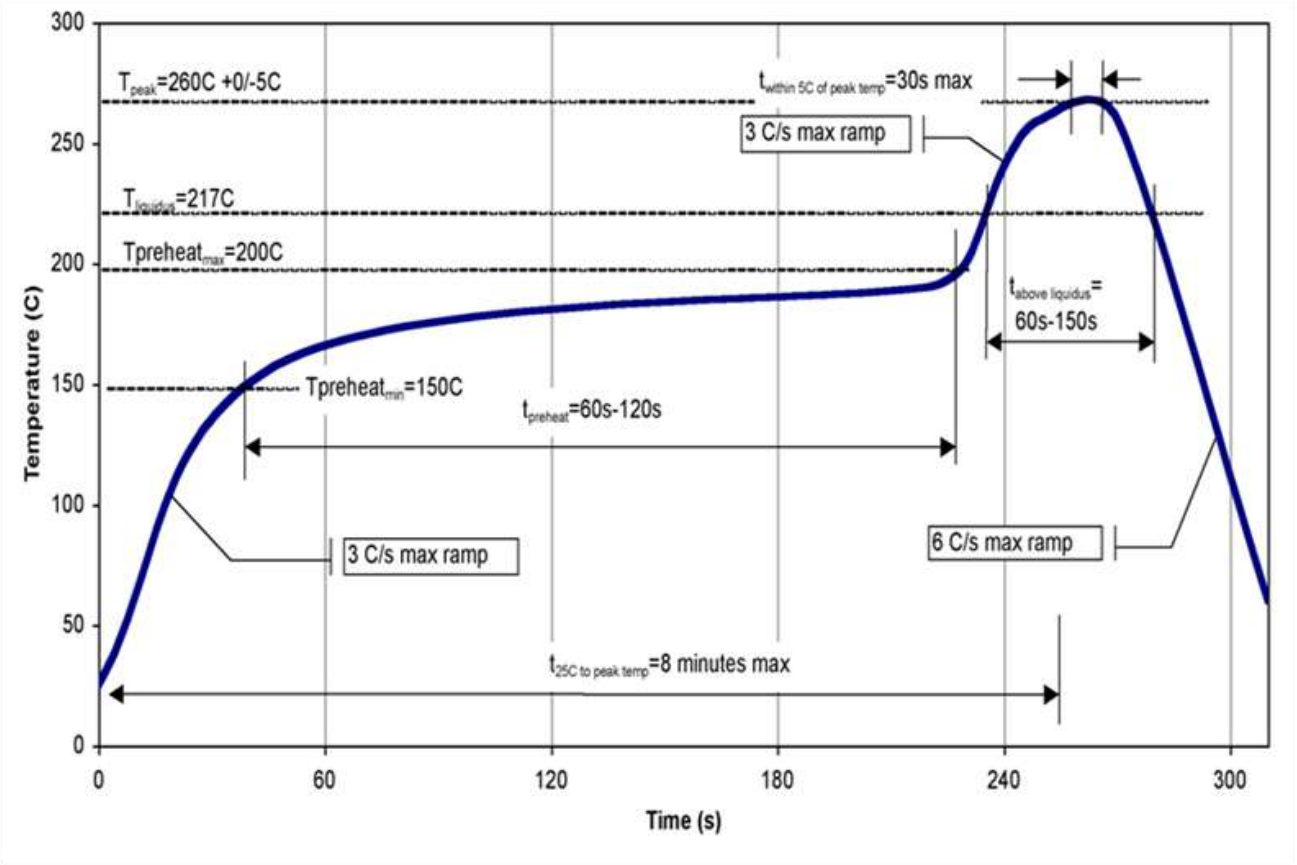


Notes:
1. Empty part cavities at the trailing and leading ends are sealed with cover tape. See EIA 481-1-A.
2. Labels are placed on the flange opposite the sprockets in the carrier tape.

Assembly Notes

1. Compatible with both Lead-free solder (260°C peak reflow temperature) and tin/lead (245°C peak reflow temp.) soldering processes.
2. Contact plating: Ni-Pd-Au.

Recommended Soldering Temperature Profile



ES France - Département RF & Hyperfréquences - 127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 60 - Fax. 01 47 01 16 22 - e-mail: hyper@es-france.com - Site Web: www.es-france.com

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 2	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C3	ESDA / JESD22-C101
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020

Caution!
ESD-Sensitive Device

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 ($C_{15}H_{12}Br_40_2$) Free
- SVHC Free

Contact Information

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

Web: www.qorvo.com

Tel: 1-844-890-8163

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