

# QM23171

## B71 Duplexer

### Product Description

The QM23171 is a B71 duplexer which uses Qorvo's leading technology, with excellent performance optimized to achieve high isolation requirements along with good insertion loss in a compact footprint.

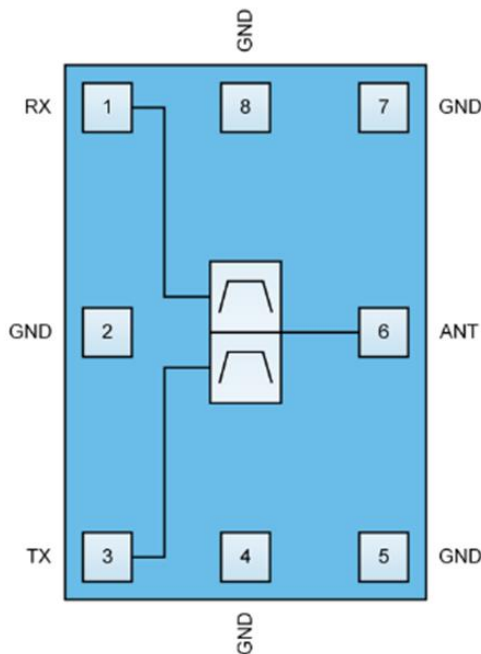
The QM23171 is specifically designed to meet the high performance expectations of insertion loss, isolation, rejection and linearity for LTE and NR systems under all operating condition.

The QM23171 uses common module packaging techniques to achieve the industry standard 1.8 x 1.4 x 0.6 mm footprint. This duplexer exhibits excellent power handling capabilities.



8 Pin 1.8 x 1.4 x 0.6 mm package

### Functional Block Diagram



Top View

### Feature Overview

- Compact Form-Factor: 1.8 x 1.4 x 0.6 mm
- Low insertion loss
- Excellent TX/RX Isolation
- Single-Ended operation
- RoHS Compliant, Pb-free module package

### Applications

- NR and LTE Mobile Products
  - Handsets
  - Datacards

### Ordering Information

Part Number	Description
QM23171EVB	Evaluation Board
QM23171SB	5pc sample bag
QM23171SR	100pcs on 7" reel
QM23171TR13	10,000 pcs on 13" reel

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

Parameter	Conditions	Range/Value	Units
Storage Temperature		-40 to +90	°C
RF Input Power (Pin 3, TX)	LTE, 5MHz BW, 1RB, 24RB Offset +55 °C for 5K hours	+30	dBm
RF Input Power (Pin 6, ANT)	CW, +55 °C for 5K hours	+15	dBm
Peak RF Input Power (Pin 3, TX)	CW, Max duration of 0.2 sec	+33.5	dBm

Notes:

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

## Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Case Temperature (no damage)	-30		+85	°C

## Electrical Specifications<sup>(1)</sup> Band 71 Transmit

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	663 MHz – 698 MHz	-	1.1 <sup>(2)</sup>	2.8 <sup>(3)</sup>	dB
VSWR (TX Port)	663 MHz – 698 MHz	-	1.3:1	2:1	-
VSWR (ANT Port)	663 MHz – 698 MHz	-	1.3:1	2:1	-
Attenuation	10 MHz – 608 MHz	43	45	-	dB
	608 MHz – 614 MHz	54	60	-	
	617 MHz – 652 MHz <sup>(4)</sup>	54	63	-	
	717 MHz – 728 MHz <sup>(4)</sup>	29	44	-	
	722 MHz – 729 MHz	41	56	-	
	729 MHz – 746 MHz	54	61	-	
	746 MHz – 768 MHz	48	55	-	
	768 MHz – 805 MHz	44	48	-	
	824 MHz – 849 MHz	44	49	-	
	859 MHz – 894 MHz	30	39	-	
	1164 MHz – 1250 MHz	40	45	-	
	1326 MHz – 1396 MHz	38	49	-	
	1559 MHz – 1563 MHz	44	53	-	
	1565.42 MHz – 1573.374 MHz	44	53	-	
	1573.374 MHz – 1577.644 MHz	44	53	-	
	1577.644 MHz – 1585.42 MHz	44	53	-	
	1597.551 MHz – 1605.886 MHz	45	53	-	
	1710 MHz – 1755 MHz	43	50	-	
	1805 MHz – 1880 MHz	43	51	-	
	1930 MHz – 1990 MHz	42	53	-	
	1989 MHz – 2094 MHz	42	51	-	
	2110 MHz – 2200 MHz	42	51	-	
	2400 MHz – 2484 MHz	40	51	-	
	2652 MHz – 2792 MHz	32	48	-	
	3300 MHz – 3800 MHz	33	40	-	
	3300 MHz – 4200 MHz	29	36	-	
	4400 MHz – 5000 MHz	21	29	-	
	4900 MHz – 5950 MHz	22	27	-	
	5925 MHz – 7125 MHz	22	28	-	

**Notes:**

1. All specifications are based on the QM23171 Applications Circuit
2. Typical specified as average at room temperature
3. Specified from +25°C to +85°C
4. Integrated over any 5 MHz bandwidth

## Electrical Specifications<sup>(1)</sup> Band 71 Receive

Parameter	Conditions	Min.	Typ.	Max.	Units
Insertion Loss	617 MHz – 652 MHz	-	1.3 <sup>(2)</sup>	2.5 <sup>(3)</sup>	dB
	617.25 MHz – 651.75 MHz	-	1.4 <sup>(2)</sup>	3.0	
VSWR (RX Port)	617 MHz – 652 MHz	-	1.5:1	2:1	-
VSWR (ANT Port)	617 MHz – 652 MHz	-	1.4:1	2:1	-
Attenuation	33 MHz – 55 MHz	77	81	-	dB
	602 MHz – 608 MHz <sup>(4)</sup>	41 <sup>(5)</sup>	50	-	
	608 MHz – 614 MHz <sup>(4)</sup>	6 <sup>(5)</sup>	18	-	
	663 MHz – 698 MHz <sup>(6)</sup>	56	61	-	
	709 MHz – 740 MHz	34	41	-	
	776 MHz – 793 MHz	31	38	-	
	793 MHz – 805 MHz	29	38	-	
	824 MHz – 849 MHz	33	42	-	
	1058 MHz – 1138 MHz	35	41	-	
	1163 MHz – 1204 MHz	35	40	-	
	1233 MHz – 1281 MHz	39	43	-	
	1461 MHz – 1484 MHz	41	45	-	
	1653 MHz – 1698 MHz	38	46	-	
	1710 MHz – 1780 MHz	41	47	-	
	1850 MHz – 1920 MHz	40	45	-	
	1851 MHz – 1956 MHz	40	45	-	
	2305 MHz – 2315 MHz	43	53	-	
	2327 MHz – 2407 MHz	43	53	-	
	2400 MHz – 2500 MHz	43	53	-	
	2468 MHz – 2608 MHz	41	53	-	
	2496 MHz – 2690 MHz	41	53	-	
	2922 MHz – 2967 MHz	39	57	-	
	3300 MHz – 4200 MHz	32	46	-	
	4037 MHz – 4162 MHz	32	47	-	
	4317 MHz – 4472 MHz	30	42	-	
	4900 MHz – 5950 MHz	34	45	-	
	5925 MHz – 7125 MHz	36	43	-	

**Notes:**

1. All specifications are based on the QM23171 Applications Circuit
2. Typical specified as average at room temperature
3. Specified from -10°C to +85°C
4. Average over specified frequency range
5. Specified from -30°C to +55°C
6. Integrated over any 5 MHz bandwidth

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

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation	663 MHz – 698 MHz	55	61	-	dB
	617 MHz – 652 MHz	55 <sup>(2)</sup>	63	-	
	1326 MHz – 1396 MHz	56	60	-	
	1989 MHz – 2094 MHz	56	61	-	
	2652 MHz – 2792 MHz	60	66	-	

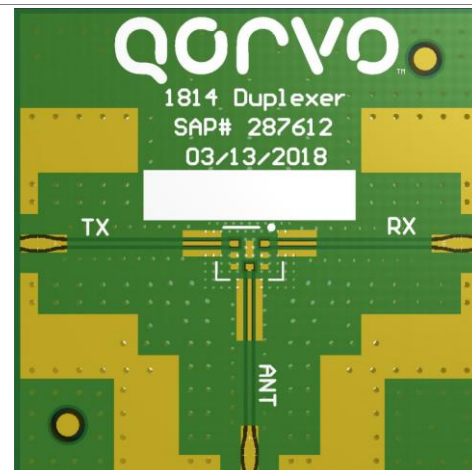
Notes:

1. All specifications are based on the QM23171 Applications Circuit
2. Integrated over any 5 MHz bandwidth

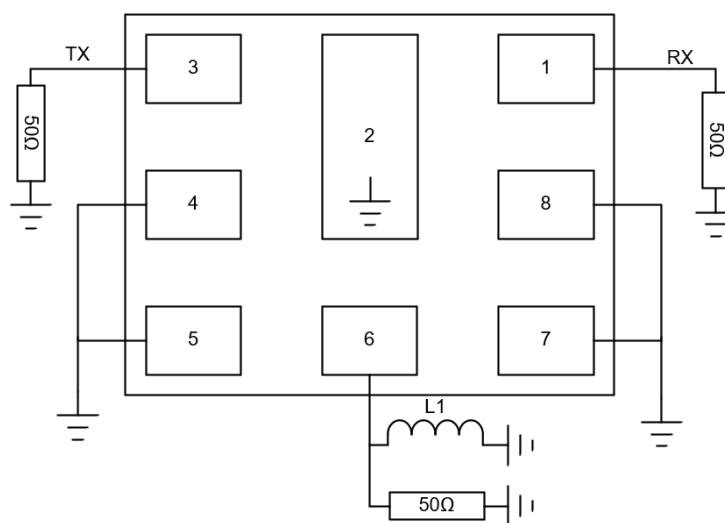
## QM23171EVB PCB Information

### Evaluation Board Layer Description/Stackup

Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Taiyo PSR4000 GREEN	0.80mil	3.5	
3	Top Layer	Copper	1.40mil		
4	Dielectric1	FR-408HR	4.00mil	4.2	
5	Layer 2	Copper	1.40mil		
6	Dielectric 3	FR-408HR	27.00mil	4.2	
7	Layer 3	Copper	1.40mil		
8	Dielectric 2	FR-408HR	4.00mil	4.2	
9	Bottom Layer	Copper	1.40mil		
10	Bottom Solder	Taiyo PSR4000 GREEN	0.80mil	3.5	
11	Bottom Overlay				



## QM23171 Applications Circuit



Top View

### Note:

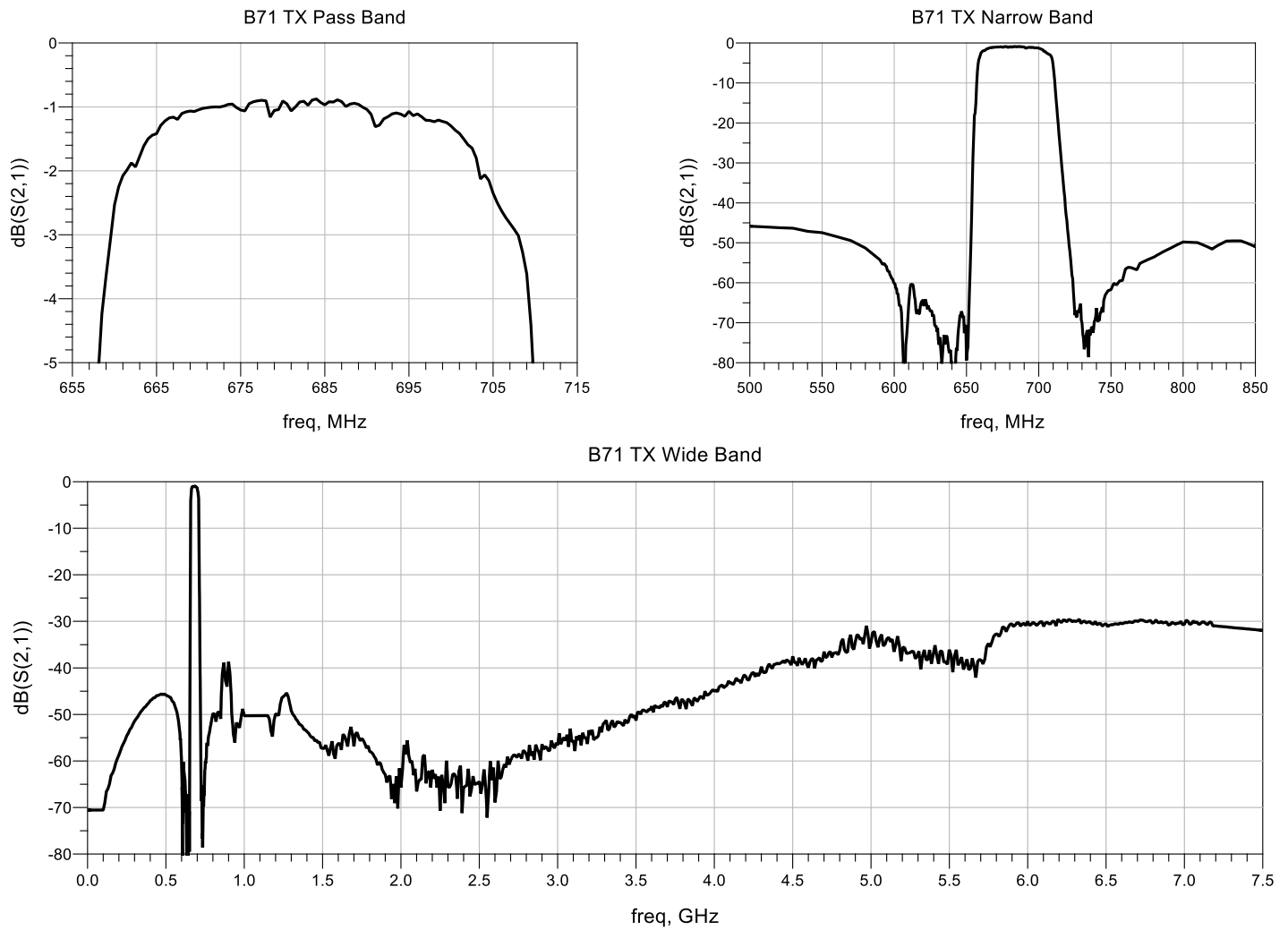
1. Pin 6 (ANT) is terminated with an inductor, actual matching values may vary depending on PCB design and impedance requirements. All other ports are internally matched to 50 ohms.
2. Recommend connecting all ground pins together on PCB.
3. Recommend adding Pi network close to each RF port for phone level tuning/optimization.
4. Blocking capacitors are needed on any ports where a DC voltage may be present.

## QM23171-EVB Bill of Material

Ref. Des.	Value	Description	Manuf.	Part Number
PCB	N/A	4-layer Printed Circuit Board	Multiple	QM23171EVB
U1	N/A	B71 Duplexer	Qorvo	QM23171
L1	16 nH	Inductor, 0201	Multiple	Ideal

## Band 71 Transmit Insertion Loss and Attenuation Plots

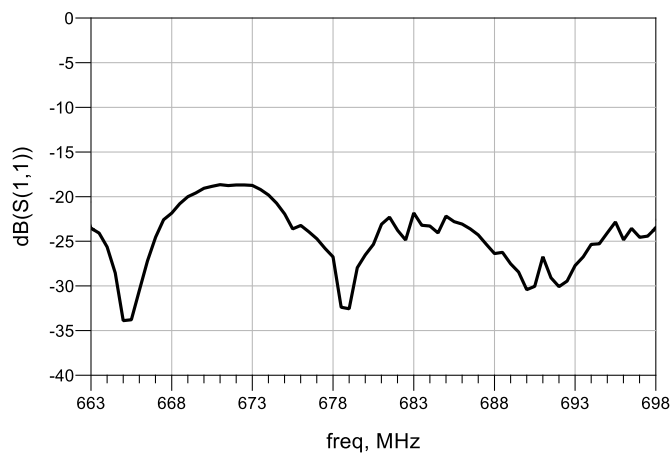
Test conditions unless otherwise noted: Temp. = +25°C



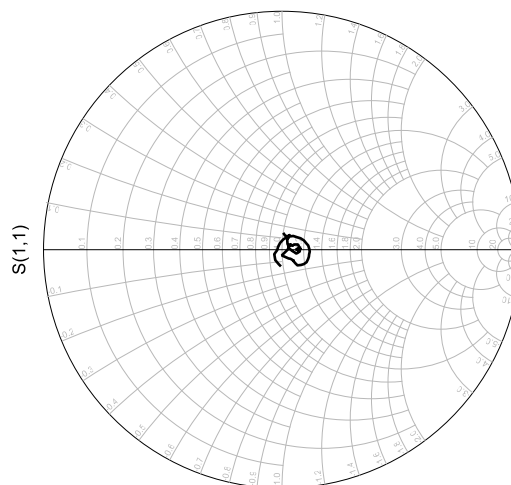
## Band 71 Transmit Return Loss and Impedance Plots

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

B71 TX ANT Port Return Loss

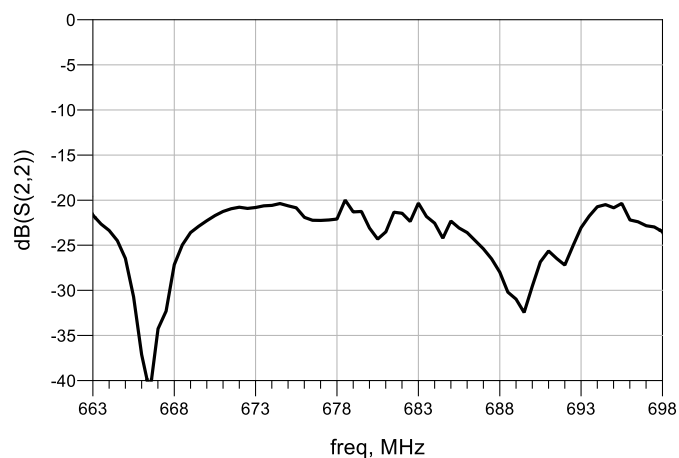


B71 TX ANT Port Impedance

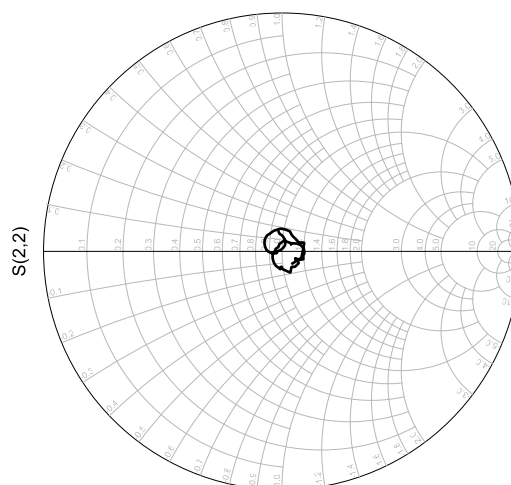


freq (663.0MHz to 698.0MHz)

B71 TX Port Return Loss



B71 TX Port Impedance

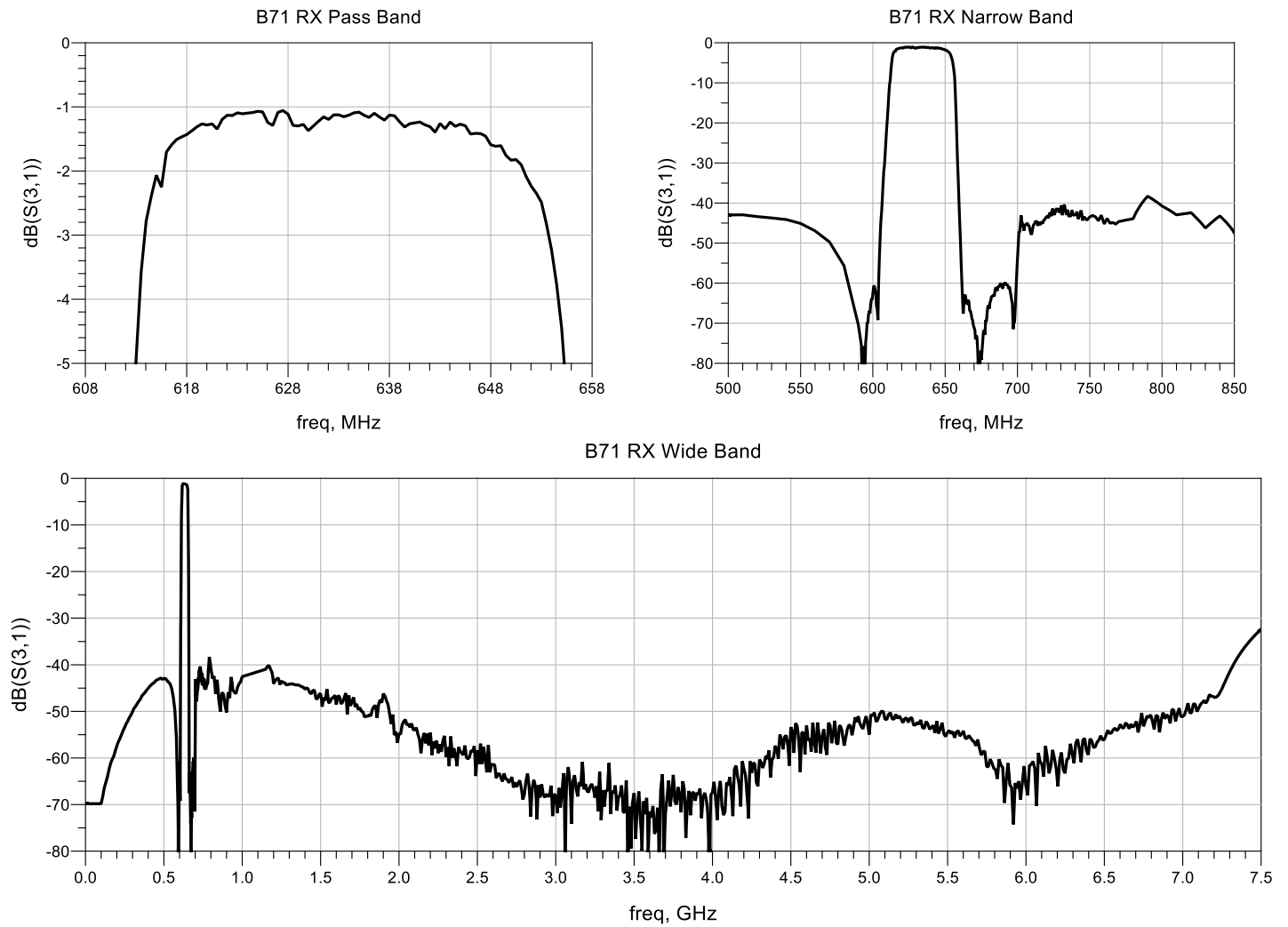


freq (663.0MHz to 698.0MHz)



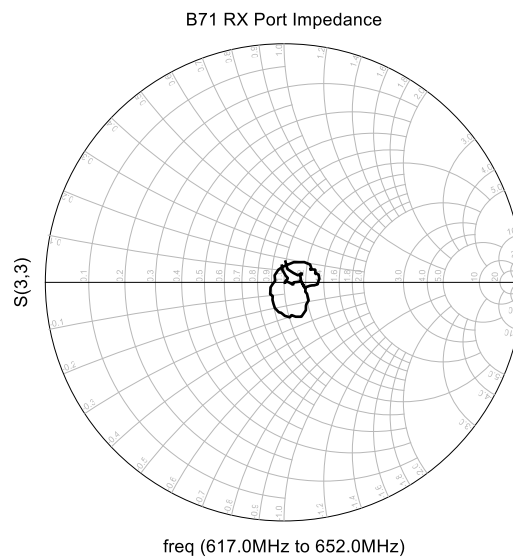
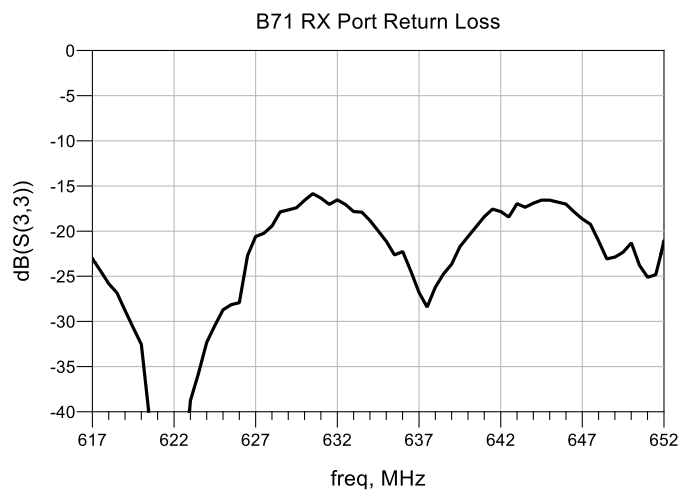
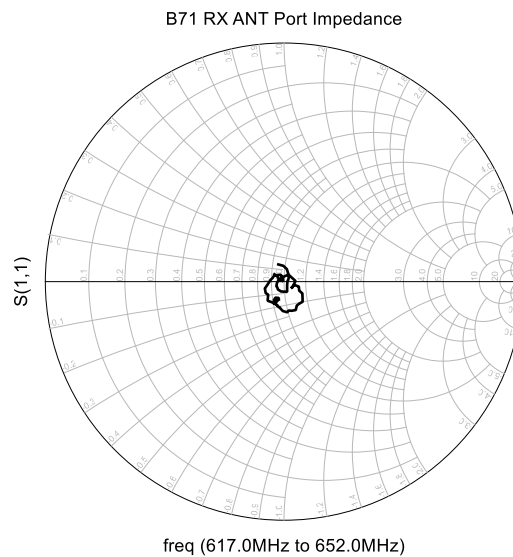
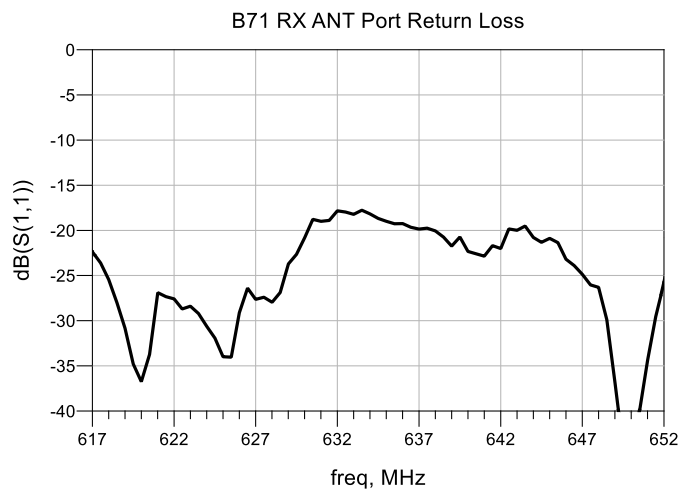
## Band 71 Receive Insertion Loss and Attenuation Plots

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



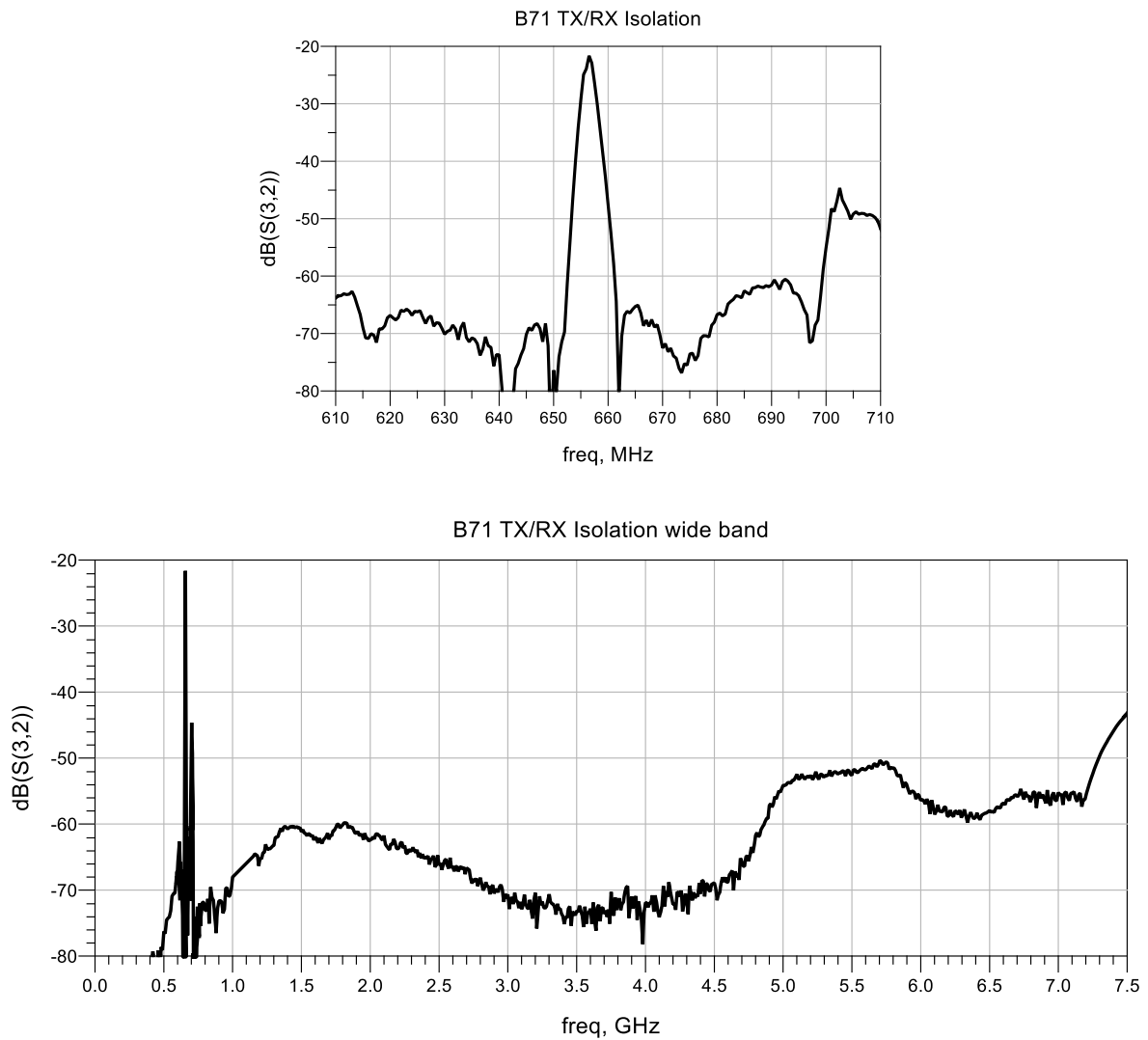
## Band 71 Receive Return Loss and Impedance Plots

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

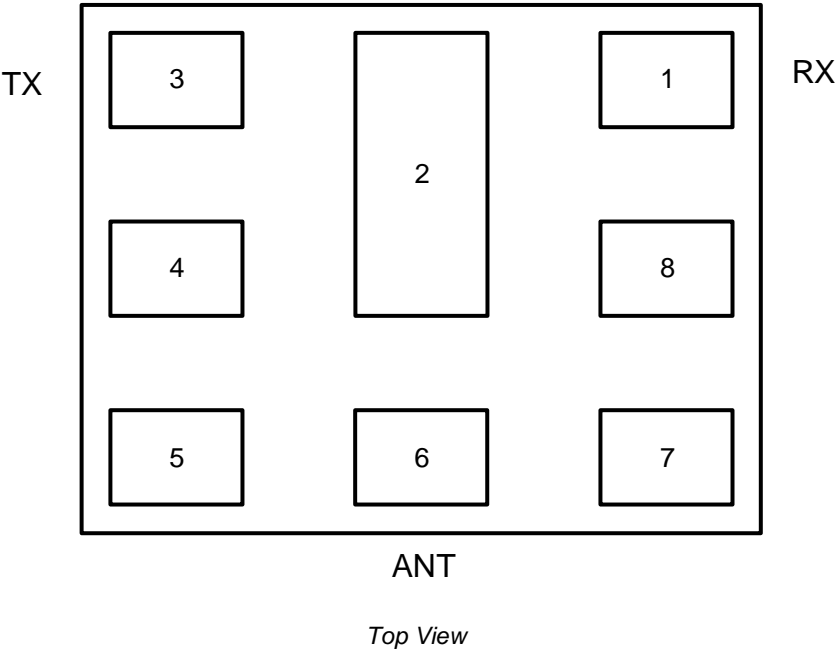


## Isolation Plots

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



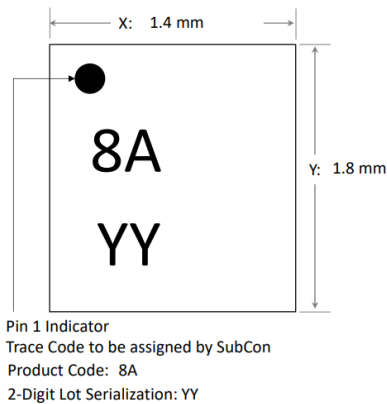
Pin Configuration and Description



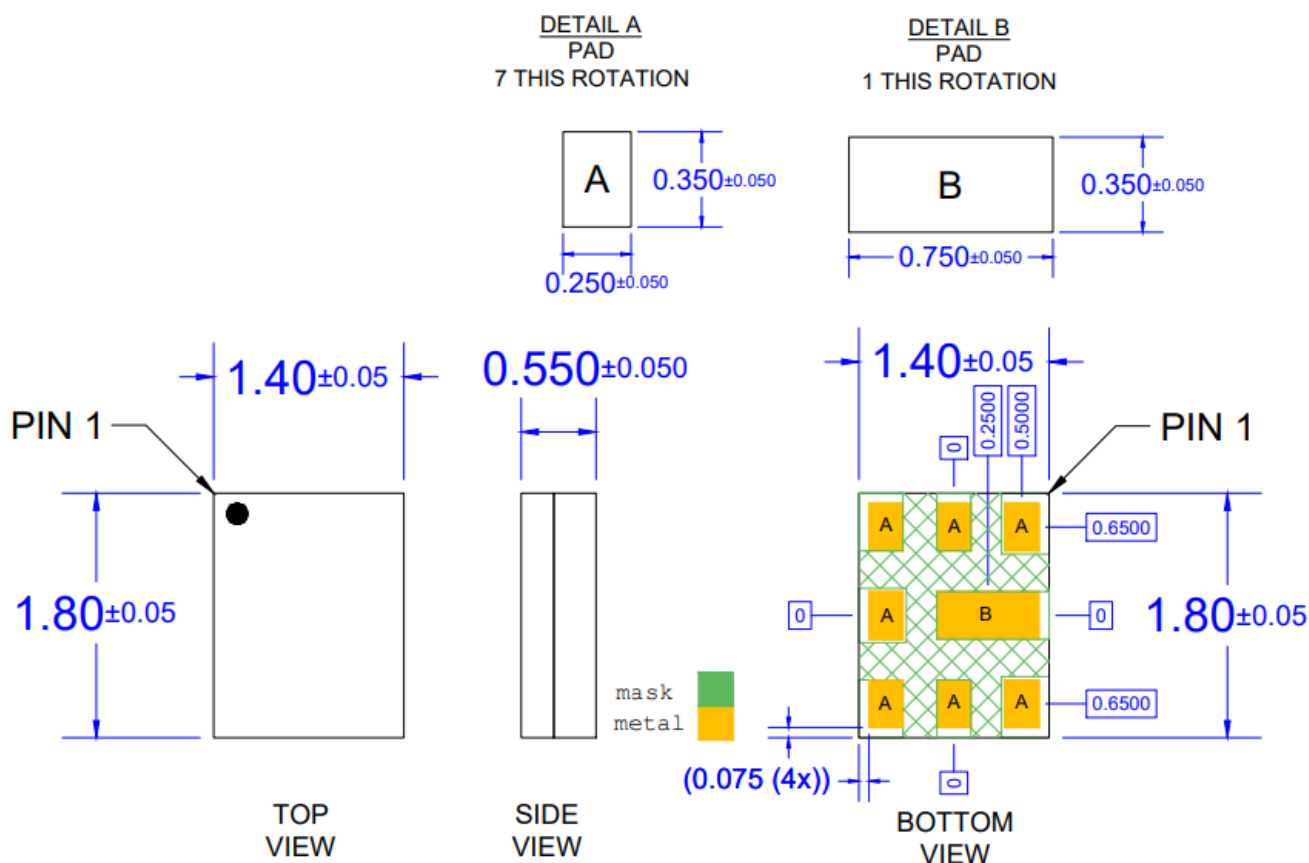
Pin Number	Label	Description
1	B71 RX	Band 71 Receive Port
3	B71 TX	Band 71 Transmit Port
6	ANT	Antenna Port
2, 4, 5, 7 and 8	GND	Package Ground

## Package Marking and Dimensions

### Package Marking Diagram



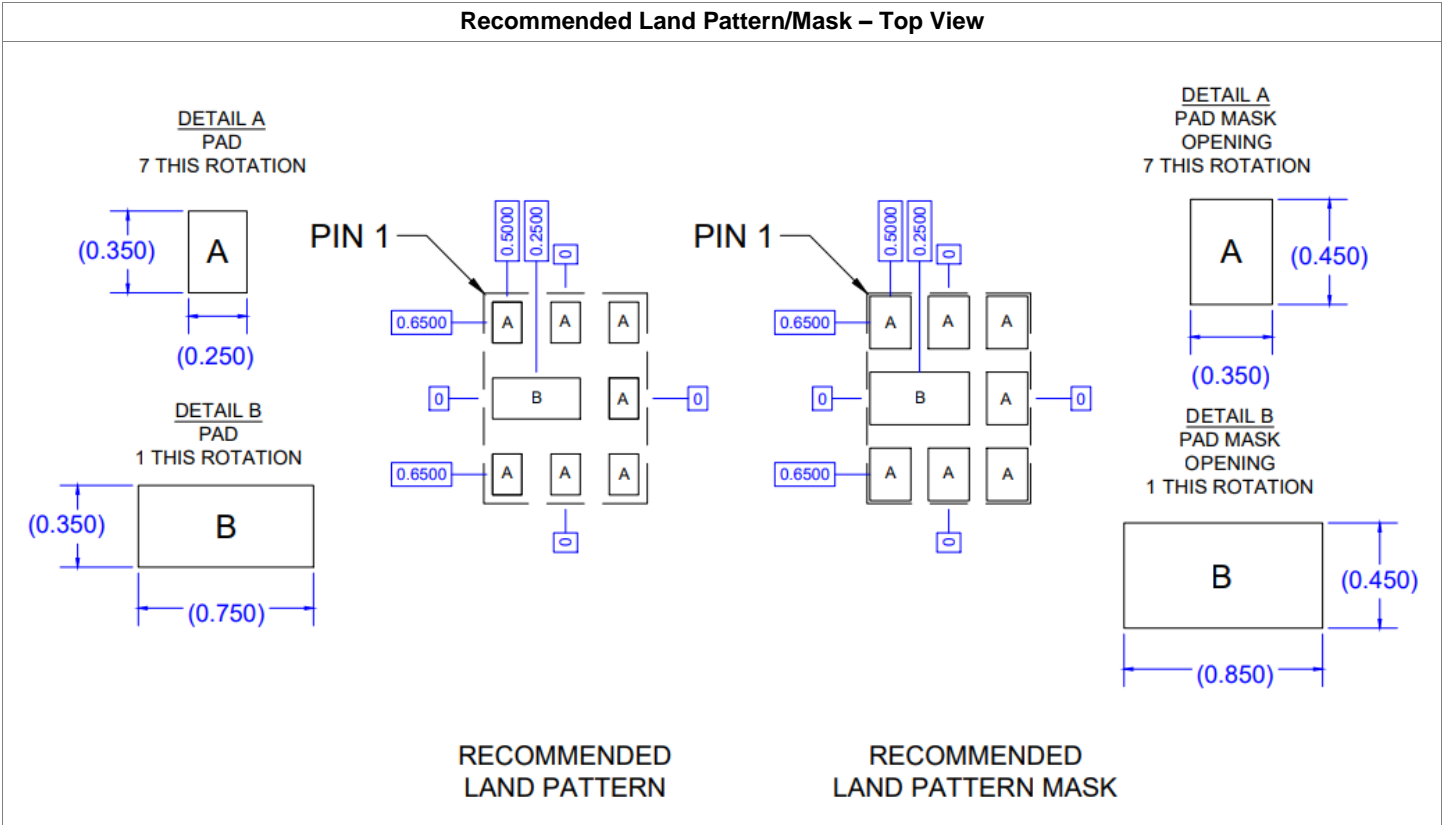
### Package Outline Dimension Drawing



#### Notes:

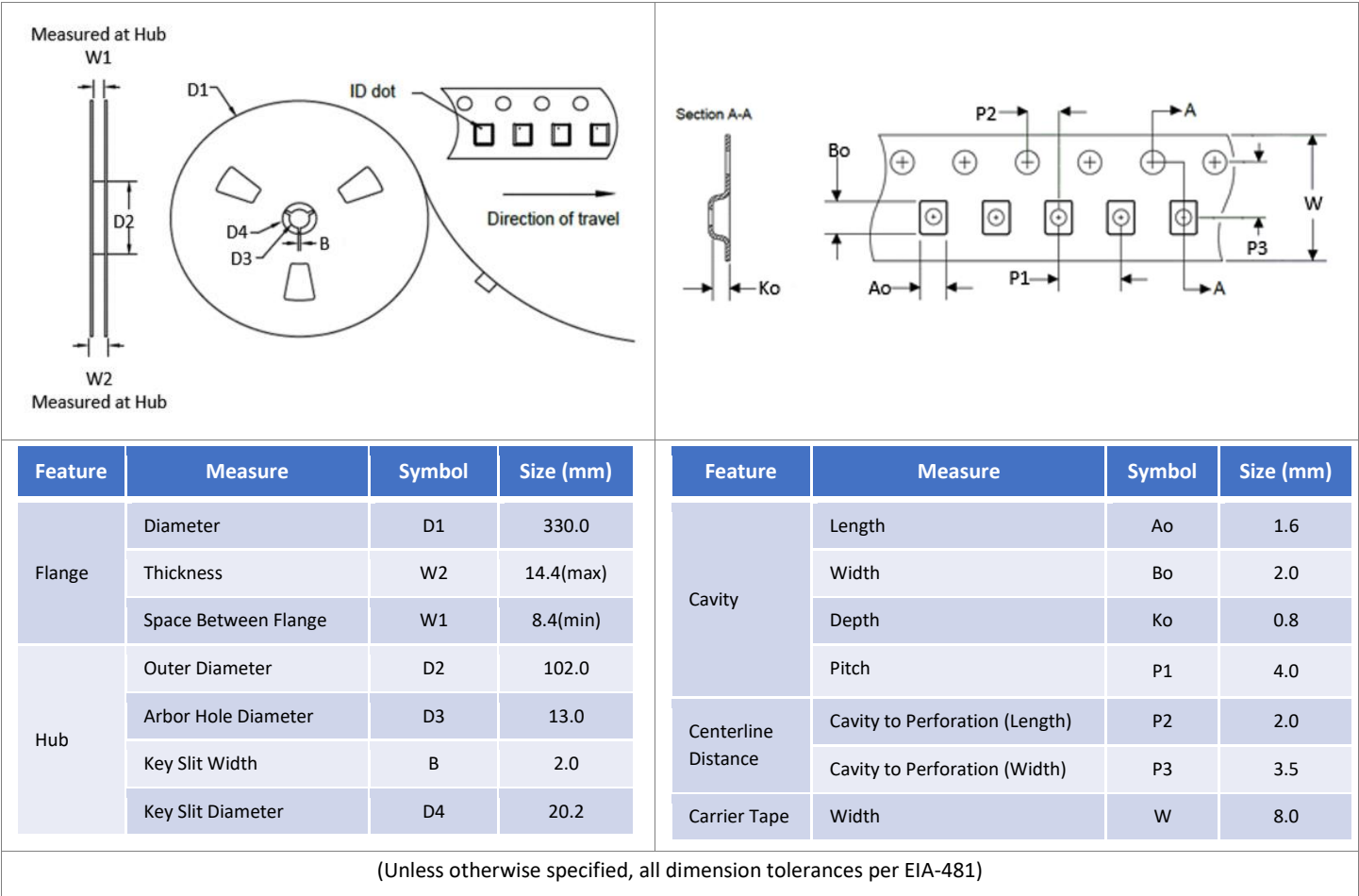
1. All dimensions are in millimeters.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012

Mechanical Information



- Notes:
1. All dimensions are in millimeters.
  2. Dimension and tolerance formats conform to ASME Y14.4M-1994.

Tape and Reel Information



## Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	1B	ESDA/JEDEC JS-001
ESD – Charged Device Model (CDM)	C3	ESDA/JEDEC JS-002
MSL – Moisture Sensitivity 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<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free
- SVHC Free



## Contact Information

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

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

**Tel:** 1-844-890-8163

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

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## REVISION HISTORY

Revision	Date (MMDDYYYY)	Description
E	08172023	Production release

## Contact Information

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

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

**Tel:** 1-844-890-8163

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

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