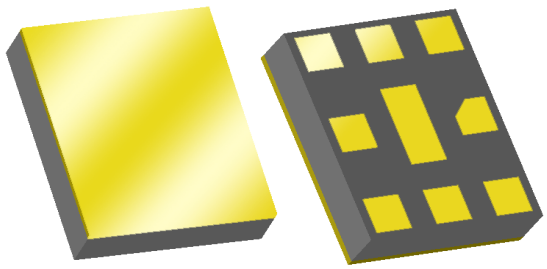
857181

782/751 MHz Duplexer

Applications

- For Band 13 LTE applications
- LTE B13, data cards, mobile routers

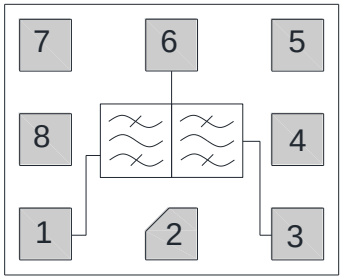


CSP-10KT, 2.5 x 2.00 x 0.56 mm

Product Features

- High Rejection in Band 14
- Usable bandwidth 10 MHz
- High Uplink-Downlink Isolation
- Low loss (or High attenuation)
- Single-ended Downlink and Uplink operation
- Ceramic chip-scale Hermetic Package (CSP)
- Small Size: 2.5 x 2.00 x 0.56 mm
- Hermetic RoHS compliant, Pb-free

Functional Block Diagram



General Description

The 857181 is a high-performance Temperature Compensated Surface Acoustic Wave (TC SAW) duplexer designed to meet the strict LTE requirements for use in Band 13.

857181 is specifically designed to meet the high performance expectations of insertion loss, isolation and BC14 rejection in LTE systems operating in B13 applications under all operating condition.

The 857181 uses common packaging techniques to achieve the industry standard 2.5 x 2.0 mm footprint. The duplexer exhibits excellent power handling capabilities.

Pin Configuration - Single Ended

Pin No.	Label
1	Downlink
3	Uplink
6	Ant/Phase Inductor
2,4,5,7,8,,9	Ground

Ordering Information

Part No.	Description
857181	Packaged Part
857181-EVB	Evaluation board description

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

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature [1]	-40 to +90°C
Operable Temperature [2]	-40 to +90°C
RF Input Power [3]	+29 dBm

1. Operation of this device outside the parameter ranges given may cause permanent damage.
2. Specifications are not guaranteed over all operable conditions.
3. Input Power at Downlink Pin 1 with applied CW signal at +95°C for 10K hours in the 746 -756 MHz frequency band.

Uplink Electrical Specifications [1]

Specified Temperature Range [2] = -30 to +90°C

Parameter [3]	Conditions	Min	Typ [4]	Max	Units
Center Frequency		-	782	-	MHz
Maximum Insertion Loss	777 –787 MHz	-	1.9	2.5	dB
Amplitude Variation [5]	777 – 787 MHz over any 5 MHz	-	0.64	1.2	dB p-p
Absolute Attenuation [6]	10 – 716 MHz	32	37.7	-	dB
	716 – 728 MHz	36	40.8	-	dB
	728 – 746 MHz	35	43.6	-	dB
	746 – 756 MHz	47	56.2	-	dB
	758 – 767 MHz	37	46.9	-	dB
	767 – 768 MHz	30	45.2	-	dB
	768 – 769 MHz	15	42.7	-	dB
	769 – 770 MHz	2	32.1	-	dB
	869 – 894 MHz	35	38.5	-	dB
	1554 – 1565 MHz	41	47.2	-	dB
	1565 – 1585 MHz	40	47.5	-	dB
	1597 – 1607 MHz	40	48.5	-	dB
	1805 – 1880 MHz	40	51.7	-	dB
	1930 – 1990 MHz	40	50.5	-	dB
	2110 – 2170 MHz	40	48.8	-	dB
	2331 – 2361 MHz	38	55.4	-	dB
	2400 – 2484 MHz	38	53.1	-	dB
	3108 – 3148 MHz	35	47.2	-	dB
Uplink Return Loss	777 –787 MHz	10	19.8	-	dB
Antenna Return Loss	777 –787 MHz	10	16	-	dB
Uplink Impedance [7]	Single ended	-	50	-	Ω
Antenna Impedance [7]	Single ended	-	50	-	Ω

Notes:

1. All Specifications are based on the TriQuint schematic for the main reference design shown on page 4
2. In production devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temp.
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. Typical values are based on average measurements at room temperature
5. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency points
6. Relative to zero dB.
7. This is the optimum impedance in order to achieve the performance shown

Downlink Electrical Specifications [1]

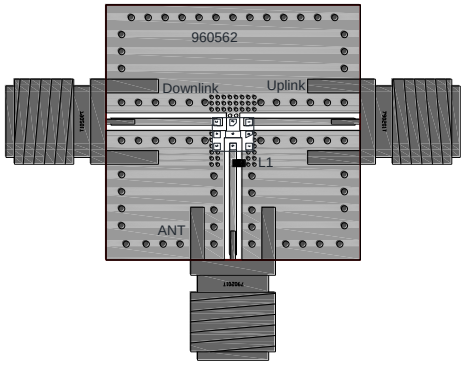
Specified Temperature Range [2] = -30 to +90°C

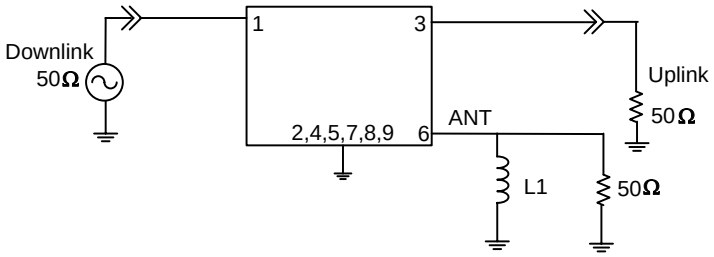
Parameter [3]	Conditions	Min	Typ[4]	Max	Units
Center Frequency		-	751	-	MHz
Maximum Insertion Loss	746 – 756 MHz	-	1.8	2.5	dB
Amplitude Variation [5]	746 – 756 MHz	-	0.52	1.1	dB p-p
Absolute Attenuation [6]	650 – 729 MHz	27	32.1	-	dB
	729 – 736 MHz	5	22.7	-	dB
	777 – 787 MHz	47	51.8	-	dB
	793 – 805 MHz	33	37.2	-	dB
	805 – 3200 MHz	16	20	-	dB
	3200 – 4200 MHz	18	19.2	-	dB
	4200 – 6000 MHz	10	12.5	-	dB
IMR2 [7] (a) (b)		-	TBD	-	dBm
IMR3 [7] (c) (d)		-	TBD	-	dBm
Downlink Return Loss	746 – 756 MHz	8.5	14.3	-	dB
Antenna Return Loss	746 – 756 MHz	10	14.8	-	dB
Downlink Impedance (single-ended) [8]		-	50	-	Ω
Antenna Impedance (single-ended) [8]		-	50	-	Ω
Uplink-Downlink Specification					
Uplink to Downlink Isolation	777 – 787 MHz	47	51.7	-	dB
	746 – 749 MHz	50	58.8	-	dB
	749 – 752 MHz	50	63.8	-	dB
	752 – 756 MHz	53	61.5	-	dB
	1552 – 1574 MHz	60	71.9	-	dB
	2328 – 2361 MHz	60	65.7	-	dB
	3104 – 3148 MHz	50	56	-	dB

Notes:

1. All Specifications are based on the TriQuint schematic for the main reference design shown on page 4
2. In production devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temp.
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. Typical values are based on average measurements at room temperature
5. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency points
6. Relative to zero dB.
7. All Power levels are referenced to the antenna port. Two CW tones are applied at frequencies f1 and f2, and the resultant intermodulation product in the Downlink band is measured. The first tone is applied to the Uplink port, in the range f1 = 777 to 787 MHz, at+21.5 dBm (referenced to the antenna port). The second tone is -15 dBm, applied to the antenna port at f2, with the following four cases: a. (f2 = 31 MHz); b. (f2 = 2 * f1 - 31 MHz); c. (f2 = f1 + 31 MHz); d. (f2 = 3 * f1 - 31 MHz). The intermodulation product is measured at f1 - 31 MHz.
8. This is the optimum impedance in order to achieve the performance shown

857181 Evaluation Board



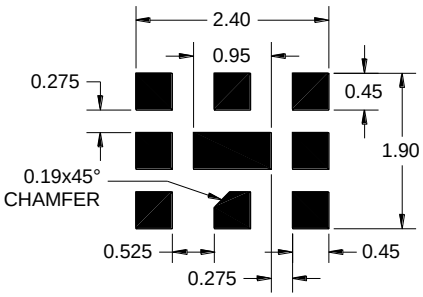


Notes:
1. This is the optimum impedance in order to achieve the performance shown
2. PCB: 0.75 x 0.75 x 0.063; Construction: 1 OZ *Cu* Top, Middle and Bottom Layers; Material in between middle and top layer: *TLY-5A* (.0075); Material in between mid-bottom layers: *FR4*. (dimensions are in inches)

Bill of Material – 857181-EVB

Reference Des.	Value	Description	Manuf.	Part Number
U1	n/a	Duplexer 751/782 MHz	TriQuint	857181
L1	15nH	0402, +/- 5%, wire wound chip ind.	Murata	LQW15AN15NJ00
SMA	N/A	SMA connector	Radiall	9602-1111-018
PCB	n/a	Printed Circuit Board	TriQuint	960562

PCB Mounting Pattern

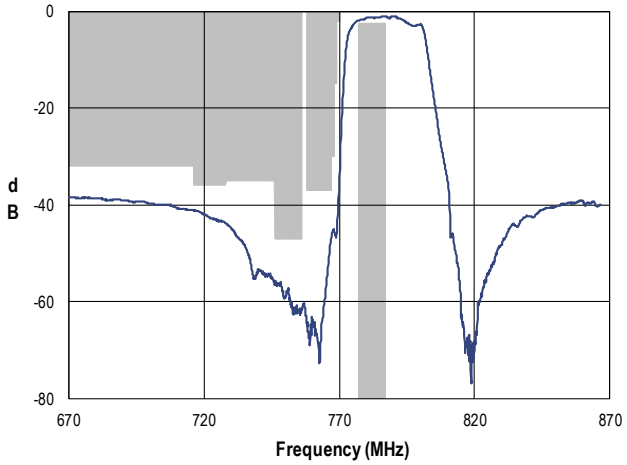


Notes:
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the TriQuint evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

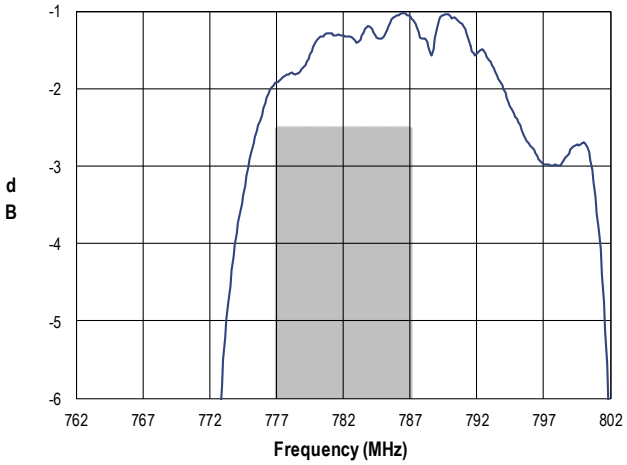
Performance Plots - 857181-EVB

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

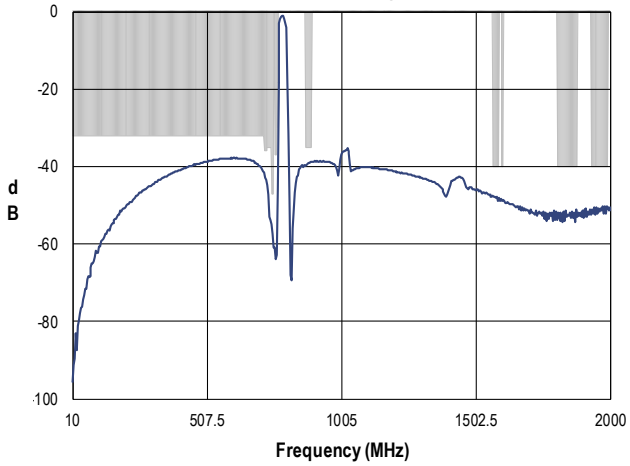
Rx Frequency Response



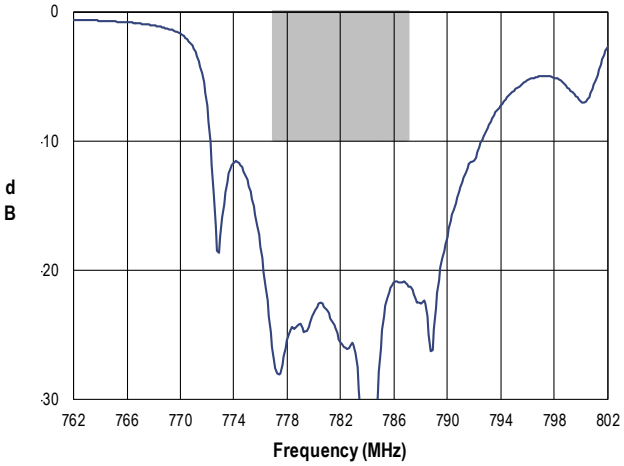
Rx Passband Response



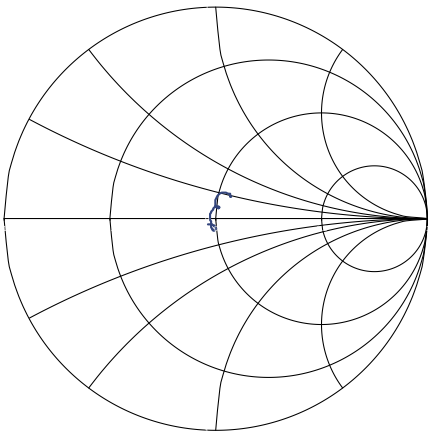
Rx Wideband Response



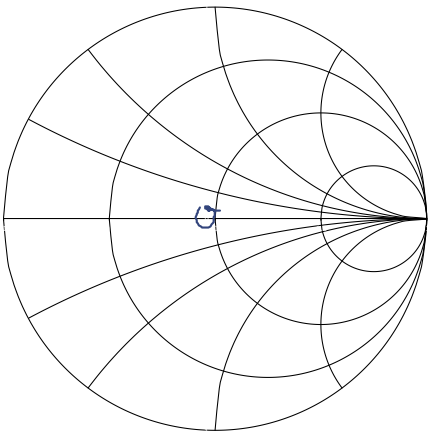
Rx Return Loss



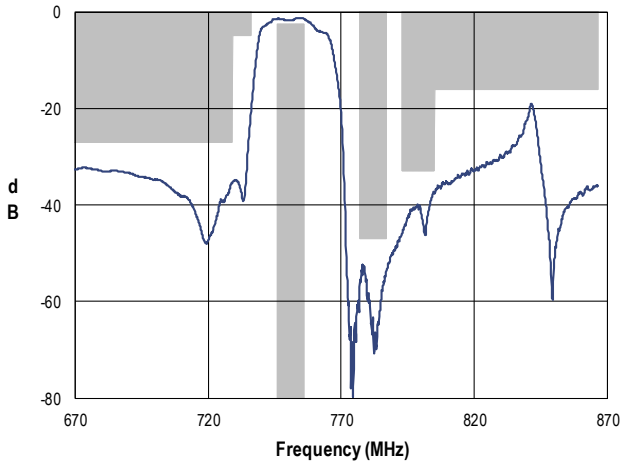
Uplink Path - Ant Port Impedance



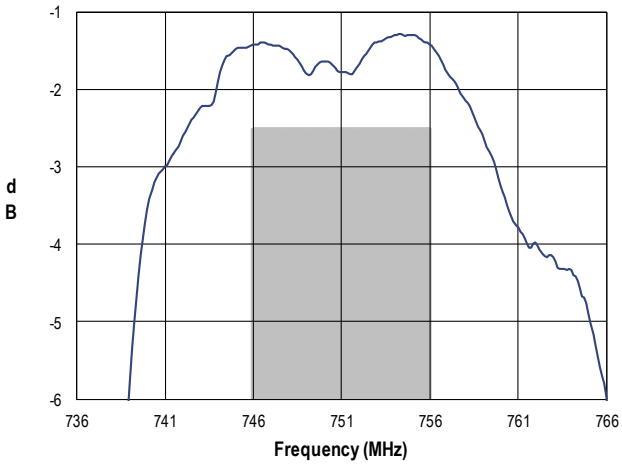
Uplink Port Impedance



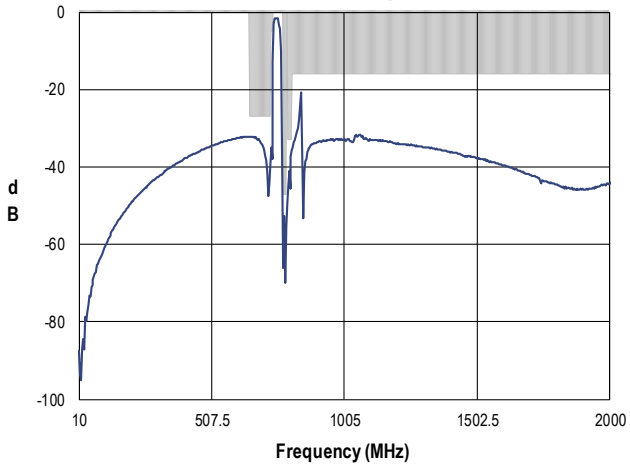
Tx Frequency Response



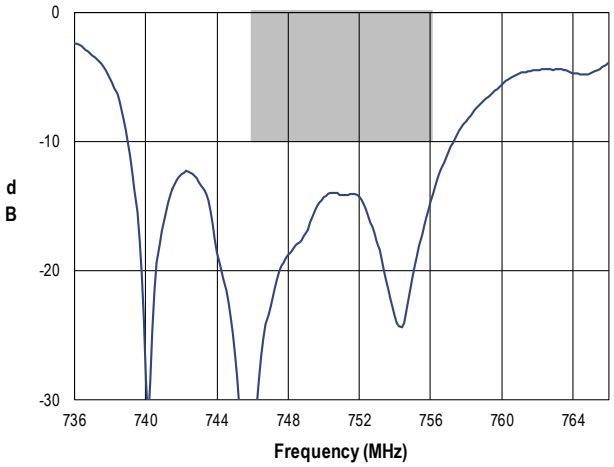
Tx Passband Response



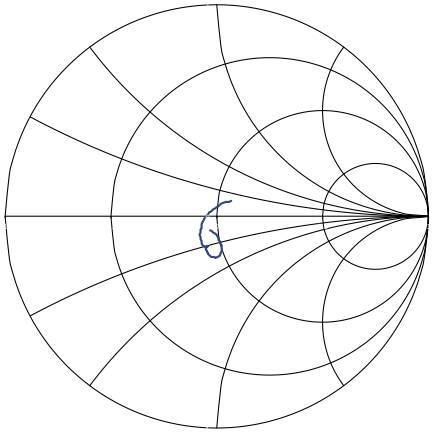
Tx Wideband Response



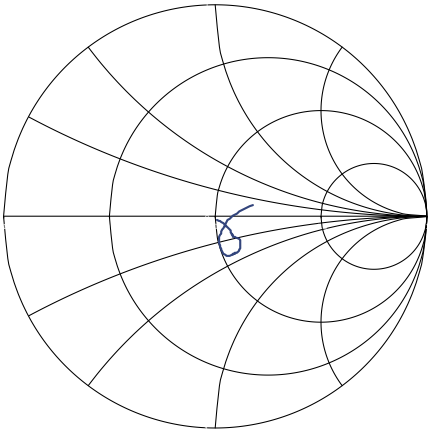
Tx Return Loss

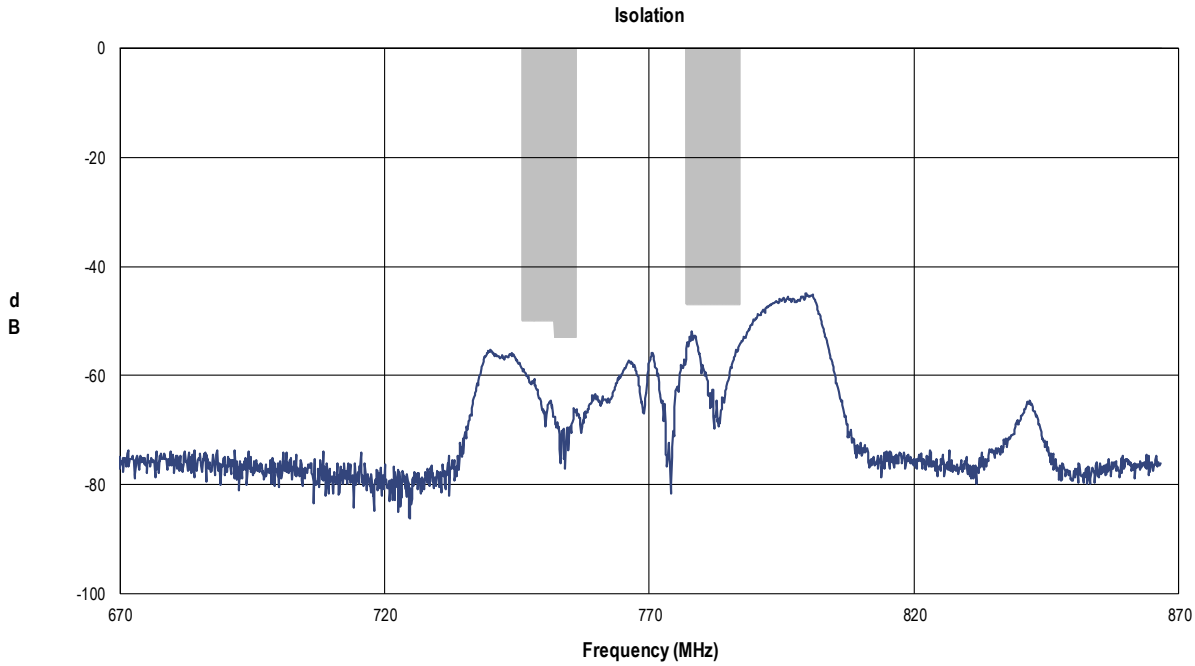


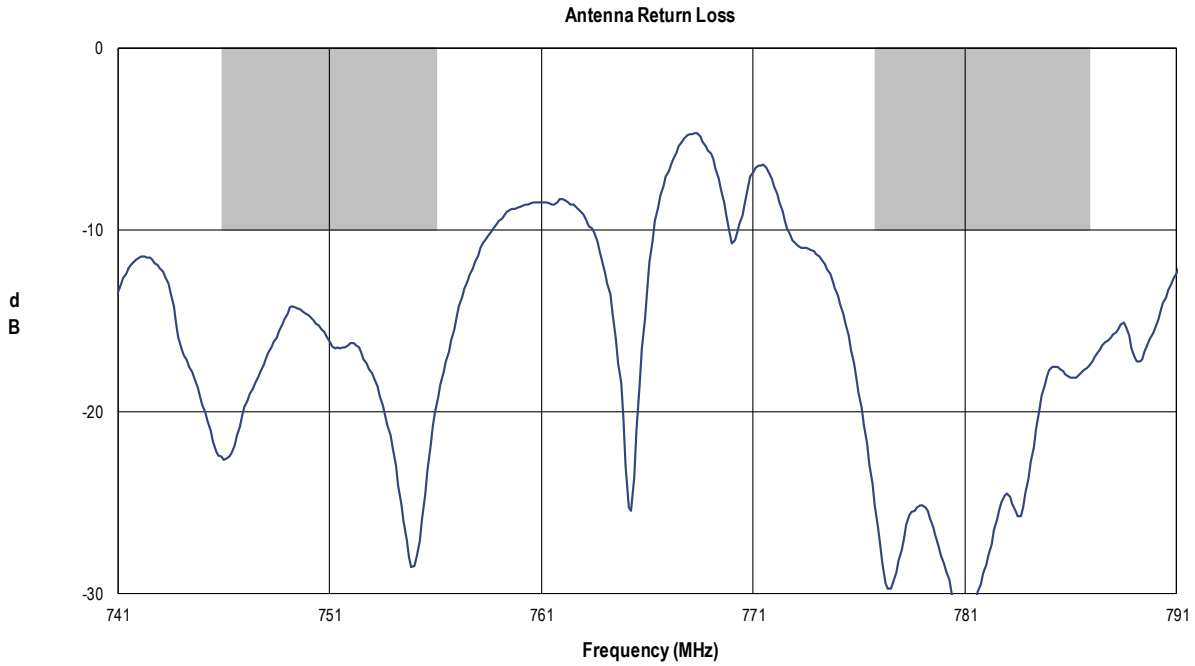
Downlink Path - Ant Port Impedance



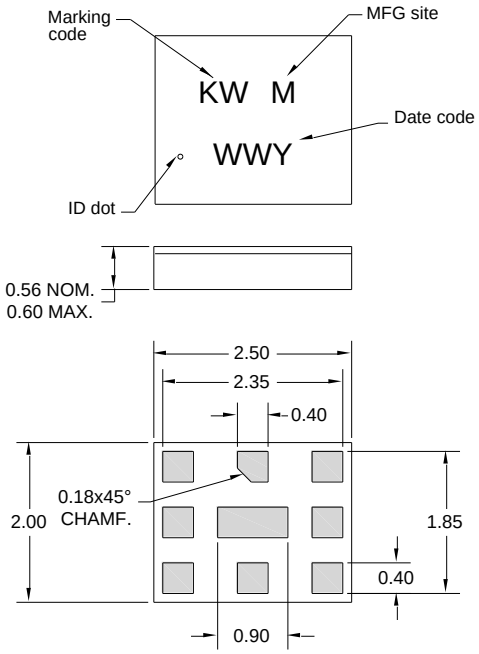
Downlink Port Impedance







Package Information, Marking and Dimensions



Package Style: CSP-10KT
Dimensions: 2.5 x 2.00 x 0.56 mm

Body: Al_2O_3 ceramic
Lid: *Kovar* or Alloy42, Au over Ni plated
Terminations: *Au* plating 0.5 - 1.0µm, over a 2-6µm *Ni* plating

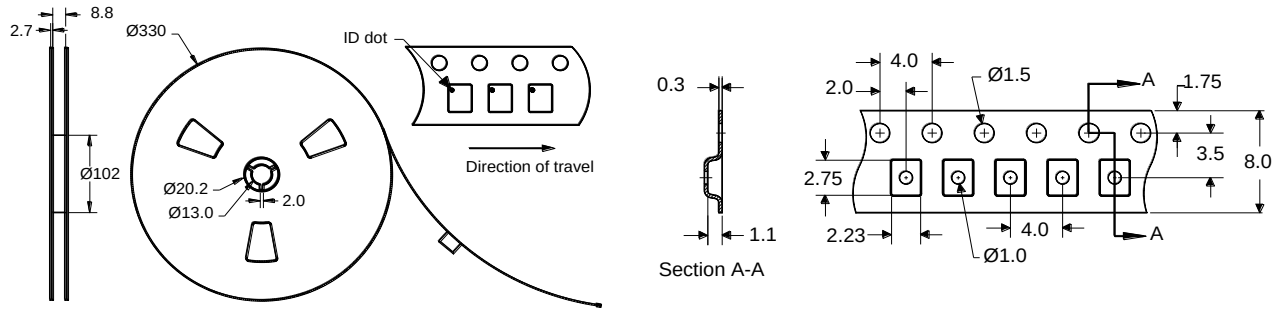
All dimensions shown are nominal in millimeters
All tolerances are ±0.15mm except overall length and width ±0.10mm

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

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

Tape and Reel information

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



Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Rating: Class 0B
Value: Passes ≥ 250 V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class A
Value: Passes ≥ 50V
Test: Machine Model (MM)
Standard: JEDEC Standard JESD22-A115

MSL Rating

Not applicable. Hermetic package.

Solderability

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

Refer to **Soldering Profile** for recommended guidelines.

RoHs Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

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

Contact Information

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

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