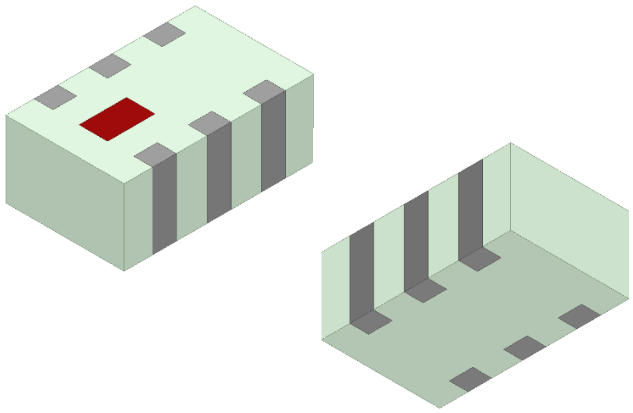
770 – 928 MHz Impedance-matched Balun-filter for Texas Instruments CC1310, 1312R, 1314R10 Wireless MCUs

- 783, 868, and 915MHz ISM bands
- SMD, EIA 0603
- Complete front-end solution
  - Integrated impedance-matching balun
  - Integrated harmonic filter for regulatory compliance
- Designed for use with Texas Instruments MCU part numbers:
  - CC1310
  - CC1312R
  - CC1314R10 (RGZ)



General Specifications[1]

Passband Frequency (MHz)	**770 - 928**	
Unbalanced Impedance, Antenna-side (Ω)	50	
Balanced Impedance, Transceiver-side (Ω)	Impedance match to Texas Instruments CC1310, CC1312R, CC1314R10	
Frequency Bands (MHz)	**770 – 860**	**860 – 928**
Insertion Loss (dB)	1.3 Typ. (1.6 Max.)	1.8 Typ. (2.2 Max.)
Return Loss (dB)	9.5 Min.	9.5 Min.
Phase Difference (Degree)	180 ± 17	180 ± 15
Amplitude Difference (dB)	3.5 Max.	2.0 Max.
Attenuation		
Frequency Range (MHz) Attenuation (dB)	1540 – 1720 8 Min.	
Frequency Range (MHz) Attenuation (dB)	1720 – 1736 15 Min.	
Frequency Range (MHz) Attenuation (dB)	1736 – 1856 15 Min.	
Frequency Range (MHz) Attenuation (dB)	2310 – 2580 30 Min.	

[1] Typical value represents average measurement at 25°C. Min./Max. values represent measurements over specified operating temperature.

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General Specifications (continued)

Frequency Range (MHz) Attenuation (dB)	2580 – 2784 30 Min.
Frequency Range (MHz) Attenuation (dB)	3080 – 3440 33 Min.
Frequency Range (MHz) Attenuation (dB)	3440 – 3712 35 Min.

Maximum Ratings

Power Capacity (W)	2 Max. (CW)
Operating Temperature (°C)	-40 to +105
Recommended Storage Conditions post-installation (°C)	-40 to +105
Recommended Storage Conditions and Period for Unused T&R Product	45% - 75% RH +5 to +35 °C 18 Months Max.

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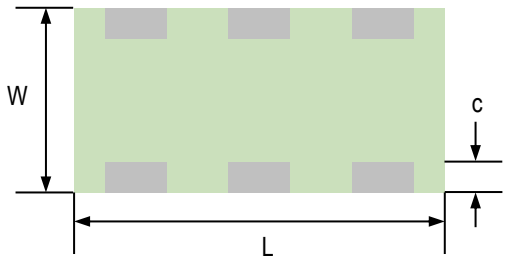
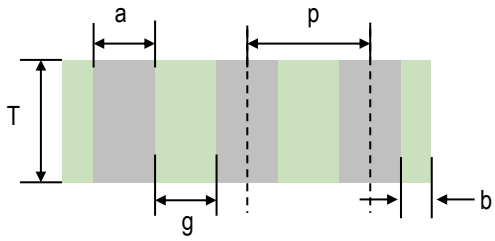
Mechanical Dimensions

	Inches			Millimeters		
L	0.063	±	0.004	1.60	±	0.10
W	0.031	±	0.004	0.80	±	0.10
T	0.024	±	0.004	0.60	±	0.10
a	0.008	±	0.004	0.20	±	0.10
b	0.008	+0.004/-0.006		0.20	+0.10/-0.15	
c	0.006	±	0.004	0.15	±	0.10
g	0.012	±	0.004	0.30	±	0.10
p	0.020	±	0.002	0.50	±	0.05

Bottom view



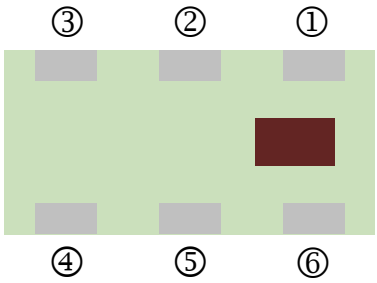
Side view



Terminal Configuration[2]

Pin Number	Function
1	Unbalanced
2	RX/TX
3	Balanced RF_N
4	Balanced RF_P
5	GND
6	GND

Top view



[2] The termination type is Nickel Tin. Go to: https://www.johansontechnology.com/ipcsoldering-profile for Typical Soldering Profile.

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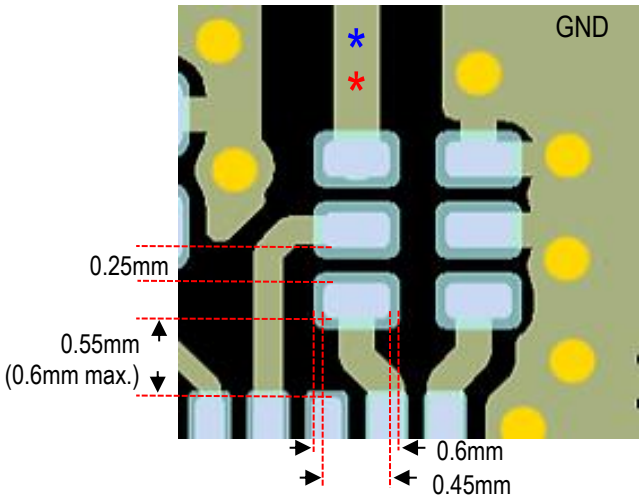
PCB Reference Design Layout



Solder Resist

Solder Pads

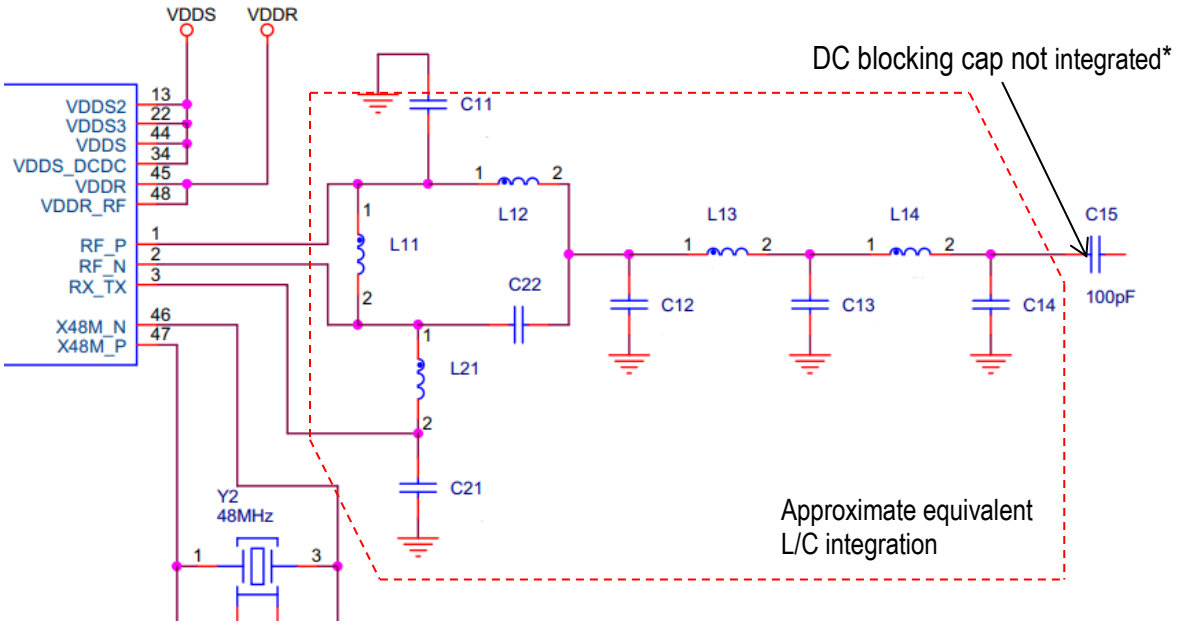
GND Via (ø 0.35mm)

NOTE: GND via placement is crucial to the harmonic attenuation capability of the filter.

* We recommend the designer place a DC blocking cap (68-100pF) in series after Pin 1 (between 0850BM14E0016001T and antenna) per page 4 of the datasheet.

* Transmission line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

Equivalent Integrated Circuit



*We recommend the designer place a DC blocking cap (68-100pF) in series after Pin 1 (between 0850BM14E0016001T and antenna).

If you would like the full reference design package or have any questions,
contact our application engineers at https://www.johansontechnology.com/ask-a-question

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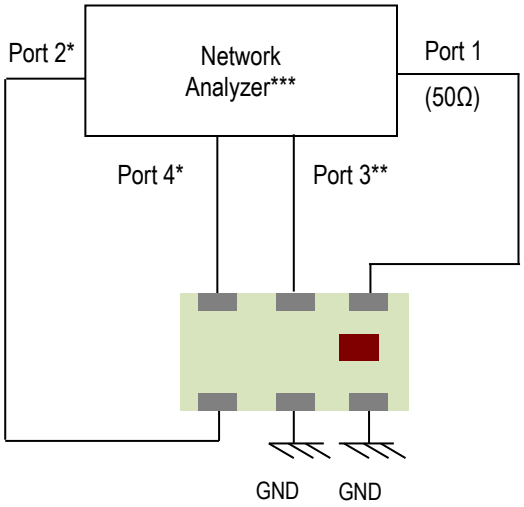
Measuring Diagram



Port 1: Unbalanced

Ports 2 and 4: Balanced

Port 3: RX_TX

Insertion Loss= S_{DS21}

Return Loss=S_{SS11}

Amplitude Difference = dB(S(2,1)/S(4,1))

Phase Difference = Phase(S(2,1)/S(4,1))

*Ports 2 and 4: Conjugate match to TI CC13XX chipset

**Port 3: Load impedance looking into RX_TX pin of TI CC1310/1312R chipset

*** E5071B from Agilent

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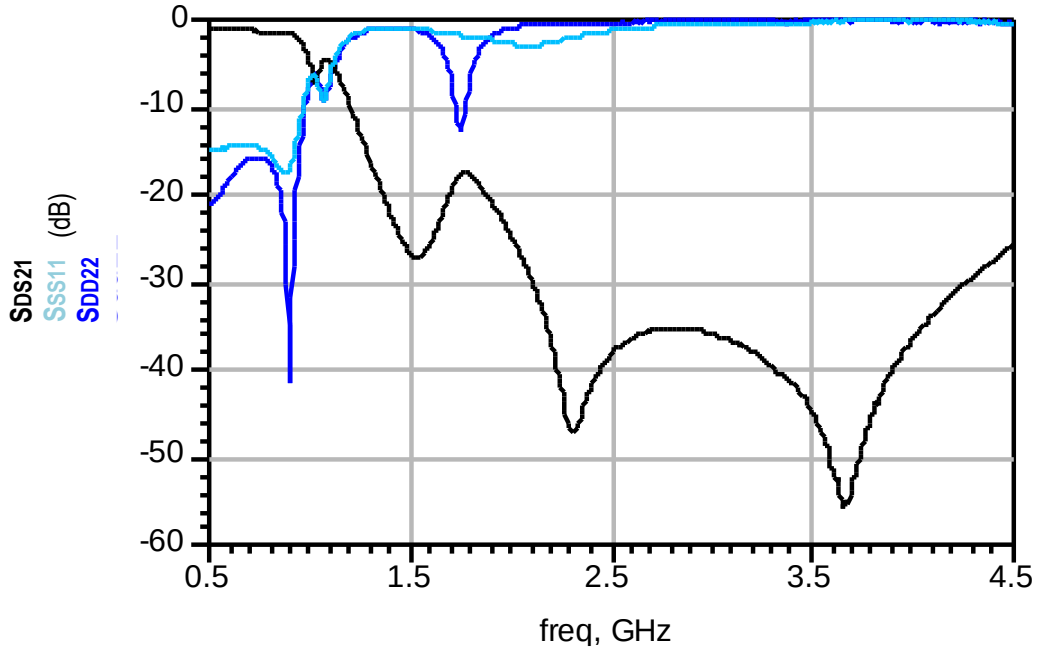
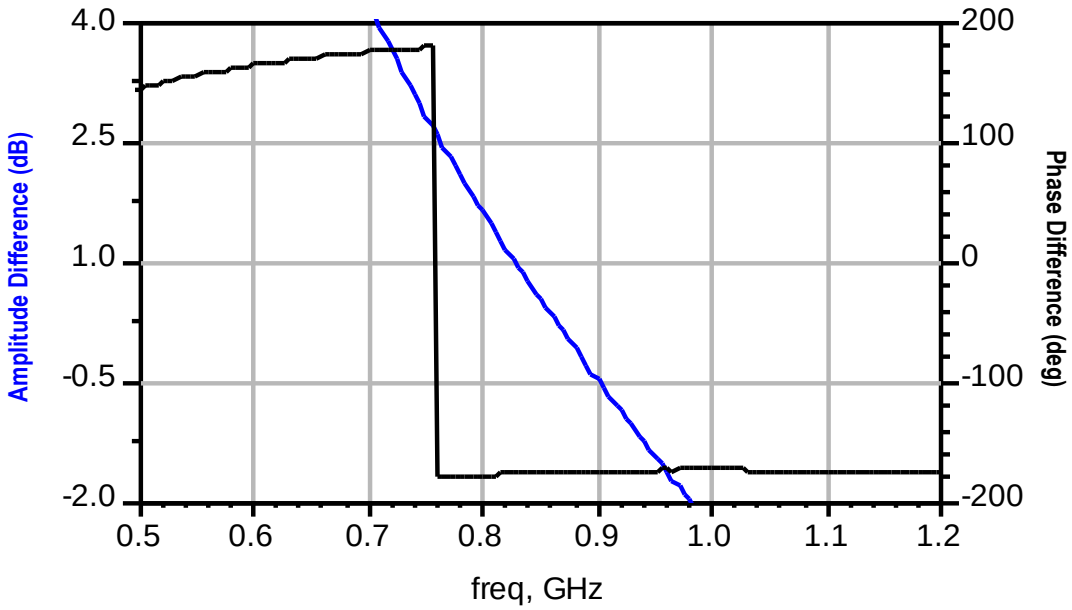
RF Measurement

Insertion Loss, Return Loss, Attenuation



Phase Difference, Amplitude Difference



S-parameter and layout files available upon request. Please contact us at: https://www.johansontechnology.com/ask-a-question

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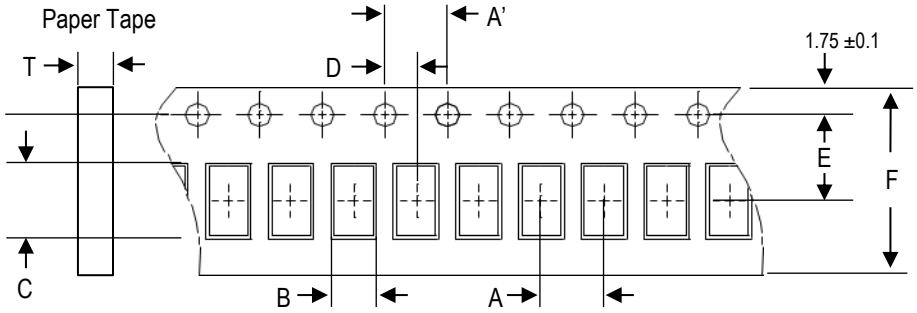
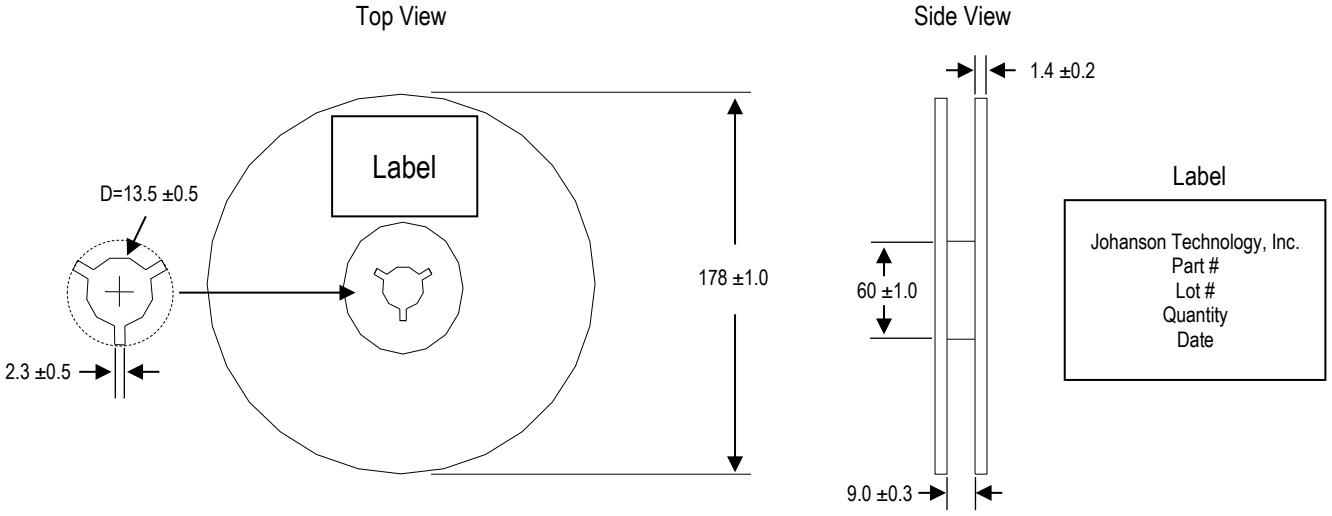
Tape and Reel Specification (Units in mm)

Tape Dimensions

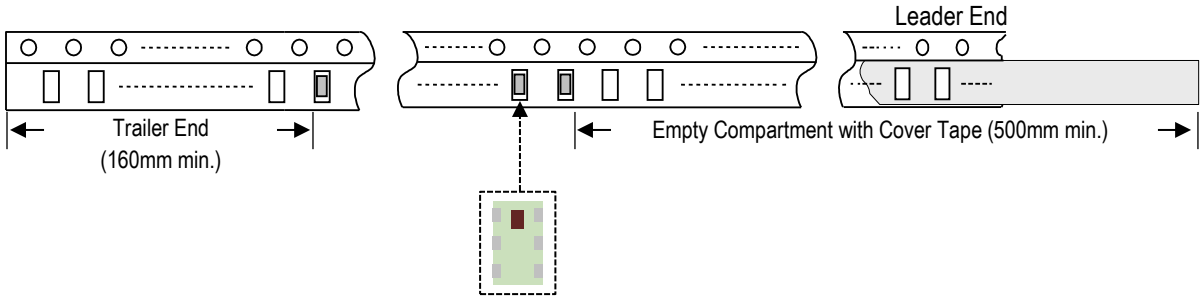


A	A'	B	C	D	E	F	T	Quantity/reel	Tape material
4.0 ±0.1	4.0 ±0.1	1.1 ±0.1	1.92 ±0.1	2.0 ±0.1	3.5 ±0.1	8.0 ±0.1	0.75 ±0.05	4,000pcs	Paper

Reel Dimensions



Leader and Trailer Dimensions



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Orderable Part Number

Packaging Style	Part Number	Termination
Bulk (loose pcs.)	0850BM14E0016001B	Nickel Tin
T & R (7" Reel Paper Tape)	0850BM14E0016001T (Qty: 4,000 pcs/reel)	

Important Links

0850BM14E0016001T Product Page

Texas Instruments Application Note SWRA524

More RF Baluns

Antenna Tuning, Optimization, and Validation Services

Soldering Information

MSL Information

Packaging Information

Recommended Storage Condition and Max Shelf Life

RoHS Compliance

Contact our application engineers for a PCB layout review.

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