

# High Frequency Ceramic Solutions

**Sub-GHz Impedance Matched Balun + LPF integrated Passive Component for Texas Instruments' CC1310, CC1312 Chipsets**

**P/N: 0850BM14E0016**

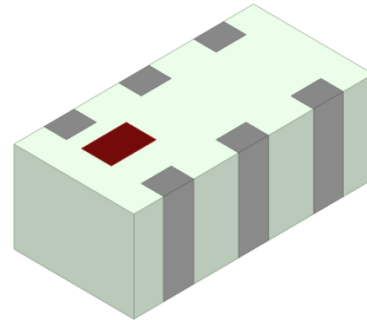
Detail Specification: 3/22/2018

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Do you need a small 900MHz antenna? Go to: [www.johansontechnology.com/antennas](http://www.johansontechnology.com/antennas)

## General Specifications

|                                   |                                                                                                                                                                                          |                     |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Part Number                       | 0850BM14E0016                                                                                                                                                                            |                     |
| Frequency (MHz)                   | 770 - 860                                                                                                                                                                                | 860 - 928           |
| Unbalanced Impedance ( $\Omega$ ) | 50                                                                                                                                                                                       |                     |
| Balanced Impedance ( $\Omega$ )   | Impedance matched to Texas Instruments' CC1310, CC1312 chipsets                                                                                                                          |                     |
| 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 (deg)            | 180 $\pm$ 17                                                                                                                                                                             | 180 $\pm$ 15        |
| Amplitude Difference (dB)         | 3.5 max.                                                                                                                                                                                 | 2.0 max.            |
| Attenuation (dB)                  | 8 min.@ 1540 - 1720MHz<br>15 min.@ 1720 - 1736MHz<br>15 min.@ 1736 - 1856MHz<br>30 min.@ 2310 - 2580MHz<br>30 min.@ 2580 - 2784MHz<br>33 min.@ 3080 - 3440MHz<br>35 min.@ 3440 - 3712MHz |                     |
| Power Capacity (W)                | 2 max. (CW)                                                                                                                                                                              |                     |



*Texas Instruments - Approved!*

|                                                                  |                                                    |
|------------------------------------------------------------------|----------------------------------------------------|
| Quantity/Reel                                                    | 4,000 pcs                                          |
| Operating Temperature                                            | -40°C to +85°C                                     |
| Recommended Storage Conditions for unused T&R product and period | +5 to +35 °C<br>Humidity 45 - 75%RH<br>18 mos. max |

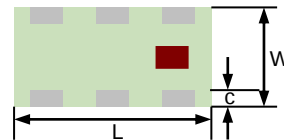
For more TI matched balun-filters, go to: [www.johansontechnology.com/ti](http://www.johansontechnology.com/ti)

## Part Number Explanation

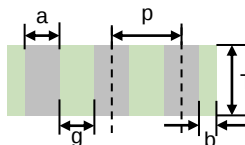
| P/N Suffix | Packing Style | Bulk     | Suffix = S    | eg. 0850BM14E0016S        |
|------------|---------------|----------|---------------|---------------------------|
|            |               | T & R    | Suffix = E    | eg. 0850BM14E0016T        |
|            |               | 100% Tin | Suffix = None | eg. 0850BM14E0016(T or S) |

## Mechanical Dimensions

|   | In                       | mm                  |
|---|--------------------------|---------------------|
| L | 0.063 $\pm$ 0.004        | 1.60 $\pm$ 0.10     |
| W | 0.031 $\pm$ 0.004        | 0.80 $\pm$ 0.10     |
| T | 0.024 $\pm$ 0.004        | 0.60 $\pm$ 0.10     |
| a | 0.008 $\pm$ 0.004        | 0.20 $\pm$ 0.10     |
| b | 0.008 $\pm$ 0.004/-0.008 | 0.20 $\pm$ 0.1/-0.2 |
| c | 0.006 $\pm$ 0.004        | 0.15 $\pm$ 0.10     |
| g | 0.012 $\pm$ 0.004        | 0.30 $\pm$ 0.10     |
| p | 0.020 $\pm$ 0.002        | 0.50 $\pm$ 0.05     |



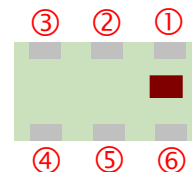
Top



Side

## Terminal Configuration

| No. | Function           |
|-----|--------------------|
| 1   | Unbalanced Port    |
| 2   | RX/TX              |
| 3   | Balanced Port RF_N |
| 4   | Balanced Port RF_P |
| 5   | GND                |
| 6   | GND                |



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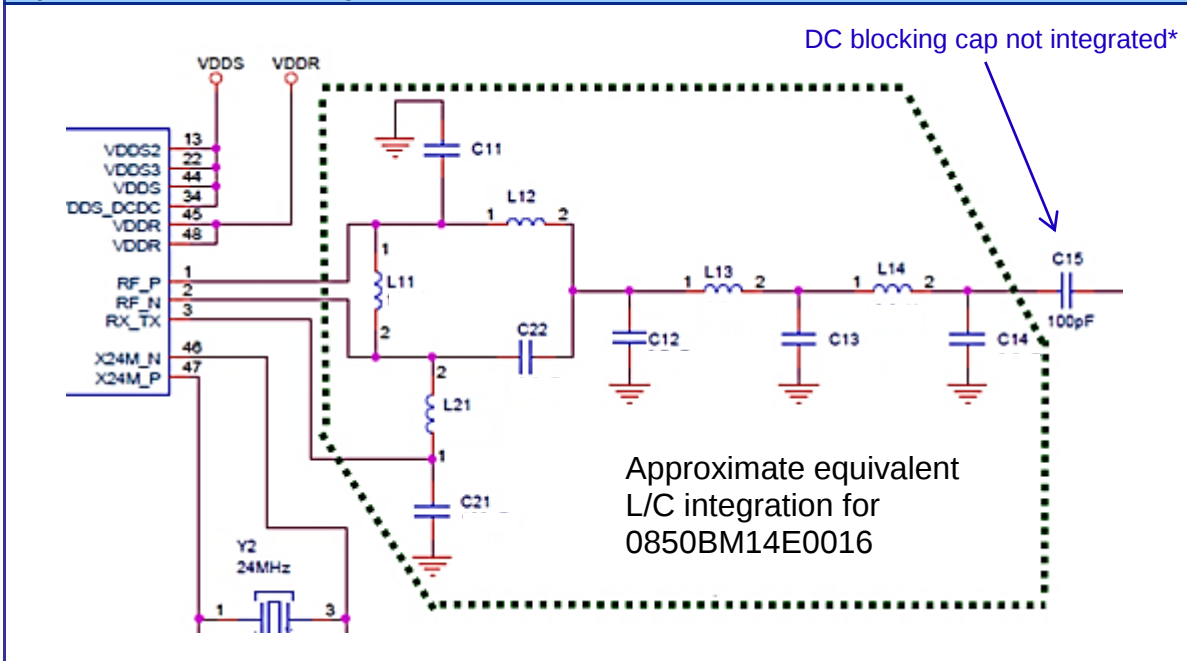
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## Equivalent L/C Circuit Integrated into IPC



\*Even though Pins 3, 4, and 1 are internally *DC blocked* from GND, Pins 3/4 are *DC coupled* to Pin 1 (there's a DC path between them). We recommend the designer place a DC blocking cap (68-100pF) in series after Pin 1 (between IPC and antenna).

Would you like the reference design, schematic, and gerber files? Need us to review your layout for free or an antenna recommendation for your application? Contact us at:

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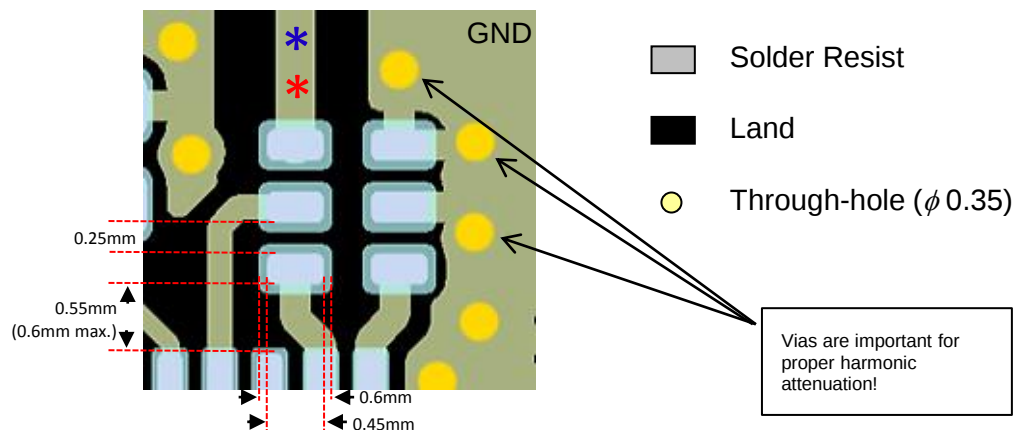
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## Pad-Soldermask Guidelines

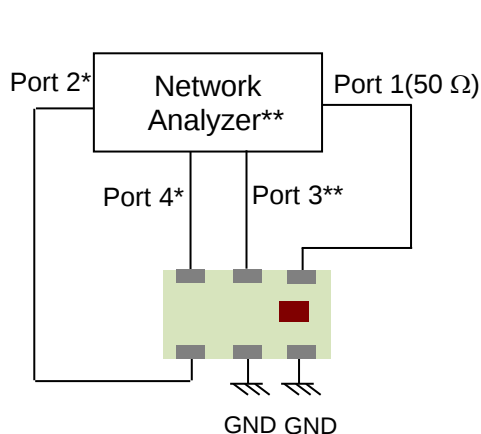
Request reference design, schematic, and gerber files at: [www.johansontechnology.com/ask-a-question](http://www.johansontechnology.com/ask-a-question)



\* Even though Pins 3, 4, and 1 are DC blocked from GND, Pins 3/4 are DC coupled to Pin 1 (there's a DC path between them). We recommend the designer place a DC blocking cap (68-100pF) in series after Pin 1 (between IPC and antenna) per page 2 of the datasheet.

\* Line width should be designed to match 50ohm characteristic impedance, depending on PCB material and thickness. Grounded CPWG is recommended.

## Measurement Diagram



Port 1: Unbalanced Port

Ports 2 and 4: Balanced Port

\*Ports 2 and 4 Terminate impedance

=Conjugate match to TI CC13XX chipset

Port 3: RX\_TX Port

\*\*Port 3 Terminate impedance

=The load Impedance looking into

RX\_TX pin of TI CC13XX chipset

$$IL = S_{DS21}$$

$$RL = S_{SS11}$$

$$\text{Amp\_balance} = \text{dB}(S(2,1)/S(4,1))$$

$$\text{Phase\_balance} = \text{Phase}(S(2,1)/S(4,1))$$

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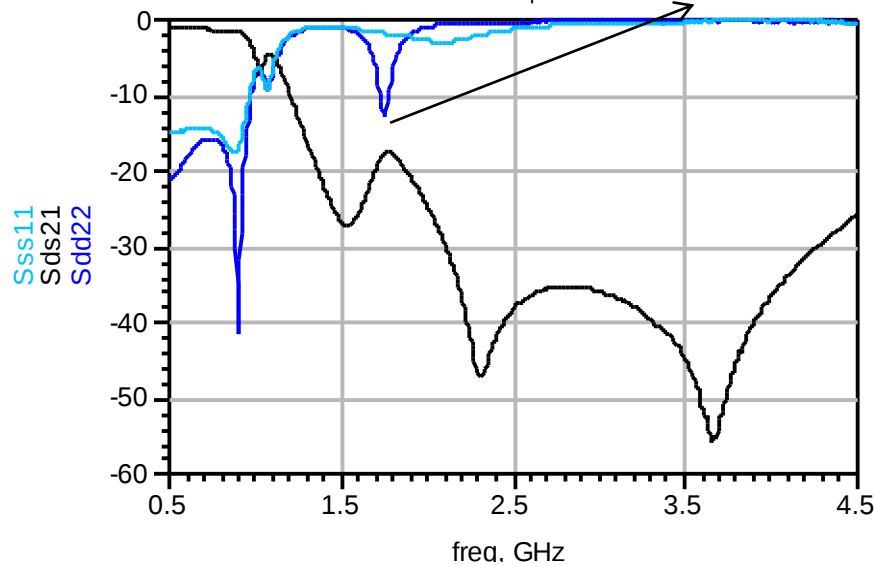
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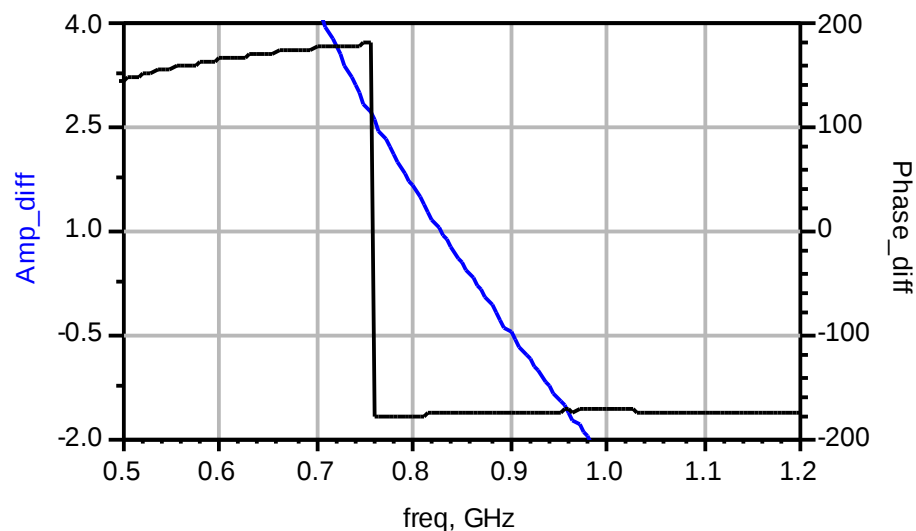
## Typical Electrical Characteristics (T=25°C)

### Insertion Loss, Return Loss

The Sds21 resonance around 1.8GHz was puposefully designed due to an impedance reactance with he CC13XX for proper harmonic power level



### Phase Difference, Amplitude Balance



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## Application Notes, Layout Files, and more

[www.johansontechnology.com/ti](http://www.johansontechnology.com/ti)

## Small SMD 900MHz (or 2.4G, 5G) antennas at:

[www.johansontechnology.com/antennas](http://www.johansontechnology.com/antennas)

## RoHS Compliance

[www.johansontechnology.com/rohs-compliance](http://www.johansontechnology.com/rohs-compliance)

## Soldering Information

[www.johansontechnology.com/ipcsoldering-profile](http://www.johansontechnology.com/ipcsoldering-profile)

## Antenna layout and tuning techniques

[www.johansontechnology.com/tuning](http://www.johansontechnology.com/tuning)

## Antenna layout review, tuning, and characterization services

[www.johansontechnology.com/ipc-antenna-services](http://www.johansontechnology.com/ipc-antenna-services)

## MSL Info

[www.johansontechnology.com/msl-rating](http://www.johansontechnology.com/msl-rating)

## Recommended Storage Condition and Max Shelf Life

[www.johansontechnology.com/recommended-storage-conditions](http://www.johansontechnology.com/recommended-storage-conditions)

## Packaging information

[www.johansontechnology.com/tape-reel-packaging](http://www.johansontechnology.com/tape-reel-packaging)

Would you like us to review your layout for free? Need an antenna recommendation for your application?

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