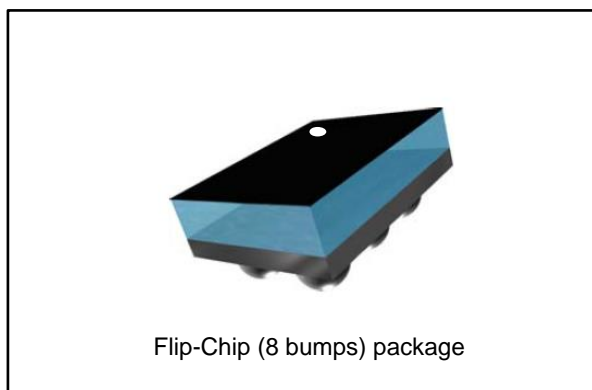


50 ohm nominal input / conjugate match balun CC1120, CC1125 (868-928 MHz), with integrated harmonic filter

Datasheet - production data



Description

STMicroelectronics' BALF-112X-01D3 is an ultra-miniature balun, integrating both matching network and harmonics filter.

Matching impedance has been customized for the CC1120, CC1125, CC1175 and CC1200 transceivers from Texas Instruments. The device uses STMicroelectronics' IPD technology on a non-conductive glass substrate, which optimizes RF performance.

Features

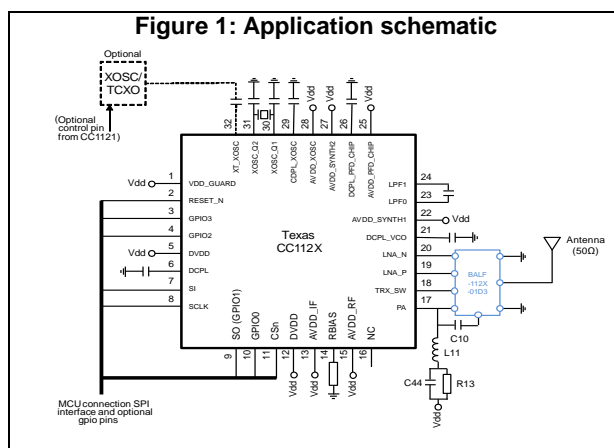
- 50 Ω nominal input / conjugate match to CC1120, CC1125
- Low insertion loss
- Low amplitude imbalance
- Low phase imbalance
- Small footprint

Benefits

- Very low profile (< 670 μm thickness)
- High RF performance
- RF BOM and size reduction

Applications

- 868 MHz and 928 MHz impedance-matched balun filter optimized for Texas Instruments® CC1120, CC1125, CC1175, CC1200 sub-GHz RFICs.



C10 is a DC block capacitor: 0402/100 pF/50 V

1 Characteristics

Table 1: Absolute maximum ratings (limiting values)

| Symbol | Parameter | Value | | | Unit |
|------------------|---|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| P _{IN} | Input power RFIN | | - | 20 | dBm |
| V _{ESD} | ESD ratings MIL STD883C (HBM: C = 100 pF, R = 1.5 Ω, air discharge) | 500 | - | | V |
| | ESD ratings machine model (MM: C = 200 pF, R = 25 W, L = 500 nH) | 250 | - | | |
| T _{OP} | Operating temperature | -40 | - | +85 | °C |

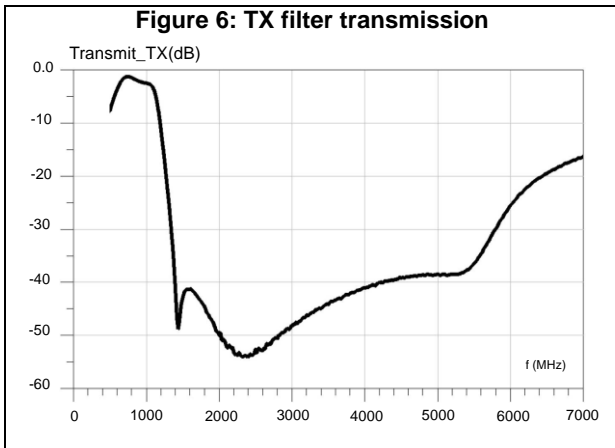
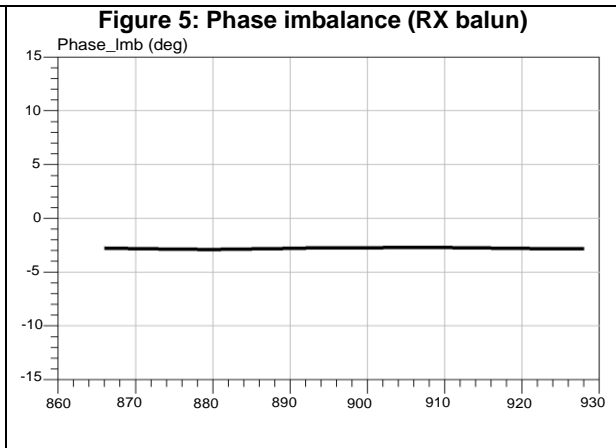
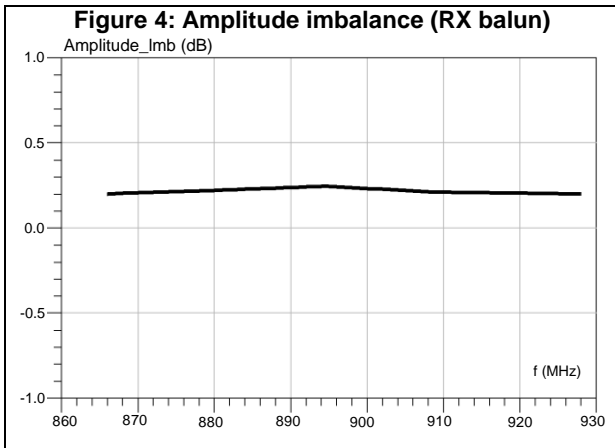
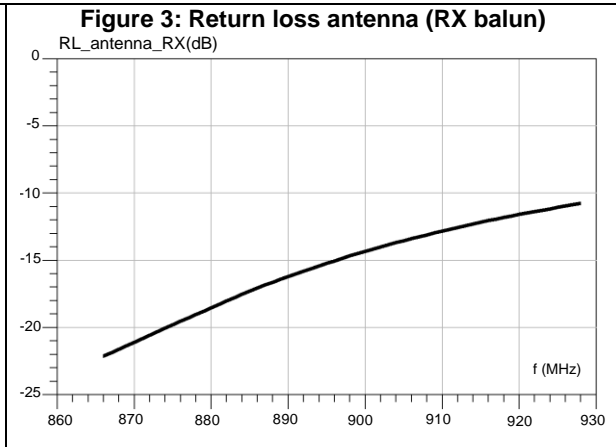
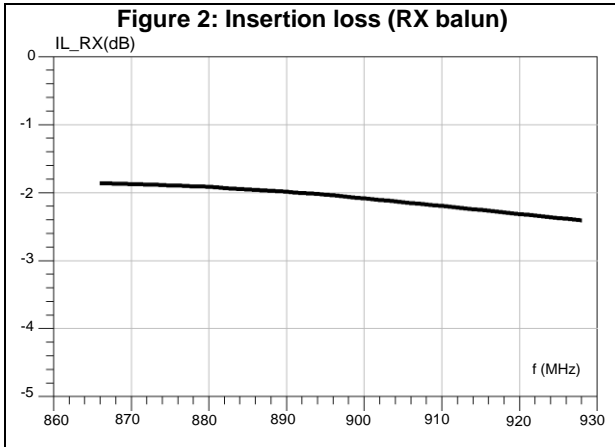
Table 2: Electrical characteristics and RF performance (T_{amb} = 25 °C) RX balun

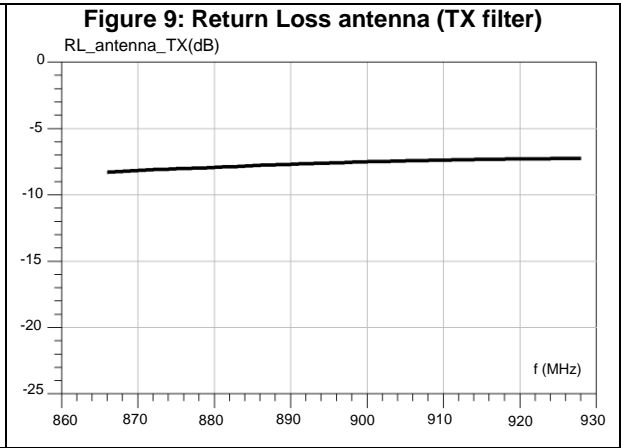
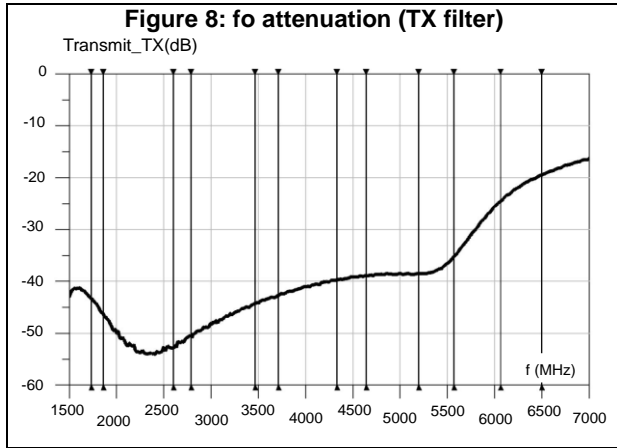
| Symbol | Parameter | Test condition | Value | | | Unit |
|-----------------------|--------------------------------|----------------|-------|-----------------|------|------|
| | | | Min. | Typ. | Max. | |
| Z _{RX} | Nominal differential impedance | | | Match to CC112X | | Ω |
| Z _{ANT} | Antenna impedance | | | 50 | | Ω |
| f | Frequency range (bandwidth) | | 866 | | 928 | MHz |
| S _{21RX-ANT} | Insertion loss in bandwidth | at 868 MHz | -2.3 | -1.9 | | dB |
| | | at 928 MHz | -2.8 | -2.4 | | |
| S _{11ANT} | Input return loss in bandwidth | at 868 MHz | | -22 | -20 | dB |
| | | at 928 MHz | | -11 | -9 | |
| Phase_imbal | Output phase imbalance | | -10 | -2.9 | 10 | ° |
| Ampl_imbal | Output amplitude imbalance | | -1 | -0.3 | 1 | dB |

Table 3: Electrical characteristics and RF performance ($T_{amb} = 25\text{ °C}$) TX filter

| Symbol | Parameter | Test condition | Value | | | Unit |
|-------------------|--------------------------------|---------------------|-------|-----------------|------|----------|
| | | | Min. | Typ. | Max. | |
| Z_{TX} | Nominal TX impedance | | | Match to CC112X | | Ω |
| Z_{ANT} | Antenna impedance | | | 50 | | Ω |
| f | Frequency range (bandwidth) | | 866 | | 928 | MHz |
| $S_{21_{TX-ANT}}$ | Insertion loss in bandwidth | at 868 MHz | -2.3 | -1.9 | | dB |
| | | at 928 MHz | -2.7 | -2.3 | | |
| $S_{11_{ANT}}$ | Input return loss in bandwidth | at 868 MHz | | -8 | -6 | dB |
| | | at 928 MHz | | -7 | -5 | |
| Att | Harmonic levels | Attenuation at 2 fo | | -43 | -41 | dBm |
| | | Attenuation at 3 fo | | -50 | -46 | |
| | | Attenuation at 4 fo | | -43 | -40 | |
| | | Attenuation at 5 fo | | -39 | -37 | |
| | | Attenuation at 6 fo | | -35 | -33 | |
| | | Attenuation at 7 fo | | -19 | -17 | |

1.1 RF measurement





2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 Flip-Chip CSPG 0.4 package information

Figure 10: Flip-Chip CSPG 0.4 package outline

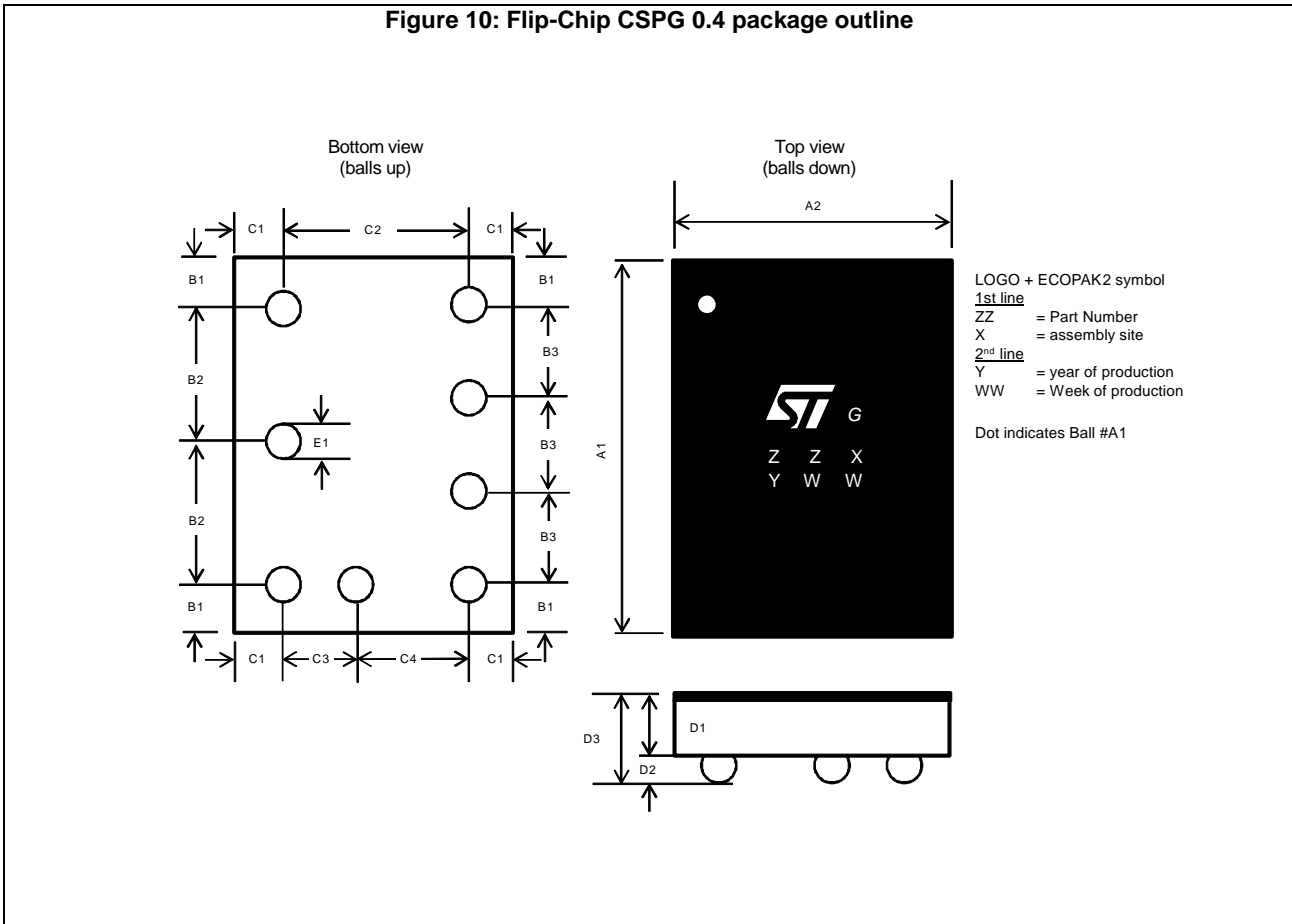


Table 4: Flip-Chip CSPG 0.4 mechanical data

| Dimensions | Frequency | A1 | A2 | B1 | B2 | B3 | C1 | C2 | C3 | C4 | D1 | D2 | D3 | E1 |
|---------------|-----------|------|------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| BAL-112X-01D3 | 868 MHz | 1950 | 1450 | 225 | 750 | 500 | 223 | 1004 | 400 | 604 | 425 | 205 | 630 | 255 |

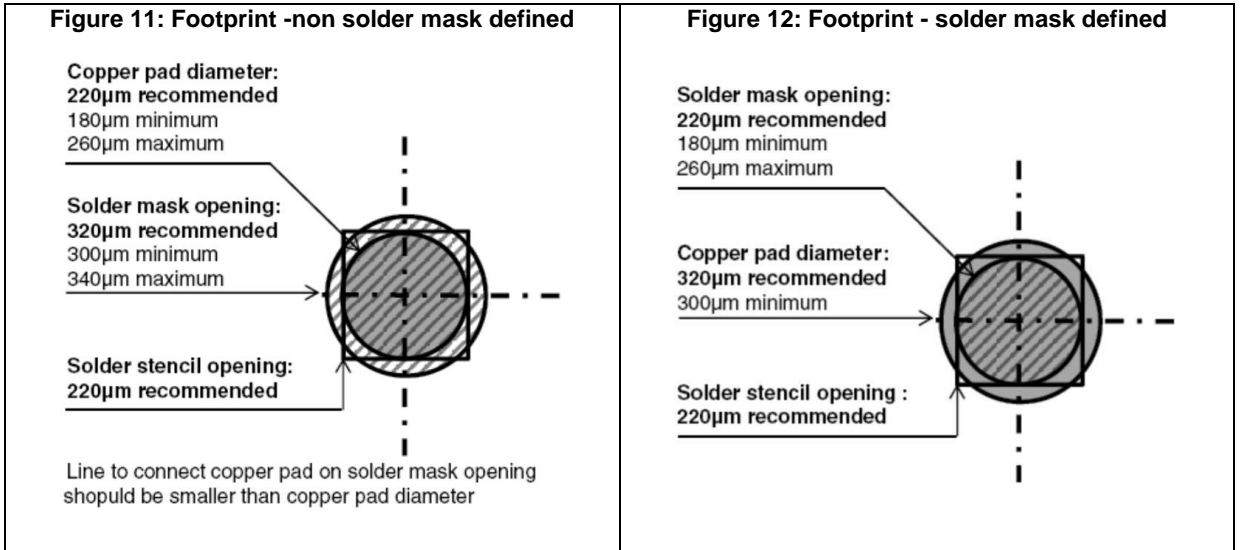
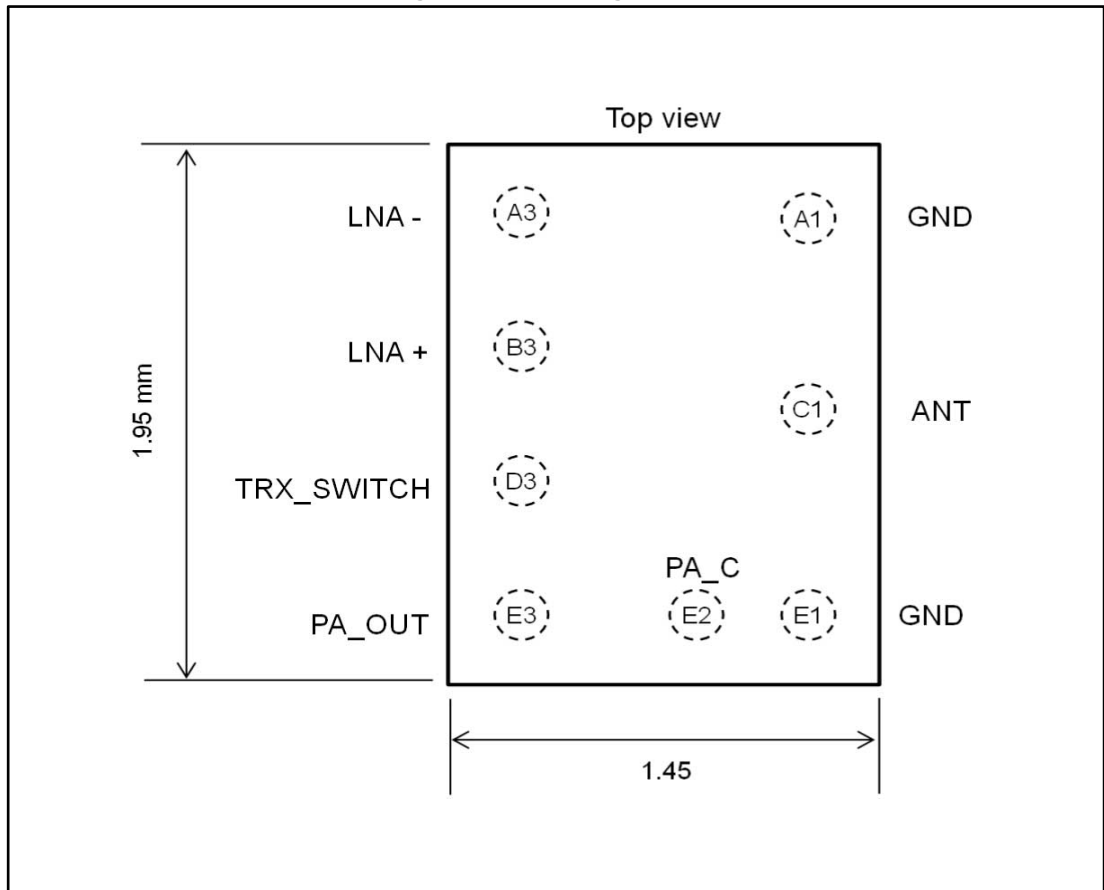


Figure 13: Ball assignment



3 Ordering information

Table 6: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|----------------|---------|---------|---------|-----------|---------------|
| BALF-112X-01D3 | TF | CSPG | 3.02 mg | 5000 | Tape and reel |

4 Revision history

Table 7: Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------------|
| 04-Jul-2016 | 1 | First issue. |
| 20-Feb-2017 | 2 | Updated Front page. |

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