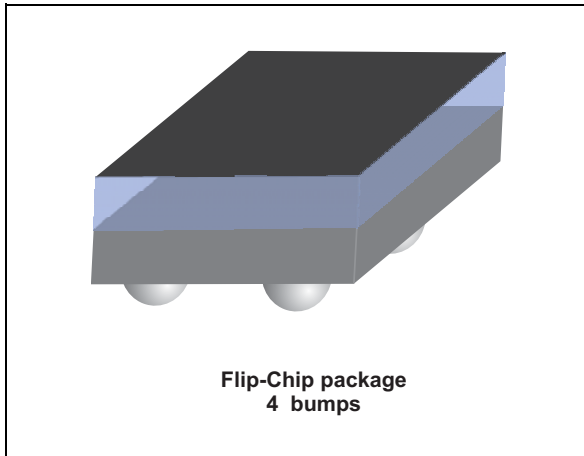


50 ohm nominal input / conjugate match balun to CC1101 / CC1150 (868-928 MHz), with integrated harmonic filter

Datasheet – production data



## Description

STMicroelectronics BAL-CC1101-01D3 is an ultra miniature balun which integrates a matching network in a monolithic glass substrate. This has been customized for the CC1101 / CC1150 TI transceiver.

It's a design using STMicroelectronics IPD (integrated passive device) technology on non-conductive glass substrate to optimize RF performance.

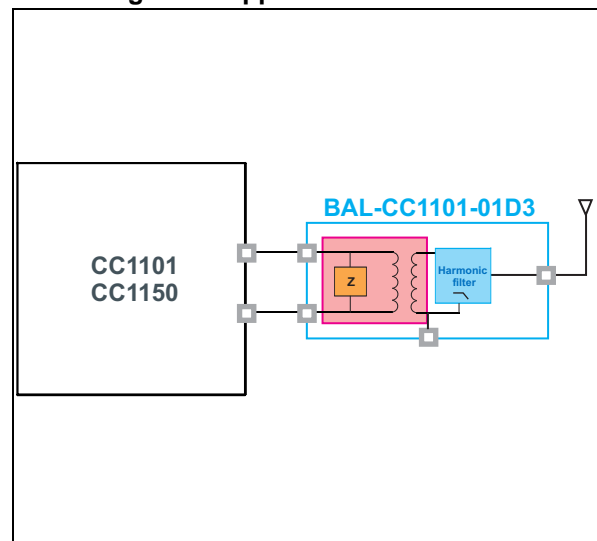
## Features

- 50  $\Omega$  nominal input / conjugate match to CC1101 / CC1150
- Low insertion loss
- Low amplitude imbalance
- Low phase imbalance
- Coated Flip-Chip on glass
- Small footprint: < 2.1 mm<sup>2</sup>

## Benefits

- Extremely low profile (< 550  $\mu$ m after reflow)
- High RF performance
- RF BOM and area reduction

Figure 1. Application schematic



# 1 Characteristics

**Table 1. Absolute maximum rating (limiting values)**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$P_{IN}$	Input power $RF_{IN}$		20		dBm
$V_{ESD}$	ESD ratings human body model (JESD22-A114C), all I/O one at a time while others connected to GND	2000			V
	ESD ratings machine model, all I/O	500			
	ESD ratings charged device model (JESD22-C101D)	500			
$T_{OP}$	Operating temperature	-40		+125	°C

**Table 2. Electrical characteristics - RF performance ( $T_{amb} = 25\text{ °C}$ )**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$Z_{OUT}$	Nominal differential output impedance		Conjugate match to CC1101 / CC1150		$\Omega$
$Z_{IN}$	Nominal input impedance		50		
F	Frequency range (bandwidth)	779		928	MHz
$I_L$	Insertion loss in bandwidth		1.7	1.9	dB
$R_{L\_SE}$	Single ended return loss in bandwidth		15		dB
$R_{L\_DIFF}$	Differential ended return loss in bandwidth		15		dB
$\Phi_{imb}$	Phase imbalance	-10		10	°
$A_{imb}$	Amplitude imbalance	-1		1	dB
Att	Harmonic levels (TX filter)				dB
	Attenuation at 2fo		-25		
	Attenuation at 3fo		-50		

### 1.1 Measurements

Figure 2. Transmission (S21)

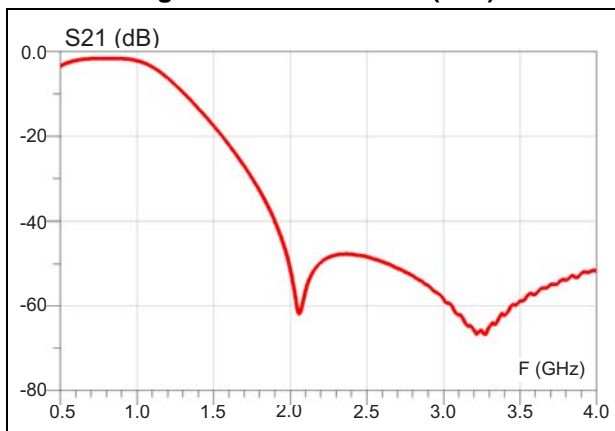


Figure 3. Insertion loss in band

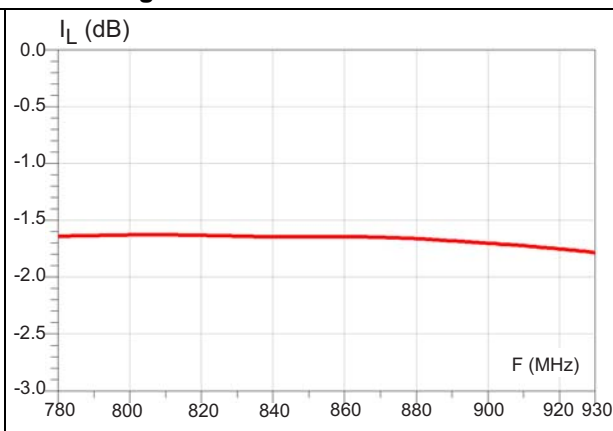


Figure 4. Return loss single-ended

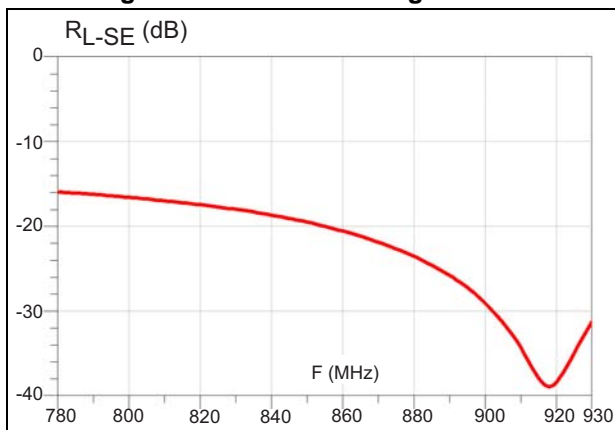


Figure 5. Return loss differential

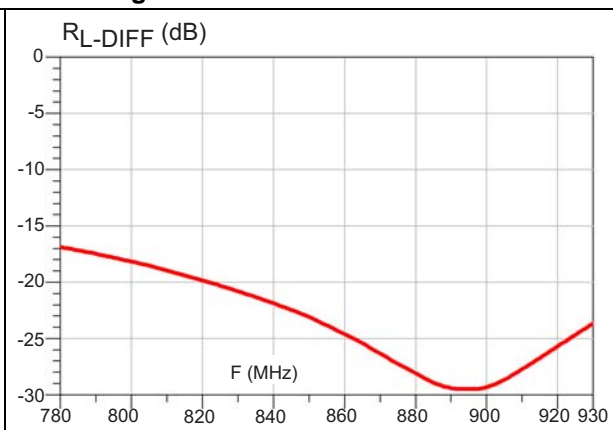


Figure 6. Phase imbalance

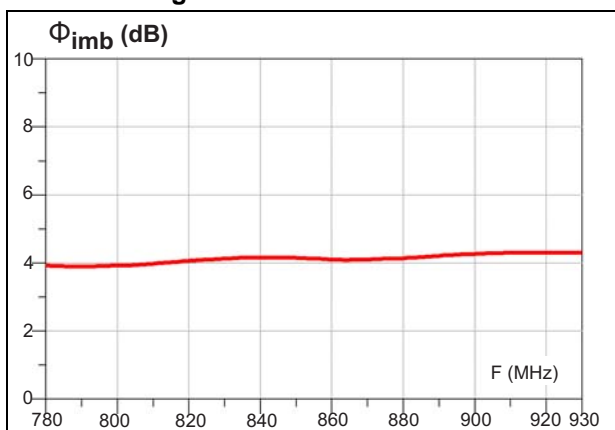


Figure 7. Amplitude imbalance

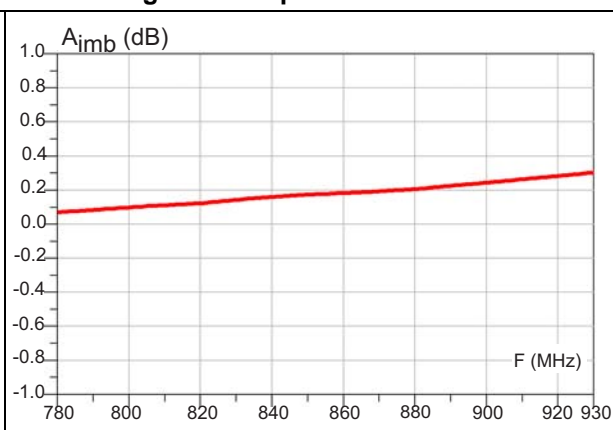


Figure 8. H2 attenuation

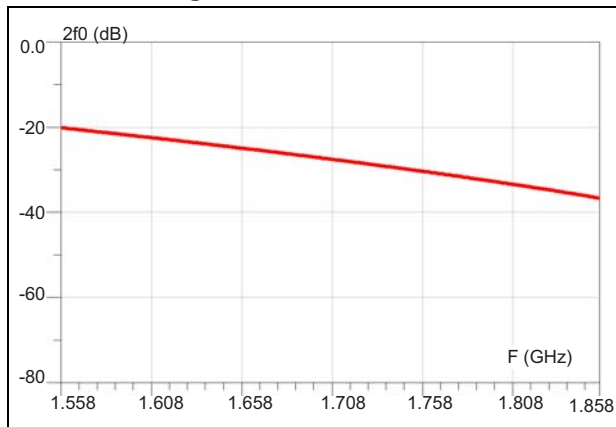
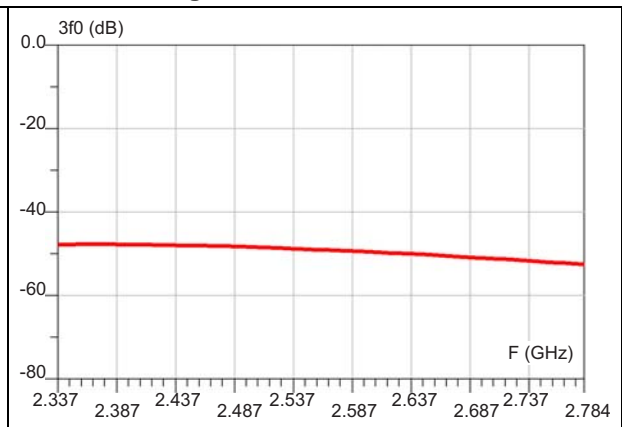


Figure 9. H3 attenuation



## 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 10. Package dimensions (bump side view)

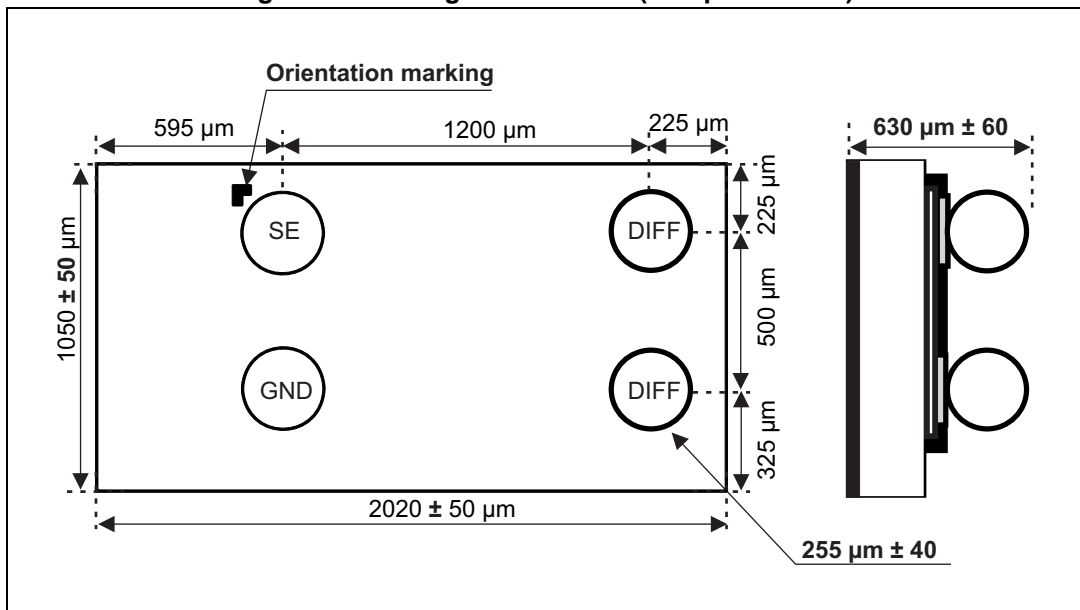


Figure 11. PCB view CC1101 with BAL-CC1101-01D3

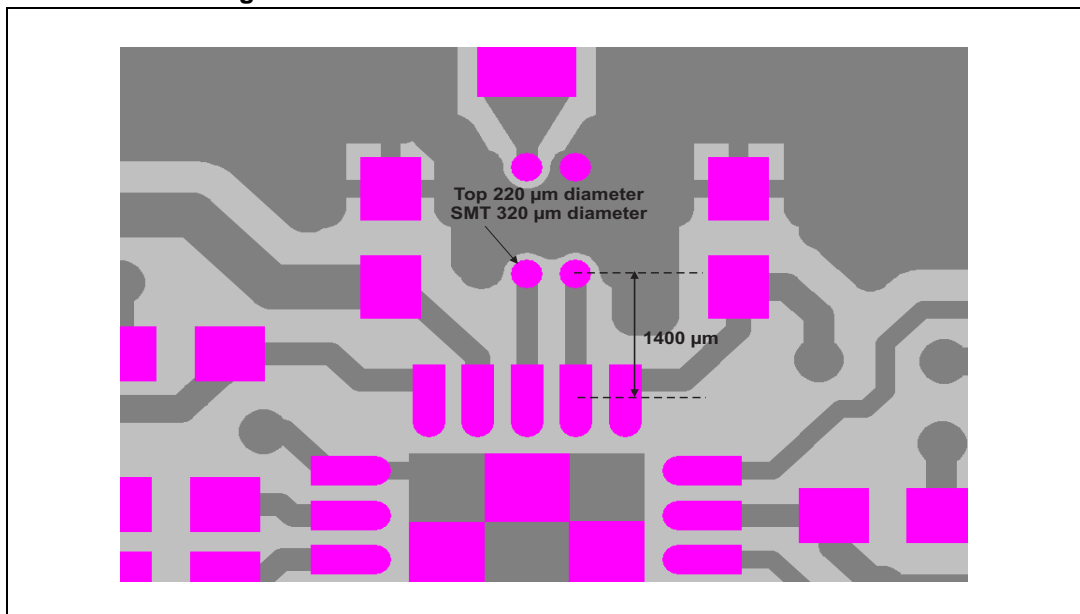


Figure 12. Marking

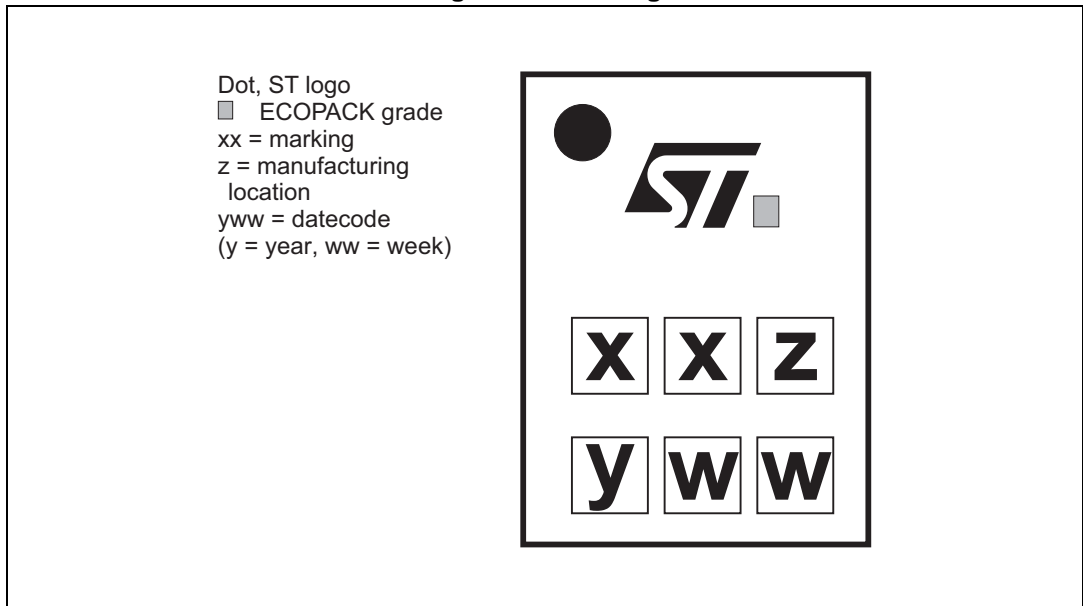
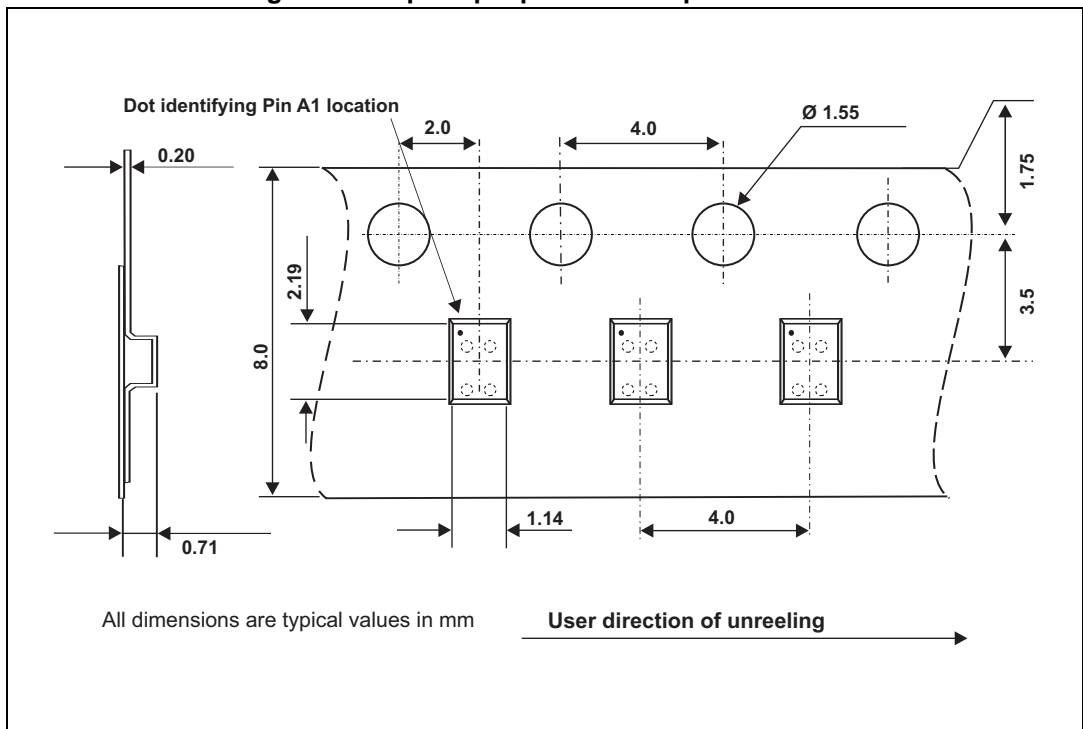


Figure 13. Flip Chip tape and reel specifications



Note: More information is available in the STMicroelectronics Application note: AN2348 Flip-Chip: "Package description and recommendations for use"

### 3 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAL-CC1101-01D3	SS	Flip Chip	2.21 mg	5000	Tape and reel (7")

### 4 Revision history

Table 4. Document revision history

Date	Revision	Changes
23-Jan-2014	1	Initial release

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