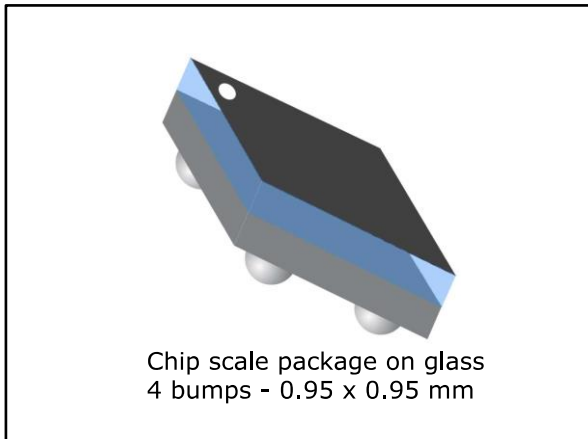


50 Ω / conjugate match to WILC1000 transformer balun

Datasheet - production data



## Features

- 2.45 GHz Balun with integrated matching network
- Matching optimized for ATMEL WILC1000
- Low insertion loss
- Low amplitude imbalance
- Coated Flip-Chip on glass
- Small footprint < 0.90 mm<sup>2</sup>

## Benefits

- Very low profile
- High RF performance
- PCB space saving versus discrete solution
- BOM count reduction
- Efficient manufacturability

## Description

This device is an ultra-miniature matched balun. Matching impedance has been optimized for the ATMEL SmartConnect WILC1000 Wireless Link Controller. It is using STMicroelectronics IPD technology on non-conductive glass substrate which optimizes RF performance.

Figure 1: Pin configuration (bump view)

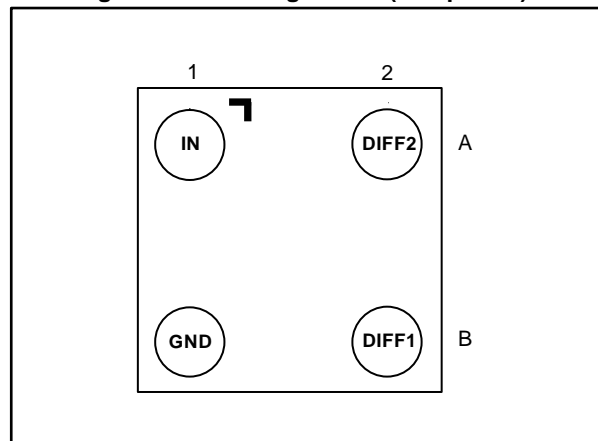
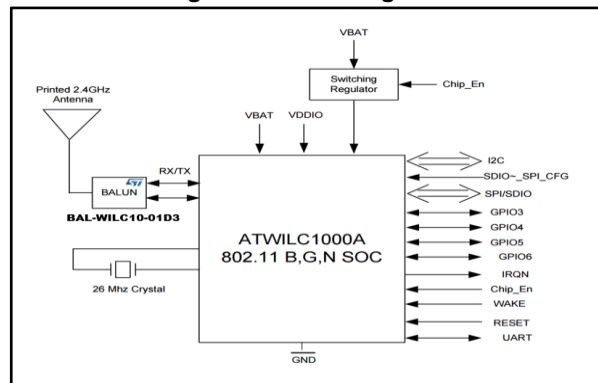


Figure 2: Block diagram



# 1 Characteristics

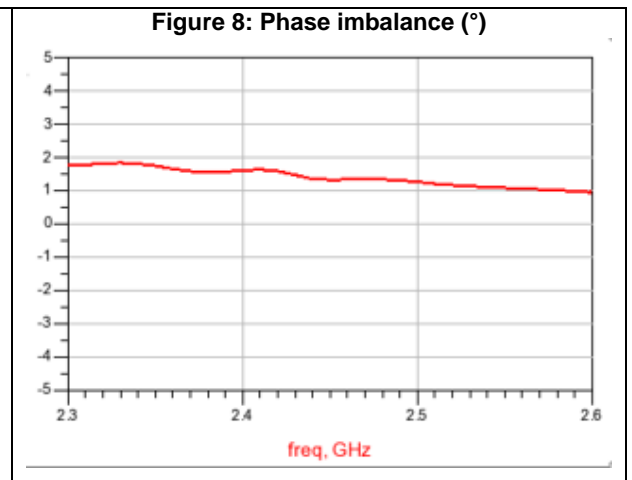
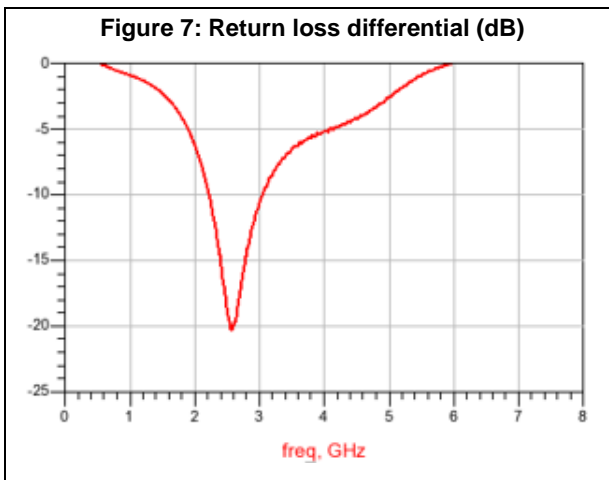
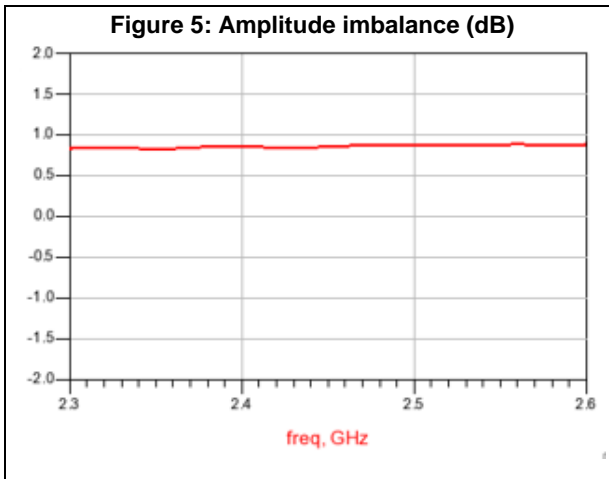
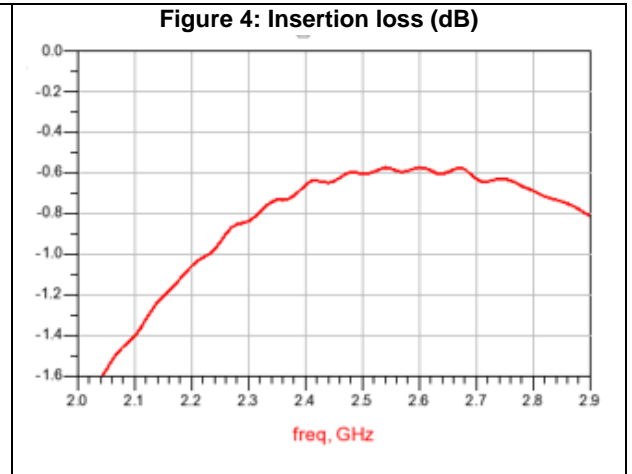
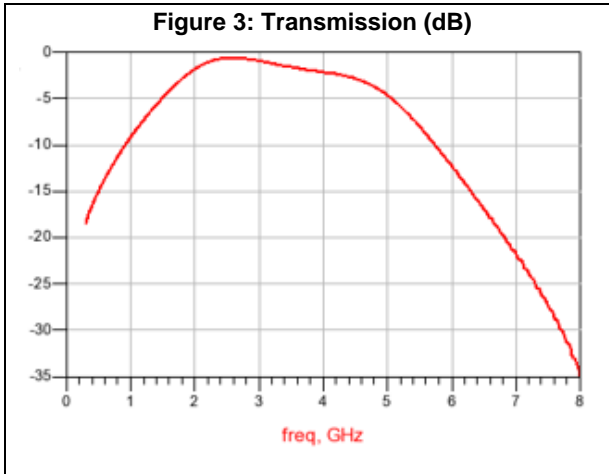
**Table 1: Absolute maximum ratings (limiting values)**

Symbol	Parameter	Value	Unit
P <sub>IN</sub>	Input power R <sub>FIN</sub>	20	dBm
V <sub>ESD</sub>	ESD ratings MIL STD 883C (HBM: C = 100pF, R = 1.5kΩ, air discharge)	2000	V
	ESD ratings machine model (MM: C = 200pF, R = 25 Ω, L = 500 nH)	500	
	ESD ratings charged device model (CDM, JESD22-C101D)	500	
T <sub>OP</sub>	Operating temperature	-40 to +105	°C

**Table 2: Electrical characteristics (values, T<sub>amb</sub> = 25 °C)**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
Z <sub>OUT</sub>	Nominal differential output impedance	Conjugate match to WILC1000			Ω
Z <sub>IN</sub>	Nominal input impedance	-	50	-	Ω
f	Frequency range (bandwidth)	2400		2500	MHz
I <sub>L</sub>	Insertion loss in bandwidth		0.65	0.8	dB
R <sub>L_SE</sub>	Single ended return loss in bandwidth		-16	-15	
R <sub>L_DIFF</sub>	Differential return loss in bandwidth		-17	-15	
H <sub>2</sub>	Second harmonic rejection (differential mode)			-3.8	
H <sub>3</sub>	Third harmonic rejection (differential mode)			-23	
Φ <sub>imb</sub>	Phase imbalance	-2	1.3	2	°
A <sub>imb</sub>	Amplitude imbalance	-0.9	0.8	0.9	dB

### 1.1 RF measurements



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

### 2.1 Flip-Chip package information

Figure 9: Flip-Chip 4 bumps CSPG 0.4 package outline

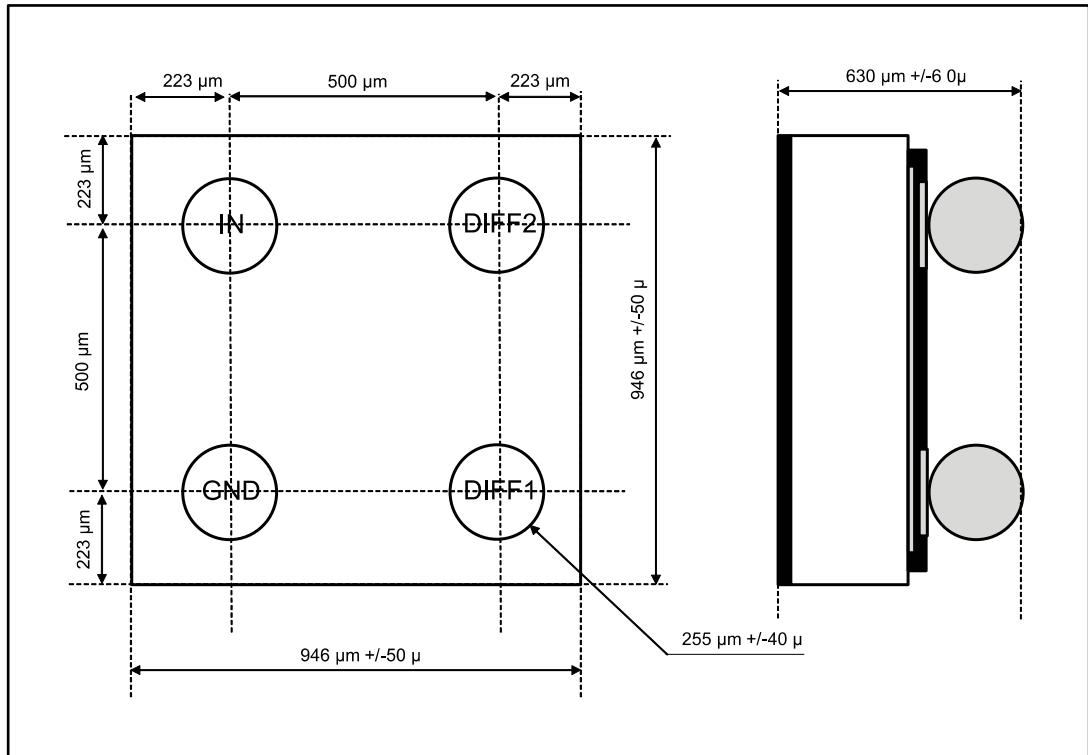
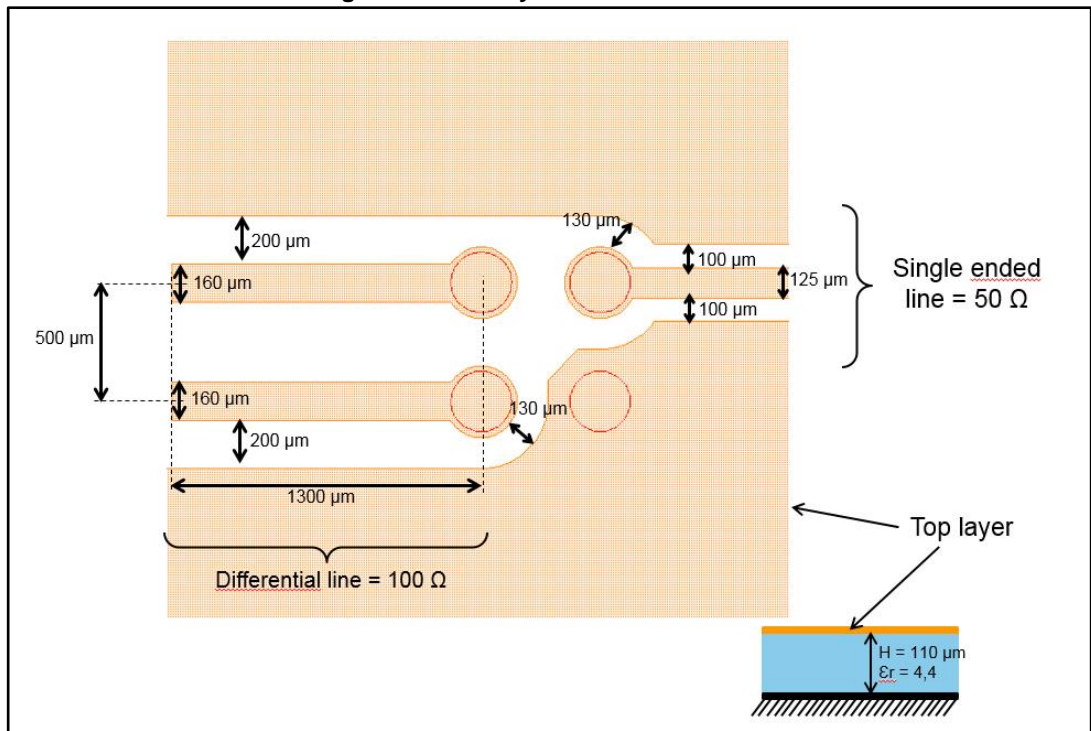
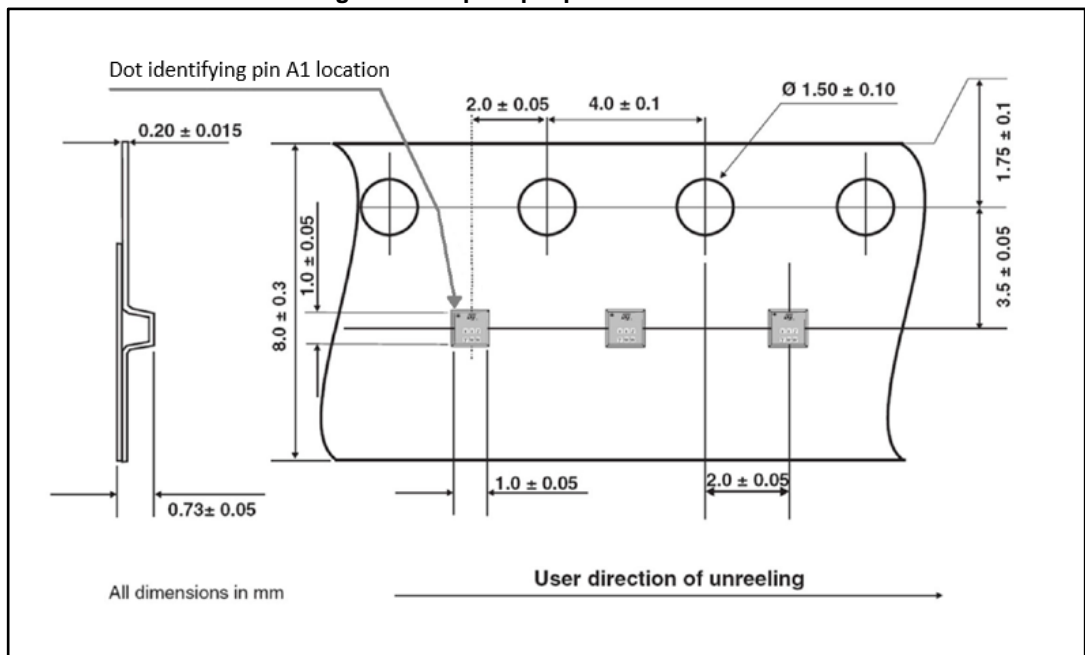


Figure 10: PCB layout recommendation



## 2.2 Flip-chip 4 bumps CSPG packing information

Figure 11: Flip-chip tape and reel outline



More information is available in the application note AN2348: "Flip Chip: Package description and recommendations for use"

Figure 12: Marking

● Dot, ST logo  
 ■ ECOPACK grade  
 xx = marking  
 z = manufacturing location  
 yww = datecode

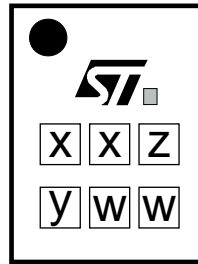


Figure 13: Footprint - non solder mask defined

**Copper pad diameter:**  
 220µm recommended  
 180µm minimum  
 260µm maximum

**Solder mask opening:**  
 320µm recommended  
 300µm minimum  
 340µm maximum

**Solder stencil opening:**  
 220µm recommended

Line to connect copper pad on solder mask opening should be smaller than copper pad diameter

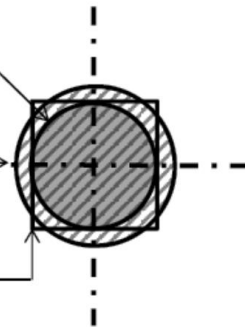
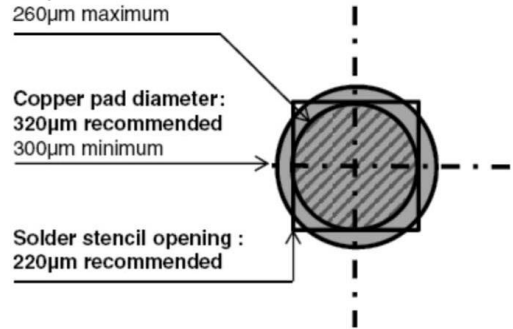


Figure 14: Footprint - solder mask defined

**Solder mask opening:**  
 220µm recommended  
 180µm minimum  
 260µm maximum

**Copper pad diameter:**  
 320µm recommended  
 300µm minimum

**Solder stencil opening :**  
 220µm recommended



### 3 Ordering information

Table 3: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
BAL-WILC10-01D3	L	WLCSP	1.084 mg	5000	Tape and reel (7")

### 4 Revision history

Table 4: Document revision history

Date	Revision	Changes
31-Mar-2017	1	Initial release.

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