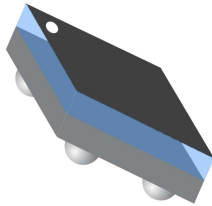
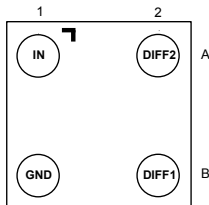


## 50 $\Omega$ / conjugate match to WILC1000 transformer balun



Chip scale package on glass  
4 bumps - 0.95 x 0.95 mm



### 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

### Applications

- 2.45 GHz impedance matched balun
- Optimized for the ATMEL SmartConnect WILC1000 Wireless Link Controller
- Connectivity

### 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.

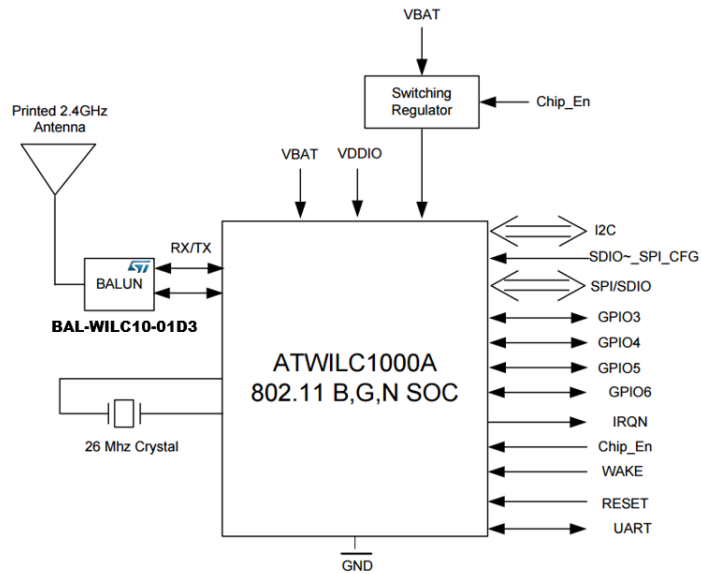
Product status link

[BAL-WILC10-01D3](#)

# 1 Characteristics

## 1.1 Circuit block diagram

Figure 1. Block diagram



## 1.2 Absolute ratings

Table 1. Absolute maximum ratings (limiting values)

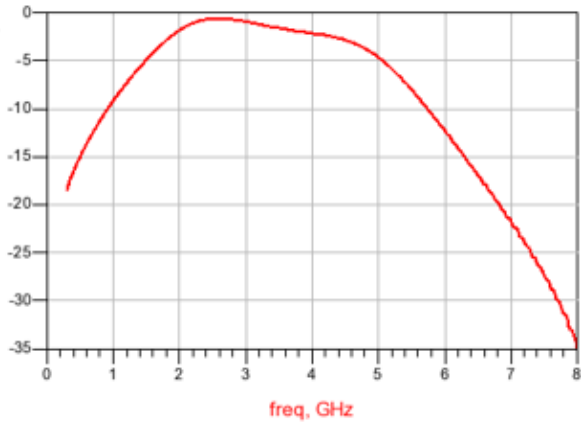
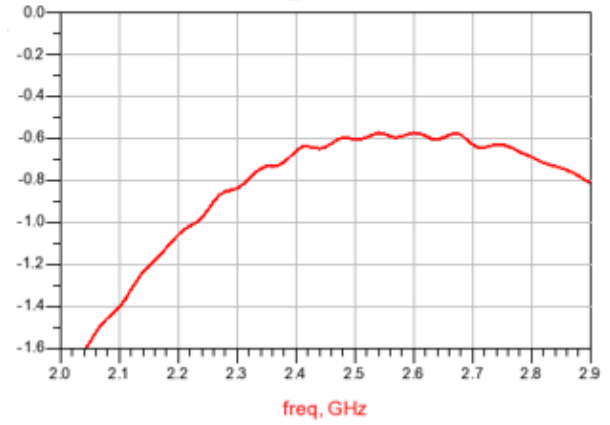
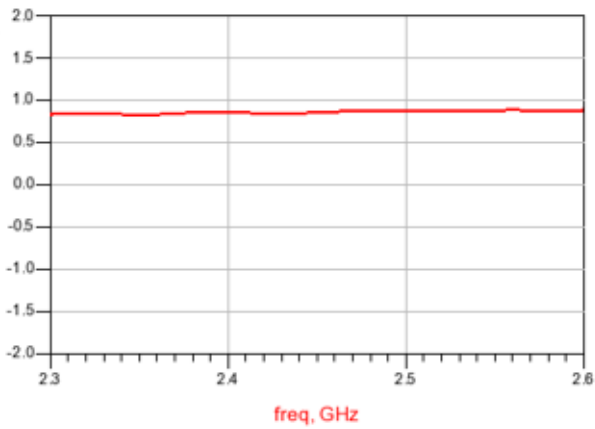
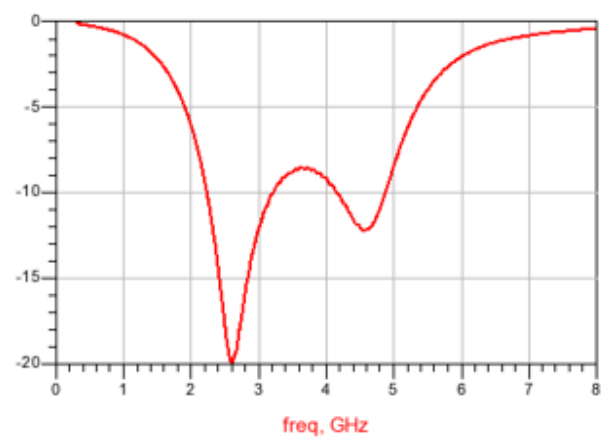
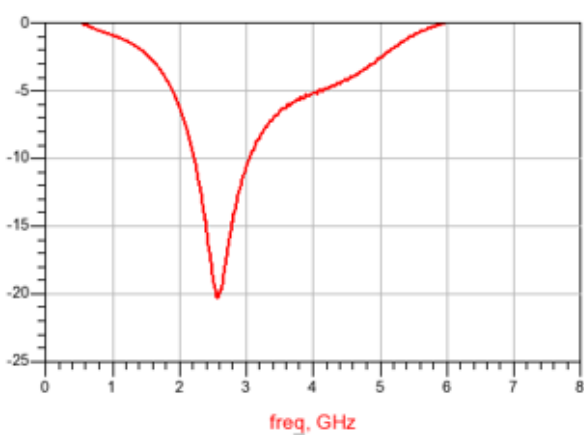
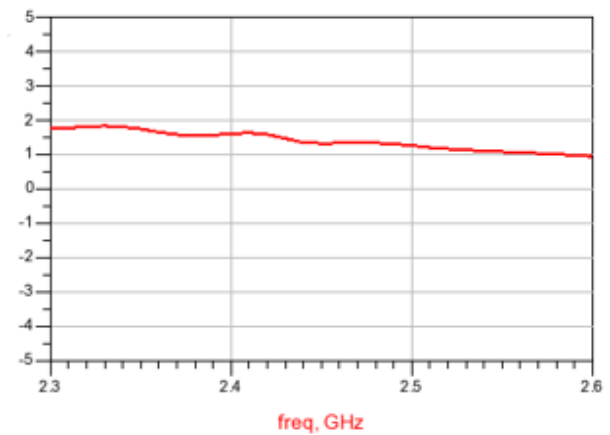
Symbol	Parameter	Value	Unit
$P_{IN}$	Input power $RF_{IN}$	20	dBm
$V_{ESD}$	ESD ratings MIL STD 883C (HBM: C = 100pF, R = 1.5k $\Omega$ , air discharge)	2000	V
	ESD ratings machine model (MM: C = 200pF, R = 25 $\Omega$ , L = 500 nH)	500	
	ESD ratings charged device model (CDM, JESD22-C101D)	500	
$T_{OP}$	Operating temperature	-40 to +105	$^{\circ}C$

### 1.3 Electrical characteristics

**Table 2. Electrical characteristics (values,  $T_{amb} = 25\text{ °C}$ )**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$Z_{OUT}$	Nominal differential output impedance	Conjugate match to WILC1000			$\Omega$
$Z_{IN}$	Nominal input impedance		50		$\Omega$
f	Frequency range (bandwidth)	2400		2500	MHz
$I_L$	Insertion loss in bandwidth		0.65	0.8	dB
$R_{L\_SE}$	Single ended return loss in bandwidth		-16	-15	
$R_{L\_DIFF}$	Differential return loss in bandwidth		-17	-15	
$H_2$	Second harmonic rejection (differential mode)			-3.8	
$H_3$	Third harmonic rejection (differential mode)			-23	
$\Phi_{imb}$	Phase imbalance	-2	1.3	2	$^\circ$
$A_{imb}$	Amplitude imbalance	-0.9	0.8	0.9	dB

## 1.4 Characteristics curves

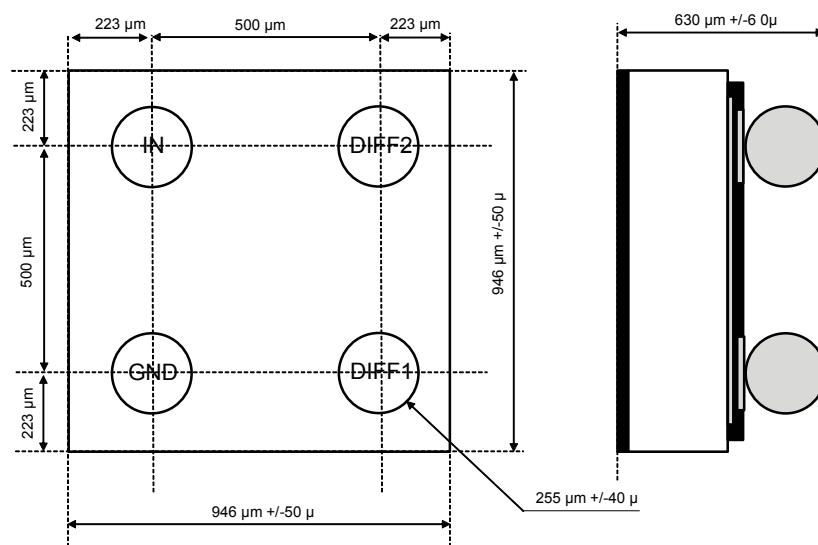
**Figure 2. Transmission (dB)**

**Figure 3. Insertion loss (dB)**

**Figure 4. Amplitude imbalance (dB)**

**Figure 5. Return loss single ended (dB)**

**Figure 6. Return loss differential (dB)**

**Figure 7. Phase imbalance (°)**


## 2 Package information

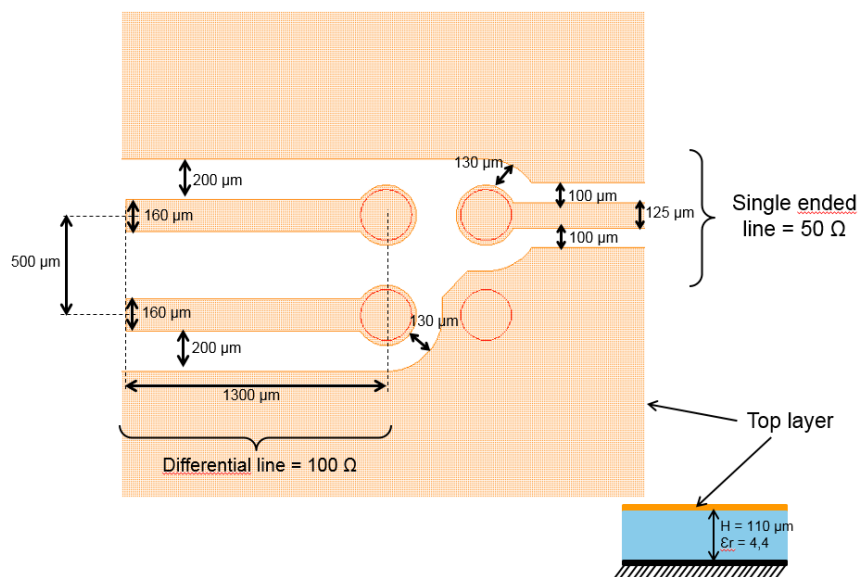
In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 WLCSP 8 bumps package information

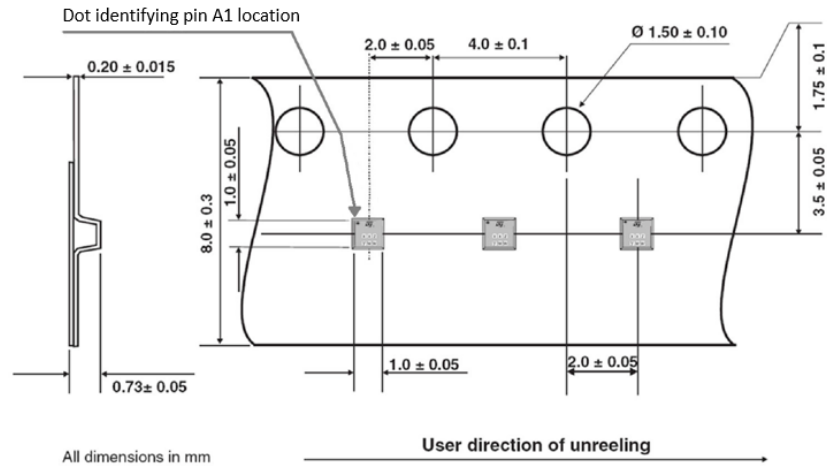
**Figure 8. Flip-Chip 4 bumps CSPG 0.4 package outline**



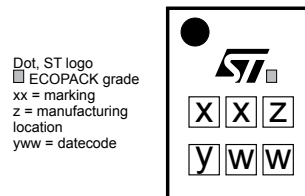
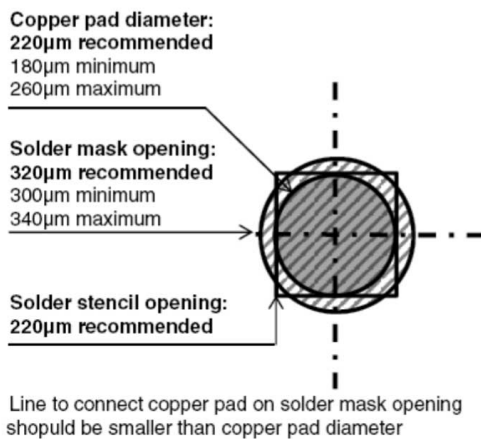
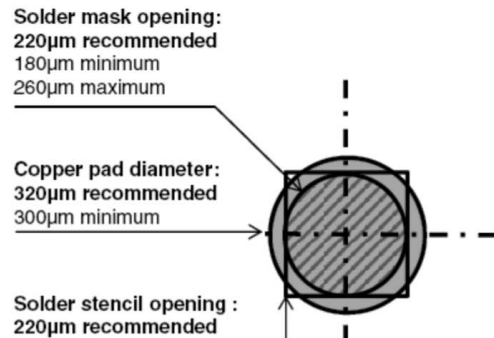
**Figure 9. PCB layout recommendation**



## 2.2 Flip-chip 4 bumps CSPG packing information

**Figure 10. Flip-chip tape and reel outline**


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

**Figure 11. Marking**

**Figure 12. Footprint - non solder mask defined**

**Figure 13. Footprint - solder mask defined**


### 3 Ordering information

**Table 3. Ordering information**

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

## Revision history

**Table 4. Document revision history**

Date	Revision	Changes
10-Mar-2017	1	Initial release.
03-Dec-2020	2	Updated <a href="#">Table 3</a> . Added Applications section.



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