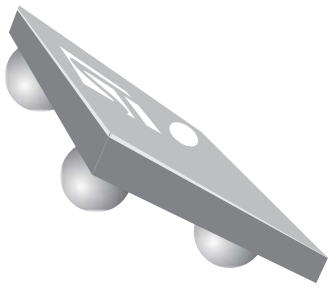
BAL-CC25-01D3

50 ohm, conjugate match to CC253x, CC254x, CC257x, CC852x, CC853x, transformer balun

Datasheet – production data



Flip-Chip package
4 bumps

Features

- 2.45 GHz balun with integrated matching network
- Matching optimized for following chip-sets:
  - CC2530, CC2531, CC2533
  - CC2540
  - CC2543, CC2544, CC2545
  - CC2570, CC2571
  - CC8520, CC8521
  - CC8530, CC82531
- Low insertion loss
- Low amplitude imbalance
- Low phase imbalance
- Coated Flip-Chip on glass
- Small footprint: < 0.88 mm²

Benefits

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

Description

STMicroelectronics BAL-CC25-01D3 is an ultra miniature balun which integrates a matching network in a monolithic glass substrate. This has been customized for the CC25xx and CC85xx RF transceivers.

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

Figure 1. Pin configuration (top view)

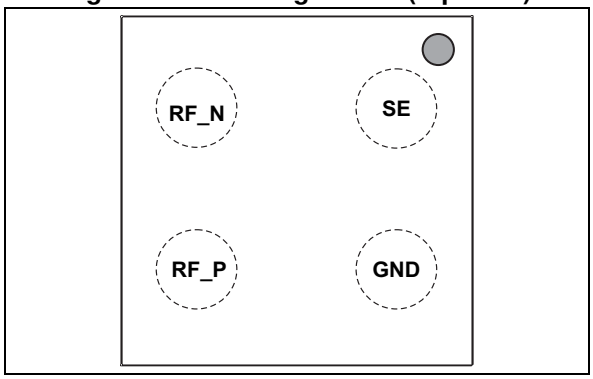
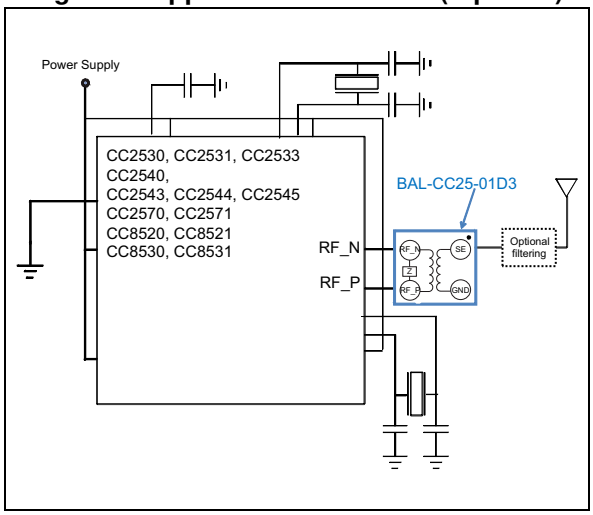


Figure 2. Application schematic (top view)



This is information on a product in full production. www.st.com

1 Characteristics

Table 1. Absolute maximum rating (limiting values)

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
P_{PEAK}	Input power RF_{IN}		20		dBm
V_{ESD}	ESD ratings MIL STD883C (HBM: C = 100 pF, R = 1.5 kΩ, air discharge)	2000			V
	ESD ratings machine model (MM: C = 200 pF, R = 25 Ω, L = 500 nH)	500			
	ESD ratings charged device model (CDM, JESD22-C101D)	500			
T_{OP}	Operating temperature	-40		+125	ºC

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

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
Z_{OUT}	Nominal differential output impedance	Conjugate match to CC25xx, CC85xx			Ω
Z_{IN}	Nominal input impedance				
F	Frequency range (bandwidth)	2379		2507	
I_L	Insertion loss in bandwidth		0.66		dB
R_{L_SE}	Single ended return loss in bandwidth		19		dB
R_{L_DIFF}	Differential ended return loss in bandwidth		19		dB
Φ_{imb}	Phase imbalance		14		°
A_{imb}	Amplitude imbalance		0.3		dB

Figure 3. Insertion loss (T_{amb} = 25 °C)

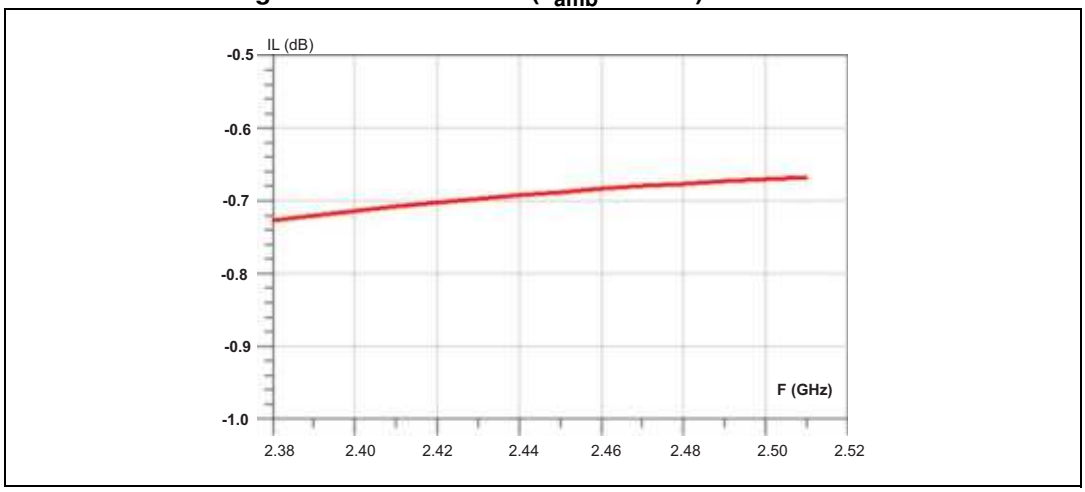


Figure 4. Return loss (T_{amb} = 25 °C)

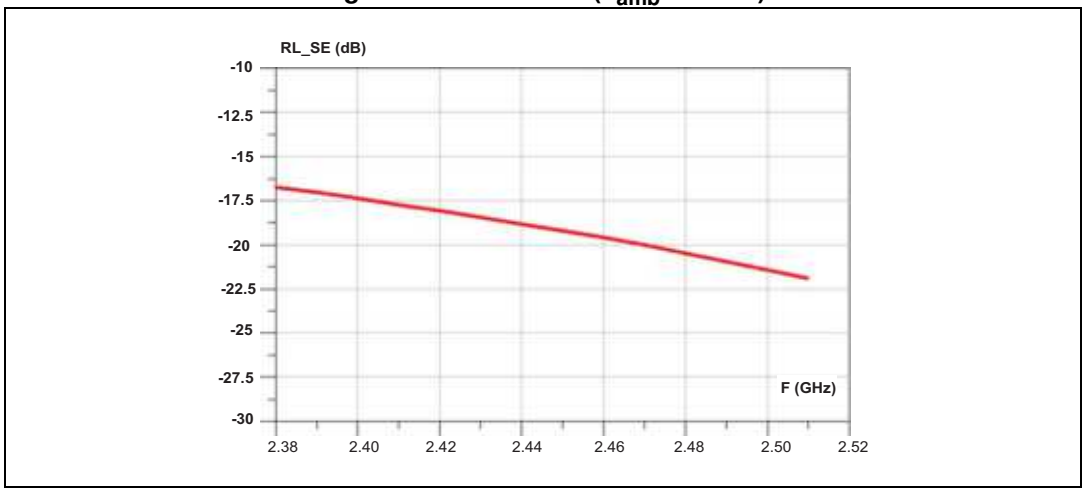


Figure 5. Return loss (T_{amb} = 25 °C)

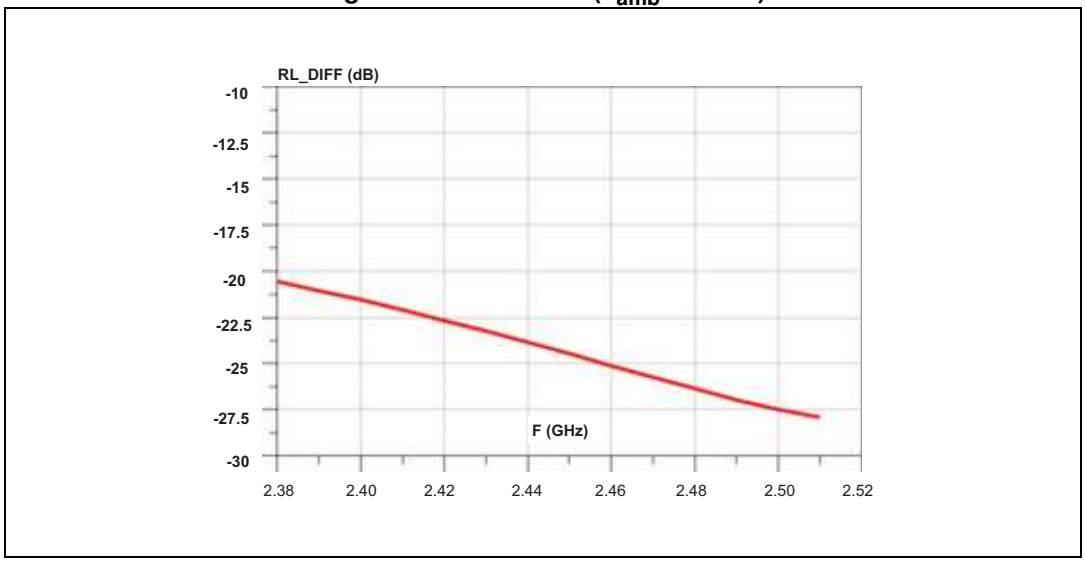


Figure 6. Amplitude imbalance (T_{amb} = 25 °C)

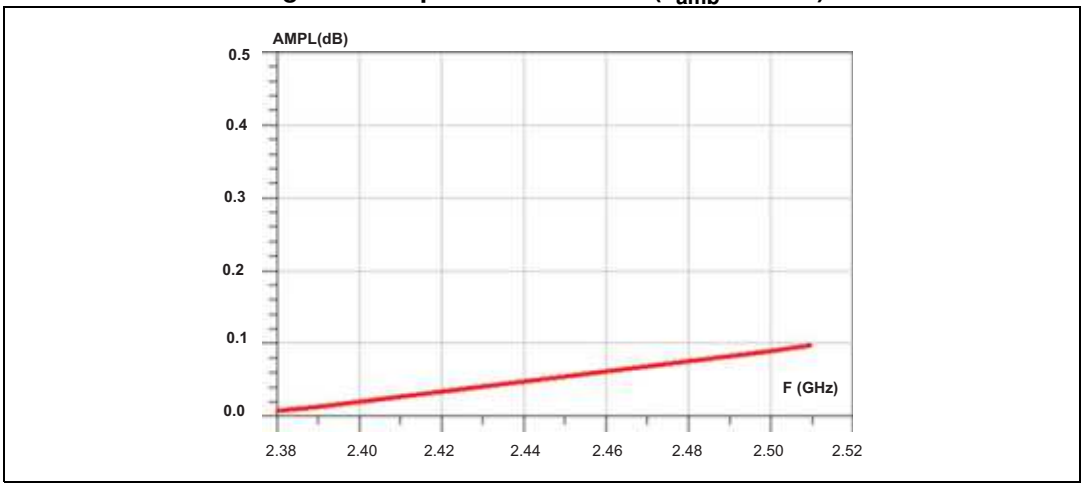
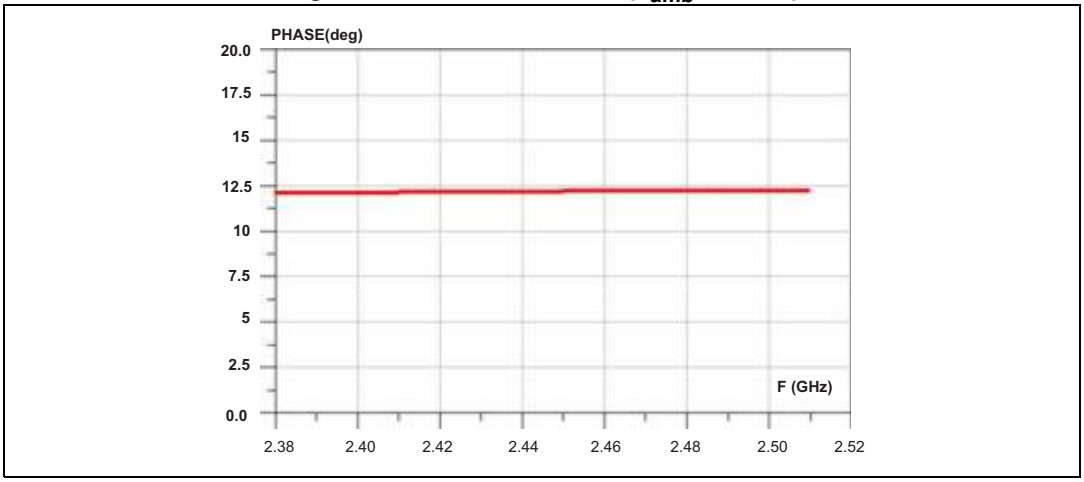


Figure 7. Phase imbalance (T_{amb} = 25 °C)



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*. ECOPACK® is an ST trademark.

2.1 Flip-Chip package information

Figure 8. Flip-Chip package outline

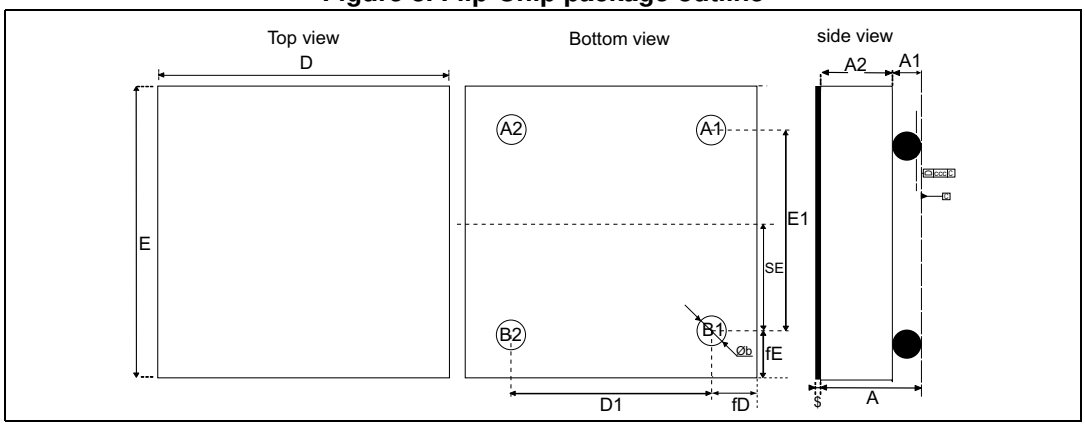


Table 3. Flip-Chip package mechanical data

Parameter	Description	Min.	Typ.	Max.	Unit
A	Bump height + substrate thickness	0.570	0.630	0.690	mm
A1	Bump height	0.155	0.205	0.255	mm
A2	Substrate thickness		0.400		mm
b	Bump diameter	0.215	0.255	0.295	mm
D	Y dimension of the die	0.890	0.940	0.990	mm
D1	Y pitch		0.500		mm
E	X dimension of the die	0.890	0.940	0.990	mm
E1	X pitch		0.500		mm
SE			0.250		mm
fD	Distance from bump to edge of die on Y axis		0.220		mm
fE	Distance from bump to edge of die on X axis		0.220		mm
ccc				0.05	mm
$			0.025		mm

Figure 9. Footprint

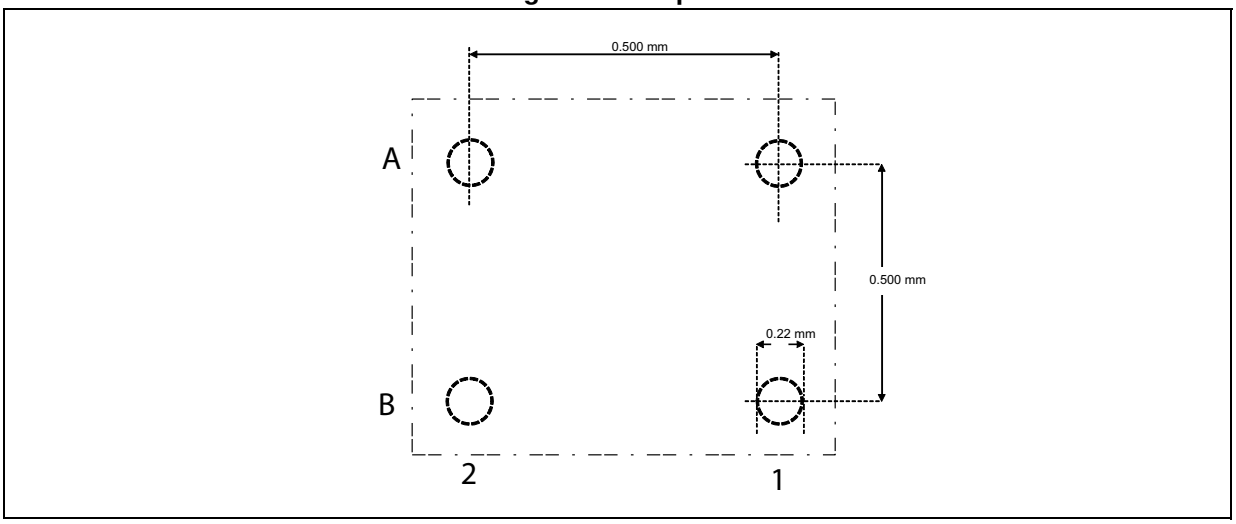


Figure 10. Footprint - 3 mils stencil -non solder mask defined

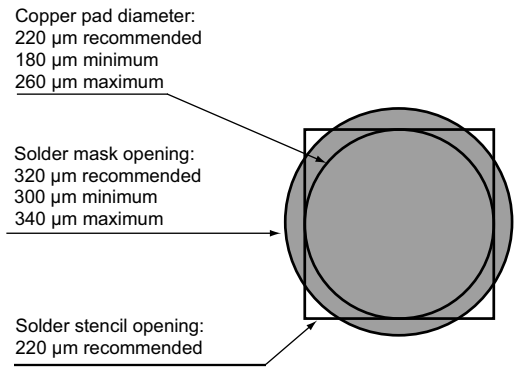


Figure 11. Footprint - 3 mils stencil - solder mask defined

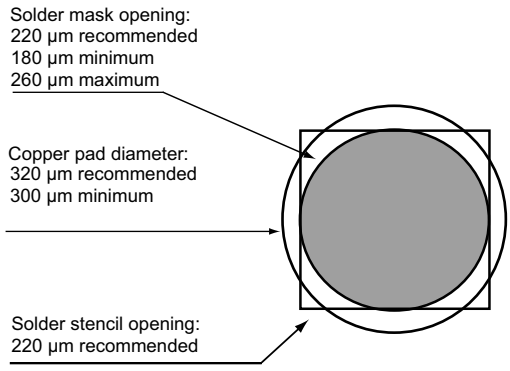


Figure 12. Footprint - 5 mils stencil -non solder mask defined

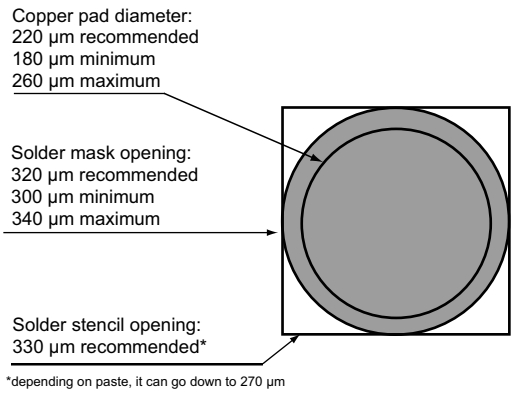


Figure 13. Footprint - 5 mils stencil - solder mask defined

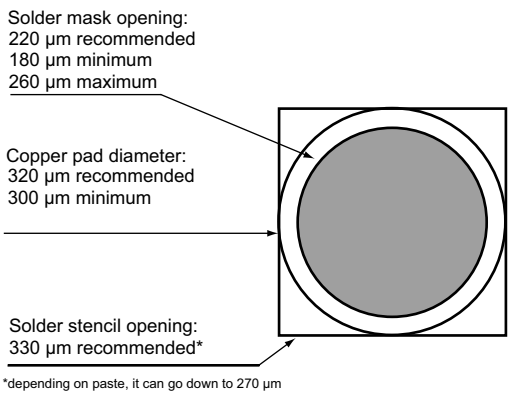


Figure 14. PCB layout recommendation

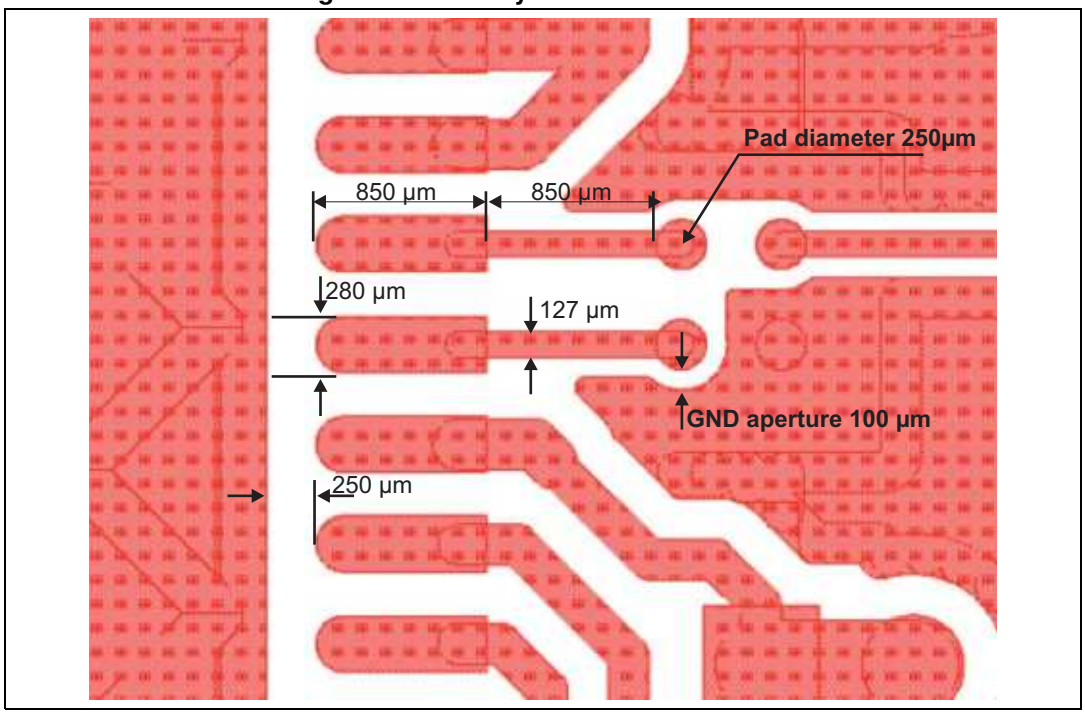
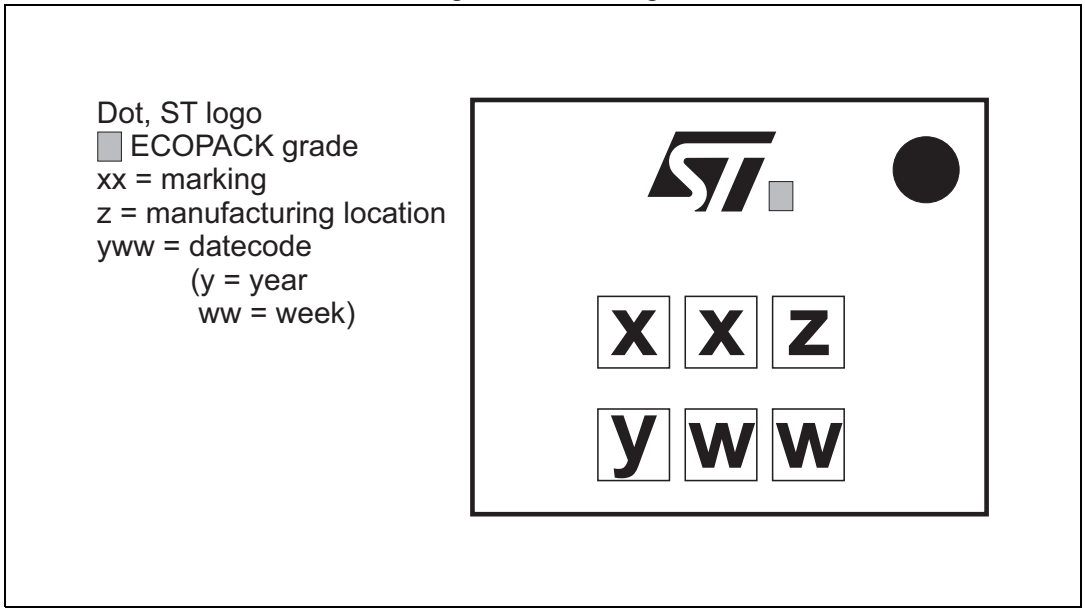
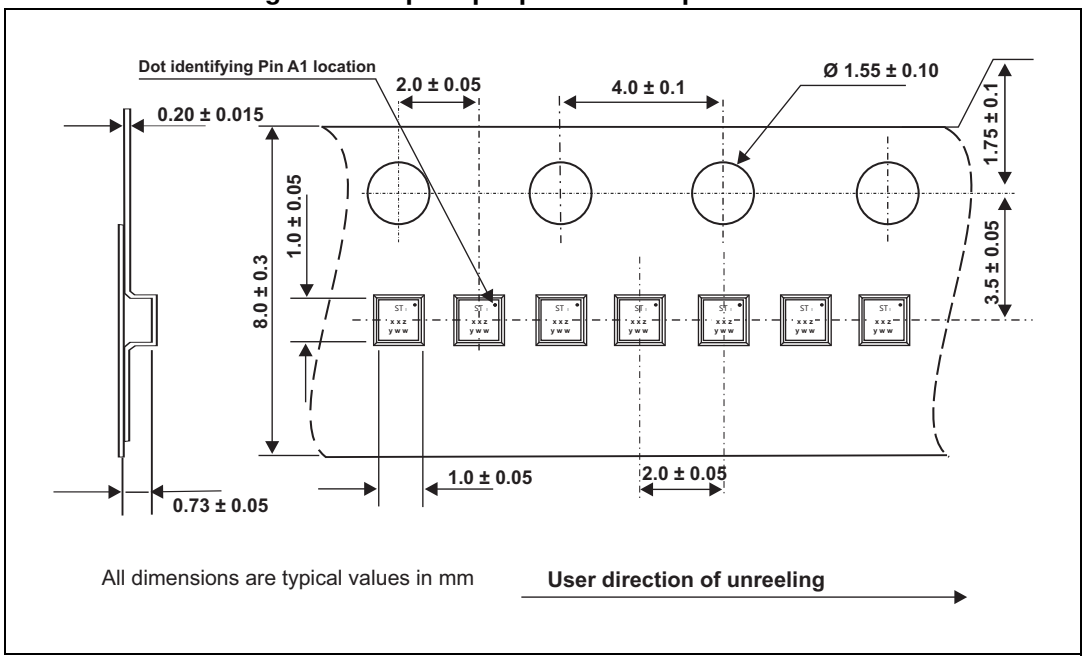


Figure 15. Marking



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

Figure 16. Flip Chip tape and reel specifications



Note: More information is available in the application note:

AN2348: “Flip Chip: package description and recommendations for use”

3 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAL-CC25-01D3	SL	Flip Chip	1.07 mg	5000	Tape and reel (7”)

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
23-May-2013	1	Initial release
11-Jul-2013	2	Updated Figure 14.
04-Sep-2015	3	Updated Figure 8. Added Figure 10, Figure 11, Figure 12, Figure 13 and Table 3.
12-Nov-2015	4	Updated *Table 1*.

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