1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
P_{IN}	Input power RFIN		10	13	dBm
V_{ESD}	ESD rating, human body model (JESD22-A114-C) all I/O one at a time while others connected to GND	2000			V
	ESD rating, machine model, all I/O	200			
T_{OP}	Operating temperature range	-40		+85	°C

Table 2. Impedances (T_{amb} = 25 °C)

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
Z_{DIFF}	Nominal differential impedance		matched to STLC2690		Ω
Z_{SE}	Nominal single-ended impedance		50		

Table 3. RF performance (T_{amb} = 25 °C)

Symbol	Parameter	Test condition	Value			Unit
			Min.	Typ.	Max.	
f	Frequency range (bandwidth)		2400		2500	MHz
I_L	Insertion loss in bandwidth			+1.2		dB
R_{L_SE}	Return loss in bandwidth		15	21		dB
ϕ_{imb}	Output phase imbalance (single ended)		-10		+10	°
A_{imb}	Output amplitude imbalance		-1	0.5	1	dB
CMRR	Common mode rejection (S_{SC12})		20			dB
Att_{2fo}	2nd harmonic S21 attenuation	4800-5000 MHz	31			dB
Att_{3f0}	3rd harmonic S21 attenuation	7200-7500 MHz	36			

1.1 Measurements

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

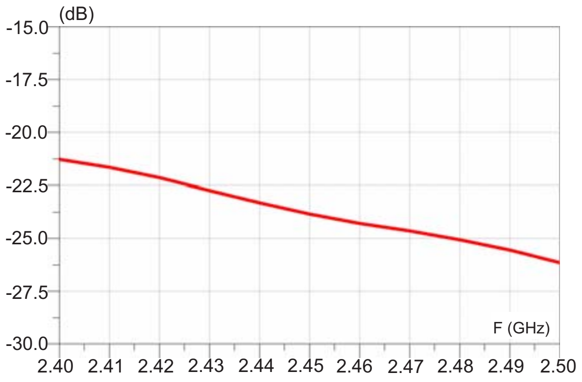


Figure 4. Insertion loss (T_{amb} = 25 °C)

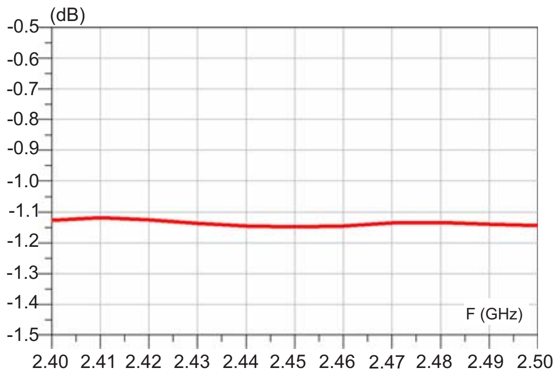


Figure 5. Phase imbalance (T_{amb} = 25 °C)

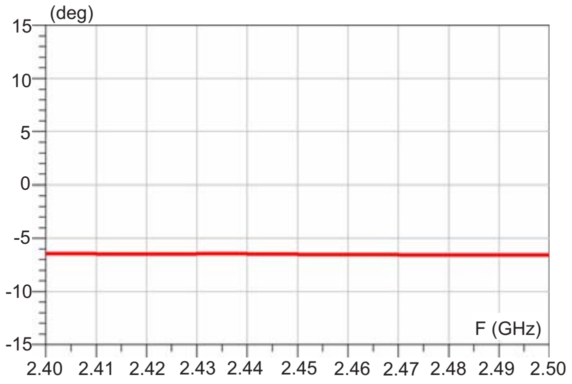


Figure 6. Amplitude imbalance (T_{amb} = 25 °C)

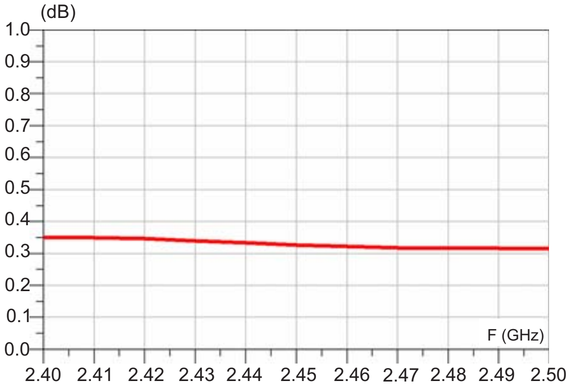


Figure 7. Transmission: 2nd harmonic (dB) (T_{amb} = 25 °C)

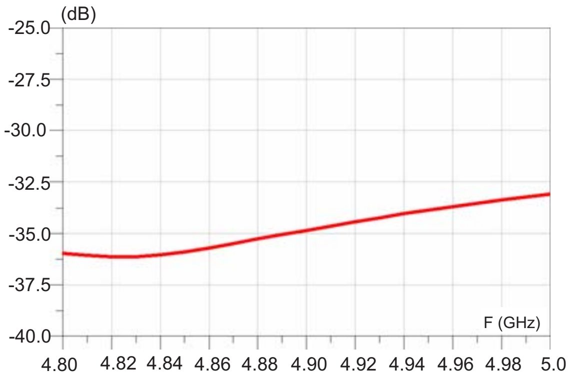


Figure 8. Transmission: 3rd harmonic (dB) (T_{amb} = 25 °C)

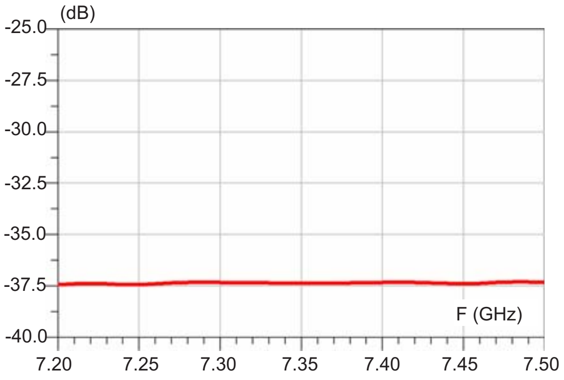
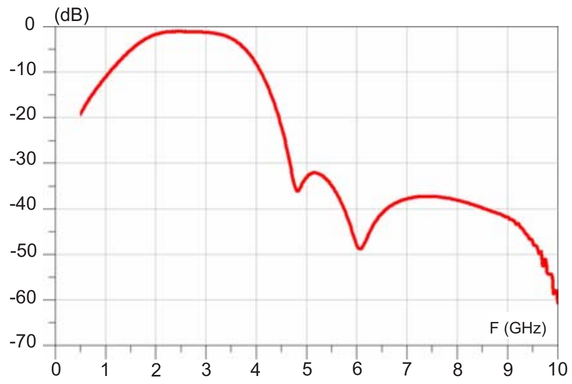


Figure 9. Transmission (dB)



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 10. Flip-Chip package outline

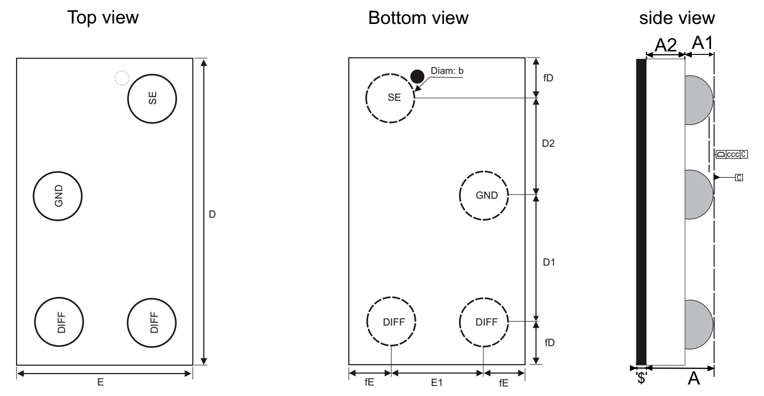


Table 4. Flip-Chip package mechanical data

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	1.590	1.640	1.690	mm
D1	Y pitch		0.660		mm
D2	Y pitch2		0.540		mm
E	X dimension of the die	0.890	0.940	0.990	mm
E1	X pitch		0.500		mm
fD	Distance from bump to edge of die on Y axis		0.225		mm
fE	Distance from bump to edge of die on X axis		0.215		mm
ccc				0.05	mm
$			0.025		mm

Figure 11. Footprint

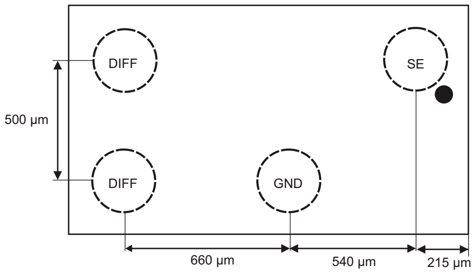
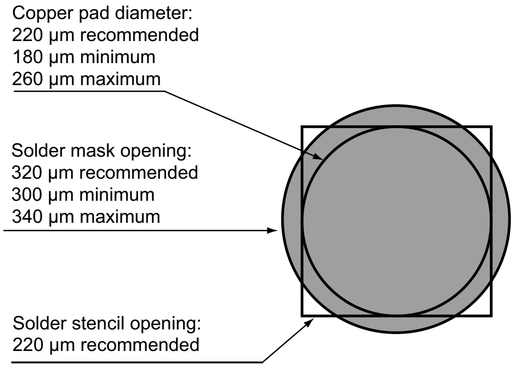


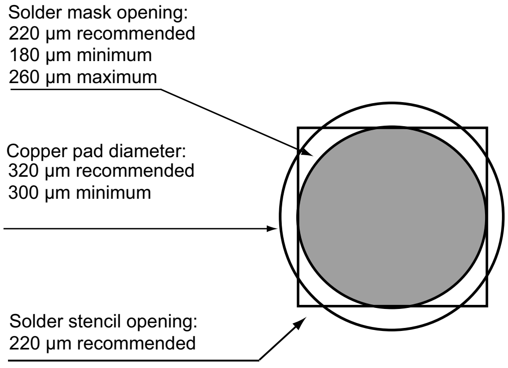
Figure 12. Footprint - 3 mils stencil -non solder mask defined


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

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

Solder stencil opening:
220 µm recommended

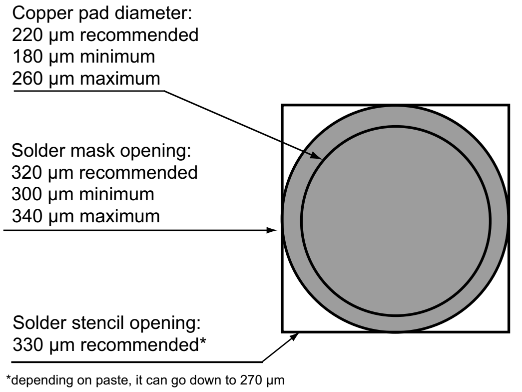
Figure 13. Footprint - 3 mils stencil - solder mask defined


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

Copper pad diameter:
320 µm recommended
300 µm minimum

Solder stencil opening:
220 µm recommended

Figure 14. Footprint - 5 mils stencil -non solder mask defined

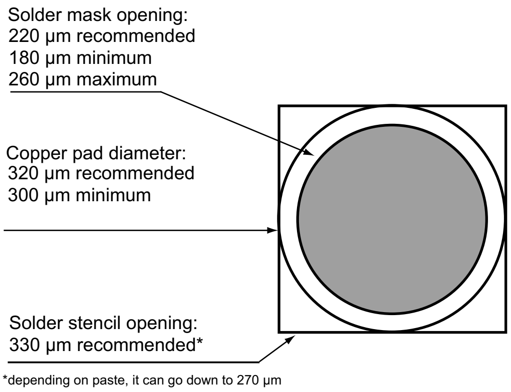

Copper pad diameter:
220 µm recommended
180 µm minimum
260 µm maximum

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

Solder stencil opening:
330 µm recommended*

*depending on paste, it can go down to 270 µm

Figure 15. Footprint - 5 mils stencil - solder mask defined


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

Copper pad diameter:
320 µm recommended
300 µm minimum

Solder stencil opening:
330 µm recommended*

*depending on paste, it can go down to 270 µm

Figure 16. Marking

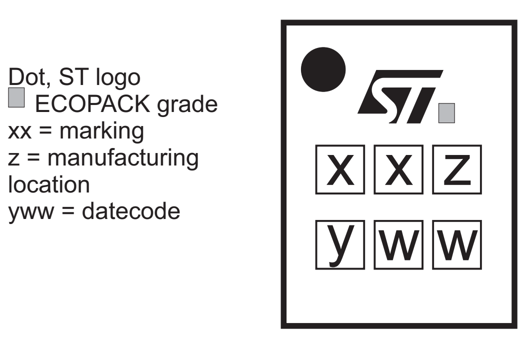


Figure 17. Recommended land pattern

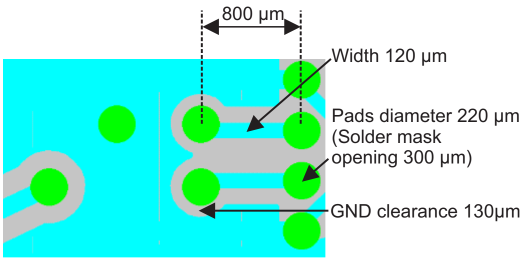
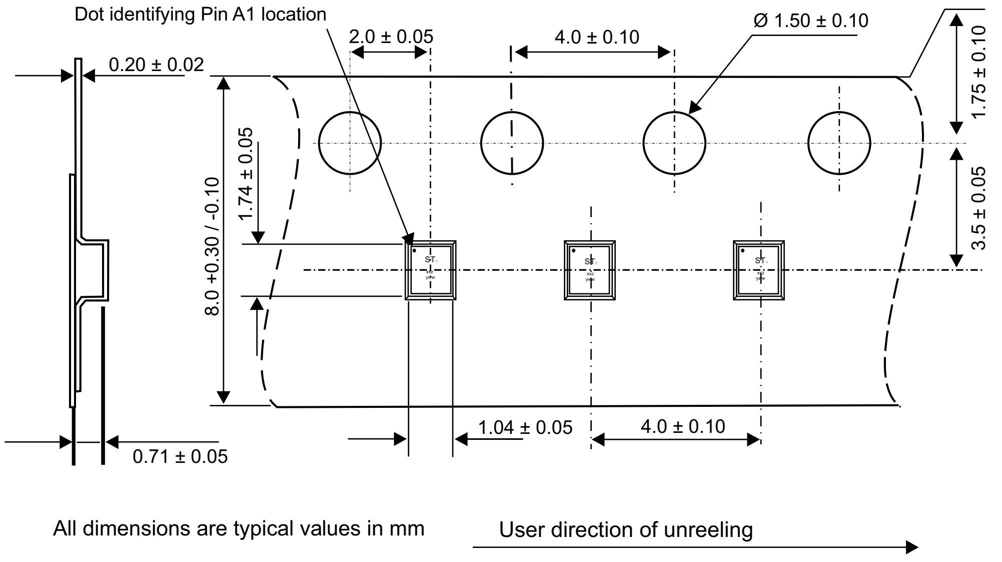


Figure 18. Flip Chip tape and reel specifications



Note: More information is available in the STMicroelectronics application notes:

AN2348 Flip-Chip: “Package description and recommendations for use”

3 Ordering information

Table 5. Ordering information

Order code	Marking	Weight	Base Qty	Delivery mode
BALF-2690-02D3	SP	1.81 mg	5000	Tape and Reel

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
27-Sep-2013	1	Initial release
19-Dec-2013	2	Added product weight in *Table 5* and updated *Table 1*.
19-Nov-2014	3	Added tape and reel dimensions.
02-Sep-2015	4	Updated *Figure 10*. Added *Figure 12*, *Figure 13*, *Figure 14*, *Figure 15* and *Table 4*.