

CC2420

Reliability Report

CONCLUSION

The CC2420 meets the Chipcon product reliability qualification standards based on the procedures and tests documented in the following.

Design phase

Design is made for robustness using extensive corner simulations for:

- Process variations
- Minimum/maximum operating temperature
- Minimum/maximum operating voltage
- Minimum/maximum process limitations

Process

The CC2420 is based on the Chipcon SmartRF®-03 platform. It is designed in an industry standard 0.18µm mixed signal CMOS process with 1 poly layer and 4 metal layers.

Package reliability (QLP-48 Pb free)

| | |
|----------------------------|---------------------------------|
| Moisture Sensitivity Level | JEDEC Level 3 |
| Temp Cycling | -65/150°C, 1000 cycles |
| High Temp Storage Test | 150°C, 1000 hrs. |
| Autoclave | 121°C / 100% RH, 2 atm, 168 hrs |

ESD and Latch-Up

Latch-up testing according to JEDEC 17.

Minimum immunity level: ± 100mA at all pins. VDD abs. max. rating + 20% at all supply pins.

ESD test according to Mil. Std. 883E 3015 Human Body Model.

Minimum immunity level non-RF pin groups: 1kV, except:

| | | | |
|--------------------|--------|-----------------------|--------|
| DI to VCO_GUARD | 0.75kV | DI to DIO | 0.75kV |
| DI to AVDD_PRE | 0.75kV | VCO_GUARD to AVDD_RF2 | 0.75kV |
| DI to AVDD_RF2 | 0.5kV | VCO_GUARD to DVDD1.8 | 0.5kV |
| DI to AVDD_IF2 | 0.75kV | VCO_GUARD to DVDD_RAM | 0.75kV |
| DI to AVDD_ADC | 0.5kV | AVDD_VCC to DVDD_RAM | 0.75kV |
| DI to DVDD3.3 | 0.5kV | AVDD_SW to DVDD_ADC | 0.75kV |
| DI to DVDD1.8 | 0.75kV | AVDD_SW to AVDD_XOSC | 0.75kV |
| DI to AVDD_XOSC | 0.5kV | AVDD_RF2 to DVDD_RAM | 0.75kV |
| DI to AVDD_CHP | 0.5kV | AVDD_IF2 to DVDD1.8 | 0.75kV |
| DI to DGND | 0.75kV | DVDD3.3 to AVDD_CHP | 0.5kV |
| DI to DSUB_PADS | 0.75kV | DVDD1.8 to AVDD_CHP | 0.5kV |
| DI to DSUB_CORE | 0.75kV | DVDD1.8 to DSUB_CORE | 0.75kV |
| DIO to AVDD_CHP | 0.5kV | DVDD1.8 to DVDD_RAM | 0.75kV |
| AO&AI to DVDD1.8 | 0.5kV | AVDD_CHP to DVDD_RAM | 0.5kV |
| AO&AI to DSUB_CORE | 0.75kV | DI to $\bar{D}I$ | 0.5kV |

Minimum immunity level RF pin groups: 0.5kV, except:

| | | | |
|----------------------|--------|--------------------|--------|
| RF_IO to VCO_GUARD | 0.25kV | RF_IO to AVDD_IF1 | 0.25kV |
| RF_IO to AVDD_VCC | 0.25kV | RF_IO to AVDD_CHP | 0.25kV |
| RF_IO to AVDD_PRE | 0.25kV | RF_IO to VCO_GND | 0.1kV |
| RF_IO to AVDD_RF1 | 0.25kV | RF_IO to DSUB_PADS | 0.25kV |
| RF_IO to TXRX_SWITCH | 0.25kV | RF_IO to DSUB_CORE | 0.1kV |
| RF_IO to AVDD_ADC | 0.25kV | RF_IO to DVDD_RAM | 0.25kV |
| RF_IO to DVDD_ADC | 0.25kV | RF_IO to RF_IO | 0.25kV |
| RF_IO to DVDD1.8 | 0.25kV | RF_IO to DIO | 0.25kV |

Transfer to Production

First Article Inspection (testing at $-40/+25/+85^{\circ}\text{C}$)

Production test limits extraction based on statistical methods.

Accelerated lifetime test. Minimum expected lifetime (*): 10 years at 58°C ,
1.4 years at 85°C , FIT of approx. 60 (at room temp) with 60% confidence level.

(*) based on test of 9 devices at 125°C and 1 device at 25°C for 1070 hours, 0 failures. Devices from lot W61665.07.

Production test

Final test $+25^{\circ}\text{C}$

QA sampling ($-40/+25/+85^{\circ}\text{C}$)

Tape & Reel specification

Package: QLP 48 - Pb free

Tape Width: 16,0mm

Component Pitch: 12,0mm

Hole Pitch: 4,0mm

13inch tape with 4000 pcs.

Carrier tape and reel is in accordance with EIA specification 481.

Solderability

Recommended soldering profile is according to IPC/JEDEC J-STD-020C July 2004

Summary

The above data show that CC2420 meets the Chipcon product reliability qualification standards and has an acceptable level of reliability.

Revision history

1.0 Initial version

1.1 Fixed minor typing error

1.2 Removed information about field return