

Namics Under-fill

Qualification Report

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Revision History

The following table shows the revision history for this document.

| Date | Version | Revision |
|----------|---------|-------------------------------|
| 08/24/07 | 1.0 | Initial Xilinx release. |
| 08/27/07 | 1.0.1 | Typos in Table 1 and Table 2. |

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Namics Under-fill Qualification Report

Overview

This report summarizes the reliability testing results that were obtained to qualify Namics under-fill material that will be used in SPIL's Flip-Chip package assembly.

Qualification Objective

The objective of this qualification is to qualify Namics under-fill material for the flip-chip packages that are already in production.

Reliability Test Conditions and Results

The qualification vehicles were selected from several different product families as well as several different package sizes and pin counts for reliability tests. [Table 1](#) provides a summary of the qualification.

Table 1: Reliability Test Conditions and Results

| Test | Conditions | Test Vehicle | Lot Qty | Cum Device-Hr/Cyc | # of Failures |
|---------------------|---------------------------------|-------------------|---------|-------------------|---------------|
| TC-B ⁽¹⁾ | -55 to +125°C, 1000 cyc | XC4VLX200/FFG1513 | 3 | 102,000 | 0 |
| | | XC4VLX160/FFG1513 | 3 | 112,000 | 0 |
| | | XC4VLX25/SFG363 | 1 | 101,000 | 0 |
| | | XC2VP70/FFG1517 | 3 | 155,000 | 0 |
| | | XC2VP100/FFG1704 | 1 | 69,000 | 0 |
| | | XC2V8000/FFG1152 | 3 | 127,000 | 0 |
| | | XC2V6000/FFG1152 | 3 | 125,000 | 0 |
| TC-G ⁽¹⁾ | -40 to +125°C, 1000 cyc | XC2V6000/FFG1517 | 3 | 132,000 | 0 |
| THB ⁽¹⁾ | 85°C, 85%RH, V _{DDMAX} | XC5VLX50T/FFG1136 | 3 | 142,000 | 0 |
| TH ⁽¹⁾ | 85°C, 85%RH | XC5VLX50T/FFG1136 | 3 | 142,000 | 0 |

Table 1: Reliability Test Conditions and Results (Continued)

| Test | Conditions | Test Vehicle | Lot Qty | Cum Device-Hr/Cyc | # of Failures |
|--------------------|-----------------------|-------------------|---------|-------------------|---------------|
| HTS ⁽²⁾ | T _A =150°C | XC5VLX50T/FFG1136 | 3 | 144,000 | 0 |

Notes:

1. Package level-4 preconditioning performed prior to THB, TH, and TC-B tests.
2. Reflow (3X) applied to HTS samples prior to the stress test.

Based on the data gathered to date, Namics under-fill has demonstrated a satisfactory result meeting qualification requirements for releasing to SPIL's production assembly.

Qualification Data

Table 2: Qualification Data

| Test | Conditions | Rel # | Device | Package | Samples | Duration | Fail Qty |
|---------------------|--------------|--------|-----------|---------|---------|-----------|----------|
| TC-B ⁽¹⁾ | -55°C/+125°C | 192907 | XC4VLX200 | FFG1513 | 36 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 193007 | XC4VLX200 | FFG1513 | 35 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 193107 | XC4VLX200 | FFG1513 | 31 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 193207 | XC4VLX160 | FFG1513 | 33 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 193307 | XC4VLX160 | FFG1513 | 37 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 193407 | XC4VLX160 | FFG1513 | 42 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 204507 | XC2VP70 | FFG1517 | 47 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 204607 | XC2VP70 | FFG1517 | 50 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 204707 | XC2VP70 | FFG1517 | 58 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 204807 | XC2V8000 | FFG1152 | 43 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 204907 | XC2V8000 | FFG1152 | 44 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 205007 | XC2V8000 | FFG1152 | 40 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 205107 | XC2V6000 | FFG1152 | 43 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 205207 | XC2V6000 | FFG1152 | 38 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 205307 | XC2V6000 | FFG1152 | 44 | 1,000 cys | 0 |
| TC-G ⁽¹⁾ | -40°C/+125°C | 205407 | XC2V6000 | FFG1517 | 40 | 1,000 cys | 0 |
| TC-G ⁽¹⁾ | -40°C/+125°C | 205507 | XC2V6000 | FFG1517 | 44 | 1,000 cys | 0 |

Table 2: Qualification Data (Continued)

| Test | Conditions | Rel # | Device | Package | Samples | Duration | Fail Qty |
|---------------------|--|--------|-----------|---------|---------|-----------|----------|
| TC-G ⁽¹⁾ | -40°C/+125°C | 205607 | XC2V6000 | FFG1517 | 48 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 212207 | XC4VLX25 | SFG363 | 101 | 1,000 cys | 0 |
| TC-B ⁽¹⁾ | -55°C/+125°C | 224907 | XC2VP100 | FFG1704 | 69 | 1,000 cys | 0 |
| THB ⁽¹⁾ | 85°C, 85%RH, Bias, V _{CCMAX} | 175707 | XC5VLX50T | FFG1136 | 43 | 1,000 hrs | 0 |
| TH ⁽¹⁾ | 85°C, 85%RH | 175807 | XC5VLX50T | FFG1136 | 44 | 1,000 hrs | 0 |
| HTS ⁽²⁾ | T _A = 150°C | 175907 | XC5VLX50T | FFG1136 | 45 | 1,000 hrs | 0 |
| THB ⁽¹⁾ | 85°C, 85%RH, Bias, V _{CCMAX} | 189307 | XC5VLX50T | FFG1136 | 49 | 1,000 hrs | 0 |
| TH ⁽¹⁾ | 85°C, 85%RH | 189407 | XC5VLX50T | FFG1136 | 49 | 1,000 hrs | 0 |
| HTS ⁽²⁾ | T _A = 150°C | 189507 | XC5VLX50T | FFG1136 | 50 | 1,000 hrs | 0 |
| THB ⁽¹⁾ | 85°C, 85%RH, Bias, V _{CCMAX} | 190607 | XC5VLX50T | FFG1136 | 50 | 1,000 hrs | 0 |
| TH ⁽¹⁾ | 85°C, 85%RH | 190707 | XC5VLX50T | FFG1136 | 49 | 1,000 hrs | 0 |
| HTS ⁽²⁾ | T _A = 150°C | 190807 | XC5VLX50T | FFG1136 | 49 | 1,000 hrs | 0 |

Notes:

1. Package level-4 preconditioning performed prior to THB, TH, and TC-B tests.
2. Reflow (3X) applied to HTS samples prior to the stress test.

