



FAILURE ANALYSIS

1251 McKay Dr • San Jose, CA 95131 • Tel: (408) 904-1100

FAILURE ANALYSIS REPORT

To: ALT
From: WH Lin
Customer #: ALT/SKB
Synaptics FACR #: 017191(SN1)
CC: Pavan Singaraju
Date: 6/3/2022

8-Discipline Format

- (1) Team Formation
Product / Testing Engineering – Scott L.
Quality / Reliability / Failure Analysis – Wh L.
Application / Design Engineering – Nghia N./Robin H.
CQE – HK L.

- (2) Problem Description
Background information:
AUX pin fixed low.

#	Device	Lot #/ Date Code	Failure Mode
SN1	VS550 A1	051AATH 191 TBGY90.00AC	AUX pin fixed low.

- (3) Containment Action

N/A

- (4) Root Cause Identification & Verification
Analysis and conclusion:

SN1:

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- Synaptics FA team provided non-destructive analyses for visual inspection, CSAM, and X-ray on SN1 that no abnormalities found.
- ATE verification showed SN1 to fail ATE with current test program for pin_SCRD0_GPIO [1] (R4) leakage fail.
- Synaptics FA team conducted further IV curve measurement for SN1 to check leakage failure pin that leakage failure was confirmed. (Please refer to Figure 1).

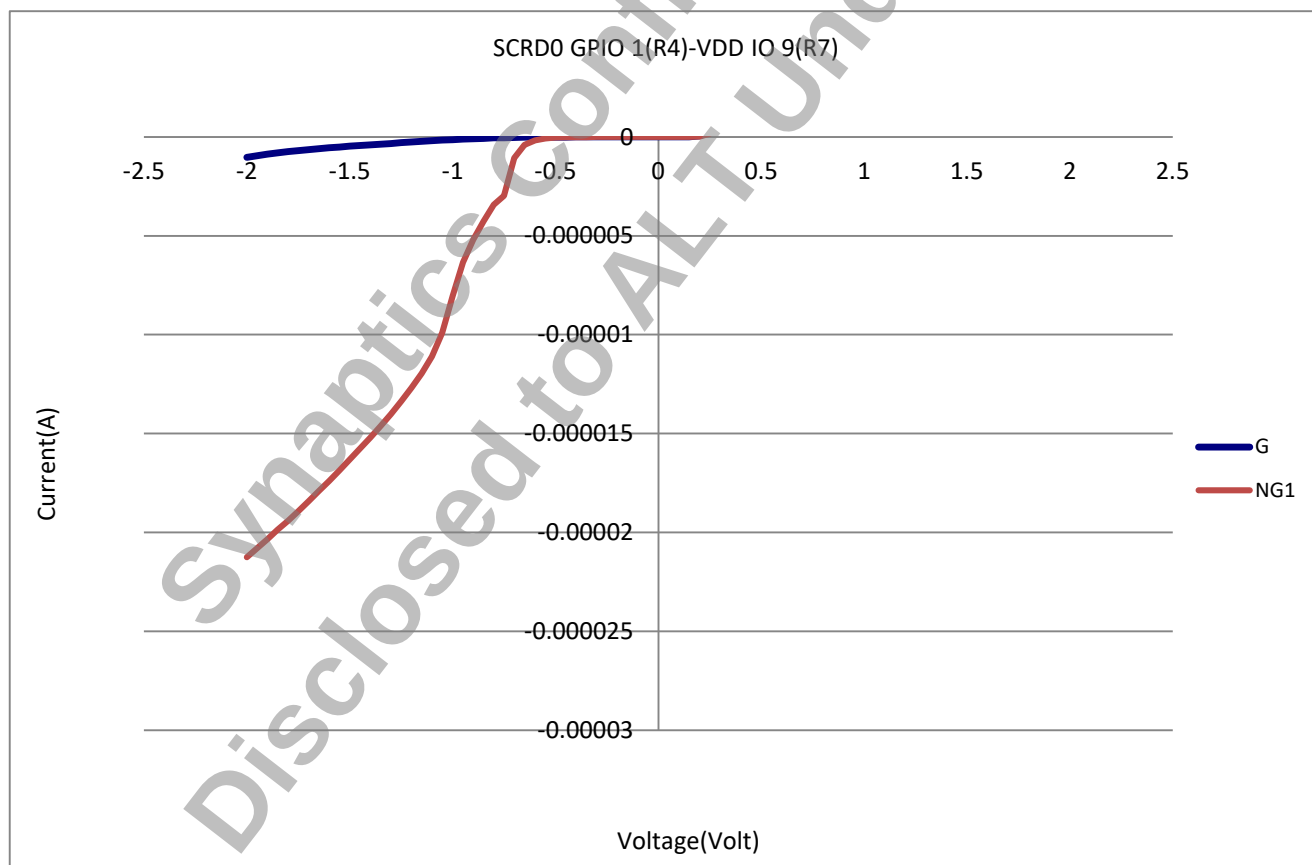
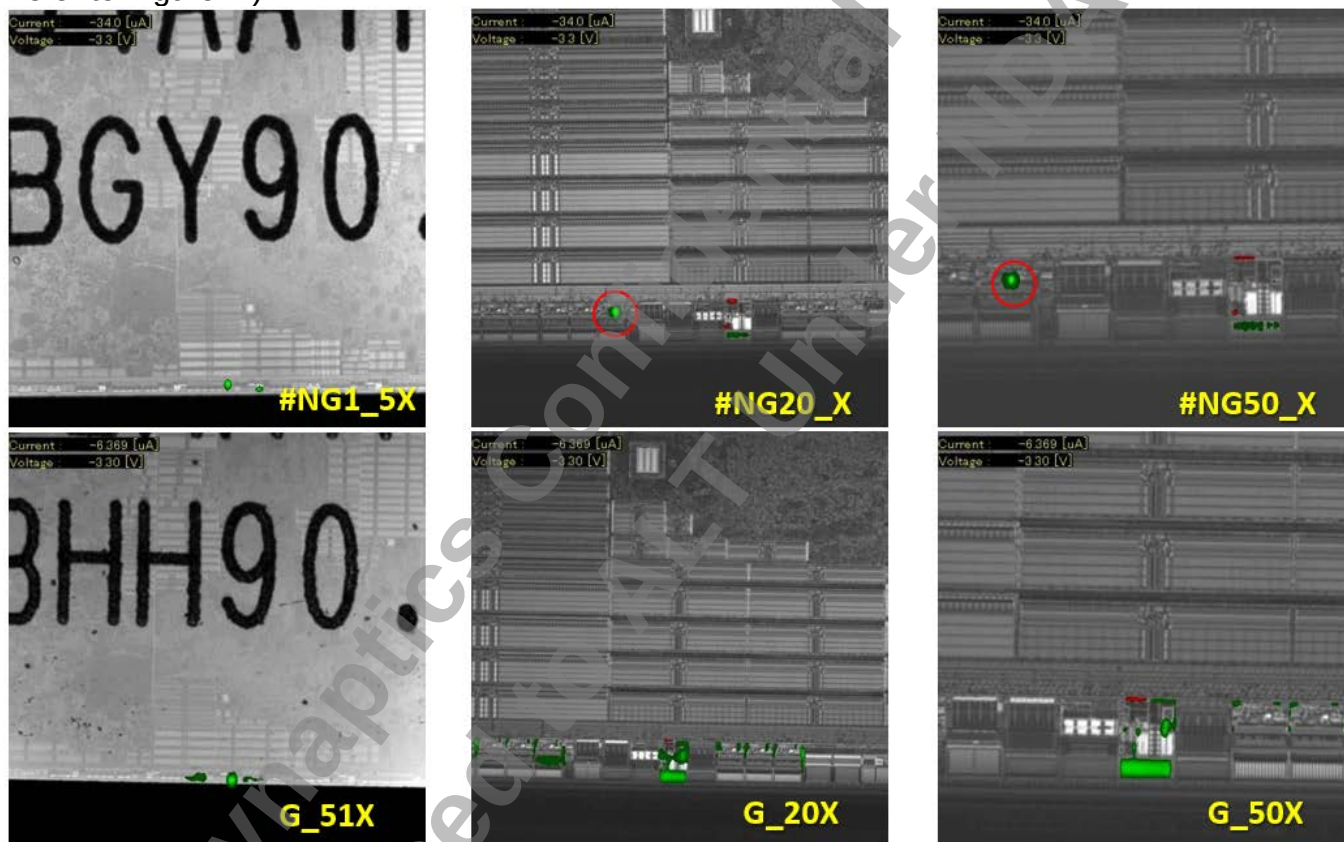


Figure 1. IV Curve analysis

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- Synaptics FA team provided OBIRCH analysis for SN1 to analyze the leakage failure pin for SCRD0_GPIO [1] (R40) to VSS that obvious burnt marks were confirmed (Please refer to Figure 2.)

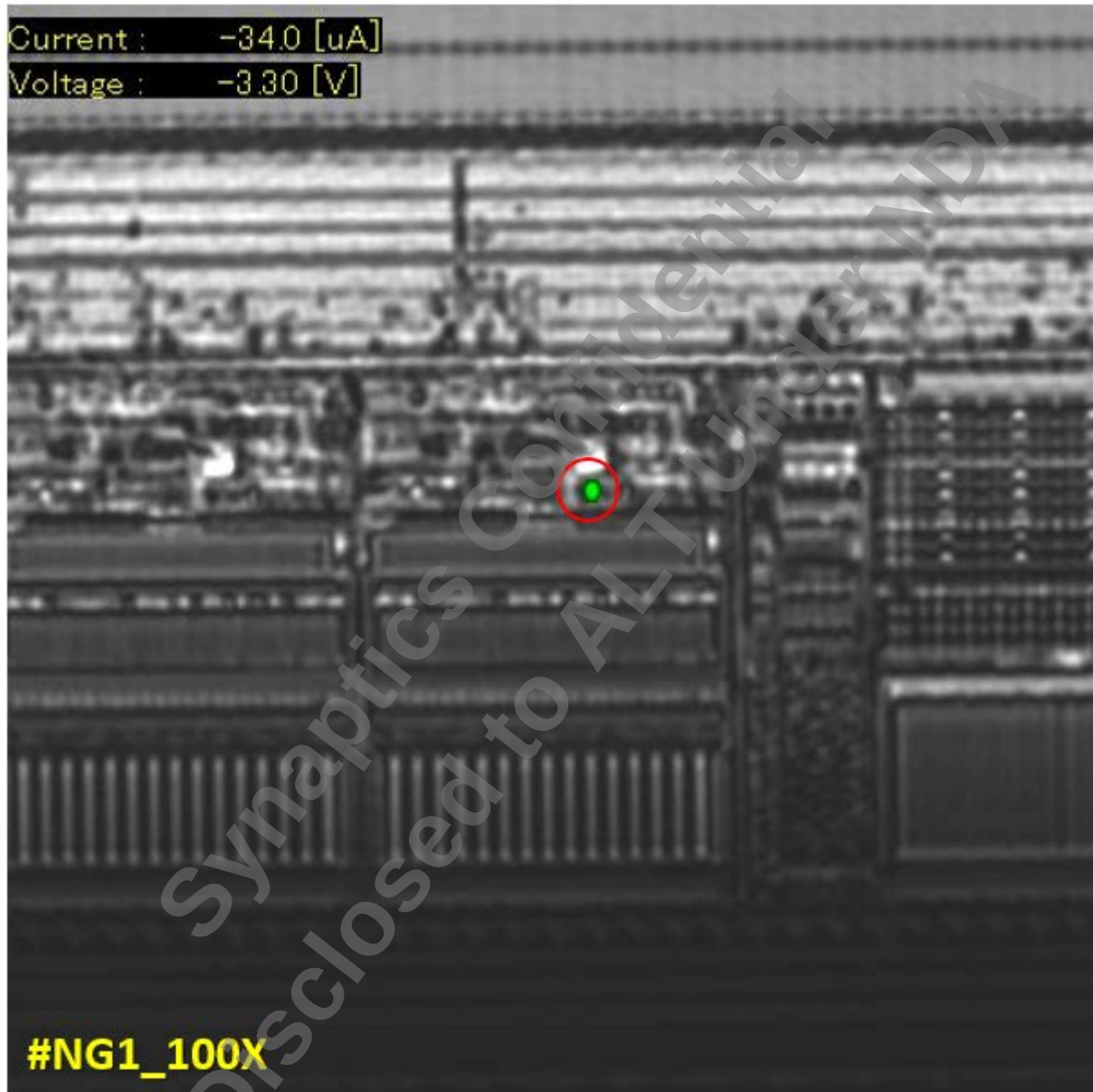


No #	Test Condition	Force Voltage	Current
#NG1	SCRD0_GPIO[1] (R4) to VDD_IO_9 (R7)	-3.3 V	34 u A
#G			6.3 u A



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Figure 2. OBIRCH analysis

- Based on above analyses that SN1 revealed as EOS failures from the pin for SCRD0_GPIO [1] (R40). However, we suspect the returned units of SN1 was exposed to electrical overstress conditions. EOS occurs when a high voltage is inadvertently applied to a device for tens to several hundred milliseconds. In particular, it is important to ensure that power supplies to power pins must be clean and have good regulation. Also, it is important to ensure that the system has good signal integrity to prevent ground bounces due to abrupt variation in current consumption and over or undershoots due to transmission line reflections. Stresses beyond the recommended operating conditions may cause permanent damage.

Synaptics' devices have been extensively tested in accordance to industry's standards. A robust customer system design can help mitigate damages to its' internal components including Synaptics' device. Please feel free to reach out to our sales team for any applicable design guides pertinent to your Synaptics' product.

(5) Corrective Action Plan



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N/A

(6) Implementation of Corrective Action & Verification
N/A

(7) Preventive Action Plan

(8) Congratulate The Team
Thank you all.

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