# Body biasing fault injection: Enhancements, analysis, modeling, and simulation

PhD thesis defense

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# Introduction

## Context

- Electronics systems are everywhere, from entertainment to business;
- They embed cryptographic algorithms to ensure secure operation;
- These implementations are fallible $\rightarrow$ they leak information.

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# Introduction

## Objectives

- Fault injection...;
- Side-channel attacks...;
- Main target $\rightarrow$ Modeling body biasing injection:
  - Characterize better practices for BBI;
  - Define electrical models for BBI simulation;
  - Understand the mechanisms at work;
  - Bring insights on substrate thinning and BBI.

Main flaws of algorithms implemented on actual circuits

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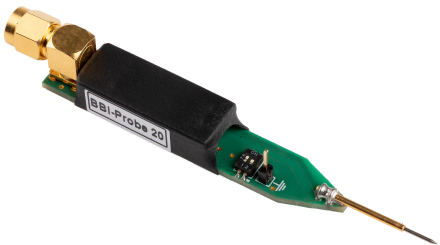
# Body biasing injection: state-of-the-art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NewAE Technology Inc.

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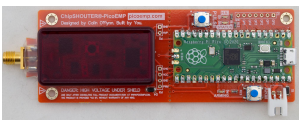
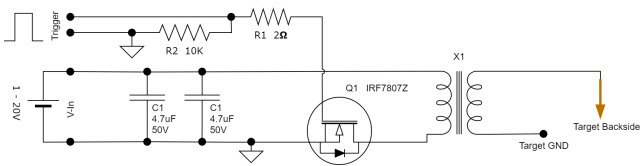
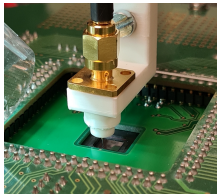
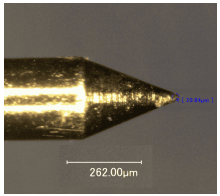


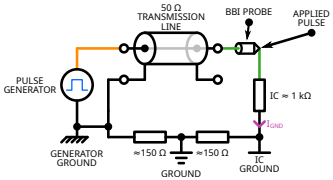

Trigger
R2 10K
R1 2Ω
X1
1 - 20V
V-In
C1
4.7uF
50V
C1
4.7uF
50V
Q1 IRF7807Z
Target Backside
Target GND

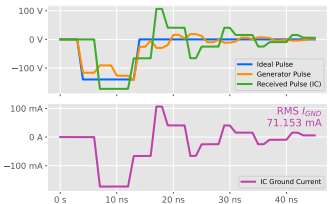



262.00µm

# BBI in practice

## Typical platform

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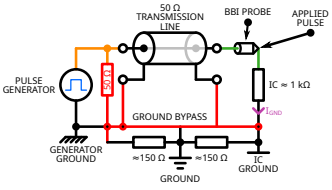
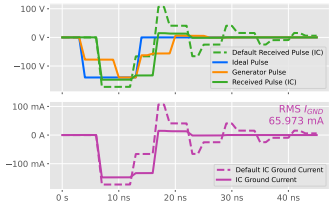
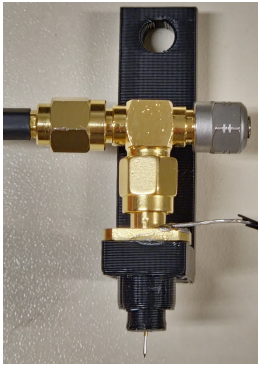
# BBI in practice

## Enhanced platform



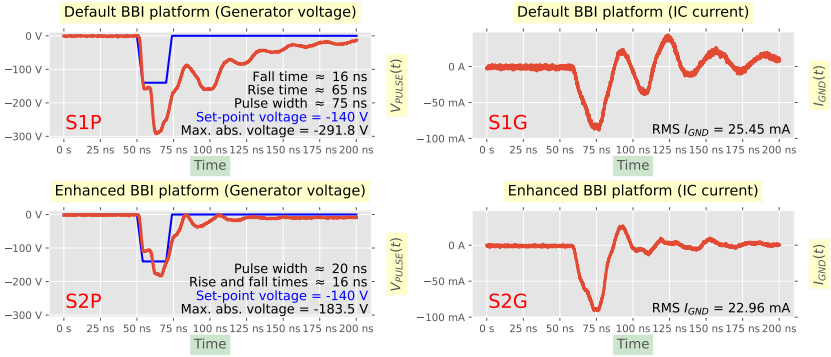







# BBI in practice

## Actual results



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