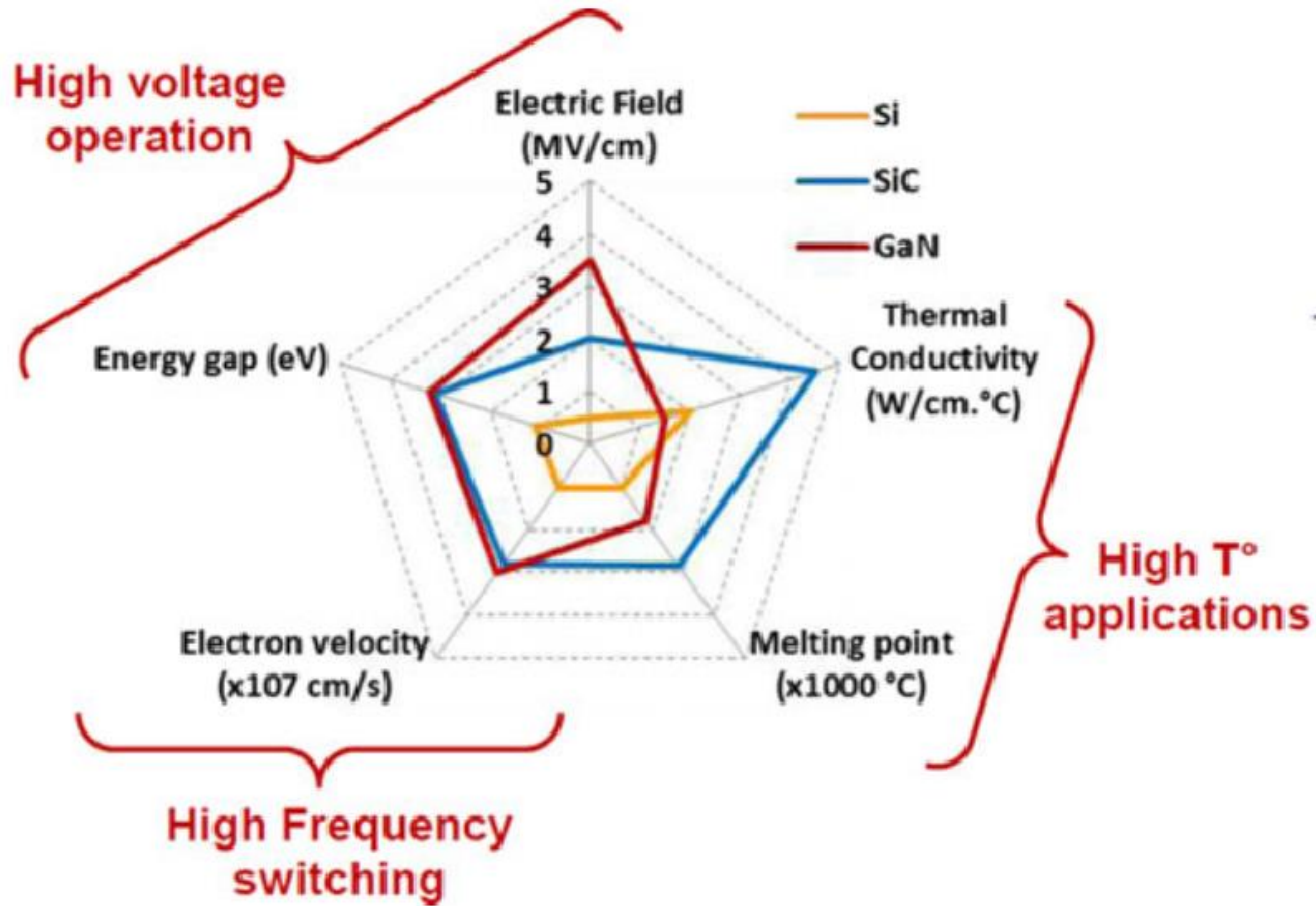


North China Electrical Power University  
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Chinese Academy of Sciences  
Xi'an Jiaotong University  
University

# Implantation optimization for 1200 V SiC MPS with ultra-low leakage current and high surge current capability

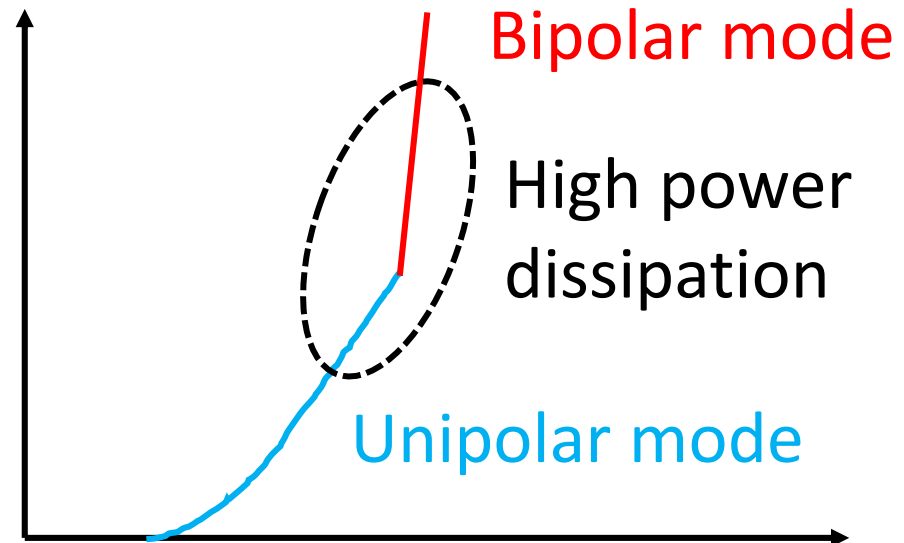
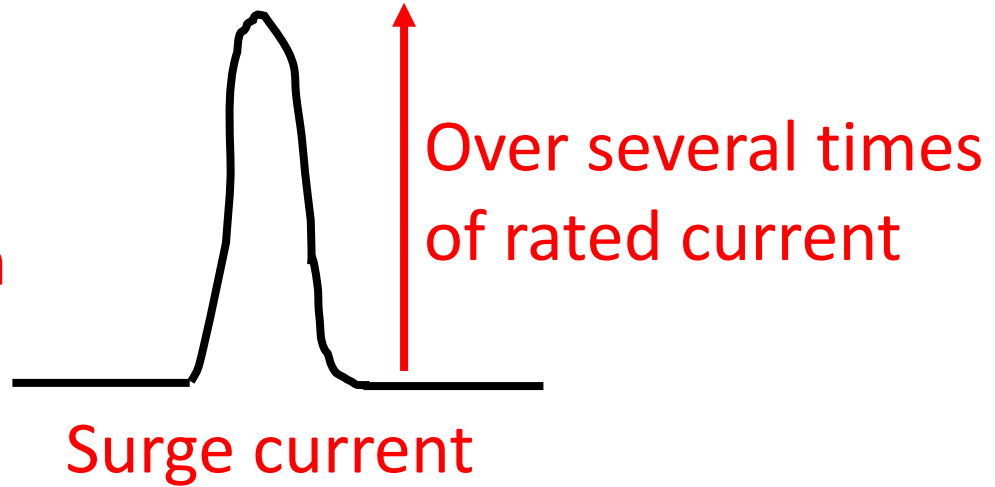
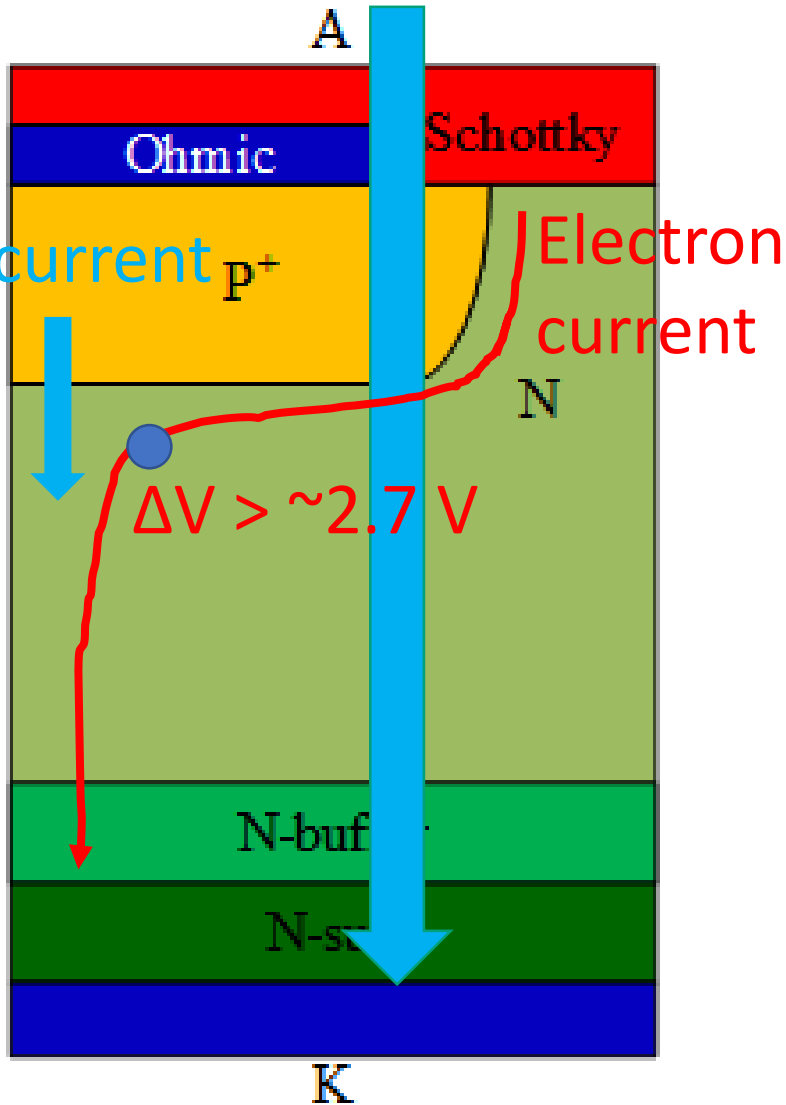
Bo Yi  
University of Electronic Science and Technology of China

- Introduction of SiC MPS
- Simulation of 1200 V/20 A MPS
- Fabricating and Comparison
- Summary

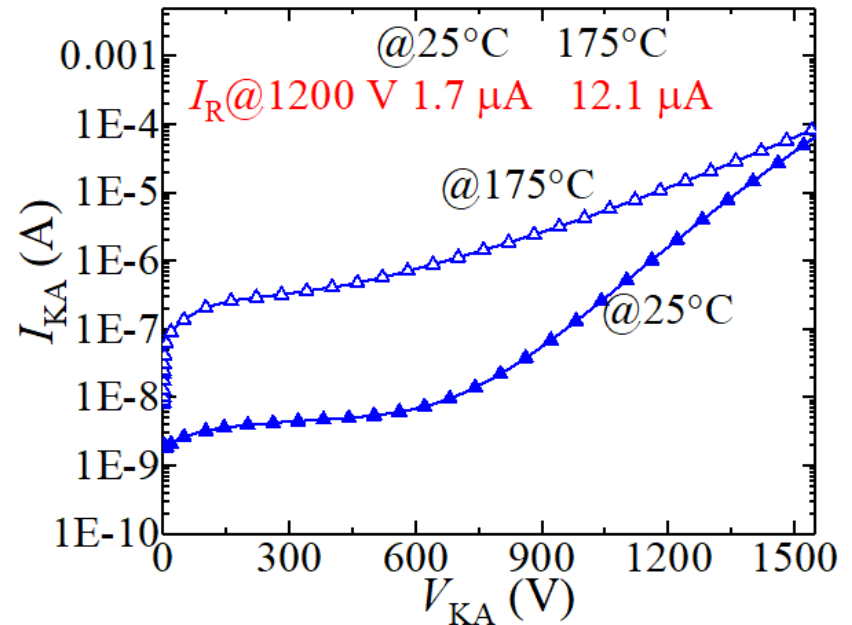
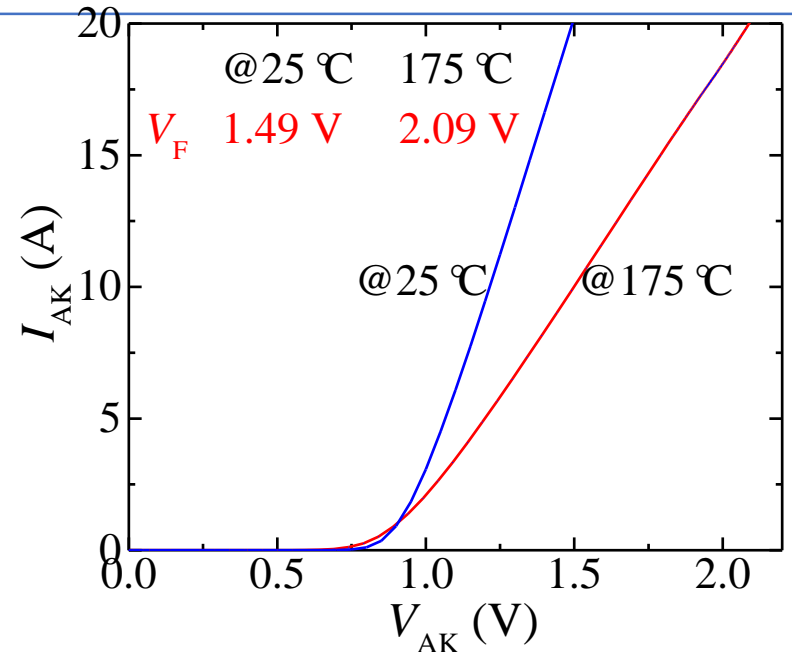
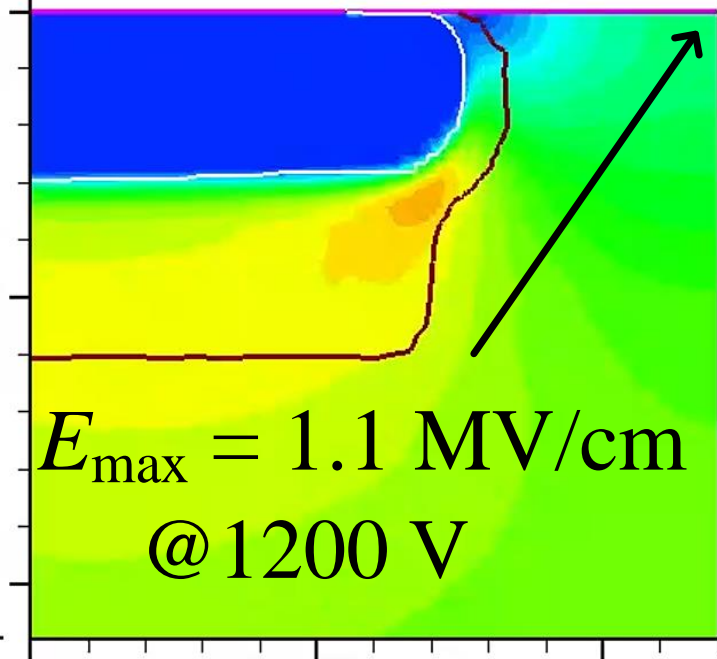
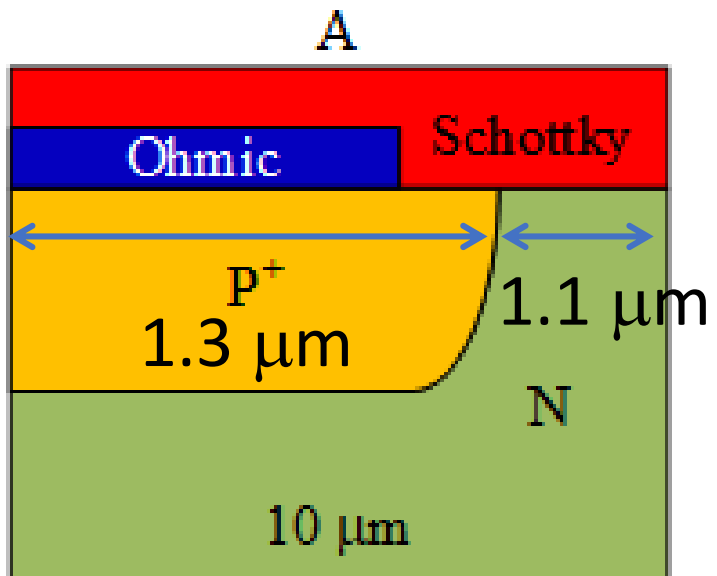


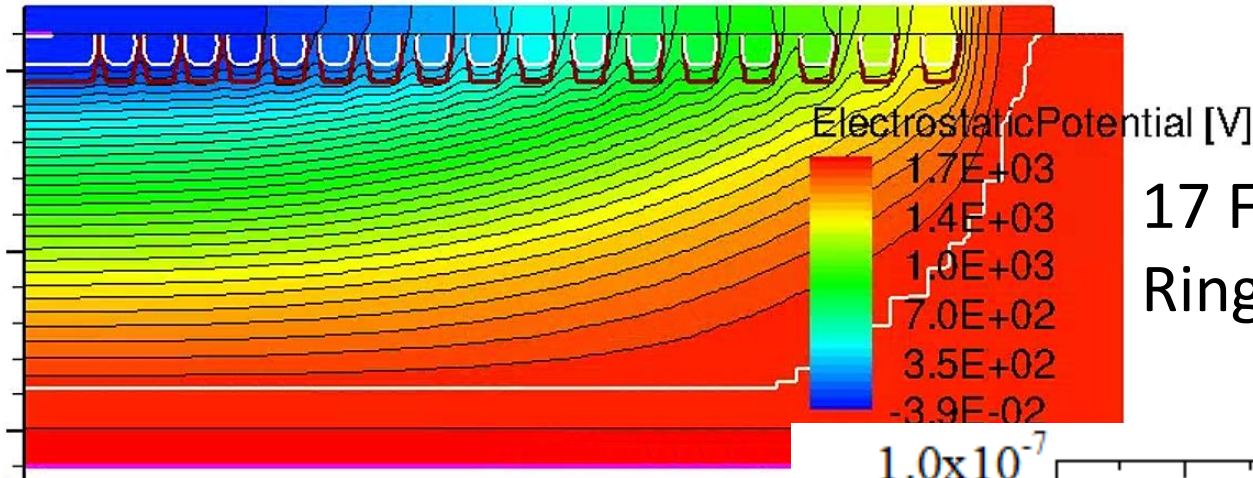
Highly preferred for high voltage and high power applications

## Surge current



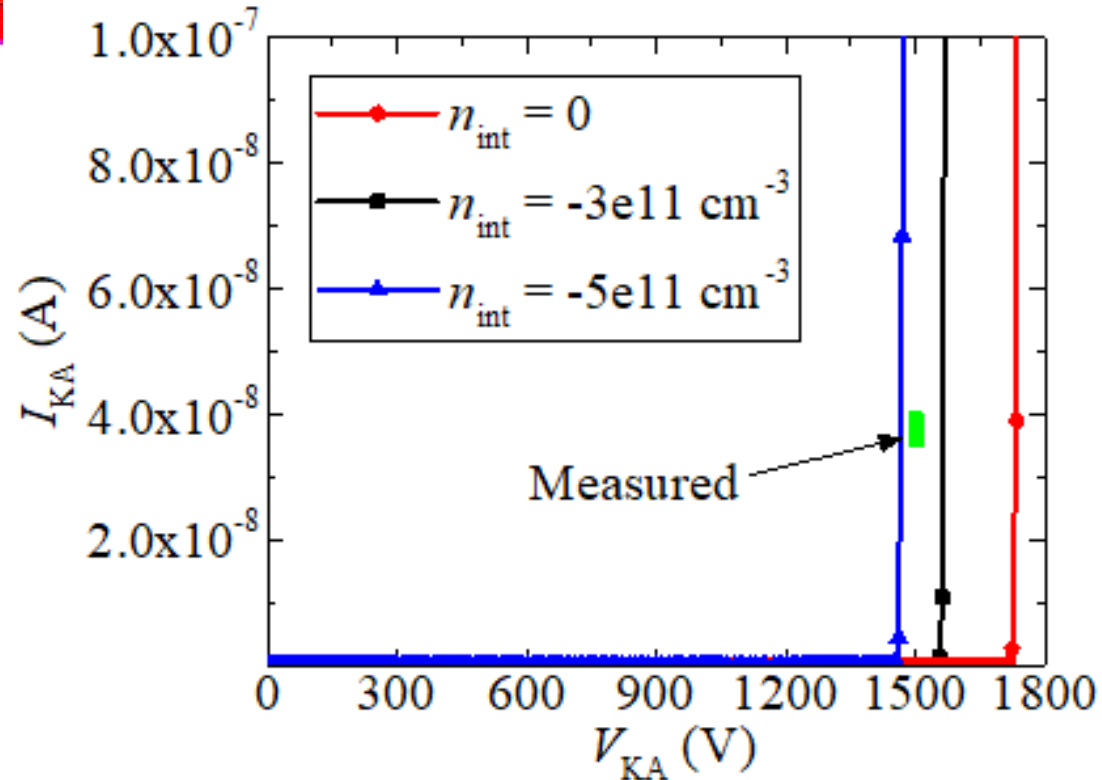
# ➤ Simulation of 1200 V/20 A MPS





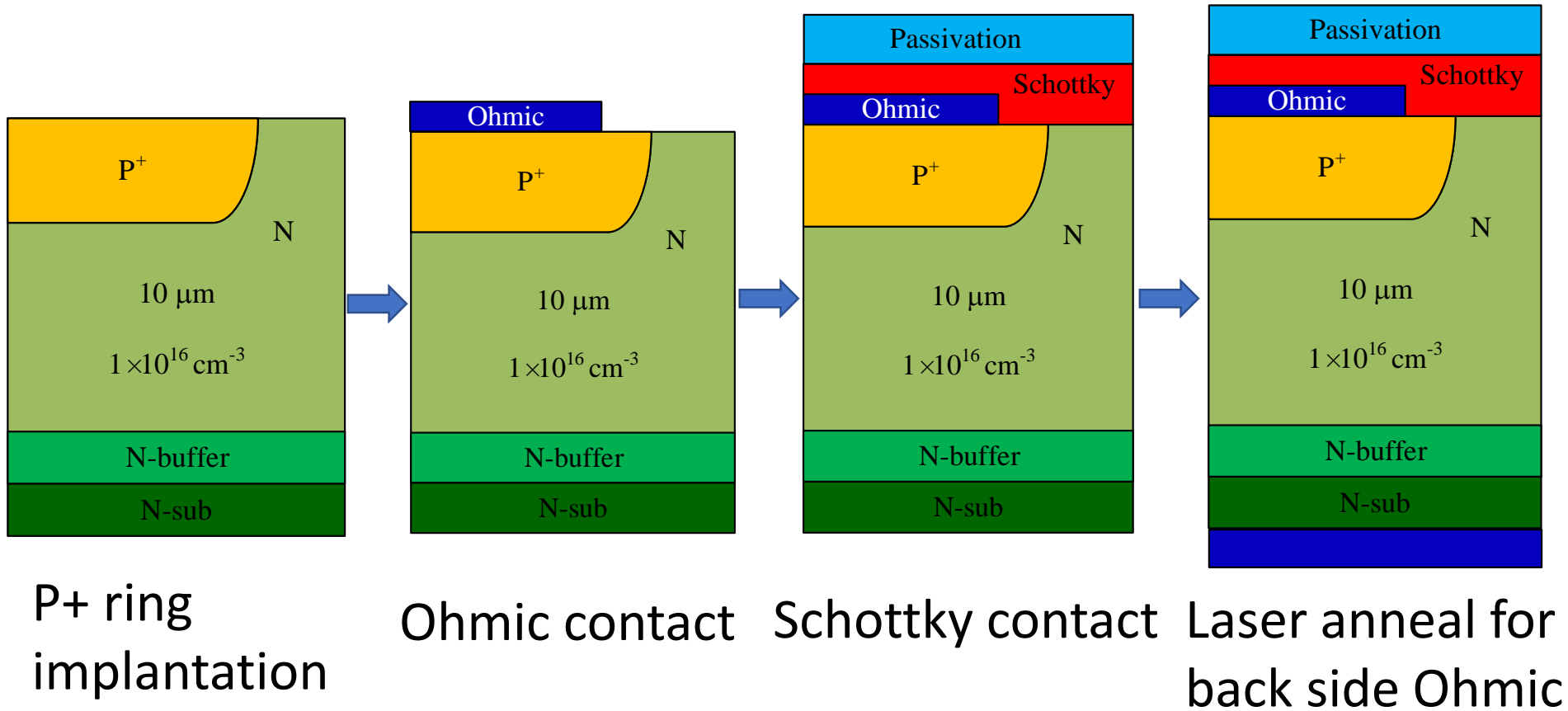
17 Floating Field Rings for terminal

Interface charge is estimate to  $\sim -4 \text{ e}11 \text{ cm}^{-3}$



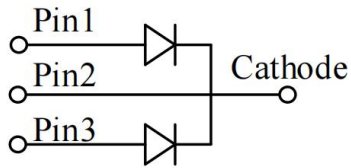
Influence of interface charge

## Simplified fabricating flow

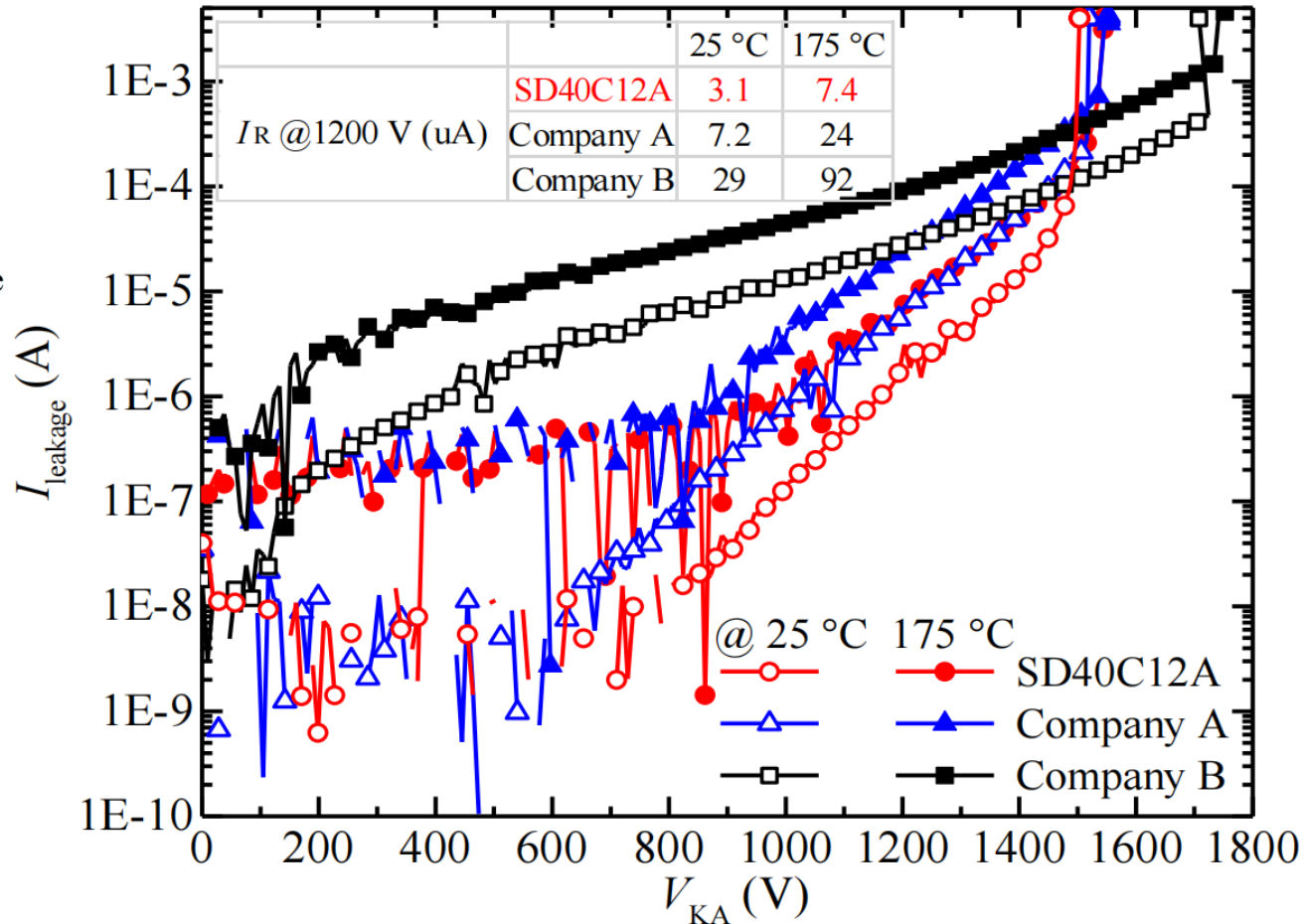


## BV testing

		@25 °C	@175 °C
$I_R$ @ 1200V	TCAD	1.7 $\mu$ A	12.1 $\mu$ A
	Measured	3.1 $\mu$ A	7.4 $\mu$ A



TO 247-3L  
20 A/Leg

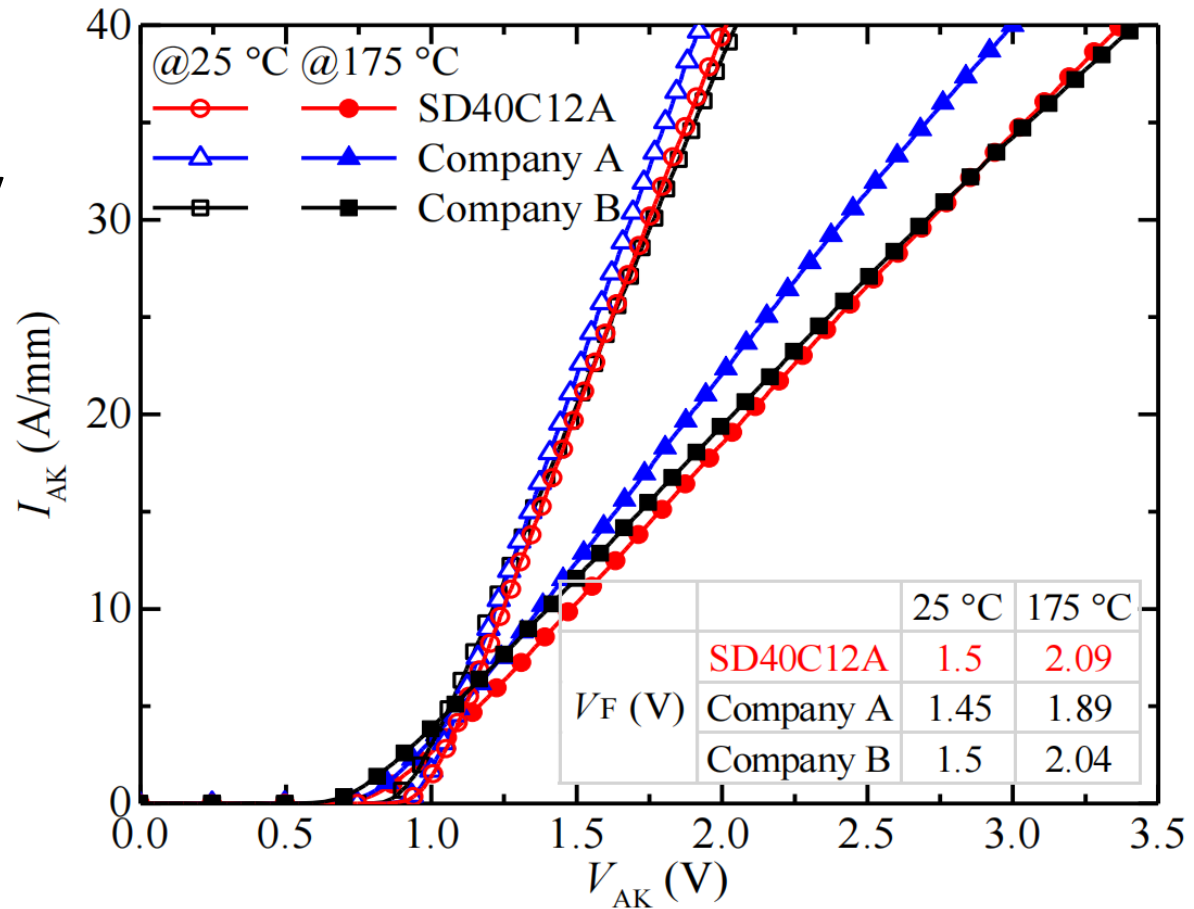




## IV testing

		@25 °C	@175 °C
$V_F$ @20 A	TCAD	1.49 V	2.09 V
	Measured	1.5 V	2.09 V

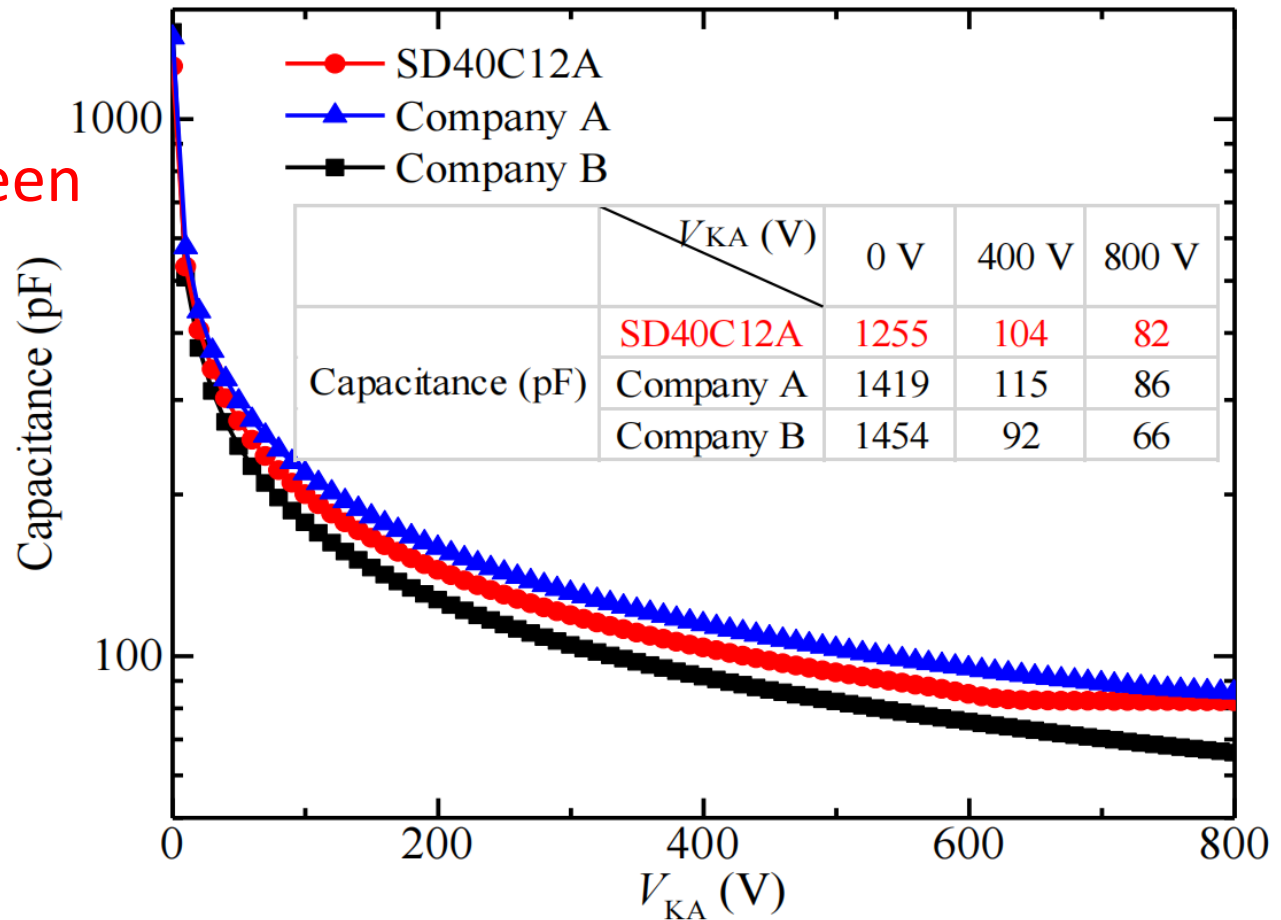
Typical  $V_F \sim 1.5$  V



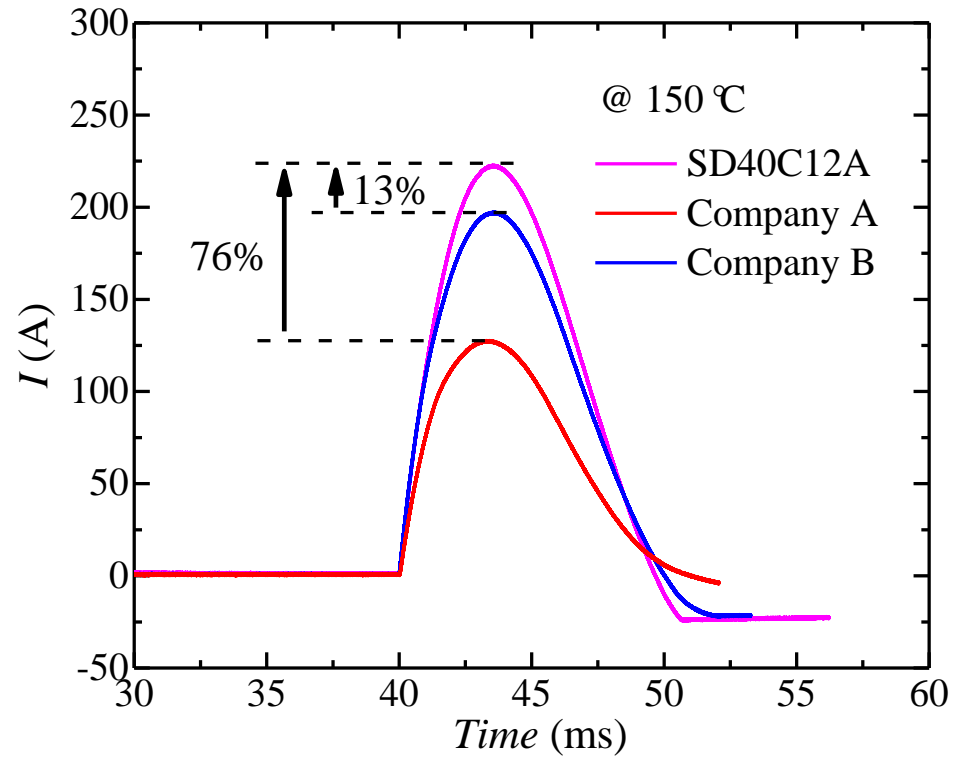
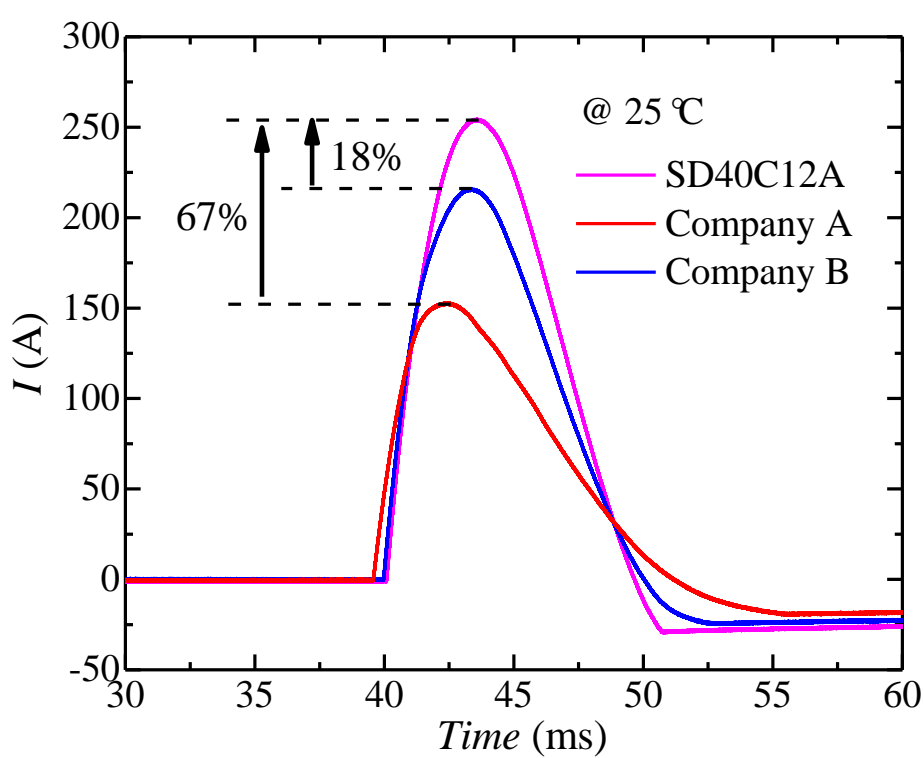
## CV testing

	0 V	400 V	800
TCAD	1419 pF	108 pF	80 pF
Measured	1255 pF	104 pF	82 pF

Capacitance is between Company A and B

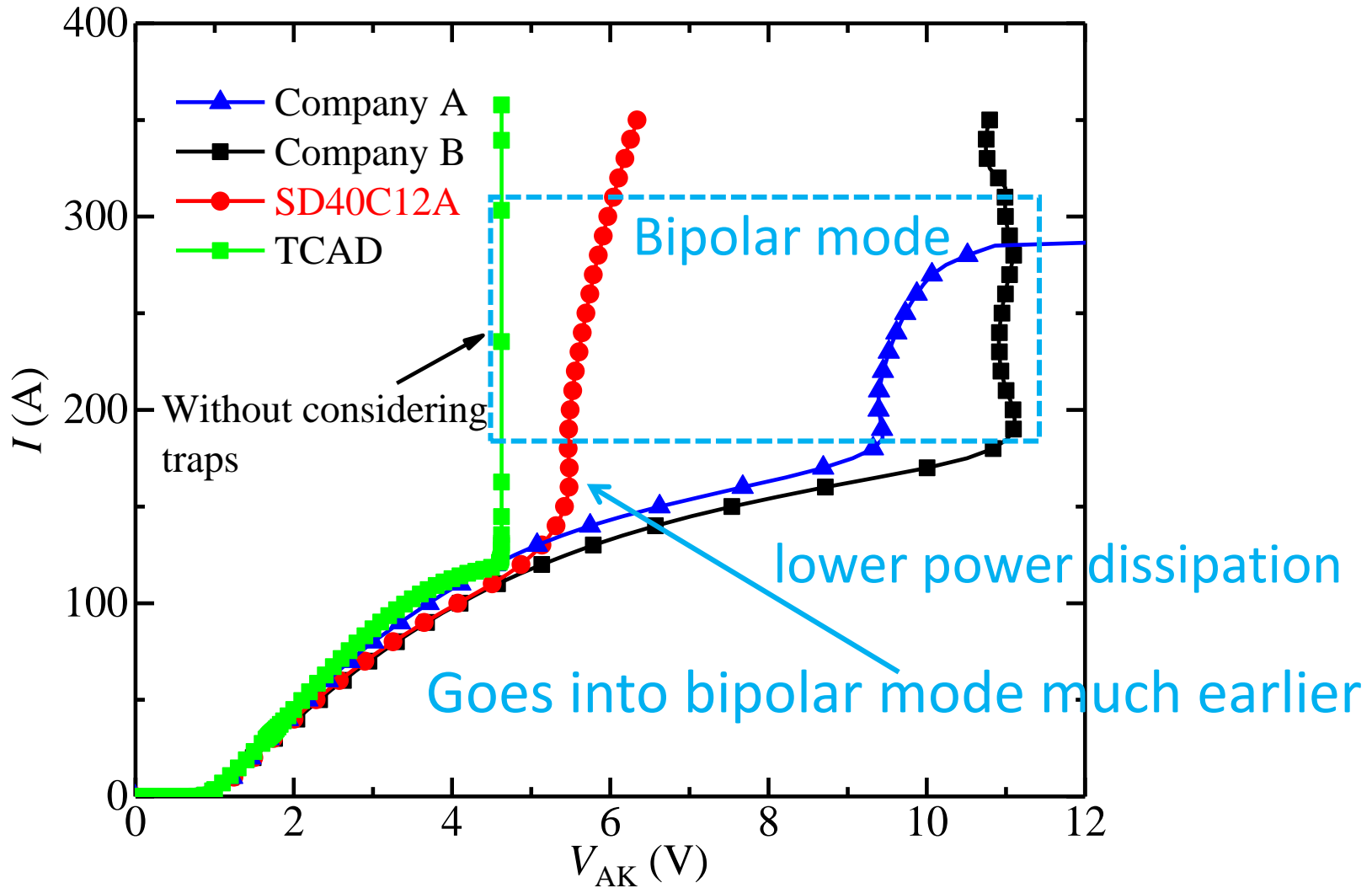


## Surge current testing

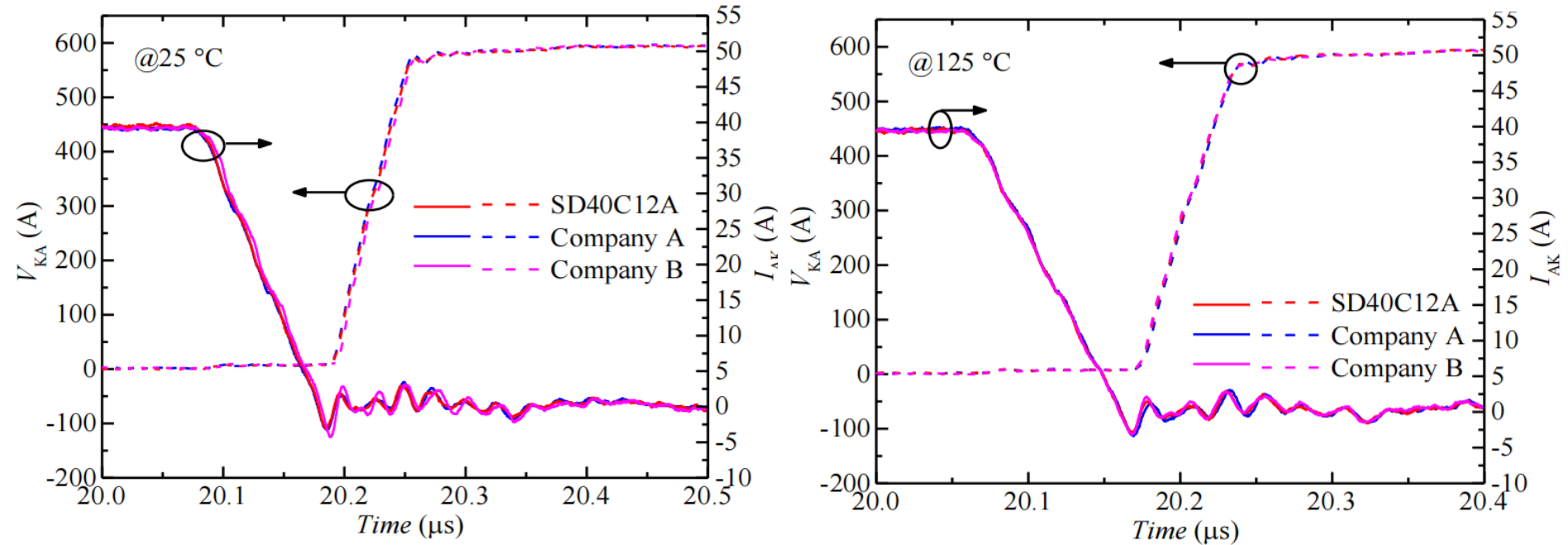


Surge current capability comparison under different temperature

## IV testing under high current



## Turning off testing



Similar turning off curves for the three diode

1200 V/20 A SiC MPS

Features

Ultra-low leakage current

High surge current capability

Without scarifying  $V_F$   
or other characteristics



Thank you for listening