

GaN-on-Silicon TSRP: Device Characterization and Process Design Kit (PDK) Establishment

TSRP

Project Leader and Team Members

- Project Leader: Shane Todd
- Project Team: Yuan Li, Zuhui Chen

Collaborators (University/RI/Hospital)

- Zhou Xin (NTU)

Project Duration

- 3 years (01 April 2011 – 31 March 2014)

KPI Status

KPI Indicators	Total target as per grant		IME Stretch KPI in FY11	Actual	
	Collaborator KPI	IME KPI		Collaborator KPI	IME KPI
No. of Prestigious Journal Papers published	4	4		0	1 (under review)
No. of Prestigious Conference Papers published	3	3		0	2
No. of Invention Disclosure	1	1		0	0
No. of patent filed	1	1		0	0
No. of patent granted	1	1		0	0

What new capabilities have been developed?

New Capabilities to be developed	Status of Capability Development	Capabilities beneficial to	Plan for next phrase		
			Industry Project with RCA\$	Next phase for future development	Integrated Capability / Cross lab Project
Load Pull Measurement	Setup almost complete, verifying characterization procedure	Characterization of high power/high frequency transistors under large signal biasing	Huawei		NTU/NUS
High Voltage/High Power Power Device Analyzer Measurement	Tender Requisition submitted, receiving product demos	Characterization of breakdown voltage > 3000 V, current measurement > 20 A, Power measurement > 400 W	Azzurro		NTU/NUS
Pulsed IV Characterization Measurement	Tender Requisition submitted, receiving product demos	Characterization of device performance while eliminating self heating effects and characterization of trap behavior	Azzurro		NTU/NUS

The challenges & problems the project are facing and how to address them

Challenges / Problems <i>(e.g. Technical constraints etc.)</i>	Impact	Mitigation action
NTU CMOS-compatible GaN HEMT process development has been delayed. Estimated completion date is Feb 2012 (6 month delay)	No ability to characterize devices for PDK establishment	Developing process independently at IME, will use IME process for PDK establishment
Yong Zhong leaves IME	Transfer of responsibilities causes project delay, especially for equipment purchase / measurement setup	Shane taking over project leadership

The objective is to identify potential show-stoppers.

Contributions/Problems from External Collaborators

The objective is to assess true collaborations and the leverage factor.

Deliverables

Deliverables	Original Grant Completion Date	Actual/ Current Completion Date	If delayed, Why?
Journal: GaN Schottky diode 1/f noise investigation	Nov 11	Oct 11	No delay but still under review
Journal: Silicon based photonic driver	Jan 12	Jun 13	NTU process development delay, will use IME process PDK
Journal: GaN power amplifier	Jan 12	Jun 13	NTU process development delay, will use IME process PDK
Journal: MISHEMT power performance	Feb 14	Feb 14	No delay
Conference: GaN Schottky diode 1/f noise investigation	Jun 11	Jun 11	No delay
GaN Schottky diode power performance	Jun 11	Jun 11	No delay
Conference: Silicon based photonic driver	Jun 12	Jun 13	NTU process development delay, will use IME process PDK
Conference: GaN power amplifier	Jan 12	Jun 13	NTU process development delay, will use IME process PDK
Invention Disclosures (2)	Jan 13	Jan 13	
Primary Patent Application Filed (2)	Mar 13	Mar 13	
No of Patents Granted (2)	Mar 14	Mar 14	
No Research Staff Hired (2)	Jan 12	Jan 12	

