



# High Bandwidth Phase-Change Switch Technology

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## Driving Applications: Resulted from Radio Frequency Field Programmable Gate Arrays (RF-FPGA)

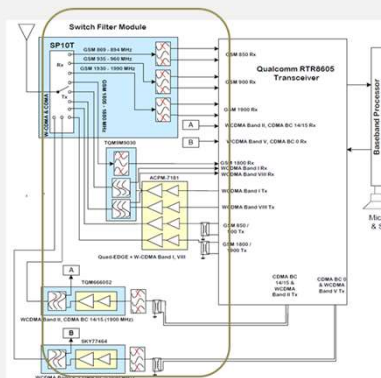
RF switches are for:

- Signal routing,
- Frequency band switching,
- Antenna switching & matching,
- Receiver diversity switching,
- Phase shifter,
- Tunable RF,
- Reconfigurable RF...

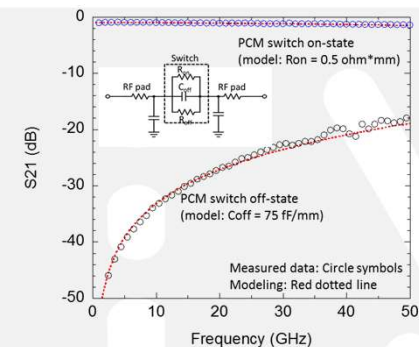
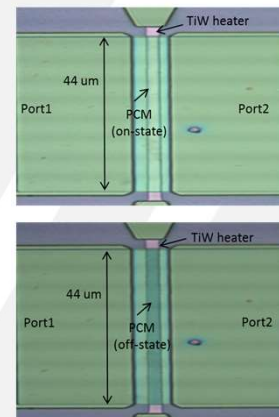
Standard	2G	3G	4G
# of Bands	4	7	>16
Channel Bandwidth	fixed	fixed	fixed
# of RF Ports @ TRX	10	16 .. 19	60
# of Switch Ports	6	9	30
# of Filters	6 .. 8	12 .. 17	45
# of Antennas	1	1	>2

Source: Intel Mobile Comm, IMS 2013

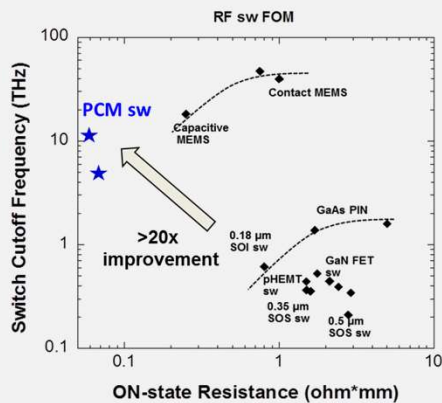
### A smart phone RF architecture: RF switch matrix



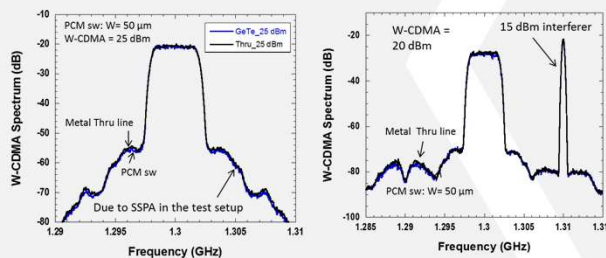
### Robust PCM RF Switches



RF switch FOM = Ron\*Coff  
 Switch cut-off frequency = 1/(2πRon\*Coff)

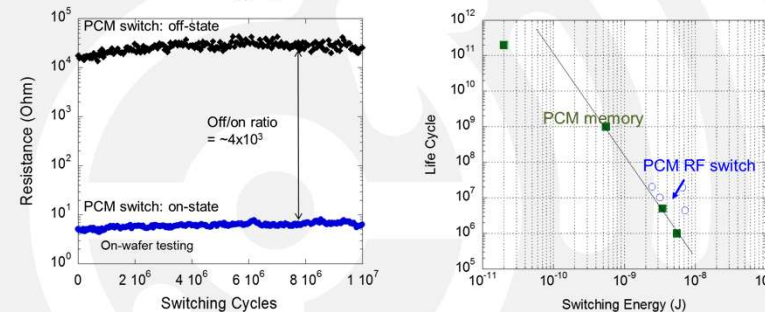


### PCM Switch Linearity under W-CDMA Signal

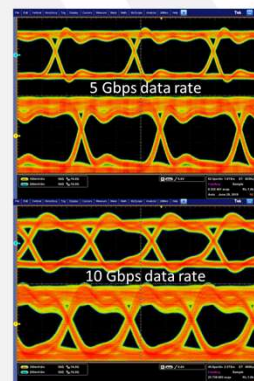
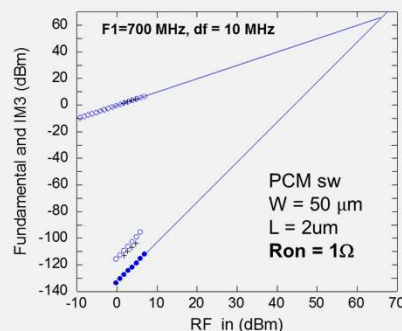


J. Moon et al., International Microwave Symposium, 2015

### Switching cycle endurance over 10 million



### PCM SW Data Bandwidth



Device parameters	Lds (um)	Ron (Ω-mm)	Coff (fF/mm)	Ron*Coff (fS)	Reference
SOI	0.32	0.8	312	250	[1]
SOS	0.25	1.6	280	448	[2]
PHEMT	0.5	1.5	240	360	[3]
Phase-change	5	0.5	75	37	This work

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