

Research Summary

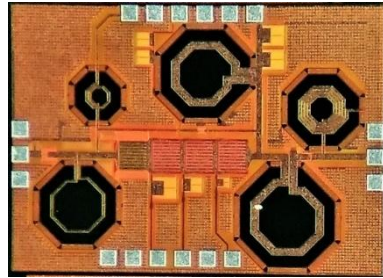
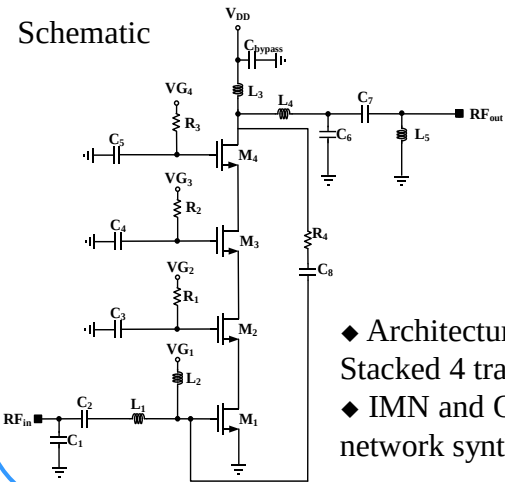
Applied Microwave Technology Group

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CMOS Broadband Power Amplifier

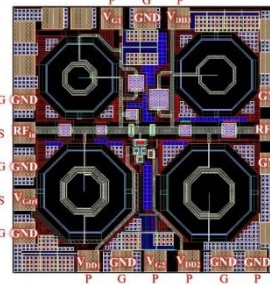
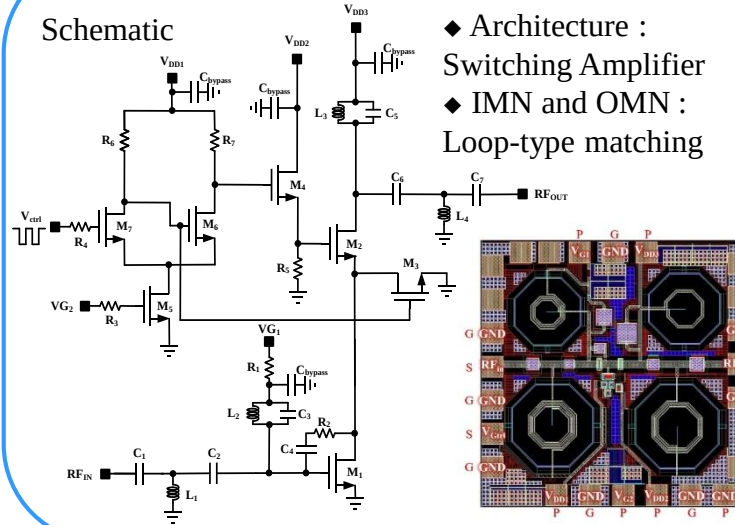
Schematic



- ◆ Architecture : Stacked 4 transistors
- ◆ IMN and OMN : network synthesis

CMOS Pulse Modulator

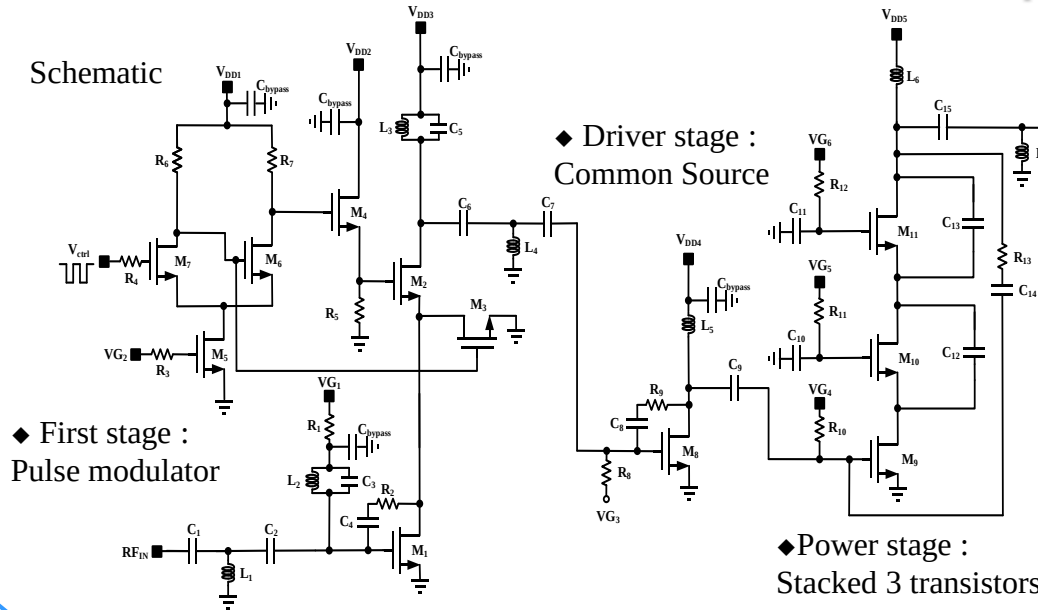
Schematic



- ◆ Architecture : Switching Amplifier
- ◆ IMN and OMN : Loop-type matching

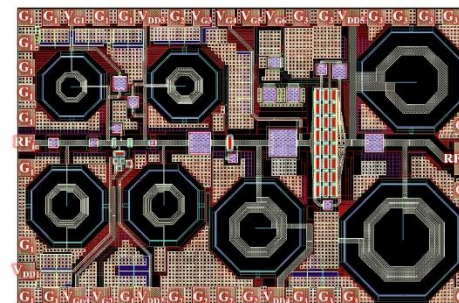
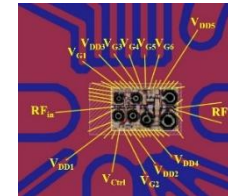
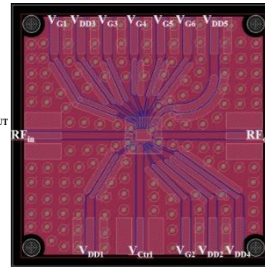
CMOS Pulse Modulated Power Amplifier

Schematic



- ◆ Driver stage : Common Source

- ◆ Power stage : Stacked 3 transistors



CMOS Broadband PA		CMOS Pulse Modulator		CMOS Pulse Modulated PA	
Technology	0.13 μm	Technology	0.13 μm	Technology	0.13 μm
V_{DD} (V)	4.8	V_{DD} (V)	1.2	V_{DD} (V)	4.2
Frequency (GHz)	2 – 6	Frequency (GHz)	1.9	Frequency (GHz)	1.9
1 dB Bandwidth (GHz)	2 – 6 @ P_{SAT}	$S_{11} < -10$ dB BW (MHz)	590 (1640 ~ 2230)	Rise / Fall time (ns)	0.81 / 0.87
	2 – 6 @ P_{1dB}	$S_{22} < -10$ dB BW (MHz)	590 (1630 ~ 2220)	OOK Rate (MHz)	432 / 402
Gain S_{21} (dB)	19.1 – 20.1	S_{21} 3-dB BW (MHz)	530 (1685 ~ 2215)	Power Gain (dB)	34.0
Gain Flatness (dB)	1.0	Isolation (dB)	> 65.42	CW P_{SAT} (dBm)	28.0
CW P_{1dB} (dBm)	28.1 – 29.1	DC Current (mA)	8.43	Peak PAE (%)	58.9
CW P_{SAT} (dBm)	30.9 – 31.9	Power (mW)	10.1	Chip Size (mm^2)	1.54
PAE @ P_{1dB} (%)	35.3 – 48.7	Rise / Fall time (ns)	0.681 / 0.682		
PAE @ P_{SAT} (%)	46.6 – 50.2	OOK Rate (MHz)	514 / 513		
Chip Size (mm^2)	1.575	Chip Size (mm^2)	0.63		