

8 to 12 GHz power amplifier

OVERVIEW

055TSMC_PA_05 is a block includes a power amplifier (PA), output power adjustment system and supply voltage stabilizer. The PA is designed to provide the required power of the transmission path output signal and provides a wide range of output power adjustment. The output power adjustment system is designed to generate a gain control signal, detect the output signal and set thresholds for monitoring its level. The adjustment system can operate in one of two modes:

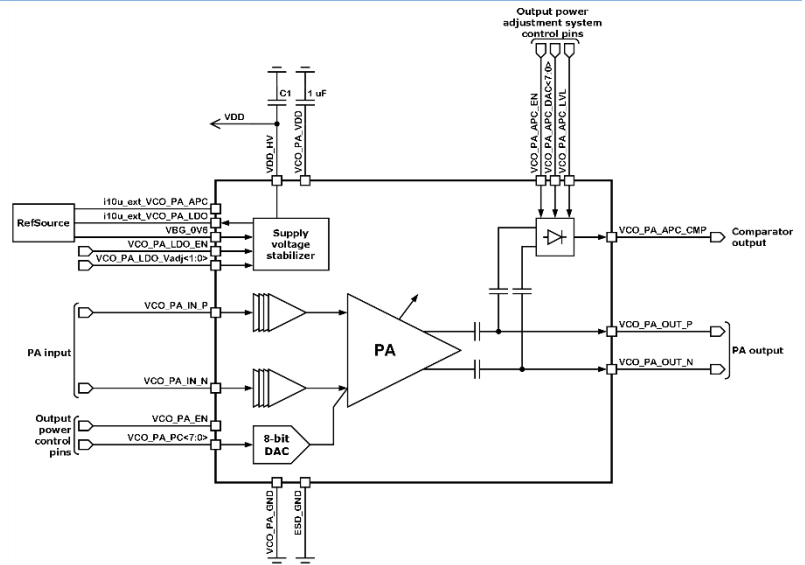
- Automatic mode
- Manual mode with digital control

The supply voltage stabilizer is used to form an internal reference voltage, and also performs the function of a voltage regulator with the ability to adjust the output level.

IP technology: TSMC CMOS 55nm

IP status: silicon proven

Area: 0.7 mm²



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Unit	
			min	typ.	max		
Supply voltage	V _{DD}	-	2.25	2.5	2.75	V	
Operating temperature range	T _J	Nominal	-45	+25	+85	°C	
Current consumption	I _{VDD}	P _{OUT} = -25dBm	@8GHz	-	6	-	mA
			@10GHz	-	2.5	-	
			@12GHz	-	2.9	-	
		P _{OUT} = 0dBm	@8GHz	-	19.1	-	
			@10GHz	-	13.6	-	
			@12GHz	-	21.2	-	
		P _{OUT} = P _{OUT_MAX}	@8GHz	-	22.2	-	
			@10GHz	-	22.2	-	
			@12GHz	-	22.3	-	
10uA output reference current	I _{I0u}	-	9.8	-	10.8	uA	
Input reference voltage	V _{ref}	-	-	0.6	-	V	
Input logic-low level	V _{IL}	-	0	-	0.2	V	
Input logic-high level	V _{IH}	-	V _{DD} -0.2	-	V _{DD}	V	
Operating frequency range	F _{OUT}	-	8000	-	12000	MHz	
Maximum output power	P _{OUT_MAX}	@8GHz	-	1.2	-	dBm	
		@10GHz	-	4	-		
		@12GHz	-	1.3	-		
Output power adjustment range	ΔG	-	-	38	-	dB	
Output power adjustment step	ΔP _{OUT_STEP}	-	0.06	0.2	0.38	dB	
CMOS input range	V _{p-p}	-	-	1.2	-	V	
Third harmonic power	H ₃	P _{OUT} = -25dBm	@8GHz	-	-62.6	-	dBm
			@10GHz	-	-93.6	-	
			@12GHz	-	-86.8	-	
		P _{OUT} = 0dBm	@8GHz	-	-38.2	-	
			@10GHz	-	-56	-	
			@12GHz	-	-55.7	-	
VSWR by output	VSWR _{OUT}	R _{LOAD} =50Ω	-	3	7	-	
Output impedance	R _{OUT}	When using a transformer	-	50	-	Ω	