

## Wideband LNA with a gain adjustment range from -22 to 20dB

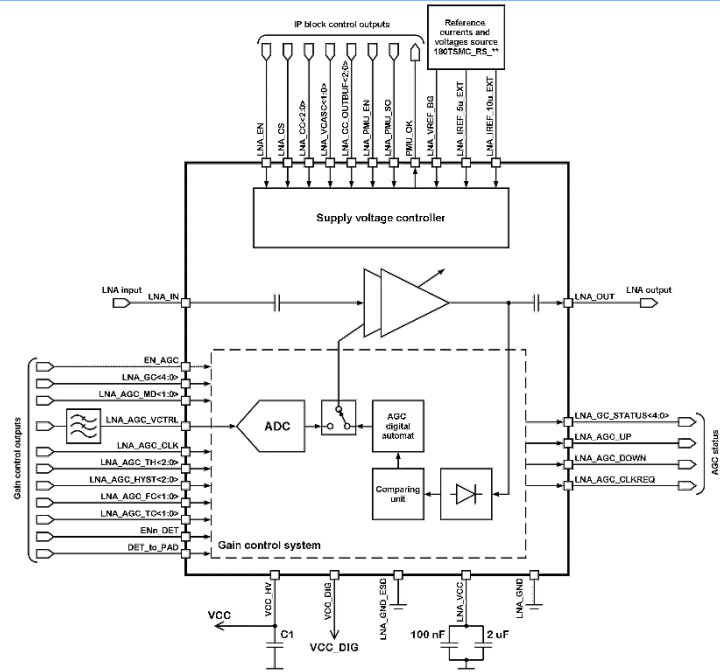
### OVERVIEW

180TSMC\_LNA\_14 is a IP block which includes a low-noise amplifier (LNA), gain control system and supply voltage controller. The low-noise amplifier is intended to amplify wideband high-frequency signal at the receiver input, provides a wide range of gain control and low noise figure as well as has high linearity characteristics. The supply voltage controller is designed to generate internal reference currents and indicate increased current consumption.

IP technology: TSMC SiGe BiCMOS 180nm.

IP status: silicon proven.

Area: 0.98mm<sup>2</sup>.



### ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Unit
			min	typ.	max	
Supply voltage	V <sub>CC</sub>	-	2.97	3.3	3.63	V
Operating temperature range	T <sub>J</sub>	Nominal	-40	+40	+100	°C
Current consumption	I <sub>CC</sub>	Operating mode	-	18	-	mA
		Standby mode	-	100	-	µA
		Shutdown mode	-	380	-	nA
Input logic-level low	V <sub>IL</sub>	-	0	-	0.2V <sub>CC</sub>	V
Input logic-level high	V <sub>IH</sub>	-	0.8V <sub>CC</sub>	-	3.6	V
Output logic-level low	V <sub>OL</sub>	Load current 299µA	0	-	0.4	V
Output logic-level high	V <sub>OH</sub>	Load current 287µA	V <sub>CC</sub> -0.4	-	V <sub>CC</sub>	V
Input reference current (inflow)	I <sub>5u</sub>	-	4.9	-	5.4	µA
Input reference current (inflow)	I <sub>10u</sub>	-	9.8	-	10.7	µA
Reference voltage	V <sub>REF</sub>	-	1.14	-	1.21	V
LNA input DC level	V <sub>IN_DC</sub>	AC coupling	-0.4	-	4	V
LNA output DC level	V <sub>OUT_DC</sub>	AC coupling	-0.4	-	4	V
Operating frequency range	F <sub>IN</sub>	-	500	-	1500	MHz
Gain	G	Minimum	-	-22	-	dB
		Maximum	17.5	20.0	21.4	
Gain adjustment step	ΔG <sub>STEP</sub>	-	0.4	1.5	2.5	dB
Noise figure	NF	G = 20dB	1.4	2	3.3	dB
		G = 0dB	-	16	-	
Input compression point	IP <sub>1dB</sub>	G = 20dB	-20.6	-17.2	-14.4	dBm
		G = -22dB	-	21	-	
3 <sup>rd</sup> order intermodulation point	IP <sub>3</sub>	G = 20dB	-7.6	0	2.6	dBm
		G = -22dB	-	30	-	
3 <sup>rd</sup> order intermodulation distortions	IM <sub>3</sub>	P <sub>IN</sub> = -45dBm; P <sub>OUT</sub> = -25dBm	-	90	-	dB
		P <sub>IN</sub> = -40dBm; P <sub>OUT</sub> = -25dBm	-	75	-	
		P <sub>IN</sub> = -3dBm; P <sub>OUT</sub> = -25dBm	-	65	-	
Multi-tone power ratio	MTPR	-	-	44.4	-	dB
Input VSWR	VSWR <sub>IN</sub>	50Ω	-	-	2.3	-
Output VSWR	VSWR <sub>OUT</sub>	50Ω	-	-	2	-