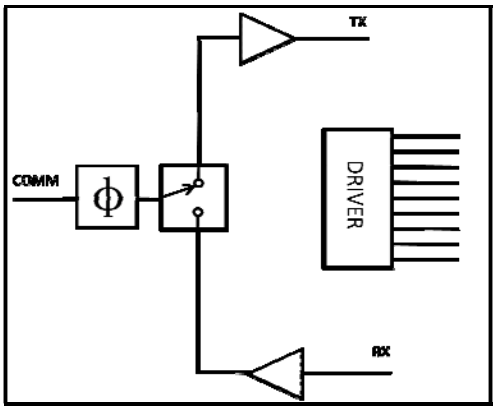
Features

Frequency: 8～10GHz
Transmit Path Linear Gain: 8dB
Receive Path Linear Gain: 9dB
Phase Shift Step: 11.25°
Phase Shift Bit: 5
RMS Phase Error: 3°
Supply Voltage: ±5V
Supply Current: 95mA/-5mA
Control Voltage: 0/+5V
Chip Size: 3.1mm×2.5mm×0.1mm

General Description

The HG135N is a multi-function GaAs pHEMT chip which is operating between 8 and 10 GHz. It includes a 5-bit digital phase shifter, amplifier, driver, switch and so on.

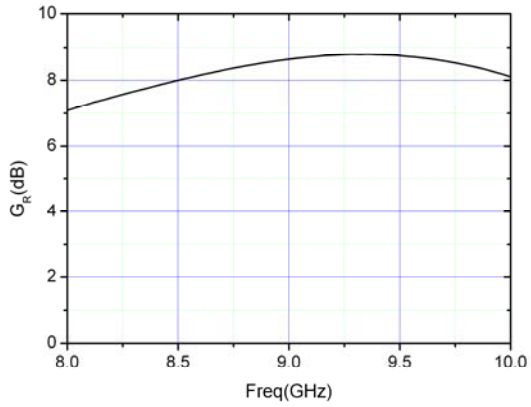
Functional Diagram



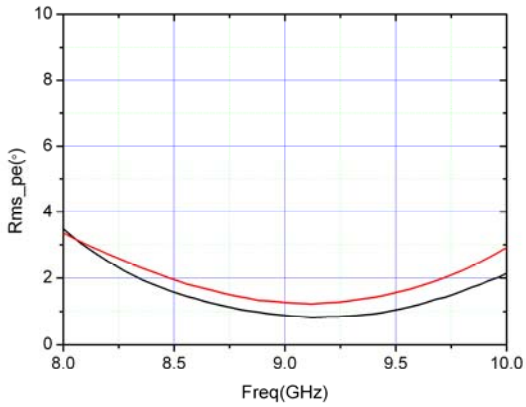
Electrical Specifications(T_A=25 ℃, VDD_DR= VDD_LNA= +5V, VDD_DIG= -5V)

Parameter	Symbol	Unit	Min.	Typ.	Max
Frequency	f	GHz	8~10		
Transmit Gain	G_T	dB	—	8	—
Transmit Gain Flatness	ΔG_T	dB	—	±1	—
Transmit Output Power	$P_{-1}(T)$	dBm	20	—	—
Receive Gain	G_R	dB	—	9	—
Receive Gain Flatness	ΔG_R	dB	—	±1	—
Receive Output Power for 1dB Compression	P-1(R)	dBm	9	—	—
RMS Phase Error	Rms_pe	°	—	3	—
Phase Amplitude Variation	ΔA	dB	-1.5	—	1
Input/Output VSWR	VSWR	-	—	1.5	—
Isolation	ISO	dB	50	—	—

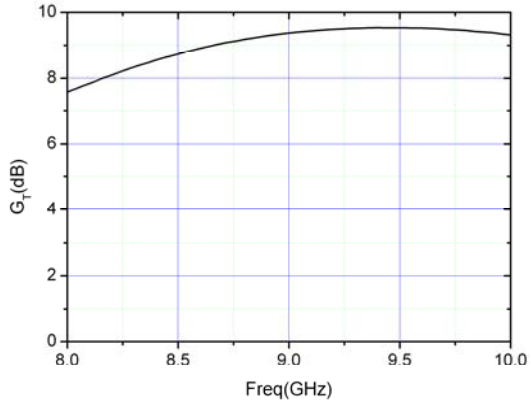
Transmit Gain



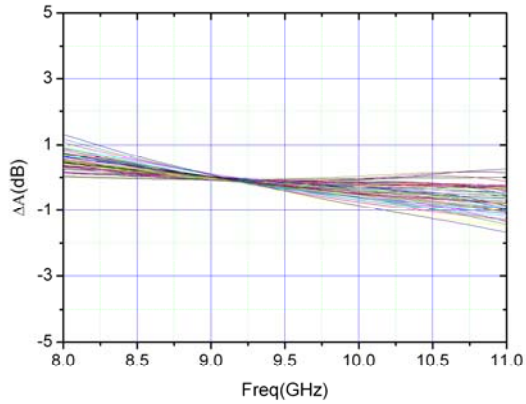
RMS Phase Error



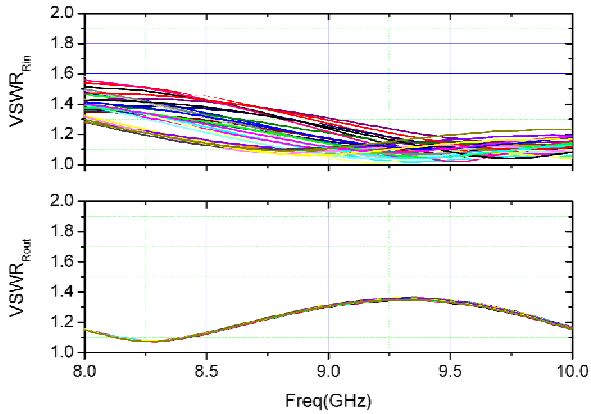
Receive Gain



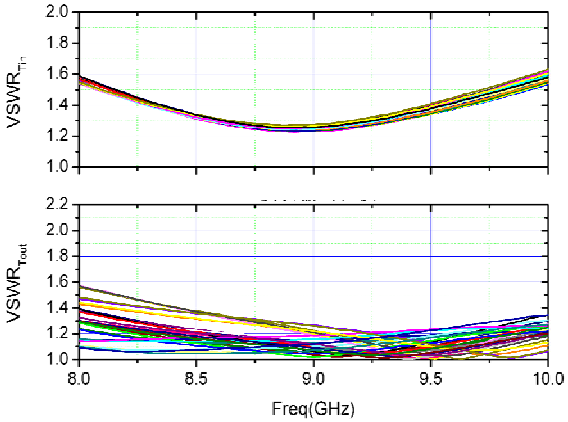
Phase Amplitude Variation



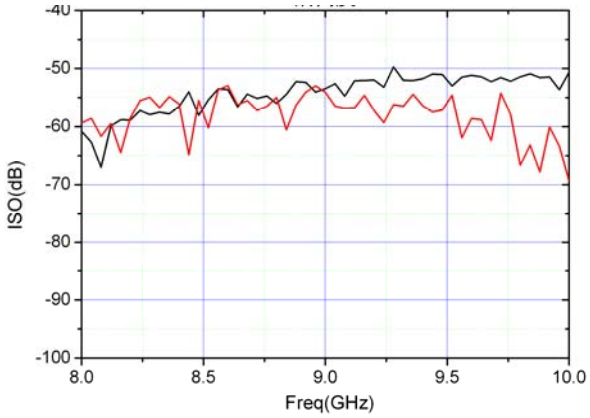
Transmit VSWR



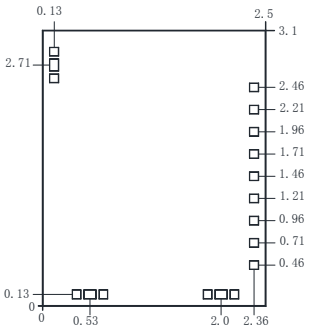
Receive VSWR



Isolation



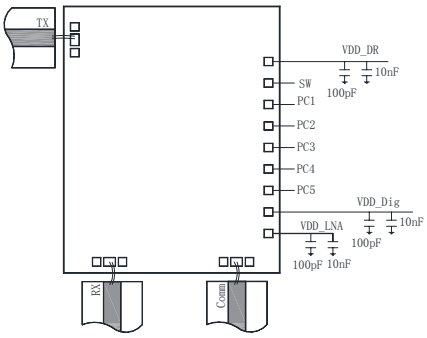
Outline Drawing (mm)



Absolute Maximum Ratings

Supply Voltage	+5.5V, -5.5V	
RF Input Power	+20dBm	
Control Voltage	Low Level: 0 ~ 0.5V	High Level: 3.7 ~ 5V
Operating Temperature	-55℃～125℃	
Storage Temperature	-65℃～150℃	

Assembly Diagram



Ports Description

RF Ports	COMM	Transmit/Receive Common Ports
	TX	Transmit RF output
	RX	Receive RF input
Voltage	VDD1	-5V
	VDD2	+5V(Common amplifier)
	VDD3	+5V(Transmit amplifier)
	VDD4	+5V(Receive amplifier)
Control	PC1-PC5	5-bit digital Phase shift Control ports
	SW	Switch Control Port

Phase Shift Truth Table(0: 0V, 1: +5V)

State	PC1	PC2	PC3	PC4	PC5
0	0	0	0	0	0
-11.25°	1	0	0	0	0
-22.5°	0	1	0	0	0
-45°	0	0	1	0	0
-90°	0	0	0	1	0
-180°	0	0	0	0	1
-348.75°	1	1	1	1	1

Switch Truth Table(0: 0V, 1: +5V)

SW	COMM-TX	COMM-RX
0	OFF	ON
1	ON	OFF

Notes:

1. The chip should be stored in a dry and nitrogen environment, and used in a clean environment.
2. GaAs material is brittle, can not touch the surface of the chip, must be careful when using.
3. The chip is welding with conductive adhesive or alloy (alloy temperature should not exceed 300℃, and no more than 30 sec.), and should make it fully grounded.
4. The chip microwave port and substrate gap is not exceeding 0.05mm, with Φ25μm double gold wire bonding, suggested length of gold wire 250～400μm.
5. Chip microwave port with a DC blocking capacitor except COMM port.
6. The chip is sensitive to static electricity, and should be protected against static electricity during storage and use.