

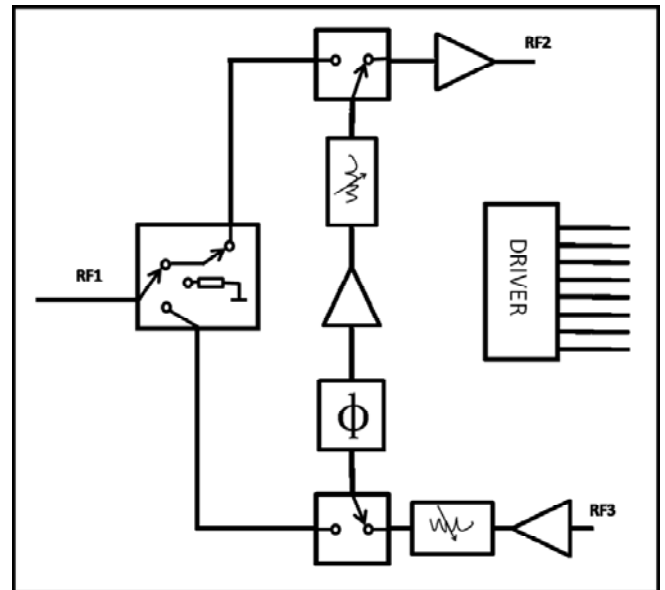
### Features

- Frequency: 8~12GHz
- Transmit Linear Gain: 4 dB
- Receive Liner Gain: 2.5 dB
- Phase Shift Step: 5.625°
- Phase Shift Bit: 6
- RMS Phase Error: 2°
- Attenuation Step: 0.5 dB
- Attenuation Bit: 6
- RMS of Attenuation Accuracy: 0.5 dB
- Supply Voltage: +5V/-5V
- Supply Current: 73mA/-18mA
- Control Voltage: 0/+5V
- Chip Size: 5mm×3.5mm×0.1mm

### General Description

The HG155N-2 is a multi-function GaAs pHEMT chip which is operating between 8 and 12 GHz. It includes two amplifiers, 6-bit digital phase shifter, 6-bit digital attenuator, switch, driver and so on.

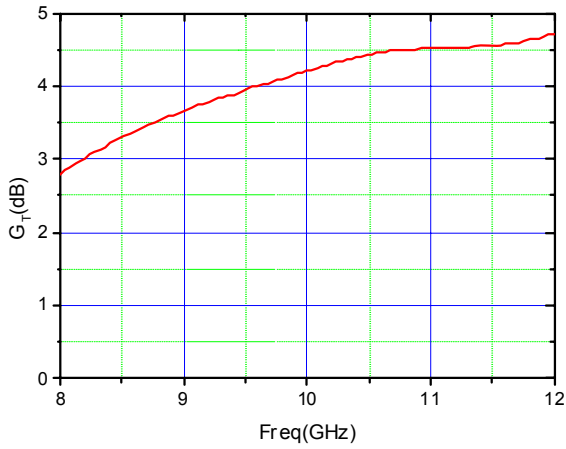
### Functional Diagram



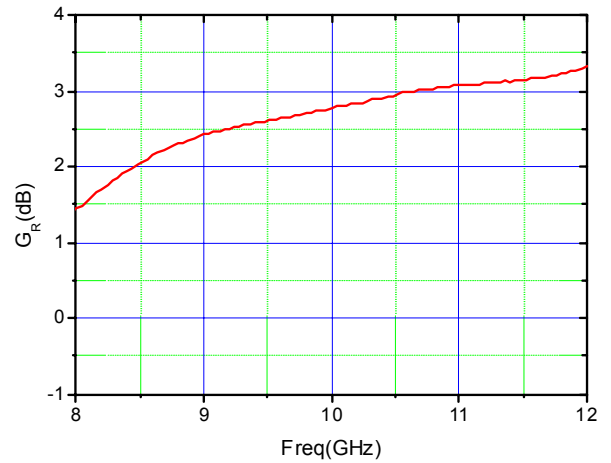
### Electrical Specifications ( $T_A=25^\circ\text{C}$ , $V_{dd}= \pm 5\text{V}$ , $V_{ctl}= 0/+5\text{V}$ )

Parameter	Symbol	Unit	Min.	Typ.	Max
Frequency (GHz)	f	GHz	8~12		
Transmit Gain	$G_T$	dB	—	4	—
Transmit Gain Flatness	$\Delta G_T$	dB	—	$\pm 0.8$	—
Transmit Output Power	$P_{-1}(T)$	dBm	—	13	—
Receive Gain	$G_R$	dB	—	2.5	—
Receive Gain Flatness	$\Delta G_R$	dB	—	$\pm 0.8$	—
Receive Output Power for 1dB Compression	$P_{1dB}(R)$	dBm	—	12	—
RMS Phase Error	Rms_pe	°	—	2	—
Phase Amplitude Variation	$\Delta A$	dB	—	$\pm 0.8$	—
RMS of Attenuation Accuracy	Rms_att	dB	—	0.5	—
Attenuator Phase Variation	$\Delta \phi$	°	—	-9~3	—
Input/Output VSWR	VSWR	-	—	1.7	—
Transmit/Receive Isolation	ISO	dB	—	35	—

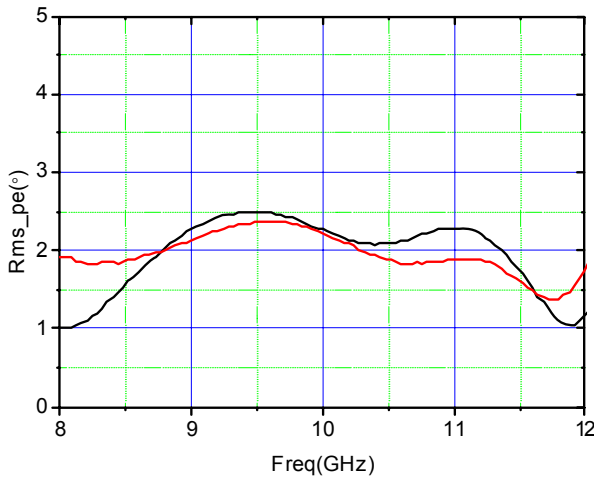
**Transmit Gain**



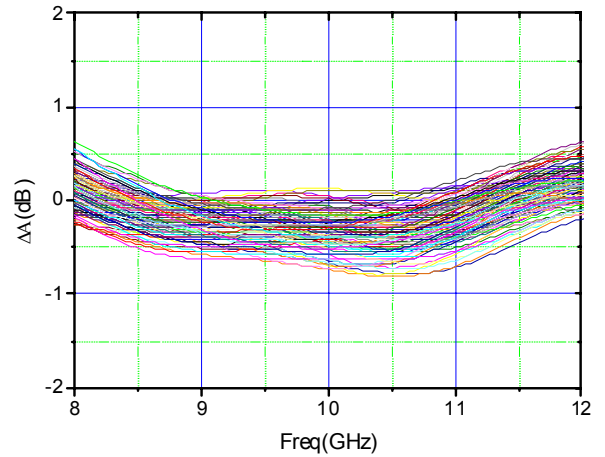
**Receive Gain**



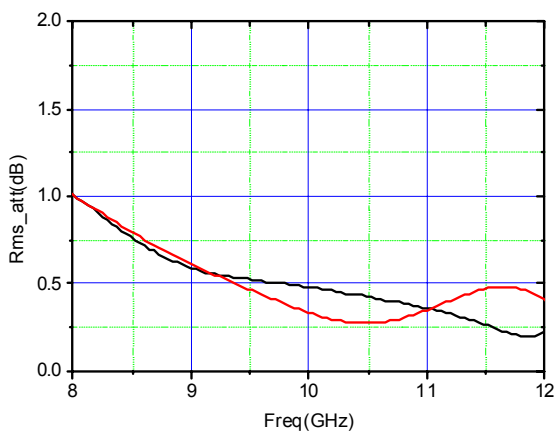
**RMS Phase Error**



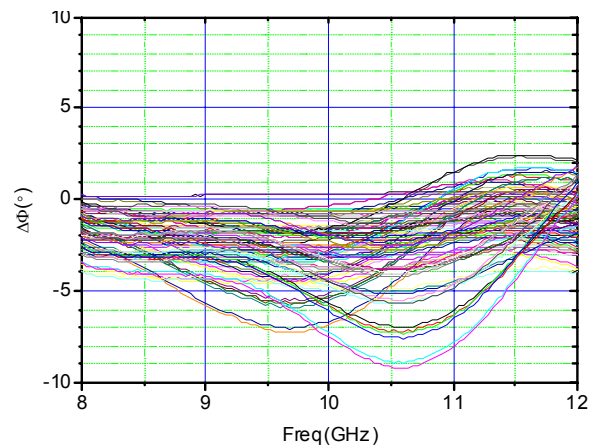
**Phase Amplitude Variation**



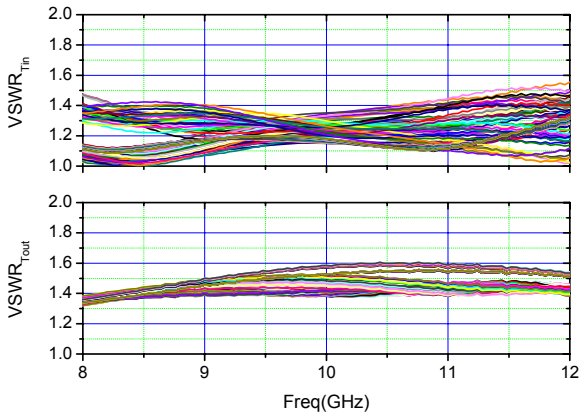
**RMS of Attenuation Accuracy**



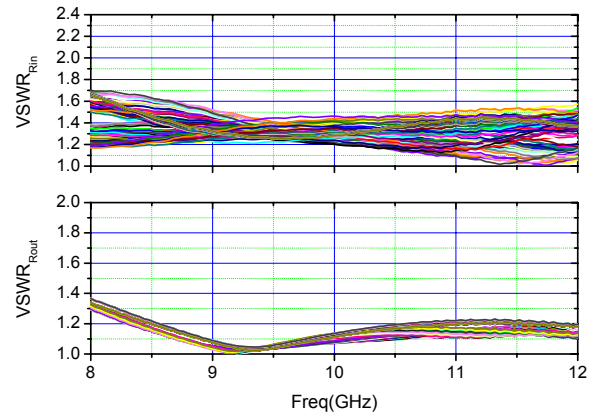
**Attenuation Phase Variation**



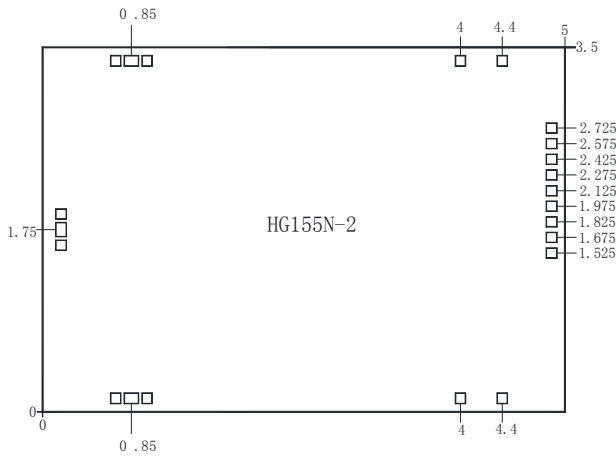
### Transmit VSWR



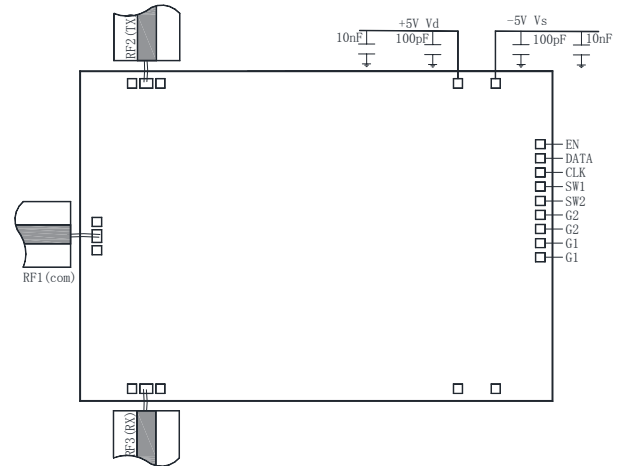
### Receive VSWR



### Outline Drawing (mm)



### Assembly Diagram



Note: G1 and G2 are variable attenuation control bits of 1dB and 2dB for receive path.

### Ports Description

NO.	Symbol	Function	Description
1	CLK	Clock signal	Falling edge sampling
2	DAT	D1-D6 Attenuate Control Ports	Input data at falling edge
		D7-D12 Phase Shift Control Ports	
3	EN	Enable port	Lock data at falling edge
4	Vs	Driver bias voltage, -5V	
5	VD	Amplifier bias voltage, +5V	

**Serial Input Data Bit and Truth Table(0: 0V, 1: +5V)**

Data Bit	Attenuation Control Bit					
	D12	D11	D10	D9	D8	D7
Function	16dB	8dB	4dB	2dB	1dB	0.5dB
Reference State	0	0	0	0	0	0
Full State	1	1	1	1	1	1

Data Bit	Phase Shift Control Bit					
	D6	D5	D4	D3	D2	D1
Function	180°	90°	45°	22.5°	11.25°	5.6°
Reference State	0	0	0	0	0	0
Full State	1	1	1	1	1	1

Note: D1 First in.

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

SW1	SW2	RF1-RF2	RF3-RF1	RF1-Load
0	0	OFF	OFF	ON
0	1	OFF	ON	OFF
1	0	ON	OFF	OFF
1	1	ON	OFF	OFF

**Absolute Maximum Ratings**

Supply Voltage	±5.5V	
RF Input Power	+20dBm	
Control Voltage	Low Level: 0 ~ 0.5V	High Level: 4 ~ 5V
Operating Temperature	-55°C ~ 125°C	
Storage Temperature	-65°C ~ 150°C	

**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°C, 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 without DC blocking capacitor.
6. The chip is sensitive to static electricity, and should be protected against static electricity during storage and use.