

## Features

- Frequency: 1.98GHz~2.3GHz
- RMS of Attenuation Accuracy: 0.5dB
- RMS of Phase Accuracy: 1.5°
- Gain: 16.5dB
- Die Size: 3.2mm×3.2mm×0.1 mm

## General Description

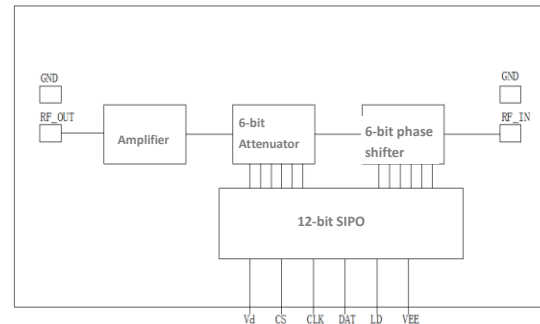
SAC3602 is a high performance GaAs MMIC Core Chip which operates in S-band. It integrated 12-bit serial to parallel chip, amplifier, 6-bit phase shifter, 6-bit attenuator.

The die is fabricated by using 0.5um gate length PHEMT Technology. The MMIC uses gold bonding pads and backside metallization. It is fully protected with BCB passivation to achieve the highest level of reliability.

## Typical Applications

- EW
- Military Radar and Weather Radar
- SATCOM
- Beamforming
- Phase Shift

## Functional Diagram



## Electrical Performance ( $T_A = +25^\circ\text{C}$ , $V_D = -5\text{V}$ , Control Voltage = 0/+5V , $Z_0 = 50\Omega$ )

Parameter	Min.	Typ.	Max.	Units
Frequency Range	1.98~2.3			GHz
Gain	—	16.5	—	dB
Gain Flatness	—	0.1	—	dB
Output P <sub>-1dB</sub>	18	—	—	dBm
Attenuation Range	0.5	—	31.5	dB
RMS of Attenuation Accuracy	—	0.5	—	dB
A <sub>TT</sub> - Phase Error	—	—	2	°
Phase Range	5.625	—	354.375	°
RMS of Phase Accuracy	—	1.5	—	°
P <sub>HASE</sub> -Amplitude Error	—	±0.5	—	dB
Input VSWR	—	1.4	—	: 1
Output VSWR	—	1.3	—	: 1
TTL Control Voltage	—	0(0V)	1(+5V)	V
Positive Power Supply(+5V)	—	90	100	mA
Negative Power Supply (-5V)	—	10	20	mA
Storage Temperature	-55	—	75	°C

## Port Definition

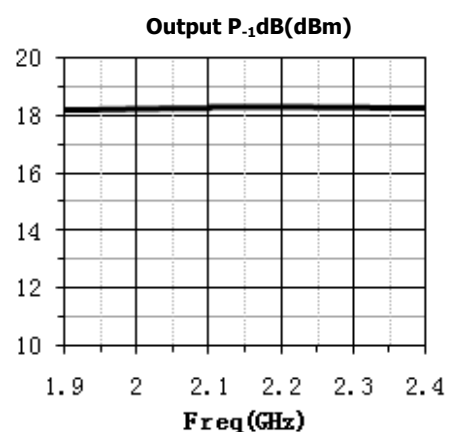
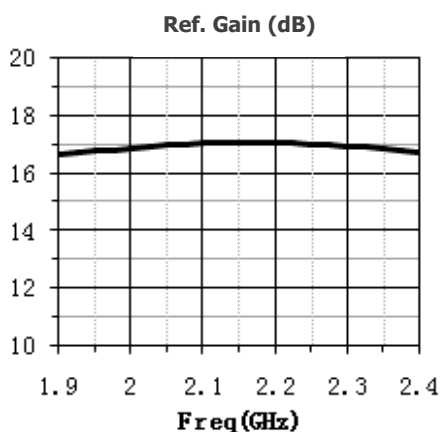
Num.	Symbol	Function Definition	Notes
1	CLK	CLOCK	falling edge trigger
2	DAT	D1-D6 Phase Shift	data is latched on falling edge
		D7-D12 Attenuation	
3	EN	—	low level effective
4	Vs	Driver bias power supply, -5V	Add 0.1uF bypass capacitor
5	Vd	Amplifier bias voltage, +5V	Add 0.1uF bypass capacitor

## Serial Data Timing ( 0 : 0V , 1 : +5V )

BITS	Attenuator bits						Phase shifter bits					
	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Func.	16dB	8dB	4dB	2dB	1dB	0.5dB	5.625°	11.25°	22.5°	45°	90°	180°
Ref.	0	0	0	0	0	0	0	0	0	0	0	0
All on	1	1	1	1	1	1	1	1	1	1	1	1

Notes: D12 first in.

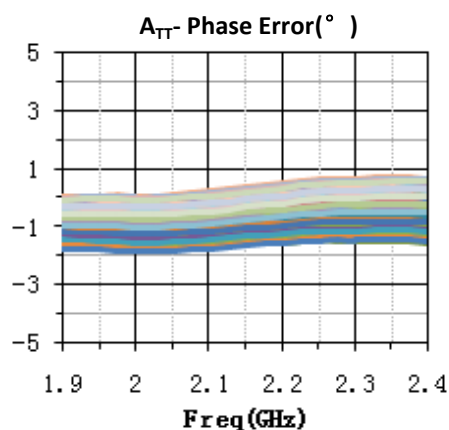
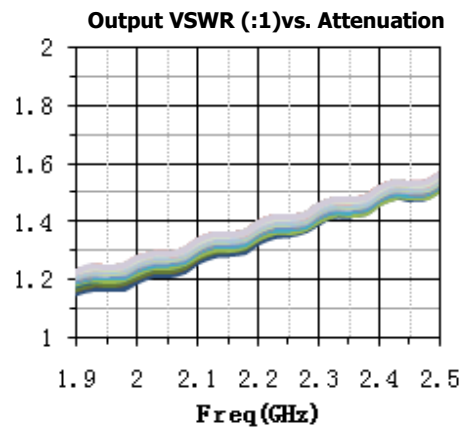
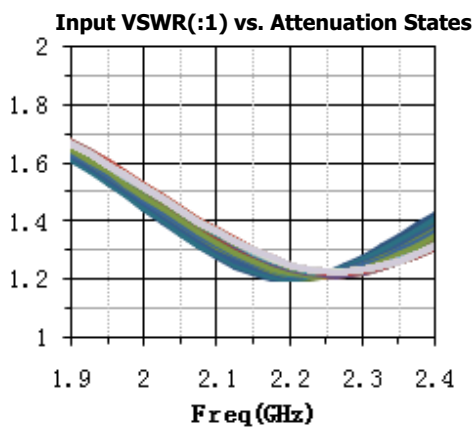
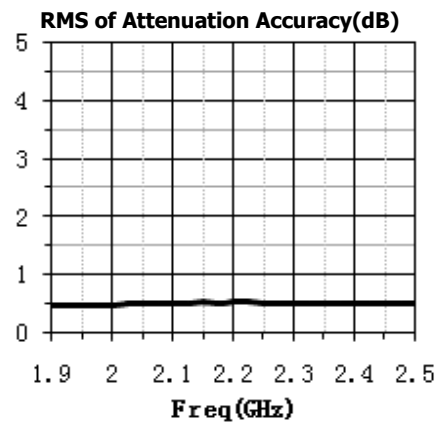
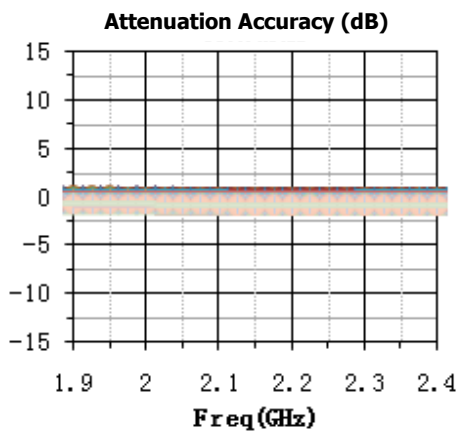
## ON WAFER MEASUREMENTS



# SAC3602

S-band Multi-function Chip integrated with Serial Driver, Phase Shifter and Attenuator Chip  
1.98GHz~2.3GHz

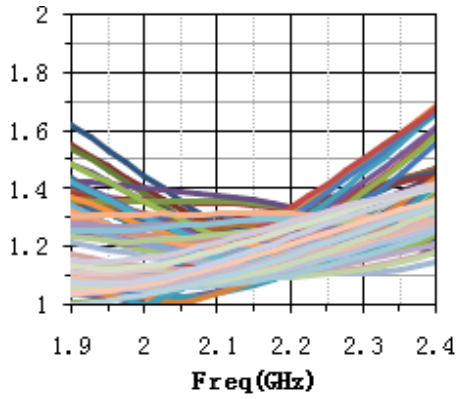
Rev 2.1



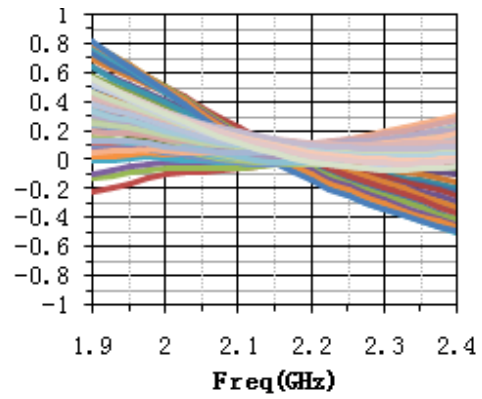
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S-band Multi-function Chip integrated with Serial Driver, Phase Shifter and Attenuator Chip  
1.98GHz~2.3GHz Rev 2.1

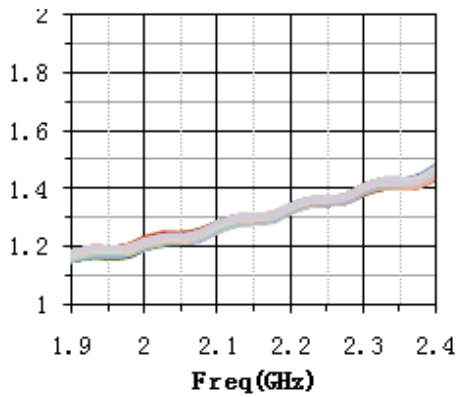
**Input VSWR(:1) vs. Phase Shift States**



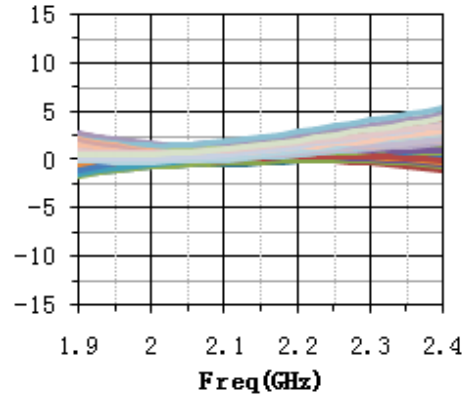
**P<sub>PHASE</sub>-Amplitude Error(dB)**



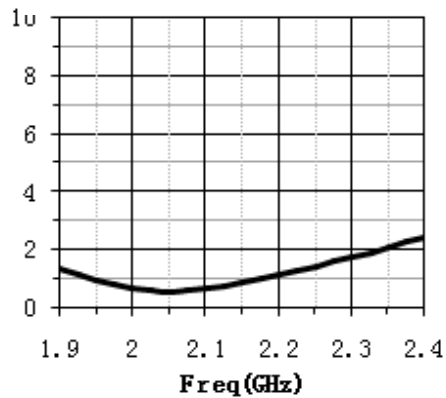
**Output VSWR(:1)vs. Phase Shift States**



**Phase Accuracy(° )**



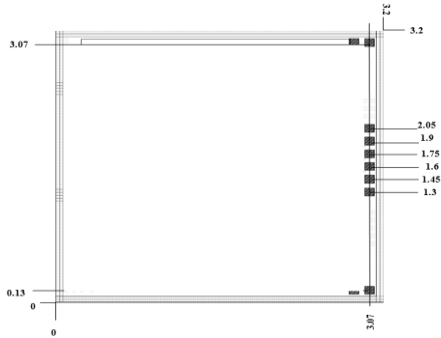
**RMS of Phase Accuracy(° )**



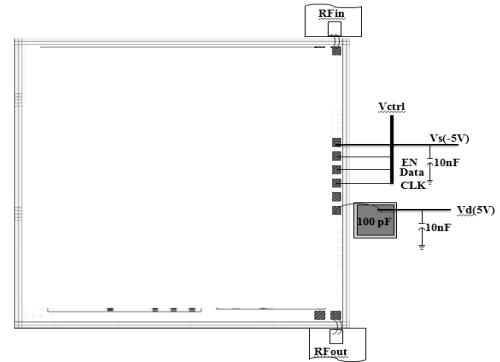
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1.98GHz~2.3GHz Rev 2.1

**Die Outline**  
(all dimensions in mm)



**Assembly Diagram**



**Attention:**

GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.