BSTAT65-0018

DC-18GHz 6-bit Digital Controlled Attenuator

Data Sheet

I. Product Introduction

BSTAT65-0018 is a high-performance GaAs 6-bit digitally controlled attenuator chip with a frequency range of DC to 18 GHz. Its insertion loss is typically 4 dB, and its basic attenuation levels are 0.5 dB, 1 dB, 2 dB, 4 dB, 8 dB, and 16 dB, for a total attenuation of 31.5 dB.

The chip adopts 0/+5V control and adopts on-chip through-hole metallization process to ensure good grounding, without the need for additional grounding measures.

The back of the chip is metallized, making it suitable for eutectic sintering or conductive adhesive bonding.

II. Key Technical Indicators

- Frequency range: DC-18GHz
- Insertion loss: 4dB
- Attenuation bit number: 6bit
- Attenuation step: 0.5dB
- Attenuation range: 0~31.5dB
- Chip size: 2.40mm × 1.20mm × 0.10mm

III. Functional Block Diagram

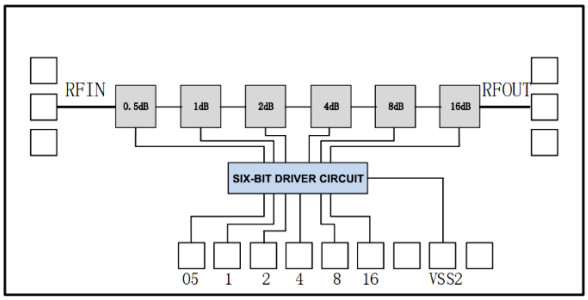

Figure 1

IV. Electrical Performance Table (T_A = +25 ℃)

Table 1

PARAMETER NAME	SYMBOL	MINIMUM	TYPICAL VALUES	MAXIMUM	UNIT
Frequency range	Freq	DC	—	18	GHz
Insertion loss	IL	2.8	4	4.5	dB
Attenuation range	ATT_Range	0.5	—	31.5	dB
Input return loss	RL_IN	14	18	—	dB
Output return loss	RL_OUT	14	18	—	dB
Attenuation of additional phase shift	Phase_Add	—	±2	±6	deg
Switching time	—	—	—	TBD	ns
Working current	I_{ss}	—	2.5	4	mA
Operating voltage	V_{ss}	—	-5	—	V
Control voltage	V_c	0/+5V TTL compatible			V

V. Absolute Maximum Ratings

Table 2

PARAMETER	LIMIT VALUE
Control voltage range	0~+6.5V
Supply voltage range	-7V
Maximum input power	+25dBm
Storage temperature	-65℃ ~ +150℃
Operating temperature	-55℃ ~ +125℃

VI. Test Curve

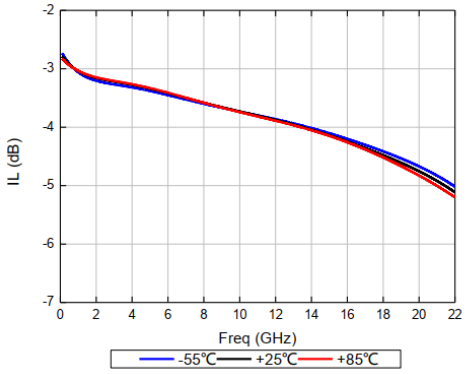

Figure 2. Insertion loss

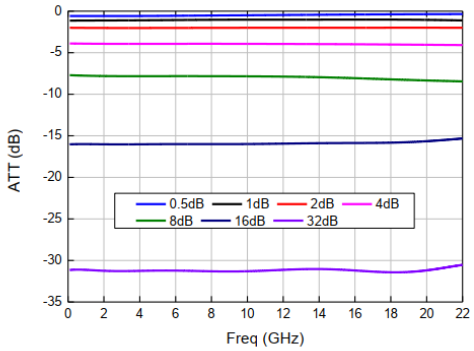

Figure 3. Attenuation (+25℃)

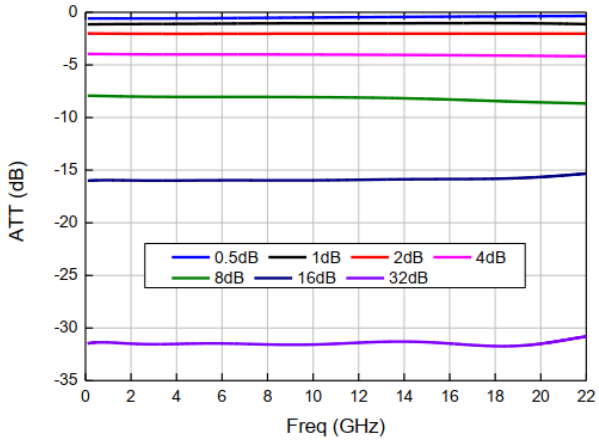

Figure 4. Attenuation (-55℃)

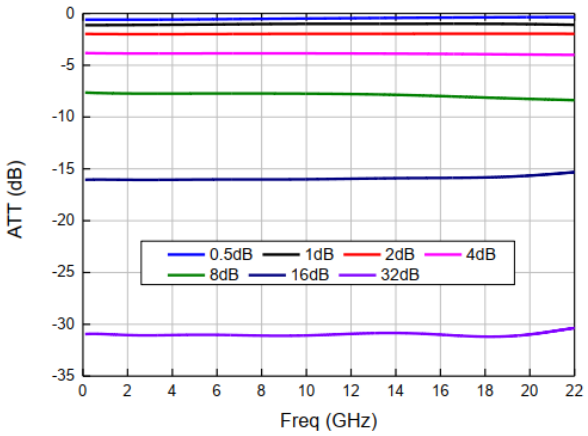

Figure 5. Attenuation (+85℃)

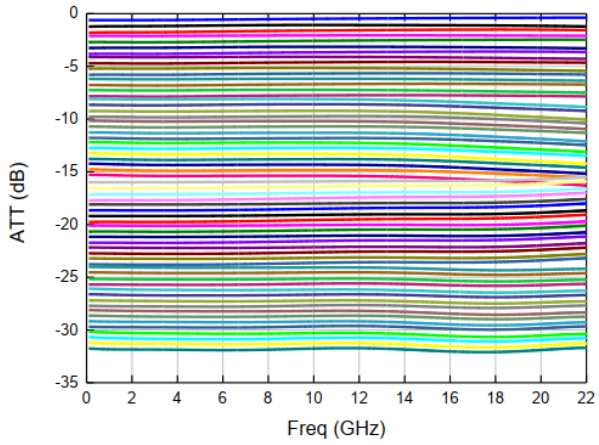

Figure 6. Full-state decay

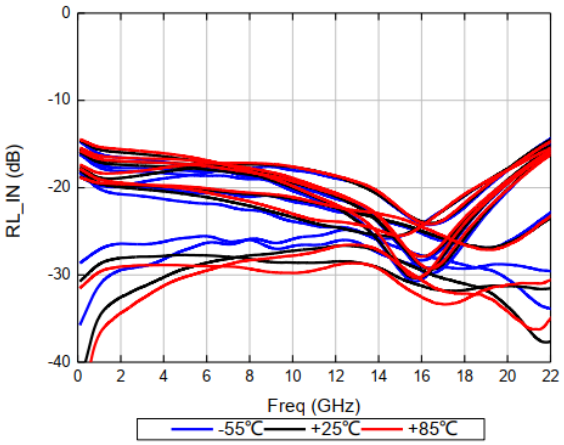

Figure 7. Input return loss

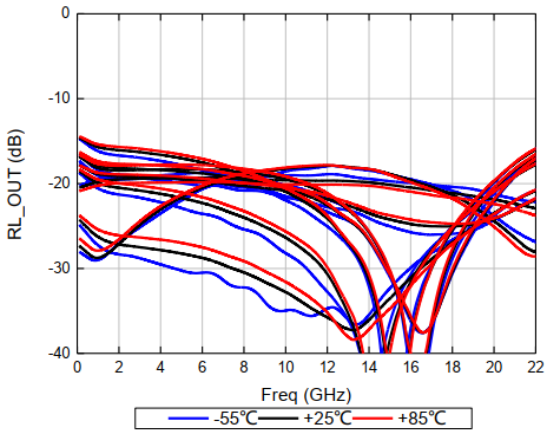

Figure 8. Output return loss

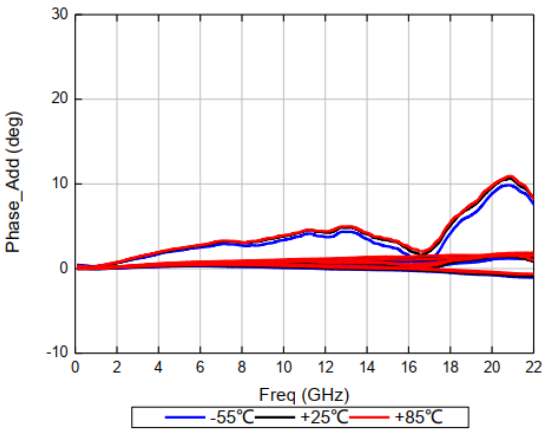

Figure 9. Attenuation of additional phase shift

VII. Chip Port Diagram (Unit: μm)

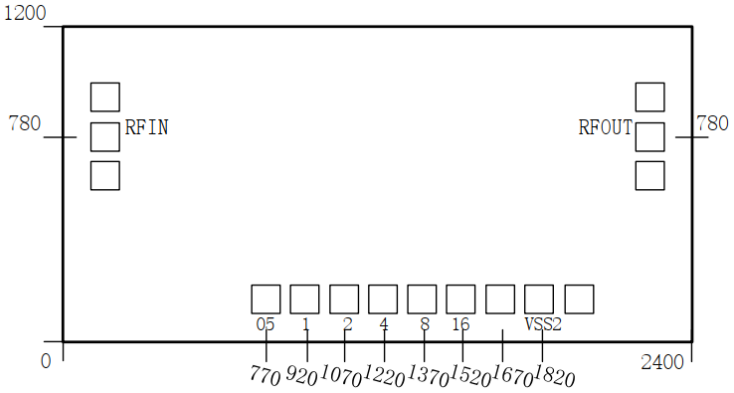

Figure 10

VIII. Port Definition

Table 3

PORT NAME	DEFINITION	SIGNAL OR VOLTAGE
RFIN	RF signal input	RF
RFOUT	RF signal output	RF
05, 1, 2, 4, 8, 16	control signal	0/+5V
VSS2	Negative power supply voltage	-5 ± 1V

IX. Truth Table

Table 4

DECAY STATE	A1	A2	A3	A4	A5	A6	VSS2
Ground state / reference state	0	0	0	0	0	0	-5V
0.5dB	+5V	0	0	0	0	0	
1dB	0	+5V	0	0	0	0	
2dB	0	0	+5V	0	0	0	
4dB	0	0	0	+5V	0	0	
8dB	0	0	0	0	+5V	0	
16dB	0	0	0	0	0	+5V	

X. Assembly Drawing

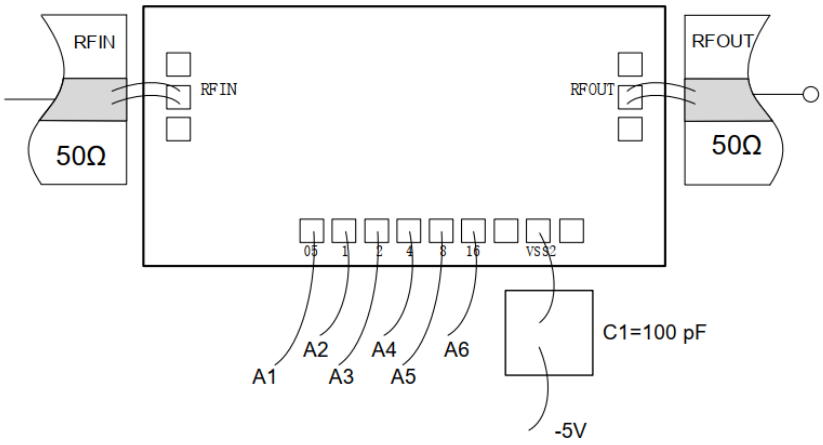

Figure 11

XI. Precautions

- Assemble and use in a clean environment;
- GaAs material is very brittle and the chip surface is easily damaged (do not touch the surface), so you must be careful when using it;
- Two bonding wires (25μm diameter gold wire) are used for input and output, and the length of the bonding wire is about 400μm;
- The sintering temperature should not exceed 300°C, and the sintering time should be as short as possible, not exceeding 30 seconds;
- This product is an electrostatic sensitive device, please be careful to prevent static electricity during storage and use;
- Store in a dry, nitrogen environment;
- Do not attempt to clean the chip surface with dry or wet chemical methods.