BSTTR13-0713

7-13GHz Bidirectional Amplifier Chip

Data Sheet

I. Product Introduction

BSTTR13-0713 is a high-performance bidirectional amplifier chip covering the 7-13 GHz frequency range. Its receive channel gain is typically 10 dB, and its output power at 1 dB compression is typically 16.3 dBm. Its transmit channel gain is typically 11.6 dB, and its output power at 1 dB compression is typically 20 dBm. Its input and output switches utilize 0/+3.3 V control.

The chip uses on-chip through-hole metallization technology to ensure good grounding, without the need for additional grounding measures, and is simple and convenient to use.

The back side is metallized and suitable for eutectic sintering or conductive adhesive bonding.

II. Key Technical Indicators

- Frequency range: 7-13GHz
- Receive gain: 10dB
- Receive P1dB output power: 16.3dBm
- Receiving working current: 51mA
- Transmitter gain: 11.6dBm
- Transmitter P1dB output power: 20dBm
- Transmitter operating current: 77mA
- Working power supply: +5V/+5V/-5V
- Chip size: 2.00 mm × 2.00 mm × 0.10 mm

III. Functional Block Diagram

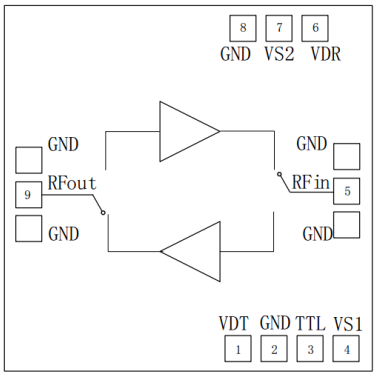

Figure 1. Functional Block Diagram

IV. Electrical Performance Table (T_A = +25 °C, VD = +5V, VS = -5V)

Table 1.

PARAMETER NAME	SYMBOL	MINIMUM	TYPICAL VALUES	MAXIMUM	UNIT
Frequency range	Freq	7	—	13	GHz
Receive gain	RX_Gain	9.5	10	10.4	dB
Transmitter gain	TX_Gain	11.5	11.6	11.7	dB
Receive P1dB output power	RX_OP1dB	15.8	16.3	—	dBm
Transmit P1dB output power	TX_OP1dB	18.8	20	—	dBm
Receive input return loss	RX_RL_IN	12	14	—	dB
Receive output return loss	RX_RL_OUT	14	16	—	dB
Transmit input return loss	TX_RL_IN	16	17	—	dB
Transmit output return loss	TX_RL_OUT	16	20	—	dB
Receiving working current	RX_IDQ	—	51	—	mA
Emission operating current	TX_IDQ	—	77	—	mA

V. Absolute Maximum Ratings

Table 2.

PARAMETER	VALUE
Maximum drain operating voltage	+6V
Maximum driving voltage	-6V
Maximum receive / transmit input power	+20dBm
Storage temperature	-65℃ ~ +150℃
Operating temperature	-55℃ ~ +125℃

VI. Test curve (VD=+5V, VS=-5V)

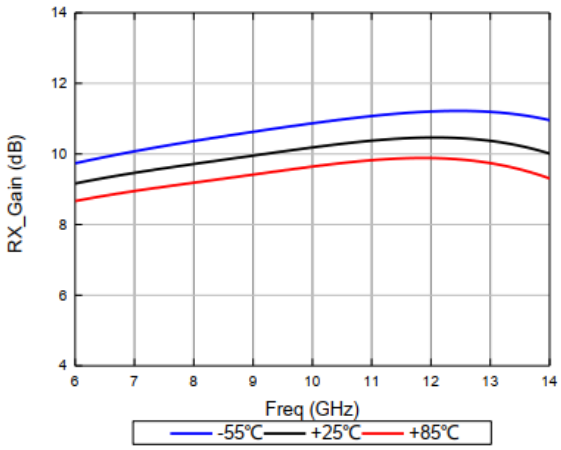

Figure 2. Receive gain

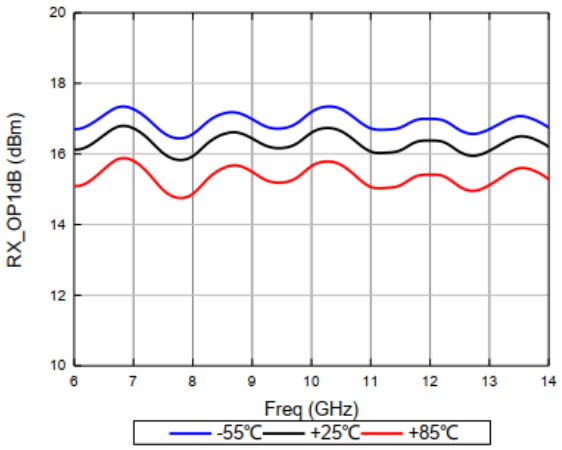

Figure 3. Receive P1dB output power

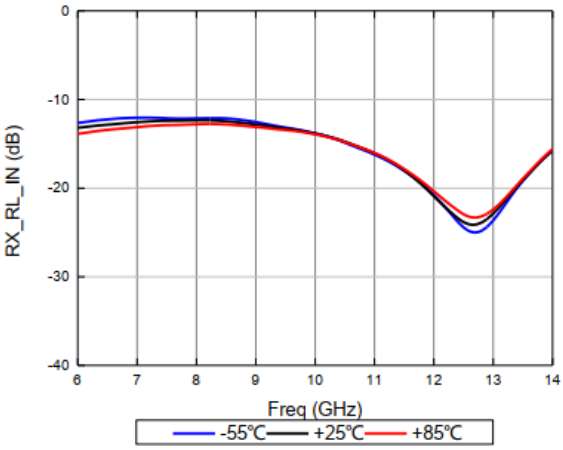

Figure 4. Receive input return loss

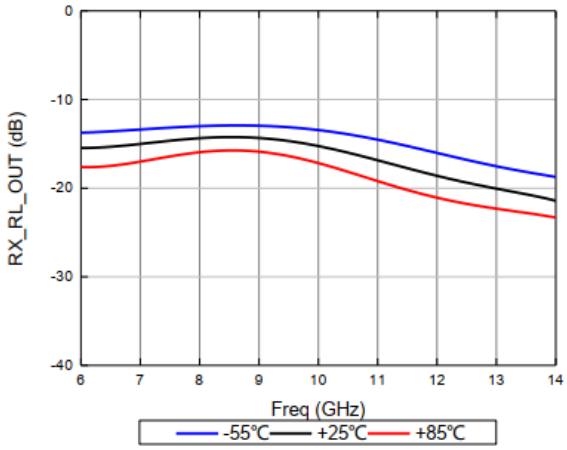

Figure 5. Receive output return loss

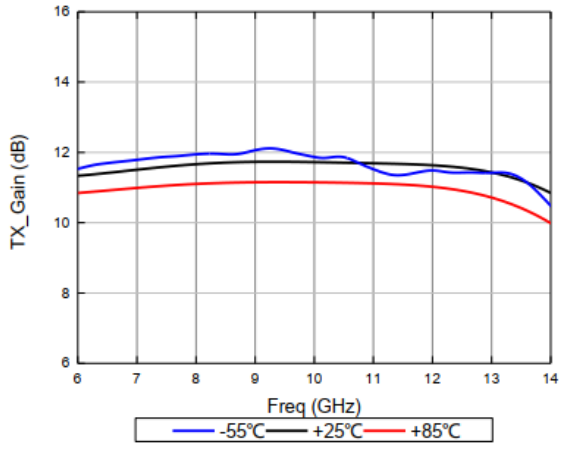

Figure 6. Transmitter gain

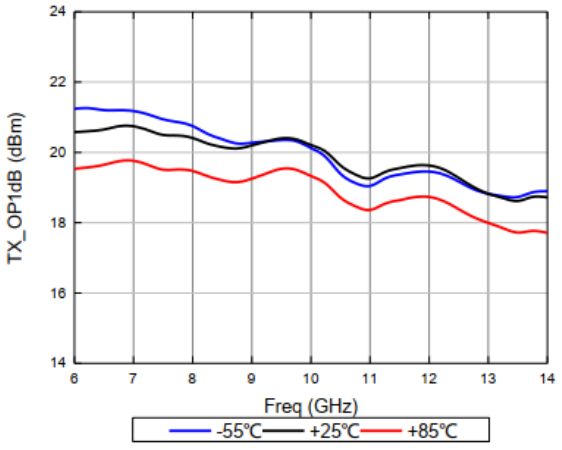

Figure 7. Transmit P1dB output power

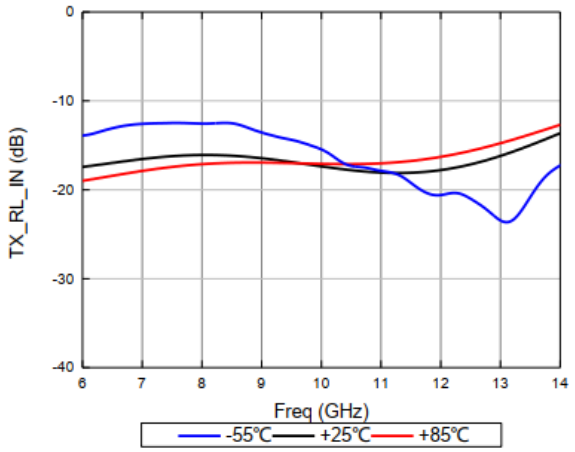

Figure 8. Transmit input return loss

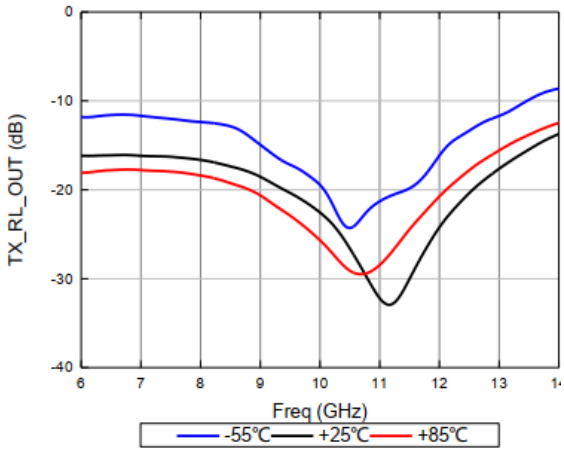

Figure 9. Transmit output return loss

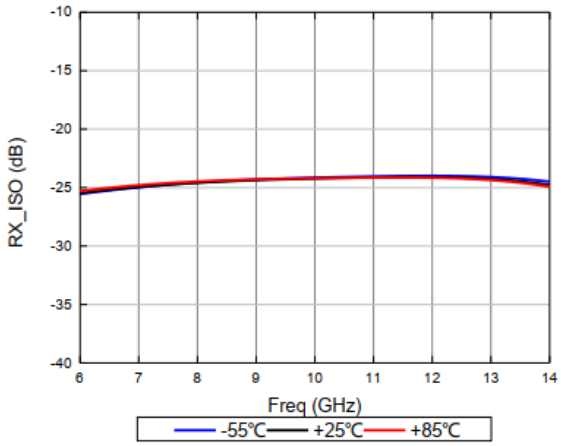

Figure 10. Receive reverse isolation

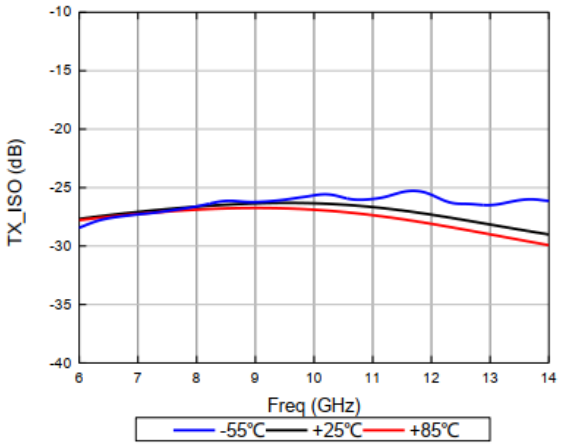

Figure 11. Transmit reverse isolation

VII. Chip Port Diagram (Unit: μm)

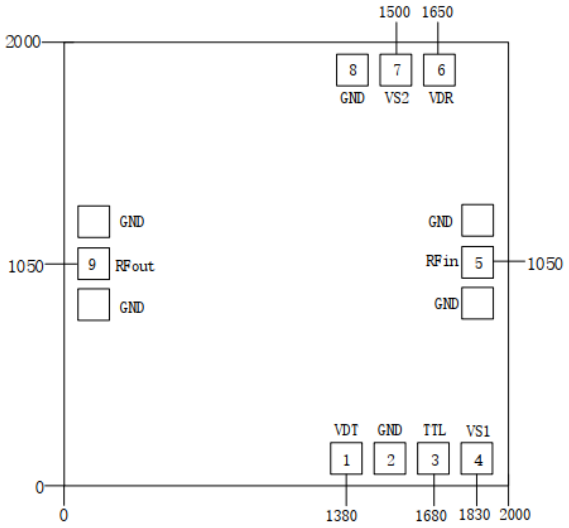

Figure 12.

VIII. Port Definition

Table 3.

SERIAL NUMBER	PORT NAME	DEFINITION	SIGNAL OR VOLTAGE
1	VDT	Transmitter amplifier drain voltage	+5V
2/8	GND	Ground pressure point	/
3	TTL	Receive / transmit switch	0/+3.3V
4	VS1	Amplifier Gate Voltage / Driver Power Supply	-5V
5	RFin	Transmitter branch input / receiver branch output	RF
6	VDR	Receive amplifier drain voltage	+5V
7	VS2	Amplifier Gate Voltage / Driver Power Supply	-5V
9	RFout	Transmitting branch output / receiving branch input	RF

IX. Receive and transmit truth table

Table 4.

CONTROL TERMINAL	V_S (V) *	TTL	VDT(V)	VDR(V)	REMARK
RF_{out} - RF_{in}	-5	1	5	0	Transmit
RF_{in} - RF_{out}	-5	0	0	5	Receive
* Either VS1 or VS2 can be connected					

X. Recommended assembly drawing

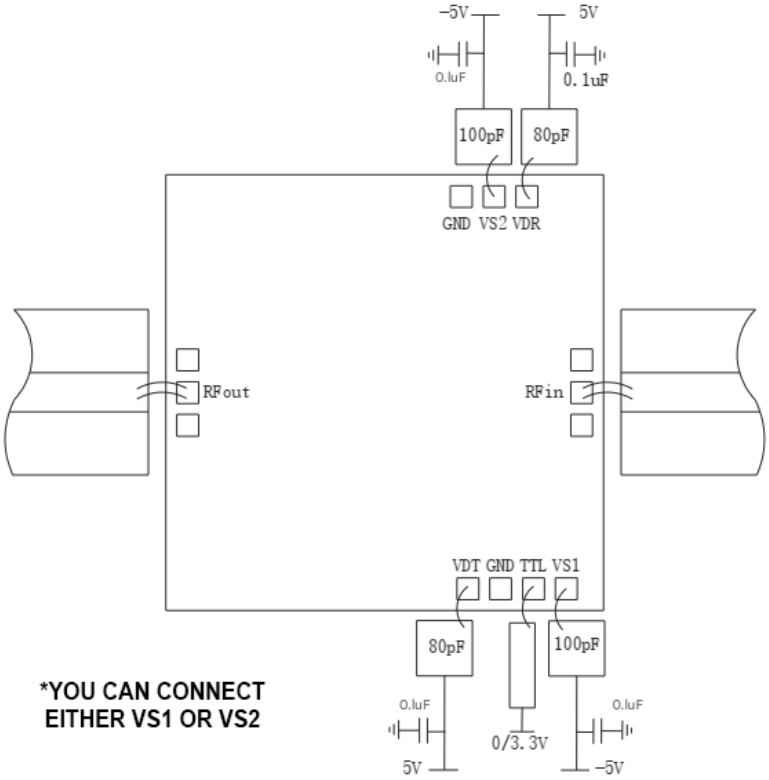

Figure 13.

XI. Notes

- 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.