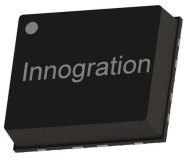
200W,50V Plastic RF LDMOS Transistor

ITGV10200C9



Description

The ITGV10200C9 is a dual path 50-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies up to 1GHz, in 12*10mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

It can be configured as Doherty to be as high efficiency and low cost driver for 4G/5G application within 0.6-1GHz.

- Typical Doherty RF Performance (On Innogration fixture with device soldered).

Freq (MHz)	Pout (dBm)	Psat (W)	ACPR (dBc)	Gain (dB)	Eff (%)
758-821	45	210	-30	18	52
869-894	45	210	-28	19	52

Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Excellent thermal stability, low HCI drift
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Pb-free, RoHS-compliant

Suitable Applications

- P band power amplifier
- All 4G/5G cellular application within 0.6 to 1GHz

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+110	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, DC test	$R_{\theta JC}$	0.55	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22--A114)	Class 2

Table 4. Electrical Characteristics (TA = 25 ℃ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit

DC Characteristics

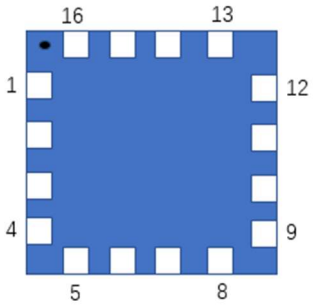
Drain-Source Voltage V_{GS}=0, I_{DS}=100uA	$V_{(BR)DSS}$		110		V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 90V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Gate--Source Leakage Current (V_{GS} = 11 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 50V, I_D = 600 μA)	$V_{GS}(th)$	——	2	——	V
Gate Quiescent Voltage (V_{DD} = 50V, I_D = 60mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.14	——	V

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 50Vdc, I_{DQ} = 60mA, f = 800 MHz

VSWR 10:1 at 200W pulse CW Output Power	No Device Degradation

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



Pin No.	Symbol	Description
5,6	RF IN/Vgs of Main	RF Input/Gate bias of main path
7,8	RF IN/Vgs of Peak	RF Input/Gate bias of peak path
13,14	RF OUT/Vds of Peak	RF Output/Drain bias of peak path
15,16	RF OUT/Vds of Main	RF Output/Drain bias of main path
Other Pins	GND	Grounding
Package Base	GND	DC/RF Ground. Proposed to be soldered to heatsink plane directly for the best CW thermal and RF performance. Soldered through vias or copper coin allowed for pulsed CW and back off applications, but will result in higher junction temperatures

758-821MHz application board

Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

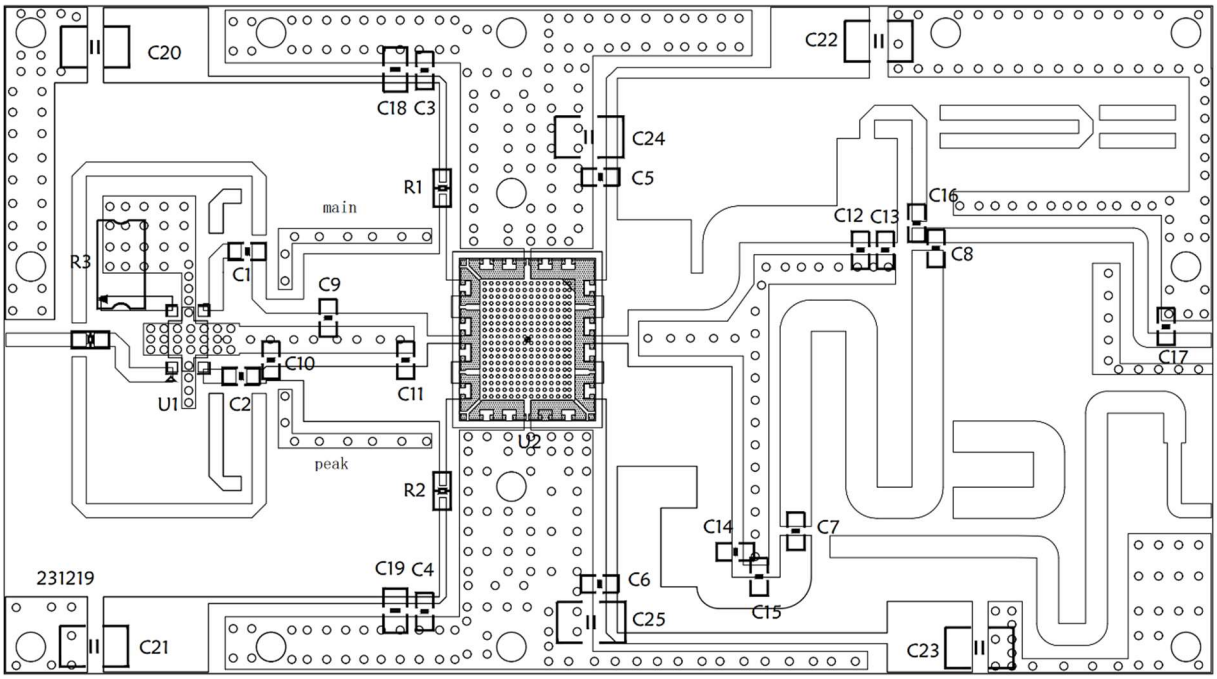


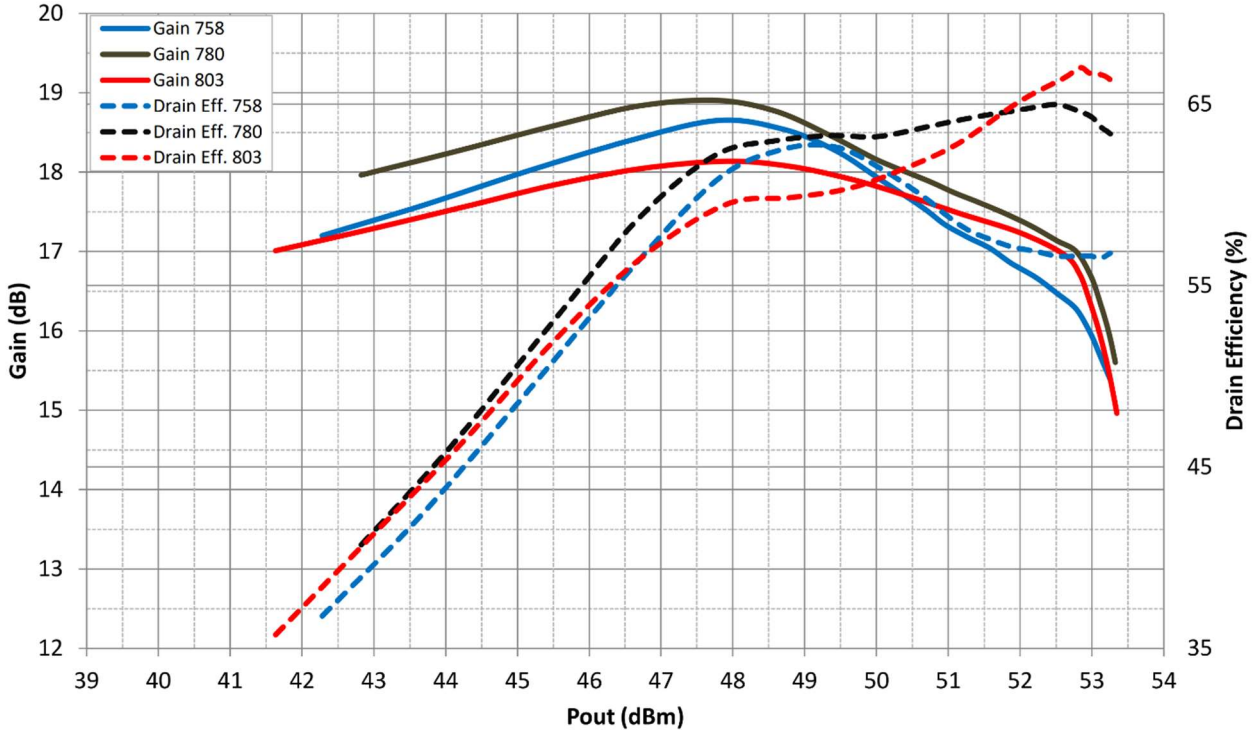
Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6, C7, C8	0603	68pF/250V	8
C9, C16	0603	15pF/250V	2
C10	0603	12pF/250V	1
C11, C14, C15	0603	6.8pF/250V	3
C12, C17	0603	3.9pF/250V	2
C13	0603	5.6pF/250V	1
C18, C19	0805	1nF/50V	2
C20, C21, C22, C23, C24, C25	1210	10uF/100V	6
R1, R2	0603	10R	2
R3	2512	51R	1
U1	3.18*5.08mm	X3C07F1-02S	1
U2	C9	ITGV10200C9	1

TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at Idq=60mA



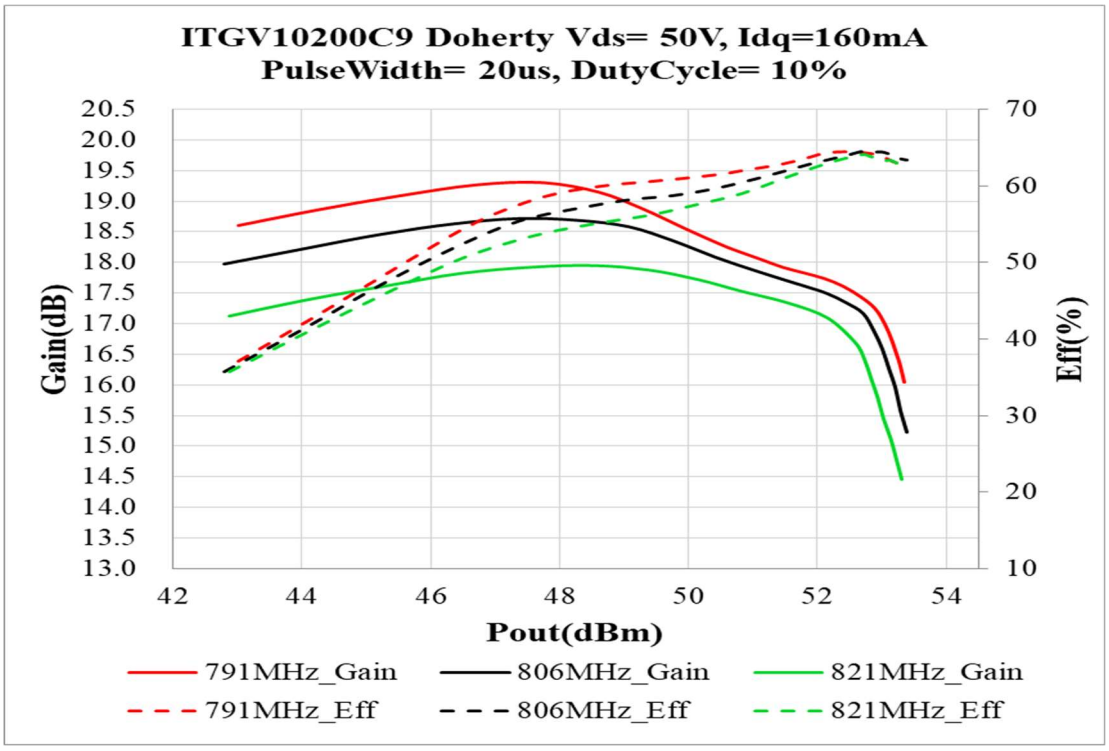
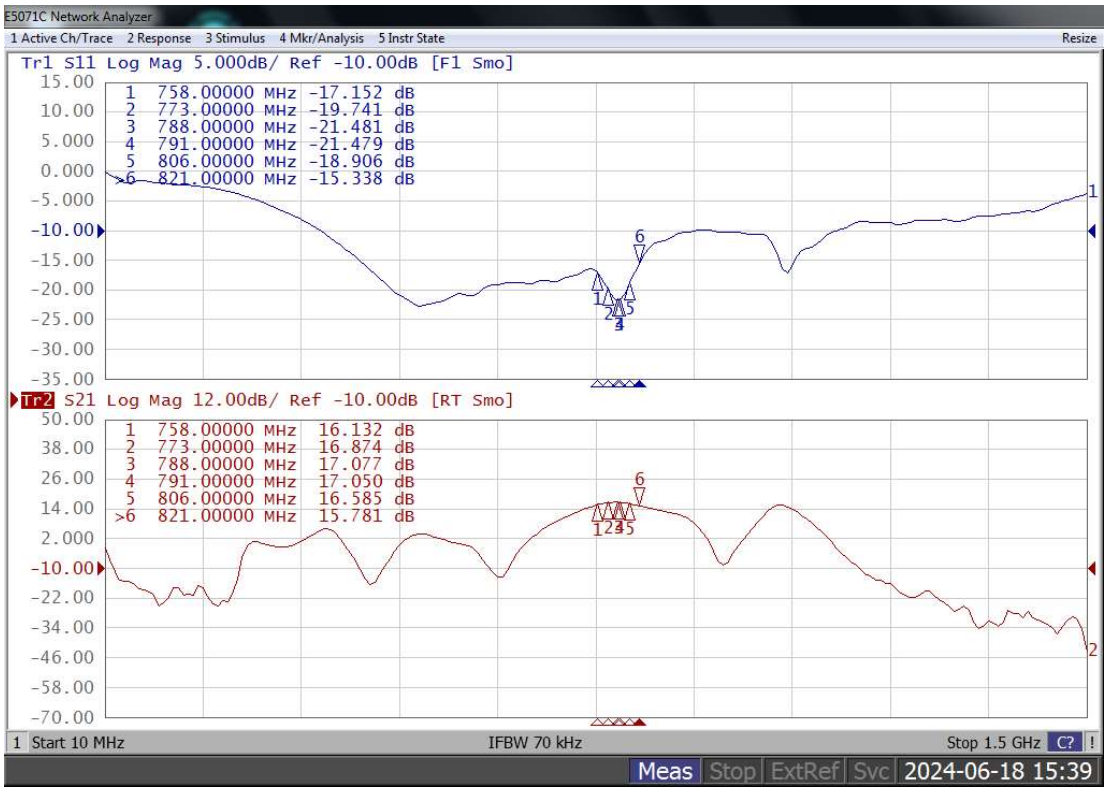


Figure 5.Network analyzer output S11/S21



869-894MHz application board

Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

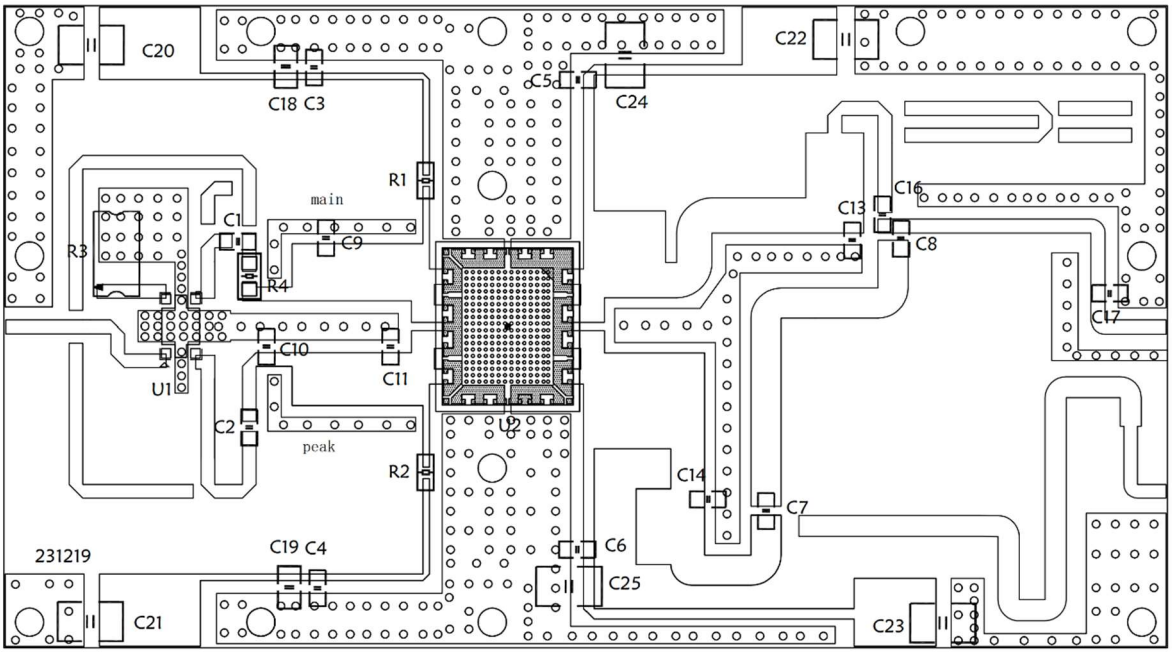


Figure 6. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C2, C3, C4, C5, C6, C7, C8	0603	68pF/250V	7
C1	0603	15pF/250V	1
C9, C14	0603	10pF/250V	2
C10	0603	6.8pF/250V	1
C11	0603	8.2pF/250V	1
C13	0603	5.6pF/250V	1
C16	0603	3.9pF/250V	1
C17	0603	2.2pF/250V	1
C18, C19	0805	1nF/50V	2
C20, C21, C22, C23, C24, C25	1210	10uF/100V	6
R1, R2	0603	10R	2
R3	2512	51R	1
R4	0805	10R	1
U1	3.18*5.08mm	X3C07F1-02S	1
U2	C9	ITGV10200C9	1

TYPICAL CHARACTERISTICS

Figure 7. Power Gain and Drain Efficiency as function of Power Output at Idq=60mA

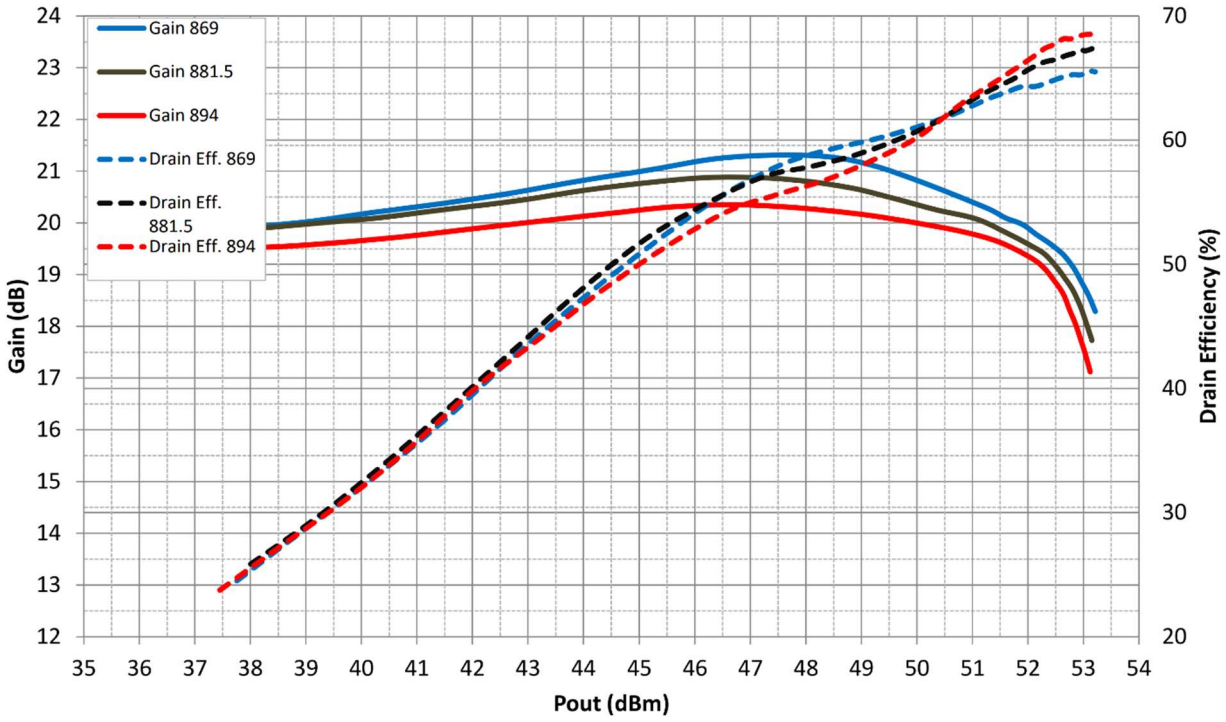
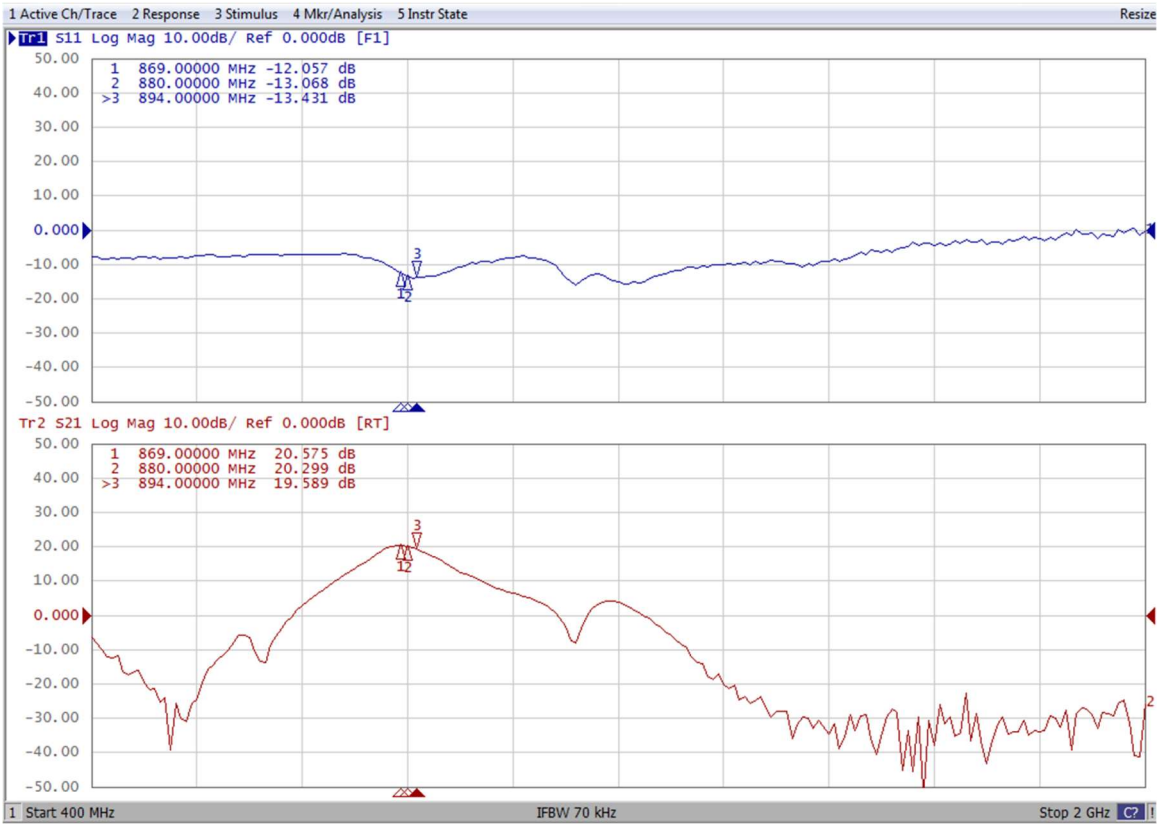
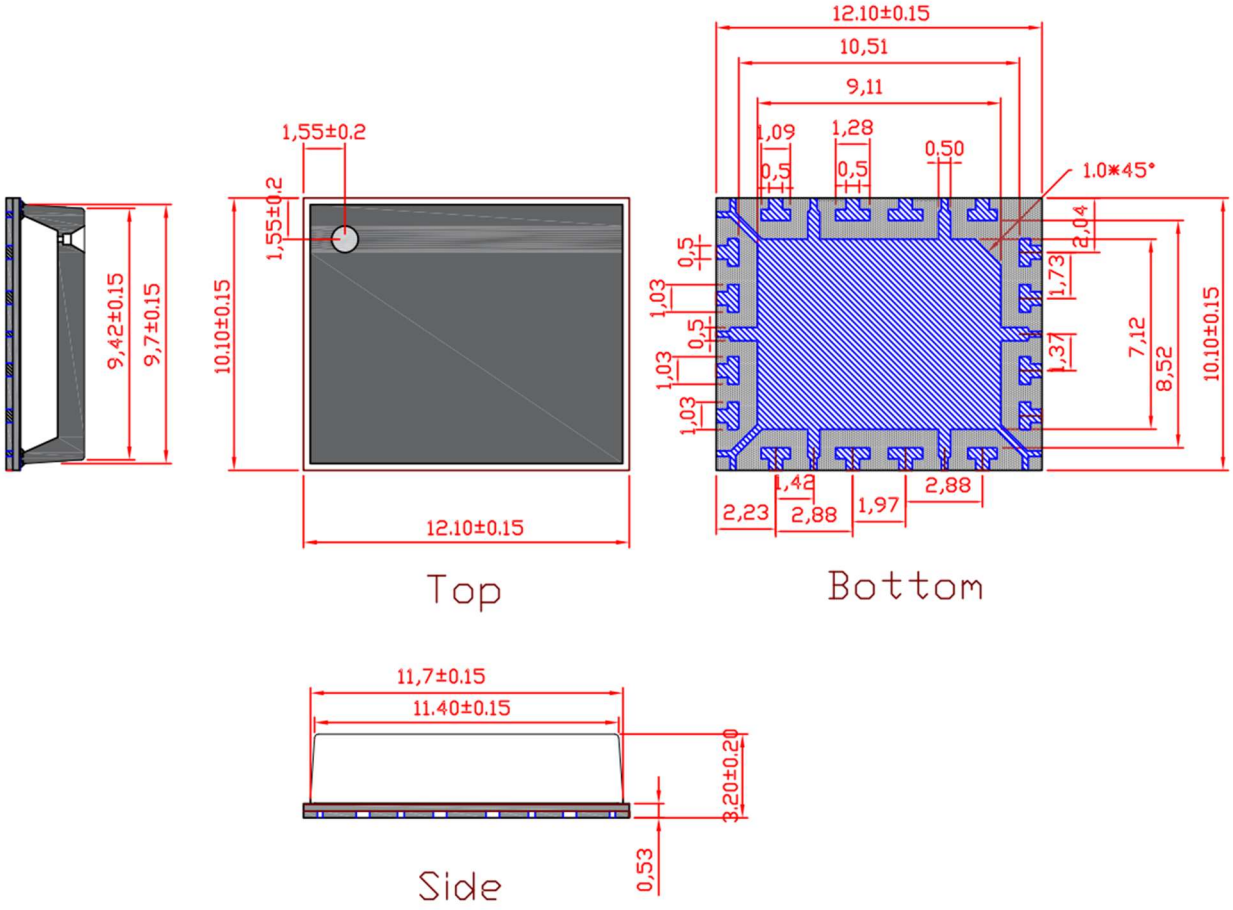


Figure 8.Network analyzer output S11/S21



Package Dimensions （Unit:mm）



Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2024/2/2	**Rev 1.0**	**Preliminary Datasheet**
2024/3/4	**Rev 1.1**	Add 869-894MHz data
2024/6/18	**Rev 1.2**	Extended test for 758-821MHz

Application data based on ZBB-24-05/07

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