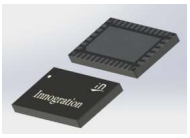
10W,50V Plastic RF LDMOS Transistor

ITGV22010C6



Description

The ITGV22010C6 is a 10-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies up to 2.2GHz, in 10*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

- Typical **2.1GHz and 750MHz narrow band** Class AB RF Performance

(On Innogration fixture with device soldered) Vds=50V (1)Idq=5mA, (2) Idq=25mA

Freq (MHz)	Pulse CW Signal(1)			P_{avg}=28dBm WCDMA Signal(2)		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	Eff(%)	$ACPR_{5M}$ (dBc)
2110-2170	17	11	54	18.8	15	-46
730-760	26	11	66	27	17	-44

- Typical **1.8-2.2GHz full band** Class AB RF Performance (On Innogration fixture with device soldered).

Vds=50V，Idq=35mA

ACPR @28dBm_1C-WCDMA			
Freq (MHz)	ACPR (dBc)	Gain (dB)	Efficiency (%)
1805	-42.35	20.35	13.68
1842.5	-41.51	20.43	14.09
1880	-43.58	20.54	14.54
2110	-41.97	19.11	15.03
2140	-42.98	18.86	14.67
2170	-43.99	18.62	14.37

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

- L, S band power amplifier
- All 4G/5G cellular application within 0.5 to 2.2GHz

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	Tstg	-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	$R_{\theta JC}$	6.5	°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 = 25mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.4	——	V

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 50Vdc, I_{DQ} = 25 mA, f = 2200 MHz

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

Figure 1:Pin Definition(Top View)

Pin No.	Symbol	Description
8,9,10,11,	Vgs/RF In	Vgs and RF input
32,33,34,35	Vds/RF out	Vds and RF output
2,5,7,12,13,18,20,23,25,30,31,36	GND	DC/RF Ground
Others	NC	No connection
Package Base	GND	DC/RF Ground.

2.1GHz application board

Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

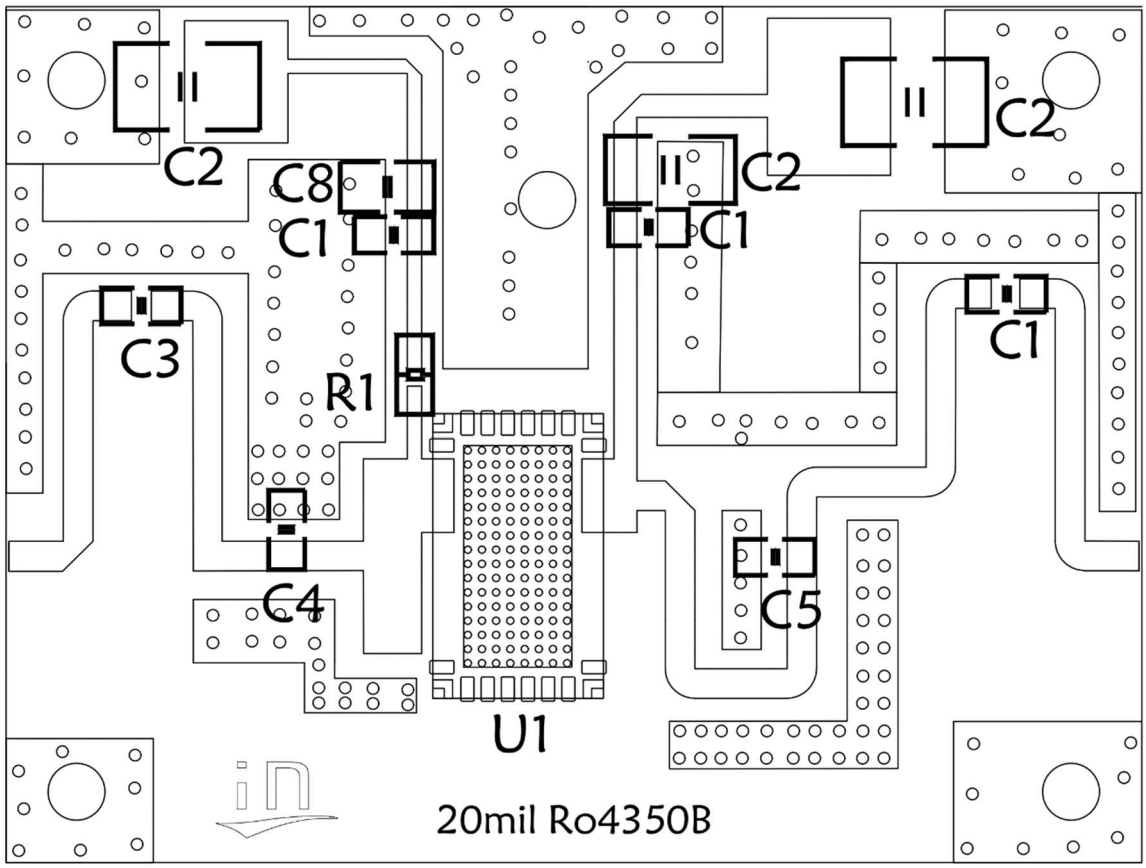


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	20pF/250V	3
C2	1210	10uF/100V	3
C3	0805	3.0pF/250V	1
C4	0805	3.3pF/250V	1
C5	0805	1.2pF/250V	1
C8	0805	10uF/16V	1
R1	0603	10R	2
U1	C6	ITGV22010C6	1

TYPICAL CHARACTERISTICS

Figure 2. Power Gain and Drain Efficiency as function of Power Output at different Idq (Left: 5mA, right:25mA)

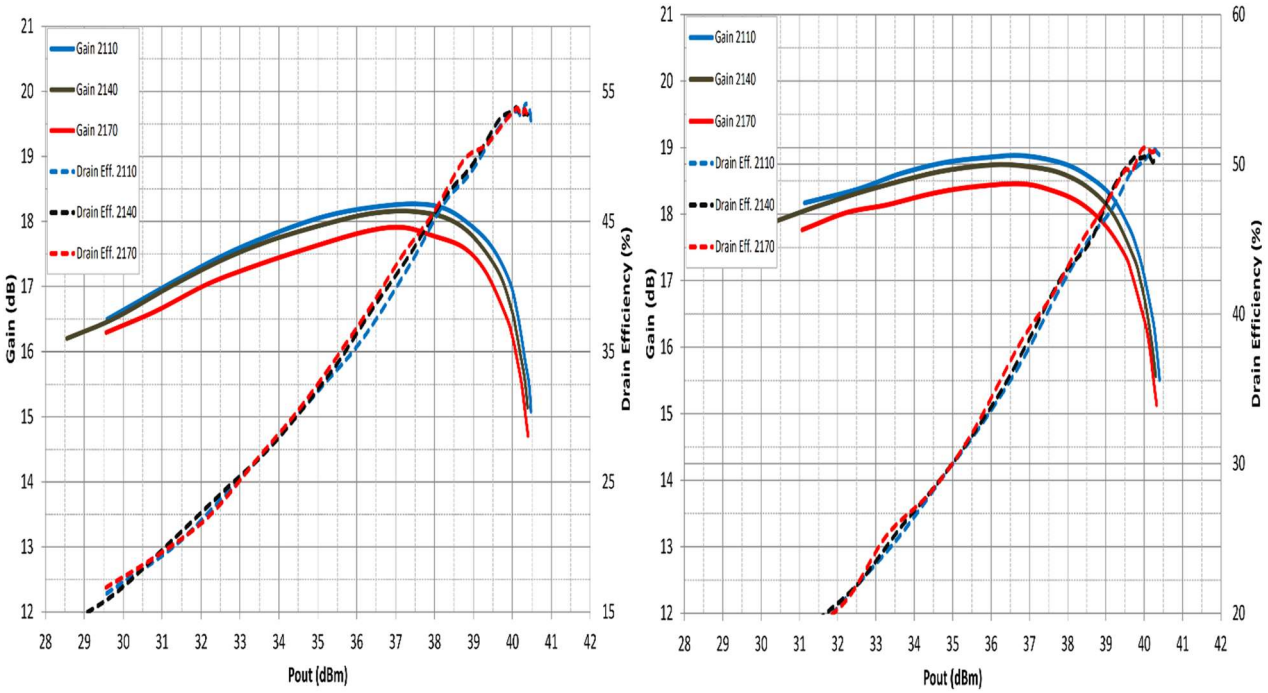
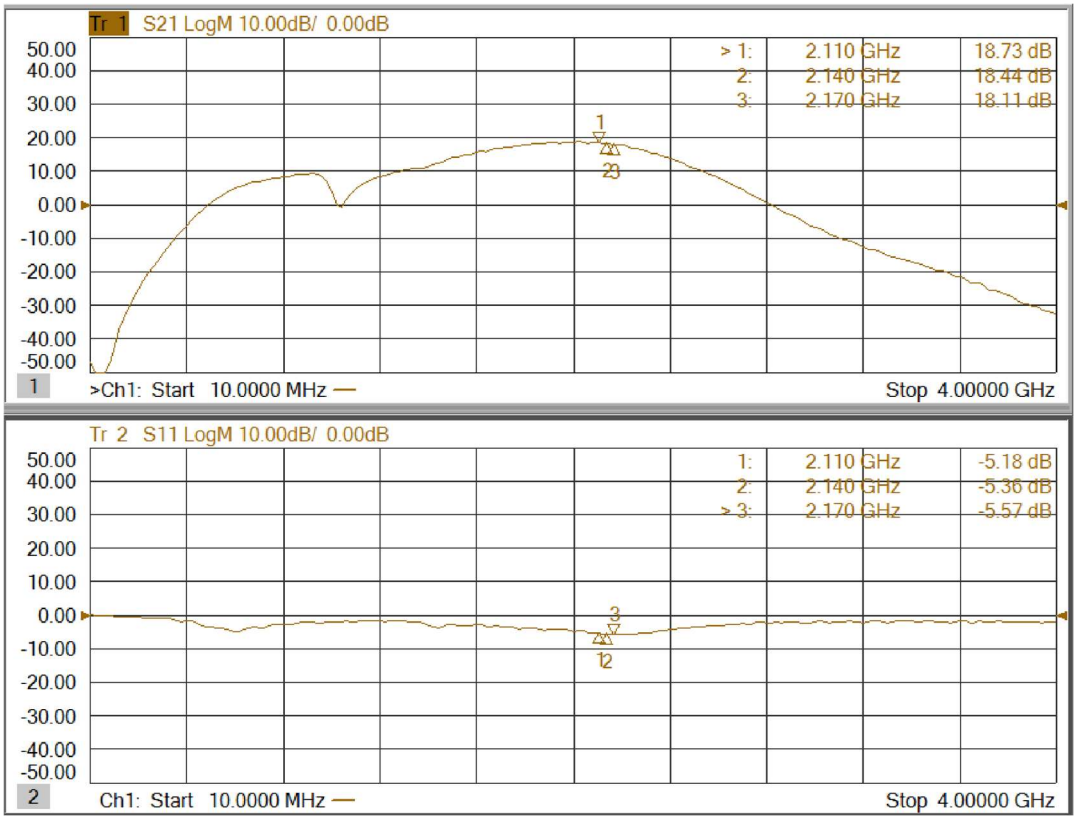


Figure 3.Network analyzer output S11/S21



1.8-2.2GHz application board

Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

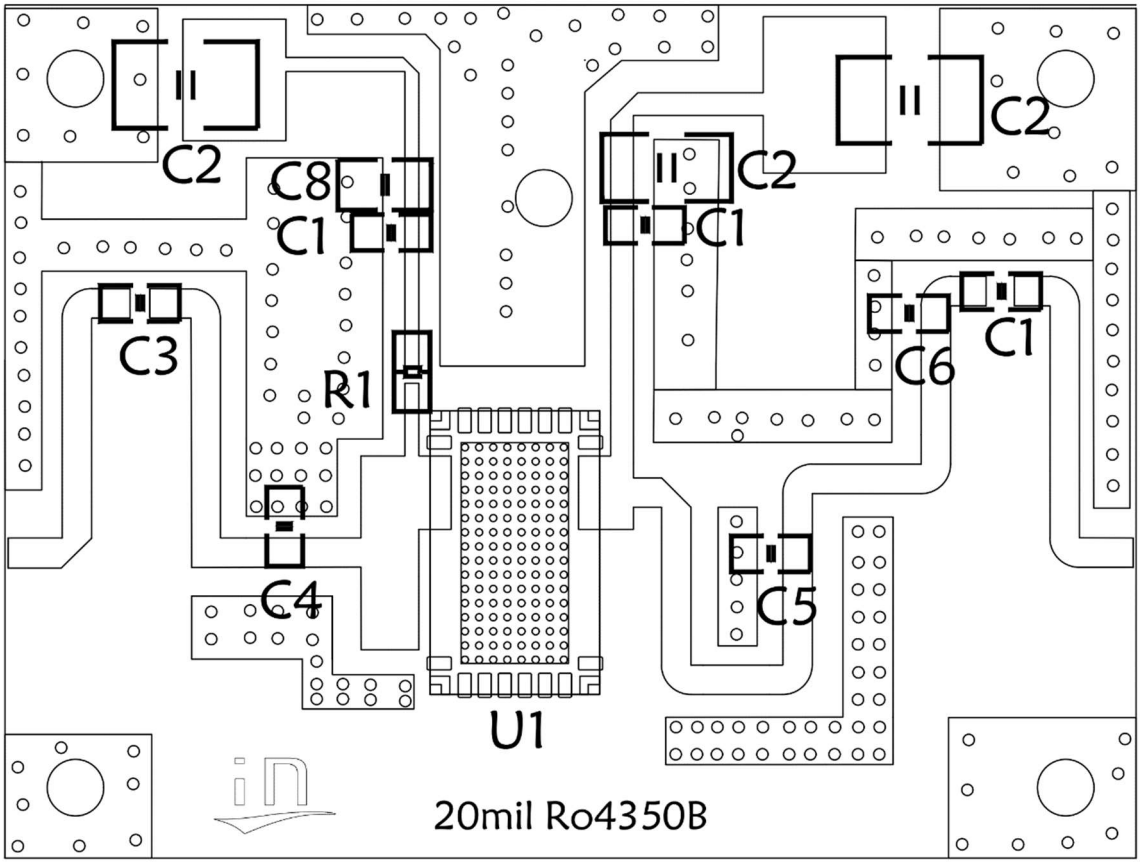


Figure 2. Test Circuit Component Layout

Table 6. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	20pF/250V	3
C2	1210	10uF/100V	3
C3	0805	3.0pF/250V	1
C4	0805	3.3pF/250V	1
C5	0805	1.2pF/250V	1
C6	0805	0.4pF/250V	1
C8	0805	10uF/16V	1
R1	0603	10R	1
U1	C6	ITGV22010C6	1

TYPICAL CHARACTERISTICS

Figure 4. Power Gain and Drain Efficiency as function of Power Output at Idq=35mA

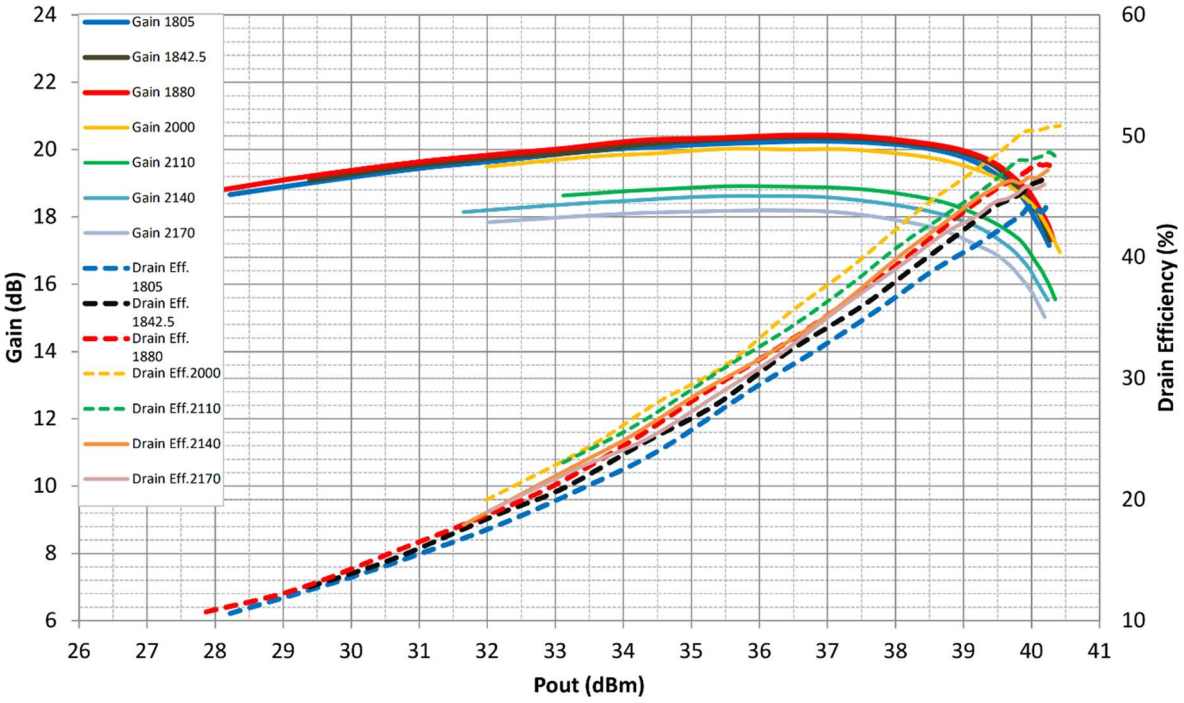
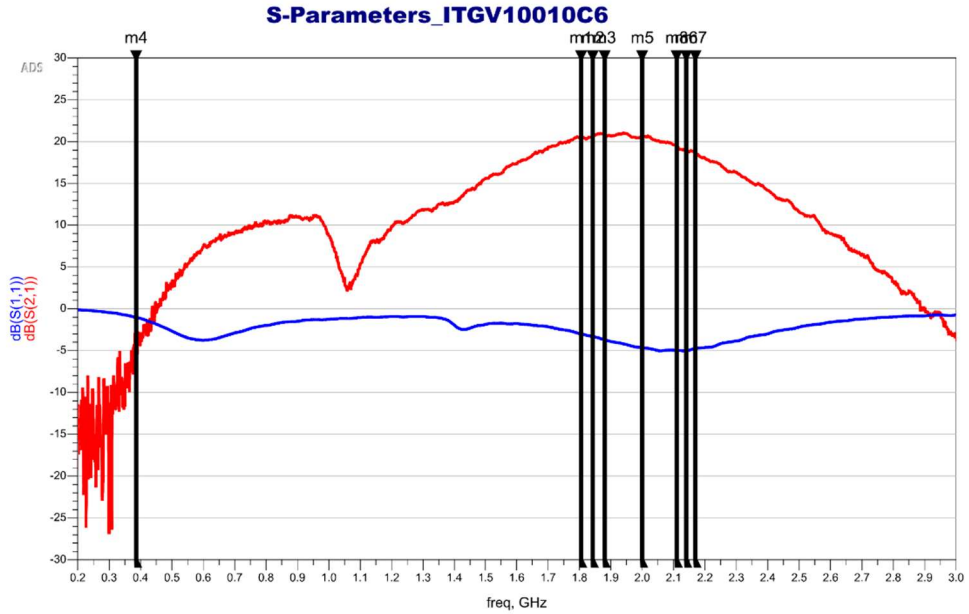


Figure 5.Network analyzer output S11/S21

m4 freq=385.9 MHz dB(S(2,1))=-4.937 dB(S(1,1))=-1.048	m8 freq=2.110 GHz dB(S(2,1))=19.442 dB(S(1,1))=-4.988	m6 freq=2.140 GHz dB(S(2,1))=18.928 dB(S(1,1))=-5.055	m7 freq=2.170 GHz dB(S(2,1))=18.658 dB(S(1,1))=-4.740
m1 freq=1.805 GHz dB(S(2,1))=20.408 dB(S(1,1))=-3.012	m2 freq=1.843 GHz dB(S(2,1))=20.573 dB(S(1,1))=-3.339	m3 freq=1.880 GHz dB(S(2,1))=20.882 dB(S(1,1))=-3.730	m5 freq=2.000 GHz dB(S(2,1))=20.590 dB(S(1,1))=-4.665



750MHz application board

Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

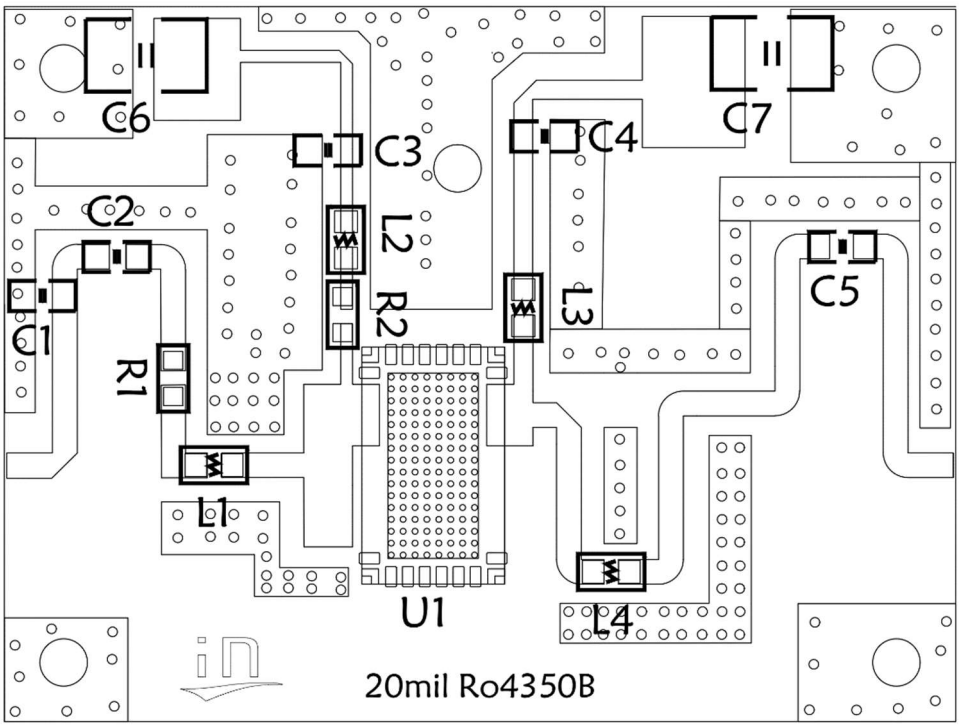


Figure 6. Test Circuit Component Layout

Table 7. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0603	6.8pF/250V	1
C2, C3, C4, C5	0603	100pF/250V	4
L2, L3	0603	18nH	2
L1	0603	6.8nH	1
L4	0603	12nH	1
R1	0603	2.4 ohm	1
R2	0603	10R	1
C6, C7	1210	10uF/100V	2
U1	C6	ITGV22010C6	1

TYPICAL CHARACTERISTICS

Figure 7. Power Gain and Drain Efficiency as function of Power Output at Idq=35mA

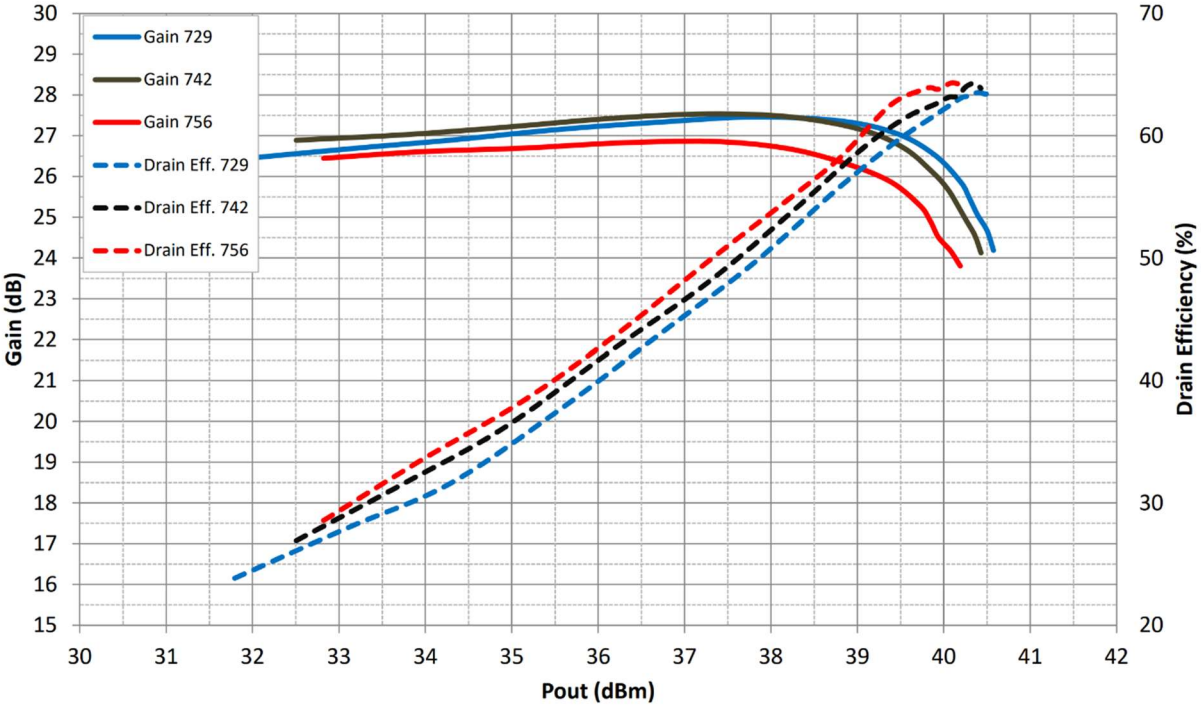
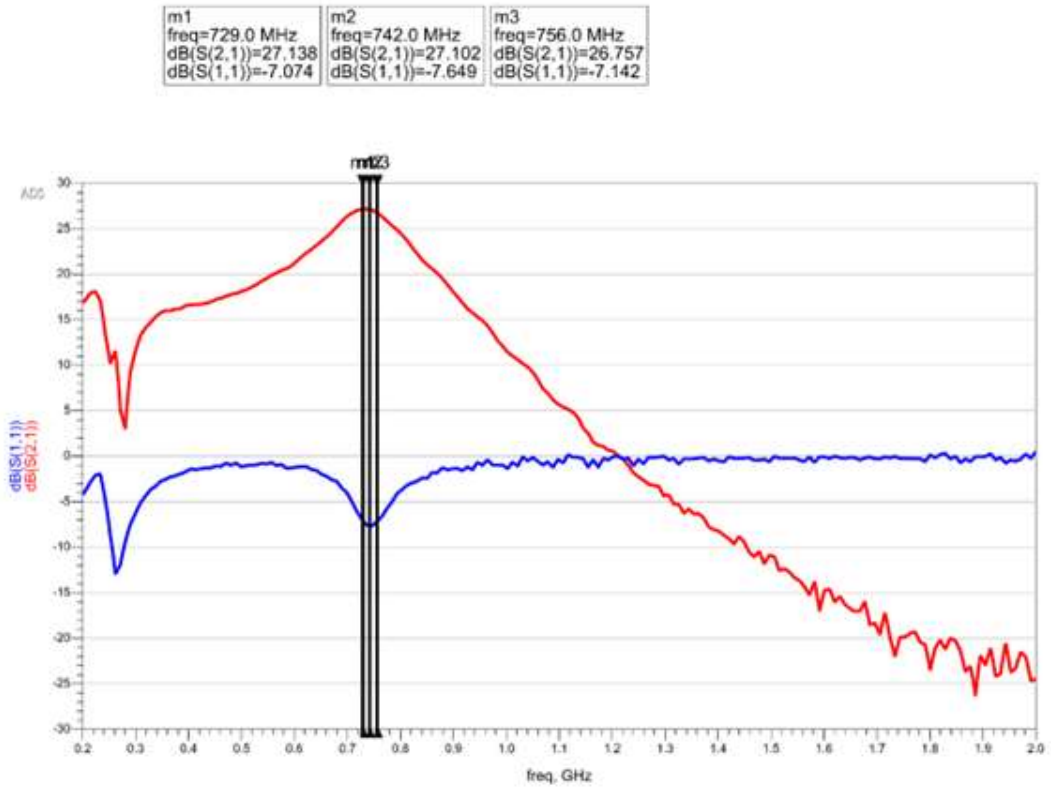
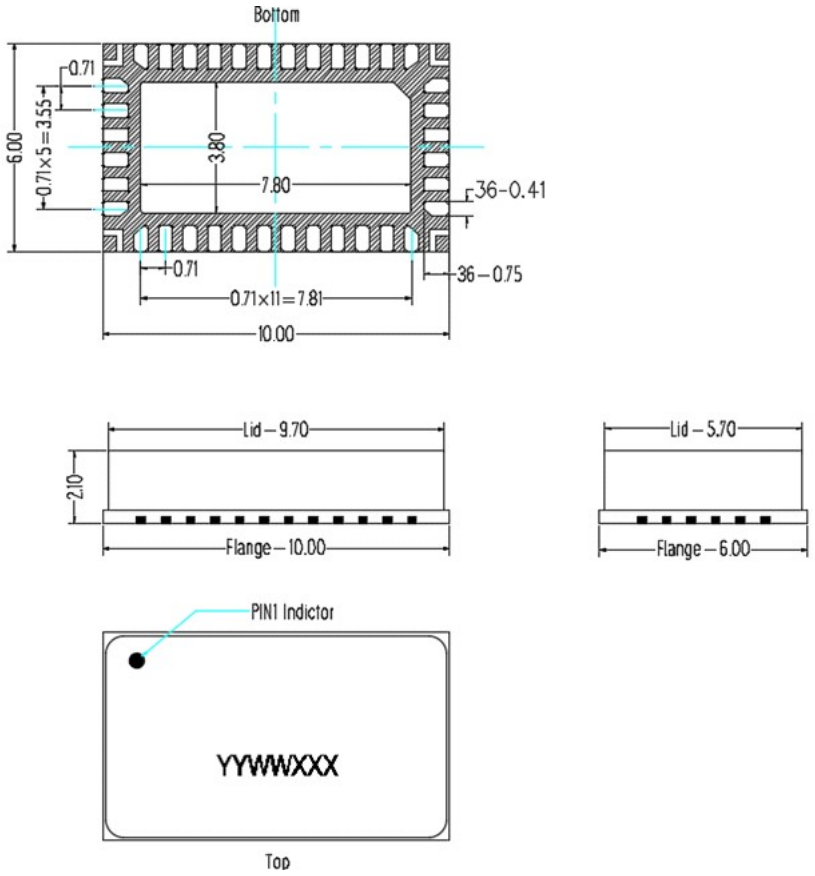


Figure 8.Network analyzer output S11/S21



Package Dimensions

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2022/12/30	**Rev 1.0**	**Preliminary Datasheet**
2023/1/16	**Rev 1.1**	Add 1.8-2.2G data
2023/3/24	**Rev 1.2**	Add 750MHz data

Application data based on ZBB-22-22/23-04/23-08

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