

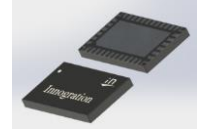


30W,50V Plastic RF LDMOS Transistor

ITGV22030C6

Description

The ITGV22030C6 is a 30-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 Class AB RF Performance (On Innegration fixture with device soldered).

V_{ds}=50V

Freq (MHz)	Pulse CW Signal ⁽¹⁾			P _{avg} =33dBm WCDMA Signal ⁽²⁾		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	Eff(%)	ACPR _{5M} (dBc)
2110	17.24	38.33	56.49	19.12	15.50	-43.56
2140	17.29	36.44	56.29	18.81	15.84	-42.58
2170	16.80	35.09	55.16	18.47	16.02	-44.62

(1) Id_q=5mA, (2) Id_q=65mA

- Typical 1.8GHz Class AB RF Performance (On Innegration fixture with device soldered).

V_{ds}=50V

Freq (MHz)	Pulse CW Signal ⁽¹⁾			P _{avg} =33dBm WCDMA Signal ⁽²⁾		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	Eff(%)	ACPR _{5M} (dBc)
1805	17.70	37.95	58.06	19.30	15.53	-45.46
1840	17.34	37.05	58.51	19.39	15.80	-44.55
1880	17.66	35.88	57.58	19.25	15.88	-45.81

(1) Id_q=5mA, (2) Id_q=65mA

- Typical 1.5GHz Class AB RF Performance (On Innegration fixture with device soldered).

V_{ds}=50V

Freq (MHz)	Pulse CW Signal ⁽¹⁾			P _{avg} =33dBm WCDMA Signal ⁽²⁾		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	Eff(%)	ACPR _{5M} (dBc)
1475	17.23	37.8	59.0	15.4	18.8	-44.1
1510	17.31	37.4	59.3	15.6	18.9	-44.7

(1) Id_q=5mA, (2) Id_q=65Ma

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 1.4 to 2.2GHz

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+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 $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC test	$R_{\theta JC}$	2	°C/W

Table 3. ESD Protection Characteristics

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

Table 4. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC Characteristics

Drain-Source Voltage $V_{GS}=0$, $I_{DS}=100\mu\text{A}$	$V_{(BR)DSS}$		110		V
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 90\text{V}$, $V_{GS} = 0\text{V}$)	I_{DSS}	—	—	1	μA
Gate--Source Leakage Current ($V_{GS} = 11\text{V}$, $V_{DS} = 0\text{V}$)	I_{GSS}	—	—	1	μA
Gate Threshold Voltage ($V_{DS} = 50\text{V}$, $I_D = 600\mu\text{A}$)	$V_{GS(th)}$	—	2	—	V
Gate Quiescent Voltage ($V_{DD} = 50\text{V}$, $I_D = 65\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	3.4	—	V

Load Mismatch (In Innogrator Test Fixture, 50 ohm system): $V_{DD} = 50\text{Vdc}$, $I_{DQ} = 65\text{mA}$, $f = 2200\text{MHz}$

VSWR 10:1 at 30W pulse CW Output Power	No Device Degradation
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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

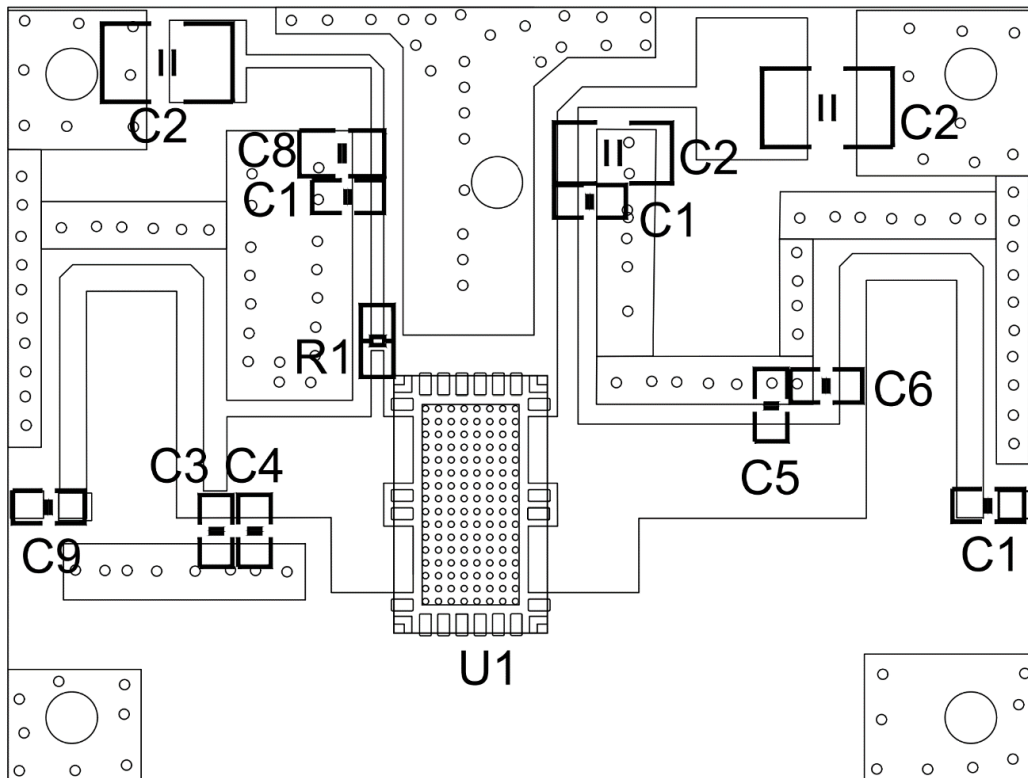


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	20pF/250V	3
C2	1210	10uF/100V	3
C3	0805	1.0pF/250V	1
C4	0805	2.4pF/250V	1
C5	0805	1.5pF/250V	1
C6	0805	2.0pF/250V	1
C8	0805	10uF/16V	1
C9	0805	3.0pF/250V	1
R1	0603	10R	1
U1	C6	ITGV22030C6	1



TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at different I_{dq} (Left: 5mA, right: 65mA)

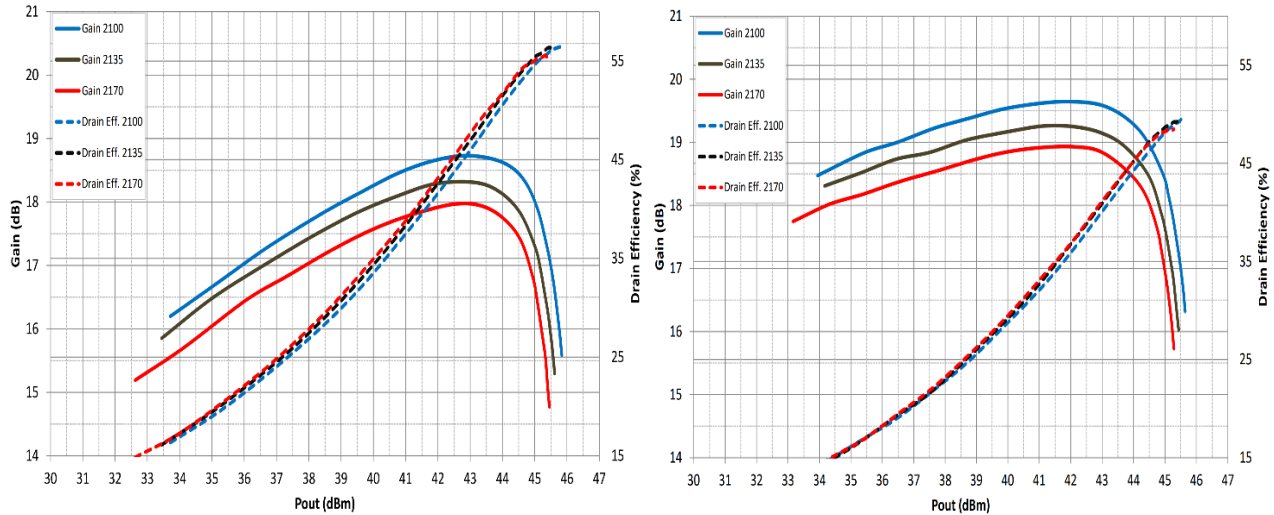
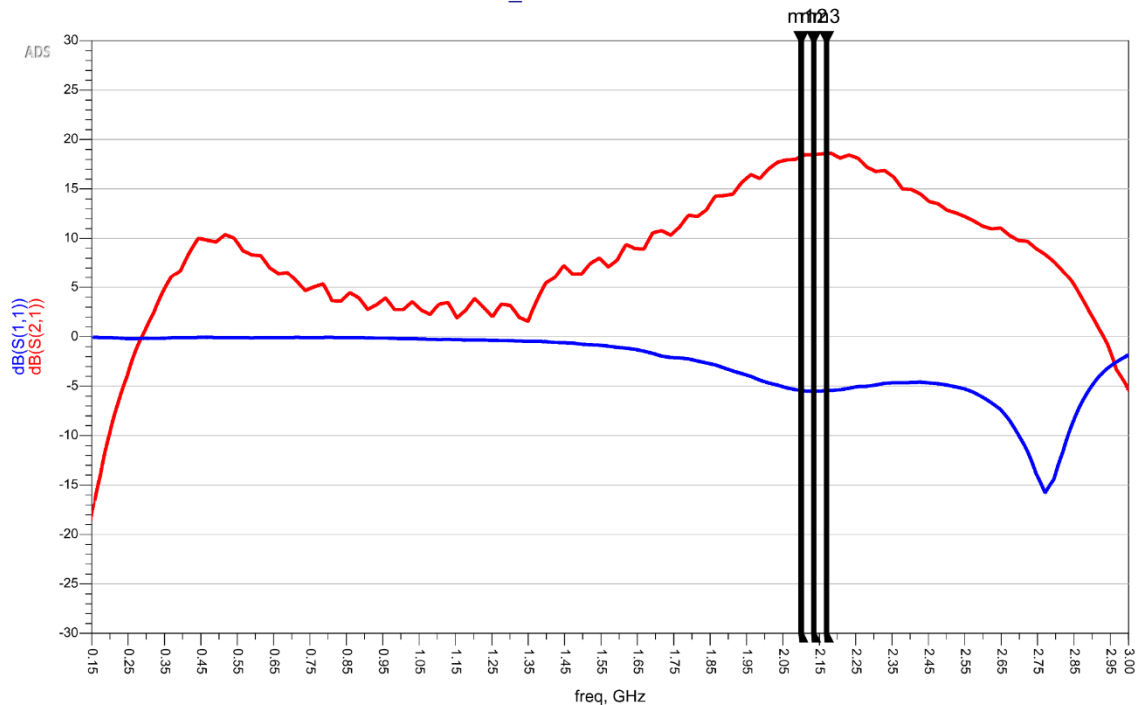


Figure 5. Network analyzer output S11/S21

m1 freq=2.100 GHz dB(S(2,1))=18.285 dB(S(1,1))=-5.438	m2 freq=2.135 GHz dB(S(2,1))=18.468 dB(S(1,1))=-5.521	m3 freq=2.170 GHz dB(S(2,1))=18.580 dB(S(1,1))=-5.465
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S-Parameters_ITGV22030C6 Class AB



1.8GHz application board

Reference Circuit of Test Fixture Assembly Diagram

20mils RO4350B

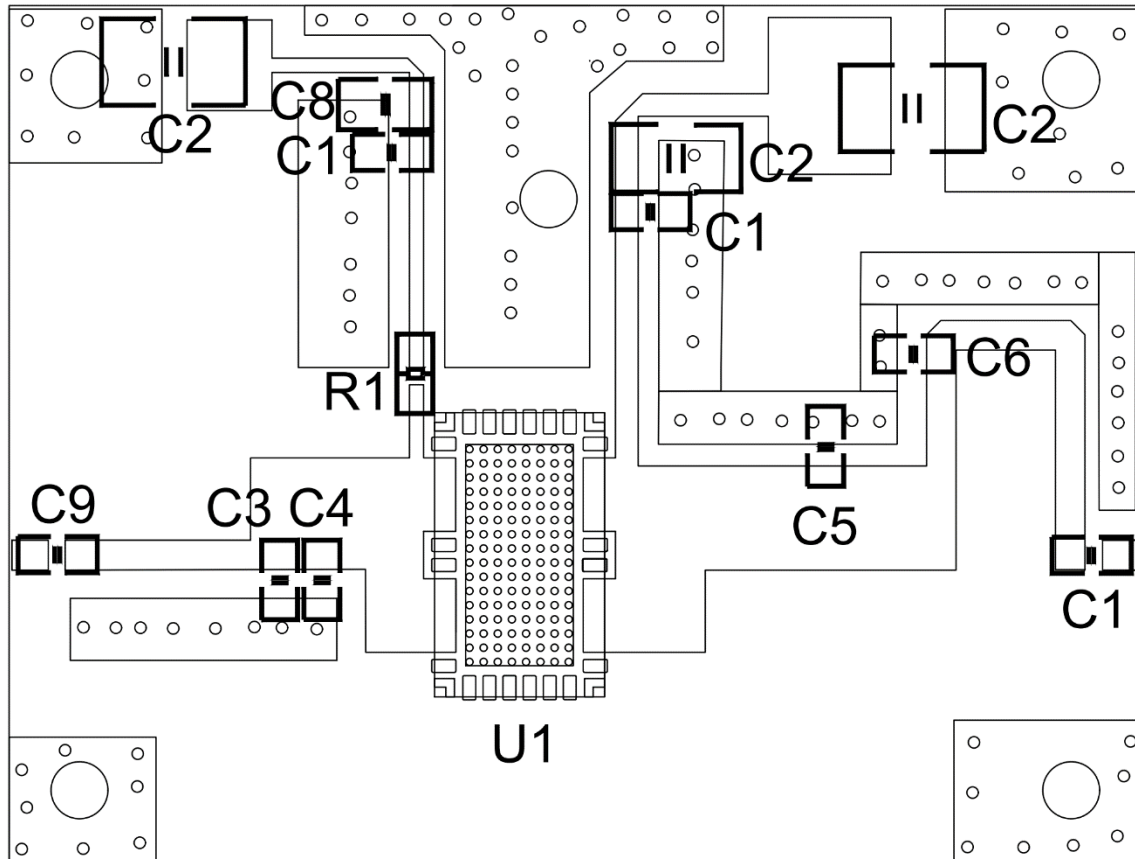


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	15pF/250V	3
C2	1210	10uF/100V	3
C3	0805	2.0pF/250V	1
C4	0805	2.4pF/250V	1
C5	0805	2.0pF/250V	1
C6	0805	2.7pF/250V	1
C8	0805	10uF/16V	1
C9	0805	3.0pF/250V	1
R1	0603	10R	1
U1	C6	ITGV22030C6	1



TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at different I_{dq} (Left: 5mA, right:65mA)

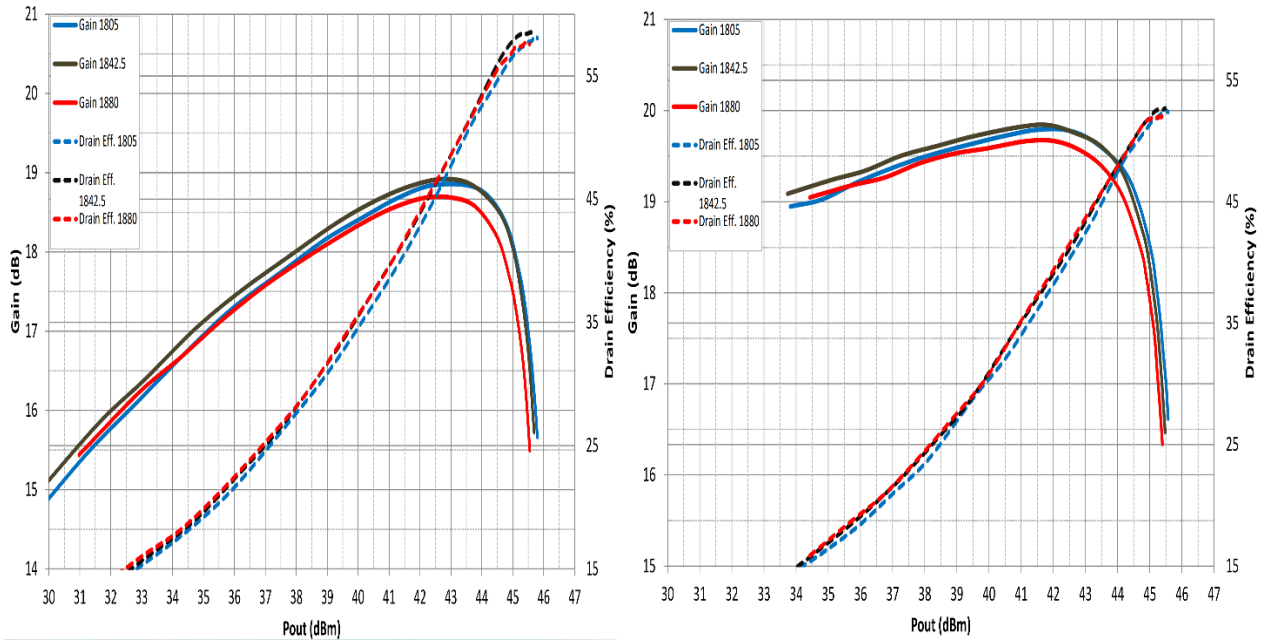


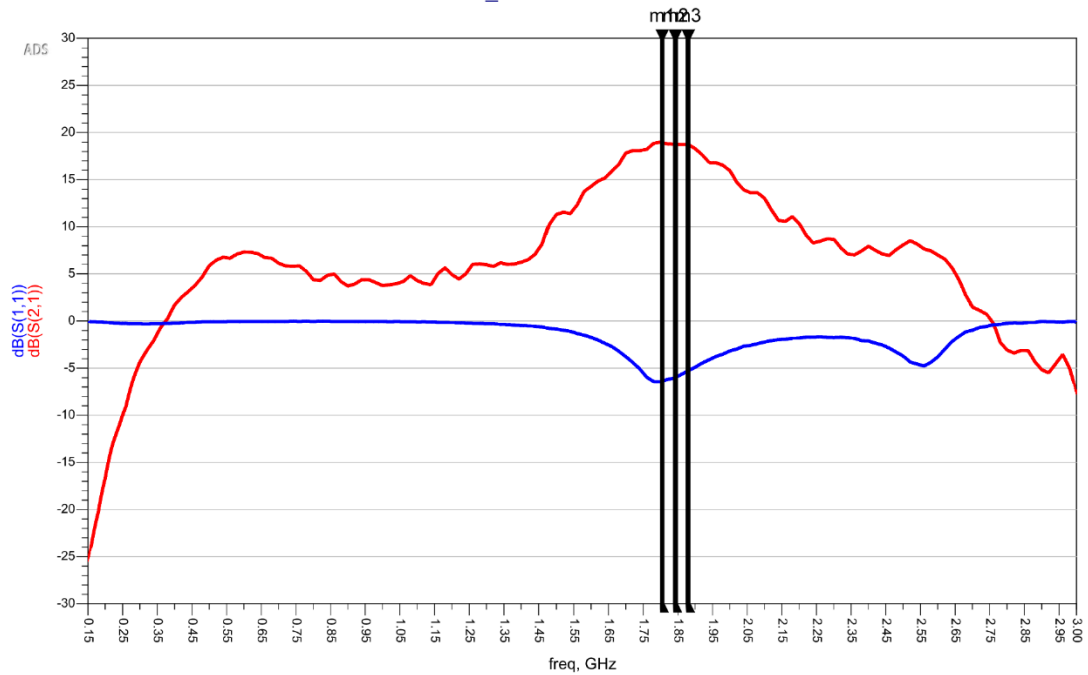
Figure 5. Network analyzer output S11/S21

m1
freq=1.805 GHz
dB(S(2,1))=18.934
dB(S(1,1))=-6.389

m2
freq=1.843 GHz
dB(S(2,1))=18.753
dB(S(1,1))=-5.996

m3
freq=1.880 GHz
dB(S(2,1))=18.727
dB(S(1,1))=-5.285

S-Parameters_ITGV22030C6 Class AB



1.5GHz application board

Reference Circuit of Test Fixture Assembly Diagram 20mils RO4350B

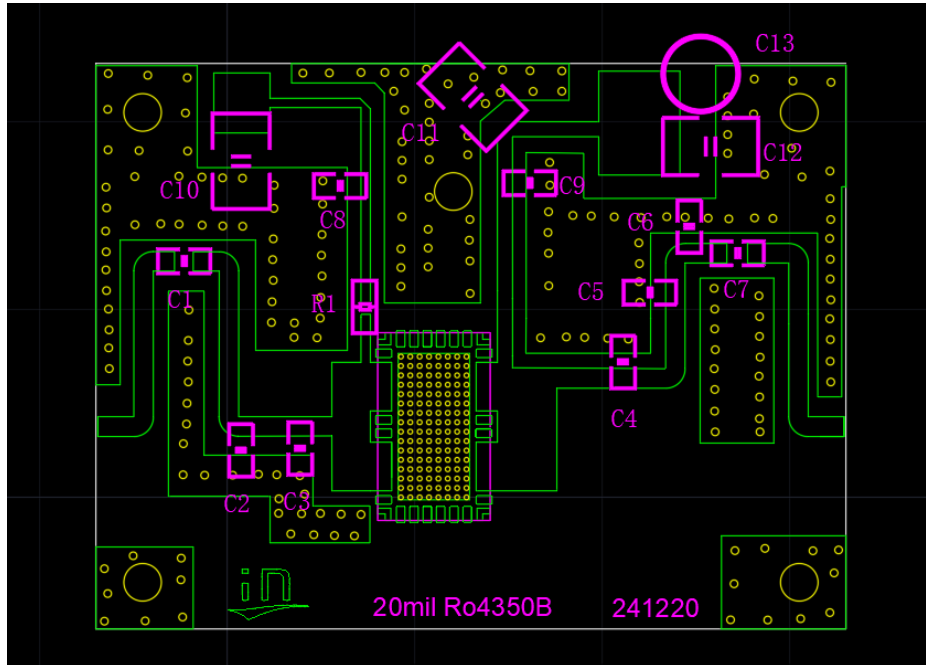


Figure 6. Test Circuit Component Layout

Table 6. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1、C7、C8、C9	0805	20pF/250V	4
C10、C11、C12	1210	10uF/100V	3
C2、C5	0805	2.0pF/250V	2
C3	0805	4.7pF/250V	1
C4	0805	0.5pF/250V	1
C6	0805	1.2pF/250V	1
C13		470uF/63V	1
R1	0603	10R	1
U1	C6	ITGV22030C6	1

TYPICAL CHARACTERISTICS

Figure 7. Power Gain and Drain Efficiency as function of Power Output at $I_{dq}=65mA$

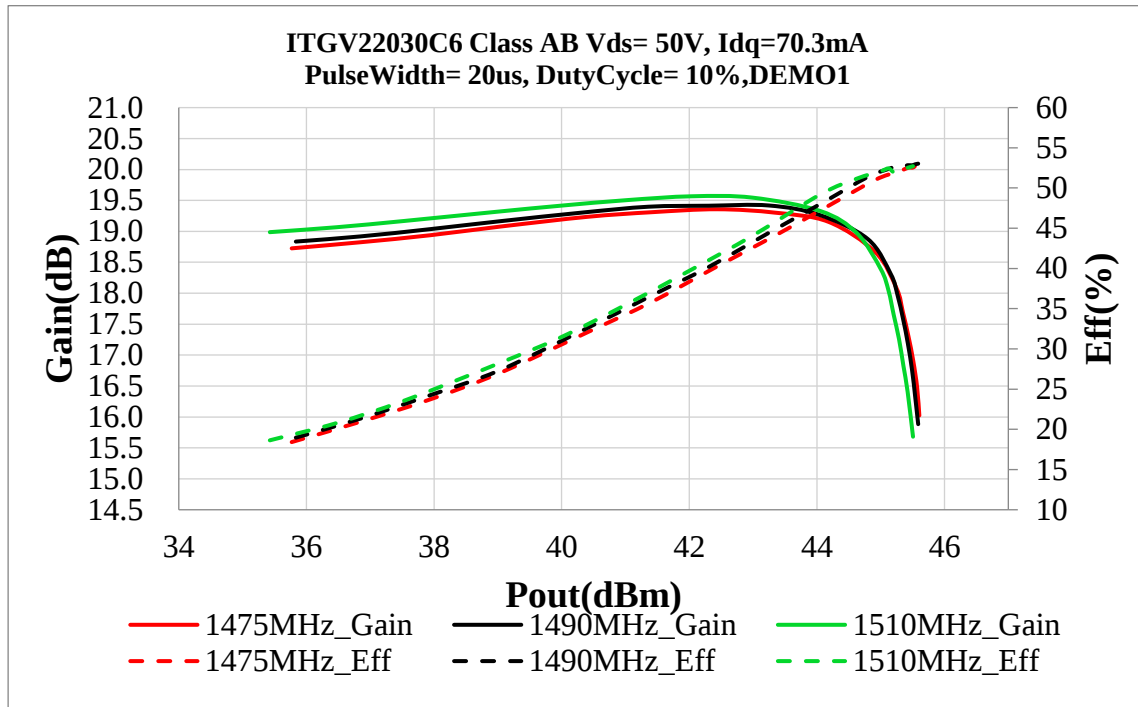
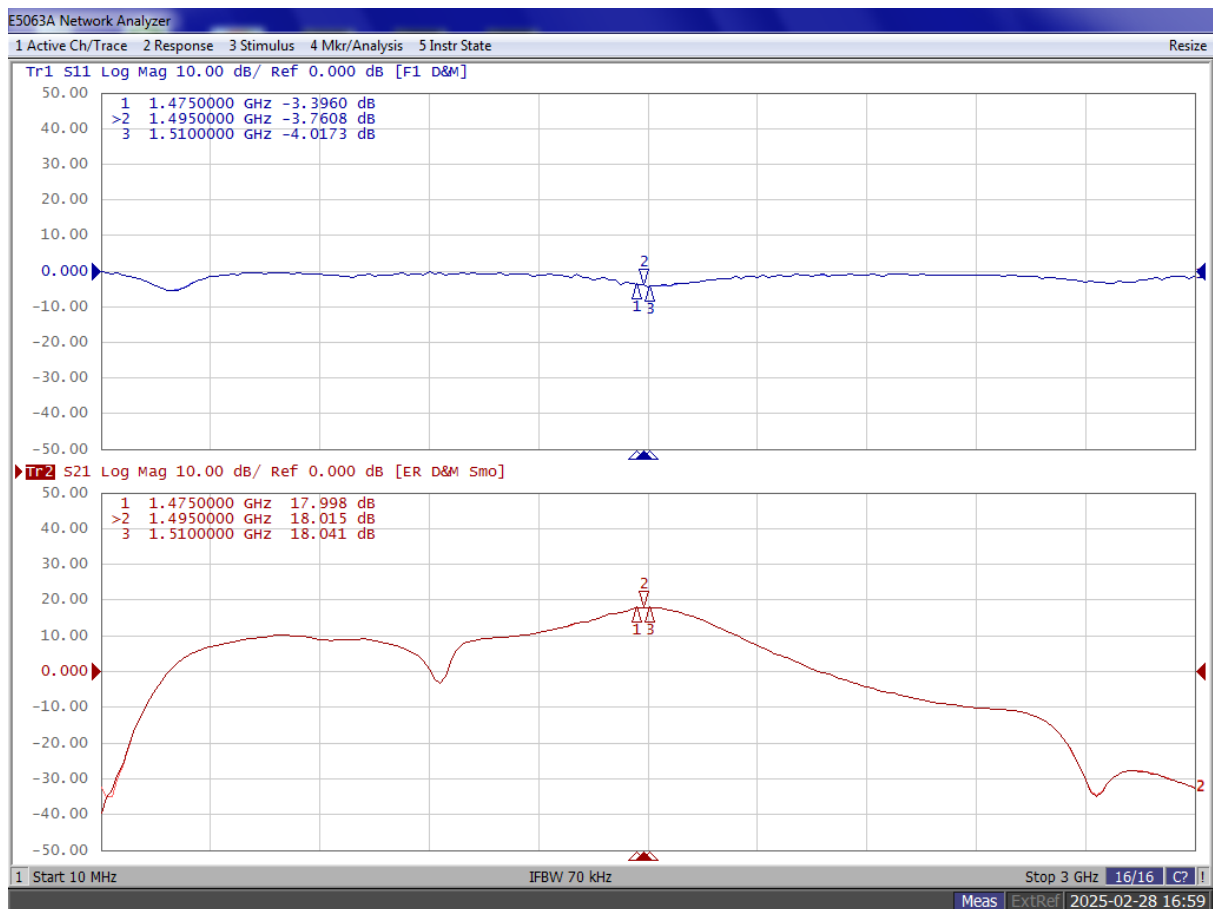
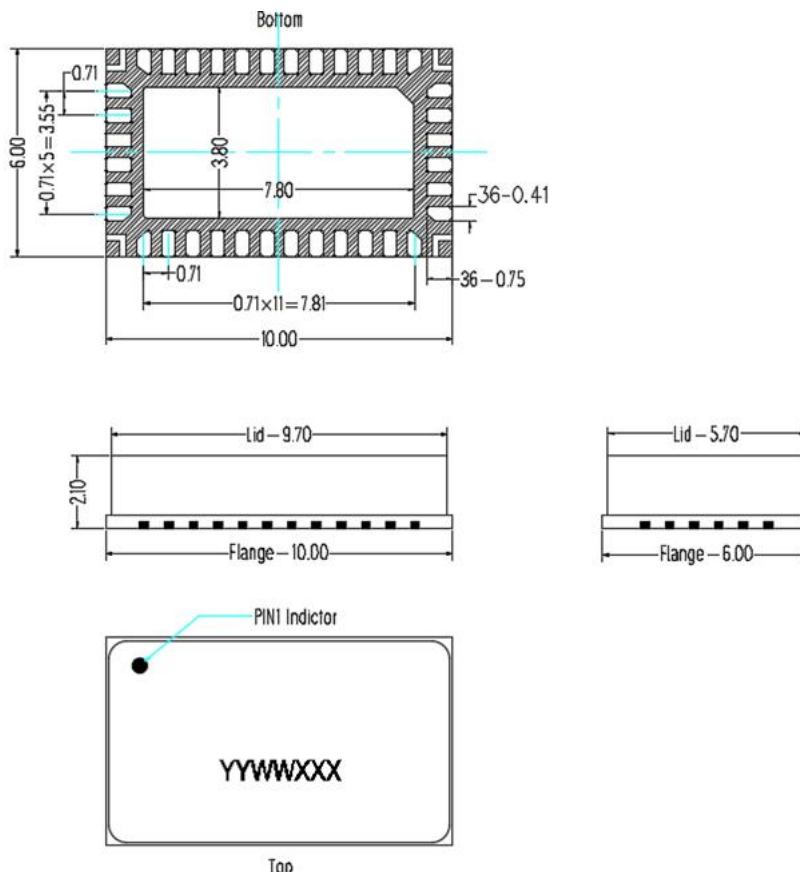


Figure 8. Network analyzer output S11/S21



Package Dimensions

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are $\pm 0.2\text{mm}$.

Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2022/12/27	Rev 1.0	Preliminary Datasheet
2025/2/28	Rev 1.1	Add 1.5G application data

Application data based on ZBB-22-17/20, ZYX-25-03

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