



50W,50V Plastic RF LDMOS Transistor

ITGV22050C6

Description

The ITGV22050C6 is a 50-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 1.8GHz Class AB RF Performance (On Innegration fixture with device soldered).

V_{ds}=50V

Freq (MHz)	Pulse CW Signal ⁽¹⁾			P _{avg} =35dBm WCDMA Signal ⁽²⁾		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	h _D (%)	ACPR _{5M} (dBc)
1805	16.55	69.44	58.97	18.23	14.05	-47.75
1842	16.36	65.58	58.85	18.29	14.61	-47.57
1880	16.31	61.62	58.48	18.30	15.01	-48.70

- Typical 2.1GHz Class AB RF Performance (On Innegration fixture with device soldered).

V_{ds}=50V

Freq (MHz)	Pulse CW Signal ⁽¹⁾			P _{avg} =35dBm WCDMA Signal ⁽²⁾		
	Gain P1dB (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	h _D (%)	ACPR _{5M} (dBc)
2110	17.02	63.62	56.65	18.74	14.20	-47.71
2140	16.52	60.53	57.33	18.73	14.77	-47.02
2170	16.58	56.19	55.96	18.72	15.10	-47.67

(1) I_{dq}=5mA, (2) I_{dq}=120mA

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 _{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 $T_C=85^{\circ}\text{C}$, $T_J=200^{\circ}\text{C}$, DC test	$R_{\theta JC}$	1.1	$^{\circ}\text{C}/\text{W}$

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 ($V_{DD} = 50\text{V}$, $I_D = 120\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	3.4	—	V

Load Mismatch (In Innogrations Test Fixture, 50 ohm system): $V_{DD} = 50\text{Vdc}$, $I_{DQ} = 120\text{mA}$, $f = 2200\text{MHz}$

VSWR 10:1 at 50W 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.

1.8GHz application board

Reference Circuit of Test Fixture Assembly Diagram 20mils RO4350B

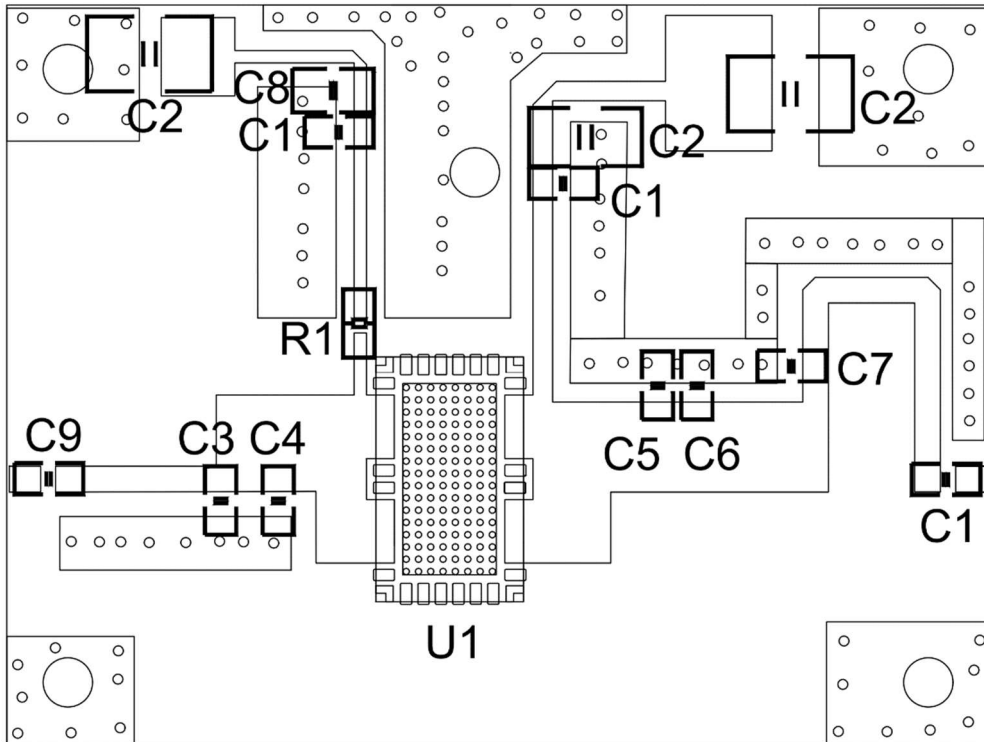


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	15pF/250V	3
C2	1210	10uF/100V	3
C3	0805	1.5pF/250V	1
C4	0805	2.4pF/250V	1
C5	0805	2.0pF/250V	1
C6	0805	2.0pF/250V	1
C7	0805	2.4pF/250V	1
C8	0805	10uF/16V	1
C9	0805	3.0pF/250V	1
R1	0603	10R	1
U1	C6	ITGV22050C6	1



TYPICAL CHARACTERISTICS

Figure 3. Power Gain and Drain Efficiency as function of Power Output at different Idq (Left: 5mA, right:120mA)

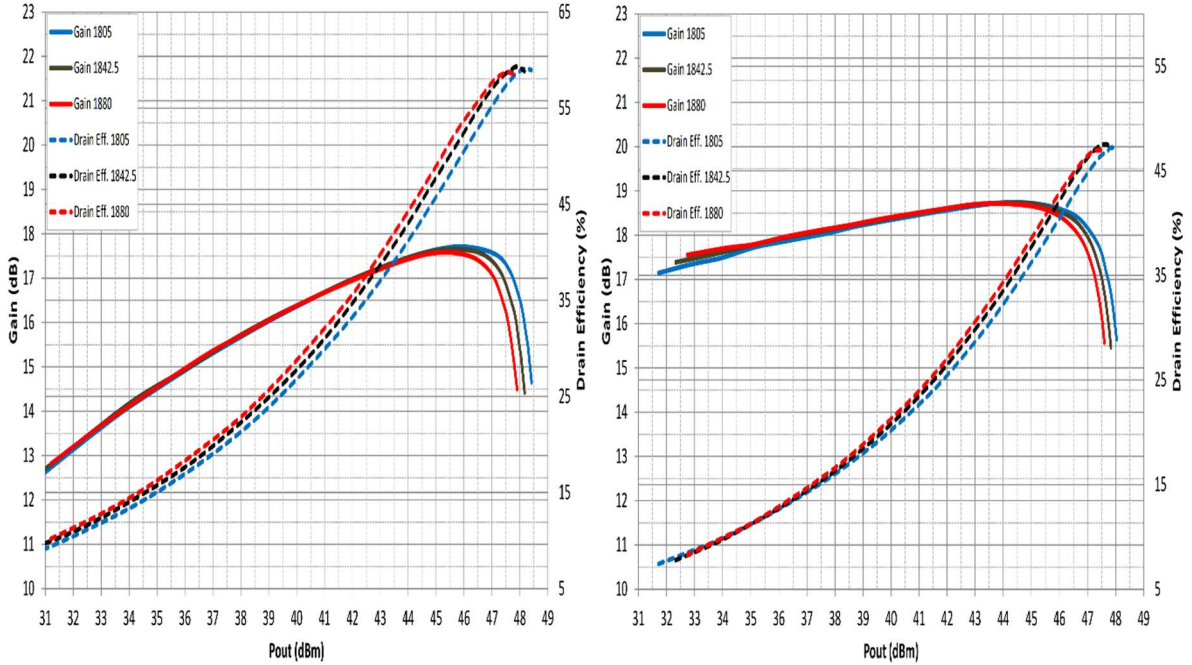
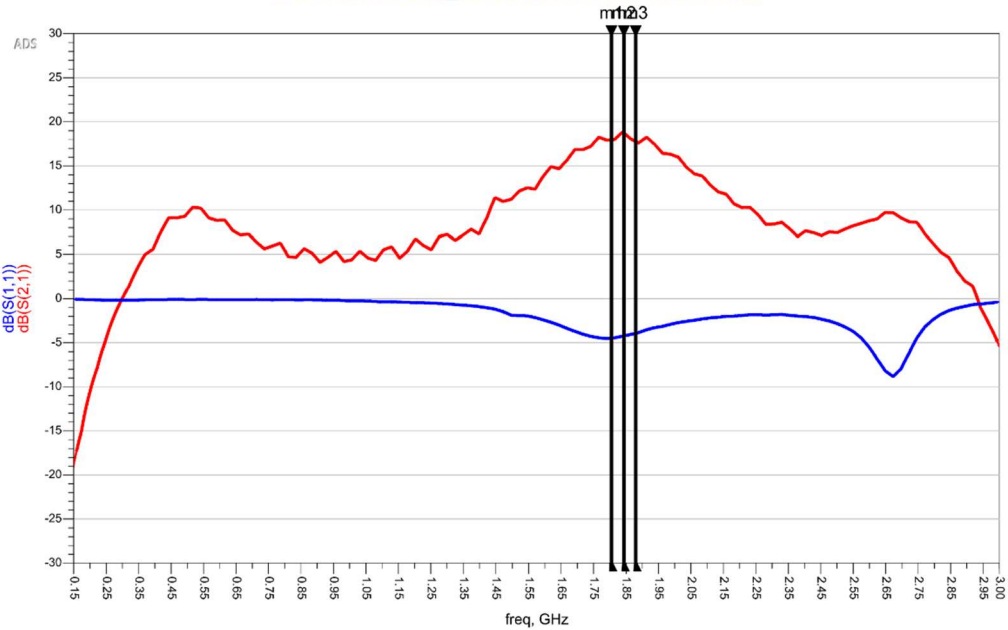


Figure 4. Network analyzer output S11/S21

m1 freq=1.805 GHz dB(S(2,1))=17.972 dB(S(1,1))=-4.478	m2 freq=1.843 GHz dB(S(2,1))=18.738 dB(S(1,1))=-4.234	m3 freq=1.880 GHz dB(S(2,1))=17.765 dB(S(1,1))=-3.931
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S-Parameters_ITGV22050C6 Class AB



2.1GHz application board

Reference Circuit of Test Fixture Assembly Diagram 20mils RO4350B

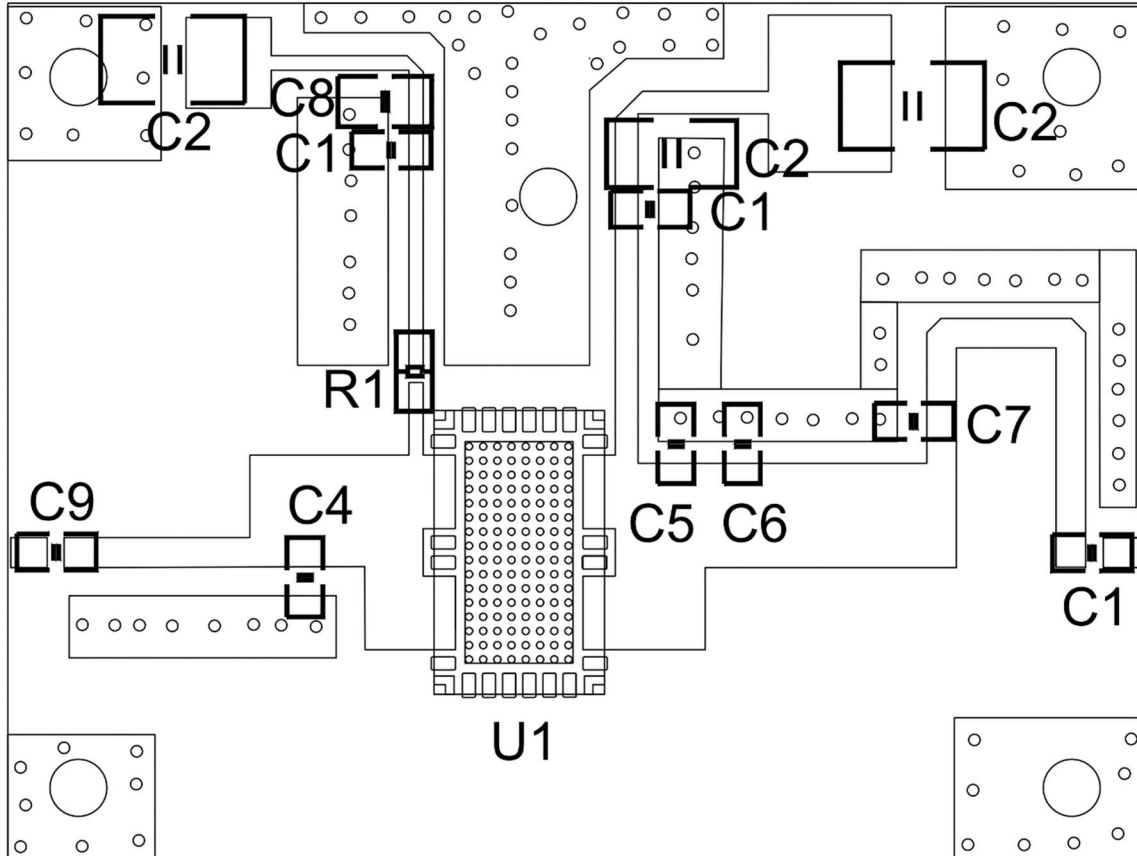


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0805	15pF/250V	3
C2	1210	10uF/100V	3
C4	0805	2.0pF/250V	1
C5	0805	2.0pF/250V	1
C6	0805	3.6pF/250V	1
C7	0805	1.5pF/250V	1
C8	0805	10uF/16V	1
C9	0805	3.0pF/250V	1
R1	0603	10R	1
U1	C6	ITGV22050C6	1



TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at different Idq (Left: 5mA, right:120mA)

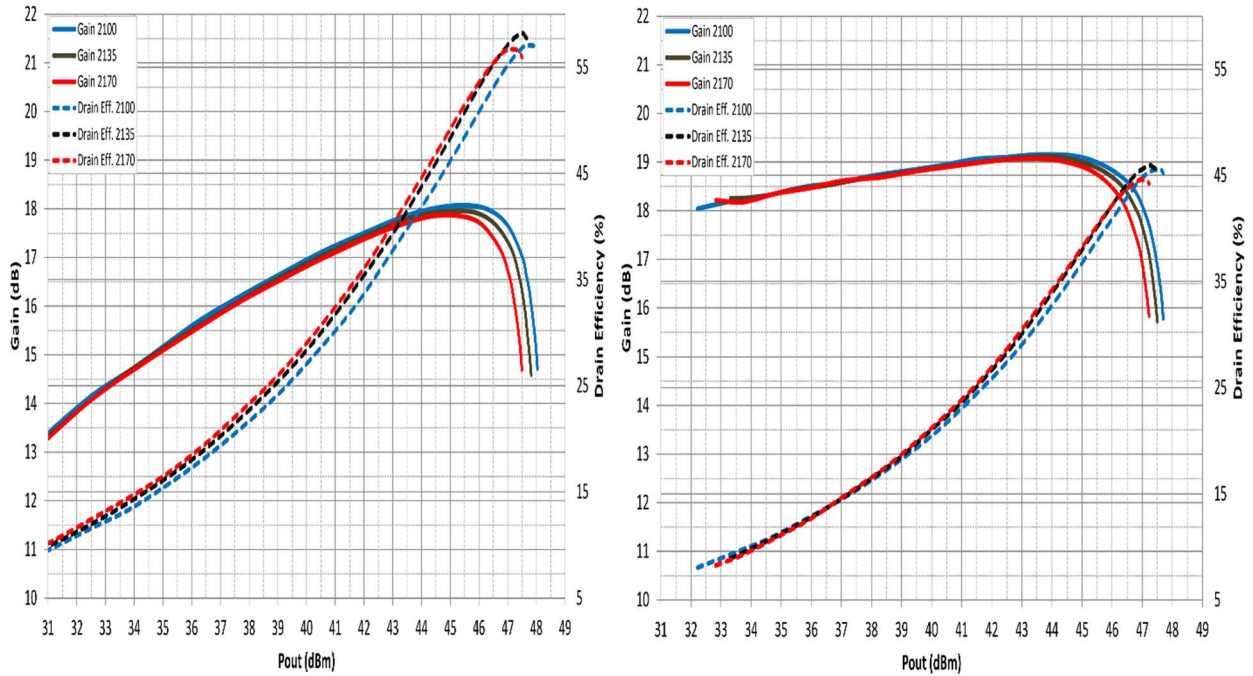
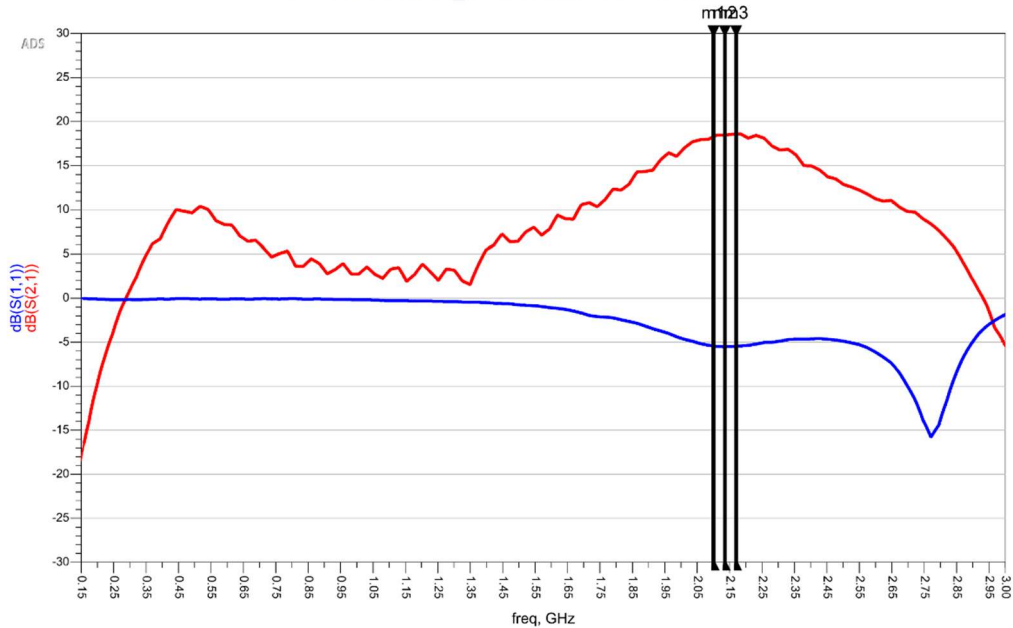


Figure 5. Network analyzer output S11/S21

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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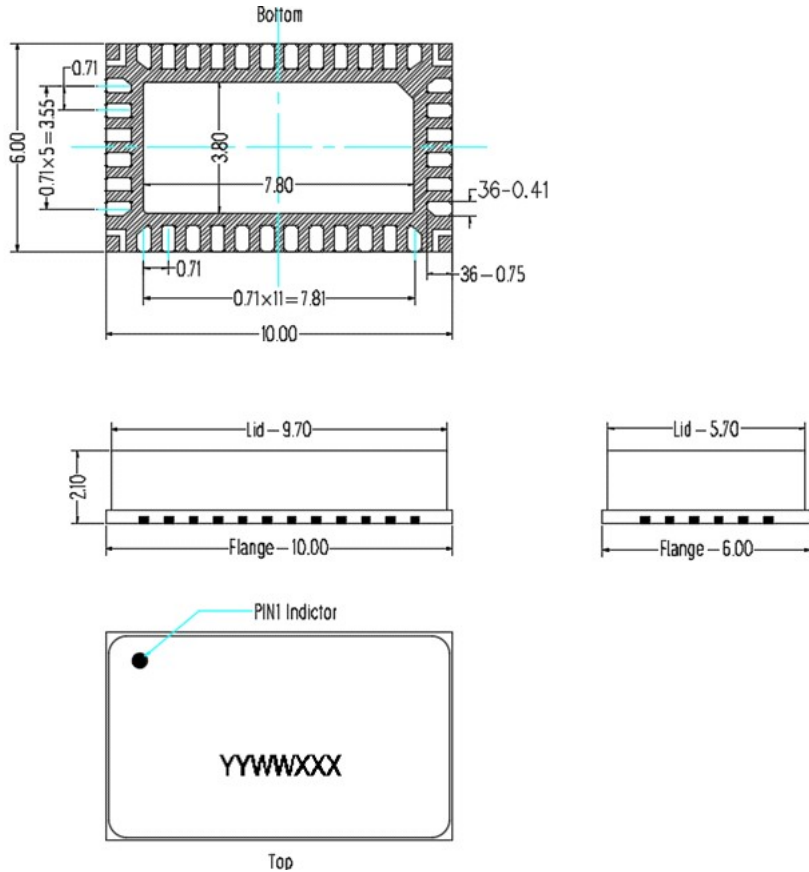
S-Parameters_ITGV22050C6 Class AB





Package Dimensions

10*6 Plastic Package



Notes:

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

Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2022/12/13	Rev 1.0	Preliminary Datasheet

Application data based on ZBB-22-18&19

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