



6W,28V Plastic RF LDMOS Transistor

ITEH38006C6

Description

The ITEH38006C6 is a 6-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies up to 3.8GHz, in 10*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

It is part of low power general purpose plastic LDMOS with pin to pin compatibility.

• Typical 3.4-3.6GHz Class AB RF Performance (On Innogrator fixture with device soldered).

VDS=28V, IDQ=50mA Pulsed CW: 100 us width, 20% duty cycle.

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
3400	38.14	6.5	53.9	16.07	38.75	7.5	53.8
3500	37.56	5.7	54.1	16.42	38.36	6.9	54.1
3600	37.12	5.2	52.1	16.32	38.24	6.7	54.1



WCDMA 1 carrier at different back off: (PAR=10.8db @0.01% probability)

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
3400	26	10.17	-48.3	17.2	13.5
3500	26	10.05	-46.9	17.5	14.4
3600	26	9.77	-46.3	17.4	14.9

• Typical 3.6-3.8GHz Class AB RF Performance (On Innogrator fixture with device soldered).

VDS=28V, IDQ=50mA Pulsed CW: 100 us width, 20% duty cycle.

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
3600	39.29	8.49	53.3	15.09	39.89	9.75	54.66
3700	38.64	7.66	55.03	15.96	39.57	9.07	56.32
3800	38.1	6.46	52.75	15.42	39.05	8.03	54.46

Features

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

Suitable Applications

- Broadcast and Industrial, Scientific and Medical
- All 4G/5G cellular application below 3.8GHz

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V _{DSS}	+65	Vdc
Gate--Source Voltage	V _{GS}	-10 to +10	Vdc
Operating Voltage	V _{DD}	+28	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 _{θJC}	3.5	°C/W

Table 3. ESD Protection Characteristics

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
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DC Characteristics

Drain-Source Voltage V _{GS} =0, I _{DS} =100uA	V _{(BR)DSS}		65		V
Zero Gate Voltage Drain Leakage Current (V _{DS} = 28V, V _{GS} = 0 V)	I _{loss}	—	—	1	μA
Gate--Source Leakage Current (V _{GS} = 11 V, V _{DS} = 0 V)	I _{gss}	—	—	1	μA
Gate Threshold Voltage (V _{DS} = 28V, I _D = 600 μA)	V _{GS(th)}	—	2	—	V
Gate Quiescent Voltage (V _{DD} = 28V, I _D = 50mA, Measured in Functional Test)	V _{GS(Q)}	—	2.7	—	V

Load Mismatch (In Innegration Test Fixture, 50 ohm system): V_{DD} = 28Vdc, I_{DQ} = 100 mA, f = 3600 MHz

VSWR 10:1 at 20W 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.

**Reference Circuit of Test Fixture Assembly Diagram
3400-3600MHz RO4350B 20mils**

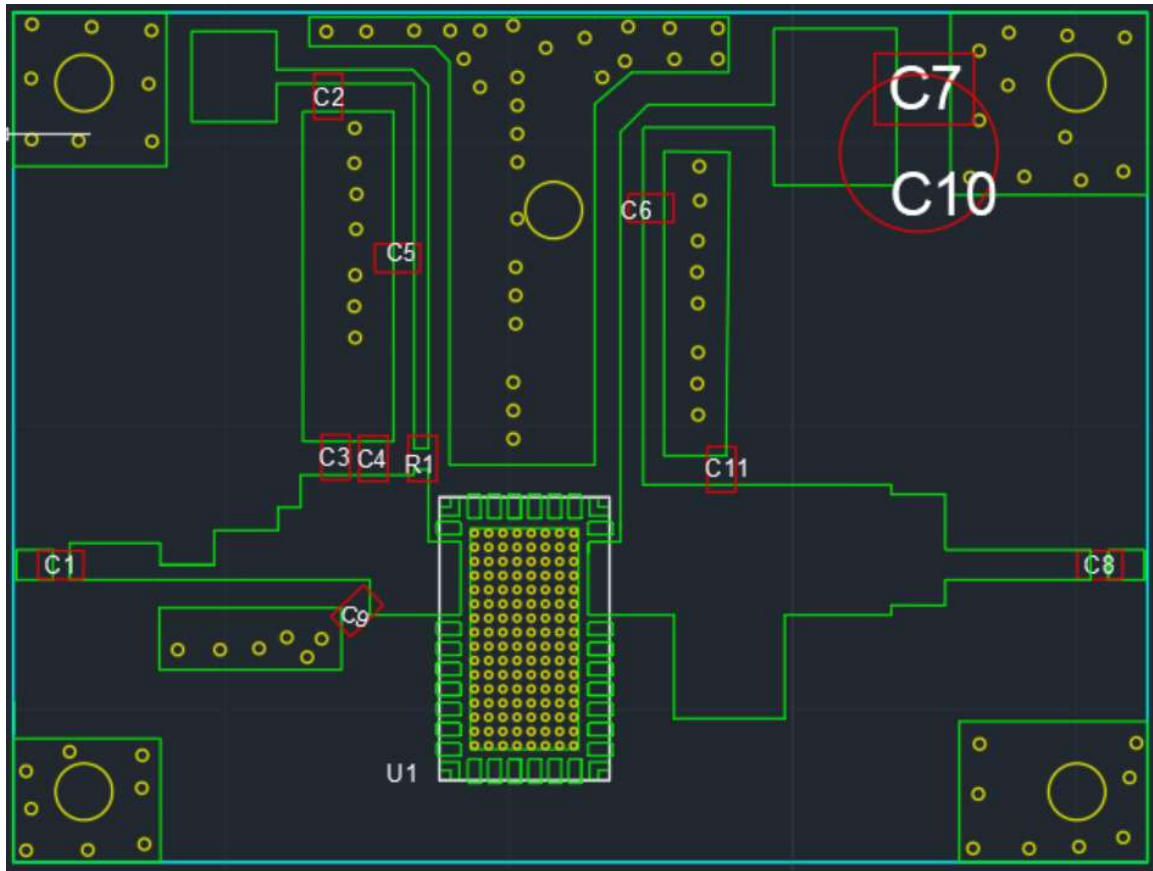


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

BOM		
C2,C7	10uF/63V	1210
C1,C8,C5,C6	8.2pF	0603
R1	10 ohm	0603
C3	0.2pF	0805
C4, C9	0.5pF	0603
C10	470uF	
C11	0.5 pF	0805

TYPICAL CHARACTERISTICS

Figure 3. Power Gain and Drain Efficiency as function of Power Out

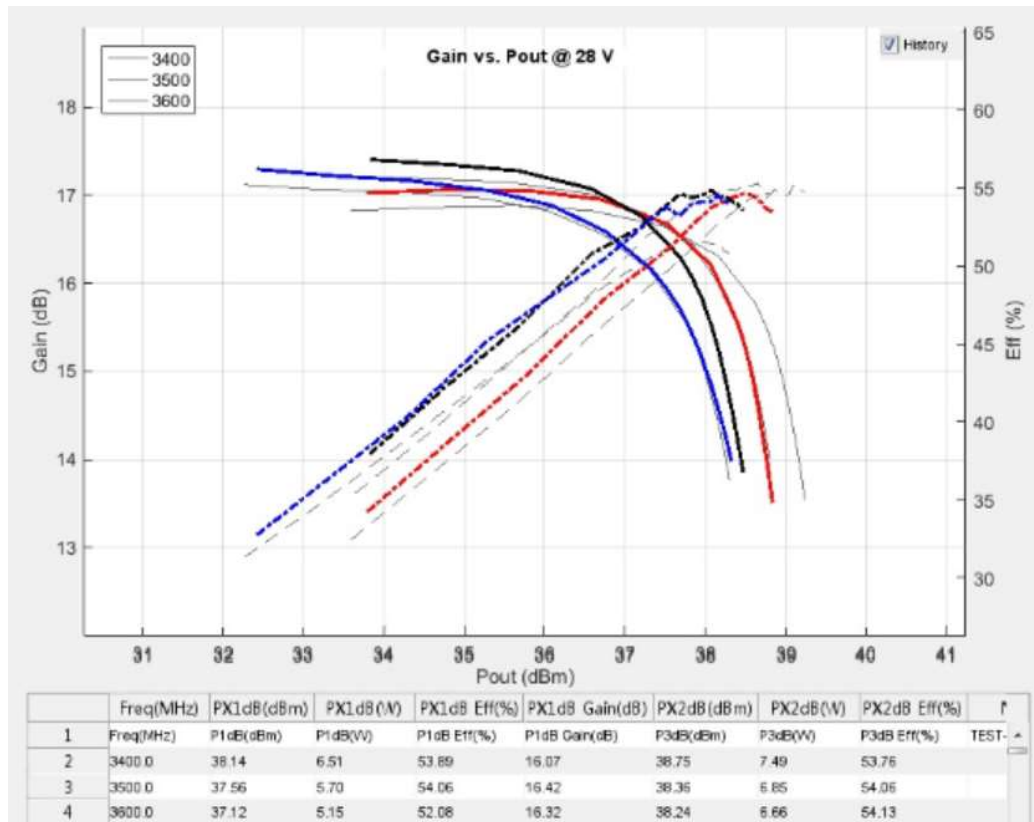
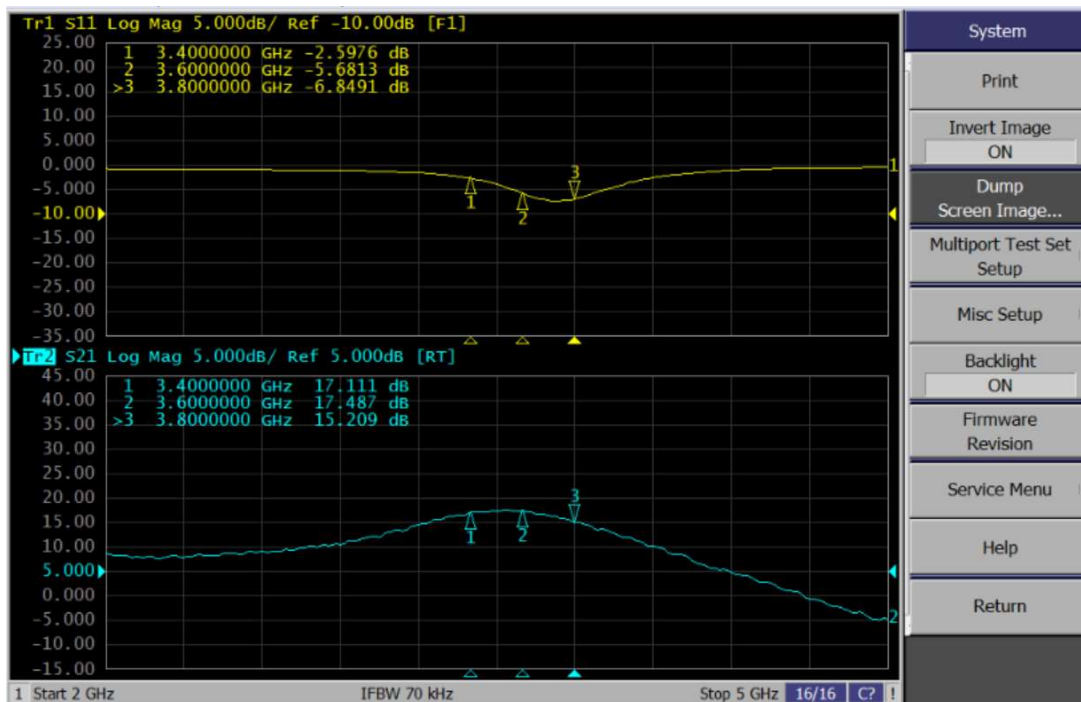


Figure 4. Network analyzer output S11/S21



**Reference Circuit of Test Fixture Assembly Diagram
3600-3800MHz RO4350B 20mils**

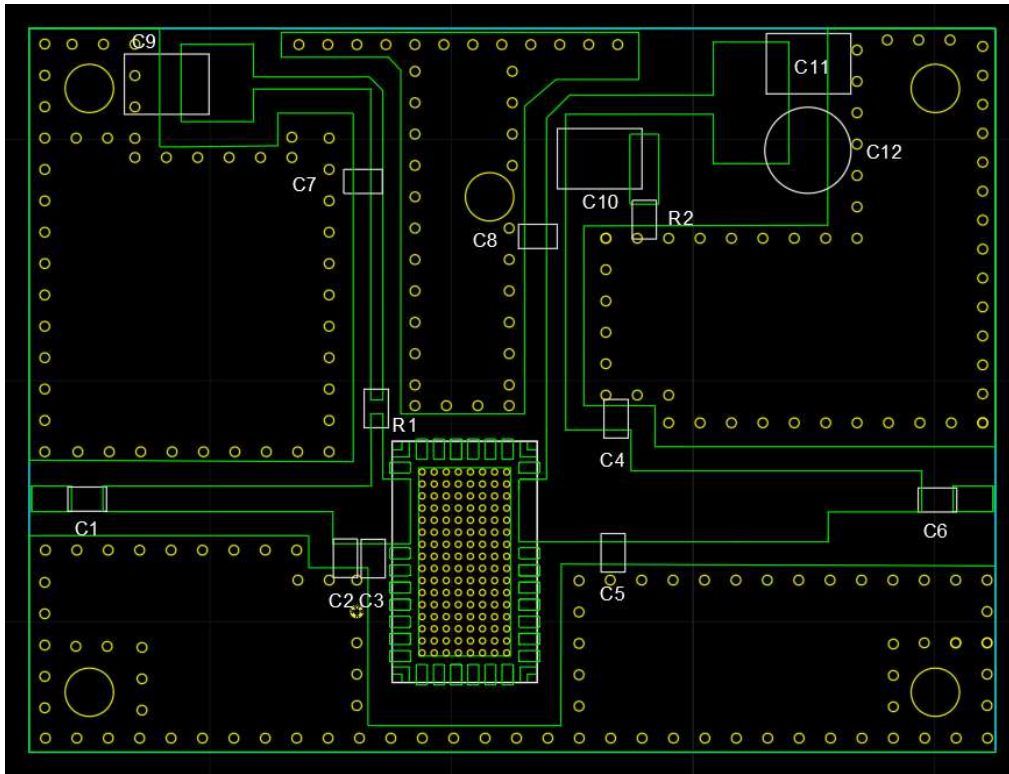


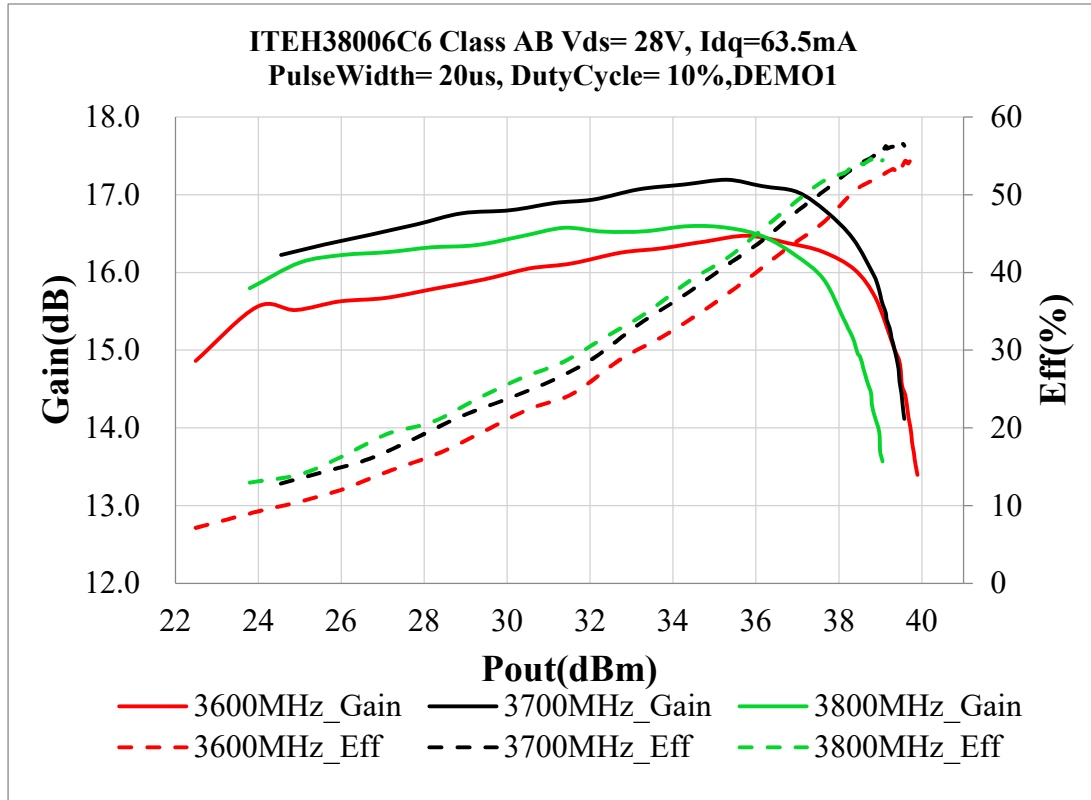
Figure 5. Test Circuit Component Layout

Table 6. Test Circuit Component Designations and Values

Component	Value	Quantity
U1	ITEH38006C6	1
C1、C6、C7、C8	8.2pF	4
C9、C10、C11	10uF/63V	3
R1、R2	10 Ω	2
C12	470uF/63V	1
C2	0.3pF	1
C3、C4	1.2pF	2
C5	0.5pF	1

TYPICAL CHARACTERISTICS

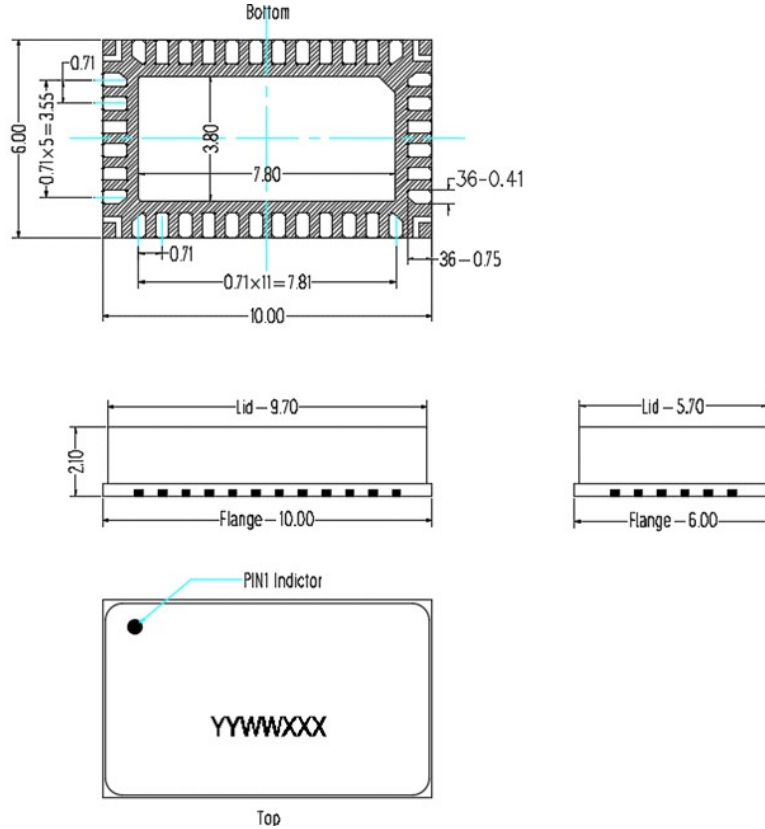
Figure 7. Power Gain and Drain Efficiency as function of Power Out





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
2022/2/19	Rev 1.0	Preliminary Datasheet
2022/12/9	Rev 1.1	Update on Pin Definition
2023/5/31	Rev 1.2	Add 3.6-3.8GHz application data

Application data based on ZXY-22-05/23-05

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