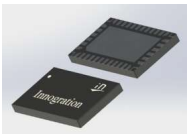
12W,28V Plastic RF LDMOS Transistor

ITEH38012C6



Description

The ITEH38012C6 is a 12-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 Innogration fixture with device soldered).

VDS=**28V**, IDQ=90mA

Pulsed CW: 100 us width, 20% duty cycle.

Freq(MHz)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	Psat(dBm)	Psat(W)	Psat Eff(%)
3400	41.47	14.0	46.6	14.48	42.57	18.1	50.0
3500	41.3	13.5	49.5	14.32	42.37	17.3	53.1
3600	40.82	12.1	48.1	13.89	41.92	15.6	51.1

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	30	10.04	-49.8	15.3	14.0
3500		10.02	-50.5	15.1	15.1
3600		9.89	-50.1	14.7	15.6
3400	29	10.06	-50.2	15.4	12.4
3500		10.03	-51.3	15.1	13.6
3600		9.97	-50.8	14.8	14.1
3400	28	10.05	-50.4	15.3	10.8
3500		10.02	-50.9	15.2	11.9
3600		10.02	-50.3	14.8	11.8

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

- Broadcast and Industrial, Scientific and Medical applications in the frequency range from HF to 3.8GHz
- 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	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	$R_{\theta JC}$	1.8	°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	$V_{(BR)DSS}$		65		V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28V, 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} = 28V, I_D = 600 μA)	$V_{GS(th)}$	——	2	——	V
Gate Quiescent Voltage (V_{DD} = 28V, I_D = 70mA, Measured in Functional Test)	$V_{GS(Q)}$	——	2.7	——	V

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

VSWR 10:1 at 12W 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.

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

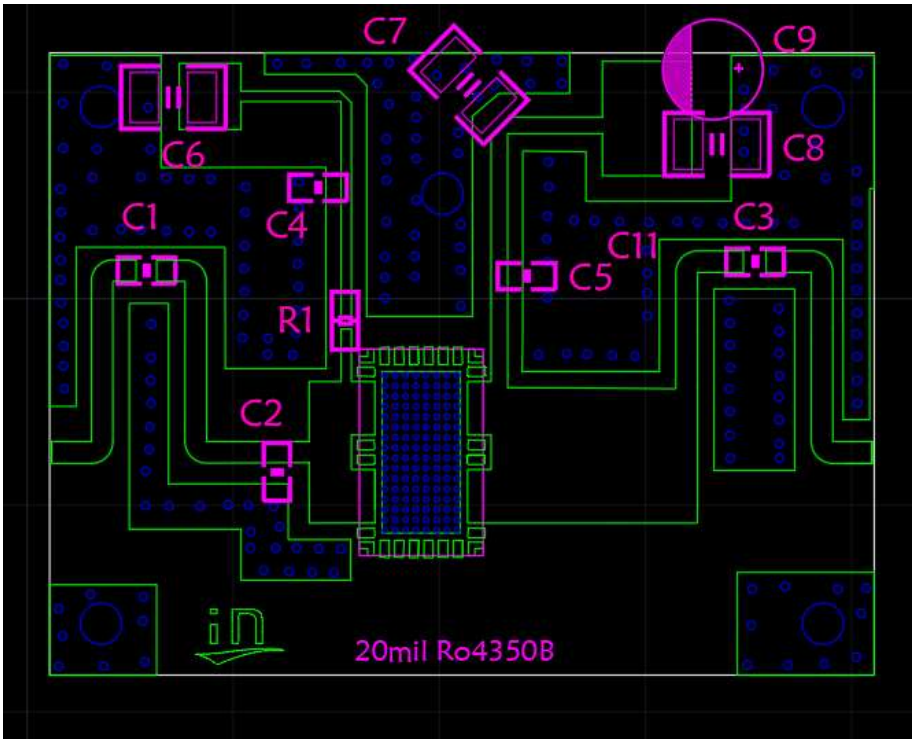


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1	0603	5.6pF	1
C3, C4, C5	0603	8.2pF	3
C2	0603	0.3pF	1
C6, C7, C8	1210	10uF/100V	3
C9		470uF/63V	1
R1	0603	10Ω	1
U1	C6	ITEH38012C6	1

TYPICAL CHARACTERISTICS

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

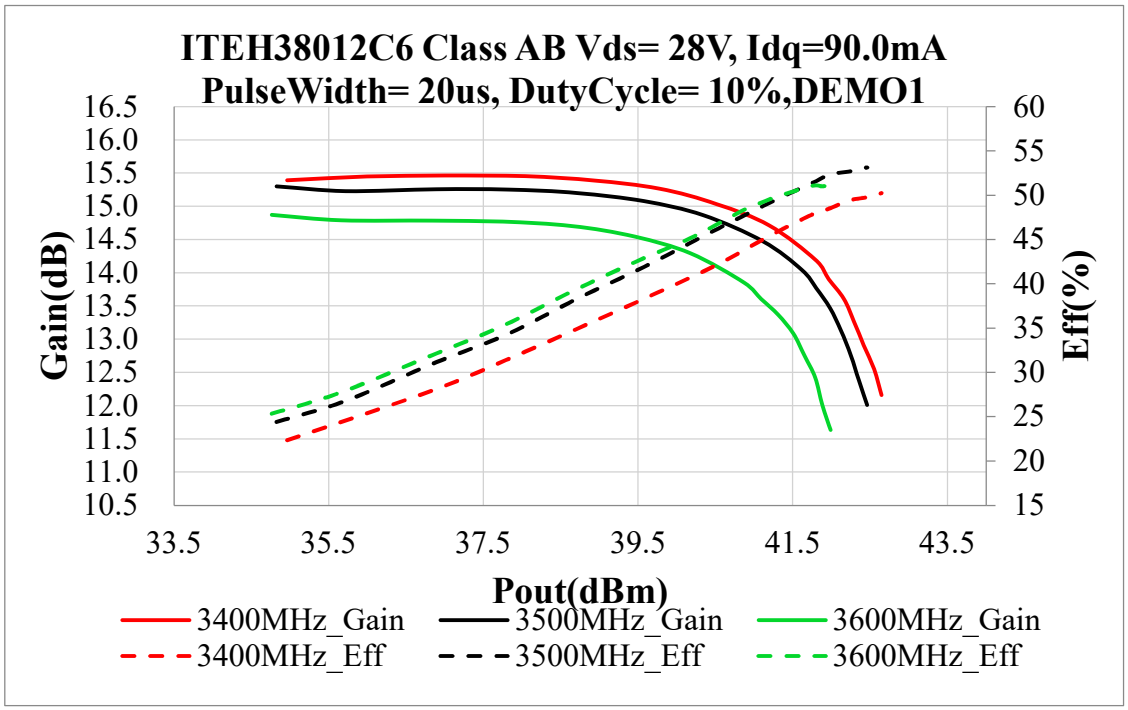
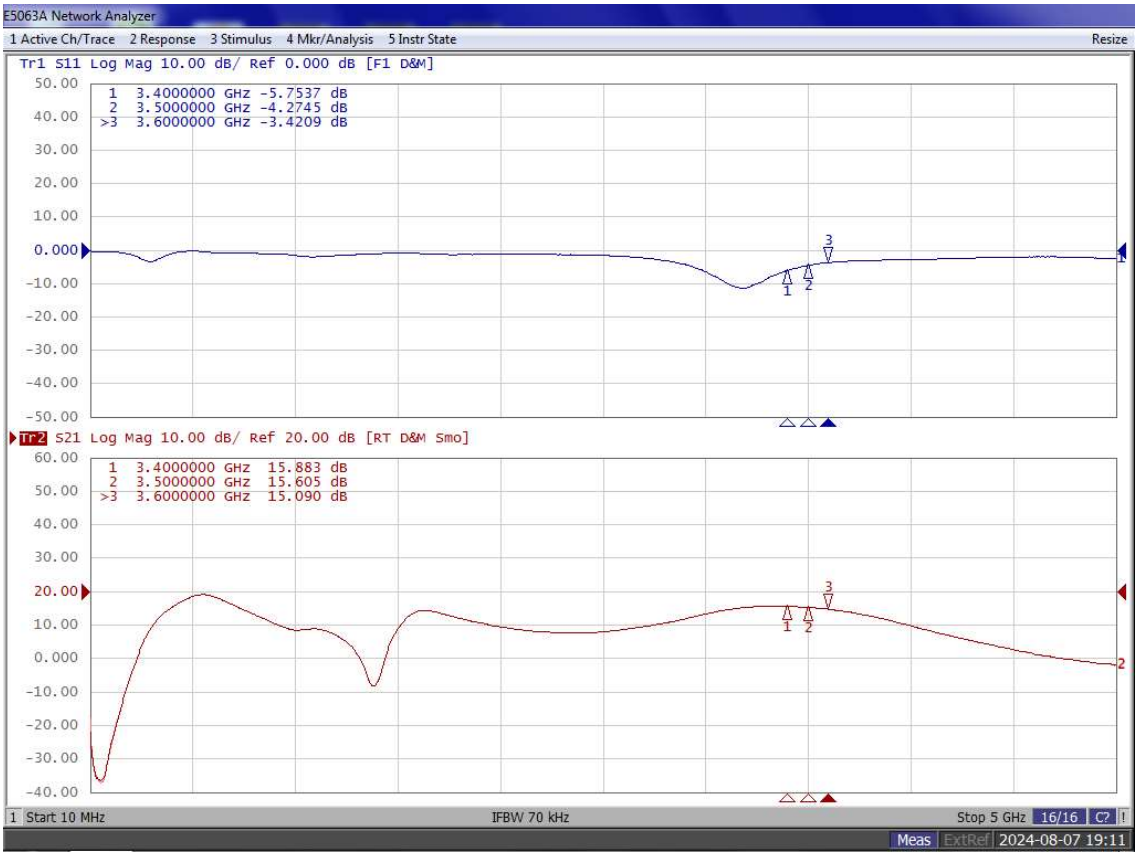
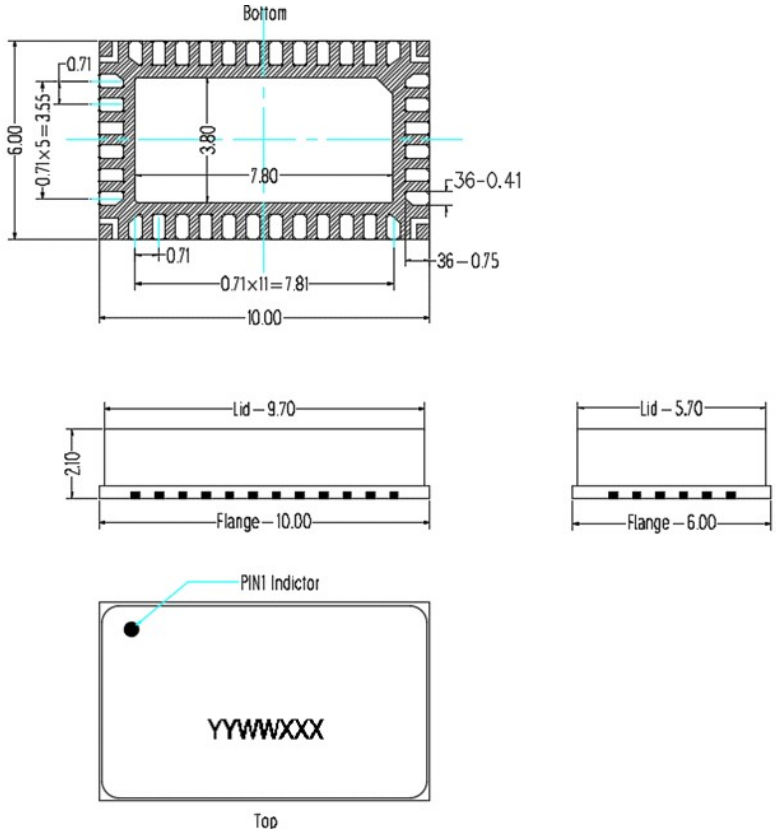


Figure 4.Network analyzer output S11/S21



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
2022/2/19	**Rev 1.0**	**Preliminary Datasheet**
2022/12/9	**Rev 1.1**	Update on pin definition
2024/8/8	**Rev 1.2**	Update for new tuning of better linearity

Application data based on ZXY-22-06/ZYX-24-52

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