



40W,28V Plastic RF LDMOS Transistor

ITEH38040C6

Description

The ITEH38040C6 is a 40-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies 3.3 to 3.8GHz, in 10*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.



- Typical Class AB RF Performance (On Innegration **3.3-3.6GHz** fixture with device soldered).

VDS=28V, IDQ=300mA, 1 carrier WCDMA **high linearity tuning**

Freq (MHz)	Pout (dBm)	ACPR (dBc)	Gain (dB)	Efficiency (%)
3300	35	-48.74	13.93	12.66
3450	35	-48.79	13.37	12.99
3600	35	-48.19	12.47	13.57

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

VDS=28V, IDQ=300mA, 1 carrier WCDMA

Freq (MHz)	Pout (dBm)	ACPR (dBc)	Gain (dB)	Efficiency (%)
3600	36	-42.22	14.88	13.9
3700	36	-42.59	14.55	14.28
3800	36	-41.67	14.48	14.87

Features

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

Suitable Applications

- S band power amplifier
- All 4G/5G cellular application within 3.3 to 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}	0.5	°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
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 = 350mA, Measured in Functional Test)	V _{GS(Q)}	---	2.7	---	V

Load Mismatch (In Innogrations Test Fixture, 50 ohm system): V_{DD} = 28Vdc, I_{DQ} = 350 mA, f = 3600 MHz

VSWR 10:1 at 40W pulse CW Output Power	No Device Degradation
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Figure 1: Pin Definition(Top View)



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	Vgs/RF In	Vgs and RF input
26,27,28,29,32,33,34,35	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.

3.3-3.6GHz application board

Reference Circuit of Test Fixture Assembly Diagram 20mils RO4350B

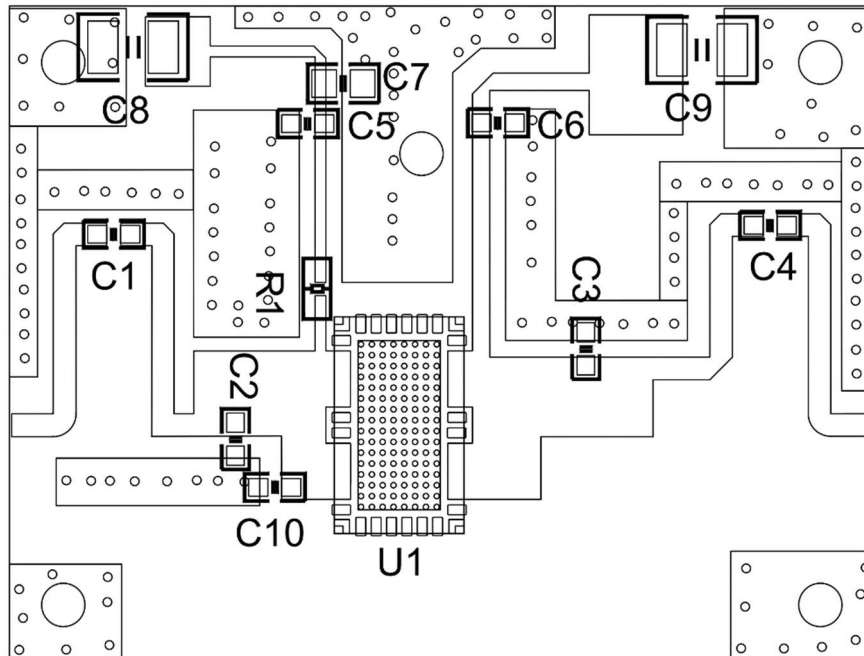


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C2	0603	0.4pF/250V	1
C3	0603	0.8pF/250V	1
C10	0603	1.3pF/250V	1
C1, C4, C5, C6	0603	8.2pF/250V	4
C7	0805	10uF/16V	1
C8, C9	1210	10uF/100V	2
R1	0603	10ohm	1
U1	C6	ITEH38040C6	1



TYPICAL CHARACTERISTICS

Figure 3. Power Gain and Drain Efficiency as function of Power Output (Vds=28V, Idq=300mA)

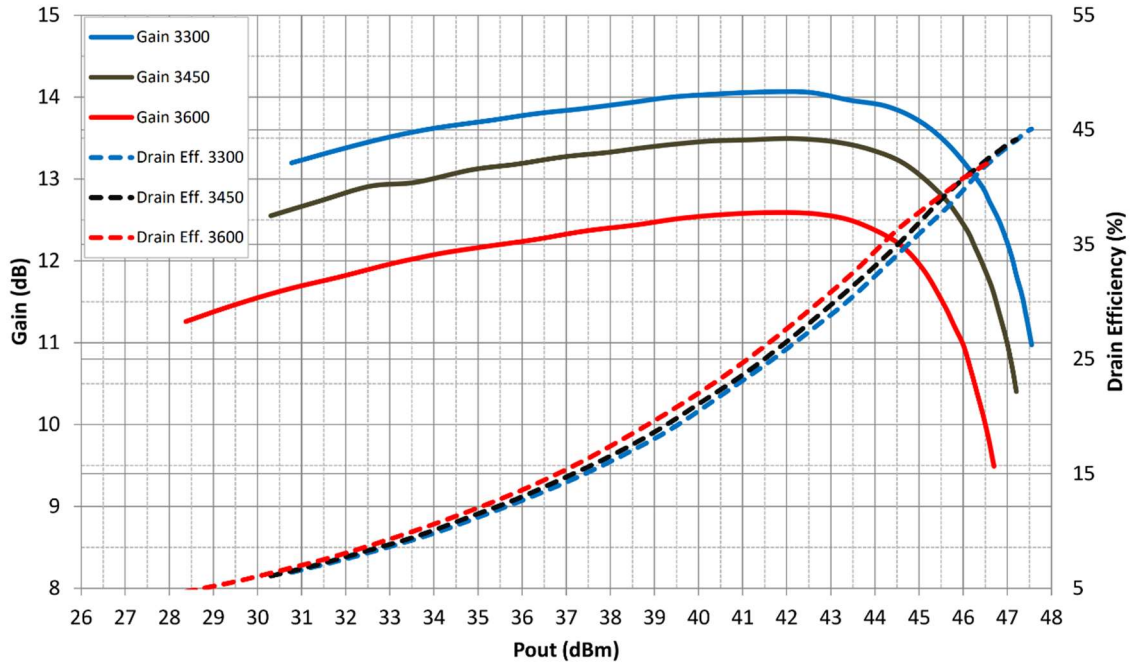
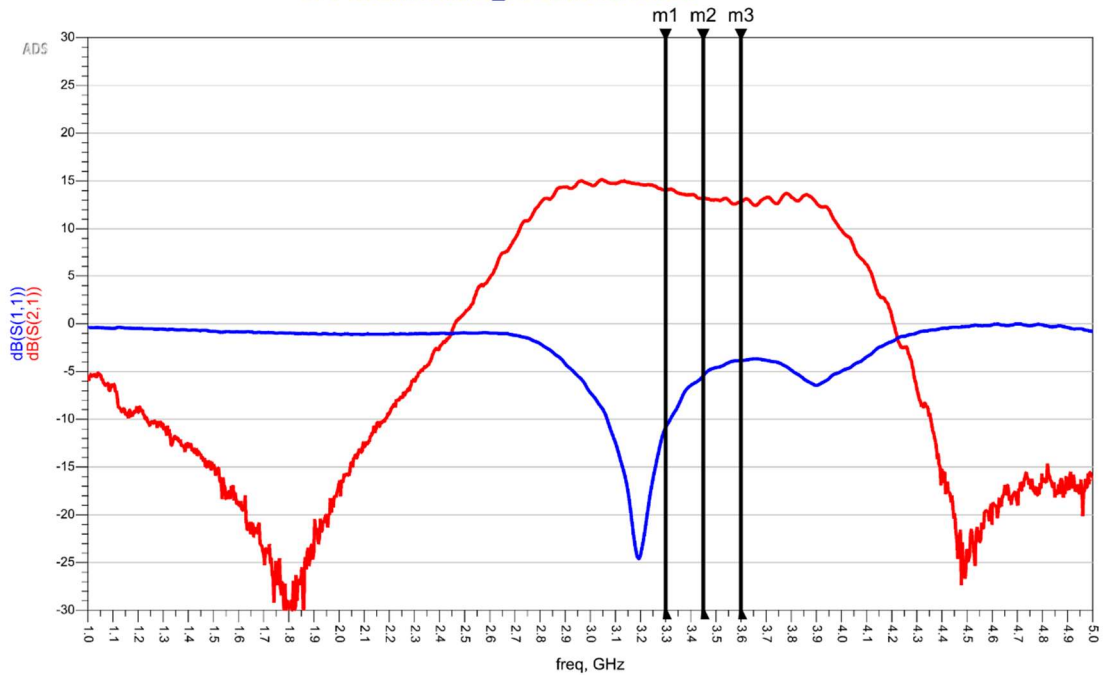


Figure 4. Network analyzer output S11/S21

m1 freq=3.300 GHz dB(S(2,1))=14.014 dB(S(1,1))=-10.856	m2 freq=3.450 GHz dB(S(2,1))=13.207 dB(S(1,1))=-5.430	m3 freq=3.600 GHz dB(S(2,1))=12.886 dB(S(1,1))=-3.866
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S-Parameters ITEH38040C6



3.6-3.8GHz application board

Reference Circuit of Test Fixture Assembly Diagram 20mils RO4350B

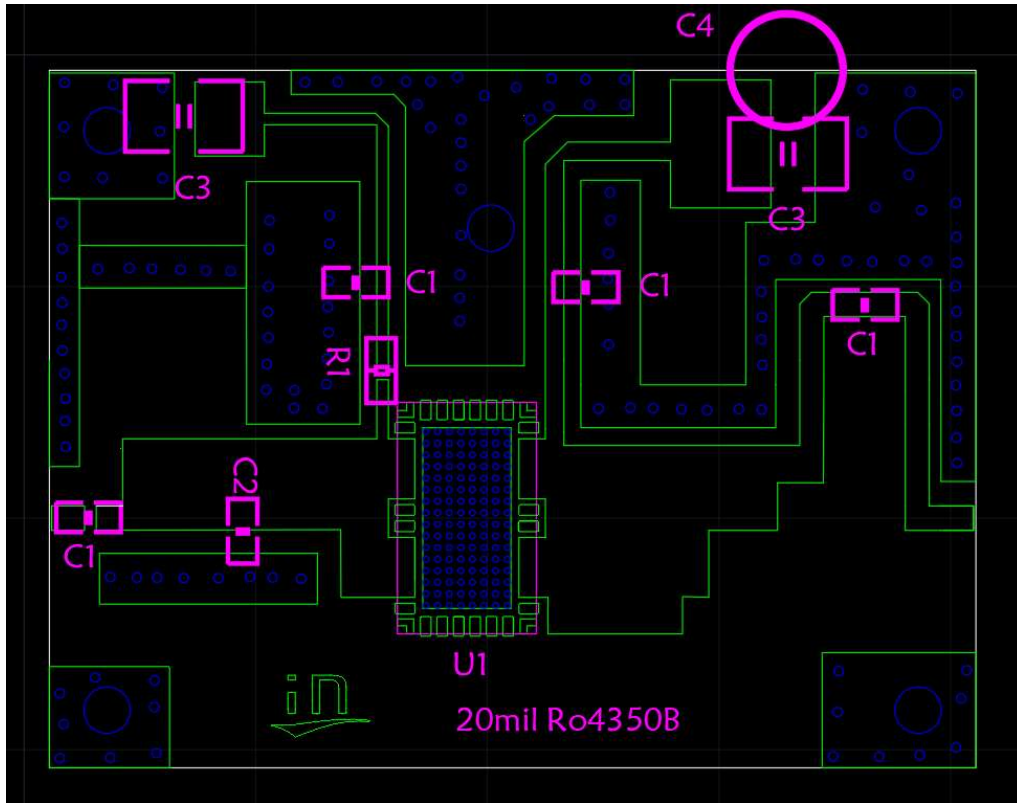


Figure 5. Test Circuit Component Layout

Table 6. Test Circuit Component Designations and Values

Component	Value	Quantity
U1	ITEH38040C6	1
C1	8.2pF	4
C2	0.3pF	1
C3	10uF/63V	2
C4	470uF/63V	1
R1	10Ω	1



TYPICAL CHARACTERISTICS

Figure 7 . Power Gain and Drain Efficiency as function of Power Output (Vds=28V, Idq=300mA)

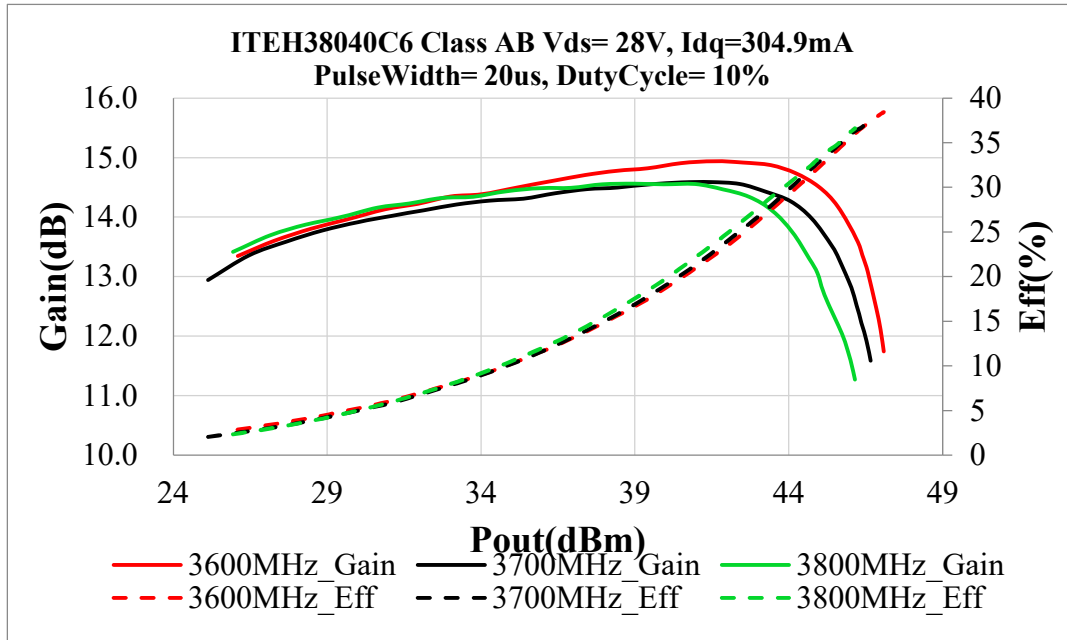
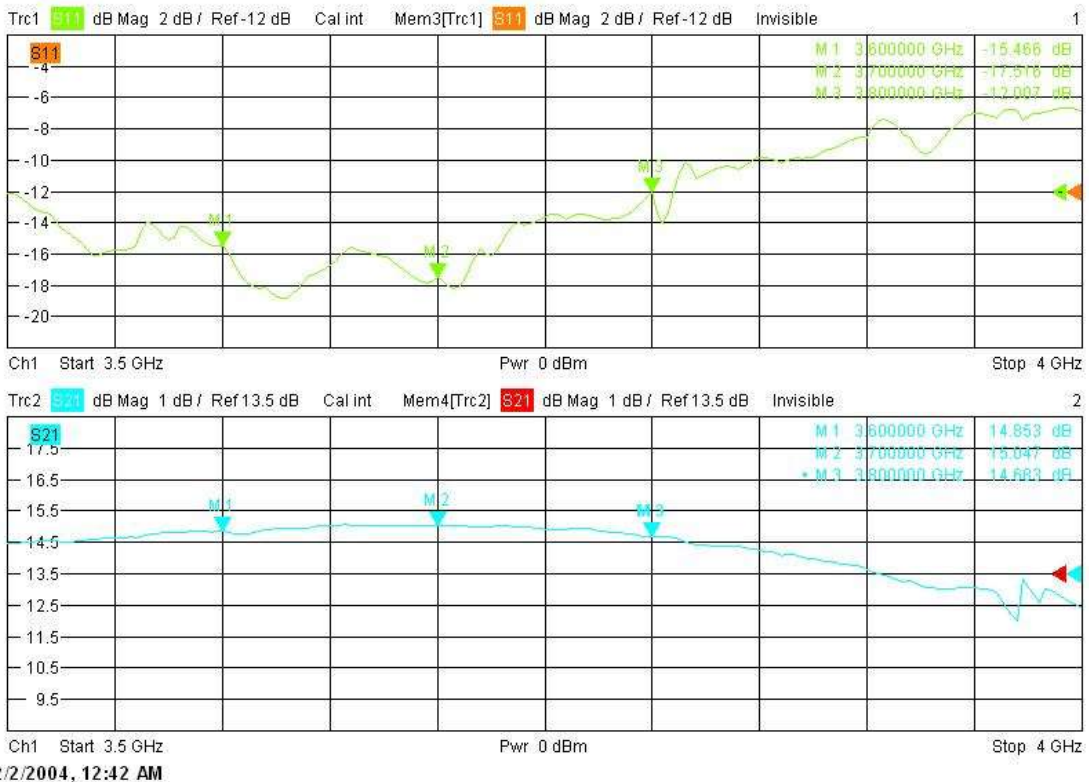
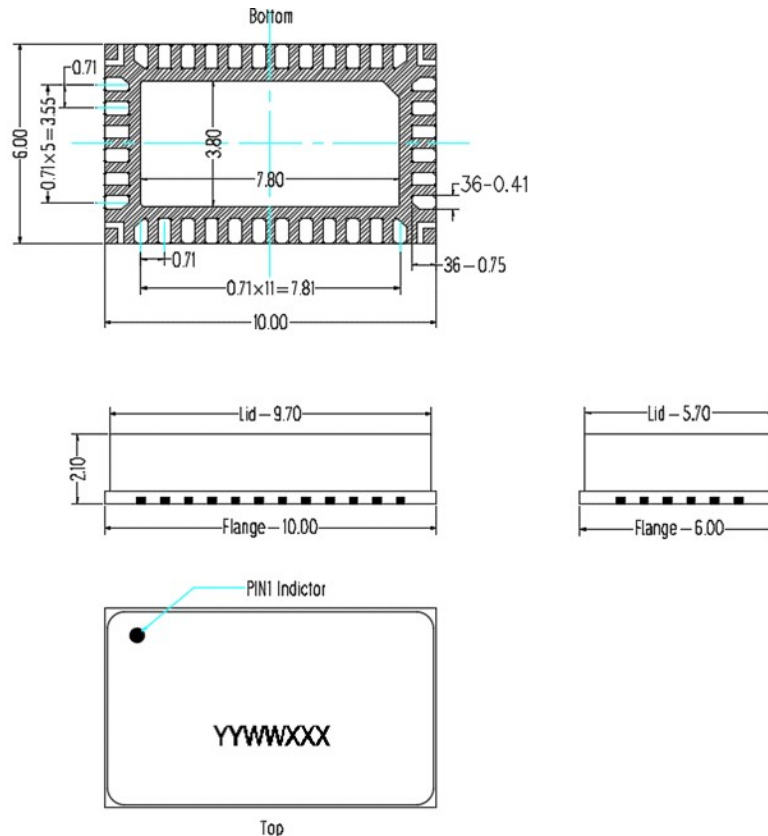


Figure 8 Network analyzer output S11/S21



Package Dimensions

10*6 Plastic Package



Notes:

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

Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2023/3/30	Rev 1.0	Preliminary Datasheet
2023/5/10	Rev 1.1	Add 3.6-3.8GHz application data
2023/6/26	Rev 1.2	Update 3.3-3.6GHz application data for high linearity

Application data based on ZBB-23-10/ZXY-23-05/ZBB-23-10

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