



## 60W,28V Plastic RF LDMOS Transistor

**ITEH36060C6**

### Description

The ITEH36060C6 is a dual path 60-watt, highly rugged, LDMOS transistor, designed for driver applications at frequencies from 3.3 to 3.6GHz, in 10\*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

**It can be configured as highly compact symmetrical Doherty ,ideal for high efficiency and low cost, DPD friendly driver stage of macro RRU or final stage of small cell for 4G/5G application within 3.3-3.6GHz.**



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

V<sub>ds</sub>=28V Id<sub>q\_main</sub>=180mA, V<sub>gs\_peak</sub>=2.15V

Freq (MHz)	Pulse CW Signal			P <sub>avg</sub> =40dBm WCDMA Signal		
	P1dB Gain (dB)	P3dB (W)	Eff@P3dB (%)	Gp (dB)	Eff(%)	ACPR <sub>5M</sub> (dBc)
3300	13.21	68.50	43.94	14.14	27.5	-32.44
3450	12.96	63.90	43.36	13.98	27	-34.26
3600	12.67	61.41	44.17	13.41	27	-35.42

### 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

- S band power amplifier
- All 4G/5G cellular application within 3.3 to 3.6GHz
- Small cell

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	V <sub>DSS</sub>	+65	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-10 to +10	Vdc
Operating Voltage	V <sub>DD</sub>	+28	Vdc
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Case Operating Temperature	T <sub>c</sub>	+150	°C
Operating Junction Temperature	T <sub>j</sub>	+225	°C

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T <sub>c</sub> = 85°C, T <sub>j</sub> =200°C, DC test	R <sub>θJC</sub>	0.4	°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)

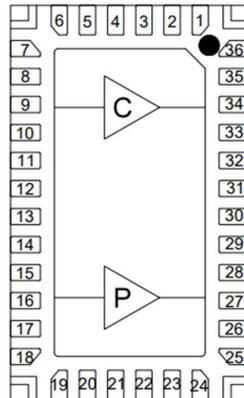
Characteristic	Symbol	Min	Typ	Max	Unit
<b>DC Characteristics</b>					
Drain-Source Voltage V <sub>GS</sub> =0, I <sub>DS</sub> =100uA	V <sub>(BR)DSS</sub>		65		V
Zero Gate Voltage Drain Leakage Current (V <sub>DS</sub> = 28V, V <sub>GS</sub> = 0 V)	I <sub>DSS</sub>	---	---	1	μA
Gate--Source Leakage Current (V <sub>GS</sub> = 11 V, V <sub>DS</sub> = 0 V)	I <sub>GSS</sub>	---	---	1	μA
Gate Threshold Voltage (V <sub>DS</sub> = 28V, I <sub>D</sub> = 600 μA)	V <sub>GS(th)</sub>	---	2	---	V
Gate Quiescent Voltage (V <sub>DD</sub> = 28V, I <sub>D</sub> = 100mA, Measured in Functional Test)	V <sub>GS(Q)</sub>	---	2.7	---	V

**Load Mismatch (In Innegration Test Fixture, 50 ohm system):** V<sub>DD</sub> = 28Vdc, I<sub>DQ</sub> = 100 mA, f = 3600 MHz

VSWR 10:1 at 60W pulse CW Output Power	No Device Degradation
--	-----------------------

**Figure 1: Pin Connection definition**

**Transparent top view (Backside grounding for source)**



Pin No.	Symbol	Description
8,9,10,11	RF IN/Vgs1	RF Input, Vgs bias for main path
14,15,16,17	RF IN/Vgs2	RF Input, Vgs bias for peak path
32,33,34,35	RF OUT/VDD1	RF Output, VDD bias for Main path
26,27,28,29	RF OUT/VDD2	RF Output, VDD bias for Peak path
Rest pins	NC	No connection
2,5,7,12,13,18,20,23,25,30,31,36, Package Base	GND	DC/RF Ground. Must be soldered directly to heatsink or copper coin for CW application.

### 3300-3600MHz application board

#### Reference Circuit of Test Fixture Assembly Diagram

20mils RO4350B

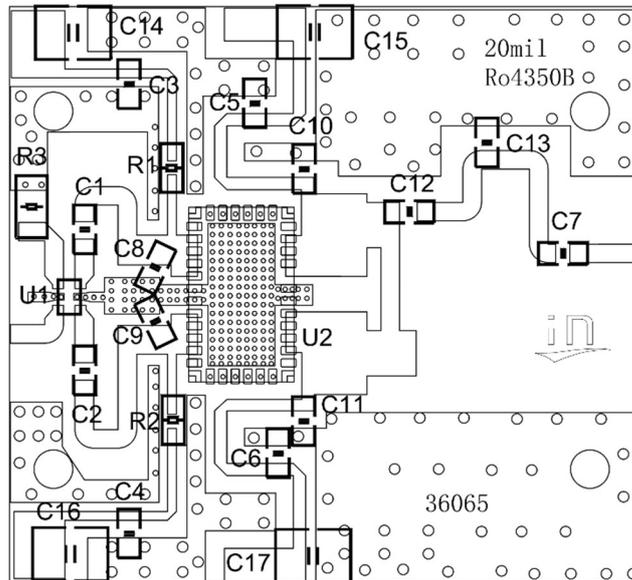


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6, C7	0603	8.2pF/250V	7
C8, C9	0603	1.6pF/250V	2
C10, C11	0603	0.9pF/250V	2
C12	0603	1.8pF/250V	1
C13	0603	0.5pF/250V	1
C14, C15, C16, C17	1210	10uF/100V	4
R1, R2	0603	10R	2
R3	0805	51R	1
U1	0805	C3337J5003AHF	1
U2	C6	ITEH36060C6 <sup>V0</sup>	1



### TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at Idq=150mA

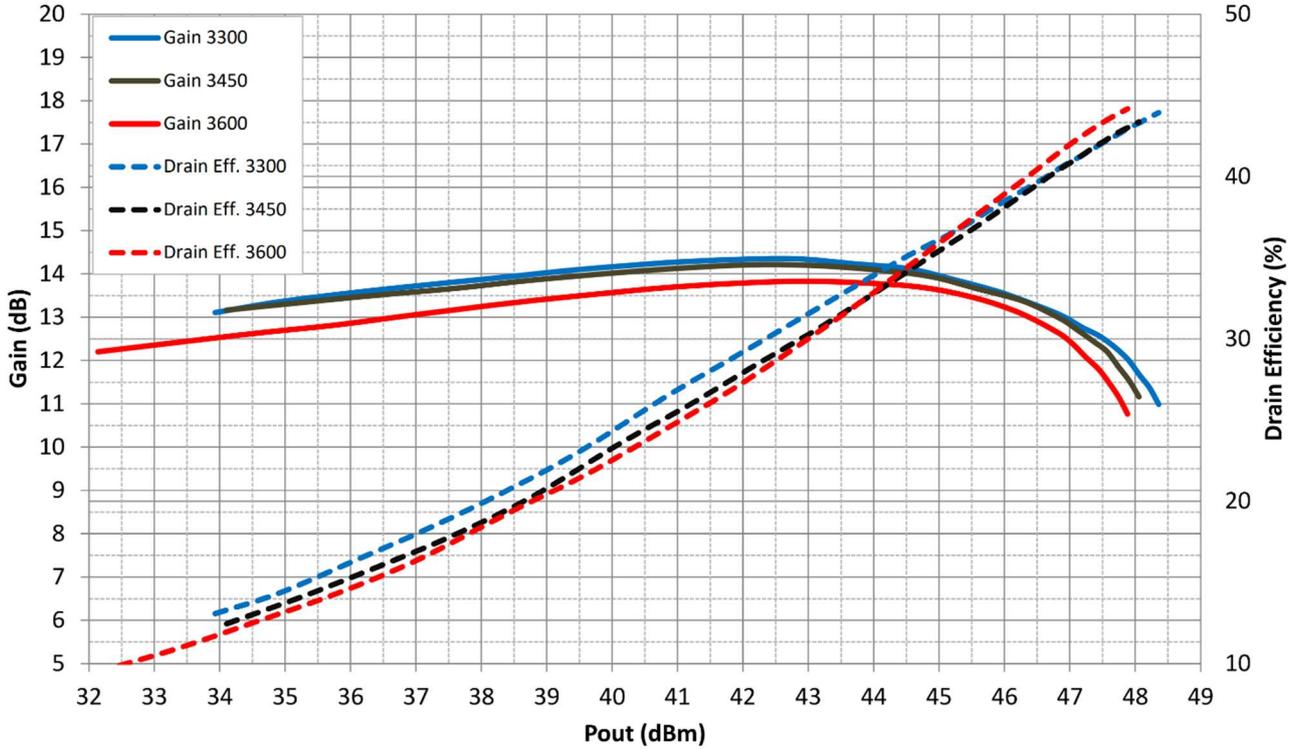
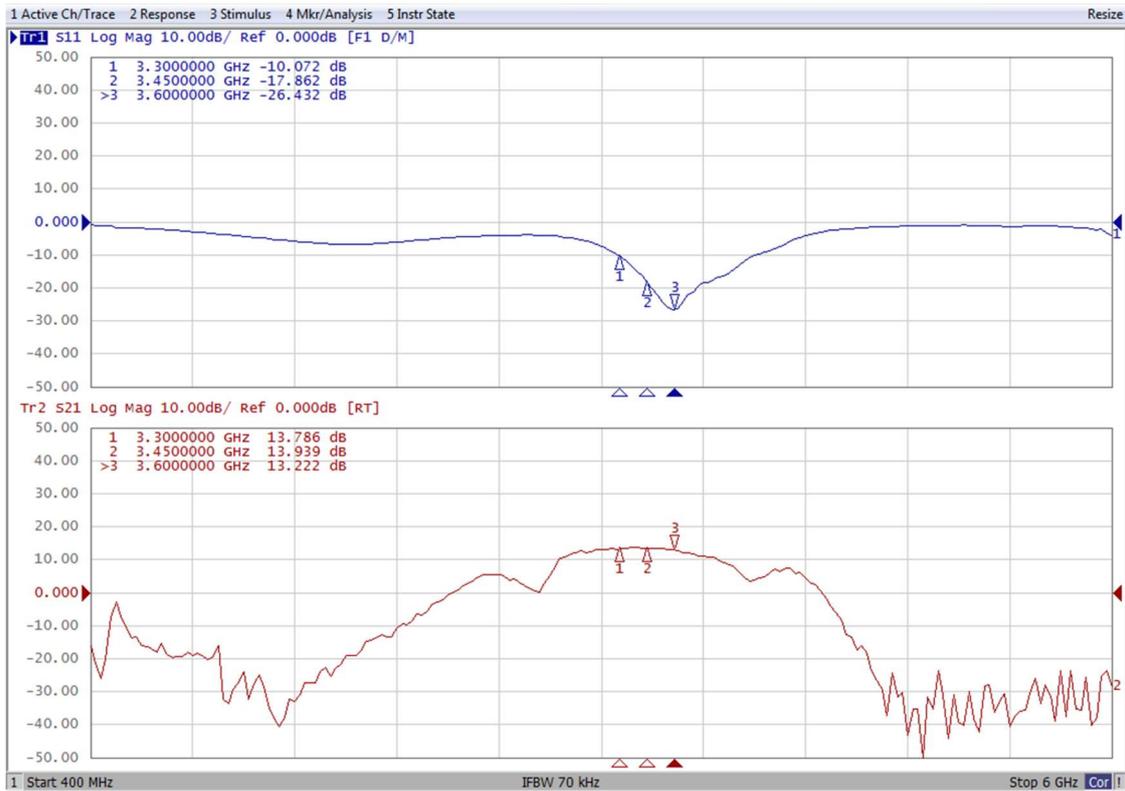


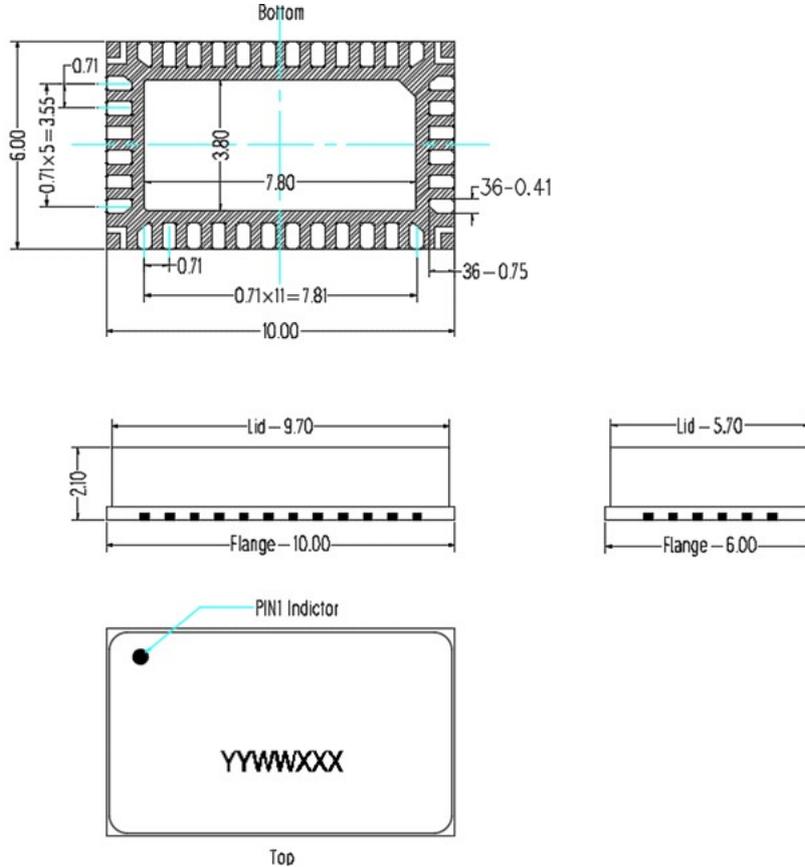
Figure 5. Network analyzer output S11/S21





### Package Dimensions

#### 10\*6 Plastic Package



Notes:

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

### Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2023/1/5	Rev 1.0	Preliminary Datasheet

Application data based on ZBB-24-01

### Disclaimers

Specifications are subject to change without notice. Innogrations believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Innogrations for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Innogrations. Innogrations makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Innogrations in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Innogrations products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogrations product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility. For any concerns or questions related to terms or conditions, pls check with Innogrations and authorized distributors

Copyright © by Innogrations (Suzhou) Co.,Ltd.