



## 20W,5-6GHz 28V Plastic RF LDMOS Transistor

**ITEH58020C6**

### Description

The ITEH58020C6 is a 20-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies 5 to 6GHz, in 10\*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

**When operated at 12.5V, it can be a 7W LDMOS**

• Typical 5.1-5.9GHz Class AB RF Performance (On Innogrator fixture with device soldered).



Freq (GHz)	Pulse CW Signal <sup>(1)</sup>			P <sub>avg</sub> =31dBm WCDMA Signal <sup>(2)</sup>		
	Gain P1 (dB)	P3dB (W)	Eff (%)	Gp (dB)	η <sub>D</sub> (%)	ACPR <sub>5M</sub> (dBc)
5.1	10	24	35	11.4	10	-48.0
5.5	9.7	22	33	10.6	10	-48.0
5.9	9.3	20	32	10.7	10	-48.6

(1) Idq=85mA; (2) Idq=180mA

### 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

- C band power amplifier
- 5G cellular power amplifier within 5-6GHz
- WIFI High power access point
- GaAs HBT lower cost replacement

**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>	1	°C/W

**Table 3. ESD Protection Characteristics**

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



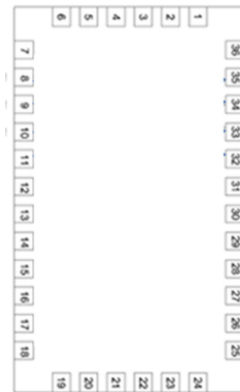
**Table 4. Electrical Characteristics** (TA = 25 °C unless otherwise noted)

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> = 180mA, Measured in Functional Test)	V <sub>GS(Q)</sub>	—	2.8	—	V

**Load Mismatch (In Innogrations Test Fixture, 50 ohm system):** V<sub>DD</sub> = 28Vdc, I<sub>DQ</sub> = 180mA, f = 6000 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
8,9,10,11,14,15,16,17	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.

**Reference Circuit of Test Fixture Assembly Diagram**  
**5100-5900MHz RO4350B 20mils**

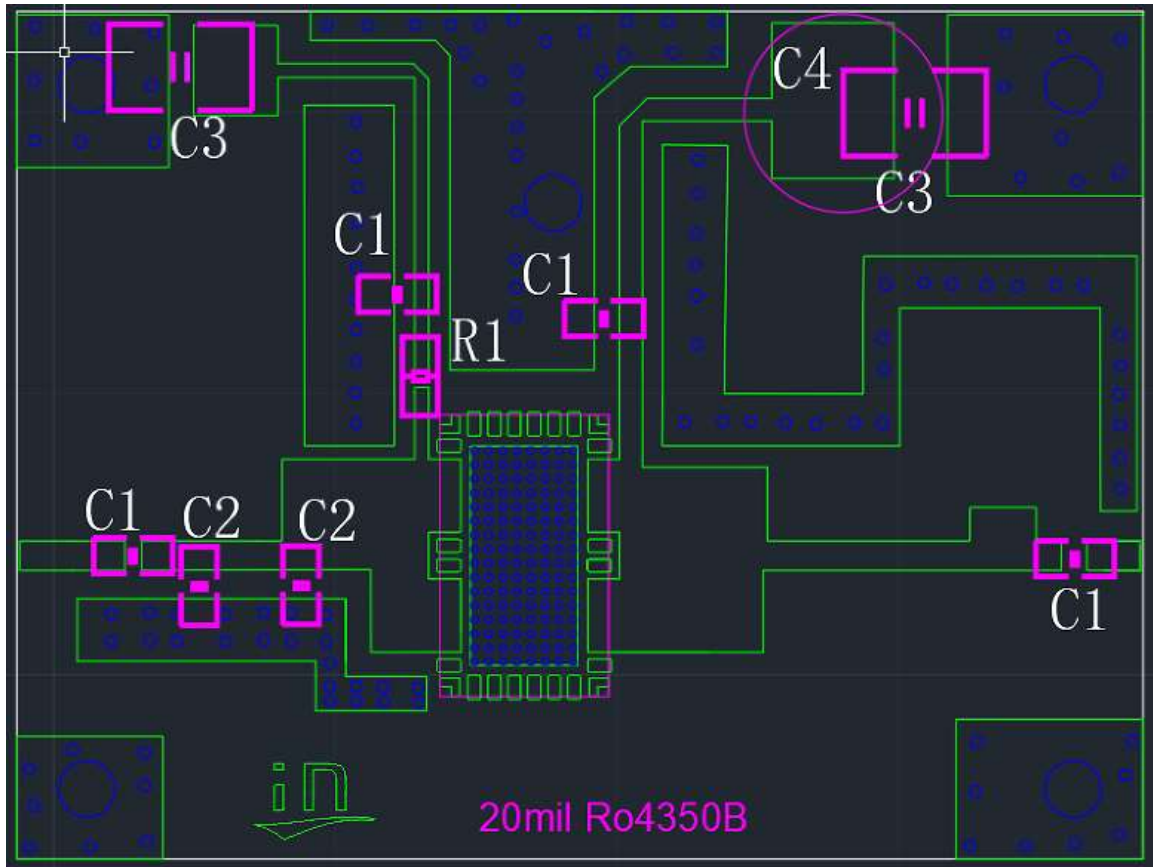


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Component	Value	Quantity
C1	3.9pF	4
C3	10uF	3
R1	10 ohm	1
C2	0.5pF	2
C4	470uF	1



### TYPICAL CHARACTERISTICS

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

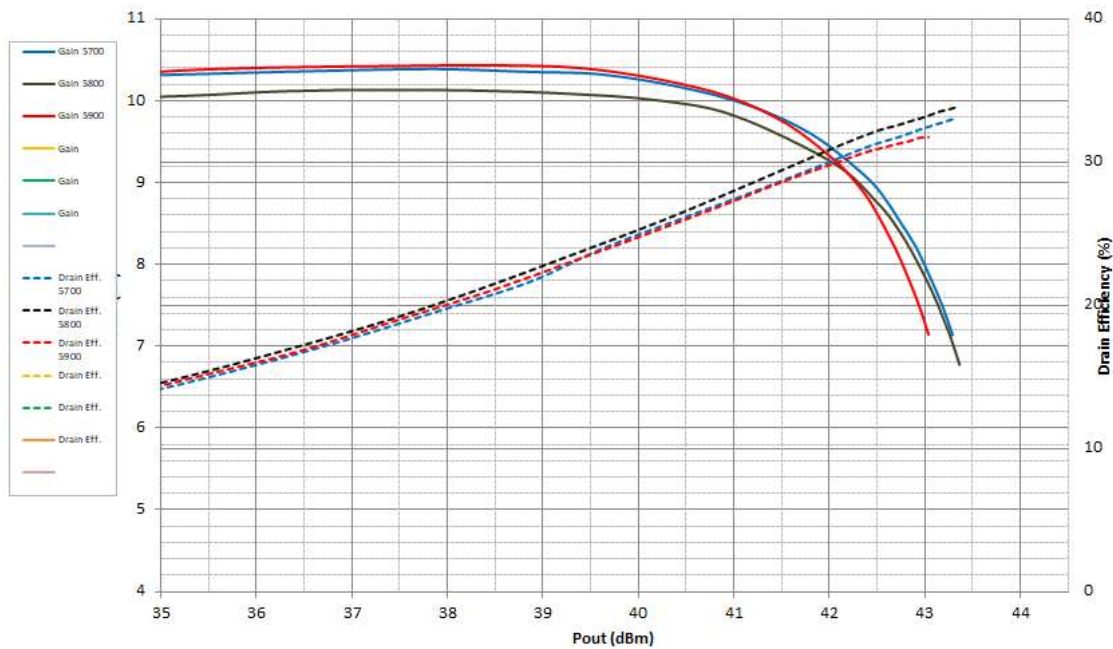
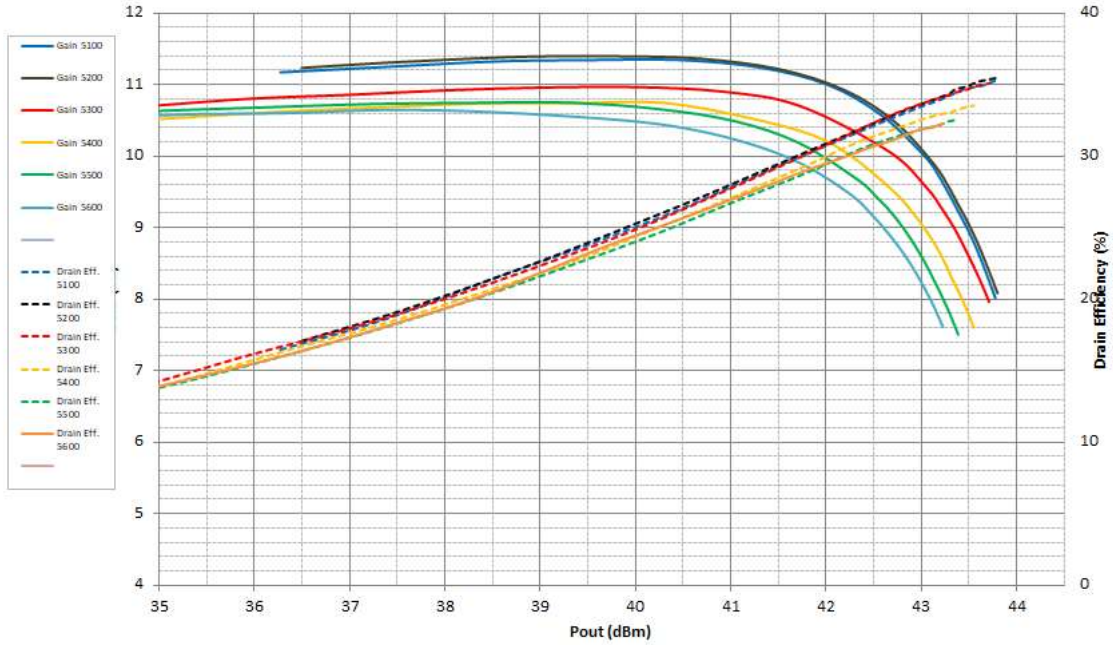
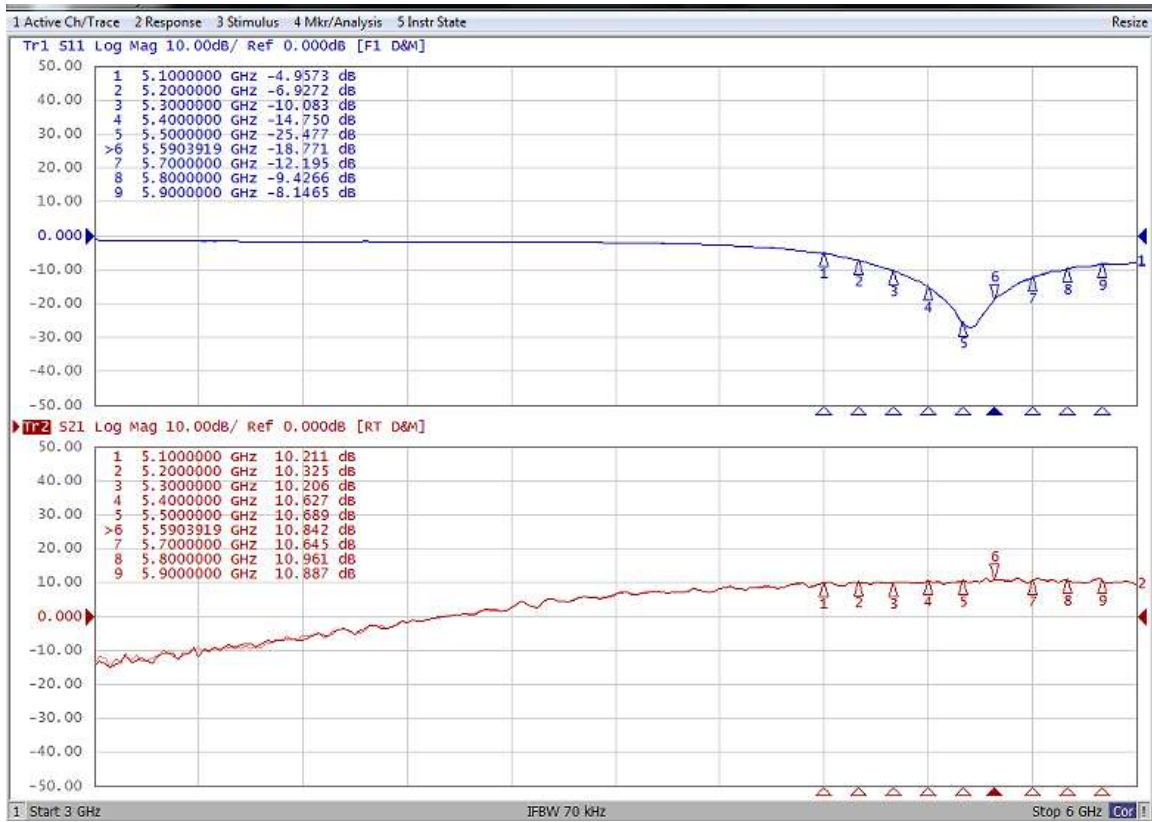




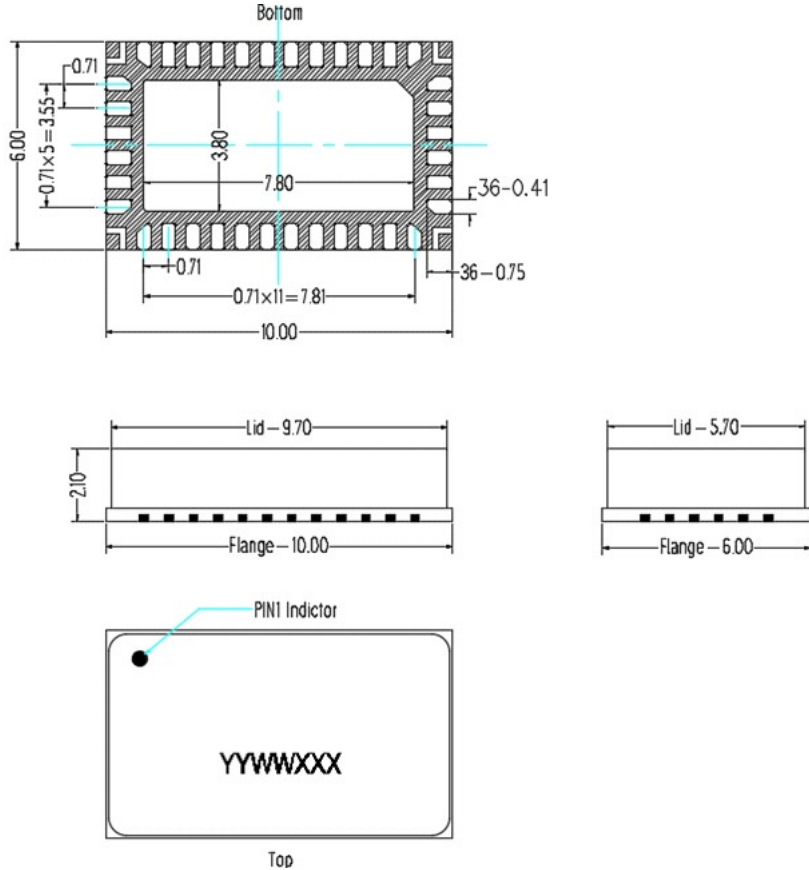
Figure 4. Network analyzer output S11/S21





### 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
2024/4/23	Rev 1.0	Preliminary Datasheet

Application data based on ZXY-24-11

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