



20W,4.4-5GHz 28V Plastic RF LDMOS Transistor

ITEH50020C6

Description

The ITEH50020C6 is a 20-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies 4.4 to 5GHz, in 10*6mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

- Typical 4.8-5GHz Class AB RF Performance (On Innogrator fixture with device soldered).



| Freq (GHz) | Pulse CW Signal ⁽¹⁾ | | | P _{avg} =32dBm WCDMA Signal ⁽²⁾ | | |
|------------|--------------------------------|--------|---------|---|--------------------|--------------------------|
| | GainP1 (dB) | P3 (W) | Eff (%) | Gp (dB) | η _D (%) | ACPR _{5M} (dBc) |
| 4.8 | 12.26 | 31.6 | 38 | 13.3 | 10.2 | -46.1 |
| 4.9 | 12.28 | 30.8 | 40 | 13.3 | 11.0 | -47.1 |
| 5.0 | 11.74 | 28.7 | 38 | 12.8 | 11.1 | -46.1 |

(1) Idq=20mA; (2) Idq=120mA

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 4.4-5GHz

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} | 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 |
|--|---------------|-----|------|-----|---------|
| DC Characteristics | | | | | |
| Drain-Source Voltage $V_{GS}=0, I_{DS}=100\mu A$ | $V_{(BR)DSS}$ | | 65 | | V |
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 28V, V_{GS} = 0V$) | I_{DSS} | — | — | 1 | μA |
| Gate--Source Leakage Current ($V_{GS} = 11V, V_{DS} = 0V$) | I_{GSS} | — | — | 1 | μA |
| Gate Threshold Voltage ($V_{DS} = 28V, I_D = 600\mu A$) | $V_{GS(th)}$ | — | 2 | — | V |
| Gate Quiescent Voltage ($V_{DD} = 28V, I_D = 120mA$, Measured in Functional Test) | $V_{GS(O)}$ | — | 2.65 | — | V |

Load Mismatch (In Innogrations Test Fixture, 50 ohm system): $V_{DD} = 28Vdc, I_{DQ} = 120mA, f = 5000MHz$

| | |
|--|-----------------------|
| VSWR 10:1 at 12W pulse CW Output Power | No Device Degradation |
|--|-----------------------|

Figure 1: Pin Definition (Top View)



| Pin No. | Symbol | Description |
|----------------------------------|------------|-------------------|
| 8,9,10,11,14,15,16,17 | 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
4800-5000MHz RO4350B 20mils**

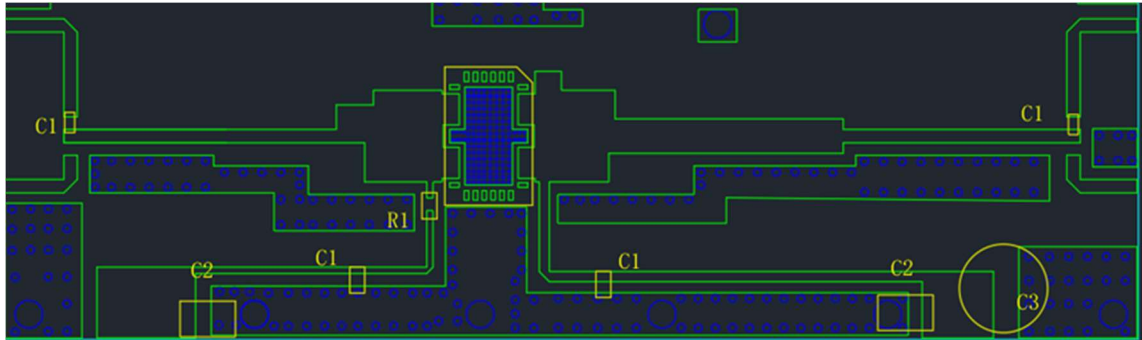


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

| Component | | |
|-----------|-------------|---|
| U1 | ITEH50020C6 | 1 |
| C1 | 3.9pF | 4 |
| C2 | 10uF/63V | 2 |
| R1 | 10 Ω | 1 |

TYPICAL CHARACTERISTICS

Figure 3. Power Gain and Drain Efficiency as function of Power Out at Idq=120mA

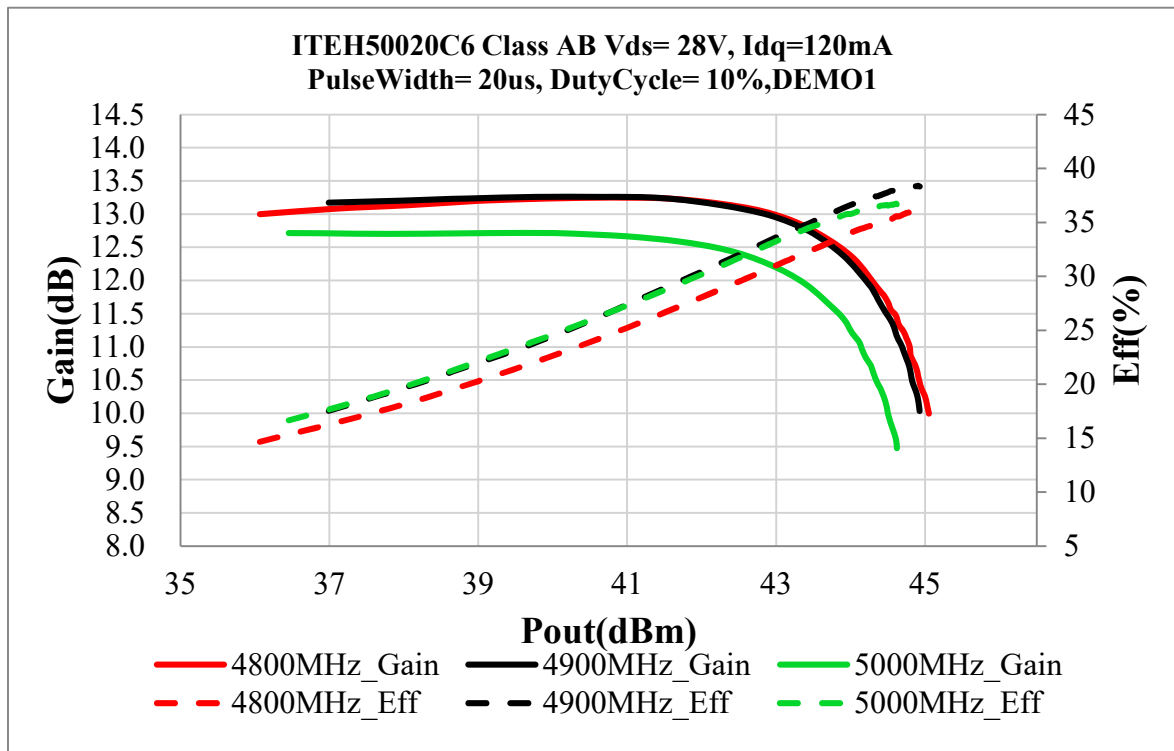
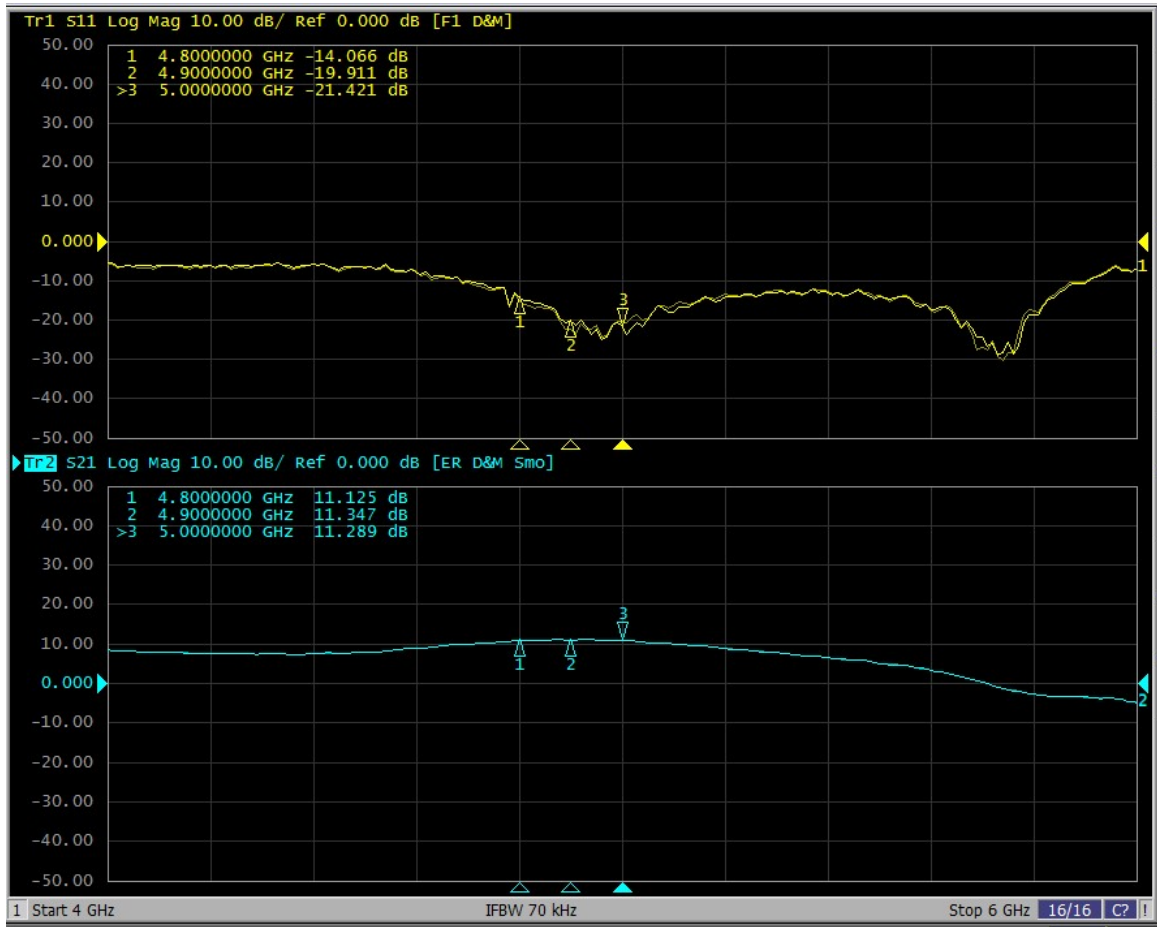




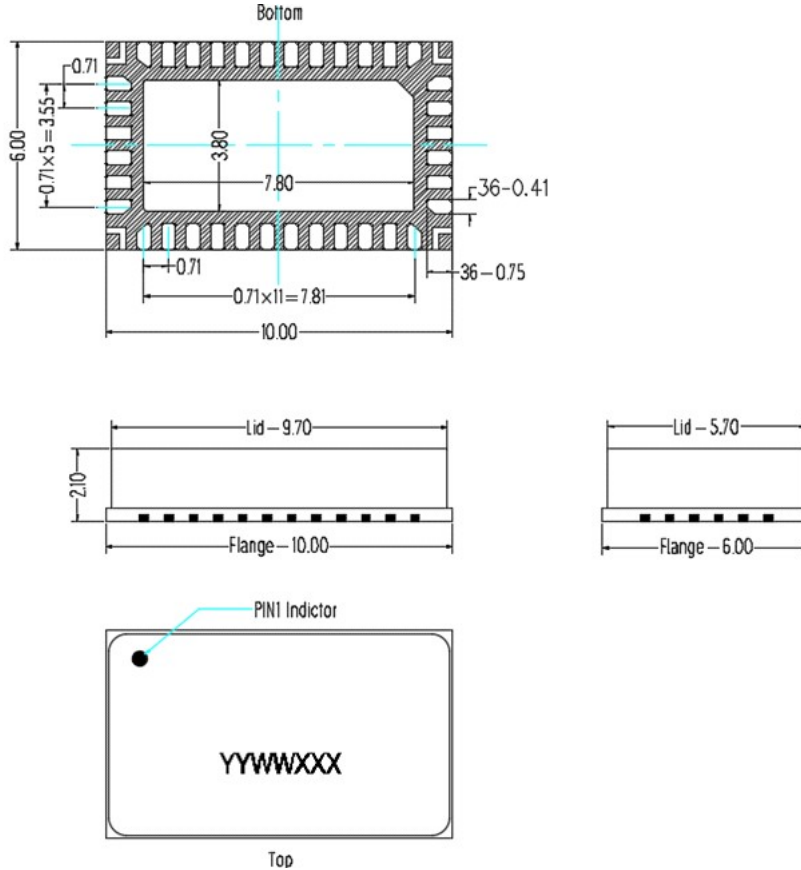
Figure 4. Network analyzer output S11/S21





Package Dimensions

10*6 Plastic Package



Notes:

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

Revision history

Table 7. Document revision history

| Date | Revision | Datasheet Status |
|-----------|----------|-----------------------|
| 2023/8/18 | Rev 1.0 | Preliminary Datasheet |
| | | |

Application data based on ZXY-23-08

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