

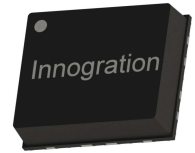


## 80W,28V Plastic RF LDMOS Transistor

### Description

The ITEH20080C9 is an 80-watt, high performance, LDMOS transistor, designed for any general applications at frequencies from 1.8 to 2.0GHz, in 12\*10mm QFN plastic package, It can be soldered on PCB through high density grounding vias for pulse or back off linear application .

ITEH20080C9



- Typical 1.8-1.9GHz Class AB RF Performance (On Innegration fixture with device soldered).

| $V_{DS}=28V$ , $V_{GS}=2.65V(I_{dQ}=600mA)$ , |         |            |          |         |
|-----------------------------------------------|---------|------------|----------|---------|
| $P_{out}=39.0dBm$ , WCDMA 1 Carrier           |         |            |          |         |
| Freq (MHz)                                    | P3dB(W) | ACPR (dBc) | Gain(dB) | EFF (%) |
| 1800                                          | 100     | -46.5      | 18       | 18.5    |
| 1900                                          | 99      | -46        | 17       | 18.5    |

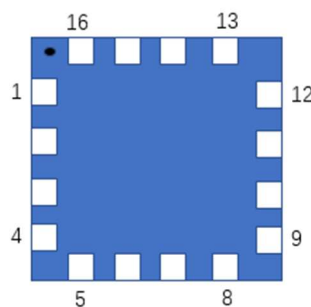
### Features

- 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

- L band power amplifier
- All 4G/5G cellular application within 1.8 to 2.0GHz

### Pin Configuration and Description (Top view)



| Pin No.      | Symbol     | Description                                                                                                                                                                                                                                                           |
|--------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-8          | RF IN/Vgs  | RF Input/Gate bias                                                                                                                                                                                                                                                    |
| 13-16        | RF OUT/Vds | RF Output/Drain bias                                                                                                                                                                                                                                                  |
| Others       | NC         | Can be left as either no use or grounding                                                                                                                                                                                                                             |
| Package Base | GND        | DC/RF Ground. Proposed to be soldered to heatsink plane directly for the best CW thermal and RF performance. Soldered through vias or copper coin allowed for pulsed CW applications, but will result in excessive junction temperatures and different RF performance |



**Table 1. Maximum Ratings**

| Rating                         | Symbol    | Value       | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage          | $V_{DS}$  | +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<br>$T_c = 85^\circ\text{C}$ , DC test, <b>device soldered on heatsink directly</b> | $R_{\theta JC}$ | 0.9   | °C/W |

**Table 3. ESD Protection Characteristics**

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

**Table 4. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**DC Characteristics**

|                                                                                                         |              |   |     |    |               |
|---------------------------------------------------------------------------------------------------------|--------------|---|-----|----|---------------|
| Drain-Source Voltage<br>$V_{GS}=0$ , $I_{DS}=100\mu\text{A}$                                            | $V_{(BR)DS}$ |   | 65  | 70 | V             |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 28\text{V}$ , $V_{GS} = 0\text{V}$ )             | $I_{DSS}$    | — | —   | 1  | $\mu\text{A}$ |
| Gate--Source Leakage Current<br>( $V_{GS} = 11\text{V}$ , $V_{DS} = 0\text{V}$ )                        | $I_{GSS}$    | — | —   | 1  | $\mu\text{A}$ |
| Gate Threshold Voltage<br>( $V_{DS} = 28\text{V}$ , $I_D = 600\mu\text{A}$ )                            | $V_{GS(th)}$ | — | 2   | —  | V             |
| Gate Quiescent Voltage<br>( $V_{DD} = 28\text{V}$ , $I_D = 600\text{mA}$ , Measured in Functional Test) | $V_{GS(Q)}$  | — | 2.6 | —  | V             |

**Load Mismatch (In Innogrator Test Fixture, 50 ohm system):**  $V_{DD} = 28\text{Vdc}$ ,  $I_{DQ} = 600\text{mA}$ ,  $f = 2000\text{MHz}$

|                                        |                       |
|----------------------------------------|-----------------------|
| VSWR 10:1 at 80W pulse CW Output Power | No Device Degradation |
|----------------------------------------|-----------------------|

## 1800-1900MHz application board

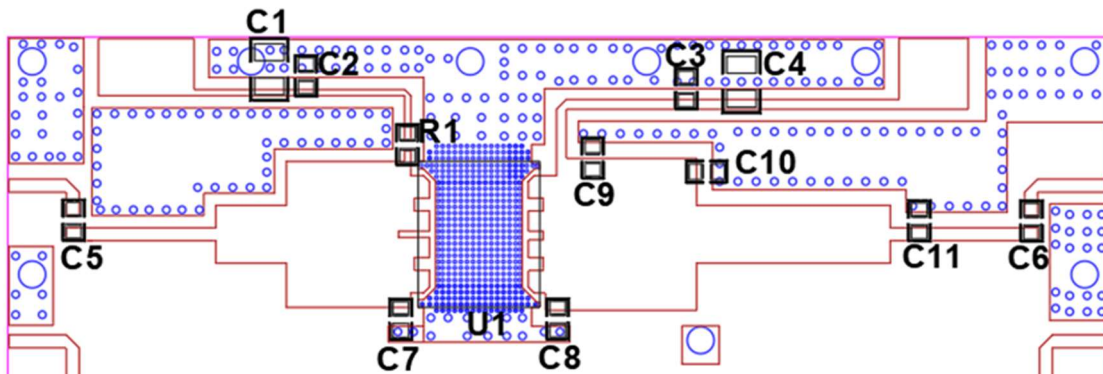


Figure 2. Test Circuit Component Layout, 20mils RO4350B

Table 5. Test Circuit Component Designations and Values

| Component      | Value            | Description |
|----------------|------------------|-------------|
| PCB            | Thickness, 20mil | Rogers 4350 |
| U1             | ITEH20080C9      | PA          |
| C1, C4         | 10uF             | TDK1206     |
| C2, C3, C5, C6 | 12pF             | ATC600S     |
| C7             | 2.0pF            | ATC600S     |
| C8             | 3.3pF            | ATC600S     |
| C9             | 2.4pF            | ATC600S     |
| C10            | 1.0pF            | ATC600S     |
| C11            | 1.6pF            | ATC600S     |
| R1             | 10 $\Omega$      | TDK0805     |

## TYPICAL CHARACTERISTICS

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

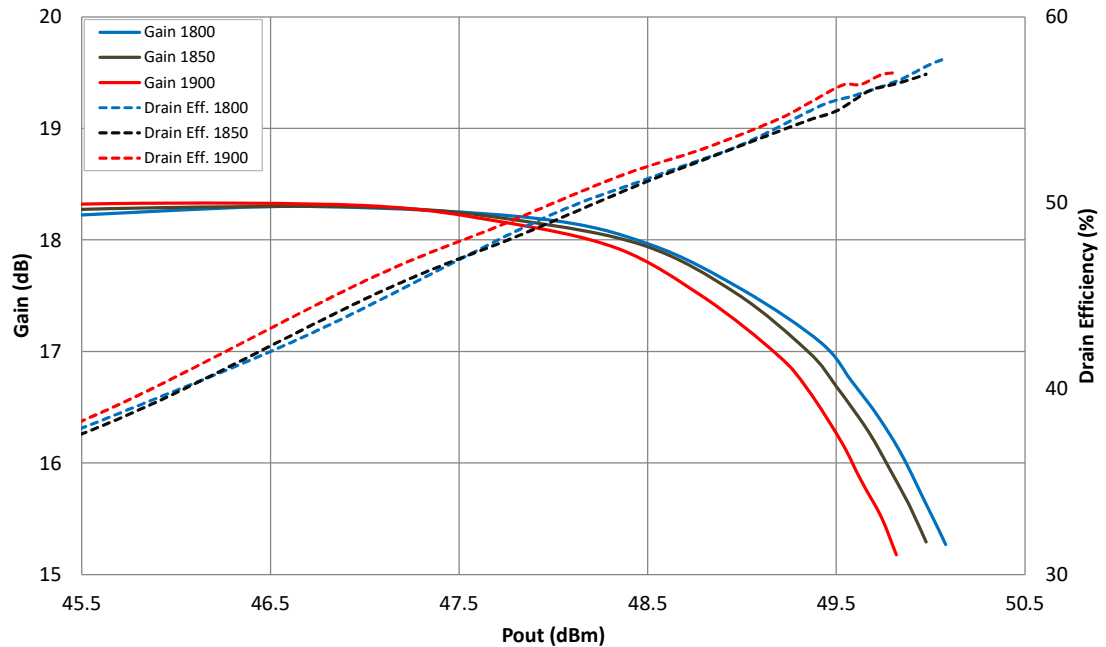
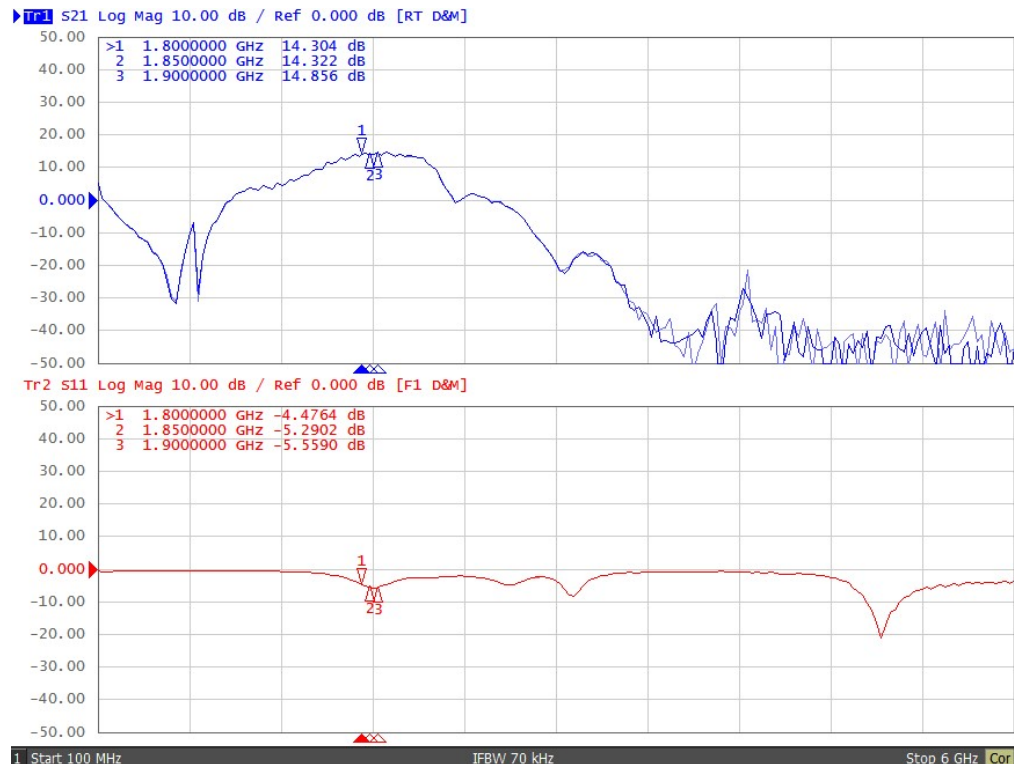
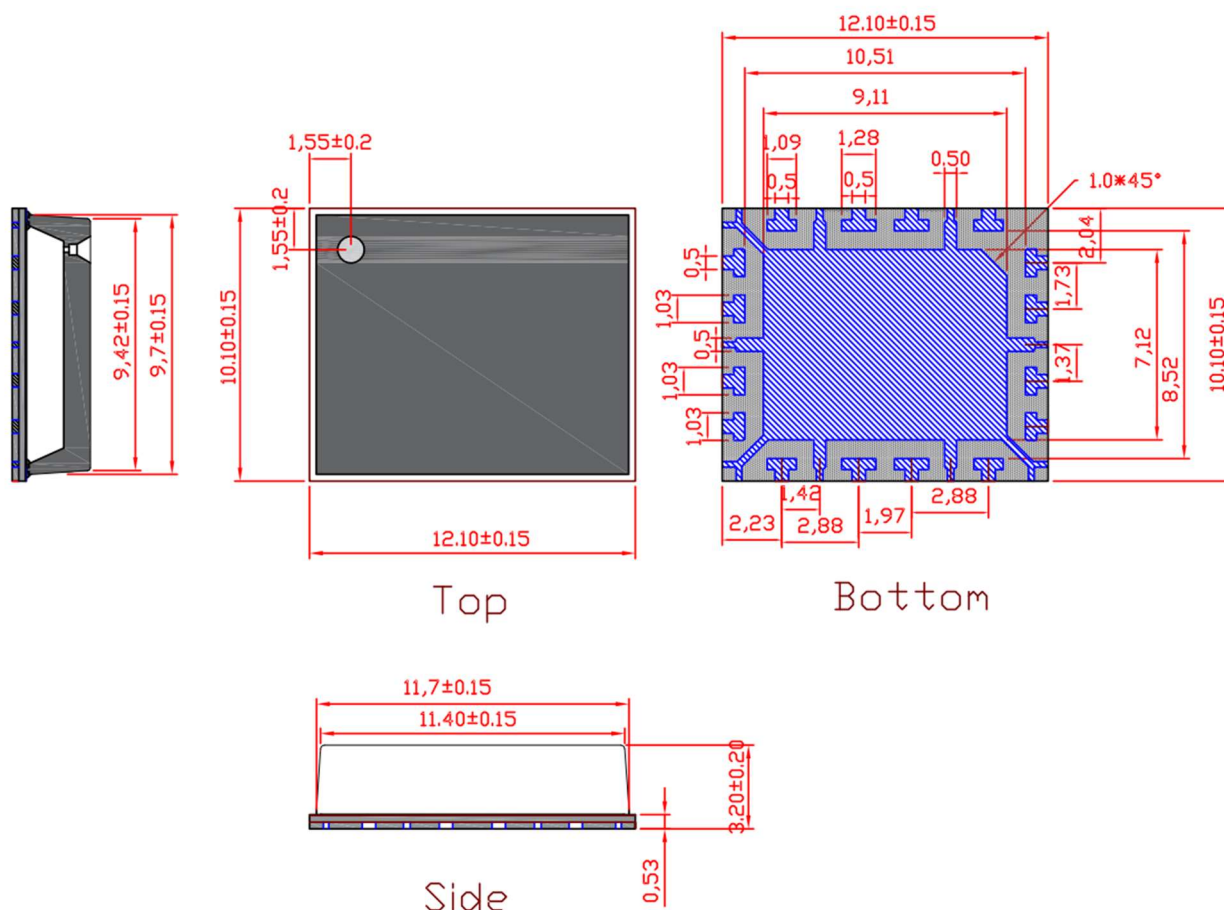


Figure 4. Network analyzer output S11/S21



## Package Dimensions



## Revision history

Table 7. Document revision history

| Date       | Revision | Datasheet Status      |
|------------|----------|-----------------------|
| 2023/12/28 | Rev 1.0  | Preliminary Datasheet |
|            |          |                       |

**Application data based on HJ-23-22**

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