



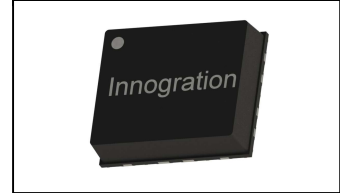
130W,50V Plastic RF LDMOS Transistor

ITGV10130C9

Description

The ITGV10130C9 is a dual path 130-watt, highly rugged, LDMOS transistor, designed for any general applications at frequencies up to 1GHz, in 12*10mm QFN plastic package, supporting surface mounted on PCB through high density grounding vias.

It can be configured as Doherty to be as high efficiency and low cost driver for 4G/5G application within 0.6-1GHz.



- Typical Doherty RF Performance (On Innogrations fixture with device soldered).

V_{ds}= 50V, I_{dq}=100mA(V_m=3.3V, V_p=1.6V)

| Freq (MHz) | Pout (dBm) | CCDF (dB) | Ppeak (dBm) | Ppeak (W) | ACPR (dBc) | Gain (dB) | Eff (%) |
|------------|------------|-----------|-------------|-----------|------------|-----------|---------|
| 869 | 42.50 | 8.44 | 50.93 | 123.9 | -27.4 | 18.8 | 51.3 |
| 881.5 | 42.50 | 8.83 | 51.33 | 135.9 | -28.9 | 18.4 | 52.7 |
| 894 | 42.50 | 8.98 | 51.48 | 140.5 | -30.8 | 17.9 | 52.4 |

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

- P band power amplifier
- All 4G/5G cellular application within 0.6 to 1GHz

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|--------------------------------|------------------|-------------|------|
| Drain--Source Voltage | V _{DSS} | +110 | Vdc |
| Gate--Source Voltage | V _{GS} | -10 to +10 | Vdc |
| Operating Voltage | V _{DD} | +55 | 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} | 0.7 | °C/W |

Table 3. ESD Protection Characteristics

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

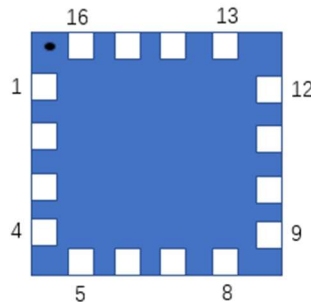


Table 4. Electrical Characteristics (TA = 25 °C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|-----------------------|-----|-----|-----|---------|
| DC Characteristics | | | | | |
| Drain-Source Voltage $V_{GS}=0, I_{DS}=100\mu A$ | $V_{(BR)DSS}$ | | 110 | | V |
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 90V, V_{GS} = 0V$) | I_{DSS} | — | — | 1 | μA |
| Gate--Source Leakage Current ($V_{GS} = 11V, V_{DS} = 0V$) | I_{GSS} | — | — | 1 | μA |
| Gate Threshold Voltage ($V_{DS} = 50V, I_D = 600\mu A$) | $V_{GS(th)}$ | — | 2 | — | V |
| Gate Quiescent Voltage ($V_{DD} = 50V, I_D = 100mA$, Measured in Functional Test) | $V_{GS(Q)}$ | — | 3.3 | — | V |
| Load Mismatch (In Innogrations Test Fixture, 50 ohm system): $V_{DD} = 50Vdc, I_{DQ} = 100mA, f = 880MHz$ | | | | | |
| VSWR 10:1 at 130W pulse CW Output Power | No Device Degradation | | | | |

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



| Pin No. | Symbol | Description |
|--------------|--------------------|--|
| 1,2 | RF IN/Vgs of Main | RF Input/Gate bias of main path |
| 3,4 | RF IN/Vgs of Peak | RF Input/Gate bias of peak path |
| 9,10 | RF OUT/Vds of Peak | RF Output/Drain bias of peak path |
| 11,12 | RF OUT/Vds of Main | RF Output/Drain bias of main path |
| Other Pins | GND | 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 and back off applications, but will result in higher junction temperatures |

869-894MHz application board
Reference Circuit of Test Fixture Assembly Diagram
20mils RO4350B

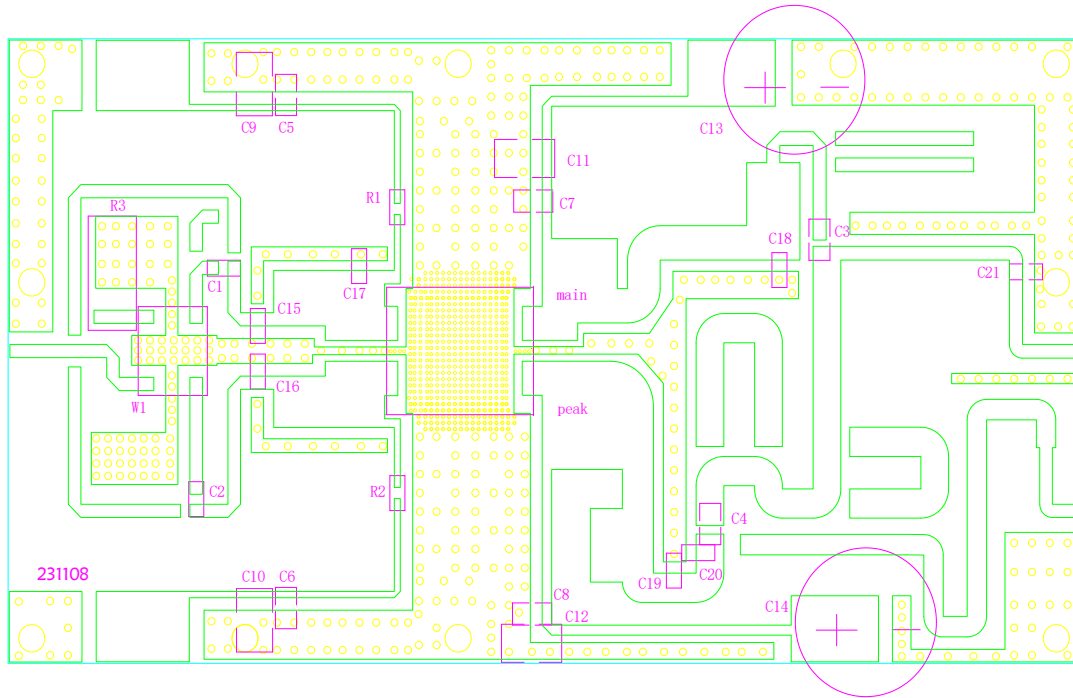


Figure 2. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

| Designator | Footprint | Comment | Quantity |
|------------------------|-----------|----------------------|----------|
| C1, C2, C19 | 0603 | 6.8 pF | 3 |
| C3, C4, C5, C6, C7, C8 | 0603/0805 | 47 pF | 6 |
| C9, C10, C11, C12 | 1210 | 10uF/100V | 4 |
| C13, C14 | | 220uF/63V | 2 |
| C15, C16 | 0603 | 8.2 pF | 2 |
| C17 | 0603 | 2.4 pF | 1 |
| C18, C20 | 0603 | 3.0 pF | |
| R1,R2 | 0603 | 10Ω | 2 |
| R3 | 2512 | 51Ω | 1 |
| W1 | | DC07F02 (YANTEL 2dB) | 1 |



TYPICAL CHARACTERISTICS

Figure 5. Power Gain and Drain Efficiency as function of Power Output at Idq=100mA

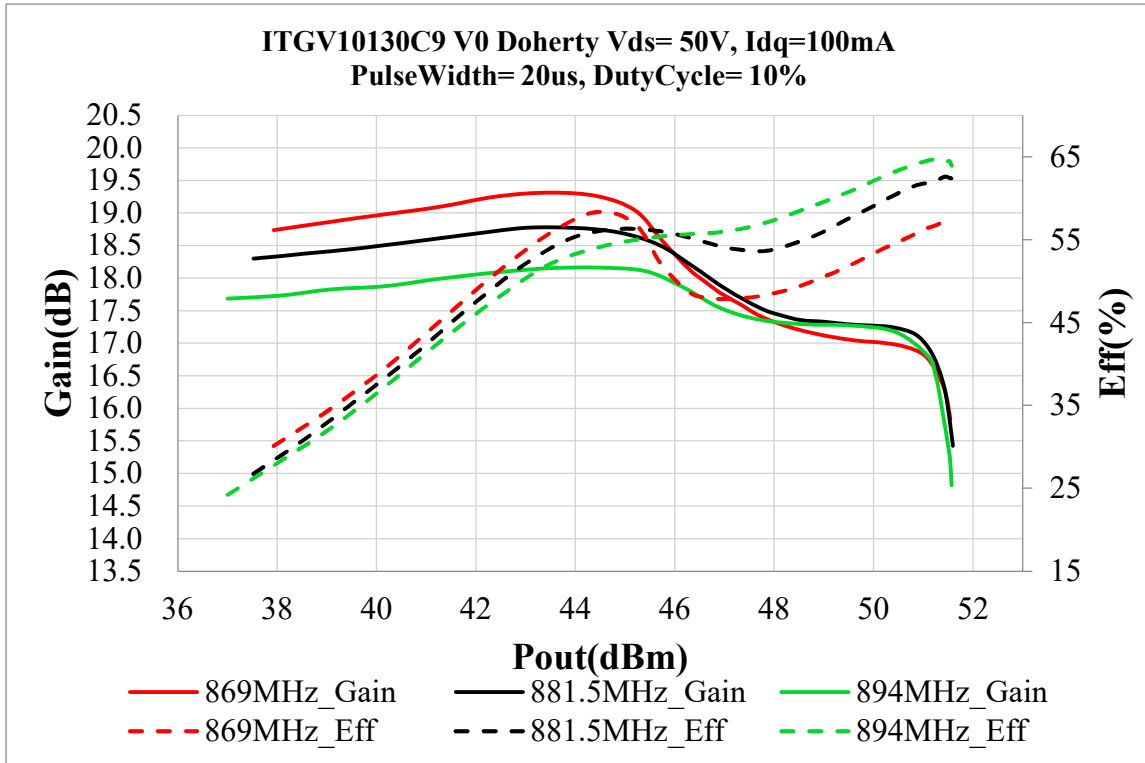


Figure 5. Network analyzer output S11/S21

