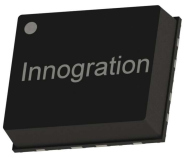
# ITEV01300C9 LDMOS TRANSISTOR

Document Number: ITEV01300C9
Preliminary Datasheet V1.1

## 300W, 50V High Power RF LDMOS FETs

**ITEV01300C9**




## Description

The ITEV01300C9 is a 300-watt capable, high performance, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 150MHz. The device offers a more cost effective solution than traditional ceramic device，housed in 12*10mm cost effective plastic open cavity package, and heat dissipated by copper flange directly.

It is featured by single ended configuration for high power and high ruggedness, suitable for Industrial, Scientific and Medical application

- Typical performance(on Innogration test board with device soldered)
  Signal: CW , Vgs=3.2V,Vds=50V,Idq=100mA

| Freq (MHz) | Pin (dBm) | Pout (dBm) | Pout (W) | Ids (A) | Gain (dB) | Eff (%) | 2nd harmonic (dBc) |
|---|---|---|---|---|---|---|---|
| 40.68 | 35 | 55 | 316 | 7.9 | 20 | 80 | -20 |

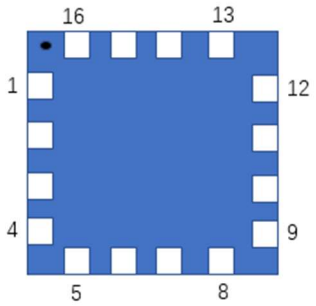
## Features

- 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

- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

## 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 | $V_{DSS}$ | +135 | 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<br>$T_C$= 85°C, $T_J$=200°C, DC test | $R_{\theta JC}$ | 0.55 | °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 ℃ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **DC Characteristics (per half section)** | | | | | |
| Drain-Source Voltage<br>$V_{GS}$=0, $I_{DS}$=1.0mA | $V_{(BR)DSS}$ | | 135 | | V |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 75V, $V_{GS}$ = 0 V) | $I_{DSS}$ | —— | —— | 1 | μA |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 50 V, $V_{GS}$ = 0 V) | $I_{DSS}$ | —— | —— | 1 | μA |
| Gate--Source Leakage Current<br>($V_{GS}$ = 10 V, $V_{DS}$ = 0 V) | $I_{GSS}$ | —— | —— | 1 | μA |
| Gate Threshold Voltage<br>($V_{DS}$ = 50V, $I_D$ = 600 μA) | $V_{GS(th)}$ | —— | 2.65 | —— | V |
| Gate Quiescent Voltage<br>($V_{DD}$ = 50 V, $I_D$ = 100 mA, Measured in Functional Test) | $V_{GS(Q)}$ | —— | 3.2 | —— | V |

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):** $V_{DD}$ = 50 Vdc, $I_{DQ}$ = 100 mA, f =100MHz, pulse width:100us, duty cycle:10%

| | |
|---|---|
| Load 65:1 All phase angles, at 300W Pulsed CW Output Power | No Device Degradation |

## TYPICAL CHARACTERISTICS

**Figure 1: CW Gain and Power Efficiency as a Function of Pout at 40.68MHz**

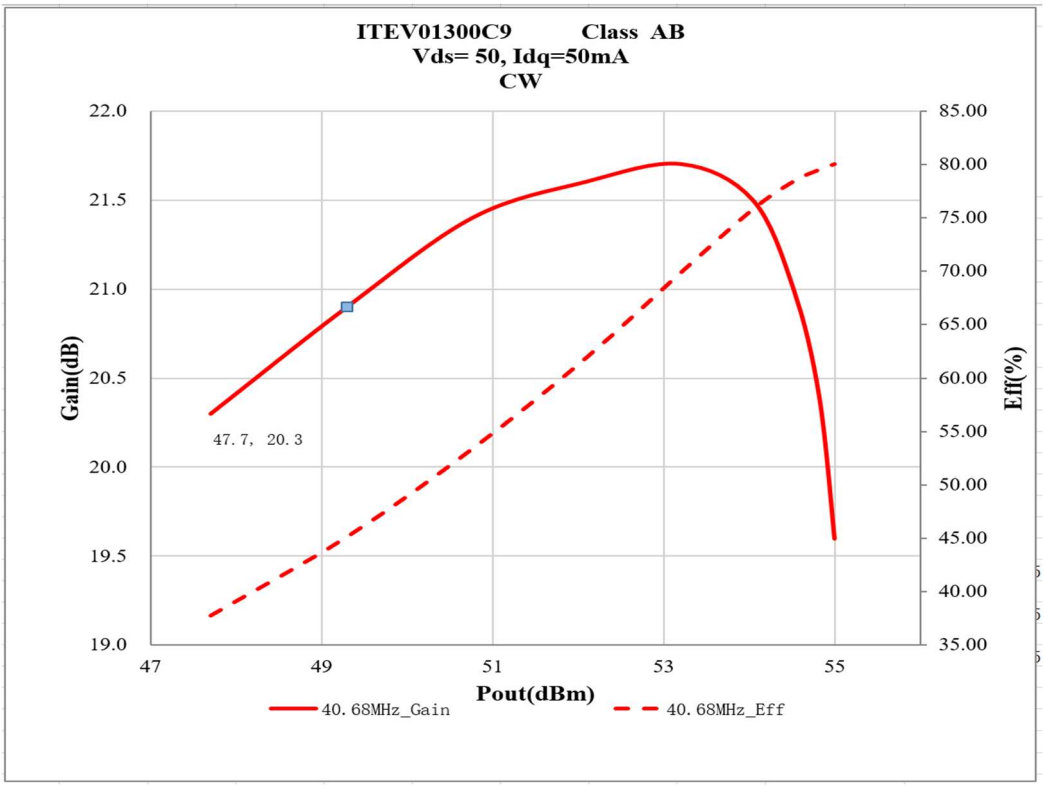
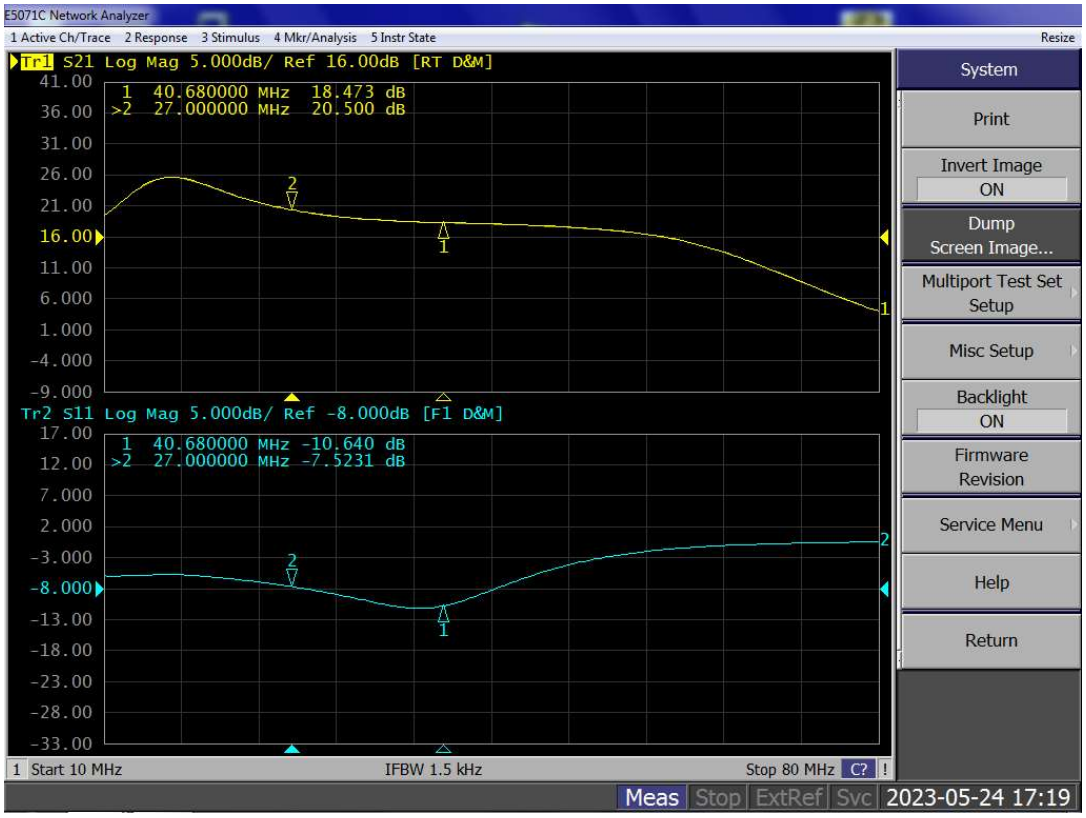



**Figure 2: Network analyzer output S11/S21**



## Reference Circuit of Test Fixture Assembly Diagram

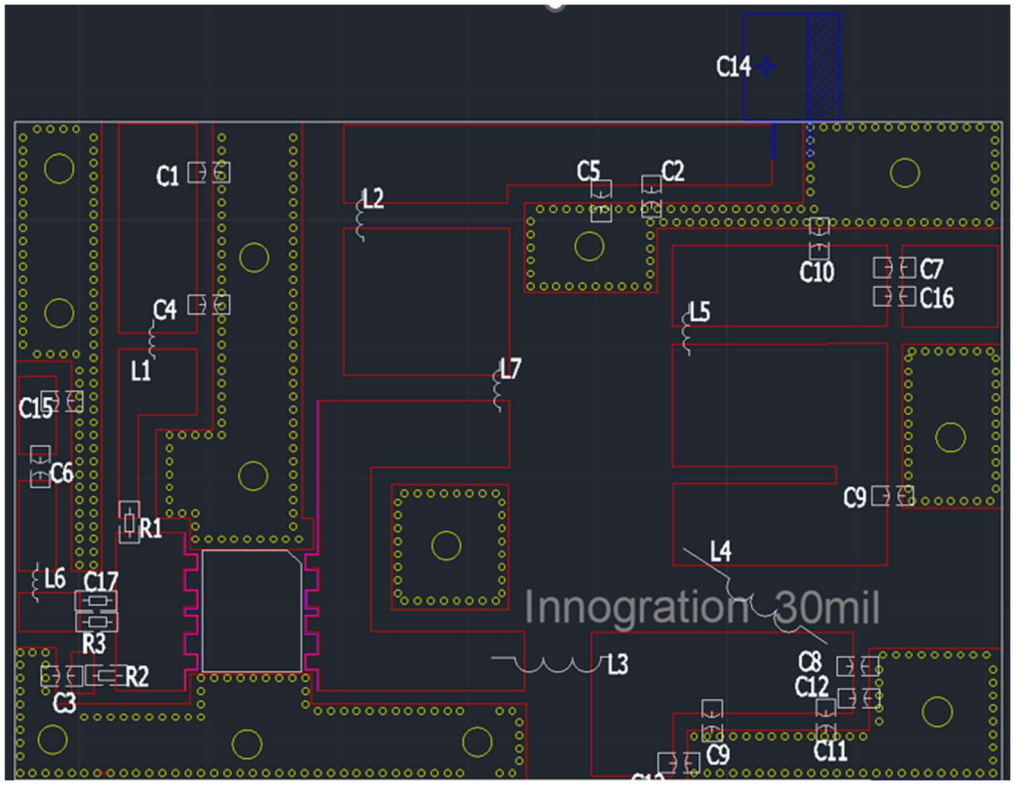
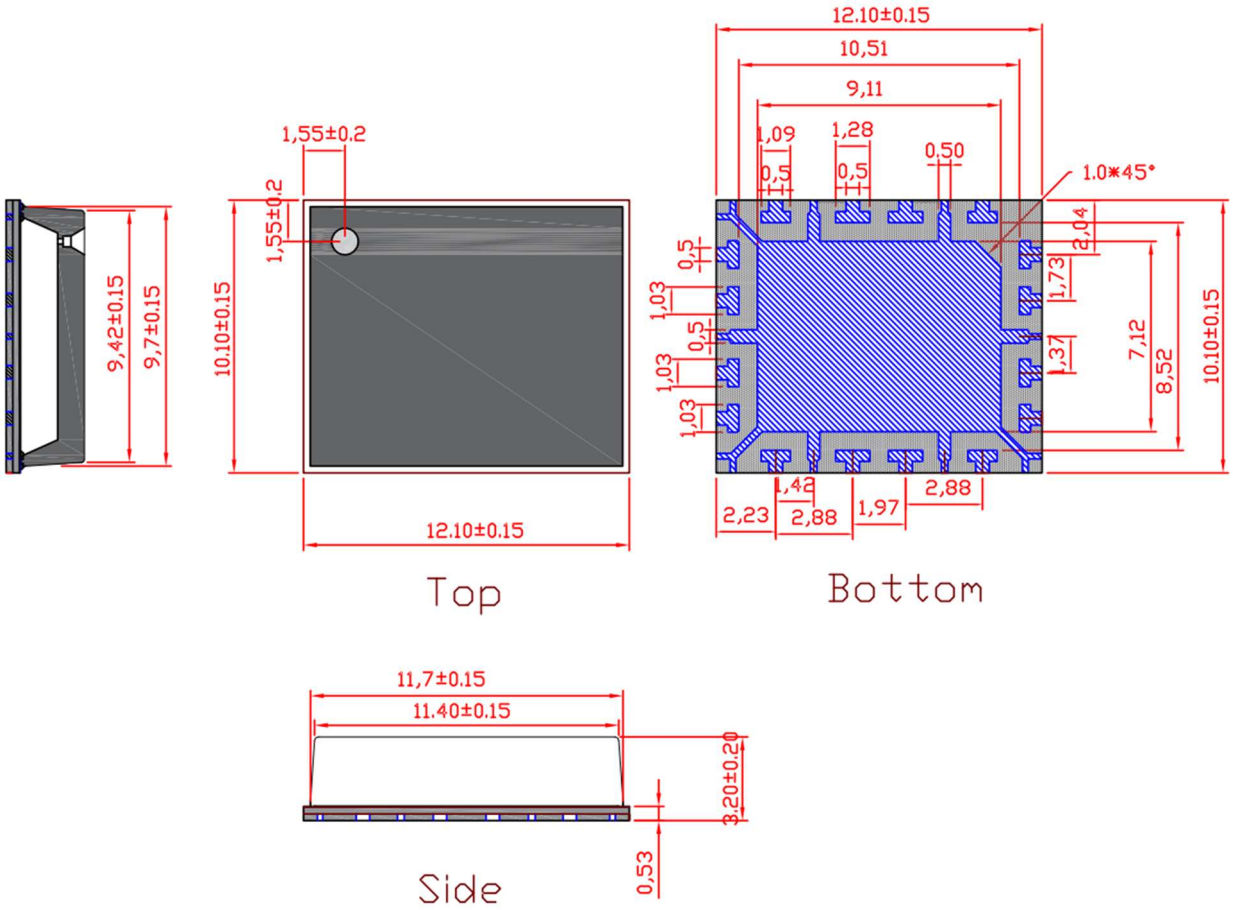



**Table 5. Test Circuit Component Designations and Values**

| Component | Description | Suggestion |
|---|---|---|
| C1,C2,C3, | 10uF 100V | Ceramic multilayer capacitor |
| C4,C5,C6,C7,C16 | 10nF 100V | Ceramic multilayer capacitor |
| C14 | 470uF,63V | Electrolytic Capacitor |
| C15 | 200pF | MQ101111 |
| C8 | 100pF | MQ101111 |
| C9,C11 | 33pF | MQ101111 |
| C10 | 22pF | MQ101111 |
| C12 | 150pF | MQ101111 |
| C13 | 56pF | MQ101111 |
| C15 | 39pF | MQ101111 |
| L1 | 47nH | |
| L6 | 150nH | |
| R1 | 300Ω，1206 | Chip Resistor |
| R2 | 5Ω | Chip Resistor |
| L2,L7 | 1.5mm，6 turns，Φ5 | |
| L3 | 1.5mm，2 turns，Φ5 | |
| L4 | 1.5mm，4 turns，Φ5 | |
| PCB | 30Mil Rogers4350 | |

## Package Dimensions （Unit:mm）




## Revision history

**Table 5. Document revision history**

| Date | Revision | Datasheet Status |
|---|---|---|
| 2023/5/25 | Rev 1.0 | Preliminary Datasheet Creation |
| 2023/8/17 | Rev 1.1 | Modification of package drawing on last page |
| | | |

**Application data based on SYX-23-21**

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