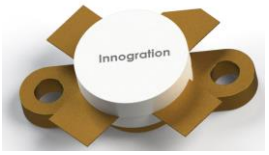
# MV0520X LDMOS TRANSISTOR

Document Number: MV0520X
Preliminary Datasheet V1.1

## 200W, HF-200MHz 28V High Power RF LDMOS

**MV0520X**




### Description

The MV0520X is a 200W single ended 28V LDMOS, highly rugged，unmatched for any applications within HF-200MHz

It supports CW, and pulsed and any modulated signal at either saturated or linear application.

**It is also intended to be the drop-in replacement of legacy VDMOS such as D1017UK etc in the same mechanical outline while with improved performance**

•Typical Performance (On Innogration fixture with device soldered):

$V_{DD}$ = 28 Volts, $I_{DQ}$ = 150 mA, CW.

| Frequency | Pin（dBm） | Gp (dB) | $P_{OUT}$ (W) | $\eta_D$ (%) |
|---|---|---|---|---|
| 40.68MHz | 33 | 20 | 203 | 81 |

### 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

- 2-30MHz (HF or Short wave communication)
- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 118 -140MHz (Avionics)
- 136-174MHz (Commercial ground communication)
- 160-230MHz (TV VHF III)

**Table 1. Maximum Ratings**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain--Source Voltage | $V_{DSS}$ | +95 | Vdc |
| Gate--Source Voltage | $V_{GS}$ | -10 to +10 | Vdc |
| Operating Voltage | $V_{DD}$ | +36 | Vdc |
| Storage Temperature Range | Tstg | -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** (TA = 25 ℃ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **DC Characteristics** | | | | | |
| Drain-Source Voltage<br>$V_{GS}$=0, $I_{DS}$=1.0mA | $V_{(BR)DSS}$ | 95 | —— | | 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>($V_{DS}$ = 28 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>($V_{DS}$ = 28V, $I_D$ = 400 μA) | $V_{GS}$(th) | —— | 2.2 | —— | V |
| Gate Quiescent Voltage<br>($V_{DD}$ = 28 V, $I_D$ = 150 mA, Measured in Functional Test) | $V_{GS(Q)}$ | —— | 3.05 | —— | V |
| Common Source Input Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =28 V, f = 1 MHz) | $C_{ISS}$ | | 187 | | pF |
| Common Source Output Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =28 V, f = 1 MHz) | $C_{OSS}$ | | 79 | | pF |
| Common Source Feedback Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =28 V, f = 1 MHz) | $C_{RSS}$ | | 4.6 | | pF |

**Functional Tests** (In Demo Test Fixture, 50 ohm system) $V_{DD}$ = 28 Vdc, $I_{DQ}$ = 150mA, f = 150 MHz, Pin=2W, CW Signal Measurements.

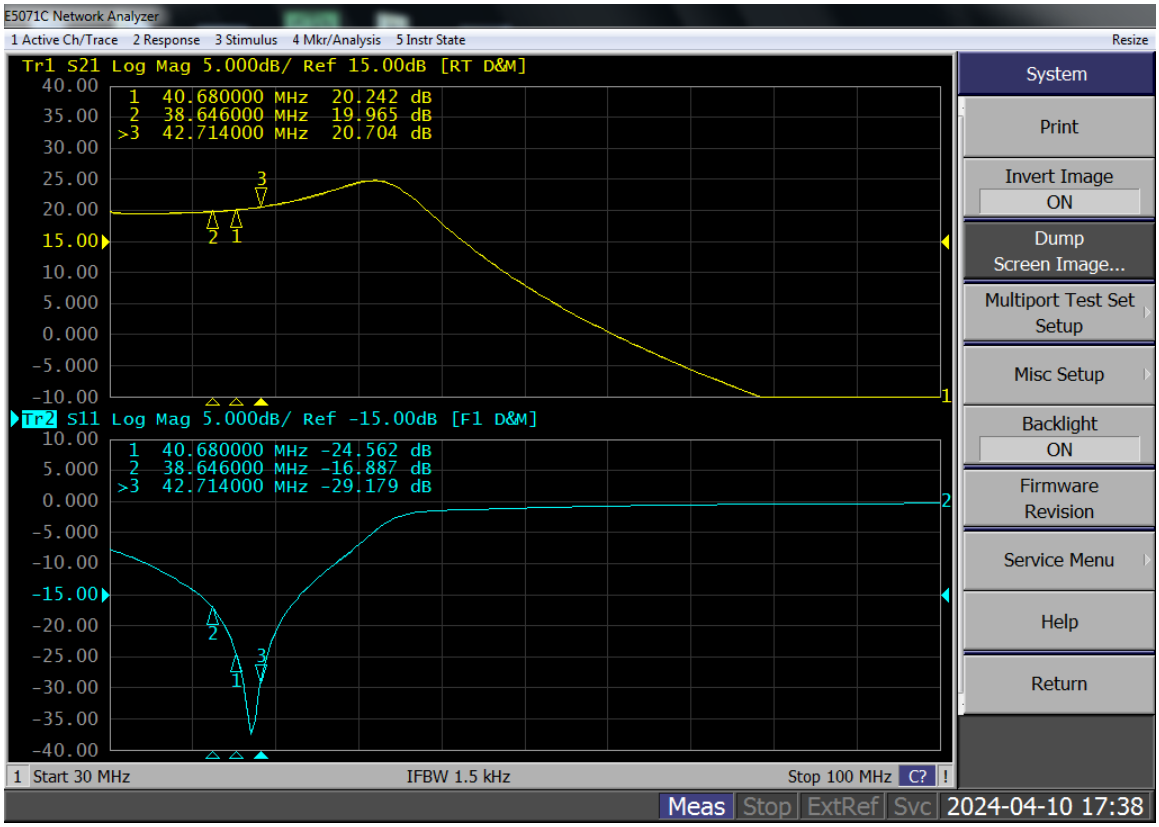
| | | | | | |
|---|---|---|---|---|---|
| Power Gain | $G_p$ | —— | 20 | —— | dB |
| Drain Efficiency@Pout | $\eta_D$ | —— | 80 | —— | % |
| Output Power | $P_{out}$ | —— | 200 | —— | W |
| Input Return Loss | IRL | —— | -7 | —— | dB |

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):** $V_{DD}$ = 28 Vdc, $I_{DQ}$ = 150 mA, f = 150 MHz

| | |
|---|---|
| VSWR 20:1 at 200W pulse CW Output Power | No Device Degradation |

## TYPICAL CHARACTERISTICS

**Figure 1: Network analyzer output S11/221**




**Reference Circuit of Test Fixture Assembly Diagram (PCB file upon request)**

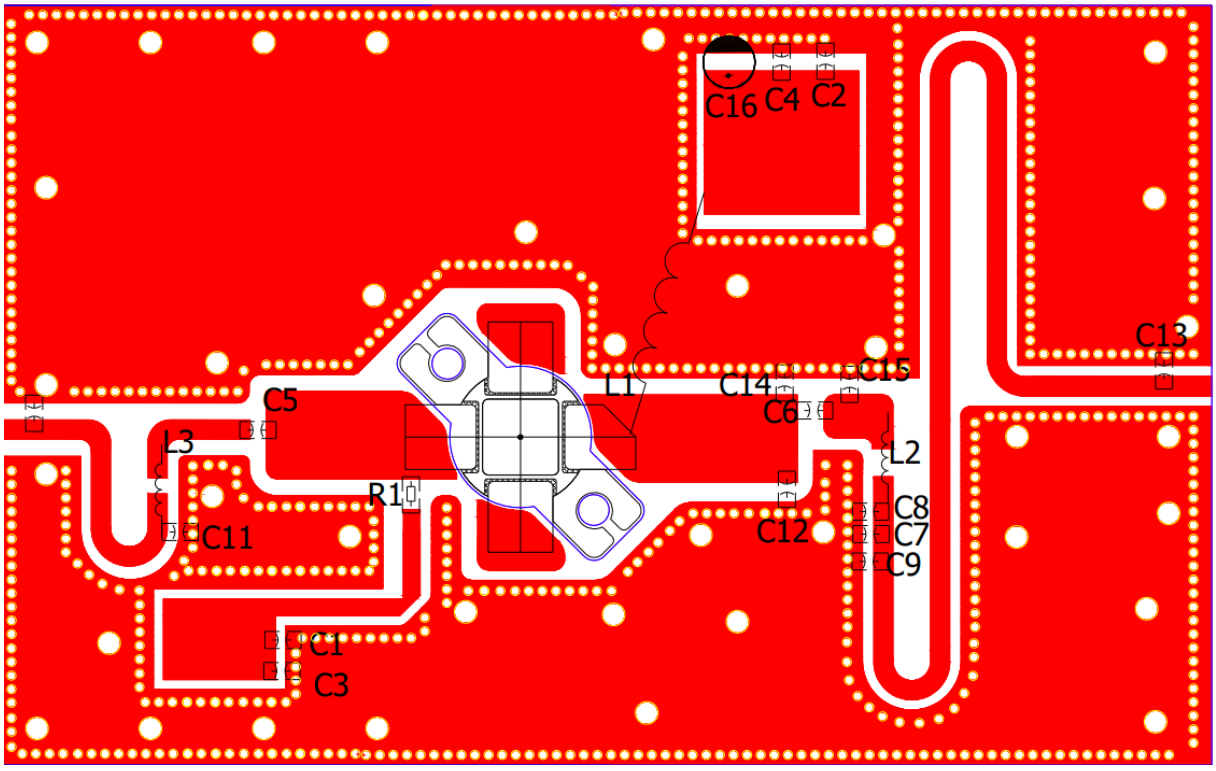
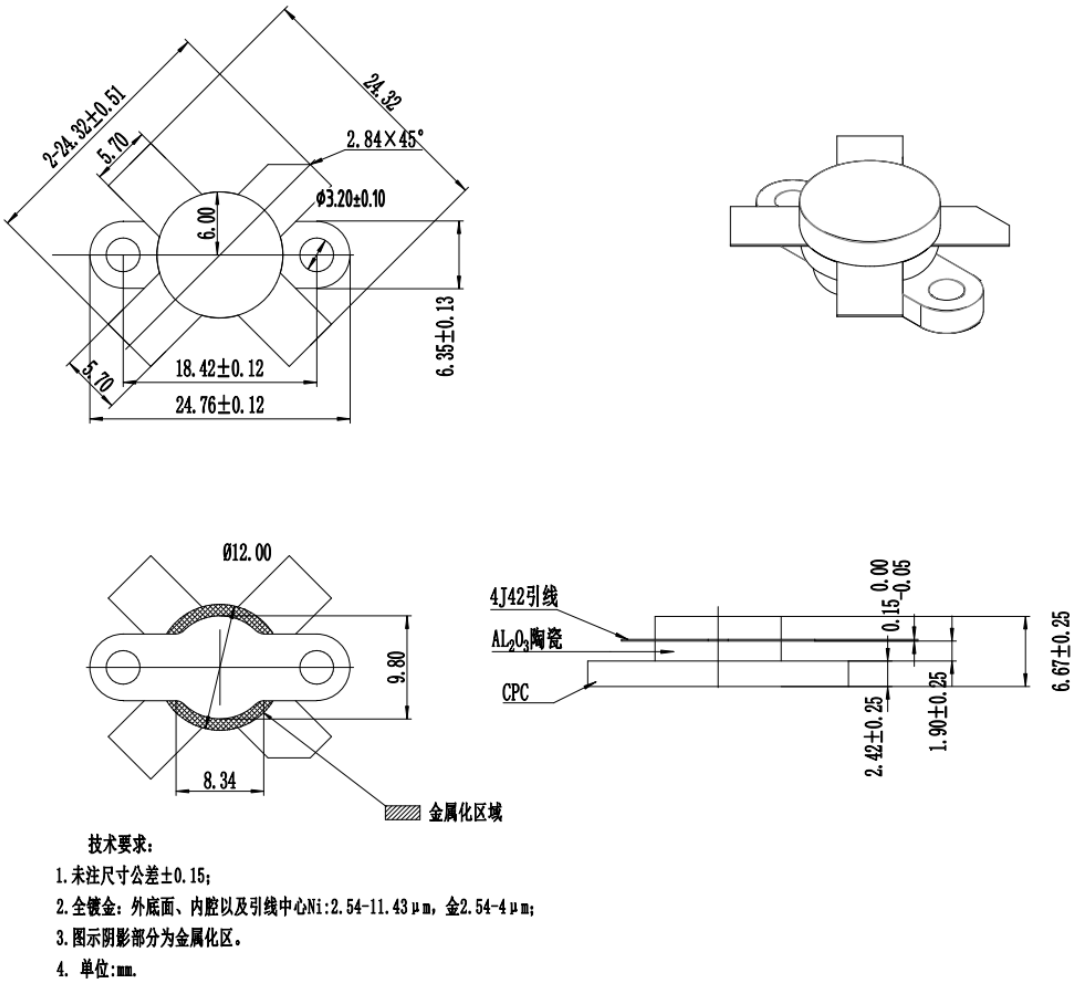


**Table 1. Test Circuit Component Designations and Values (40.68MHz)**

| Component | Description | Suggestion |
|---|---|---|
| C1,C2 | 10uF | 10uF/100V |
| C3~C6 | 10nF | 10nF/100V |
| C7,C8 | 150pF | MQ101111 |
| C9 | 39pF | MQ101111 |
| C10 | 120pF | MQ101111 |
| C11 | 47pF | MQ101111 |
| C12 | 18pF | MQ101111 |
| C13 | 12pF | MQ101111 |
| C14 | 200pF | MQ101111 |
| C15 | 470uF/63V | Electrolytic Capacitor |
| R1 | 10Ω | Chip Resistor |
| L1 | 1.5mm/5mm，8 turns | |
| L2 | 1.5mm/5mm，4 turns | |
| L3 | 1.5mm/5mm，6 turns | |
| PCB | 30Mil Rogers4350 | |

## Package Outline

**Flanged ceramic package; 2 mounting holes; 2 leads（1—Gate、2—Drain、3—Source）**




技术要求：

1. 未注尺寸公差±0.15；
2. 全镀金：外底面、内腔以及引线中心Ni:2.54-11.43μm，金2.54-4μm；
3. 图示阴影部分为金属化区。
4. 单位:mm.

## Revision history

**Table 5. Document revision history**

| Date | Revision | Datasheet Status |
|---|---|---|
| 2021/3/26 | Rev 1.0 | Preliminary datasheet |
| 2025/1/13 | Rev 1.1 | Modify the PCB layout according to V4E package |

**Applicaion data based on TC-24-22**

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