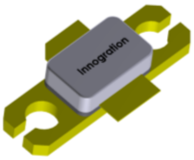
# MU0517VX LDMOS TRANSISTOR

## 170W, 50V High Power RF LDMOS FETs

**MU0517VX**



### Description

The MU0517VX is a 170-watt capable, high performance, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 0.5 GHz.

It is featured by single ended configuration for high power and high ruggedness, suitable for Industrial, Scientific and Medical application, as well as FM radio, VHF TV and Aerospace applications.

- Typical performance(on Innogration test board with device soldered)
  Signal: CW , Vgs=3.4v,Vds=50v,Idq=180mA

| Freq<br>(MHz) | Pin<br>(dBm) | Psat<br>(dBm) | Psat<br>(W) | IDS<br>(A) | Gain<br>(dB) | Eff<br>(%) | 2nd harmonic<br>(dBc) | 3rd harmonic<br>(dBc) |
|---|---|---|---|---|---|---|---|---|
| 123 | 27.8 | 52.15 | 164.1 | 4.22 | 24.35 | 78 | -26 | -35 |
| 128 | 27.7 | 51.99 | 158.1 | 3.98 | 24.29 | 79 | -26 | -36 |
| 133 | 28.6 | 51.47 | 140.3 | 3.53 | 22.87 | 79 | -26 | -37 |

### 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)
- 160-230MHz (TV VHF III)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

**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 | 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 | RθJC | 0.8 | °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, $I_D$ = 180 mA, Measured in Functional Test) | $V_{GS(Q)}$ | —— | 3.4 | —— | V |
| Drain source on state resistance<br>(Vds=0.1V, Vgs=10V) | Rds(on) | | | | mΩ |
| Common Source Input Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =50 V, f = 1 MHz) | $C_{ISS}$ | | | | pF |
| Common Source Output Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =50 V, f = 1 MHz) | $C_{OSS}$ | | | | pF |
| Common Source Feedback Capacitance<br>($V_{GS}$ = 0V, $V_{DS}$ =50 V, f = 1 MHz) | $C_{RSS}$ | | | | pF |

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):** $V_{DD}$ = 50 Vdc, $I_{DQ}$ = 100 mA, f =160MHz, pulse width:100us, duty cycle:10%

| | |
|---|---|
| Load 20:1 All phase angles, at 250W Pulsed CW Output Power | No Device Degradation |

# TYPICAL CHARACTERISTICS

Figure 1: Pulsed CW Gain and Power Efficiency as a Function of Pout at 128MHz

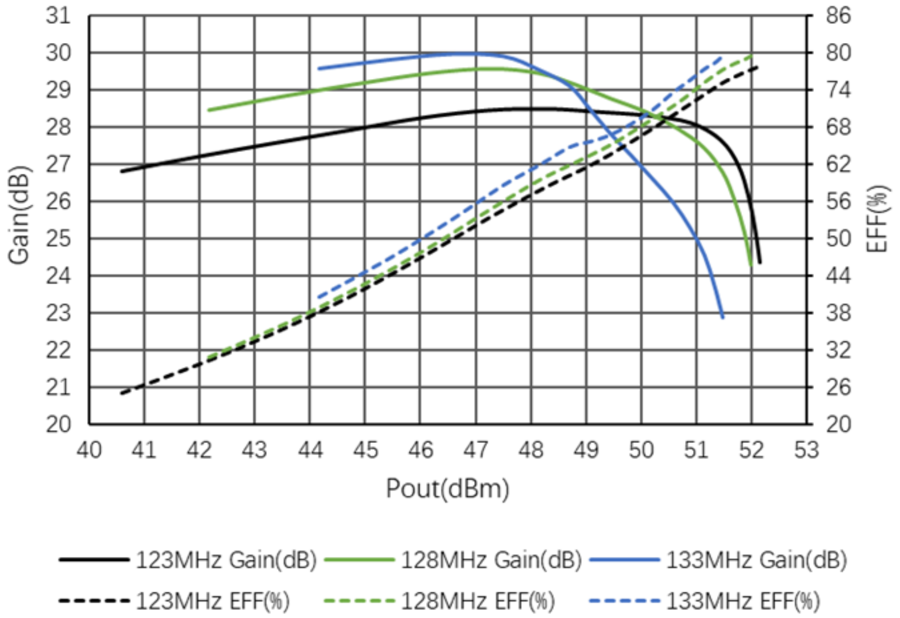


Figure 1: Network analyzer output S11/221

```
Tr1 S21 Log Mag 10.00dB/ Ref 0.000dB [RT]
  1  123.00000 MHz  23.825 dB
  2  128.00000 MHz  24.776 dB
 >3  133.00000 MHz  25.618 dB
Tr2 S11 Log Mag 10.00dB/ Ref 0.000dB [RS]
  1  123.00000 MHz -5.5462 dB
  2  128.00000 MHz -8.1263 dB
 >3  133.00000 MHz -13.264 dB
1 Start 20 MHz          IFBW 1 kHz          Stop 200 MHz   C2
```

## Reference Circuit of Test Fixture Assembly Diagram

**(Layout file upon request, 30mil RO4350)**

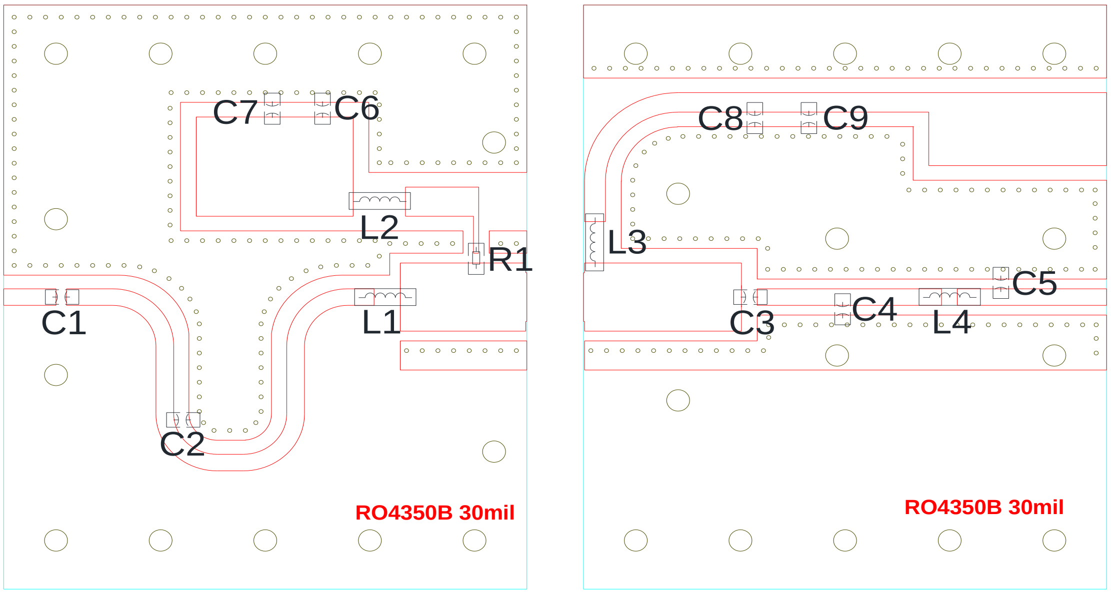
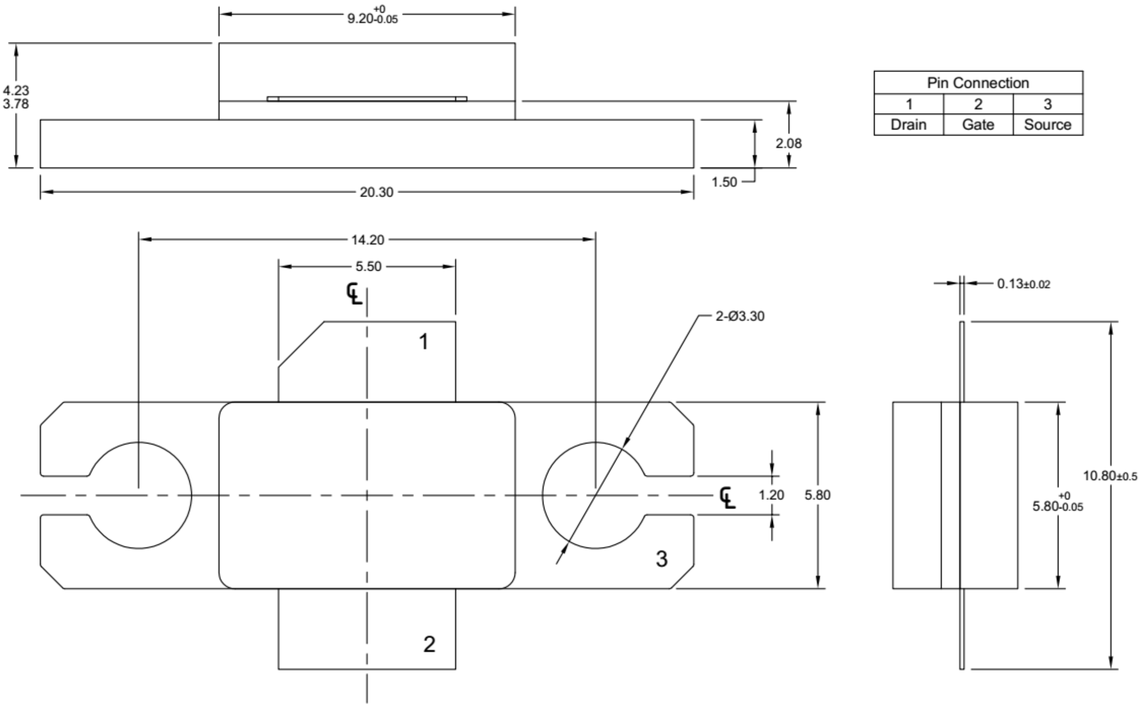


**Table 5. Test Circuit Component Designations and Values**

| **Component** | **Description** | **Suggested Manufacturer** |
|---|---|---|
| C1,C6,C8 | 1000pF | DLC70B |
| C2 | 100pF | DLC70B |
| C3 | 200pF | ATC800B |
| C4 | 30pF | DLC70B |
| C5 | 47pF | ATC800B |
| C7,C9 | 10uF | 10uF/50V |
| R1 | Chip Resistor,9.1Ω, | 1206 |
| L1 | 10nH | 1606 |
| L2,L3,L4 | 34nH,4turns | 线径 1mm,<br>绕径 3.5mm |

## Package Outline

### Flanged ceramic package; 2 leads



| Pin Connection | | |
|---|---|---|
| 1 | 2 | 3 |
| Drain | Gate | Source |

Unit: mm
Tolerances(unless specified): x.x ±0.1
x.xx ±0.05

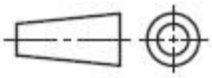
| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | |
| PKG-GXB | | | |  | **10/10/2017** |

**Figure 1. Package Outline PKG-G2E**

## Revision history

**Table 5. Document revision history**

| Date | Revision | Datasheet Status |
|---|---|---|
| **2018/5/29** | **Rev 1.0** | **Preliminary Datasheet Creation** |
| | | |
| | | |

**Application data based on HL-21-01/02**

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