

## 90W, 50V High Power RF LDMOS FETs

### Description

The M2X1509RVP is a 90-watt P1dB minimum, highly rugged, thermally enhanced, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 1.5 GHz. It is featured for high power and high ruggedness, suitable for Industrial, Scientific and Medical applications as well as FM radio, VHF TV and other ISM applications.



• Typical RF Performance (On Innogrator broadband fixture with device soldered):

$V_{DD} = 50$  Volts,  $I_{DQ} = 200$  mA, CW.

Frequency	P1dB(W)	Psat(W)	Gp @ Psat (dB)	$\eta_D @ Psat$ (%)
500-1000M	>100	>140	>13	45~60

### 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)
- 1200-1400MHz(L band)
- 136-174MHz (Commercial ground communication)
- 160-230MHz (TV VHF III)
- 30-512MHz (Jammer, Ground/Air communication)
- 470-860MHz (TV UHF)
- 100kHz - 1000MHz (ISM, instrumentation)
- 960-1215MHz(Avionics)

**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 $T_c = 85^\circ\text{C}$ , DC Test, $T_J = 200^\circ\text{C}$	$R_{\theta JC}$	0.5	°C/W

**Table 3. ESD Protection Characteristics**

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

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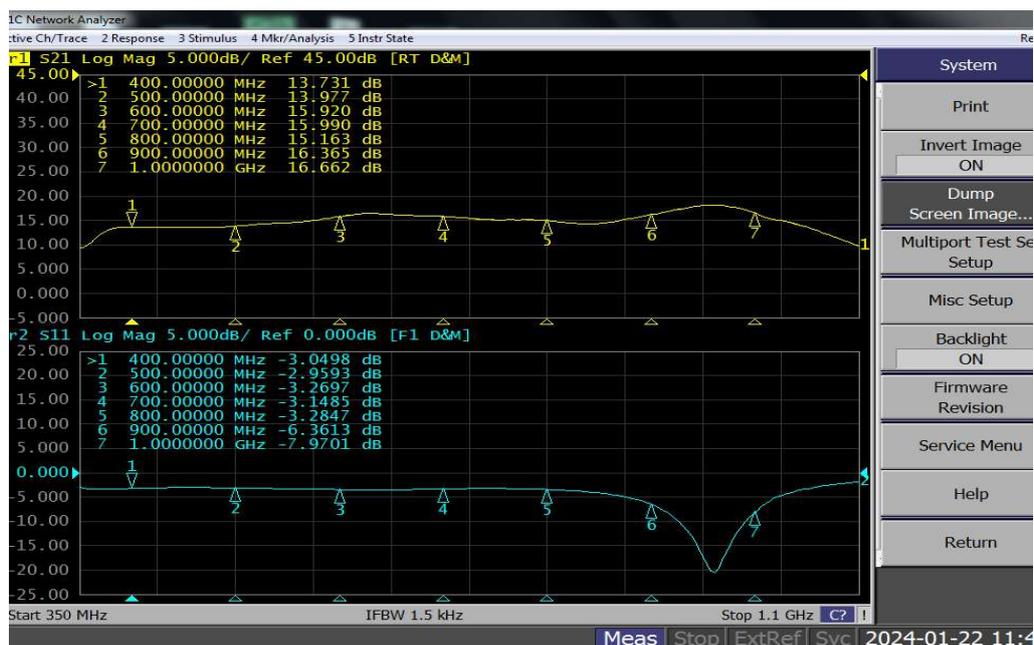
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**Table 4. Electrical Characteristics** (TA = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>DC Characteristics</b>					
Drain-Source Voltage $V_{GS}=0, I_{DS}=1.0\text{Ma}$	$V_{(BR)DSS}$		110		V
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$ )	$I_{DSS}$	—	—	1	$\mu\text{A}$
Gate—Source Leakage Current ( $V_{GS} = 10\text{V}, V_{DS} = 0\text{V}$ )	$I_{GSS}$	—	—	1	$\mu\text{A}$
Gate Threshold Voltage ( $V_{DS} = 50\text{V}, I_D = 600\ \mu\text{A}$ )	$V_{GS(th)}$	—	2.65	—	V
Gate Quiescent Voltage ( $V_{DD} = 50\text{V}, I_D = 200\text{mA}$ , Measured in Functional Test)	$V_{GS(Q)}$	—	3.57	—	V
Drain source on state resistance ( $V_{DS} = 0.1\text{V}, V_{GS} = 10\text{V}$ ) Each section side of device measured	$R_{ds(on)}$		470		$\text{m}\Omega$
Common Source Input Capacitance ( $V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$ ) Each section side of device measured	$C_{ISS}$		36		$\text{pF}$
Common Source Output Capacitance ( $V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$ ) Each section side of device measured	$C_{OSS}$		18		$\text{pF}$
Common Source Feedback Capacitance ( $V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$ ) Each section side of device measured	$C_{RSS}$		1		$\text{pF}$

## TYPICAL CHARACTERISTICS

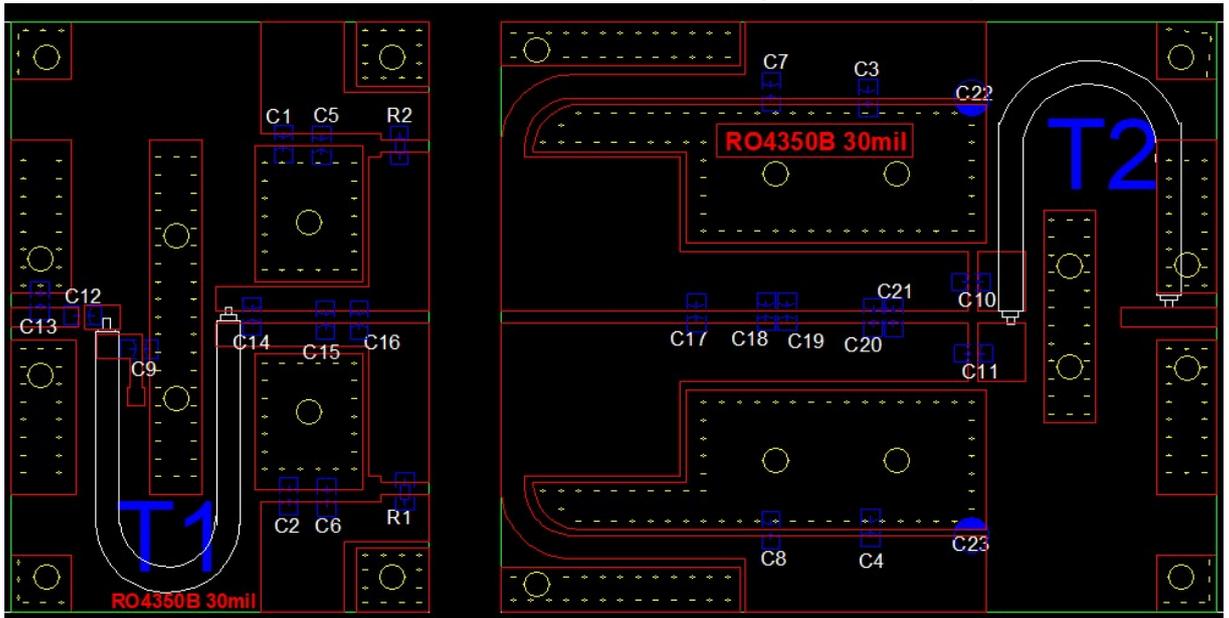
**Figure 1: Network analyzer output S11/S21  $V_{ds}=50\text{V}, I_{dq}=200\text{mA}, P_{in}=0\text{dBm}$**



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## Reference Circuit of Test Fixture (500-1000MHz)



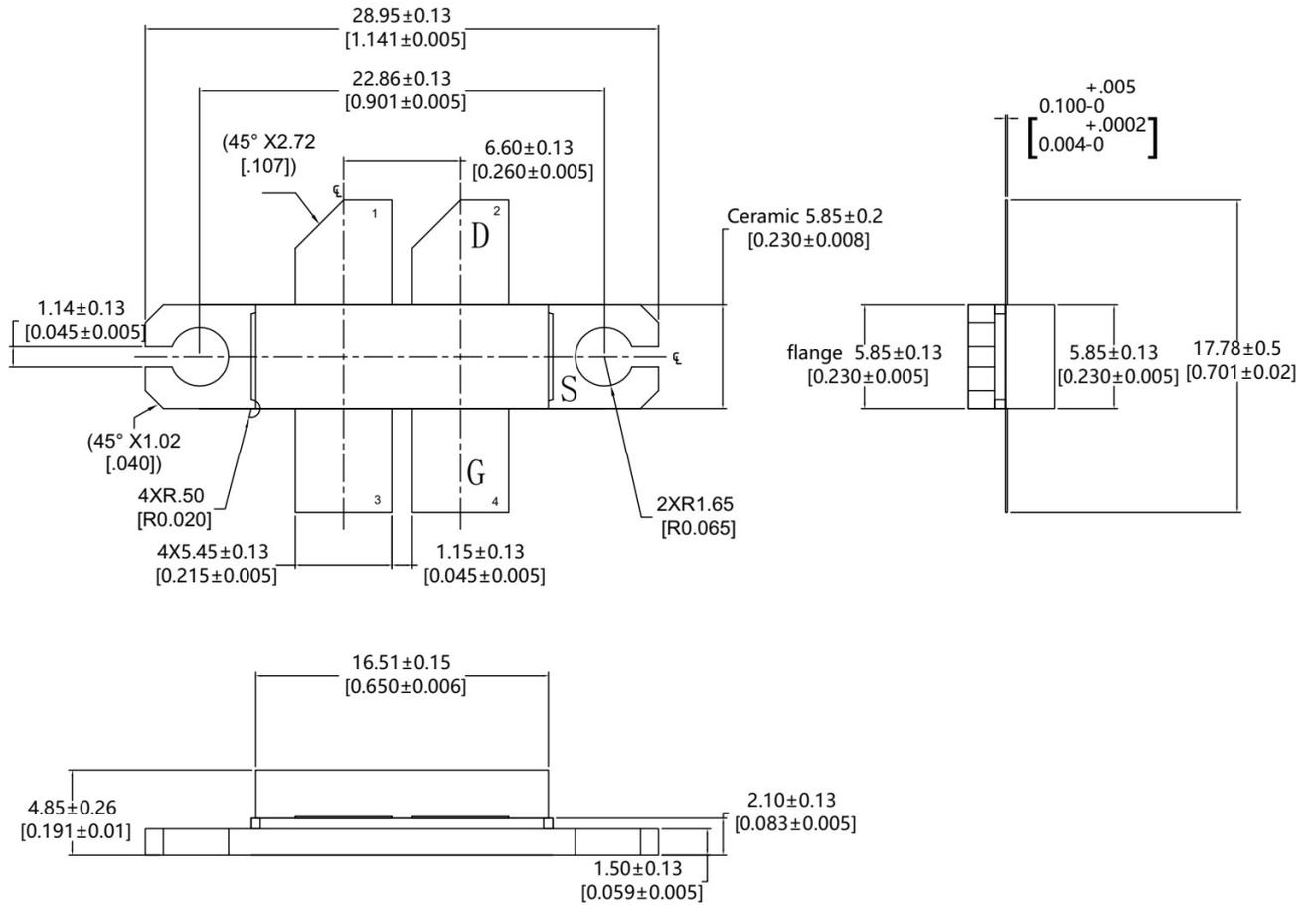
Component	Description	Suggested Manufacturer
C1~C4	10uF	10uF/100V
C5~C9	200pF	MQ101111
C10,C11	68pF	MQ101111
C12	82pF	MQ101111
C13	1pF	MQ101111
C14, C20	2pF	MQ101111
C15	12pF	MQ101111
C16	7.5pF	MQ101111
C17	3pF	MQ101111
C18	1.5pF	MQ101111
C19	0.5pF	MQ101111
C21	3.6pF	MQ101111
C22,C23	470uF,63V	Electrolytic Capacitor
R1	10 $\Omega$	
T1	25 ohm,60 mm	RFSFBU-086-50
T2	35 ohm,60mm	SFF-35-3
PCB	30mil Rogers 4350B	

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## Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-LB/LBB					05/21/2021

## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/1/22	Rev 1.0	Preliminary Datasheet Creation

Application based on TC-24-04

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