

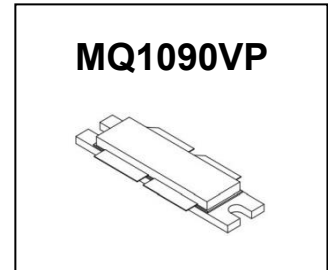
# MQ1090VP LDMOS TRANSISTOR

Document Number: MQ1090VP  
Preliminary Datasheet V1.2

## 1000W, UHF 50V High Power RF LDMOS FETs

### Description

The MQ1090VP is a 1000-watt capable, high performance, internally matched LDMOS FET, designed for narrow band pulsed amplifier applications within UHF band up to 1GHz



- Typical **pulsed CW** Performance (on innogration narrow band test fixture with device soldered):

$V_{ds} = 50$  Volts,  $I_{dq} = 100$  mA,  $T_A = 25$  C

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
900	59.52	896.3	59.8	17.45	60.44	1105.6	60.6

### Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Internally Matched for Ease of Use
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Excellent thermal stability, low HCI drift
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DSS}$	115	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, Case Temperature 80°C, 1000W Pout, Pulse width: 100us, duty cycle: 10%, $V_{ds}=50$ V, $I_{DQ} = 100$ mA , Frequency at 1000MHz	$R_{\theta JC}$	0.02	°C/W

**Table 3. ESD Protection Characteristics**

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

**Table 4. Electrical Characteristics** ( $T_A = 25$  C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### DC Characteristics

Drain-Source Breakdown Voltage ( $V_{GS}=0V$ ; $I_D=100\mu A$ )	$V_{DSS}$	115	---	---	V
Zero Gate Voltage Drain Leakage Current	$I_{DSS}$	---	---	10	$\mu A$

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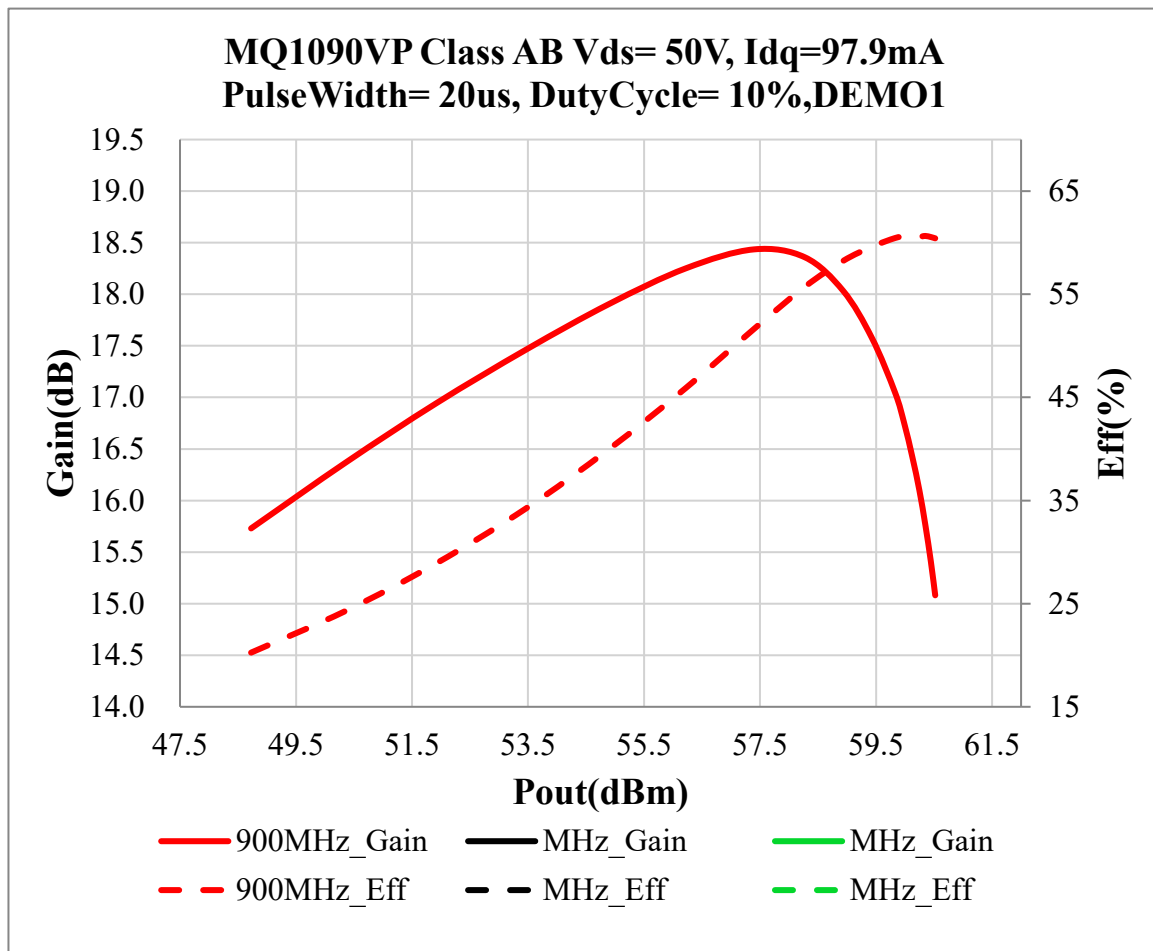
Document Number: MQ1090VP  
Preliminary Datasheet V1.2

( $V_{DS} = 50\text{ V}$ , $V_{GS} = 0\text{ V}$ )					
Gate--Source Leakage Current ( $V_{GS} = 6\text{ V}$ , $V_{DS} = 0\text{ V}$ )	$I_{GSS}$	-----	-----	1	$\mu\text{A}$
Gate Threshold Voltage ( $V_{DS} = 50\text{ V}$ , $I_D = 600\text{ uA}$ )	$V_{GS(th)}$	-----	1.6	-----	V
Gate Quiescent Voltage ( $V_{DD} = 50\text{ V}$ , $I_{DQ} = 100\text{ mA}$ , Measured in Functional Test)	$V_{GS(Q)}$		3.0		V

**Functional Tests (In Innogration test fixture, 50 ohm system) :**  $V_{DD} = 50\text{ Vdc}$ ,  $I_{DQ} = 100\text{ mA}$ ,  $f = 1000\text{ MHz}$ , Pulse CW Signal Measurements.  
(Pulse Width=100  $\mu\text{s}$ , Duty cycle=10%),  $P_{in}=46\text{ dBm}$

Power Gain	$G_p$	-----	14	-----	dB
Output Power	$P_{out}$	-----	1000	-----	W
Drain Efficiency@ $P_{out}$	$\eta_D$	-----	56	-----	%
Input Return Loss	IRL	-----	-7	-----	dB

Figure 1: Power Gain, Efficiency as a Function of Output Power



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Preliminary Datasheet V1.2

Figure 2: Network analyzer output S11/S21 Vds = 50Vdc, Idq =2.5A

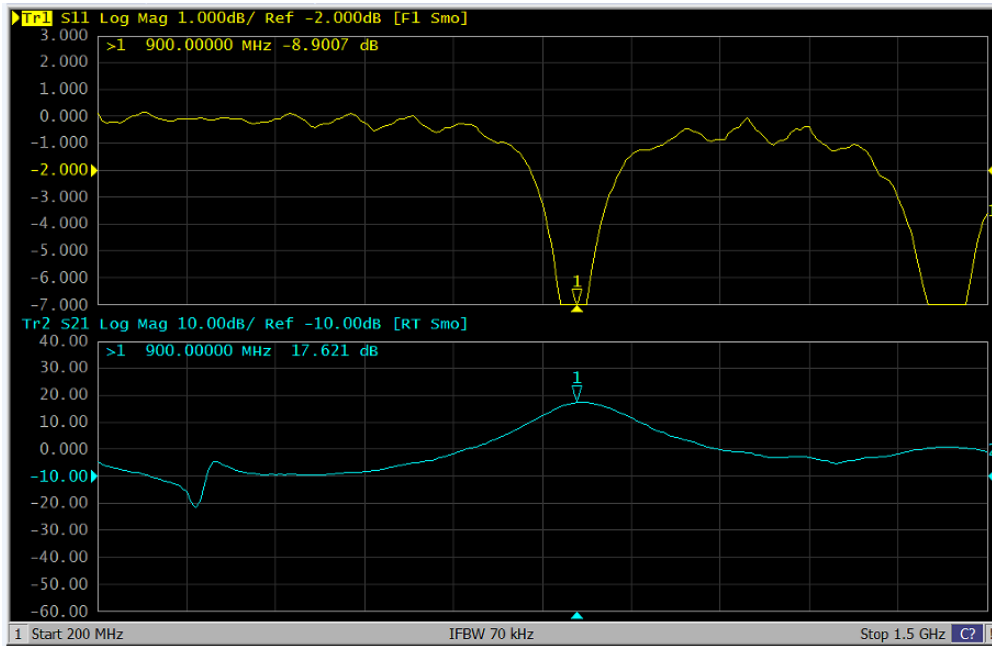
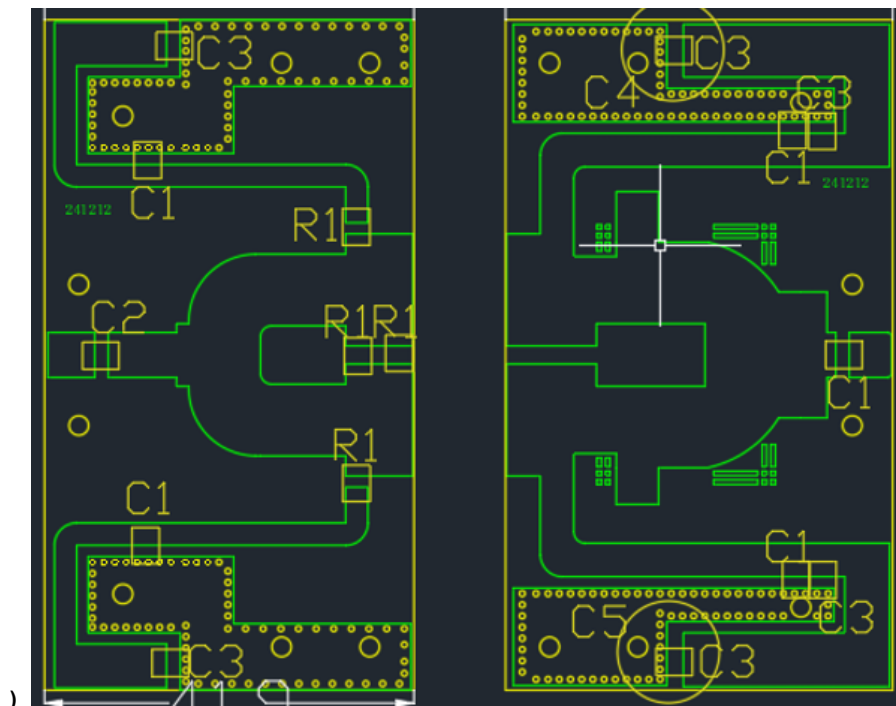


Figure 3: Test fixture photo



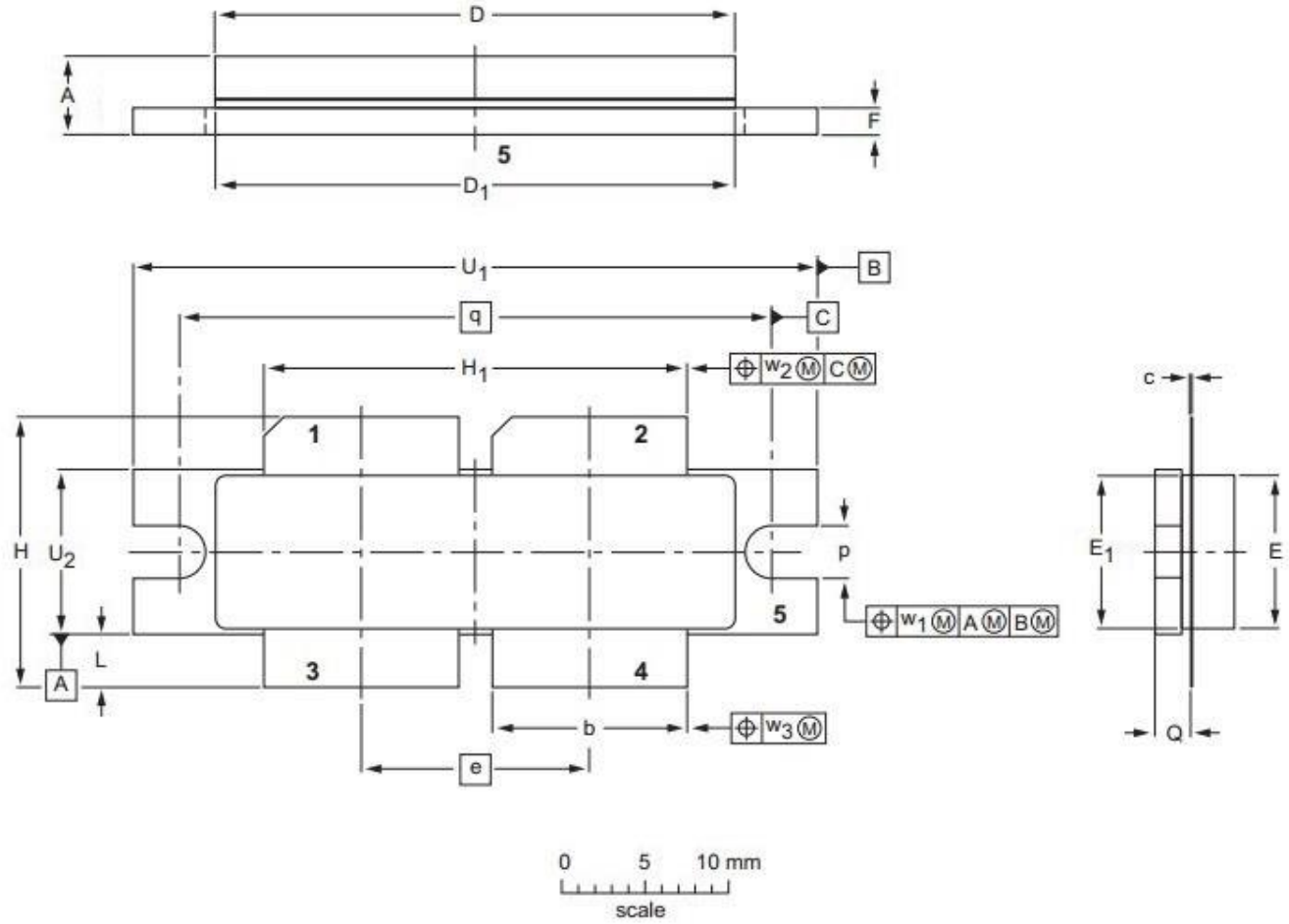
BOM		
Component	Value	Quantity
C1	56pF	5
C3	10uF	3
R1	10 ohm	4
C4	470uF	1
C2	8.2pF	1
C5	4700uF	1

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Preliminary Datasheet V1.2

## Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads (1、2—DRAIN、3、4—GATE、5—SOURCE)



UNIT	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	L	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>2</sub>
mm	4.7	11.81	0.18	31.55	31.52	13.72	9.50	9.53	1.75	17.12	25.53	3.48	3.30	2.26	35.56	41.28	10.29	0.25	0.51	0.25
	4.2	11.56	0.10	30.94	30.96		9.30	9.27	1.50	16.10	25.27	2.97	3.05	2.01		41.02	10.03			
inches	0.185	0.465	0.007	1.242	1.241	0.540	0.374	0.375	0.069	0.674	1.005	0.137	0.130	0.089	1.400	1.625	0.405	0.01	0.02	0.01
	0.165	0.455	0.004	1.218	1.219		0.366	0.365	0.059	0.634	0.995	0.117	0.120	0.079		1.615	0.395			

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-D4E					03/12/2013

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Preliminary Datasheet V1.2

## Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2017/11/8	Rev 1.0	Preliminary Datasheet Creation
2022/10/4	Rev 1.1	Modify to 1GHz to be UHF specified product
2025/10/29	Rev 1.2	Update with professional test report

Application data based on ZXY-25-12

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