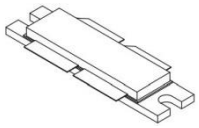
MQ0523R LDMOS TRANSISTOR

Document Number: MQ0523R
Preliminary Datasheet V1.2

230W, 28V High Power RF LDMOS FETs

MQ0523R



Description

The MQ0523R is a 230-watt capable, high performance, unmatched push pull LDMOS FET, for wide-band commercial and industrial applications with frequencies HF to 1000MHz.

It can be used for both CW and pulse application or any other modulation signal.

It is featured for high power and high ruggedness, low thermal resistor, suitable for Industrial, Scientific and Medical application, as well as FM radio, VHF TV and mobile radio applications.

It is the performance enhancement of MK0520/MK0525 with similar power capability, with higher efficiency and lower Rth

- Typical broadband Performance at 28V (On Innogration 30-512MHz wideband fixture with device soldered):

MQ0523R VGS=3.10V VDS=28V IDQ=390mA CW								
Freq (MHz)	**Psat (dBm)**	**Psat (W)**	**IDS (A)**	**Pin (dBm)**	**Gain (dB)**	**Eff(%)**	**2nd（dBc）**	**3rd（dBc）**
30	53.10	204.2	9.19	38.65	14.45	79.35	-25.10	-11.00
100	54.00	251.2	12.53	38.20	15.80	71.60	-32.50	-10.80
200	54.17	261.2	14.82	39.70	14.47	62.95	-34.70	-9.30
300	53.23	210.4	12.51	38.53	14.70	60.06	-31.70	-25.20
400	53.79	239.3	13.79	38.60	15.19	61.98	-38.80	-44.10
500	53.58	228.0	12.86	39.24	14.34	63.33	-58.20	-46.80
512	53.29	213.3	12.05	39.94	13.35	63.22	-58.90	-46.30

- Typical narrow band Performance at 24V (On Innogration 400-460MHz wideband fixture with device soldered):

MQ0523R^{V0} VGS=2.93V VDS=24V IDQ=200mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2nd（dBc）	3rd（dBc）
400	53.19	208.4	12.18	36.00	17.19	71.31	-27.70	-40.40
410	53.36	216.8	12.60	36.05	17.31	71.68	-31.30	-42.40
420	53.35	216.3	12.46	36.23	17.12	72.32	-33.20	-44.40
430	53.16	207.0	11.95	36.37	16.79	72.18	-34.30	-47.00
440	53.04	201.4	11.60	36.26	16.78	72.33	-36.00	-48.80
450	53.12	205.1	11.63	36.28	16.84	73.49	-37.60	-50.60
460	53.04	201.4	11.29	36.50	16.54	74.32	-38.70	-51.30

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Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Excellent thermal stability, low HCI dri
- 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)
- 30-512MHz (ultra shortwave communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 118 -140MHz (Avionics)
- 136-174MHz (Commercial ground communication)
- 160-230MHz (TV VHF III)
- 30-512MHz (Jammer, Ground/Air communication)
- 470-860MHz (TV UHF)
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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}	+40	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 T_C= 85°C, T_J=200°C, DC test	RθJC	0.2	°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)

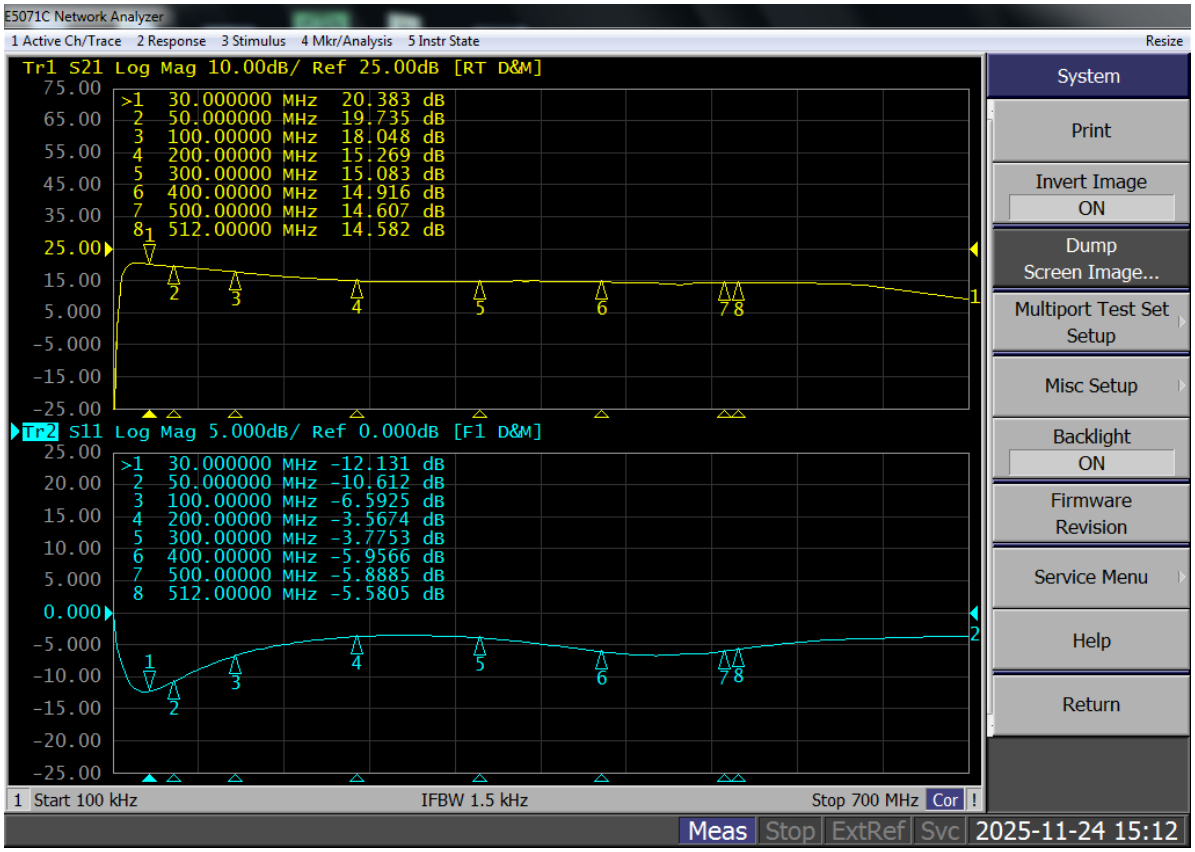
Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics (per half section)					
Drain-Source Voltage V_{GS}=0, I_{DS}=1.0mA	$V_{(BR)DSS}$	95			V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 75V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28 V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Gate--Source Leakage Current (V_{GS} = 10 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 28V, I_D = 800 μA)	$V_{GS(th)}$	——	2.2	——	V
Gate Quiescent Voltage (V_{DD} = 28 V, I_D = 800 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.1	——	V

Common Source Input Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{ISS}		110		pF
Common Source Output Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{OSS}		45		pF
Common Source Feedback Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{RSS}		2		pF

30-512MHz

TYPICAL CHARACTERISTICS

Figure 1: Network analyzer output S11/S21 at 28V Idq=800mA



Reference Circuit of Test Fixture Assembly Diagram

(Layout file upon request, 30mil RO4350)

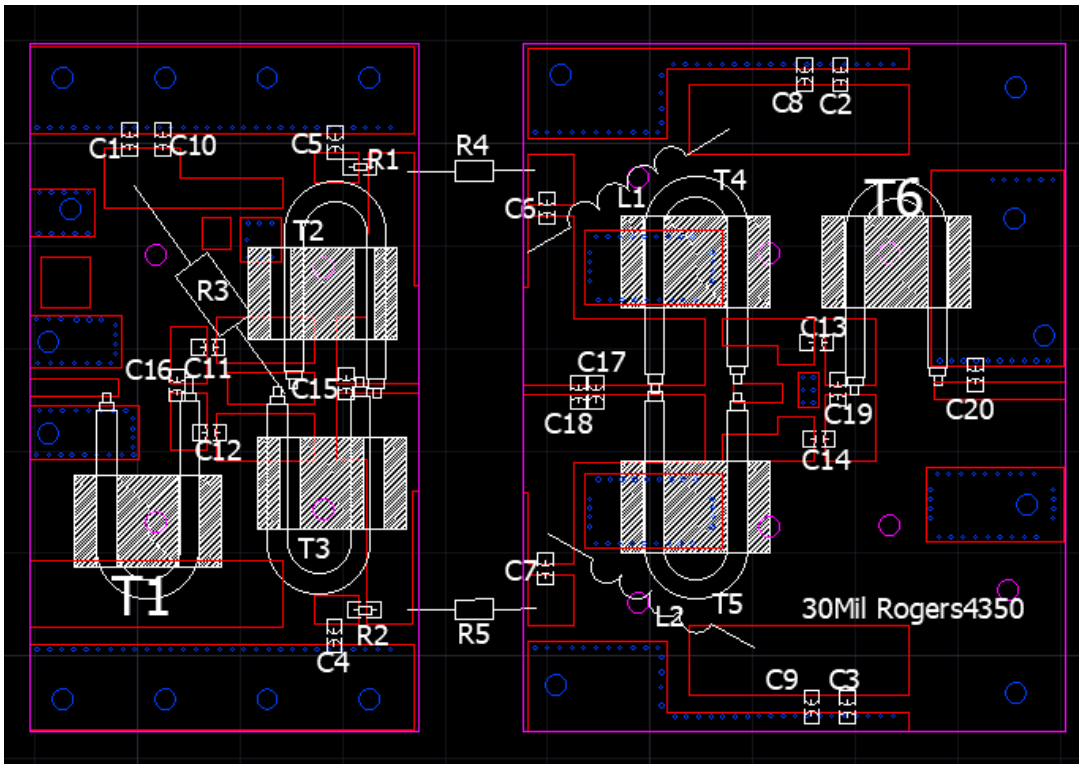


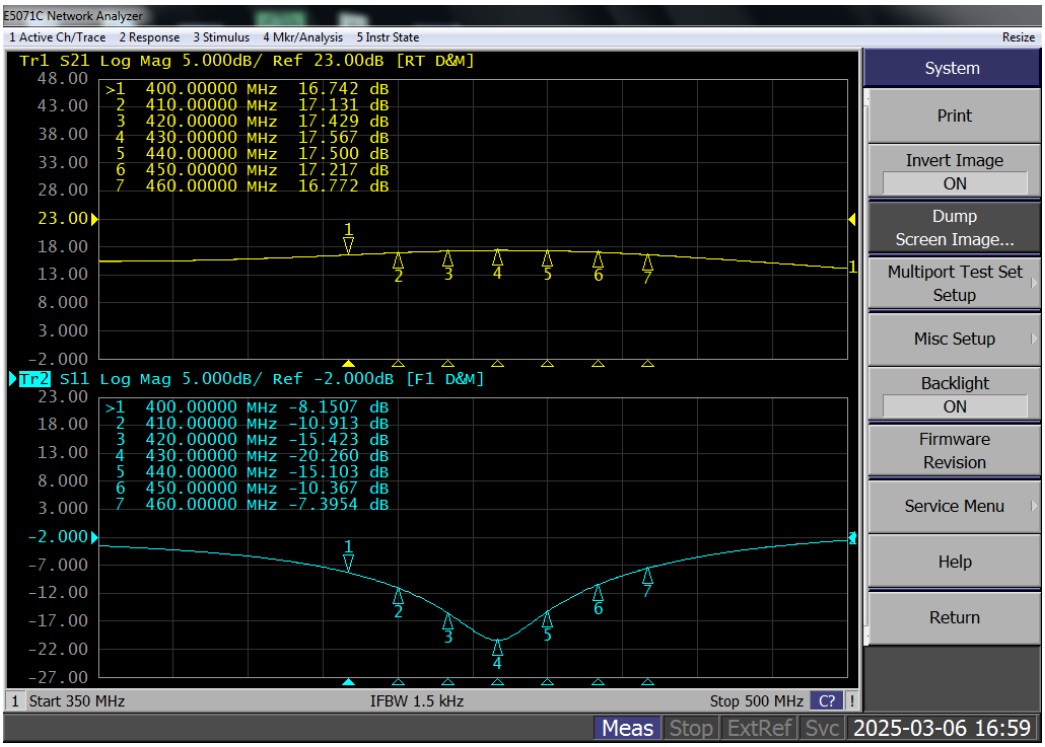
Table 5. Test Circuit Component Designations and Values

Component	Description	Suggested Manufacturer
C1~C5	10uF/200V-1210	Ceramic multilayer capacitor
C6~12	10nF/200V-1210	Ceramic multilayer capacitor
C13，C14	910pF	
C15	15pF	
C16	2.7pF	
C17	12pF	
C18	18pF	
C19	2.2pF	
C20	3pF	
T1,T6	50 ohm-65mm;BN-61-202	RFSFBU-086-50;BN-61-202
T2,T3	16.7 ohm-65mm,BN-61-202	SFF-16.7-1.5;BN-61-202
T4,T5	12.5 ohm-70mm,BN-61-202	SFF-12.5-1.5;BN-61-202
R1,R2	18 Ω-1206	Chip Resistor
R3	300 Ω	color ring resistor
R4,R5	330 Ω	color ring resistor
L1,L2	1.5mm wire ， 5mm inner diameter， 6 Turns	DIY

400-460MHz

TYPICAL CHARACTERISTICS

Figure 2: Network analyzer output S11/S21 at 25V Idq=570mA



Reference Circuit of Test Fixture Assembly Diagram

(Layout file upon request, 30mil RO4350)

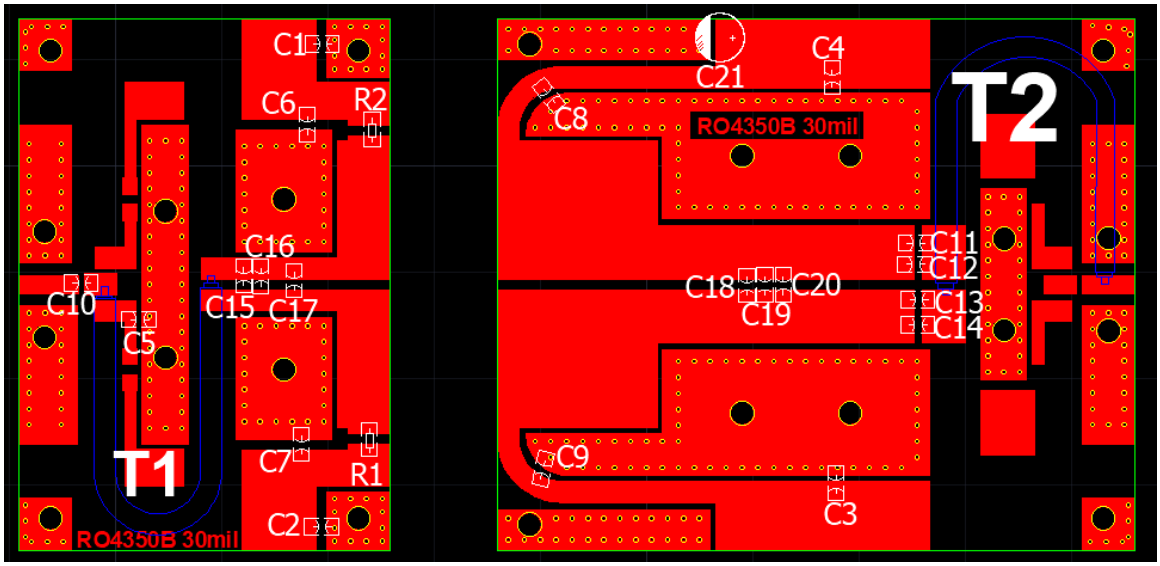
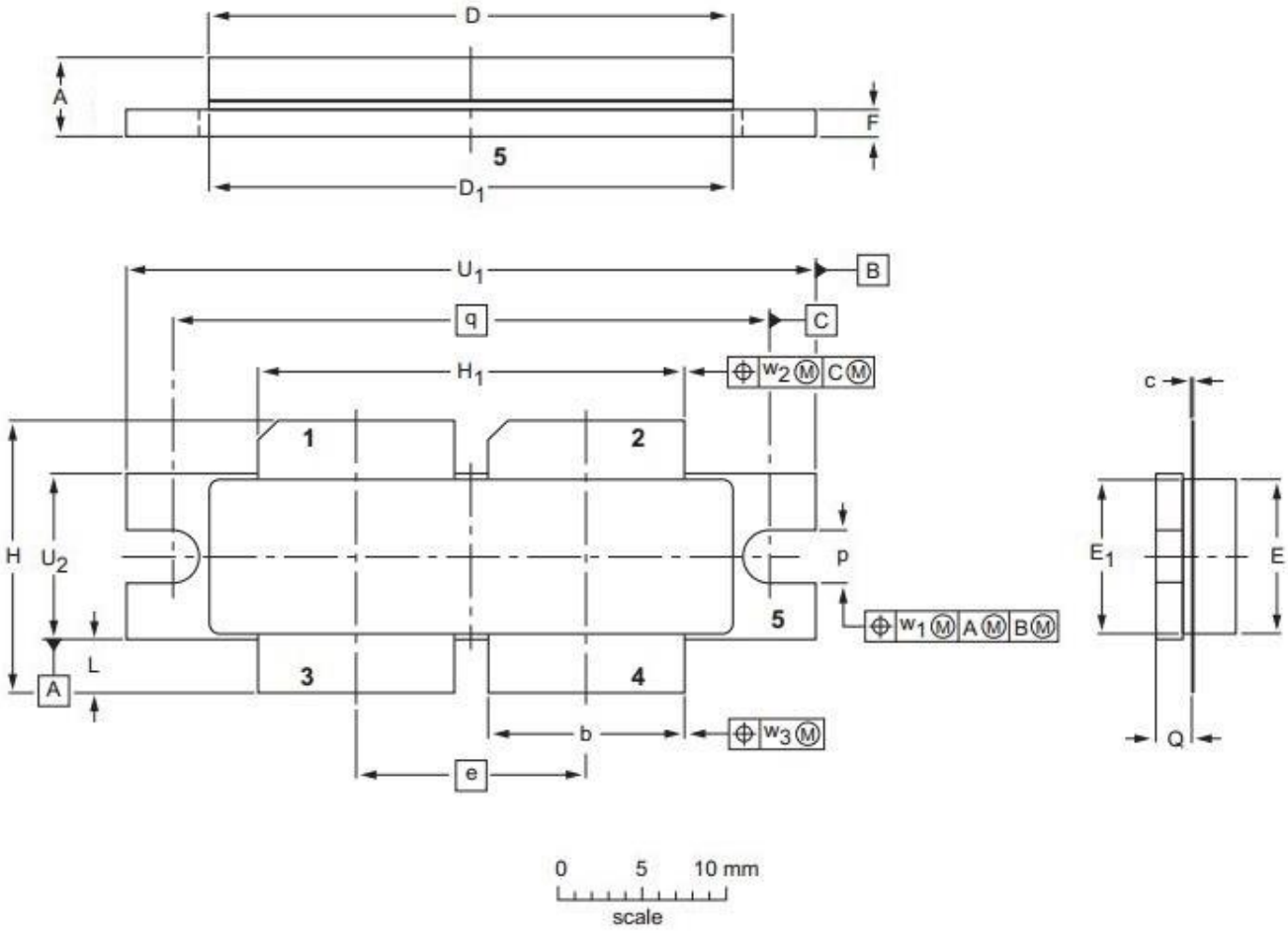


Table 6. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1~C5	10uF/200V-1210	Ceramic multilayer capacitor
C6,C7	200pF	
C8，C9	560pF	
C10~C14	47pF	
C15	18pF	
C16,C17,C19	15pF	
C18	4.7pF	
C20	1.5pF	
C21	470uF/63V	Electrolytic Capacitor
T1	25ohm-60mm	RFSFBU-086-25
T2	35ohm-65mm	SFF-35-3
R1,R2	10Ω-1206	chip resistor

Package Outline

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



UNIT	A	b	c	D	D_1	e	E	E_1	F	H	H_1	L	p	Q	q	U_1	U_2	W_1	W_2	W_2
mm	4.7 4.2	11.81 11.56	0.18 0.10	31.55 30.94	31.52 30.96	13.72	9.50 9.30	9.53 9.27	1.75 1.50	17.12 16.10	25.53 25.27	3.48 2.97	3.30 3.05	2.26 2.01	35.56	41.28 41.02	10.29 10.03	0.25	0.51	0.25
inches	0.185 0.165	0.465 0.455	0.007 0.004	1.242 1.218	1.241 1.219	0.540	0.374 0.366	0.375 0.365	0.069 0.059	0.674 0.634	1.005 0.995	0.137 0.117	0.130 0.120	0.089 0.079	1.400	1.625 1.615	0.405 0.395	0.01	0.02	0.01

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

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/9/8	Rev 1.0	Preliminary Datasheet
2025/3/7	Rev 1.1	Add 400-460MHz application data
2025/11/25	Rev 1.2	Modify the 30-512M application with better result to reach 200W Psat

Application data based on SYX-23-44/TC-25-13/TC-25-41

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