

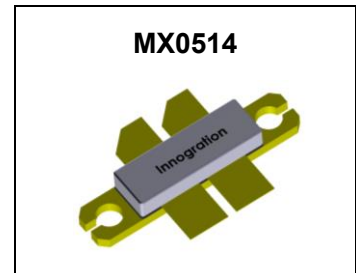
MX0514 LDMOS TRANSISTOR

Document Number: MX0514
Product Datasheet V1.2

140W, 28V High Power RF LDMOS FETs

Description

The MX0514 is a 140-watt capable, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 1 GHz.



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

MX0514 VDD=28V Vgs=3.00V Idq=200mA CW							Harmonic	
F (MHz)	Pout (dBm)	Pout (W)	ID (A)	Pin (dBm)	Gain (dB)	Eff (%)	2 nd	3 rd
30	51.03	127	7.67	34.70	16.33	59.0	-27.6	-10.59
50	51.47	140	7.76	35.03	16.44	64.6	-26.3	-11.5
100	51.94	156	8.53	33.40	18.54	65.4	-29.3	-10.7
200	51.43	139	8.26	33.80	17.63	60.1	-30.93	-9.5
300	51.58	144	8.4	32.70	18.88	61.2	-34.5	-22.2
400	51.8	151	8.67	34.00	17.8	62.3	-39.36	-20.3
500	51.25	133	8.44	32.80	18.45	56.4	-56.7	-36.5
520	51	126	7.89	34.15	16.85	57.0	-68.1	-36.4

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)
- 30-512MHz (Jammer, Ground/Air communication)
- 470-860MHz (TV UHF)
- 100kHz - 1000MHz (ISM, instrumentation)

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Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+95	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+40	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 $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC test	$R_{\theta JC}$	0.4	°C/W

Table 3. ESD Protection Characteristics

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

Table 4. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC Characteristics (per half section)

Drain-Source Voltage $V_{GS} = 0$, $I_{DS} = 1.0\text{mA}$	$V_{(BR)DS}$	95			V
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 75\text{V}$, $V_{GS} = 0\text{V}$)	I_{DSS}	—	—	1	μA
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 28\text{V}$, $V_{GS} = 0\text{V}$)	I_{DSS}	—	—	1	μA
Gate--Source Leakage Current ($V_{GS} = 10\text{V}$, $V_{DS} = 0\text{V}$)	I_{GSS}	—	—	1	μA
Gate Threshold Voltage ($V_{DS} = 28\text{V}$, $I_D = 400\mu\text{A}$)	$V_{GS(th)}$	—	2.2	—	V
Gate Quiescent Voltage ($V_{DD} = 28\text{V}$, $I_D = 800\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	3.1	—	V
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{ISS}		70		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{OSS}		29.5		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{RSS}		1.1		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 800\text{mA}$, $f = 1000\text{MHz}$, CW Signal Measurements.

Power Gain	G_p	—	18	—	dB
Drain Efficiency@P1dB	η_D	—	60	—	%
1 dB Compression Point	P_{-1dB}	—	140	—	W
Input Return Loss	IRL	—	-7	—	dB

Load Mismatch (In Innogration Test Fixture, 50 ohm system): $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 800\text{mA}$, $f = 1000\text{MHz}$

VSWR 20:1 at 140W pulse CW Output Power

No Device Degradation

TYPICAL CHARACTERISTICS

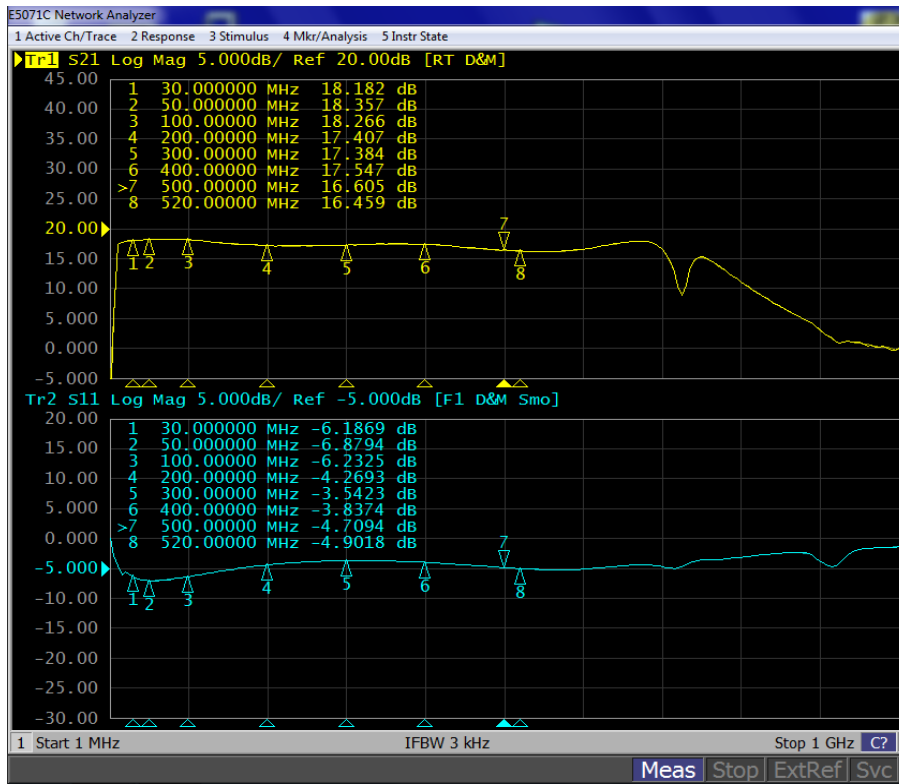


Figure 2: Network analyzer output, S11 (Vds=28V, Idq=500mA, Vgs=3.48V)

MX0514 Class AB Vds=28V, Idq=200mA
CW

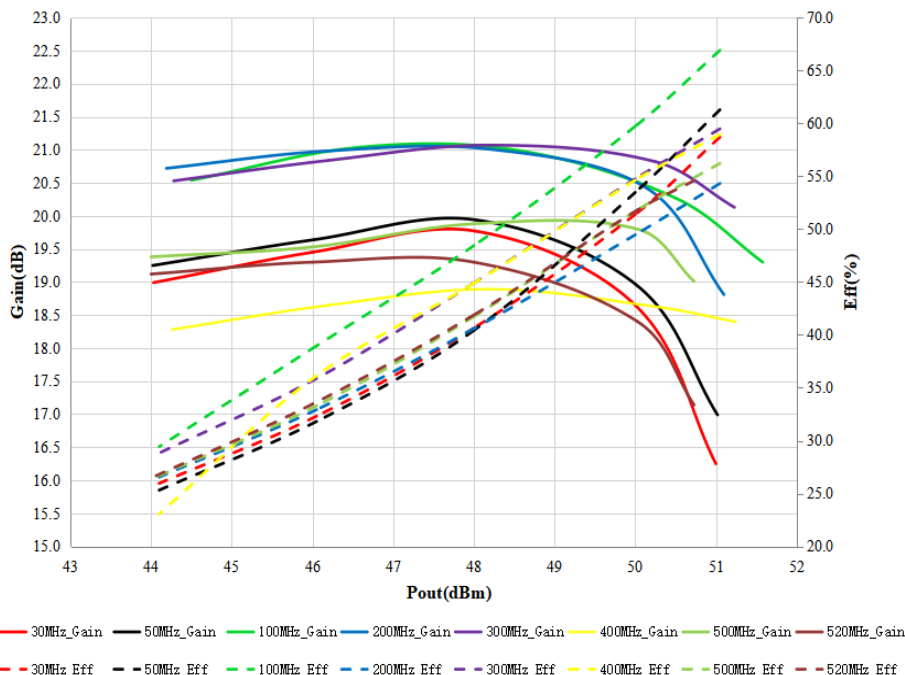
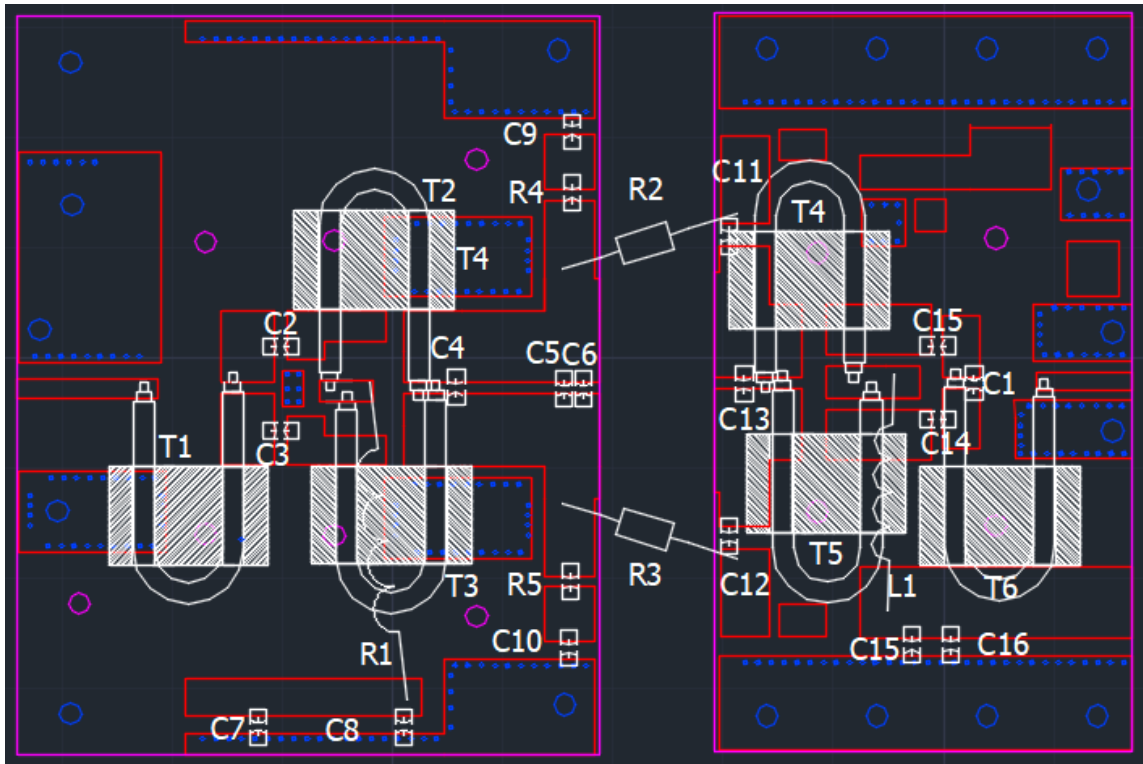


Figure 3: Power gain, Efficiency as the function of Pout across the full band

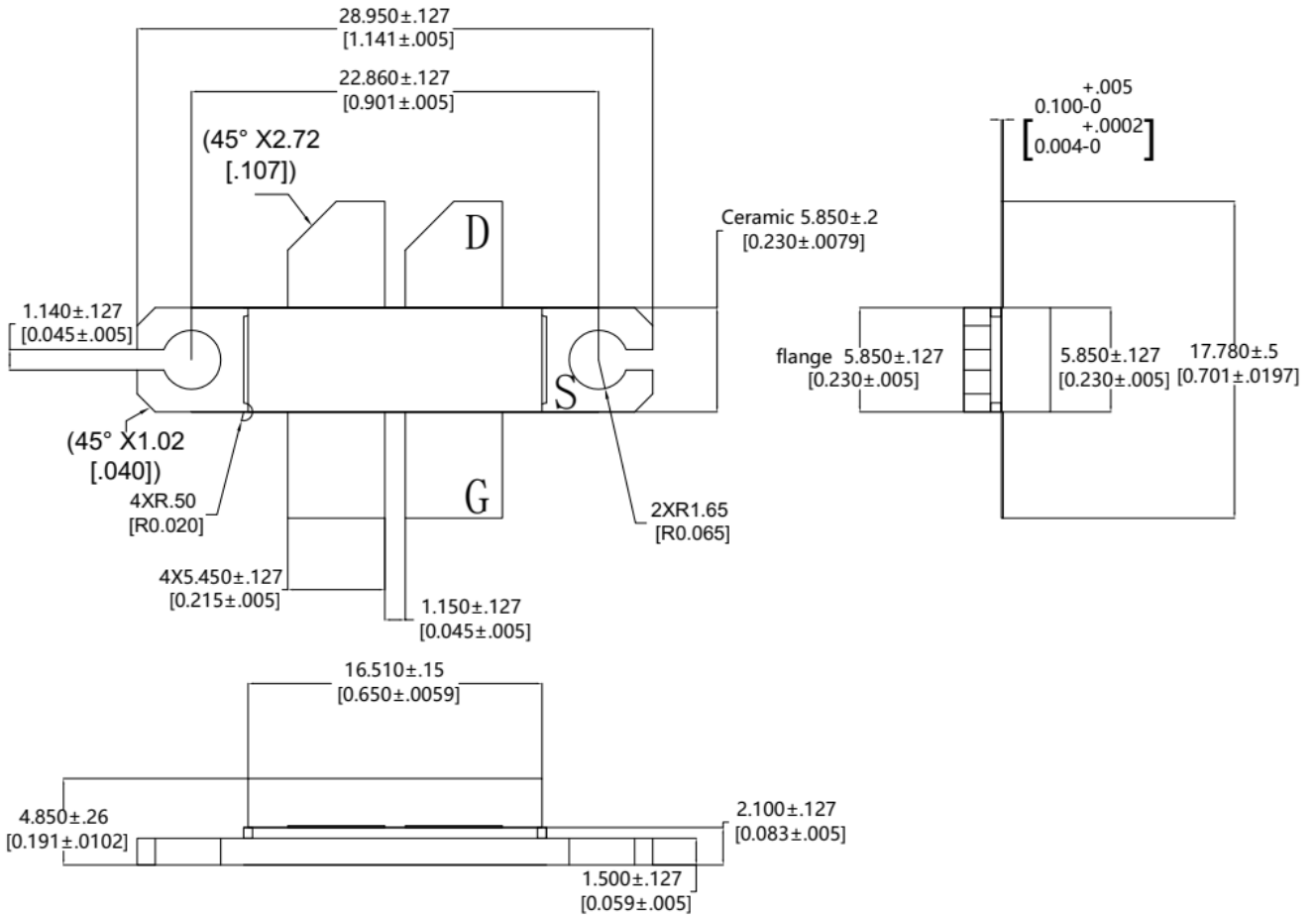
Reference Circuit of Test Fixture (30-520MHz) (Layout file upon request)



Component	Description	Suggestion
C1	0.5pF 0805	
C2,C3,C5,C13	200pF MQ101111	
C4,C12	10uF	
C6,C7,C8,C9,C11,C10	10nF 0805	
C14	3pF MQ301111	
R1,R2,R3,R4	51ohm 1206	/
R5,R6,R7	240ohm	/
T1,T6	50ohm, Line length=70mm	SF-086-50 BN-61-202
T2,T3	17ohm, Line length=70mm	SFF-16.7-1.5 BN-61-202
T4,T5	12.5ohm, Line length=70mm	SFF-12.5-1.5 BN-61-202
L1	1.5mmwire,9Turns,5minner diameter	DIY

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
2017/10/13	Rev 1.0	Product Datasheet Creation
2021/5/21	Rev 1.1	Package outline update
2025/10/29	Rev 1.2	Add application data

Application data based on SYX-25-44

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