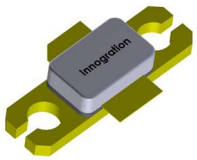
MU1504 LDMOS TRANSISTOR

Document Number: MU1504
Product Datasheet V3.2

1500MHz, 40W, 28V High Power RF LDMOS FETs

MU1504



Description

The MU1504 is a 40-watt, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications at frequencies HF to 1.5 GHz. It can be used in Class AB/B and Class C for all typical modulation formats.

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

MU1504 Vgs=3.0V Vds=28V Idq=50mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff(%)	2th （dBc）	3th （dBc）
30	46.7	46.8	2.32	34.2	12.5	72.00	-12.5	-9.37
50	46.52	44.9	2.15	33.3	13.22	74.54	-14.95	-9.68
100	46.54	45.1	2.12	33.5	13.04	75.95	-14.49	-10.04
200	46.37	43.4	2.13	32.7	13.67	72.69	-33.13	-11.12
300	46.3	42.7	2.15	33.1	13.2	70.86	-20.75	-11.31
400	45.85	38.5	2.35	33.2	12.65	58.45	-23.63	-19.7
500	46.38	43.5	2.74	33.6	12.78	56.64	-28.68	-35.14
600	46.24	42.1	2.75	33.42	12.82	54.64	-29.25	-37.84
678	46.4	43.7	2.75	33.58	12.82	56.69	-28.48	-50
700	46.36	43.3	2.66	33.94	12.42	58.07	-31.71	-51.63
800	45.7	37.2	2.13	33.95	11.75	62.30	-33.4	-43.25

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)

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	$R_{\theta JC}$	1.4	°C/W

Table 3. ESD Protection Characteristics

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

Table 4. Electrical Characteristics (TA = 25 ℃ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
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 = 150 μA)	$V_{GS(th)}$	——	2.11	——	V
Gate Quiescent Voltage (V_{DD} = 28 V, I_D = 200 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.1	——	V

Functional Tests (In Demo Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 200mA, f = 1000 MHz, CW Signal Measurements.

Power Gain	Gp	——	20	——	dB
Drain Efficiency@P1dB	η_D	——	60	——	%
1 dB Compression Point	P_{-1dB}	35	40	——	W
Input Return Loss	IRL	——	-7	——	dB

Figure 2. Network analyzer output S11/S21

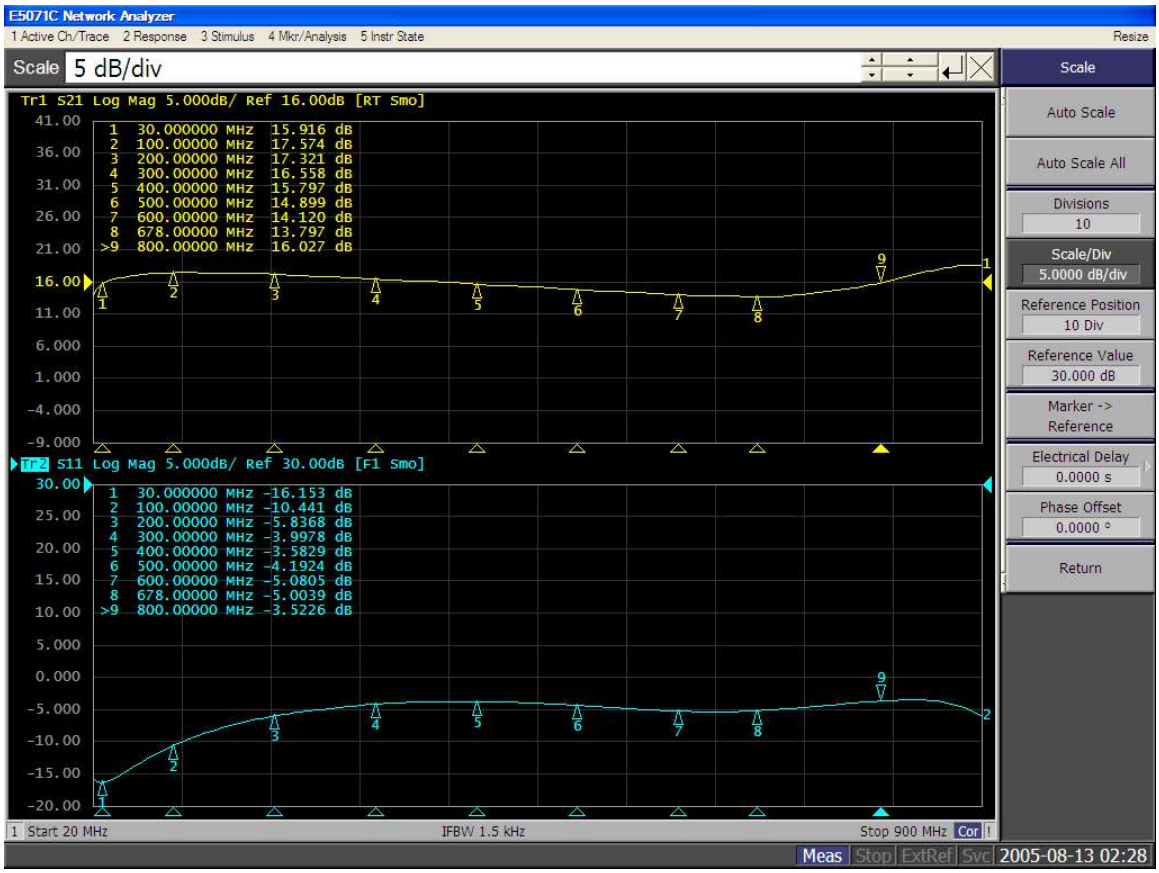
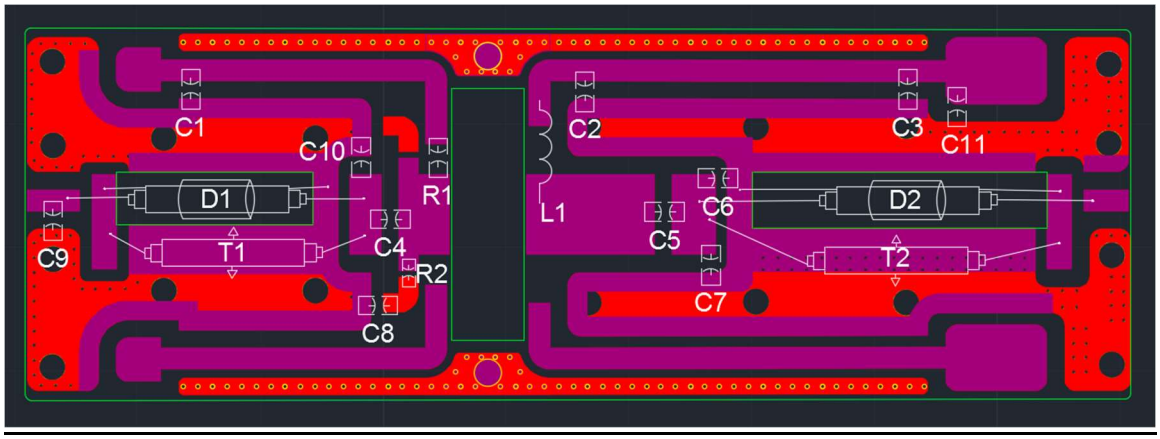


Figure 2. Test Circuit Component Layout of 30-800MHz

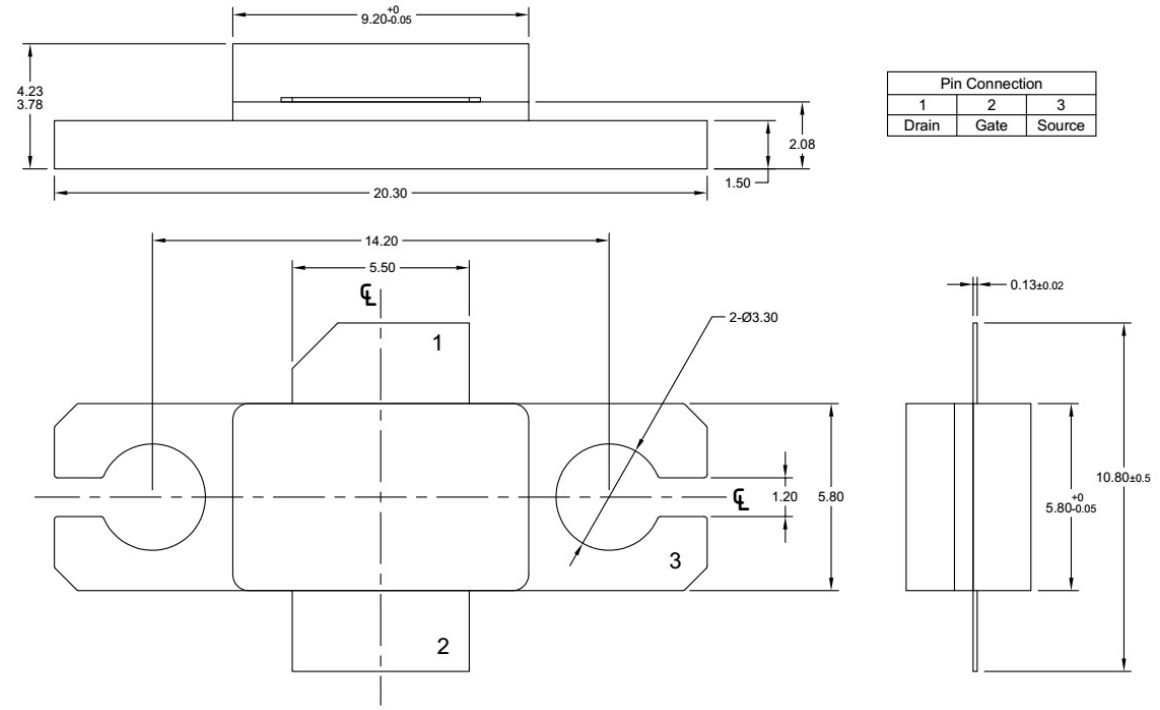


C1,C2,C4,C5	10nF/1210	/
C3,C8	10uF/1210	/
C6,C7	10pF/MQ301111	BEIJING YUANLU HONGYUAN ELECTRONICTECHNOLOGY CO., LTD.
C9	2.7pF/MQ301111	BEIJING YUANLU HONGYUAN ELECTRONICTECHNOLOGY CO., LTD.
C10	15pF/MQ301111	BEIJING YUANLU HONGYUAN

		ELECTRONICTECHNOLOGY CO., LTD.
C11	470uF/63V	/
R1	360Ω/1206	/
R2	22Ω/0805	/
D1	25 Ohm,25mm/FB-61-2501	SFF-25-1.5
D2	25 Ohm,32mm/FB-61-2501	SFF-25-1.5
T1	25 Ohm,24mm	SFF-25-1.5
T2	25 Ohm,31mm	SFF-25-1.5
L1	1mm wire,12turns, ϕ=3mm	DIY inductor
PCB	RO 4350B 30mils	

Package Outline

Flanged ceramic package; 2 leads



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
2016/4/13	V1.0	Preliminary Datasheet Creation
2016/6/16	V2.0	Preliminary Datasheet, Update Datasheet Template
2017/2/22	V3.0	Product Datasheet
2024/3/28	V3.1	Change the application carrier to 30-512MHz
2024/8/14	V3.2	Change the application carrier to 30-800MHz

Application data based on TC-24-18/SJJ-24-04

Disclaimers

Specifications are subject to change without notice. Innogration believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Innogration for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Innogration . Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.“Typical” parameters are the average values expected by Innogration in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer’s technical experts for each application. Innogration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility. For any concerns or questions related to terms or conditions, pls check with Innogration and authorized distributors