

MU1502 LDMOS TRANSISTOR

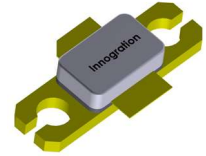
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Product Datasheet V4.1

1500MHz, 25W, 28V High Power RF LDMOS FETs

Description

The MU1502 is a 25-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.

MU1502



- Typical broadband Performance (In Demo Fixture):

MU1502 Vgs=3.00V Vds=28V Idq=50mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2nd (dBc)	3rd (dBc)
30	44.26	26.7	1.39	28.86	15.40	68.52	-10.6	-10.8
50	44.78	30.1	1.55	27.97	16.81	69.26	-12.3	-15.1
100	45.32	34.0	1.80	28.42	16.90	67.54	-12.8	-13.6
150	45.54	35.8	1.96	28.17	17.37	65.25	-10.8	-13.6
200	45.38	34.5	1.97	28.23	17.15	62.57	-12.8	-12.9
250	45.16	32.8	1.95	28.20	16.96	60.09	-14.3	-19.8
300	45.52	35.6	1.89	28.21	17.31	67.36	-17.0	-21.8
350	45.01	31.7	1.69	27.71	17.30	66.98	-20.2	-22.7
400	43.81	24.0	1.47	26.50	17.31	58.42	-26.2	-29.3
450	43.10	20.4	1.39	26.32	16.78	52.46	-24.6	-35.2
500	42.81	19.1	1.18	26.94	15.87	57.80	-27.1	26.1
512	42.95	19.7	1.17	27.23	15.72	60.21	-26.4	-19.8

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

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Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+50	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	$R_{\theta JC}$	1.5	°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
DC Characteristics					
Drain-Source Voltage $V_{GS} = 0$, $I_{DS} = 1.0\text{mA}$	$V_{(BR)DSS}$	95	97		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 ($V_{DS} = 28\text{V}$, $I_D = 150\mu\text{A}$)	$V_{GS(th)}$	---	2.11	---	V
Gate Quiescent Voltage ($V_{DD} = 28\text{V}$, $I_D = 150\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	---	3.0	---	V
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{ISS}		31.5		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{OSS}		12.8		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{RSS}		0.7		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 150\text{mA}$, $f = 1000\text{MHz}$, CW Signal Measurements.

Power Gain	G_p	---	20	---	dB
Drain Efficiency@P1dB	η_D	---	60	---	%
1 dB Compression Point	P_{-1dB}	---	25	---	W
Input Return Loss	IRL	---	-7	---	dB

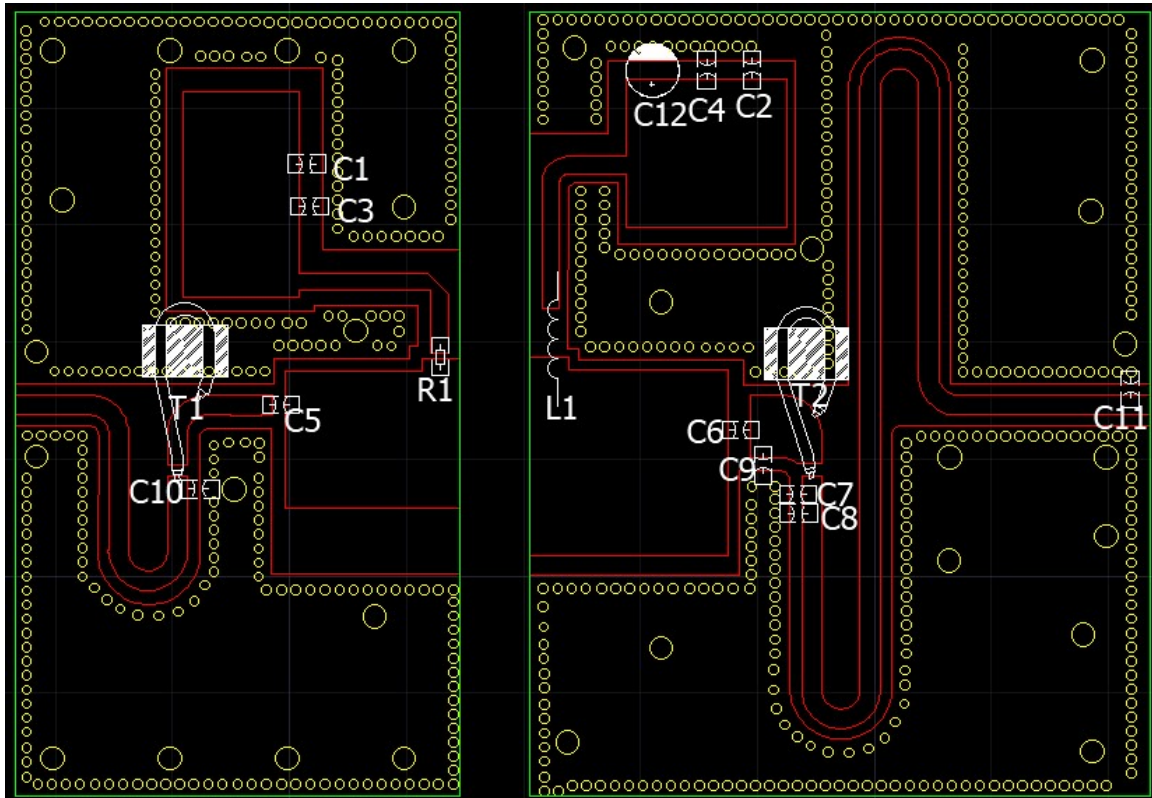
Load Mismatch (In Innogration Test Fixture, 50 ohm system): $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 150\text{mA}$, $f = 1000\text{MHz}$

VSWR 20:1 at 25W pulse CW Output Power	No Device Degradation
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Figure 2. Test Circuit Component Layout of 30-512MHz



Component	Description	Suggestion
C1,C2	10uF	10uF/100V
C3,C4	10nF	10nF/100V
C5,C6	470pF	MQ101111
C7	2pF	MQ101111
C8,C11	1.5pF	MQ101111
C9	3.6pF	MQ101111
C10	3pF	MQ101111
C12	470uF/63V	Electrolytic Capacitor
R1	100 Ω	Chip Resistor
L1	d=1.5mm, D=3.1mm, 8 turns	
T1	25ohm, 60mm	SFF-25-1.5, BN-61-1502
T2	50ohm, 60mm	RFSFBU-086-50;BN-61-1502
PCB	30Mil Rogers4350	

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Package Outline

Flanged ceramic package; 2 leads

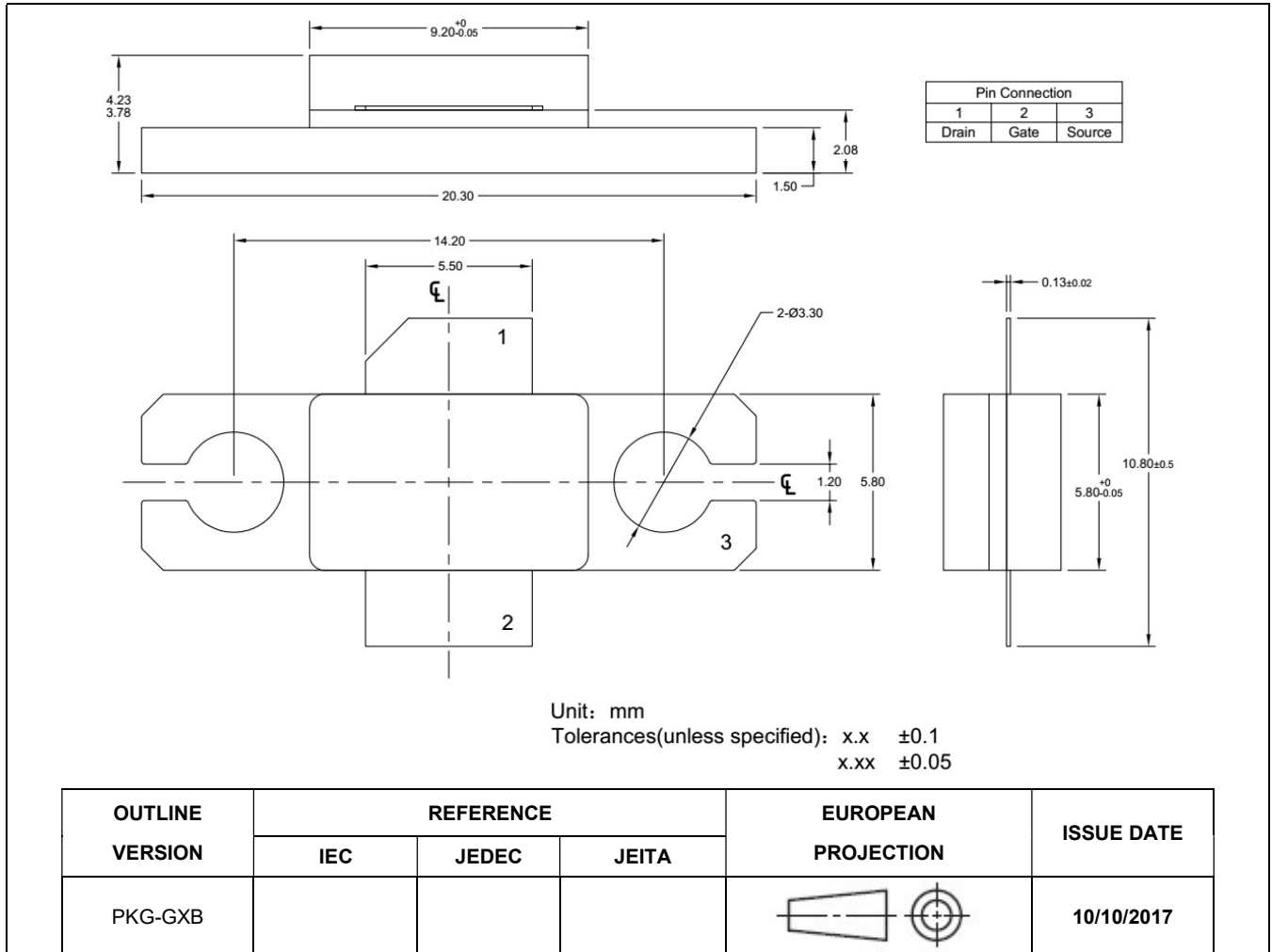


Figure 1. Package Outline PKG-G2E

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2016/3/28	Rev 1.0	Preliminary Datasheet
2016/8/8	Rev 2.0	Preliminary Datasheet
2016/8/22	Rev 2.1	Preliminary Datasheet
		Add Package Name
2016/12/2	Rev 3.0	Preliminary Datasheet
		Add Higher supply voltage performance
2017/2/22	Rev 4.0	Product Datasheet
		Add CV parameter
2024/4/7	Rev 4.1	Use 30-512MHz as carrier of application data

Application data based on TC-24-20

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