

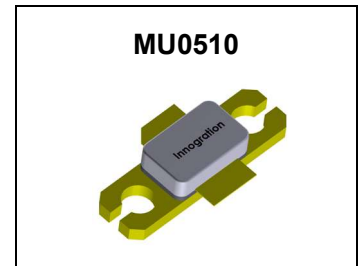
# MU0510 LDMOS TRANSISTOR

Document Number: MU0510  
Product Datasheet V1.0

## 100W, 28V High Power RF LDMOS FETs

### Description

The MU0510 is a 100-watt high performance, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 1.0 GHz.



- Typical Performance (On Innogration fixture with device soldered):

MU0510 Vgs=2.90V Vds=28V Idq=100mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2 <sup>nd</sup> (dBc)	3 <sup>rd</sup> (dBc)
134	50.23	105.4	5.90	27.90	22.33	63.82	-22.20	-16.10
140	50.41	109.9	6.03	27.90	22.51	65.09	-19.40	-15.30
145	50.62	115.3	6.18	27.93	22.69	66.66	-18.20	-15.30
150	50.80	120.2	6.22	27.54	23.26	69.03	-17.00	-15.00
155	50.91	123.3	6.23	27.29	23.62	70.69	-16.30	-15.00
160	50.85	121.6	6.05	27.47	23.38	71.79	-15.80	-14.70
165	50.70	117.5	5.75	27.71	22.99	72.98	-15.30	-14.10
170	50.60	114.8	5.50	27.95	22.65	74.56	-14.80	-13.40
175	50.28	106.7	5.09	28.09	22.19	74.84	-14.50	-12.50

### 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 <sub>DSS</sub>	+95	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-10 to +10	Vdc
Operating Voltage	V <sub>DD</sub>	+40	Vdc

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Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Case Operating Temperature	T <sub>c</sub>	+150	°C
Operating Junction Temperature	T <sub>j</sub>	+225	°C

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T <sub>c</sub> = 85°C, T <sub>j</sub> =200°C, DC test	R <sub>θJC</sub>	0.7	°C/W

**Table 3. ESD Protection Characteristics**

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

**Table 4. Electrical Characteristics** (T<sub>A</sub> = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>DC Characteristics</b>					
Drain-Source Voltage V <sub>GS</sub> =0, I <sub>DS</sub> =1.0mA	V <sub>(BR)DSS</sub>	90	95		V
Zero Gate Voltage Drain Leakage Current (V <sub>DS</sub> = 28 V, V <sub>GS</sub> = 0 V)	I <sub>DSS</sub>	—	—	1	μA
Gate--Source Leakage Current (V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0 V)	I <sub>GSS</sub>	—	—	1	μA
Gate Threshold Voltage (V <sub>DS</sub> = 28V, I <sub>D</sub> = 600 μA)	V <sub>GS(th)</sub>	—	2.1	—	V
Gate Quiescent Voltage (V <sub>DD</sub> = 28 V, I <sub>D</sub> = 100 mA, Measured in Functional Test)	V <sub>GS(Q)</sub>	—	2.9	—	V
Common Source Input Capacitance (V <sub>GS</sub> = 0V, V <sub>DS</sub> =28 V, f = 1 MHz)	C <sub>ISS</sub>		106		pF
Common Source Output Capacitance (V <sub>GS</sub> = 0V, V <sub>DS</sub> =28 V, f = 1 MHz)	C <sub>OSS</sub>		40		pF
Common Source Feedback Capacitance (V <sub>GS</sub> = 0V, V <sub>DS</sub> =28 V, f = 1 MHz)	C <sub>RSS</sub>		1.6		pF

**Functional Tests** (In Demo Test Fixture, 50 ohm system) V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 100 mA, f = 1000 MHz, CW Signal Measurements.

Power Gain	G <sub>p</sub>	—	17	—	dB
Drain Efficiency@P1dB	η <sub>D</sub>	—	61	—	%
1 dB Compression Point	P <sub>-1dB</sub>	—	100	—	W
Input Return Loss	IRL	—	-7	—	dB

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):** V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 100 mA, f = 1000 MHz

VSWR 10:1 at 100W CW Output Power	No Device Degradation
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## TYPICAL CHARACTERISTICS

Figure 1. Network analyzer output S11/S21 (VDS=28V IDQ=400mA )

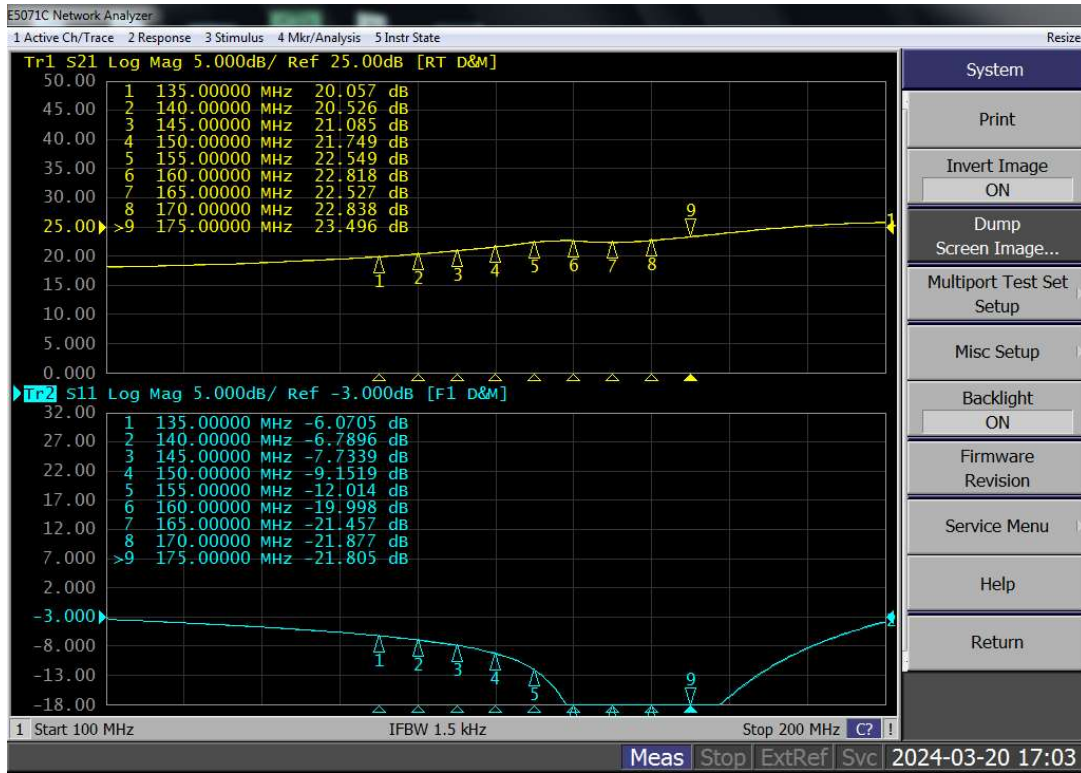
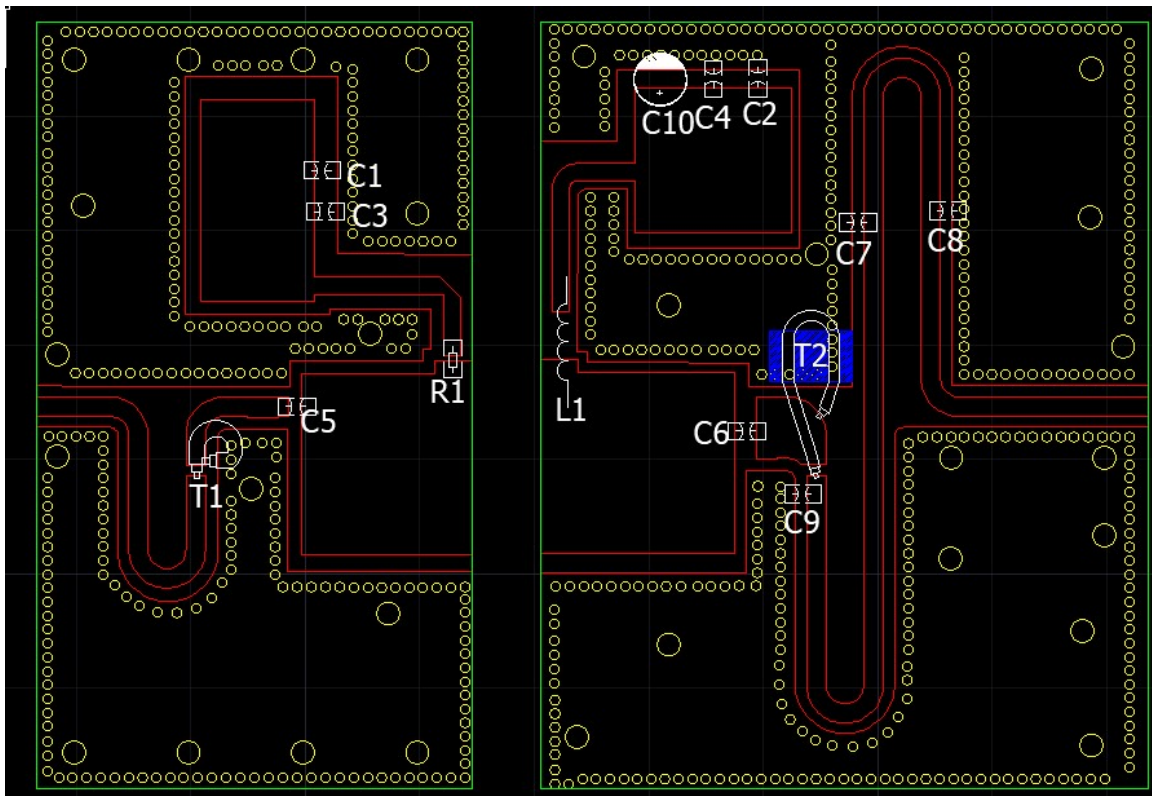


Figure 2. Test Circuit Component Layout



**Table 5. Test Circuit Component Designations and Values**

Component	Description	Suggested Manufacturer
C1,C2	10uF	10uF/100V
C3,C4	1000pF	MQ101111
C5,C6	560pF	MQ101111
C7	12pF	MQ101111
C8	7.5pF	MQ101111
C9	4.7pF	MQ101111
C10	470uF/63V	Electrolytic Capacitor
R1	10 $\Omega$	Chip Resistor
L1	d=1.5mm,D=5mm, 7 Turns	
T1	50ohm, 35mm	RFSFBU-086-50
T2	50ohm, 50mm	RFSFBU-086-50;BN-61-202
PCB	30Mil	Rogers4350

## Package Outline

Flanged ceramic package; 2 leads

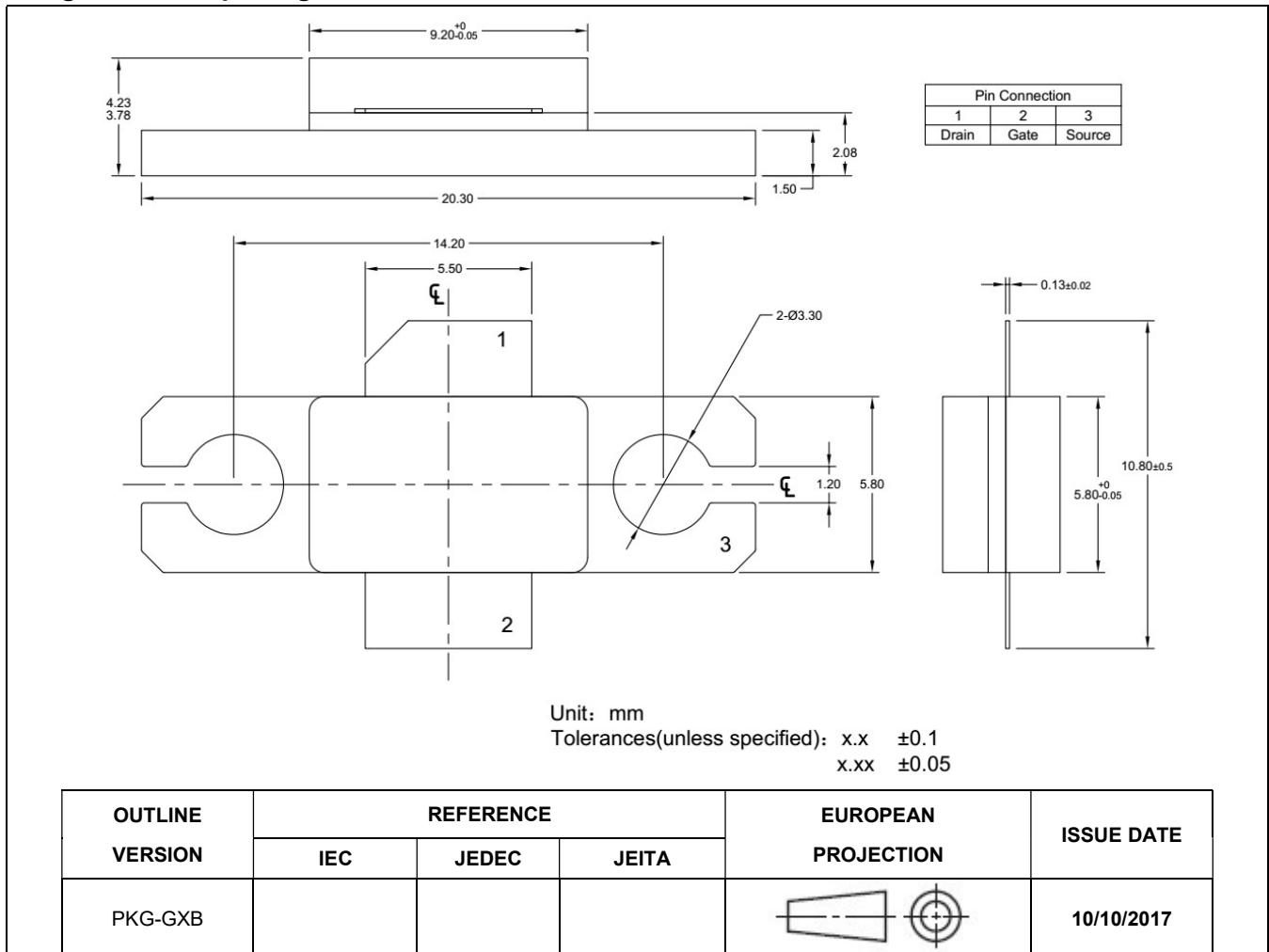


Figure 1. Package Outline PKG-G2E

## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/3/21	Rev 1.0	Product Datasheet

Application data based on TC-24-15

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