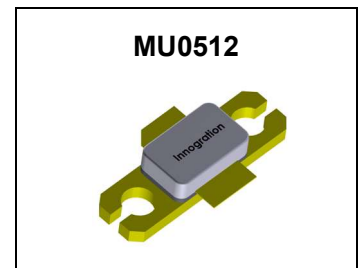


125W, 28V High Power RF LDMOS FETs

Description

The MU0512 is a 125-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):

MU0512 Vgs=3.01V Vds=28V Idq=210mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2nd (dBc)	3 rd (dBc)
134	50.87	122.2	6.70	30.10	20.77	65.13	-23.90	-16.00
140	51.04	127.1	6.90	30.05	20.99	65.76	-20.60	-15.24
145	51.28	134.3	7.09	30.10	21.18	67.64	-19.10	-15.25
150	51.43	139.0	7.13	30.23	21.20	69.62	-17.70	-14.80
155	51.55	142.9	7.14	30.44	21.11	71.47	-16.70	-14.80
160	51.56	143.2	6.99	30.70	20.86	73.18	-15.90	-14.50
165	51.45	139.6	6.69	30.93	20.52	74.54	-15.20	-13.90
170	51.16	130.6	6.26	30.10	21.06	74.52	-14.80	-13.30
175	50.83	121.1	5.75	30.26	20.57	75.19	-14.40	-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 _{DSS}	+95	Vdc
Gate--Source Voltage	V _{GS}	-10 to +10	Vdc

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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	$R_{\theta JC}$	0.7	°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

Drain-Source Voltage $V_{GS} = 0$, $I_{DS} = 1.0\text{mA}$	$V_{(BR)DSS}$	90	95		V
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 ($V_{DS} = 28\text{V}$, $I_D = 600\ \mu\text{A}$)	$V_{GS(th)}$	—	2.1	—	V
Gate Quiescent Voltage ($V_{DD} = 28\text{V}$, $I_D = 100\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	2.5	—	V
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{ISS}		128		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{OSS}		43		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 28\text{V}$, $f = 1\text{MHz}$)	C_{RSS}		2.4		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 1000\text{MHz}$, CW Signal Measurements.

Power Gain	G_p	—	16	—	dB
Drain Efficiency@P1dB	η_D	—	61	—	%
1 dB Compression Point	P_{-1dB}	—	125	—	W
Input Return Loss	IRL	—	-7	—	dB

Load Mismatch (In Innogration Test Fixture, 50 ohm system): $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 1000\text{MHz}$

VSWR 10:1 at 125W CW Output Power	No Device Degradation
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TYPICAL CHARACTERISTICS

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

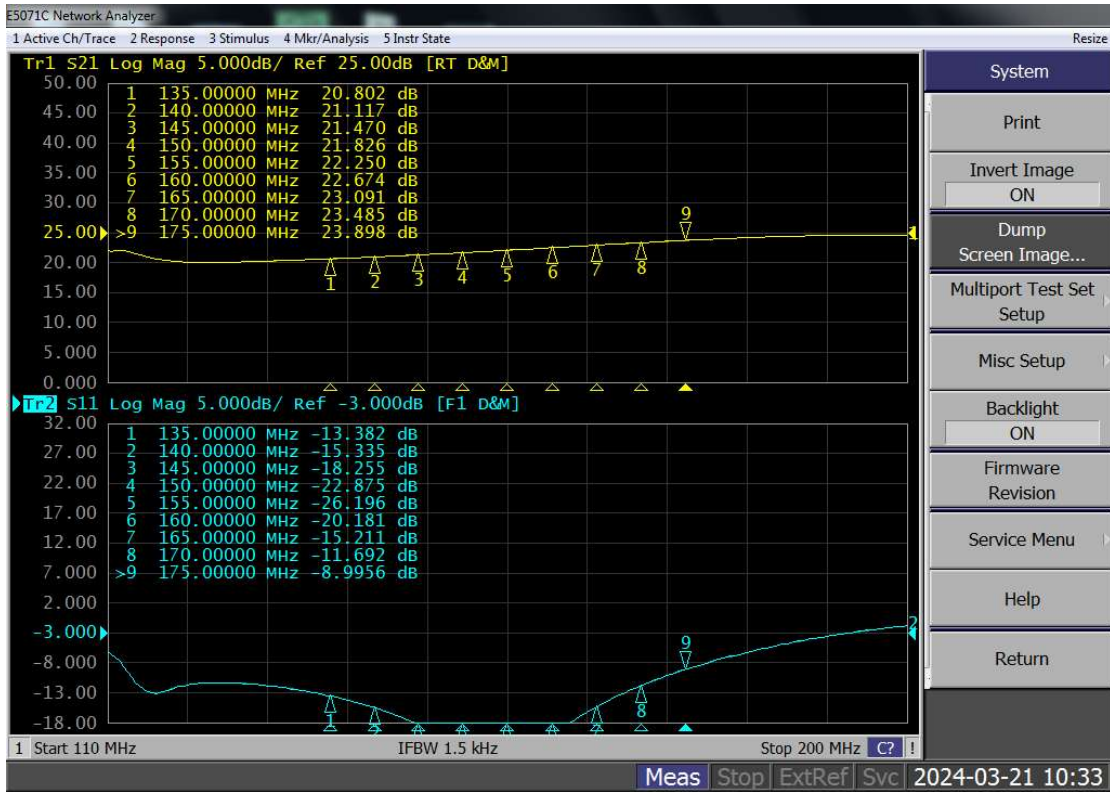


Figure 2. Test Circuit Component Layout

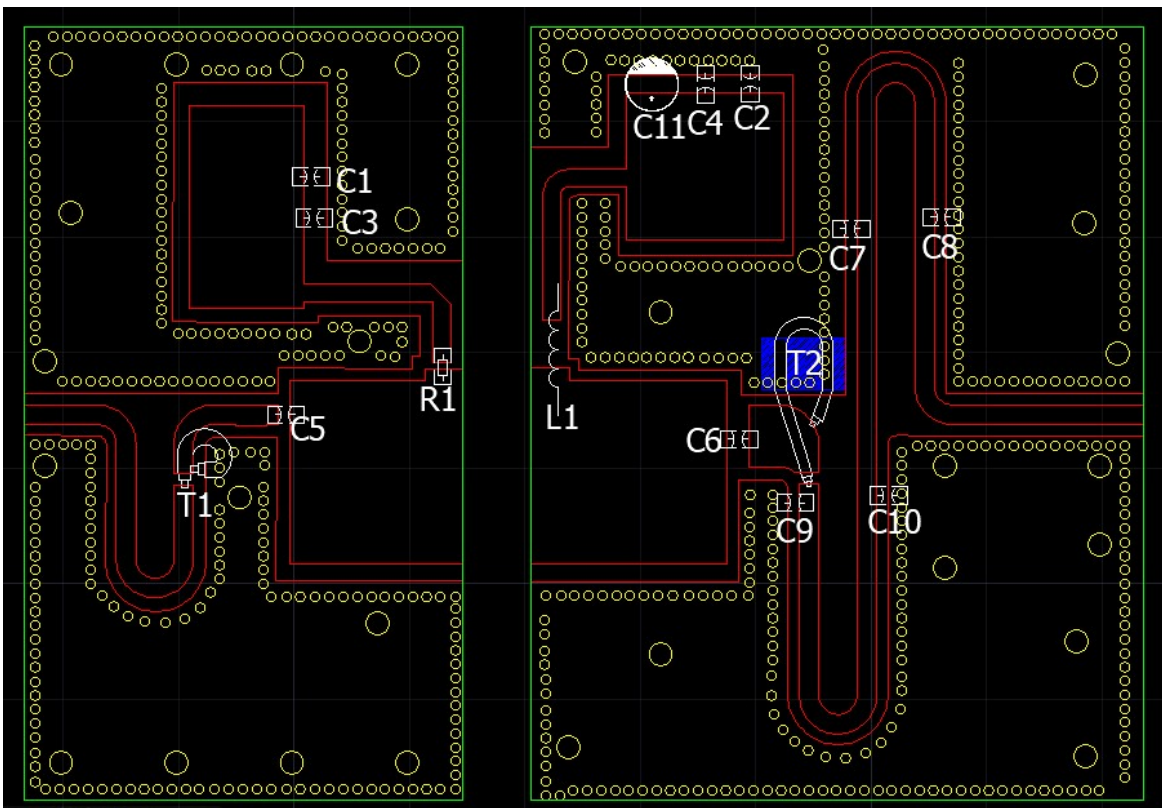


Table 5. Test Circuit Component Designations and Values

Component	Description	Suggestion
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	4.3pF	MQ101111
C11	470uF/63V	Electrolytic Capacitor
R1	10 Ω	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

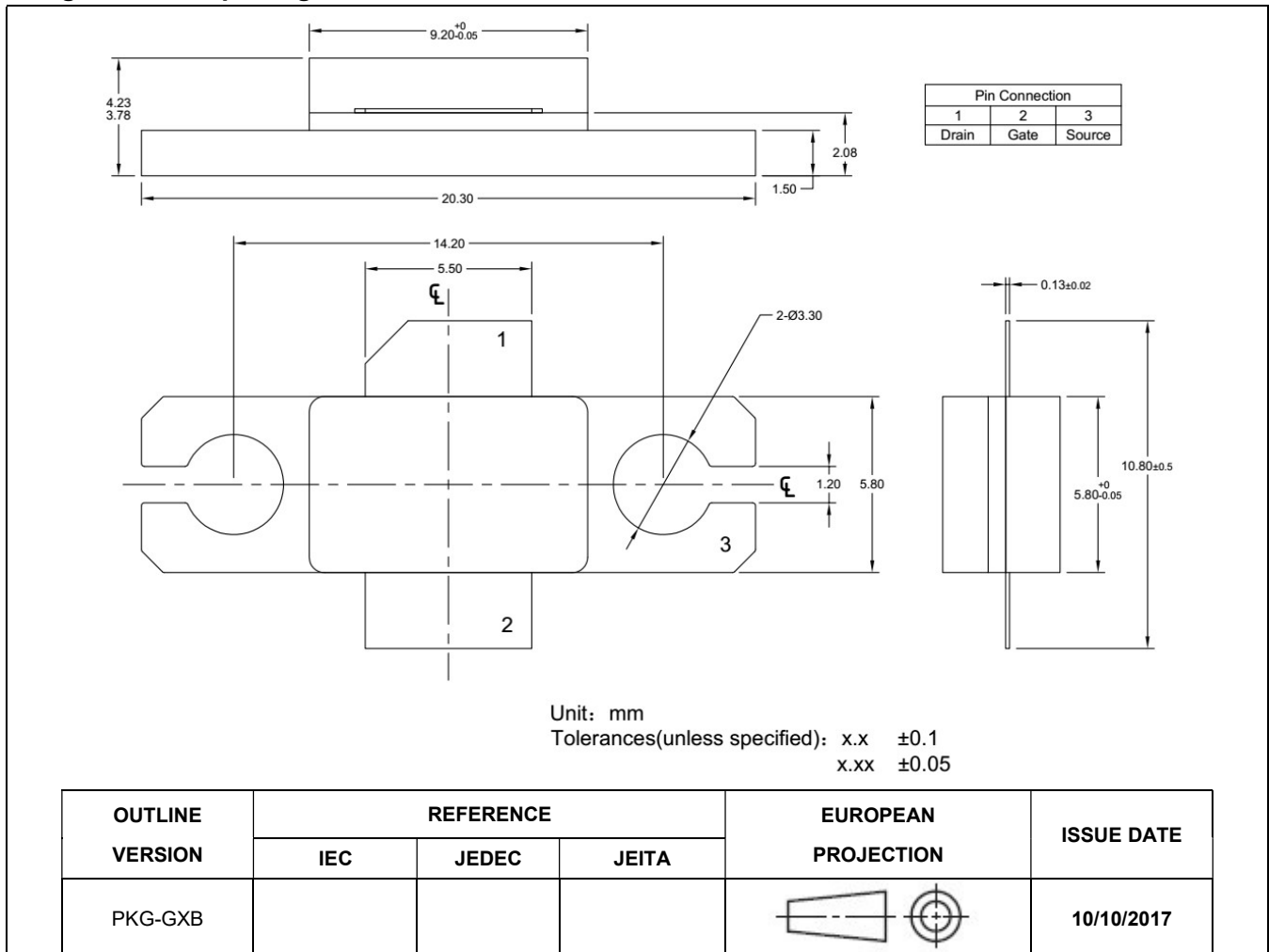


Figure 1. Package Outline PKG-G2E

Revision history

Table 5. Document revision history

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

Application data based on TC-24-14

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