

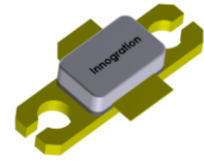
250W, 50V High Power RF LDMOS FETs

Description

The MU0530VX is a 250-watt capable, high performance, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 0.5 GHz.

It is featured for high power and high ruggedness, suitable for Industrial, Scientific and Medical application, as well as FM radio, VHF TV applications.

MU0530VX



- Typical performance(on Innogrator test board with device soldered)

Signal: CW, $V_{gs}=3.38v$, $V_{ds}=50v$, $I_{dq}=120mA$

Freq(MHz)	Pout(W)	Gain(dB)	Eff(%)
110	214	17.1	69
120	234	17.5	70
130	218	17.48	69
140	228	17.58	70
150	238	17.86	73
160	229	17.8	78

- Typical performance(on Innogrator test board with device soldered)

Signal: CW, $V_{gs}=3.38v$, $V_{ds}=50v$, $I_{dq}=600mA$

Freq	P1dB	P1dB	P1dB Eff	P1dB Gain	P3dB	P3dB	P3dB Eff
(MHz)	(dBm)	(W)	%	dB	(dBm)	(W)	%
223	53.31	214.3	63.2	17.92	54.45	278.7	69.9
224	53.19	208.5	63.3	18	54.37	273.3	70.5
225	53.18	207.8	64.3	18.02	54.29	268.3	71.0

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

- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 160-230MHz (TV VHF III)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+135	Vdc
Gate--Source Voltage	V_{GS}	-9 to +11	Vdc

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Operating Voltage	V_{DD}	+55	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	$R_{\theta JC}$	0.60	°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 $V_{GS}=0$, $I_{DS}=1.0\text{mA}$	$V_{(BR)DSS}$		135		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 ($V_{DS} = 50\text{V}$, $V_{GS} = 0\text{V}$)	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 ($V_{DS} = 50\text{V}$, $I_D = 600\mu\text{A}$)	$V_{GS(th)}$	—	2.65	—	V
Gate Quiescent Voltage ($V_{DD} = 50\text{V}$, $I_D = 100\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	3.1	—	V
Drain source on state resistance ($V_{DS}=0.1\text{V}$, $V_{GS}=10\text{V}$)	$R_{ds(on)}$		217		m Ω
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{ISS}		158		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{OSS}		46.8		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{RSS}		1.24		pF

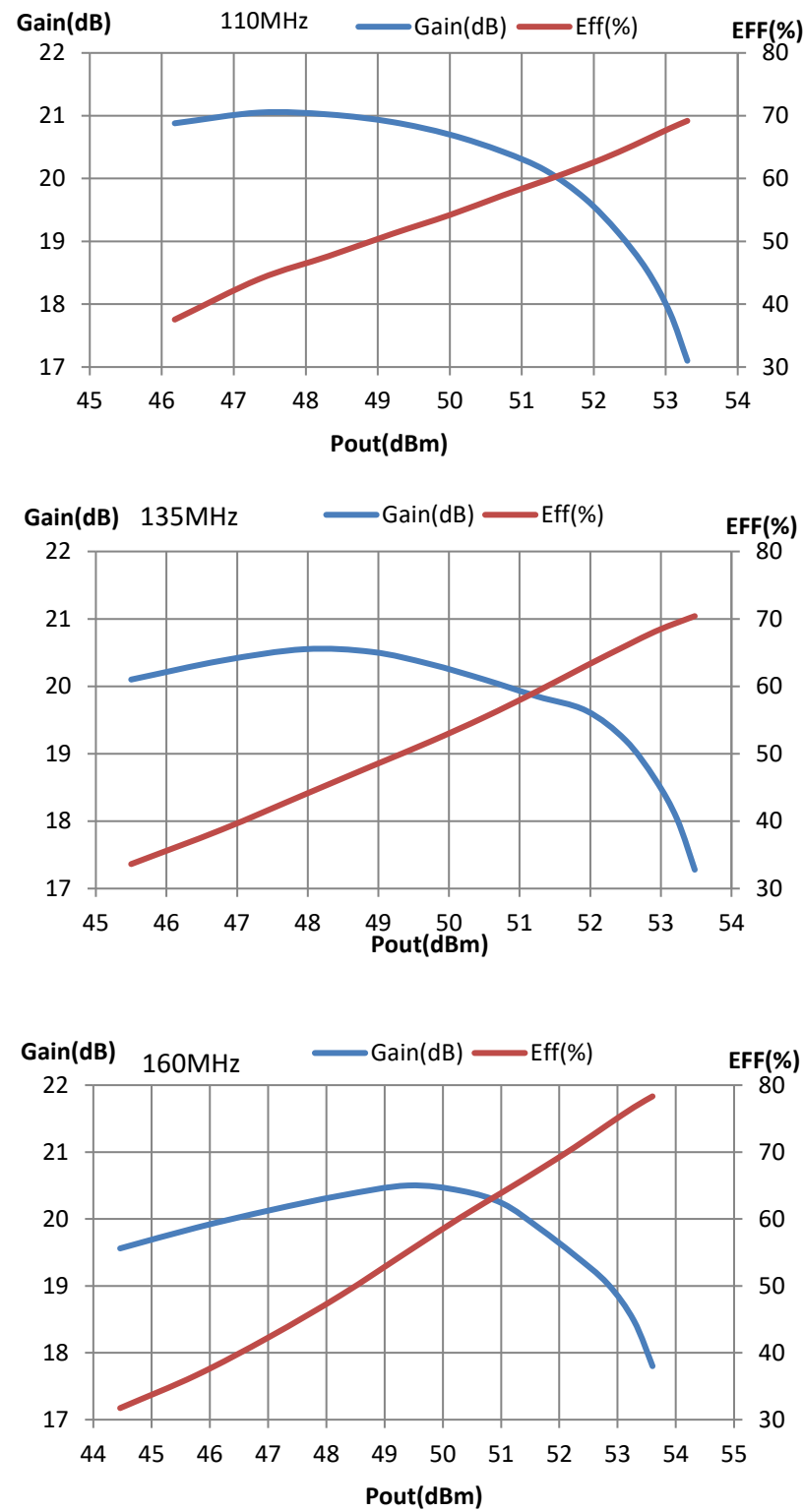
Load Mismatch (In Innogration Test Fixture, 50 ohm system): $V_{DD} = 50\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 160\text{MHz}$, pulse width:100us, duty cycle:10%

Load 20:1 All phase angles, at 250W Pulsed CW Output Power	No Device Degradation
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110-160MHz

TYPICAL CHARACTERISTICS

Figure 1: CW Gain and Power Efficiency as a Function of Pout across 110-160MHz



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Reference Circuit of Test Fixture Assembly Diagram (Layout file upon request, 30mil TC350)

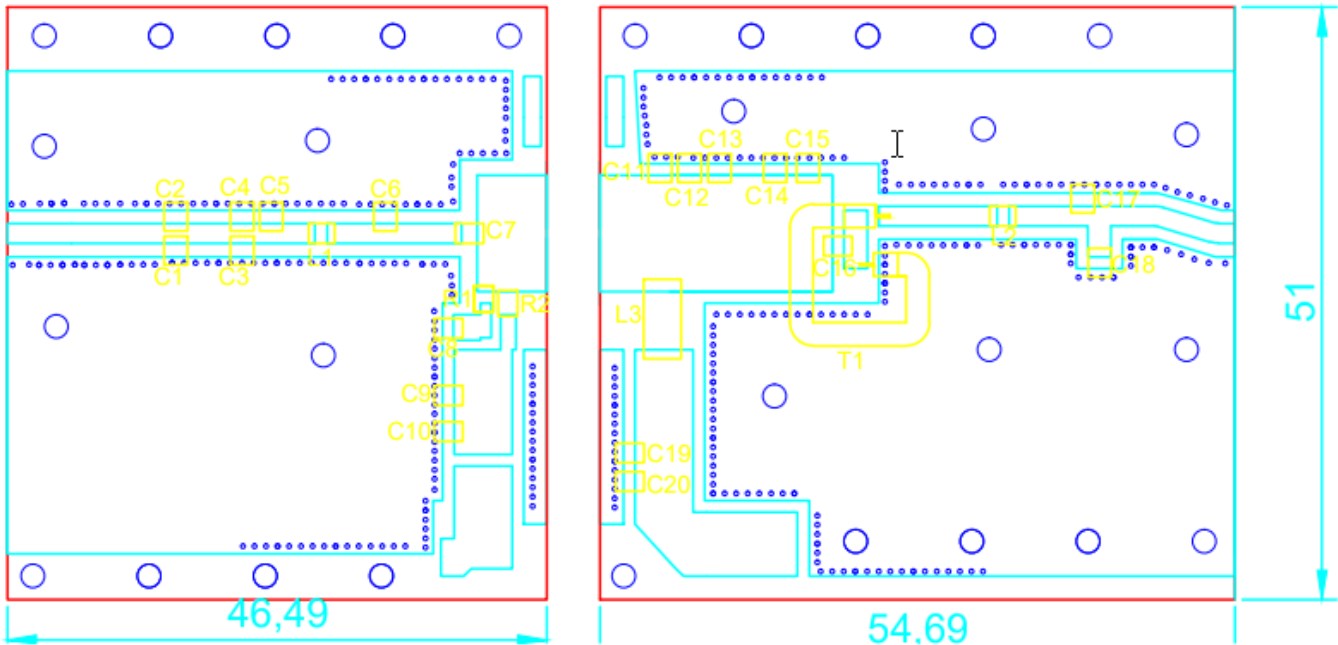


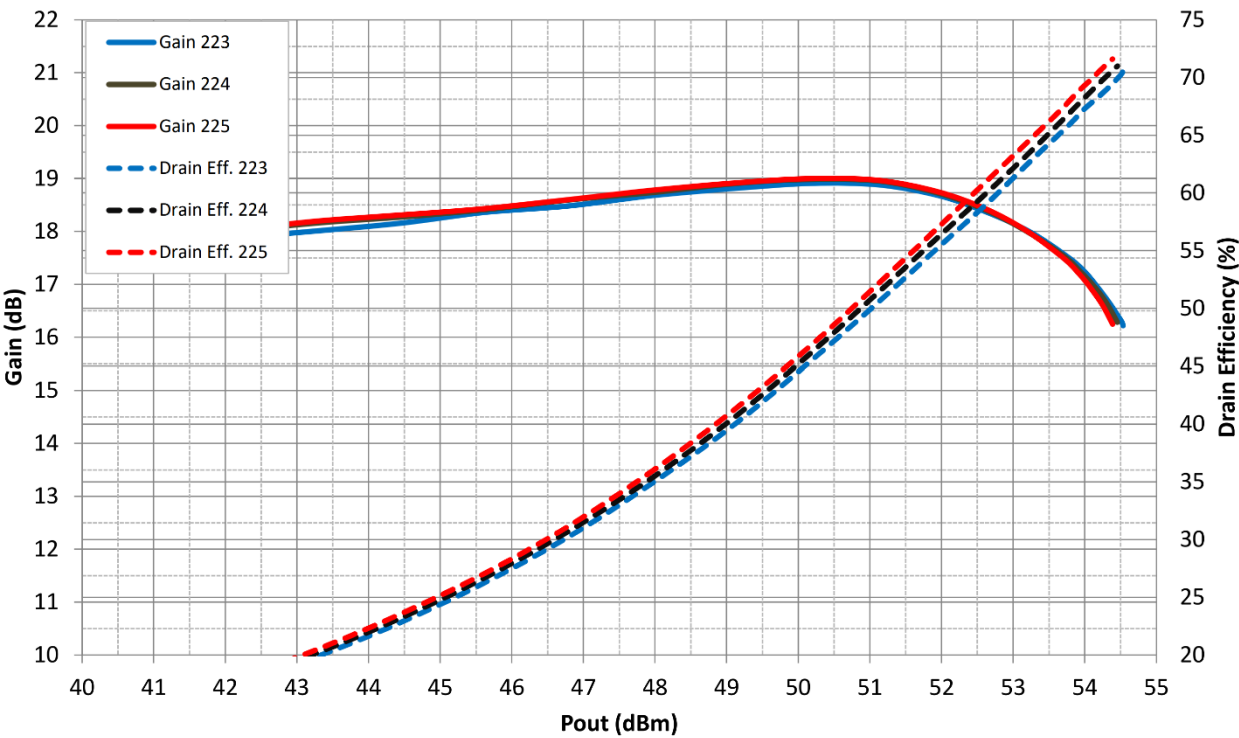
Table 5. Test Circuit Component Designations and Values

Part	description	Model
C1,C2,C3,C4,C17,C18	9.1pF	ATC800B
C5,C14	5.1pF	ATC800B
C6	39pF	ATC800B
C7,C8,C19	10nF	C4532X7R3D103KT000N
C9,C16	1000pF	ATC800B
C11,C12,C13,C15	10pF	ATC800B
C10,C20	10uF	10Uf/50V
R1	75Ω	0805
R2	39Ω	0805
L1	22nH	0805
L2	1 turns, line length= 10mm	
L3	16 turns, diameter=5mm	
T1	50Ω, line length=115mm	SF-086-50

220-230MHz

TYPICAL CHARACTERISTICS

Figure 3: CW Gain and Power Efficiency as a Function of Pout z



Reference Circuit of Test Fixture Assembly Diagram

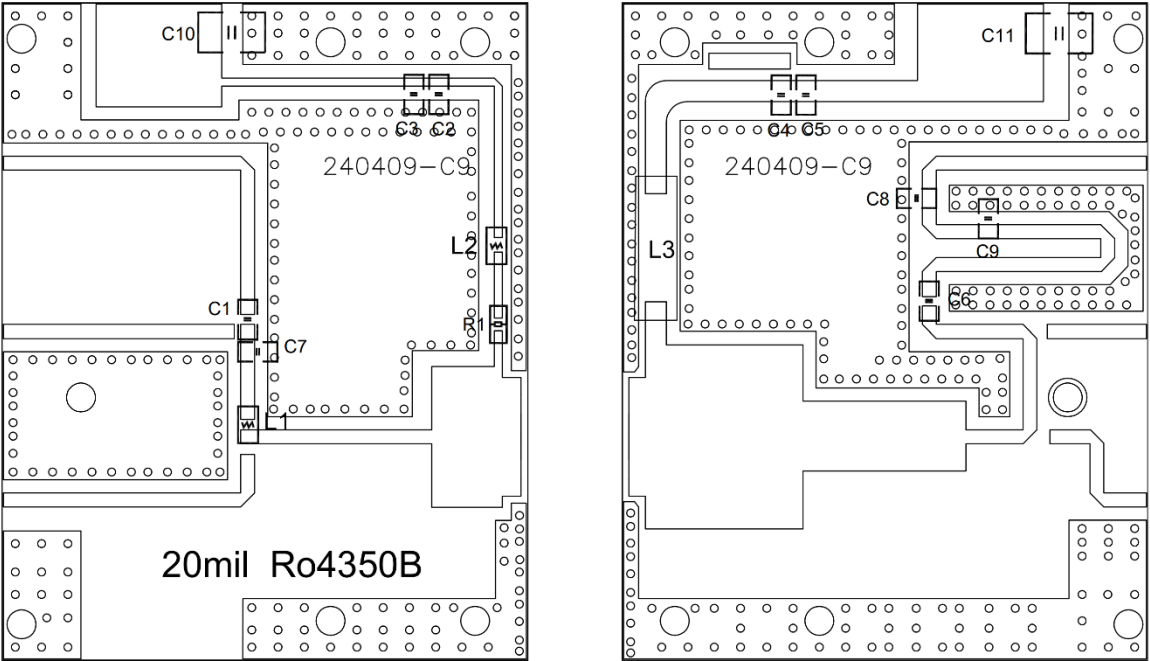


Table 6. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1, C2, C4, C5, C6	0603	100pF/250V	5
C3	0603	4.7nF/50V	1
L1	0603	12nH	1
L2	0603	18nH	1
C7	0603	27pF/250V	1
C8	0603	39pF/250V	1
C9	0603	8.2pF/250V	1
C10, C11	1210	10uF/100V	3
L3		1.1mm wire, 4.1mm inner diameter, 12 turns	
R1	0603	10R	1
		MU0530VX	1

Package Outline

Flanged ceramic package; 2 leads

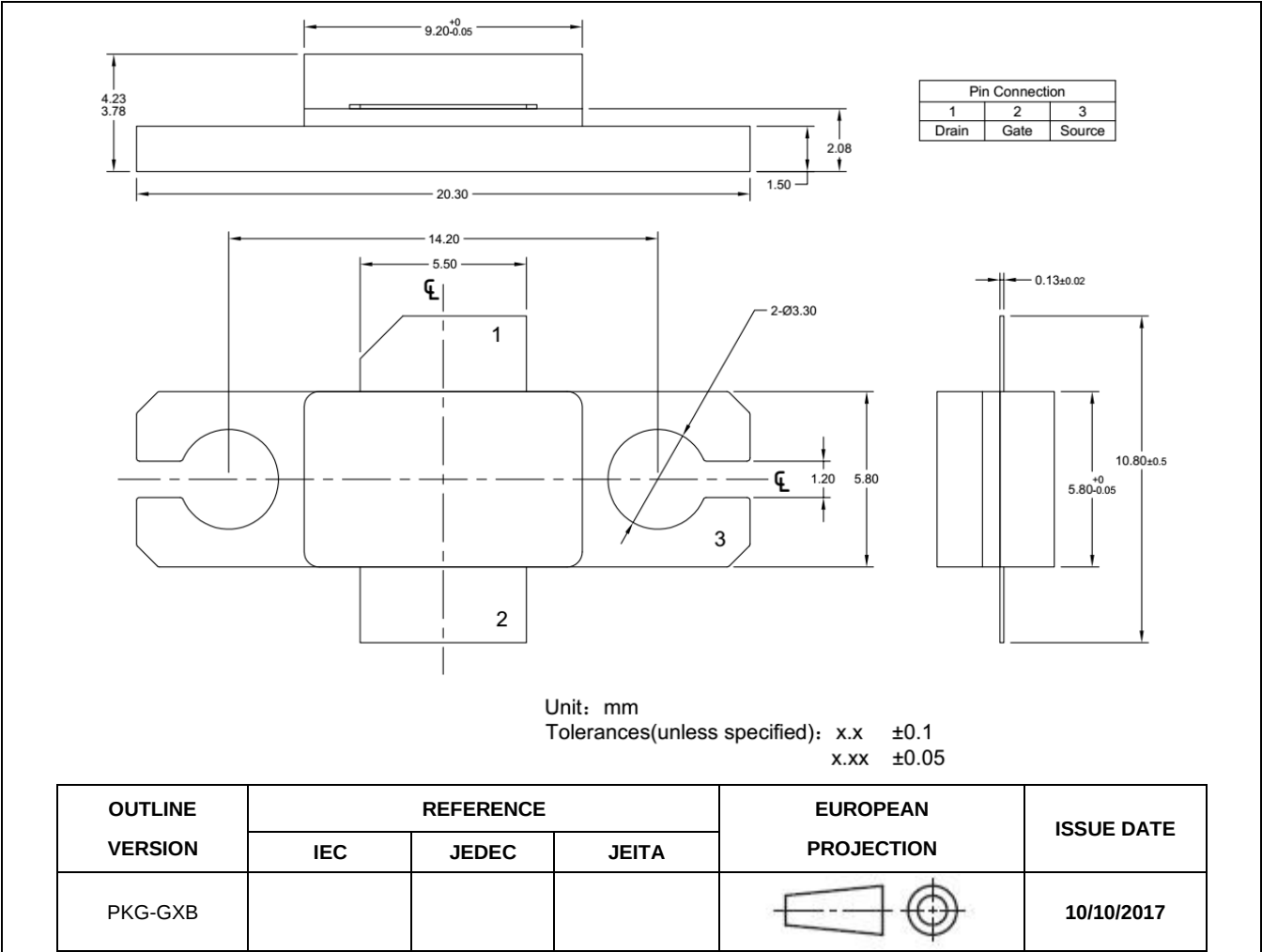


Figure 1. Package Outline PKG-G2E

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2018/5/29	Rev 1.0	Preliminary Datasheet Creation
2018/9/27	Rev 1.1	Update on upper frequency limits,Rth
2020/9/9	Rev 1.2	Application data update
2024/8/21	Rev 2.0	Modify the typo of power rating to be 250W device
2024/9/2	Rev 2.1	Add 220-230MHz application data

Application data based on ZL-19-28/ZBB-24-32

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