

MU1020V LDMOS TRANSISTOR

Document Number: MU1020V
Preliminary Datasheet V1.2

HF-800MHz, 200W, 50V RF LDMOS FETs

Description

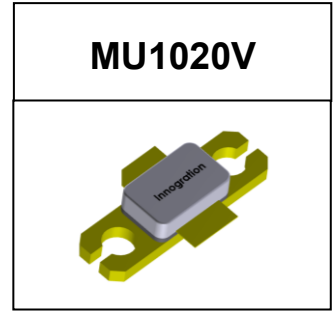
The MU1020V is a 200-watt, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications at frequencies HF to 1GHz.

It is recommended to use it under pulsed CW condition.

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

Pulsed CW, 1ms/50%, VDS=48V, VGS=3.3V, Idq=200mA

Freq(MHz)	Pin(dBm)	Pout(dBm)	Gain(dB)	EFF(%)
410	36.3	53.1	16.8	57.5%
420	36.1	53.3	17.2	58.6%
440	36	53.5	17.5	60.6%
460	36.2	53.5	17.3	59.8%
480	36.2	53.8	17.6	59.5%
500	36.5	53.9	17.4	57.5%
520	36.8	54	17.2	56.3%
540	35.8	53.9	18.1	56.2%
560	34.9	53.7	18.8	58.1%
580	35	53.5	18.5	59.0%
600	36	53	17	60.2%



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}	120	Vdc
Gate--Source Voltage	V _{GS}	-10 to +10	Vdc
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

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Preliminary Datasheet V1.2

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	$R_{\theta JC}$	0.58	$^\circ\text{C/W}$

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 $V_{GS}=0$, $I_{DS}=1.0\text{mA}$	$V_{(BR)DSS}$		122		V
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 ($V_{DS} = 50\text{V}$, $I_D = 600\ \mu\text{A}$)	$V_{GS(th)}$	---	2.73	---	V
Gate Quiescent Voltage ($V_{DD} = 50\text{V}$, $I_D = 200\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	---	3.3	---	V
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{ISS}		150		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{OSS}		56		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$)	C_{RSS}		1.6		pF

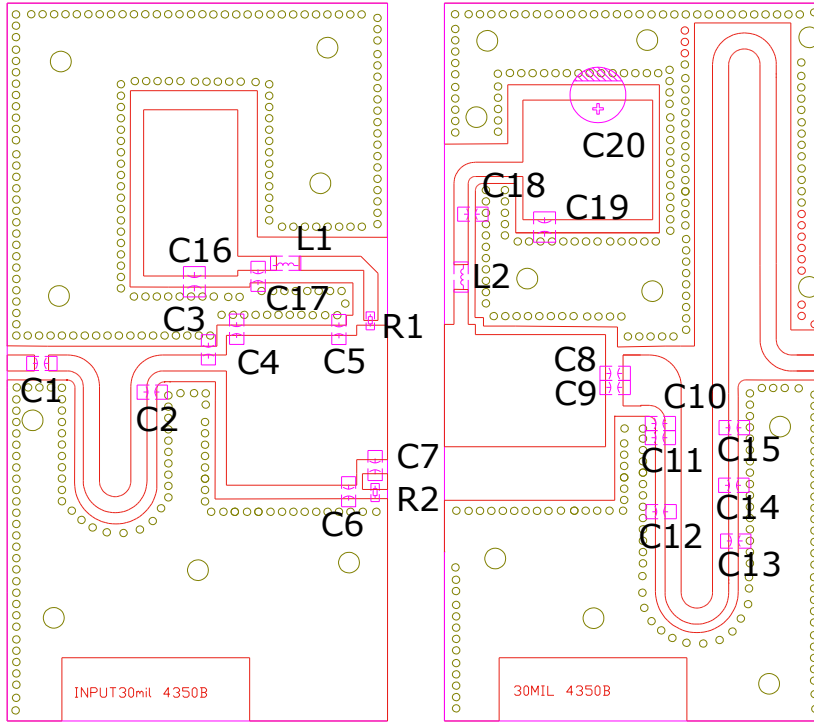
Functional Tests (In Demo Test Fixture, 50 ohm system) $V_{DD} = 48\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 600\text{MHz}$, CW Signal Measurements, $P_{in}=36\text{dBm}$

Power Gain@Pout	G_p	---	17	---	dB
Output Power	P_{out}	30	200		W
Drain Efficiency@Pout	η_D	---	60	---	%
Input Return Loss	IRL	---	-7	---	dB

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Preliminary Datasheet V1.2

Reference Circuit of Test Fixture Assembly Diagram 410-600MHz Class AB (Layout file upon request,)



Test Circuit Component Designations and Values

Component	Description	Suggested Manufacturer
C1	100pF	ATC600F
C2,	15pF	ATC800B
C3	6.8pF	ATC800B
C4	20pF	ATC800B
C5, C6, C10	24pF	ATC800B
C8, C9, C17, C18	56pF	ATC600F
C11	8.2pF	ATC800B
C12	18pF	ATC800B
C13, C14	4.7pF	ATC800B
C15	3.3pF	ATC800B
C7, C16, C19	10uF 100V	Ceramic multilayer capacitor
C20	470uF,63V	Electrolytic Capacitor
R1, R2	9.1 Ω , 1206	Chip Resistor
L1, L2	10nH	DIY air core inductance
PCB	0.762mm [0.030"] thick, εr=3.50, Rogers 4350B, 1 oz. copper	

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Package Outline

Flanged ceramic package; 2 leads

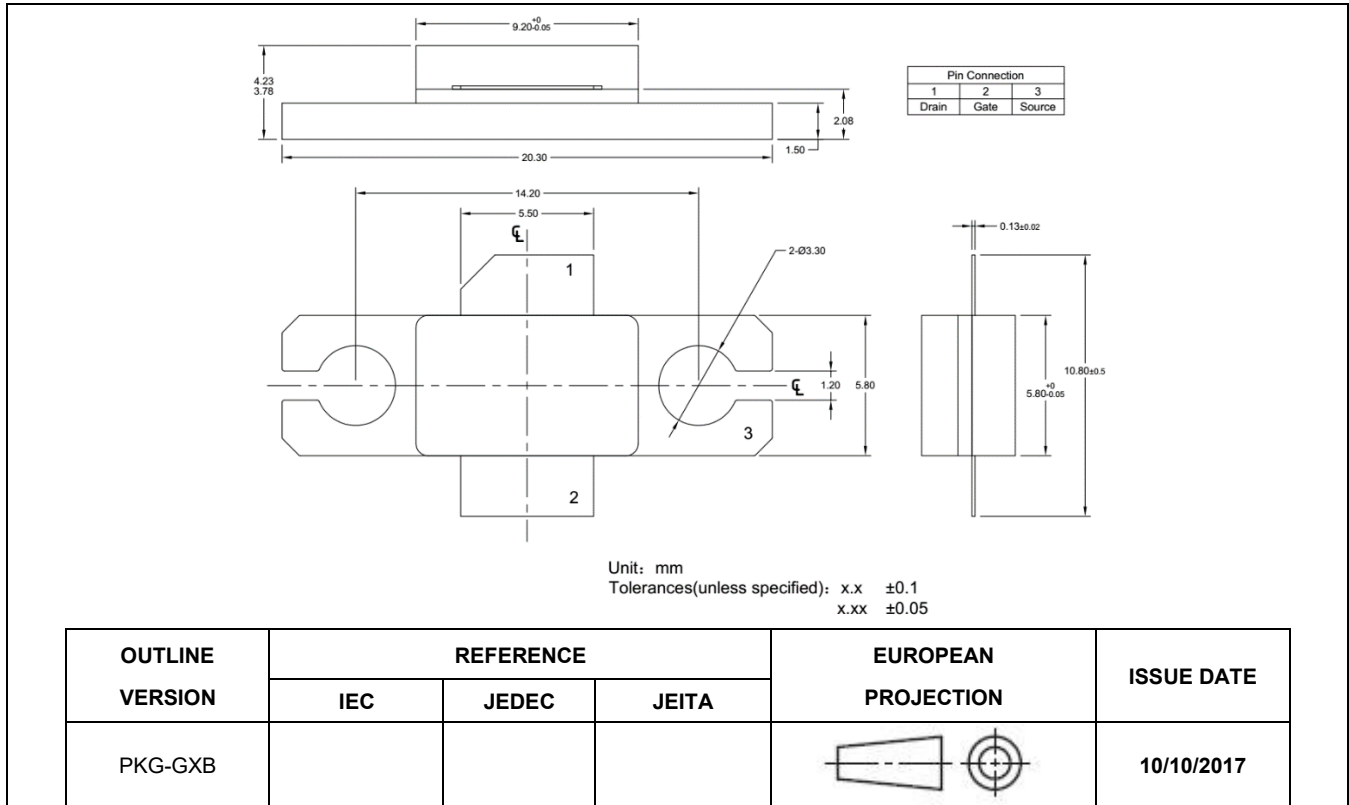


Figure 1. Package Outline PKG-G2E

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2021/6/11	V1.0	Preliminary Datasheet Creation
2024/9/26	V1.1	G2E package drawing finalized
2025/5/1	V1.2	Change the upper limits to 1GHz, and preferred application from CW to pulsed CW

Application data based on TK-21-03

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