MF121K3VP LDMOS TRANSISTOR

Document Number: MF121K3VP
Preliminary Datasheet V1.1

1300W, 50V Avionics RF LDMOS FETs

MF121K3VP

Description

The MF121K3VP is a 1300W, high performance, internally matched LDMOS FET, designed for avionics applications with frequencies 960-1215MHz.It is featured for high power and high ruggedness.

It is recommended to use this device under pulse condition only

- Typical Pulse Performance (on innogration wide band test fixture with device soldered):

  Vds = 50 V, Idq = 100 mA, TA = 25 °C, Pulse condition: 10%, 300us

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
960	61.16	1304.7	58.3	15.52	61.6	1444.1	58.2
1030	60.11	1025.0	58.1	16.91	61.04	1269.3	59.3
1090	60.65	1160.9	56.3	15.15	61.26	1336.3	56.4
1130	60.78	1195.4	54.8	14.55	61.42	1386.7	55.4
1160	60.42	1101.2	56.5	15.69	61.14	1299.6	57.2
1180	60.03	1007.6	49.5	15.09	61.12	1293.4	52.1
1200	61.16	1304.7	58.3	15.52	61.6	1444.1	58.2
1215	60.11	1025.0	58.1	16.91	61.04	1269.3	59.3

- Typical Pulse Performance (on innogration narrow band test fixture with device soldered):

Vds = 50 V, Idq = 200 mA, TA = 25 °C, Pulse condition: 10%, 300us

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1030	61.48	1405.6	52.4	18.41	62.26	1682.2	54.7
1060	61.23	1327.8	50.1	18.27	62.05	1603.0	52.4
1090	61.32	1355.6	50.1	17.9	61.94	1562.2	51.3

Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Internally Matched for Ease of Use
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Excellent thermal stability, low HCI drift
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	115	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	Tstg	-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,Case Temperature 80°C,1300W Pout, Pulse width: 100us, duty cycle: 10%, Vds=50 V, I_{DQ} = 100 mA	$R_{\theta JC}$	0.018	°C/W

Table 3. ESD Protection Characteristics

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

Table 4. Electrical Characteristics (TA = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
Drain-Source Breakdown Voltage (V_{GS}=0V; I_D=100uA)	V_{DSS}	115			V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 50 V, V_{GS} = 0 V)	I_{DSS}			10	μA
Gate--Source Leakage Current (V_{GS} = 6 V, V_{DS} = 0 V)	I_{GSS}			1	μA
Gate Threshold Voltage (V_{DS} = 50V, I_D = 600 uA)	$V_{GS(th)}$		1.6		V
Gate Quiescent Voltage (V_{DD} = 50 V, I_{DQ} = 100 mA, Measured in Functional Test)	$V_{GS(Q)}$		2.9		V

960-1215MHz
Reference Circuit of Test Fixture
(Layout file upon request) PCB: Roger 4350B, 20mils

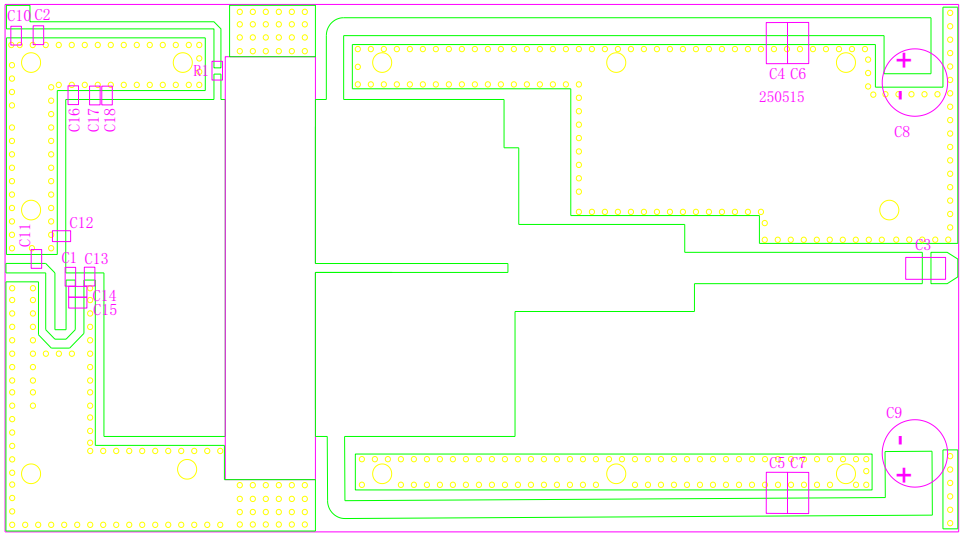


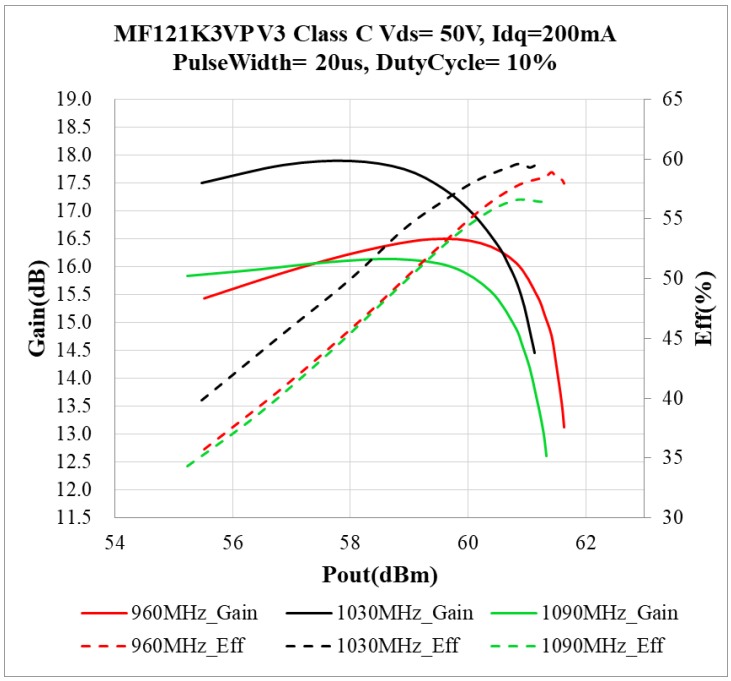
Figure 1. Test Circuit Component Layout

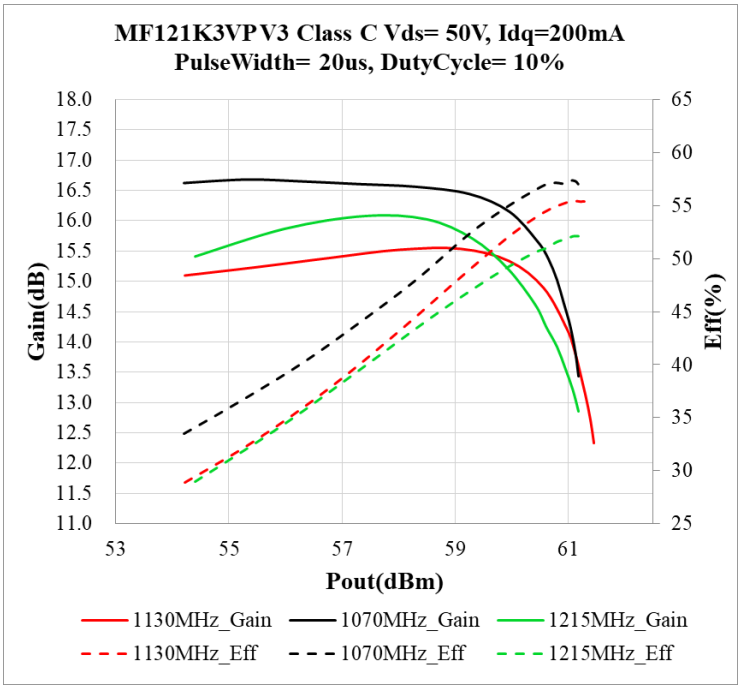
Designator	Comment	Footprint	Quantity
C1, C2	47 pF	0603/0805	2
C3, C4, C5,	47 pF	1210	3
C6, C7	10uF/100V	1210	2
C8, C9	1000uF/63V		2

C10	10uF/16V	0603/0805	1
C11	1.2 pF	0603/0805	1
C12, C13, C17	2.0 pF	0603/0805	3
C14, C15, C16	3.3 pF	0603/0805	3
C18	4.7 pF	0603/0805	1
R1	10 Ω	0603/0805	1

TYPICAL CHARACTERISTICS

Figure 2: Power gain and Efficiency as a Function of Pout Pulse width:10uS, duty cycle: 10%, Vds = 50 V, Idq = 100 mA,





1030-1090MHz
Reference Circuit of Test Fixture
(Layout file upon request) PCB: Roger 4350B, 20mils

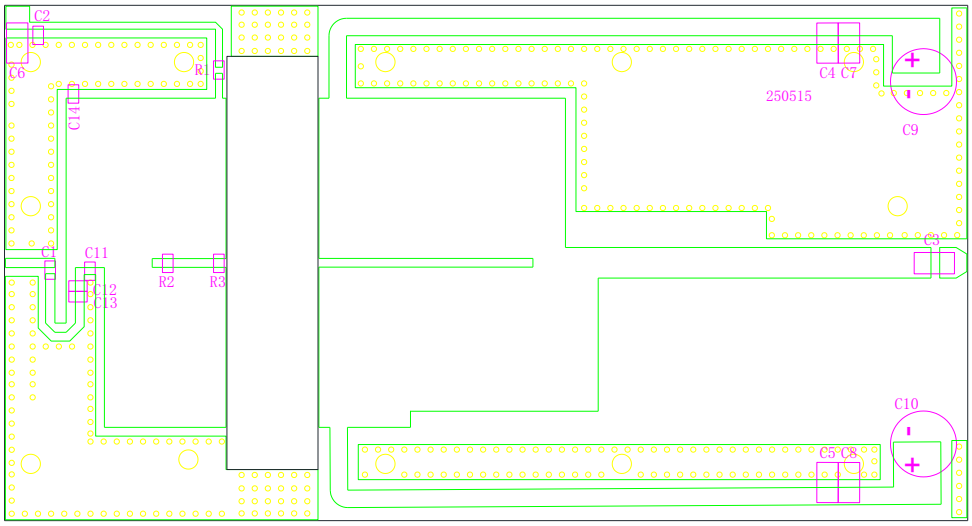
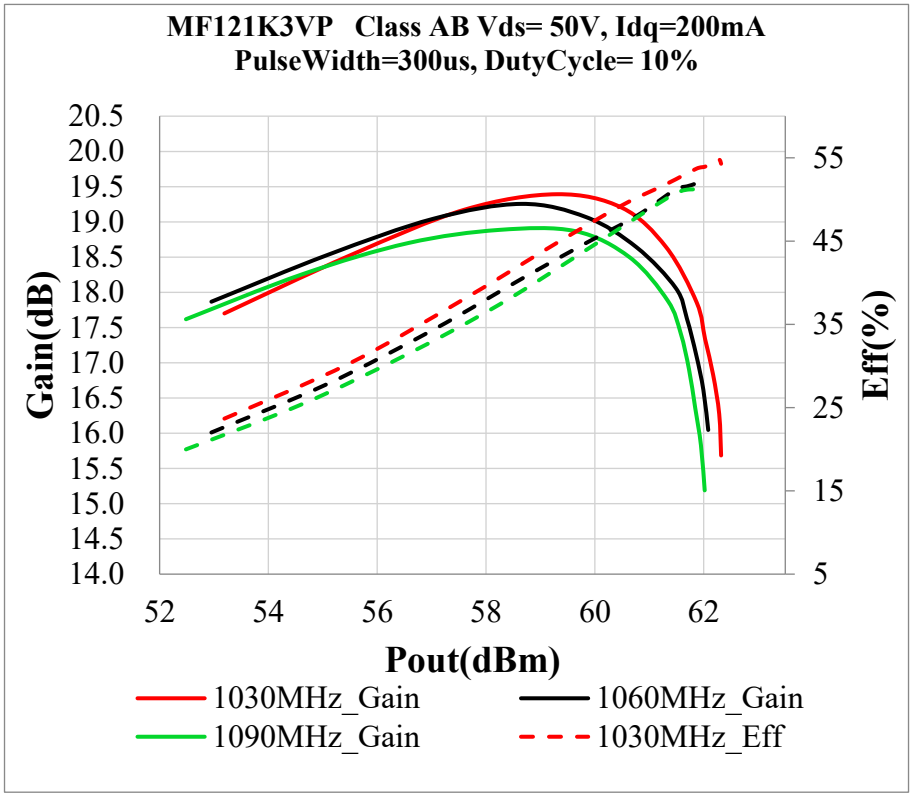


Figure 4. Test Circuit Component Layout

Designator	Comment	Footprint	Quantity
C1	6.8pF	0603/0805	1
C2	47 pF	0603/0805	1
C3, C4, C5,	47 pF	1210	3
C6, C7, C8	10uF/100V	1210	3
C9, C10	1000uF/63V		2
C11	2.0 pF	0603/0805	1
C12, C13, C14	3.3 pF	0603/0805	3
R1, R2, R3	10 Ω	0805	3

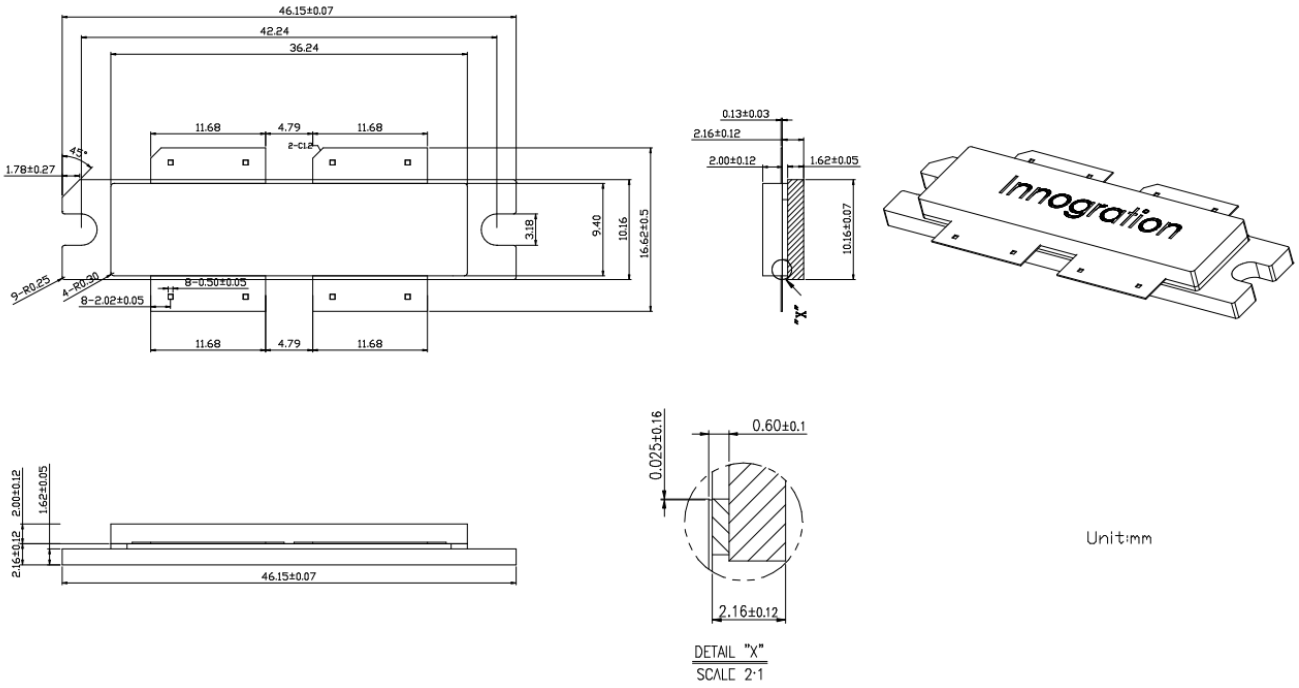
TYPICAL CHARACTERISTICS

Figure 5: Power gain and Efficiency as a Function of Pout



Package Outline

Flanged ceramic package;



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-O4E					5/6/2024

Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2025/7/24	Rev 1.0	Preliminary Datasheet Creation
2026/5/12	Rev 1.1	Add pulsed CW performance under width 300us within 1.03-1.09GHz By retuning, on 1st page, delete misleading S21/S11 info

Application data based on LSM-25-22/26-15

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