

MX1040VP LDMOS TRANSISTOR

Document Number: MX1040VP
Preliminary Datasheet V1.0

400W, 50V High Power RF LDMOS FETs

Description

The MX1040VP is a 400-watt, highly rugged, thermally enhanced, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 1GHz, supporting both pulse and CW applications.

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



•Typical Performance (On Innogrator wideband band fixture with device soldered):

$V_{DD} = 50$ Volts, $I_{DQ} = 200$ mA, CW.

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
475	37.07	55.6	363.1	13.8	18.53	52.62
500	39.33	56.1	407.4	15	16.77	54.32
525	37.64	56.6	457.1	14	18.96	65.30
550	37.99	56.6	457.1	13.4	18.61	68.22
575	37.7	56.08	405.5	12.27	18.38	66.10
600	39.39	56	398.1	12.8	16.61	62.20
625	39.05	55.5	354.8	12.75	16.45	55.66
650	38.26	55.3	338.8	13	17.04	52.13
675	38.19	55.6	363.1	14.9	17.41	48.74
700	37.56	55.65	367.3	15.3	18.09	48.01
725	37.51	55.65	367.3	15.2	18.14	48.33
750	37.68	55.7	371.5	14.7	18.02	50.55
775	37.19	55.4	346.7	13.2	18.21	52.54
800	36.95	55.1	323.6	11.5	18.15	56.28
825	37.6	54.9	309.0	10.35	17.3	59.72

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)

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Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+115	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

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 25^\circ\text{C}$, $P_{out} = 350\text{W CW}$,	$R_{\theta JC}$	0.35	°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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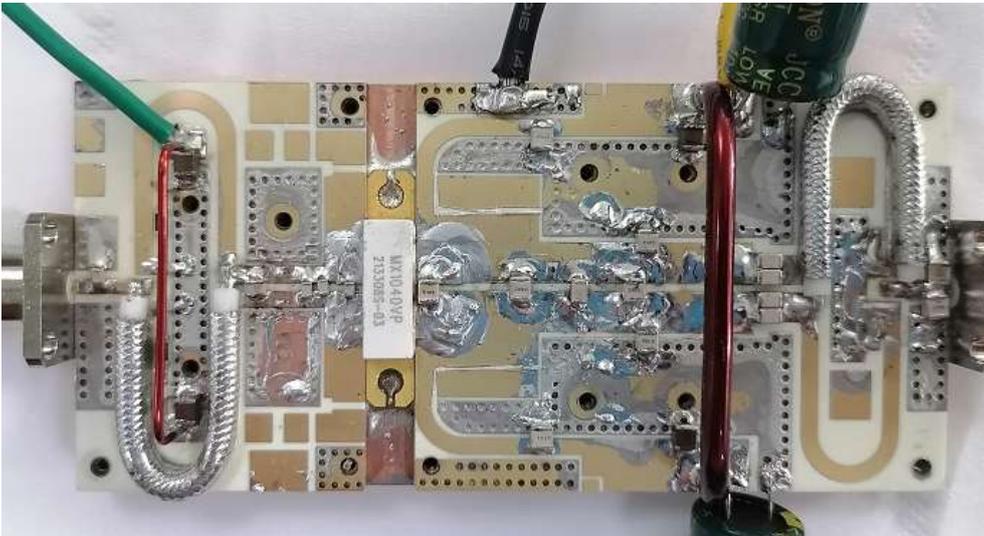
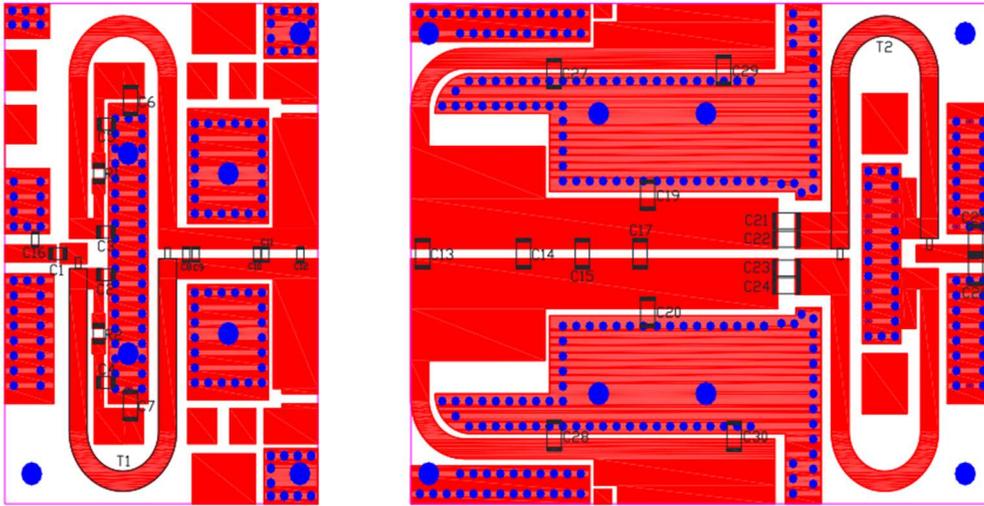
DC Characteristics

Drain-Source Voltage $V_{GS} = 0$, $I_{DS} = 1.0\text{Ma}$	$V_{(BR)DSS}$		115		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 ($V_{DS} = 50\text{V}$, $I_D = 600\ \mu\text{A}$)	$V_{GS(th)}$	—	2.65	—	V
Gate Quiescent Voltage ($V_{DD} = 50\text{V}$, $I_D = 200\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	3.34	—	V
Drain source on state resistance ($V_{DS} = 0.1\text{V}$, $V_{GS} = 10\text{V}$) Each section side of device measured	$R_{ds(on)}$		208		$\text{m}\Omega$
Common Source Input Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured	C_{ISS}		110		pF
Common Source Output Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured	C_{OSS}		42.4		pF
Common Source Feedback Capacitance ($V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$) Each section side of device measured	C_{RSS}		1.22		pF

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Reference Circuit of Test Fixture (470-825MHz) (Layout file upon request) PCB: Roger 4350B, 20mils



Component	Description	Suggested Manufacturer
C1,C2,C3,C4,C5	100pF	DLC75D
C8,C10,C11,C12	15pF	0805
C9	8.2pF	0805
C14,C17	8.2pF	DLC70B
C16	2.2pF	0805
C13,C15	1.8pF	DLC70B
C25,C26	0.5pF	DLC70B
C19,C20	1pF	DLC70B
C21,C22,C23,C24	22pF	DLC70B
C27,C28	110pF	DLC70B
C6,C7,C29,C30	10uF/50V	10uF/50V
R1,R2	Chip Resistor,10ohm	1206
T1,T2	25ohm,Line length=55mm	SF-086-25

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2021/8/27	Rev 1.0	Datasheet Creation

Application data based on ZL-21-18

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