MJ1505 LDMOS TRANSISTOR

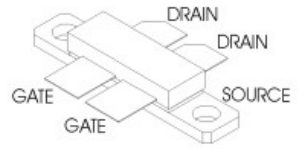
Document Number: MJ1505
Product Datasheet V2.1

50W, 28V High Power RF LDMOS FETs

Description

The MJ1505 is a 50-watt, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications at frequencies HF to 1.5 GHz. It can be used in Class AB/B and Class C for all typical modulation formats.

MJ1505



- Typical Performance (On Innogration fixture with device soldered):

V_{DD} = 28 Volts, I_{DQ} = 300 mA, CW.

Frequency	Gp (dB)	P_{-1dB} (W)	η_D@P_{-1} (%)
1000 MHz	20	50	60

- Typical Performance (In Innogration broadband demo): V_{DD} = 28 Volts, I_{DQ} = 200 mA, CW.

Freq (MHz)	Gp (dB)	P_{-1dB} (dBm)	η_D@P_{-1} (%)
15	16.8	46.0	36.3%
20	17.1	46.6	39.2%
30	15.5	46.9	40.6%
60	15.5	46.5	38.8%
90	16.4	46.3	39.6%
120	16.8	46.6	43.0%
150	16.7	47.4	49.2%
200	19.2	47.2	48.4%
250	17.4	47.4	49.2%
300	19.1	47.6	49.5%
350	18.0	47.5	49.0%
400	18.2	47.9	51.2%
450	17.8	47.9	51.9%
500	17.8	47.7	51.9%
512	18.2	47.4	50.6%
550	18.3	47.1	49.8%
600	17.7	47.0	49.7%
650	18.1	46.6	47.6%
700	16.1	46.4	47.4%
750	16.8	46.7	47.7%
800	16.0	46.4	46.3%
850	15.5	46.2	43.9%
900	14.5	46.2	43.3%
950	14.0	45.5	40.4%
1000	13.9	45.4	39.4%

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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
Operating Voltage	V_{DD}	+40	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 T_C= 85°C, T_J=200°C, DC test	RθJC	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 ℃ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics (per half section)					
Drain-Source Voltage V_{GS}=0, I_{DS}=1.0mA	$V_{(BR)DSS}$	95			V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28 V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Gate--Source Leakage Current (V_{GS} = 10 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 28V, I_D = 150 μA)	$V_{GS(th)}$	——	2.17	——	V
Gate Quiescent Voltage (V_{DD} = 28 V, I_D =200 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.1	——	V
Common Source Input Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{ISS}		30.7		pF

Common Source Output Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{OSS}		13.4		pF
Common Source Feedback Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{RSS}		0.7		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 300 mA, f = 1000 MHz, CW Signal Measurements.

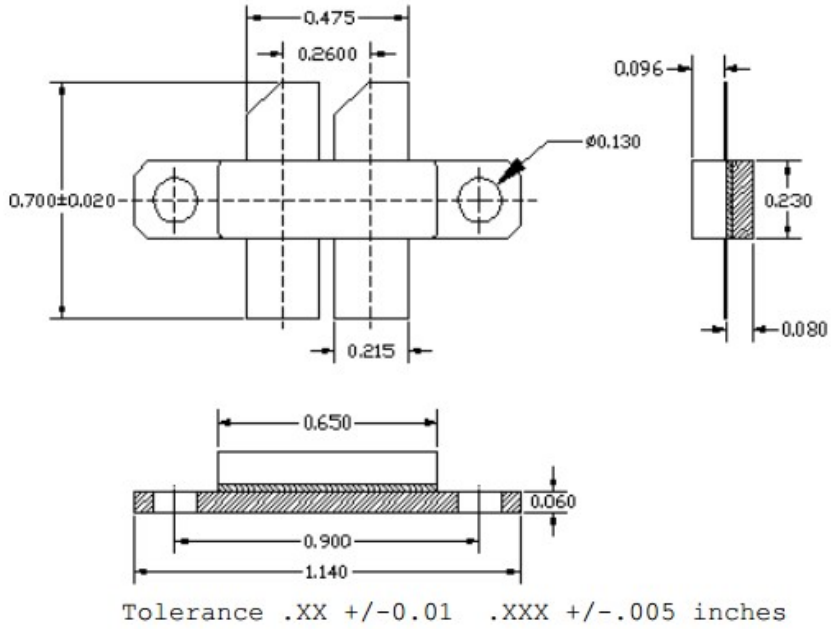
Power Gain	G_p		20		dB
Drain Efficiency@P1dB	η_D		60		%
1 dB Compression Point	P_{-1dB}		50		W
Input Return Loss	IRL		-7		dB

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 300 mA, f = 1000 MHz

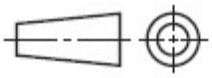
VSWR 20:1 at 50W pulse CW Output Power	No Device Degradation

Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



Tolerance .XX +/-0.01 .XXX +/-.005 inches

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-F4E					03/12/2013

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2016/8/8	**Rev 1.0**	**Preliminary Datasheet**
2016/12/27	**Rev 1.1**	**Preliminary Datasheet**
		Add Thermal Resistance
2017/02/20	**Rev 2.0**	**Product Datasheet**
2017/03/28	**Rev 2.1**	**Product Datasheet**

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