MJ1509 LDMOS TRANSISTOR

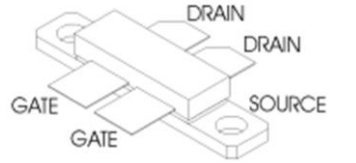
Document Number: MJ1509
Preliminary Datasheet V1.0

90W, 28V High Power RF LDMOS FETs

Description

The MJ1509 is a 90-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.

MJ1509



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

V_{DD} = 28 Volts, I_{DQ} = 500 mA, CW.

Frequency	Gp (dB)	P_{-1dB} (W)	η_D@P_{-1} (%)
1000 MHz	18	90	60

- Typical Performance (on Innogration broadband demo): V_{DD} = 24 Volts, I_{DQ} = 600 mA, CW.

Frequency(MHz)	Pin(dBm)	P_{-1dB} (W)	Gp (dB)	η_D@P_{-1} (%)
30	29.40	57.54	18.20	49.33
60	30.10	75.86	18.70	57.36
100	29.00	79.43	20.00	60.18
200	28.30	79.43	20.70	64.02
300	28.00	67.61	20.30	61.78
400	29.30	57.54	18.30	56.28
512	30.20	51.29	16.90	55.50

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	$R_{\theta JC}$	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} = 75V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
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 =500 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.3	——	V
Common Source Input Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{ISS}		TBD		pF
Common Source Output Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{OSS}		TBD		pF
Common Source Feedback Capacitance (V_{GS} = 0V, V_{DS} =28 V, f = 1 MHz)	C_{RSS}		TBD		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 500 mA, f = 1000 MHz, CW Signal Measurements.

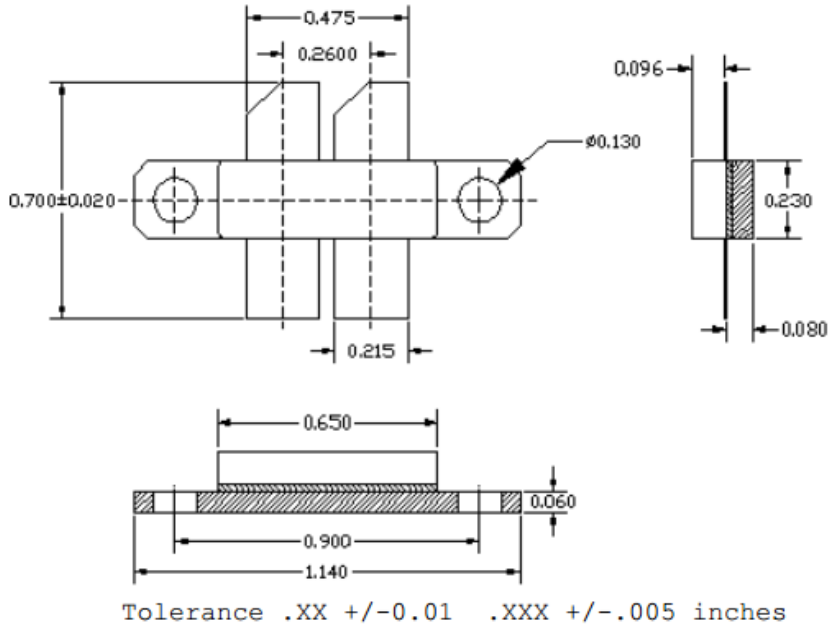
Power Gain	Gp	——	18	——	dB
Drain Efficiency@P1dB	η_D	——	60	——	%
1 dB Compression Point	P_{-1dB}	——	90	——	W
Input Return Loss	IRL	——	-7	——	dB

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 600 mA, f = 1000 MHz

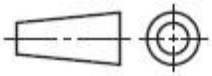
VSWR 20:1 at 90W pulse CW Output Power	No Device Degradation

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
2017/05/20	Rev 1.0	Preliminary Datasheet

Disclaimers