

MM1001 LDMOS TRANSISTOR

Document Number: MM1001
Product Datasheet V5.0

10W, 28V High Power RF LDMOS FETs

Description

The MM1001 is a 10-watt, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications at frequencies up to 2 GHz. It can be used in Class AB/B and Class C for all typical modulation formats.

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

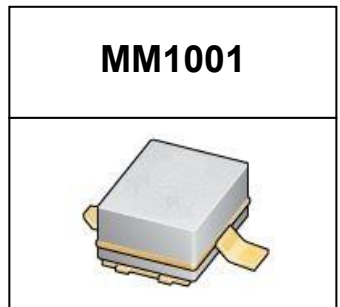
$V_{DD} = 28$ Volts, $I_{DQ} = 100$ mA, CW.

Frequency	Gp (dB)	P_{-1dB} (W)	$\eta_D@P_{-1}$ (%)
960 MHz	23	13	63

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

$V_{DD} = 28$ Volts, $I_{DQ} = 100$ mA, CW, $P_{in}=28$ dBm

Frequency	Gp (dB)	Psat (W)	$\eta_D@Psat$ (%)
50-1500 MHz	12-14	11-16	>35



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	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 $T_c = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC test	$R_{\theta JC}$	3	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
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Human Body Model (per JESD22--A114)	Class 2
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Table 4. Electrical Characteristics (TA = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
Drain-Source Voltage V _{GS} =0, I _{DS} =1.0mA	V _{(BR)DSS}	90	97		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 = 50 μA)	V _{GS(th)}	—	2.07	—	V
Gate Quiescent Voltage (V _{DD} = 28 V, I _D = 100 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}		16.2		pF
Common Source Output Capacitance (V _{GS} = 0V, V _{DS} =28 V, f = 1 MHz)	C _{OSS}		5.9		pF
Common Source Feedback Capacitance (V _{GS} = 0V, V _{DS} =28 V, f = 1 MHz)	C _{RSS}		0.5		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 100mA, f = 960 MHz, CW Signal Measurements.

Power Gain	G _p	—	23	—	dB
Drain Efficiency@P1dB	η _D	—	63	—	%
1 dB Compression Point	P _{-1dB}	—	13	—	W
Input Return Loss	IRL	—	-7	—	dB

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 100 mA, f = 960 MHz

VSWR 20:1 at 13W pulse CW Output Power	No Device Degradation
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960MHz

TYPICAL CHARACTERISTICS

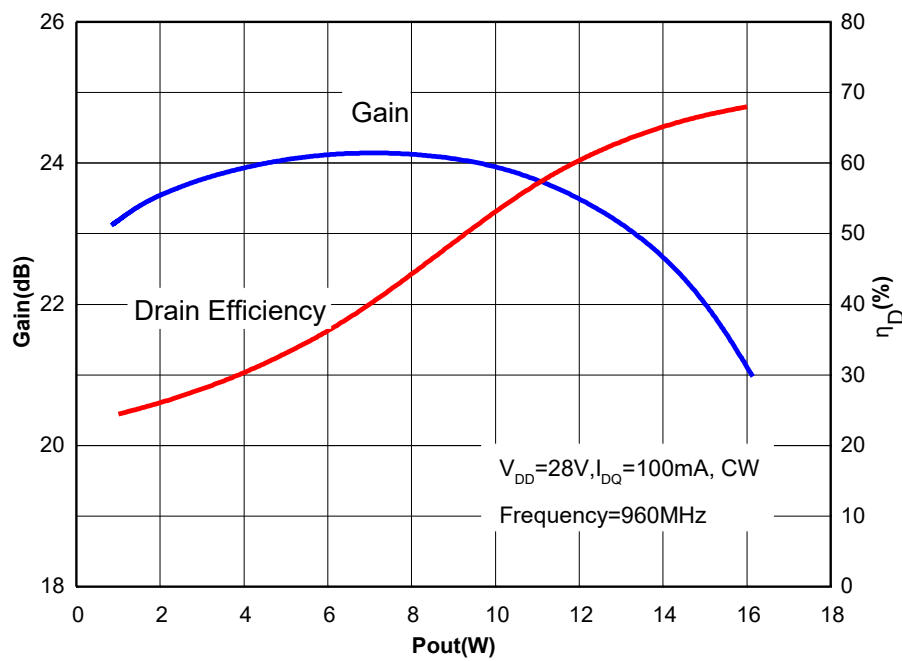


Figure 1. Power gain and drain efficiency as function of Power out

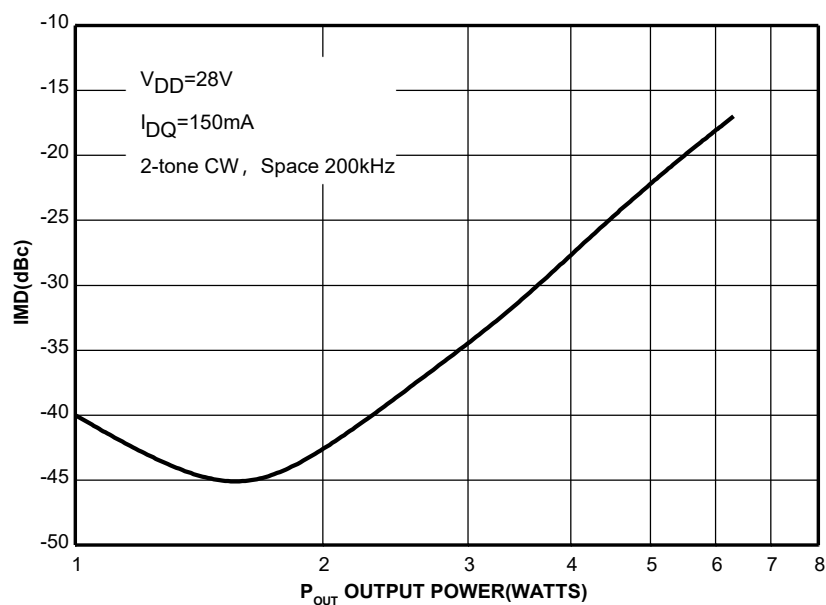


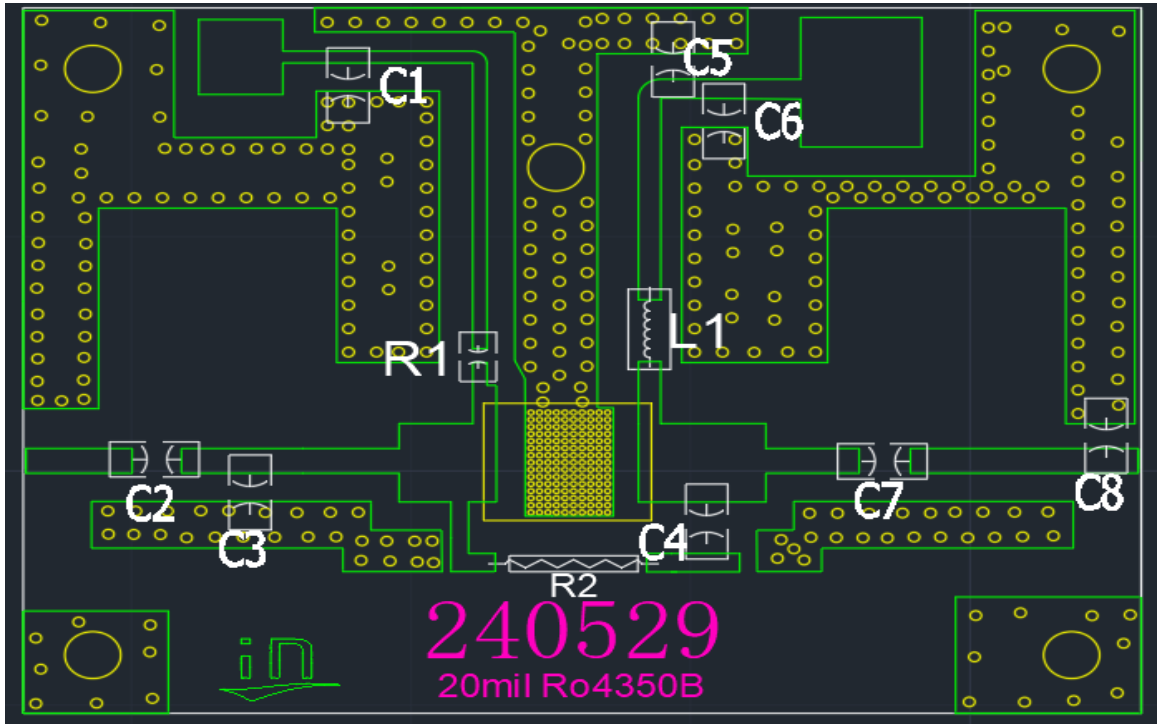
Figure 2. IMD3 versus Output Power

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50-1500MHz

TYPICAL CHARACTERISTICS



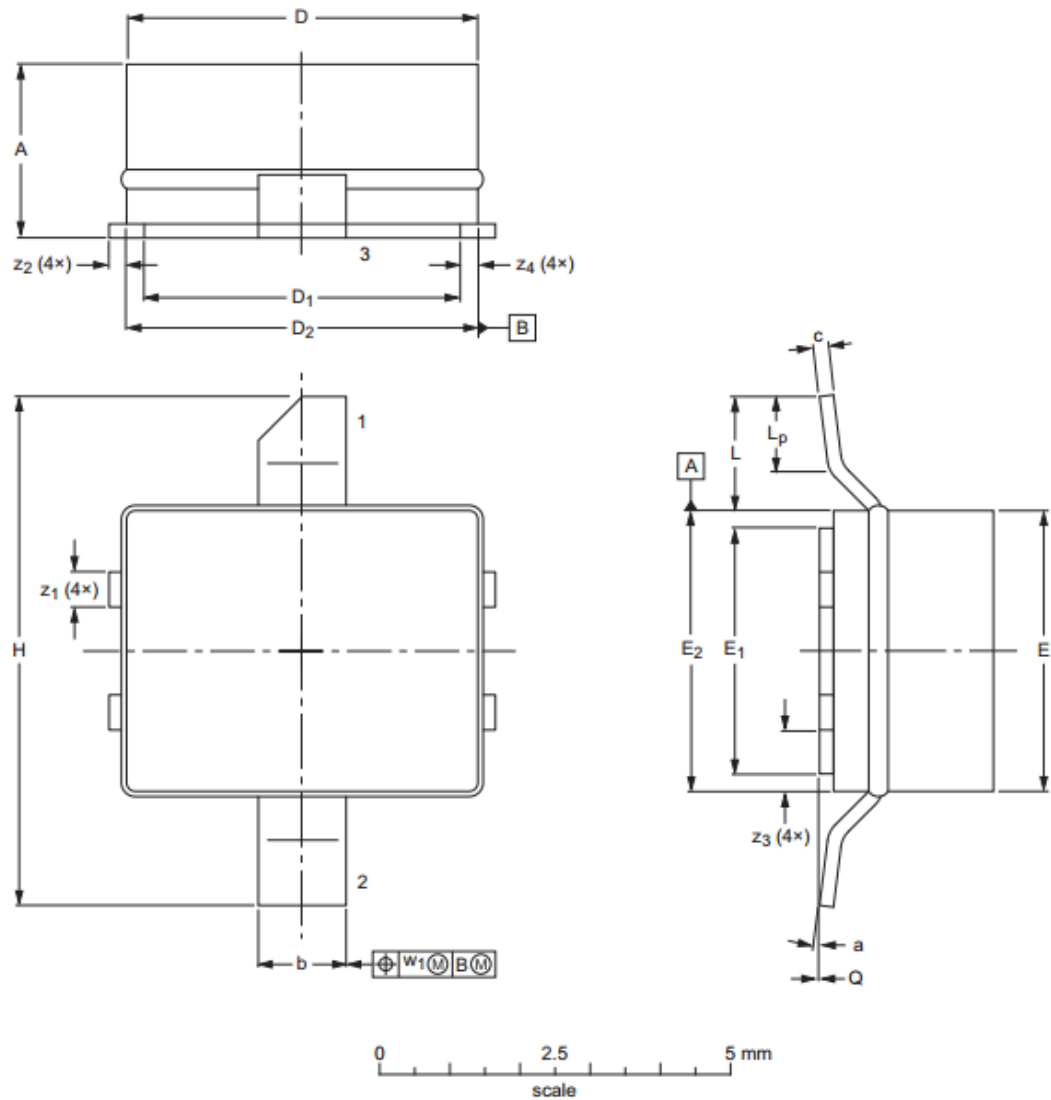
Component	Description	Suggested Manufacturer
C1,C6	10nF 0805	
C2	120pF MQ300805	
C3	3.6pF MQ301111	
C4	150F MQ301111	
C5	240pF MQ300805	
C7	150F MQ300805	
C8	2.7pF MQ300805	
L1	0.5mm wire, 6Turns ,3.15m inner diameter,	DIY
R1	220Ω 0805	/
R2	330Ω/1W	/

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Package Outline

Earless Flanged ceramic package; 2 leads(1-Drain,2-Gate,3-Source)



UNIT	A	b	c	D	D ₁	E	E ₁	E ₂	H	L	L _p	Q	w ₁	z ₁	z ₂	z ₃	z ₄	α
mm	2.34	1.35	0.23	5.16	4.65	4.14	3.63	4.14	7.49	2.03	1.02	0.1	0.25	0.58	0.25	0.97	0.51	7°
	2.13	1.19	0.18	5.00	4.50	3.99	3.48	3.99	7.24	1.27	0.51	0.0		0.43	0.18	0.81	0.00	0°

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-MM					18/6/2014

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2015/4/29	Rev 1.0	Preliminary Datasheet
2016/8/8	Rev 2.0	Preliminary Datasheet
2016/11/23	Rev 3.0	Preliminary Datasheet
		Add test data and graph
2016/12/27	Rev 3.1	Preliminary Datasheet
		Add Thermal Resistance
2017/02/22	Rev 4.0	Product Datasheet
		Add CV parameter
2025/9/25	Rev 5.0	Add 50-1500M application data

Application based on SYX-25-36

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