

NME8001H GaN TRANSISTOR

Document Number: NME8001H
Preliminary Datasheet V1.1

Gallium Nitride 28V 10W, RF Power Transistor

Description

The NME8001H is a 10W, GaN HEMT, designed for multiple applications with frequencies up to 8GHz. There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

- Typical broad band performance $V_{ds}=28V$, $I_{dq}=50mA$

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
6000	39.56	9.0	37.5	6.56	40.94	12.4	41.4
6100	39.62	9.2	39.1	6.87	41.04	12.7	43.4
6200	39.76	9.5	41.4	7.21	41.11	12.9	45.4
6300	39.8	9.6	43.7	7.59	41.15	13.0	47.8
6400	39.74	9.4	44.5	7.79	41.1	12.9	48.5
6500	39.59	9.1	42.4	7.72	40.98	12.5	46.5
6600	39.49	8.9	41.4	7.59	40.93	12.4	45.7
6700	39.51	8.9	41.8	7.57	40.91	12.3	45.9
6800	39.48	8.9	41.7	7.4	40.87	12.2	46.0
6900	39.58	9.1	41.5	7.18	40.79	12.0	45.0
7000	39.26	8.4	39.1	7.08	40.7	11.8	43.3
7100	39.35	8.6	38.6	6.72	40.7	11.8	42.5
7200	39.47	8.9	38.8	6.62	40.74	11.9	42.3
7300	39.57	9.1	41.3	6.84	40.87	12.2	44.8
7400	39.11	8.2	41.9	7.15	40.77	12.0	47.1
7500	39.32	8.6	44.0	7.19	40.48	11.2	46.3
7600	39.13	8.2	42.7	7.29	40.33	10.8	45.2
7700	39.34	8.6	44.8	7.51	40.42	11.0	46.8
7800	39.28	8.5	46.8	7.84	40.45	11.1	49.5
7900	39.18	8.3	47.0	7.75	40.37	10.9	50.1
8000	39.05	8.0	45.9	7.35	40.35	10.8	49.2

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

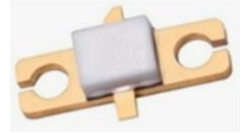
Turning the device ON

- Set V_{GS} to the pinch-off (V_P) voltage, typically $-5V$
- Turn on V_{DS} to nominal supply voltage (28V)
- Increase V_{GS} until I_{DS} current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce V_{GS} down to V_P , typically $-5V$
- Reduce V_{DS} down to 0V
- Turn off V_{GS}

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Table 1. Maximum Ratings (Not simultaneous, TC = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	40	Vdc
Maximum Forward Gate Current	I_{gmax}	2.5	mA
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_c	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C

1. Continuous operation at maximum junction temperature will affect MTTF

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 Power Dissipation(See note 1)	$R_{\theta JC}$	8	C/W

1. $R_{\theta JC}$ -DC is tested at only DC condition, it is related to the highest thermal resistor value among all test conditions. It might be differently lower in different RF operation conditions like CW signal ,pulsed RF signal etc.

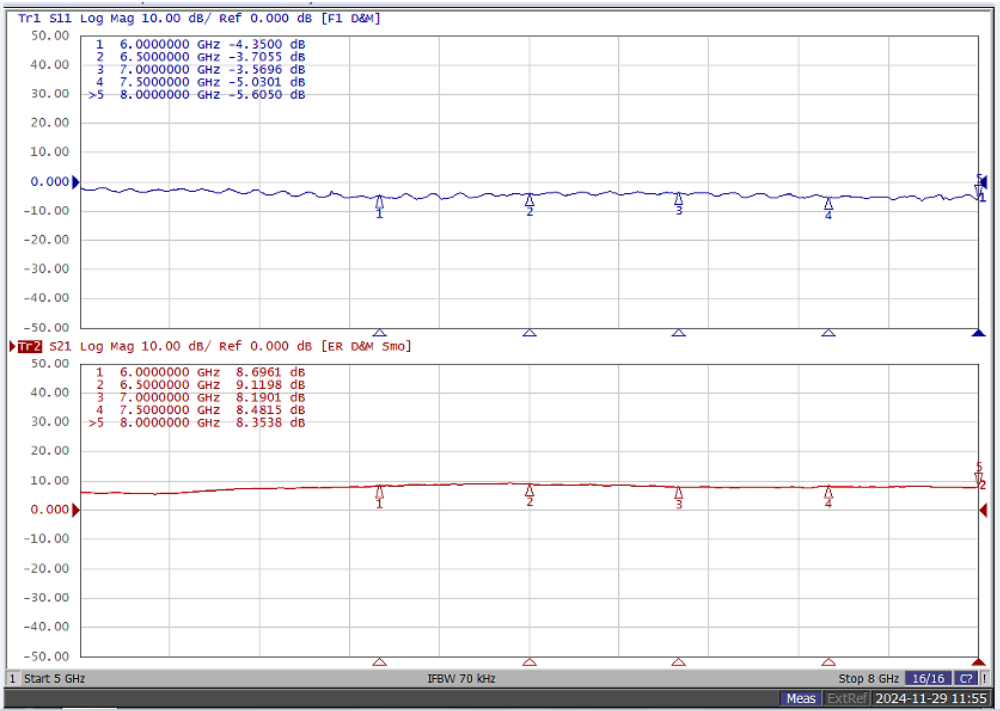
Table 3. Electrical Characteristics ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$; $I_{DS}=2.5\text{mA}$	V_{DSS}	150			V
Gate Threshold Voltage	$V_{DS}=28\text{V}$, $I_D=2.5\text{mA}$	$V_{GS(th)}$		-2.7		V
Gate Quiescent Voltage	$V_{DS}=28\text{V}$, $I_{DS}=50\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.47		V

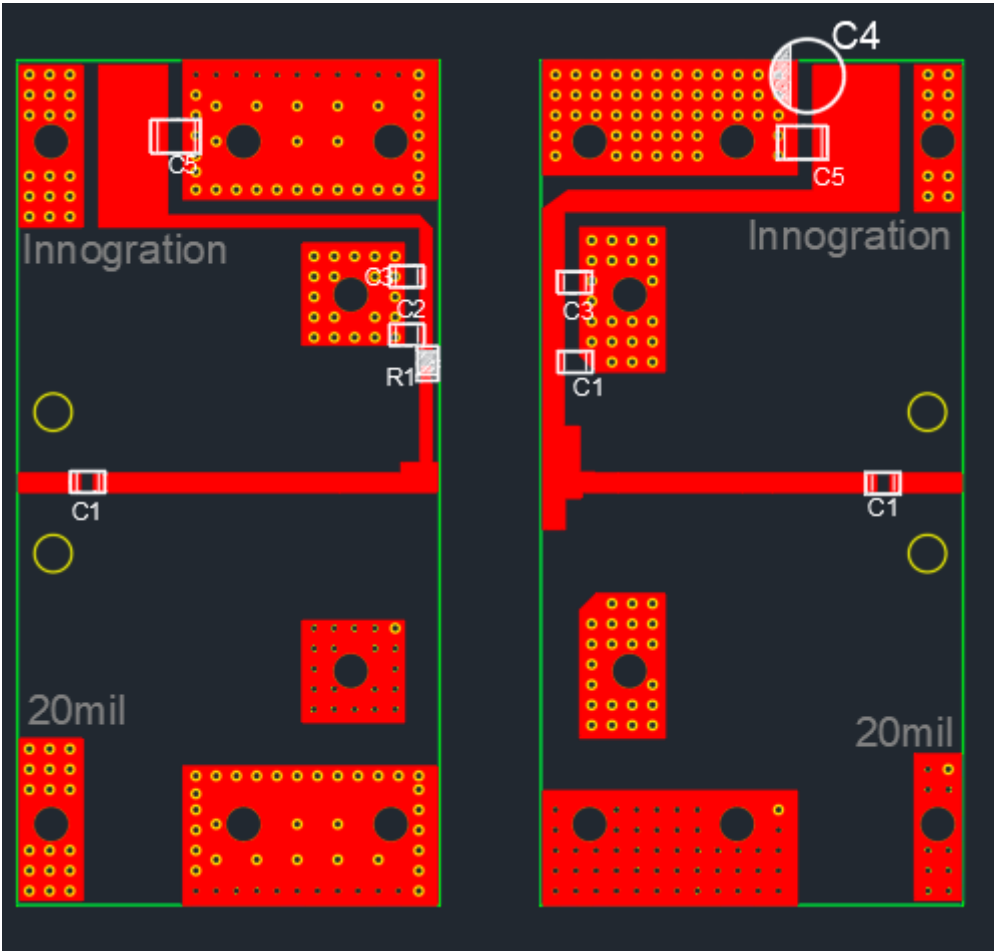
6-8GHz

Figure 2: Network analyzer output, S11 and S21 ($V_{DS}=28\text{V}$ $V_{GS}=-2.45\text{V}$ $I_{DQ}=50\text{mA}$)



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BOM		
Component	Value	Quantity
C1	1.2pF	3
C2	0.7pF	1
R1	10 ohm	1
C5	10uF	2
C3	1uF	2
C4	470uF	1

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Package Outline

Flanged ceramic package; 2 leads

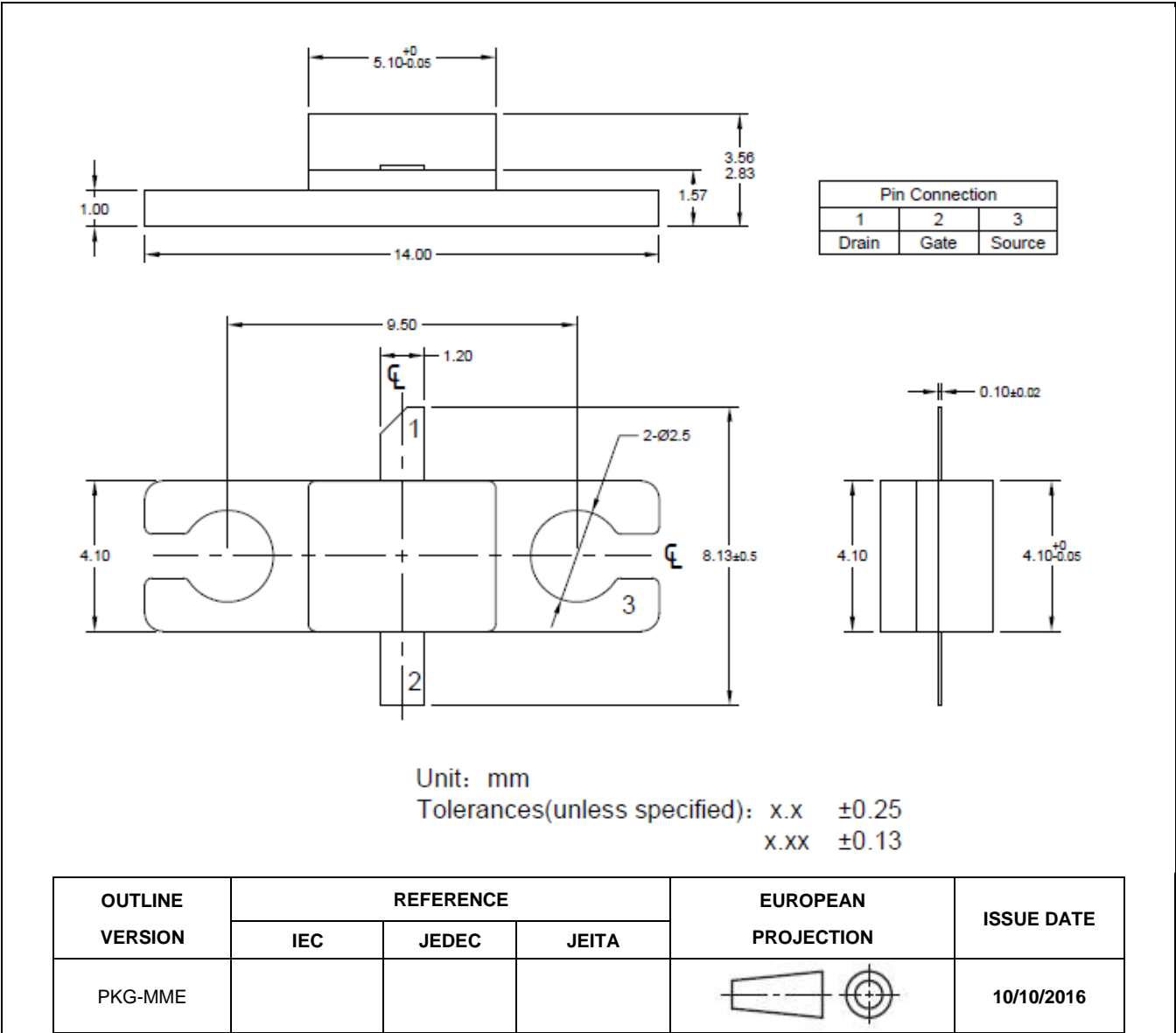


Figure 1. Package Outline PKG-MME

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Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/2/28	V1.0	Preliminary Datasheet
2024/12/4	V1.1	Change the application carrier from 6.9-7.4GHz to 6-8GHz

Application data based on RXT-23-05/ZXY-24-37

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