

# SME8002V GaN TRANSISTOR

Document Number: SME8002V  
Preliminary Datasheet V1.0

## GaN 50V ,8GHz, 20W, RF Power Transistor

### Description

The SME8002V is a 20-watt, internal matched GaN HEMT, designed for multiple applications with frequencies up to 8000MHz.

**In its typical multi-octave wideband application across L/S/C band, it can deliver >15W pulsed CW across 1.0-8.0GHz**

The performance is guaranteed for applications operating in the mentioned frequencies.

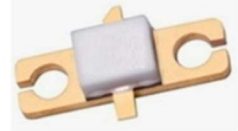
There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

- Typical performance (on fixture with device soldered):

$V_{DD}=50V$   $I_{DQ}=50mA$ , Pulse CW, Pulse Width=20 us, Duty cycle=10% .

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
1000	31.6	42.6	18.2	0.106	11.0	34.3
1200	31.7	43.8	23.9	0.104	12.1	46.0
1400	32.6	44.0	25.1	0.111	11.4	45.3
1600	33.9	43.9	24.8	0.116	10.1	42.7
1800	34.4	44.1	25.6	0.117	9.7	43.7
2000	34.8	43.8	23.9	0.105	9.0	45.6
2200	34.8	44.2	26.2	0.115	9.4	45.5
2400	36.0	44.0	25.1	0.117	8.0	42.9
2600	36.7	44.1	25.4	0.115	7.3	44.2
2800	35.7	43.9	24.8	0.117	8.2	42.3
3000	35.1	43.7	23.6	0.116	8.6	40.6
3200	36.1	43.4	22.0	0.112	7.3	39.2
3400	36.3	43.1	20.5	0.123	6.9	33.4
3600	36.8	43.2	20.9	0.157	6.5	26.7
3800	35.3	42.9	19.3	0.134	7.6	28.8
4000	36.1	43.8	24.1	0.166	7.7	29.0
4200	36.5	44.7	29.6	0.155	8.2	38.3
4400	37.3	44.8	30.2	0.182	7.5	33.2
4600	36.3	43.9	24.4	0.120	7.6	40.7
4800	37.1	44.5	27.9	0.122	7.4	45.8
5000	36.8	44.3	26.6	0.120	7.4	44.3
5200	36.5	43.7	23.6	0.121	7.2	39.0
5400	36.8	43.4	21.8	0.133	6.6	32.8
5600	36.3	43.0	19.7	0.137	6.7	28.8
5800	35.9	43.2	20.8	0.134	7.2	31.0
6000	35.3	42.7	18.5	0.144	7.4	25.7
6200	33.6	42.3	17.0	0.147	8.7	23.2
6400	32.1	41.8	15.1	0.147	9.7	20.6
6600	33.8	42.1	16.1	0.151	8.3	21.3

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6800	34.5	42.1	16.1	0.154	7.6	20.9
7000	33.9	42.3	17.0	0.151	8.4	22.5
7200	35.2	42.7	18.5	0.151	7.5	24.4
7400	35.0	43.2	20.7	0.136	8.1	30.4
7600	35.0	43.7	23.3	0.120	8.7	38.8
7800	36.3	44.2	26.2	0.114	7.9	46.0
8000	36.0	42.5	17.5	0.090	6.5	40.0

## 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

1. Set VGS to the pinch--off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage (50V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

### Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

**Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DSS}$	+200	Vdc
Gate--Source Voltage	$V_{GS}$	-8 to 0	Vdc
Operating Voltage	$V_{DD}$	0 to 55	Vdc
Maximum forward gate current	$I_{gf}$	3	mA
Storage Temperature Range	$T_{stg}$	-65 to +150	C
Case Operating Temperature	$T_C$	-55 to +150	C
Operating Junction Temperature	$T_J$	+225	C

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$ , Pulsed CW, FEA	$R_{\theta JC}$	6.8	C/W

**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	$V_{GS} = -8\text{V}$ ; $I_{DS} = 3\text{mA}$	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$ , $I_D = 3\text{mA}$	$V_{GS(th)}$		-3.4		V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$ , $I_{DS} = 50\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.12		V

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## Reference Circuit of Test Fixture Assembly Diagram

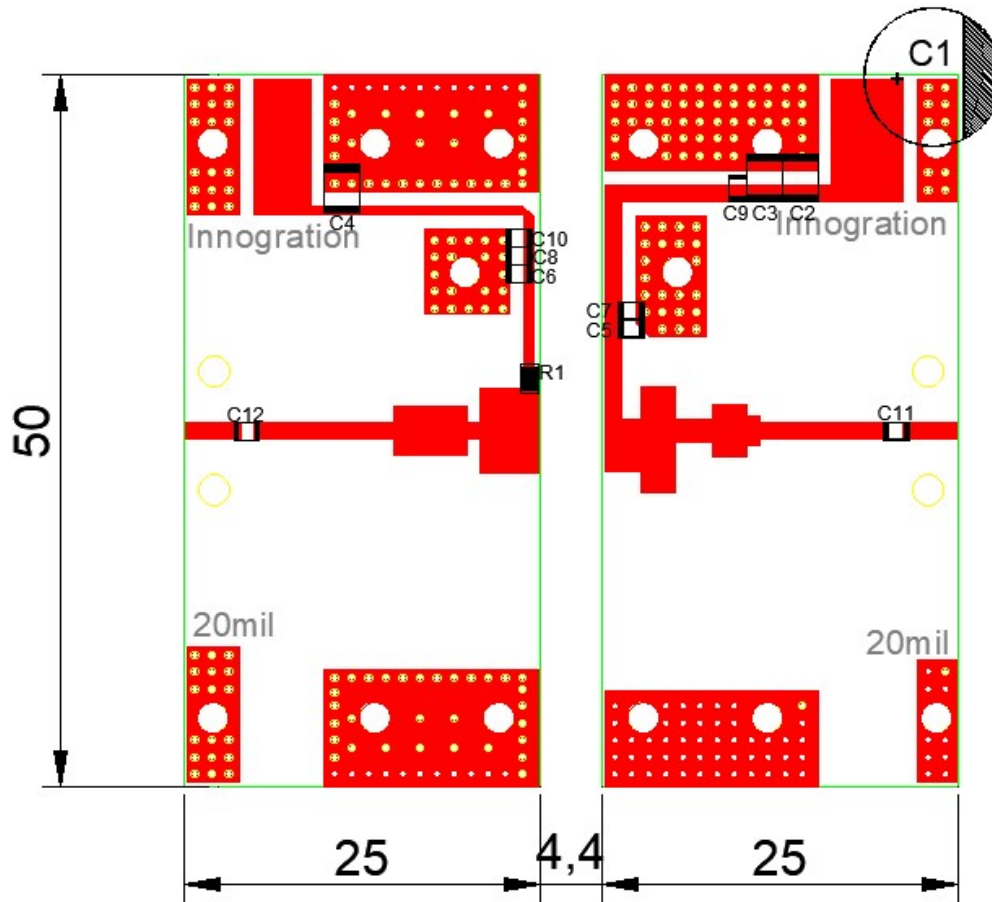


Figure 1. Test Circuit Component Layout (1000MHz~8000MHz)

Table 4. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1	470uF/63V	
C2,C3,C4	10 uF	1210
C5,C6	82pF	0805
C7,C8	51pF	0805
C9,C10,C11,C12	3.3pF	0805
R1	Chip Resistor,10Ω	0805
PCB	20Mil Rogers 4350B	

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## Package Outline

Flanged ceramic package; 2 leads

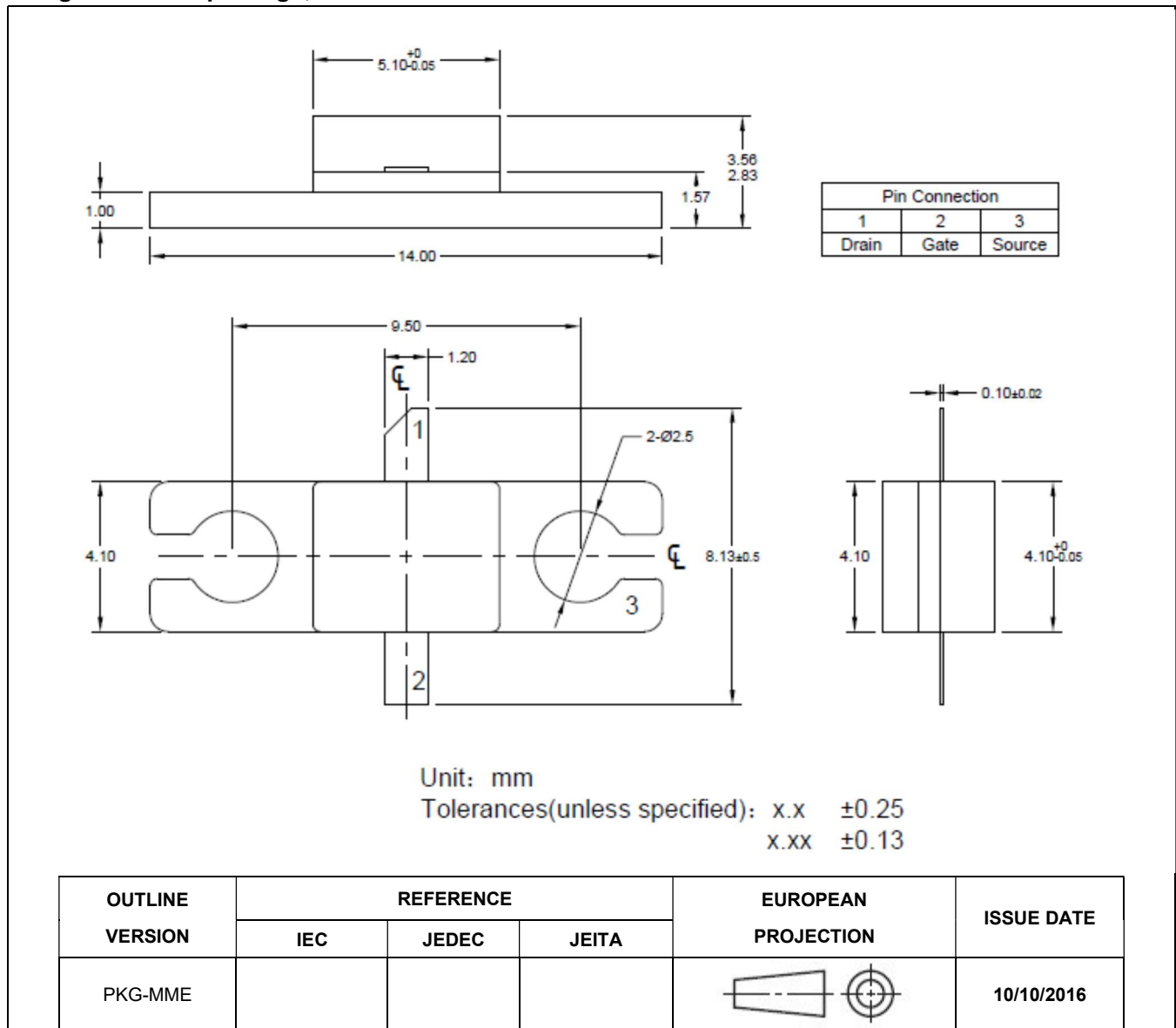


Figure 1. Package Outline PKG-MME

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## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/7/31	V1.0	Preliminary Datasheet Creation from NME4008V

Application data based on RXT-23-32

## Notice

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