

# SME2013V GaN TRANSISTOR

Document Number: SME2013V  
Preliminary Datasheet V1.0

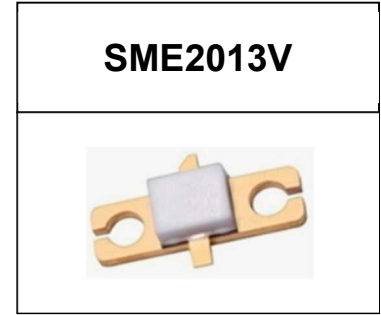
## Gallium Nitride 50V 130W, RF Power Transistor

### Description

The SME2013V is a 130-watt, unmatched GaN HEMT, designed for multiple applications with frequencies up to 2000MHz.

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 Pulsed CW RF performance (on fixture with device soldered):



V<sub>ds</sub>= 50V, I<sub>dq</sub>=150mA, V<sub>gs</sub> = -3.15V

Freq (MHz)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
960	50.84	121.4	61.2	18.31	51.67	147.0	67.2
1080	51.21	132.1	61.0	19.7	52.37	172.7	67.2
1215	50.47	111.6	65.3	20.07	51.83	152.3	72.5

CW data upon request

### 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 V<sub>GS</sub> to the pinch-off (V<sub>P</sub>) voltage, typically -5 V
2. Turn on V<sub>DS</sub> to nominal supply voltage (50V)
3. Increase V<sub>GS</sub> until I<sub>DS</sub> current is attained
4. Apply RF input power to desired level

#### Turning the device OFF

1. Turn RF power off
2. Reduce V<sub>GS</sub> down to V<sub>P</sub>, typically -5 V
3. Reduce V<sub>DS</sub> down to 0 V
4. Turn off V<sub>GS</sub>

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V <sub>DSS</sub>	+200	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-8 to 0	Vdc
Operating Voltage	V <sub>DD</sub>	0 to 55	Vdc
Maximum forward gate current	I <sub>gf</sub>	16.8	mA
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	C
Case Operating Temperature	T <sub>c</sub>	-55 to +150	C
Operating Junction Temperature	T <sub>j</sub>	+225	C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T <sub>C</sub> = 25°C, P <sub>out</sub> =130W Pulsed CW, FEA	R <sub>θJC</sub>	2.1	C/W

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

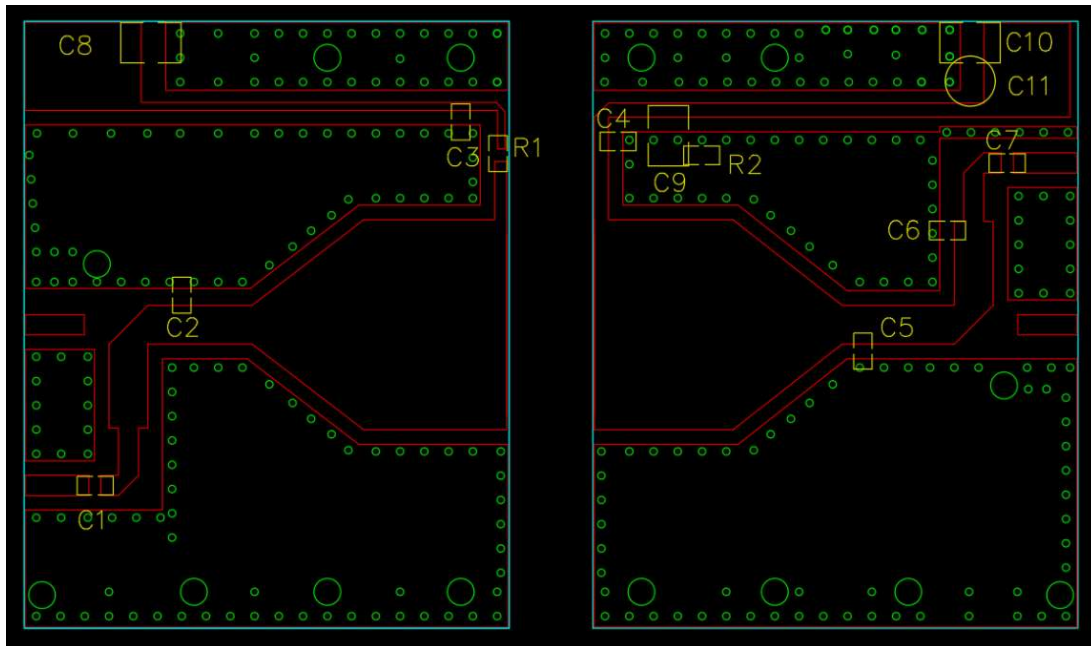
**DC Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}; I_{DS} = 16.8\text{mA}$	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}, I_D = 16.8\text{mA}$	$V_{GS(th)}$		-3.4		V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}, I_{DS} = 150\text{mA}$ , Measured in Functional Test	$V_{GS(Q)}$		-3.1		V

**Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) :**  $V_{DD} = 50\text{Vdc}$ ,  $I_{DQ} = 150\text{mA}$ ,  $f = 1000\text{MHz}$ , Pulsed CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	Gp		17		dB
Drain Efficiency@P3dB <sub>t</sub>	Eff		65		%
3dB Compressed point	P3dB		130		W
Mismatch stress at all phases(No device damage)	VSWR		10:1		$\Psi$

## Reference Circuit of Test Fixture Assembly Diagram



**Figure 2. Test Circuit Component Layout (960-1215M)**

**Table 4. Test Circuit Component Designations and Values**

Component	Value	Quantity
U1	SME2013V	1
C1、C3、C4、C7	20pF	4
C8、C9、C10	10uF/63V	3
R1、R2	10 $\Omega$	2
C11	470uF/63V	1
C2	3pF	1
C5	3.6pF	1
C6	1.8pF	1

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Figure 3. Pulse RF performance

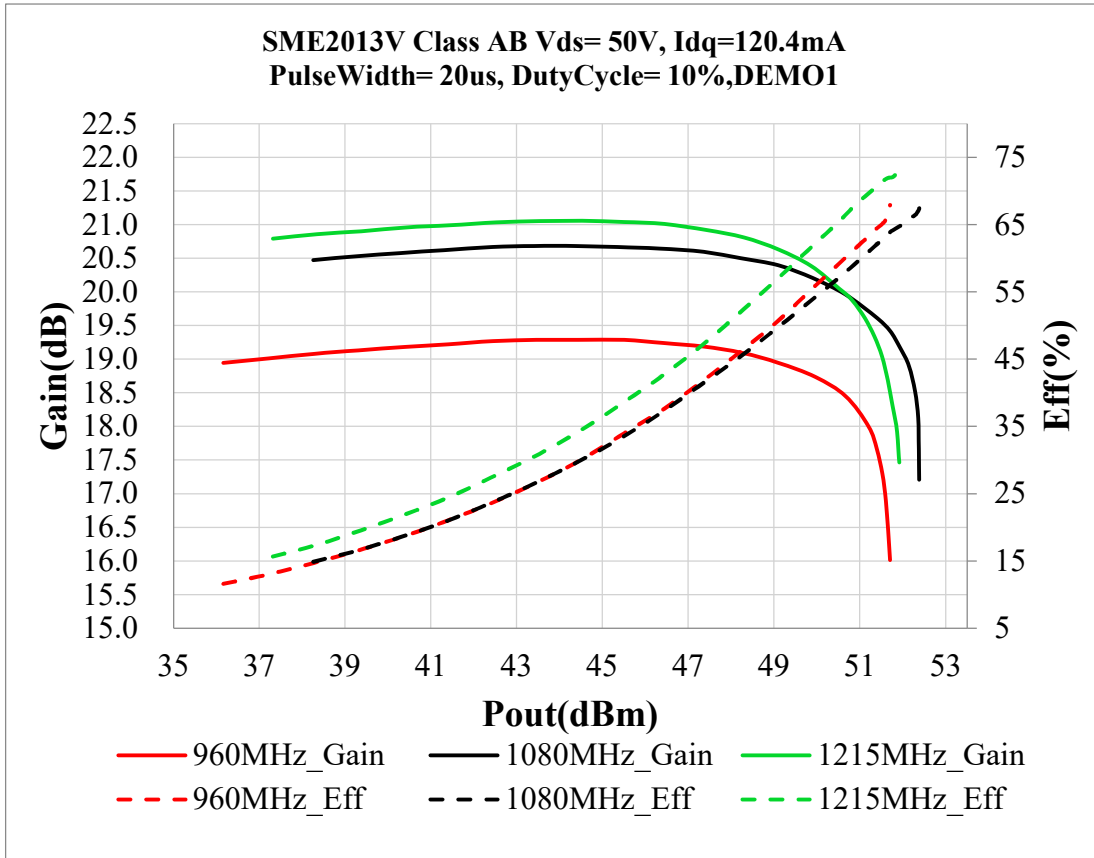
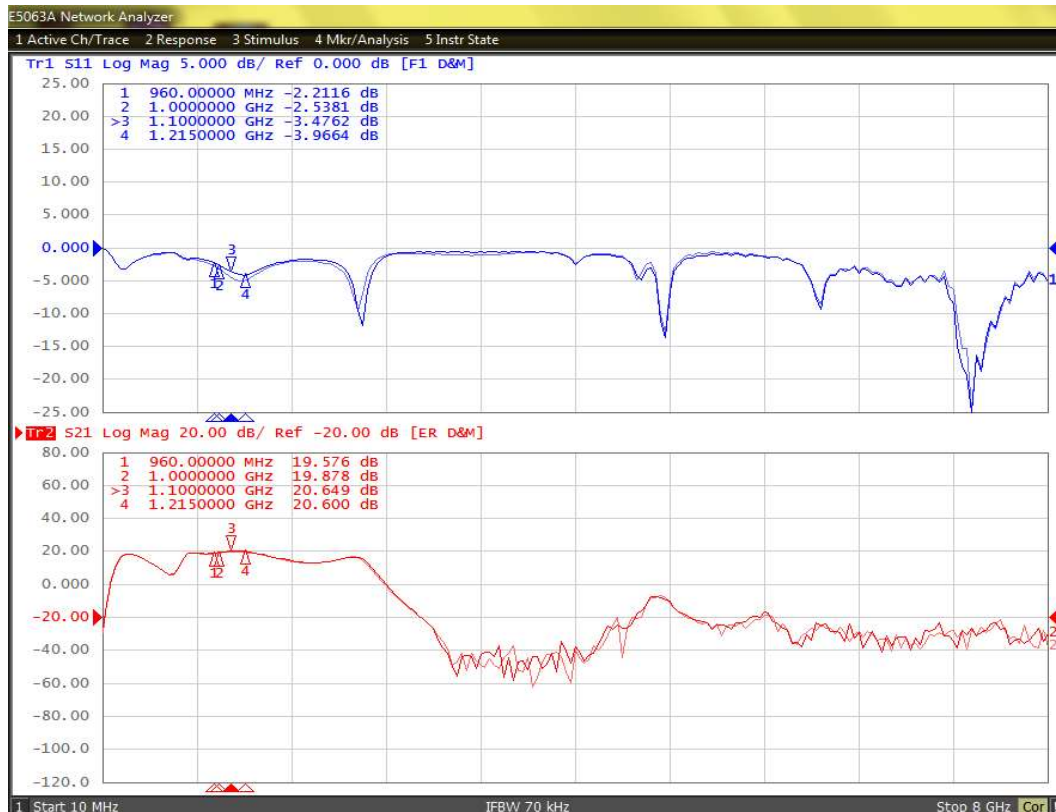


Figure 4. Network Analyzer result S11 and S21



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## Package Outline

Flanged ceramic package; 2 leads

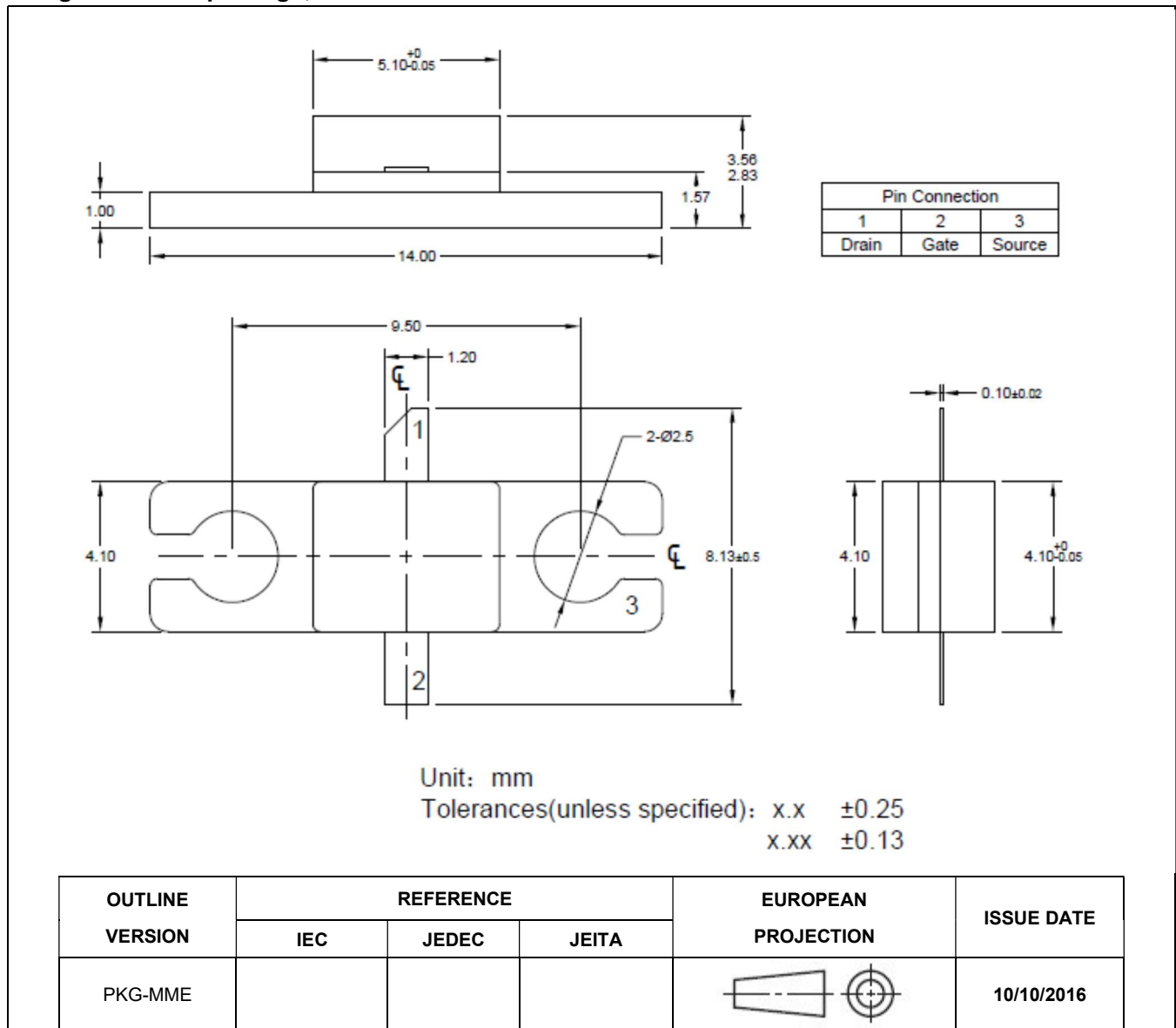


Figure 1. Package Outline PKG-MME

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## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/1/18	V1.0	Preliminary Datasheet Creation

Application data based on ZYX-23-01

## Notice

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