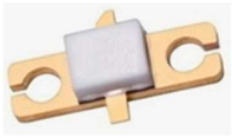
SME3010V GaN TRANSISTOR

Document Number: SME3010V
Preliminary Datasheet V1.0

Gallium Nitride 50V 100W, RF Power Transistor

SME3010V



Description

The SME3010V is a 100-watt, unmatched GaN HEMT, designed for multiple applications with frequencies up to 3000MHz.It can support CW, and pulsed CW, or any other modulated signal in form of saturated or back off conditions

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):

VDS= 50V, IDQ=70mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400.00	49.86	96.77	68.85	17.06	51.00	125.92	74.08
2500.00	49.77	94.81	67.57	17.12	50.97	124.89	73.07
2600.00	49.62	91.67	65.90	16.97	50.93	123.77	71.92

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 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	Igf	12	mA
Storage Temperature Range	Tstg	-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= 25°C, Pout=130W Pulsed CW, FEA	$R_{\theta JC}$	2.6	C/W

Table 3. Electrical Characteristics (T_C = 25℃ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=12mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 10V, I_D = 12 mA	V_{GS}(th)		-3.4		V
Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.1		V

Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) : V_{DD} = 50 Vdc, I_{DQ} = 70 mA, f = 2500 MHz, Pulsed CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	Gp		14.5		dB
Drain Efficiency@P3dB$_t$	Eff		65		%
3dB Compressed point	P3dB		100		W
Mismatch stress at all phases(No device damage)	VSWR		10:1		Ψ

Reference Circuit of Test Fixture Assembly Diagram

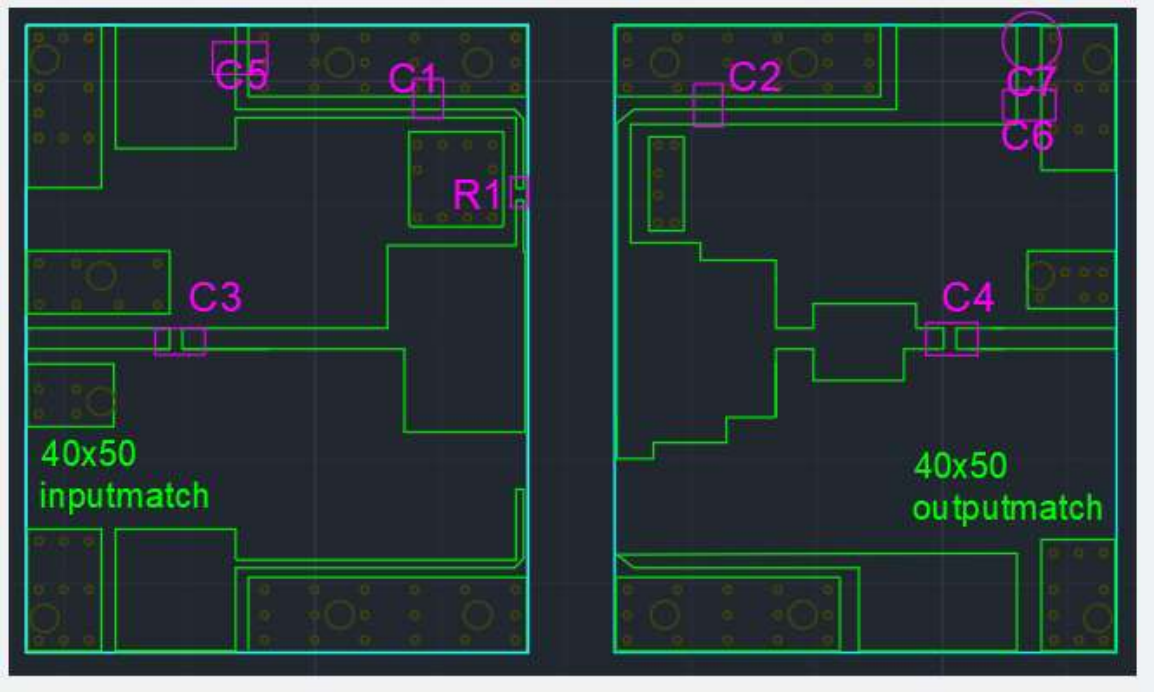
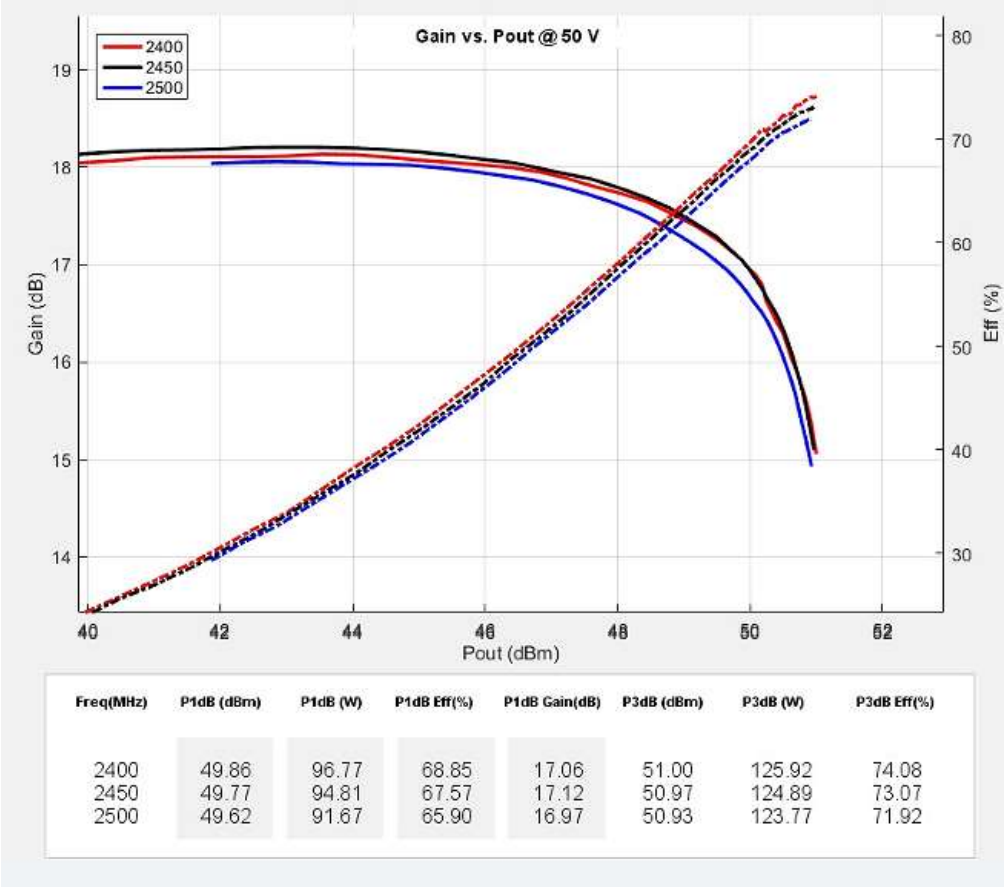


Figure 2. Test Circuit Component Layout (2400-2600MHz)

Table 4. Test Circuit Component Designations and Values

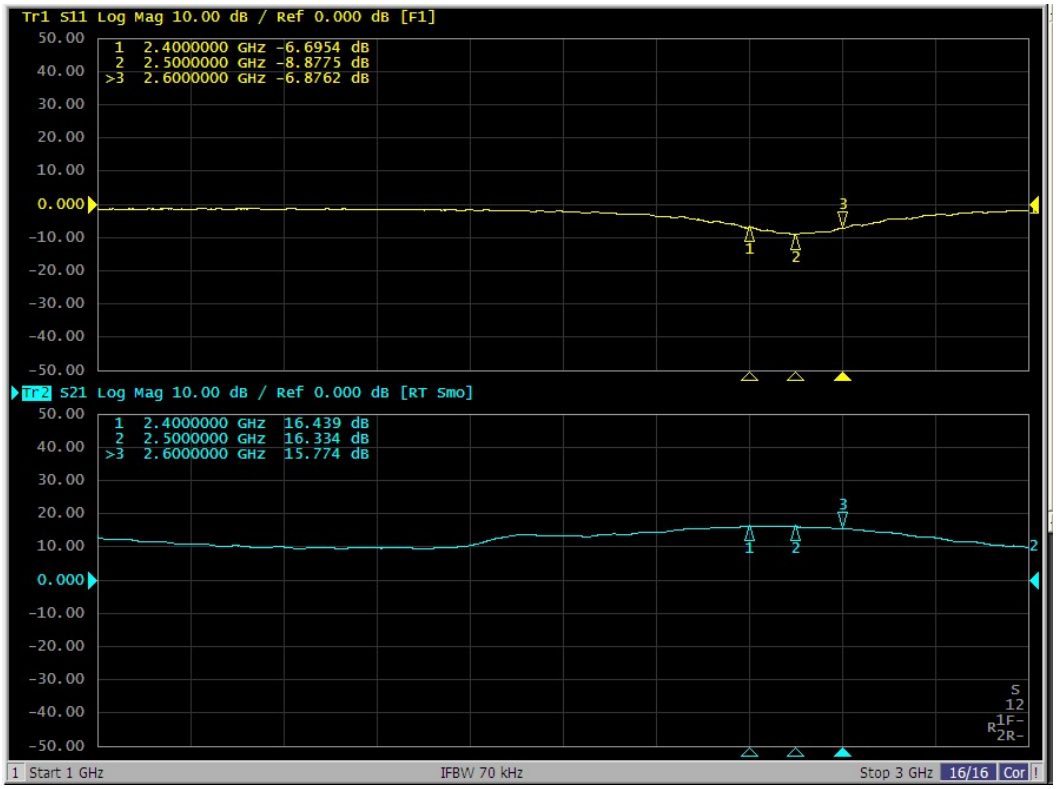
Component	Value	Quantity
C1 C2 C3 C4	15 pF	4
C5 C6	10 uF	2
C7	470uF	1
R1	10ohm	1
C6	1.8pF	1

Figure 3. Pulse RF performance



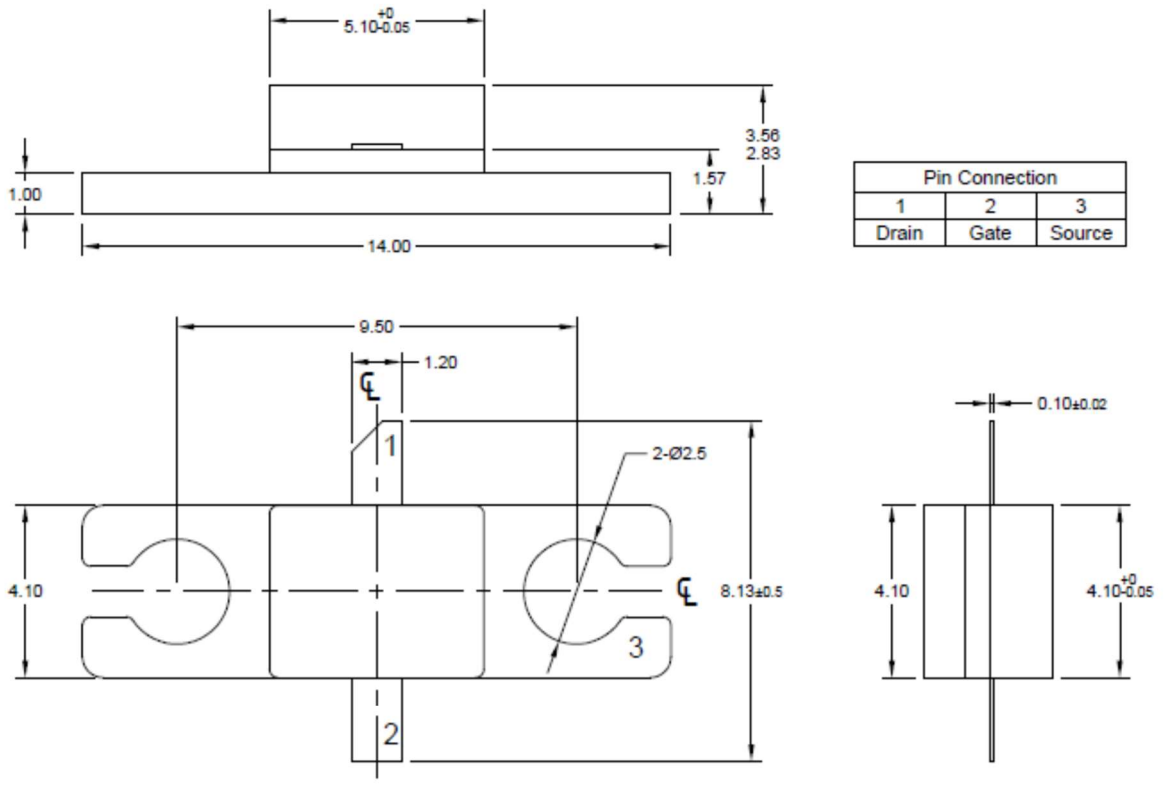
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400	49.86	96.77	68.85	17.06	51.00	125.92	74.08
2450	49.77	94.81	67.57	17.12	50.97	124.89	73.07
2500	49.62	91.67	65.90	16.97	50.93	123.77	71.92

Figure 4. Network Analyzer result S11 and S21



Package Outline

Flanged ceramic package; 2 leads



Pin Connection		
1	2	3
Drain	Gate	Source

Unit: mm
Tolerances(unless specified): x.x ±0.25
x.xx ±0.13

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-MME					10/10/2016

Figure 1. Package Outline PKG-MME

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/1/30	**V1.0**	**Preliminary Datasheet Creation**

Application data based on ZXY-23-01

Notice

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