SME6001V GaN TRANSISTOR

Document Number: SME6001V
Preliminary Datasheet V1.0

Gallium Nitride 50V 10W, RF Power Transistor

SME6001V

Description

The SME6001V is a 10-watt, unmatched GaN HEMT, designed for multiple applications with frequencies up to 6000MHz.

It can support CW, pulsed and any modulation applications

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

- Typical performance (on Innogration production fixture with device soldered)

V_{DD}=50V, I_{DQ}=10mA, CW,

Frequency(MHz)	Gp (dB)	P_{3dB}(W)	Efficiency (%)
2000	18	10	70

- Typical performance (on fixture with device soldered)：

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

Freq(MHz)	P1dB(dBm)	P1dB Gain(dB)	P3dB(dBm)	EFF(%)@P3dB
3400	38.2	17.2	40.3	58.6
3500	38.6	17.3	40.7	61.8
3600	38.6	17.3	40.4	59.8

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	1.2	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= 85°C, T_J=200°C, DC Power Dissipation, FEA	$R_{\theta JC}$	19	℃/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}=5mA	V_{DSS}		200		V
Gate Threshold Voltage	V_{DS} = 10V, I_D = 5mA	V_{GS}(th)		-3.3		V
Gate Quiescent Voltage	V_{DS} =50V, I_{DS}=10mA, Measured in Functional Test	$V_{GS(Q)}$		-2.95		V

Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) :V_{DD} = 50 Vdc, I_{DQ} = 10 mA, f = 3500 MHz, CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P1dB	Gp		17.3		dB
Drain Efficiency@P3dB$_t$	Eff		61.8		%
3dB Compressed point	P3dB		40		dBm
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases(No device damage)	VSWR		10:1		φ

Reference Circuit of Test Fixture Assembly Diagram

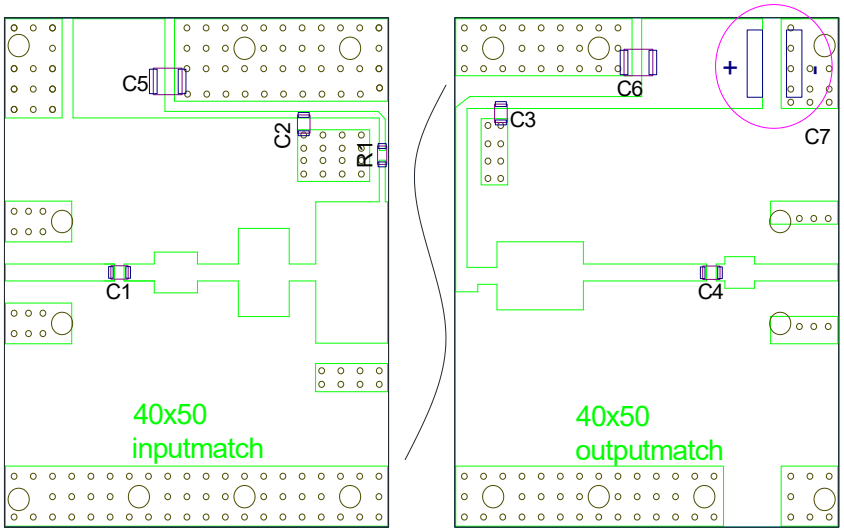


Figure 1. Test Circuit Component Layout (3400MHz~3600MHz)

Table 4. Test Circuit Component Designations and Values

Designator	Value	Package
C1, C2, C3, C4	8.2pF	0805
C5, C6	10uF	1210
R1	10Ω	0603
C7	100uF/63V	
PCB	0.762mm [0.030"] thick, εr=3.48, Rogers RO4350B, 1 oz. copper	

Figure 2. Pulse RF performance (3400MHz~3600MHz) V_{DD}=50V I_{DQ}=10mA, Pulse CW, Pulse Width=20 us, Duty cycle=10%

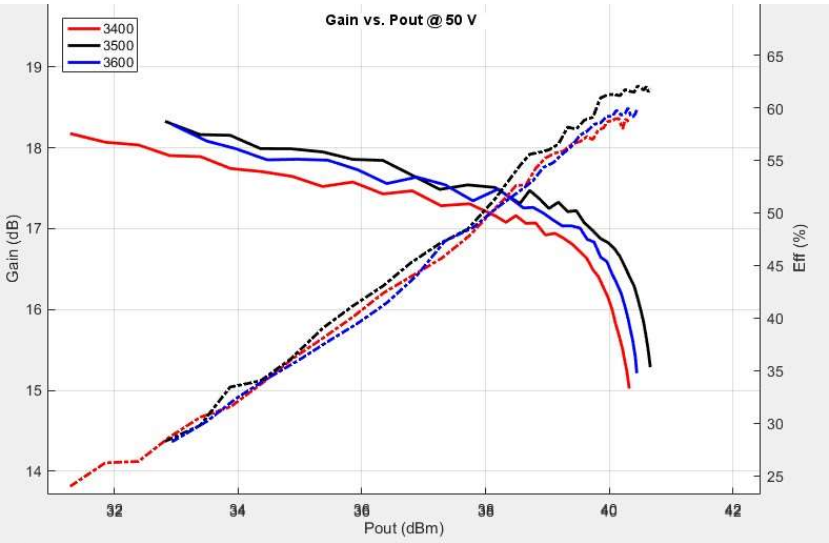
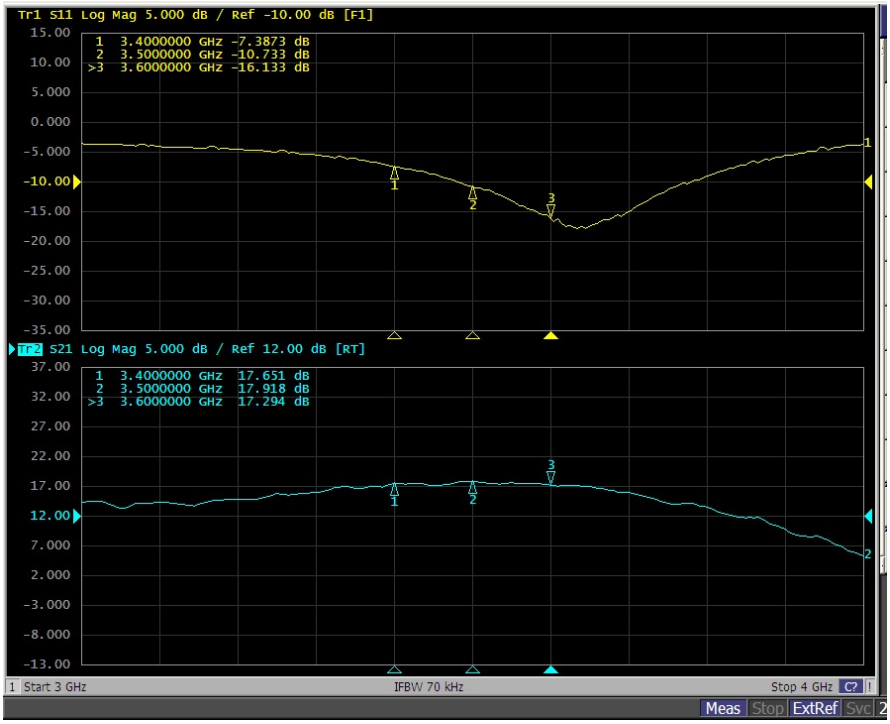
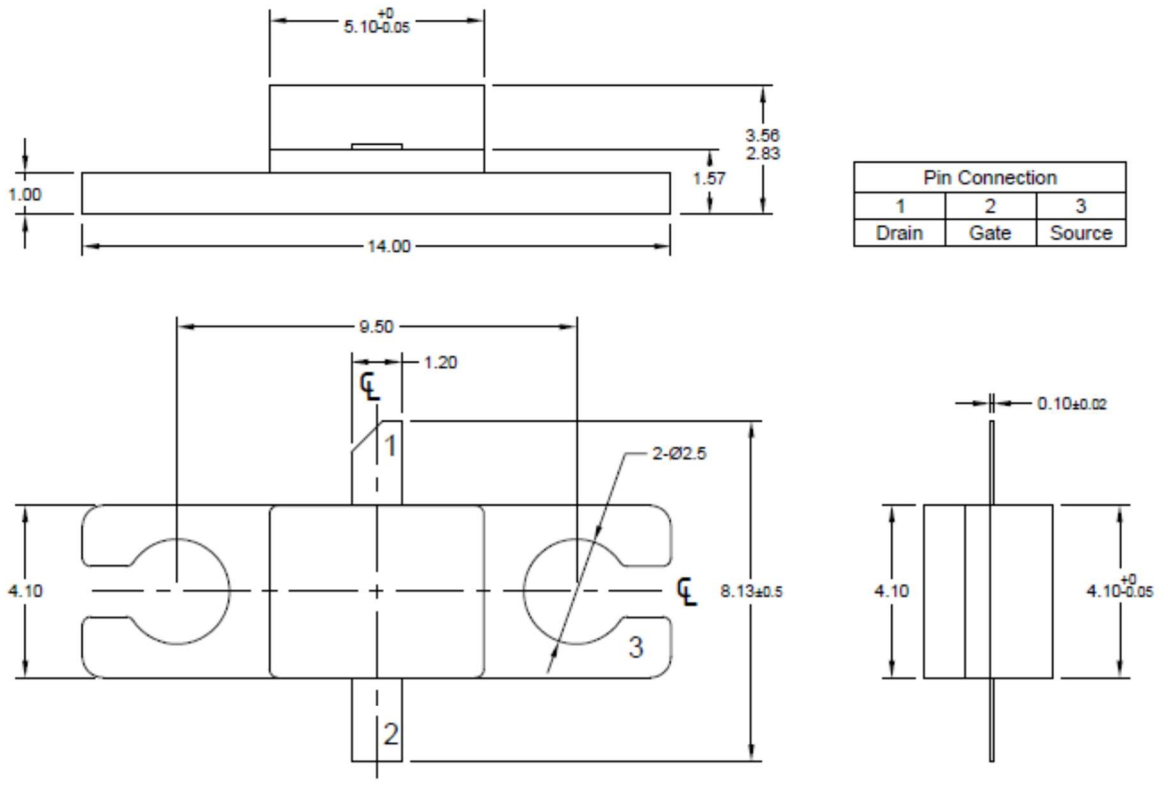


Figure 3. Network Analyzer result S11 and S21 (3400MHz~3600MHz)



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
2021/2/4	**V1.0**	**Preliminary Datasheet Creation**

Notice

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