

SME80R6V GaN TRANSISTOR

Document Number: SME80R6V
Preliminary Datasheet V1

Gallium Nitride 50V 6W, RF Power Transistor

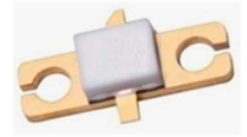
Description

The SME80R6V is a 6-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.

SME80R6V



• 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 (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
3400	36.91	4.9	50.9	17.23	38.11	6.5	53.8
3500	37.38	5.5	55.1	17.51	38.62	7.3	57.3
3600	37.43	5.5	53.3	17.41	38.69	7.4	57.4
3700	37.9	6.2	55.6	17.26	38.76	7.5	58.4
3800	37.43	5.5	53.0	16.96	38.66	7.4	57.3

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}	0.8	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
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Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC Power Dissipation, FEA	$R_{\theta JC}$	19	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	$V_{GS} = -8\text{V}$; $I_{DS} = 0.8\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 0.8\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 10\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.8		V

Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) : $V_{DD} = 50\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 3500\text{MHz}$, Pulsed CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	Gp		15		dB
Drain Efficiency@P3dB _t	Eff		55		%
3dB Compressed point	P3dB		6		W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases(No device damage)	VSWR		10:1		Ψ

Reference Circuit of Test Fixture Assembly Diagram

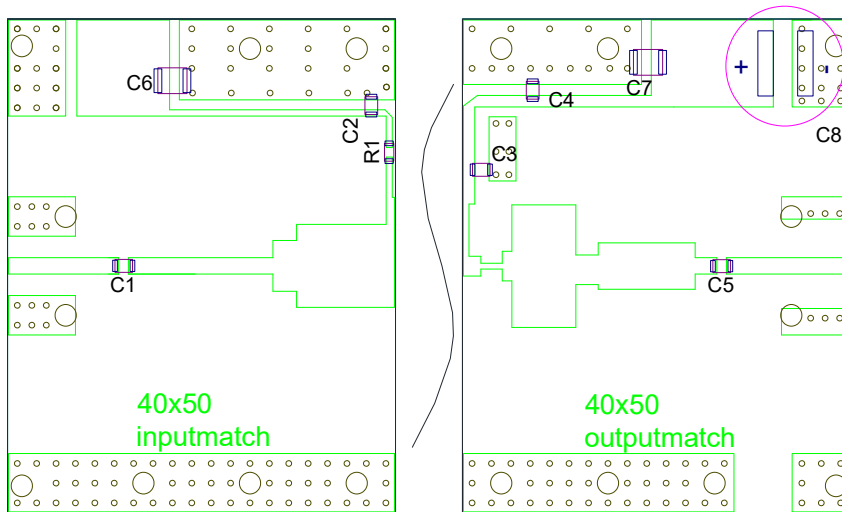


Figure 1. Test Circuit Component Layout (3400MHz~3800MHz) PCB:RO4350B 30mils

Table 4. Test Circuit Component Designations and Values

Designator	Comment	Footprint	Quantity
C1, C2	8.2pF	0603	2
C3, C4	10pF	0603	2
C5	6.8pF	0805	1
C6, C7	10uF	1210	2
C8	100uF/63V		1
R1	51ohm	0603	1

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Figure 2. Pulse RF performance (3400MHz~3800MHz) $V_{DD}=50V$ $I_{DQ}=10mA$, Pulse CW, Pulse Width=20 us, Duty cycle=10%

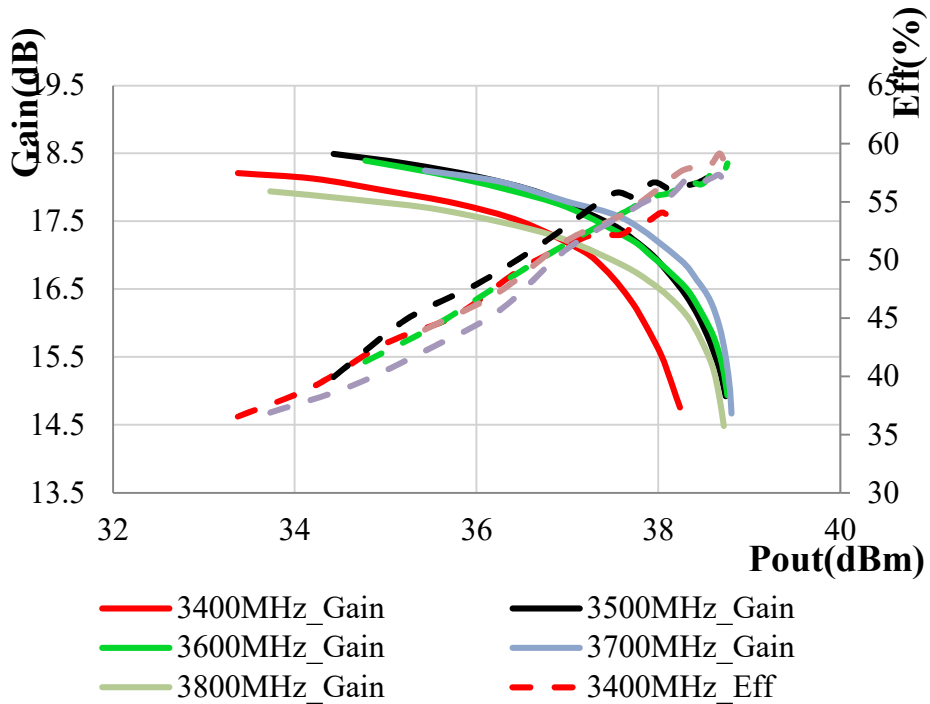
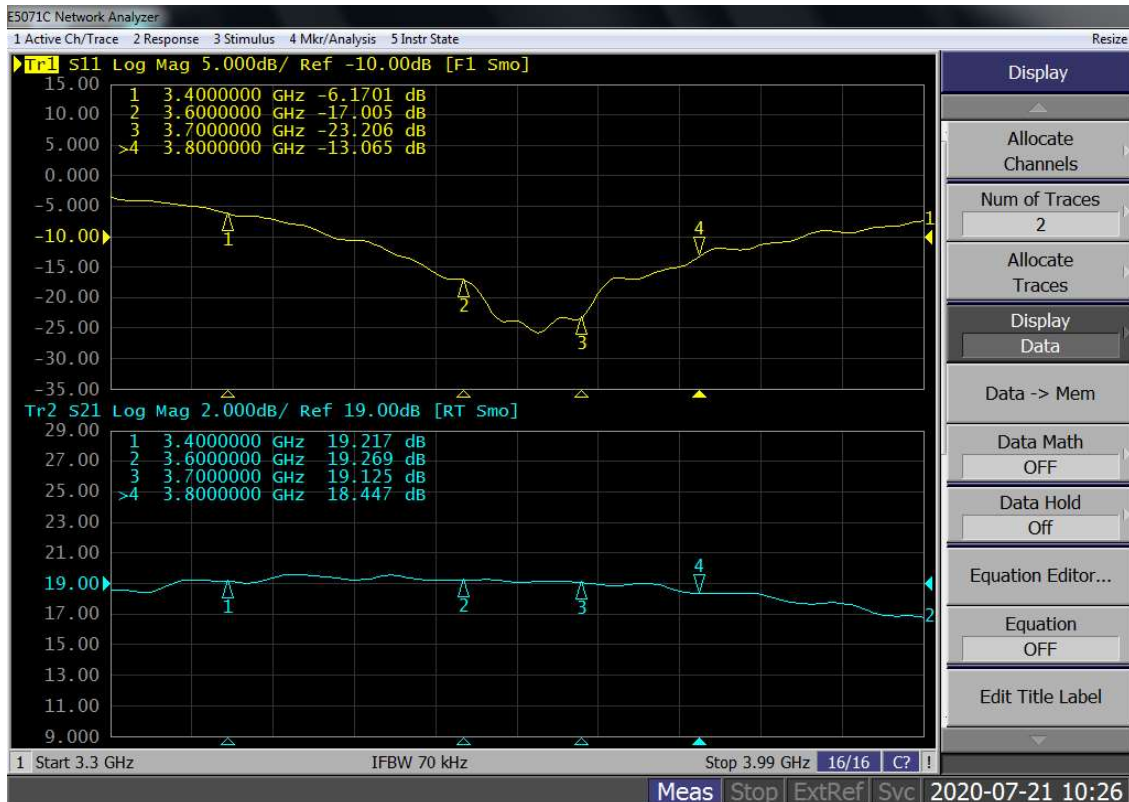


Figure 3. Network Analyzer result S11 and S21 (3400MHz~3800MHz)



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Package Outline

Flanged ceramic package; 2 leads

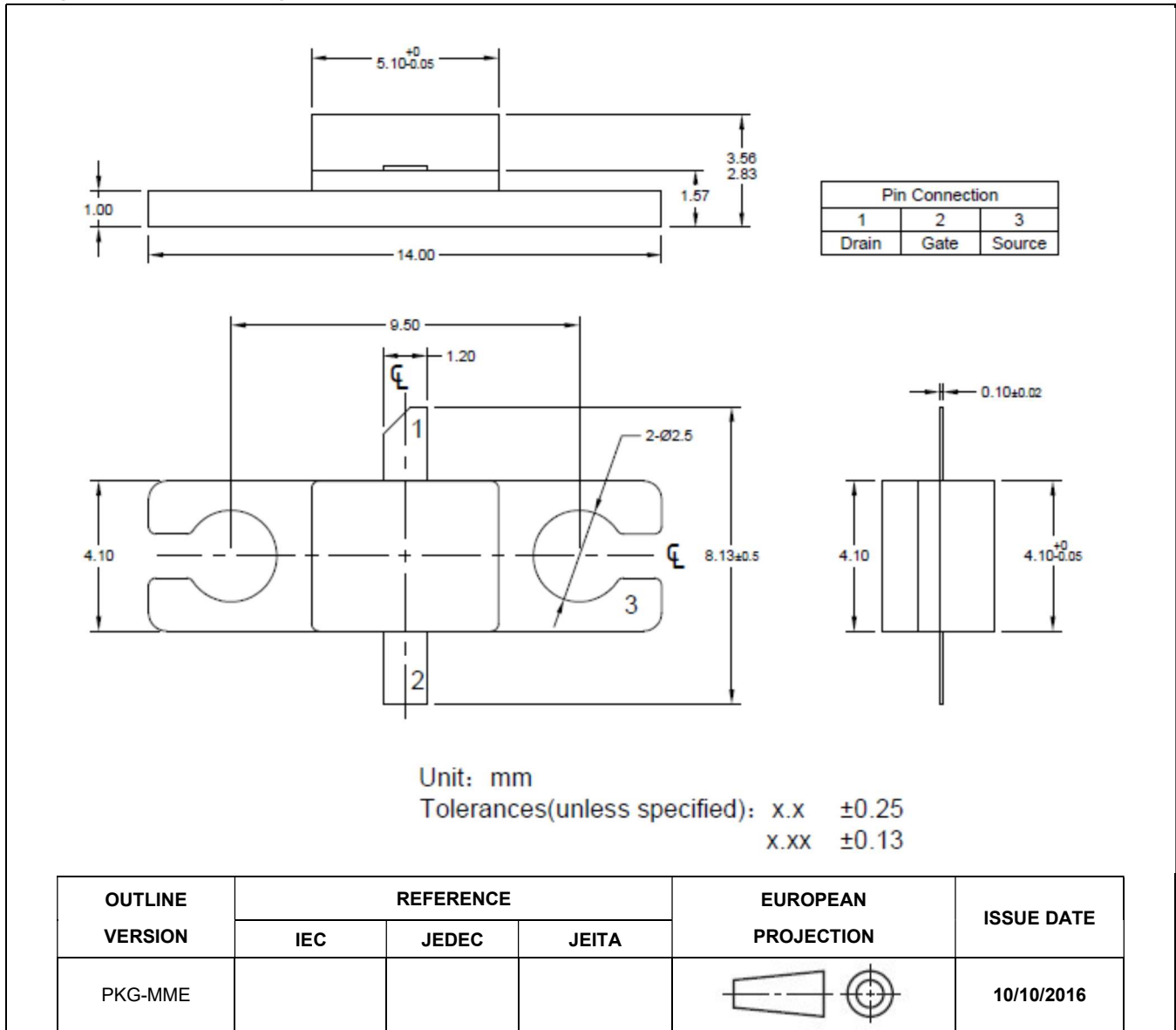


Figure 1. Package Outline PKG-MME

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2020/7/21	V1.0	Preliminary Datasheet Creation

Application data based on LSM-20-11

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