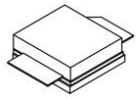
SG4016VS GaN TRANSISTOR

Document Number: SG4016VS
Preliminary Datasheet V1.0

GaN 50V, 160W,2-3GHz RF Transistor

SG4016VS



Earless

Description

The SG4016VS is a 160-watt, internally matched GaN HEMT, designed for CW applications with frequencies from 2000 to 3000MHz, in typical 2.3-2.7GHz, it can deliver 160W within full band There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

- Typical **CW** Performance (On Innogration fixture with device soldered):

V_{DD} = 50 Volts, I_{DQ} = 200 mA

Freq (MHz)	Power gain (dB)	Pout (dBm)	Pout (W)	Ids (A)	Eff (%)
2300	13.07	53.07	202.8	6.51	62.30
2400	13.80	53.00	199.5	6.24	63.97
2500	14.20	52.80	190.5	5.88	64.81
2600	13.70	52.56	180.3	5.57	64.74
2700	12.90	52.20	165.9	5.28	62.86

Applications and Features

- Suitable for broad band application in S band CW amplifier applications.
- 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 (50 V)
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 @ T_C = 25°C	Igmax	22	mA

Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case,P_{OUT}=160W CW @3GHz by FEA	$R_{\theta JC}$	1.0	°C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=22mA	V_{DSS}	——	200	——	V
Gate Threshold Voltage	V_{DS} = 10V, I_D = 22mA	$V_{GS(th)}$	-4		-2	V

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 50 Vdc, I_{DQ} = 200 mA, f = 3000 MHz

VSWR 10:1 at 350W pulse CW Output Power	No Device Degradation

TYPICAL CHARACTERISTICS

Figure 2. Power gain, efficiency as function of Pout, Pulsed CW

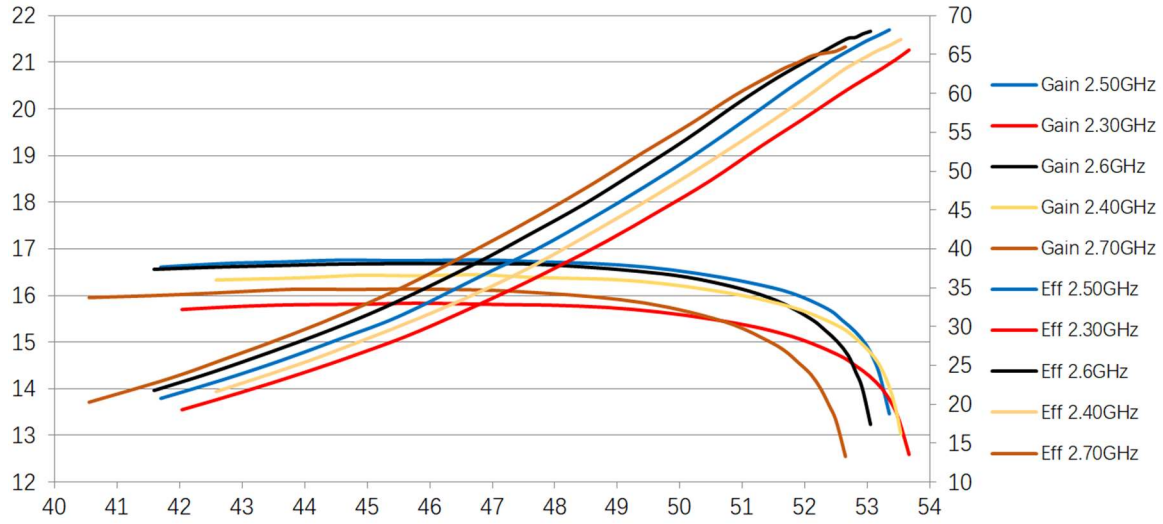


Figure 3. Test Circuit Component Layout

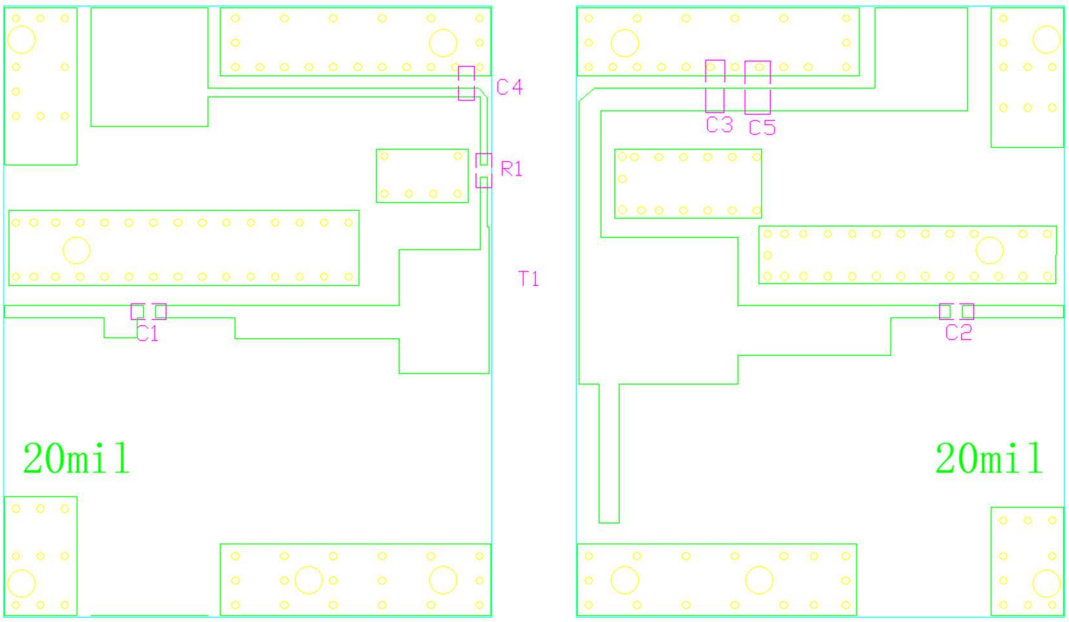
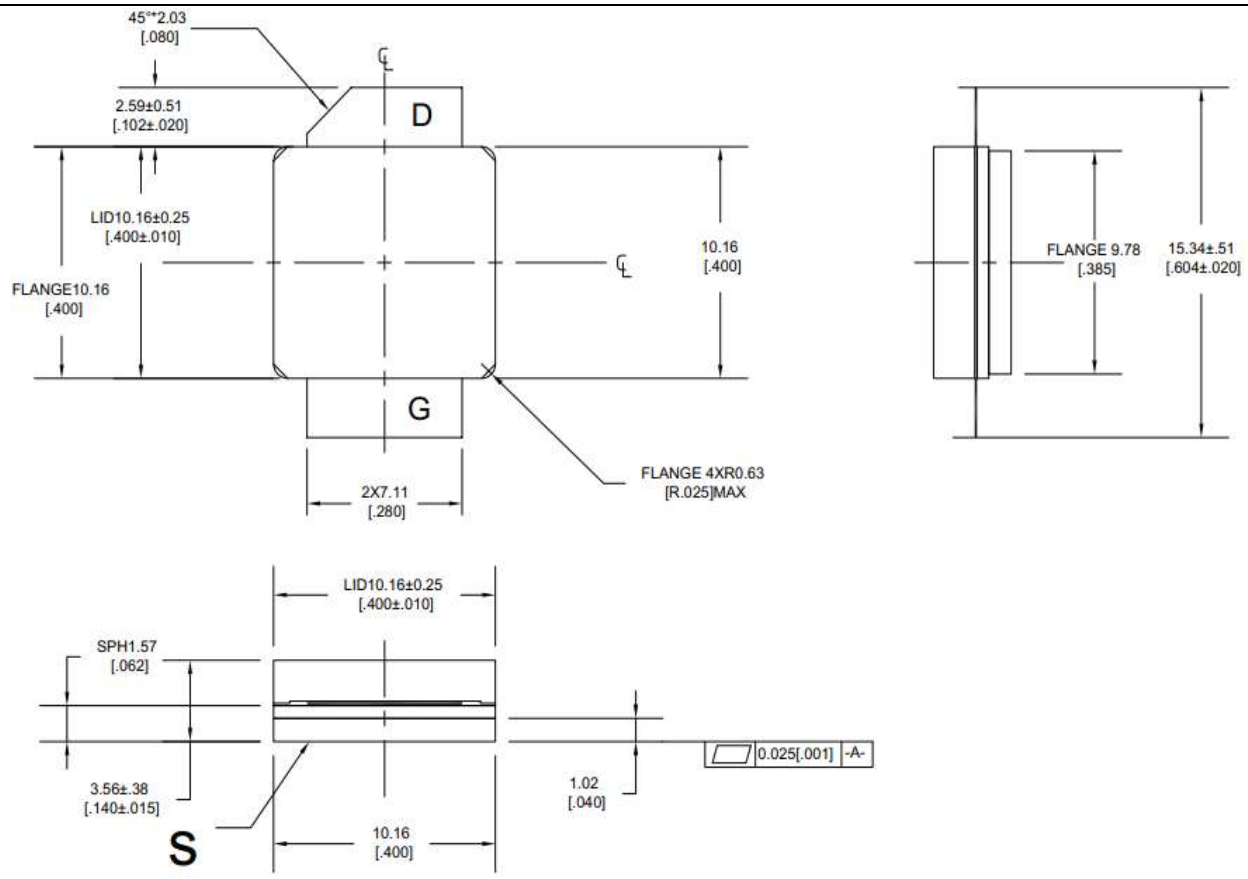


Table 4. Test Circuit Component Designations and Values

Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	10pFHigh Q Capacitor	251SHS100BSE	TEMEX
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
C5	1	10uF MLCC	GRM32EC72A106ME05	Murata
T1	1	160W GaN Dual Transistor	SG4016VS	Innogration



Unit: mm [inch]

Tolerance .xx +/- 0.01 .xxx +/- 0.005 inches

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/7/3	**Rev 1.0**	**Preliminary Datasheet**

Application data based on LWH-24-25

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