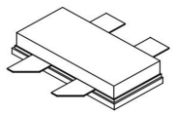
GaN 50V, 330W,UHF to L band RF Power Transistor

SK2033VPS



Description

The SK2033VPS is a 330W, input matched GaN HEMT, ideal for multiple applications within UHF to L band.

It can support CW, pulse or any modulated signal .**In typical broadband application within 1-2G, it can deliver >330W pulsed CW**.There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across 1-2GHz class AB application circuit with device soldered

VDS= 50V, IDQ=200mA(Vgs=-3.25V) Pulsed CW 100us/10%

Freq (MHz)	P2.5dB (dBm)	P2.5dB (W)	P2.5dB Eff(%)	P2.5dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
800	55.21	332.0	45.5	14.5	55.4	347.1	45.9
900	54.77	300.0	51.4	15.1	54.94	311.6	51.9
1000	**55.65**	**367.6**	**58.6**	**15.7**	**55.82**	**382.1**	**58.9**
1100	**55.45**	**350.6**	**56.7**	**16.3**	**55.54**	**358.4**	**56.6**
1200	**55.22**	**332.6**	**59.4**	**17.3**	**55.33**	**341.3**	**59.4**
1300	**56.21**	**418.0**	**51.9**	**15.6**	**56.35**	**432.0**	**52.0**
1400	**56.27**	**424.0**	**53.8**	**14.1**	**56.41**	**437.3**	**54.6**
1500	**56.05**	**402.5**	**52.4**	**13.5**	**56.26**	**422.8**	**53.3**
1600	**56.62**	**459.2**	**56.7**	**13.7**	**56.72**	**469.7**	**57.5**
1700	**56.63**	**460.7**	**58.7**	**16.6**	**56.75**	**473.6**	**59.4**
1800	**56.39**	**435.9**	**57.8**	**18.1**	**56.56**	**453.2**	**58.5**
1900	**56.06**	**403.7**	**57.1**	**16.3**	**56.31**	**427.3**	**58.3**
2000	**55.98**	**396.0**	**58.1**	**14.4**	**56.21**	**418.3**	**59.1**
2100	55.89	388.4	52.9	13.9	56.13	409.8	53.9
2200	55.8	379.7	46.4	12.0	56.0	401.8	47.4

Applications

- P band power amplifier
- L band power amplifier
- Wideband power amplifier
- ISM

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
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}	-10 to +2	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	Igs	43.2	mA

Storage Temperature Range	Tstg	-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 by FEA T_C= 85°C, Pout=330W ,Pulsed CW, 100us， 10%	$R_{\theta JC}$	0.25	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=43.2mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 43.2mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=500mA, Measured in Functional Test	$V_{GS(Q)}$		-3.3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1GHz, Pout=330W Pulsed CW All phase, No device damages	VSWR		5:1		

1-2GHz

Figure 2: Network analyzer output, S11 and S21（ VDS=50V VGS=-3.2V IDQ=500mA）

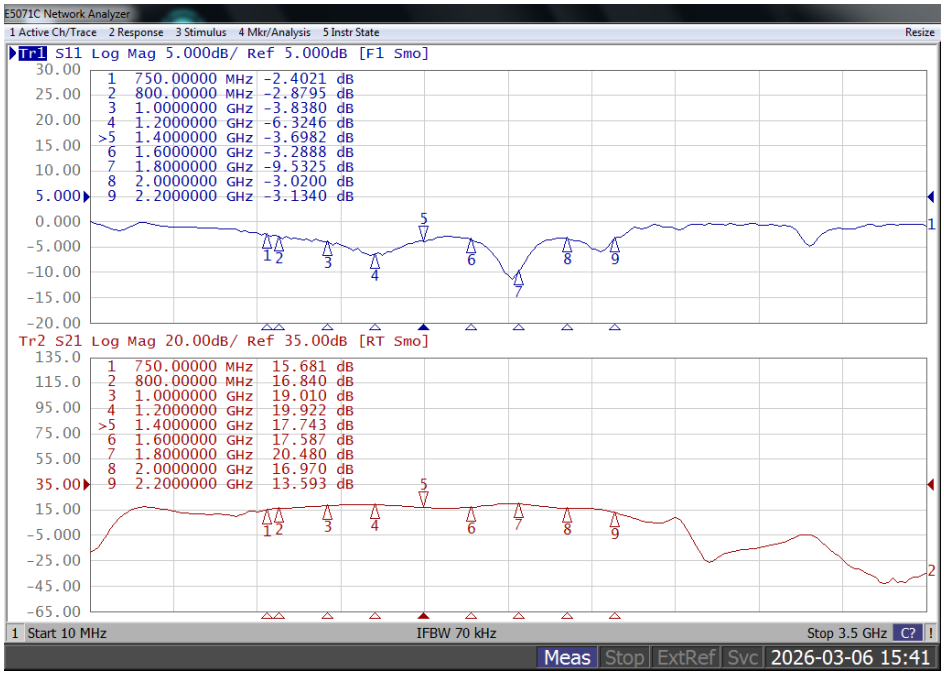


Figure 3: Picture of application board (RO4350B 20mils)

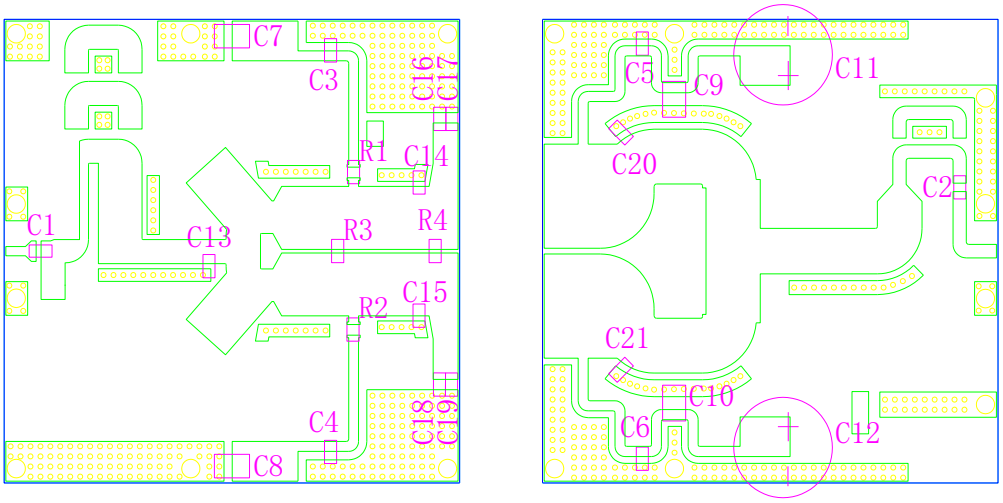
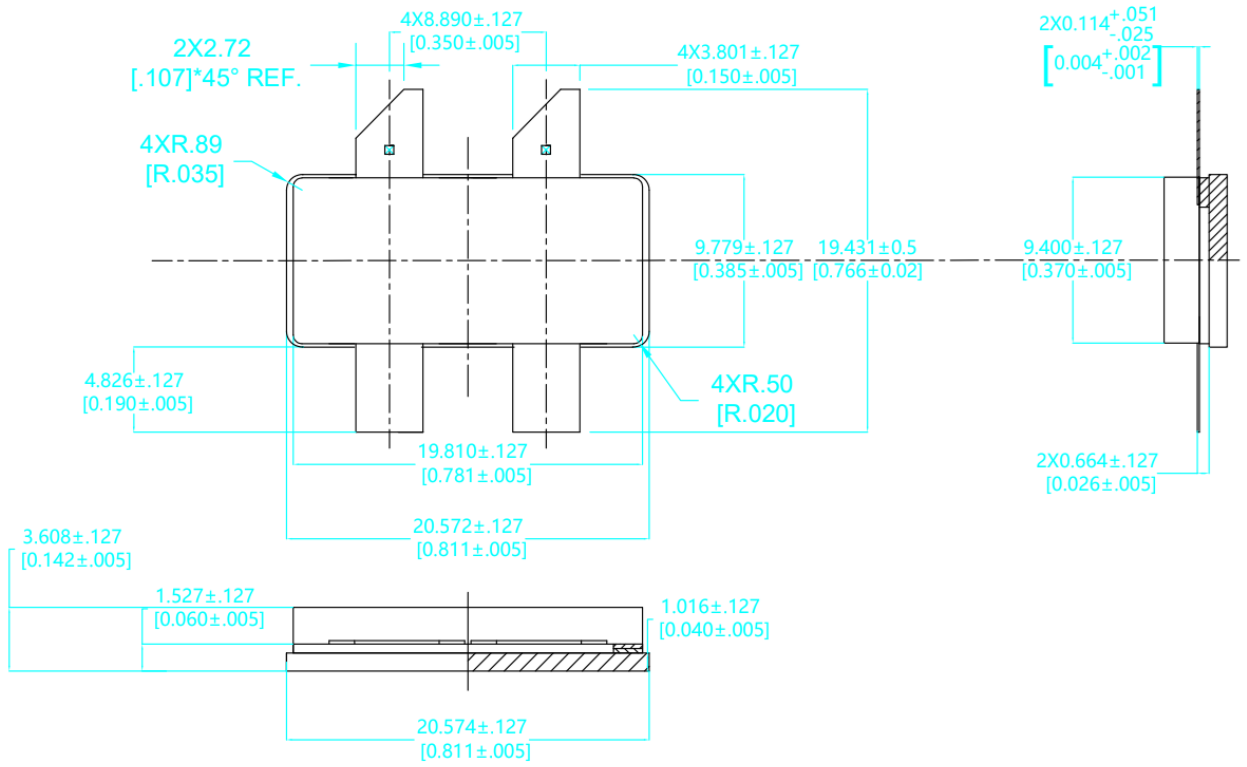


Table 4. Bill of materials of application board (PCB layout upon request)

Designator	Footprint	Comment	Quantity
C1	0603/0805	6.8 pF	1
C2, C3, C4, C5, C6	0805	30 pF	5
C7, C8, C9, C10	1210	10uF/100V	4
C11, C12		1000uF/63V	2
C13	0603/0805	2 pF	1
C14, C15	0603/0805	1 pF	2
C16, C17, C19	0603/0805	1.5 pF	3
C18	0603/0805	0.7 pF	1
C20, C21	0603/0805	2 pF	2
R1, R2, R3, R4	0603/0805	10Ω	4

Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2026/3/9	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: LSM-26-08

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