

SK1285RV GaN TRANSISTOR

Document Number: SK1285RV
Preliminary Datasheet V1.0

Gallium Nitride 50V, 800W, RF Power Transistor

Description

The SK1285RV is a 800-watt, internally matched GaN HEMT, designed for pulsed amplifier applications with frequencies from 960MHz to 1200MHz.

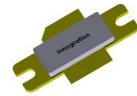
There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

It is recommended to use this device only at pulse condition, and power rating will decrease according to longer pulse width and higher duty cycle

SK1285RVS



SK1285RV



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

$V_{DD} = 50$ Volts, $I_{DQ} = 100$ mA, Pulse CW, Pulse width=20us, Duty cycle=10%.

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
960	59.23	836.8	54.9	14.71	59.76	945.7	56.0
1000	59.31	853.8	58.0	14.88	60.14	1032.7	61.9
1050	59.2	830.9	60.4	14.89	60.26	1060.8	65.8
1100	58.71	742.2	60.5	14.66	59.95	987.4	65.8
1150	58.59	722.7	61.9	14.52	59.4	871.1	62.9
1200	58.55	716.6	61.7	14.29	59.34	859.9	62.0
1225	58.55	716.2	61.0	14.25	59.32	854.1	60.9

Typical **long pulse** Performance (On Innogration fixture with device soldered):

$V_{DD} = 50$ Volts, $I_{DQ} = 100$ mA, Pulse CW, Pulse width=300us, Duty cycle=30%

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	IDS(A)	Gain(dB)	EFF(%)
960	46	59.2	831.76	9.6	13.2	51.99
1000	46.2	59.6	912.01	9.64	13.4	56.76
1050	46.7	60.0	1000.00	9.56	13.3	62.76
1100	46.6	59.6	912.01	8.8	13.0	62.18
1150	46.9	59.2	831.76	8.3	12.3	60.13
1200	47.3	59.1	812.83	8.33	11.8	58.55
1225	47	59.07	807.24	8.3	12.1	58.35

Applications and Features

- Suitable for broad band application in L band avionics
- 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

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■ 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 @ $T_C = 25^\circ C$	I_{gmax}	108	mA
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ C$
Case Operating Temperature	T_C	+150	$^\circ C$
Operating Junction Temperature	T_J	+225	$^\circ C$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case, $P_{OUT}=800W$ @1.1GHz 20us/10%, $T_{case}=85^\circ C$, 50 Vdc, $I_{DQ} = 100$ mA	$R_{\theta JC}$	0.2	$^\circ C/W$

Table 3. Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8V$; $I_{DS}=120mA$	V_{DSS}	---	200	---	V
Gate Threshold Voltage	$V_{DS} = 10V$, $I_D = 120mA$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50V$, $I_{DS}=100mA$, Measured in Functional Test	$V_{GS(Q)}$	---	-3.37	---	V

Functional Tests (In Innogation Test Fixture, 50 ohm system) : $V_{DD} = 50Vdc$, $I_{DQ} = 100$ mA, $f = 1100MHz$, Pulse CW, Pulse width=20us, Duty cycle=20%.

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P_{-1dB}	G_P	---	14	---	dB
Drain Efficiency@ P_{SAT}	η_D	---	65	---	%
Saturated Power	P_{SAT}	---	59.5	---	dBm
Input Return Loss	IRL	---	-7	---	dB

Load Mismatch (In Innogation Test Fixture, 50 ohm system): $V_{DD} = 50$ Vdc, $I_{DQ} = 100$ mA, $f = 1100$ MHz

VSWR 10:1 at 800W pulse CW Output Power	No Device Degradation
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TYPICAL CHARACTERISTICS

Figure 2. Network analyzer output S11/S21 VDS=50V IDQ=500mA VGS=-3.13V



Figure 3. Test Circuit Component Layout

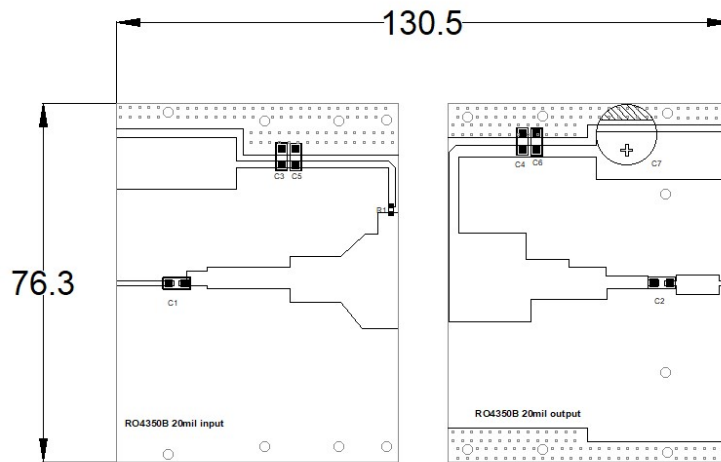


Table 4. Test Circuit Component Designations and Values

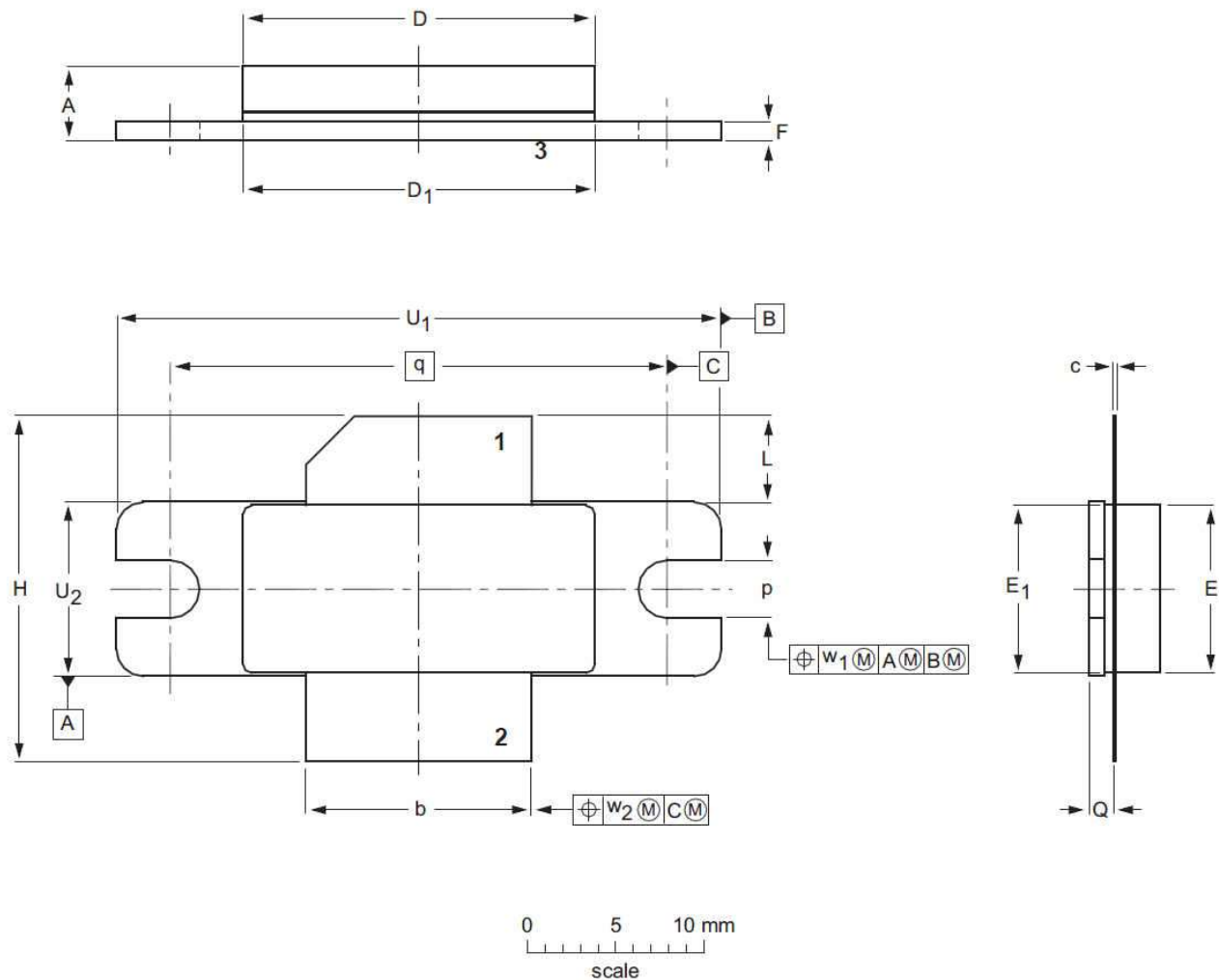
Component	Description	Suggested Manufacturer
C1,	10pF	ATC800B
C2,C3,C4	47pF	ATC800B
C5,C6	Ceramic multilayer capacitor, 10uF, 100V	10uF/100V
C7	2200uF	63V/1000uF
R1	Chip Resistor, 9.1 Ω	
PCB	20mil thick, εr=3.48, Rogers RO4350B, 1 oz. copper	

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Package Outline

Flanged ceramic package; 2 mounting holes; 2 leads (1—DRAIN, 2—GATE, 3—SOURCE)



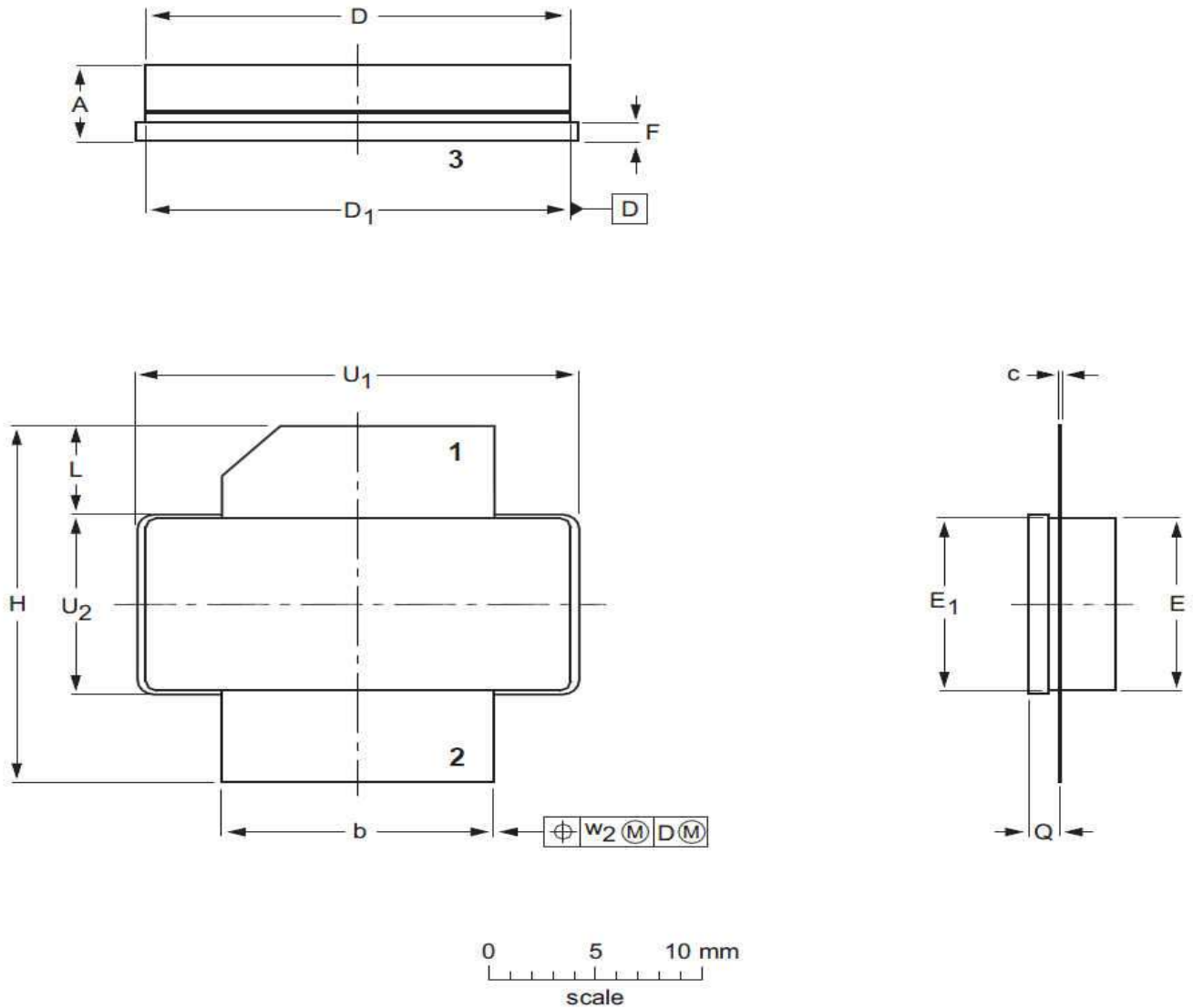
UNIT	A	b	c	D	D ₁	E	E ₁	F	H	L	p	Q	q	U ₁	U ₂	W ₁	W ₂
mm	4.72	12.83	0.15	20.02	19.96	9.50	9.53	1.14	19.94	5.33	3.38	1.70	27.94	34.16	9.91	0.25	0.51
	3.43	12.57	0.08	19.61	19.66	9.30	9.25	0.89	18.92	4.32	3.12	1.45		33.91	9.65		
inches	0.186	0.505	0.006	0.788	0.786	0.374	0.375	0.045	0.785	0.210	0.133	0.067	1.100	1.345	0.390	0.01	0.02
	0.135	0.495	0.003	0.772	0.774	0.366	0.364	0.035	0.745	0.170	0.123	0.057		1.335	0.380		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B2E					03/12/2013

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Earless flanged ceramic package; 2 leads (1—DRAIN、2—GATE、3—SOURCE)



UNIT	A	b	c	D	D ₁	E	E ₁	F	H	L	Q	U ₁	U ₂	W ₂
mm	4.72	12.83	0.15	20.02	19.96	9.50	9.53	1.14	19.94	5.33	1.70	20.70	9.91	0.25
	3.43	12.57	0.08	19.61	19.66	9.30	9.25	0.89	18.92	4.32	1.45	20.45	9.65	
inches	0.186	0.505	0.006	0.788	0.786	0.374	0.375	0.045	0.785	0.210	0.067	0.815	0.390	0.010
	0.135	0.495	0.003	0.772	0.774	0.366	0.364	0.035	0.745	0.170	0.057	0.805	0.380	

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B2					03/12/2013

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2022/3/22	Rev 1.0	Preliminary Datasheet,

Application data based on YHG-22-07

Notice

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