

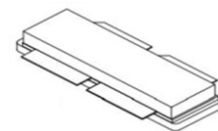


GaN 50V,UHF to L band 600W, RF Power Transistor

SQ1560RVPS

Description

The SQ1560RVPS is a push pull 600W capable, internally matched GaN HEMT, ideal for multiple applications up to 2GHz. It is optimized thermally to support higher duty cycle or longer pulse up to CW application. In typical wideband application from 960 to 1225MHz, it can deliver >450W CW across the full band, from 900-1500MHz, it can deliver >400W CW, and from 1.1-1.7GHz, it can deliver >350W CW



● Typical Avionics band RF performance with device soldered

SQ1560RVPS VDD=48V Vgs=-3.43V Idq=150mA,CW							Harmonic	
F (MHz)	Pin (dBm)	Pout (dBm)	Psat (W)	Id (A)	Gain (dB)	Eff (%)	2 nd	3 rd
960	45.1	57.23	528	17.84	12.1	61.7	-38.8	-37.6
1000	45.1	57.85	610	18.50	12.8	68.6	-38.6	-33.4
1050	45	57.35	543	16.10	12.4	70.3	-39.1	-37.6
1100	44.9	56.85	484	14.30	12.0	70.5	-42.3	-38.3
1150	44.9	56.65	462	15.86	11.8	60.7	-27.4	-51
1200	44.7	56.66	463	16.60	12.0	58.2	-40.6	-45
1250	45	56.60	457	16.20	11.6	58.8	-39.2	-41.1

● Typical 900-1500MHz RF performance with device soldered

SQ1560RVPS VDD=50V Vgs=-3.3V Idq=300mA,CW							Harmonic	
F (MHz)	Pin (dBm)	Pout (dBm)	Psat (W)	Id (A)	Gain (dB)	Eff (%)	2 nd	3 rd
900	46.77	56.45	441.57	16.78	9.68	52.63	-19.7	-19.7
1000	46.53	57.29	535.80	15.42	10.76	69.49	-25.4	-29.5
1100	46.32	56.08	405.51	13.33	9.76	60.84	-33.2	-33.8
1200	46.29	56.10	407.38	14.83	9.81	54.94	-27.9	-52.0
1300	46.03	56.68	465.59	15.54	10.65	59.92	-26.6	-51.2
1400	46.44	56.61	458.14	14.90	10.17	61.50	-23.5	-33.4
1500	46.47	56.19	415.91	13.23	9.72	62.87	-29.4	-24.6

● Typical 1100-1700MHz RF performance with device soldered

SQ1560RVPS VDD=50V Vgs=-3.3V Idq=300mA,CW							Harmonic	
F (MHz)	Pin (dBm)	Pout (dBm)	Psat (W)	Id (A)	Gain (dB)	Eff (%)	2 nd	3 rd
1100	46.18	57.10	512.86	15.77	10.92	65.04	-21.8	-39.0
1200	46.15	55.57	360.58	12.47	9.42	57.83	-23.1	-26.8
1300	45.87	56.05	402.72	14.02	10.18	57.45	-28.8	-26.6
1400	46.44	55.73	374.11	14.18	9.29	52.77	-22.4	-32.0
1500	46.38	56.32	428.55	15.10	9.94	56.76	-33.6	-41.3



1600	46.73	56.38	434.51	14.38	9.65	60.43	-41.0	-51.3
1700	46.34	55.78	378.44	13.50	9.44	56.07	-56.5	-58.8

Applications

- L/P band power amplifier
- UHF TV
- Public Safety Radio
- Data link power amplifier

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_{DS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	I_{gs}	72	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 by FEA $T_C = 25^\circ\text{C}$, at $P_{out}=600\text{W}$ @900MHz	$R_{\theta JC}$	0.3	°C /W

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

DC Characteristics (Each path, measured on wafer prior to packaging)

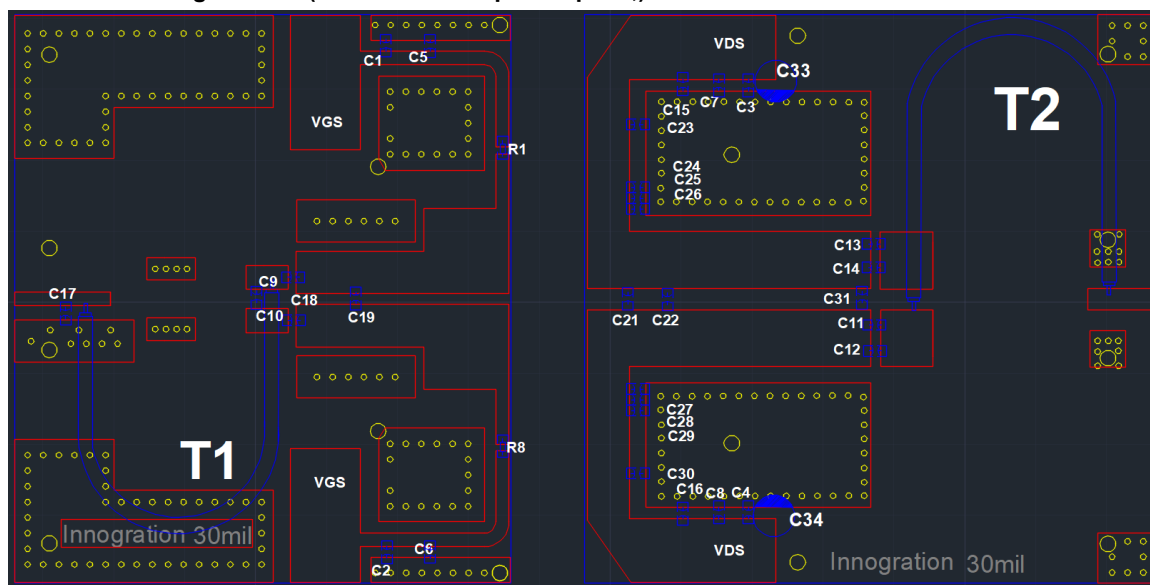
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 36\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 36\text{mA}$	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 800\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	900MHz, $P_{out}=600\text{W}$ pulse CW All phase, No device damages	VSWR		5:1		

960-1225MHz

Figure 1: Reference design circuit (PCB DWG file upon request,)



Component	Description	Suggested Manufacturer
C1,C2,C3,C4	10uF	10uF/100V
C5,C6	39pF	
C7,C8	100pF	
C9,C10	56pF	
C11,C12,C13,C14	20pF	
C15,C16	91pF	
C17,C19	2pF	
C18	1.2pF	
C20	6.2pF	
C21	4.7pF	
C22,C27,C28,C29,C30	2.4pF	
C23	1pF	
C24,C25,C26	0.8pF	
C31,C32	0.5pF	
C33,C34	4700uF/50V	Electrolytic Capacitor
R1,R8	10 Ω	Chip Resistor
T1	25 ohm,50mm	RFSFBU-086-25
T2	35 ohm ,80mm	SFF-35-3
PCB	30Mil	Rogers4350b

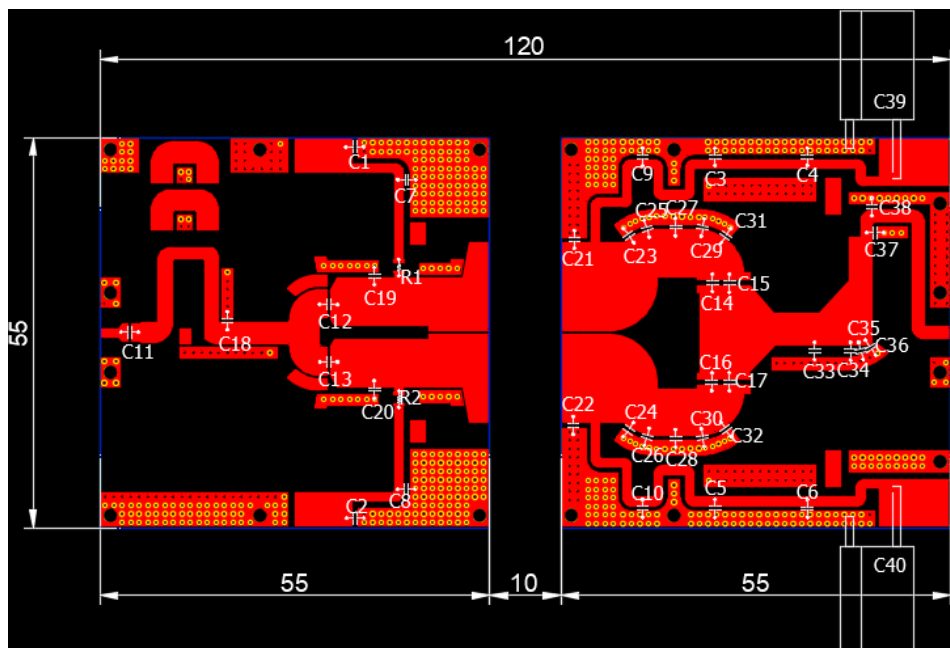


Figure 2: Network analyzer output S21/S11 (Vds=50V, Idq=600mA)



900-1500MHz

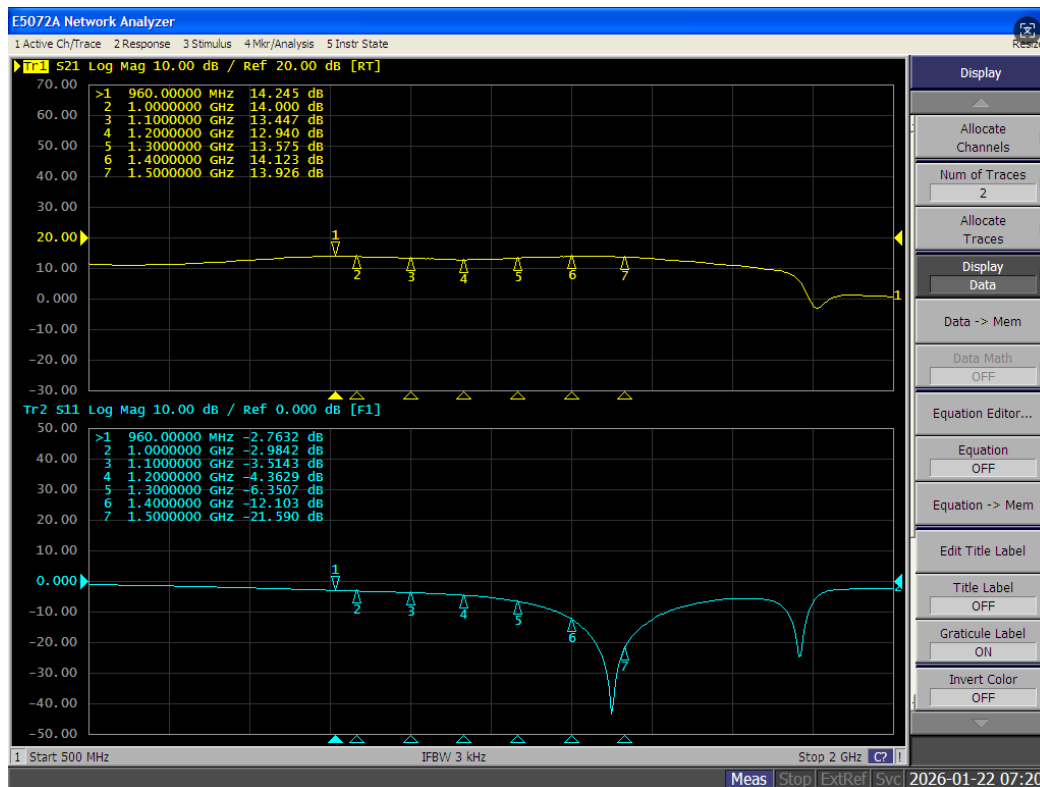
Figure 3: Reference design circuit (PCB DWG file upon request,)





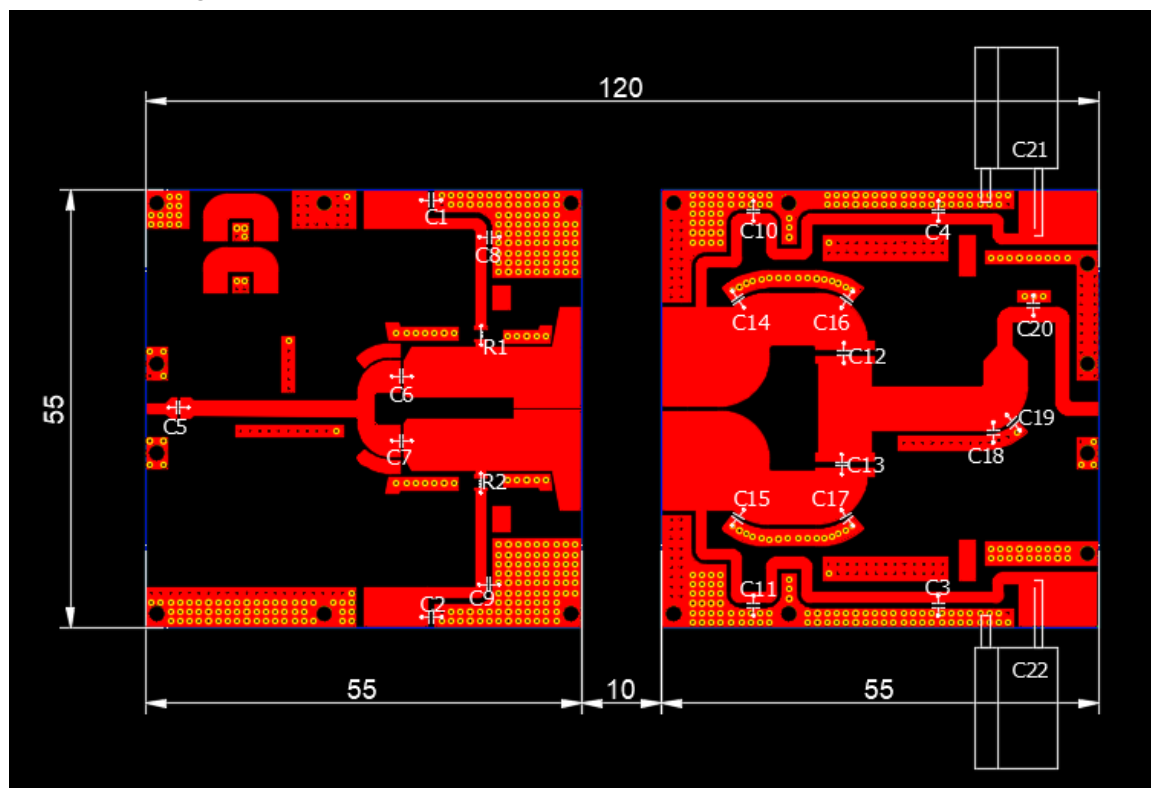
Component	Description	Suggested Manufacturer
C1~C6	10uF 1210	TDK
C7~C13	47pF MQ301111	
C14~C17	33pF MQ301111	
C18	1pF MQ301111	
C19,C20	1.8pF MQ301111	
C21	2.4pF MQ301111	
C22,C25,C26,C27,C28,C31,C32	1.2pF MQ301111	
C23	2pF MQ301111	
C24	2+0.5pF MQ301111	
C29,C30	1+1pF MQ301111	
C33	0.8pF MQ301111	
C34	1.5pF MQ301111	
C35,C37	0.3pF MQ301111	
C36	0.8pF MQ301111	
C38	0.5pF MQ301111	
C39,C40	2200uF/63V	/
R1,R2	10 Ω 1206	/
PCB	20mil Rogers 4350B	

Figure 4: Network analyzer output S21/S11 (Vds=50V, Idq=800mA)



1100-1700MHz

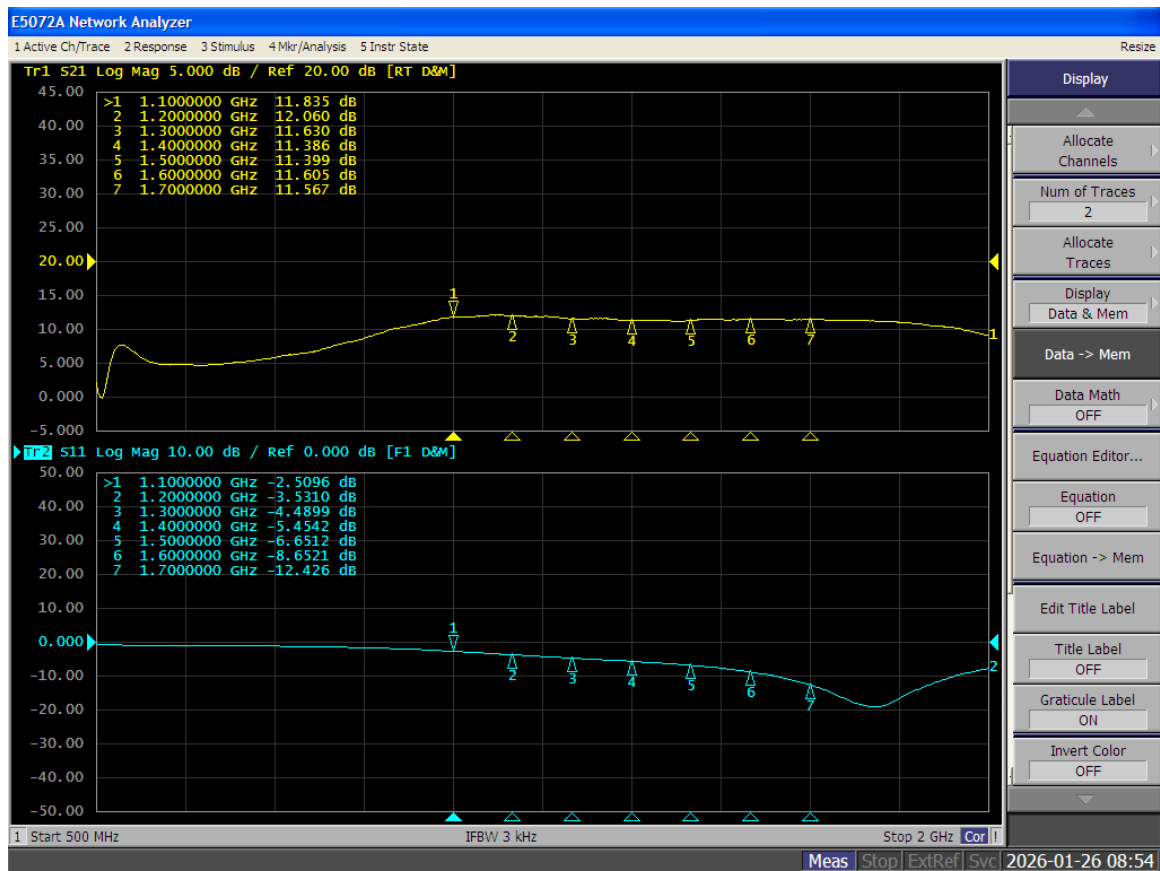
Figure 5: Reference design circuit (PCB DWG file upon request,)



Component	Description	Suggested Manufacturer
C1~C4	10uF 1210	TDK
C5~C11	30pF MQ301111	
C12,C13	15pF MQ301111	
C14,C15	2.4pF MQ301111	
C16,C17,C19	1pF MQ301111	
C18	0.5pF MQ301111	
C20	0.3pF MQ301111	
C21,C22	2200uF/63V	/
R1,R2	10 Ω 1206	/
PCB	20mil Rogers 4350B	



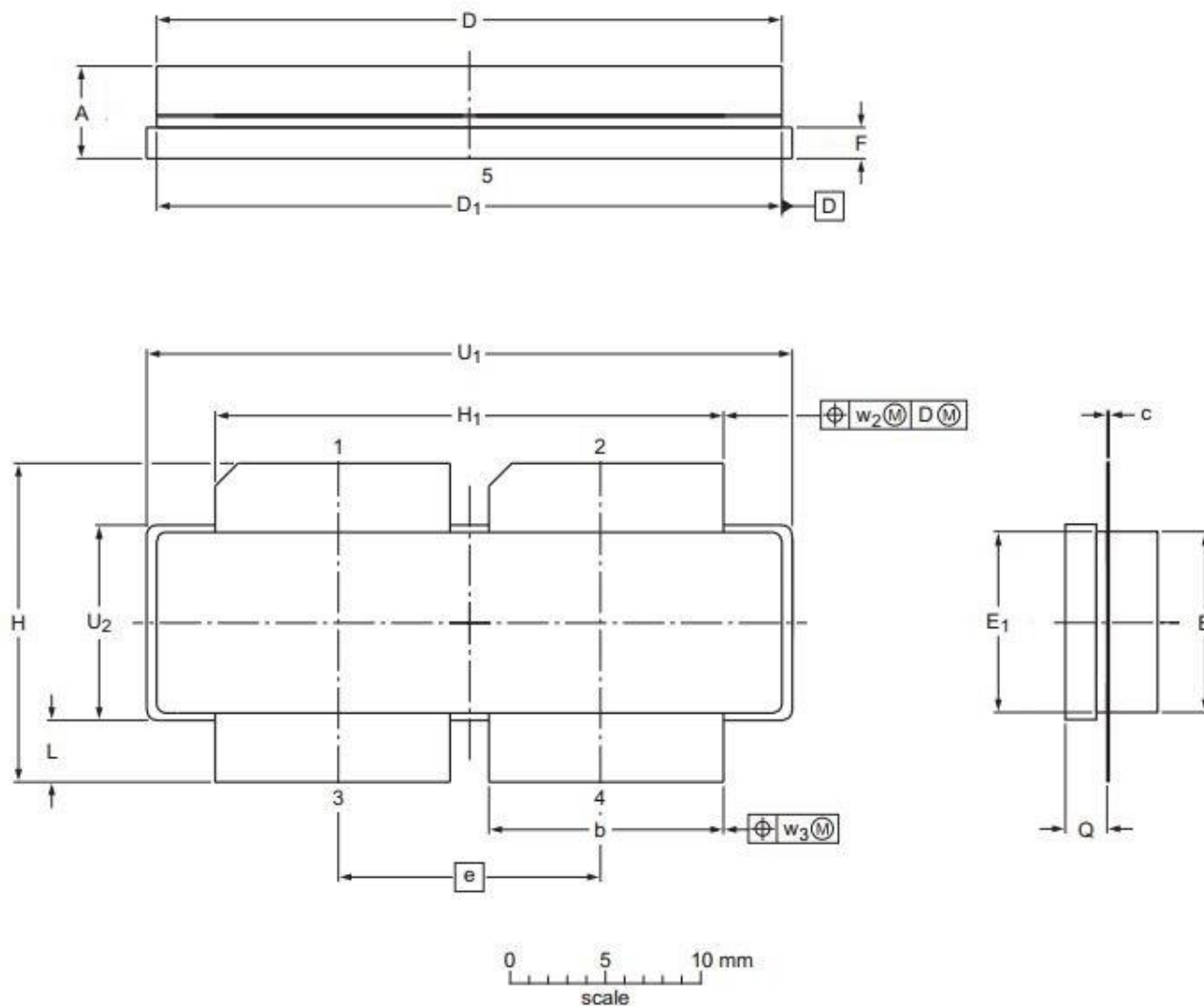
Figure 6: Network analyzer output S21/S11 (Vds=50V, Idq=800mA)





Package Outline

Earless flanged ceramic package; 4 leads (1、2—DRAIN、3、4—GATE、5—SOURCE)



UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	Q	U ₁	U ₂	W ₂	W ₂
mm	4.7	11.81	0.18	31.55	31.52	13.72	9.50	9.53	1.75	17.12	25.53	3.48	2.26	32.39	10.29	0.25	0.25
	4.2	11.56	0.10	30.94	30.96		9.30	9.27	1.50	16.10	25.27	2.97	2.01	32.13	10.03		
inches	0.185	0.465	0.007	1.242	1.241	0.540	0.374	0.375	0.069	0.674	1.005	0.137	0.089	1.275	0.405	0.01	0.01
	0.165	0.455	0.004	1.218	1.219		0.366	0.365	0.059	0.634	0.995	0.117	0.079	1.265	0.395		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-D4					03/12/2013



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/9/8	V1.0	Preliminary Datasheet Creation
2026/1/26	V2.0	Update the upper limits to 2GHz, and add 0.9-1.5/1.1-1.7G new application data

Application data based on:SYX-25-32/HL-26-03&04

c

Notice

Specifications are subject to change without notice. Innegration believes the information within the data sheet to be reliable. Innegration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innegration in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innegration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innegration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innegration and authorized distributors

Copyright © by Innegration (Suzhou) Co.,Ltd.