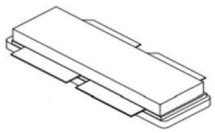
GaN 50V, 1200W, RF Power Transistor

STCV071K3RD4



Description

The STCV071K3RD4 is a push pull 1200W P1dB capable, internally matched GaN HEMT, ideal for ISM and RF energy applications below 700MHz.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical CW performance at 650MHz applications
  Vds=50V, Idq=300mA

Pin(dBm)	Pout(dBm)	Pout(W)	Id(A)	Gain(dB)	Eff(%)
38.62	59.2	831.8	26.2	20.58	63.5
39 5	60	1000 0	28 7	20 5	69 7
40.37	60.61	1150.8	31	20.24	74.2
41.28	60.95	1244.5	32	19.67	77.8
42 1	61 13	1297 2	32 8	19 03	79 1

Applications

- 650MHz particle linear accelerator
- P band power amplifier
- UHF TV

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}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	Igs	168	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= 25°C, at Pd=340W	$R_{\theta JC}$	0.3	°C /W

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

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=84mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 84mA	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		--3.45		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	650MHz, Pout=800W pulse CW All phase, No device damages	VSWR		5:1		

TYPICAL CHARACTERISTICS

Figure 1: Efficiency and power gain as function of CW Pout

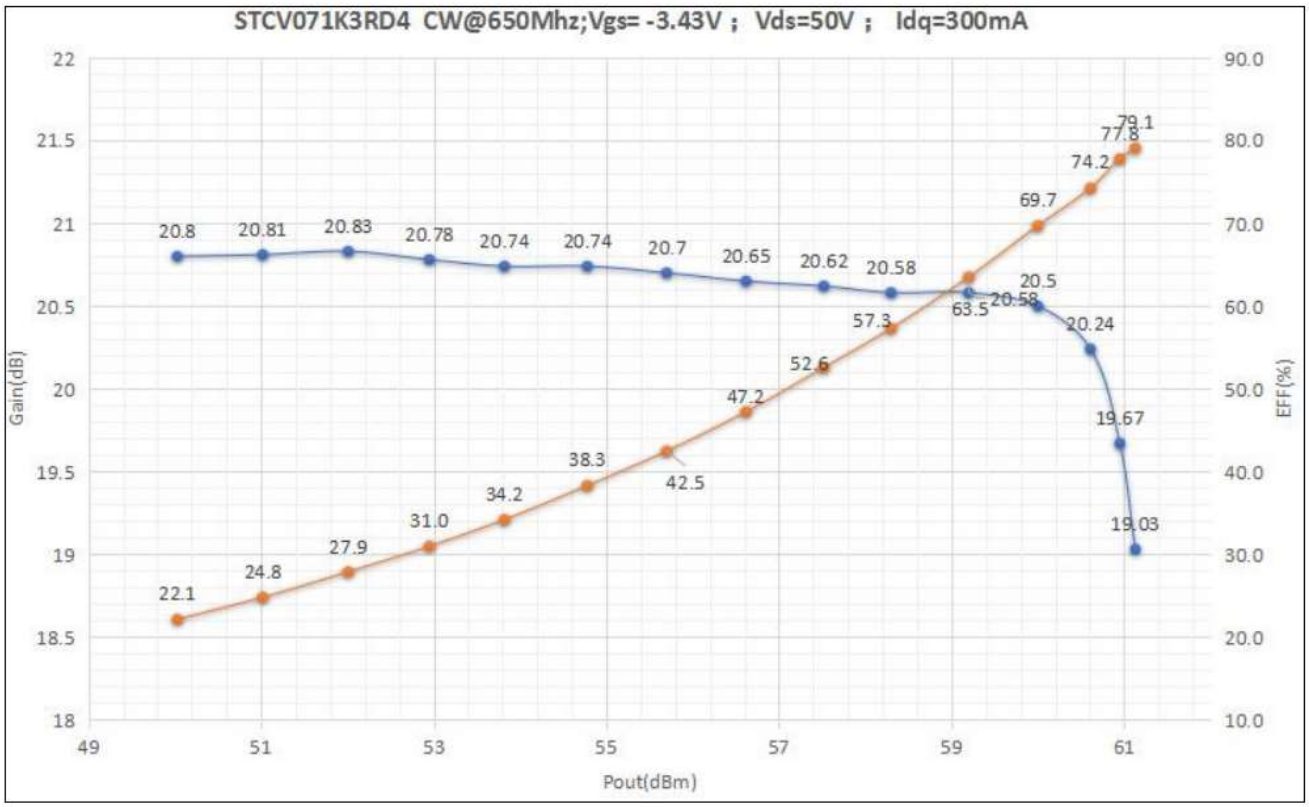


Figure 2: S11/S21 output from Network analyser (VDS= 50V, IDQ=300 mA Vgs =-3.45V)

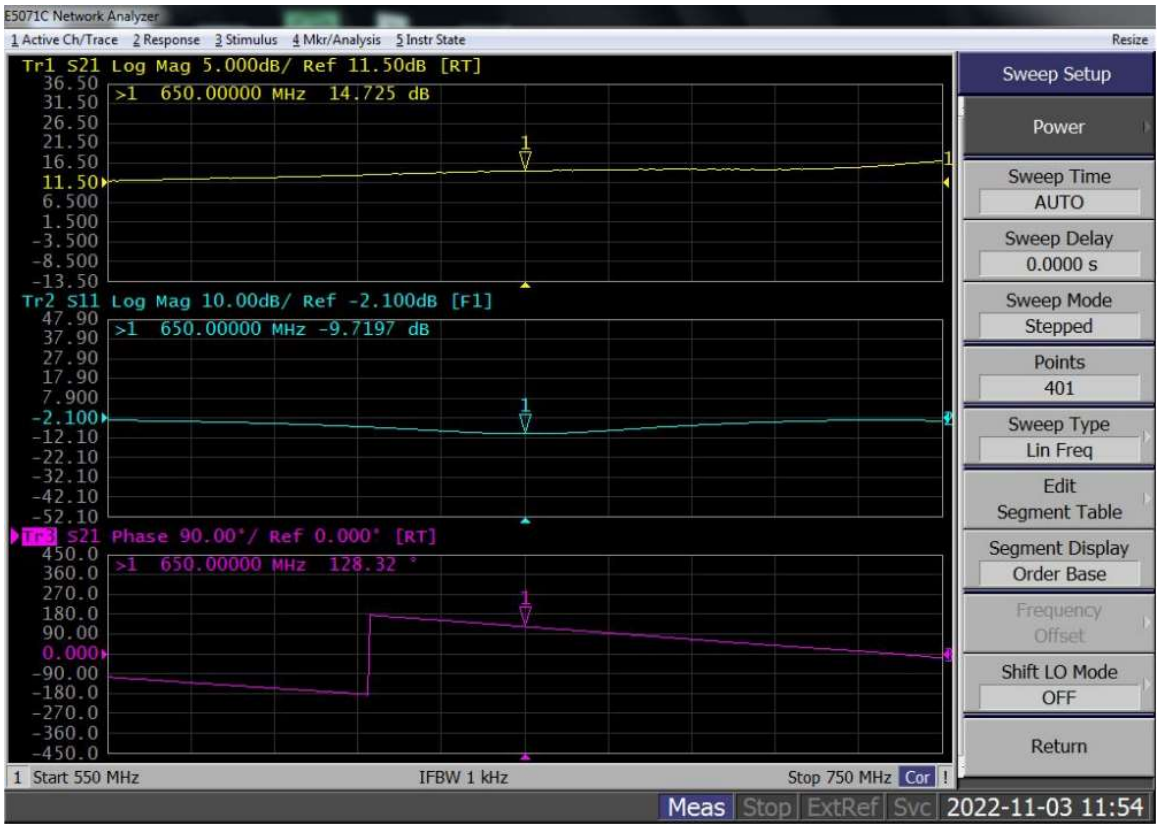
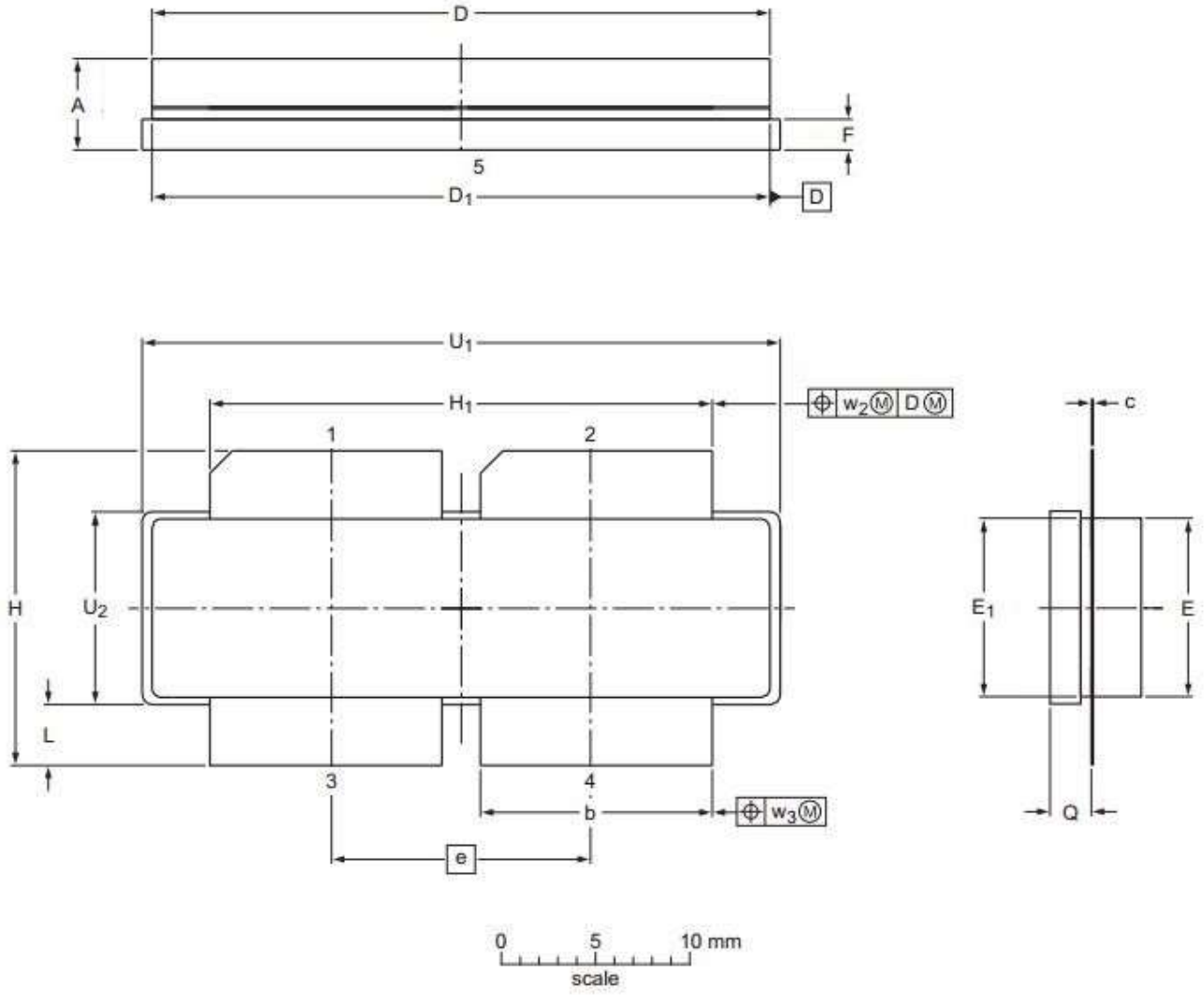


Figure 3: Reference design circuit (PCB DWG file upon request,)

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 4.2	11.81 11.56	0.18 0.10	31.55 30.94	31.52 30.96	13.72	9.50 9.30	9.53 9.27	1.75 1.50	17.12 16.10	25.53 25.27	3.48 2.97	2.26 2.01	32.39 32.13	10.29 10.03	0.25	0.25
inches	0.185 0.165	0.465 0.455	0.007 0.004	1.242 1.218	1.241 1.219	0.540	0.374 0.366	0.375 0.365	0.069 0.059	0.674 0.634	1.005 0.995	0.137 0.117	0.089 0.079	1.275 1.265	0.405 0.395	0.01	0.01

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
2022/11/7	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: HL-22-47

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