

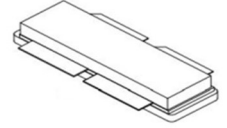


GaN 50V, 750W, L band CW RF Power Transistor

STCV16750RD4

Description

The STCV16750RD4 is a push pull 750W saturated power capable, internally matched GaN HEMT, ideal for ISM or RF energy applications at fixed frequency point or very narrow band within 1.2 to 1.6GHz typically for 1.3G/1.6G particle accelerator applications.



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

- Typical CW performance at 1.3GHz applications with transistor soldered on heatsink

Test Signal	Frequency (GHz)	Vds (V)	PL (W)	Gp (dB)	Eff (%)
CW	1.3	50	790	16	73
CW	1.6	50	730	13.5	72

Applications

- 1.3/1.5GHz particle linear accelerator
- L band power amplifier
- GPS ground station

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	I _{gs}	100.8	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°C, at Pd=250W	R _{θJC}	0.45	°C /W

Table 3. Electrical Characteristics (TA = 25°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	VGS=-8V; IDS=50.4mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 50.4mA	V _{GS(th)}	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=200mA, Measured in Functional Test	V _{GS(Q)}		--3.2		V



Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1.3GHz, Pout=750W pulse CW All phase, No device damages	VSWR		5:1		

TYPICAL CHARACTERISTICS

1300MHz

Figure 1: S11/S21 output from Network analyser (VDS= 50V, IDQ=500 mA Vgs =-3.05V)

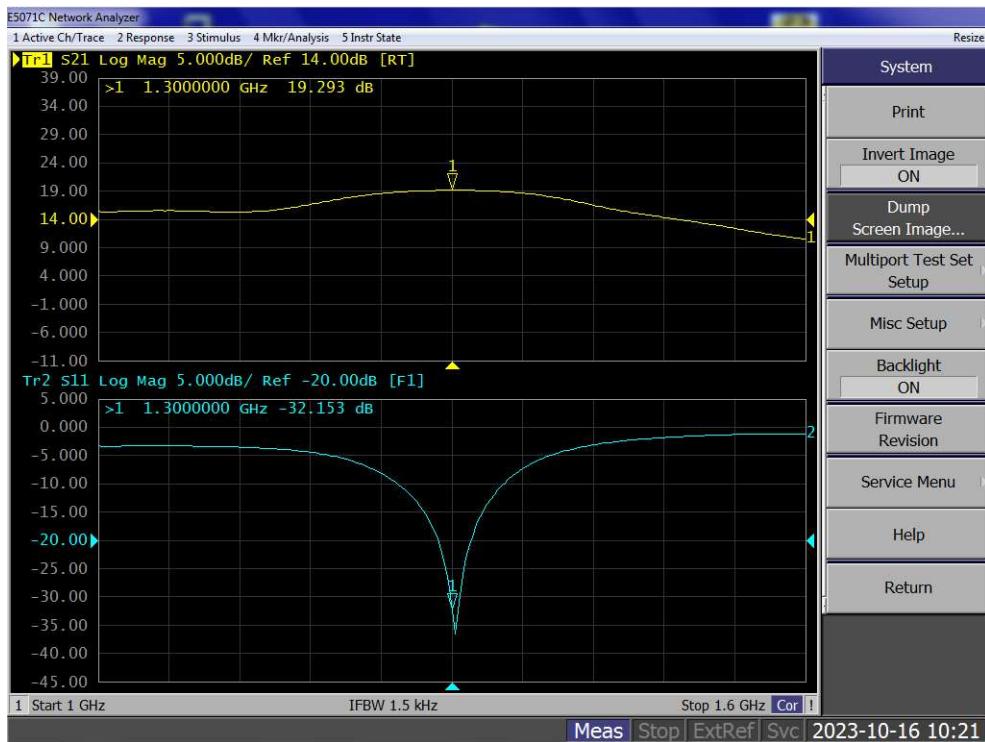
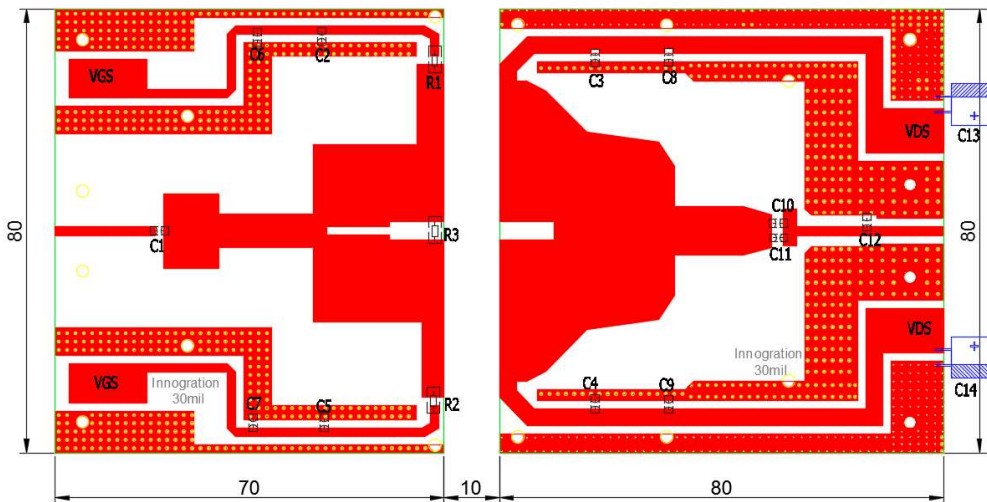


Figure 2: Reference design circuit (PCB DWG file upon request,)





Component	Description	Suggestion
C6~C9	10uF	10uF/100V
C1~C5	47pF	MQ301111
C10,C11	22pF	MQ301111
C12	1.8pF	MQ301111
C13,C14	2200uF/63V	Electrolytic Capacitor
R1,R2	18 Ω	Chip Resistor
R3	10 Ω	Chip Resistor
PCB	30Mil Rogers4350	

1600MHz

Figure 3: S11/S21 output from Network analyser (VDS= 50V, IDQ=500 mA Vgs =-3.05V)

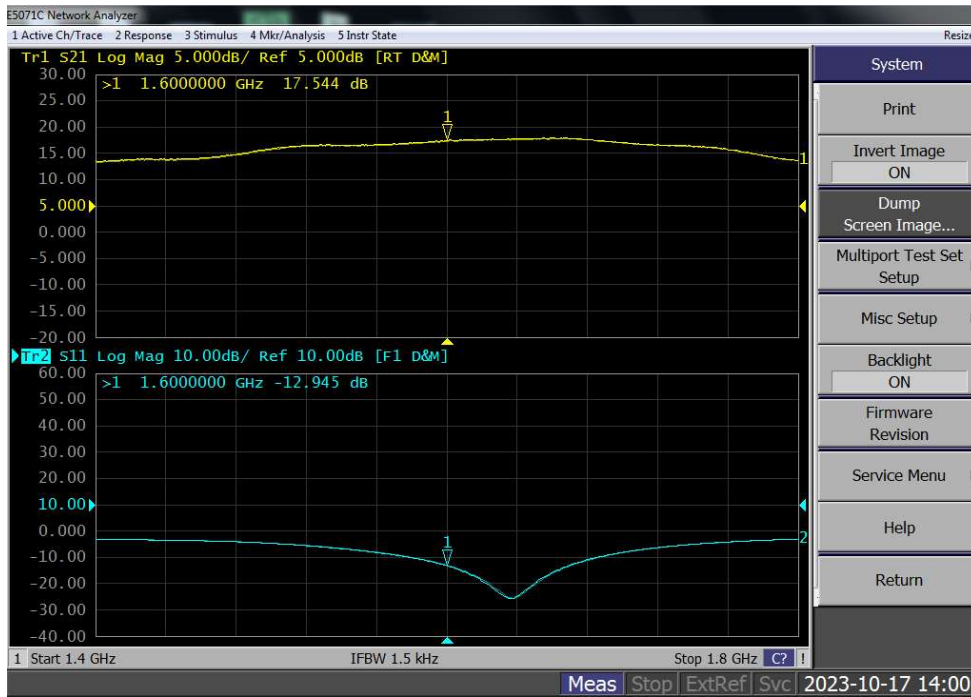
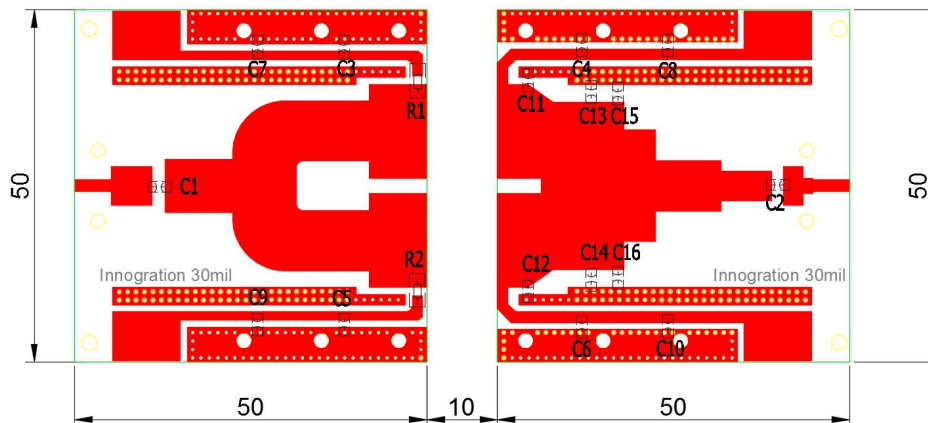


Figure 4: Reference design circuit (PCB DWG file upon request,)



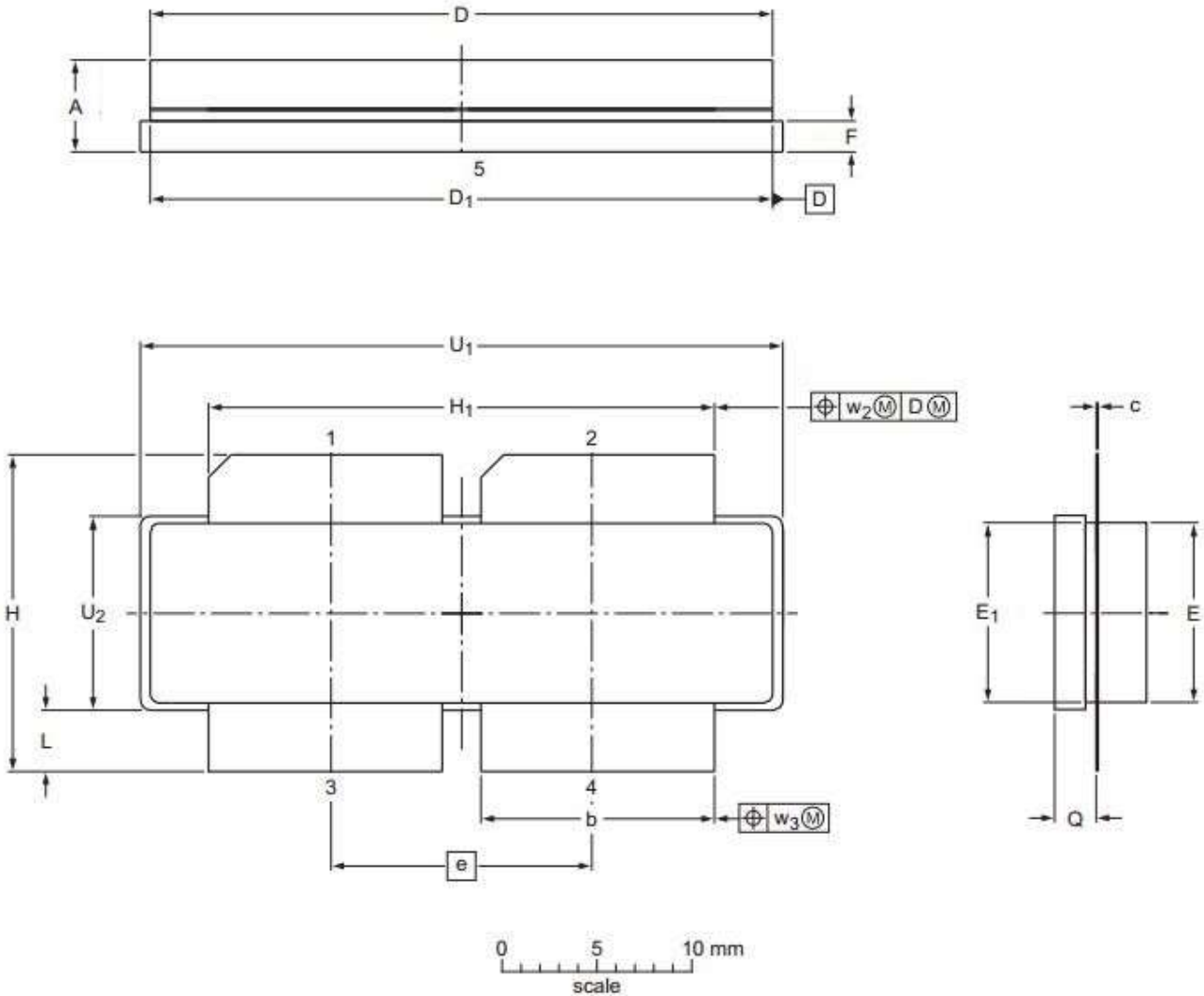


Component	Description	Suggestion
C1	30pF	MQ301111
C2	27pF	MQ102525
C3~C6	100pF	MQ101111
C7~C10	10uF/100V	Ceramic multilayer capacitor
C11,C12	3.0pF	MQ301111
C13,C14	2.4pF	MQ301111
C15,C16	0.7pF	MQ301111
R1,R2	10 Ω	Chip Resistor
R3	10 Ω	Chip Resistor
PCB	30Mil	Rogers4350



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
2023/10/17	V1.0	Preliminary Datasheet Creation

Application data based on: HL-23-48/49

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