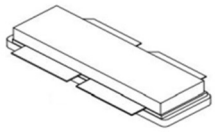
GaN 50V, 750W, 2.45GHz RF Power Transistor

STCV25750D4



Description

The STCV25750D4 is a 750W capable, push pull, internally matched GaN HEMT, ideal for ISM or RF energy applications at 2450MHz narrow band

In typical CW operation, it can deliver 700W under water cooling condition，and 650W CW under air cooling condition.

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

- Typical RF performance at 2450MHz applications

Vds=50V, Vgs=-4.8V, CW, Tc=25 degree C,

Freq	Test Signal	Cooling method	Psat	Psat Eff	Power Gain
(MHz)		(W)	(W)	%	(dB)
2445-2455	Pulse CW	Air	>750	73	13.5
2445-2455	CW	Water	>700	72	13.5
2445-2455	CW	Air	>650	71	14

Note:

Performance might be varied under different load conditions due to loadpull effect, application report with isolator included upon request

Recommended driver: STAV25050G2

Applications

- 2.45GHz RF Energy
- S band 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_{DSS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	Igs	102	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=250W	$R_{\theta JC}$	0.4	°C /W

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

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

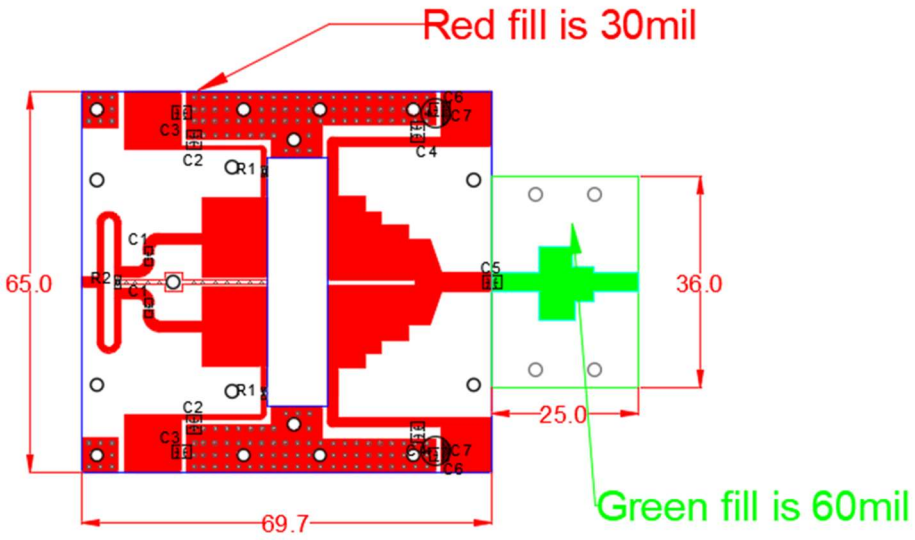
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=102mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 102mA	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=120mA, Measured in Functional Test	$V_{GS(Q)}$		--3.48		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.45GHz, Pout=750W pulse CW All phase, No device damages	VSWR		5:1		

Reference Circuit of Test Fixture Assembly Diagram

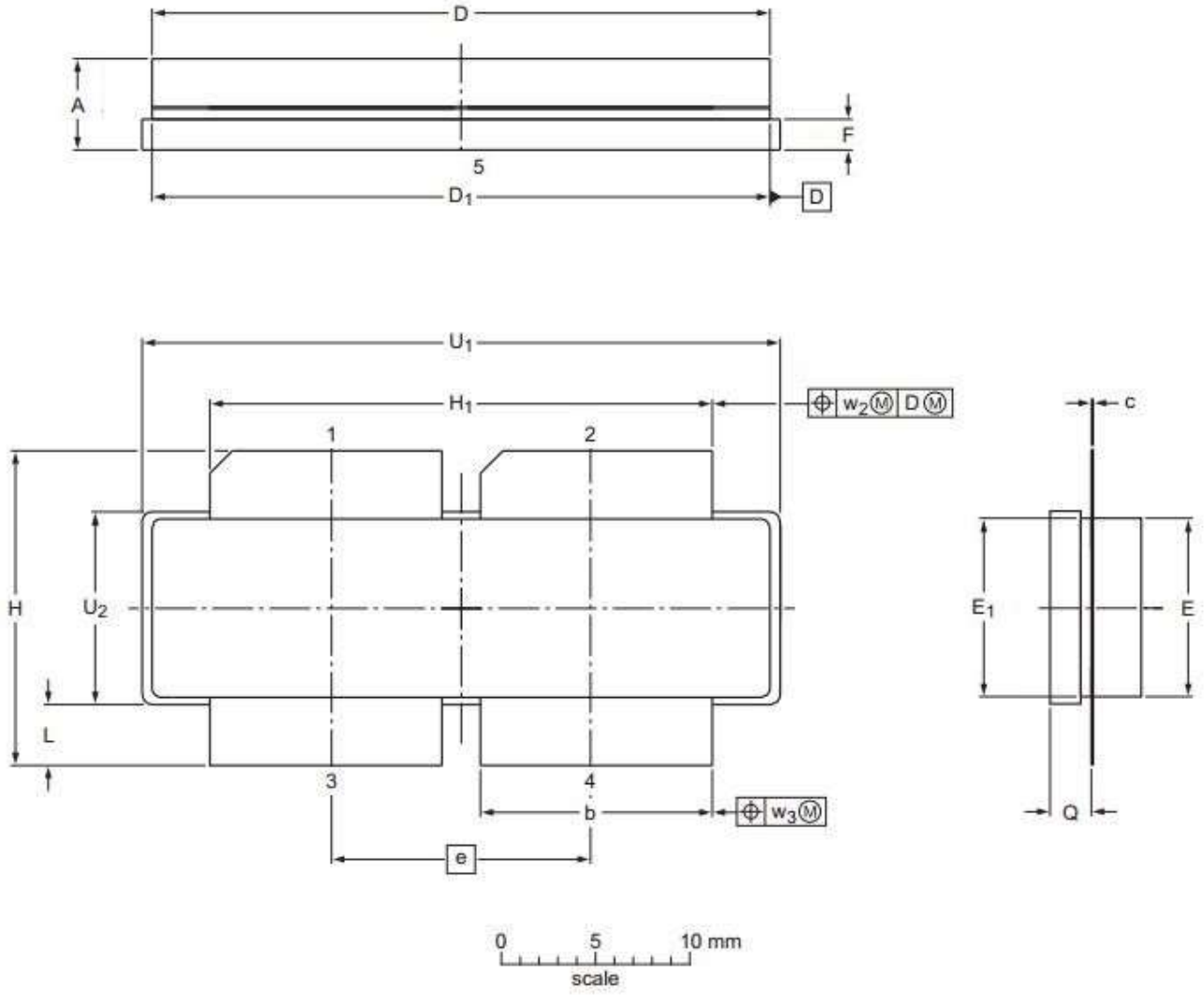
DXF file upon request



Component	Description	Suggestion
C1	18pF	MQ200805
C2	24pF	MQ301111
C4	15 pF	MQ301111
C5	MCM-1-300V-D-100-J	
C3,	10uF, 100V	1210
C6,	10uF, 100V	5750
C7	4700uF/63V	
R1	Chip Resistor,10Ω	0805
R2	Chip Resistor,100Ω	1206
PCB	Rogers tc350-plus, r= 3.5, thickness 30 mils, 1oz copper（red fill）; //Taconic RF-35TC-0600-A, thickness 60 mils, 1oz copper(green fill)	

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
2023/6/7	**Rev 1.0**	**Preliminary datasheet creation**

Application data based on: YHG-23-11

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