GaN 50V, 50W, 8.5-9.6GHz X band RF Power Transistor

STCV96050C6

Description

The STCV96050C6 is a 50watt capable, GaN HEMT, ideal for general applications from 8.5 to 9.6GHz. It features high gain, wide band and low cost, in 10*6mm plastic open cavity package, enabling surface mounted on PCB through grounding vias or soldered on heatsink directly.

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

- Typical Class AB pulse CW performance across 8.5-9.6GHz:

Vds = 50 V, Vgs = -3.60 V, Idq = 10mA,Pulse width=100us, duty cycle=10% (On innogration application board with device soldered)

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(mA)	Gain(dB)	Eff (%)
8000	40.00	46.73	47.1	345	6.7	27.3
8300	40.00	47.02	50.4	317	7.0	31.8
8500	**40.00**	**46.48**	**44.5**	**321**	**6.5**	**27.7**
8800	**40.00**	**46.48**	**44.5**	**299**	**6.5**	**29.7**
9000	**40.00**	**46.38**	**43.5**	**285**	**6.4**	**30.5**
9300	**40.00**	**46.40**	**43.7**	**280**	**6.4**	**31.2**
9600	**40.00**	**46.24**	**42.1**	**250**	**6.2**	**33.7**
10000	40.00	44.70	29.5	183	4.7	32.3

Applications

- Marine radio
- X band pulsed 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	6.6	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= 85°C, at Pout=40W Pulsed CW	$R_{\theta JC}$	TBD	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

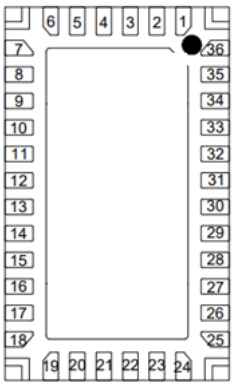
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=6.6mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 6.6mA	$V_{GS(th)}$	-4	-3.7	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=10mA, Measured in Functional Test	$V_{GS(Q)}$		-3.6		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	9.6GHz, Pout=40W pulse CW All phase, No device damages	VSWR		10:1		

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	RF IN/Vgs	RF Input, Vgs bias
26,27,28,29,32,33,34,35	RF OUT/VDD	RFOutput, Drain bias
Rest Pins and Package Base	GND	DC/RF Ground. Must be soldered directly to heatsink or copper coin for CW application.

Figure 3: Network plot for S11/S21

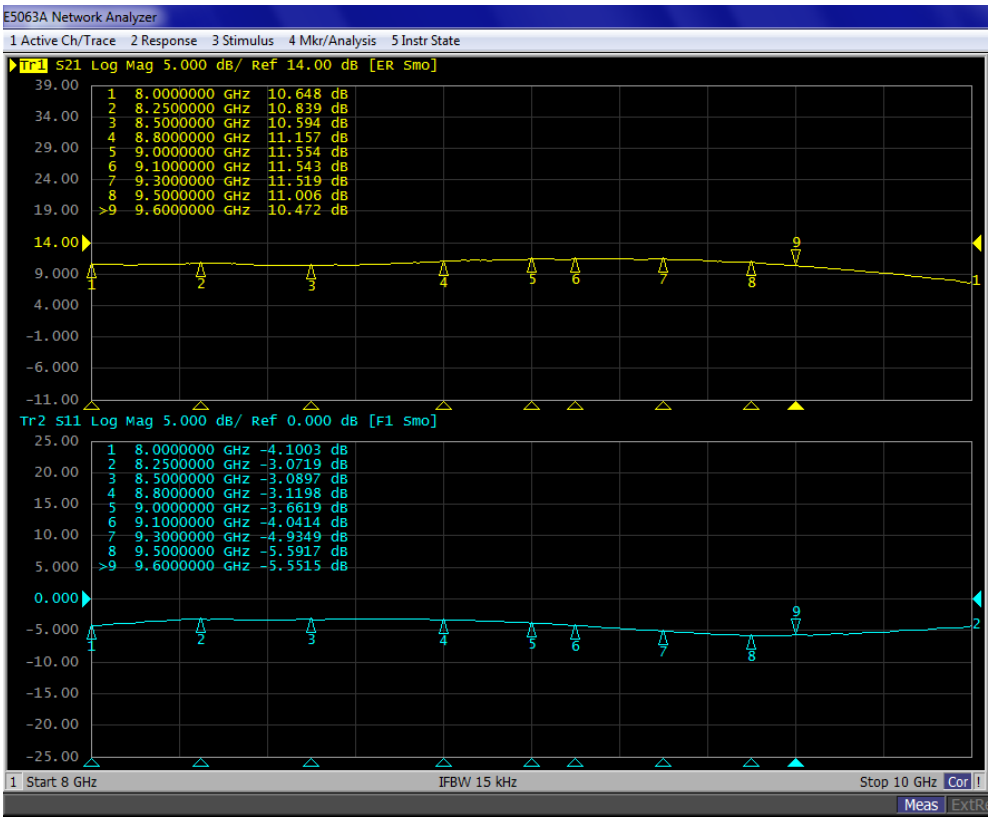


Figure 4: Picture of application board

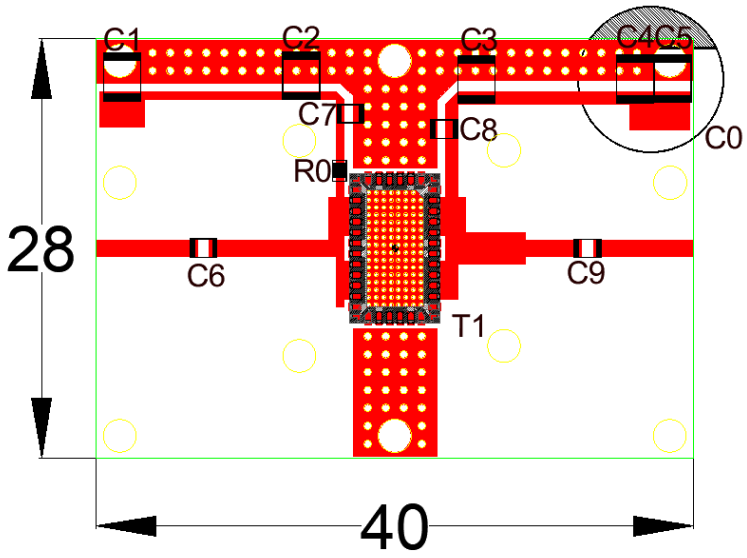
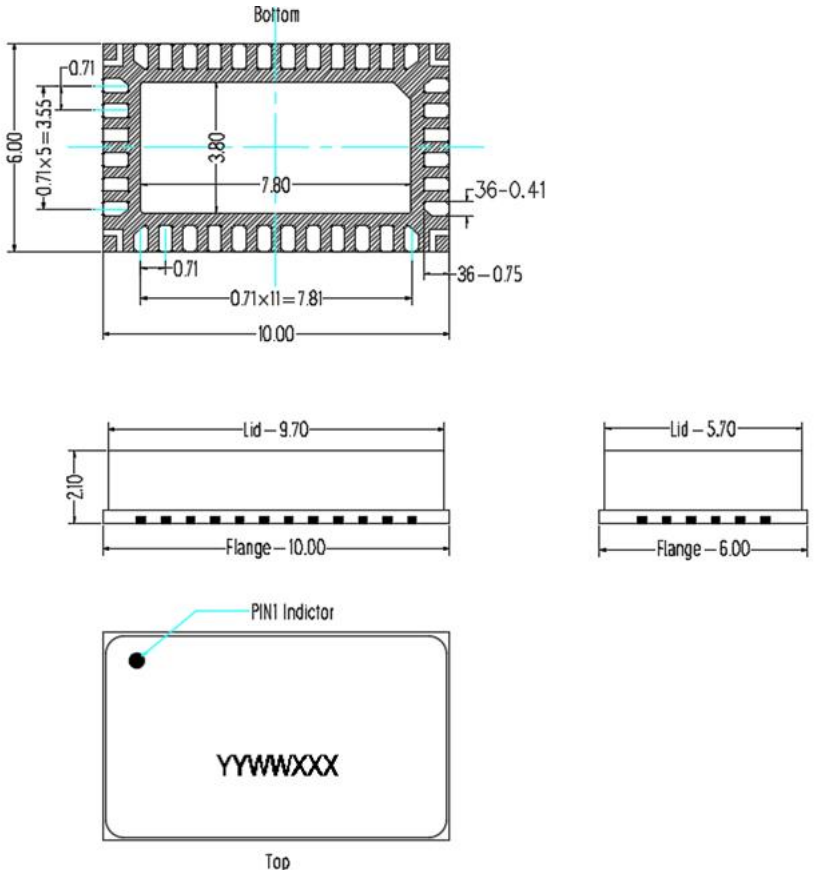


Table 4. Bill of materials of application board (PCB layout upon request)

Reference Designator	Description	Quantity	Suggestion
C0	470uF/100V	1	Electrolytic Capacitor
C1, C2, C3, C4, C5	10uF/200V, 1210	5	
C6	1.5 pF, 0603/0805	1	
C7, C8, C9	0.7 pF, 0603/0805	3	
R0	10 Ω, 0603/0805	1	Murata
T1	STCV96050C6 V1	1	Innogration
PCB	Rogers 4350B, 20mil		-

Package Dimensions

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2026/3/2	**V1.0**	**Preliminary datasheet**

Application data based on: RXT-26-05

Notice

Specifications are subject to change without notice. Innogration believes the information within the data sheet to be reliable. Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.
"Typical" parameter is the average values expected by Innogration 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.
Innogration 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 Innogration 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 Innogration and authorized distributors