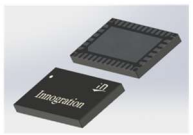
Gallium Nitride 50V, 65W, 3.7-4.2GHz RF Power Transistor

STAV42065C6



Description

The STAV42065C6 is a 65watt, GaN HEMT, ideal for general applications from 3.7 to 4.2GHz.

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 RF performance across 3.7-4.0GHz with device soldered through grounding vias

  Pulsed CW: 20us, 10%

FREQ (MHZ)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
3700	47.76	59.7	57.62	17.52	48.93	78.16	62.59
3850	47.21	52.6	58.75	17.57	48.64	73.11	65.51
4000	46.73	47.1	59.28	17.21	48.31	67.76	67.48

Applications

- 5G, 4G wireless infrastructure
- Wideband or narrowband power amplifier
- Test instruments
- Jammer

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	8	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 Pavg=4W WCDMA 1 carrier	$R_{\theta JC}$	3.7	°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=8mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 8mA	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=80mA, Measured in Functional Test	$V_{GS(Q)}$		-3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.8GHz, Pout=65W pulse CW All phase, No device damages	VSWR		10:1		

Figure 1: Pin Definition (Top view)

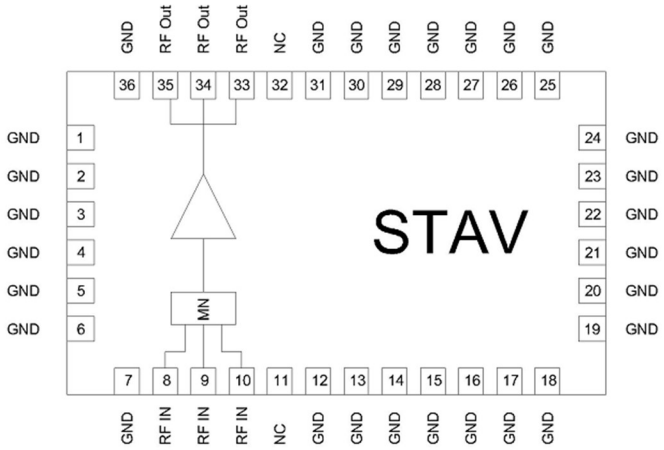


Figure 2: Efficiency and power gain as function of Pout (Measured on 3.7-4.0GHz application board)

V_{DD} = 50 Vdc, I_{DQ} = 80mA, Pulse width=50us, duty cycle=20%

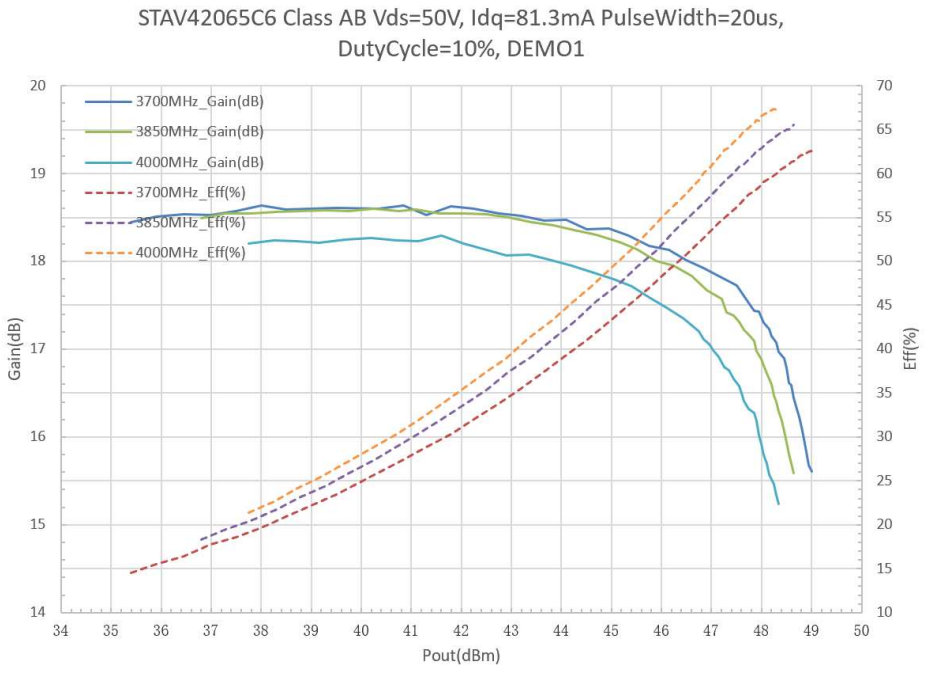


Figure 3: Network plot for S11/S21

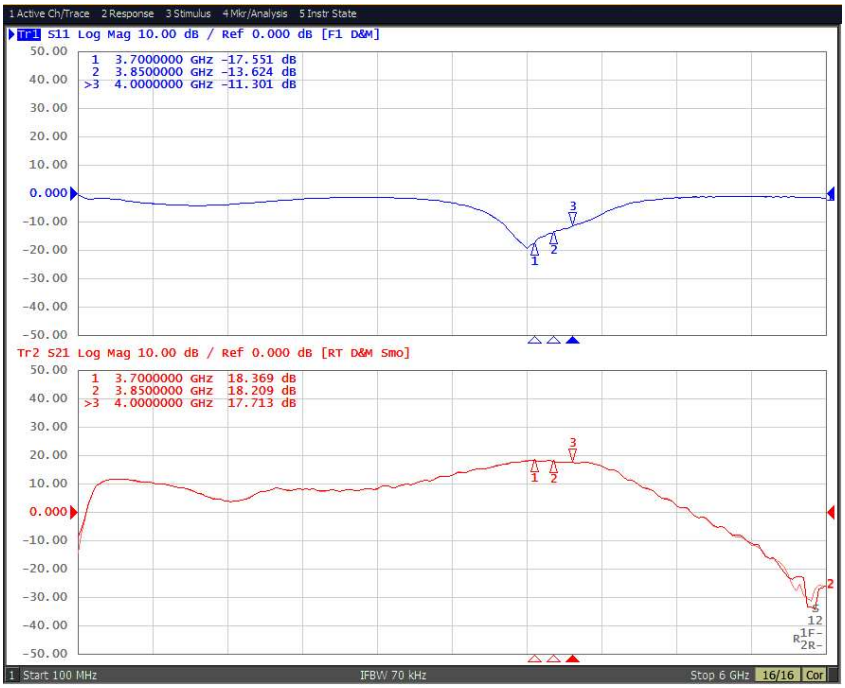


Figure 4: Picture of application board of 3.7-4.0GHz

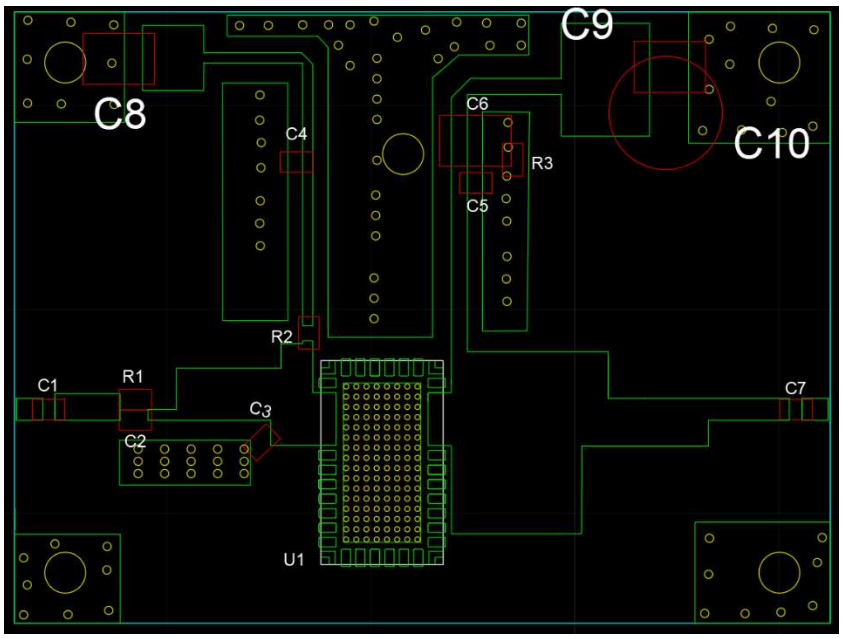
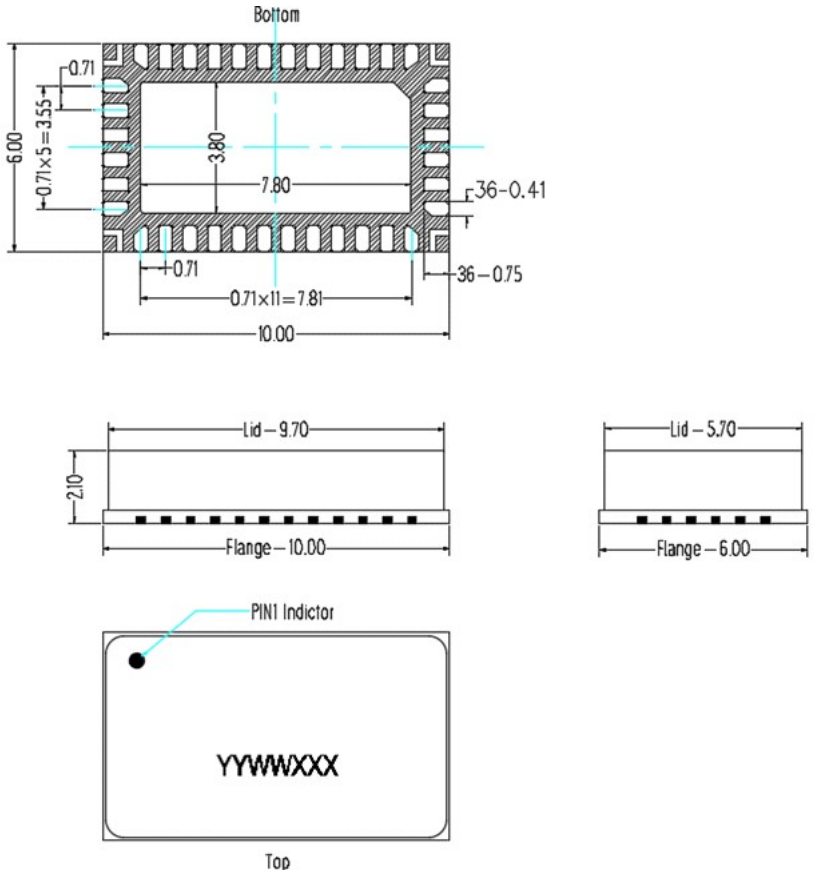


Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

Component	Value	Quantity
U1	STAV42065C6	1
C1、C2、C4、C5、C7	8.2pF	5
C6、C8、C9	10uF/63V	3
C3	0.75pF	1
R1、R2、R3	10Ω	3
C10	470uF/63V	1

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
2022/7/12	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: ZYX-22-07

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