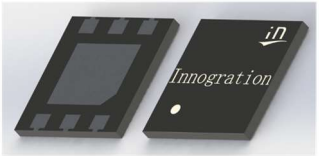
Gallium Nitride 50V, 25W, DC-6GHz RF Power Transistor

Description

STAV58025P2



The STAV58025P2 is a 25 watt, unmatched GaN HEMT, ideal for general applications up to 6GHz

It features high gain, wide band and low cost, in 4*4.5mm DFN plastic package.

It can support CW, pulse or any modulated signal.

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

- Typical Class AB Single--Carrier W--CDMA Characterization Performance:

V_{DD} = 50 Vdc, I_{DQ} = 50 mA, P_{out} = 34dBm Avg., Input Signal PAR = 10 dB

@ 0.01% Probability on CCDF. (On innogration application board with device soldered)

Freq(MHz)	Pout(dBm)	CCDF(dB	Ppeak(dBm)	Ppeak(W)	ACPR(dBc)	Gain(dB)	Efficiency(%)
3400	33.97	9.16	43.12	20.53	-45.07	16.55	22.54
3500	33.98	9.16	43.14	20.62	-45.15	16.96	22.77
3600	33.99	9.10	43.08	20.34	-44.92	17.21	22.84

Freq(MHz)	Pout(dBm)	CCDF(dB	Ppeak(dBm)	Ppeak(W)	ACPR(dBc)	Gain(dB)	Efficiency(%)
3700	33.98	9.09	43.07	20.29	-44.79	17.16	23.30
3800	33.99	8.93	42.93	19.62	-43.74	16.55	22.98

Applications

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

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

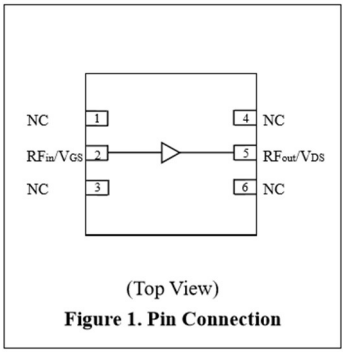
Turning the device ON

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

Figure 1: Pin Connection definition



(Top View)

Figure 1. Pin Connection

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
Maximum forward gate current	Igs	3	mA
Operating Voltage	V_{DD}	55	Vdc
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, Pdiss=6.5W at Pavg=30dBm WCDMA 1 carrier	$R_{\theta JC}$	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=3mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 3mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=50mA, Measured in Functional Test	$V_{GS(Q)}$		-2.97		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.6GHz, Pout=30dBm WCDMA 1 Carrier, All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

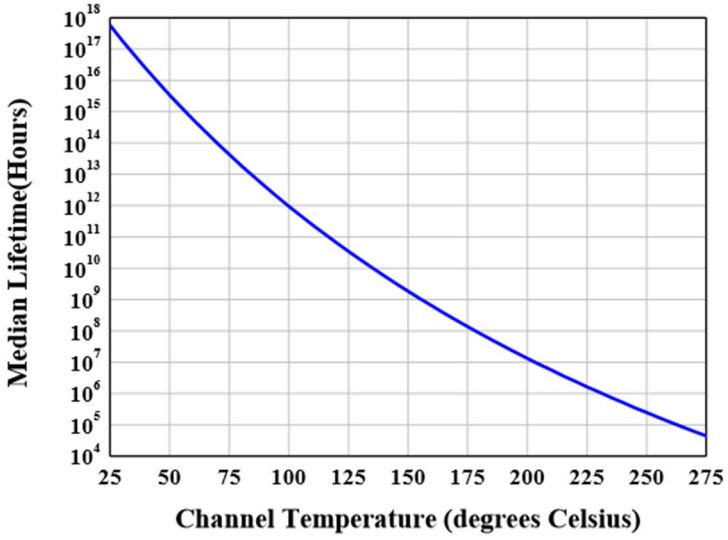


Figure 3: Efficiency and power gain as function of Pout

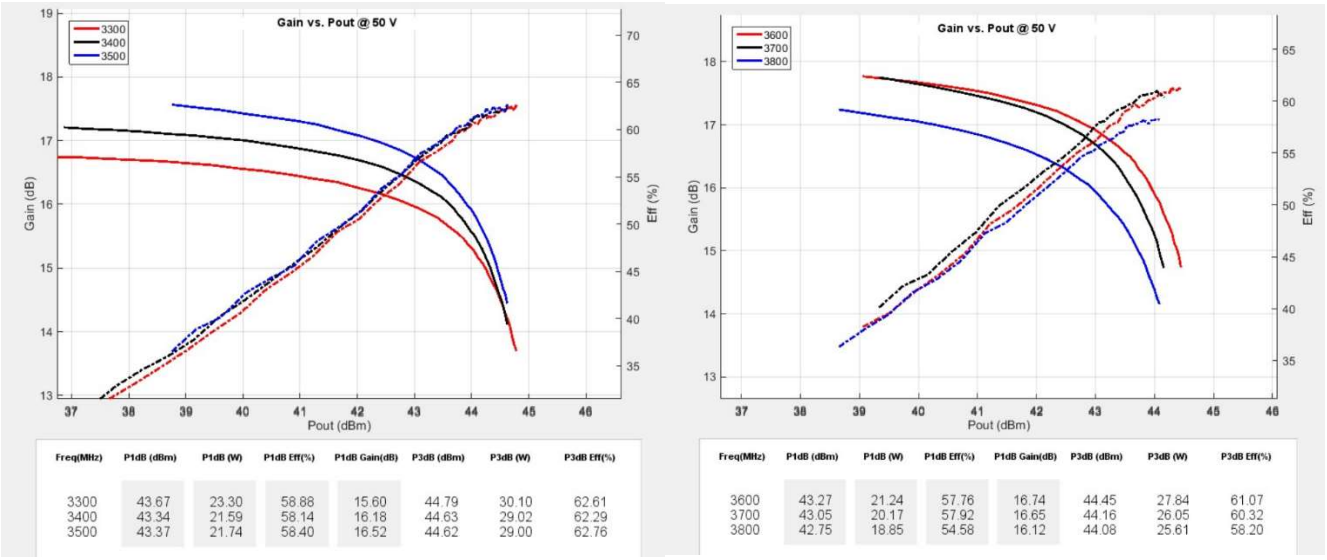


Figure 4: Network analyzer output, S11 and S21

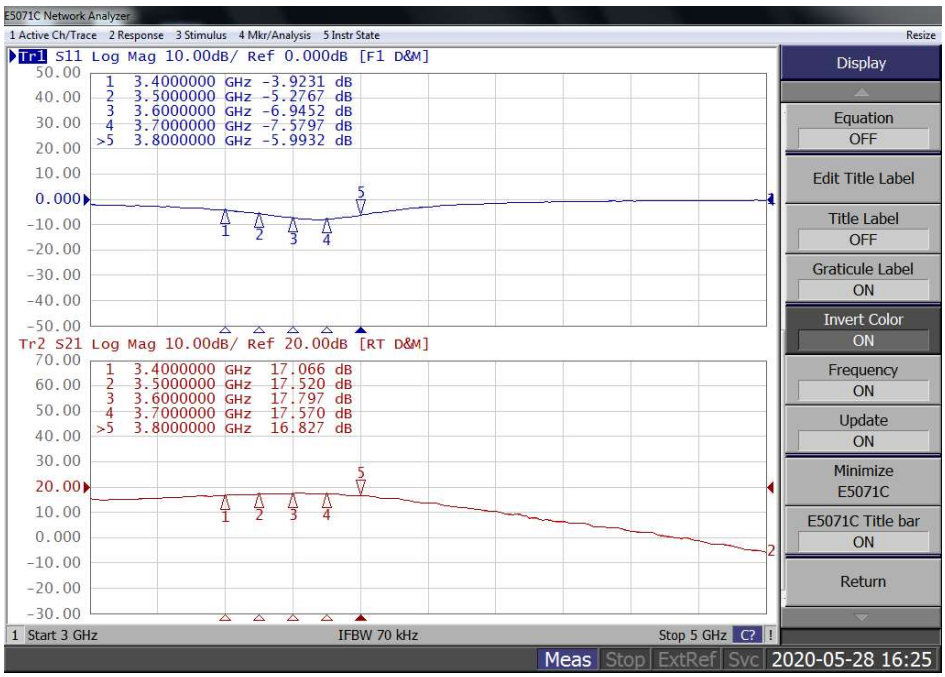
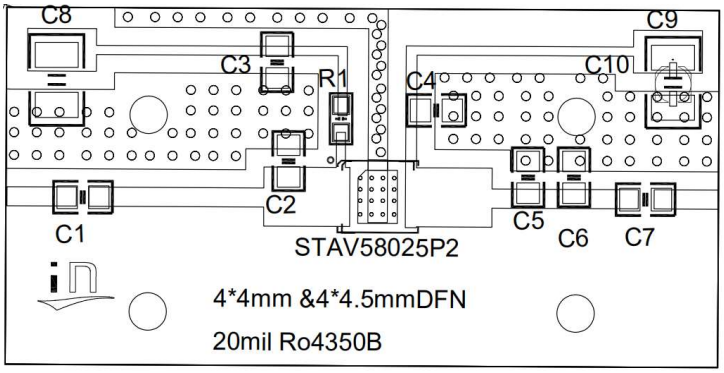


Figure 5: Picture of application board



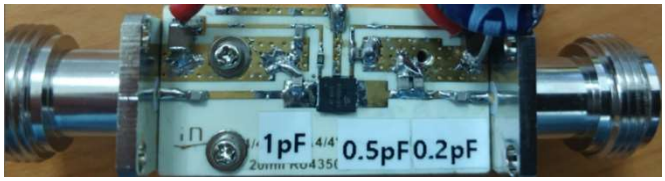
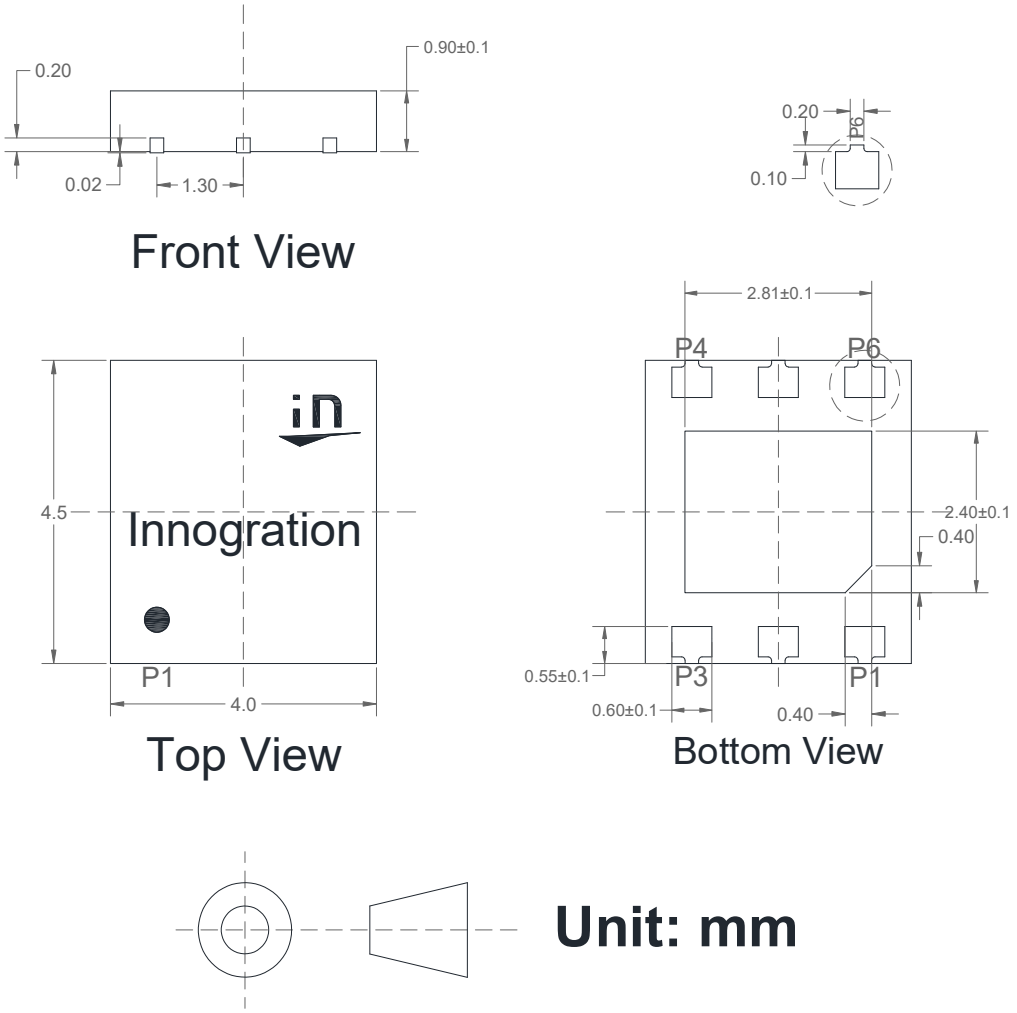


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

C1,C3,C4,C7	5.6pF	ATC600F
C2	1pF	ATC600F
C5	0.5pF	ATC600F
C6	0.2pF	ATC600F
C8,C9	10uF/63V	
C10	470uF/63V	
R1	10 ohm	

Package Dimensions

4.0*4.5mm Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.1mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2020/3/26	V1.0	Objective Datasheet Creation
2020/6/1	V1.0	Preliminary Datasheet Creation

Application data based on ZBB-20-10

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