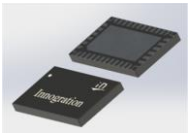
Gallium Nitride 12.5V, 20W, 4GHz RF Power Transistor

YTAN40020C6



Description

The YTAN40020C6 is a 20watt, CW capable，GaN HEMT, ideal for multiple applications up to 4GHz. It features high gain, high efficiency and low cost, in 10*6mm plastic open cavity package, enabling surface mounted on PCB through grounding vias directly.

- Typical Class AB RF CW performance with device soldered through grounding vias
  Vds=12.5V, Idq=80mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2200	42.65	18.40	60.01	11.82	43.90	24.57	67.51
2250	42.55	17.97	62.87	12.41	43.78	23.88	70.54
2300	42.28	16.90	63.87	11.92	43.54	22.59	71.90

Applications

- UHF/L/S band power amplifier
- 2.45G WIFI amplifier
- GPS/Beidou 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}	+80	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	18	Vdc
Maximum gate current	Igs	16	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=20 CW，mounted on high density vias	$R_{\theta JC}$	2.7	°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=16mA	V_{DSS}		80		V
Gate Threshold Voltage	VDS =10V, ID = 16mA	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=120mA, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.3GHz, Pout=20W pulse CW All phase, No device damages	VSWR		10:1		

Figure 1:Pin Definition(Top View)

Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	Vgs/RF In	Vgs and RF input
26,27,28,29,32,33,34,35	Vds/RF out	Vds and RF output
2,5,7,12,13,18,20,23,25,30,31,36	GND	DC/RF Ground
Package Base	GND	DC/RF Ground.
Others	NC	

Typical characters

Figure 2: Efficiency and power gain as function of Pout

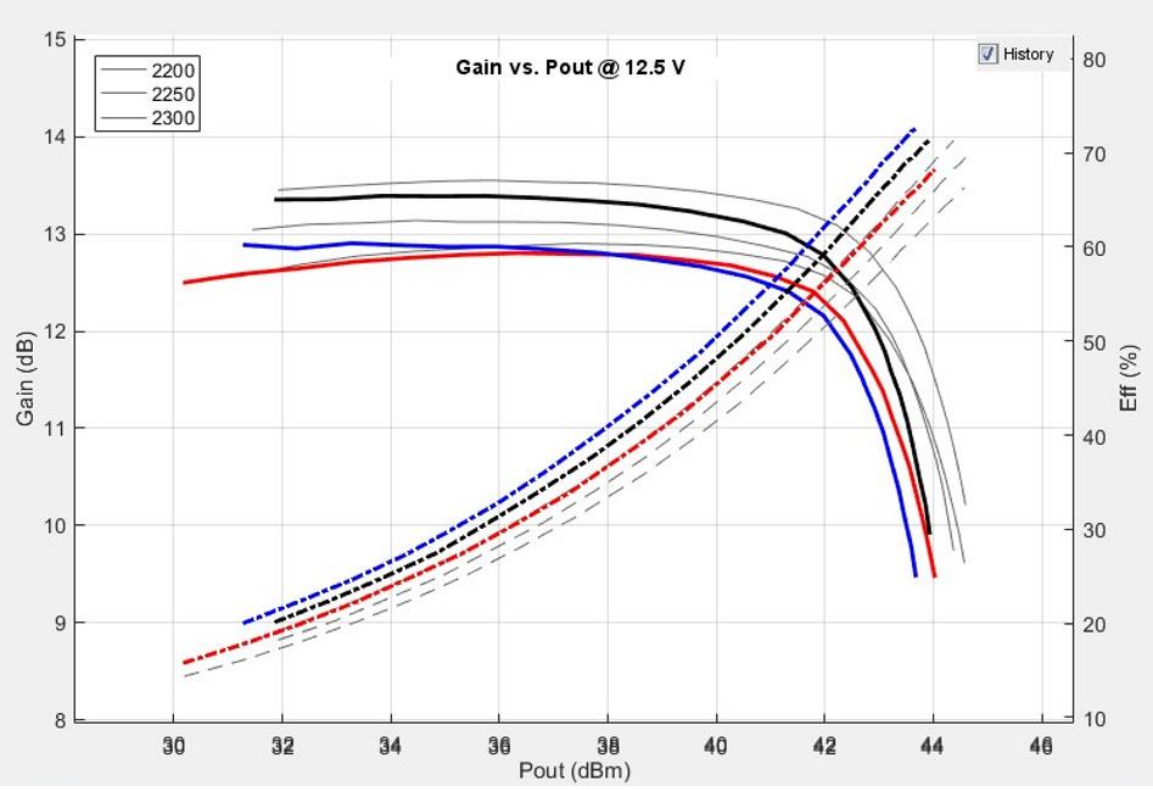


Figure 3: Picture of application board

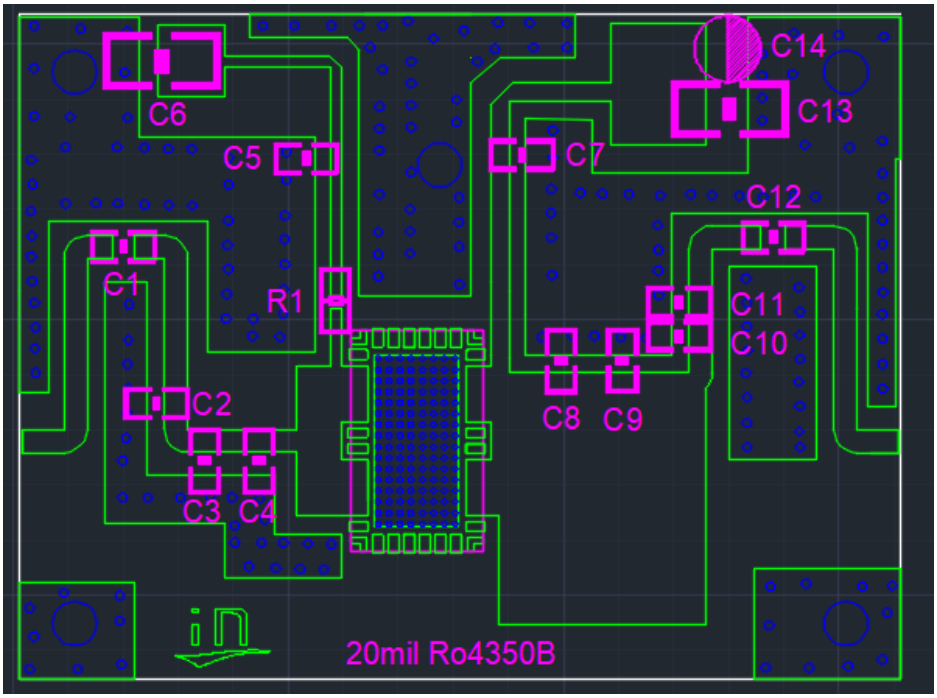
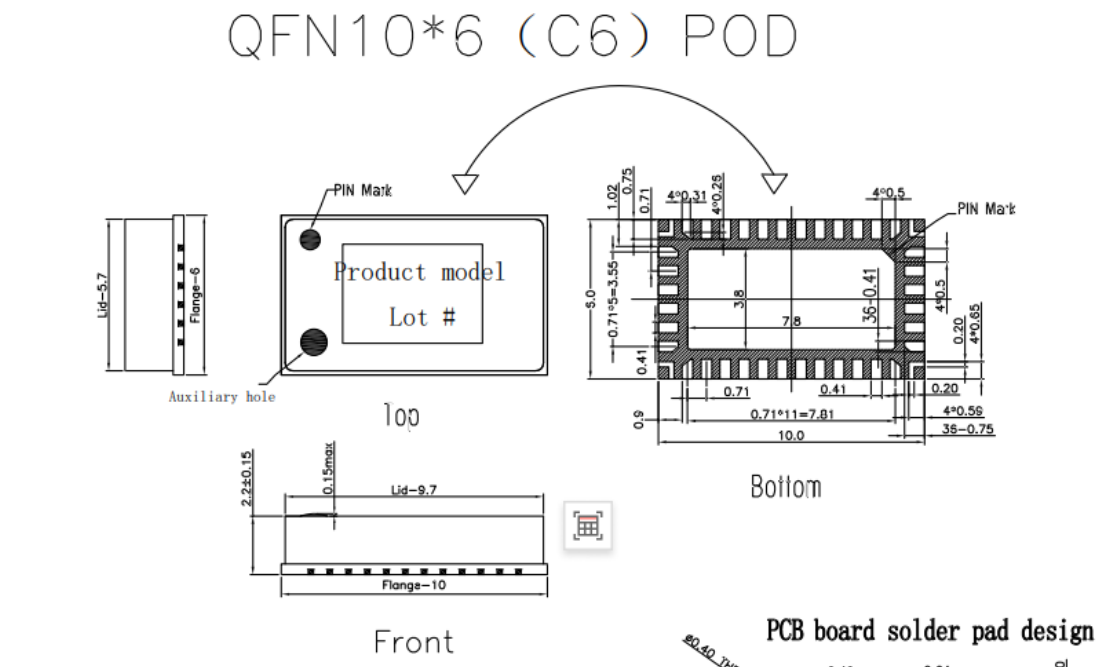


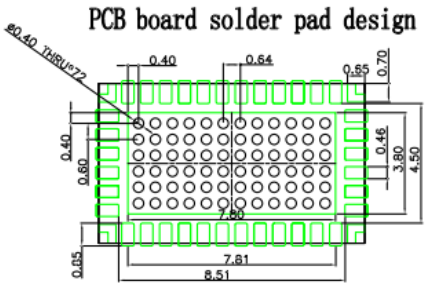
Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

Component	Value	Footprint	Quantity
C6,C13	10uF/63V	1210	2
R1	10 ohm	0603	1
C1,C5,C7,C12	10pF	0603	4
C2	0.3pF	0603	1
C3	1.5pF	0805	1
C4	2.2pF	0805	1
C8,C9	1 pF	0603	2
C10	0.7 pF	0603	1
C11	0.5 pF	0603	1
C14	470Uf/63V		1
U1	YTAN40020C6	QFN 10*6	1

Package Dimensions

10*6 Plastic Package





X.X	±0.10
X.XX	±0.05

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
2025/6/25	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: LBG-25-24

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