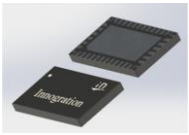
Gallium Nitride 12.5V, 10W,4GHz RF Power Transistor

YTAN40010C6



Description

The YTAN40010C6 is a 10watt, CW capable，GaN HEMT, ideal for multiple application 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=40mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2200	39.96	9.90	62.45	13.97	41.02	12.65	68.16
2250	39.84	9.63	63.23	15.08	40.99	12.57	69.40
2300	39.69	9.31	63.89	14.76	40.89	12.26	70.42

- Typical Class AB RF CW performance with device soldered through grounding vias
  Vds=8V, Idq=40mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P4dB (dBm)	P4dB (W)	P4dB Eff(%)
400	35.85	3.9	60.4	13.26	36.32	4.3	60.7
450	35.83	3.8	62.2	13.5	37.58	5.7	75.6
500	36.51	4.5	71.4	13.91	37.13	5.2	74.4
550	36.89	4.9	73.5	13.6	37.35	5.4	76.8
600	35.37	3.4	54.4	12.88	36.55	4.5	56.2
650	35.34	3.4	47.9	11.74	36.99	5.0	54.6
700	37.24	5.3	50.9	11.81	38.81	7.6	61.3

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	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 Pout=10 CW， mounted on high density vias	$R_{\theta JC}$	5.4	°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}		80		V
Gate Threshold Voltage	VDS =10V, ID = 8mA	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=40mA, 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=10W 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	

2.2-2.3GHz 12V

Typical characters

Figure 2: Efficiency and power gain as function of Pout

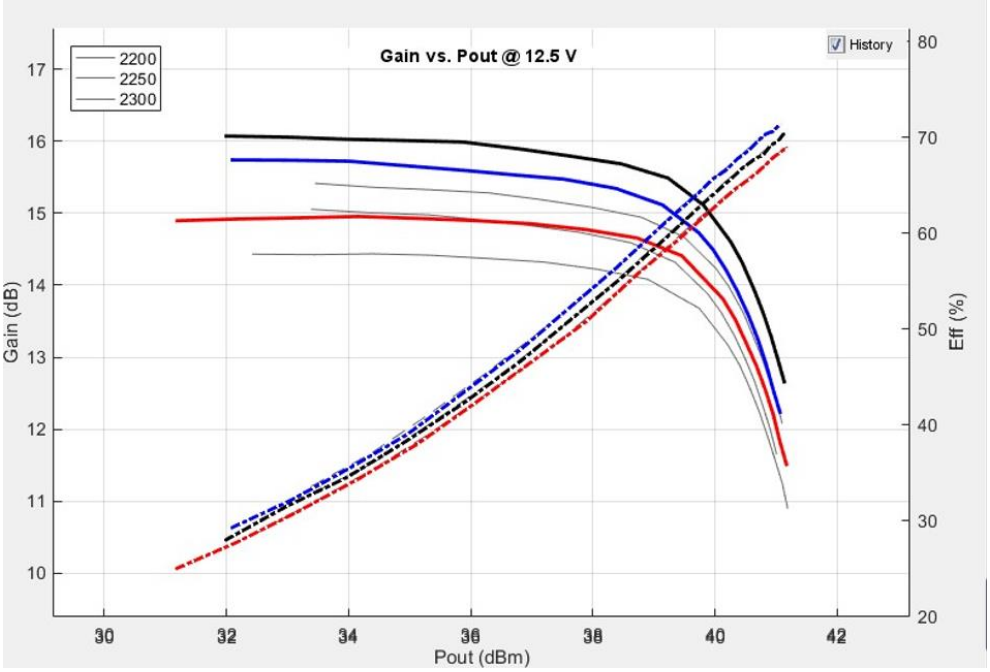


Figure 3: Picture of application board

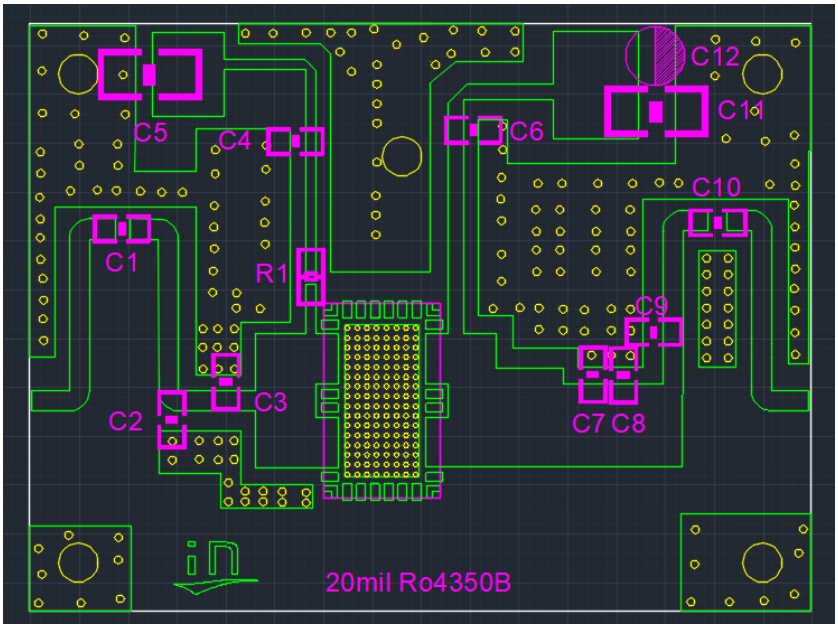


Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

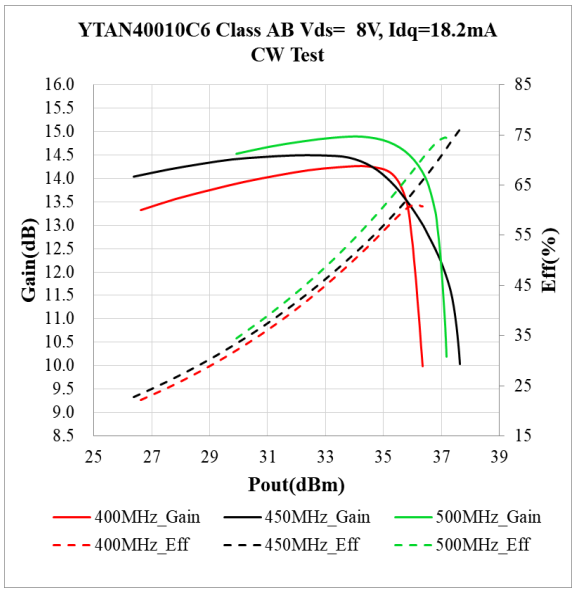
Component	Value	Footprint	Quantity
C5,C14	10uF/63V	1210	2
R1	10 ohm	0603	1
C1,C4,C6,C10	10pF	0603	4

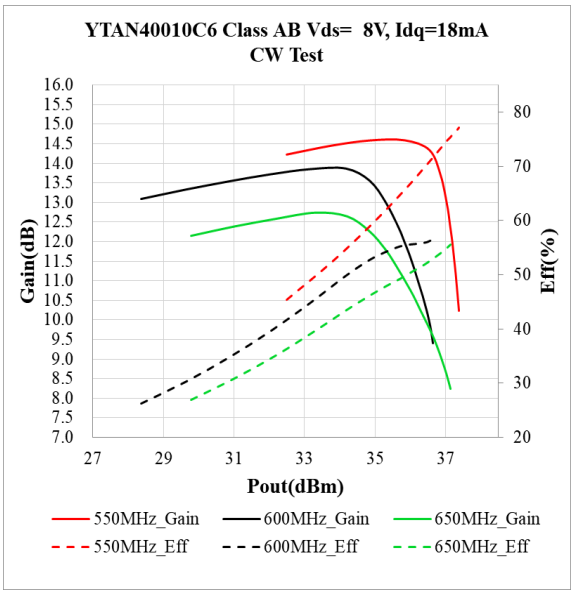
C2	1.2pF	0805	1
C3	2.2pF	0805	1
C7,C8,C9	0.5 pF	0603	3
C12	470Uf/63V		1
U1	YTAN40010C6	QFN 10*6	1

400-700MHz 8V

Typical characters

Figure 4: Efficiency and power gain as function of Pout





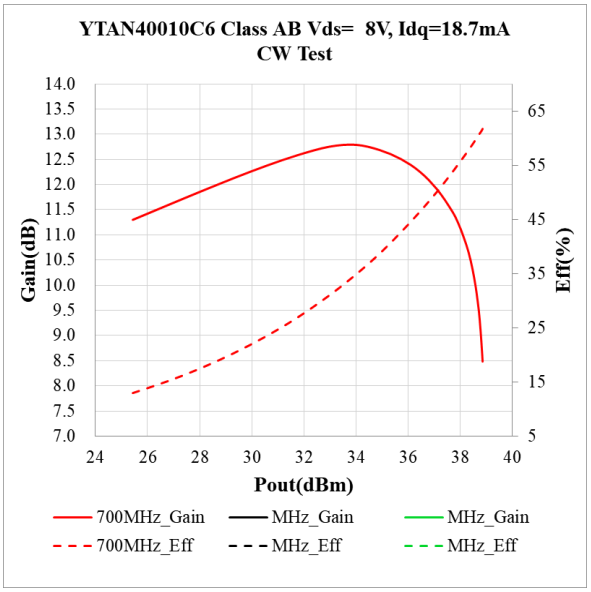


Figure 5: Picture of application board

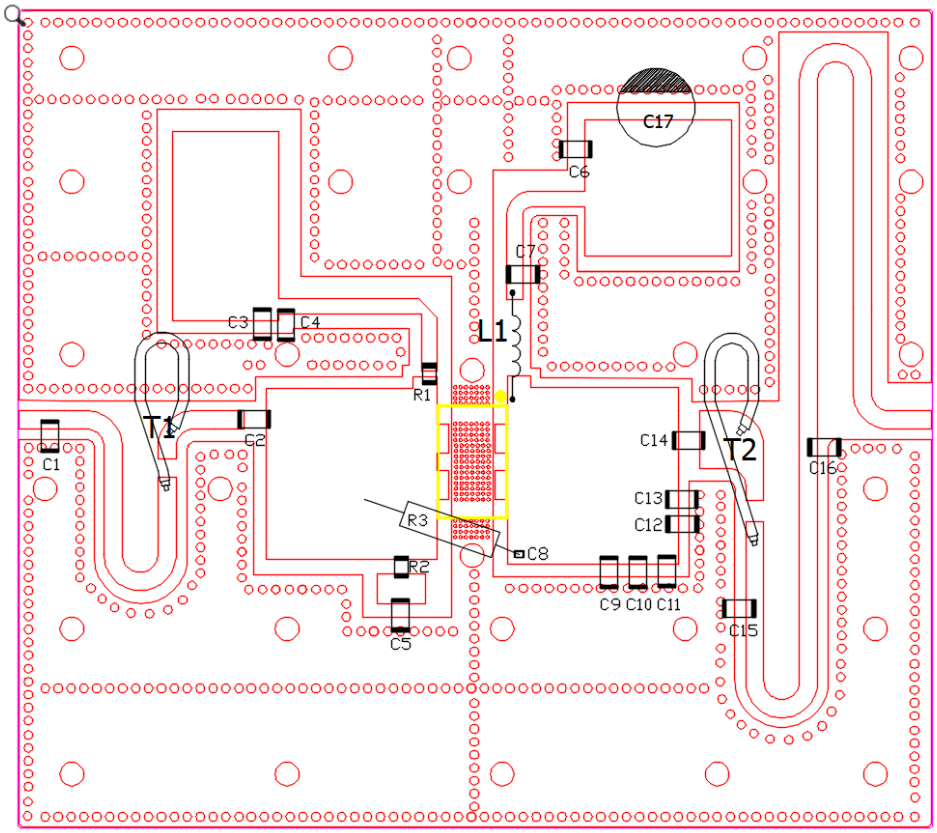
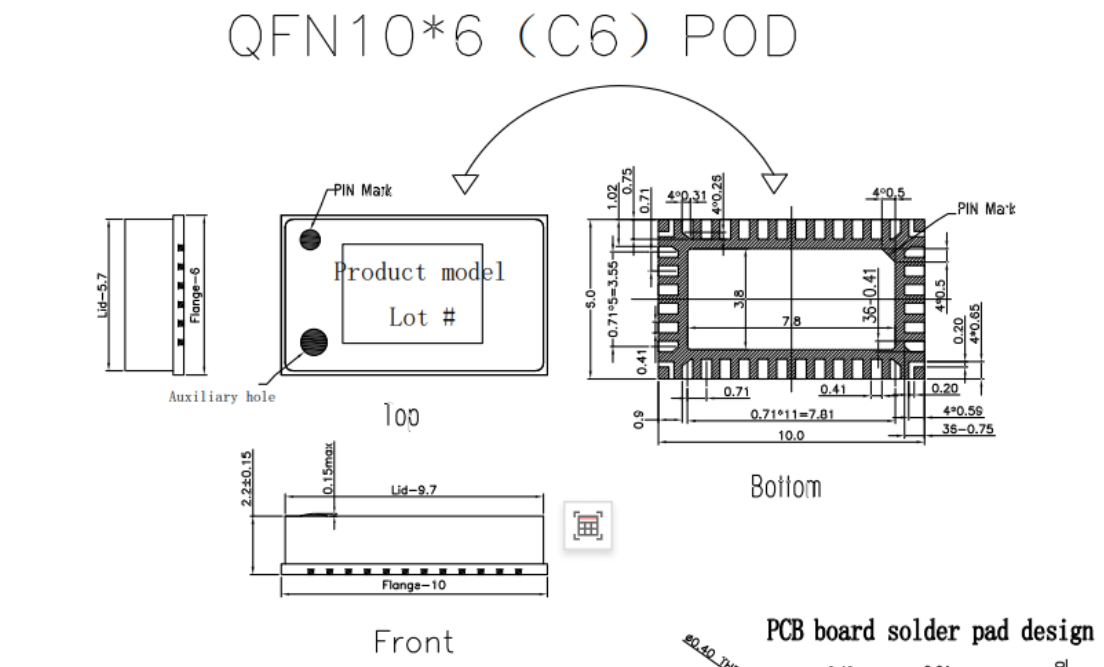


Table 5. Bill of materials of application board (RO4350B 30mils,PCB layout upon request)

Component	Description	Suggestion
C3,C5,C6,C8	10uF/1210	Ceramic Multilayer Capacitor
C2,C4,C7,C14	200pF/1210	Ceramic Multilayer Capacitor
C1,C15	2pF	Beijing yuanlu MQ30_1111
C9,C12,C13	2.4pF	Beijing yuanlu MQ30_1111
C10	9.1pF	Beijing yuanlu MQ30_1111
C11	4.7pF	Beijing yuanlu MQ30_1111
C16	1.8pF	Beijing yuanlu MQ30_1111
C17	470uF/100V	Electrolyic capacitor
T1	12.5ohm 60mm	SFF-12.5-1.5 BN-61-202
T2	12.5ohm 50mm	SFF-12.5-1.5
R1	10Ω /1206	Chip Resistor
R2	51Ω /1206	Chip Resistor
R3	300 Ω	Color ring Resistor
L1	ϕ 1mm Inner diameter 5mm 8 turn	DIY
PCB	30Mil Rogers4350	

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
2025/6/10	V1.0	Preliminary Datasheet Creation

Application data based on: LBG-25-24/26

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