



Gallium Nitride 12.5V, 10W, 5.8GHz RF Power Transistor

Description

The YTAN58010C6 is a 10watt, CW capable, GaN HEMT, ideal for ISM and RF Energy application at 5.8G. 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.

Its reference design in highly compact size 23*16mm, At back off condition, it represent good linearity at 1W

- 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 (%)
5700	40.14	10.33	50.02	8.46	41.26	13.37	53.92
5800	39.92	9.83	51.46	8.92	41.13	12.98	55.74
5900	39.62	9.17	52.96	8.14	40.86	12.20	57.07

1 carrier WCDMA test at back off

Freq (MHz)	Pout (dBm)	ACPR (dBc)	Gain (dB)	Efficiency (%)
5700	30	-47	9.64	18.81
5800		-47	10.01	19.27
5900		-46	9.31	20.89

Applications

- 5.8G RF Energy
- 5.8G WIFI and router
- C band UAV amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

- Set VGS to the pinch--off (VP) voltage, typically -5 V
- Turn on VDS to nominal supply voltage
- Increase VGS until IDS current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce VGS down to VP, typically -5 V
- Reduce VDS down to 0 V
- 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	I _{gs}	8	mA
Storage Temperature Range	T _{stg}	-65 to +150	°C

YTAN58010C6





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 $T_C = 85^\circ\text{C}$, at $P_{out}=10\text{ CW}$, mounted on high density vias	$R_{\theta JC}$	5.4	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 8\text{mA}$	V_{DSS}		80		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 8\text{mA}$	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 40\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, $P_{out}=10\text{W}$ pulse CW All phase, No device damages	VSWR		10:1		

Figure 1:Pin Definition(Top View)



Pin No.	Symbol	Description
8,9,10,11	Vgs/RF In	Vgs and RF input
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

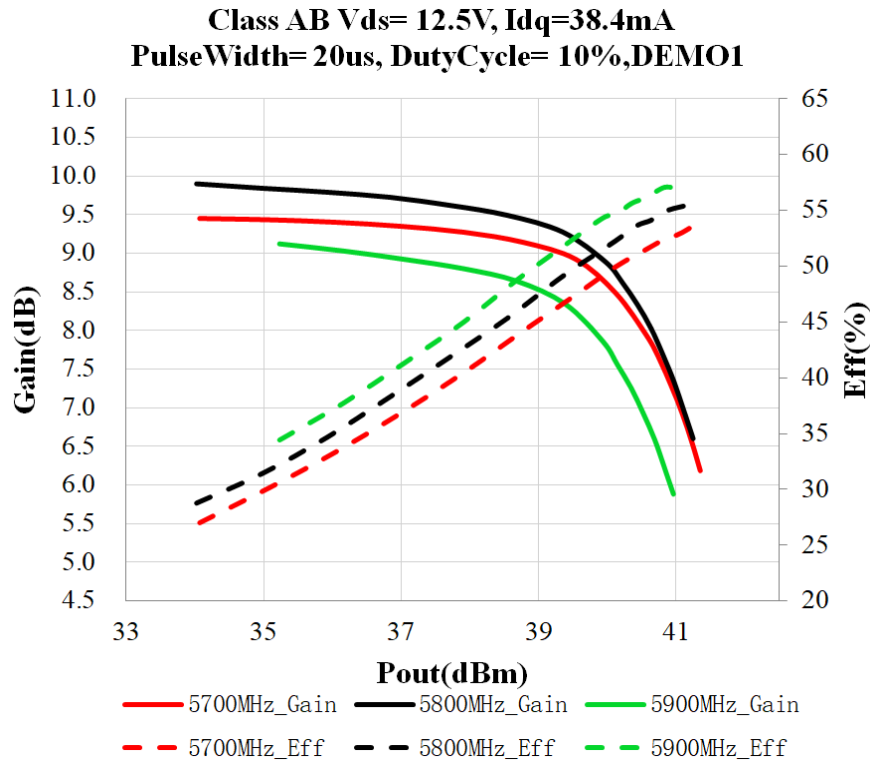


Figure 3: Network plot for S11/S21

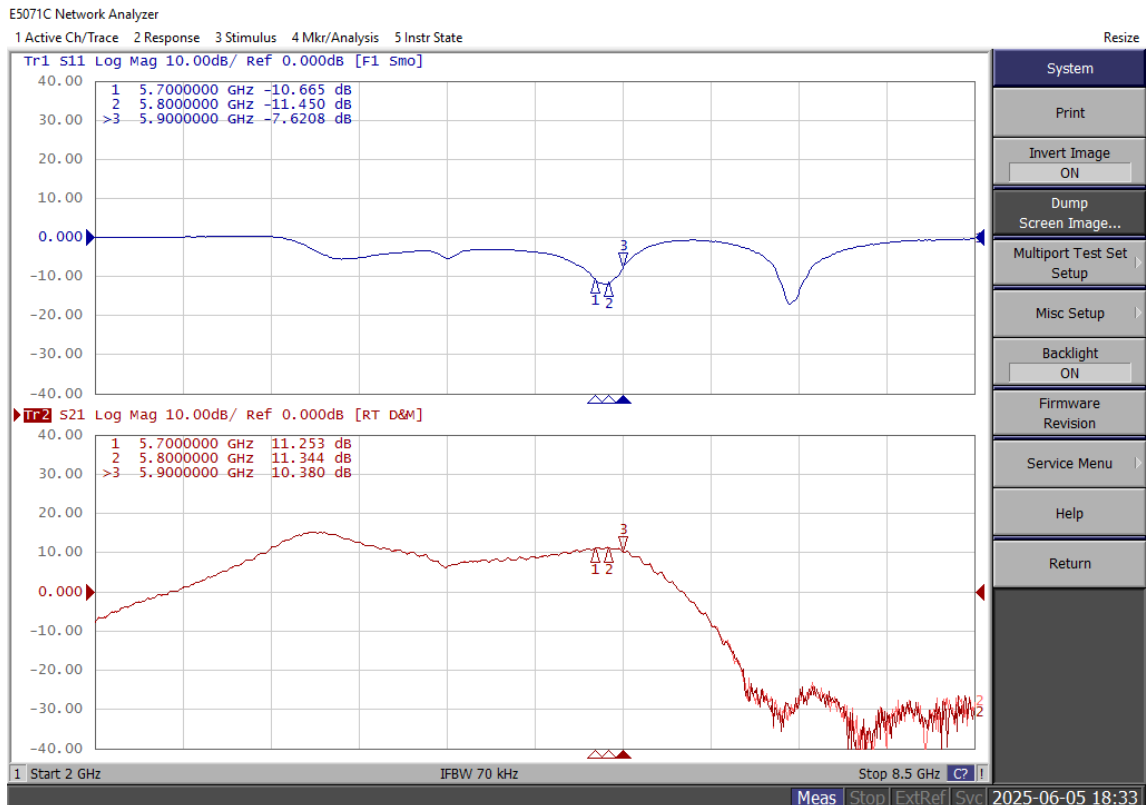


Figure 4: Picture of application board of 3.4-3.8GHz

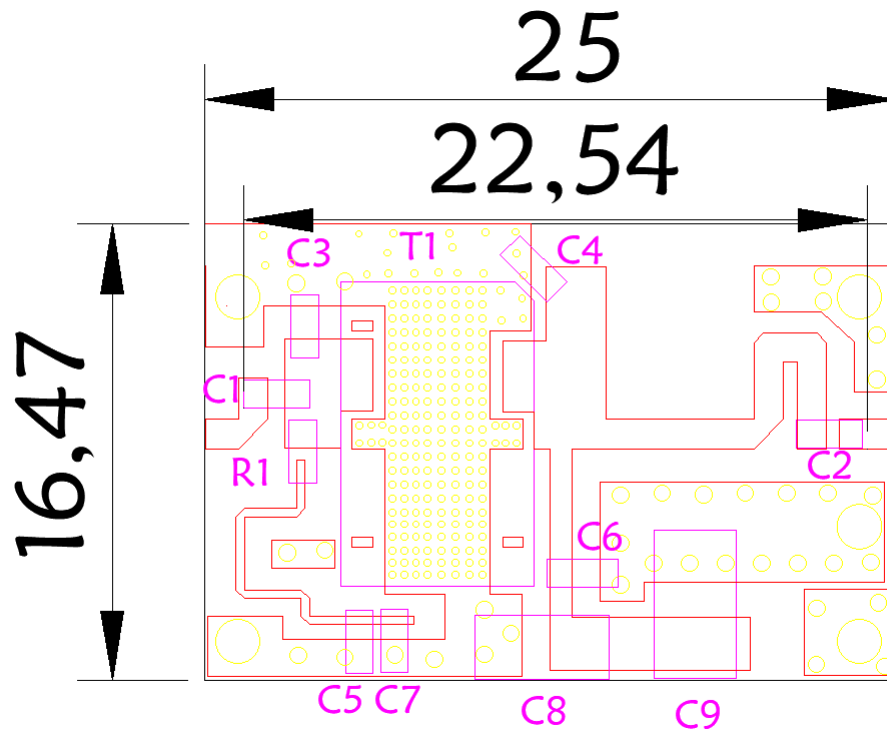


Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

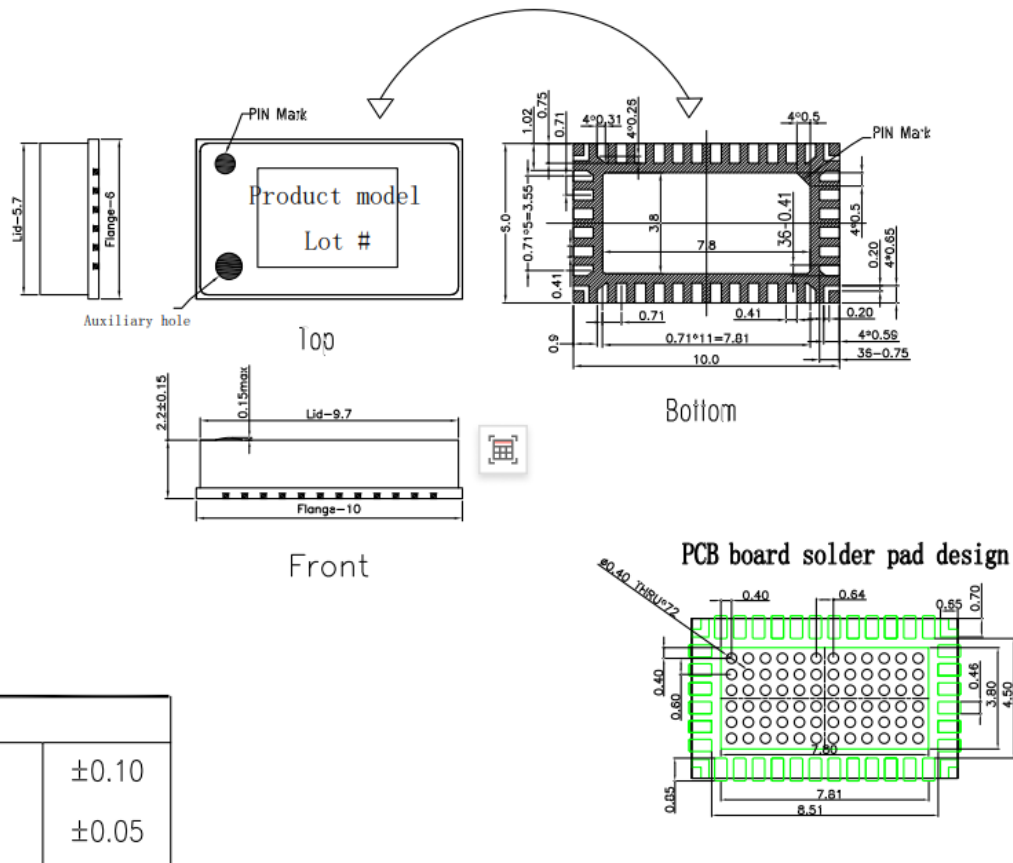
Part	Quantity	Description	Part Number	Manufacture
C1,C2,C5,C6	4	3.9pFHigh Q Capacitor	251SHS3R9BSE	TEMEX
C3	1	0.7pFHigh Q Capacitor	251SHS0R7BSE	TEMEX
C4	1	0.2pFHigh Q Capacitor	251SHS0R2BSE	TEMEX
C7,C8,C9	3	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10 Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	GaN Transistor	YTAN58010C6	Innogrations



Package Dimensions

10*6 Plastic Package

QFN10*6 (C6) POD



X.X	±0.10
X.XX	±0.05

Notes:

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

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/6/10	V1.0	Preliminary Datasheet Creation

Application data based on: LWH-25-22

Notice

Specifications are subject to change without notice. Innegration believes the information within the data sheet to be reliable. Innegration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innegration 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.

Innegration 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 Innegration 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 Innegration and authorized distributors

Copyright © by Innegration (Suzhou) Co.,Ltd.