



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

V_{ds}=12.5V, I_{dq}=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 V_{GS} to the pinch--off (V_P) voltage, typically -5 V
- Turn on V_{DS} to nominal supply voltage
- Increase V_{GS} until I_{DS} current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce V_{GS} down to V_P, typically -5 V
- Reduce V_{DS} down to 0 V
- Turn off V_{GS}

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)

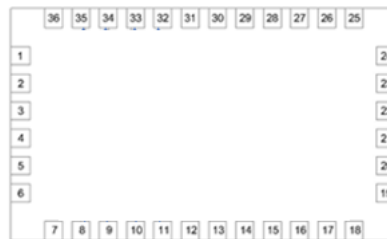
DC Characteristics (measured on wafer prior to packaging)

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

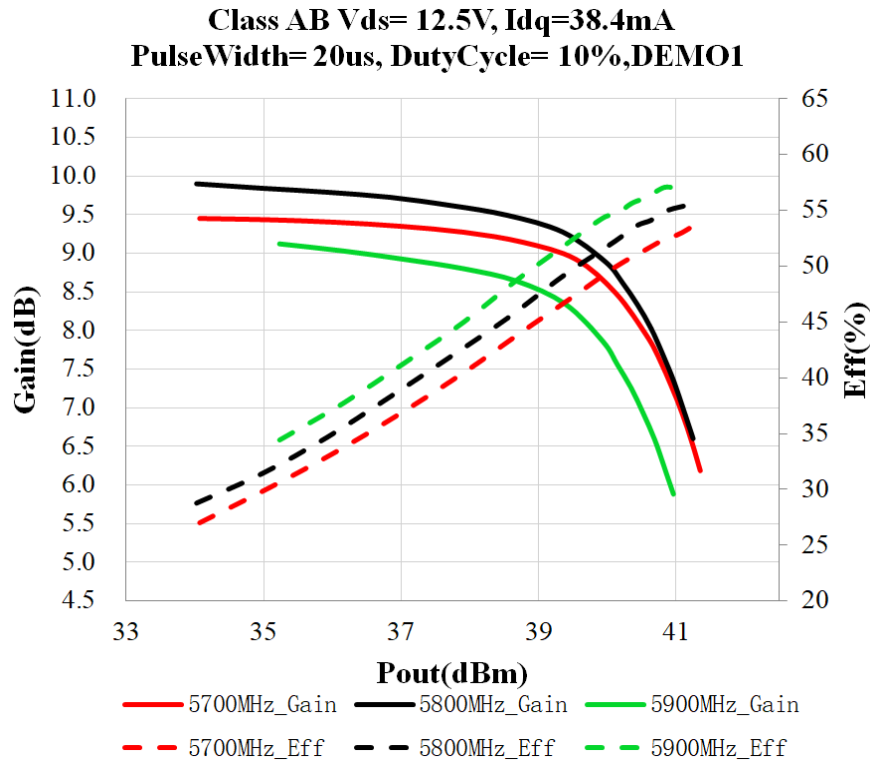


Figure 3: Network plot for S11/S21

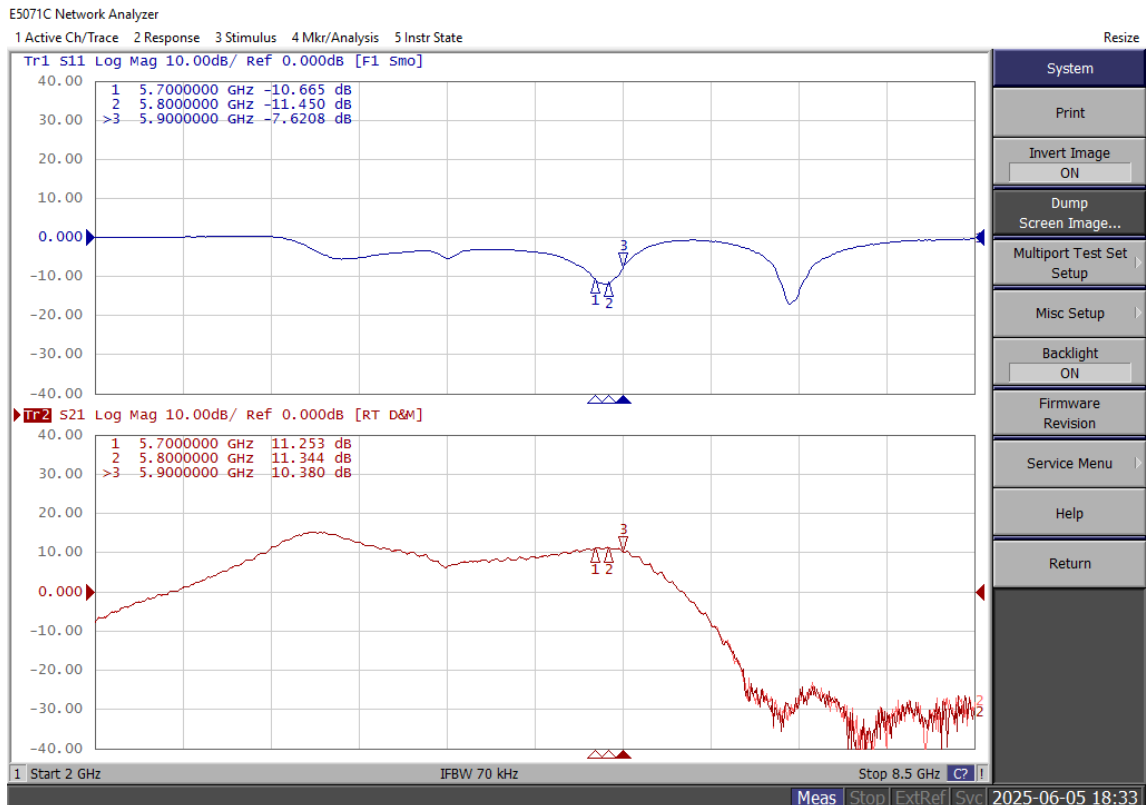


Figure 4: Picture of application board of 5.7-5.9GHz

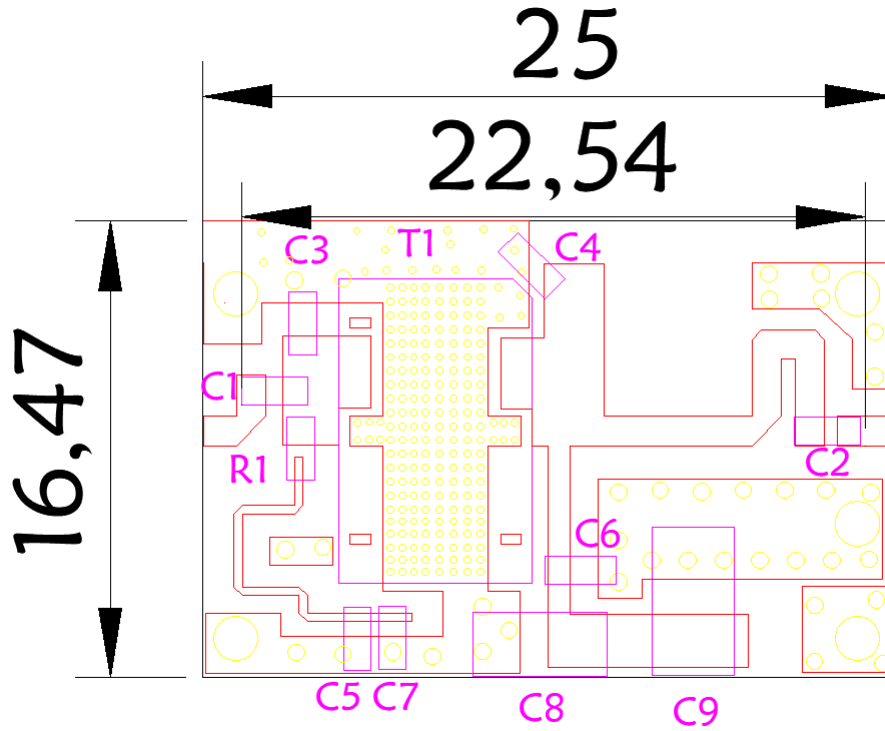


Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

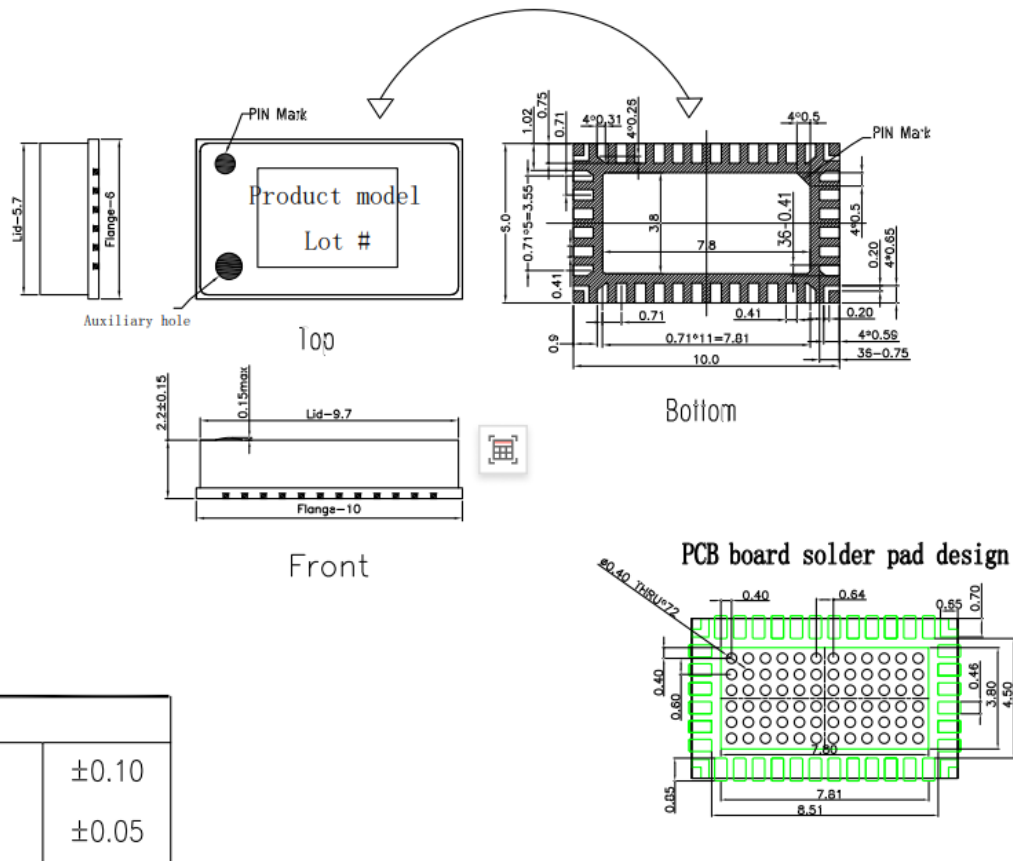
Part	Quantity	Description	Part Number	Manufacture
C1,C2,C5,C6	4	3.9pFHigh Q Capacitor	251SHS3R9BSE	TEMEX
C3	1	0.7pFHigh Q Capacitor	251SHS0R7BSE	TEMEX
C4	1	0.2pFHigh Q Capacitor	251SHS0R2BSE	TEMEX
C7,C8,C9	3	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10 Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	GaN Transistor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

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