



Gallium Nitride 12.5V, 20W, 5.8GHz RF Power Transistor

Description

The YTAN58020C6 is a 20watt, 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 30*21mm, At back off condition, it represent good linearity at 2W

- Typical Class AB RF CW performance with device soldered through grounding vias

$V_{ds}=12.5V$, $I_{dq}=120mA$

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
5700	42.8	19.1	46.3	8	44.08	25.6	50.3
5800	42.43	17.5	47.9	8.34	43.84	24.2	53.1
5900	41.77	15.0	48.7	7.66	43.14	20.6	53.6

1 carrier WCDMA test at back off

Freq (MHz)	Pout (dBm)	ACPR (dBc)	Gain (dB)	Efficiency (%)
5700	33	-46	8.8	18.2
5800		-45	9.0	19.5
5900		-43	8.4	21.4

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_{DS}	+80	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	18	Vdc
Maximum gate current	I_{gs}	16	mA
Storage Temperature Range	T_{stg}	-65 to +150	°C

YTAN58020C6





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 $P_{out}=20\text{ CW}$, mounted on high density vias	$R_{\theta JC}$	2.7	°C /W

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

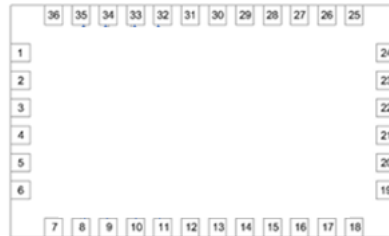
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$; $I_{DS}=16\text{mA}$	V_{DSS}		80		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$, $I_D=16\text{mA}$	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	$V_{DS}=50\text{V}$, $I_{DS}=120\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, $P_{out}=20\text{W}$ pulse CW All phase, No device damages	VSWR		10:1		

Figure 1:Pin Definition(Top View)



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	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

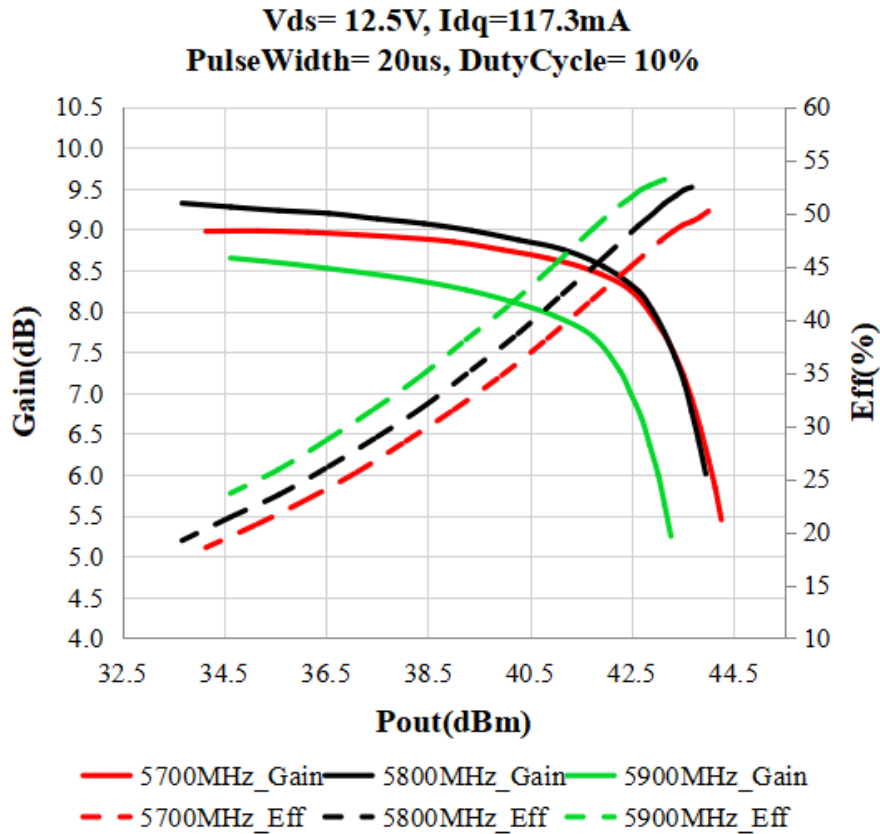


Figure 3: Network plot for S11/S21

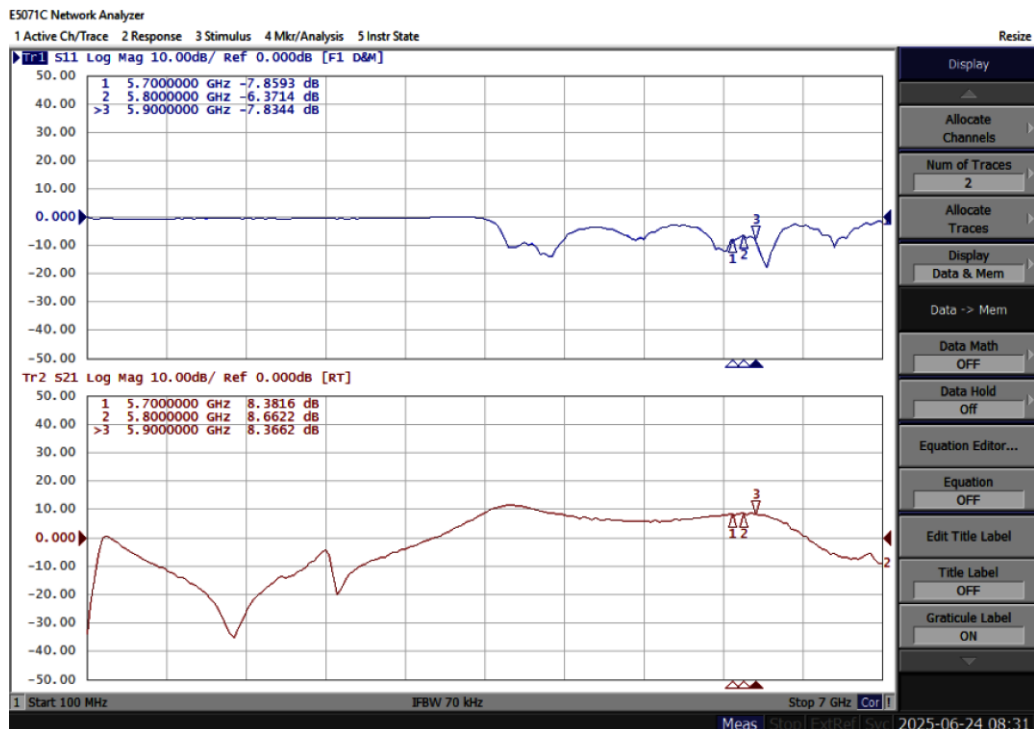


Figure 4: Picture of application board

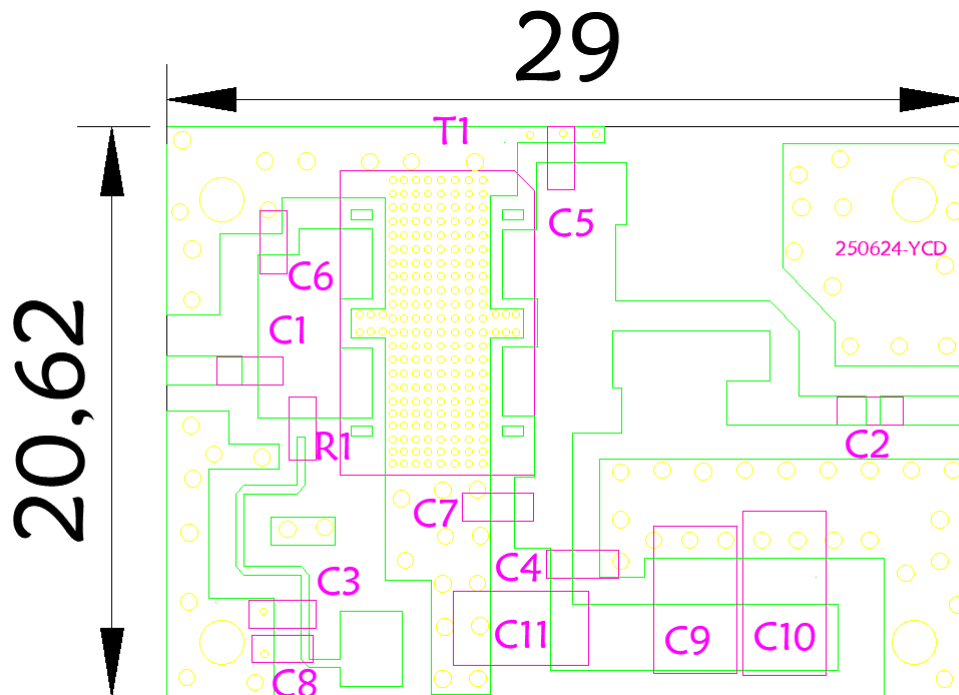


Table 4. Bill of materials of application board (RO4350B 20mils,PCB layout upon request)

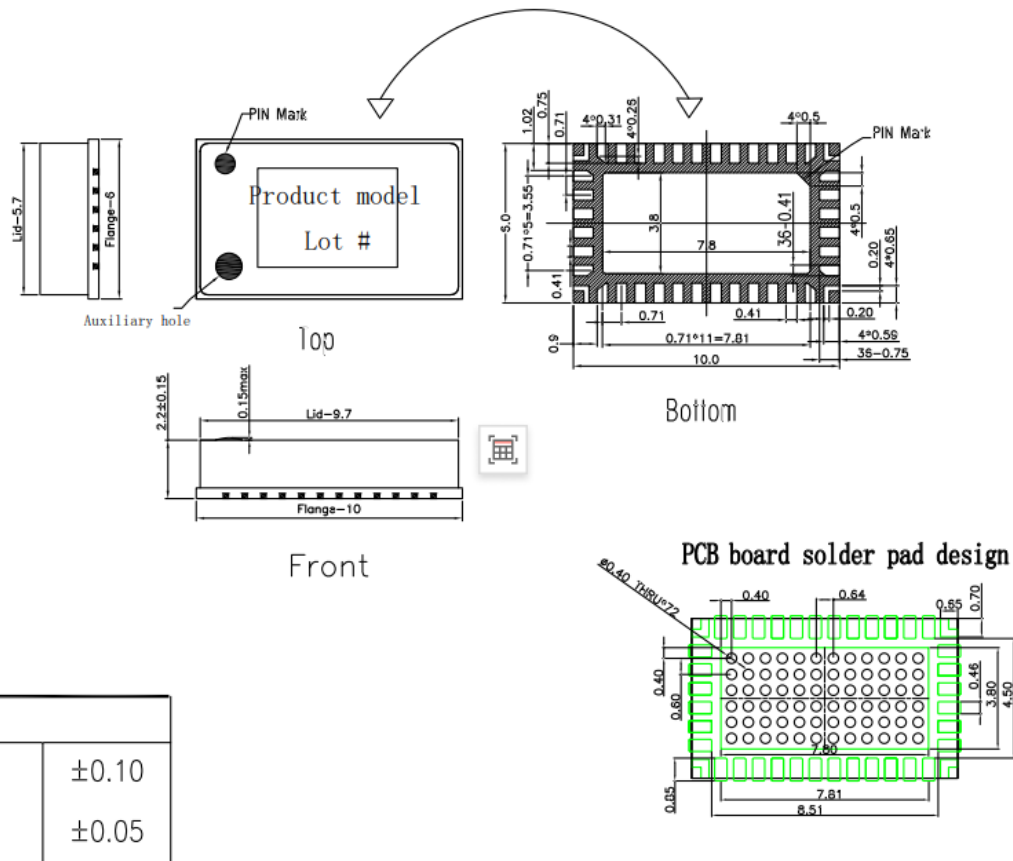
Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	3.9pF High Q Capacitor	251SHS3R9BSE	TEMEX
C5	1	0.2pF High Q Capacitor	251SHS0R2BSE	TEMEX
C6	1	0.3pF High Q Capacitor	251SHS0R3BSE	TEMEX
C7	1	0.1pF High Q Capacitor	251SHS0R1BSE	TEMEX
C8,C9,C10,C11	4	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10 Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	GaN Transistor	YTAN58020C6	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
2025/6/24	V1.0	Preliminary Datasheet Creation

Application data based on: LWH-25-27

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