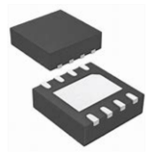
Gallium Nitride 12V 1W, General purpose RF Power Transistor

XTAN80001PD


DFN 4*4mm

Description

The XTAN80001PD is a 1W GaN HEMT, designed for multiple applications, up to 8GHz. The transistor is available in a highly cost effective 4mm*4mm, surface mount, DFN package with 100% DC production test to ensure the quality and consistency.

It can be used in CW, Pulse and any other modulation modes, especially LTE-U/WIFI 6/WIFI 6E etc.There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical wideband Performance broadband class AB circuit (On Innogration fixture):

V_{DD} =12 V, I_{DQ} =20 mA, CW

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	Ids(A)	Gain(dB)	Eff(%)	2nd (dBc)	3rd(dBc)
2000	22.50	32.86	1.9	0.25	10.4	64.9	-13.6	-12.5
3000	22.50	32.72	1.9	0.25	10.2	61.4	-16.1	-27.5
4000	22.50	32.34	1.7	0.28	9.8	51.0	/	/
5000	22.50	32.30	1.7	0.27	9.8	52.8	/	/
6000	22.50	31.72	1.5	0.21	9.2	58.1	/	/

- Typical narrow band Performance broadband class AB circuit (On Innogration fixture):

V_{DD} =12 V, I_{DQ} =20 mA, CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
3000	32.31	1.7	56.9	13.17	33.28	2.1	61.0
3300	31.8	1.5	56.6	12.85	32.57	1.8	58.1
3600	31.45	1.4	54.2	13.21	32.29	1.7	56.2

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Note: Proper Biasing Sequence for GaN HEMT Transistors

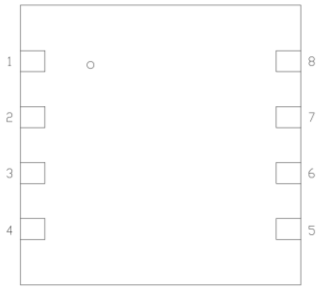
Turning the device ON

1. Set VGS to the pinch—off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage (28V)
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

Pin Configuration and Description(Top view)



Device labeling: AH004PD

Pin No.	Symbol	Description
2, 3	RF IN /VGS	RF Input, Gate Bias
6, 7	RF OUT /VDS	RF Output, Drain Bias
1, 4, 5, 8	NC	No connection
Package Base	GND	DC/RF Ground. Must be soldered to EVB ground plane over array of vias for thermal and RF performance. Solder voids under Pkg Base will result in excessive junction temperatures causing permanent damage.

Table 1. Maximum Ratings (Not simultaneous, TC = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	80	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	20	Vdc
Maximum Forward Gate Current	Igmax	1	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C

1. **Continuous operation at maximum junction temperature will affect MTTF**
2. **Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase**

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, DC Power Dissipation, FEA (See note 1)	$R_{θJC-DC}$	16	C/W

1. **$R_{θJC-DC}$ is tested at only DC condition, it is related to the highest thermal resistor value among all test conditions. It might be differently lower in different RF operation conditions like CW signal ,pulsed RF signal etc.**

Table 3. Electrical Characteristics (T_C = 25℃ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=1mA	V_{DSS}		150		V
Gate Threshold Voltage	V_{DS} = 12V, I_D = 1mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =12V, I_{DS}=20mA, Measured in Functional Test	$V_{GS(Q)}$	——	-2.3	——	V

2-6GHz

Reference circuit of test fixture assembly diagram

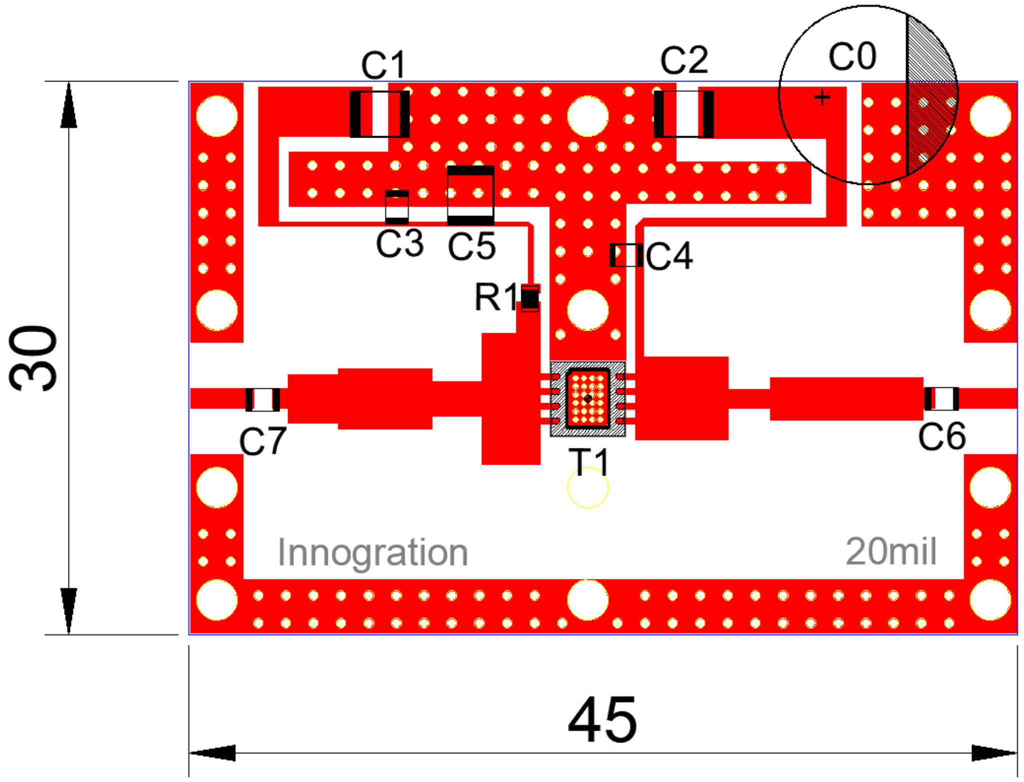


Table 4: components designations and values

Component	Description	Suggestion
C0	470uF/63V	Electrolytic Capacitor
C1, C2	10uF	1210
C3	1nF	0805
C5	470pF	
C4, C6, C7	4.3pF	
R1	Chip Resistor,50Ω	0805
T1	XTAN80001PD	Innogration
PCB	Rogers 4350b, thickness 20 mils, 1oz copper	

3.0-3.6GHz

Reference circuit of test fixture assembly diagram

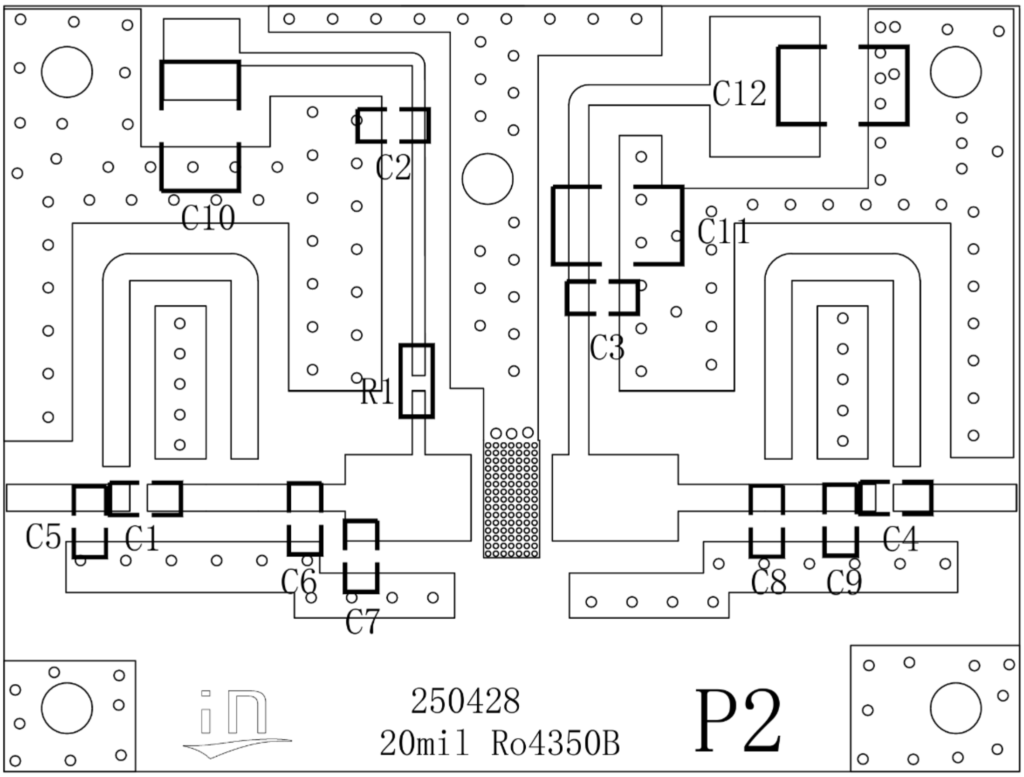
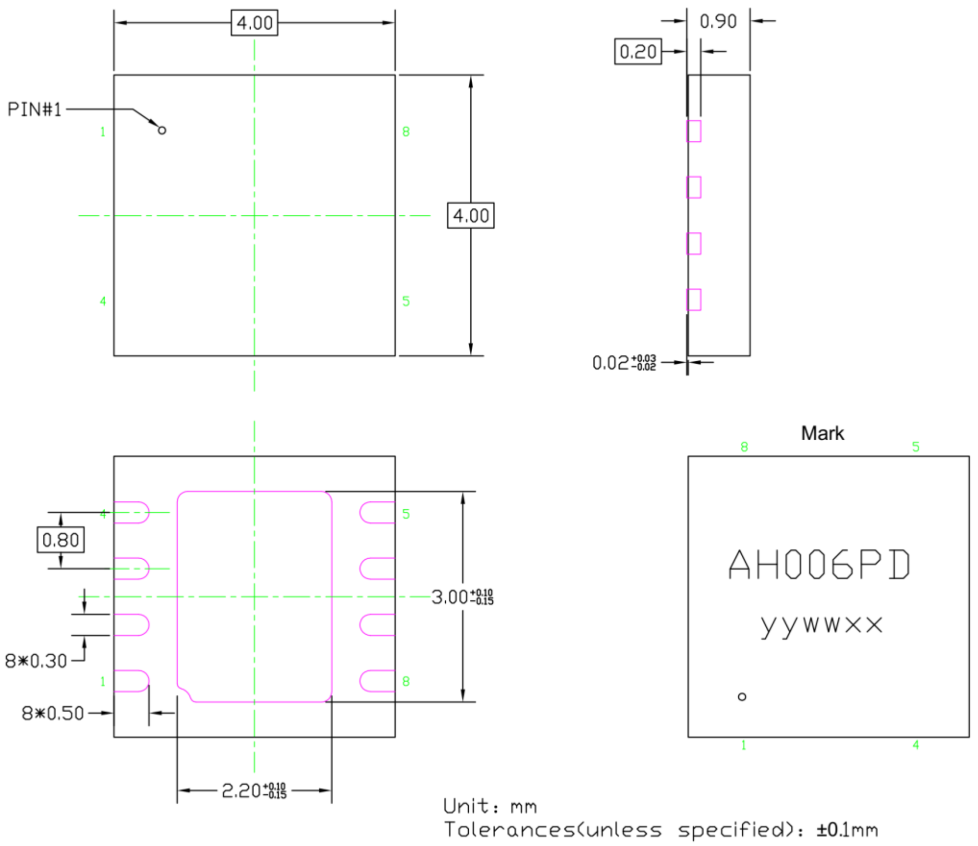


Table 4: components designations and values

Reference	Footprint	Value	Quantity
C1, C2, C3, C4	0603	10pF/250V	4
C5, C6	0603	0.5pF/250V	2
C7	0603	1.0pF/250V	1
C8, C9	0603	0.3pF/250V	2
C10, C11, C12	1210	10uF/100V	3
R1	0603	10R	1
U1		XTAN80001PD	1

Package Dimensions

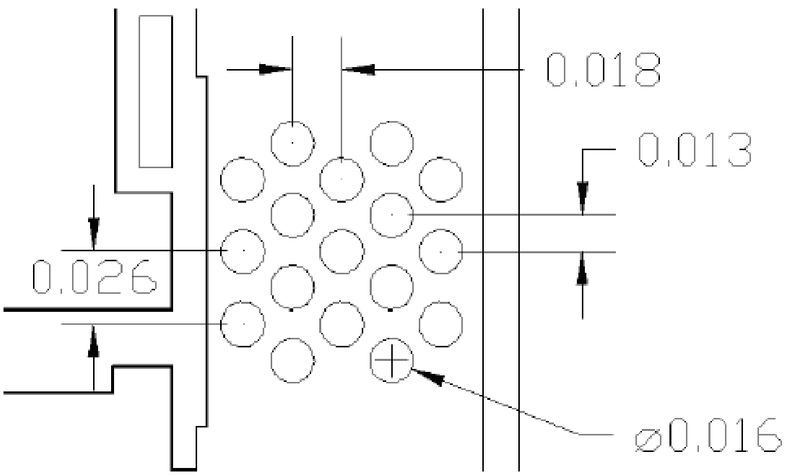
4*4 DFN Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.1mm.

Recommended vias layout: (all in inches)



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/6/26	V1.0	Preliminary Datasheet Creation

Application data based on RXT-25-20/ZBB-25-19

Notice

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