



Gallium Nitride 12V 3W, General purpose RF Power Transistor

Description

The XTAN80003PD is a 3W GaN HEMT, designed for multiple applications, up to 6GHz.

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 Innegration fixture):

$V_{DD} = 12\text{ V}$, $I_{DQ} = 20\text{ mA}$, CW $V_{DD} = 28\text{ V}$, $I_{DQ} = 30\text{ mA}$, CW

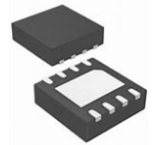
Freq (MHz)	CW Signal			
	P_{1dB} (W)	Gain@ P_{1dB} (dB)	P_{3dB} (W)	$\eta_D@P_3$ (%)
5100-5900	3	7	4	57

Typical Performance of class AB circuit (On different Innegration fixtures):

$V_{DD} = 12\text{ V}$, $I_{DQ} = 30\text{ mA}$, WCDMA 1 carrier CCDF=10dB

Freq (MHz)	Pout=27dBm			
	CCDF (dB)	ACPR (dB)	Gain (dB)	η_D (%)
5100-5900	9.	-45	7.5	22

XTAN80003PD



DFN 4*4mm

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

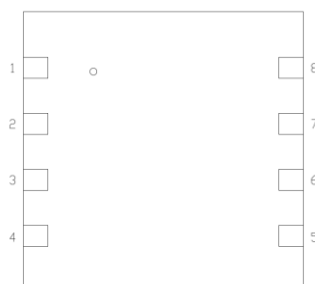
Turning the device ON

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)





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	I_{gmax}	2.5	mA
Storage Temperature Range	T_{stg}	-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: $P_{diss} < (T_J - T_C) / R_{JC}$ and $T_C = T_{case}$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC Power Dissipation, FEA (See note 1)	$R_{\theta JC-DC}$	5.5	C/W

1. $R_{\theta JC-DC}$ 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 ($T_C = 25^\circ\text{C}$ unless otherwise noted)**DC Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 1\text{mA}$	V_{DSS}		80		V
Gate Threshold Voltage	$V_{DS} = 12\text{V}$, $I_D = 1\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 12\text{V}$, $I_{DS} = 30\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$	---	-2.5	---	V

5.1-5.9GHz

Reference circuit of test fixture assembly diagram

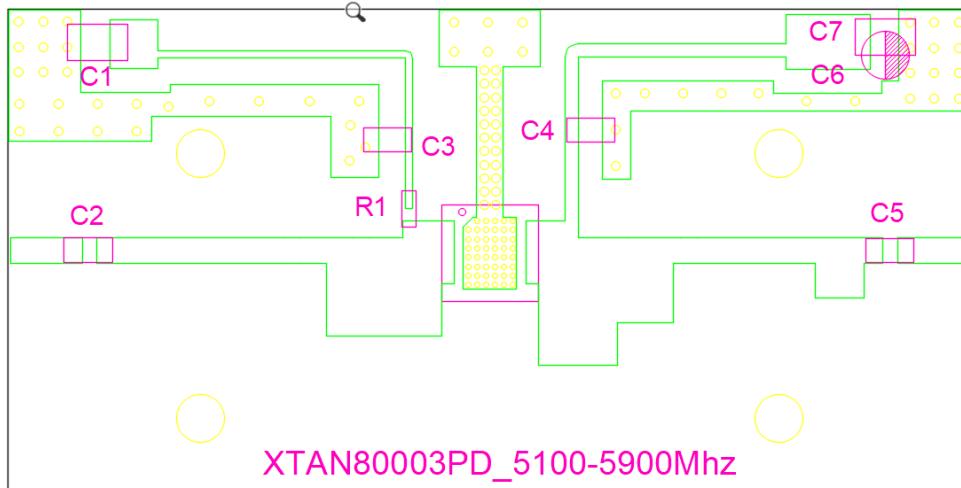
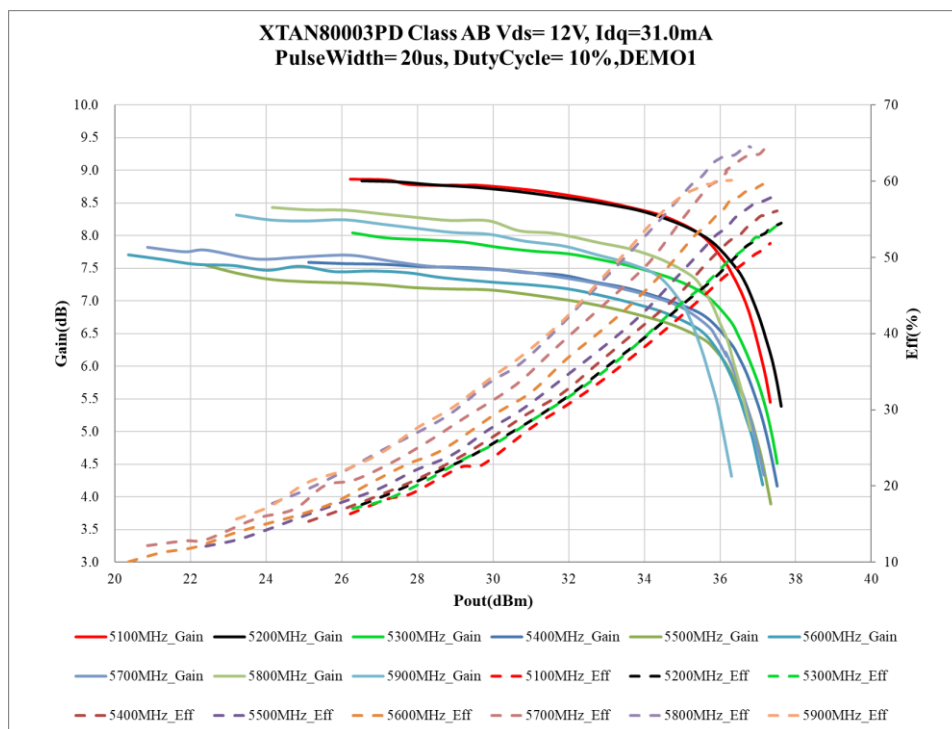


Table 4: components designations and values

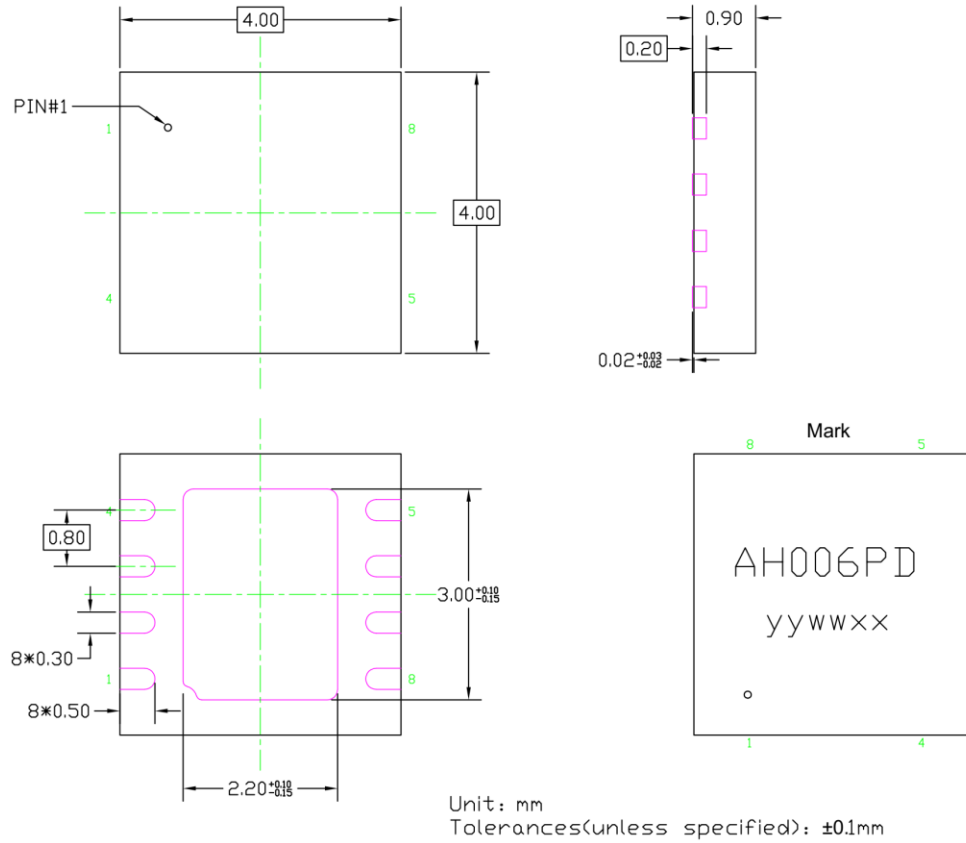
Reference	Footprint	Value	Quantity
C1, C6	1210	10uF/100V	2
C2,C3,C4,C5	0603	3.9pF	4
R1	0603	10Ω	1
C7		470uf/63V	1
U1	DFN4*4	XTAN80003PD	1





Package Dimensions

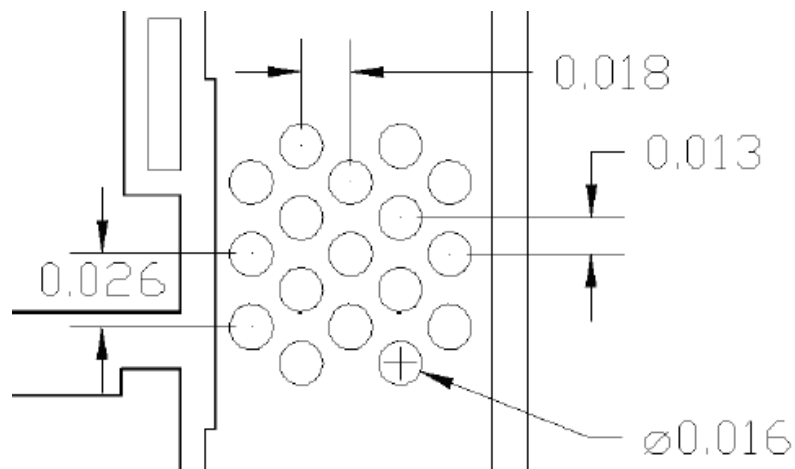
4*4 DFN Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are $\pm 0.1\text{mm}$.

Recommended vias layout: (all in inches)





Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/7/24	V1.0	Preliminary Datasheet Creation

Application data based on LBG-25-30

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