



RF LDMOS 13.6V 12W Transistor, HF-2000MHz

Description

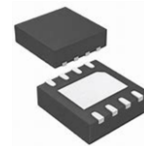
The ITCN10012PD is a 12W RF LDMOS, designed for multiple applications, up to 2GHz.

The transistor is available in a 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 multiple modulation mode.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

ITCN10012PD



DFN 4*4mm

•Typical Performance of 1.6GHz class AB circuit (On Innegration fixture):

$V_{DD} = 13.6\text{ V}$, $I_{DQ} = 100\text{ mA}$, Pulse CW, Pulse Width=20 us, Duty cycle=10%.

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
1585	39.84	9.6	55.8	14.27	41.25	13.3	62.0
1600	39.57	9.1	55.8	14.1	41.02	12.7	62.0
1615	39.37	8.7	56.0	13.94	40.81	12.0	62.1

•Typical Performance of 800MHz class AB circuit (On Innegration fixture):

$V_{DD} = 12.5\text{ V}$, $I_{DQ} = 300\text{ mA}$, Pulse CW, Pulse Width=20 us, Duty cycle=10%.

Freq (MHz)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)	P3dB Gain (dB)	Psat (dBm)	Psat (W)	Psat Eff (%)
760	41.46	14.0	55.3	12.95	41.98	15.8	58.1
780	41.72	14.9	58.0	13.83	42.41	17.4	61.5
800	41.84	15.3	59.9	15.18	42.56	18.0	63.7
820	41.70	14.8	60.8	16.62	42.56	18.0	65.6
840	41.27	13.4	60.4	17.13	42.61	18.3	68.4
860	40.77	12.0	59.6	16.87	42.37	17.3	69.5
880	40.27	10.7	58.8	15.87	42.02	15.9	70.2

•Typical Performance of 1-1.4GHz class AB circuit (On Innegration fixture):

$V_{DD} = 12.5\text{ V}$, $I_{DQ} = 200\text{ mA}$, CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
1060	39.68	9.3	50.7	12.67	41	12.6	56.8
1100	39.68	9.3	50.4	13.25	41.2	13.2	58.2
1150	39.92	9.8	53.4	13.1	41.41	13.9	61.3
1200	39.91	9.8	56.2	13.53	41.44	13.9	64.4
1250	39.87	9.7	59.8	13.5	41.31	13.5	67.7
1300	39.57	9.1	61.4	12.76	40.96	12.5	69.1
1350	39.11	8.2	62.8	12.6	40.45	11.1	70.0
1380	38.78	7.6	62.8	12	40.08	10.2	69.4



Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Excellent thermal stability, low HCI drift
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Pb-free, RoHS-compliant

Suitable Applications

- VHF/UHF Land mobile radio (LMR)
- Beidou amplifier
- L band amplifier
- UAV image transmission

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+40	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+13.6	Vdc
Storage Temperature Range	T_{stg}	-65 to +150	°C
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 $T_c = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, DC test	$R_{\theta JC}$	1.8	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22--A114)	Class 2

Table 4. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC Characteristics

Drain-Source Voltage $V_{GS}=0$, $I_{DS}=100\mu\text{A}$	$V_{(BR)DSS}$		43		V
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 13.6\text{V}$, $V_{GS} = 0\text{V}$)	I_{DSS}	—	—	1	μA
Gate--Source Leakage Current ($V_{GS} = 9\text{V}$, $V_{DS} = 0\text{V}$)	I_{GSS}	—	—	1	μA
Gate Threshold Voltage ($V_{DS} = 13.6\text{V}$, $I_D = 600\mu\text{A}$)	$V_{GS(th)}$	—	2	—	V
Gate Quiescent Voltage ($V_{DD} = 13.6\text{V}$, $I_D = 100\text{mA}$, Measured in Functional Test)	$V_{GS(Q)}$	—	2.7	—	V

Load Mismatch (In Innegration Test Fixture, 50 ohm system): $V_{DD} = 13.6\text{Vdc}$, $I_{DQ} = 100\text{mA}$, $f = 1600\text{MHz}$

VSWR 10:1 at 12W pulse CW Output Power	No Device Degradation
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TYPICAL CHARACTERISTICS

1.6GHz beidou application

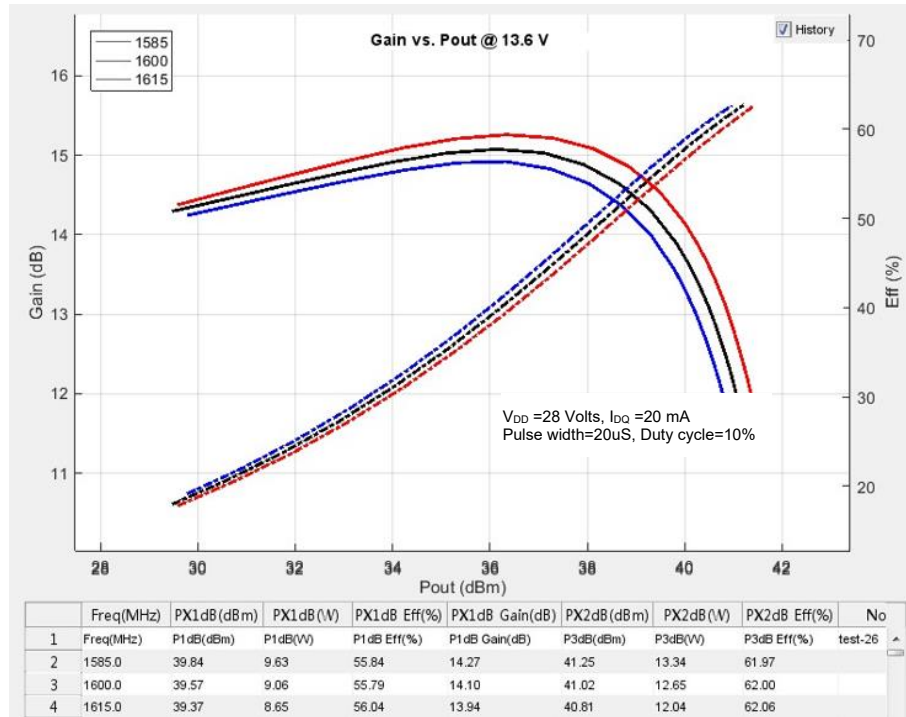


Figure 2. Power Gain and Drain Efficiency as Function of Pulse Output Power

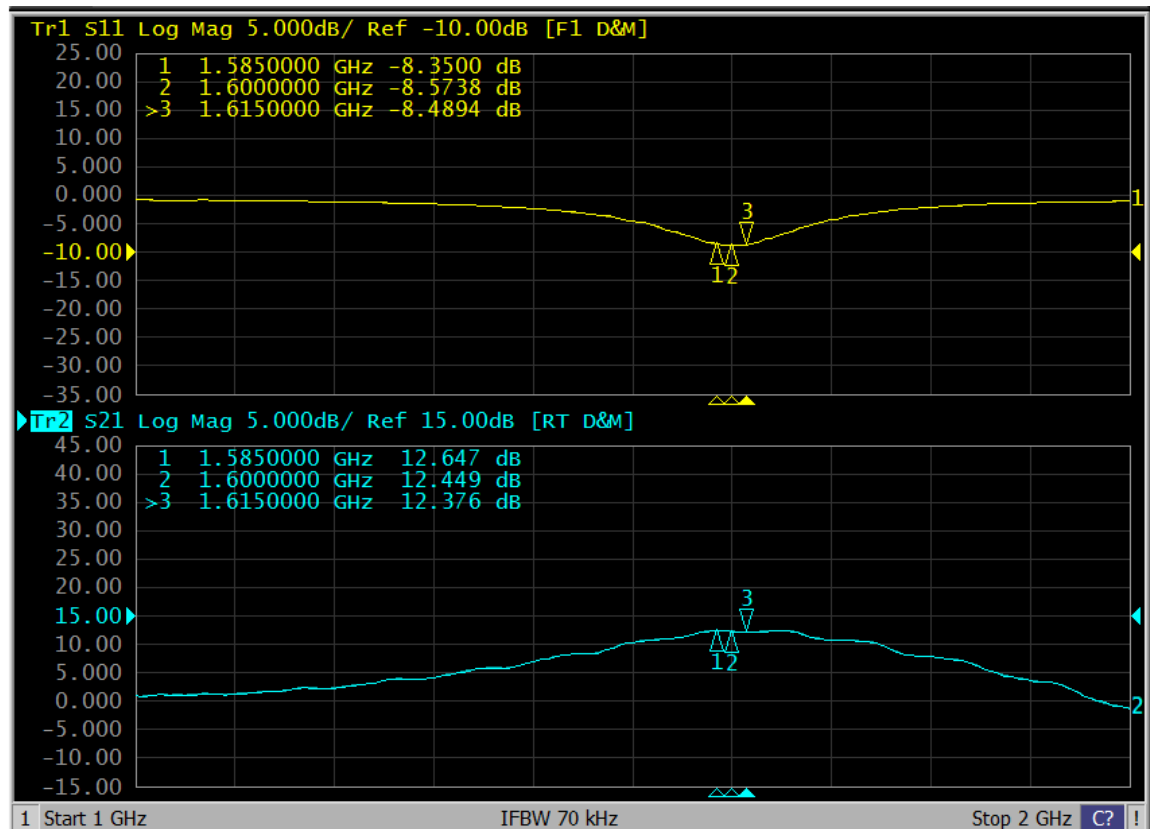
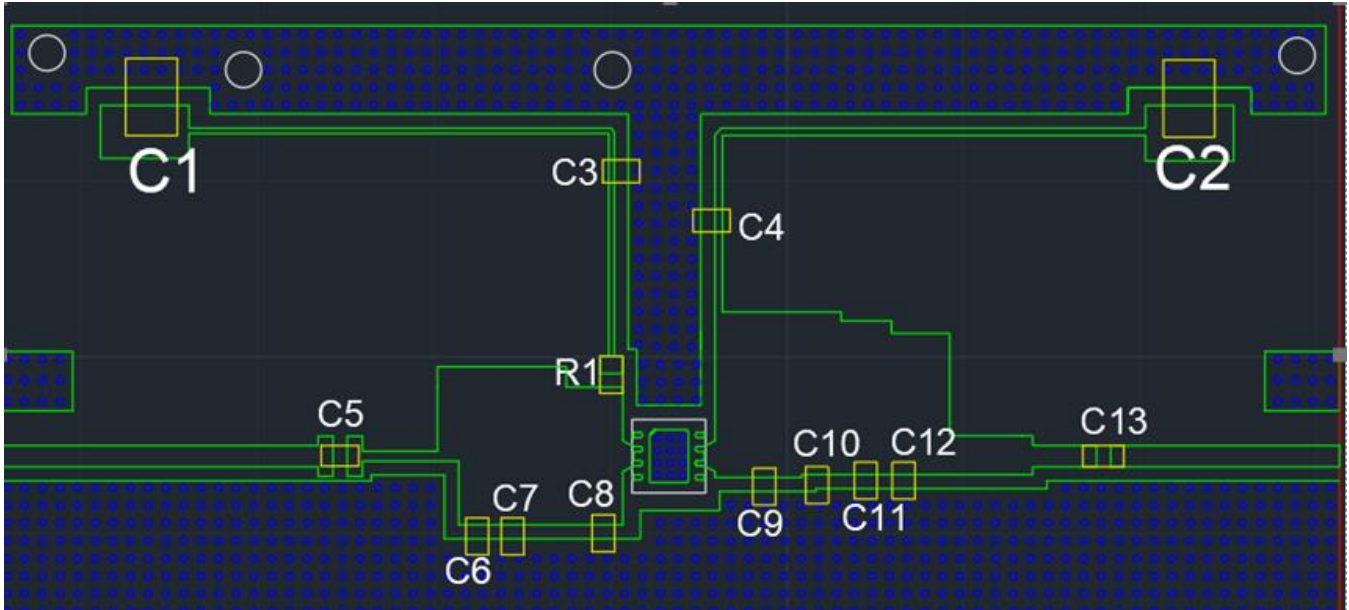


Figure 3. Network analyzer output S11/S21 VDS = 13.6Vdc, Idq = 100mA



Reference Circuit of Test Fixture Assembly Diagram
1.6GHz RO4350B 20mils(Layout upon request)



BOM		
C1,C2	10uF/63V	
C3,C4,C13	27pF	ATC600F
R1	10 ohm	
C5	3.9pF	
C6,C7,C11	2pF	
C8,C9,C12	1pF	
C10	1.8pF	

TYPICAL CHARACTERISTICS

800MHz LAND Mobile application

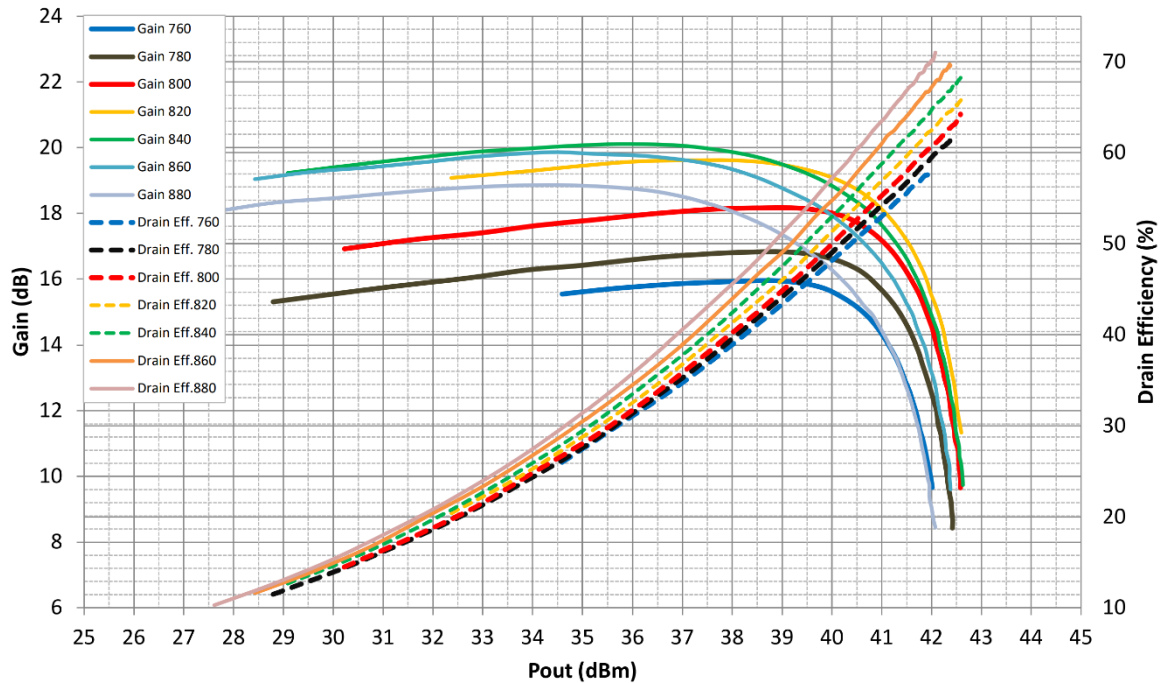


Figure 4. Power Gain and Drain Efficiency as Function of Pulse Output Power

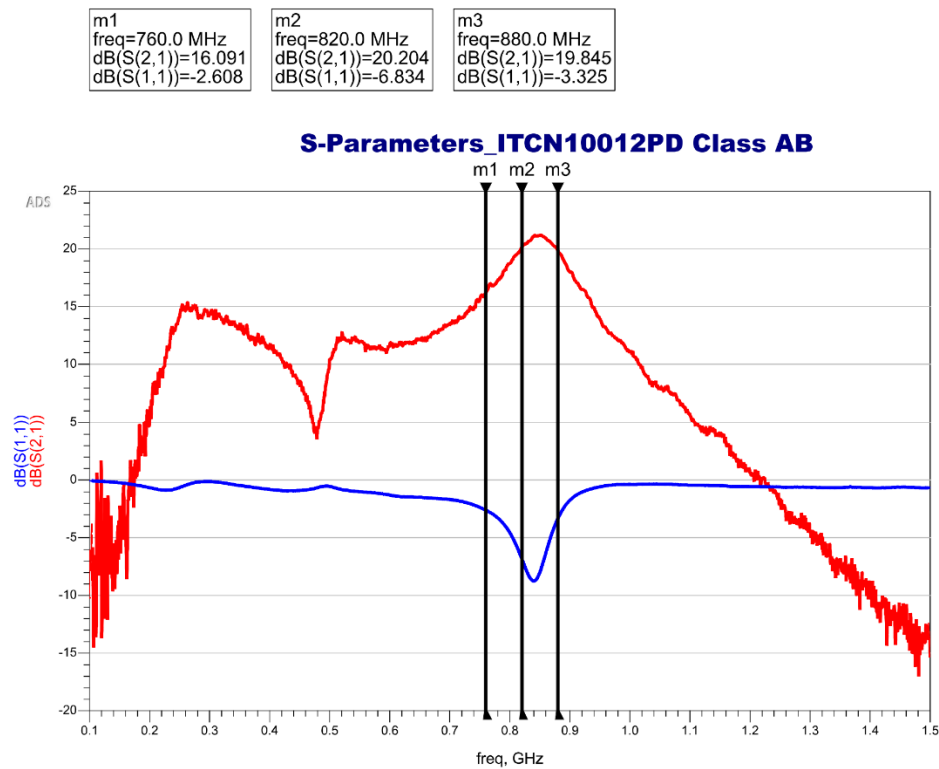
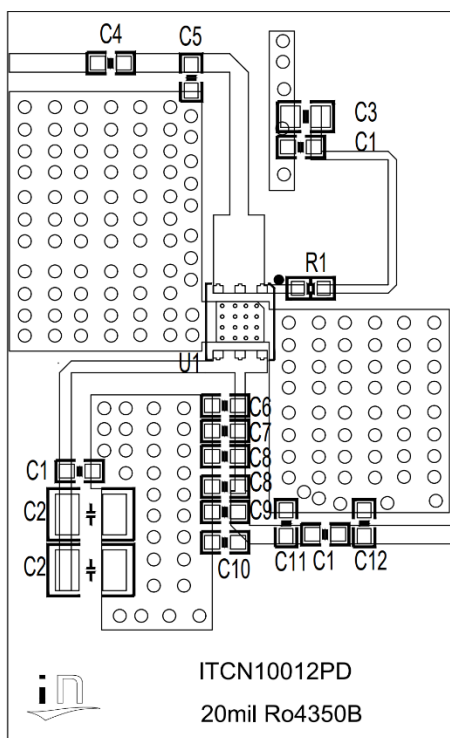


Figure 3. Network analyzer output S11/S21 VDS = 12.5Vdc, Idq= 300mA



Reference Circuit of Test Fixture Assembly Diagram
800MHz RO4350B 20mils(Layout upon request)



Reference	Footprint	Value	Quantity
C1	0603	68pF/250V	3
C2	1210	10uF/100V	2
C3	0805	10uF/16V	1
C4	0603	3.9pF/250V	1
C5	0603	10pF/250V	1
C6	0603	2pF/250V	1
C7	0603	2.7pF/250V	1
C8	0603	1pF/250V	2
C9	0603	1.5pF/250V	1
C10	0603	0.5pF/250V	1
C11	0603	5.6pF/250V	1
C12	0603	3.0pF/250V	1
R1	0603	10R	1
U1	DFN 4*4mm	ITCN10012PD	1

TYPICAL CHARACTERISTICS

1-1.4GHz LAND Mobile application

ITCN10012PD Class AB $V_{ds}=12.5V$, $I_{dq}=205.1mA$
CW Test

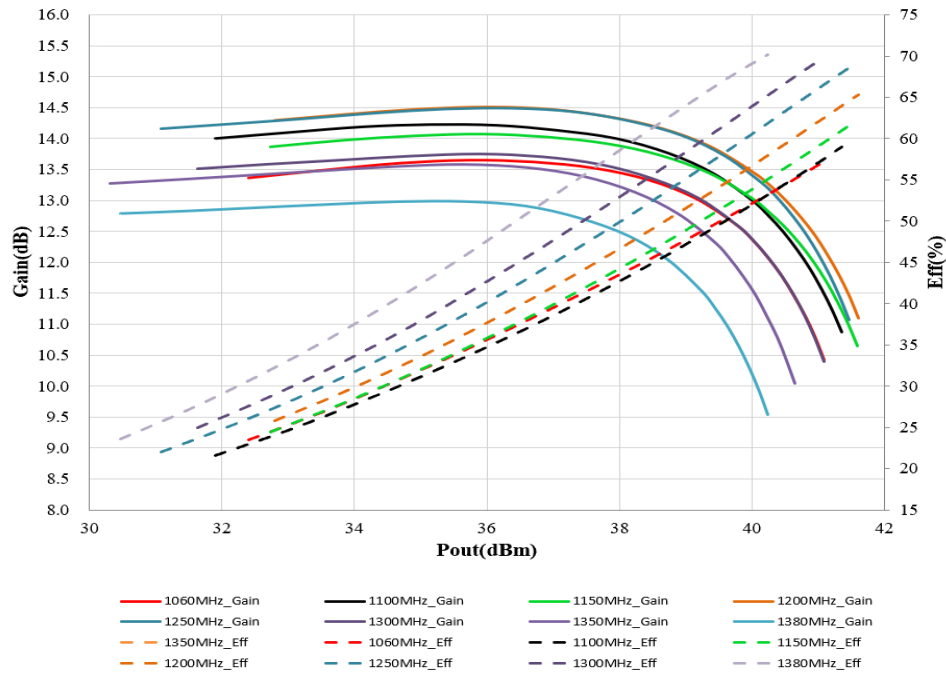
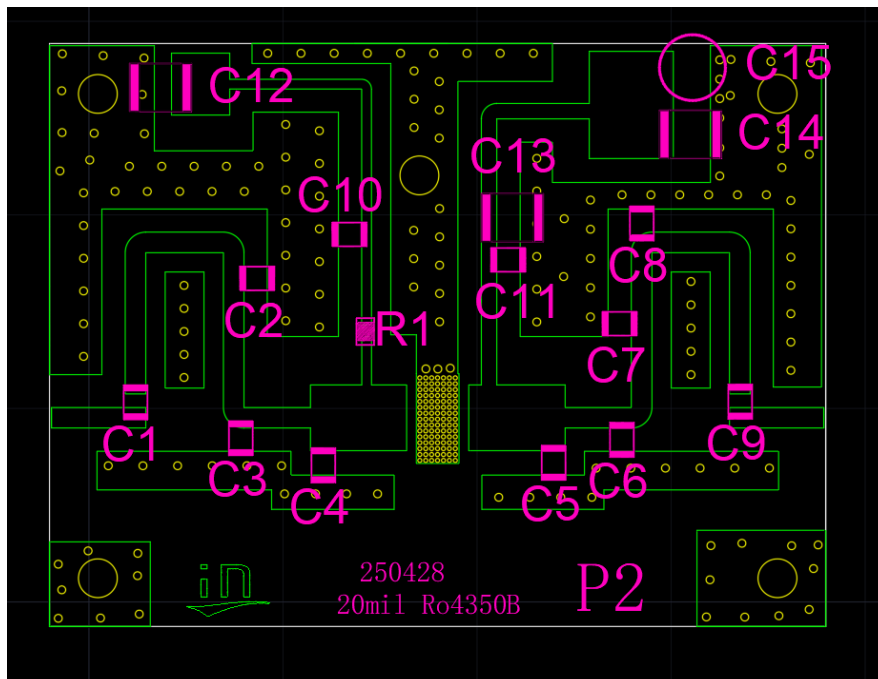


Figure 4. Power Gain and Drain Efficiency as Function of Pulse Output Power

Reference Circuit of Test Fixture Assembly Diagram 1-1.4GHz RO4350B 20mils(Layout upon request)



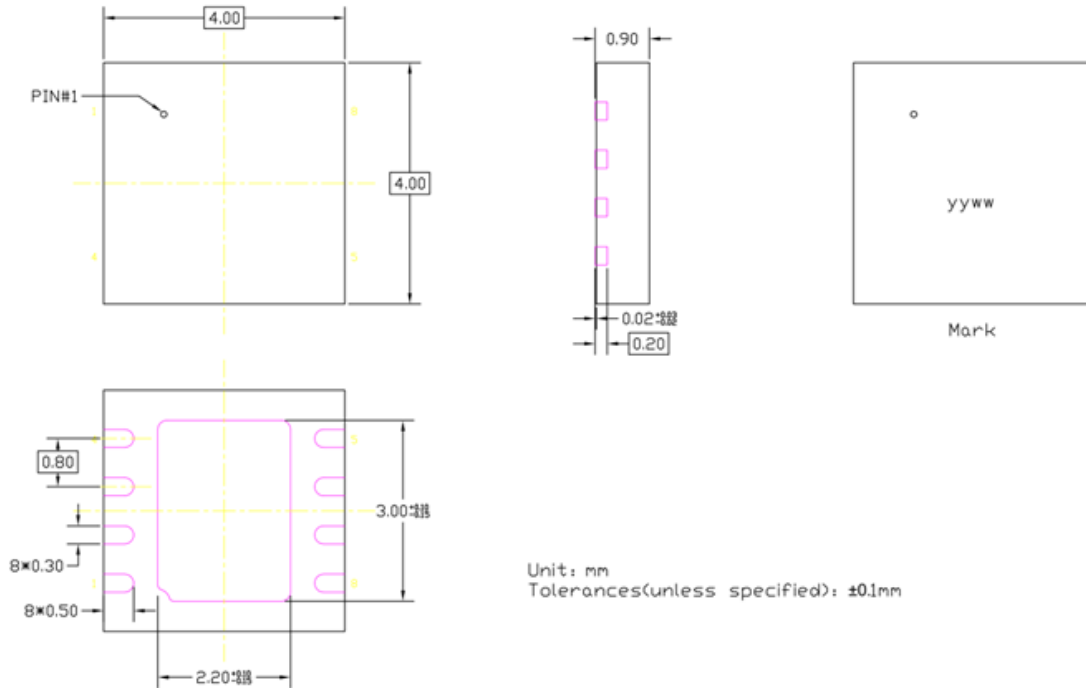


Component	Value	Quantity
U1	ITCN10012PD	1
C1、 C9、 C10、 C11	30pF	4
C2	3.9pF	1
C3	2.4pF	1
C4	6.8pF	1
C5、 C6	5.1pF	2
C7	1.5pF	1
C8	1pF	1
C12、 C13、 C14	10uF/63V	3
C15	470uF/63V	1
R1	10Ω	1



Package Dimensions

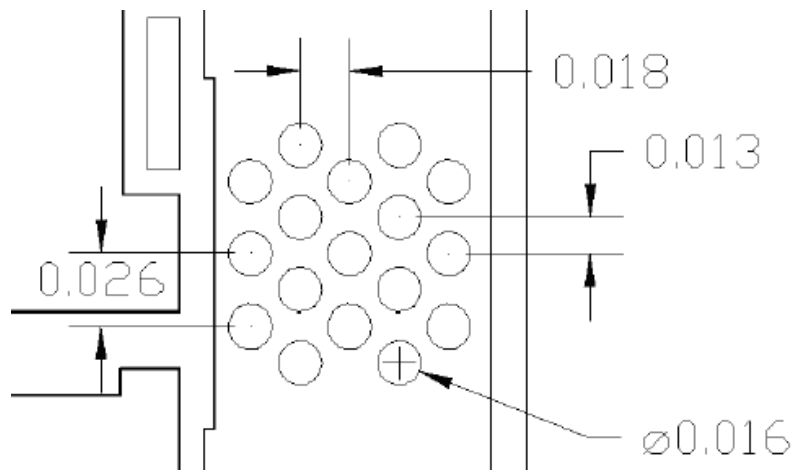
4*4 DFN Package



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
2021/12/23	V1.0	Datasheet Creation
2022/8/11	V1.1	Add 800MHz application data
2025/8/14	V1.2	Add 1-1.4GHz application data

Application data based on ZBB-22-04/ZYX-25-34

Notice

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