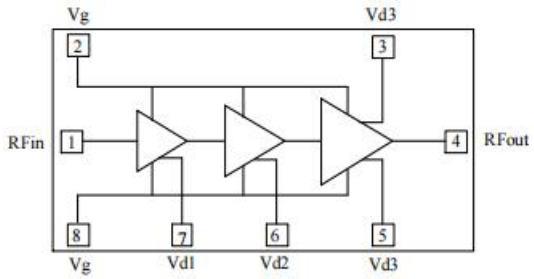
★1. Product Features

- Frequency range: 5.0 GHz ~ 6.0 GHz
- Power gain: 26 dB
- Saturated output power: 45 dBm
- Power added efficiency: 52%
- +28 V @ 1200 mA (quiescent)
- Chip size: 3.50 mm × 3.50 mm × 0.08 mm

Functional Block Diagram



★2. Product Introduction

TFPA0506 is a high power amplifier chip implemented in a 0.25 μm GaN HEMT power MMIC process. It covers 5 GHz ~ 6 GHz with a power gain of more than 26 dB, a typical saturated output power of 30 W and a power added efficiency of 52%. The second harmonic suppression is -50 dB. The chip can be operated in pulsed and CW mode, is grounded through backside via holes and requires a dual supply with typical Vd = +28 V and Vg = -2.2 V.The chip is intended for microwave T/R modules and high power solid-state transmitters.

★3. DC Characteristics (TA = +25 ℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Gate operating voltage	Vg	—	-2.2	—	V
Drain operating voltage	Vd	—	28	32	V
Quiescent drain current	Id	—	1200	—	mA
Dynamic drain current	Idd	—	2.0	—	A
Dynamic gate current	Igg	—	0.3	2.5	mA

★4. Microwave Characteristics (TA = +25 ℃, Vd = +28 V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Frequency range	f	5 ~ 6			GHz
Saturated output power	Psat	44.5	45	—	dBm
Power gain	Gp	25.5	26	—	dB
Power gain flatness	ΔGp	—	±0.5	—	dB
Power added efficiency	PAE	50	55	—	%
Linear gain	Gain	33	36	39	dB

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Website:ttfelectronic.com

Parameter	Symbol	Min.	Typ.	Max.	Unit
Linear gain flatness	ΔGain	—	±1	—	dB
Input VSWR	VSWR(in)	—	1.5	2	—

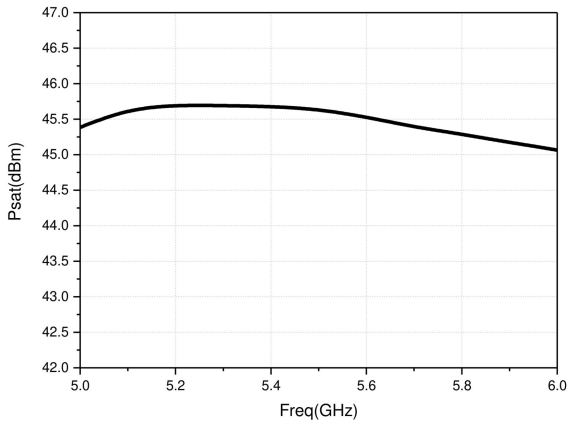
Note: all chips are 100% DC tested and 100% RF tested on wafer.

★5. Absolute Maximum Ratings

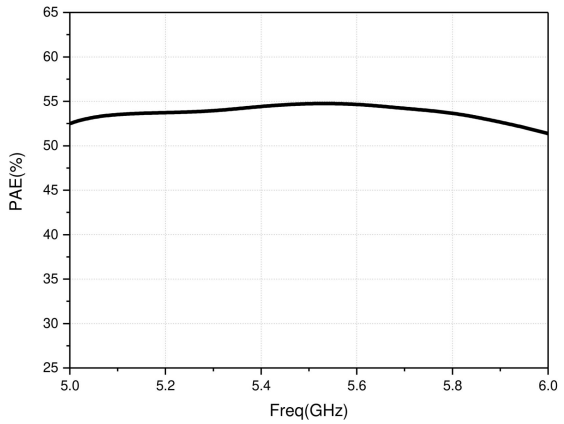
Parameter	Symbol	Limit
Maximum drain-source voltage	Vd	+36 V
Maximum gate-source voltage	Vg	-3 V
Maximum input power (CW)	Pp	+25 dBm
Storage temperature	TSTG	-65 ℃ ~ +150 ℃
Maximum operating channel temperature	Top	+225 ℃
Load impedance mismatch (burn-out)	Z0	5:1

★6. Typical Test Curve

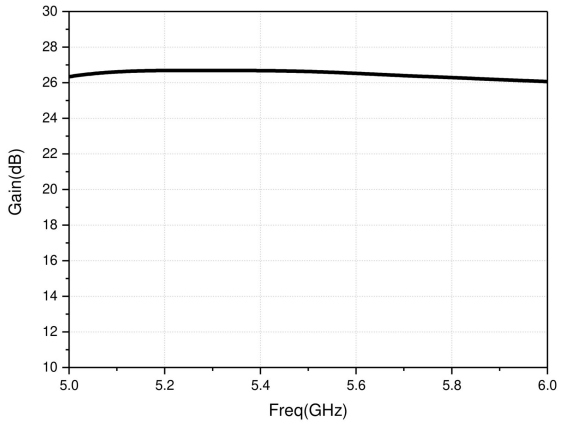
Saturated output power vs. frequency
(Pin = 19 dBm)



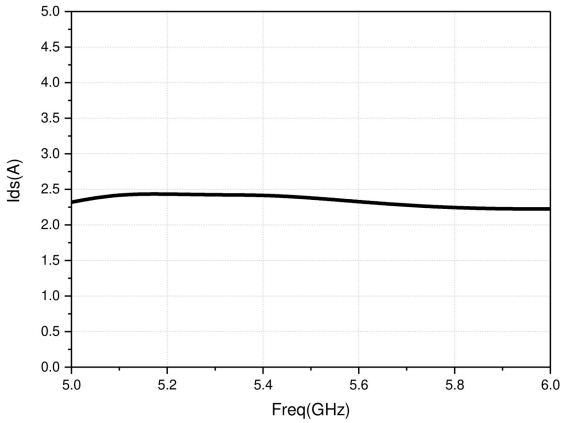
Power added efficiency vs. frequency
(Pin = 19 dBm)



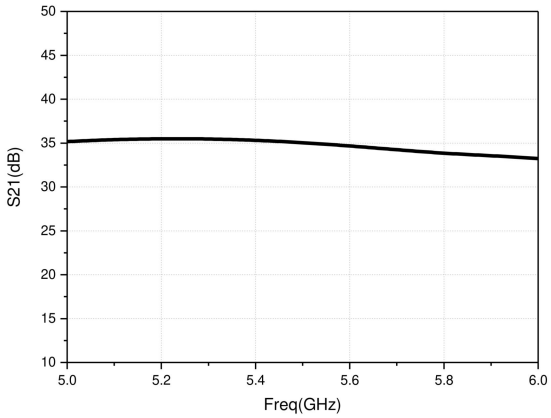
Power gain vs. frequency (Pin = 19 dBm)



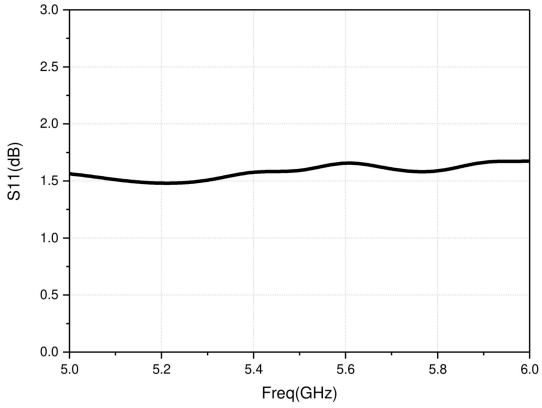
Dynamic drain current vs. frequency (Pin = 19 dBm)



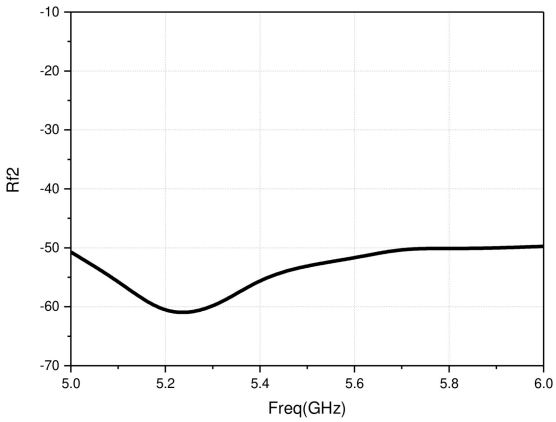
Small signal gain vs. frequency (Pin = -20 dBm)



Input VSWR vs. frequency (Pin = -20 dBm)

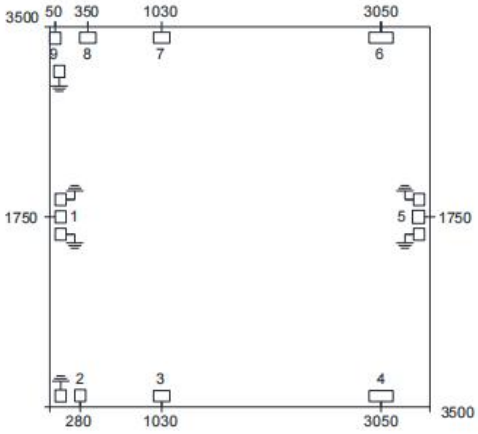


Second harmonic suppression vs. frequency (Pin = 19 dBm)



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★7. Outline Dimensions



Note:
1) All dimensions are in micrometers (μm).
2) Chip thickness: 80 μm.
3) Outline tolerance: ±25 μm.

★8. Bonding Pad Definition

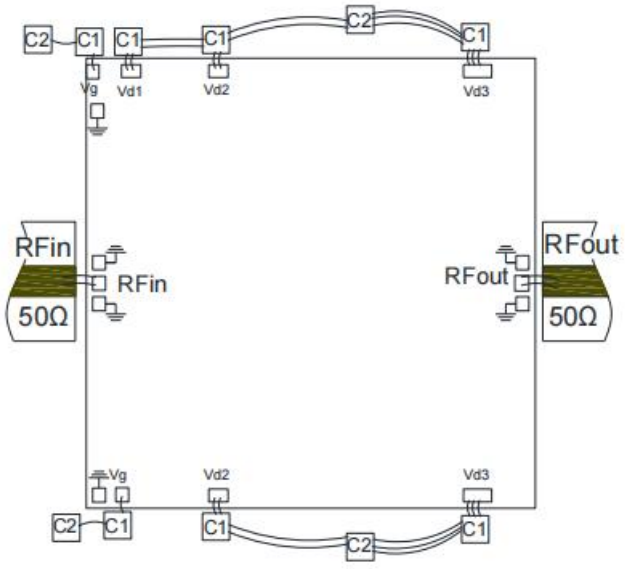
Pad No.	Symbol	Function	Size
1	RFin	RF input pad	100 × 100 μm²
2, 9	Vg	Gate bonding pad	100 × 110 μm²
8	Vd1	Drain bonding pad	150 × 100 μm²
3, 7	Vd2	Drain bonding pad	150 × 100 μm²
4, 6	Vd3	Drain bonding pad	220 × 100 μm²
5	RFout	RF output pad	120 × 100 μm²

Note:

1) External capacitors are C1 = 100 pF and C2 = 1000 pF; single-layer ceramic capacitors are recommended, and C1 shall be placed as close to the chip as possible, not exceeding 750 μm.

2) For power circuits at Ku band and below, 200 μm ~ 300 μm thick ceramic microstrip lines sintered on a carrier may be used to simplify the assembly process. At Ku band and above, 125 μm ~ 250 μm low-loss, low-permittivity material shall be adopted to reduce transmission loss; the input and output bond wires shall be kept within 350 μm ± 150 μm.

★9. Suggested Assembly Diagram



★10. Precautions

1. Assemble and operate the chip in a clean-room environment.
2. GaN is brittle and the chip surface is easily damaged; do not touch the surface and handle with care.
3. Use two bonding wires (25 μm diameter gold wire) for input and output; keep the wires as short as possible and no longer than 300 μm.
4. DC blocking capacitors are integrated at the input and output.
5. Die attach with 80/20 AuSn solder; the soldering temperature shall not exceed 300 ℃ and the soldering time shall be as short as possible, not exceeding 30 s.
6. This product is an electrostatic sensitive device; observe ESD precautions during storage and use.
7. Store the chip in a dry nitrogen environment.
8. Do not attempt to clean the chip surface with dry or chemical methods.
9. Contact the supplier if any problem occurs.



This product is sensitive to electrostatic discharge; observe ESD precautions during use.