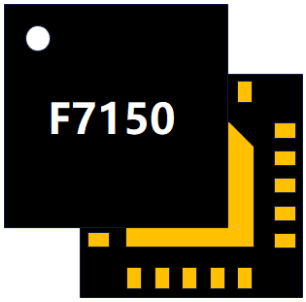
1. Description

- The F7150 is a three-stage power amplifier (PA) featuring excellent output power, linearity and power efficiency. Integrated with a compensated DC biasing circuit, the device is fully optimized across 4.6GHz to 6.3GHz frequency band. It is manufactured using advanced Gallium Arsenide (GaAs) Heterojunction Bipolar Transistor (HBT) process technology.
- The F7150 delivers a typical 30dB gain and 33dBm output power. With these superior performance characteristics, the device is ideally suited for Wireless Local Area Network (WLAN, IEEE 802.11ac) applications.



F7150-PDS-F01

Figure 1. F7150 Package Outline

2. Applications

- IEEE 802.11 ac WLAN
- Media Gateways
- Set-top Boxes
- LCD TVS
- 5G, Pre-5G Small Cell BTS
- Wireless Systems

3. Features

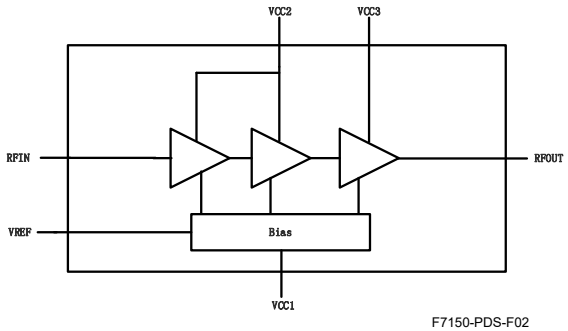
- 4.6-6.3GHz Operating Bandwidth
- High Gain: 30dB@5V
- Saturated Power P_{SAT}: 33dBm@5V
- Integrated Temperature Compensation Circuits
- Fully Matched at RF Input/Output Ports
- LGA 4.0 x 4.0 x 0.6mm 20-Pin Package

4. Brief Typical Performance

Table 1. Brief Typical Performance (VCC1=VCC2=VCC3=5.0V, VREF=2.55V, Top=+25°C)

Parameter	Min.	Typ.	Max.	Units
Frequency	4.6	-	6.3	GHz
Saturated Power (P_{SAT}), CW	33	33.5	-	dBm
Small Signal Gain	30	33	-	dB
PAE	37	42	-	%

5. Block Diagram



F7150-PDS-F02

Figure 2. F7150 Block Diagram

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8	Performance	3
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6. Absolute Maximum Ratings

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Operating Voltage	VCC1, VCC2, VCC3	5.8	V
	VREF	2.95	V
Input Power	P_{IN}	+10	dBm
Operating Temperature Range	T_{OP}	-40~+85	°C
Storage Temperature Range	T_{STG}	-40~+150	°C
Operating Junction Temperature	T_J	150	°C

7. Recommended Operating Conditions

Table 3. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (VCC1)	3.5	5.0	5.5	V
Supply Voltage (VCC2/VCC3)	4.0	5.0	5.5	V
Reference Voltage (VREF)	2.5	2.55	2.8	V

8. Performance

Table 4. Electrical Characteristics (VCC1=VCC2=VCC3=5.0V, VREF=2.55V, T_C=+25°C)

Parameter	Min.	Typ.	Max.	Units
Frequency	4.6	-	6.3	GHz
Saturated Power (P_{SAT}), CW	33	33.5	-	dBm
Small Signal Gain	30	33		dB
Input Return Loss	-	10	-	dB
Output Return Loss	-	6	-	dB
Power Added Efficiency, CW	37	42	-	%
Output P1dB	-	31	-	dBm
Stability, P_{OUT}=+33dBm@50Ω, VSWR=6:1	-	-	-36	dBm
Ruggedness, P_{OUT}=33dBm, CW, VSWR=10:1, all phases	No Damage			

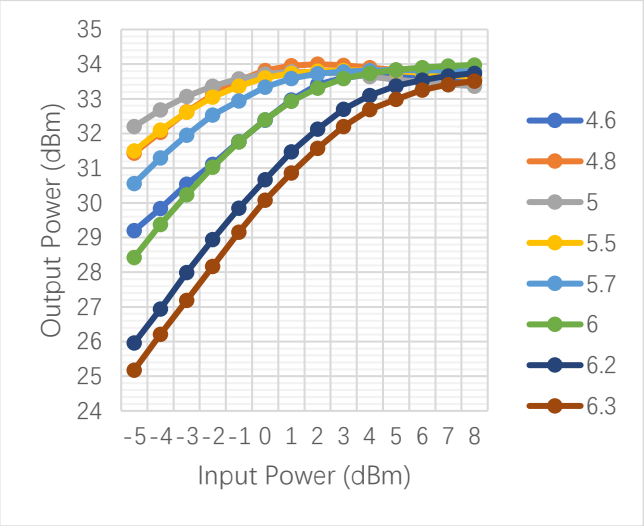
Table 5. Quiescent Current Values for Various Reference Voltage (VREF)*

Parameter	Value					Units
VREF	2.50	2.55	2.65	2.75	2.80	V
Quiescent Current	155	207	345	460	505	mA

* Different Reference Voltage (VREF) values result in different quiescent currents, with minor variations in corresponding gain and output power (Pout).

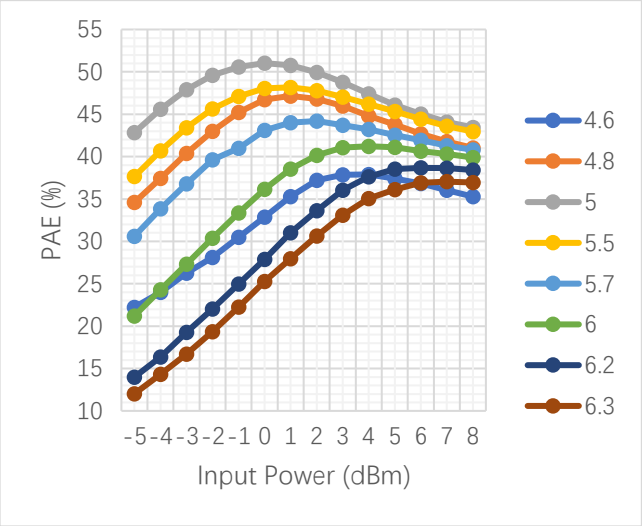
It is recommended to set VREF to 2.55V as shown in table5.

Typical Performance Characteristics



F7150-PDS-F03

Figure 3. Output Power（CW,100% Duty Cycle）

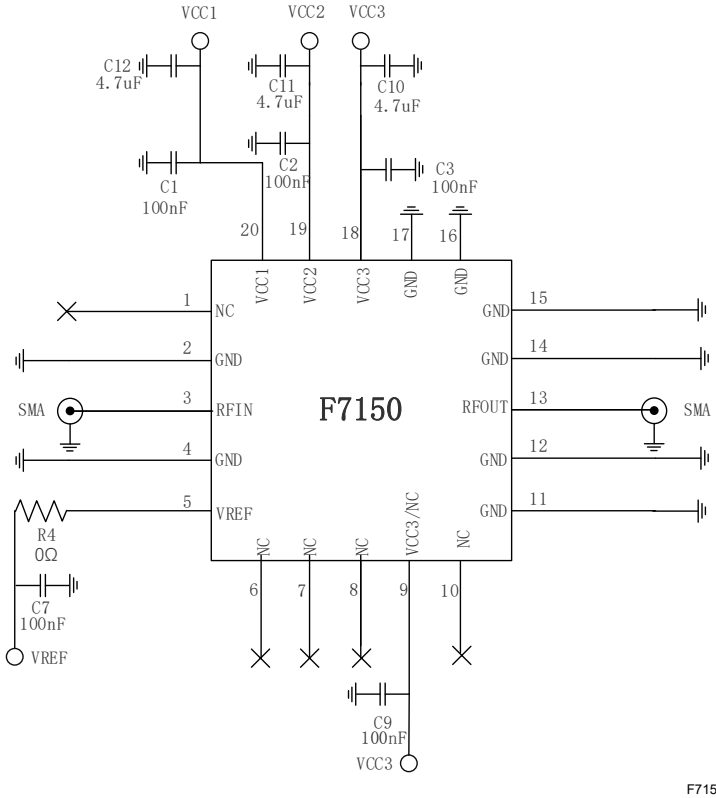


F7150-PDS-F04

Figure 4. PAE（CW,100% Duty Cycle）

9. Evaluation Board Description

The schematic diagram of the F7150 Evaluation Board is shown in Figure 3. A photograph of the Evaluation Board is shown in Figure 4. The BOM is listed in Table 5.



F7150-PDS-F05

Figure 5. F7150 Evaluation Board Schematic

Note1: Pin9 can be connected to VCC3 or NC. It is recommended as VCC3.

Note2: After decoupling with respective capacitors, VCC1, VCC2 and VCC3 can be tied together for single-supply operation.

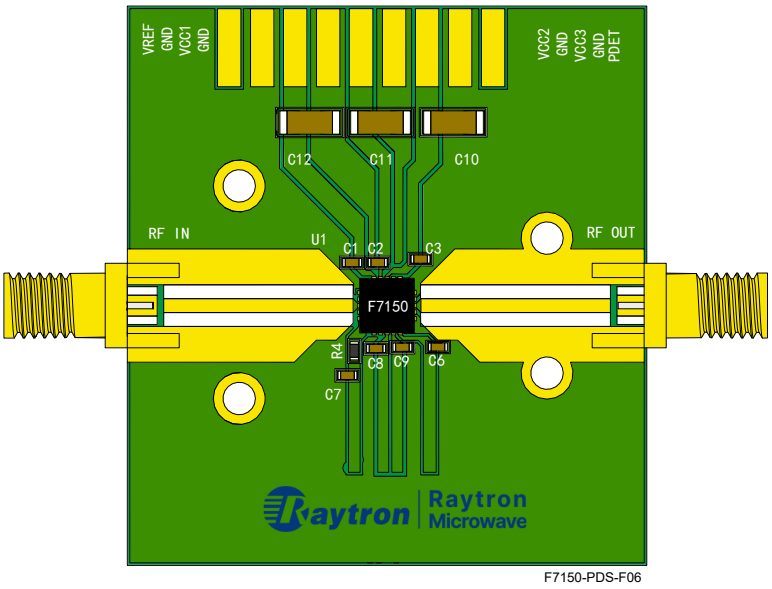


Figure 6. F7150 Evaluation Board

Table 6. F7150 Evaluation Board Bill of Materials

Component	Value	Size	Manufacture
PCB	20mil	4.0 x 4.3cm	Rogers (RO4350B)
C1, C2, C3, C7, C9	100nF	0402	Murata
C6, C8	NC	0402	-
C10, C11, C12	4.7uF	1206	Murata
R4	0Ω	0402	YAGEO

10. Package Outline

■ Pin Layout

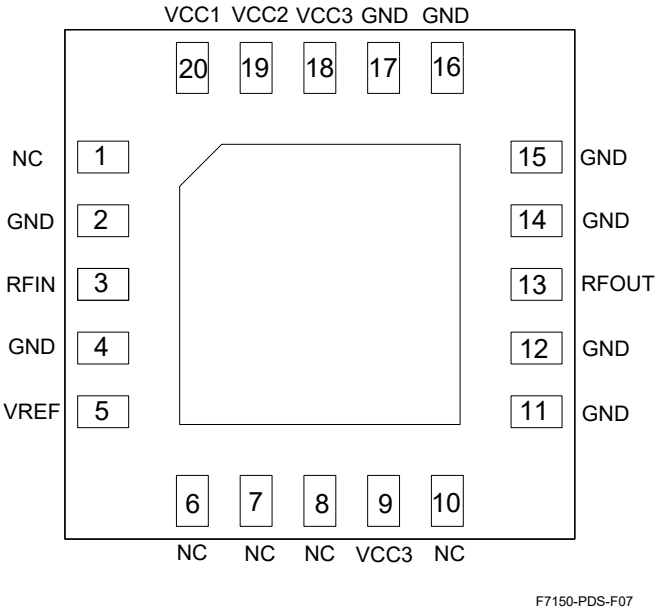


Figure 7. F7150 Pin Layout

Table 7. Pin Description

Pin	Pin Name	Description
1/6/7/8/10	NC	Not Connected
2/4/11/12/14/15/16/17	GND	Ground
3	RFIN	RF Input
5	VREF	Reference Voltage
9	VCC3	Third Stage PA Collector Supply, can be NC
13	RFOUT	RF Output
18	VCC3	Third Stage PA Collector Supply
19	VCC2	First and Second Stage PA Collector Supply
20	VCC1	Bias Supply

■ Mechanical Drawing

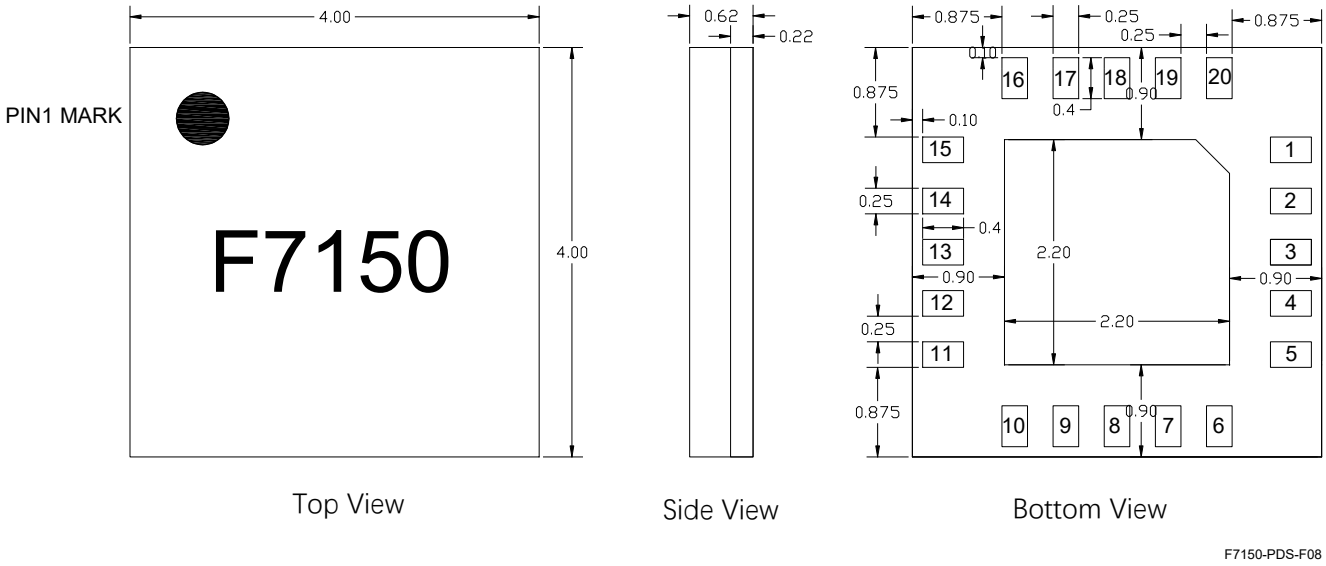


Figure 8. F7150 Mechanical Drawing

11. Handling Precautions

■ ESD Caution

Table 8. ESD/MSL Rating

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1C	ESDA / JEDEC JS-001-2014
ESD – Charged Device Model (CDM)	Class C3	ESDA / JEDEC JS-002-2014
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



12. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

13. Disclaimer

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