

Preliminary DATA SHEET

CAQ8009T

12V, DC-8GHz, 10Watts GaN Power Amplifier

Product overview

CAQ8009T is an 10W(P3dB) unmatched GaN power amplifier. It operates from DC to 8GHz with 12 volt rail, offers a general purpose, broadband, high power and high efficiency wireless pulse and CW communication application.

Key Features

- DC– 8GHz
- Operating Drain Voltage: +12V
- 12dB linear Gain @5.8GHz
- 40.2dBm CW Peak Power
- 65% Drain Efficiency @P3dB_40dBm
- 4x4.5mmmm DFN package
(MSL3, 260°C per JEDEC J-STD-020)
- ESD Level: HBM TBD ; CDM TBD
- ROHS compatible

Applications

- 3GPP 4G LTE/5G NR massive MIMO basestation
- Driver amplifier for micro-base and macro-base Stations
- Active antenna array
- Pico/Small Cell
- Test Instrumentation
- Industrial, scientific, and medical
- Wideband amplifiers



Figure 1. 4x4.5mmmm DFN Package

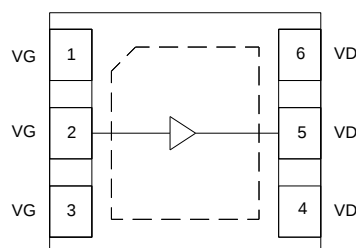


Figure 2. CAQ8009T Function Block Diagram

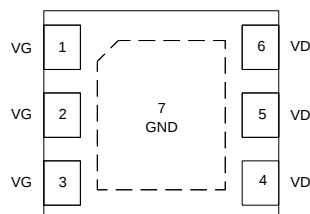


Figure 3. CAQ8009T Pinout

Table 1. CAQ8009T Signal Descriptions

Pin	Name	Description
1, 2, 3	VG/RFin	RF input port with Gate Bias
4, 5, 6	VD/RFout	RF output port with Drain Supply Voltage
7	GND	Ground

Ordering Information

Part No.	Description
CAQ8009T	DC-8GHz 10Watts Peak Power GaN wideband PA, 7' Reel with 1500pcs

Table 2. CAQ8009T Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Storage Temperature	TSTG	-55 to 125	°C
Operating Temperature	TC	-40 to +85	°C
Operating Junction Temperature	TJ	200	°C
Thermal Resistance	Rθjc		°C/W
Operating Voltage	VDD	0 to 12	V
Drain-Source Voltage	VDSS	60	V
Gate-Source Voltage	VGS	-8 to 0	V
Maximum Forward Gate Current		10	mA
Input Power	PIN	+35	dBm

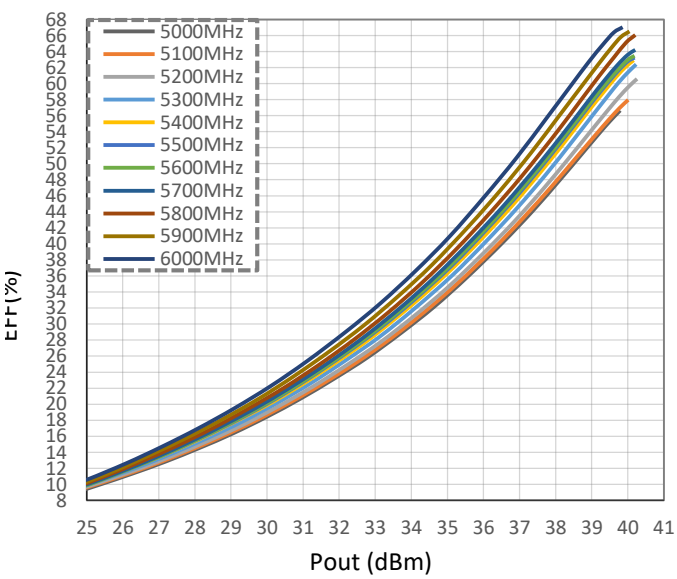
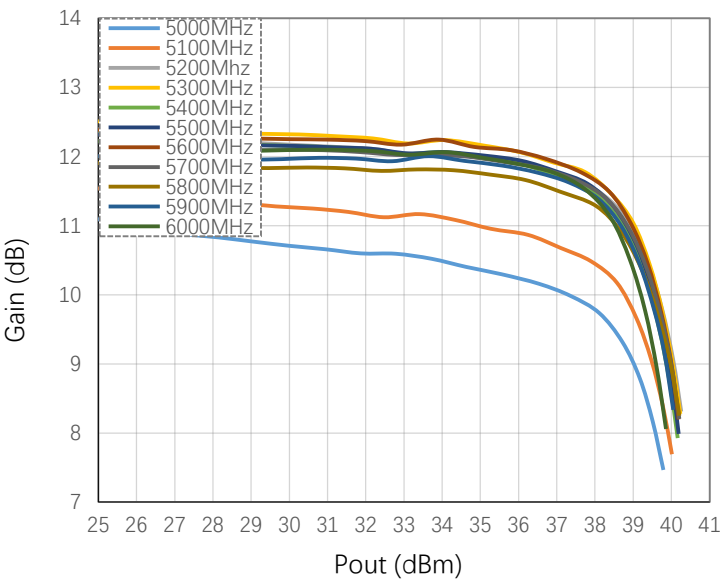
Table 3. CAQ8009T Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating frequency	f	DC		8	GHz
Operating temperature	TC	-40	25	85	°C
Drain Voltage	VDD		12		V
Gate Voltage	VGS		-2.5		V
Quiescent Current	IDQ		160		mA

Table 4. CAQ8009T Electrical Specifications

Evaluation Board TYPICAL PERFORMANCE: POWER TUNED AT P3dB (VD=12V, Idq=160mA, TC=+25 °C, Input /Output Load = 50Ω)

Parameter	Conditions	Min	Typ	Max	Unit
Frequency			5800		MHz
Output P3dB			40	40.5	dBm
Gain @ small signal			12		dB
Gain @ 40dBm			9		dB
Drain efficiency @P3dB			65		%



	Layer Stack up	0.65 mm+/-0.1mm
	Silk Top	Default
	Solder Top	
TOP		2.1mil (1.0oz+plating)
CORE(R04350B)	0.508mm	20mil (R04350B)
BOTTOM		2.1mil (1.0oz+plating)
	Solder Bot	Default
	Silk Bot	

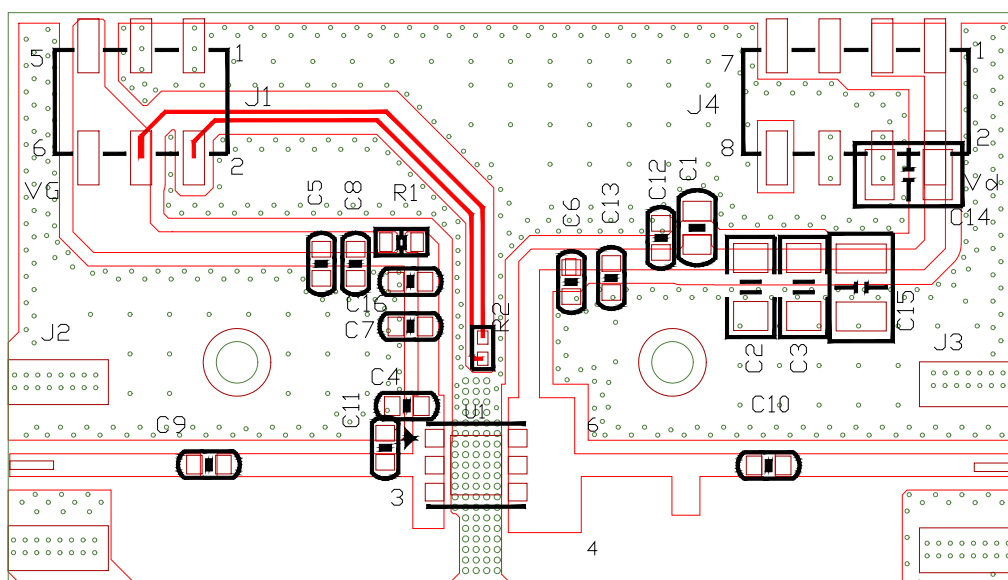


Figure 4. CAQ8009T 5-6GHz Evaluation Board

Table 6. CAQ8009T 5-6GHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C8	1nF, 50V	0603
C5	1uF, 50V	0603
C2, C3	10uF, 50V	1206
C9, C10, C13, C16	3pF,5 0V	0603
C1	100pF, 50V	0603
C11	0.1pF	0603
R1	10 Ohm	0603

Evaluation board test procedure

Turn-on sequence

- 1 . Connect test equipment to the input and output port of Evaluation board and then connect DC ground.
- 2 . Turn on VG to -7V, turn on VD to 12V then tune VG(-2.6V) to 160mA quiescent current in order.
- 3 . Apply RF signal.

Turn-off sequence

- 1 . Turn off RF signal.
- 2 . Turn off VD.
- 3 . Turn off VG.

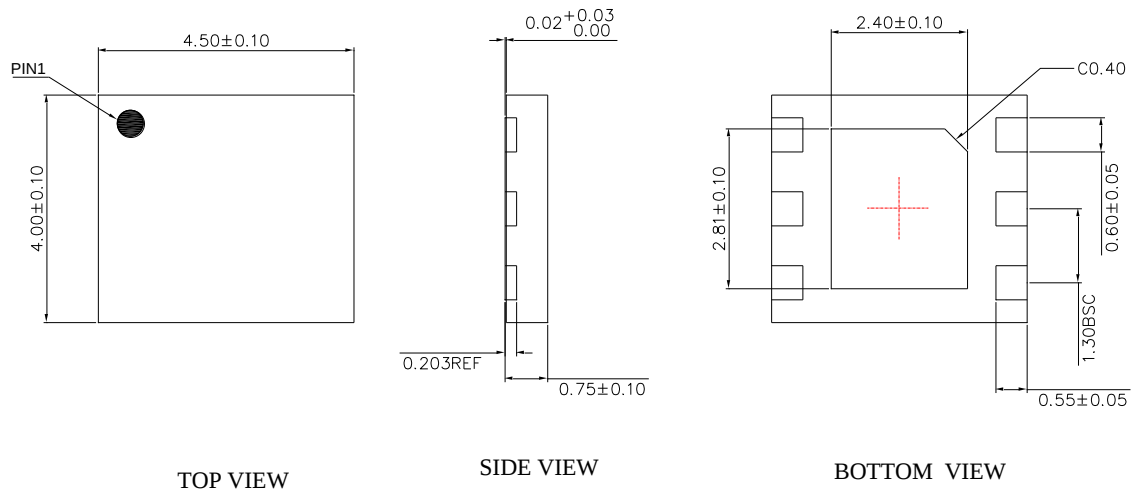


Figure 5. CAQ8009T Package Dimensions

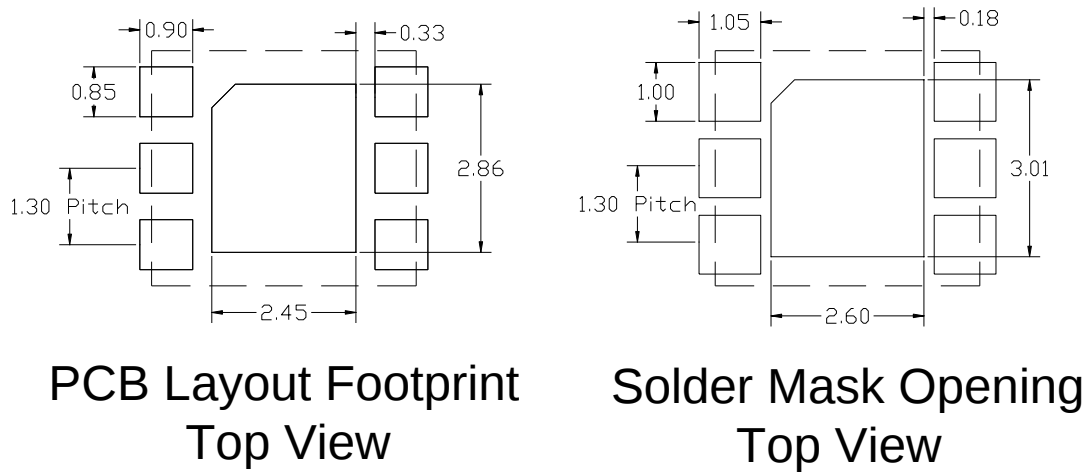
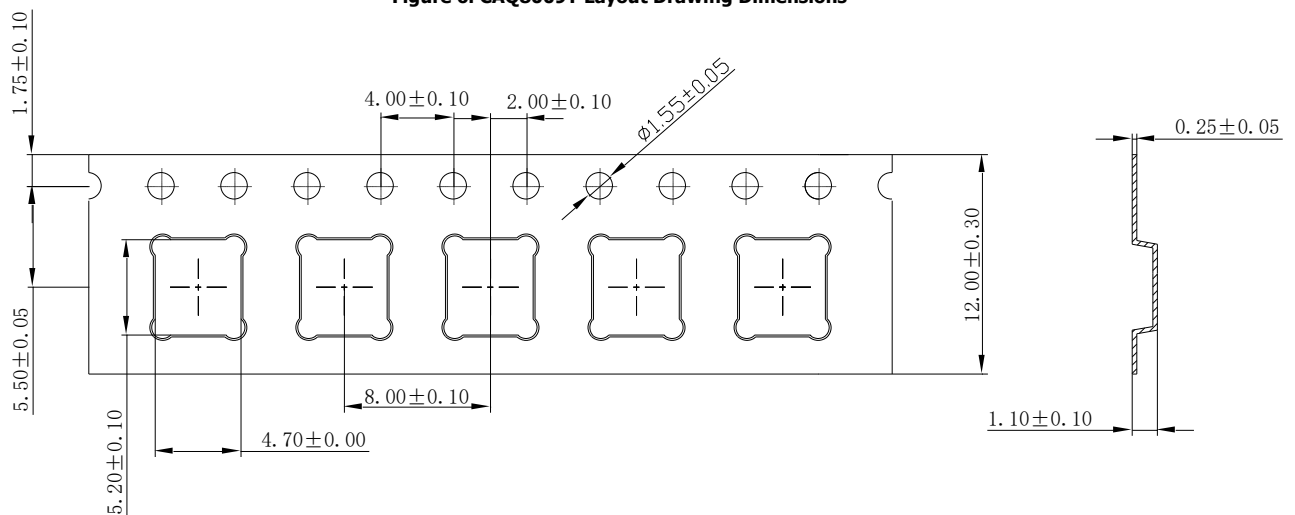


Figure 6. CAQ8009T Layout Drawing Dimensions



Technical requirements:

- 1.The accumulative error of the distance between any 10 transmitting holes is ± 0.1 mm;
- 2.The lateral bending of the belt along the length direction is ≤ 1 mm/100mm;
- 3.Roughness: $R_a < 0.8 \mu\text{m}$;
- 4.Carrier tape color:Black.

Figure 7. Tape and Reel Dimensions

CAQ8009T REVISION HISTORY

Revision	Date	Description
0.1	2025-03-27	Initial datasheet