

Preliminary DATA SHEET

CAQ4050L

28V, DC-4GHz, CW 50Watts GaN Power Amplifier

Product overview

CAQ4050L is a 60W(P3dB) unmatched GaN power amplifier. It operates from DC to 4GHz with 28 volt rail, offers a general purpose, broadband, high power and high efficiency wireless pulse and CW communication application.

Key Features

- DC– 4GHz
- Operating Drain Voltage: +28V
- 19dB linear Gain @0.9GHz
- Above 48dBm CW Peak Power
- 70% Drain Efficiency @P_{sat}
- 7x6.5mm 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. 7x6.5mm DFN Package

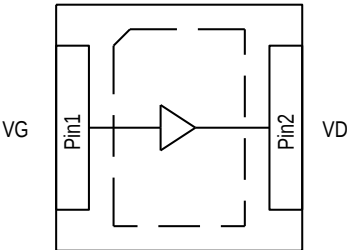


Figure 2. CAQ4050L Function Block Diagram

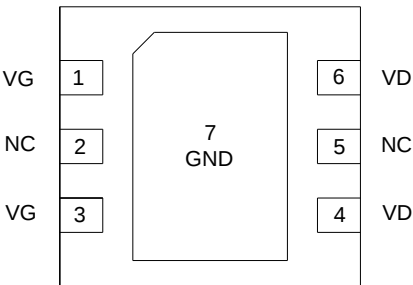


Figure 3. CAQ4050L Pinout

Table 1. CAQ4050L Signal Descriptions

Pin	Name	Description
1,3	RFIN/VG	RF input port with Gate Bias
4,6	RFOUT/VD	RF output port with Drain Supply Voltage
2,5	NC	No connection
7	GND	Ground

Ordering Information

Part No.	Description
CAQ4050L	DC-4GHz CW 50Watts Peak Power GaN wideband PA, 7' Reel with 1500pcs

Table 2. CAQ4050L Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Storage Temperature	TSTG	-55 to 125	°C
Operating Temperature	TC	-40 to +105	°C
Operating Junction Temperature	TJ	225	°C
Thermal Resistance	Rθjc		°C/W
Operating Voltage	VDD	0 to 55	V
Drain-Source Voltage	VDSS	200	V
Gate-Source Voltage	VGS	-8 to 0	V
Maximum Forward Gate Current		10	mA
Input Power	PIN	+33	dBm

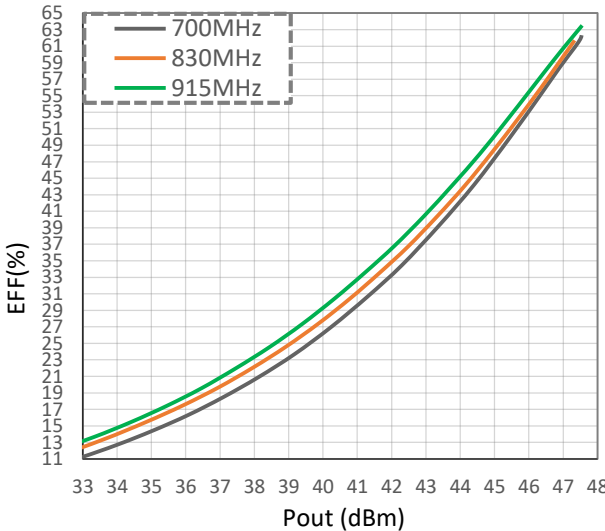
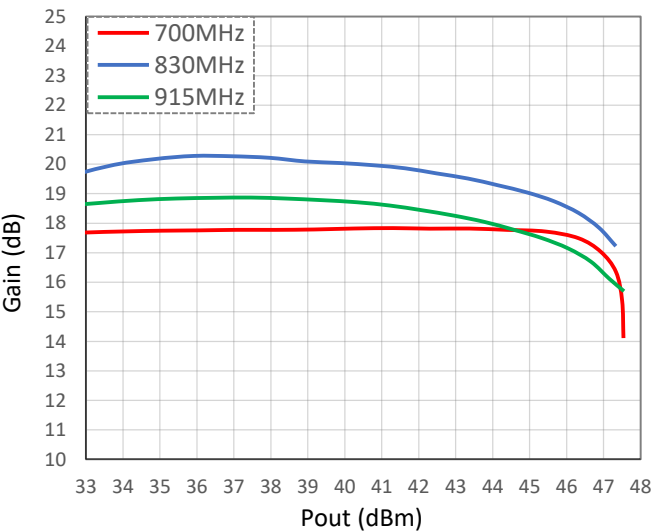
Table 3. CAQ4050L Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating frequency	f	DC		4	GHz
Operating temperature	TC	-40	25	65	°C
Drain Voltage	VDD		28		V
Gate Voltage	VGS		-3.5		V
Quiescent Current	IDQ		80		mA

Table 4. CAQ4050L Electrical Specifications

Evaluation Board TYPICAL PERFORMANCE: POWER TUNED AT P3dB (VD=28V, Idq=80mA, TC=+25 °C, Input /Output Load = 50Ω)

Parameter	Conditions	Min	Typ	Max	Unit
Frequency			2400		MHz
Output P3dB			+47.5		dBm
Gain @ P3dB			13		dB
Drain efficiency @P3dB			66		%



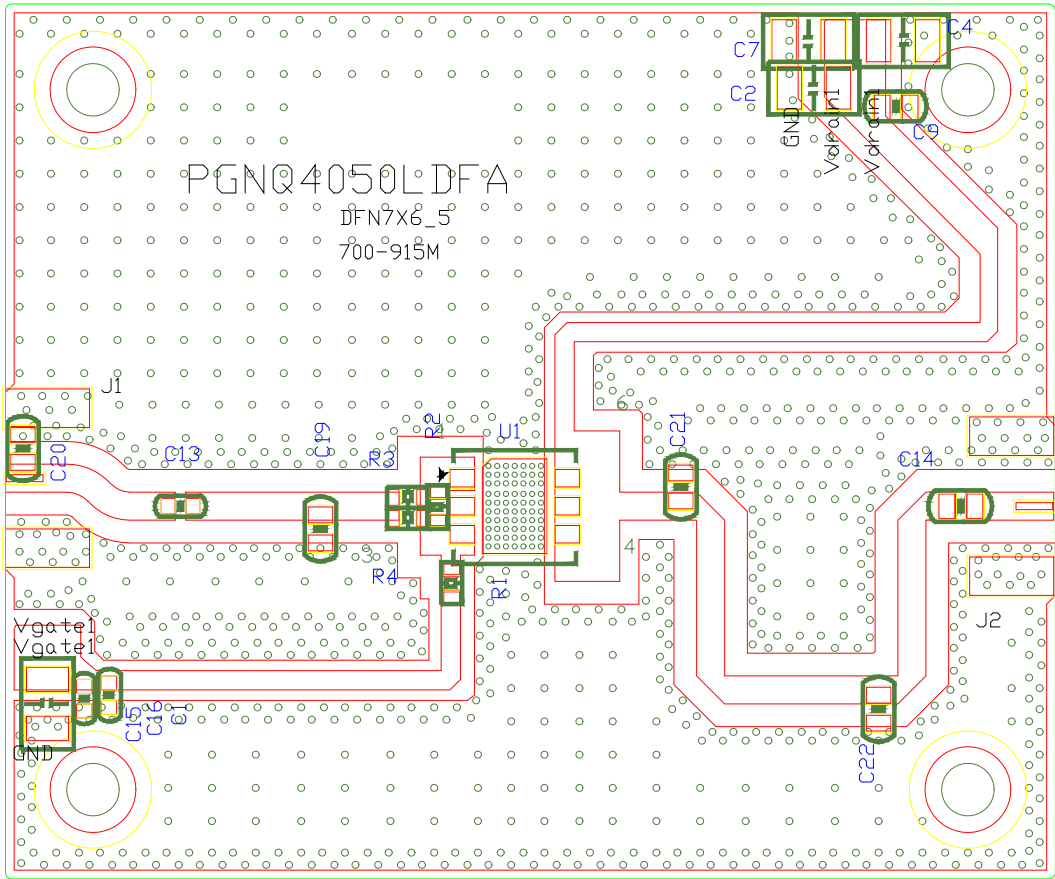


Figure 4. CAQ4050L 700-915MHz Evaluation Board

Table 5. CAQ4050L 700-915MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C1, C13, C9, C14	100PF/GQM1875G2E101BB12	C0603
C2, C4, C7, C15	10 uF	C1210
C16	1nF	C0603
C19	18PF/GQM1875G2E180BB12	C0805
C20	5.1PF/GQM1875G2E5R1BB12	C0805
C21	10PF/GQM1875G2E100BB12	C0805
C22	3.6PF/GQM1875G2E3R6BB12	C0805
R1	39 Ohm	R0603
R2	10 Ohm	R0603
R3, R4	5.1 Ohm	R0603

Rest of the components on the schematic are not used in this part.

Datasheet: CAQ4050L DC to 4GHz CW 50Watts GaN Power Amplifier

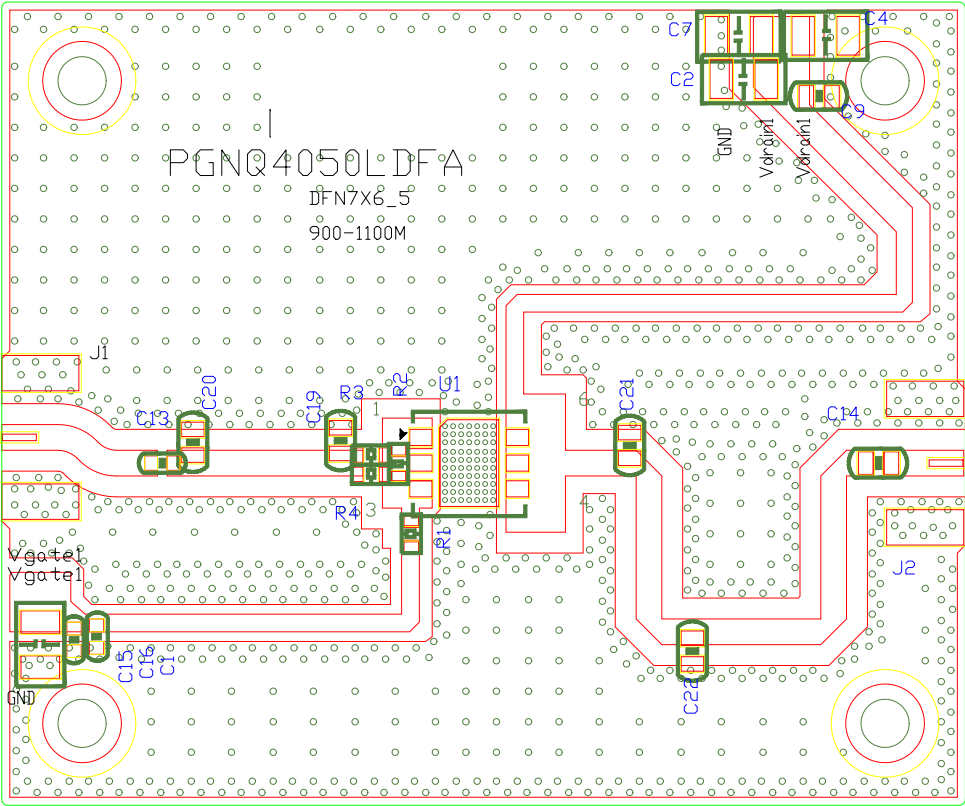
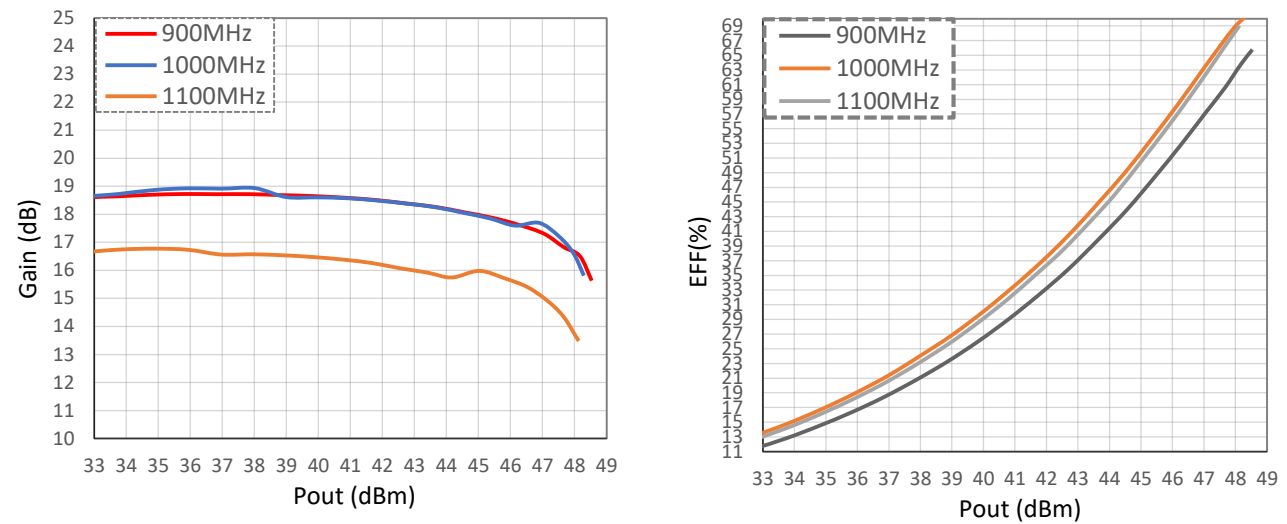


Figure 5. CAQ4050L 900-1100MHz Evaluation Board

Table 6. CAQ4050L 900-1100MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C1, C13, C9, C14	100 pF	C0603
C2, C4, C7, C15	10 uF	C1210
C16	1nF	C0603
C19	12PF	C0805
C20	5.6PF	C0805
C21	8.2PF	C0805
C22	3.3PF	C0805
R1	39 Ohm	R0603

Datasheet: CAQ4050L DC to 4GHz CW 50Watts GaN Power Amplifier

R2	10 Ohm	R0603
R3, R4	5.1 Ohm	R0603

Rest of the components on the schematic are not used in this part.

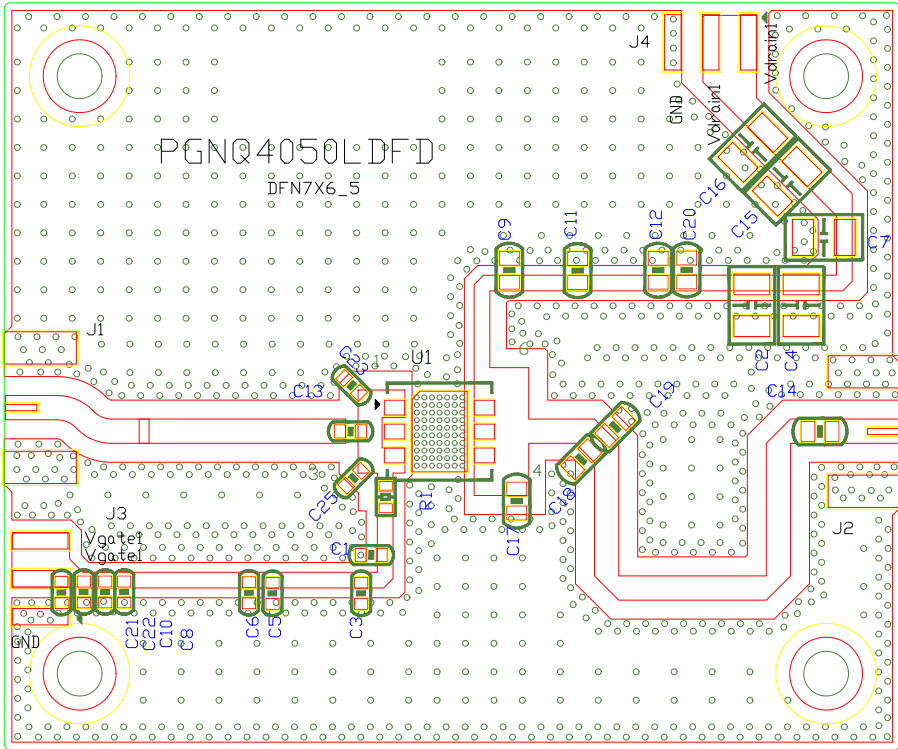
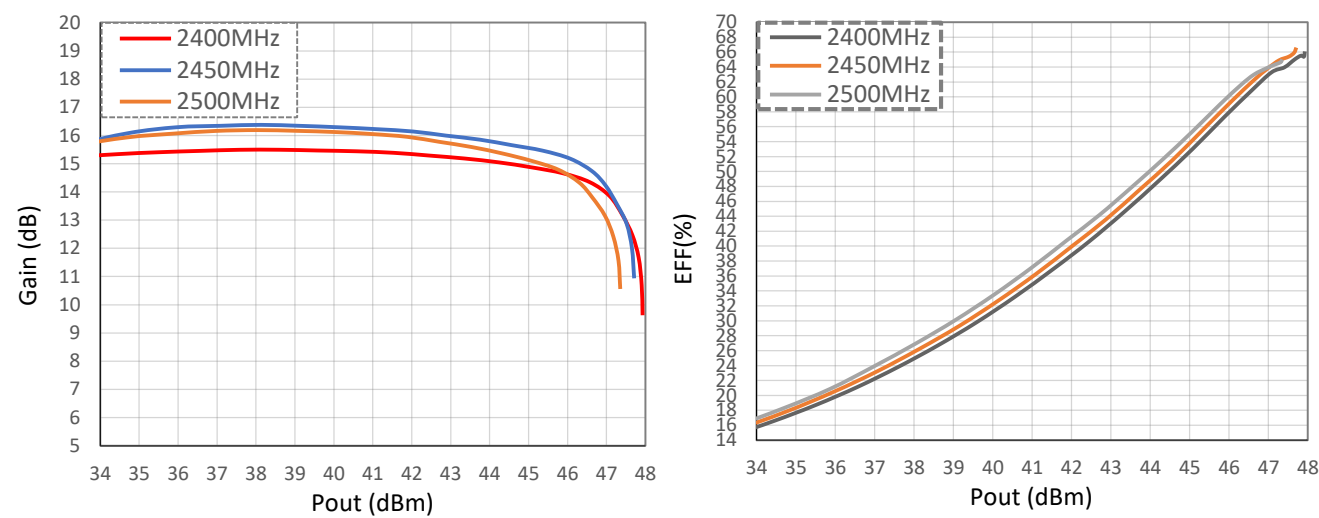


Figure 6. CAQ4050L 2400-2500MHz Evaluation Board

Table 6. CAQ4050L 2400-2500MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C13	1 pF, highQ, 250V	0603
C23, C25	1.3pF, high Q,250V	0603
C10	12pF, highQ, 250V	0603
R1	10ohm	0603
C22	1nF, 50V	0603

Datasheet: CAQ4050L DC to 4GHz CW 50Watts GaN Power Amplifier

C21	1uF, 50V	0603
C17	2.4pF, highQ, 250V	0805
C19	1.1pF, highQ, 250V	0805
C18	1 pF, highQ, 250V	0805
C20, C14	10pF, highQ, 250V	0805
C2, C4, C7	10uF, 100V	1206

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 28V then tune VG to 80mA quiescent current in order.
- 3 . Apply RF signal.

Turn-off sequence

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

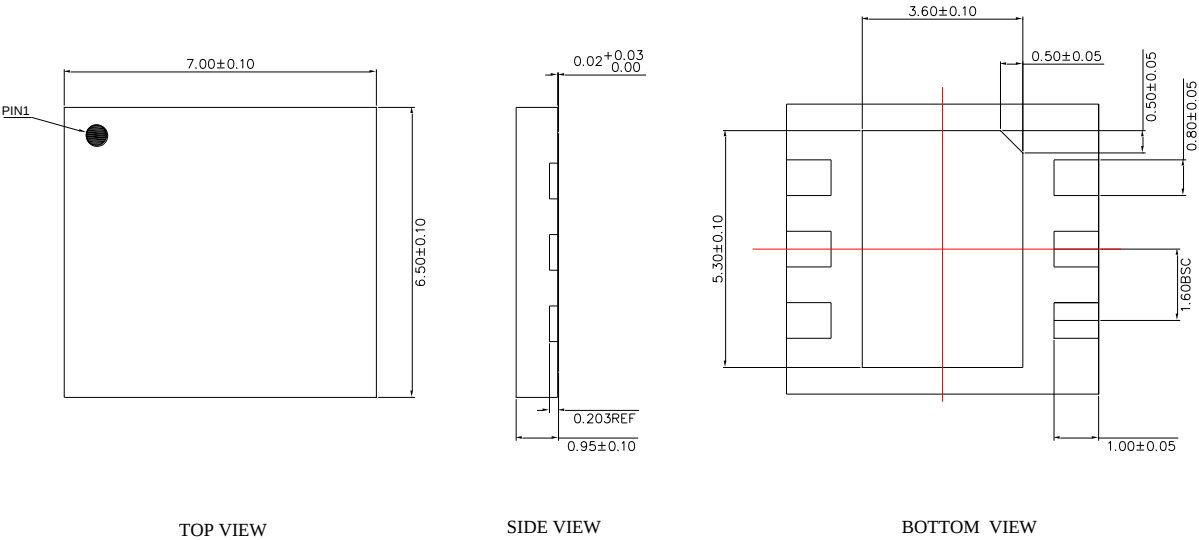


Figure 4. CAQ4050L Package Dimensions

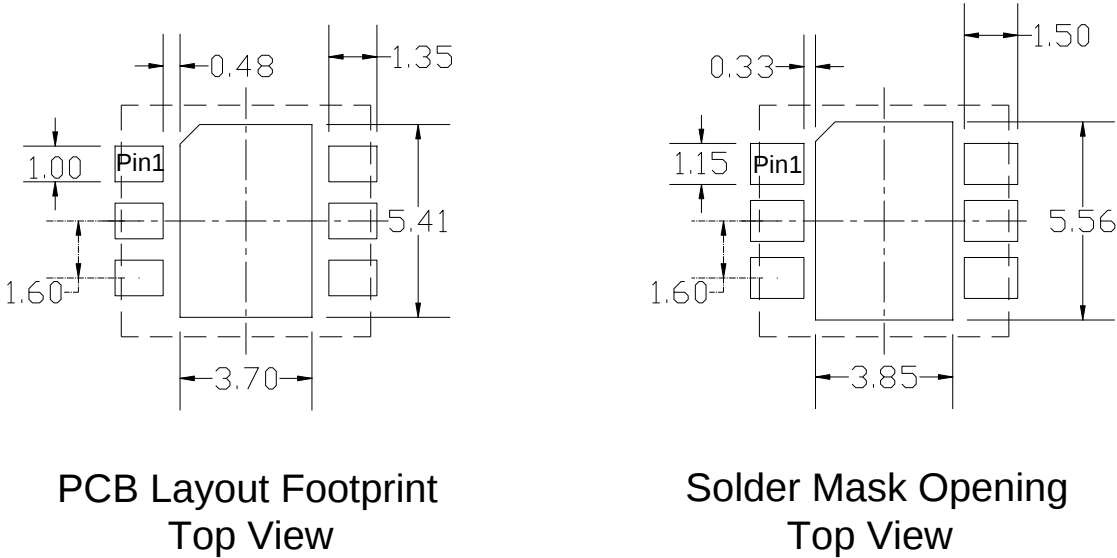
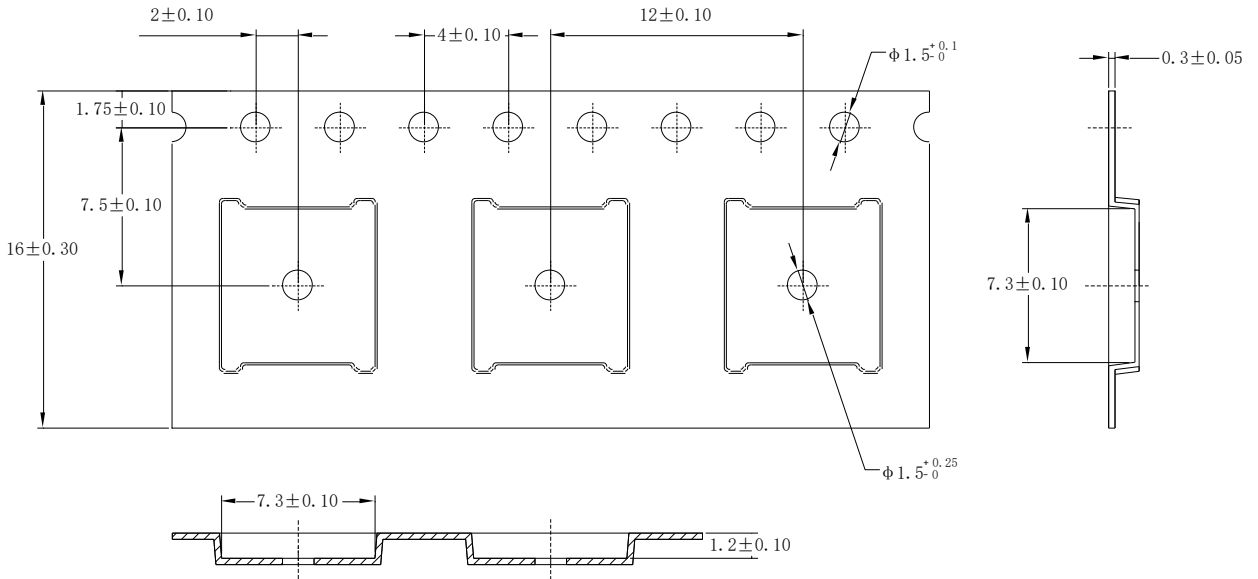


Figure 5. CAQ4050L Package Dimensions



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 $\leq 1\text{mm}/100\text{mm}$;
- 3.Roughness: $R_a < 0.8\mu\text{m}$;
- 4.Carrier tape color:Black.

Figure 7. Tape and Reel Dimensions

CAQ4050L REVISION HISTORY

Revision	Date	Description
0.1	Sept 2, 2024	Initial release of data sheet
0.2	Sept 18, 2024	Update with EVB information