

Preliminary DATA SHEET

CAQ4031L

28V, DC-4GHz, CW 30Watts GaN Power Amplifier

Product overview

CAQ4031L is a 30W(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 45dBm CW Peak Power
- 68% 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

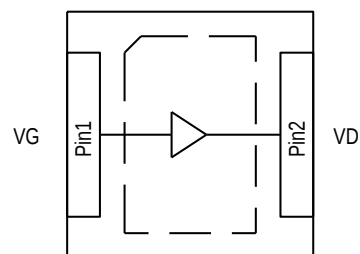


Figure 2. CAQ4031L Function Block Diagram

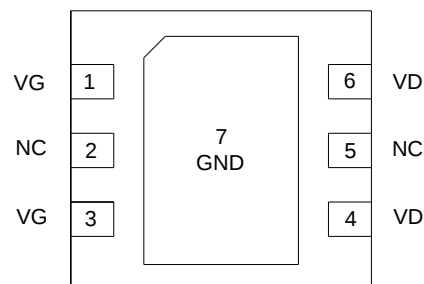


Figure 3. CAQ4031L Pinout

Table 1. CAQ4031L 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
CAQ4031L	DC-4GHz CW 30Watts Peak Power GaN wideband PA, 7' Reel with 1500pcs

Table 2. CAQ4031L 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	+35	dBm

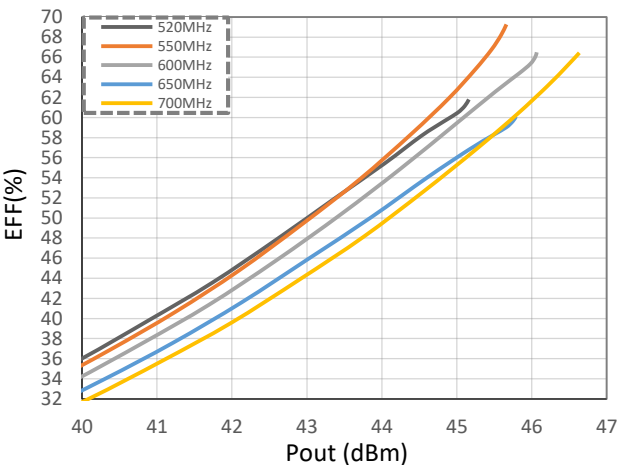
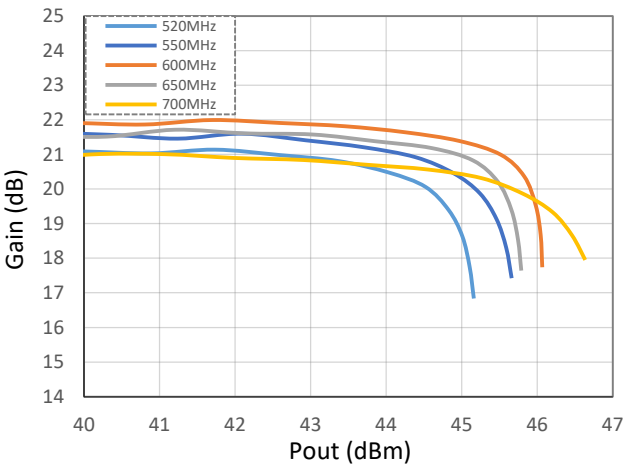
Table 3. CAQ4031L Recommended Operating Conditions

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		100		mA

Table 4. CAQ4031L Electrical Specifications

Evaluation Board TYPICAL PERFORMANCE: POWER TUNED AT P3dB (VD=28V, Idq=100mA, TC=+25 °C, Input /Output Load = 50Ω)

Parameter	Conditions	Min	Typ	Max	Unit
Frequency			2400		MHz
Output P3dB			+45.5		dBm
Gain @ P3dB			13		dB
Drain efficiency @P3dB			68		%



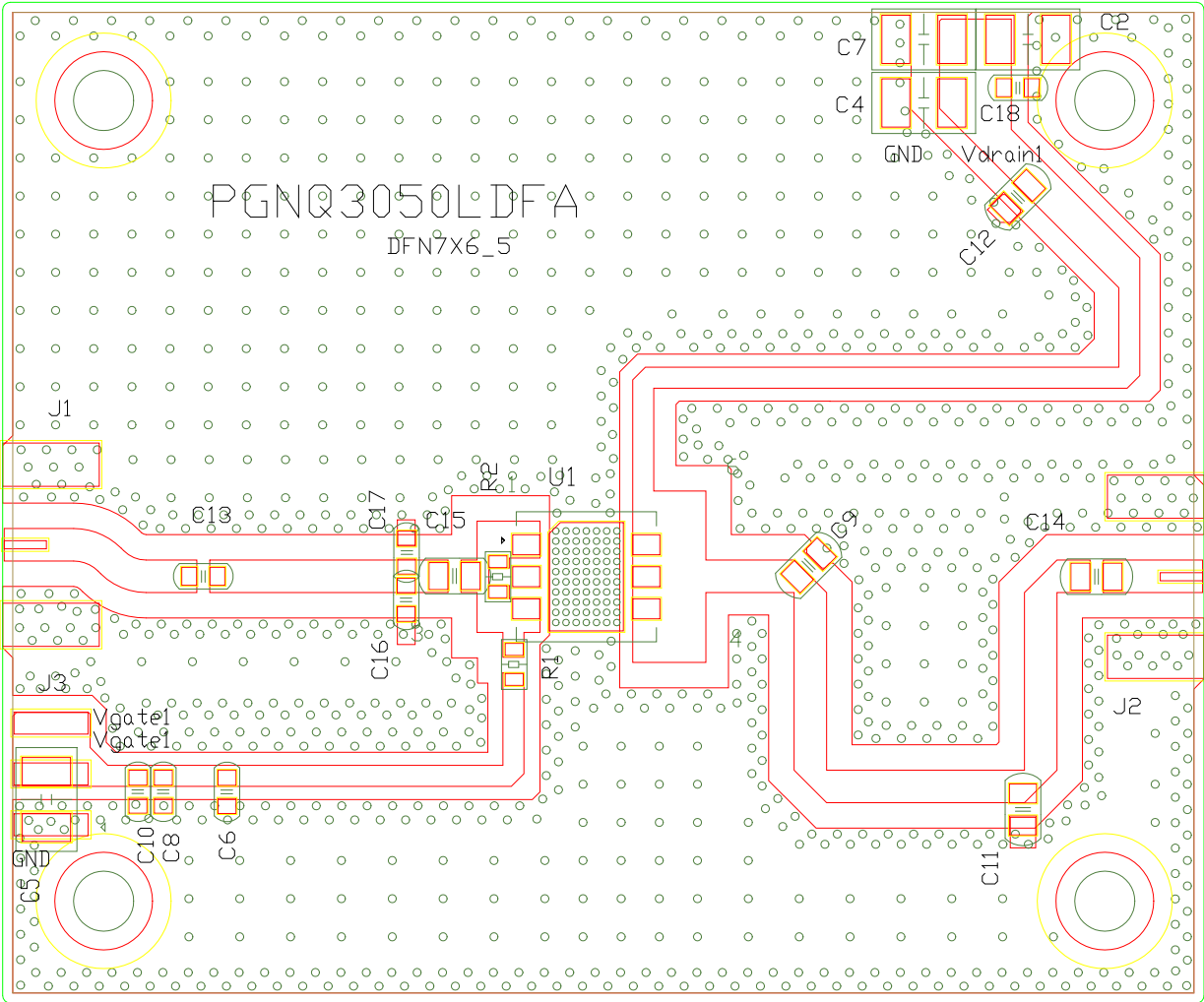


Figure 4. CAQ4031L 520-700MHz Evaluation Board

Table 5. CAQ4031L 520-700MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C9	10pF High Q	C0603
C11	4.7pF High Q	C0603
C15	30pF High Q	C0603
C16	4.7nH High Q	L0603
C17	12nH High Q	L0603
C2, C4, C5, C7	10uF	C1210
C10, C18	1nF	C0603
C6, C8,C12, C13 C14	100pF High Q	C0603

Datasheet: CAQ4031L DC to 4GHz CW 30Watts GaN Power Amplifier

R1	39ohm	R0603
R2	10 ohm	R0603

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

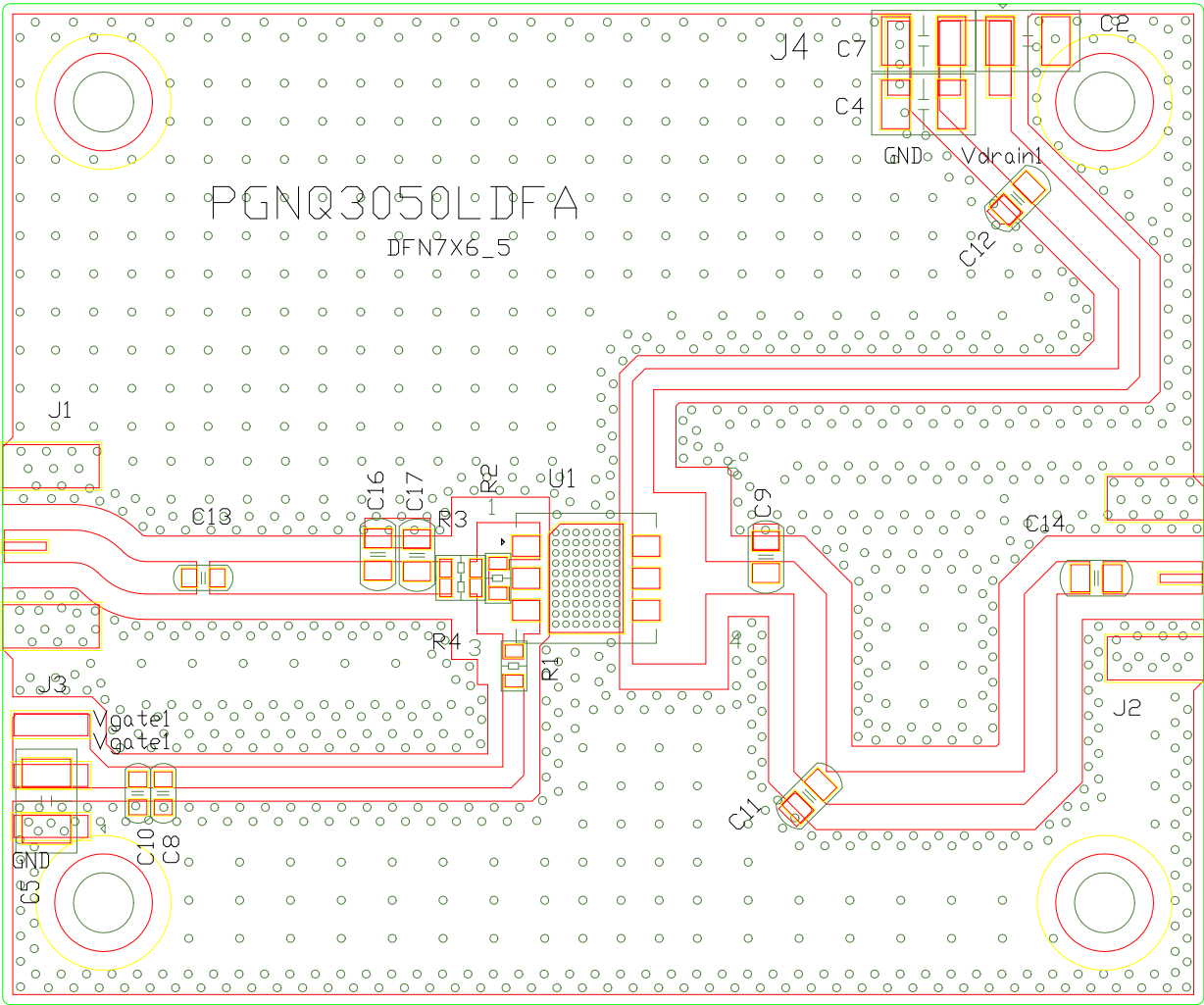


Figure 5. CAQ4031L 1300-1700MHz Evaluation Board

Table 6. CAQ4031L 1300-1700MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C9	5.1pF High Q	C0603
C11	2.2pF High Q	C0603
C16	2.2pF High Q	C0603
C17	3.3pF High Q	C0603
C2, C4, C5, C7	10uF	C1210
C10, C18	1nF	C0603
C6, C8, C12, C13 C14	33pF High Q	C0603

Datasheet: CAQ4031L DC to 4GHz CW 30Watts GaN Power Amplifier

R1	39ohm	R0603
R2	10ohm	R0603
R3, R4	5R1ohm	R0603

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

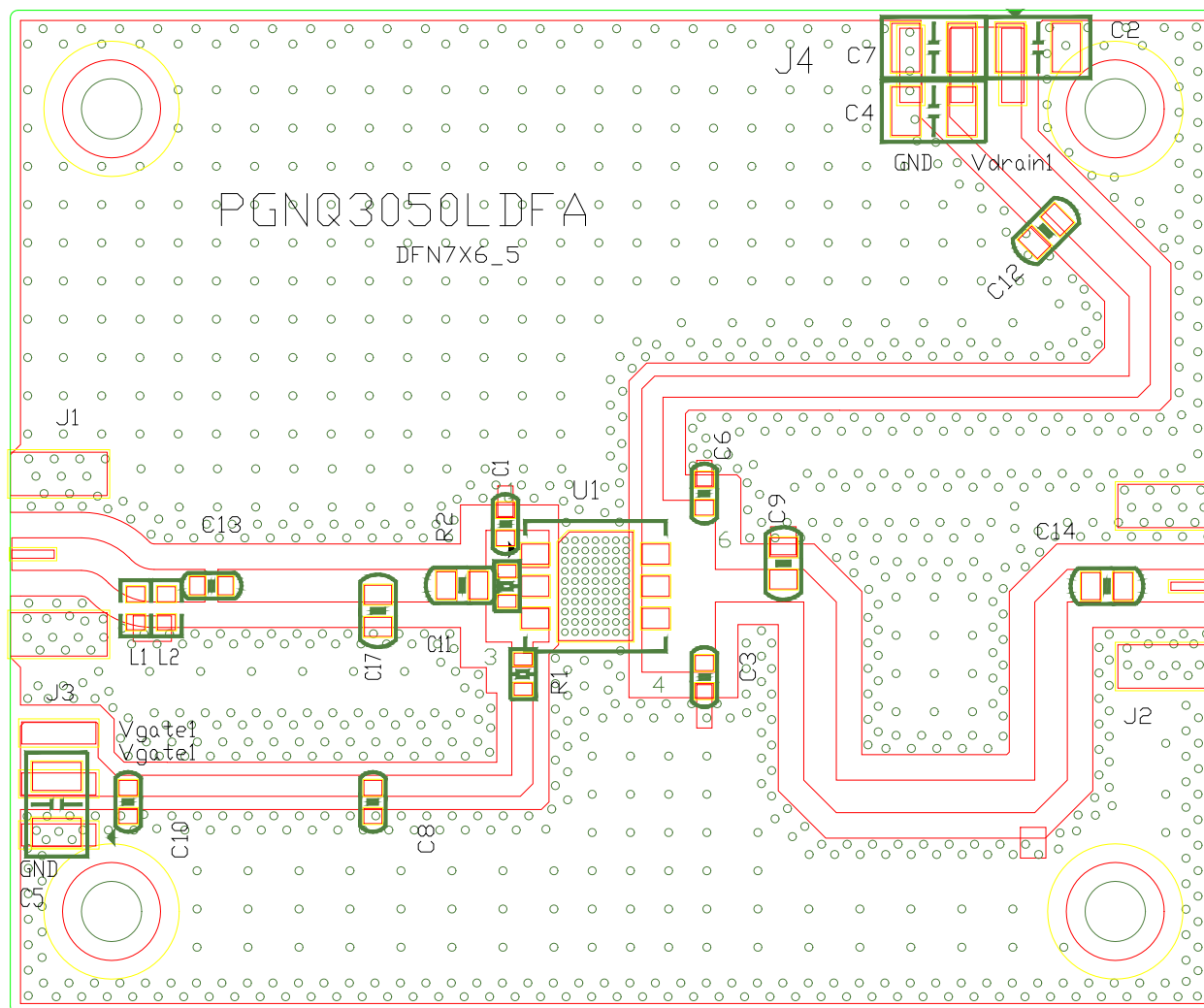


Figure 4. CAQ4031L 2900-4000MHz 20W Evaluation Board

Table 7. CAQ4031L 2900-4000MHz Evaluation Board Bill of Materials (BOM)

Component	Description	Size
C1	0.9pF High Q	C0603
C3, C6	0.1pF	C0603
C9	0.8pF	C0603
C2, C4, C5, C7	10uF	C1210
C10	1nF	C0603
C8, C11, C12, C14	8.2pF High Q	C0603
R1	39ohm	R0603

R2	10ohm	R0603
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Rest of the components on the schematic are not used in this part.

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 40mA quiescent current in order.
- 3 . Apply RF signal.

Turn-off sequence

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

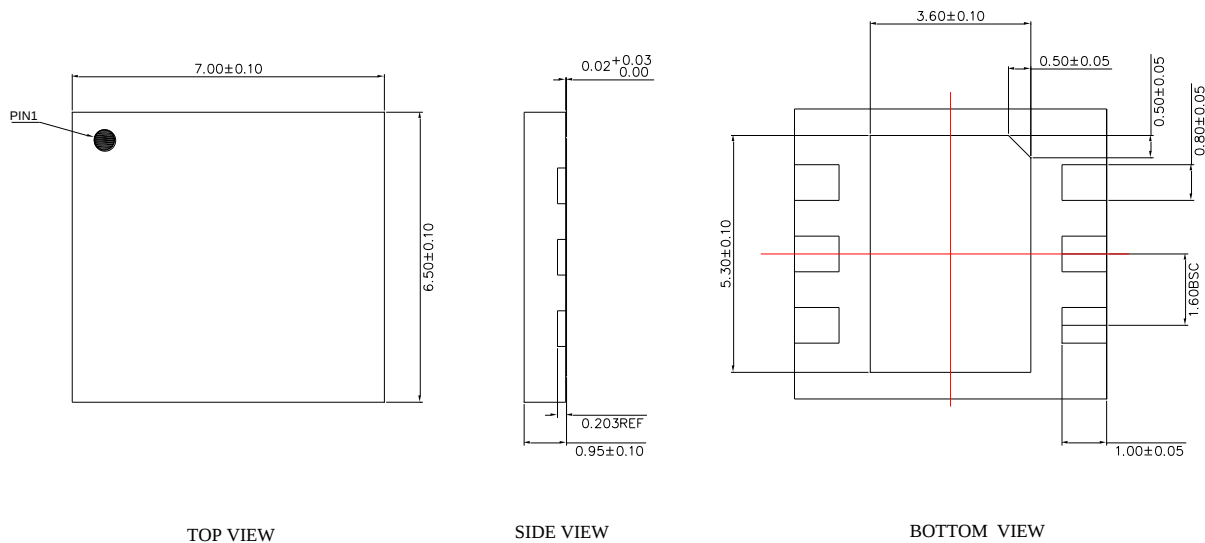
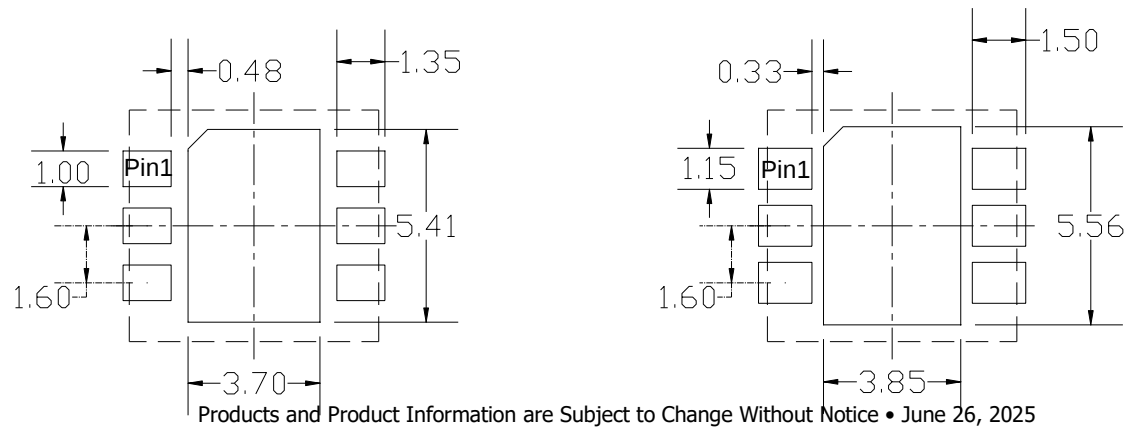


Figure 4. CAQ4031L Package Dimensions



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PCB Layout Footprint
Top View

Solder Mask Opening
Top View

Figure 5. CAQ4031L Package Dimensions

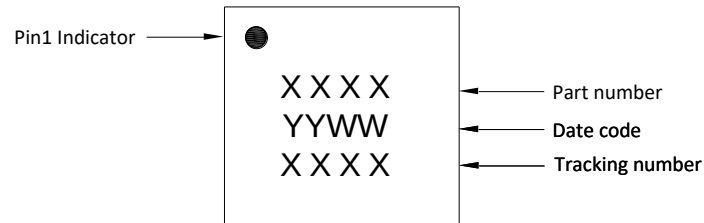
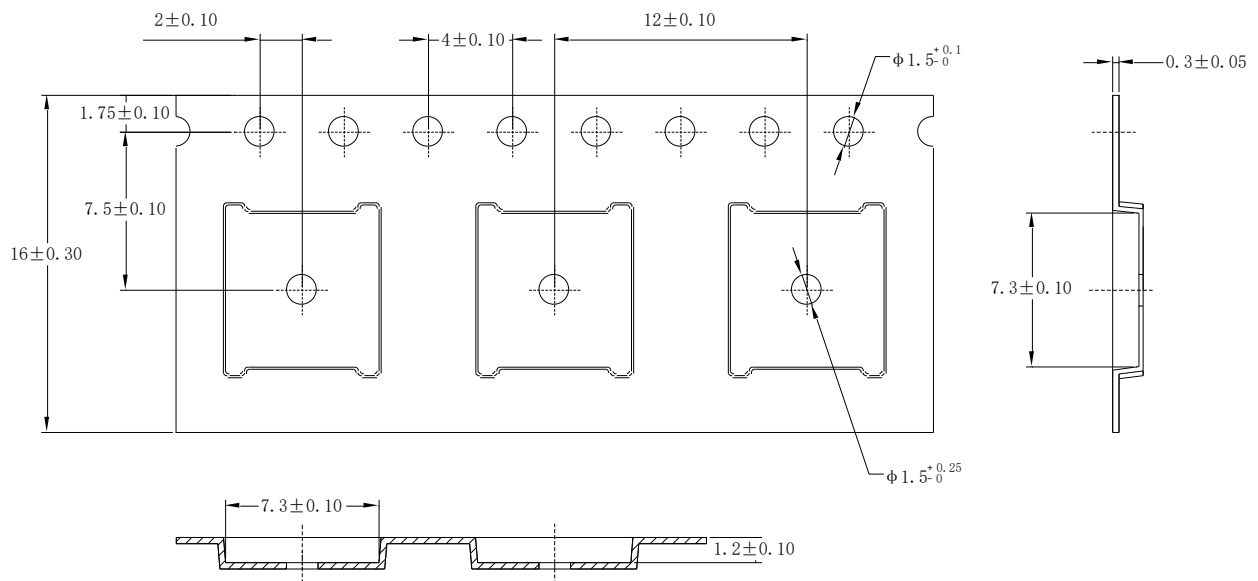


Figure 6. CAQ4031L Marking information



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

CAQ4031L REVISION HISTORY

Revision	Date	Description
0.1	2025-06-26	Initial release of data sheet