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PRODUCTION EQUIPMENT



Introduction to Alumina HTCC Packaging Shell



Product type

① Photoelectric detection and communication device packaging shell

The shell of photoelectric detection and communication devices is applied in the fields of infrared detectors and fiber optic communication, achieving high-speed conversion, coupling, and transmission of electrical and optical signals. It is used to package various infrared detectors, photoelectric transceiver devices, optical switches, and other devices and modules. The product can be equipped with sapphire light windows and microwave transmission connectors, which can meet the transmission rate requirements of 10Gbps, 25Gbps, 40Gbps, and 100Gbps.

② Military microwave module substrate and packaging shell

Microwave component substrates and packaging shells provide a highly integrated HTCC microwave ceramic substrate solution, commonly used for MCM component and SIP microsystem packaging.

③ Single chip integrated circuit packaging shell

Integrated circuit packaging shells are currently the most developed and widely used ceramic packaging shells. The product series includes SMD, CDIP, CQFN, CSOP, CLGA, CFP, CLCC, etc. The products are applied to single chip microwave integrated circuits such as FPGA, DSP, MMIC, MEMS devices, etc.

④ Packaging shell for microwave wireless communication devices

The packaging shell of microwave wireless communication devices is mainly designed for various applications of microwave devices and modules used in wireless communication. The packaging materials mainly include aluminum oxide, tungsten copper, kovar alloy, etc. It can be used for packaging RF power devices and modules. Microwave packaging has the characteristics of low insertion loss and good impedance matching, with a frequency of over 40GHz.

Material parameters

Material properties	Alumina (ALN)	Alumina white porcelain (Al ₂ O ₃)	Alumina black porcelain (Al ₂ O ₃)
Coefficient of thermal expansion (ppm/°C)	4.7±0.4	6.5±0.3	6.7±0.3
Bending strength (MPa)	> 320	> 400	> 350
Thermal conductivity (W/m·K)	> 170	> 15	> 12
Dielectric constant (10GHz)	8.5±0.2	8.9±0.2	9.7±0.2
Dielectric loss (10GHz)	0.03	0.001	0.02
Volume resistivity (Ω·cm)	> 1×10 ¹³	> 1×10 ¹²	> 1×10 ¹²
Dielectric strength (KV/mm)	> 20	> 20	> 20
Internal metallized material	tungsten	tungsten	tungsten
Surface Coating	Nickel plated gold or nickel plated palladium	Nickel plated gold or nickel plated palladium	Nickel plated gold or nickel plated palladium

Design specification for multi-layer high-temperature co fired ceramic products

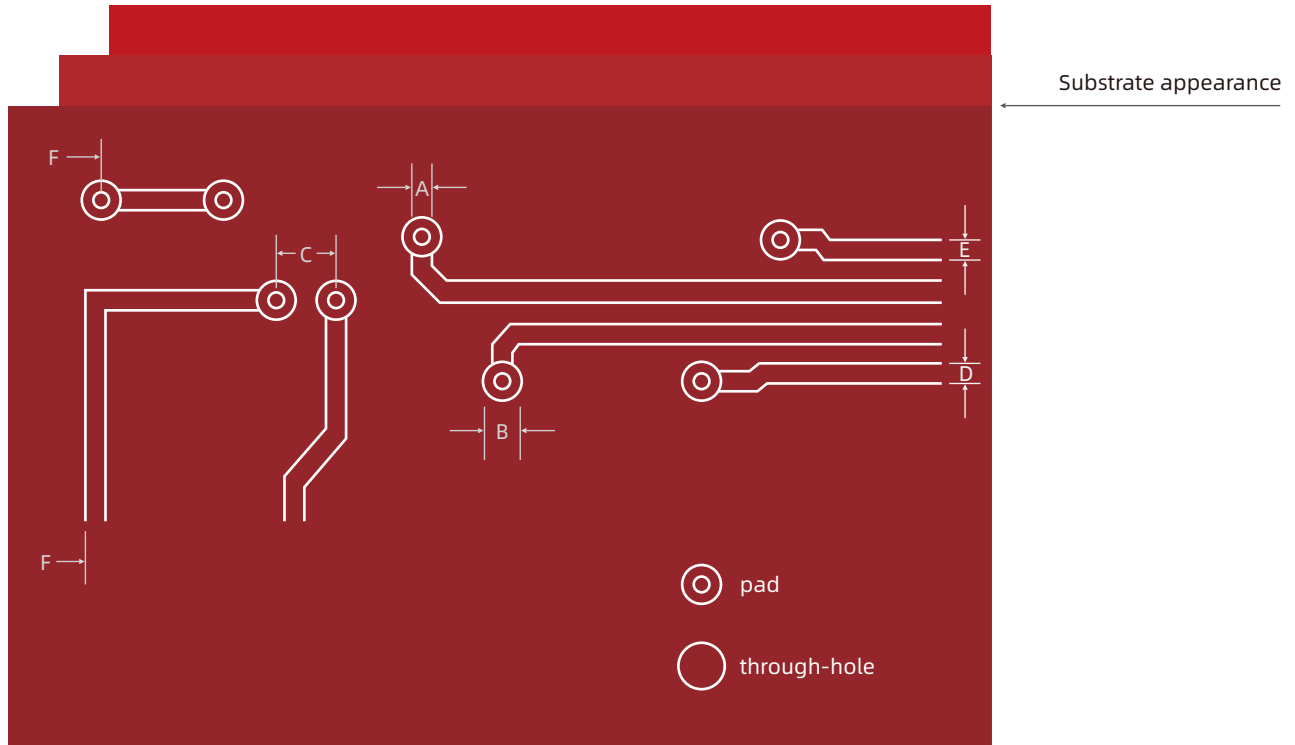
Dimensions (data after sintering)

- 1 The maximum size of the product is 100 × 100mm, with a tolerance of ± 0.15%, customizable;
- 2 The product thickness is 0.3-4.0mm, with a tolerance of ± 0.05mm, and can be customized;
- 3 The thickness of the single layer is 0.1-0.2mm, and the number of layers is 2-30, which can be customized.

Layout design

Layout design reference (sintered data)

Name	Order number	Minimum (mm)	Recommend
Through-hole diameter	A	0.08	0.125mm或0.165mm
Pad	B	A+(0.1~0.2)	-
Wire width	D	0.10	0.15mm
Wire spacing	E	0.10	0.15mm
Between through-hole and substrate edge	F	0.5	1mm
Between the wire and the edge of the substrate	G	0.5	1mm



Substrate cross-section

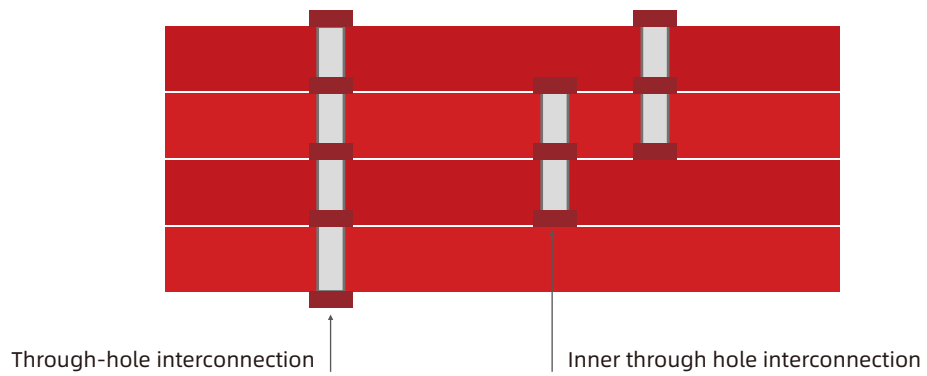


Figure 1 Layout Design Reference

Design reference for grid ground and network power layer

The large area power layer and grounding layer of HTCC multi-layer substrate circuit are designed using a grid network. The reference diagram for the design of grid grounding and grid power layer is shown in Figure 2. Reference dimensions (post sintering data):

Name	Order number	Minimum (mm)
Through-hole diameter	A	0.2~0.4
Pad	B	0.3~0.4
Wire width	C	0.2

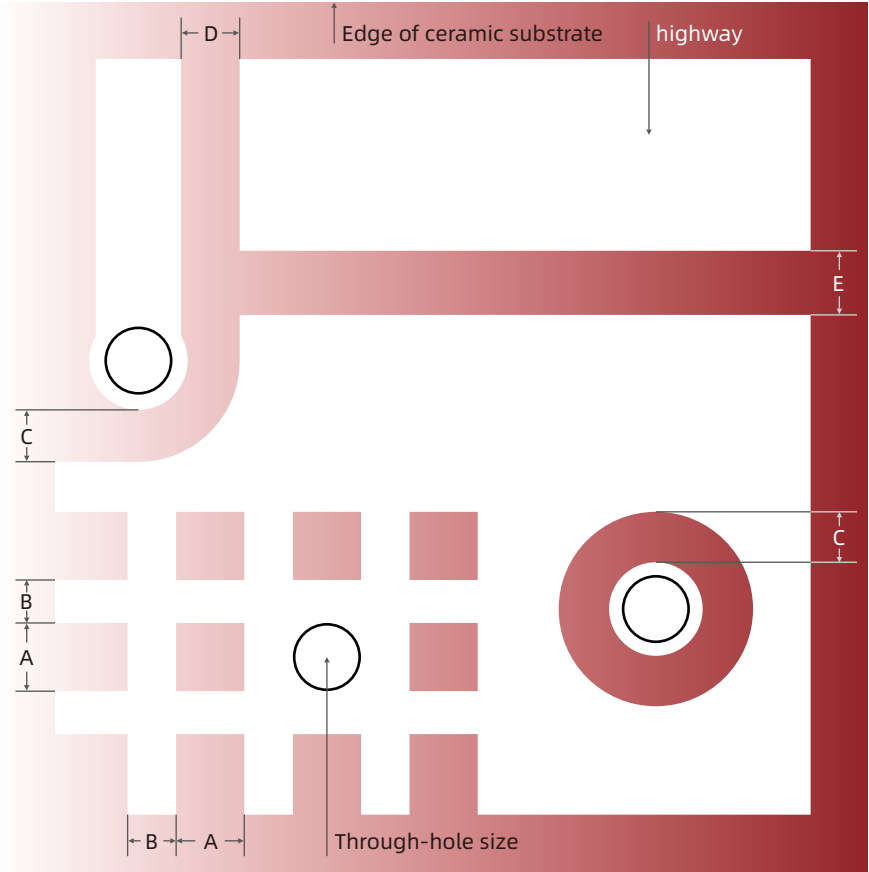


Figure 2 Design reference for grid ground and network power layers

Reference for cavity design

Specification requirements for cavity design (data after sintering)

Name	Order number	Measurement (mm)
Cavity depth	A	0.1~3.0
Distance from cavity bottom to substrate bottom	B	> 0.38
Cavity spacing	C	> 0.5
Distance between cavity and substrate edge	D	> 0.5
Distance between through-hole and cavity edge	E	Greater than twice the through-hole diameter

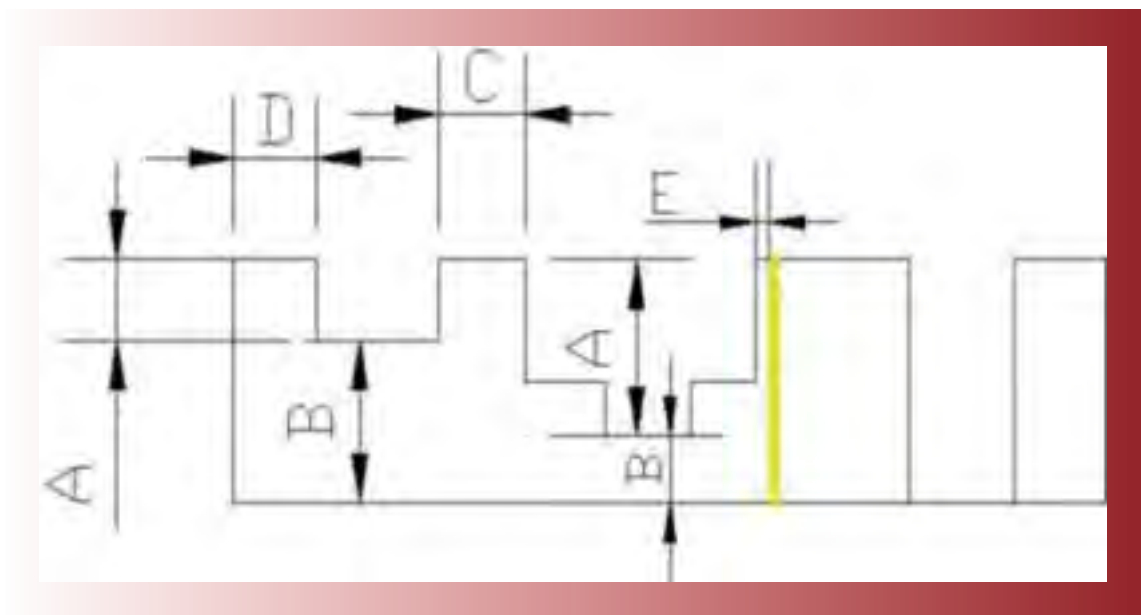


Figure 3 Reference for cavity design

Product Catalog

CSMD series

SMD (Surface Mount Ceramic Packages) ceramic surface mount device packaging is widely used as a ceramic packaging base for quartz crystal oscillators, SAW filters, duplexers, and MEMS devices. Low coefficient of thermal expansion and high thermal conductivity; Good insulation and air tightness.

Product List



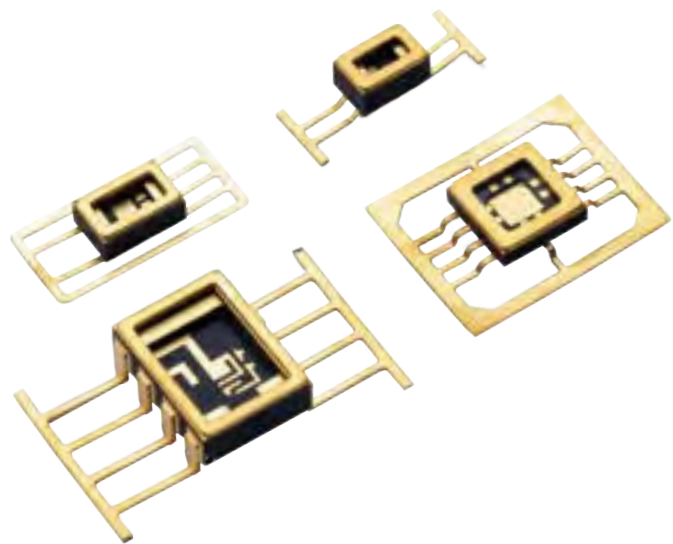
Order number	Product Name	Number of outgoing terminals	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	CSMD0.1	2	5.3	2.8	6	3.5	Flat seal
2	CSMD0.1-1	3	2.7	2.2	4	3.5	Flat seal
3	CSMD0.2	3	7.15	4.6	7.95	5.4	Flat seal
4	CSMD0.5	3	8.96	6.52	10.16	7.52	Flat seal
5	CSMD0.5e	3	9	6.4	10.2	7.5	Flat seal
6	CSMD1	3	14.45	10.01	15.85	11.41	Flat seal
7	CSMD2	3	16.52	12.34	17.52	13.34	Flat seal
8	CSMD0.1a	2	5.3	2.6	6	3.5	Flat seal
9	CSMD0.5a	3	8.9	6.3	10.2	7.55	Flat seal

CSOP series

CSOP (Ceramic small outline package) ceramic small outline package is a miniaturized mount shell with wing shaped leads that are more conducive to absorbing stress between the shell and PCB, improving reliability. Widely used in amplifiers, drivers, memories, comparators, etc.

Product List

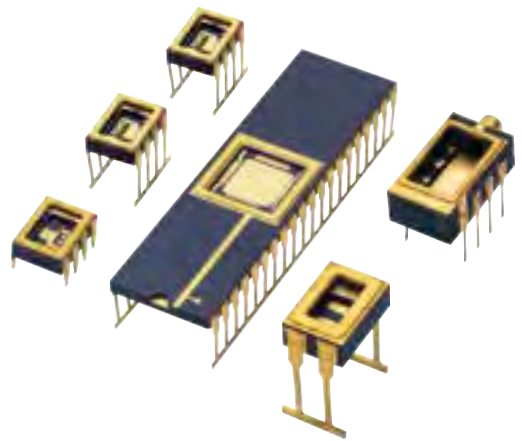
Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	CSOP-G4	4	1.27	2.2	1.6	5	3.2	Flat seal
2	CSOP-G4a	4	1.27	2.2	1.5	4.6	2.9	Flat seal
3	CSOP-G8	8	1.27	4	4	6	6	Flat seal
4	CSOP-G8a	8	1.27	5.3	3.4	5.5	5	Flat seal
5	CSOP-G8b	8	1.27	3.74	3	5	4.4	Flat seal
6	CSOP-G8c	8	1.27	7	6.5	10.3	8.4	Flat seal
7	CSOP-G8d	8	1.27	4.34	3	5.6	4.4	Flat seal
8	CSOP-G8e	8	2.54	2.54	7.5	3.5	9.7	Flat seal
9	CSOP-G10	10	1.27	4.75	3.15	6.35	6.35	Flat seal
10	CSOP-G10a	10	1.27	4.75	3.15	6.35	6.35	Flat seal



Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
11	CSOP-G14	14	1.27	4.8	2.98	8.65	4.4	Flat seal
12	CSOP-G16	16	1.27	2.48	2.08	10	4.4	Flat seal
13	CSOP-G16a	16	1.27	2.2	2.2	5.15	5	Flat seal
14	CSOP-G20	20	1.27	7.6	3.4	12.7	7.47	Flat seal
15	CSOP-G32	32	0.8	12.7	5.28	20.5	13.12	Flat seal
16	CSOP-G48	48	1.27	5.82	3	12.5	6.4	Flat seal
17	CSOP-G4b	4	2.54	3	2.6	6.8	4.9	Flat seal
18	CSOP-G4c	4	1.27	2.2	1.6	5	3.2	Flat seal
19	CSOP-G4d	4	1.27	2.2	1.6	5	3.2	Flat seal
20	CSOP-G4e	4	2.54	2.6	2.4	5.2	4	Flat seal
21	CSOP-G6	6	1.27/2.54	3.1	2	5.75	3.7	Flat seal
22	CSOP-G8f	8	1.27	2.7	1.6	5.1	5.1	Flat seal
23	CSOP-G8g	8	1.27	2.7	1.6	5.1	5.1	Flat seal
24	CSOP-G8h	8	2.54	5.95	5.55	9.75	7.37	Flat seal
25	CSOP-G8i	8	1.27	3.74	3	5	4.4	Flat seal
26	CSOP-G8j	8	1.27	3.34	3	5.6	4.4	Flat seal
27	CSOP-G8k	8	1.27	1.6	2.2	5.5	5	Flat seal
28	CSOP-G16b	16	1.27	1.6	2.2	10.5	5.4	Flat seal
29	CSOP-G16c	16	1.27	2	4	11.1	7.1	Flat seal

CDIP series

The CDIP (Ceramic Dual In line Package) ceramic dual inline housing has the advantages of good thermoelectric performance and high reliability. The commonly used lead pitch is 2.54mm; It is divided into two types: with heat sink and without heat sink.



Product List

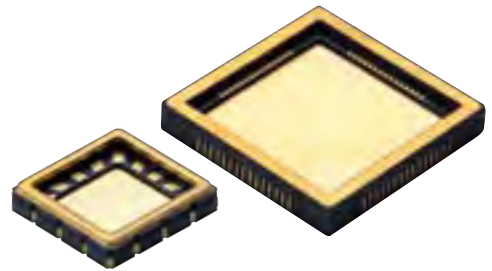
Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	CDIP-T6	6	2.54	3.8	3	9	7.37	Flat seal
2	CDIP-T8	8	2.54	5.1	5.1	10	7.37	Flat seal
3	CDIP-T8a	8	2.54	5.1	3.4	10	7.37	Flat seal
4	CDIP-T14	14	2.54	5.7	5.8	17.78	7.3	Flat seal
5	CDIP-T28	28	2.54	7.62	4.72	13.97	7.37	Flat seal
6	CDIP-T4	4	2.54	2.6	3	5	7.37	Flat seal
7	CDIP-T6a	6	2.54	3.8	3.1	9	7.3	Flat seal
8	CDIP-T6b	6	2.54	3.9	3.2	9.92	7.37	Flat seal
9	CDIP-T8b	8	2.54	3.18	4.42	10.28	7.37	gum
10	CDIP-T8c	8	2.54	5.9	3.7	9.9	7.37	Flat seal
11	CDIP-T8d	8	2.54	5.9	3.7	9.9	7.37	Flat seal
12	CDIP-T8e	8	2.54	5.9	3.7	9.9	7.37	Flat seal
13	CDIP-T8f	8	2.54	3	3.4	11.5	7.3	Flat seal
14	CDIP-T8g	8	2.54	2.35	3.7	9.9	7.37	Flat seal
15	CDIP-T16	16	2.54	2.8	3.7	20.6	7.37	Flat seal
16	CDIP-T16a	16	2.54	8.13	3.8	20.1	7.37	Flat seal
17	CDIP-T40	16	2.54	7.2	7.2	50.8	14.94	Flat seal

CLCC series

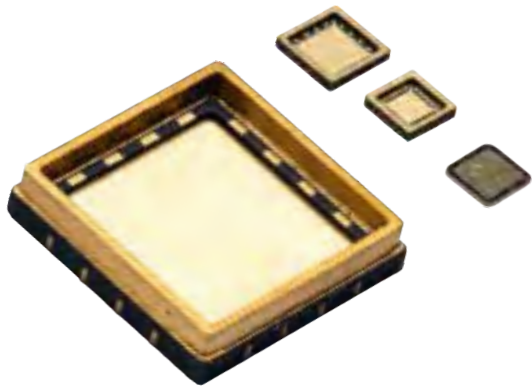


The CLCC (Ceramic Leadless Chip Carrier) ceramic leadless chip carrier packaging can be divided into two structures: cavity up and cavity down. The commonly used lead end pitches are 1.27mm and 0.5mm. CLCC is suitable for surface installation, with small parasitic parameters, small volume, light weight, good heat dissipation, and easy installation of heat sinks. Used for packaging various VLSI, ASIC, ECL and other circuits.

Product List

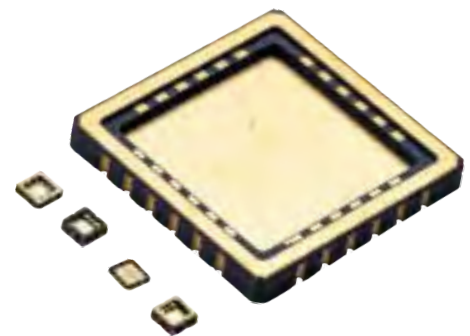


Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	CLCC-N6	6	/	1.4	2.54	2.8	2.54	/
2	CLCC-N6a	6	/	2.09	1.92	3.25	3.3	/
3	CLCC-03	3	/	1.8	1.3	3.05	2.54	Gold tin
4	CLCC-03a	3	/	1.8	1.3	4	3.5	Gum
5	CLCC-N4	4	/	2	2	4.4	3.4	Flat seal
6	CLCC-N12	12	/	2	1.7	5.8	5.5	Gum
7	CLCC-16	16	/	8.3	8.3	12	12	Gold tin
8	CLCC-16a	16	1.27	3	3	5	5	Flat seal
9	CLCC-16b	16	1.27	3	3	5	5	Flat seal
10	CLCC-16c	16	1.27	5	4.6	7	7	Flat seal
11	CLCC-N20	20	/	4.4	4.4	10.2	10.2	Gum
12	CLCC-N24	24	2.54	16	16	21	21	Gold tin



CQFN series

CCQFN (Ceramic Quad Flat Non led Package) ceramic square flat lead-less packaging is mainly used in GaAs/GaN frequency microwave chip packaging due to its excellent electrical and thermal properties, small size and light weight. It has excellent RF transmission performance, usually covering DC-12GHz and DC-20GHz frequencies. CQFN packaging with special design and materials can cover DC-40GHz frequencies.



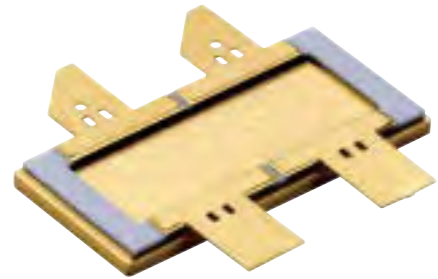
Product List

Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	CQFN-N06a	6	1.1	2.2	2.2	3	3	Flat seal
2	CQFN-N06b	6	1.1	2.2	2.2	3	3	Flat seal
3	CQFN-N06c	6	1.27	2.8	2.8	3.8	3.8	Flat seal
4	CQFN-N12	12	0.5	2.2	2.2	3	3	Flat seal
5	CQFN-N16	16	0.5	1.5	1.5	3	3	Flat seal
6	CQFN-N16a	16	0.9	3.5	3.5	5	5	Flat seal
7	CQFN-N20	20	0.5	3.18	3.18	4	4	Flat seal
8	CQFN-N24	24	0.44	2.53	3.18	4	4	Flat seal
9	CQFN-N28	28	0.57	3.5	3.5	5	5	Flat seal
10	CQFN-N48	48	0.5	7.2	7.2	8	8	Flat seal
11	CQFN-N56	56	56	9	9	10	10	Flat seal

Power amplifier series

The RF power tube housing with metal base plate metal wall ceramic insulator structure is usually used to package GaAs or GaN solid state microwave power devices above S band. The RF insulator ports of this type of product are designed with impedance matching to reduce insertion loss and return loss, and have excellent microwave transmission performance. The metal substrate material can be copper based composite materials such as oxygen free copper, tungsten copper, CMC, or CPC with high thermal conductivity to solve the heat dissipation problem of power tubes. At present, we can provide a full range of compatible products in this type of packaging on the market.

This type of shell is applied to wireless communication power devices and modules in fields such as digital mobile communication, point-to-point and multi-point communication, wireless broadband access, and other wireless networks.



Product List

Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type	remarks
1	FP1506-F4	4	5.5	2.8	12.5	15.3	5.5	Gum	
2	FP2010-F4	4	8.6	16.51	6.1	20.57	9.78	Gum	
3	FP0905-F2	2	3.05	6.6	2.79	9.65	5.84	Gum	
4	FP4110-F6	4	14.2	27.94	6.1	31	9.66	Gum	With flange
5	VP0504-F2a	2	2.3	2.03	3.05	5.08	4.07	Gum	With flange
6	VP0504-F2	2	2.3	2.03	3.05	5.08	4.07	Gum	
7	FP2110-F4	4	8.9	6.1	16.51	20.6	9.8	Gum	
8	VP1809-F6	6	2.8	8.85	6.2	10.05	8.7	Gum	With flange

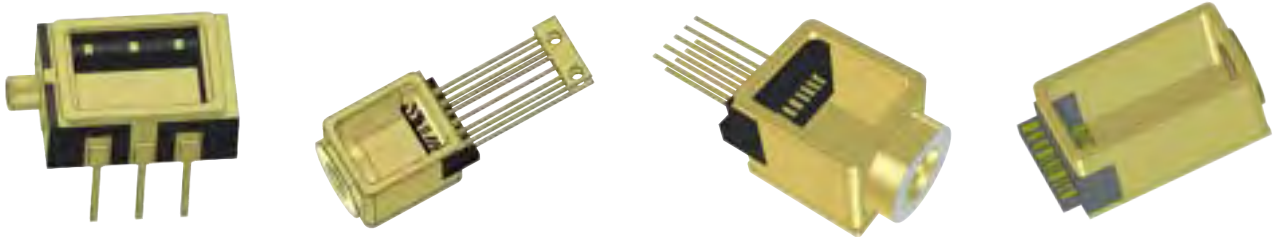
Optical detection and communication series

Using metal TOSA: Transmitter Optical Subassembly for light emission secondary mode. ROSA: Receiver Optical Subassembly. Suitable for optical receiving, transmitting, and receiving integrated devices, the product can be equipped with sapphire optical windows, which can meet the requirements of transmission rates such as 2.5Gbps, 10Gbps, 25Gbps, 40Gbps, 100Gbps, etc. The product parameters, airtightness, and reliability all meet international standards. The product appearance, structure, and size can be customized and developed.

The butterfly shaped optoelectronic device shell, named after its appearance, has always been used in optical communication systems in this packaging form. Provide mechanical environmental protection, heat transfer, and ensure the stability of the optical path for active optical devices. It can integrate optical windows, coaxial connectors, and provide functions such as optical and electrical paths.

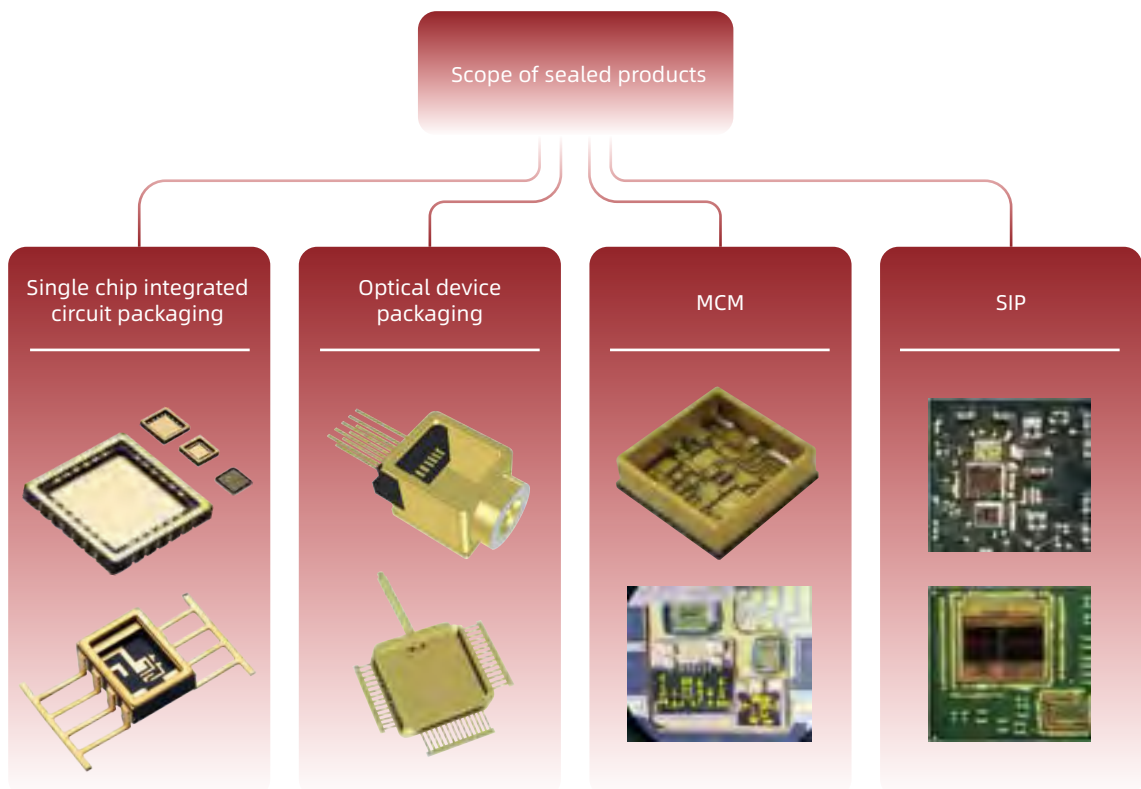
Product List

Order number	Product Name	Number of outgoing terminals	Lead out pitch	Core cavity (length mm)	Core cavity (width mm)	Appearance of ceramic parts (length mm)	Appearance of ceramic parts (width mm)	Sealing type
1	FP1106-N24	24	/	9.9	4.85	12.5	5.85	Flat seal
2	FP157-N22	22	/	13.6	5.6	16.85	6.6	Flat seal
3	FP0605-N9	9	0.7	5.2	4.4	8.7	5.4	Flat seal



Chip packaging

Chip packaging testing

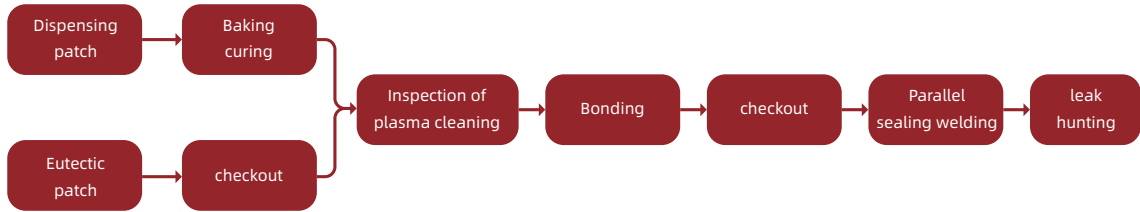


Sealing Line Capability

1 Overview of the development line

At present, the packaging development line has been preliminarily built to meet the traditional micro assembly process development needs of microwave devices and modules. The basic equipment is mainly manual and semi-automatic, covering the research and production capacity of single chip integrated circuits and small multi chip components.

2 Sealing Line Process Flow



Sealing Line Process Capability



Capable of developing single chip circuit packaging and multi chip components



Capable of parallel sealing and solder fusion sealing of ceramic and metal tube shells