GK7205V210 Datasheet

Version   1.1

Hunan Guoke Microelectronics Co.

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Version History

Version	Note
V0.1	Initial Version
V0.2	Format Adjustment
V0.3	Add Order Notes
V1.1	Additional hardware features

Catalog

1.Overview

Т h е GK7205V210 chip is a new generation of low-power multimedia SOC chip that supports H.265 encoding from GOK.

The chip integrates a dedicated ISP with efficient video encoding processing performance and supports H.265 encoding to meet customers' various differentiated business needs. The integrated RTC, POR, Audio codec and rich peripheral interfaces help customers to reduce BOM cost, and the low-power CPU and low-power architecture help customers to reduce power consumption.
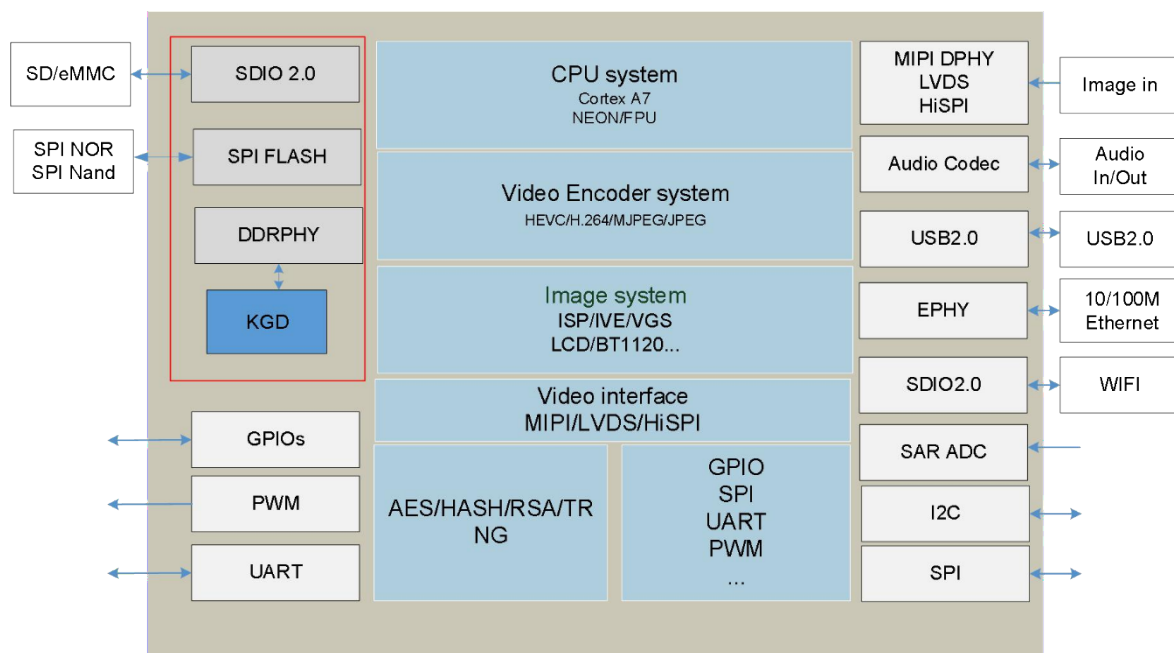
F i g u r e 0-1: GK7205V210 Function Block Diagram

2. Key Features

CPU

- ARM Cortex A7 @ 900MHz

- 32KB I-Cache, 32KB D-Cache, 128KB L2 Cache

- Integrated multimedia acceleration engine - NEON and hardware Java acceleration

- Integrated hardware floating point co-processor

Storage interface and startup

- Embedded 512Mb DDR2

- Supports up to 1200Mbps

- Support SPI Nor Flash, maximum capacity 256MB

- Supports SPI Nand Flash with a maximum capacity of 1GB

- Supports eMMC 4.5, up to 2TB capacity

- Selectable boot from SPI Nor or SPI Nand or eMMC

Video Encoding

- Support H.265/H.264 video encoding

  ✓ Supports a maximum resolution of 2560x1440

- MJPEG/JPEG encoding support

- Support CBR/VBR/FIXQP/AVBR/QPMAP/CVBR

Audio Codec

- Support software codec, support G.711G.726,

ADPCM

- Support Audio 3A (AEC/ANR/AGC)

Video and graphics processing

- Support for multiple application analysis

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- Support video, graphics PQ boost

- Support ISP

Safe handling

- Supports AES/RSA and other algorithms

- HASH Support

- OTP support

- Support TRNG

Audio and video interface

- Video Input

  - ✓ Supports MIPI, LVDS, HiSPI interfaces

  - ✓ Support various mainstream HD sensors

- Video Output

  - ✓ LCD output support

  - ✓ Supports BT656/BT1120 output

- Audio Interface

  - ✓ Supports mic/line in input

  - ✓ Support line out output

  - ✓ I2S support

Peripherals & Others

- Supports one USB2.0 Host/Device interface

- Supports one SDIO2.0 with SD2.0 card

- Supports 10M/100M Ethernet with built-in EPHY

- Supports four PWMs

- Supports three UART interfaces

- Dual-channel SAR ADC support

- Multiple I2C interfaces; multiple GPIO interfaces

- SPI interface support

- Built-in high-precision RTC

Physical Specifications

- Operating Voltage

  ✓ Core Voltage: 0.9v

  ✓ IO Voltage: 3.3v

  ✓ SDRAM Voltage: 1.8v

- Package:

  ✓ QFN 9mm * 9mm, 88pins

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3. Package and Pinouts

3.1 Package

   GK7205V210 chip adopts QFN package,the package size is 9mm×9mm,the pin pitch is 0.35mm, the total number of pins is 88, please refer to the figure for the detailed package.
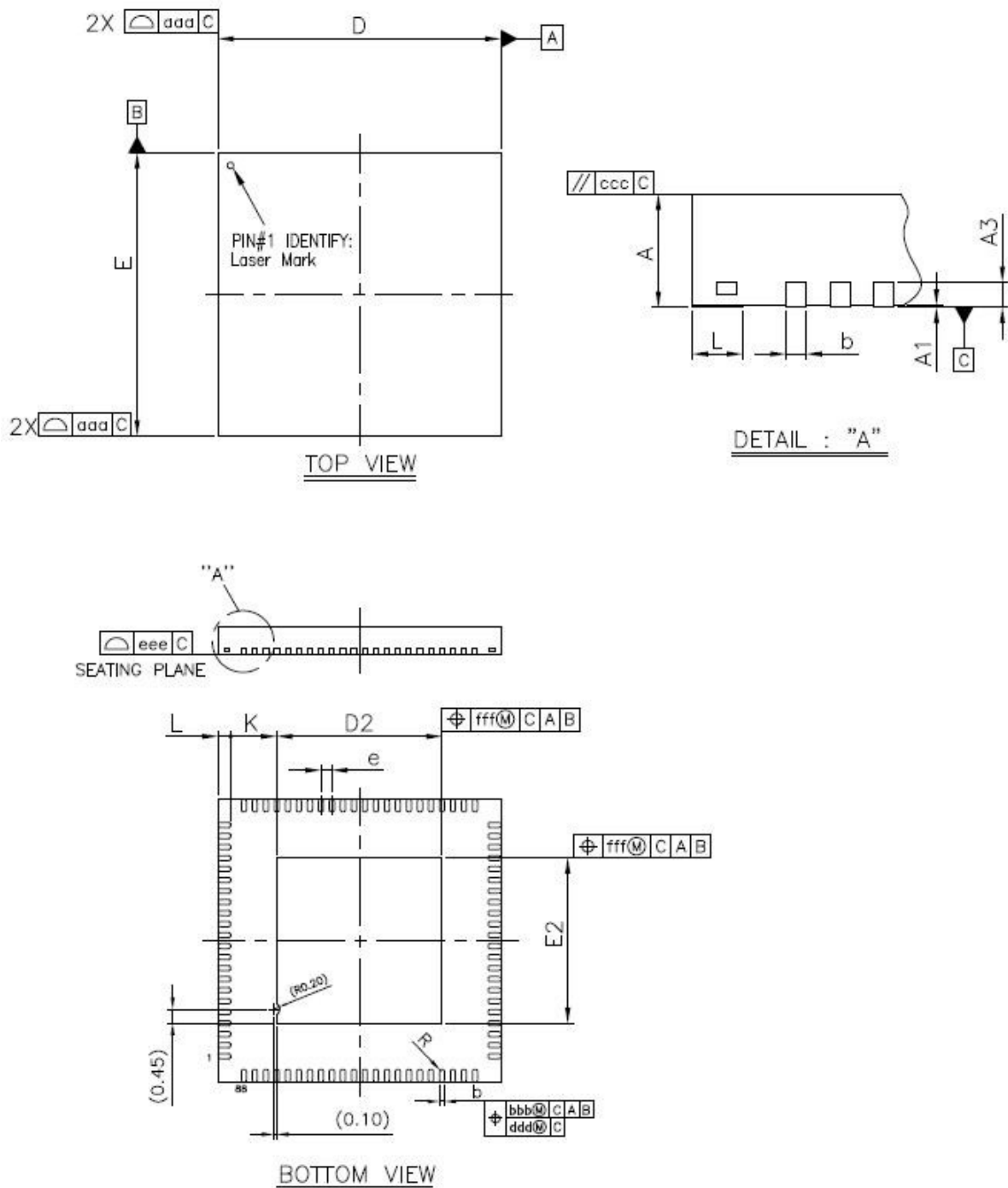

Figure 3- 1 GK7205V210 chip package diagram

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Table 3-1 GK7205V210 chip package parameters

Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.90	0.95	0.033	0.035	0.037
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.20 REF			0.008 REF		
b	0.11	0.16	0.21	0.004	0.006	0.008
D	8.90	9.00	9.10	0.350	0.354	0.358
E	8.90	9.00	9.10	0.350	0.354	0.358
D2	5.16	5.26	5.36	0.203	0.207	0.211
E2	5.16	5.26	5.36	0.203	0.207	0.211
e	0.35 BSC			0.014 BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020
K	0.20	---	---	0.008	---	---
R	0.055	---	0.105	0.002	---	0.004
aaa	0.10			0.004		
bbb	0.07			0.003		
ccc	0.10			0.004		
ddd	0.05			0.002		
eee	0.08			0.003		
fff	0.10			0.004		

NOTE:

1. CONTROLLING DIMENSION : MILLIMETER

2. REFERENCE DOCUMENT: JEDEC MO-220.

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3.2 Pin Distribution

Figure 3- 2 GK7205V210 pinout diagram

4. Hardware Features

4.1   Welding process recommendations

4.1.1 Lead-free reflow soldering process parameters requirements

The lead-free reflow soldering process profile is shown in Figure 4-1.
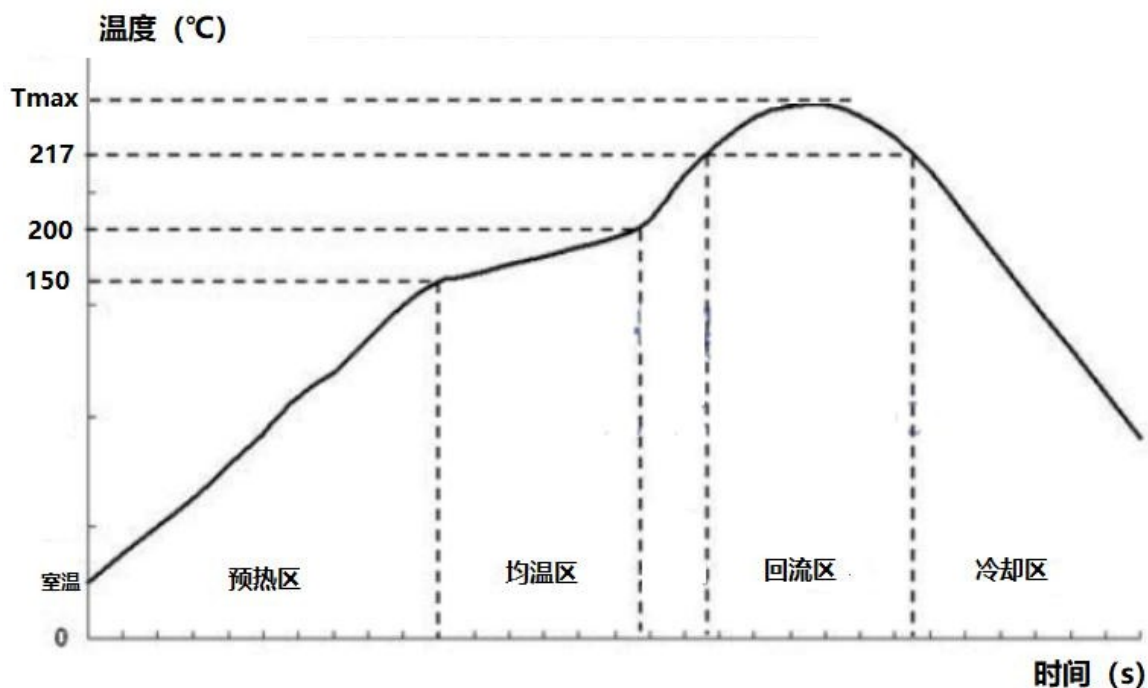
Figure 4-1. Lead-free reflow soldering process curve

Welding area	Time	Heating rate	Peak temperature	Cooling rate
Preheating zone (room temperature ~ 150℃)	60 to 150s	≤2.0℃/s	-	-
Homogeneous temperature zone (150~200℃)	60 to 120s	<1.0℃/s	-	-
Reflux zone (>217℃)	60 to 90s	-	Tmax=230-260℃	-

Cooling zone (Tmax ~ 180℃)	-	-	-	1.0℃/s≤Slope≤4.0℃/s

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Table 4-1 Lead-free reflow soldering process parameters

Lead-free reflow soldering process parameters are described:

Preheating zone: temperature from room temperature to 150 ℃, the temperature rise rate is controlled at about 2 ℃ / s, the temperature zone time is 60 ~ 150s.

Even temperature zone: temperature from 150 ℃ ~ 200 ℃, stable and slow heating, the temperature rise rate is less than 1 ℃ / s, and the region time control in 60 ~ 120 s (Note: the region must be slowly heated, otherwise it is easy to lead to poor welding).

Reflow zone: temperature from 217℃ ~ Tmax ~ 217℃, the whole zone time control in 60～90s. 60～90s as the target of reflow time, for some heat capacity can not meet the time requirements of the veneer can be relaxed to 120s reflow time.

Cooling zone: temperature from Tmax to 180°C, the maximum temperature drop rate should not exceed 4°C/s. The total time for temperature rise from room temperature to Tmax should not exceed 6 minutes.

The reflow curve is only the recommended value, the client needs to make corresponding adjustments according to the actual production situation

4.2 Tide sensitive parameters

This section sets out the principles for the use of ICs (tide sensitive products) and covers the following explanation of terms:

- Floor life: the maximum time the product is allowed to remain in the workshop (ambient <30°C/60% RH, before unpacking the moisture-proof package to reflow)

- Desiccant (desiccant): a material used to adsorb moisture and keep it dry

- Humidity Indicator Card (HIC): Humidity Indicator Card

- Moisture sensitivity level (MSL): Moisture sensitivity level

- Moisture Barrier Bag (MBB): Moisture Barrier Bag

- Solder Reflow: Reflow soldering

- Shelf Life: normal storage time after moisture-proof packaging

【Tide Sensitive Grade

The moisture sensitivity level of this product is 3.

4.2.1 Product moisture-proof packaging

4.2.1.1 Packaging Information

Dry vacuum packaging materials contain:

- Humidity Indicator Card (HIC)

- Moisture Barrier Bag (MBB)

- Desiccant

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Figure 4-2 Schematic diagram of dry vacuum packaging materials

4.2.1.2 Tide sensitive products incoming inspection

Prior to production use (SMT), after opening the vacuum bag:

* If the maximum indication point of the HIC has changed (not blue or earthen), the product must be rebake with reference to Table 4-3.

* If the 10% RH dot in the HIC is blue or earthy, the product is dry and can be vacuum sealed by simply replacing the moisture barrier.

4.2.2 Storage and Use

[Storage Environment

It is recommended to store the product in vacuum packaging at <30°C/60% RH.

【shelf life】 (normal storage time after moisture-proof packaging)

Storage environment <30°C/60% RH, vacuum packaging storage, shelf life (storage period) of not less than 12 months.

【floor life

At ambient conditions <30°C/60%, floor life is referenced below.

Table 4-2 Floor life reference table

MSL	Floor life(out of bag) at factory ambient≦30°C/60% RH or as stated
1	Unlimited at ≦30°C/85% RH

2	1 year

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MSL	Floor life(out of bag) at factory ambient≦30℃/60% RH or as stated
2a	4 weeks
3	168 hours
4	72 hours
5	48 hours
5a	24 hours
6	Mandatory bake before use, must be reflowed within the time limit specified on the label

The use of [Chao Min products].

- If the product is exposed to ≦30℃/60%RH for more than 2 hours continuously or cumulatively, it is recommended to rebake and then vacuum dry the package.

- If the product is exposed under ≦30℃/60%RH for not more than 2 hours in total, it can be used without rebake, but it should be replaced with new desiccant and vacuum dried and packed.

For storage and usage principles not mentioned in this document, please refer directly to *JEDEC J-STD-033A*.

4.2.3 Re-baking

[Scope of Use

ICs that need to be re-baked (moisture sensitive products)

[Re-baking reference table]

Table 4-3 Re-baking reference table

Body thickness	level	bake@125℃	bake@90℃≦5% RH	bake@40℃≦5% RH
≦1.4mm	2a	3 hours	11 hours	5 days
	3	7hours	23 hours	9 days
	4	7 hours	23 hours	9 days
	5	7 hours	24 hours	10 days
	5a	10 hours	24 hours	10 days
≦2.0mm	2a	16 hours	2 days	22 days
	3	17 hours	2 days	23 days
	4	20 hours	3 days	28 days
	5	25 hours	4 days	35 days
	5a	40 hours	6 days	56 days
≦4.5mm	2a	48 hours	7 days	67 days

Body thickness	level	bake@125℃	bake@90℃≦5% RH	bake@40℃≦5% RH
	3	48 hours	8 days	67 days
	4	48 hours	10 days	67 days
	5	48 hours	10 days	67 days
	5a	48 hours	10 days	67 ays
Remarks	This table shows the minimum baking time necessary after moisture. Re-baking preference is given to low temperature baking. Please refer to JEDEC for details			

5. Electrical performance

5.1 Extreme working conditions

Permanent damage may occur if the chip is operated at maximum rated conditions beyond the limit operating conditions. Functional operation should be limited to the conditions given in the "Recommended Operating Conditions" section. Prolonged operation under extreme operating conditions may affect the reliability of the device. Chip junction temperatures exceeding destructive junction temperatures may result in physical damage to the chip.

Table 5- 1 Limiting operating conditions (VSS=0V)

Parameters	Symbols	Scope	Unit
Supply voltage	0V9	-0.2 to +1.17	V
	1V8	-0.2 to +2.16	
	3V3	-0.2 to +3.96	
Destructive junction temperature	TJ	125	℃

5.2 Recommended working conditions

Table 5- 2 Recommended working conditions

Parameters	Symbols	Requirements			Unit
		Minimum value	Typical values	Maximum value	
Supply Voltage	0V9	TBD	0.9	TBD	V
	1V8	TBD	1.8	1.89	
	3V3	3.135	3.3	3.465	
Chip ambient temperature	TA	0	–	70	℃
Chip junction temperature	TJ	0	–	105	℃

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5.3 DC gas parameters

		Conditions	Minimum value	Typical values	Maximum value	Unit
High level output voltage	VOH	IO voltage = 3.3V	2.4	–	–	V
Low level output voltage	VOL		–	–	0.4	
High level input voltage	VIH		2	–	–	

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Low level input voltage	VIL		–	–	0.8	
High level output voltage	VOH	IO voltage = 1.8V	1.35	–	–	
Low level output voltage	VOL		–	–	0.4	
High level input voltage	VIH		1.27	–	–	
Low level input voltage	VIL		–	–	0.58	

Table 5- 3 DC Electrical Parameters

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6. Ordering Information

Chip identification and definition

Chip identification:

商标 ——————

芯片主型号 —————— GK7205

扩展位 —————— RNCFV210

年周号：前两位为年，后两位为第几周 —————— YYWW

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Extended bit definition:

$$R \quad N \quad C \quad F \quad Vxyz$$

环保等级：
G:无铅
R:RoHS
N:含铅但不含RoHS规定的其他五种物质

封装：
B:BGA
O:POP
N:QFN

版本标识

预留位

温度范围：
C: 0℃~70℃
I: −40℃~85℃
M: −55℃~85℃
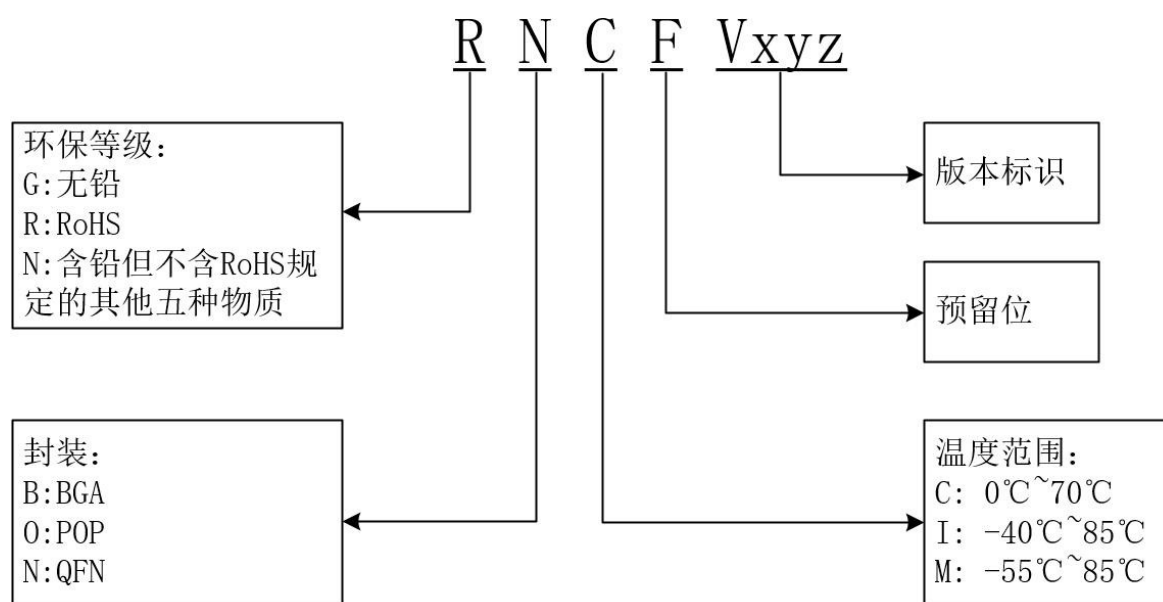
7.RoHS Description

All GK7205V210 products provided to our customers are RoHS products, i.e., they are Lead-free.

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