

Product Introduction

G32A221

Ultrasonic Sensor and Signal Processor

August 2026

1. Product characteristics

■ Applications

- Advanced Driver Assistance System (ADAS)
- Ultrasonic Parking Assist System (UPAS, PAS, etc.)
- Distance measurement

■ High-speed DSI3 communication interface

- 666kbits/s

■ Embedded 32-bit MCU

- Arm® Cortex®-M0+, with a maximum main frequency of 48MHz
- eFlash: 32KB + 512B
- SRAM: 5KB
- UART × 1
- GPIO × 4
- 10-bit ADC × 1
- 8-bit DAC × 2
- SWD debugging interface

■ High reliability and rich diagnostic functions

- Ring-down frequency and ring-down time measurement
- Built-in temperature sensor
- Self-check function

■ Excellent performance

- Ultrasonic signal coding: Fixed frequency, Linear Chirp, frequency hopping, custom waveform
- Fast Time Constant algorithm (FTC)
- Sensitivity Time Control (STC)
- Automatic threshold: It is called ATG in fixed-frequency mode; AATG in variable-frequency mode

- Static threshold STG: Supports fixed-frequency and variable-frequency modes
- Near Field Detection (NFD)
- Envelope Data Interface (EDI)
- Echo envelope processing module: Supports fixed-frequency mode and variable-frequency mode

■ Supports center-tapped transformers

■ Complies with ISO26262 functional safety level ASIL-B

■ AEC-Q100 Grade 2 Automotive Certification

■ Package

- QFN20L4

■ Introduction

- This device provides excellent performance in ultrasonic applications. The built-in programmable MCU offers maximum flexibility to adapt to various applications. Advanced and highly reliable echo detection combined with comprehensive digital signal processing (advanced filters, automatic threshold, echo peak detection, dynamic digital gain, etc.) optimizes the detection performance at both short and long distances. The new ultrasonic signal encoding realizes high-intensity reliability against noise, environmental conditions, and other ultrasonic sources.

The DSI3 communication with a maximum transmission rate of 666 kbit/s enables high-payload data transmission to reduce the system response time. Supports point-to-point topology and bus mode.

The powerful 32-bit Arm® Cortex®-M0+ processor provides many features for special analysis, evaluation, and debugging purposes (e.g., envelope and raw data output).

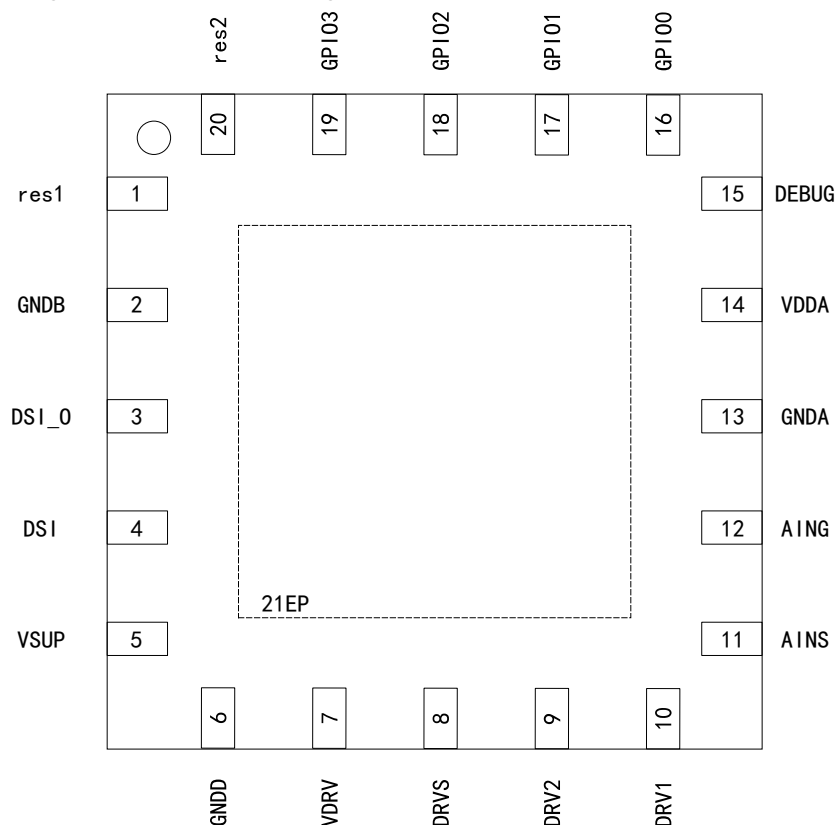
Contents

1. Product characteristics.....	1
2. Pin Information	4
2.1. Pin distribution	4
2.2. Pin functional description.....	4
3. Typical Application	6
3.1. Typical application circuit.....	6
3.2. External components.....	6
4. Package Information	8
5. Packaging Information	10
5.1. Tray packaging	10
5.2. Reel packaging.....	11
6. Ordering Information.....	12

2. Pin Information

2.1. Pin distribution

Figure 1 Distribution Diagram of G32A221 Series QFN20L4 Pins



2.2. Pin functional description

- A: Analog
- D: Digital
- S: Supply
- I: Input
- O: Output
- IO: Bidirectional

Table 1 G32A221 Pin Function Description

No.	Name	Pin type	Description
1	res1	S	Reserved
2	GNDB	S	Bus ground, needs to be connected to the system ground
3	DSI_O	A_IO	DSI bus (connect to the next DSI slave)
4	DSI	A_IO	DSI bus (connect to the DSI master)
5	VSUP	S	Power supply voltage input

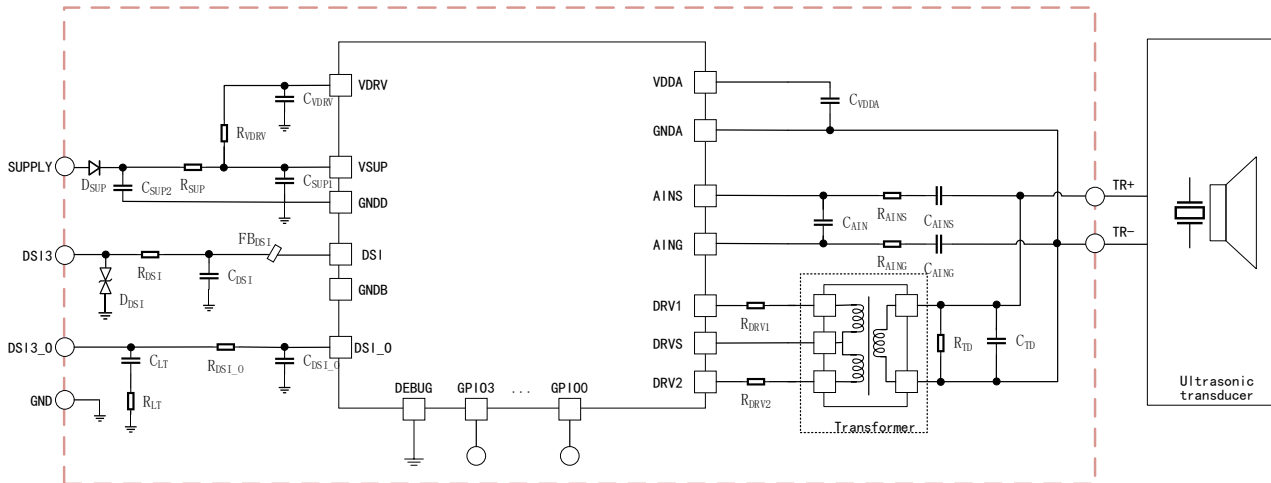
No.	Name	Pin type	Description
6	GNDD	S	Digital ground, which needs to be connected to the system ground
7	VDRV	S	Power supply voltage input for transducer drive
8	DRVS	A_O	Transducer drive current output
9	DRV2	A_I	Transducer drive signal iutput 2
10	DRV1	A_I	Transducer drive signal iutput 1
11	AINS	A_I	Signal input (positive)
12	AING	A_I	Signal input (negative)
13	GNDA	S	Analog ground should be connected to the system ground
14	VDDA	S	Analog power supply (generated internally, not for external use)
15	DEBUG	D_I	Debug mode enable, active high. It should be connected to GNDD during normal operation
16	GPIO0	D_IO	GPIO0
17	GPIO1	D_IO	GPIO1
18	GPIO2	D_IO	GPIO2
19	GPIO3	D_IO	GPIO3
20	res2	S	Reserved
21	EP	S	The exposed die pad should be connected to the system ground

3. Typical Application

3.1. Typical application circuit

G32A221 ultrasonic transducer. This circuit diagram contain components not produced by Geehy. These components are included to illustrate typical applications. Geehy does not support components beyond the performance specifications of G32A221.

Figure 2 Application Circuit of G32A221



3.2. External components

Table 2 External Components of G32A221

Symbol	Typical value	Unit	Description
C_{TD}	0-2	nF	Transducer resonant capacitance
R_{TD}	2-10	K Ω	Transducer resonant resistance
R_{DRV1}	2	Ω	Series resistance of transducer
R_{DRV2}	2	Ω	Series resistance of transducer
C_{AINS}	470	pF	AC coupling capacitor for transducer signal
R_{AINS}	100	Ω	Filter resistor for transducer signal
C_{AING}	470	pF	AC coupling capacitor for transducer signal
R_{AING}	100	Ω	Filter resistor for transducer signal
C_{AIN}	10	pF	Filter capacitor for transducer signal
$C_{DSI}^{(1)}$	1.2	nF	Filter capacitor for DSI
$R_{DSI}^{(1)}$	1	Ω	Series resistor for DSI
$L_{DSI}^{(4)}$	1k Ω @100MHz	Ω	DSI series magnetic beads
$D_{DSI}^{(4)}$	Adjust according to system requirements		ESD suppression diode

Symbol	Typical value	Unit	Description
C _{DSIO} ⁽¹⁾	1.2	nF	Filter capacitor for DSI_O
R _{DSIO} ⁽¹⁾	1	Ω	Series resistor for DSI_O
C _{LT} ⁽¹⁾	3.3	nF	Coupling capacitor of the line terminating resistor
R _{LT} ⁽¹⁾	470	Ω	Line terminating resistor
C _{VDRV}	>82	uF	Decoupling capacitor of the digital power supply
C _{VDDA}	100	nF	Decoupling capacitor of the analog power supply
C _{SUP1}	1	uF	Decoupling capacitor of the power line
C _{SUP2}	2.2	nF	Decoupling capacitor of the power line
R _{VDRV}	15	Ω	Filtering resistor for transducer drive
D _{SUP}	> 200	V	Reverse polarity protection diode
R _{SUP} ⁽²⁾	82	Ω	Series resistance of the power cord
Transformer	3-5	mH	Transformer
Transducer	30-80	KHZ	Ultrasonic transducer

Note:

- (1) It needs to be adjusted according to the circuit and topology (point-to-point or bus) of the DSI master.
- (2) If the ISO 7637-2 standard needs to be met not only at the system level but also at the module level, the component values need to be adjusted.
- (3) The values of the components should be adjusted according to N_{PULSES} and I_{DRV}.
- (4) For ESD protection, it is recommended to reserve magnetic beads close to the pins, or users may also consider using TVS diodes placed at the port.

4. Package Information

This IC uses a lead-free, RoHs-compliant QFN20 package, in accordance with JEDEC MO-220 K standard VHHC-2. According to JEDEC standards JESD-51-6 and JESD, the thermal resistance from junction to ambient $R_{th,ja}$ is 37°C/W .

Figure 3 QFN20 Package Diagram

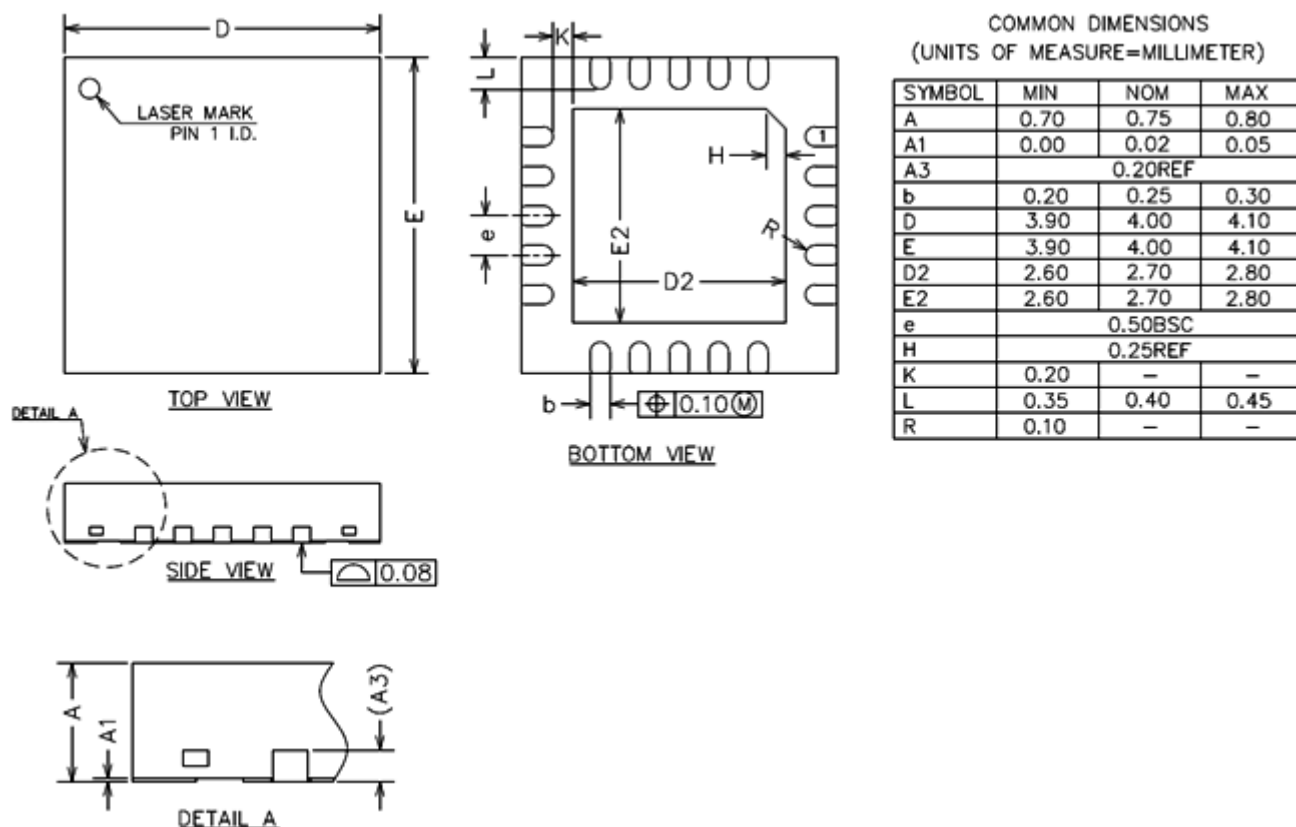


Figure 4 Silk Screen Printing Diagram

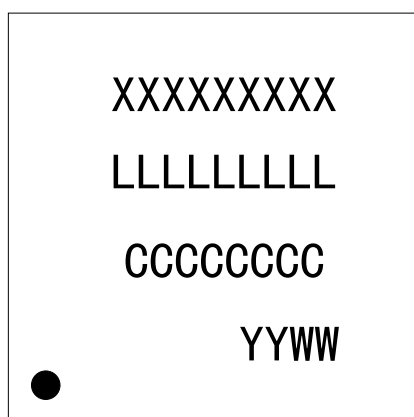


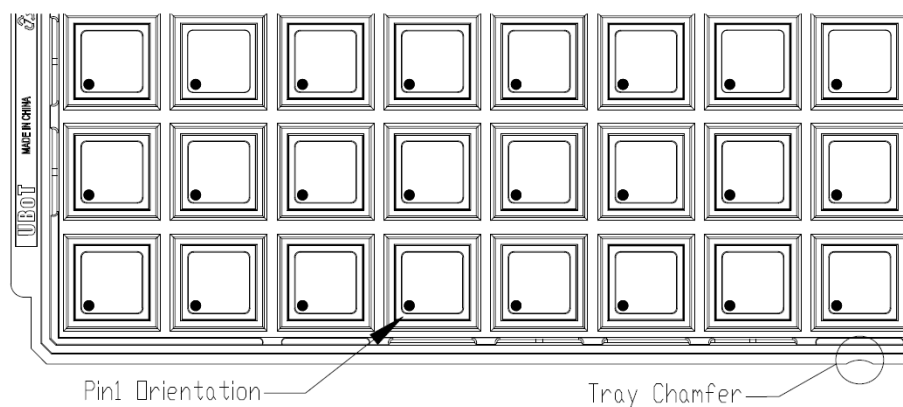
Table 3 Information of Silk Screen Printing Diagram

Character	Description
XXXXXXXXXX	Product model
LLLLLLLLLL	Batch number
CCCCCCCCC	Internal traceability code
YYWW	Production year and week
●	Point PIN1

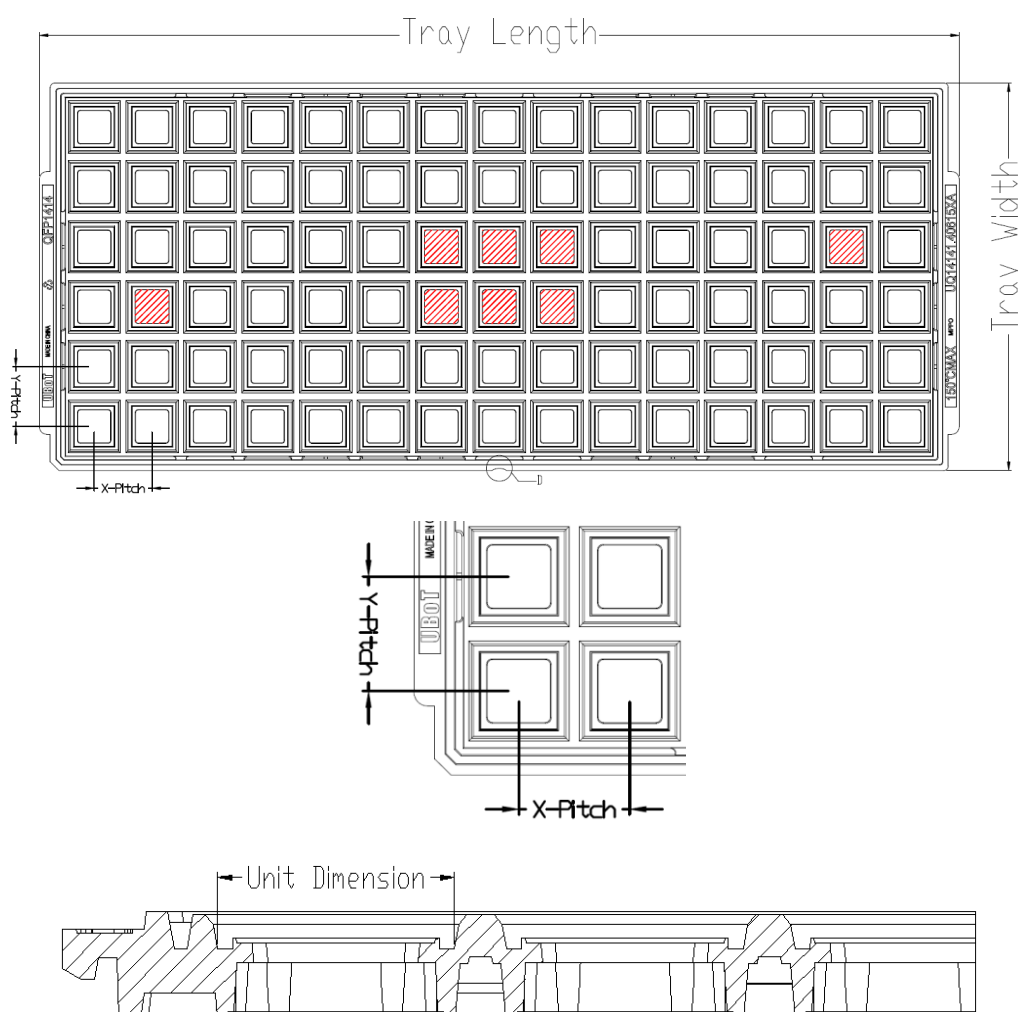
5. Packaging Information

5.1. Tray packaging

Figure 5 Tray Packaging Diagram



Tray Dimensions



All photos are for reference only, and the appearance is subject to the product

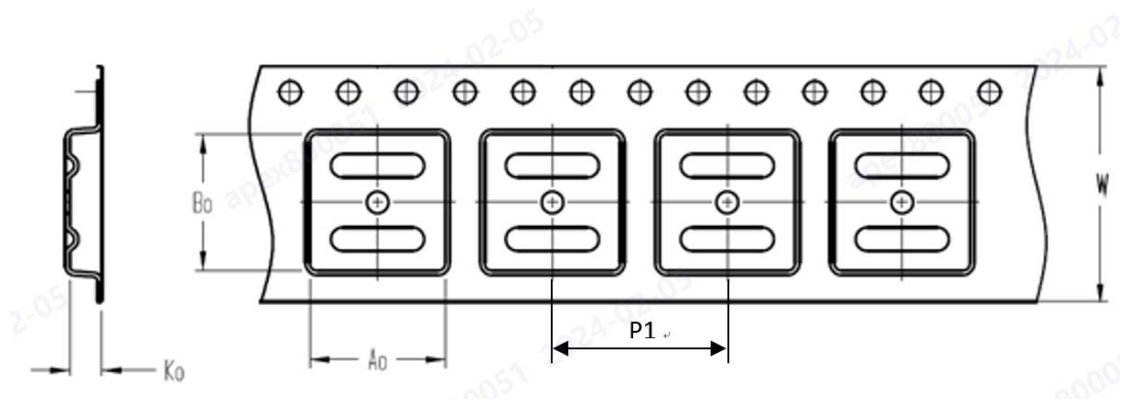
Table 4 Tray packaging parameter specification

Device	PKG Type	Pins	SPQ	X-Dimension	Y-Dimension	X-Pitch	Y-Pitch	Tray Length	Tray Width
G32A221	QFN	20	4900	4.2	4.2	8.8	9.2	322.6	135.9

SPQ: Standard Packing Quantity.

5.2. Reel packaging

Figure 6 Reel Dimensions



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
P1	Dimension designed to accommodate the component pitch
W	Overall width of the carrier tape

Figure 7 Quadrant allocation in PIN1 direction in tape

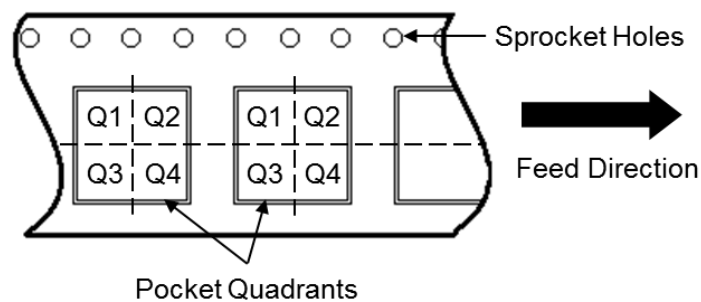


Figure 8 Reel Dimensions

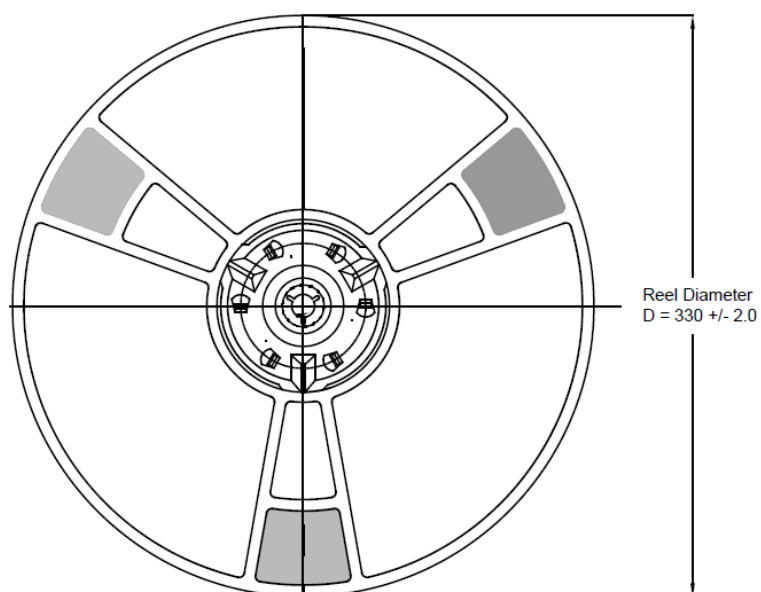


Table 5 Tape packaging parameter specification

Device	Package Type	Pins	SPQ	Reel Diameter (mm)	A0 (mm)	B0 (mm)	P1 (mm)	K0 (mm)	W (mm)	Pin1 Quadrant
G32A221	QFN	20	5000	330	4.3	4.3	1.1	8	12	Q1

6. Ordering Information

Table 6 Ordering Information List

Order code	Package	Packaging	SPQ	Temperature range
G32A221	QFN20L4	Tray	4900	-40°C to 105°C
G32A221	QFN20L4	Reel	5000	-40°C to 105°C

