

N32G435x8/xB

Product Brief

N32G435 series uses 32-bit ARM Cortex-M4F core, maximum working frequency 108MHz, support floating point operation and DSP instructions, integrated up to 128KB embedded encryption Flash, 32KB SRAM, integrated with rich high-performance analog interface, Built-in one 12bit 5Msps ADC, two independent rail-to-rail operational amplifiers, two high-speed comparators, one 1Msps 12bit DAC, Integrated multi-channel U(S)ART, I2C, SPI, USB, CAN and other digital communication interfaces, built-in password algorithm hardware acceleration engine

Main features

- **CPU core**
 - 32-bit ARM Cortex-M4 core + FPU, single-cycle hardware multiply and divide instructions, support DSP instructions and MPU.
 - Built-in 2KB instruction Cache, support Flash acceleration unit execution program 0 wait
 - The highest frequency is 108MHz, 135DMIPS
- **Cryptographic memory**
 - Up to 128KByte in-chip Flash, support encrypted storage, partition management and data protection, support hardware ECC verification, 100,000 erasing times, 10 years of data retention
 - Up to 32KByte in-chip SRAM, including 24Kbyte SRAM1(Stop2 mode can be configured as retention) and 8 Kbyte SRAM2(both Standby and Stop2 modes can be configured as retention), supporting hardware parity check
- **Low power management**
 - Support Run, Sleep, LP Run, LP Sleep, Stop2, Standby mode
- **High-performance analog interface**
 - 1x 12bit 5Msps ADC, 12/10/8/6 bits configurable, up to 16 external single-ended input channels, supporting differential mode
 - Two rail-to-rail operational amplifiers with built-in programmable gain amplifier up to 32 times
 - Two high-speed analog comparators with built-in 64-level adjustable comparison reference, COMP1 supports STOP2 working in low power mode
 - 1x 12bit DAC, sampling rate 1Msps
 - Internal 2.048V independent reference voltage reference source
 - All analog interfaces support full voltage from 1.8 to 3.6V
- **Clock**
 - 4MHz~32MHz external high-speed crystal
 - 32.768KHz External low-speed crystal
 - Internal high-speed RC(HSI) 16MHz
 - Internal multi-speed RC(MSI) 100K~4MHz
 - Internal low-speed RC(LSI) 40KHz
 - Built-in high-speed PLL
 - Supports one clock output, which can be configured as low-speed or high-speed clock output
- **Reset**
 - Support power on, brown-out, and external pin reset
 - Support watchdog reset, software reset
- **Support up to 52 GPIOs.**

- **Communication interface**
 - Five U(S)ART interfaces, including three USART interfaces (support 1xISO7816, 1xIrDA, LIN) and two UART interfaces
 - One LPUART, support STOP2 to wake up MCU in low power consumption state
 - Two SPI interfaces, the rate is up to 27 Mbps, support I2S communication
 - Two I2C interfaces, the rate is up to 1 MHz, which can be configured in master/slave mode and support dual address response in slave mode
 - One USB2.0 FS Device interface
 - One CAN 2.0A/B bus interface
- **One high-speed DMA controller, each controller supports 8 channels, channel source address and destination address can be configured arbitrarily**
- **RTC real-time clock, support leap year perpetual calendar, alarm event, periodic wake up, support internal and external clock calibration**
- **Timer counter**
 - Two 16bit advanced timer counters, support input capture, complementary output, quadrature encoding input, the highest control accuracy is 9.25ns, each timer has four independent channels, three of which support six-channel complementary PWM output
 - Five 16bit general purpose timer counters, each timer has 4 independent channels, support input capture/output comparison /PWM output
 - Two 16bit basic timer counters
 - One 16bit low power timer counter, support double pulse counting function, can work in STOP2 mode
 - 1x 24bit SysTick
 - 1x 7bit window Watchdog (WWDG)
 - 1x 12bit independent Watchdog (IWDG)
- **Programming method**
 - Support SWD/JTAG online debugging interface
 - Support UART and USB Bootloader
- **Security features**
 - Built-in cryptographic algorithm hardware acceleration engine
 - Support AES, DES, TDES, SHA1/224/256, SM1, SM3, SM4, and SM7 algorithms
 - Flash storage encryption, multi-user partition management (MMU)
 - TRNG true random number generator
 - CRC16/32 calculation
 - Support write protection (WRP), multiple read protection (RDP) levels (L0/L1/L2)
 - Support security start, program encryption download, security updates
 - Support external clock failure detection, tamper detection
- **96-bit UID and 128-bit UCID**
- **The working conditions**
 - Operating voltage range: 1.8V~3.6V
 - Operating temperature range: -40°C ~ 105°C
 - ESD: ±4KV (HBM model), ±1KV (CDM model)

● Package

- QFN28(4mm x 4mm)
- LQFP32(7mm x 7mm)
- LQFP48(7mm x 7mm)
- LQFP64(10mm x 10mm)
- LQFP64(7mm x 7mm)

● Order model

| Type | Model |
|-----------|---|
| N32G435x8 | N32G435G8Q7, N32G435K8L7, N32G435C8L7, N32G435R8L7 |
| N32G435xB | N32G435KBL7, N32G435CBL7, N32G435GBQ7, N32G435RBL7 ⁽¹⁾ , N32G435RBL7-1 ⁽²⁾ |

Note : (1) LQFP64(10mm × 10mm)

(2) LQFP64(7mm × 7mm)

1 Ordering information

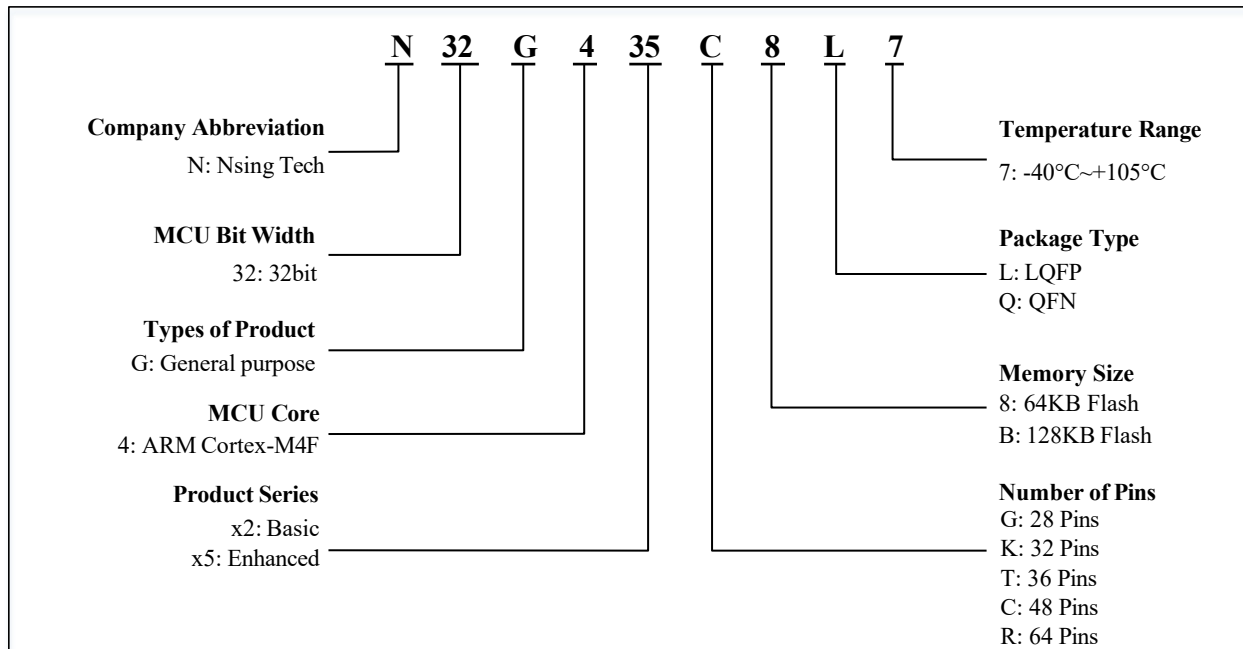


Table 1-1 N32G435 Series Ordering Code

| Ordering code ⁽¹⁾ | Package | Package size | Packaging ⁽²⁾ | SPQ ⁽³⁾ | Temperature range |
|------------------------------|---------|--------------|--------------------------|--------------------|-------------------|
| N32G435G8Q7 | QFN28 | 4mm * 4mm | Tray | 490 | -40°C ~ 105°C |
| N32G435GBQ7 | QFN28 | 4mm * 4mm | Tray | 490 | -40°C ~ 105°C |
| N32G435K8L7 | LQFP32 | 7mm * 7mm | Tray | 250 | -40°C ~ 105°C |
| N32G435KBL7 | LQFP32 | 7mm * 7mm | Tray | 250 | -40°C ~ 105°C |
| N32G435C8L7 | LQFP48 | 7mm * 7mm | Tray | 250 | -40°C ~ 105°C |
| N32G435CBL7 | LQFP48 | 7mm * 7mm | Tray | 250 | -40°C ~ 105°C |
| N32G435R8L7 | LQFP64 | 10mm * 10mm | Tray | 160 | -40°C ~ 105°C |
| N32G435RBL7 | LQFP64 | 10mm * 10mm | Tray | 160 | -40°C ~ 105°C |
| N32G435RBL7-1 | LQFP64 | 7mm * 7mm | Tray | 250 | -40°C ~ 105°C |

- For the latest detailed ordering information, please refer to the Selection Guide.
- The packaging provided is the basic packaging. If user has any other requirements, please contact Naitons.
- Minimum packaging quantity.

NSING Technologies Pte. Ltd.

Address: 20 Science Park, #03-15/16

Teletech Park, East Wing, Singapore 117674

Email: sales@nsing.com.sg

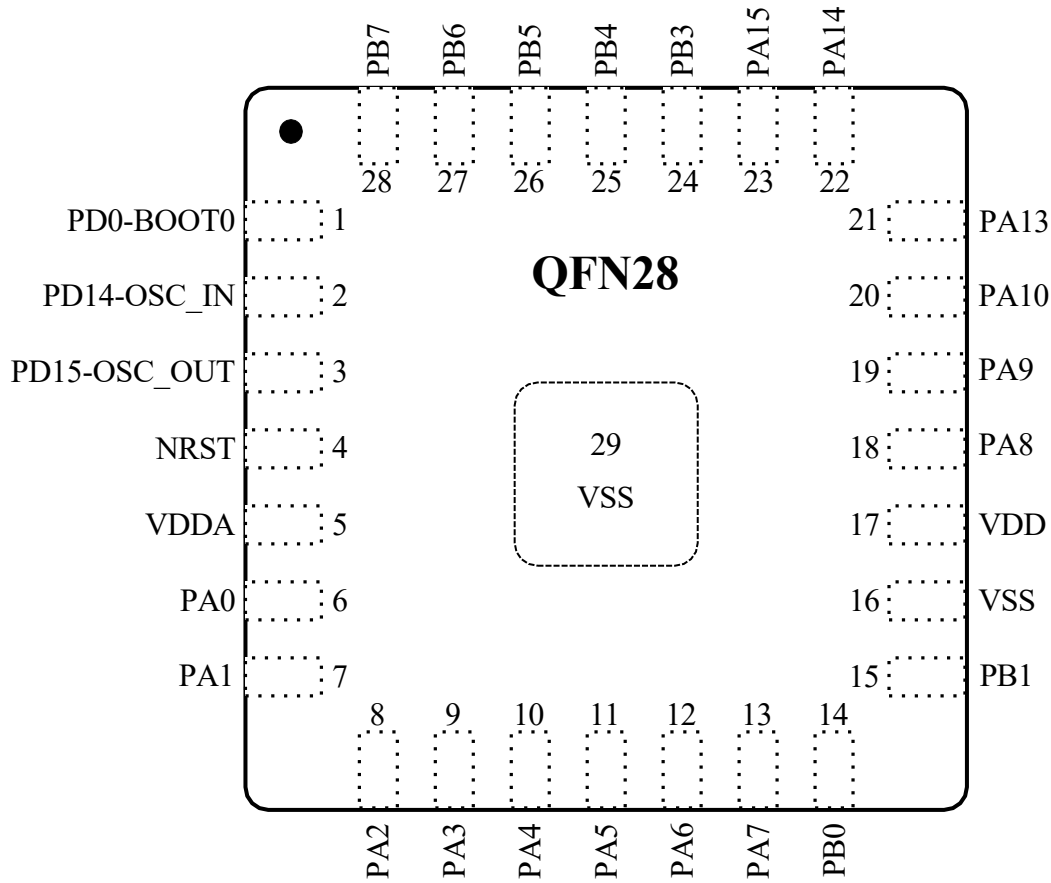
2 List of devices

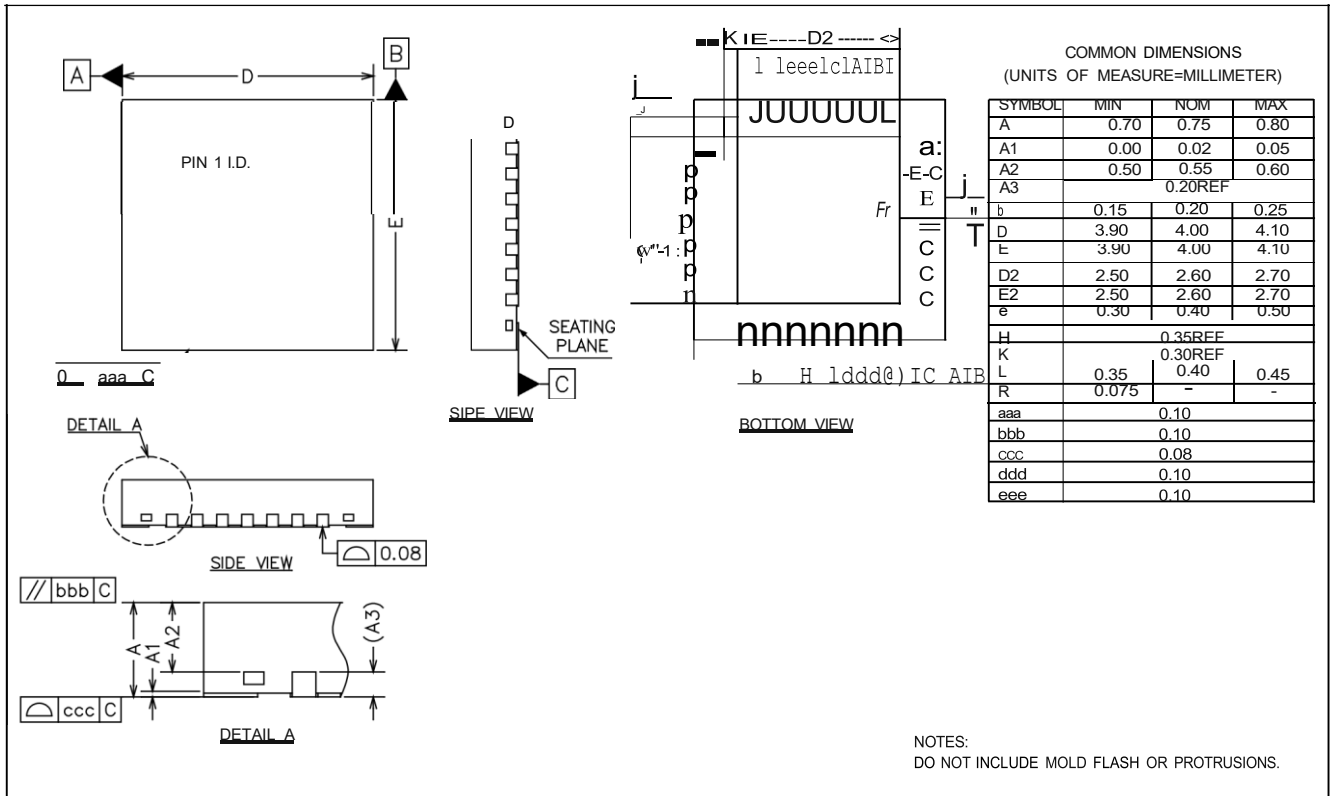
| Part Number | | N32G435G8/B | | N32G435K8/B | | N32G435C8/B | | N32G435R8/B | |
|-------------------------|----------|--|-----|-------------|-----|-------------|-----|-------------|-----|
| Flash (KB) | | 64 | 128 | 64 | 128 | 64 | 128 | 64 | 128 |
| SRAM (KB) | | 16 | 32 | 16 | 32 | 24 | 32 | 24 | 32 |
| CPU frequency | | ARM Cortex-M4 @ 108MHz, 135DMIPS | | | | | | | |
| Working environment | | 1.8~3.6V/-40~105°C | | | | | | | |
| Timer | General | 5 | | | | | | | |
| | Advanced | 2 | | | | | | | |
| | Basic | 2 | | | | | | | |
| | LPTIM | 1 | | | | | | | |
| Communication interface | SPI | 1 | | 2 | | | | | |
| | I2S | 1 | | 2 | | | | | |
| | I2C | 2 | | | | | | | |
| | UART | 2 | | | | | | | |
| | USART | 2 | | 2 | | 3 | | | |
| | LPUART | 1 | | | | | | | |
| | USB | 不支持 | | 1 | | | | | |
| | CAN | 不支持 | | 1 | | | | | |
| GPIO | | 24 | | 26 | | 38 | | 52 | |
| DMA | | 1x | | | | | | | |
| Number of Channels | | 8 Channel | | | | | | | |
| 12bit ADC | | 1x | | | | | | 1x | |
| Number of channels | | 10 Channel | | | | | | 16 Channel | |
| 12bit DAC | | 1x | | | | | | | |
| Number of channels | | 1 Channel | | | | | | | |
| OPAMP/COMP | | 2/2 | | | | | | | |
| Algorithm support | | DES/TDES, AES, SHA1/SHA224/SHA256 SM1, SM3, SM4, SM7, CRC16/CRC32, TRNG | | | | | | | |
| Security protection | | Read-write protection (RDP/WRP), storage encryption, partition protection, secure boot | | | | | | | |
| Package | | QFN28 | | LQFP32 | | LQFP48 | | LQFP64 | |

3 Package

QFN28

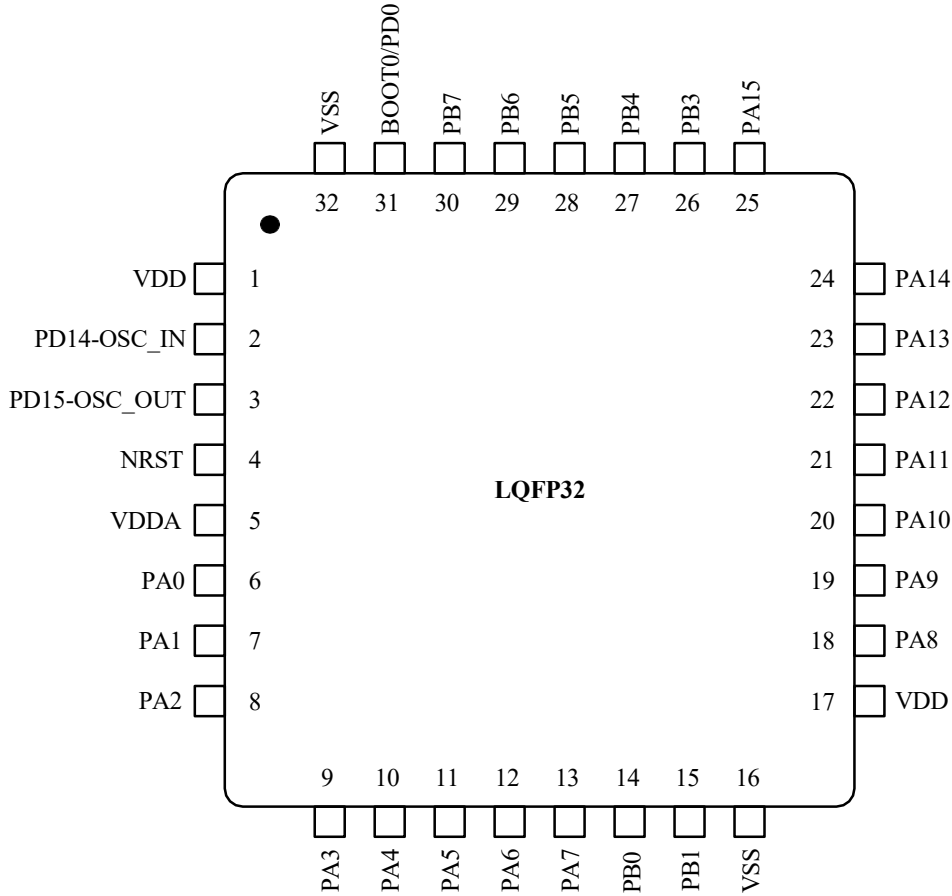
QFN28 pinout



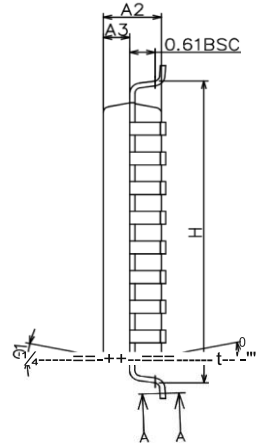
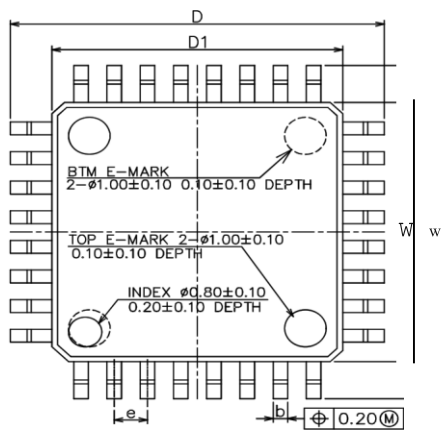
QFN28(4mm x 4mm) package


LQFP32

LQFP32 pinout

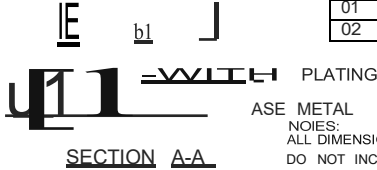
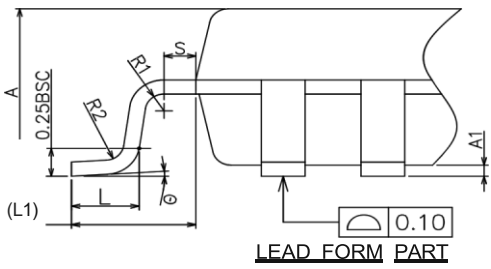


LQFP32(7mm x 7mm) package



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

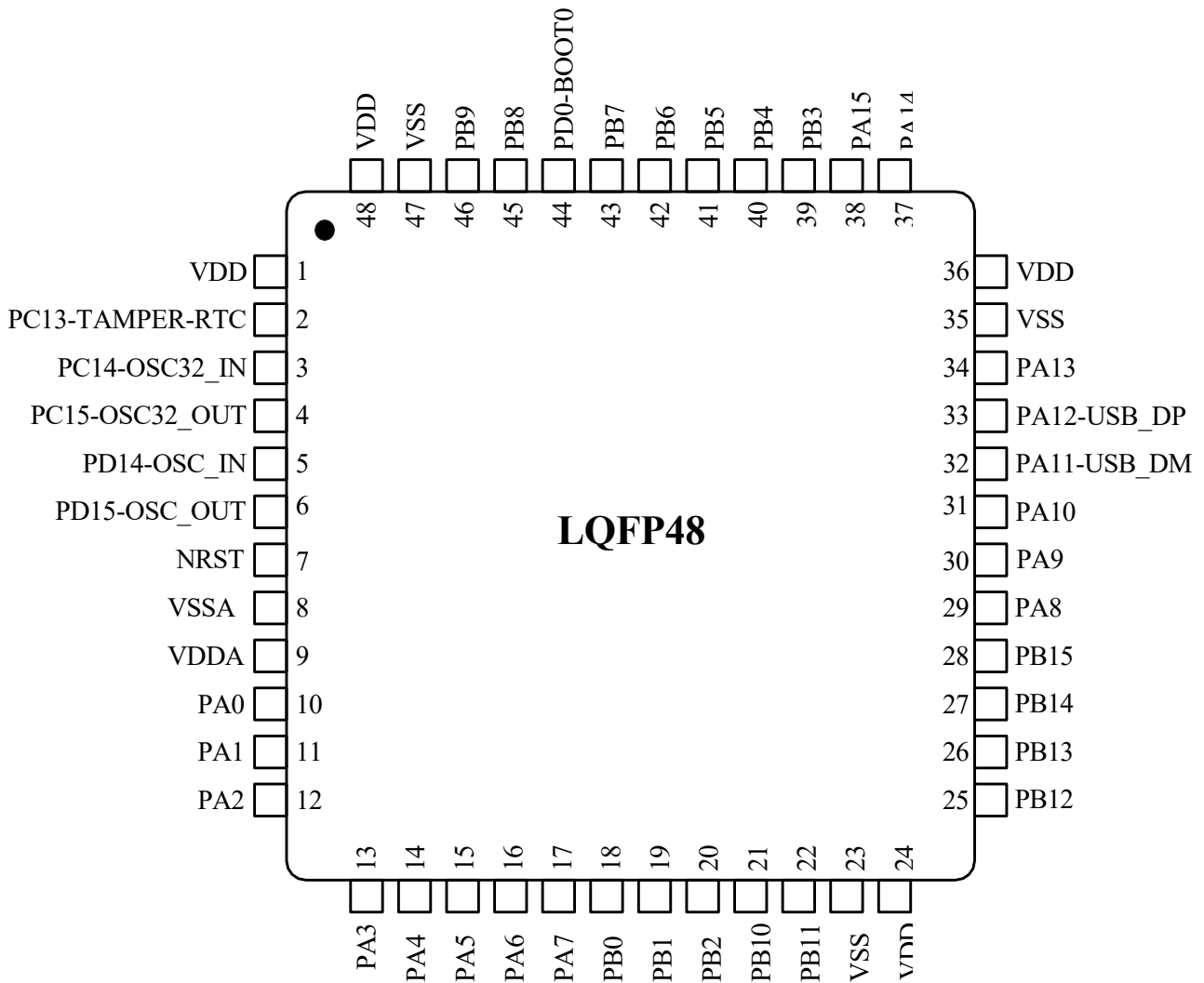
| SYMBOL | MIN | NOM | MAX |
|--------|---------|-------|-------|
| A | - | - | 1.60 |
| A1 | 0.05 | - | 0.15 |
| A2 | 1.35 | 1.40 | 1.45 |
| A3 | 0.59 | 0.64 | 0.69 |
| b | 0.33 | - | 0.42 |
| b1 | 0.32 | 0.35 | 0.38 |
| c | 0.13 | - | 0.18 |
| c1 | 0.117 | 0.127 | 0.137 |
| D | 8.80 | 9.00 | 9.20 |
| D1 | 6.90 | 7.00 | 7.10 |
| E | 8.80 | 9.00 | 9.20 |
| E1 | 6.90 | 7.00 | 7.10 |
| e | 0.70 | 0.80 | 0.90 |
| H | 8.14 | 8.17 | 8.20 |
| L | 0.50 | - | 0.70 |
| L1 | 1.00REF | | |
| R1 | 0.08 | - | - |
| R2 | 0.08 | - | 0.20 |
| s | 0.20 | - | - |
| 0 | 0° | 3.5° | 7° |
| 01 | 11° | 12° | 13° |
| 02 | 11° | 12° | 13° |



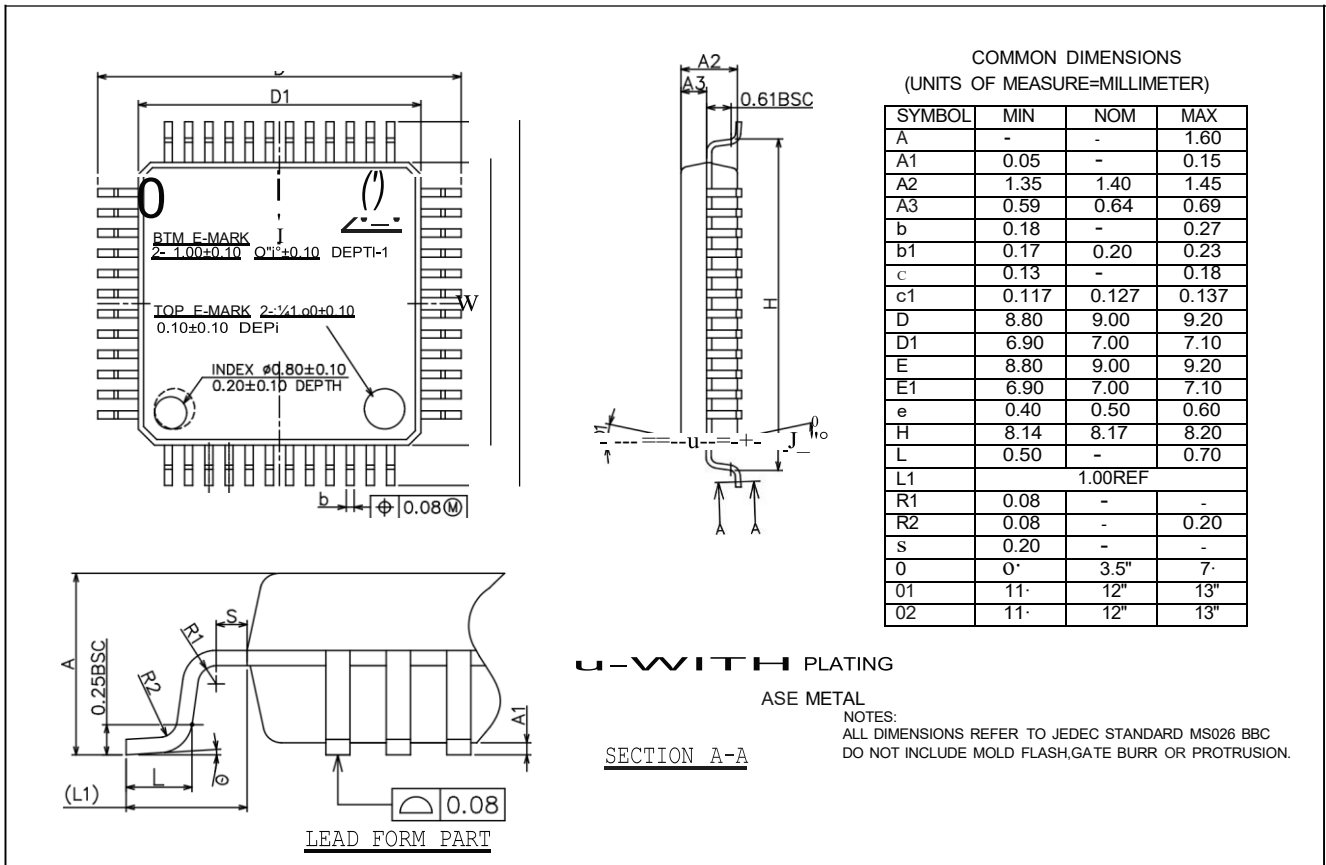
NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MS026 BBA
DO NOT INCLUDE MOLD FLASH, GAUGE BURR OR PROTRUSION.

LQFP48

LQFP48 pinout

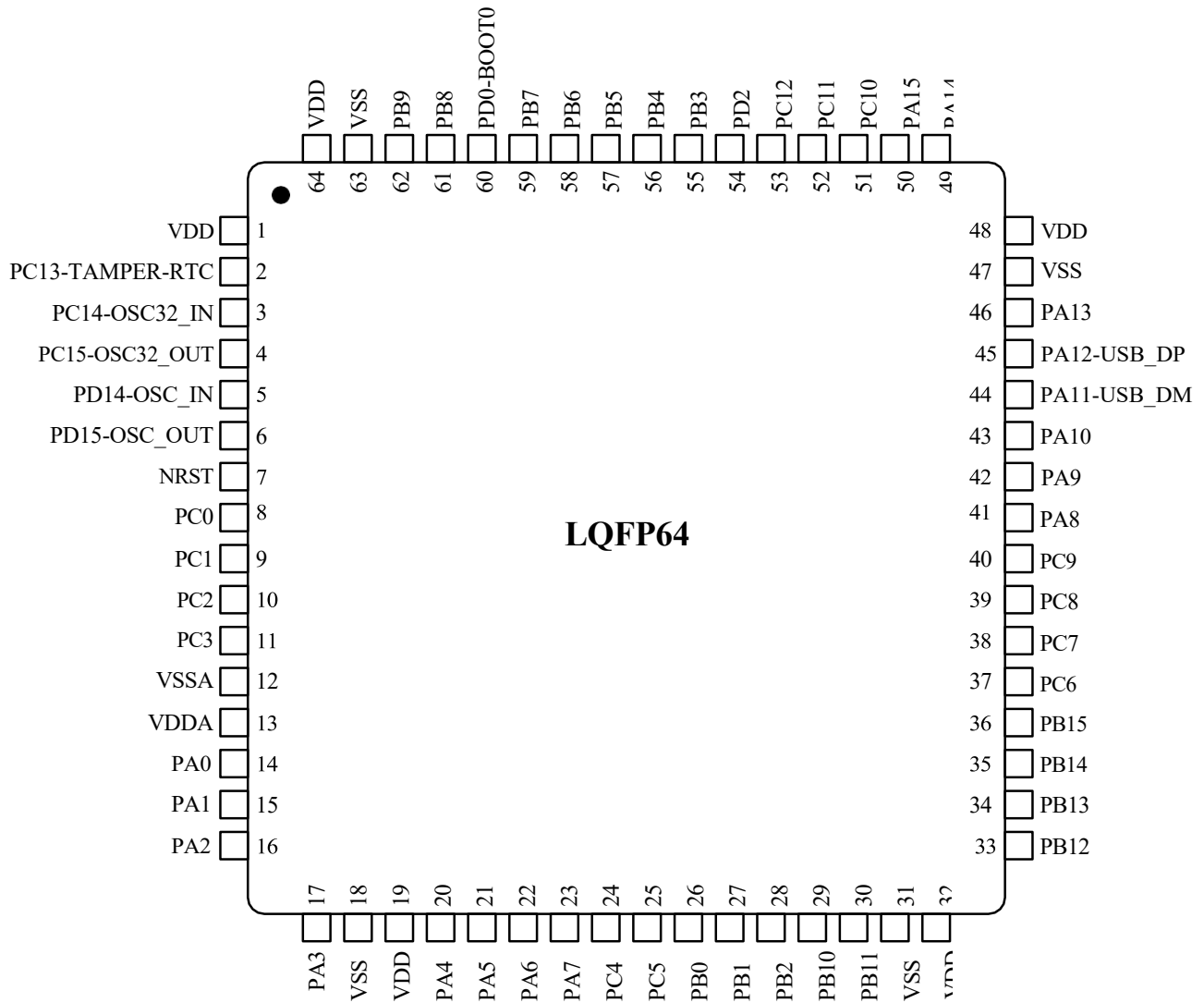


LQFP48(7mm x 7mm) package

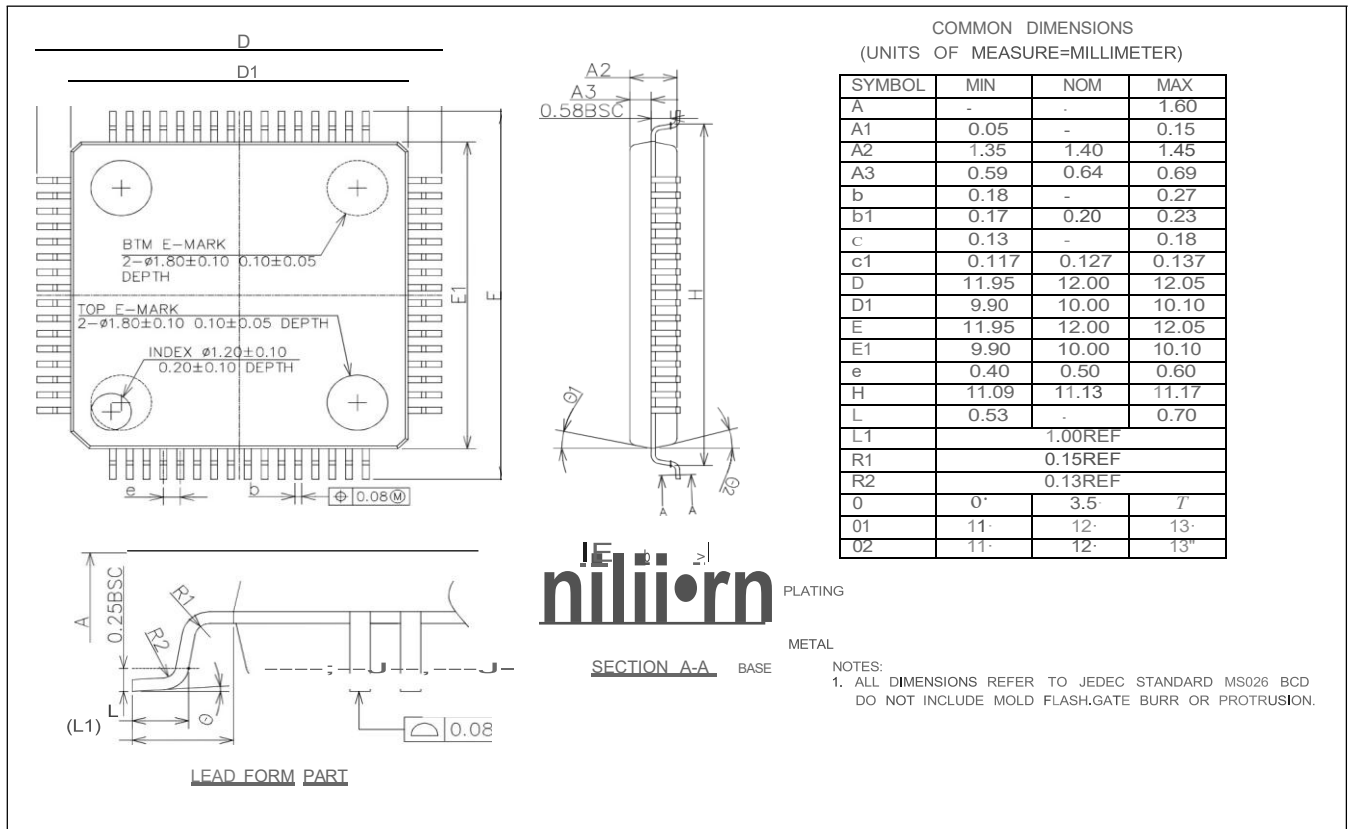


LQFP64 package

LQFP64 pinout



LQFP64(10mm x 10mm) package

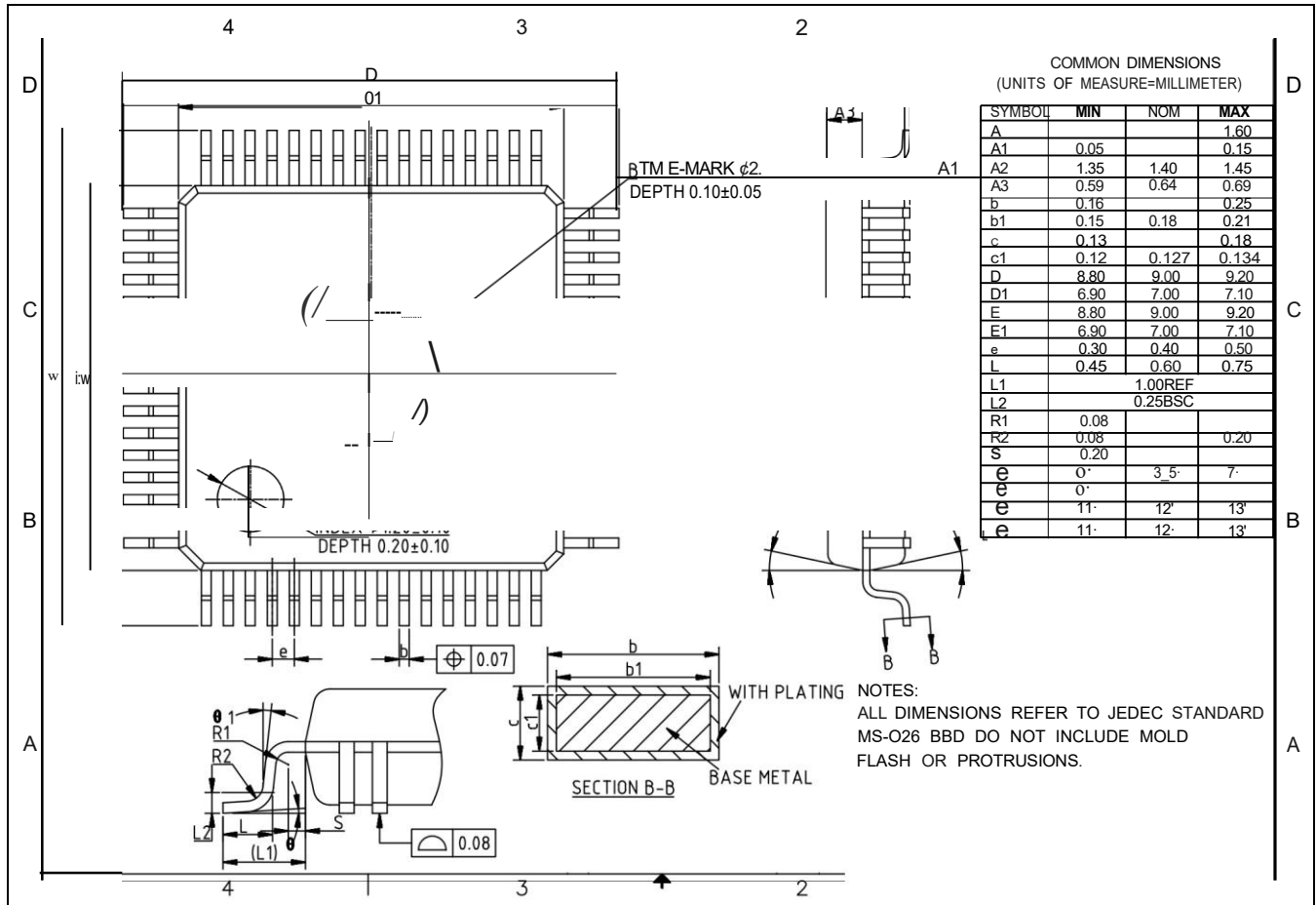


NSING Technologies Pte. Ltd.

Address: 20 Science Park, #03-15/16

Teletech Park, East Wing, Singapore 117674

Email: sales@nsing.com.sg

LQFP64(7mm x 7mm) package


4 Version history

| Version | Date | Note |
|---------|------------|--|
| V1.0 | 2020.6.12 | Initial release |
| V1.1 | 2020.9.12 | 1. Updated product model resource configuration |
| V1.2 | 2021.4.14 | 1. Added N32G435G8Q7 model 2. Add LQFP64 (7mmx7mm) model and package size |
| V1.3 | 2021.7.6 | 1. Modify the description of low power |
| V2.0.0 | 2024.07.18 | 1. Add Table 1-1 N32G435 Series Ordering Code |

5 Notice

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