N32A455xxL7 series Product Brief

N32A455xxL7 series based on 32-bit ARM Cortex-M4F kernel, run up to 144MHz, support floating-point unit and DSP instructions, integrates up to 512KB embedded flash, 144KB SRAM, integrates rich high-performance analog devices, built-in 4x 12bit 4.7Msps ADCs, 4x independent rail-to-rail operational amplifiers, 7x high-speed comparators, 2x 1Msps 12bit DACs, integrates multi-channel U(S)ART, I2C, SPI, QSPI, CAN, SDIO communication interfaces, built-in cryptographic algorithm hardware acceleration engine

Key features

- **CPU core**
  - 32-bit ARM Cortex-M4 core + FPU, single-cycle hardware multiply and divide instructions, DSP instruction and MPU support
  - Built-in 8KB instruction Cache, support Flash acceleration unit execution program 0 wait
  - Maximum main frequency 144MHz, 180DMIPS
- **Memory**
  - Up to 512KByte on-chip Flash with encrypted storage, partition management and data protection, hardware ECC checksum, 100,000 erasures, 10-year data retention
  - Up to 144KByte on-chip SRAM (including 16KByte Retention RAM) with hardware parity support
- **High-performance analog interface**
  - 4x 12bit 5Msps high-speed ADCs, configurable in 12/10/8/6-bit mode, with sampling rates up to 8.9Msps in 6bit mode, up to 38 external single-ended input channels, supporting differential mode
  - 4x rail-to-rail operational amplifiers with built-in programmable gain amplification up to 32x
  - Up to 7 high-speed analog comparators with built-in 64-level adjustable comparison reference
  - 2x 12-bit DACs with 1Msps sampling rate
  - Support external input independent reference voltage source
  - All analog interfaces support 1.8~3.6V full voltage operation
- **Clock**
  - 4MHz~32MHz External High Speed Crystal
  - 32.768KHz External Low Speed Crystal
  - Internal High Speed RC 8MHz
  - Internal low-speed RC 40KHz
  - Internal high speed PLL
  - Support 1 channel clock output, configurable system clock, HSE, HSI or PLL post-division output
- **Reset**
  - Support power-up/power-down/external pin reset

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- Support programmable low voltage detection and reset
- Support watchdog reset

- **Support up to 80 GPIOs with multiplexing function and a maximum flip speed of 50MHz**
- **Communication interface**
  - 7x U(S)ART interfaces, up to 4.5 Mbps, including 3 USART interfaces (1xISO7816, 1xIrDA, LIN supported) and 4 UART interfaces
  - 3x SPI interfaces with speeds up to 36 MHz, 2 of which support I2S
  - 1x QSPI interface with speeds up to 144 Mbps
  - 4x I2C interfaces at up to 1 MHz, master-slave mode configurable, dual address response support in slave mode
  - 2x CAN 2.0A/B bus interfaces
  - 1x SDIO interface, supporting SD/SDIO/MMC format
- **2x high-speed DMA controllers, each controller supports 8 channels, channel source and destination**
- **RTC real time clock, support leap year perpetual calendar, alarm events, periodic wake-up, support internal and external clock calibration**
- **Timer counter**
  - 2x 16-bit advanced timer counters, support input capture, complementary output, quadrature encoding input, etc., with maximum control accuracy of 6.9ns; each timer has 4 independent channels, 3 of which support 6 complementary PWM outputs
  - 4x 16bit general-purpose timers, each timer has 4 independent channels, support input capture/output comparison/PWM output
  - 2x 16bit base timer counters
  - 1x 24bit SysTick
  - 1x 7bit Window Watchdog (WWDG)
  - 1x 12bit Independent Watchdog (IWDG)
- **Programming mode**
  - Support SWD/JTAG online debugging interface
  - Support UART bootloader
- **Safety features**
  - Built-in hardware acceleration engine for cryptographic algorithms
  - Support DES/3DES、AES、SHA1/SHA224/SHA256、SM1、SM3、SM4、SM7、MD5 algorithms
  - Flash storage encryption, multi-user partition management (MMU)
  - TRNG true random number generator
  - CRC16/32 operation
  - Support write protection (WRP), multiple read protection (RDP) levels (L0/L1/L2)

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- Support program encryption download
- Support clock failure detection, tamper-proof detection

- **96-bit UID and 128-bit UCID**
- **Working Conditions**
  - Working voltage range: 1.8V~3.6V
  - Working temperature range: -40℃~105℃
  - Certified by AEC-Q100-G2
  - ESD: ±4KV (HBM model), ±1KV (CDM model)
- **Package**
  - LQFP48(7mm x 7mm)
  - LQFP64(10mm x 10mm)
  - LQFP100(14mm x 14mm)
- **Ordered information**

Series	Part Number
N32A455xxL7	N32A455CEL7,N32A455REL7, N32A455VEL7

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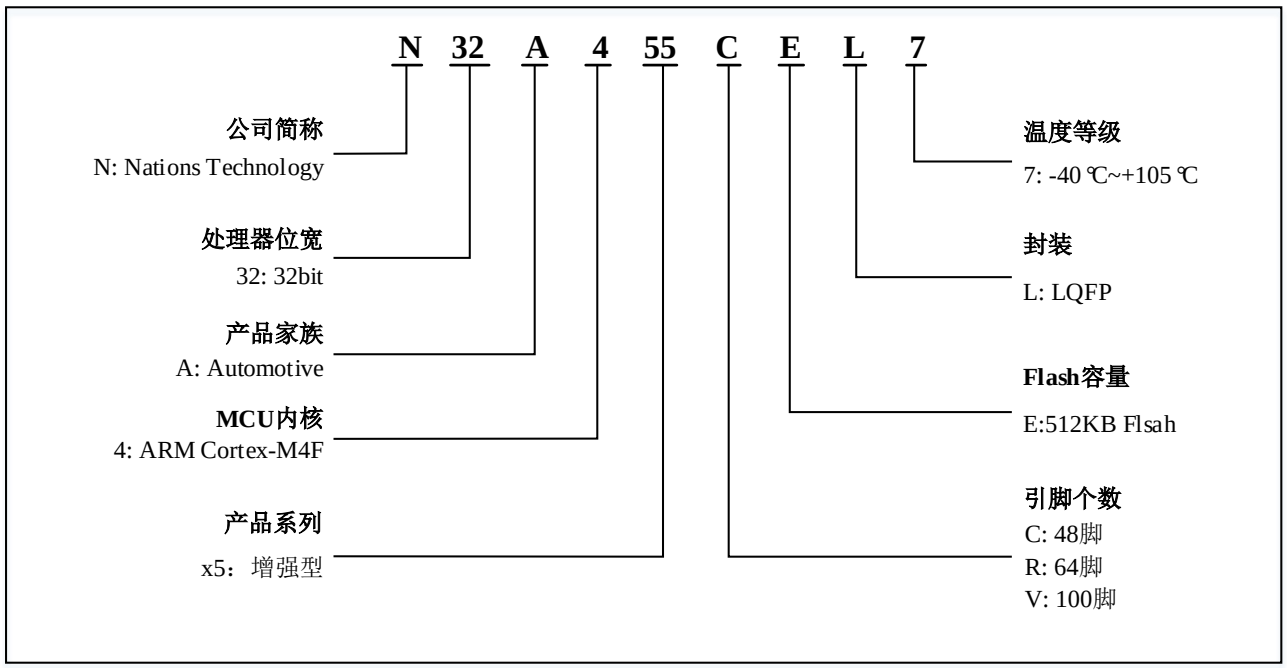
1 Part number Information



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2 List of devices

Part number		N32A455CEL7	N32A455REL7	N32A455VEL7
Flash capacity (KB)		512		
SRAM capacity (KB)		144		
CPU frequency		ARM Cortex-M4 @144MHz,180DMIPS		
Working environment		1.8~3.6V/-40~105℃		
Timer	General	4		
	Advanced	2		
	Basic	2		
Communication interface	SPI	3		
	I2S	2		
	QSPI	Only Single Wire	1	
	I2C	3	4	
	USART	3		
	UART	3	4	
	CAN	2		
	SDIO	No	1	
GPIO		37	51	80
DMA		2		
Number of Channels		16Channel		
12bit ADC		4	4	4
Number of channels		16Channel	22Channel	38Channel
12bit DAC		2		
Number of channels		2Channel		
OPA/COMP		4/5	4/7	4/7
Algorithm support		DES/3DES、AES、 SHA1/SHA224/SHA256、SM1、SM3、SM4、SM7、MD5、CRC16/CRC32、TRNG		
Security protection		Read-write protection (RDP/WRP), Storage encryption, Partition protection, Secure startup		
Package		LQFP48	LQFP64	LQFP100

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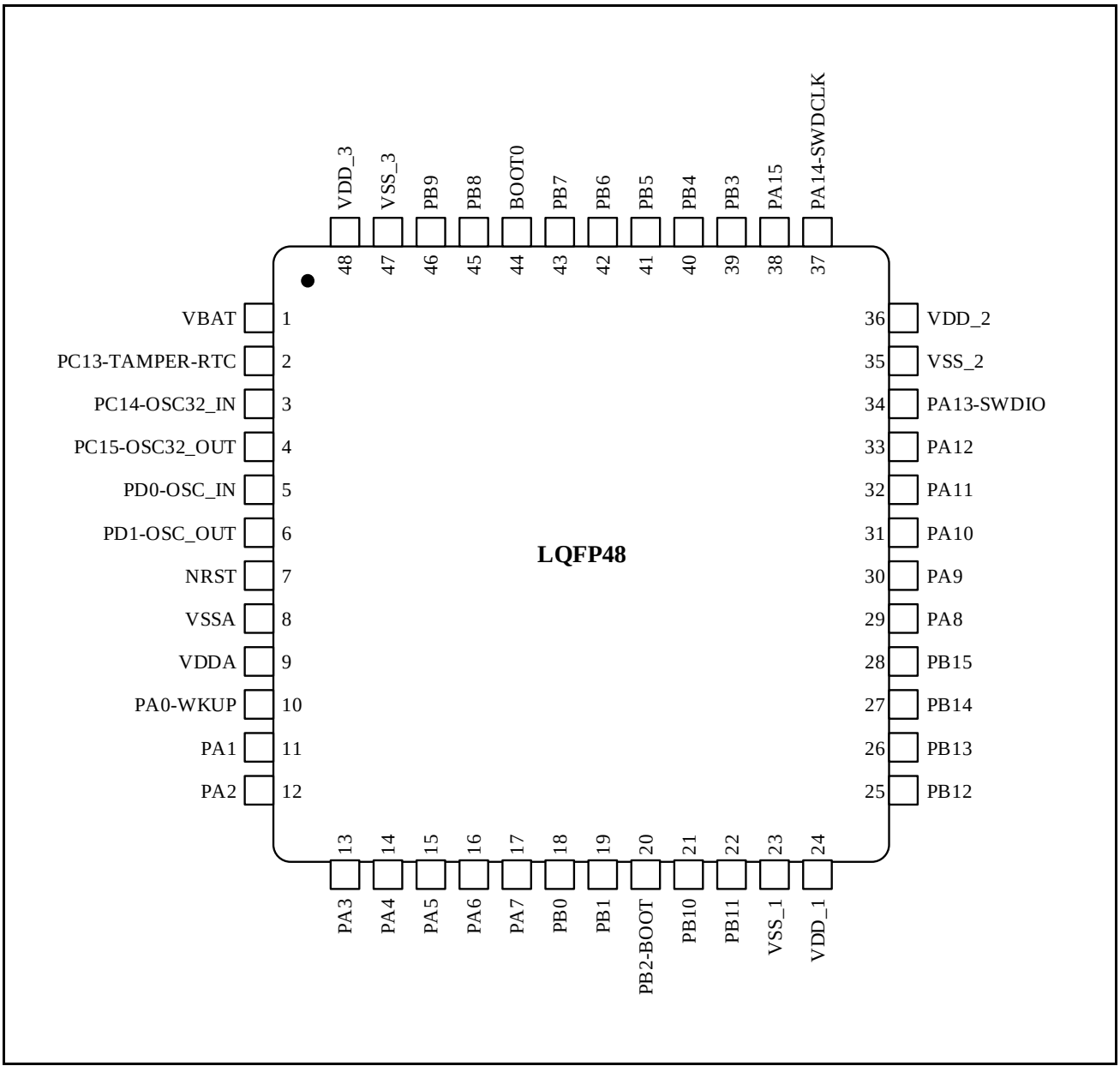
3 Package Information

3.1 LQFP48 package

3.1.1 LQFP48 pinouts



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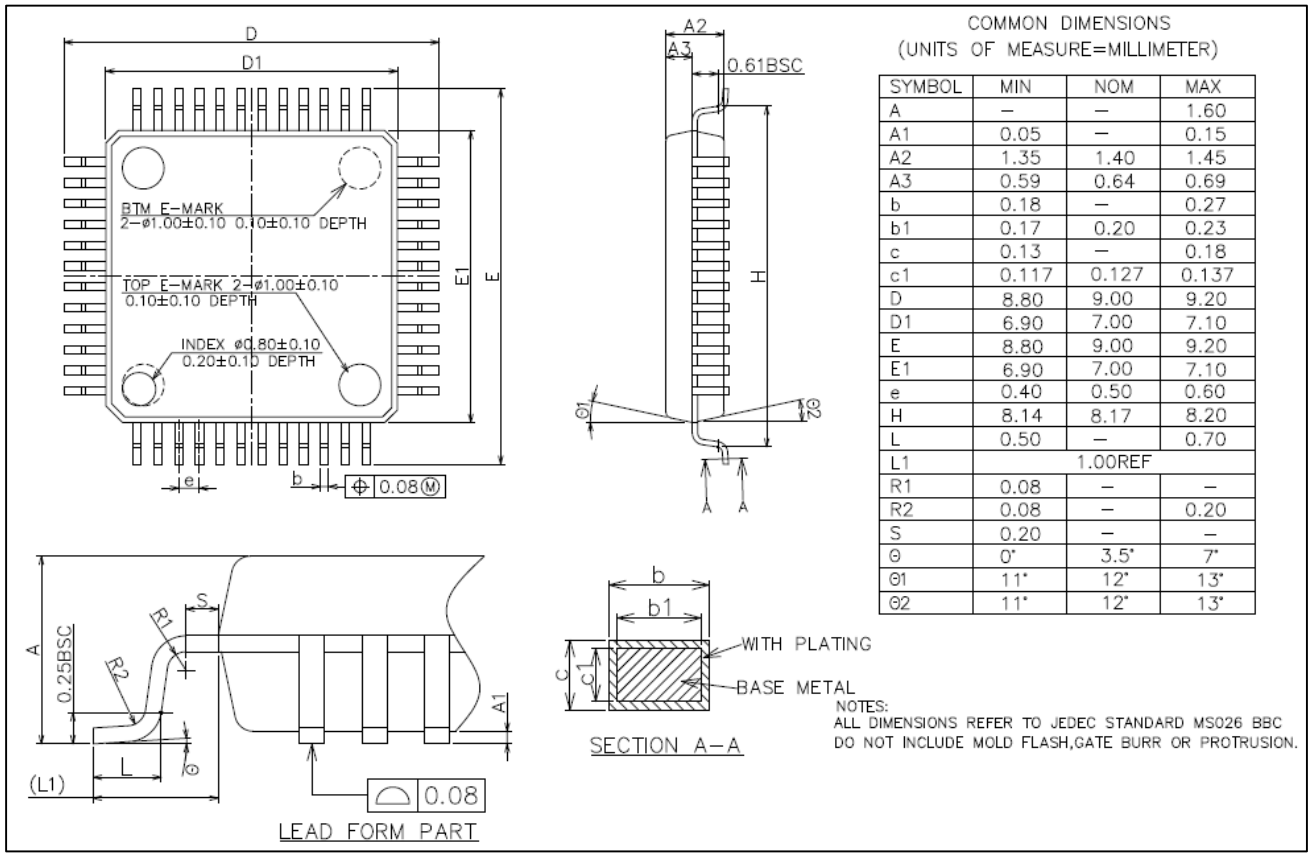
3.1.2 LQFP48 package outline



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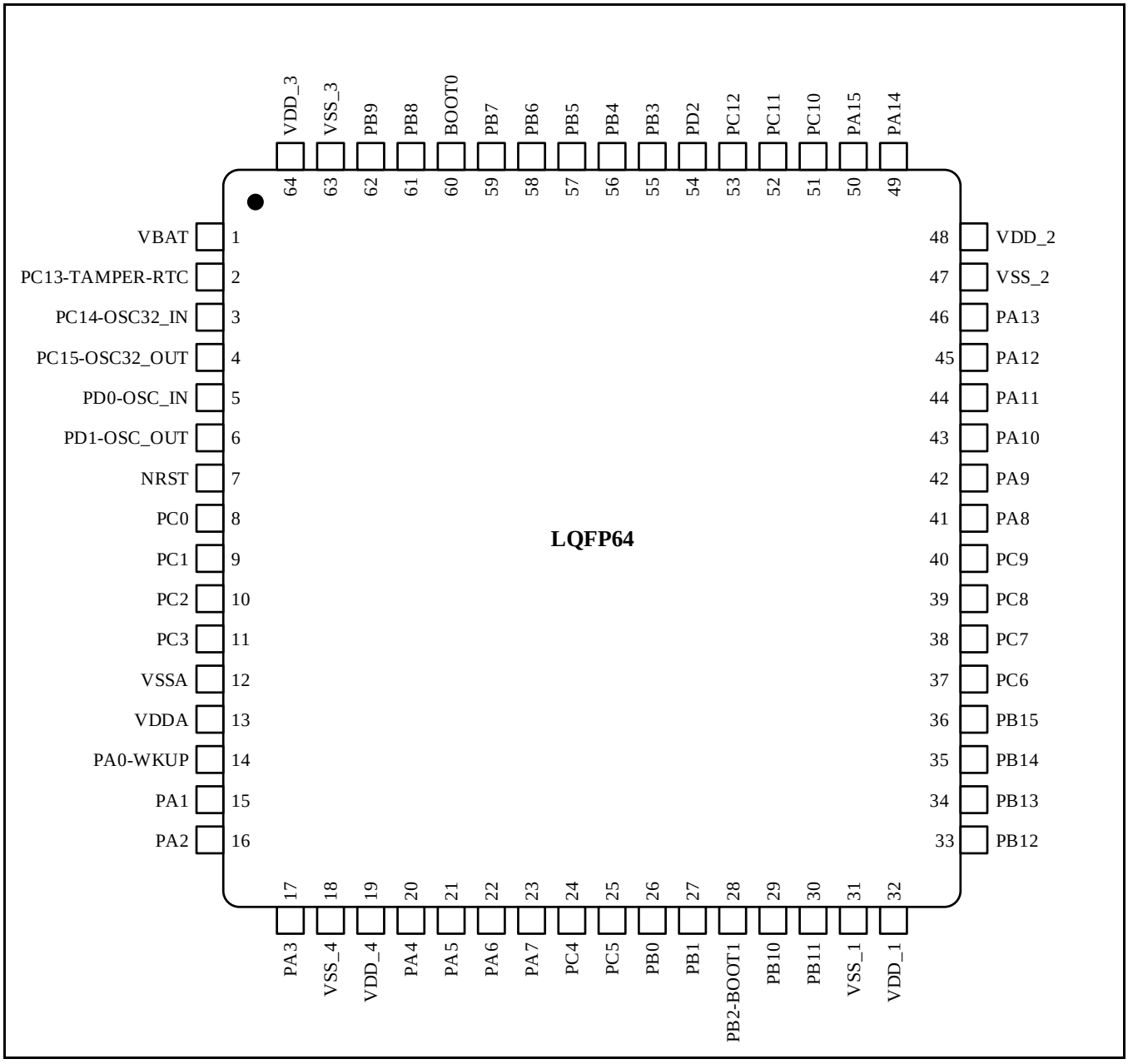
3.2 LQFP64 package

3.2.1 LQFP64 pinouts



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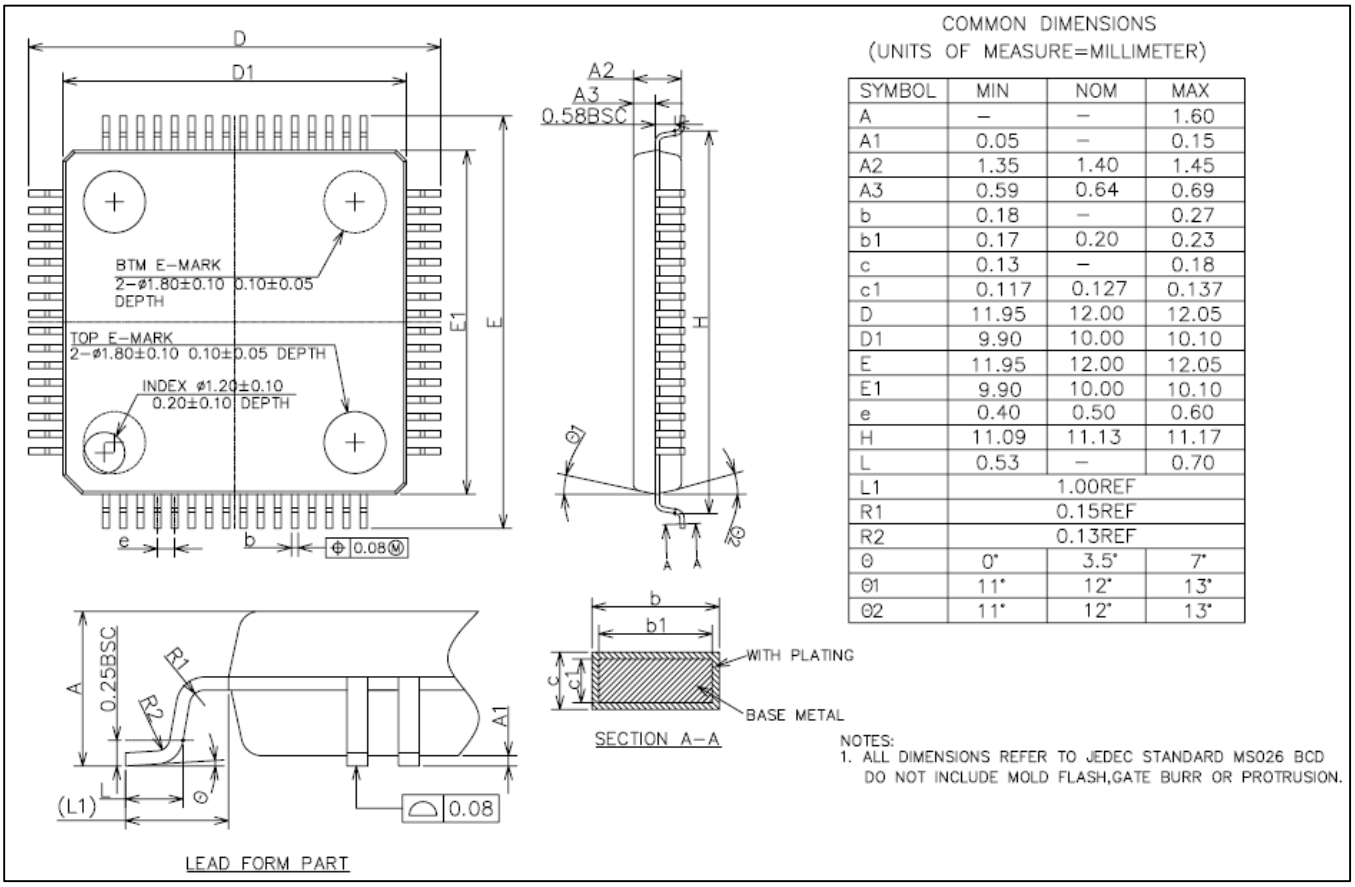
3.2.2 LQFP64 package outline



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	0.18	–	0.27
b1	0.17	0.20	0.23
c	0.13	–	0.18
c1	0.117	0.127	0.137
D	11.95	12.00	12.05
D1	9.90	10.00	10.10
E	11.95	12.00	12.05
E1	9.90	10.00	10.10
e	0.40	0.50	0.60
H	11.09	11.13	11.17
L	0.53	–	0.70
L1	1.00REF		
R1	0.15REF		
R2	0.13REF		
θ	0°	3.5°	7°
θ1	11°	12°	13°
θ2	11°	12°	13°

NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD MS026 BCD
DO NOT INCLUDE MOLD FLASH,GATE BURR OR PROTRUSION.

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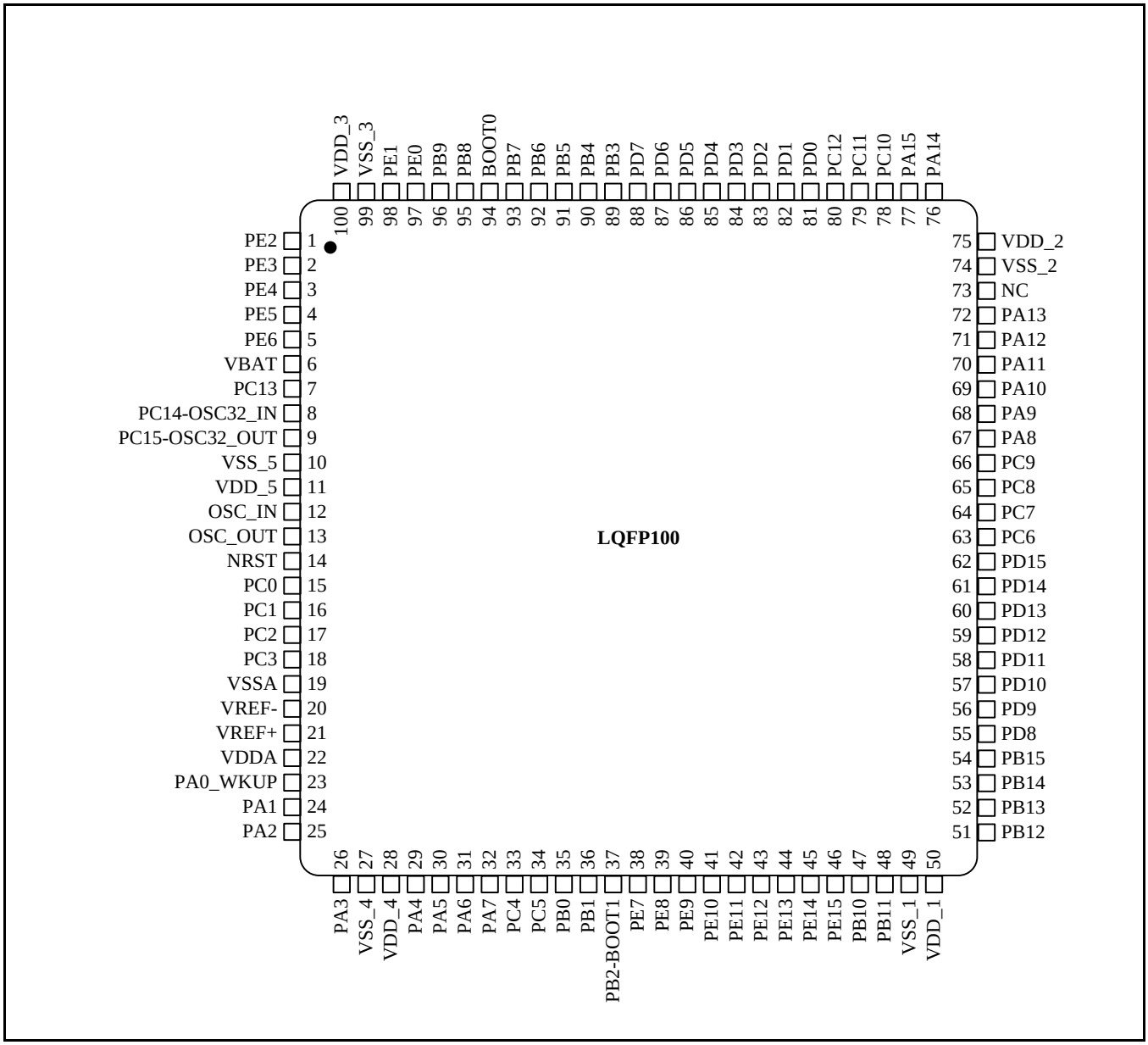
3.3 LQFP100 package

3.3.1 LQFP100 pinouts



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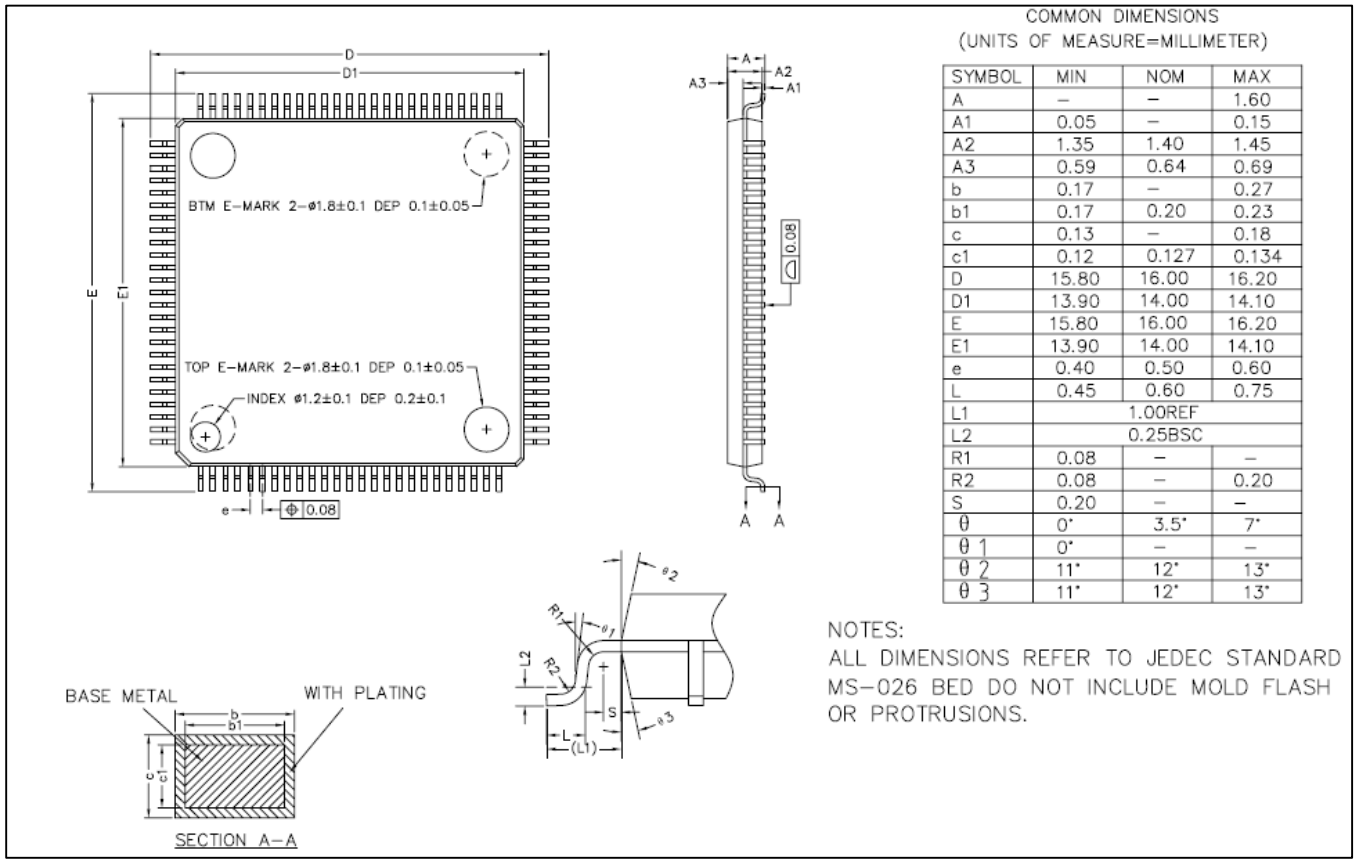
3.3.2 LQFP100 package outline



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	0.17	–	0.27
b1	0.17	0.20	0.23
c	0.13	–	0.18
c1	0.12	0.127	0.134
D	15.80	16.00	16.20
D1	13.90	14.00	14.10
E	15.80	16.00	16.20
E1	13.90	14.00	14.10
e	0.40	0.50	0.60
L	0.45	0.60	0.75
L1		1.00REF	
L2		0.25BSC	
R1	0.08	–	–
R2	0.08	–	0.20
S	0.20	–	–
θ	0°	3.5°	7°
θ 1	0°	–	–
θ 2	11°	12°	13°
θ 3	11°	12°	13°

NOTES:
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4 Version History

Version	Date	Remarks
V1.0	2023.09.21	Initial version

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