

Allwinner UltraOcta A80 Datasheet

UltraOcta Application Processor

Revision 1.1
Sep 28, 2014

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Revision History

| Revision | Date | Description |
|----------|--------------|------------------------------------|
| 1.0 | Mar 17, 2014 | initial version for public release |
| 1.1 | Sep 28, 2014 | Change power up/down sequence |

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1 OVERVIEW

Allwinner's latest flagship octa-core application processor is a revolutionary advance in mobile processor technology. The A80 packs octa-core big.LITTLE Cortex™-A15/7 in a 28nm process to deliver an outstanding combination of both computing power and efficiency.

Fast, smooth, and fluid graphics drive the user experience on premium devices. A80 features the lightning-fast PowerVR 64-core G6230 GPU from Imagination Technologies, delivering industry-leading graphics performance and enabling console-class performance even on the most graphics-intensive games. In addition to superior graphics performance, the A80 excels in multimedia with an advanced HawkView™ ISP supporting cameras up to 16M, innovative video engine technology with 4Kx2K video encoding/decoding, high resolution displays up to 2560x1600, advanced HD DRM support, and low power LTE connectivity.

Application usage is extremely diverse on tablets and smartphones: users listen to music, watch movies, browse the web, share photos, play games, send emails, and more. Each application requires different levels of processing power, and that means different applications run more efficiently on different cores. To deliver optimal efficiency, the Allwinner A80 features all-new CoolFlex technology that enables devices to seamlessly run different applications on different CPU cores - saving power by giving applications just the right amount of juice that they need.

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FEATURES

2.1. CPU Architecture

The A80 platform is based on octa-core big. LITTLE Cortex™-A15/7 CPU architecture.

- ARMv7 ISA standard instruction set plus Thumb-2 and Jazeller RCT
- NEON with SIMD and VFPv4 support
- Support LPAE
- Support 32KB I-cache and 32KB D-cache per CPU
- Support 2MB+512KB L2 cache

2.2. GPU

- PowerVR 64-core G6230 GPU
- Support OpenGL ES 1.1/2.0/3.0, OpenCL 1.1, DirectX 9.3 standards
- Geometry ability up to 133M/s
- Effective pixel ability up to 5.33G/s
- Support up to 85 GFLOPs

2.3. Memory Subsystem

This section consists of:

- Boot ROM
- SDRAM
- NAND Flash
- SD/MMC interface

Boot ROM

- On-chip ROM boot
- Support secure and non-secure access boot
- Support system boot from Raw NAND, eMMC NAND, SPI NOR Flash, and SD/TF card
- Support system code download through USB DRD(Dual-Role Device)

SDRAM

- Support 8GB address space
- Support dual-channel 64-bit bus width
- Compatible with JEDEC standard LPDDR2/LPDDR3/DDR3/DDR3L SDRAM
- Support 2 chip select signals per channel
- 16 address lines and 3 bank address lines per channel
- Support Memory Dynamic Frequency Scale

NAND Flash

- Support 8-bit data BUS width
- Support 72-bit ECC per 1024 bytes
- Support 4 flash chips
- Support 1024, 2048, 4096, 8192, 16K, 32K bytes size per page
- Support SDR, ONFI NV-DDR/NV-DDR2 and Toggle DDR/DDR2

SD/MMC Interface

- Comply to eMMC standard specification V4.5, SD physical layer specification V3.0, SDIO card specification V2.0
- Support 4/8-bit bus width
- Support data rate up to 100Mbps
- Support four SD/MMC controllers
- Support SDIO interrupt detection
- Support hardware CRC generation and error detection
- Support 3.3V/1.8V IO voltage

2.4. System Peripheral

This section includes:

- Timer
- High Speed Timer
- GIC
- DMA
- CCU
- PWM
- Security System
- Security ID
- Trustzone
- CPU Configuration
- Power Management

Timer

- Support eight timers
- Support 33-bit AVS counter
- Support 2 watchdogs to generate reset signal or interrupts

High Speed Timer

- Support 5 high speed timers, support five counters up to 56 bits

OSC24M

- Support 1.8v oscillator
- Support internal RC oscillator

GIC

- Support 16 Software Generated Interrupts(SGIs), 16 Private Peripheral Interrupts(PPIs) and 192 Shared Peripheral Interrupts(SPIs)

DMA

- 16-channel DMA
- Support data width of 8/16/32 bits
- Support linear and IO address modes
- Support data tranfer types with memory-to-memory, memory-to-peripheral, peripheral-to-memory

CCU

- 12 PLLs
- Support a 24MHz oscillator and an on-chip RC oscillator
- Support clock configuration for corresponding modules
- Support software-controlled clock gating and software-controlled reset for corresponding modules

PWM

- Support four PWM outputs
- Support outputting continuous waveform and pulse waveform
- 0Hz to 12MHz output frequency

Security System

- Support AES, DES, 3DES, SHA1/224/256, MD5
- Support ECB, CBC, CTR, CTS modes for AES
- Support ECB, CBC, CTR modes for DES/3DES
- 128-bit, 192-bit and 256-bit key size for AES
- 160-bit hardware PRNG with 192-bit seed
- 512/1024/2048-bits RSA
- 32bits hardware CRC
- 256bit TRNG

Security ID

- Support 4Kb EFUSE for chip ID and security application

Trustzone

- Support trustzone technology
- Support 256KB secure SRAM

CPU Configuration

- Support power clamp
- Support flexible CPU configuration

Power Management

- Support DVFS for CPU frequency and voltage adjustment
- Support flexible clock gate and module reset
- Support dynamic frequency adjustment for external DRAM
- Support multiple power domains

2.5. Display Subsystem

This section includes:

- Display engine
- Video output

Display Engine

- Four movable layers, each layer size up to 8192x8192 pixels
- Ultra-Scaling engine
 - Support 8-tap anti-aliasing filter in horizontal and 4-tap in vertical
 - Support input and output size up to 4096x4096 pixels
 - 16/32bpp ARGB/YUV444/420/422/411
 - resize ratio from 1/16x to 32x
- Support multiple image input formats: 16/24/32bpp RGB, Planar YUV444/420/422/411
- Support alpha blending / color key
- Support Color Management Unit (CMU) and Dynamic Range Controller (DRC)
- Support realtime write back function
- Support hardware cursor

Video Output

- Support three independent display channels
- Support 3D function
- Support parallel LCD port up to 2048x1536@60Hz resolution
- Support dual-channel LVDS up to 1920x1080@60Hz resolution
- Support 4-lane MIPI DSI (V1.0) up to 1920x1200@60Hz resolution
- Support 4-lane eDP (V1.2) up to 2560x1600@60Hz resolution
- Support HDMI V1.4 output

2.6. Video Engine

Video Decoding

- Support video playback up to 4096x2048@30fps
- Support multi-format video playback, including MPEG1/2, MPEG4 SP/ASP GMC, H.263 including Sorenson Spark, H.264 BP/MP/HP, VP8, WMV9/VC-1, JPEG/MJPEG, etc
- Support H.265 1080p@30fps by software

Video Encoding

- Support H.264/VP8 video encoding up to 4096x2048@30fps, 1080p@120fps, 720p@240fps
- JPEG baseline: picture size up to 8192x8192
- Support input picture size up to 4800x4800
- Support input format: tiled /YUV planner/YUV semi-planner/ARGB/YUYV/UYVY
- Support Alpha blending
- Support thumb generation
- Support 4x2 scaling ratio: from 1/16 to 64 arbitrary non-integer ratio
- Support rotated input

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2.7. Image Subsystem

CSI

- Support 12-bit parallel camera sensor
- Support up to 5M pixel camera sensor
- Support video shot up to 720p@30fps

MIPI CSI

- Support 4-lane MIPI CSI-2
- Support up to 16M pixel camera sensor
- Support video shot up to 1080p@60fps

2.8. ISP

- Supported input formats: 8/10/12-bit RAW RGB, 8/10-bit YCbCr
- Supported output formats: YCbCr420 semi-planar, YCrCb420 semi-planar, YCbCr422 semi-planar, YCrCb422 semi-planar, YUV420 planar, YUV422 planar.
- Support image mirror flip and rotation
- Support thumb image generation
- Support two output channels
- Support valid picture size up to 4800x4800
- Support speed up to 400M pixels

2.9. Face Detection

- Support up to 900 faces per frame
- Support up to 15 frames per second, with up to 15 faces on each frame
- Support 15 ROI region (size up to 320 x 320 per ROI)
- Support front-view face and side-view face: -90/-45/0/45/90 degree
- Support 0/90/180/270 degree detection
- Support input image resize

2.10. External Peripherals

This section includes:

- USB
- Ethernet MAC
- ADC
- Digital Audio Interface
- Transport Stream
- CIR
- UART
- SPI
- TWI
- One Wire
- RSB™

USB

- USB 3.0 DRD SIE with both USB 2.0 and USB 3.0 PHY
 - Support Super-Speed(SS,5-Gbps),High-Speed(HS,480-Mbps),Full-Speed(FS,12-Mbps) in Device mode
 - Support Super-Speed(SS,5-Gbps),High-Speed(HS,480-Mbps),Full-Speed(FS,12-Mbps) and Low-Speed(LS,1.5-Mbps) in Host mode
 - Implements both static and dynamic power reduction techniques at multiple levels
 - Simultaneous IN and OUT transfer support in superspeed mode
- Three EHCI/OHCI compliant Host SIE multiplexed with two USB 2.0 analog PHYs, one HSIC PHY
 - Complies with Enhanced Host Controller Interface(EHCI)Specification,Version 1.0,and the Open Host Controller Interface(OHCI)Specification,Version 1.0a
 - Support Super-Speed(SS,5-Gbps),High-Speed(HS,480-Mbps),Full-Speed(FS,12-Mbps) USB Device through standard USB difference port
 - HCI1 support only High-Speed(HS,480-Mbps) mode through HSIC port
 - HCI1 support only High-Speed(HS,480-Mbps) mode through ULPI Slave port
 - HCI1 support only High-Speed(HS,480-Mbps) mode through ULPI Master port
 - HCI2 support High-Speed(HS,480-Mbps),Full-Speed(FS,12-Mbps) and Low-Speed(LS,1.5-Mbps)USB Device through standard USB difference port

Ethernet MAC

- Support 10/100/1000 Mbps data transfer rate
- Support MII/RGMII PHY interface
- Support full-duplex and half-duplex operation
- Programmable frame length
- Automatic CRC and pad generation controllable on a per-frame basis
- Programmable Inter Frame Gap(40-96 bit times in steps of 8)
- Support a variety of flexible address filtering modes

ADC

- KeyADC with 6-bit resolution
- GPADC with 12-bit resolution

Digital Audio Interface

- Compliant with standard Philips Inter-IC Sound(I2S)bus specification
- Compliant with Left-justified, Right-justified, PCM mode, and TDM(Time Division Multiplexing) format
- Master/Slave mode configurable
- Audio data resolution from 8-bit to 32-bit
- Support sample rate from 8KHz to 192KHz
- Support 8-bits u-law and 8-bits A-law companded sample

Transport Stream

- Support both Synchronous Parallel Interface (SPI) and Synchronous Serial Interface (SSI)
- Support speed up to 150Mbps for both SPI and SSI interface
- Support 32-channel PID filter

CIR

- Support a flexible receiver for IR remote

UART

- Support seven UART controllers
- Software/Hardware Flow Control

SPI

- Support four SPI controllers
- Master/Slave configurable
- DMA-based or interrupt-based operation
- Polarity and phase of the Chip Select(SPI_SS) and SPI Clock(SPI_SCLK) are configurable

TWI

- Support seven TWI controllers
- Support Standard mode(up to 100Kbps)and Fast mode(up to 400Kbps)
- Master/Slave configurable
- Allow 10-bits addressing transactions

One Wire

- Support an one-wire controller for single wire communication
- Support simple mode or standard mode at one time

RSB™ (Reduced Serial Bus)

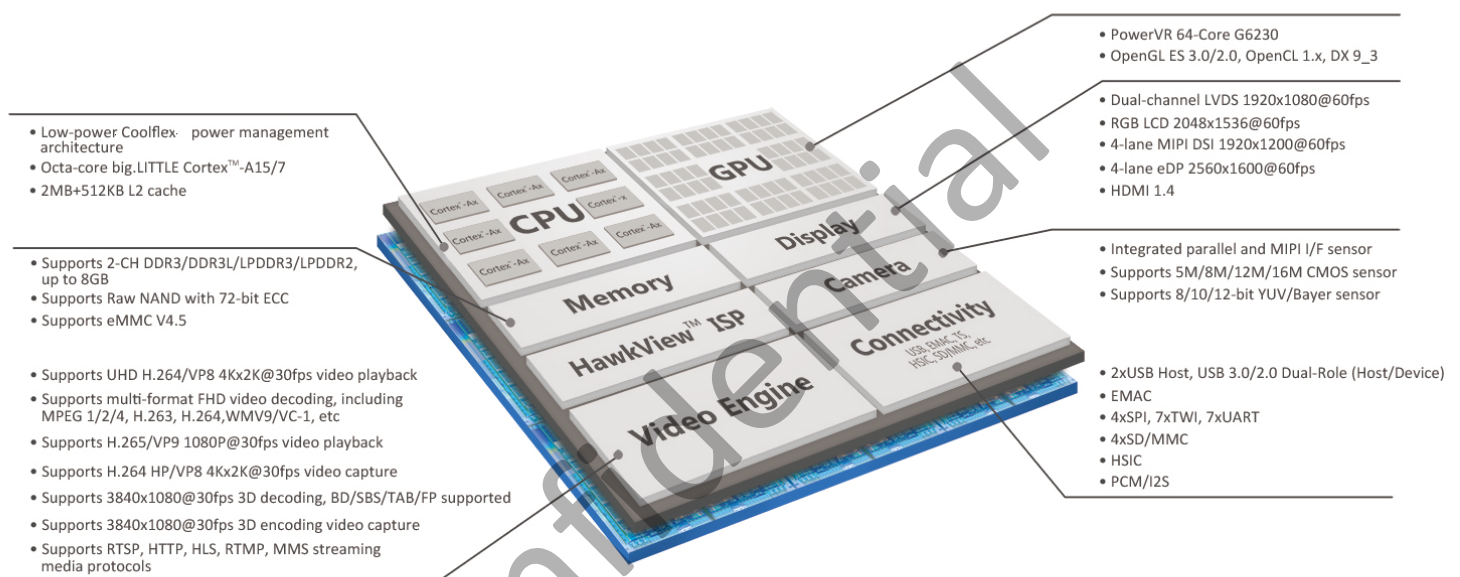
- Support transfer speed up to 20Mbps using 2-wire push-pull bus

2.11. Process and Package

- 28nm process
- FCBGA 636 balls, 0.65mm ball pitch, 19mm x 19mm

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3 BLOCK DIAGRAM



A80 Block Diagram

4 PIN DESCRIPTION

4.1. PIN CHARACTERISTICS

Following table describes the A80 pin characteristics from seven aspects: **BALL#**, **Pin Name**, **Default Function¹**, **Type²**, **Reset State³**, **Default Pull Up/Down⁴**, and **Buffer Strength⁵**.

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|--------------|----------|------------------|------|-------------|----------------------|----------------------|
| SDRAM | | | | | | |
| V1 | S0DQ0 | DRAM | I/O | Z | - | - |
| V2 | S0DQ1 | DRAM | I/O | Z | - | - |
| U1 | S0DQ2 | DRAM | I/O | Z | - | - |
| U2 | S0DQ3 | DRAM | I/O | Z | - | - |
| R1 | S0DQ4 | DRAM | I/O | Z | - | - |
| R2 | S0DQ5 | DRAM | I/O | Z | - | - |
| P1 | S0DQ6 | DRAM | I/O | Z | - | - |
| P2 | S0DQ7 | DRAM | I/O | Z | - | - |
| L2 | S0DQ8 | DRAM | I/O | Z | - | - |
| K2 | S0DQ9 | DRAM | I/O | Z | - | - |
| K1 | S0DQ10 | DRAM | I/O | Z | - | - |
| J1 | S0DQ11 | DRAM | I/O | Z | - | - |
| H2 | S0DQ12 | DRAM | I/O | Z | - | - |
| G1 | S0DQ13 | DRAM | I/O | Z | - | - |
| G2 | S0DQ14 | DRAM | I/O | Z | - | - |
| F1 | S0DQ15 | DRAM | I/O | Z | - | - |
| AD2 | S0DQ16 | DRAM | I/O | Z | - | - |
| AC1 | S0DQ17 | DRAM | I/O | Z | - | - |
| AC2 | S0DQ18 | DRAM | I/O | Z | - | - |
| AB1 | S0DQ19 | DRAM | I/O | Z | - | - |
| AA2 | S0DQ20 | DRAM | I/O | Z | - | - |
| Y1 | S0DQ21 | DRAM | I/O | Z | - | - |
| Y2 | S0DQ22 | DRAM | I/O | Z | - | - |

Note:

- Default function** defines the default function of each pin, especially for pins with multiplexing functions;
- There are five **pin types** here: O for output, I for input, I/O for input/output, A for analog, OD for Open-Drain, P for power and G for ground;
- Reset state** defines the state of the terminal at reset: Z for high-impedance.
- Default Pull up/down** defines the presence of an internal pull up or pull down resistor. Unless otherwise specified, the pin is default to be floating, and can be configured as pull up or pull down;
- Buffer strength** defines the driver strength of the associated output buffer. It is tested in the condition that VCC= 3.0V, strength=MAX;

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|-------|----------|------------------|------|-------------|----------------------|----------------------|
| W1 | S0DQ23 | DRAM | I/O | Z | - | - |
| E1 | S0DQ24 | DRAM | I/O | Z | - | - |
| E2 | S0DQ25 | DRAM | I/O | Z | - | - |
| D1 | S0DQ26 | DRAM | I/O | Z | - | - |
| D2 | S0DQ27 | DRAM | I/O | Z | - | - |
| B1 | S0DQ28 | DRAM | I/O | Z | - | - |
| B2 | S0DQ29 | DRAM | I/O | Z | - | - |
| A2 | S0DQ30 | DRAM | I/O | Z | - | - |
| A3 | S0DQ31 | DRAM | I/O | Z | - | - |
| M3 | S0VREF | DRAM | P | - | - | - |
| C2 | S0DQS3 | DRAM | I/O | Z | - | - |
| AA1 | S0DQS2 | DRAM | I/O | Z | - | - |
| H1 | S0DQS1 | DRAM | I/O | Z | - | - |
| T2 | S0DQS0 | DRAM | I/O | Z | - | - |
| C1 | S0DQS3B | DRAM | I/O | Z | - | - |
| AB2 | S0DQS2B | DRAM | I/O | Z | - | - |
| J2 | S0DQS1B | DRAM | I/O | Z | - | - |
| T1 | S0DQS0B | DRAM | I/O | Z | - | - |
| F2 | S0DQM3 | DRAM | O | Z | - | - |
| AD1 | S0DQM2 | DRAM | O | Z | - | - |
| L1 | S0DQM1 | DRAM | O | Z | - | - |
| W2 | S0DQM0 | DRAM | O | Z | - | - |
| N1 | SOCK | DRAM | O | Z | - | - |
| M1 | SOCK1 | DRAM | O | Z | - | - |
| N2 | SOCKB | DRAM | O | Z | - | - |
| M2 | SOCK1B | DRAM | O | Z | - | - |
| U4 | SOCKE | DRAM | O | Z | - | - |
| U5 | SOCKE1 | DRAM | O | Z | - | - |
| R3 | SOA0 | DRAM | O | Z | - | - |
| R6 | SOA1 | DRAM | O | Z | - | - |
| U7 | SOA2 | DRAM | O | Z | - | - |
| P5 | SOA3 | DRAM | O | Z | - | - |
| M4 | SOA4 | DRAM | O | Z | - | - |
| J3 | SOA5 | DRAM | O | Z | - | - |
| F3 | SOA6 | DRAM | O | Z | - | - |
| L4 | SOA7 | DRAM | O | Z | - | - |
| L5 | SOA8 | DRAM | O | Z | - | - |
| F4 | SOA9 | DRAM | O | Z | - | - |
| R4 | SOA10 | DRAM | O | Z | - | - |
| R7 | SOA11 | DRAM | O | Z | - | - |
| P8 | SOA12 | DRAM | O | Z | - | - |
| J4 | SOA13 | DRAM | O | Z | - | - |
| P7 | SOA14 | DRAM | O | Z | - | - |
| P4 | SOA15 | DRAM | O | Z | - | - |
| E4 | SOBA0 | DRAM | O | Z | - | - |
| U8 | SOBA1 | DRAM | O | Z | - | - |
| H4 | SOBA2 | DRAM | O | Z | - | - |
| H5 | S0WE | DRAM | O | Z | - | - |
| L7 | S0CAS | DRAM | O | Z | - | - |
| H7 | S0RAS | DRAM | O | Z | - | - |
| M7 | S0CS | DRAM | O | Z | - | - |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|-------|----------|------------------|------|-------------|----------------------|----------------------|
| M6 | S0CS1 | DRAM | O | Z | - | - |
| J7 | S0ODT | DRAM | O | Z | - | - |
| J6 | S0ODT1 | DRAM | O | Z | - | - |
| B3 | S0ZQ | DRAM | A | Z | - | - |
| L8 | S0RST | DRAM | O | Z | - | - |
| AG16 | S1DQ0 | DRAM | I/O | Z | - | - |
| AG17 | S1DQ1 | DRAM | I/O | Z | - | - |
| AH16 | S1DQ2 | DRAM | I/O | Z | - | - |
| AH15 | S1DQ3 | DRAM | I/O | Z | - | - |
| AH13 | S1DQ4 | DRAM | I/O | Z | - | - |
| AG13 | S1DQ5 | DRAM | I/O | Z | - | - |
| AH12 | S1DQ6 | DRAM | I/O | Z | - | - |
| AG14 | S1DQ7 | DRAM | I/O | Z | - | - |
| AH9 | S1DQ8 | DRAM | I/O | Z | - | - |
| AG9 | S1DQ9 | DRAM | I/O | Z | - | - |
| AH8 | S1DQ10 | DRAM | I/O | Z | - | - |
| AG8 | S1DQ11 | DRAM | I/O | Z | - | - |
| AH6 | S1DQ12 | DRAM | I/O | Z | - | - |
| AG6 | S1DQ13 | DRAM | I/O | Z | - | - |
| AG5 | S1DQ14 | DRAM | I/O | Z | - | - |
| AH5 | S1DQ15 | DRAM | I/O | Z | - | - |
| AB12 | S1DQ16 | DRAM | I/O | Z | - | - |
| AD15 | S1DQ17 | DRAM | I/O | Z | - | - |
| AD12 | S1DQ18 | DRAM | I/O | Z | - | - |
| AC17 | S1DQ19 | DRAM | I/O | Z | - | - |
| AE12 | S1DQ20 | DRAM | I/O | Z | - | - |
| AE17 | S1DQ21 | DRAM | I/O | Z | - | - |
| AF17 | S1DQ22 | DRAM | I/O | Z | - | - |
| AF14 | S1DQ23 | DRAM | I/O | Z | - | - |
| AG4 | S1DQ24 | DRAM | I/O | Z | - | - |
| AH3 | S1DQ25 | DRAM | I/O | Z | - | - |
| AG3 | S1DQ26 | DRAM | I/O | Z | - | - |
| AH2 | S1DQ27 | DRAM | I/O | Z | - | - |
| AF1 | S1DQ28 | DRAM | I/O | Z | - | - |
| AF2 | S1DQ29 | DRAM | I/O | Z | - | - |
| AE1 | S1DQ30 | DRAM | I/O | Z | - | - |
| AE2 | S1DQ31 | DRAM | I/O | Z | - | - |
| AD3 | S1VREF | DRAM | P | - | - | - |
| AG1 | S1DQS3 | DRAM | I/O | Z | - | - |
| AE15 | S1DQS2 | DRAM | I/O | Z | - | - |
| AG7 | S1DQS1 | DRAM | I/O | Z | - | - |
| AH14 | S1DQS0 | DRAM | I/O | Z | - | - |
| AG2 | S1DQS3B | DRAM | I/O | Z | - | - |
| AF15 | S1DQS2B | DRAM | I/O | Z | - | - |
| AH7 | S1DQS1B | DRAM | I/O | Z | - | - |
| AG15 | S1DQS0B | DRAM | I/O | Z | - | - |
| AH4 | S1DQM3 | DRAM | O | Z | - | - |
| AB17 | S1DQM2 | DRAM | O | Z | - | - |
| AG10 | S1DQM1 | DRAM | O | Z | - | - |
| AH17 | S1DQM0 | DRAM | O | Z | - | - |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|--|-----------|------------------|------|-------------|----------------------|----------------------|
| AH11 | S1CK | DRAM | O | Z | - | - |
| AH10 | S1CK1 | DRAM | O | Z | - | - |
| AG12 | S1CKB | DRAM | O | Z | - | - |
| AG11 | S1CK1B | DRAM | O | Z | - | - |
| AD6 | S1CKE | DRAM | O | Z | - | - |
| AE6 | S1CKE1 | DRAM | O | Z | - | - |
| AE11 | S1A0 | DRAM | O | Z | - | - |
| AF11 | S1A1 | DRAM | O | Z | - | - |
| AD9 | S1A2 | DRAM | O | Z | - | - |
| AE9 | S1A3 | DRAM | O | Z | - | - |
| AC8 | S1A4 | DRAM | O | Z | - | - |
| AF5 | S1A5 | DRAM | O | Z | - | - |
| AE5 | S1A6 | DRAM | O | Z | - | - |
| AD4 | S1A7 | DRAM | O | Z | - | - |
| AC5 | S1A8 | DRAM | O | Z | - | - |
| AC4 | S1A9 | DRAM | O | Z | - | - |
| AE14 | S1A10 | DRAM | O | Z | - | - |
| AB11 | S1A11 | DRAM | O | Z | - | - |
| AC11 | S1A12 | DRAM | O | Z | - | - |
| AA6 | S1A13 | DRAM | O | Z | - | - |
| AA12 | S1A14 | DRAM | O | Z | - | - |
| AC14 | S1A15 | DRAM | O | Z | - | - |
| AA3 | S1BA0 | DRAM | O | Z | - | - |
| AB14 | S1BA1 | DRAM | O | Z | - | - |
| AA4 | S1BA2 | DRAM | O | Z | - | - |
| Y5 | S1WE | DRAM | O | Z | - | - |
| Y4 | S1CAS | DRAM | O | Z | - | - |
| V7 | S1RAS | DRAM | O | Z | - | - |
| AF8 | S1CS | DRAM | O | Z | - | - |
| AE8 | S1CS1 | DRAM | O | Z | - | - |
| V6 | S1ODT | DRAM | O | Z | - | - |
| V4 | S1ODT1 | DRAM | O | Z | - | - |
| V3 | S1ZQ | DRAM | A | Z | - | - |
| AA15 | S1RST | DRAM | O | Z | - | - |
| Y8,Y9,AA9,AB8 | VDD18-DLL | POWER | P | - | - | - |
| F5,J5,M5,R5,V5,AD17,H6,L6,P6,U6,Y6,AB6,AC7,AD8,AC9,AD11,AC12,AD14,AC15,AA5 | VCC-DRAM | POWER | P | - | - | - |
| GPIO A | | | | | | |
| AE23 | PA0 | GPIO | I/O | Z | NO PULL | 20 |
| AF23 | PA1 | GPIO | I/O | Z | NO PULL | 20 |
| AG23 | PA2 | GPIO | I/O | Z | NO PULL | 20 |
| AH23 | PA3 | GPIO | I/O | Z | NO PULL | 20 |
| AD23 | PA4 | GPIO | I/O | Z | NO PULL | 20 |
| AB23 | PA5 | GPIO | I/O | Z | NO PULL | 20 |
| AG22 | PA6 | GPIO | I/O | Z | NO PULL | 20 |
| AH22 | PA7 | GPIO | I/O | Z | NO PULL | 20 |
| AC21 | PA8 | GPIO | I/O | Z | NO PULL | 20 |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|---------------|----------|------------------|------|-------------|----------------------|----------------------|
| AD21 | PA9 | GPIO | I/O | Z | NO PULL | 20 |
| AE21 | PA10 | GPIO | I/O | Z | NO PULL | 20 |
| AG21 | PA11 | GPIO | I/O | Z | NO PULL | 20 |
| AH21 | PA12 | GPIO | I/O | Z | NO PULL | 20 |
| AE20 | PA13 | GPIO | I/O | Z | NO PULL | 20 |
| AF20 | PA14 | GPIO | I/O | Z | NO PULL | 20 |
| AG20 | PA15 | GPIO | I/O | Z | NO PULL | 20 |
| AH20 | PA16 | GPIO | I/O | Z | NO PULL | 20 |
| AC20 | PA17 | GPIO | I/O | Z | NO PULL | 20 |
| AD20,AC22 | VCC-PA | POWER | P | - | - | - |
| GPIO B | | | | | | |
| AD18 | PB5 | GPIO | I/O | Z | NO PULL | 20 |
| AG18 | PB6 | GPIO | I/O | Z | NO PULL | 20 |
| AH18 | PB14 | GPIO | I/O | Z | NO PULL | 20 |
| AB18 | PB15 | GPIO | I/O | Z | NO PULL | 20 |
| AA18 | PB16 | GPIO | I/O | Z | NO PULL | 20 |
| AC18 | VCC-PB | POWER | P | - | - | - |
| GPIO C | | | | | | |
| H11 | PC0 | GPIO | I/O | Z | NO PULL | 20 |
| H9 | PC1 | GPIO | I/O | Z | NO PULL | 20 |
| G9 | PC2 | GPIO | I/O | Z | NO PULL | 20 |
| E9 | PC3 | GPIO | I/O | Z | PULL UP | 20 |
| D9 | PC4 | GPIO | I/O | Z | PULL UP | 20 |
| C9 | PC5 | GPIO | I/O | Z | NO PULL | 20 |
| B9 | PC6 | GPIO | I/O | Z | PULL UP | 20 |
| G11 | PC7 | GPIO | I/O | Z | NO PULL | 20 |
| A8 | PC8 | GPIO | I/O | Z | NO PULL | 20 |
| A9 | PC9 | GPIO | I/O | Z | NO PULL | 20 |
| B10 | PC10 | GPIO | I/O | Z | NO PULL | 20 |
| A10 | PC11 | GPIO | I/O | Z | NO PULL | 20 |
| H12 | PC12 | GPIO | I/O | Z | NO PULL | 20 |
| G12 | PC13 | GPIO | I/O | Z | NO PULL | 20 |
| E11 | PC14 | GPIO | I/O | Z | NO PULL | 20 |
| D11 | PC15 | GPIO | I/O | Z | NO PULL | 20 |
| B11 | PC16 | GPIO | I/O | Z | NO PULL | 20 |
| A11 | PC17 | GPIO | I/O | Z | NO PULL | 20 |
| H14 | PC18 | GPIO | I/O | Z | NO PULL | 20 |
| G14 | PC19 | GPIO | I/O | Z | NO PULL | 20 |
| F9,F11 | VCC-PC | POWER | P | - | - | - |
| GPIO D | | | | | | |
| D12 | PD0 | GPIO | I/O | Z | NO PULL | 20 |
| E12 | PD1 | GPIO | I/O | Z | NO PULL | 20 |
| B12 | PD2 | GPIO | I/O | Z | NO PULL | 20 |
| A12 | PD3 | GPIO | I/O | Z | NO PULL | 20 |
| B13 | PD4 | GPIO | I/O | Z | NO PULL | 20 |
| A13 | PD5 | GPIO | I/O | Z | NO PULL | 20 |
| E14 | PD6 | GPIO | I/O | Z | NO PULL | 20 |
| D14 | PD7 | GPIO | I/O | Z | NO PULL | 20 |
| B14 | PD8 | GPIO | I/O | Z | NO PULL | 20 |
| A14 | PD9 | GPIO | I/O | Z | NO PULL | 20 |
| G15 | PD10 | GPIO | I/O | Z | NO PULL | 20 |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|---------------|------------|------------------|------|-------------|----------------------|----------------------|
| H15 | PD11 | GPIO | I/O | Z | NO PULL | 20 |
| D15 | PD12 | GPIO | I/O | Z | NO PULL | 20 |
| E15 | PD13 | GPIO | I/O | Z | NO PULL | 20 |
| B15 | PD14 | GPIO | I/O | Z | NO PULL | 20 |
| A15 | PD15 | GPIO | I/O | Z | NO PULL | 20 |
| B16 | PD16 | GPIO | I/O | Z | NO PULL | 20 |
| A16 | PD17 | GPIO | I/O | Z | NO PULL | 20 |
| B17 | PD18 | GPIO | I/O | Z | NO PULL | 20 |
| A17 | PD19 | GPIO | I/O | Z | NO PULL | 20 |
| C17 | PD20 | GPIO | I/O | Z | NO PULL | 20 |
| D17 | PD21 | GPIO | I/O | Z | NO PULL | 20 |
| F17 | PD22 | GPIO | I/O | Z | NO PULL | 20 |
| G17 | PD23 | GPIO | I/O | Z | NO PULL | 20 |
| H17 | PD24 | GPIO | I/O | Z | NO PULL | 20 |
| F18 | PD25 | GPIO | I/O | Z | NO PULL | 20 |
| G18 | PD26 | GPIO | I/O | Z | NO PULL | 20 |
| H18 | PD27 | GPIO | I/O | Z | NO PULL | 20 |
| C15 | VCC18-LVDS | POWER | P | - | - | - |
| F12,F14,F15 | VCC-PD | POWER | P | - | - | - |
| GPIO E | | | | | | |
| AA27 | PE0 | GPIO | I/O | Z | NO PULL | 20 |
| AA28 | PE1 | GPIO | I/O | Z | NO PULL | 20 |
| V26 | PE2 | GPIO | I/O | Z | NO PULL | 20 |
| Y26 | PE3 | GPIO | I/O | Z | NO PULL | 20 |
| V25 | PE4 | GPIO | I/O | Z | NO PULL | 20 |
| Y25 | PE5 | GPIO | I/O | Z | NO PULL | 20 |
| AA25 | PE6 | GPIO | I/O | Z | NO PULL | 20 |
| V24 | PE7 | GPIO | I/O | Z | NO PULL | 20 |
| V23 | PE8 | GPIO | I/O | Z | NO PULL | 20 |
| R22 | PE9 | GPIO | I/O | Z | NO PULL | 20 |
| Y23 | PE10 | GPIO | I/O | Z | NO PULL | 20 |
| AA23 | PE11 | GPIO | I/O | Z | NO PULL | 20 |
| V22 | PE12 | GPIO | I/O | Z | NO PULL | 20 |
| R21 | PE13 | GPIO | I/O | Z | NO PULL | 20 |
| AA22 | PE14 | GPIO | I/O | Z | NO PULL | 20 |
| Y22 | PE15 | GPIO | I/O | Z | NO PULL | 20 |
| U21 | PE16 | GPIO | I/O | Z | NO PULL | 20 |
| V21 | PE17 | GPIO | I/O | Z | NO PULL | 20 |
| Y24,AA24 | VCC-PE | POWER | P | - | - | - |
| GPIO F | | | | | | |
| AB21 | PF0 | GPIO | I/O | Z | NO PULL | 20 |
| AB20 | PF1 | GPIO | I/O | Z | NO PULL | 20 |
| AA20 | PF2 | GPIO | I/O | Z | NO PULL | 20 |
| Y21 | PF3 | GPIO | I/O | Z | NO PULL | 20 |
| AG19 | PF4 | GPIO | I/O | Z | NO PULL | 20 |
| AH19 | PF5 | GPIO | I/O | Z | NO PULL | 20 |
| AE18 | VCC-PF | POWER | P | - | - | - |
| GPIO G | | | | | | |
| B4 | PG0 | GPIO | I/O | Z | NO PULL | 20 |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|---------------|----------|------------------|------|-------------|----------------------|----------------------|
| A4 | PG1 | GPIO | I/O | Z | NO PULL | 20 |
| D6 | PG2 | GPIO | I/O | Z | NO PULL | 20 |
| C5 | PG3 | GPIO | I/O | Z | NO PULL | 20 |
| B5 | PG4 | GPIO | I/O | Z | NO PULL | 20 |
| A5 | PG5 | GPIO | I/O | Z | NO PULL | 20 |
| E6 | PG6 | GPIO | I/O | Z | NO PULL | 20 |
| D5 | PG7 | GPIO | I/O | Z | NO PULL | 20 |
| B6 | PG8 | GPIO | I/O | Z | NO PULL | 20 |
| A6 | PG9 | GPIO | I/O | Z | NO PULL | 20 |
| B7 | PG10 | GPIO | I/O | Z | NO PULL | 20 |
| A7 | PG11 | GPIO | I/O | Z | NO PULL | 20 |
| G8 | PG12 | GPIO | I/O | Z | NO PULL | 20 |
| E8 | PG13 | GPIO | I/O | Z | NO PULL | 20 |
| D8 | PG14 | GPIO | I/O | Z | NO PULL | 20 |
| B8 | PG15 | GPIO | I/O | Z | NO PULL | 20 |
| F7,F8 | VCC-PG | POWER | P | - | - | - |
| GPIO H | | | | | | |
| AB28 | PH0 | GPIO | I/O | Z | NO PULL | 20 |
| AB27 | PH1 | GPIO | I/O | Z | NO PULL | 20 |
| AC28 | PH2 | GPIO | I/O | Z | NO PULL | 20 |
| AC27 | PH3 | GPIO | I/O | Z | NO PULL | 20 |
| AC26 | PH4 | GPIO | I/O | Z | NO PULL | 20 |
| AC25 | PH5 | GPIO | I/O | Z | NO PULL | 20 |
| AD28 | PH6 | GPIO | I/O | Z | NO PULL | 20 |
| AD27 | PH8 | GPIO | I/O | Z | NO PULL | 20 |
| AD26 | PH9 | GPIO | I/O | Z | NO PULL | 20 |
| AE28 | PH10 | GPIO | I/O | Z | NO PULL | 20 |
| AE27 | PH11 | GPIO | I/O | Z | NO PULL | 20 |
| AF28 | PH12 | GPIO | I/O | Z | NO PULL | 20 |
| AF27 | PH13 | GPIO | I/O | Z | NO PULL | 20 |
| AG28 | PH14 | GPIO | I/O | Z | NO PULL | 20 |
| AG27 | PH15 | GPIO | I/O | Z | NO PULL | 20 |
| AH27 | PH16 | GPIO | I/O | Z | NO PULL | 20 |
| AG26 | PH17 | GPIO | I/O | Z | NO PULL | 20 |
| AH26 | PH18 | GPIO | I/O | Z | NO PULL | 20 |
| AG25 | PH19 | GPIO | I/O | Z | NO PULL | 20 |
| AH25 | PH20 | GPIO | I/O | Z | NO PULL | 20 |
| AF24 | PH21 | GPIO | I/O | Z | NO PULL | 20 |
| AD25,AE24 | VCC-PH | POWER | P | - | - | - |
| GPIO L | | | | | | |
| E28 | PL0 | GPIO | I/O | Z | | 20 |
| E27 | PL1 | GPIO | I/O | Z | | 20 |
| E26 | PL2 | GPIO | I/O | Z | NO PULL | 20 |
| E23 | PL3 | GPIO | I/O | Z | NO PULL | 20 |
| F25 | PL4 | GPIO | I/O | Z | NO PULL | 20 |
| F26 | PL5 | GPIO | I/O | Z | NO PULL | 20 |
| F27 | PL6 | GPIO | I/O | Z | NO PULL | 20 |
| F28 | PL7 | GPIO | I/O | Z | NO PULL | 20 |
| F22 | PL8 | GPIO | I/O | Z | NO PULL | 20 |
| G23 | PL9 | GPIO | I/O | Z | NO PULL | 20 |
| F24 | VCC-PL | POWER | P | - | - | - |
| GPIO M | | | | | | |
| B24 | PM0 | GPIO | I/O | Z | | 20 |
| A25 | PM1 | GPIO | I/O | Z | | 20 |
| B25 | PM2 | GPIO | I/O | Z | NO PULL | 20 |
| A26 | PM3 | GPIO | I/O | Z | NO PULL | 20 |
| E25 | PM4 | GPIO | I/O | Z | NO PULL | 20 |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|-----------------------|-------------|------------------|------|-------------|----------------------|----------------------|
| B26 | PM8 | GPIO | I/O | Z | NO PULL | 20 |
| B27 | PM9 | GPIO | I/O | Z | NO PULL | 20 |
| A27 | PM10 | GPIO | I/O | Z | | 20 |
| B28 | PM11 | GPIO | I/O | Z | | 20 |
| C27 | PM12 | GPIO | I/O | Z | NO PULL | 20 |
| C28 | PM13 | GPIO | I/O | Z | NO PULL | 20 |
| D27 | PM14 | GPIO | I/O | Z | NO PULL | 20 |
| D28 | PM15 | GPIO | I/O | Z | NO PULL | 20 |
| D24 | VCC-PM | POWER | P | - | - | - |
| GPIO N | | | | | | |
| B23 | PN0 | GPIO | I/O | Z | PULL UP | 20 |
| A23 | PN1 | GPIO | I/O | Z | PULL UP | 20 |
| SYSTEM CONTROL | | | | | | |
| A21 | UBOOT | - | I | - | PULL UP | - |
| H23 | JTAGSELO | - | I | - | PULL UP | - |
| H22 | JTAGSEL1 | - | I | - | PULL UP | - |
| AG24 | BOOTSELO | - | I | - | PULL UP | - |
| AH24 | BOOTSEL1 | - | I | - | PULL UP | - |
| J20 | VCC18-EFUSE | - | P | - | - | - |
| C24 | NMI | - | I | Z | NO PULL | - |
| C26 | RESET | - | I | Z | NO PULL | - |
| USB | | | | | | |
| R27 | USB0-DM | - | A | - | - | - |
| R28 | USB0-DP | - | A | - | - | - |
| P22 | USB0-ID | - | A | - | - | - |
| P21 | USB0-VBUS | - | A | - | - | - |
| P27 | USB0-SSTXN | - | A | - | - | - |
| P28 | USB0-SSTXP | - | A | - | - | - |
| N27 | USB0-SSRXN | - | A | - | - | - |
| N28 | USB0-SSRXP | - | A | - | - | - |
| M26 | VCC33-USB0 | - | P | - | - | - |
| M24 | VDD09-USB0 | - | P | - | - | - |
| P26 | GND-USB0 | - | G | - | - | - |
| R25 | USB1-DM | - | A | - | - | - |
| R24 | USB1-DP | - | A | - | - | - |
| P24 | USB2-DM | - | A | - | - | - |
| P25 | USB2-DP | - | A | - | - | - |
| R26 | VCC33-USBH | - | P | - | - | - |
| P23,R23 | VDD09-USBH | - | P | - | - | - |
| HSIC | | | | | | |
| T27 | HSIC-STRB | - | A | - | - | - |
| T28 | HSIC-DATA | - | A | - | - | - |
| U22 | VCC12-HSIC | - | P | - | - | - |
| ADC | | | | | | |
| G20 | GPADC0 | - | A | - | - | - |
| H20 | GPADC1 | - | A | - | - | - |
| E21 | KeyADC0 | - | A | - | - | - |
| B21 | KeyADC1 | - | A | - | - | - |
| D21 | VCC18-ADC | - | P | - | - | - |
| C21 | GND-ADC | - | G | - | - | - |
| HDMI | | | | | | |
| J28 | HTX0P | - | A | - | - | - |
| J27 | HTX0N | - | A | - | - | - |
| H28 | HTX1P | - | A | - | - | - |
| H27 | HTX1N | - | A | - | - | - |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|-----------------|------------|------------------|------|-------------|----------------------|----------------------|
| G28 | HTX2P | - | A | - | - | - |
| G27 | HTX2N | - | A | - | - | - |
| K28 | HTXCP | - | A | - | - | - |
| K27 | HTXCN | - | A | - | - | - |
| L25 | HHPD | - | A | - | - | - |
| J24 | VCC18-HDMI | - | P | - | - | - |
| L24 | VDD09-HDMI | - | P | - | - | - |
| H24 | GND-HDMI | - | G | - | - | - |
| eDP | | | | | | |
| D18 | EDPD0P | - | A | - | - | - |
| C18 | EDPD0N | - | A | - | - | - |
| A18 | EDPD1P | - | A | - | - | - |
| B18 | EDPD1N | - | A | - | - | - |
| A19 | EDPD2P | - | A | - | - | - |
| B19 | EDPD2N | - | A | - | - | - |
| D20 | EDPD3P | - | A | - | - | - |
| E20 | EDPD3N | - | A | - | - | - |
| A20 | EDPAUXP | - | A | - | - | - |
| B20 | EDPAUXN | - | A | - | - | - |
| F20 | EDPHPD | - | A | - | - | - |
| E18 | VCC18-EDP | - | P | - | - | - |
| E17 | GND-EDP | - | G | - | - | - |
| MIPI DSI | | | | | | |
| M21 | MDSI-DM0 | - | A | - | - | - |
| M22 | MDSI-DP0 | - | A | - | - | - |
| J25 | MDSI-DM1 | - | A | - | - | - |
| J26 | MDSI-DP1 | - | A | - | - | - |
| L22 | MDSI-DM2 | - | A | - | - | - |
| L21 | MDSI-DP2 | - | A | - | - | - |
| J21 | MDSI-DM3 | - | A | - | - | - |
| J22 | MDSI-DP3 | - | A | - | - | - |
| H26 | MDSI-CKN | - | A | - | - | - |
| H25 | MDSI-CKP | - | A | - | - | - |
| J23 | VCC18-MDSI | - | P | - | - | - |
| L23 | GND-MDSI | - | G | - | - | - |
| MIPI CSI | | | | | | |
| Y28 | MCSI-DM0 | - | A | - | - | - |
| Y27 | MCSI-DP0 | - | A | - | - | - |
| W28 | MCSI-DM1 | - | A | - | - | - |
| W27 | MCSI-DP1 | - | A | - | - | - |
| U28 | MCSI-DM2 | - | A | - | - | - |
| U27 | MCSI-DP2 | - | A | - | - | - |
| U25 | MCSI-DM3 | - | A | - | - | - |
| U24 | MCSI-DP3 | - | A | - | - | - |
| V28 | MCSI-CKN | - | A | - | - | - |
| V27 | MCSI-CKP | - | A | - | - | - |
| U23 | VCC18-MCSI | - | P | - | - | - |
| U26 | GND-MCSI | - | G | - | - | - |
| CLOCK | | | | | | |
| F21 | REXT | - | A | - | - | - |
| G21 | VIO-RTC | - | P | - | - | - |
| A24 | X32KI | - | A | - | - | - |
| A22 | X24MI | - | A | - | - | - |
| B22 | X24MO | - | A | - | - | - |
| D23 | VCC18-PLL | - | P | - | - | - |

| BALL# | Pin Name | Default Function | Type | Reset State | Default Pull Up/Down | Buffer Strength (mA) |
|--|------------|------------------|------|-------------|----------------------|----------------------|
| C23 | GND-PLL | - | G | - | - | - |
| POWER | | | | | | |
| M20,N20,P20 | VDD18 | - | P | - | - | - |
| K19,K20,L20 | VDD-CPUS | - | P | - | - | - |
| K11,K12,K13,K15, L10,L11,L12,L13, L14,L15,M10,M13, M14,M15,N10, N11,N12,N13,N14, N15,P11,P12,P13, P14 | VDD-CPUB | - | P | - | - | - |
| R17,R18,T16,T17, T18,T19,U16,U17, U18,U19 | VDD-CPUA | - | P | - | - | - |
| J14 | VDDFB-CPUB | - | P | - | - | - |
| K14 | GNDFB-CPUB | - | P | - | - | - |
| T20 | VDDFB-CPUA | - | P | - | - | - |
| T11,T12,T13,T14, U11,U12,U14,V11, V12,V13,V14 | VDD-GPU | - | P | - | - | - |
| T9 | VDDFB-GPU | - | P | - | - | - |
| J16,J17,J18,K17, L17,L18,M17,M18, N17,N18 | VDD-SYS | - | P | - | - | - |
| W16,W17,W18, W19,W20 | VDD-VPU | - | P | - | - | - |
| A1, AH1, C3, E3, H3, L3, P3, U3, Y3, AC3, AF3, C6, G6, AF6, Y7, AA7, J8, M8, R8, V8, C8, J9, K9, L9, M9, N9, P9, R9, U9, V9, W9, AB9, AF9, J10, K10, P10, R10, T10, U10, V10, W10, Y10, J11, M11, R11, W11, Y11, AA11, C11, C12, J12, M12, R12, W12, Y12, AF12, J13, R13, U13, W13, Y13, R14, W14, Y14, AA14, J15, C14, P15, R15, T15, U15, V15, W15, Y15, K16, L16, M16, N16, P16, R16, V16, AA17, P17, V17, Y17, K18, P18, V18, Y18, AF18, J19, L19, M19, N19, P19, R19, V19, Y19, C20, R20, U20, V20, Y20, AF21, AC24, AF26, AA26, L26, A28, AH28 | GND | - | P | - | - | - |
| L28, L27, M28, M27, M25, M23 | NC | - | - | - | - | - |

4.2. GPIO MULTIPLEXING FUNCTIONS

Following table provides a description of the GPIO multiplexing functions of A80.

| Port | Default Function | IO Type | Default IO State | Default Pull-up/down | Multiplexing Function 2 | Multiplexing Function 3 | Multiplexing Function 4 | Multiplexing Function 5 | Multiplexing Function 6 |
|--------|------------------|---------|------------------|----------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| PA0 | GPIO | I/O | DIS | Z | RGMII-RXD3/ MII-RXD3 | | UART1_TX | | PA_EINT0 |
| PA1 | GPIO | I/O | DIS | Z | RGMII-RXD2/ MII-RXD2 | | UART1_RX | | PA_EINT1 |
| PA2 | GPIO | I/O | DIS | Z | RGMII-RXD1/ MII-RXD1 | | UART1_RTS | | PA_EINT2 |
| PA3 | GPIO | I/O | DIS | Z | RGMII-RXD0/ MII-RXD0 | | UART1_CTS | | PA_EINT3 |
| PA4 | GPIO | I/O | DIS | Z | RGMII-RXCK/ MII-RXCK | | UART1_DTR | | PA_EINT4 |
| PA5 | GPIO | I/O | DIS | Z | RGMII-RXCTL/ MII-RXDV | | UART1_DSR | | PA_EINT5 |
| PA6 | GPIO | I/O | DIS | Z | MII-RXERR | | UART1_DCD | | PA_EINT6 |
| PA7 | GPIO | I/O | DIS | Z | RGMII-TXD3/ MII-TXD3 | | UART1_RING | | PA_EINT7 |
| PA8 | GPIO | I/O | DIS | Z | RGMII-TXD2/ MII-TXD2 | | ECLK_IN0 | | PA_EINT8 |
| PA9 | GPIO | I/O | DIS | Z | RGMII-TXD1/ MII-TXD1 | | ECLK_IN1 | | PA_EINT9 |
| PA10 | GPIO | I/O | DIS | Z | RGMII-TXD0/ MII-TXD0 | | CLKA_OUT | | PA_EINT10 |
| PA11 | GPIO | I/O | DIS | Z | MII-CRS | | CLKB_OUT | | PA_EINT11 |
| PA12 | GPIO | I/O | DIS | Z | RGMII-TXCK/ MII-TXCK | | PWM3_P | | PA_EINT12 |
| PA13 | GPIO | I/O | DIS | Z | RGMII-TXCTL/ MII-TXEN | | PWM3_N | | PA_EINT13 |
| PA14 | GPIO | I/O | DIS | Z | MII-TXERR | | SPI1_CS0 | | PA_EINT14 |
| PA15 | GPIO | I/O | DIS | Z | RGMII-CLKIN/ MII-COL | | SPI1_CLK | | PA_EINT15 |
| PA16 | GPIO | I/O | DIS | Z | EMDC | | SPI1_MOSI | | PA_EINT16 |
| PA17 | GPIO | I/O | DIS | Z | EMDIO | | SPI1_MISO | | PA_EINT17 |
| VCC-PA | GPIO | P | | | | | | | |
| PB5 | GPIO | I/O | DIS | Z | | UART3_TX | | | PB_EINT5 |
| PB6 | GPIO | I/O | DIS | Z | | UART3_RX | | | PB_EINT6 |
| PB14 | GPIO | I/O | DIS | Z | | MCSI_MCLK | | | PB_EINT14 |
| PB15 | GPIO | I/O | DIS | Z | | MCSI_SCK | TWI4_SCK | | PB_EINT15 |
| PB16 | GPIO | I/O | DIS | Z | | MCSI_SDA | TWI4_SDA | | PB_EINT16 |
| VCC-PB | GPIO | P | | | | | | | |
| PC0 | GPIO | I/O | DIS | Z | NAND0_WE | SPI0_MOSI | | | |
| PC1 | GPIO | I/O | DIS | Z | NAND0_ALE | SPI0_MISO | | | |

| | | | | | | | | | |
|--------|------|-----|-----|---------|-----------|-------------|--|--|--|
| PC2 | GPIO | I/O | DIS | Z | NAND0_CLE | SPIO_CLK | | | |
| PC3 | GPIO | I/O | DIS | PULL-UP | NAND0_CE1 | | | | |
| PC4 | GPIO | I/O | DIS | PULL-UP | NAND0_CE0 | | | | |
| PC5 | GPIO | I/O | DIS | Z | NAND0_RE | | | | |
| PC6 | GPIO | I/O | DIS | PULL-UP | NAND0_RB0 | SDC2_CMD | | | |
| PC7 | GPIO | I/O | DIS | PULL-UP | NAND0_RB1 | SDC2_CLK | | | |
| PC8 | GPIO | I/O | DIS | Z | NAND0_DQ0 | SDC2_D0 | | | |
| PC9 | GPIO | I/O | DIS | Z | NAND0_DQ1 | SDC2_D1 | | | |
| PC10 | GPIO | I/O | DIS | Z | NAND0_DQ2 | SDC2_D2 | | | |
| PC11 | GPIO | I/O | DIS | Z | NAND0_DQ3 | SDC2_D3 | | | |
| PC12 | GPIO | I/O | DIS | Z | NAND0_DQ4 | SDC2_D4 | | | |
| PC13 | GPIO | I/O | DIS | Z | NAND0_DQ5 | SDC2_D5 | | | |
| PC14 | GPIO | I/O | DIS | Z | NAND0_DQ6 | SDC2_D6 | | | |
| PC15 | GPIO | I/O | DIS | Z | NAND0_DQ7 | SDC2_D7 | | | |
| PC16 | GPIO | I/O | DIS | Z | NAND0_DQS | SDC2_RST | | | |
| PC17 | GPIO | I/O | DIS | PULL-UP | NAND0_CE2 | NAND0_RE_B | | | |
| PC18 | GPIO | I/O | DIS | PULL-UP | NAND0_CE3 | NAND0_DQS_B | | | |
| PC19 | GPIO | I/O | DIS | PULL-UP | | SPIO_CS0 | | | |
| VCC-PC | GPIO | P | | | | | | | |
| PD0 | GPIO | I/O | DIS | Z | LCD_D0 | LVDS0_VP0 | | | |
| PD1 | GPIO | I/O | DIS | Z | LCD_D1 | LVDS0_VN0 | | | |
| PD2 | GPIO | I/O | DIS | Z | LCD_D2 | LVDS0_VP1 | | | |
| PD3 | GPIO | I/O | DIS | Z | LCD_D3 | LVDS0_VN1 | | | |
| PD4 | GPIO | I/O | DIS | Z | LCD_D4 | LVDS0_VP2 | | | |
| PD5 | GPIO | I/O | DIS | Z | LCD_D5 | LVDS0_VN2 | | | |
| PD6 | GPIO | I/O | DIS | Z | LCD_D6 | LVDS0_VPC | | | |
| PD7 | GPIO | I/O | DIS | Z | LCD_D7 | LVDS0_VNC | | | |
| PD8 | GPIO | I/O | DIS | Z | LCD_D8 | LVDS0_VP3 | | | |
| PD9 | GPIO | I/O | DIS | Z | LCD_D9 | LVDS0_VN3 | | | |
| PD10 | GPIO | I/O | DIS | Z | LCD_D10 | LVDS1_VP0 | | | |
| PD11 | GPIO | I/O | DIS | Z | LCD_D11 | LVDS1_VN0 | | | |
| PD12 | GPIO | I/O | DIS | Z | LCD_D12 | LVDS1_VP1 | | | |
| PD13 | GPIO | I/O | DIS | Z | LCD_D13 | LVDS1_VN1 | | | |
| PD14 | GPIO | I/O | DIS | Z | LCD_D14 | LVDS1_VP2 | | | |
| PD15 | GPIO | I/O | DIS | Z | LCD_D15 | LVDS1_VN2 | | | |
| PD16 | GPIO | I/O | DIS | Z | LCD_D16 | LVDS1_VPC | | | |
| PD17 | GPIO | I/O | DIS | Z | LCD_D17 | LVDS1_VNC | | | |
| PD18 | GPIO | I/O | DIS | Z | LCD_D18 | LVDS1_VP3 | | | |
| PD19 | GPIO | I/O | DIS | Z | LCD_D19 | LVDS1_VN3 | | | |
| PD20 | GPIO | I/O | DIS | Z | LCD_D20 | | | | |
| PD21 | GPIO | I/O | DIS | Z | LCD_D21 | | | | |
| PD22 | GPIO | I/O | DIS | Z | LCD_D22 | | | | |
| PD23 | GPIO | I/O | DIS | Z | LCD_D23 | | | | |
| PD24 | GPIO | I/O | DIS | Z | LCD_CLK | | | | |
| PD25 | GPIO | I/O | DIS | Z | LCD_DE | | | | |
| PD26 | GPIO | I/O | DIS | Z | LCD_HSYNC | | | | |
| PD27 | GPIO | I/O | DIS | Z | LCD_VSYNC | | | | |

| | | | | | | | | |
|------------|------|-----|-----|---|-----------|-----------|-----------|-----------|
| VCC18-LVDS | GPIO | P | | | | | | |
| VCC-PD | GPIO | P | | | | | | |
| PE0 | GPIO | I/O | DIS | Z | CSI_PCLK | TS_CLK | | PE_EINT0 |
| PE1 | GPIO | I/O | DIS | Z | CSI_MCLK | TS_ERR | | PE_EINT1 |
| PE2 | GPIO | I/O | DIS | Z | CSI_HSYNC | TS_SYNC | | PE_EINT2 |
| PE3 | GPIO | I/O | DIS | Z | CSI_VSYNC | TS_DVLD | | PE_EINT3 |
| PE4 | GPIO | I/O | DIS | Z | CSI_D0 | SPI2_CS0 | UART5_TX | PE_EINT4 |
| PE5 | GPIO | I/O | DIS | Z | CSI_D1 | SPI2_CLK | UART5_RX | PE_EINT5 |
| PE6 | GPIO | I/O | DIS | Z | CSI_D2 | SPI2_MOSI | UART5_RTS | PE_EINT6 |
| PE7 | GPIO | I/O | DIS | Z | CSI_D3 | SPI2_MISO | UART5_CTS | PE_EINT7 |
| PE8 | GPIO | I/O | DIS | Z | CSI_D4 | TS_D0 | | PE_EINT8 |
| PE9 | GPIO | I/O | DIS | Z | CSI_D5 | TS_D1 | | PE_EINT9 |
| PE10 | GPIO | I/O | DIS | Z | CSI_D6 | TS_D2 | | PE_EINT10 |
| PE11 | GPIO | I/O | DIS | Z | CSI_D7 | TS_D3 | | PE_EINT11 |
| PE12 | GPIO | I/O | DIS | Z | CSI_D8 | TS_D4 | | PE_EINT12 |
| PE13 | GPIO | I/O | DIS | Z | CSI_D9 | TS_D5 | | PE_EINT13 |
| PE14 | GPIO | I/O | DIS | Z | CSI_D10 | TS_D6 | | PE_EINT14 |
| PE15 | GPIO | I/O | DIS | Z | CSI_D11 | TS_D7 | | PE_EINT15 |
| PE16 | GPIO | I/O | DIS | Z | CSI_SCK | TWI4_SCK | | PE_EINT16 |
| PE17 | GPIO | I/O | DIS | Z | CSI_SDA | TWI4_SDA | | PE_EINT17 |
| VCC-PE | GPIO | P | | | | | | |
| PF0 | GPIO | I/O | DIS | Z | SDC0_D1 | | | |
| PF1 | GPIO | I/O | DIS | Z | SDC0_D0 | | | |
| PF2 | GPIO | I/O | DIS | Z | SDC0_CLK | | UART0_TX | |
| PF3 | GPIO | I/O | DIS | Z | SDC0_CMD | | | |
| PF4 | GPIO | I/O | DIS | Z | SDC0_D3 | | UART0_RX | |
| PF5 | GPIO | I/O | DIS | Z | SDC0_D2 | | | |
| VCC-PF | GPIO | P | | | | | | |
| PG0 | GPIO | I/O | DIS | Z | SDC1_CLK | | | PG_EINT0 |
| PG1 | GPIO | I/O | DIS | Z | SDC1_CMD | | | PG_EINT1 |
| PG2 | GPIO | I/O | DIS | Z | SDC1_D0 | | | PG_EINT2 |
| PG3 | GPIO | I/O | DIS | Z | SDC1_D1 | | | PG_EINT3 |
| PG4 | GPIO | I/O | DIS | Z | SDC1_D2 | | | PG_EINT4 |
| PG5 | GPIO | I/O | DIS | Z | SDC1_D3 | | | PG_EINT5 |
| PG6 | GPIO | I/O | DIS | Z | UART2_TX | | | PG_EINT6 |
| PG7 | GPIO | I/O | DIS | Z | UART2_RX | | | PG_EINT7 |
| PG8 | GPIO | I/O | DIS | Z | UART2_RTS | | | PG_EINT8 |
| PG9 | GPIO | I/O | DIS | Z | UART2_CTS | | | PG_EINT9 |
| PG10 | GPIO | I/O | DIS | Z | TWI3_SCK | | | PG_EINT10 |
| PG11 | GPIO | I/O | DIS | Z | TWI3_SDA | | | PG_EINT11 |
| PG12 | GPIO | I/O | DIS | Z | UART4_TX | | | PG_EINT12 |
| PG13 | GPIO | I/O | DIS | Z | UART4_RX | | | PG_EINT13 |
| PG14 | GPIO | I/O | DIS | Z | UART4_RTS | | | PG_EINT14 |
| PG15 | GPIO | I/O | DIS | Z | UART4_CTS | | | PG_EINT15 |
| VCC-PG | GPIO | P | | | | | | |
| PH0 | GPIO | I/O | DIS | Z | TWI0_SCK | | | |

| | | | | | | | | |
|--------|------|-----|-----|---------|------------|--------------|--|-------------|
| PH1 | GPIO | I/O | DIS | Z | TWI0_SDA | | | |
| PH2 | GPIO | I/O | DIS | Z | TWI1_SCK | | | |
| PH3 | GPIO | I/O | DIS | Z | TWI1_SDA | | | |
| PH4 | GPIO | I/O | DIS | Z | TWI2_SCK | | | |
| PH5 | GPIO | I/O | DIS | Z | TWI2_SDA | | | |
| PH6 | GPIO | I/O | DIS | Z | PWM0 | | | |
| PH8 | GPIO | I/O | DIS | Z | | PWM1_P | | PH_EINT8 |
| PH9 | GPIO | I/O | DIS | Z | | PWM1_N | | PH_EINT9 |
| PH10 | GPIO | I/O | DIS | Z | | PWM2_P | | PH_EINT10 |
| PH11 | GPIO | I/O | DIS | Z | | PWM2_N | | PH_EINT11 |
| PH12 | GPIO | I/O | DIS | Z | UART0_TX | SPI3_CS2 | | PH_EINT12 |
| PH13 | GPIO | I/O | DIS | Z | UART0_RX | SPI3_CS3 | | PH_EINT13 |
| PH14 | GPIO | I/O | DIS | Z | SPI3_CLK | | | PH_EINT14 |
| PH15 | GPIO | I/O | DIS | Z | SPI3_MOSI | | | PH_EINT15 |
| PH16 | GPIO | I/O | DIS | Z | SPI3_MISO | | | PH_EINT16 |
| PH17 | GPIO | I/O | DIS | Z | SPI3_CS0 | | | PH_EINT17 |
| PH18 | GPIO | I/O | DIS | Z | SPI3_CS1 | | | PH_EINT18 |
| PH19 | GPIO | I/O | DIS | Z | HSCL | | | |
| PH20 | GPIO | I/O | DIS | Z | HSDA | | | |
| PH21 | GPIO | I/O | DIS | Z | HCEC | | | |
| VCC-PH | GPIO | P | | | | | | |
| PL0 | GPIO | I/O | DIS | Z | | S_UART_TX | | S_PL_EINT0 |
| PL1 | GPIO | I/O | DIS | Z | | S_UART_RX | | S_PL_EINT1 |
| PL2 | GPIO | I/O | DIS | Z | | | | S_PL_EINT2 |
| PL3 | GPIO | I/O | DIS | Z | | | | S_PL_EINT3 |
| PL4 | GPIO | I/O | DIS | Z | | | | S_PL_EINT4 |
| PL5 | GPIO | I/O | DIS | Z | | | | S_PL_EINT5 |
| PL6 | GPIO | I/O | DIS | Z | | S_CIR_RX | | S_PL_EINT6 |
| PL7 | GPIO | I/O | DIS | Z | | 1WIRE | | S_PL_EINT7 |
| PL8 | GPIO | I/O | DIS | Z | | S_PS2_SCK1 | | S_PL_EINT8 |
| PL9 | GPIO | I/O | DIS | Z | | S_PS2_SDA1 | | S_PL_EINT9 |
| VCC-PL | GPIO | P | | | | | | |
| PM0 | GPIO | I/O | DIS | Z | | | | S_PM_EINT0 |
| PM1 | GPIO | I/O | DIS | Z | | | | S_PM_EINT1 |
| PM2 | GPIO | I/O | DIS | Z | | | | S_PM_EINT2 |
| PM3 | GPIO | I/O | DIS | Z | | | | S_PM_EINT3 |
| PM4 | GPIO | I/O | DIS | Z | | S_I2S1_LRCKR | | S_PM_EINT4 |
| PM8 | GPIO | I/O | DIS | Z | | S_TWI1_SCK | | S_PM_EINT8 |
| PM9 | GPIO | I/O | DIS | Z | | S_TWI1_SDA | | S_PM_EINT9 |
| PM10 | GPIO | I/O | DIS | Z | S_I2S_MCLK | S_I2S1_MCLK | | |
| PM11 | GPIO | I/O | DIS | Z | S_I2S_BCLK | S_I2S1_BCLK | | |
| PM12 | GPIO | I/O | DIS | Z | S_I2S_LRCK | S_I2S1_LRCK | | |
| PM13 | GPIO | I/O | DIS | Z | S_I2S_DIN | S_I2S1_DIN | | |
| PM14 | GPIO | I/O | DIS | Z | S_I2S_DOUT | S_I2S1_DOUT0 | | |
| PM15 | GPIO | I/O | DIS | Z | | | | S_PM_EINT15 |
| VCC-PM | GPIO | P | | | | | | |
| PN0 | GPIO | I/O | DIS | PULL-UP | S_TWI0_SCK | S_RSB_SCK | | |

| | | | | | | | | | |
|-----|------|-----|-----|---------|------------|-----------|--|--|--|
| PN1 | GPIO | I/O | DIS | PULL-UP | S_TWI0_SDA | S_RSB_SDA | | | |
|-----|------|-----|-----|---------|------------|-----------|--|--|--|

4.3. DETAILED PIN/SIGNAL DESCRIPTION

| Pin/Signal | Description | Type |
|-----------------------|---------------------------------|------|
| DRAM (x=0/1) | | |
| SxDQ[31:0] | DRAM Data Bit [31:0] | I/O |
| SxVREF | DRAM Reference Input | P |
| SxDQS[3:0] | DRAM Data Strobe [3:0] | I/O |
| SxDQSB[3:0] | DRAM Data Strobe Negative [3:0] | I/O |
| SxDQM[3:0] | DRAM DQ Mask[3:0] | O |
| SxCK | DRAM Clock Positive | O |
| SxCKB | DRAM Clock Negative | O |
| SxCKE | DRAM Clock Enable | O |
| SxA[15:0] | DRAM Address[15:0] | O |
| SxBA[2:0] | DRAM Bank Address[2:0] | O |
| SxWE | DRAM Write Enable | O |
| SxCAS | DRAM Column Address Strobe | O |
| SxRAS | DRAM Row Address Strobe | O |
| SxCS | DRAM Chip Select | O |
| SxODT | DRAM ODT Control | O |
| SxZQ | DRAM ZQ Calibration | A |
| SxRST | DRAM Reset | O |
| VDD18-DLL | DLL Power Supply | P |
| VCC-DRAM | DRAM Power Supply | P |
| SYSTEM CONTROL | | |
| NMI | Non-Maskable Interrupt Input | I |
| RESET | Reset Input | I |
| UBOOT | USB Boot Mode Enable | I |
| JTAGSEL[1:0] | JTAG Mode Select | I |
| BOOTSEL[1:0] | Boot Mode Select | I |
| VCC18-EFUSE | eFUSE power supply | P |
| INTERRUPT | | |
| EINT | External Interrupt | I |
| PWM(x=0/1/2/3) | | |
| PWM-P | PWM Output Positive | O |
| PWM-N | PWM Output Negative | O |
| CLOCK | | |
| REXT | External Reference Resistor | A |

| Pin/Signal | Description | Type |
|---------------------|---------------------------------------|------|
| VIO-RTC | Internal LDO Output | P |
| X32KI | Clock Input of 32768Hz Oscillator | A |
| X24MI | Clock Input of 24MHz Crystal | A |
| X24MO | Clock Output of 24MHz Crystal | A |
| VCC18-PLL | PLL Power Supply | P |
| GND-PLL | PLL Ground | G |
| CLK-OUT | Internal Clock Output | O |
| ECLK-IN[1:0] | External Clock Input | I |
| NAND FLASH | | |
| NAND-DQ[7:0] | NAND Flash Data Bit[7:0] | I/O |
| NAND-CE[3:0] | NAND Flash Chip Select[3:0] | O |
| NAND-WE | NAND Flash Write Enable | O |
| NAND-ALE | NAND Flash Address Latch Enable | O |
| NAND-CLE | NAND Flash Command Latch Enable | O |
| NAND-RE | NAND Flash Read Enable | O |
| NAND-RB[1:0] | NAND Flash Ready/Busy Bit | I |
| NAND-DQS | NAND Flash Data Strobe | I/O |
| NAND-RE-B | NAND Flash RE Complementary Signal | O |
| NAND-DQS-B | NAND DQS Complementary Signal | I/O |
| LCD | | |
| LCD-D[23:0] | LCD Data Bit[23:0] | O |
| LCD-CLK | LCD Clock Signal | O |
| LCD-DE | LCD Data Enable | O |
| LCD-HSYNC | LCD Horizontal SYNC | O |
| LCD-VSYNC | LCD Vertical SYNC | O |
| LVDS (x=0/1) | | |
| LVDSx-VP[3:0] | LVDS Data Positive Signal Output[3:0] | A |
| LVDSx-VN[3:0] | LVDS Data Negative Signal Output[3:0] | A |
| LVDSx-VPC | LVDS Clock Positive Output | A |
| LVDSx-VNC | LVDS Clock Negative Output | A |
| MIPI | | |
| MDSI-DN[3:0] | DSI Data Negative | A |
| DSI-DP[3:0] | DSI Data Positive | A |
| DSI-CKN | DSI Clock Negative | A |
| DSI-CKP | DSI Clock Positive | A |
| VCC18-MDSI | DSI Power Supply | P |
| GND-MDSI | MIPI DSI Ground | G |
| MCSI-DN[3:0] | CSI Data Negative | A |
| MCSI-DP[3:0] | CSI Data Positive | A |
| MCSI-CKN | CSI Clock Negative | A |
| MCSI-CKP | CSI Clock Positive | A |
| VCC18-MCSI | MIPI CSI Power Supply | P |
| GND-MCSI | MIPI CSI Ground | G |
| eDP | | |
| EDPTXP[3:0] | eDP Data Transmit Positive [3:0] | A |
| EDPTXN[3:0] | eDP Data Transmit Negative [3:0] | A |
| EDPAUXP | eDP Auxiliary Positive | A |
| EDPAUXN | eDP Auxiliary Negative | A |
| EDPHPD | eDP Hot Plug Detection | A |
| VCC18-EDP | eDP Power Supply | P |
| GND-EDP | eDP Ground | G |
| HDMI | | |
| HTXP[2:0] | TMDS Data Positive | A |
| HTXN[2:0] | TMDS Data Negative | A |
| HTXCP | TMDS Clock Positive | A |
| HTXCN | TMDS Clock Negative | A |

| Pin/Signal | Description | Type |
|-------------------------|-------------------------------------|------|
| HHPD | HDMI Hot Plug Detection Signal | A |
| HSCL | HDMI DDC Clock | IO |
| HSDA | HDMI DDC Data | IO |
| HCEC | HDMI CEC | IO |
| VCC18-HDMI | HDMI Power Supply | P |
| VDD09-HDMI | HDMI Power Supply | p |
| GND-HDMI | HDMI Ground | G |
| CSI | | |
| CSI-D[11:0] | CSIO Data Bit[11:0] | I |
| CSI-PCLK | CSI Pixel Clock | I |
| CSI-MCLK | CSI Master Clock | O |
| CSI-SCK | CSI Command Serial Clock Signal | O |
| CSI-SDA | CSI Command Serial Data Signal | IO |
| CSI-HSYNC | CSI Horizontal SYNC | I |
| CSI-VSYNC | CSI Vertical SYNC | I |
| TRANSPORT STREAM | | |
| TS-D[7:0] | Transport Stream Data[7:0] | I |
| TS-CLK | Transport Stream Clock | I |
| TS-ERR | Transport Stream Error Indicate | I |
| TS-SYNC | Transport Stream Sync | I |
| TS-DVLD | Transport Stream Valid Signal | I |
| USB | | |
| USB0-DM | USB DM Signal | A |
| USB0-DP | USB DP Signal | A |
| USB0-ID | USB ID Signal | A |
| USB0-SSTXN | USB Super Speed Transmit Negative | A |
| USB0-SSTXP | USB Super Speed Transmit Positive | A |
| USB0-SSRXN | USB Super Speed Receive Negative | A |
| USB0-SSRXP | USB Super Speed Receive Positive | A |
| VCC33-USB0 | USB Power Supply | P |
| VDD09-USB0 | USB Power Supply | P |
| GND-USB0 | USB Ground | G |
| USB0-VBUS | USB Power Detect Input | A |
| USB1-DM | USB DM Signal | A |
| USB1-DP | USB DP Signal | A |
| USB2-DM | USB DM Signal | A |
| USB2-DP | USB DP Signal | A |
| VCC33-USBH | USB Power Supply | P |
| VDD09-USBH | USB Power Supply | P |
| HSIC | | |
| VCC12-HSIC | HSIC Power Supply | P |
| HSIC-STRB | USB HSIC Signal | A |
| HSIC-DATA | USB HSIC Data Signal | A |
| ADC | | |
| GPADC[1:0] | GPADC Input | A |
| KEYADC[1:0] | Key ADC Input | A |
| VCC18-ADC | ADC Power Supply | P |
| GND-ADC | ADC Ground | G |
| I2S (x=0/1) | | |
| S-I2Sx-LRCK | I2S Left/Right Channel Select Clock | I/O |
| S-I2Sx-MCLK | I2S Master Clock | O |
| S-I2Sx-BCLK | I2S Bit Clock | I/O |
| S-I2Sx-LRCKR | S-I2S-LRCK only for S-I2S-DIN | I/O |
| S-I2Sx-DIN | I2S Data Input | I |
| S-I2Sx-DOUT | I2S Data Output | O |
| SPI | | |

| Pin/Signal | Description | Type |
|--------------------------------------|---|------|
| SPI-CS | SPI Chip Select Signal | I/O |
| SPI-CLK | SPI Clock Signal | I/O |
| SPI-MOSI | SPI Master Data Out, Slave Data In | I/O |
| SPI-MISO | SPI Master Data In, Slave Data Out | I/O |
| UART (x=0/1/2/3/4/5) | | |
| UARTx-TX | UART Data Transmit | O |
| UARTx-RX | UART Data Receive | I |
| UARTx-RTS | UART Data Request to Send | O |
| UARTx-CTS | UART Data Clear to Send | I |
| UART1-DTR | UART Data Terminal Ready | O |
| UART1-DSR | UART Data Set Ready | I |
| UART1-DCD | UART Data Carrier Detect | I |
| UART1-RING | UART RING Indicator | I |
| 1 WIRE | | |
| 1 WIRE | One Wire Signal | I/O |
| IR | | |
| S-CIR-RX | CIR Signal Receive | I |
| PS2 | | |
| S-PS2-SCLK | PS2 Clock Signal | I/O |
| S-PS2-SDA | PS2 Data Signal | I/O |
| TWI (x=0/1/2/3/4)(Open-Drain) | | |
| TWix-SCK | TWI Clock Signal | I/O |
| TWix-SDA | TWI Data Signal | I/O |
| SD/MMC (x=0/1/2) | | |
| SDCx-D[3:0] | SD/MMC/SDIO Data Bit | I/O |
| SDCx-CLK | SD/MMC/SDIO Clock | O |
| SDCx-CMD | SD/MMC/SDIO Command Signal | I/O |
| ETHERNET MAC | | |
| RGMII-RXD[3:0] | MII Receive Data Nibble Data Bit [3:0] | I |
| RGMII-RXCK | MII Receive Clock | I |
| RGMII-RXCTL/MII-RXDV | MII Receive Control / EMAC Receive Data Valid | I |
| MII-RXERR | MII Receive Error | I |
| RGMII-TXD[3:0] | MII Transmit Data Nibble Data Bit [3:0] | O |
| MII-CRS | MII Carrier Sense | I |
| RGMII-TXCK/MII-TXCK | MII Transmit Clock | O |
| RGMII-TXCTL/MII-TXEN | MII Transmit Control / MII Transmit Enable | O |
| MII-TXERR | MII Transmit Error | O |
| RGMII-CLKIN/MII-COL | MII Clock Input / EMAC Collision Detect | I |
| EMDC | MII Management Data Clock | O |
| EMDIO | MII Management Data Input/Output | I/O |
| RSB | | |
| S-RSB-SCK | RSB Clock | O |
| S-RSB-SDA | RSB Data | I/O |
| POWER | | |
| VDD18 | Power | P |
| VDD-CPUS | Power Supply for CPUS | P |
| VDD-CPUB | Power Supply for Cluster B | P |
| VDD-CPUA | Power Supply for Cluster A | P |
| VDD-GPU | Power Supply for GPU | P |
| VDD-SYS | Power Supply for System | P |
| VDD-VPU | Power Supply for VPU | P |
| GND-IO | IO Ground | G |
| GND | Ground | G |

5

ELECTRICAL CHARACTERISTICS

5.1. ABSOLUTE MAXIMUM RATINGS

Functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

| SYMBOL | PARAMETER | MIN | MAX | UNIT | |
|-------------|-------------------------------------|---------------------------|------|------|-----------|
| T_g | Storage Temperature | -65 | 150 | °C | |
| $I_{I/O}$ | In/Out current for input and output | - | - | mA | |
| V_{ESD} | ESD stress voltage | HBM(human body model) | - | - | V_{ESD} |
| | | CDM(charged device model) | NA | NA | |
| T_j | Junction Temperature | - | 125 | °C | |
| VCC-DRAM | Power Supply for DRAM | -0.3 | 1.65 | V | |
| VDD18-DLL | Power Supply for DLL | -0.3 | 1.98 | V | |
| VCC-PA | Power Supply for GPIO Port A | -0.3 | 3.6 | V | |
| VCC-PB | Power Supply for GPIO Port B | -0.3 | 3.6 | V | |
| VCC-PC | Power Supply for GPIO Port C | -0.3 | 3.6 | V | |
| VCC-PD | Power Supply for GPIO Port D | -0.3 | 3.6 | V | |
| VCC-PE | Power Supply for GPIO Port E | -0.3 | 3.6 | V | |
| VCC-PF | Power Supply for GPIO Port F | -0.3 | 3.6 | V | |
| VCC-PG | Power Supply for GPIO Port G | -0.3 | 3.6 | V | |
| VCC-PH | Power Supply for GPIO Port H | -0.3 | 3.6 | V | |
| VCC-PL | Power Supply for GPIO Port L | -0.3 | 3.6 | V | |
| VCC-PM | Power Supply for GPIO Port M | -0.3 | 3.6 | V | |
| VCC18-EFUSE | Power Supply for EFUSE | -0.3 | 1.98 | V | |
| VCC33-USB0 | Power Supply for USB | -0.3 | 3.6 | V | |
| VDD09-USB0 | Power Supply for USB | -0.3 | 1.1 | V | |
| VCC33-USBH | Power Supply for USB | -0.3 | 3.6 | V | |
| VDD09-USBH | Power Supply for USB | -0.3 | 1.1 | V | |
| VCC12-HSIC | Power Supply for HSIC | -0.3 | 1.32 | V | |
| VCC18-ADC | Power Supply for ADC | -0.3 | 1.98 | V | |
| VCC18-HDMI | Power Supply for HDMI | -0.3 | 1.98 | V | |
| VDD09-HDMI | Power Supply for HDMI | -0.3 | 1.1 | V | |
| VCC18-EDP | Power Supply for EDP | -0.3 | 1.98 | V | |
| VCC18-MDSI | Power Supply for MDSI | -0.3 | 1.98 | V | |

| SYMBOL | PARAMETER | MIN | MAX | UNIT |
|------------|-------------------------|------|------|------|
| VCC18-MCSI | Power Supply for MCSI | -0.3 | 1.98 | V |
| VCC18-LVDS | Power Supply for LVDS | -0.3 | 1.98 | V |
| VCC18-PLL | Power Supply for PLL | -0.3 | 1.98 | V |
| VDD18 | Power Supply | -0.3 | 1.98 | V |
| VDD-CPUS | Power Supply for CPUS | -0.3 | 1.1 | V |
| VDD-CPUB | Power Supply for CPUB | -0.3 | 1.1 | V |
| VDD-CPUA | Power Supply for CPUTA | -0.3 | 1.1 | V |
| VDD-GPU | Power Supply for GPU | -0.3 | 1.1 | V |
| VDD-SYS | Power Supply for System | -0.3 | 1.1 | V |
| VDD-VPU | Power Supply for VPU | -0.3 | 1.1 | V |

5.2. RECOMMENDED OPERATING CONDITIONS

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNIT |
|----------------|---|------|-----|------|------|
| T _a | Ambient Operating Temperature[Commercial] | -20 | - | 70 | °C |
| GND | Ground | 0 | 0 | 0 | V |
| VCC-DRAM | Power Supply for DRAM | 1.2 | NA | 1.65 | V |
| VDD18-DLL | Power Supply for DLL | 1.62 | 1.8 | 1.98 | V |
| VCC-PA | Power Supply for Port A | 1.8 | NA | 3.6 | V |
| VCC-PB | Power Supply for Port B | 1.8 | NA | 3.6 | V |
| VCC-PC | Power Supply for Port C | 1.8 | NA | 3.6 | V |
| VCC-PD | Power Supply for Port D | 1.8 | NA | 3.6 | V |
| VCC-PE | Power Supply for Port E | 1.8 | NA | 3.6 | V |
| VCC-PF | Power Supply for Port F | 1.8 | NA | 3.6 | V |
| VCC-PG | Power Supply for Port G | 1.8 | NA | 3.6 | V |
| VCC-PH | Power Supply for Port H | 1.8 | NA | 3.6 | V |
| VCC-PL | Power Supply for Port L | 1.8 | NA | 3.6 | V |
| VCC-PM | Power Supply for Port M | 1.8 | NA | 3.6 | V |
| VCC18-EFUSE | Power Supply for EFUSE | 1.62 | 1.8 | 1.98 | V |
| VCC33-USB0 | Power Supply for USB | 3.0 | - | 3.6 | V |
| VDD09-USB0 | Power Supply for USB | 0.8 | 0.9 | 1.1 | V |
| VCC33-USBH | Power Supply for USB | 3.0 | - | 3.6 | V |
| VDD09-USBH | Power Supply for USB | 0.8 | 0.9 | 1.1 | V |
| VCC12-HSIC | Power Supply for HSIC | 1.08 | 1.2 | 1.32 | V |
| VCC18-ADC | Power Supply for ADC | 1.62 | 1.8 | 1.98 | V |
| VCC18-HDMI | Power Supply for HDMI | 1.62 | 1.8 | 1.98 | V |
| VDD09-HDMI | Power Supply for HDMI | 0.8 | 0.9 | 1.1 | V |
| VCC18-EDP | Power Supply for eDP | 1.62 | 1.8 | 1.98 | V |

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNIT |
|------------|----------------------------|------|-----|------|------|
| VCC18-MDSI | Power Supply for MDSI | 1.62 | 1.8 | 1.98 | V |
| VCC18-MCSI | Power Supply for MCSI | 1.62 | 1.8 | 1.98 | V |
| VCC18-LVDS | Power Supply for LVDS | 1.62 | 1.8 | 1.98 | V |
| VCC18-PLL | Power Supply for PLL | 1.62 | 1.8 | 1.98 | V |
| VDD18 | Power Supply | 1.62 | 1.8 | 1.98 | V |
| VDD-CPUS | Power Supply for CPUS | 0.8 | 0.9 | 1.1 | V |
| VDD-CPUB | Power Supply for Cluster B | 0.8 | 0.9 | 1.1 | V |
| VDD-CPUA | Power Supply for Cluster A | 0.8 | 0.9 | 1.1 | V |
| VDD-GPU | Power Supply for GPU | 0.8 | 0.9 | 1.1 | V |
| VDD-SYS | Power Supply for System | 0.8 | 0.9 | 1.1 | V |
| VDD-VPU | Power Supply for VPU | 0.8 | 0.9 | 1.1 | V |

5.3. DC ELECTRICAL CHARACTERISTICS

| SYMBOL | PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------|----------------------------------|---------------------------|------|-----|------|------|
| V _{IH} | High-Level Input Voltage | VCC-IO ¹ =3.0V | 2.4 | - | 3.6 | V |
| | | VCC-IO = 1.8V | 1.1 | - | 1.98 | V |
| V _{IL} | Low-Level Input Voltage | VCC-IO=3.0V | -0.3 | - | 0.7 | V |
| | | VCC-IO = 1.8V | -0.3 | - | 0.7 | V |
| V _{HYS} | Hysteresis Voltage | - | - | - | mV | |
| I _{IH} | High-Level Input Current | VCC-IO=3.0V, VI=3.0V | TBD | TBD | TBD | uA |
| | | VCC-IO = 1.8V | TBD | TBD | TBD | uA |
| I _{IL} | Low-Level Input Current | VCC-IO=3.0V, VI=0V | TBD | TBD | TBD | uA |
| | | VCC-IO = 1.8V | TBD | TBD | TBD | uA |
| V _{OH} | High-Level Output Voltage | VCC-IO=3.0V | 2.7 | - | NA | V |
| | | VCC-IO = 1.8V | 1.5 | - | NA | V |
| V _{OL} | Low-Level Output Voltage | VCC-IO=3.0V | NA | - | 0.4 | V |
| | | VCC-IO = 1.8V | NA | - | 0.4 | V |
| I _{oz} | Tri-State Output Leakage Current | VCC-IO=3.0V | TBD | TBD | TBD | uA |
| | | VCC-IO = 1.8V | TBD | TBD | TBD | uA |
| C _{IN} | Input Capacitance | - | NA | NA | 5 | pF |
| C _{OUT} | Output Capacitance | - | NA | NA | 5 | pF |

Notes: VCC-IO here refers to the power supply for all GPIOs, including VCC-PA, VCC-PB, VCC-PC, VCC-PD, VCC-PE, VCC-PF, VCC-PG, VCC-PH, VCC-PL, VCC-PM.

5.4. OSCILLATOR ELECTRICAL CHARACTERISTICS

The A80 contains a 24MHz oscillator and a 32K clock input.

5.4.1. 24MHz OSCILLATOR CHARACTERISTICS

The 24MHz crystal is connected between the X24MI and X24MO.

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNIT |
|-------------------|---------------------------------------|-------------|-----|-----|------|
| 1/(tCPMAIN) | Crystal Oscillator Frequency Range | - | 24 | - | MHz |
| t _{ST} | Startup Time | - | - | - | ms |
| | Frequency Tolerance at 25°C | -50 | - | 50 | ppm |
| | Oscillation Mode | Fundamental | | | - |
| | Maximum Change Over Temperature Range | -50 | - | 50 | ppm |
| PON | Drive Level | - | - | 50 | uW |
| CL | Equivalent Load Capacitance | - | - | - | pF |
| CL1,CL2 | Internal Load Capacitance(CL1=CL2) | - | - | - | pF |
| RS | Series Resistance(ESR) | - | - | - | Ω |
| | Duty Cycle | 30 | 50 | 70 | % |
| CM | Motional Capacitance | - | - | - | pF |
| C _{SHUT} | Shunt Capacitance | - | - | - | pF |
| R _{BIAS} | Internal Bias Resistor | - | - | - | MΩ |

5.4.2. 32KHZ CLOCK CHARACTERISTICS

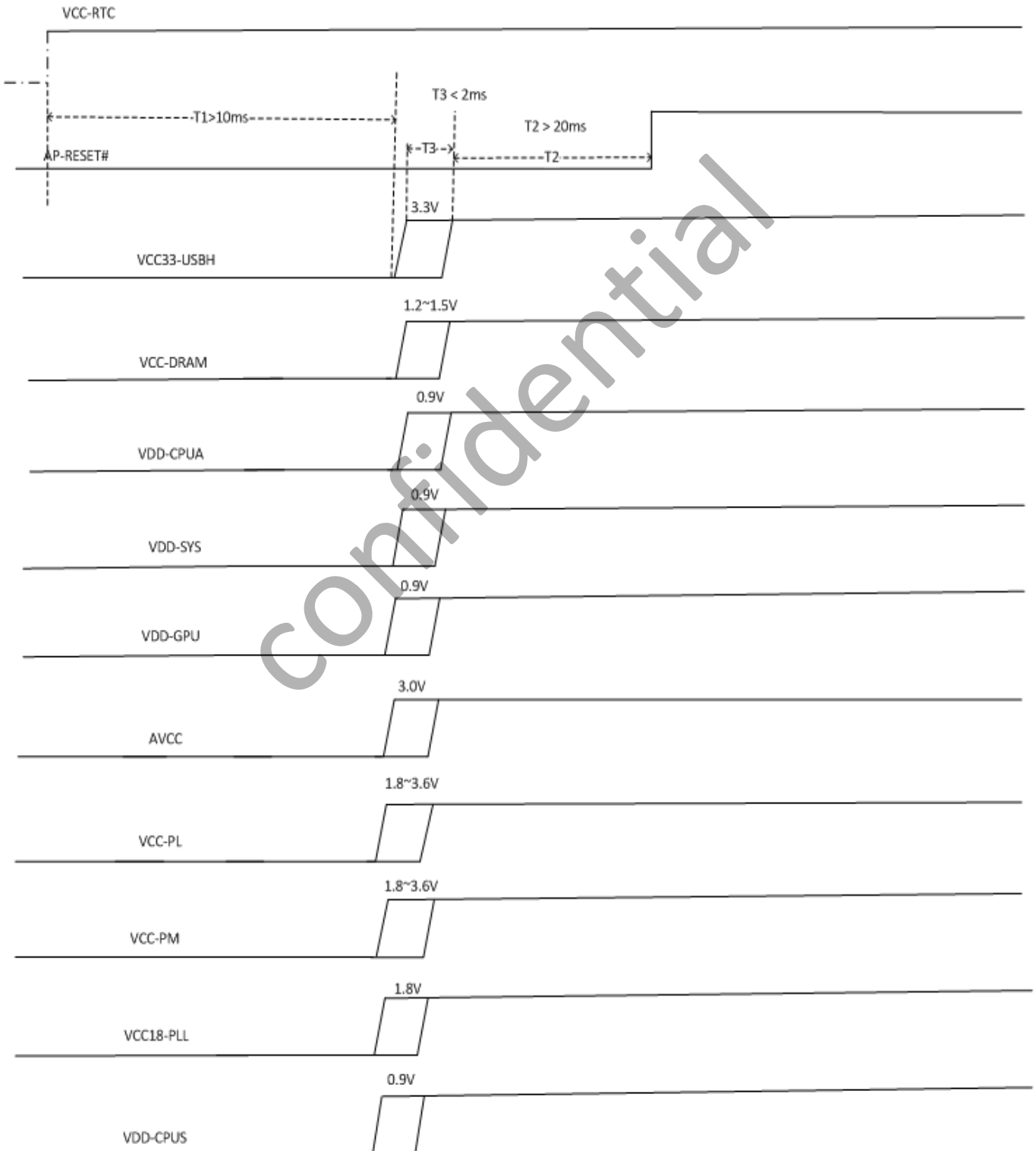
The 32KHz clock is connected to X32KI (input).

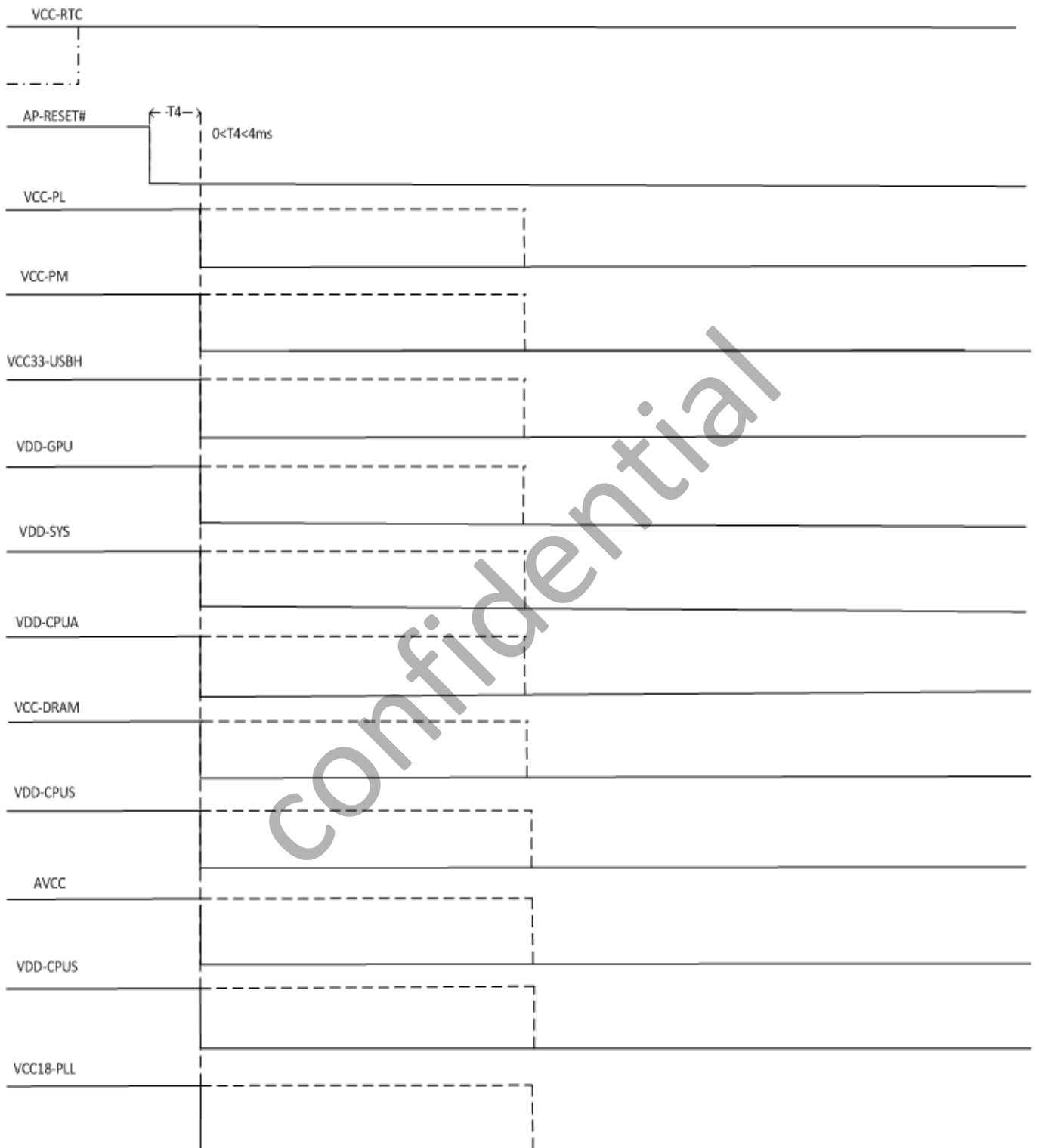
| SYMBOL | PARAMETER | MIN | TYP | MAX | UNIT |
|-----------------|--------------------------|-----|-----|-----|------|
| V _{IH} | High-Level Voltage Input | 1.2 | - | 1.8 | V |
| V _{IL} | Low-Level Voltage Input | 0 | - | 0.4 | V |
| | Frequency Range | 20 | 32 | 50 | kHz |
| | Duty Cycle | 30 | 50 | 70 | % |

5.5. POWER UP/DOWN SEQUENCE

The external voltage regulator and other power-on devices must provide the processor with a specific sequence of power and resets to ensure proper operations.

Power On Timing



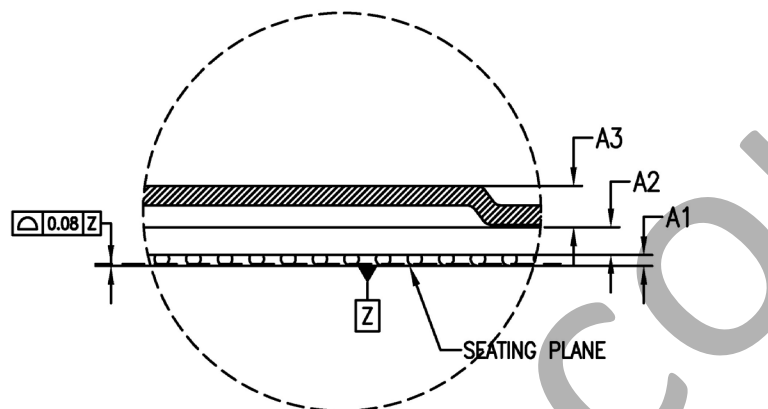
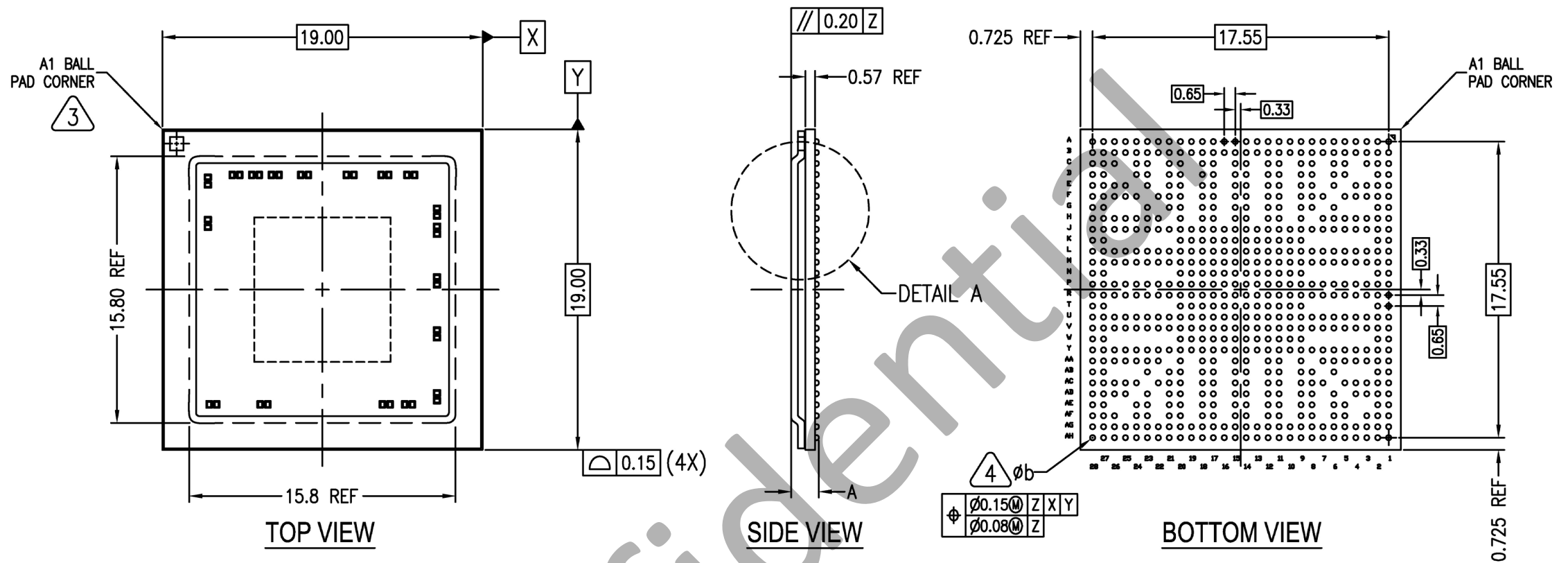
Power Down Timing


6 PIN ASSIGNMENT

6.1. PIN MAP

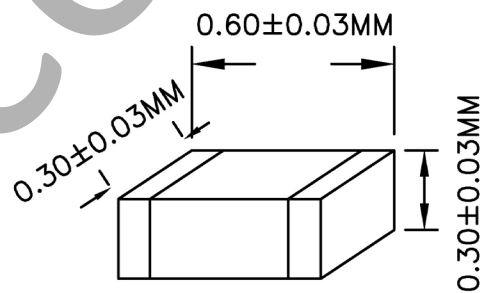
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | |
|----|---------|---------|--------|--------|----------|----------|-----------|-----------|-----------|----------|----------|----------|----------|------------|------------|----------|----------|-----------|----------|----------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|----|
| A | GND | S0DQ30 | S0DQ31 | PG1 | PG5 | PG9 | PG11 | PC8 | PC9 | PC11 | PC17 | PD3 | PD5 | PD9 | PD15 | PD17 | PD19 | EDPD1P | EDPD2P | EDPAUXP | UBOOT | X24MI | PN1 | X32KI | PM1 | PM3 | PM10 | GND | A | |
| B | S0DQ28 | S0DQ29 | S0ZQ | PG0 | PG4 | PG8 | PG10 | PG15 | PC6 | PC10 | PC16 | PD2 | PD4 | PD8 | PD14 | PD16 | PD18 | EDPD1N | EDPD2N | EDPAUXN | KeyADC1 | X24MO | PN0 | PM0 | PM2 | PM8 | PM9 | PM11 | B | |
| C | S0DQ53B | S0DQ53 | GND | | PG3 | GND | | GND | PC5 | | GND | GND | | GND | VCC18-LVDS | | PD20 | EDPD0N | | GND | GND-ADC | | GND-PLL | NMI | | RESET | PM12 | PM13 | C | |
| D | S0DQ26 | S0DQ27 | | | PG7 | PG2 | | PG14 | PC4 | | PC15 | PD0 | | | PD7 | PD12 | | PD21 | EDPD0P | | EDPD3P | VCC18-ADC | | VCC18-PLL | VCC-PM | | | PM14 | PM15 | D |
| E | S0DQ24 | S0DQ25 | GND | S0BA0 | | PG6 | | PG13 | PC3 | | PC14 | PD1 | | PD6 | PD13 | | GND-EDP | VCC18-EDP | | EDPD3N | KeyADC0 | | PL3 | | PM4 | PL2 | PL1 | PL0 | E | |
| F | S0DQ15 | S0DQM3 | S0A6 | S0A9 | VCC-DRAM | | VCC-PG | VCC-PG | VCC-PC | | VCC-PC | VCC-PD | | | VCC-PD | VCC-PD | | PD22 | PD25 | | EDPHPD | REXT | PL8 | | VCC-PL | PL4 | PL5 | PL6 | PL7 | F |
| G | S0DQ13 | S0DQ14 | | | | GND | | PG12 | PC2 | | PC7 | PC13 | | PC19 | PD10 | | | PD23 | PD26 | | GPADC0 | VIO-RTC | | PL9 | | | | HTX2N | HTX2P | G |
| H | S0DQ51 | S0DQ12 | GND | S0BA2 | S0WE | VCC-DRAM | S0RAS | | PC1 | | PC0 | PC12 | | PC18 | PD11 | | PD24 | PD27 | | GPADC1 | | | JTAGSEL1 | JTAGSEL0 | GND-HDMI | MDSI-CKP | MDSI-CKN | HTX1N | HTX1P | H |
| J | S0DQ11 | S0DQ51B | S0A5 | S0A13 | VCC-DRAM | S0ODT1 | S0ODT | GND | GND | GND | GND | GND | GND | VDDFB-CPUB | GND | VDD-SYS | VDD-SYS | VDD-SYS | GND | | VCC18-EFUSE | MDSI-DM3 | MDSI-DP3 | VCC18-MDSI | VCC18-HDMI | MDSI-DM1 | MDSI-DP1 | HTX0N | HTX0P | J |
| K | S0DQ10 | S0DQ9 | | | | | | GND | GND | VDD-CPUB | VDD-CPUB | VDD-CPUB | | GND | VDD-CPUB | GND | VDD-SYS | GND | VDD-CPUS | VDD-CPUS | | | | | | | | HTXCN | HTXCP | K |
| L | S0DQM1 | S0DQ8 | GND | S0A7 | S0A8 | VCC-DRAM | S0CAS | S0RST | GND | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | GND | VDD-SYS | VDD-SYS | GND | VDD-CPUS | MDSI-DP2 | MDSI-DM2 | GND-MDSI | VDD09-HDMI | HHPD | GND | NC | NC | L | |
| M | S0CK1 | S0CK1B | S0VREF | S0A4 | VCC-DRAM | S0CS1 | S0CS | GND | GND | VDD-CPUB | GND | GND | VDD-CPUB | VDD-CPUB | VDD-CPUB | GND | VDD-SYS | VDD-SYS | GND | VDD18 | MDSI-DM0 | MDSI-DP0 | NC | VDD09-USB0 | NC | VCC33-USB0 | NC | NC | M | |
| N | S0CK | S0CKB | | | | | | GND | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | GND | VDD-SYS | VDD-SYS | GND | VDD18 | | | | | | | | USB0-SSRXN | USB0-SSRXP | N |
| P | S0DQ6 | S0DQ7 | GND | S0A15 | S0A3 | VCC-DRAM | S0A14 | S0A12 | GND | GND | VDD-CPUB | VDD-CPUB | VDD-CPUB | VDD-CPUB | GND | GND | GND | GND | GND | VDD18 | USB0-VBUS | USB0-ID | VDD09-USBH | USB2-DM | USB2-DP | GND-USB0 | USB0-SSTXN | USB0-SSTXP | P | |
| R | S0DQ4 | S0DQ5 | S0A0 | S0A10 | VCC-DRAM | S0A1 | S0A11 | GND | GND | GND | GND | GND | GND | GND | GND | GND | VDD-CPUA | VDD-CPUA | GND | GND | GND | PE13 | PE9 | VDD09-USBH | USB1-DP | USB1-DM | VCC33-USBH | USB0-DM | USB0-DP | R |
| T | S0DQS0B | S0DQ50 | | | | | | VDDFB-GPU | GND | VDD-GPU | VDD-GPU | VDD-GPU | VDD-GPU | VDD-GPU | GND | VDD-CPUA | VDD-CPUA | VDD-CPUA | VDD-CPUA | | VDDFB-CPUA | | | | | | | HSIC-STRB | HSIC-DATA | T |
| U | S0DQ2 | S0DQ3 | GND | S0CKE | S0CKE1 | VCC-DRAM | S0A2 | S0BA1 | GND | GND | VDD-GPU | VDD-GPU | GND | VDD-GPU | GND | VDD-CPUA | VDD-CPUA | VDD-CPUA | VDD-CPUA | GND | PE16 | VCC12-HSIC | VCC18-MCSI | MCSI-DP3 | MCSI-DM3 | GND-MCSI | MCSI-DP2 | MCSI-DM2 | U | |
| V | S0DQ0 | S0DQ1 | S1ZQ | S1ODT1 | VCC-DRAM | S1ODT | S1RAS | GND | GND | GND | VDD-GPU | VDD-GPU | VDD-GPU | VDD-GPU | GND | GND | GND | GND | GND | GND | PE17 | PE12 | PE8 | PE7 | PE4 | PE2 | MCSI-CKP | MCSI-CKN | V | |
| W | S0DQ23 | S0DQM0 | | | | | | GND | GND | GND | GND | GND | GND | GND | GND | VDD-VPU | VDD-VPU | VDD-VPU | VDD-VPU | VDD-VPU | | | | | | | | MCSI-DP1 | MCSI-DM1 | W |
| Y | S0DQ21 | S0DQ22 | GND | S1CAS | S1WE | VCC-DRAM | GND | VDD18-DLL | VDD18-DLL | GND | GND | GND | GND | GND | GND | GND | GND | GND | GND | GND | PF3 | PE15 | PE10 | VCC-PE | PE5 | PE3 | MCSI-DP0 | MCSI-DM0 | Y | |
| AA | S0DQS2 | S0DQ20 | S1BA0 | S1BA2 | VCC-DRAM | S1A13 | GND | | VDD18-DLL | | GND | S1A14 | | GND | S1RST | | GND | PB16 | | PF2 | | PE14 | PE11 | VCC-PE | PE6 | GND | PE0 | PE1 | AA | |
| AB | S0DQ19 | S0DQS2B | | | VCC-DRAM | | VDD18-DLL | GND | | S1A11 | S1DQ16 | | S1BA1 | GND | | S1DQM2 | PB15 | | PF1 | PF0 | | PA5 | | | | | | PH1 | PH0 | AB |
| AC | S0DQ17 | S0DQ18 | GND | S1A9 | S1A8 | VCC-DRAM | S1A4 | VCC-DRAM | | S1A12 | VCC-DRAM | | S1A15 | VCC-DRAM | | S1DQ19 | VCC-PB | | PA17 | PA8 | VCC-PA | | | GND | PH5 | PH4 | PH3 | PH2 | AC | |
| AD | S0DQM2 | S0DQ16 | S1VREF | S1A7 | | S1CKE | VCC-DRAM | S1A2 | | VCC-DRAM | S1DQ18 | | VCC-DRAM | S1DQ17 | | VCC-DRAM | PB5 | | VCC-PA | PA9 | | | PA4 | | VCC-PH | PH9 | PH8 | PH6 | AD | |
| AE | S1DQ30 | S1DQ31 | | | S1A6 | S1CKE1 | | S1CS1 | S1A3 | | S1A0 | S1DQ20 | | S1A10 | S1DQ52 | | S1DQ21 | VCC-PF | | PA13 | PA10 | | PA0 | VCC-PH | | | PH11 | PH10 | AE | |
| AF | S1DQ28 | S1DQ29 | GND | | S1A5 | GND | | S1CS | GND | | S1A1 | GND | | S1DQ23 | S1DQS2B | | S1DQ22 | GND | | PA14 | GND | | PA1 | PH21 | | GND | PH13 | PH12 | AF | |
| AG | S1DQ53 | S1DQS3B | S1DQ26 | S1DQ24 | S1DQ14 | S1DQ13 | S1DQS1 | S1DQ11 | S1DQ9 | S1DQM1 | S1CK1B | S1CKB | S1DQ5 | S1DQ7 | S1DQS0B | S1DQ0 | S1DQ1 | PB6 | PF4 | PA15 | PA11 | PA6 | PA2 | BOOTSEL0 | PH19 | PH17 | PH15 | PH14 | AG | |
| AH | GND | S1DQ27 | S1DQ25 | S1DQM3 | S1DQ15 | S1DQ12 | S1DQS1B | S1DQ10 | S1DQ8 | S1CK1 | S1CK | S1DQ6 | S1DQ4 | S1DQ50 | S1DQ3 | S1DQ2 | S1DQM0 | PB14 | PF5 | PA16 | PA12 | PA7 | PA3 | BOOTSEL1 | PH20 | PH18 | PH16 | GND | AH | |

6.2. PACKAGE DIMENSION



| DIMENSION | MINIMUM | NOMINAL | MAXIMUM |
|-----------|---------|---------|---------|
| A | 1.44 | 1.54 | 1.65 |
| A1 | 0.18 | 0.22 | 0.26 |
| A2 | 0.53 | 0.57 | 0.61 |
| A3 | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |

NUMBER OF BALLS 636



(Capacitor0201)

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Allwinner Technology Co., Ltd.

4th Floor, B6 Building, NO.1 Software Park Road,

Zhuhai, Guangdong Province, China

Contact Us:

service@allwinnertech.com

www.allwinnertech.com