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What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Active
Core Processor	ARM® Cortex®-M0+
Core Size	32-Bit Single-Core
Speed	48MHz
Connectivity	I ² C, SPI, UART/USART
Peripherals	Brown-out Detect/Reset, POR, WDT
Number of I/O	38
Program Memory Size	64KB (64K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	8K x 8
Voltage - Supply (Vcc/Vdd)	1.62V ~ 3.6V
Data Converters	A/D 14x12b; D/A 1x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	48-TQFP
Supplier Device Package	48-TQFP (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/atsamd20g16a-ant

- Up to five 16-bit Timer/Counters (TC), configurable as either:
 - One 16-bit TC with two compare/capture channels
 - One 8-bit TC with two compare/capture channels
 - One 32-bit TC with two compare/capture channels, by using two TCs
- 32-bit Real Time Counter (RTC) with clock/calendar function
- Watchdog Timer (WDT)
- CRC-32 generator
- Up to six Serial Communication Interfaces (SERCOM), each configurable to operate as either:
 - USART with full-duplex and single-wire half-duplex configuration
 - Inter-Integrated Circuit (I²C) up to 400kHz
 - Serial Peripheral Interface (SPI)
- One 12-bit, 350ksps Analog-to-Digital Converter (ADC) with up to 20 channels
 - Differential and single-ended input
 - 1/2x to 16x programmable gain stage
 - Automatic offset and gain error compensation
 - Oversampling and decimation in hardware to support 13-, 14-, 15- or 16-bit resolution
- 10-bit, 350ksps Digital-to-Analog Converter (DAC)
- Two Analog Comparators (AC) with window compare function
- Peripheral Touch Controller (PTC)
 - 256-Channel capacitive touch and proximity sensing
- I/O
 - Up to 52 programmable I/O pins
- Packages
 - 64-pin TQFP, QFN
 - 64-ball UFBGA
 - 48-pin TQFP, QFN
 - 45-ball WLCSP
 - 32-pin TQFP, QFN
- Operating Voltage
 - 1.62V – 3.63V
- Power Consumption
 - Down to 70µA/MHz in active mode
 - Down to 8µA running the Peripheral Touch Controller

1. Description

The Atmel® | SMART™ SAM D20 is a series of low-power microcontrollers using the 32-bit ARM® Cortex®-M0+ processor, and ranging from 32- to 64-pins with up to 256KB Flash and 32KB of SRAM. The SAM D20 devices operate at a maximum frequency of 48MHz and reach 2.46 CoreMark/MHz. They are designed for simple and intuitive migration with identical peripheral modules, hex compatible code, identical linear address map and pin compatible migration paths between all devices in the product series. All devices include intelligent and flexible peripherals, Atmel Event System for inter-peripheral signaling, and support for capacitive touch button, slider and wheel user interfaces.

The SAM D20 devices provide the following features: In-system programmable Flash, eight-channel Event System, programmable interrupt controller, up to 52 programmable I/O pins, 32-bit real-time clock and calendar, up to eight 16-bit Timer/Counters (TC) . The timer/counters can be configured to perform frequency and waveform generation, accurate program execution timing or input capture with time and frequency measurement of digital signals. The TCs can operate in 8- or 16-bit mode, selected TCs can be cascaded to form a 32-bit TC. The series provide up to six Serial Communication Modules (SERCOM) that each can be configured to act as an USART, UART, SPI, I²C up to 400kHz, up to twenty-channel 350ksps 12-bit ADC with programmable gain and optional oversampling and decimation supporting up to 16-bit resolution, one 10-bit 350ksps DAC, two analog comparators with window mode, Peripheral Touch Controller supporting up to 256 buttons, sliders, wheels and proximity sensing; programmable Watchdog Timer, brown-out detector and power-on reset and two-pin Serial Wire Debug (SWD) program and debug interface.

All devices have accurate and low-power external and internal oscillators. All oscillators can be used as a source for the system clock. Different clock domains can be independently configured to run at different frequencies, enabling power saving by running each peripheral at its optimal clock frequency, and thus maintaining a high CPU frequency while reducing power consumption.

The SAM D20 devices have two software-selectable sleep modes, idle and standby. In idle mode the CPU is stopped while all other functions can be kept running. In standby all clocks and functions are stopped except those selected to continue running. The device supports SleepWalking. This feature allows the peripheral to wake up from sleep based on predefined conditions, and thus allows the CPU to wake up only when needed, e.g. when a threshold is crossed or a result is ready. The Event System supports synchronous and asynchronous events, allowing peripherals to receive, react to and send events even in standby mode.

The Flash program memory can be reprogrammed in-system through the SWD interface. The same interface can be used for non-intrusive on-chip debug of application code. A boot loader running in the device can use any communication interface to download and upgrade the application program in the Flash memory.

The SAM D20 devices are supported with a full suite of program and system development tools, including C compilers, macro assemblers, program debugger/simulators, programmers and evaluation kits.

2. Configuration Summary

	SAM D20J	SAM D20G	SAM D20E
Pins	64	48	32
General Purpose I/O-pins (GPIOs)	52	38	26
Flash	256/128/64/32KB	256/128/64/32KB	256/128/64/32KB
SRAM	32/16/8/4/2KB	32/16/8/4/2KB	32/16/8/4/2KB
Timer Counter (TC) instances	8	6	6
Waveform output channels per TC instance	2	2	2
Serial Communication Interface (SERCOM) instances	6	6	4
Analog-to-Digital Converter (ADC) channels	20	14	10
Analog Comparators (AC)	2	2	2
Digital-to-Analog Converter (DAC) channels	1	1	1
Real-Time Counter (RTC)	Yes	Yes	Yes
RTC alarms	1	1	1
RTC compare values	One 32-bit value or two 16-bit values	One 32-bit value or two 16-bit values	One 32-bit value or two 16-bit values
External Interrupt lines	16	16	16
Peripheral Touch Controller (PTC) X and Y lines	16x16	12x10	10x6
Maximum CPU frequency	48MHz		
Packages	QFN TQFP UFBGA	QFN TQFP WLCSP	QFN TQFP
Oscillators	32.768kHz crystal oscillator (XOSC32K) 0.4-32MHz crystal oscillator (XOSC) 32.768kHz internal oscillator (OSC32K) 32KHz ultra-low-power internal oscillator (OSCULP32K) 8MHz high-accuracy internal oscillator (OSC8M) 48MHz Digital Frequency Locked Loop (DFLL48M)		
Event System channels	8	8	8
SW Debug Interface	Yes	Yes	Yes
Watchdog Timer (WDT)	Yes	Yes	Yes

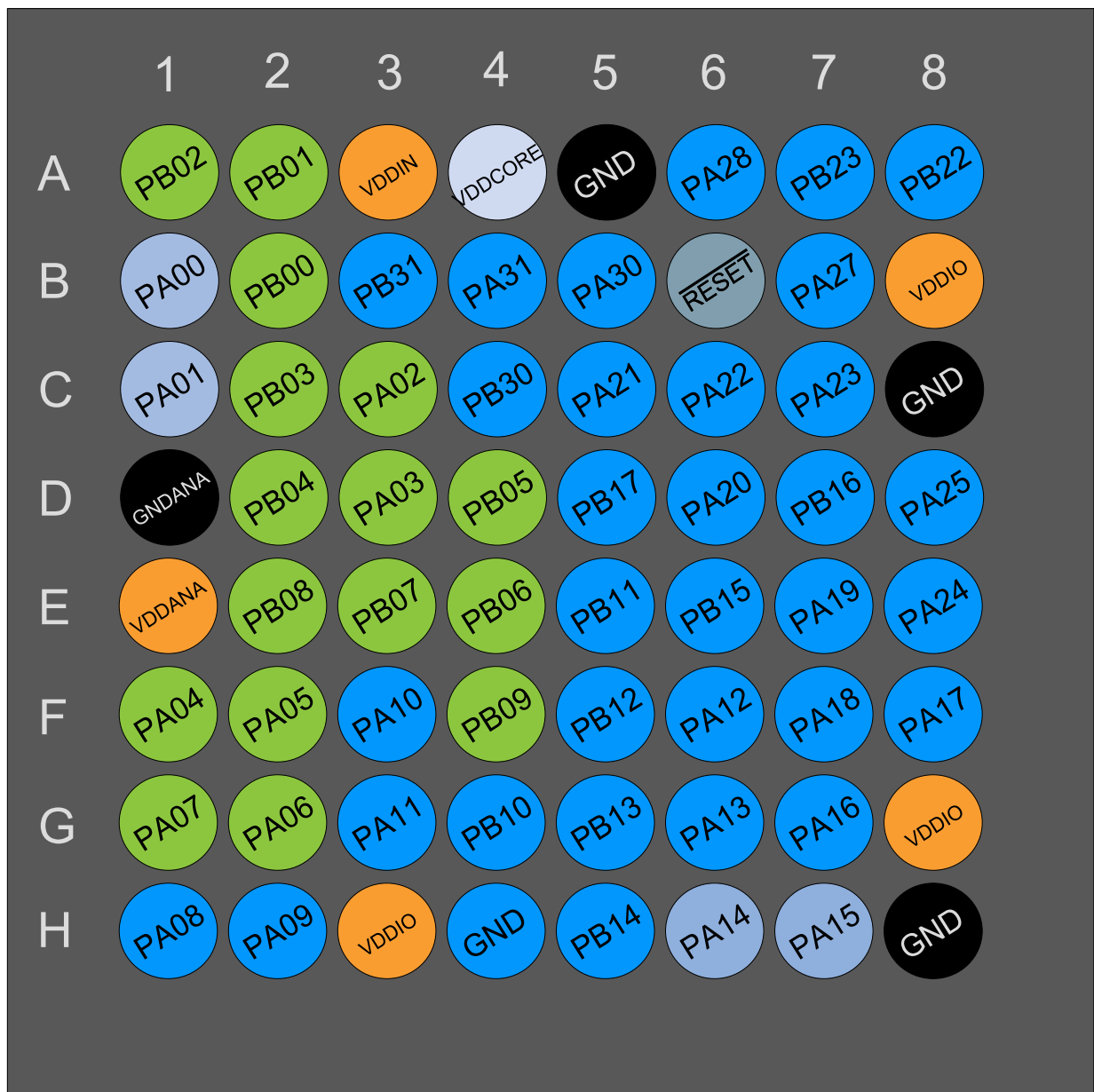
Ordering Code	FLASH (bytes)	SRAM (bytes)	Package	Carrier Type
ATSAMD20G17A-AU	128K	16K	TQFP48	Tray
ATSAMD20G17A-AUT				Tape & Reel
ATSAMD20G17A-AN				Tray
ATSAMD20G17A-ANT				Tape & Reel
ATSAMD20G17A-MU			QFN48	Tray
ATSAMD20G17A-MUT				Tape & Reel
ATSAMD20G17A-MN				Tray
ATSAMD20G17A-MNT				Tape & Reel
ATSAMD20G17A-UUT			WLCSP45	Tape & Reel
ATSAMD20G18A-AU	256K	32K	TQFP48	Tray
ATSAMD20G18A-AUT				Tape & Reel
ATSAMD20G18A-AN				Tray
ATSAMD20G18A-ANT				Tape & Reel
ATSAMD20G18A-MU			QFN48	Tray
ATSAMD20G18A-MUT				Tape & Reel
ATSAMD20G18A-MN				Tray
ATSAMD20G18A-MNT				Tape & Reel
ATSAMD20G18A-UUT			WLCSP45	Tape & Reel

3.3. SAM D20J

Ordering Code	FLASH (bytes)	SRAM (bytes)	Package	Carrier Type
ATSAMD20J14A-AU	16K	2K	TQFP64	Tray
ATSAMD20J14A-AUT				Tape & Reel
ATSAMD20J14A-AN				Tray
ATSAMD20J14A-ANT				Tape & Reel
ATSAMD20J14A-MU			QFN64	Tray
ATSAMD20J14A-MUT				Tape & Reel
ATSAMD20J14A-MN				Tray
ATSAMD20J14A-MNT				Tape & Reel

Ordering Code	FLASH (bytes)	SRAM (bytes)	Package	Carrier Type
ATSAMD20J15A-AU	32K	4K	TQFP64	Tray
ATSAMD20J15A-AUT				Tape & Reel
ATSAMD20J15A-AN				Tray
ATSAMD20J15A-ANT				Tape & Reel
ATSAMD20J15A-MU			QFN64	Tray
ATSAMD20J15A-MUT				Tape & Reel
ATSAMD20J15A-MN				Tray
ATSAMD20J15A-MNT				Tape & Reel
ATSAMD20J16A-AU	64K	8K	TQFP64	Tray
ATSAMD20J16A-AUT				Tape & Reel
ATSAMD20J16A-AN				Tray
ATSAMD20J16A-ANT				Tape & Reel
ATSAMD20J16A-MU			QFN64	Tray
ATSAMD20J16A-MUT				Tape & Reel
ATSAMD20J16A-MN				Tray
ATSAMD20J16A-MNT				Tape & Reel
ATSAMD20J16A-CU			UFBGA64	Tray
ATSAMD20J16A-CUT				Tape & Reel
ATSAMD20J17A-AU	128K	16K	TQFP64	Tray
ATSAMD20J17A-AUT				Tape & Reel
ATSAMD20J17A-AN				Tray
ATSAMD20J17A-ANT				Tape & Reel
ATSAMD20J17A-MU			QFN64	Tray
ATSAMD20J17A-MUT				Tape & Reel
ATSAMD20J17A-MN				Tray
ATSAMD20J17A-MNT				Tape & Reel
ATSAMD20J17A-CU			UFBGA64	Tray
ATSAMD20J17A-CUT				Tape & Reel

5.1.2. UFBGA64



- DIGITAL PIN
- ANALOG PIN
- OSCILLATOR
- GROUND
- INPUT SUPPLY
- REGULATED OUTPUT SUPPLY
- RESET PIN

Peripheral Source	NVIC Line
DAC – Digital-to-Analog Converter	23
PTC – Peripheral Touch Controller	24

7.3. Micro Trace Buffer

7.3.1. Features

- Program flow tracing for the Cortex-M0+ processor
- MTB SRAM can be used for both trace and general purpose storage by the processor
- The position and size of the trace buffer in SRAM is configurable by software
- CoreSight compliant

7.3.2. Overview

When enabled, the MTB records changes in program flow, reported by the Cortex-M0+ processor over the execution trace interface shared between the Cortex-M0+ processor and the CoreSight MTB-M0+. This information is stored as trace packets in the SRAM by the MTB. An off-chip debugger can extract the trace information using the Debug Access Port to read the trace information from the SRAM. The debugger can then reconstruct the program flow from this information.

The MTB simultaneously stores trace information into the SRAM, and gives the processor access to the SRAM. The MTB ensures that trace write accesses have priority over processor accesses.

The execution trace packet consists of a pair of 32-bit words that the MTB generates when it detects the processor PC value changes non-sequentially. A non-sequential PC change can occur during branch instructions or during exception entry. See the CoreSight MTB-M0+ Technical Reference Manual for more details on the MTB execution trace packet format.

Tracing is enabled when the MASTER.EN bit in the Master Trace Control Register is 1. There are various ways to set the bit to 1 to start tracing, or to 0 to stop tracing. See the CoreSight Cortex-M0+ Technical Reference Manual for more details on the Trace start and stop and for a detailed description of the MTB's MASTER register. The MTB can be programmed to stop tracing automatically when the memory fills to a specified watermark level or to start or stop tracing by writing directly to the MASTER.EN bit. If the watermark mechanism is not being used and the trace buffer overflows, then the buffer wraps around overwriting previous trace packets.

The base address of the MTB registers is 0x41006000; this address is also written in the CoreSight ROM Table. The offset of each register from the base address is fixed and as defined by the CoreSight MTB-M0+ Technical Reference Manual. The MTB has 4 programmable registers to control the behavior of the trace features:

- POSITION: Contains the trace write pointer and the wrap bit,
- MASTER: Contains the main trace enable bit and other trace control fields,
- FLOW: Contains the WATERMARK address and the AUTOSTOP and AUTOHALT control bits,
- BASE: Indicates where the SRAM is located in the processor memory map. This register is provided to enable auto discovery of the MTB SRAM location, by a debug agent.

See the CoreSight MTB-M0+ Technical Reference Manual for a detailed description of these registers.

Write-protect registers allow the user to disable a selected peripheral's write-protection without doing a read-modify-write operation. These registers are mapped into two I/O memory locations, one for clearing and one for setting the register bits. Writing a one to a bit in the Write Protect Clear register (WPCLR) will clear the corresponding bit in both registers (WPCLR and WPSET) and disable the write-protection for the corresponding peripheral, while writing a one to a bit in the Write Protect Set (WPSET) register will set the corresponding bit in both registers (WPCLR and WPSET) and enable the write-protection for the corresponding peripheral. Both registers (WPCLR and WPSET) will return the same value when read.

If a peripheral is write-protected, and if a write access is performed, data will not be written, and the peripheral will return an access error (CPU exception).

The PAC also offers a safety feature for correct program execution, with a CPU exception generated on double write-protection or double unprotection of a peripheral. If a peripheral *n* is write-protected and a write to one in WPSET[*n*] is detected, the PAC returns an error. This can be used to ensure that the application follows the intended program flow by always following a write-protect with an unprotect, and vice versa. However, in applications where a write-protected peripheral is used in several contexts, e.g., interrupts, care should be taken so that either the interrupt can not happen while the main application or other interrupt levels manipulate the write-protection status, or when the interrupt handler needs to unprotect the peripheral, based on the current protection status, by reading WPSET.

7.7. Register Description

Atomic 8-, 16- and 32-bit accesses are supported. In addition, the 8-bit quarters and 16-bit halves of a 32-bit register, and the 8-bit halves of a 16-bit register can be accessed directly. Refer to the Product Mapping for PAC locations.

Related Links

[Product Mapping](#) on page 19

7.7.1. PAC0 Register Description

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 3 – GCLK

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 2 – SYSCTRL

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 1 – PM

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

7.7.1.2. Write Protect Set

Name: WPSET
Offset: 0x04
Reset: 0x000000
Property: –

Bit	31	30	29	28	27	26	25	24
Access								
Reset								
Bit	23	22	21	20	19	18	17	16
Access								
Reset								
Bit	15	14	13	12	11	10	9	8
Access								
Reset								
Bit	7	6	5	4	3	2	1	0
		EIC	RTC	WDT	GCLK	SYSCTRL	PM	
Access		R/W	R/W	R/W	R/W	R/W	R/W	
Reset		0	0	0	0	0	0	

Bit 6 – EIC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 5 – RTC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 4 – WDT

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 3 – GCLK

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 2 – SYSCTRL

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 1 – PM

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

7.7.2. PAC1 Register Description

7.7.2.2. Write Protect Set

Name: WPSET
Offset: 0x04
Reset: 0x000002
Property: –

Bit	31	30	29	28	27	26	25	24
Access								
Reset								
Bit	23	22	21	20	19	18	17	16
Access								
Reset								
Bit	15	14	13	12	11	10	9	8
Access								
Reset								
Bit	7	6	5	4	3	2	1	0
		MTB			PORT	NVMCTRL	DSU	
Access		R/W			R/W	R/W	R/W	
Reset		0			0	0	1	

Bit 6 – MTB

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 3 – PORT

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 2 – NVMCTRL

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

7.7.3.1. Write Protect Clear

Name: WPCLR
Offset: 0x00
Reset: 0x00800000
Property: –

Bit	31	30	29	28	27	26	25	24
Access								
Reset								
Bit	23	22	21	20	19	18	17	16
					PTC	DAC	AC	ADC
Access					R/W	R/W	R/W	R/W
Reset					0	0	0	0
Bit	15	14	13	12	11	10	9	8
	TC7	TC6	TC5	TC4	TC3	TC2	TC1	TC0
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0
	SERCOM5	SERCOM4	SERCOM3	SERCOM2	SERCOM1	SERCOM0	EVSYS	
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	
Reset	0	0	0	0	0	0	0	

Bit 19 – PTC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 18 – DAC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 17 – AC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

7.7.3.2. Write Protect Set

Name: WPSET
Offset: 0x04
Reset: 0x00800000
Property: –

Bit	31	30	29	28	27	26	25	24
Access								
Reset								
Bit	23	22	21	20	19	18	17	16
					PTC	DAC	AC	ADC
Access					R/W	R/W	R/W	R/W
Reset					0	0	0	0
Bit	15	14	13	12	11	10	9	8
	TC7	TC6	TC5	TC4	TC3	TC2	TC1	TC0
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Reset	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0
	SERCOM5	SERCOM4	SERCOM3	SERCOM2	SERCOM1	SERCOM0	EVSYN	
Access	R/W	R/W	R/W	R/W	R/W	R/W	R/W	
Reset	0	0	0	0	0	0	0	

Bit 19 – PTC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 18 – DAC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 17 – AC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 16 – ADC

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bits 15,14,13,12,11,10,9,8 – TCx

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bits 7,6,5,4,3,2 – SERCOMx

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

Bit 1 – EVSYS

Writing a zero to these bits has no effect.

Writing a one to these bits will clear the Write Protect bit for the corresponding peripherals.

Value	Description
0	Write-protection is disabled.
1	Write-protection is enabled.

8.2. Package Drawings

8.2.1. 64 pin TQFP

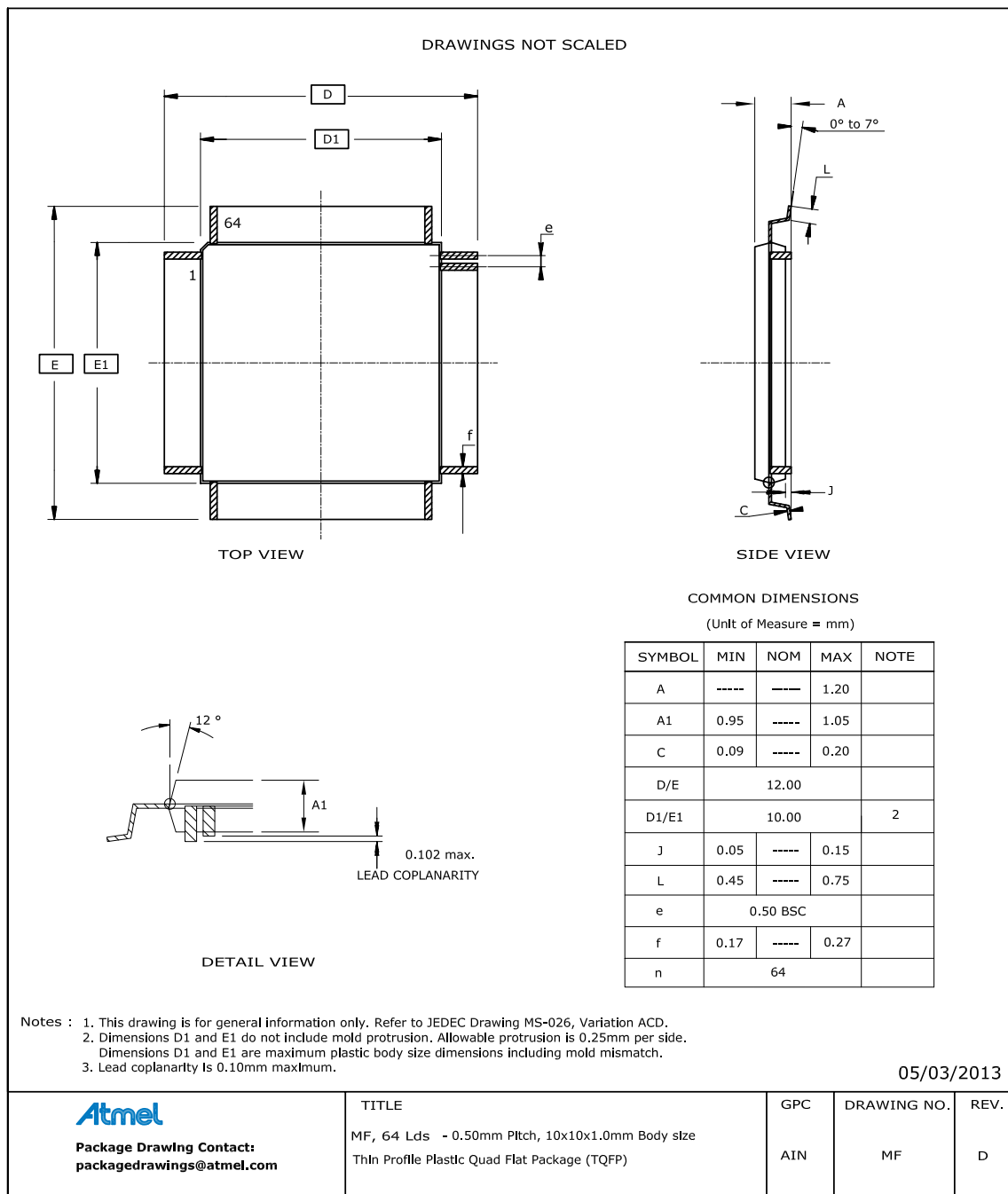


Table 8-2. Device and Package Maximum Weight

300	mg
-----	----

Table 8-3. Package Characteristics

Moisture Sensitivity Level	MSL3
----------------------------	------

Table 8-5. Device and Package Maximum Weight

200	mg
-----	----

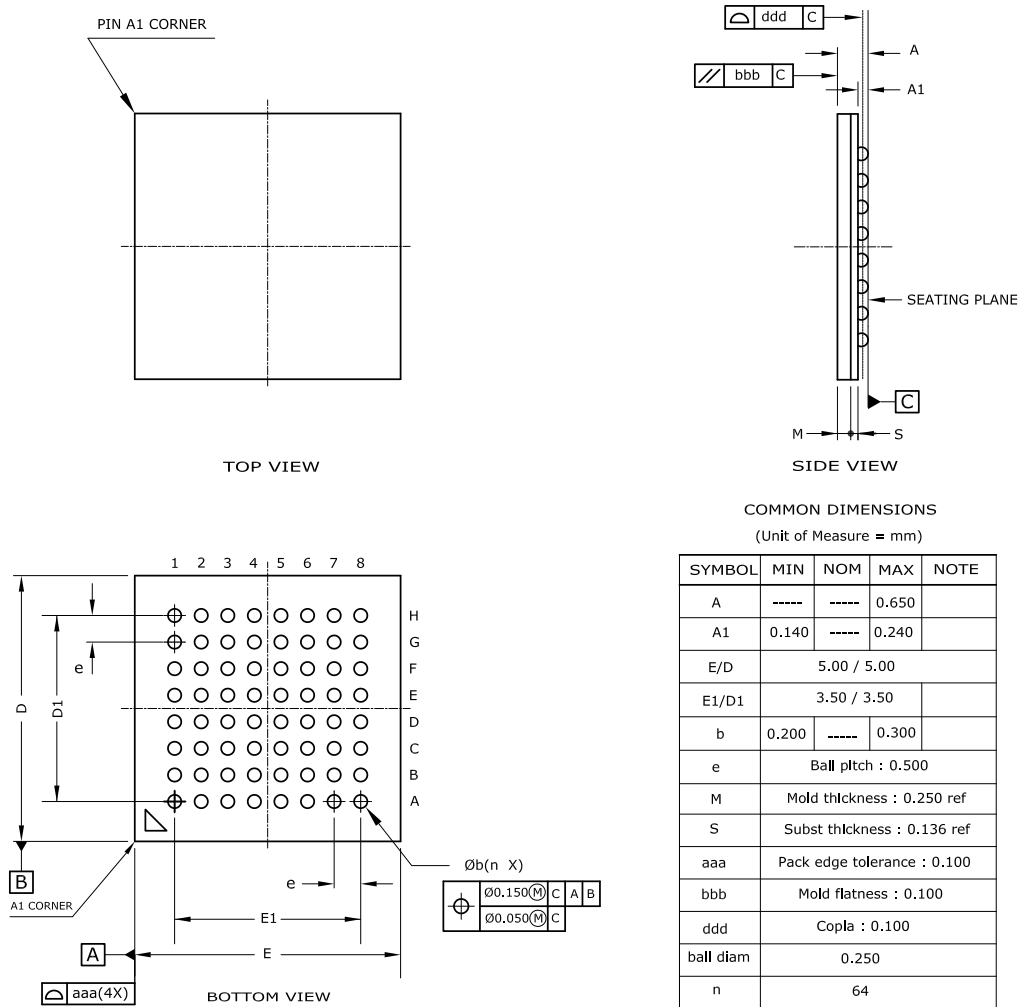
Table 8-6. Package Characteristics

Moisture Sensitivity Level	MSL3
----------------------------	------

Table 8-7. Package Reference

JEDEC Drawing Reference	MO-220
JESD97 Classification	E3

8.2.3. 64-ball UFBGA



- Notes :
1. This drawing is for general information only. Refer to JEDEC Drawing MO-280, Variation UCCBB for proper dimensions, tolerances, datums, etc.
 2. Array as seen from the bottom of the package.
 3. Dimension A includes stand-off height A1, package body thickness, and lid height, but does not include attached features.
 4. Dimension b is measured at the maximum ball diameter, parallel to primary datum C.

Table 8-8. Device and Package Maximum Weight

27.4	mg
------	----

8.2.7. 32 pin TQFP

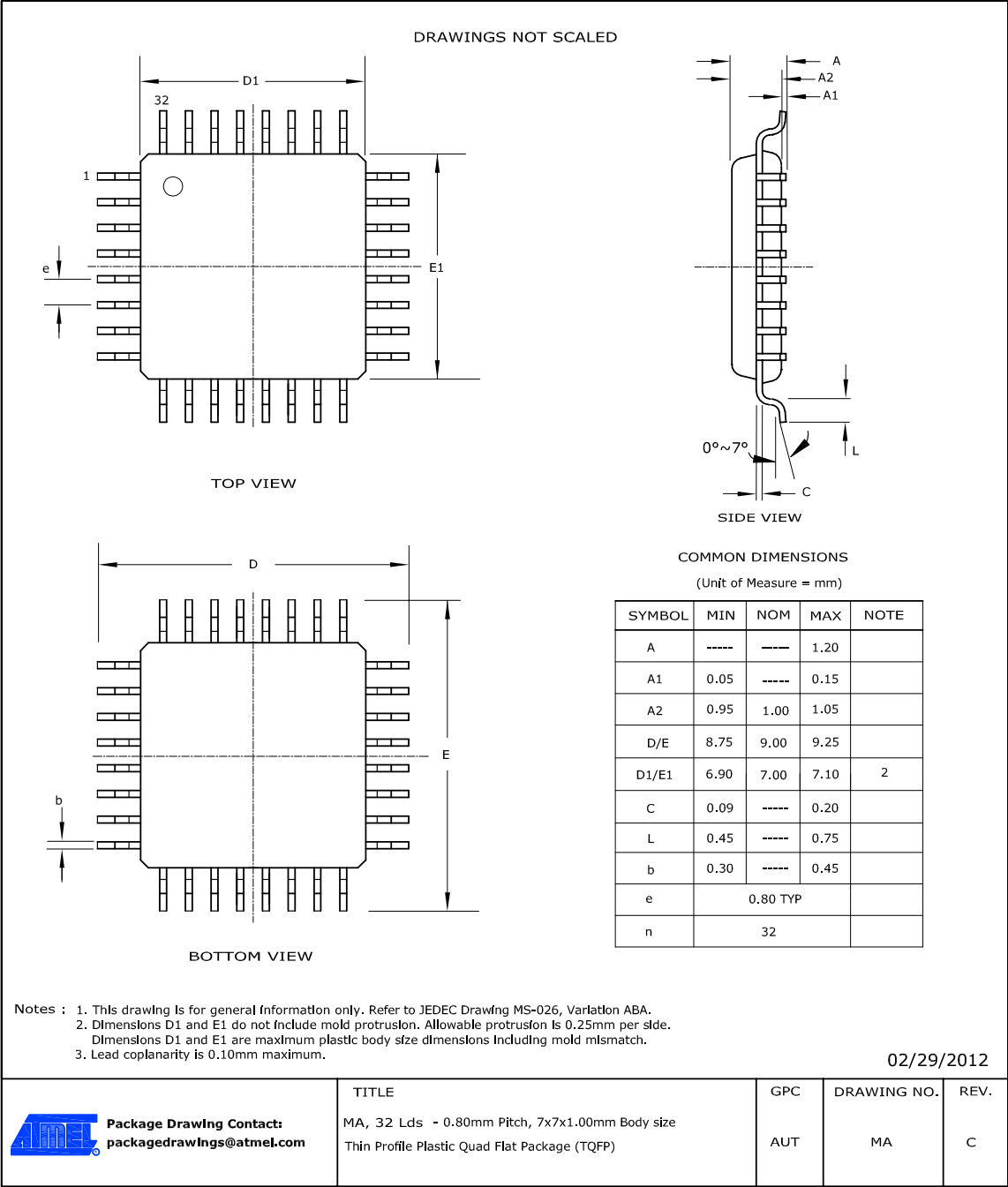


Table 8-20. Device and Package Maximum Weight

100	mg
-----	----

Table 8-21. Package Characteristics

Moisture Sensitivity Level	MSL3
----------------------------	------

Table 8-24. Package Characteristics

Moisture Sensitivity Level	MSL3
----------------------------	------

Table 8-25. Package Reference

JEDEC Drawing Reference	MO-220
JESD97 Classification	E3

8.2.9. 35 ball WLCSP

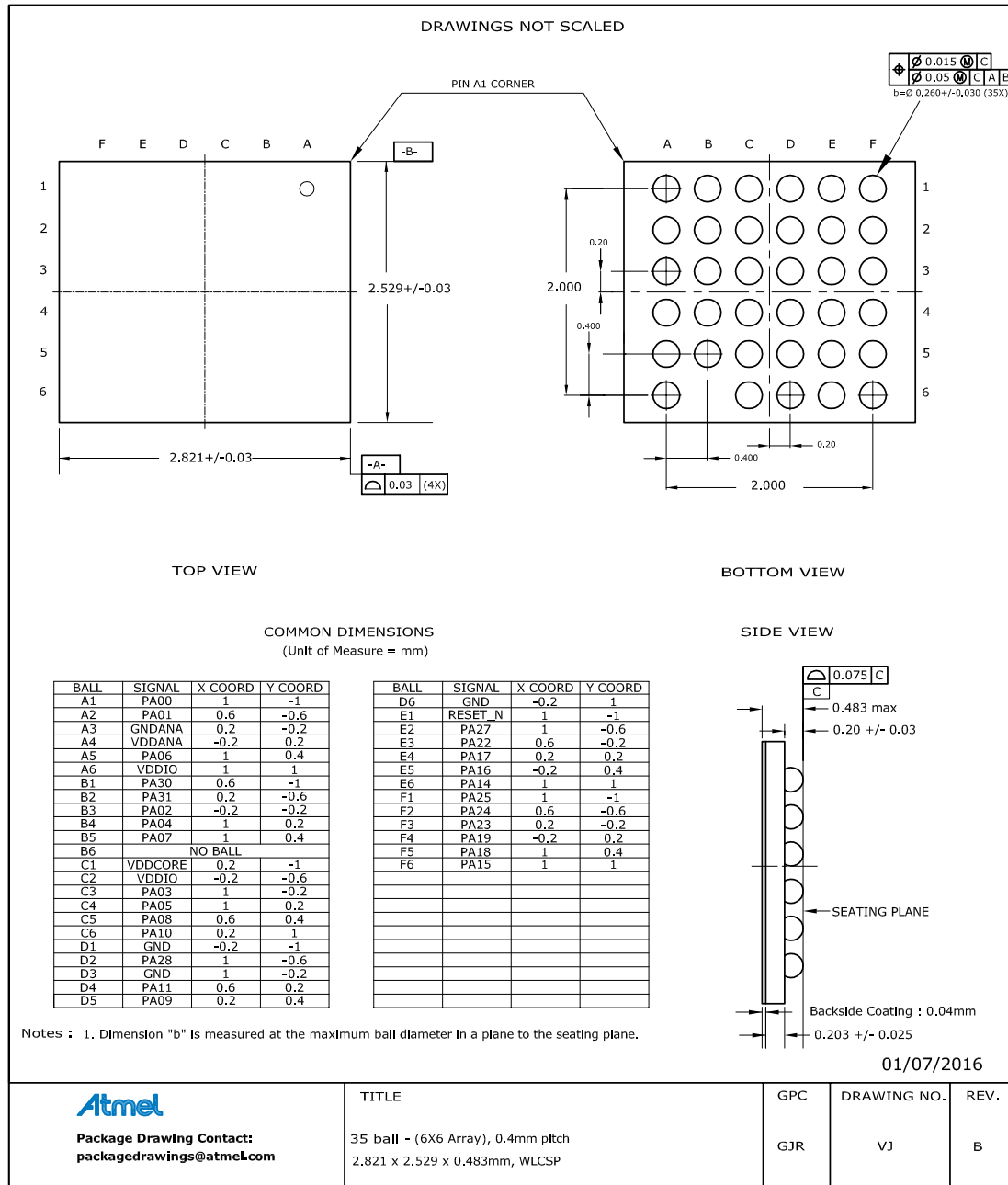


Table 8-26. Device and Package Maximum Weight

6.2	mg
-----	----

Table 8-27. Package Characteristics

Moisture Sensitivity Level	MSL1
----------------------------	------

Table 8-28. Package Reference

JEDEC Drawing Reference	MO-220
JESD97 Classification	E1

8.3. Soldering Profile

The following table gives the recommended soldering profile from J-STD-20.

Table 8-29.

Profile Feature	Green Package
Average Ramp-up Rate (217°C to peak)	3°C/s max.
Preheat Temperature 175°C ±25°C	150-200°C
Time Maintained Above 217°C	60-150s
Time within 5°C of Actual Peak Temperature	30s
Peak Temperature Range	260°C
Ramp-down Rate	6°C/s max.
Time 25°C to Peak Temperature	8 minutes max.

A maximum of three reflow passes is allowed per component.