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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             | Discontinued at Digi-Key                                                                                                                                              |
| Core Processor             | ARM® Cortex®-M0+                                                                                                                                                      |
| Core Size                  | 32-Bit Single-Core                                                                                                                                                    |
| Speed                      | 48MHz                                                                                                                                                                 |
| Connectivity               | I <sup>2</sup> C, SPI, UART/USART                                                                                                                                     |
| Peripherals                | Brown-out Detect/Reset, POR, WDT                                                                                                                                      |
| Number of I/O              | 52                                                                                                                                                                    |
| Program Memory Size        | 256KB (256K x 8)                                                                                                                                                      |
| Program Memory Type        | FLASH                                                                                                                                                                 |
| EEPROM Size                | -                                                                                                                                                                     |
| RAM Size                   | 32K x 8                                                                                                                                                               |
| Voltage - Supply (Vcc/Vdd) | 1.62V ~ 3.6V                                                                                                                                                          |
| Data Converters            | A/D 20x12b; D/A 1x10b                                                                                                                                                 |
| Oscillator Type            | Internal                                                                                                                                                              |
| Operating Temperature      | -40°C ~ 85°C (TA)                                                                                                                                                     |
| Mounting Type              | Surface Mount                                                                                                                                                         |
| Package / Case             | 64-TQFP                                                                                                                                                               |
| Supplier Device Package    | 64-TQFP (10x10)                                                                                                                                                       |
| Purchase URL               | <a href="https://www.e-xfl.com/product-detail/microchip-technology/atsamd20j18a-aues">https://www.e-xfl.com/product-detail/microchip-technology/atsamd20j18a-aues</a> |

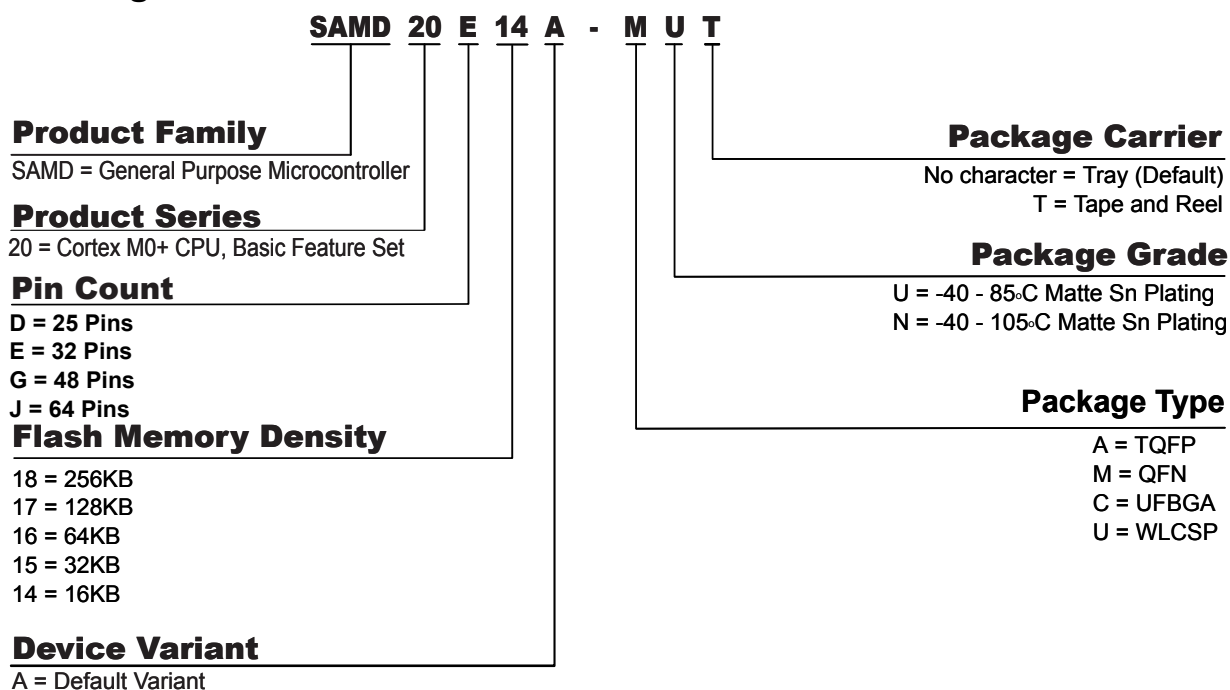
- Up to five 16-bit Timer/Counters (TC), configurable as either:
  - One 16-bit TC with two compare/capture channels
  - One 8-bit TC with two compare/capture channels
  - One 32-bit TC with two compare/capture channels, by using two TCs
- 32-bit Real Time Counter (RTC) with clock/calendar function
- 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 (I<sup>2</sup>C) 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

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### 3. Ordering Information



#### 3.1. SAM D20E

| Ordering Code    | FLASH (bytes) | SRAM (bytes) | Package | Carrier Type |
|------------------|---------------|--------------|---------|--------------|
| ATSAMD20E14A-AU  | 16K           | 2K           | TQFP32  | Tray         |
| ATSAMD20E14A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20E14A-AN  |               |              |         | Tray         |
| ATSAMD20E14A-ANT |               |              |         | Tape & Reel  |
| ATSAMD20E14A-MU  |               |              | QFN32   | Tray         |
| ATSAMD20E14A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20E14A-MN  |               |              |         | Tray         |
| ATSAMD20E14A-MNT |               |              |         | Tape & Reel  |

| Ordering Code    | FLASH (bytes) | SRAM (bytes) | Package | Carrier Type |
|------------------|---------------|--------------|---------|--------------|
| ATSAMD20E15A-AU  | 32K           | 4K           | TQFP32  | Tray         |
| ATSAMD20E15A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20E15A-AN  |               |              |         | Tray         |
| ATSAMD20E15A-ANT |               |              |         | Tape & Reel  |
| ATSAMD20E15A-MU  |               |              | QFN32   | Tray         |
| ATSAMD20E15A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20E15A-MN  |               |              |         | Tray         |
| ATSAMD20E15A-MNT |               |              |         | Tape & Reel  |
| ATSAMD20E16A-AU  | 64K           | 8K           | TQFP32  | Tray         |
| ATSAMD20E16A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20E16A-AN  |               |              |         | Tray         |
| ATSAMD20E16A-AFT |               |              |         | Tape & Reel  |
| ATSAMD20E16A-MU  |               |              | QFN32   | Tray         |
| ATSAMD20E16A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20E16A-MN  |               |              |         | Tray         |
| ATSAMD20E16A-MNT |               |              |         | Tape & Reel  |
| ATSAMD20E17A-AU  | 128K          | 16K          | TQFP32  | Tray         |
| ATSAMD20E17A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20E17A-AN  |               |              |         | Tray         |
| ATSAMD20E17A-ANT |               |              |         | Tape & Reel  |
| ATSAMD20E17A-MU  |               |              | QFN32   | Tray         |
| ATSAMD20E17A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20E17A-MN  |               |              |         | Tray         |
| ATSAMD20E17A-MNT |               |              |         | Tape & Reel  |
| ATSAMD20E18A-AU  | 256K          | 32K          | TQFP32  | Tray         |
| ATSAMD20E18A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20E18A-AN  |               |              |         | Tray         |
| ATSAMD20E18A-AFT |               |              |         | Tape & Reel  |
| ATSAMD20E18A-MU  |               |              | QFN32   | Tray         |
| ATSAMD20E18A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20E18A-MN  |               |              |         | Tray         |
| ATSAMD20E18A-MNT |               |              |         | Tape & Reel  |

| Ordering Code    | FLASH (bytes) | SRAM (bytes) | Package | Carrier Type |
|------------------|---------------|--------------|---------|--------------|
| ATSAMD20J18A-AU  | 256K          | 32K          | TQFP64  | Tray         |
| ATSAMD20J18A-AUT |               |              |         | Tape & Reel  |
| ATSAMD20J18A-AN  |               |              |         | Tray         |
| ATSAMD20J18A-ANT |               |              |         | Tape & Reel  |
| ATSAMD20J18A-MU  |               |              | QFN64   | Tray         |
| ATSAMD20J18A-MUT |               |              |         | Tape & Reel  |
| ATSAMD20J18A-MN  |               |              |         | Tray         |
| ATSAMD20J18A-MNT |               |              |         | Tape & Reel  |
| ATSAMD20J18A-CU  |               |              | UFBGA64 | Tray         |
| ATSAMD20J18A-CUT |               |              |         | Tape & Reel  |

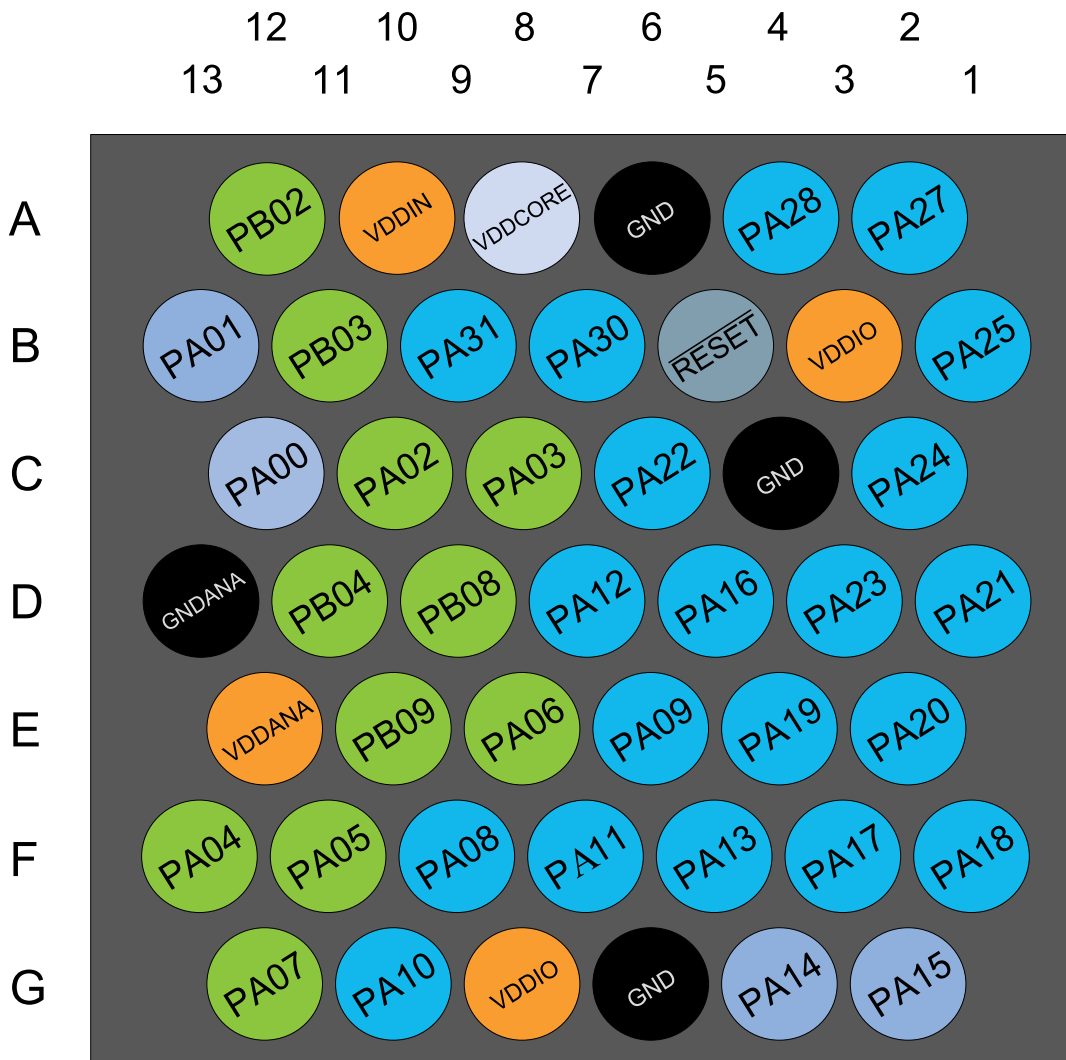
### 3.4. Device Identification

The DSU - Device Service Unit peripheral provides the Device Selection bits in the Device Identification register (DID.DEVSEL) in order to identify the device by software. The device variants have a reset value of DID=0x1001drxx, with the LSB identifying the die number ('d'), the die revision ('r') and the device selection ('xx').

**Table 3-1. Device Identification Values**

| Device Variant | DID.DEVSEL | Device ID (DID) |
|----------------|------------|-----------------|
| SAMD20J18C     | 0x00       | 0x10001300      |
| SAMD20J18A     | 0x00       | 0x10001300      |
| SAMD20J17A     | 0x01       | 0x10001301      |
| SAMD20J16A     | 0x02       | 0x10001302      |
| SAMD20J15A     | 0x03       | 0x10001303      |
| SAMD20J14A     | 0x04       | 0x10001304      |
| SAMD20G18A     | 0x05       | 0x10001305      |
| SAMD20G17A     | 0x06       | 0x10001306      |
| SAMD20G16A     | 0x07       | 0x10001307      |
| SAMD20G15A     | 0x08       | 0x10001308      |
| SAMD20G14A     | 0x09       | 0x10001309      |
| SAMD20E18A     | 0x0A       | 0x1000130A      |
| SAMD20E17A     | 0x0B       | 0x1000130B      |
| SAMD20E16A     | 0x0C       | 0x1000130C      |
| SAMD20E15A     | 0x0D       | 0x1000130D      |

### 5.2.2. WLCSP45



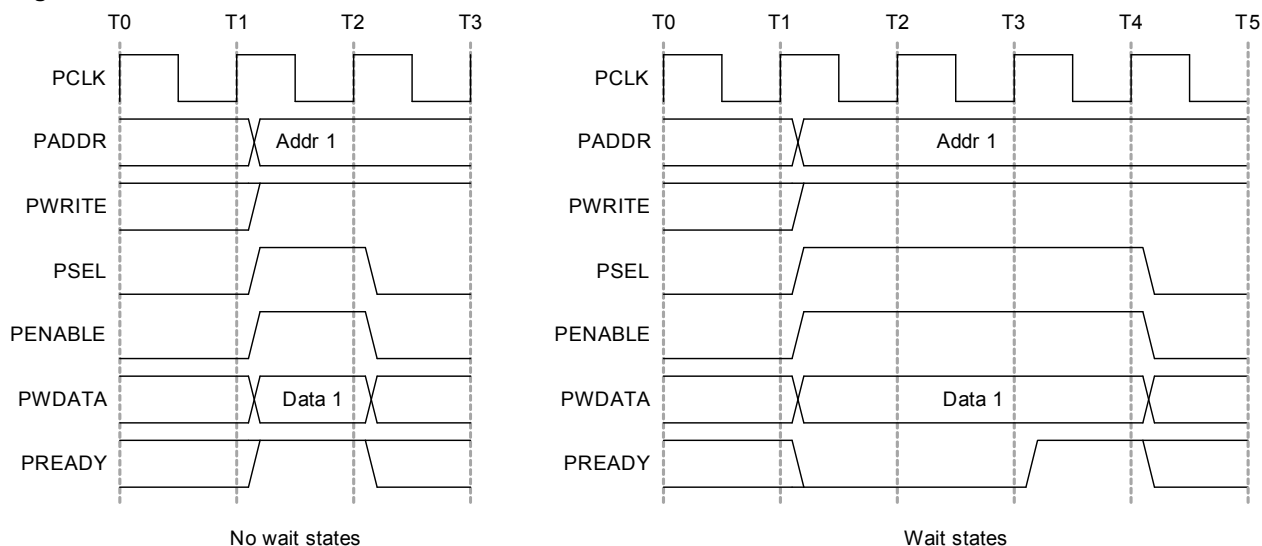
- DIGITAL PIN
- ANALOG PIN
- OSCILLATOR
- GROUND
- INPUT SUPPLY
- REGULATED OUTPUT SUPPLY
- RESET PIN

(INTFLAG) register. The interrupt flag is set when the interrupt condition occurs. Each interrupt in the peripheral can be individually enabled by writing a one to the corresponding bit in the peripheral's Interrupt Enable Set (INTENSET) register, and disabled by writing a one to the corresponding bit in the peripheral's Interrupt Enable Clear (INTENCLR) register. An interrupt request is generated from the peripheral when the interrupt flag is set and the corresponding interrupt is enabled. The interrupt requests for one peripheral are ORed together on system level, generating one interrupt request for each peripheral. An interrupt request will set the corresponding interrupt pending bit in the NVIC interrupt pending registers (SETPEND/CLRPEND bits in ISPR/ICPR). For the NVIC to activate the interrupt, it must be enabled in the NVIC interrupt enable register (SETENA/CLRENA bits in ISER/ICER). The NVIC interrupt priority registers IPR0-IPR7 provide a priority field for each interrupt.

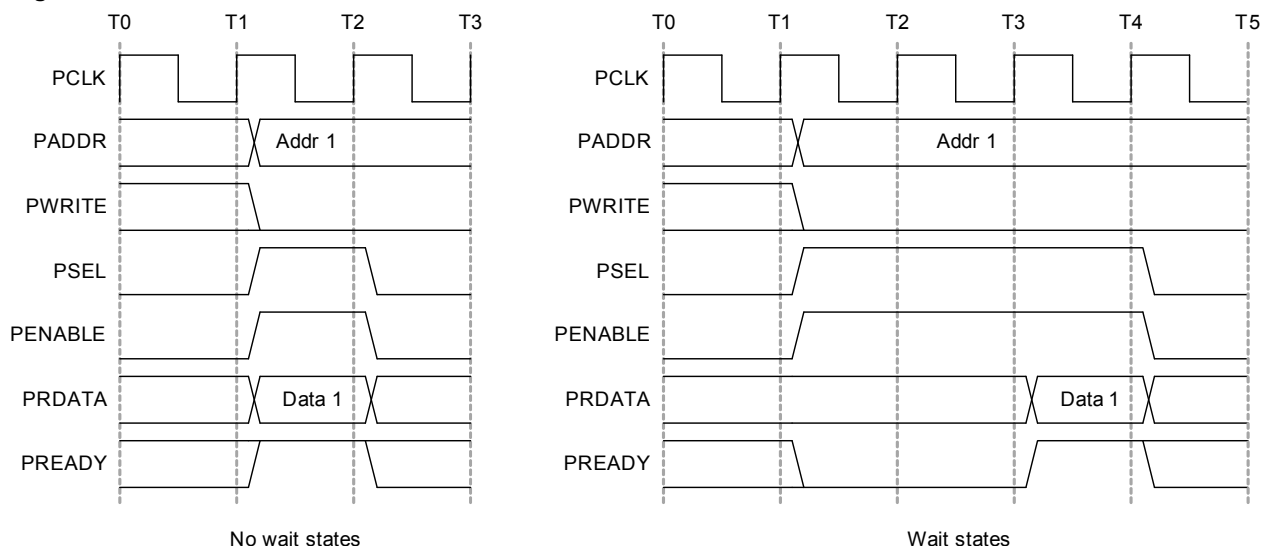
**Table 7-3. Interrupt Line Mapping**

| Peripheral Source                          | NVIC Line |
|--------------------------------------------|-----------|
| EIC NMI – External Interrupt Controller    | NMI       |
| PM – Power Manager                         | 0         |
| SYSCTRL – System Control                   | 1         |
| WDT – Watchdog Timer                       | 2         |
| RTC – Real Time Counter                    | 3         |
| EIC – External Interrupt Controller        | 4         |
| NVMCTRL – Non-Volatile Memory Controller   | 5         |
| EVSYS – Event System                       | 6         |
| SERCOM0 – Serial Communication Interface 0 | 7         |
| SERCOM1 – Serial Communication Interface 1 | 8         |
| SERCOM2 – Serial Communication Interface 2 | 9         |
| SERCOM3 – Serial Communication Interface 3 | 10        |
| SERCOM4 – Serial Communication Interface 4 | 11        |
| SERCOM5 – Serial Communication Interface 5 | 12        |
| TC0 – Timer Counter 0                      | 13        |
| TC1 – Timer Counter 1                      | 14        |
| TC2 – Timer Counter 2                      | 15        |
| TC3 – Timer Counter 3                      | 16        |
| TC4 – Timer Counter 4                      | 17        |
| TC5 – Timer Counter 5                      | 18        |
| TC6 – Timer Counter 6                      | 19        |
| TC7 – Timer Counter 7                      | 20        |
| ADC – Analog-to-Digital Converter          | 21        |
| AC – Analog Comparator                     | 22        |

**Figure 7-1. APB Write Access.**



**Figure 7-2. APB Read Access.**



## Related Links

[Product Mapping](#) on page 19

## 7.6. PAC - Peripheral Access Controller

### 7.6.1. Overview

There is one PAC associated with each AHB-APB bridge. The PAC can provide write protection for registers of each peripheral connected on the same bridge.

The PAC peripheral bus clock (CLK\_PACx\_APB) can be enabled and disabled in the Power Manager. CLK\_PAC0\_APB and CLK\_PAC1\_APB are enabled at reset. CLK\_PAC2\_APB is disabled at reset. Refer to *PM – Power Manager* for details. The PAC will continue to operate in any sleep mode where the selected clock source is running. Write-protection does not apply for debugger access. When the debugger makes an access to a peripheral, write-protection is ignored so that the debugger can update the register.

### 7.7.1.1. Write Protect Clear

**Name:** WPCLR  
**Offset:** 0x00  
**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.

### 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.

### 7.7.2.1. Write Protect Clear

**Name:** WPCLR  
**Offset:** 0x00  
**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.

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

#### Bit 1 – DSU

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.  |

### 7.7.3. PAC2 Register Description

### 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.

| 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

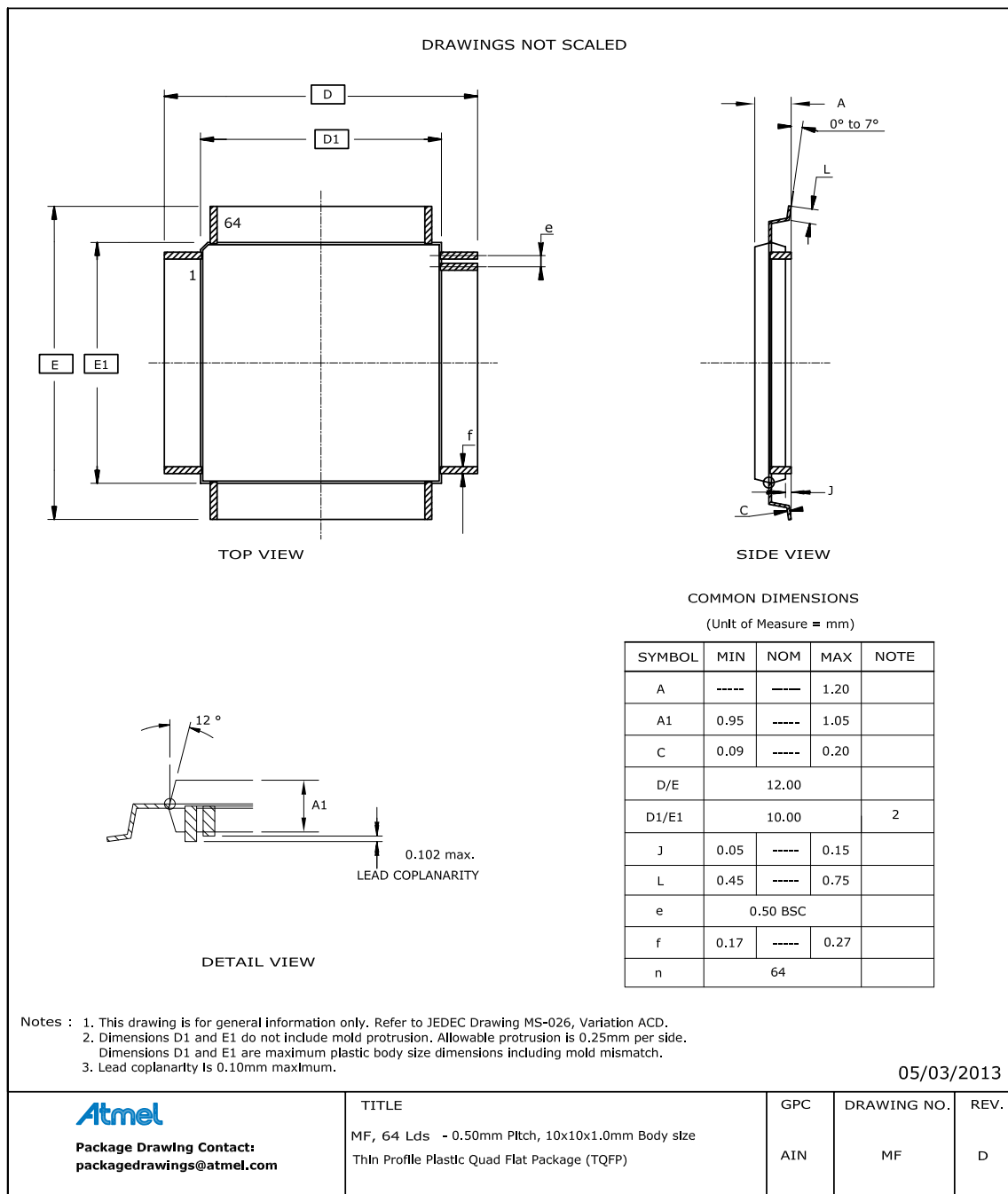
Writing a zero to these bits has no effect.

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 |
|-----|----|

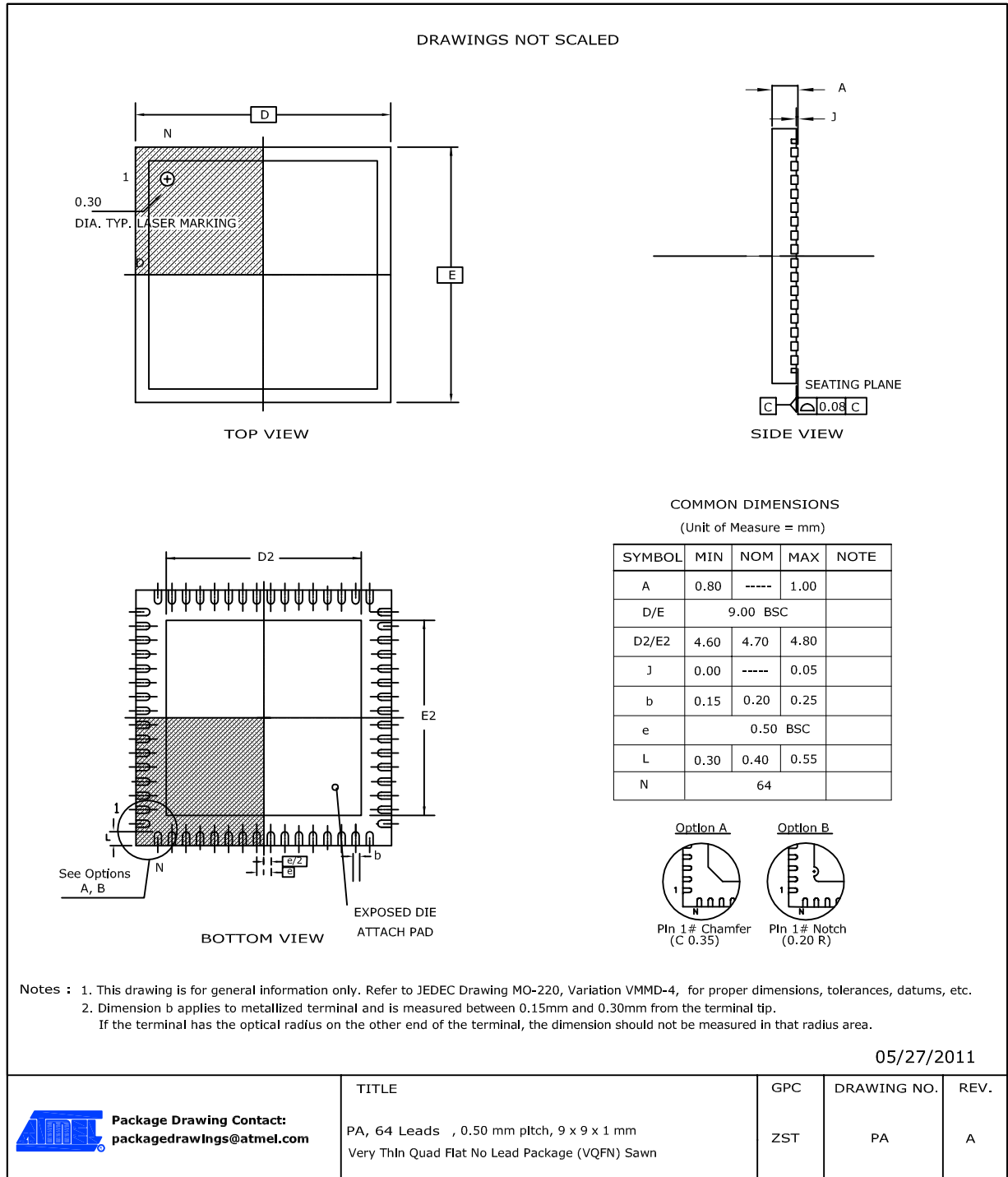
**Table 8-3. Package Characteristics**

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

**Table 8-4. Package Reference**

|                         |        |
|-------------------------|--------|
| JEDEC Drawing Reference | MS-026 |
| JESD97 Classification   | E3     |

### 8.2.2. 64 pin QFN



**Note:** The exposed die attach pad is not connected electrically inside the device.

**Table 8-5. Device and Package Maximum Weight**

|     |    |
|-----|----|
| 200 | mg |
|-----|----|

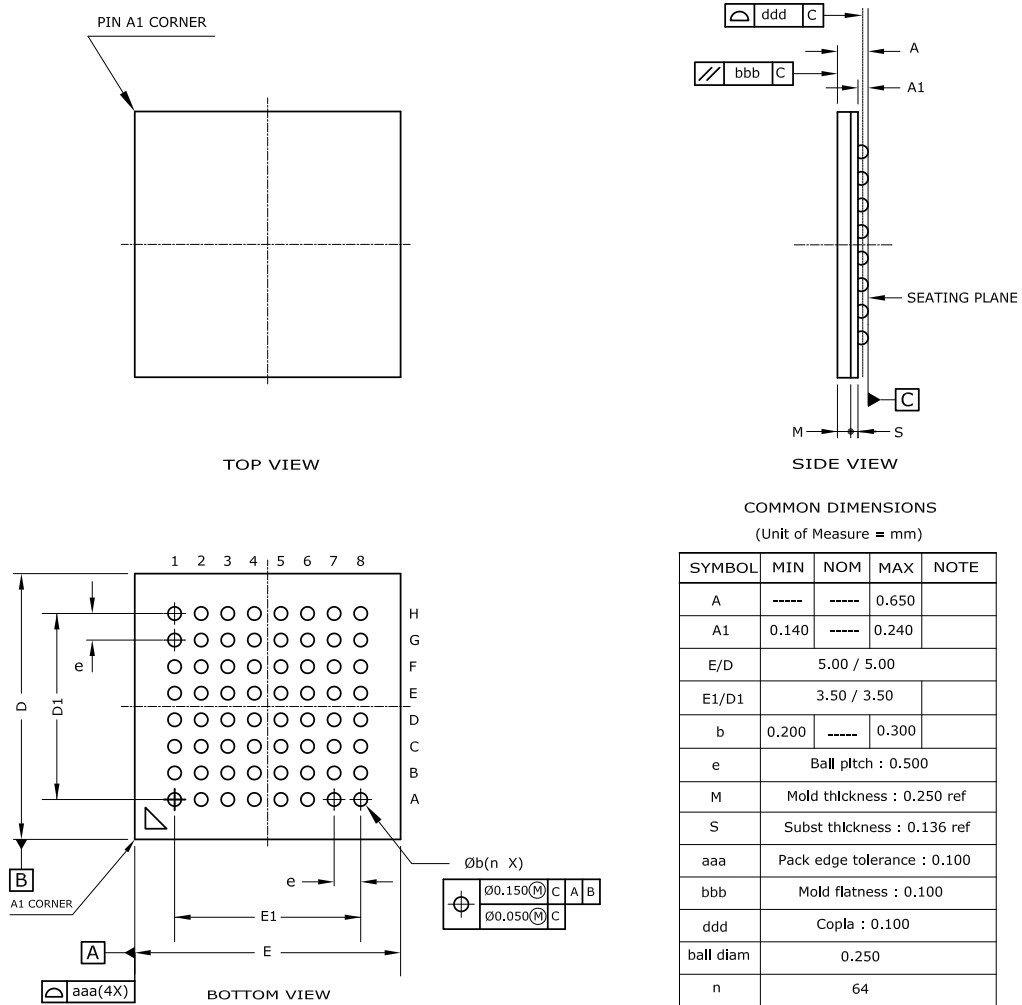
**Table 8-6. Package Characteristics**

|                            |      |
|----------------------------|------|
| 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 |
|------|----|

**Table 8-11. Device and Package Maximum Weight**

|     |    |
|-----|----|
| 140 | mg |
|-----|----|

**Table 8-12. Package Characteristics**

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

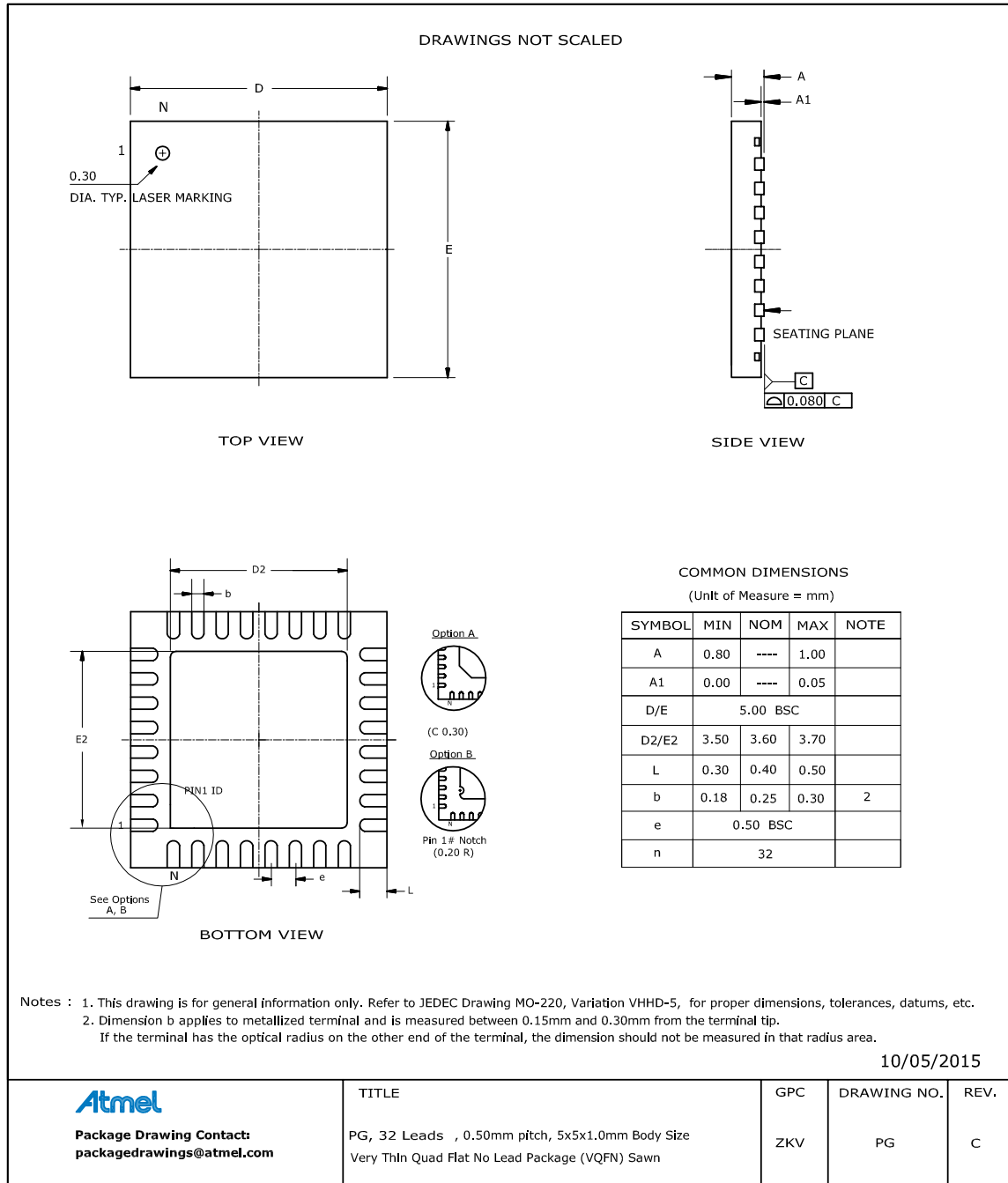
**Table 8-13. Package Reference**

|                         |        |
|-------------------------|--------|
| JEDEC Drawing Reference | MS-026 |
| JESD97 Classification   | E3     |

**Table 8-22. Package Reference**

|                         |        |
|-------------------------|--------|
| JEDEC Drawing Reference | MS-026 |
| JESD97 Classification   | E3     |

### 8.2.8. 32 pin QFN



**Note:** The exposed die attach pad is connected inside the device to GND and GNDANA.

**Table 8-23. Device and Package Maximum Weight**

|    |    |
|----|----|
| 90 | 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.