



## PCN / EOL Notification

**PCN Number: CC144901**

**Notification Date\*:** December 18, 2014

**Title:** AT24C32D to AT24C32E — 32-Kbit I<sup>2</sup>C-Compatible (Two Wire Interface) Industrial Temperature Grade (-40°C to 85°C) Serial EEPROM Process Optimization and Device Enhancement

**Product Identification:**

All package options of the Industrial Temperature Grade (-40°C to +85°C) version of the AT24C32D

**Reason for Change:**

- |                                                            |                                                 |
|------------------------------------------------------------|-------------------------------------------------|
| <input checked="" type="checkbox"/> Material / Composition | <input type="checkbox"/> Manufacturing Location |
| <input type="checkbox"/> Processing / Manufacturing        | <input type="checkbox"/> Quality / Reliability  |
| <input checked="" type="checkbox"/> Design / Firmware      | <input type="checkbox"/> Logistics              |
| <input checked="" type="checkbox"/> Datasheet              | <input type="checkbox"/> Other:                 |

**Change Description:**

Atmel has redesigned and improved its Industrial Temperature Grade (-40°C to +85°C) version of the 32-Kbit I<sup>2</sup>C-compatible Serial EEPROM and optimized the associated device's process. These changes have been made to enhance device performance and robustness. As a result, the Industrial Temperature Grade version of the AT24C32D is being replaced by the AT24C32E (please note the revision letter change from "D" to "E" in the base part number — see Table 2 for a list of full catalog part numbers). The AT24C32E is pin-to-pin and functionally backward compatible to the AT24C32D with the following exceptions and enhancements.

Supply Voltage (V<sub>CC</sub>) Range

With a growing number of MCUs, SoCs, and ASICs migrating to lower supply voltages as a result of process lithography reductions, and as the electronics industry in general also moves to lower supply voltages to reduce power consumption, Atmel developed the next-generation AT24C32E to enhance performance for these lower voltage requirements. Unlike the AT24C32D devices that operate over a 1.7V to 5.5V voltage range, the AT24C32E devices have been designed to operate from a **1.7V to 3.6V** supply. As a result, the AT24C32E has significant improvements and advantages over the AT24C32D devices with respect to power consumption, endurance, and noise suppression (see Table 1 for all differences).

*For applications operating at voltage levels above 3.6V, please contact Atmel ([MemoryPCN@atmel.com](mailto:MemoryPCN@atmel.com)) for details on continued availability of the AT24C32D and to request an exception to the Last Time Buy and Last Ship dates.*

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**Table 1**

| Parameter/Feature                    | AT24C32D                                                                     | AT24C32E                                                                                                   |
|--------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Operating Voltage                    | 1.7V to 5.5V                                                                 | 1.7V to 3.6V                                                                                               |
| Operating Temperature                | -40°C to +85°C                                                               | -40°C to +85°C                                                                                             |
| Endurance                            | 1,000,000 cycles<br>(Page Mode, +25°C, 3.3V)                                 | 1,000,000 cycles<br>(Byte or Page Mode, +25°C,<br>1.7V to 3.6V)                                            |
| Data Retention                       | 100 years                                                                    | 100 years                                                                                                  |
| Supply Current, Read                 | 0.4mA typ (5.0V, 100kHz)<br>1.0mA max (5.0V, 100kHz)                         | 0.08mA typ (1.8V, 400kHz)<br>0.3mA max (1.8V, 400kHz)<br>0.15mA typ (3.6V, 1MHz)<br>0.5mA max (3.6V, 1MHz) |
| Supply Current, Write                | 2.0mA typ (5.0V, 100kHz)<br>3.0mA max (5.0V, 100kHz)                         | 0.2mA typ (3.6V, 1MHz)<br>1.0mA max (3.6V, 1MHz)                                                           |
| Standby Current                      | 1.0µA max (1.7V)<br>6.0µA max (5.0V)                                         | 0.08µA typ (1.8V)<br>0.4µA max (1.8V)<br>0.1µA typ (3.6V)<br>0.8µA max (3.6V)                              |
| Maximum Clock Frequency              | 1MHz (2.5V min.)<br>400kHz (1.7V min.)                                       | 1MHz (2.5V min.)<br>400kHz (1.7V min.)                                                                     |
| Clock Pulse Width Low                | 1.3µs min (f <sub>SCL</sub> = 400kHz)<br>0.4µs min (f <sub>SCL</sub> = 1MHz) | 1.3µs min (f <sub>SCL</sub> = 400kHz)<br>0.5µs min (f <sub>SCL</sub> = 1MHz)                               |
| Clock Pulse Width High               | 0.6µs min (f <sub>SCL</sub> = 400kHz)<br>0.4µs min (f <sub>SCL</sub> = 1MHz) | 0.6µs min (f <sub>SCL</sub> = 400kHz)<br>0.4µs min (f <sub>SCL</sub> = 1MHz)                               |
| Input Filter Noise Suppression       | 100ns max (f <sub>SCL</sub> = 400kHz)<br>50ns max (f <sub>SCL</sub> = 1MHz)  | 100ns max (f <sub>SCL</sub> = 400kHz)<br>100ns max (f <sub>SCL</sub> = 1MHz)                               |
| Clock Low to Data Out Valid          | 900ns max (f <sub>SCL</sub> = 400kHz)<br>550ns max (f <sub>SCL</sub> = 1MHz) | 900ns max (f <sub>SCL</sub> = 400kHz)<br>450ns max (f <sub>SCL</sub> = 1MHz)                               |
| Bus Free Time Between Start and Stop | 1.2µs min (f <sub>SCL</sub> = 400kHz)<br>0.5µs min (f <sub>SCL</sub> = 1MHz) | 1.3µs min (f <sub>SCL</sub> = 400kHz)<br>0.5µs min (f <sub>SCL</sub> = 1MHz)                               |
| Input Rise Time                      | 300ns max (f <sub>SCL</sub> = 400kHz)<br>300ns max (f <sub>SCL</sub> = 1MHz) | 300ns max (f <sub>SCL</sub> = 400kHz)<br>100ns max (f <sub>SCL</sub> = 1MHz)                               |
| Input Fall Time                      | 300ns max (f <sub>SCL</sub> = 400kHz)<br>100ns max (f <sub>SCL</sub> = 1MHz) | 300ns max (f <sub>SCL</sub> = 400kHz)<br>100ns max (f <sub>SCL</sub> = 1MHz)                               |
| Write Cycle Time                     | 5ms max                                                                      | 5ms max                                                                                                    |
| Page Write Size                      | 32 bytes max                                                                 | 32 bytes max                                                                                               |
| Full Array Hardware Write Protect    | Yes                                                                          | Yes                                                                                                        |

**Identification Method to Distinguish Change:**

The revision letter in the base part number changes from “D” to “E”. New devices use the catalog part number AT24C32E, and Table 2 lists the full catalog part number combinations for each package option. Please refer to datasheet for part marking schemes for each package type.

**Table 2**

Note: Standard datasheet offerings are listed in the table; however, this PCN also applies to all special CAN (customer specific) part numbers that are not listed in the table.

| EOL Part Number  | Replacement Part Number         | Package     | Carrier Type          |
|------------------|---------------------------------|-------------|-----------------------|
| AT24C32D-PUM     | AT24C32E-PUM <sup>(1)</sup>     | PDIP        | Bulk                  |
| AT24C32D-SSH-M-B | AT24C32E-SSH-M-B                | SOIC        | Bulk                  |
| AT24C32D-SSH-M-T | AT24C32E-SSH-M-T                | SOIC        | Tape & Reel (4K/reel) |
| AT24C32D-XHM-B   | AT24C32E-XHM-B                  | TSSOP       | Bulk                  |
| AT24C32D-XHM-T   | AT24C32E-XHM-T                  | TSSOP       | Tape & Reel (5K/reel) |
| AT24C32D-MAHM-T  | AT24C32E-MAHM-T                 | UDFN        | Tape & Reel (5K/reel) |
| AT24C32D-MEHM-T  | none <sup>(2)</sup>             | XDFN        | Tape & Reel (5K/reel) |
| AT24C32D-STUM-T  | AT24C32E-STUM-T                 | SOT23       | Tape & Reel (5K/reel) |
| AT24C32D-UUM-T   | AT24C32E-UUM0B-T <sup>(3)</sup> | WLCSP       | Tape & Reel (5K/reel) |
| AT24C32D-CUM-T   | AT24C32E-CUM-T                  | VFBGA       | Tape & Reel (5K/reel) |
| AT24C32D-WWU11M  | AT24C32E-WWU11M                 | Wafer Sales | n/a                   |

Note 1: Contact Atmel regarding general PDIP availability.

Note 2: The 1.8x2.2mm XDFN package is no longer being offered on new products.

Note 3: The WLCSP 5-ball grid pattern used on the AT24C32D does not fit the new AT24C32E. A new 5-ball WLCSP is offered its place. The new device includes a backside coating to increase product robustness.

|                            |                                                                                                                                              |                                                                                                                                                |                                         |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Qualification Data:</b> | <input checked="" type="checkbox"/> Available                                                                                                | <input type="checkbox"/> Will be available (mm/dd/yr):                                                                                         | <input type="checkbox"/> Not Applicable |
| <b>Samples:</b>            | <input checked="" type="checkbox"/> Available<br>Now. Please contact Atmel Sales to submit Sample Request Form (samples in tape format only) | <input checked="" type="checkbox"/> Will be available (mm/dd/yr):<br>Online at Atmel Sample Center (www.atmel.com/samples):<br>January 1, 2015 | <input type="checkbox"/> Not Applicable |

**Quantifiable Impact on Quality & Reliability:**

No impact. Form, fit, and function over the 1.7V to 3.6V range remains unchanged.

**Forecasted Availability Date:** December 18, 2014

**Last Time Buy Date:** June 18, 2015

**Last Ship Date:** December 18, 2015

*\*All orders placed after the notification date are non-cancellable and non-returnable (NCNR).*

**Atmel Contact:** Please contact your Atmel Sales Representative or Distributor for additional information (when replying via e-mail please include the PCN number in subject line).

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