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Migrating from the Winbond 16-Mbit, 1.8 V device  
to the M69KM024A

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## **1 Introduction**

The purpose of this application note is to compare the specifications of the Winbond 16-Mbit, 1.8 V device to the M69KM024A. This information is important for migrating between the devices.

For specific information on these devices, please refer to their respective datasheets, available from your Numonyx sales office.

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## 2 Signals

The Winbond and M69KM024A devices share the same signals with differences in the following ones:

- CE2 (Winbond) and CRE (M69KM024A).  
In some cases Winbond CE2 is internally tied to Vcc by substrate. You must verify this with the final product specification of the multichip package.
- The M69KM024A has additional ADV, WAIT and CLOCK signals related to the burst mode.  
In asynchronous platforms, ADV and CLOCK must be tied to VSS and WAIT must not be connected.

## 3 Features

[Table 1](#) lists which device has which features.

**Table 1. Device features**

|                         | Winbond | M69KM024A |
|-------------------------|---------|-----------|
| Power-down modes        | Yes     | Yes       |
| Page mode               | No      | Yes       |
| Burst mode              | No      | Yes       |
| Burst mode              | No      | Yes       |
| Configuration registers | No      | Yes       |

## 4 DC specifications

[Table 2](#) lists the differences in the DC characteristics of the devices.

**Table 2. DC characteristic differences**

| Offset | Description                            | Winbond   |           | M69KM024A |            | Unit |
|--------|--|-----------|-----------|-----------|------------|------|
|        |  | Min       | Max       | Min       | Max        |      |
| VCC    | Voltage range                          | 1.7       | 1.95      | 1.7       | 1.95       | V    |
| ICC1   | Operating current @ minimum cycle time |           | 20        |           | 20         | mA   |
| ISB    | Standby current                        |           | 100       |           | 70         | µA   |
| VOH    | Output High voltage                    | 1.4       |           | 0.8 VCCQ  |            | V    |
| VOL    | Output Low voltage                     | - 0.1     | 0.2       |           | 0.2 VCCQ   | V    |
| VIH    | Input High voltage                     | VCC * 0.8 | VCC + 0.2 | 1.4       | VCCQ + 0.2 | V    |
| VIL    | Input Low voltage                      | -0.2      | 0.4       | -0.2      | 0.4        | V    |

## 5 AC timing specifications

[Table 3](#) lists the differences in the read operation AC characteristics of the devices.

**Table 3. Read operations differences (in ns)**

| Offset | Description                        | Winbond |      | M69KM024A |     |
|--------|------------------------------------|---------|------|-----------|-----|
|        |                                    | Min     | Max  | Min       | Max |
| tRC    | Read cycle time @ VCC min. = 1.7 V | 70      | 8000 | 70        | -   |
|        | Read cycle time @ VDD min. = 1.8 V |         |      |           |     |
| tCE    | CE access time                     | -       | 70   | -         | 70  |
| tOE    | OE access time                     | -       | 45   | -         | 20  |
| tAA    | Address access time                | -       | 70   | -         | 70  |
| tBA    | LB/UB access time                  | -       | 70   | -         | 70  |
| tOH    | Output data hold time              | 0       | -    | 5         | -   |
| tCLZ   | CE Low to output Low Z             | 5       | -    | 10        | -   |
| tOLZ   | OE Low to output Low Z             | 0       | -    | 3         | -   |
| tBLZ   | LB/UB Low to output Low Z          | 0       | -    | 10        | -   |
| tCHZ   | CE High to output High Z           | 0       | 25   | -         | 8   |
| tOHZ   | OE High to output High Z           | 0       | 25   | -         | 8   |
| tBHZ   | LB/UB High to output High Z        | 0       | 25   | -         | 8   |
| tCP    | CE High pulse width                | 10      | -    | 5         | -   |

There are additional timings in the M69KM024A that are related to the burst functionality.

Table 4 lists the differences in the write operation AC characteristics of the devices.

**Table 4. Write operations differences (in ns)**

| Offset | Description                         | Winbond |      | M69KM024A |      |
|--------|-------------------------------------|---------|------|-----------|------|
|        |                                     | Min     | Max  | Min       | Max  |
| tWC    | Write cycle time @ VCC min. = 1.7 V | 70      | 8000 | 70        | 4000 |
|        | Write cycle time @ VDD min. = 1.8 V |         |      |           |      |
| tAS    | Address setup time                  | 0       | -    | 0         | -    |
| tCW    | CE1 write pulse width               | 60      | -    | 70        | -    |
| tWP    | WE write pulse width                | 55      | -    | 45        | -    |
| tBW    | LB/UB write pulse width             | 60      | -    | 70        | -    |
| tWRC   | CE1 write recovery time             | -       | -    | 0         | -    |
| tWR    | WE write recovery time              | 0       | -    | 0         | -    |
| tBR    | LB/UB write recovery time           | -       | -    | 0         | -    |
| tDS    | Data setup time                     | 25      | -    | 20        | -    |
| tDH    | Data hold time                      | 0       | -    | 0         | -    |
| tAW    | Address valid to end of write       | 60      | -    | 70        | -    |
| tWHP   | WE High pulse width                 | 10      | -    | 10        | -    |
| tCP    | CE High pulse width                 | -       | -    | 5         | -    |

The M69KM024A requires 70 ns to complete write operations and also has additional timings related to the burst functionality.

## 6 Conclusion

The M69KM024A can be considered as a drop-in replacement for the Winbond device. When migrating to M69KM024A, keep in mind that there are some differences in the DC and AC characteristics.

In asynchronous platforms, be sure to properly connect the additional pins for burst mode. The M69KM024A can improve system performance by enabling the burst mode feature.

## 7 Revision history

**Table 5. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 24-Apr-2008 | 1        | Initial release. |

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