

# AK591024AS / AK591024AG

## 1,048,576 Word X 9 bit, CMOS

### Dynamic Random Access Memory

#### DESCRIPTION

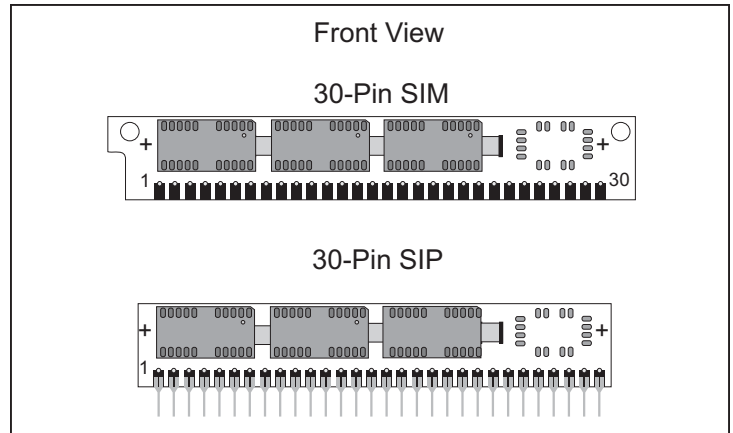
The Accutek AK591024 high density memory modules is a random access memory organized in 1 Meg x 9 bit words. The assembly consists of two 1 Meg x 4 and one 1 Meg x 1 DRAMs in surface mount packages mounted on the front side of a printed circuit board. The module can be configured as a leadless 30 pad SIM or a leaded 30 pin SIP. This packaging approach provides a better than 6 to 1 density increase over standard DIP packaging.

The operation of the AK591024 is identical to two 1 Meg x 4 plus one 1 Meg x 1 DRAMs. For the lower eight bits, the data input is tied to data output and brought out separately for each 1 Meg x 4 device, with common  $\overline{\text{RAS}}$ ,  $\overline{\text{CAS}}$  and  $\overline{\text{WE}}$  control. The  $\overline{\text{OE}}$  pins are tied to  $V_{\text{ss}}$  which dictates the use of early-write cycles to prevent contention of D and Q. Since the Write-Enable ( $\overline{\text{WE}}$ ) signal must always go low before  $\overline{\text{CAS}}$  in a write cycle, Read-Write and Read-Modify-Write operation is not possible. For the ninth bit, the data input ( $D_9$ ) and data output ( $Q_9$ ) pins are brought out separately and controlled by a separate  $\overline{\text{PCAS}}$  for that bit. Bit nine is generally used for parity.

#### FEATURES

- 1,048,576 x 9 bit organization
- Optional 30 Pad SIM (Single In-Line Module) or 30 Pin leaded SIP (Single In-Line Package)
- JEDEC standard pinout
- Common  $\overline{\text{CAS}}$ ,  $\overline{\text{RAS}}$  and  $\overline{\text{WE}}$  control for the lower eight bits
- 1024 refresh cycles/16ms
- Separate  $\overline{\text{PCAS}}$  control for  $D_9$  and  $Q_9$

- Power:
  - 1.650 Watt Max Active (60 nS)
  - 1.485 Watt Max Active (70 nS)
  - 1.265 Watt Max Active (80 nS)
  - 23.5 mWatt Standby (max)
- Operating free air temperature: 0° to 70°C
- Upward compatible with and AK594096 and AK5916384
- Downward compatible with AK59256
- Functionally and Pin compatible with AK491024



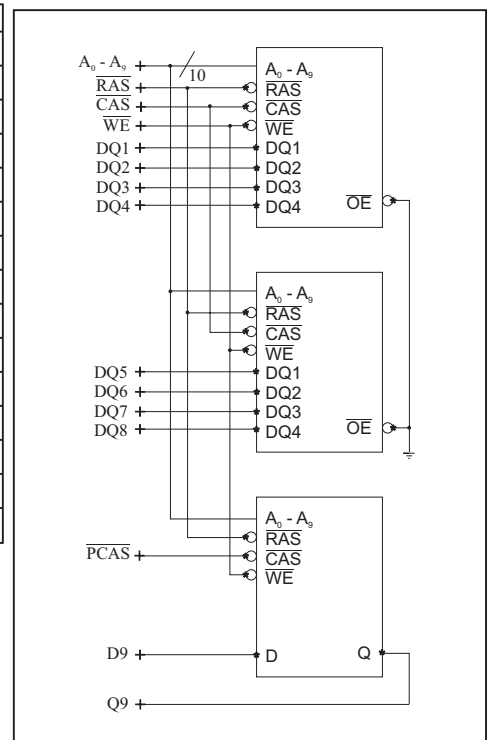
#### PIN NOMENCLATURE

|  |                       |
|--|-----------------------|
| DQ <sub>1</sub> - DQ <sub>8</sub>                  | Data In / Data Out    |
| D <sub>9</sub>                                     | Data In               |
| Q <sub>9</sub>                                     | Data Out              |
| A <sub>0</sub> - A <sub>9</sub>                    | Address Inputs        |
| $\overline{\text{CAS}}$ , $\overline{\text{PCAS}}$ | Column Address Strobe |
| $\overline{\text{RAS}}$                            | Row Address Strobe    |
| $\overline{\text{WE}}$                             | Write Enable          |
| V <sub>cc</sub>                                    | 5v Supply             |
| V <sub>ss</sub>                                    | Ground                |
| NC   | No Connect            |

#### PIN ASSIGNMENT

| PIN # | SYMBOL                  | PIN # | SYMBOL                   |
|-------|-------------------------|-------|--------------------------|
| 1     | V <sub>cc</sub>         | 16    | DQ <sub>5</sub>          |
| 2     | $\overline{\text{CAS}}$ | 17    | A <sub>8</sub>           |
| 3     | DQ <sub>1</sub>         | 18    | A <sub>9</sub>           |
| 4     | A <sub>0</sub>          | 19    | NC                       |
| 5     | A <sub>1</sub>          | 20    | DQ <sub>6</sub>          |
| 6     | DQ <sub>2</sub>         | 21    | $\overline{\text{WE}}$   |
| 7     | A <sub>2</sub>          | 22    | V <sub>ss</sub>          |
| 8     | A <sub>3</sub>          | 23    | DQ <sub>7</sub>          |
| 9     | V <sub>ss</sub>         | 24    | NC                       |
| 10    | DQ <sub>3</sub>         | 25    | DQ <sub>8</sub>          |
| 11    | A <sub>4</sub>          | 26    | Q <sub>9</sub>           |
| 12    | A <sub>5</sub>          | 27    | $\overline{\text{RAS}}$  |
| 13    | DQ <sub>4</sub>         | 28    | $\overline{\text{PCAS}}$ |
| 14    | A <sub>6</sub>          | 29    | D <sub>9</sub>           |
| 15    | A <sub>7</sub>          | 30    | V <sub>cc</sub>          |

#### FUNCTIONAL DIAGRAM



#### MODULE OPTIONS

|                           |
|---------------------------|
| Leadless SIM: AK591024ASP |
| Leaded SIP: AK591024AGP   |
|                           |

## ORDERING INFORMATION

### PART NUMBER CODING INTERPRETATION

| Position                                      | 1  | 2 | 3 | 4 | 5          | 6 | 7 | 8 |
|---|--|---|---|---|------------|---|---|---|
| <b>1 Product</b>                              |  |   |   |   |            |   |   |   |
|   | <b>AK = Accuthek Memory</b>                        |   |   |   |            |   |   |   |
| <b>2 Type</b>                                 |  |   |   |   |            |   |   |   |
|   | 4 = Dynamic RAM                                    |   |   |   |            |   |   |   |
|   | 5 = CMOS Dynamic RAM                               |   |   |   |            |   |   |   |
|   | 6 = Static RAM                                     |   |   |   |            |   |   |   |
| <b>3 Organization/Word Width</b>              |  |   |   |   |            |   |   |   |
|   | 1 = by 1 16 = by 16                                |   |   |   |            |   |   |   |
|   | 4 = by 4 32 = by 32                                |   |   |   |            |   |   |   |
|   | 8 = by 8 36 = by 36                                |   |   |   |            |   |   |   |
|   | 9 = by 9   |   |   |   |            |   |   |   |
| <b>4 Size/Bits Depth</b>                      |  |   |   |   |            |   |   |   |
|   | 64 = 64K 4096 = 4 MEG                              |   |   |   |            |   |   |   |
|   | 256 = 256K 8192 = 8 MEG                            |   |   |   |            |   |   |   |
|   | 1024 = 1 MEG 16384 = 16 MEG                        |   |   |   |            |   |   |   |
| <b>5 Package Type</b>                         |  |   |   |   |            |   |   |   |
|   | G = Single In-Line Package (SIP)                   |   |   |   |            |   |   |   |
|   | S = Single In-Line Module (SIM)                    |   |   |   |            |   |   |   |
|   | D = Dual In-Line Package (DIP)                     |   |   |   |            |   |   |   |
|   | W = .050 inch Pitch Edge Connect                   |   |   |   |            |   |   |   |
|   | Z = Zig-Zag In-Line Package (ZIP)                  |   |   |   |            |   |   |   |
| <b>6 Special Designation</b>                  |  |   |   |   |            |   |   |   |
|   | P = Page Mode                                      |   |   |   |            |   |   |   |
|   | N = Nibble Mode                                    |   |   |   |            |   |   |   |
|   | K = Static Column Mode                             |   |   |   |            |   |   |   |
|   | W = Write Per Bit Mode                             |   |   |   |            |   |   |   |
|   | V = Video Ram                                      |   |   |   |            |   |   |   |
| <b>7 Separator</b>                            |  |   |   |   |            |   |   |   |
|   | - = Commercial 0°C to +70°C                        |   |   |   |            |   |   |   |
|   | M = Military Equivalent Screened (-55°C to +125°C) |   |   |   |            |   |   |   |
|   | I = Industrial Temperature Tested (-45°C to +85°C) |   |   |   |            |   |   |   |
|   | X = Burned In                                      |   |   |   |            |   |   |   |
| <b>8 Speed (first two significant digits)</b> |  |   |   |   |            |   |   |   |
|   | DRAMS  |   |   |   | SRAMS      |   |   |   |
|   | 50 = 50 nS   |   |   |   | 8 = 8 nS   |   |   |   |
|   | 60 = 60 nS   |   |   |   | 10 = 10 nS |   |   |   |
|   | 70 = 70 nS   |   |   |   | 12 = 12 nS |   |   |   |
|   | 80 = 80 nS   |   |   |   | 15 = 15 nS |   |   |   |

The numbers and coding on this page do not include all variations available but are shown as examples of the most widely used variations. Contact Accuthek if other information is required.

### EXAMPLES:

#### AK591024AGP-60

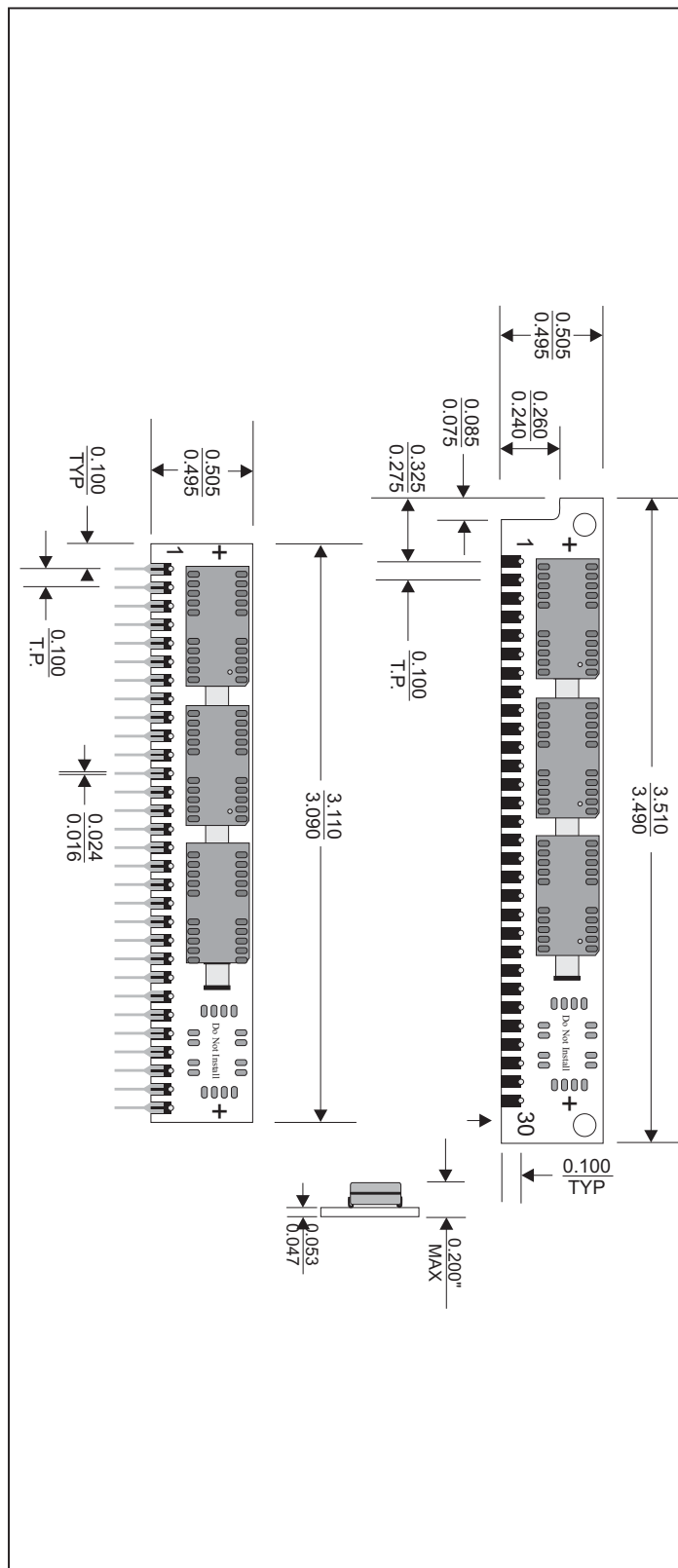
1 Meg x 9, 60 nSEC, DRAM, SIP Configuration, 30 Pin

#### AK591024ASP-70

1 Meg x 9, 70 nSEC, DRAM, SIM Configuration, 30 Pin

## MECHANICAL DIMENSIONS

Inches



Accuthek reserves the right to make changes in specifications at any time and without notice. Accuthek does not assume any responsibility for the use of any circuitry described; no circuit patent licenses are implied. Preliminary data sheets contain minimum and maximum limits based upon design objectives, which are subject to change upon full characterization over the specific operating conditions.



5 NEW PASTURE ROAD  
NEWBURYPORT, MA 01950-4040  
PHONE: 978-465-6200 FAX: 978-462-3396  
Email: sales@accutekmicro.com  
Internet: www.accutekmicro.com