

AK5322048N

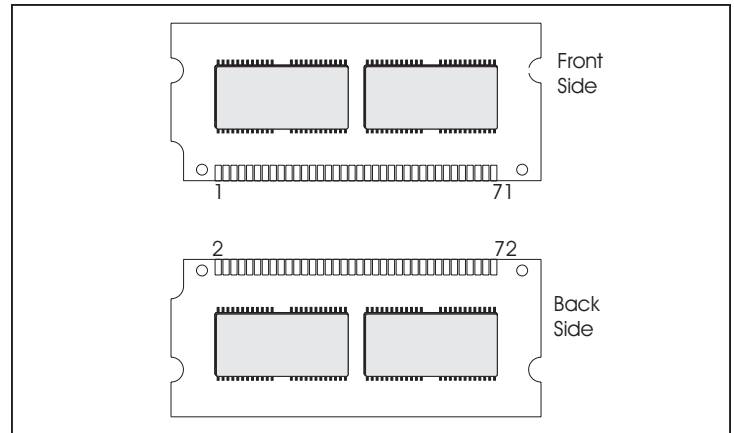
2,097,152 Word by 32 Bit CMOS Dynamic Random Access Memory

DESCRIPTION

The Accutek AK5322048N high density memory module is a CMOS dynamic RAM organized in 2048K x 32 bit words. The module consists of four standard 1 Meg x 16 DRAMs in plastic TSOP packages. The assembly has 2 drams mounted on each side of a printed circuit board in a 72 pad leadless Dual Row Sodim configuration.

This configuration allows socket-mounting of large quantities of memory in applications where high density and ease of inserting additional memory are important.

The operation of the AK5322048A is identical to four 1M x 16 Drams. There are four CAS lines and four RAS lines. On each bank of 1M x 32, independent byte control is accomplished by four $\overline{\text{CAS}}$ lines. Each separate $\overline{\text{CAS}}$ line controls one byte of the 1M x 16 Dram. Two banks of 32 bits are controlled by the two pairs of RAS lines. A sixteen bit data path can be produced by connecting DQ_0 to DQ_{16} , DQ_1 to DQ_{17} etc. and alternately strobing $\overline{\text{RAS}}_0$ with $\overline{\text{RAS}}_1$ and $\overline{\text{RAS}}_2$ with $\overline{\text{RAS}}_3$.



FEATURES

- 2,097,152 x 32 bit organization
- 72 pad Dual Row Sodim Module
- Multiple $\overline{\text{CAS}}$ and $\overline{\text{RAS}}$ lines allow x16 or x32 bit widths
- $\overline{\text{CAS}}$ -before- $\overline{\text{RAS}}$, $\overline{\text{RAS}}$ -only or hidden refresh
- Operating free air temperature 0°C to 70°C
- Single 5 Volt Power Supply
- 1024 Refresh Cycles, 16 mSEC

- Available in Fast Page Mode and Static Column Mode versions
- Power
 - 1.80 Watt Max Active (60nS)
 - 1.66 Watt Max Active (70 nS)
 - 1.44 Watt Max Active (80 nS)
 - 22 mW Max Standby Available

ADDITIONAL OPTIONS AVAILABLE

1 Meg x 32 version, AK5321024N

PIN NOMENCLATURE

| | |
|---|-----------------------|
| DQ ₀ - DQ ₃₁ | Data In/Data Out |
| A ₀ - A ₉ | Address Inputs |
| $\overline{\text{CAS}}_0$ - $\overline{\text{CAS}}_3$ | Column Address Strobe |
| $\overline{\text{RAS}}_0$ - $\overline{\text{RAS}}_3$ | Row Address Strobe |
| $\overline{\text{WE}}$ | Write Enable |
| PD ₀ - PD ₆ | Presence Detect |
| V _{cc} | 5v Supply |
| V _{ss} | Ground |
| NC | No Connect |

MODULE OPTIONS

Leadless SODIM: AK5322048N

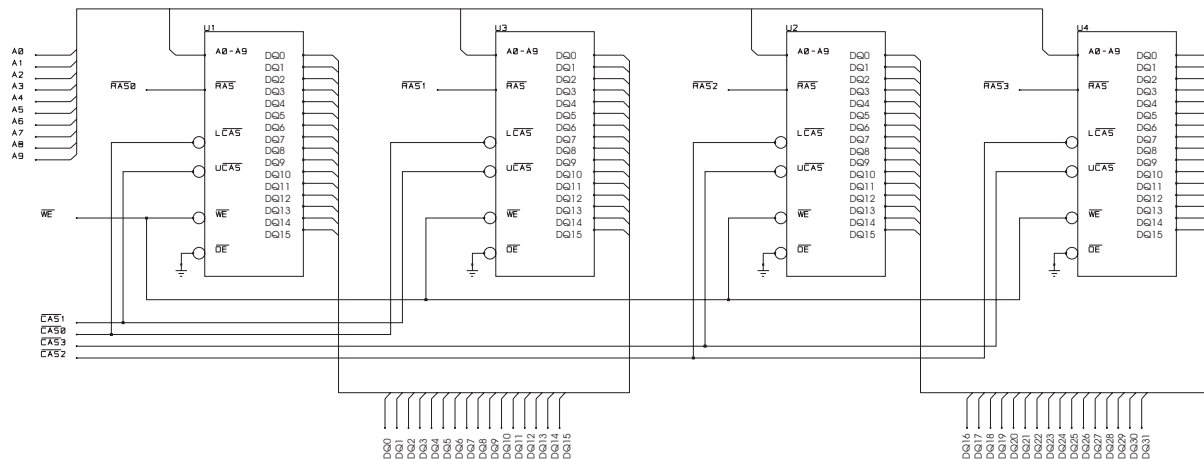
PIN ASSIGNMENT

| PIN # | SYMBOL | PIN # | SYMBOL | PIN # | SYMBOL | PIN # | SYMBOL |
|-------|-----------------|-------|---------------------------|-------|---------------------------|-------|-----------------|
| 1 | V _{ss} | 19 | NC | 37 | DQ16 | 55 | NC |
| 2 | DQ0 | 20 | NC | 38 | DQ17 | 56 | DQ24 |
| 3 | DQ1 | 21 | DQ8 | 39 | V _{ss} | 57 | DQ25 |
| 4 | DQ2 | 22 | DQ9 | 40 | $\overline{\text{CAS}}_0$ | 58 | DQ26 |
| 5 | DQ3 | 23 | DQ10 | 41 | $\overline{\text{CAS}}_2$ | 59 | DQ28 |
| 6 | DQ4 | 24 | DQ11 | 42 | $\overline{\text{CAS}}_3$ | 60 | DQ27 |
| 7 | DQ5 | 25 | DQ12 | 43 | $\overline{\text{CAS}}_1$ | 61 | V _{cc} |
| 8 | DQ6 | 26 | DQ13 | 44 | $\overline{\text{RAS}}_0$ | 62 | DQ29 |
| 9 | DQ7 | 27 | DQ14 | 45 | $\overline{\text{RAS}}_1$ | 63 | DQ30 |
| 10 | V _{cc} | 28 | A7 | 46 | NC | 64 | DQ31 |
| 11 | PD0 | 29 | NC | 47 | $\overline{\text{WE}}$ | 65 | NC |
| 12 | A0 | 30 | V _{cc} | 48 | NC | 66 | PD1 |
| 13 | A1 | 31 | A8 | 49 | DQ18 | 67 | PD2 |
| 14 | A2 | 32 | A9 | 50 | DQ19 | 68 | PD3 |
| 15 | A3 | 33 | $\overline{\text{RAS}}_3$ | 51 | DQ20 | 69 | PD4 |
| 16 | A4 | 34 | $\overline{\text{RAS}}_2$ | 52 | DQ21 | 70 | PD5 |
| 17 | A5 | 35 | DQ15 | 53 | DQ22 | 71 | PD6 |
| 18 | A6 | 36 | NC | 54 | DQ23 | 72 | V _{ss} |

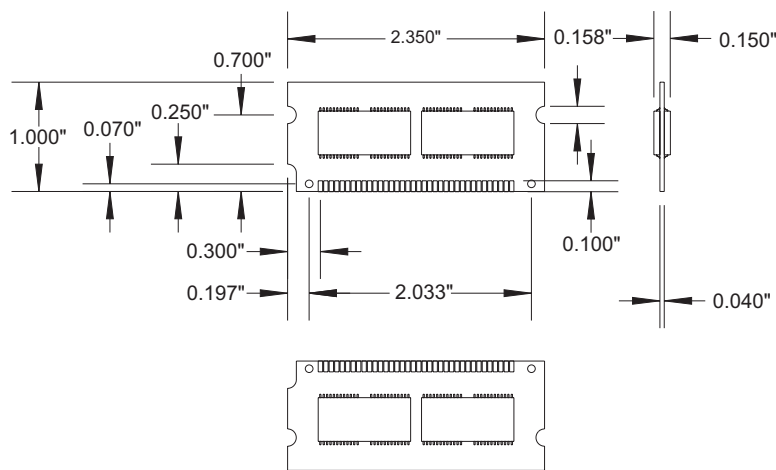
Presence Detect -

| Access Time | PD ₀ | PD ₁ | PD ₂ | PD ₃ | PD ₄ | PD ₅ | PD ₆ |
|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| -60 | NC | V _{ss} | V _{ss} | V _{ss} | NC | NC | NC |
| -70 | NC | V _{ss} | V _{ss} | V _{ss} | V _{ss} | NC | NC |

FUNCTIONAL DIAGRAM



MECHANICAL DIMENSIONS



ORDER INFORMATION

PART NUMBER CODING INTERPRETATION

| Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------|---|---|---|---|---|---|---|---|
| 1 Product | AK = Accutek Memory | | | | | | | |
| 2 Type | 4 = Dynamic RAM 5 = CMOS Dynamic RAM 6 = Static RAM | | | | | | | |
| 3 Organization/Word Width | 1 = by 1 16 = by 16 4 = by 4 32 = by 32 8 = by 8 36 = by 36 9 = by 9 | | | | | | | |
| 4 Size/Bits Depth | 64 = 64K 4096 = 4 MEG 256 = 256K 8192 = 8 MEG 1024 = 1 MEG 16384 = 16 MEG | | | | | | | |

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 Accutek if other information is required.

Position

1 2 3 4 5 6 7 8

| | | | | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|-------|-------|------------|------------|------------|------------|------------|-----------|
| 5 Package Type | G = Single In-Line Package (SIP) S = Single In-Line Module (SIM) D = Dual In-Line Package (DIP) W = .050 inch Pitch Edge Connect N = Dual Row Sodim Z = Zig-Zag In-Line Package (ZIP) | | | | | | | | | | | | | | | |
| 6 Special Designation | P = Page Mode N = Nibble Mode K = Static Column Mode W = Write Per Bit Mode V = Video Ram | | | | | | | | | | | | | | | |
| 7 Separator | - = 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 | | | | | | | | | | | | | | | |
| 8 Speed (first two significant digits) | <table border="0"> <tr> <td>DRAMS</td> <td>SRAMS</td> </tr> <tr> <td>60 = 60 nS</td> <td>12 = 12 nS</td> </tr> <tr> <td>70 = 70 nS</td> <td>15 = 15 nS</td> </tr> <tr> <td>80 = 80 nS</td> <td>20 = 20nS</td> </tr> </table> | | | | | | | | DRAMS | SRAMS | 60 = 60 nS | 12 = 12 nS | 70 = 70 nS | 15 = 15 nS | 80 = 80 nS | 20 = 20nS |
| DRAMS | SRAMS | | | | | | | | | | | | | | | |
| 60 = 60 nS | 12 = 12 nS | | | | | | | | | | | | | | | |
| 70 = 70 nS | 15 = 15 nS | | | | | | | | | | | | | | | |
| 80 = 80 nS | 20 = 20nS | | | | | | | | | | | | | | | |



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