



## 8K x 8 SRAM

### SRAM MEMORY ARRAY

### AVAILABLE AS MILITARY SPECIFICATIONS

- SMD 5962-38294
- MIL-STD-883

### FEATURES

- High Speed: 12, 15, 20, 25, 35, 45, 55, and 70ns
- Battery Backup: 2V data retention
- High-performance, low-power CMOS double-metal process
- Single +5V ( $\pm 10\%$ ) Power Supply
- Easy memory expansion with CE1\ and CE2
- All inputs and outputs are TTL compatible

### OPTIONS

#### • Timing

|             |      |
|-------------|------|
| 12ns access | -12  |
| 15ns access | -15  |
| 20ns access | -20  |
| 25ns access | -25  |
| 35ns access | -35  |
| 45ns access | -45  |
| 55ns access | -55* |
| 70ns access | -70* |

#### • Package(s)

|                       |    |         |
|-----------------------|----|---------|
| Ceramic DIP (300 mil) | C  | No. 108 |
| Ceramic LCC           | EC | No. 204 |
| Ceramic Flatpack      | F  | No. 302 |

#### • Operating Temperature Ranges

|                             |    |
|-----------------------------|----|
| Industrial (-40°C to +85°C) | IT |
| Military (-55°C to +125°C)  | XT |

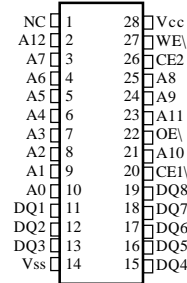
- 2V data retention/low power L

\*Electrical characteristics identical to those provided for the 45ns access devices.

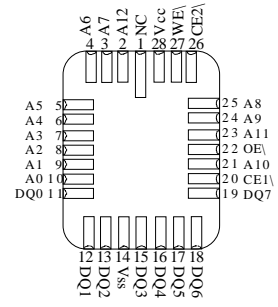
**For more products and information  
please visit our web site at  
[www.austinsemiconductor.com](http://www.austinsemiconductor.com)**

### PIN ASSIGNMENT (Top View)

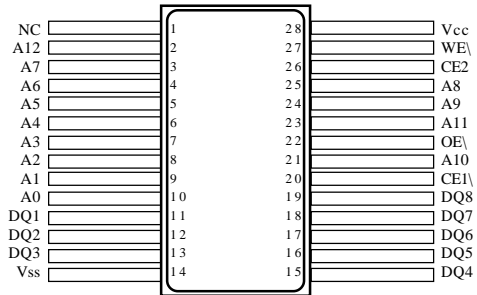
28-Pin DIP (C)  
(300 MIL)



28-Pin LCC (EC)



28-Pin Flat Pack (F)



### GENERAL DESCRIPTION

The MT5C6408, 8K x 8 SRAM, employs high-speed, low-power CMOS technology, eliminating the need for clocks or refreshing. These SRAM's have equal access and cycle times.

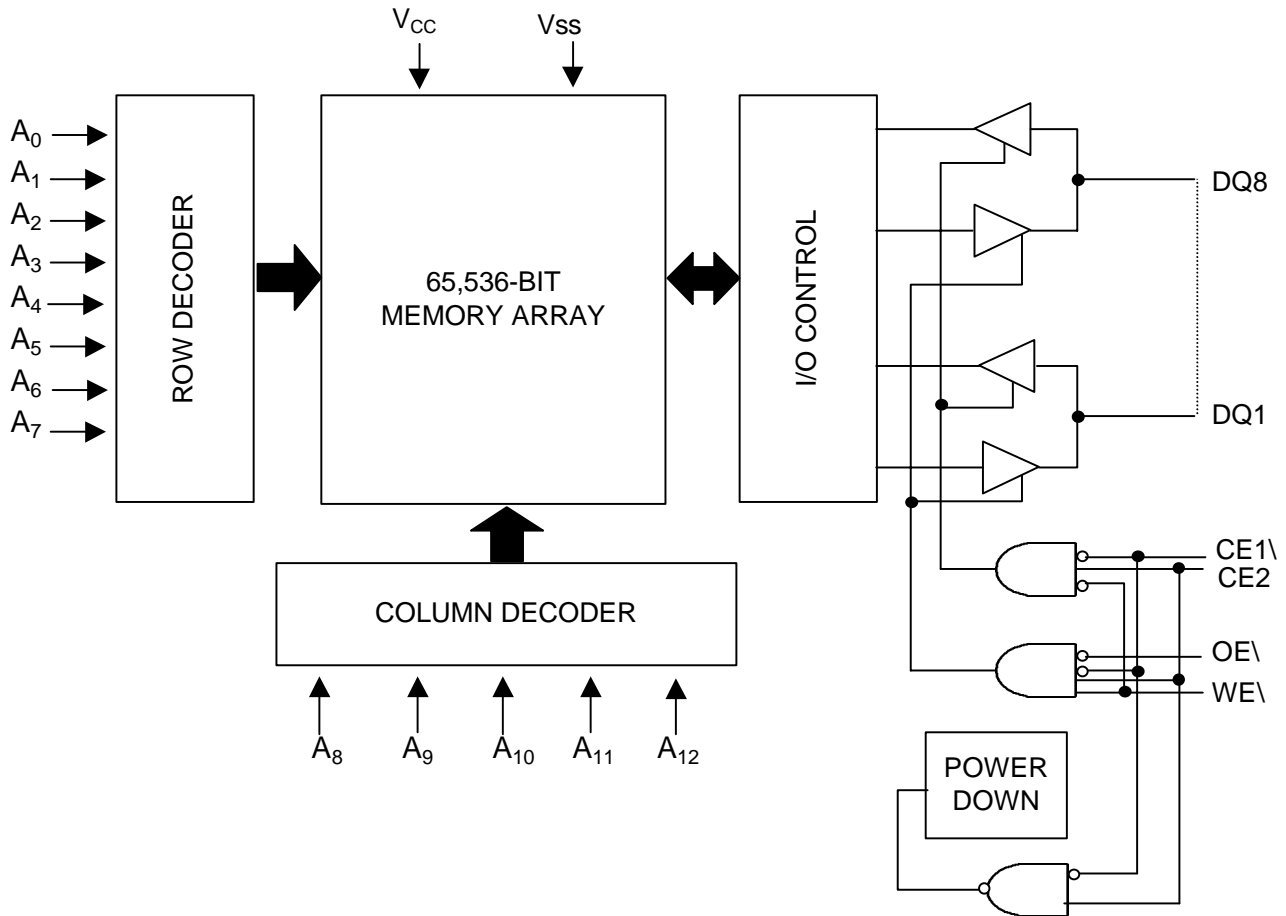
For flexibility in high-speed memory applications, Austin Semiconductor offers dual chip enables (CE1\, CE2) and output enable (OE\ ) capability. These enhancements can place the outputs in High-Z for additional flexibility in system design.

Writing to these devices is accomplished when write enable (WE\ ) and CE1\ inputs are both LOW and CE2 is HIGH. Reading is accomplished when WE\ and CE2 remain HIGH and CE1\ and OE\ go LOW. The device offers a reduced power standby mode when disabled. This allows system designs to achieve low standby power requirements.

These devices operate from a single +5V power supply and all inputs and outputs are fully TTL compatible.



**FUNCTIONAL BLOCK DIAGRAM**



**TRUTH TABLE**

| MODE    | CE1\ | CE2 | WE\ | OE\ | DQ     | POWER   |
|---------|------|-----|-----|-----|--------|---------|
| STANDBY | H    | X   | X   | X   | HIGH-Z | STANDBY |
| STANDBY | X    | L   | X   | X   | HIGH-Z | STANDBY |
| READ    | L    | H   | H   | L   | Q      | ACTIVE  |
| READ    | L    | H   | H   | H   | HIGH-Z | ACTIVE  |
| WRITE   | L    | H   | L   | X   | D      | ACTIVE  |



**ABSOLUTE MAXIMUM RATINGS\***

|   |                 |
|---|-----------------|
| Voltage on any Input or DQ Relative to Vss..... | -0.5V to +7.0V  |
| Voltage on Vcc Supply Relative to Vss.....      | -0.5V to +7.0V  |
| Storage Temperature.....                        | -65°C to +150°C |
| Power Dissipation.....                          | 1W              |
| Max Junction Temperature.....                   | +175°C          |
| Lead Temperature (soldering 10 seconds).....    | +260°C          |
| Short Circuit Output Current.....               | 50mA            |

\*Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

**ELECTRICAL CHARACTERISTICS AND RECOMMENDED DC OPERATING CONDITIONS**

(-55°C ≤ T<sub>c</sub> ≤ 125°C; V<sub>cc</sub> = 5V ±10%)

| DESCRIPTION                  | CONDITIONS  | SYMBOL          | MIN  | MAX                  | UNITS | NOTES |
|------------------------------|---|-----------------|------|----------------------|-------|-------|
| Input High (Logic 1) Voltage |   | V <sub>IH</sub> | 2.2  | V <sub>cc</sub> +0.5 | V     | 1     |
| Input Low (Logic 0) Voltage  |   | V <sub>IL</sub> | -0.5 | 0.8                  | V     | 1, 2  |
| Input Leakage Current        | 0V ≤ V <sub>IN</sub> ≤ V <sub>cc</sub>                        | I <sub>LI</sub> | -10  | 10                   | μA    |       |
| Output Leakage Current       | Output(s) disabled<br>0V ≤ V <sub>OUT</sub> ≤ V <sub>cc</sub> | I <sub>LO</sub> | -10  | 10                   | μA    |       |
| Output High Voltage          | I <sub>OH</sub> = -4.0mA                                      | V <sub>OH</sub> | 2.4  |                      | V     | 1     |
| Output Low Voltage           | I <sub>OL</sub> = 8.0mA                                       | V <sub>OL</sub> |      | 0.4                  | V     | 1     |

| PARAMETER                       | CONDITIONS   | SYM                | MAX |     |     |     |     |     | UNITS | NOTES |
|---------------------------------|--|--------------------|-----|-----|-----|-----|-----|-----|-------|-------|
|                                 |  |                    | -12 | -15 | -20 | -25 | -35 | -45 |       |       |
| Power Supply Current: Operating | CE ≤ V <sub>IL</sub> ; V <sub>cc</sub> = MAX<br>f = MAX = 1/t <sub>RC</sub> (MIN)<br>Output Open                       | I <sub>CC</sub>    | 180 | 170 | 160 | 155 | 155 | 145 | mA    | 3     |
| Power Supply Current: Standby   | CE ≥ V <sub>IH</sub> ; All Other Inputs ≤ V <sub>IL</sub> or ≥ V <sub>IH</sub> , V <sub>cc</sub> = MAX<br>f = 0 Hz     | I <sub>SBTSP</sub> | 40  | 40  | 40  | 40  | 40  | 40  | mA    |       |
|                                 |  | I <sub>SBTLP</sub> | 30  | 30  | 30  | 30  | 30  | 30  | mA    |       |
|                                 | CE ≥ (V <sub>cc</sub> - 0.2); V <sub>cc</sub> = MAX<br>All Other Inputs ≤ 0.2V or ≥ (V <sub>cc</sub> - 0.2V), f = 0 Hz | I <sub>SBCSP</sub> | 20  | 20  | 20  | 20  | 20  | 20  | mA    |       |
|                                 |  | I <sub>SBCLP</sub> | 10  | 10  | 10  | 10  | 10  | 10  | mA    |       |

**CAPACITANCE**

| DESCRIPTION        | CONDITIONS  | SYM            | MAX | UNITS | NOTES |
|--------------------|---|----------------|-----|-------|-------|
| Input Capacitance  | T <sub>A</sub> = 25°C, f = 1MHz<br>V <sub>cc</sub> = 5V | C <sub>I</sub> | 6   | pF    | 4     |
| Output Capacitance |   | C <sub>O</sub> | 7   | pF    | 4     |



**ELECTRICAL CHARACTERISTICS AND RECOMMENDED AC OPERATING CONDITIONS**

(Note 5) (-55°C ≤ T<sub>c</sub> ≤ 125°C; V<sub>cc</sub> = 5V ±10%)

| DESCRIPTION                        | SYMBOL            | -12 |     | -15 |     | -20 |     | -25 |     | -35 |     | -45 |     | UNITS | NOTES |
|------------------------------------|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|
|                                    |                   | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX |       |       |
| <b>READ CYCLE</b>                  |                   |     |     |     |     |     |     |     |     |     |     |     |     |       |       |
| READ cycle time                    | t <sub>RC</sub>   | 12  |     | 15  |     | 20  |     | 25  |     | 35  |     | 45  |     | ns    |       |
| Address access time                | t <sub>AA</sub>   |     | 12  |     | 15  |     | 20  |     | 25  |     | 35  |     | 45  | ns    |       |
| Chip Enable access time            | t <sub>ACE</sub>  |     | 12  |     | 15  |     | 20  |     | 25  |     | 35  |     | 45  | ns    |       |
| Output hold from address change    | t <sub>OH</sub>   | 2   |     | 0   |     | 0   |     | 0   |     | 3   |     | 3   |     | ns    |       |
| Chip Enable to output in Low-Z     | t <sub>LZCE</sub> | 2   |     | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | ns    | 7     |
| Chip disable to output in High-Z   | t <sub>HZCE</sub> |     | 7   |     | 10  |     | 15  |     | 15  |     | 15  |     | 25  | ns    | 6, 7  |
| Output Enable access time          | t <sub>AOE</sub>  |     | 8   |     | 12  |     | 15  |     | 15  |     | 15  |     | 20  | ns    |       |
| Output Enable to output in Low-Z   | t <sub>LZOE</sub> | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | ns    |       |
| Output disable to output in High-Z | t <sub>HZOE</sub> |     | 7   |     | 10  |     | 15  |     | 15  |     | 30  |     | 40  | ns    | 6     |
| <b>WRITE CYCLE</b>                 |                   |     |     |     |     |     |     |     |     |     |     |     |     |       |       |
| WRITE cycle time                   | t <sub>WC</sub>   | 12  |     | 15  |     | 20  |     | 25  |     | 35  |     | 45  |     | ns    |       |
| Chip Enable to end of write        | t <sub>CW</sub>   | 10  |     | 13  |     | 15  |     | 20  |     | 30  |     | 40  |     | ns    |       |
| Address valid to end of write      | t <sub>AW</sub>   | 10  |     | 13  |     | 15  |     | 20  |     | 30  |     | 40  |     | ns    |       |
| Address setup time                 | t <sub>AS</sub>   | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | ns    |       |
| Address hold from end of write     | t <sub>AH</sub>   | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | ns    |       |
| WRITE pulse width                  | t <sub>WP</sub>   | 10  |     | 13  |     | 15  |     | 20  |     | 30  |     | 40  |     | ns    |       |
| Data setup time                    | t <sub>DS</sub>   | 7   |     | 10  |     | 12  |     | 15  |     | 15  |     | 20  |     | ns    |       |
| Data hold time                     | t <sub>DH</sub>   | 0   |     | 0   |     | 0   |     | 0   |     | 5   |     | 5   |     | ns    |       |
| Write disable to output in Low-Z   | t <sub>LZWE</sub> | 2   |     | 0   |     | 0   |     | 0   |     | 0   |     | 0   |     | ns    | 7     |
| Write Enable to output in High-Z   | t <sub>HZWE</sub> | 0   | 7   | 0   | 10  | 0   | 10  | 0   | 15  | 0   | 15  | 0   | 25  | ns    | 6, 7  |

**ACTEST CONDITIONS**

|                                     |                         |
|-------------------------------------|-------------------------|
| Input pulse levels .....            | V <sub>ss</sub> to 3.0V |
| Input rise and fall times .....     | 5ns                     |
| Input timing reference levels ..... | 1.5V                    |
| Output reference levels .....       | 1.5V                    |
| Output load .....                   | See Figures 1 and 2     |

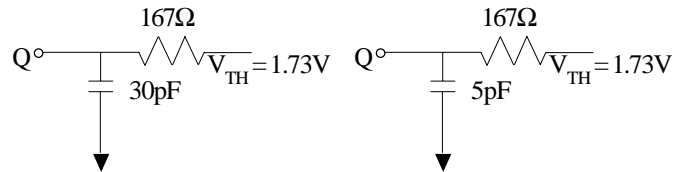


Fig. 1 Output Load Equivalent

Fig. 2 Output Load Equivalent

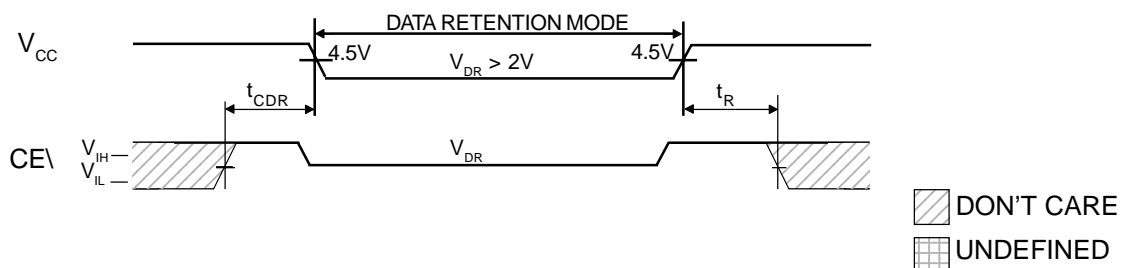
**NOTES**

- All voltages referenced to V<sub>ss</sub> (GND).
- 3V for pulse width < 20ns
- I<sub>CC</sub> is dependent on output loading and cycle rates. The specified value applies with the outputs unloaded, and  $f = \frac{1}{RC (MIN)}$  Hz.
- This parameter is guaranteed but not tested.
- Test conditions as specified with the output loading as shown in Fig. 1 unless otherwise noted.
- t<sub>LZCE</sub>, t<sub>LZWE</sub>, t<sub>LZOE</sub>, t<sub>HZCE</sub>, t<sub>HZOE</sub> and t<sub>HZWE</sub> are specified with CL = 5pF as in Fig. 2. Transition is measured ±200mV typical from steady state voltage, allowing for actual tester RC time constant.
- At any given temperature and voltage condition, t<sub>HZCE</sub> is less than t<sub>LZCE</sub>, and t<sub>HZWE</sub> is less than t<sub>LZWE</sub> and t<sub>HZOE</sub> is less than t<sub>LZOE</sub>.
- WE\ is HIGH for READ cycle.
- Device is continuously selected. Chip enables and output enables are held in their active state.
- Address valid prior to, or coincident with, latest occurring chip enable.
- RC = Read Cycle Time.
- CE2 timing is the same as CE1\ timing. The waveform is inverted.
- Chip enable (CE1\, CE2) and write enable (WE\ ) can initiate and terminate a WRITE cycle.

**DATA RETENTION ELECTRICAL CHARACTERISTICS (L Version Only)**

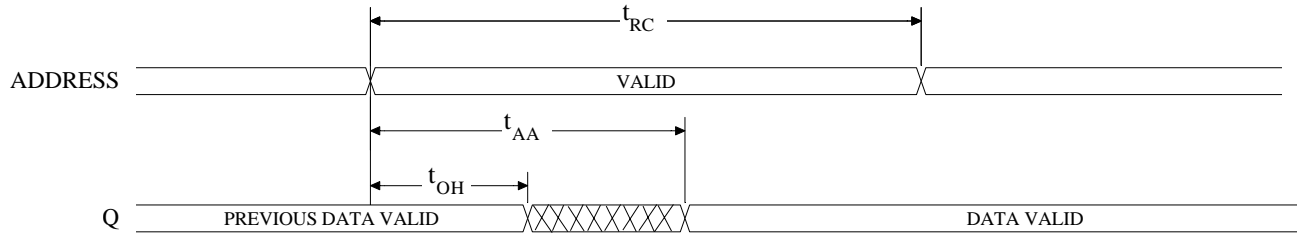
| DESCRIPTION                          | CONDITIONS  |                      | SYM               | MIN             | MAX | UNITS | NOTES |
|--------------------------------------|---|----------------------|-------------------|-----------------|-----|-------|-------|
| V <sub>CC</sub> for Retention Data   |   |                      | V <sub>DR</sub>   | 2               | --- | V     |       |
| Data Retention Current               | CE\ ≥ (V <sub>CC</sub> - 0.2V)<br>V <sub>IN</sub> ≥ (V <sub>CC</sub> - 0.2V)<br>or ≤ 0.2V | V <sub>CC</sub> = 2V | I <sub>CCDR</sub> |                 | 300 | μA    |       |
| Chip Deselect to Data Retention Time |   |                      | t <sub>CDR</sub>  | 0               | --- | ns    | 4     |
| Operation Recovery Time              |   |                      | t <sub>R</sub>    | t <sub>RC</sub> |     | ns    | 4, 11 |

**LOW V<sub>CC</sub> DATA RETENTION WAVEFORM**

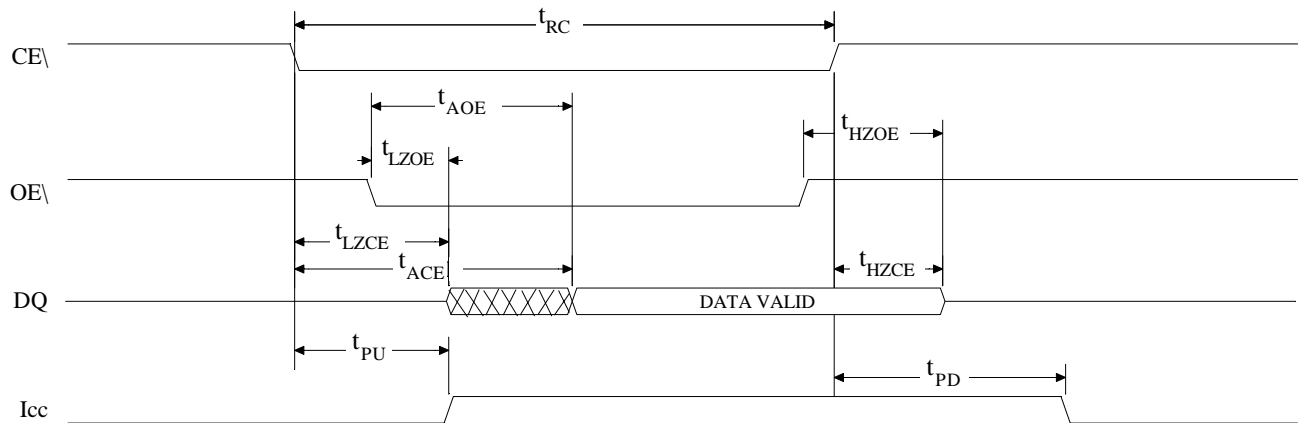






READ CYCLE NO. 1 <sup>8,9</sup>



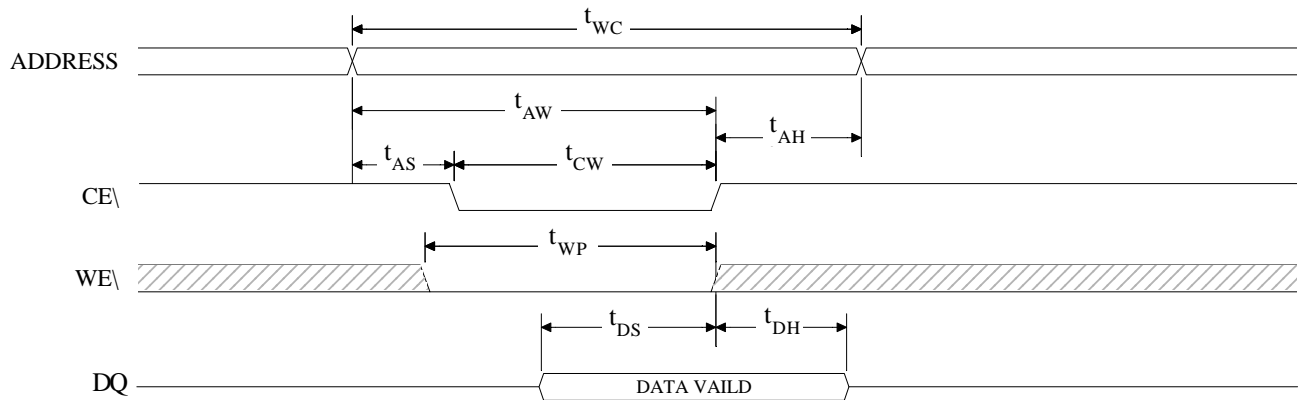
READ CYCLE NO. 2 <sup>7, 8, 10, 12</sup>



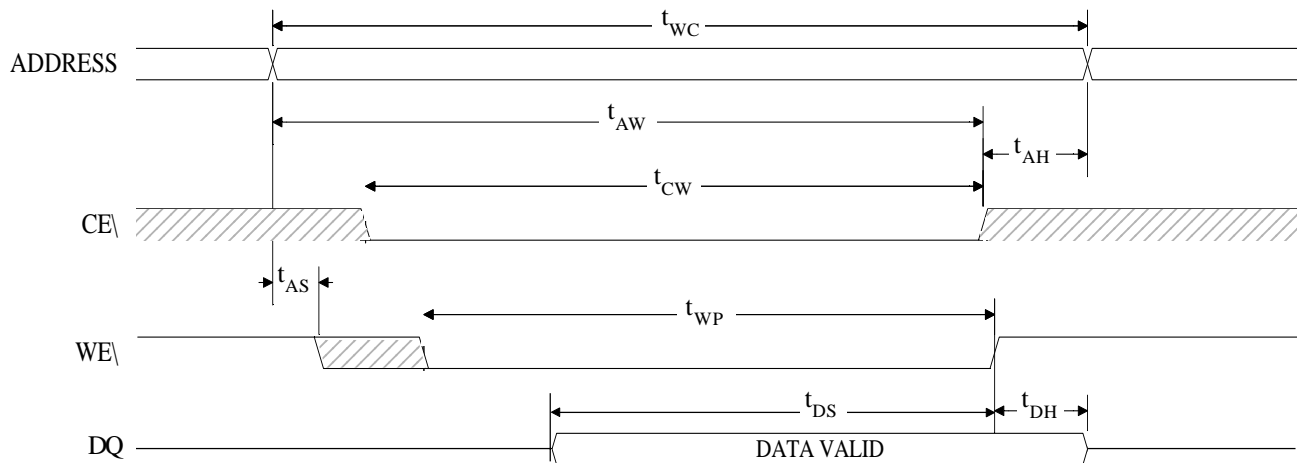
 DON'T CARE  
 UNDEFINED





**WRITE CYCLE NO. 1** <sup>12</sup>  
**(Chip Enabled Controlled)**



**WRITE CYCLE NO. 2** <sup>7, 12, 13</sup>  
**(Write Enabled Controlled)**



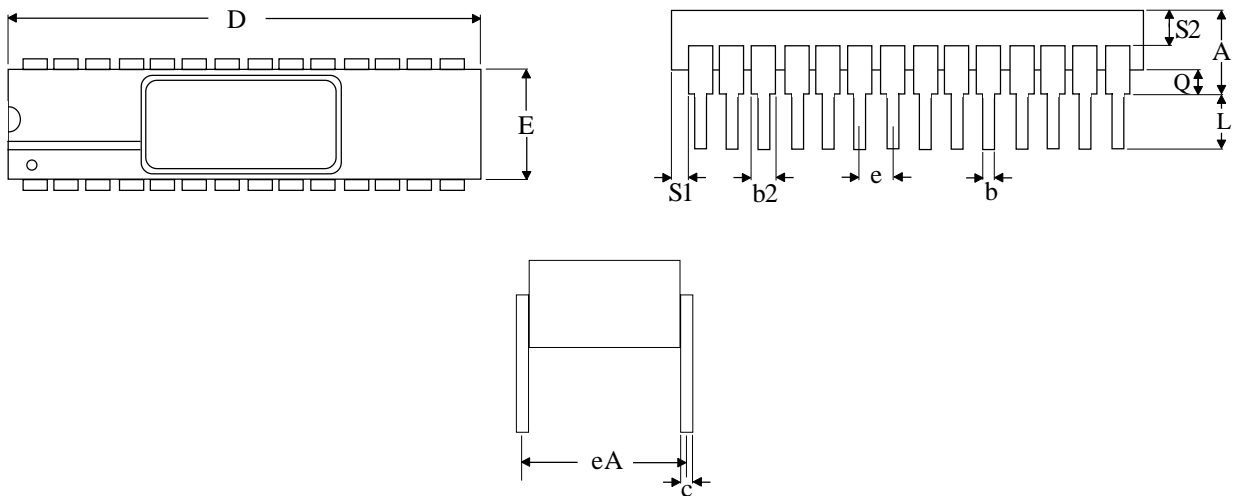
**NOTE:** Output enable (OE\) is inactive (HIGH).

 DON'T CARE  
 UNDEFINED



**MECHANICAL DEFINITIONS\***

ASI Case #108 (Package Designator C)  
SMD 5962-38294, Case Outline Z



| SYMBOL | SMD SPECIFICATIONS |       |
|--------|--------------------|-------|
|        | MIN                | MAX   |
| A      | ---                | 0.225 |
| b      | 0.014              | 0.026 |
| b2     | 0.045              | 0.065 |
| c      | 0.008              | 0.018 |
| D      | ---                | 1.485 |
| E      | 0.240              | 0.310 |
| eA     | 0.300 BSC          |       |
| e      | 0.100 BSC          |       |
| L      | 0.125              | 0.200 |
| Q      | 0.015              | 0.070 |
| S1     | 0.005              | ---   |
| S2     | 0.005              | ---   |

**NOTE:** These dimensions are per the SMD. ASI's package dimensional limits may differ, but they will be within the SMD limits.

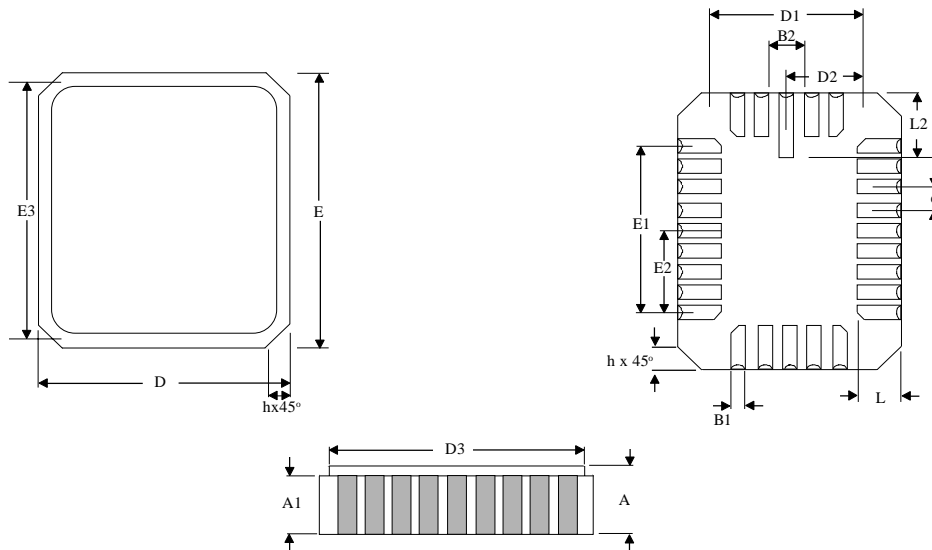
\* All measurements are in inches.





**MECHANICAL DEFINITIONS\***

ASI Case #204 (Package Designator EC)  
SMD 5962-38294, Case Outline U



| SYMBOL | SMD SPECIFICATIONS |       |
|--------|--------------------|-------|
|        | MIN                | MAX   |
| A      | 0.060              | 0.075 |
| A1     | 0.050              | 0.065 |
| B1     | 0.022              | 0.028 |
| B2     | 0.072 REF          |       |
| D      | 0.342              | 0.358 |
| D1     | 0.200 BSC          |       |
| D2     | 0.100 BSC          |       |
| D3     | ---                | 0.358 |
| E      | 0.540              | 0.560 |
| E1     | 0.400 BSC          |       |
| E2     | 0.200 BSC          |       |
| E3     | ---                | 0.558 |
| e      | 0.050 BSC          |       |
| h      | 0.040 REF          |       |
| L      | 0.045              | 0.055 |
| L2     | 0.075              | 0.095 |

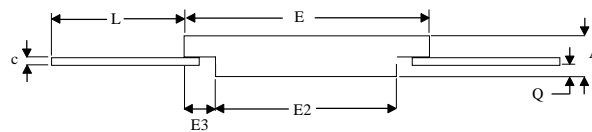
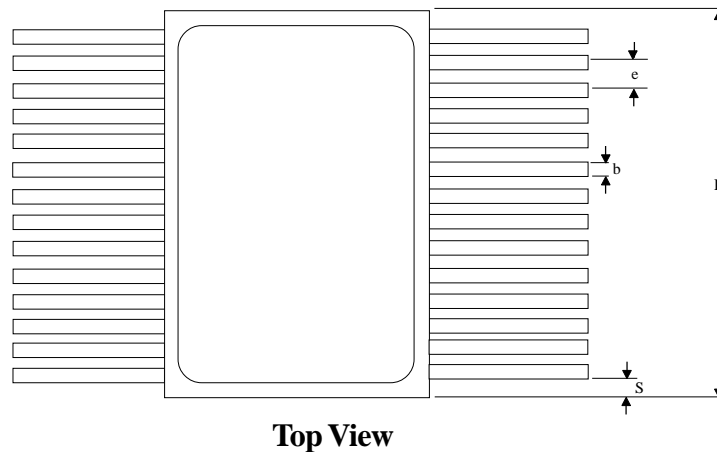
**NOTE:** These dimensions are per the SMD. ASI's package dimensional limits may differ, but they will be within the SMD limits.

\* All measurements are in inches.



**MECHANICAL DEFINITIONS\***

ASI Case #302 (Package Designator F)  
SMD 5962-38294, Case Outline M



| SYMBOL | SMD SPECIFICATIONS |       |
|--------|--------------------|-------|
|        | MIN                | MAX   |
| A      | 0.045              | 0.115 |
| b      | 0.015              | 0.019 |
| c      | 0.004              | 0.009 |
| D      | ---                | 0.640 |
| E      | 0.350              | 0.420 |
| E2     | 0.180              | ---   |
| E3     | 0.030              | ---   |
| e      | 0.050 BSC          |       |
| L      | 0.250              | 0.370 |
| Q      | 0.026              | 0.045 |
| S      | 0.000              | ---   |

**NOTE:** These dimensions are per the SMD. ASI's package dimensional limits may differ, but they will be within the SMD limits.

\* All measurements are in inches.



### ORDERING INFORMATION

**EXAMPLE:** MT5C6408C-25L/XT

| Device Number | Package Type | Speed ns | Options** | Process |
|---------------|--------------|----------|-----------|---------|
| MT5C6408      | C            | -12      | L         | /*      |
| MT5C6408      | C            | -15      | L         | /*      |
| MT5C6408      | C            | -20      | L         | /*      |
| MT5C6408      | C            | -25      | L         | /*      |
| MT5C6408      | C            | -35      | L         | /*      |
| MT5C6408      | C            | -45      | L         | /*      |
| MT5C6408      | C            | -55      | L         | /*      |
| MT5C6408      | C            | -70      | L         | /*      |

**EXAMPLE:** MT5C6408EC-15L/IT

| Device Number | Package Type | Speed ns | Options** | Process |
|---------------|--------------|----------|-----------|---------|
| MT5C6408      | EC           | -12      | L         | /*      |
| MT5C6408      | EC           | -15      | L         | /*      |
| MT5C6408      | EC           | -20      | L         | /*      |
| MT5C6408      | EC           | -25      | L         | /*      |
| MT5C6408      | EC           | -35      | L         | /*      |
| MT5C6408      | EC           | -45      | L         | /*      |
| MT5C6408      | EC           | -55      | L         | /*      |
| MT5C6408      | EC           | -70      | L         | /*      |

**EXAMPLE:** MT5C6408F-55/883C

| Device Number | Package Type | Speed ns | Options** | Process |
|---------------|--------------|----------|-----------|---------|
| MT5C6408      | F            | -12      | L         | /*      |
| MT5C6408      | F            | -15      | L         | /*      |
| MT5C6408      | F            | -20      | L         | /*      |
| MT5C6408      | F            | -25      | L         | /*      |
| MT5C6408      | F            | -35      | L         | /*      |
| MT5C6408      | F            | -45      | L         | /*      |
| MT5C6408      | F            | -55      | L         | /*      |
| MT5C6408      | F            | -70      | L         | /*      |

**\*AVAILABLE PROCESSES**

IT = Industrial Temperature Range  
XT = Extended Temperature Range  
883C = Full Military Processing

-40°C to +85°C  
-55°C to +125°C  
-55°C to +125°C

**\*\* OPTIONS**

L = 2V Data Retention/Low Power



**ASI TO DSCC PART NUMBER  
CROSS REFERENCE\***

**ASI Package Designator C**

**ASI Package Designator EC**

| <b>ASI Part #</b>  | <b>SMD Part #</b> |
|--------------------|-------------------|
| MT5C6808C-12/883C  | 5962-3829447MZX   |
| MT5C6808C-12L/883C | 5962-3829446MZX   |
| MT5C6808C-20/883C  | 5962-3829458MZA   |
| MT5C6808C-20L/883C | 5962-3829457MZA   |
| MT5C6808C-25/883C  | 5962-3829456MZA   |
| MT5C6808C-25L/883C | 5962-3829455MZA   |
| MT5C6808C-35/883C  | 5962-3829454MZA   |
| MT5C6808C-35L/883C | 5962-3829453MZA   |
| MT5C6808C-45/883C  | 5962-3829452MZA   |
| MT5C6808C-45L/883C | 5962-3829451MZA   |
| MT5C6808C-55/883C  | 5962-3829450MZA   |
| MT5C6808C-55L/883C | 5962-3829449MZA   |
| MT5C6808C-70/883C  | 5962-3829448MZA   |

| <b>ASI Part #</b>   | <b>SMD Part #</b> |
|---------------------|-------------------|
| MT5C6808EC-12/883C  | 5962-3829447MUX   |
| MT5C6808EC-12L/883C | 5962-3829446MUX   |
| MT5C6808EC-20/883C  | 5962-3829458MUA   |
| MT5C6808EC-20L/883C | 5962-3829457MUA   |
| MT5C6808EC-25/883C  | 5962-3829456MUA   |
| MT5C6808EC-25L/883C | 5962-3829455MUA   |
| MT5C6808EC-35/883C  | 5962-3829454MUA   |
| MT5C6808EC-35L/883C | 5962-3829453MUA   |
| MT5C6808EC-45/883C  | 5962-3829452MUA   |
| MT5C6808EC-45L/883C | 5962-3829451MUA   |
| MT5C6808EC-55/883C  | 5962-3829450MUA   |
| MT5C6808EC-55L/883C | 5962-3829449MUA   |
| MT5C6808EC-70/883C  | 5962-3829448MUA   |

**ASI Package Designator F**

| <b>ASI Part #</b>  | <b>SMD Part #</b> |
|--------------------|-------------------|
| MT5C6808F-12/883C  | 5962-3829447MMX   |
| MT5C6808F-12L/883C | 5962-3829446MMX   |
| MT5C6808F-20/883C  | 5962-3829458MMA   |
| MT5C6808F-20L/883C | 5962-3829457MMA   |
| MT5C6808F-25/883C  | 5962-3829456MMA   |
| MT5C6808F-25L/883C | 5962-3829455MMA   |
| MT5C6808F-35/883C  | 5962-3829454MMA   |
| MT5C6808F-35L/883C | 5962-3829453MMA   |
| MT5C6808F-45/883C  | 5962-3829452MMA   |
| MT5C6808F-45L/883C | 5962-3829451MMA   |
| MT5C6808F-55/883C  | 5962-3829450MMA   |
| MT5C6808F-55L/883C | 5962-3829449MMA   |
| MT5C6808C-70/883C  | 5962-3829448MZA   |

\* ASI part number is for reference only. Orders received referencing the SMD part number will be processed per the SMD.