



**PRELIMINARY**

**SC5104 - 64K X 4 BiCMOS ECL I/O STATIC RAM**

**GENERAL DESCRIPTION**

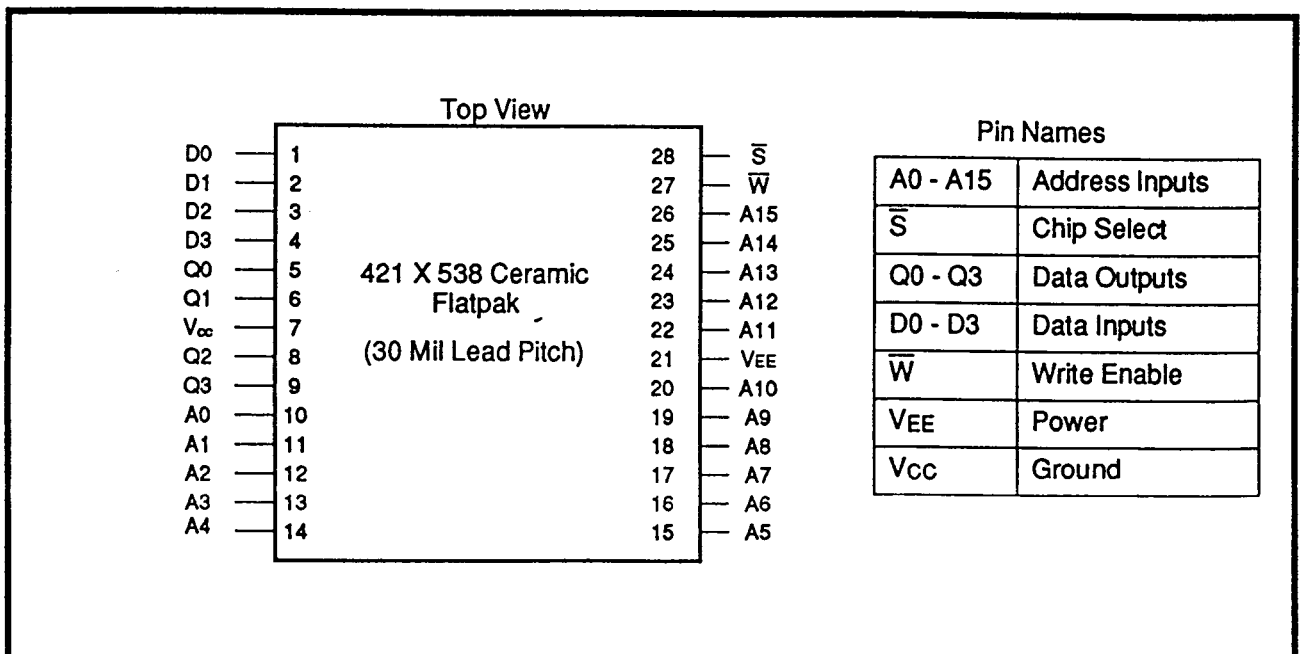
Silicon Connection's SC5104 is a fully static, asynchronous random access memory, organized 65,536 words by 4 bits. The device is built using SCC's 1.0 micron BiCMOS and features advanced circuit techniques that result in 12 nS access times.

Writing and reading the memory is accomplished via industry standard timing and signals. To write the memory the device must first be selected ( $\overline{S}$  pulled LOW) while enabling a write cycle ( $\overline{W}$  pulled LOW). Data on the input pins (D0 - D3) will then be written into the memory address specified on the address pins (A0 - A15).

To read the memory the device is selected ( $\overline{S}$  pulled LOW) while the write enable ( $\overline{W}$ ) remains in the HIGH state. This will allow the memory contents of the current address (A0 - A15) to be presented on output pins Q0 - Q3. The output pins (Q0 - Q3) will remain LOW (inactive) if either the chip select ( $\overline{S}$ ) is HIGH or write enable ( $\overline{W}$ ) is LOW.

**FEATURES**

- 12 nS/15 nS speed grades
- Power Supply -5.2V  $\pm$  10%
- 100K compatible ECL I/O's
- Balanced read and write cycle times
- Up to 33% of write cycle timing is allowed for system skews
- Power dissipation <1.1W
- Soft Error rate less than 100 FITs
- ESD protection greater than 2000 V with latch-up Immunity > 200 mA
- High density, high performance 28-pin flatpak
- 1.0 micron BiCMOS Technology



### Absolute Maximum Ratings

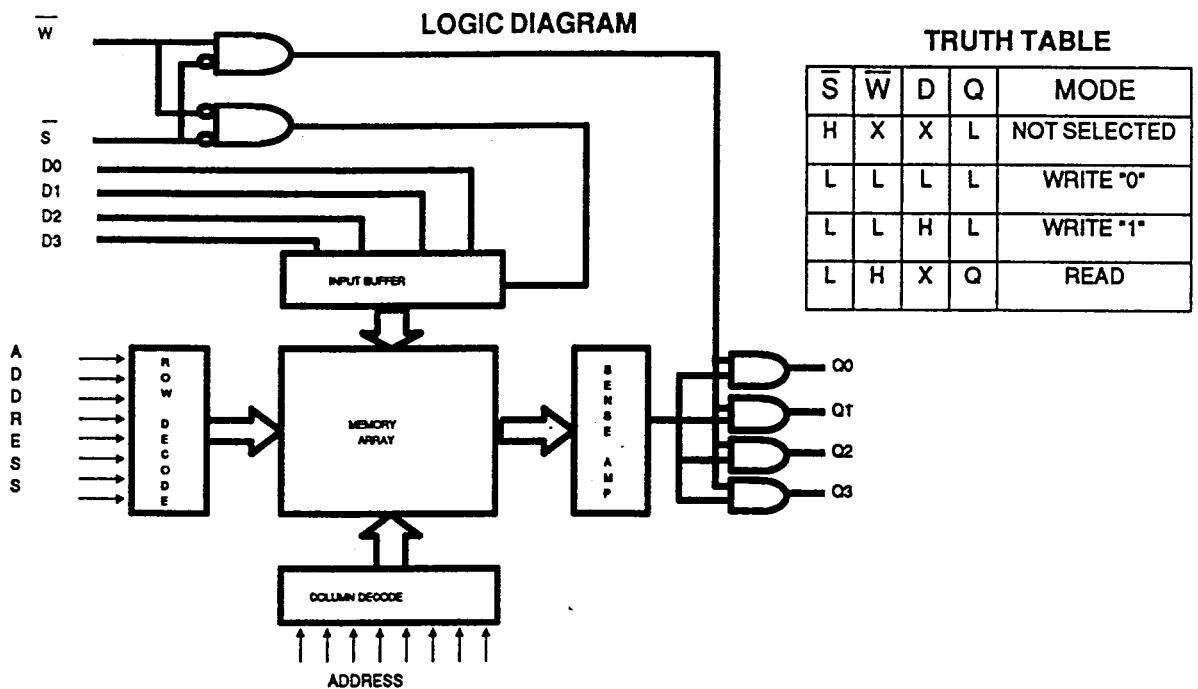
Storage Temperature ..... -65°C to +150°C  
 VEE Pin Potential to Ground ..... -7.0V to +0.5V  
 Input Voltage (DC) ..... VEE to +0.5V  
 Static Discharge Voltage ..... >2000V  
 Maximum Junction Temperature ..... +150°C  
 Output Current (DC Output High) ..... -50 mA  
 Latch-up Current ..... >200 mA

### AC Test Conditions

Input Rise and Fall Times ..... 0.7 nS  
 Output Timing Reference ..... 50% of Input  
 Input Pulse Levels ..... Figure 1  
 AC Test Circuit ..... Figure 2

### Capacitance

Input Pin (C<sub>IN</sub>) ..... 5.0 pF  
 Output Pin (C<sub>OUT</sub>) ..... 8.0 pF



### DC Electrical Characteristics

V<sub>EE</sub> = -5.2V ± 10%, V<sub>CC</sub> = Ground, T<sub>C</sub> = 0°C to +85°C

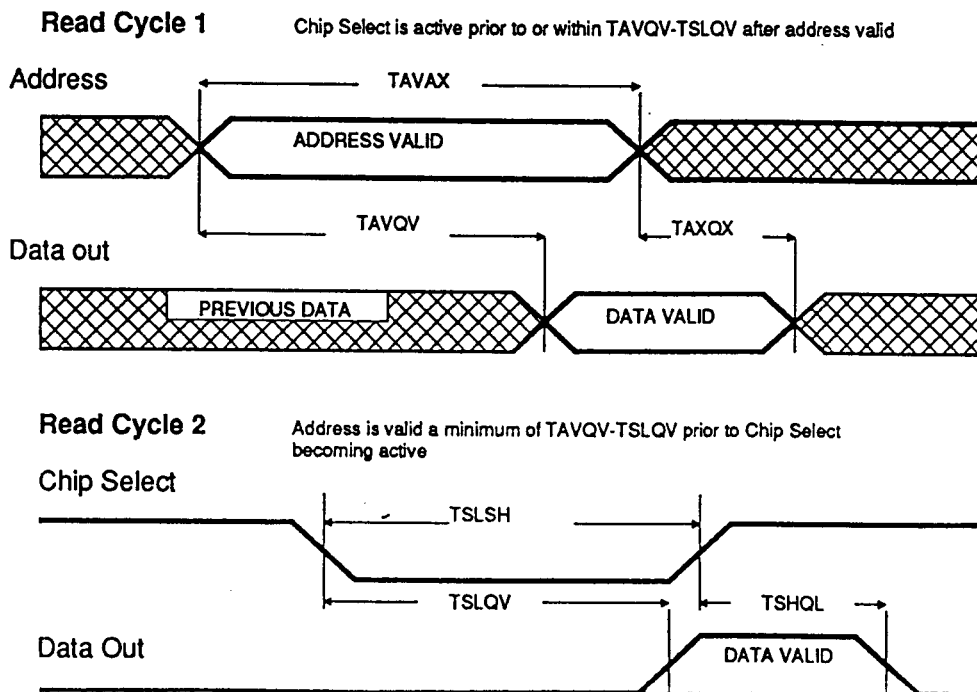
Symbol	Parameter	Conditions	Min	Max	Units
V <sub>OH</sub>	Output HIGH Voltage	V <sub>IN</sub> = V <sub>IH</sub> (MAX) or V <sub>IL</sub> (MIN)	-1025	-880	mV
V <sub>OL</sub>	Output LOW Voltage	Loading with 50 ohms to -2.0V	-1810	-1620	mV
V <sub>IH</sub>	Input HIGH Voltage		-1165	-880	mV
V <sub>IL</sub>	Input LOW Voltage		-1810	-1475	mV
V <sub>OHc</sub>	Output HIGH Voltage	V <sub>IN</sub> = V <sub>IH</sub> (MIN) or V <sub>IL</sub> (MAX)	-1025		mV
V <sub>OLc</sub>	Output LOW Voltage	Loading with 50 ohms to -2.0V		-1620	mV
I <sub>IH</sub>	Input HIGH Current	V <sub>IN</sub> = V <sub>IH</sub> (MAX)		220	uA
I <sub>IL</sub>	Input LOW Current	V <sub>IN</sub> = V <sub>IL</sub> (MAX)	-50	170	uA
I <sub>EE</sub>	Power Supply Current	f <sub>o</sub> = 50 MHz	-250		mA

## Read Cycle

### AC Timing Characteristics

$V_{EE} = -5.2V \pm 10\%$ ,  $V_{CC} = \text{Ground}$ ,  $T_C = 0^\circ\text{C to } +85^\circ\text{C}$

Symbol	Parameter	SC5104-12		SC5104-15		Units
		Min	Max	Min	Max	
TAVAX	Address Valid to Address Invalid	12		15		nS
TAVQV	Address Valid to Output Valid		12		15	nS
TAXQX	Address Invalid to Output Invalid	3	8	3	10	nS
TSLSH	Chip Select LOW to Chip Select HIGH	7		7		nS
TSLQV	Chip Select LOW to Output Valid		4		4	nS
TSHQL	Chip Select HIGH to Output LOW		4		4	nS



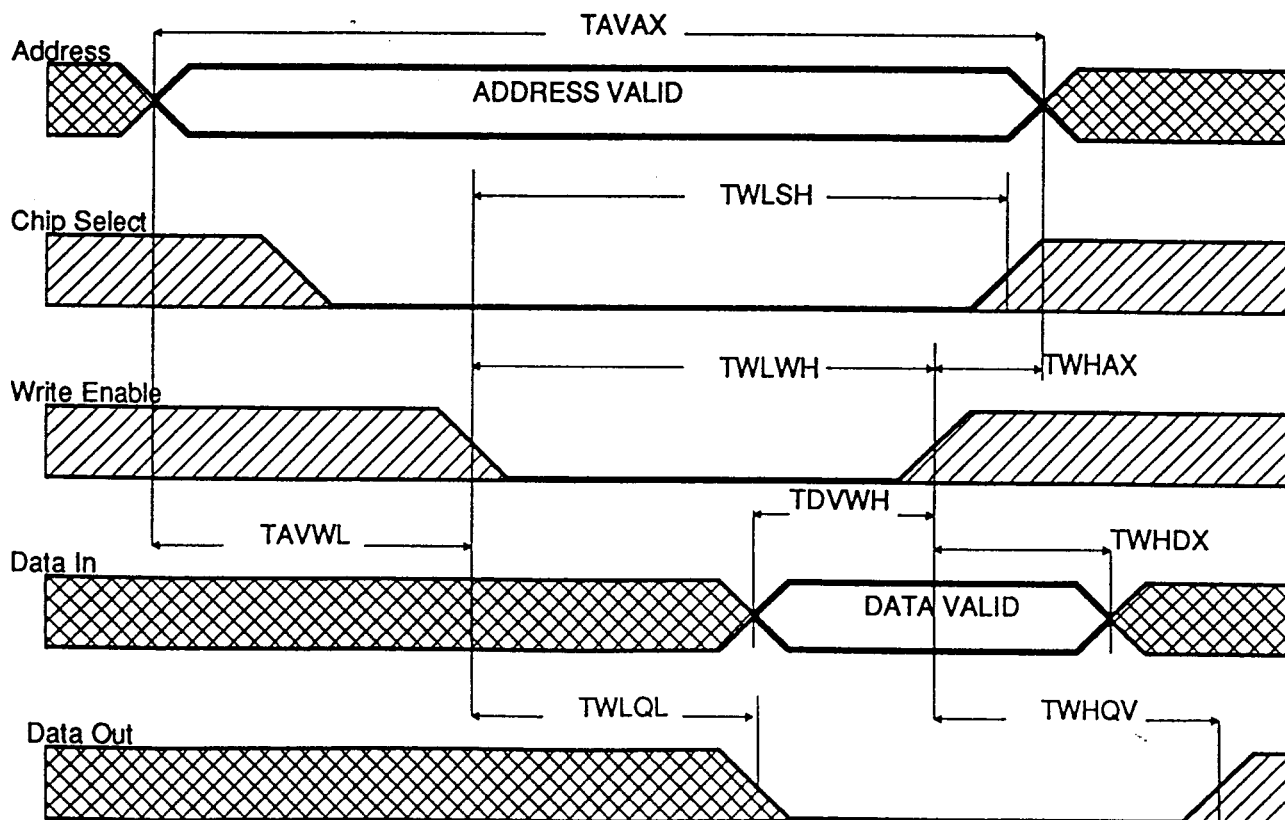
## Write Cycle 1

Write Cycle 1 is  $\overline{W}$  controlled. This is established by  $\overline{S}$  being held active (LOW) prior to  $\overline{W}$  becoming active (LOW).  $T_{WLQL}$  must be observed in Write Cycle 1 in order to avoid data bus contention in common I/O applications. At the end of Write Cycle 1 data out may become active if  $\overline{W}$  becomes inactive (HIGH) prior to  $\overline{S}$  becoming inactive (HIGH)

## AC Timing Characteristics

$V_{EE} = -5.2V \pm 10\%$ ,  $V_{CC} = \text{Ground}$ ,  $T_c = 0^\circ\text{C to } +85^\circ\text{C}$

Symbol	Parameter	SC5104-12		SC5104-15		Units
		Min	Max	Min	Max	
TAVAX	Address Valid to Address Invalid	12		15		nS
TWLSH	Write Enable LOW to Chip Select HIGH	8		10		nS
TWHAX	Write HIGH to Address Don't Care	0		0		nS
TWLWH	Write LOW to Write HIGH	8		10		nS
TAVWL	Address Valid to Write LOW	0		0		nS
TDVWH	Data Valid to Write HIGH	8		10		nS
TWHDX	Write HIGH to Data Don't Care	0		0		nS
TWLQL	Write LOW to Output LOW		4		4	nS
TWHQV	Write HIGH to Output Valid		12		15	nS



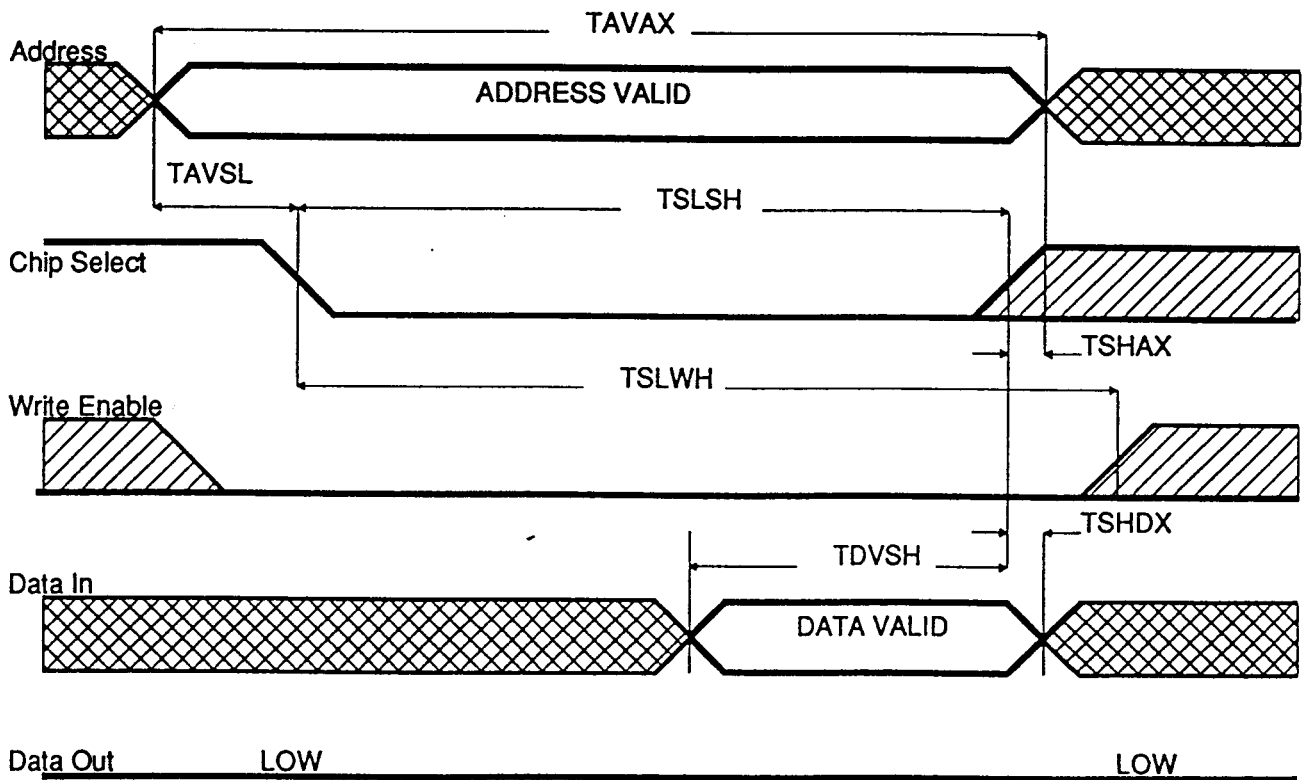
**Write Cycle 2**

Write Cycle 2 is  $\bar{S}$  controlled. This is established by  $\bar{W}$  being active coincident with or prior to  $\bar{S}$  becoming active (LOW). This cycle has identical specifications to Write Cycle 1 with the exceptions of S and W being interchanged. For common I/O applications this cycle may be more appropriate, as the data bus restrictions are eliminated.

**AC Timing Characteristics**

$V_{EE} = -5.2V \pm 10\%$ ,  $V_{CC} = \text{Ground}$ ,  $T_c = 0^\circ\text{C to } +85^\circ\text{C}$

Symbol	Parameter	SC5104-12		SC5104-15		Units
		Min	Max	Min	Max	
TAVSL	Address Valid to Chip Select LOW	0		0		nS
TSLSH	Chip Select LOW to Chip Select HIGH	8		10		nS
TSHAX	Chip Select HIGH to Address Don't Care	0		0		nS
TSLWH	Chip Select LOW to Write Enable HIGH	8		10		nS
TDVSH	Data Valid to Chip Select HIGH	8		10		nS
TSHDX	Chip Select HIGH to Data Don't Care	0		0		nS

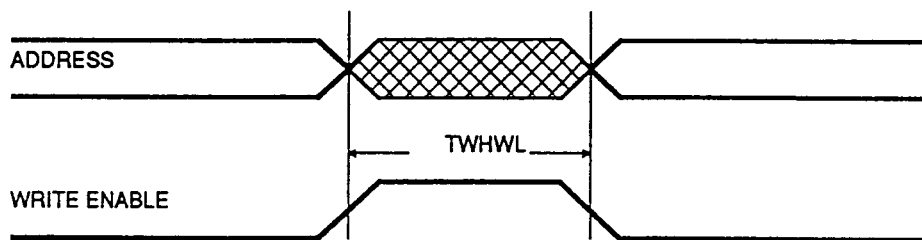


Consecutive Write Cycles  
AC Timing Characteristics

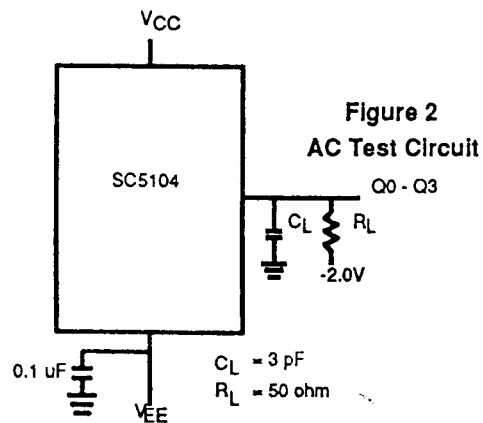
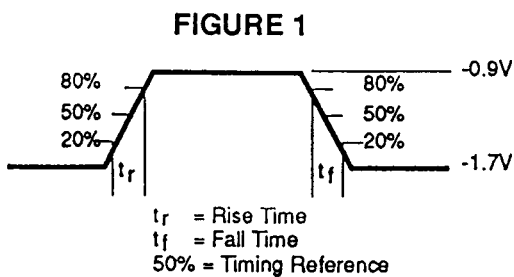
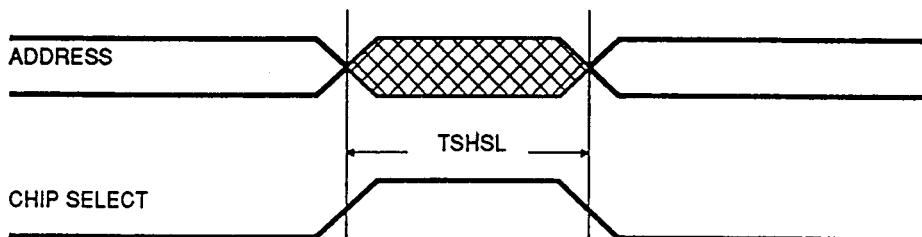
$V_{EE} = -5.2V \pm 10\%$ ,  $V_{CC} = \text{Ground}$ ,  $T_c = 0^\circ\text{C to } +85^\circ\text{C}$

Symbol	Parameter	SC5104-12		SC5104-15		Units
		Min	Max	Min	Max	
TWHWL	Write Enable HIGH to Write Enable LOW	4		4		nS
TSHSL	Chip Select HIGH to Chip Select LOW	4		4		nS

Minimum Write Pulse Disable

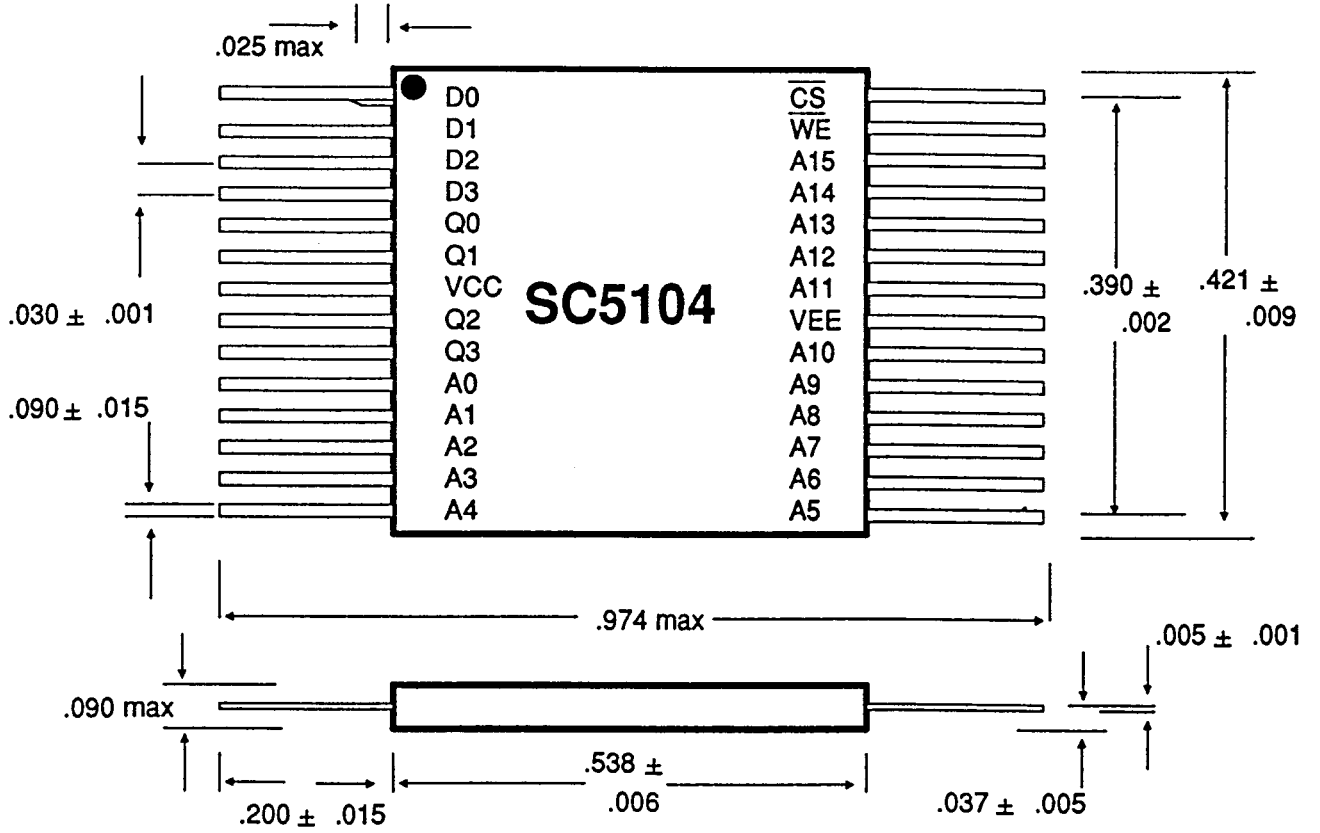


Minimum Select Pulse Disable



Package

Flat Pack



**Ordering Codes**

<b>Package Type</b>	<b>Part Number</b>
28 Pin Ceramic Flatpack	SC5104F-12/15
28 Pin Ceramic Dual-In-Line Package	SC5104D-12/15

**Order Placement****Attention: Order Entry****Silicon Connections Corporation****6160 Lusk Blvd., Suite C-204****San Diego, CA 92121****Phone: 619 - 535 - 0442****FAX: 619 - 535 - 1635**