

FEATURES

- 25, 45 ns Read Access & R/W Cycle Times
- Unlimited Read/Write Endurance
- Automatic Non-Volatile *STORE* on Power Loss
- Non-Volatile *STORE* Under Hardware Control
- Automatic *RECALL* to SRAM on Power Up
- Unlimited *RECALL* Cycles
- 1 Million *STORE* Cycles
- 100-Year Non-volatile Data Retention
- Single 5V \pm 10% Operation
- Commercial, Industrial, and Military Temperatures
- 28-Pin 300 mil SOIC or 330 mil SOIC (RoHS-Compliant)

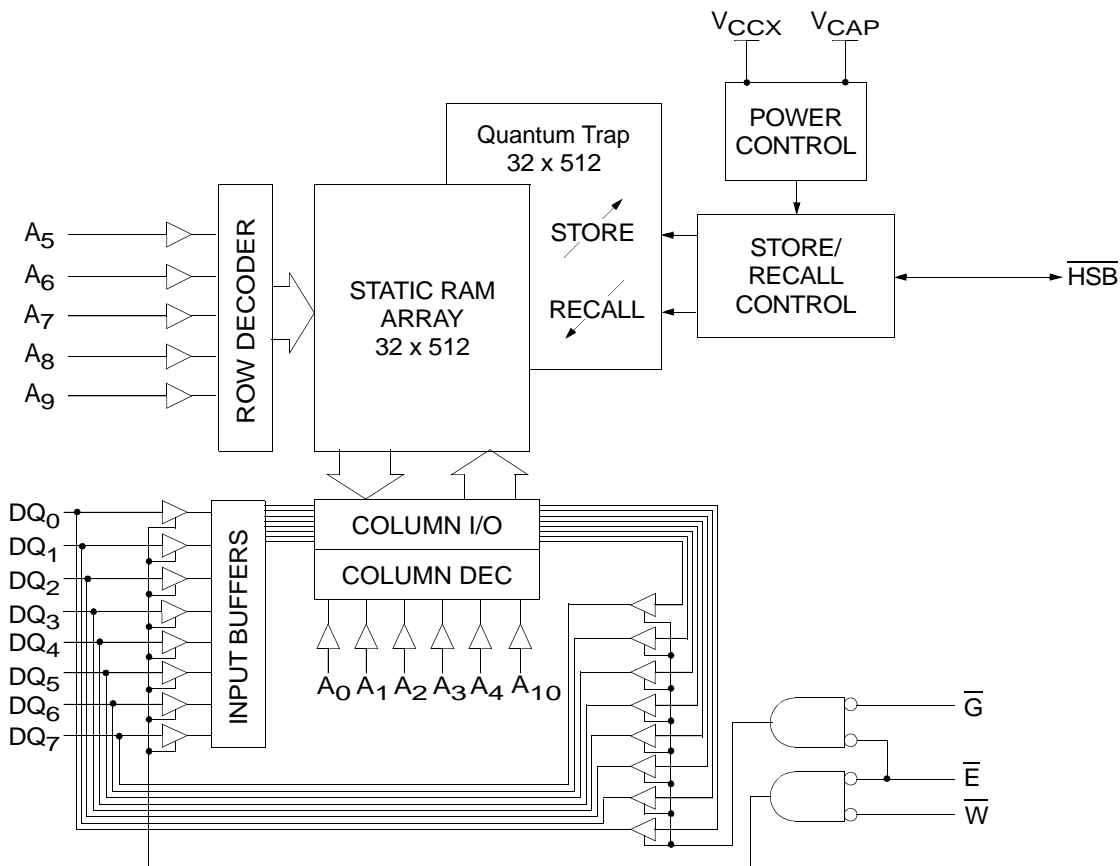
DESCRIPTION

The Simtek STK22C48 is a 16Kb fast static RAM with a nonvolatile Quantum Trap storage element included with each memory cell.

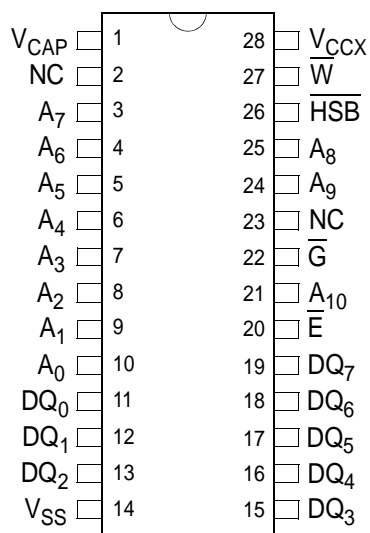
The SRAM provides the fast access & cycle times, ease of use, and unlimited read & write endurance of a normal SRAM.

Data transfers automatically to the non-volatile storage cells when power loss is detected (the *STORE* operation). On power-up, data is automatically restored to the SRAM (the *RECALL* operation). Both *STORE* and *RECALL* operations are also available under software control.

The Simtek nvSRAM is the first monolithic non-volatile memory to offer unlimited writes and reads. It is the highest-performance, most reliable non-volatile memory available.

BLOCK DIAGRAM


PIN CONFIGURATIONS



28-pin 300 mil SOIC

28-pin 330 mil SOIC

PIN NAMES

Pin Name	I/O	Description
$A_{10}-A_0$	Input	Address: The 11 address inputs select one of 2,048 bytes in the nvSRAM array
DQ ₇ -DQ ₀	I/O	Data: Bi-directional 8-bit data bus for accessing the nvSRAM
\overline{E}	Input	Chip Enable: The active low \overline{E} input selects the device
\overline{W}	Input	Write Enable: The active low \overline{W} enables data on the DQ pins to be written to the address location latched by the falling edge of \overline{E}
\overline{G}	Input	Output Enable: The active low \overline{G} input enables the data output buffers during read cycles. De-asserting \overline{G} high caused the DQ pins to tri-state.
V_{CC}	Power Supply	Power: 5.0V, $\pm 10\%$
V_{SS}	Power Supply	Ground

ABSOLUTE MAXIMUM RATINGS^a

Voltage on Input Relative to Ground -0.5V to 7.0V
 Voltage on Input Relative to V_{SS} -0.6V to (V_{CC} + 0.5V)
 Voltage on DQ₀₋₇ or HSB -0.5V to (V_{CC} + 0.5V)
 Temperature under Bias -55°C to 125°C
 Storage Temperature -65°C to 150°C
 Power Dissipation 1W
 DC Output Current (1 output at a time, 1s duration) 15mA

Note a: 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 conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC CHARACTERISTICS

(V_{CC} = 5.0V ± 10%)^e

SYMBOL	PARAMETER	COMMERCIAL		INDUSTRIAL		UNITS	NOTES
		MIN	MAX	MIN	MAX		
I _{CC1} ^b	Average V _{CC} Current		85 65		90 65	mA mA	t _{AVAV} = 25ns t _{AVAV} = 45ns
I _{CC2} ^c	Average V _{CC} Current during STORE		3		3	mA	All Inputs Don't Care, V _{CC} = max
I _{CC3} ^b	Average V _{CC} Current at t _{AVAV} = 200ns 5V, 25°C, Typical		10		10	mA	$\bar{V} \geq (V_{CC} - 0.2V)$ All Others Cycling, CMOS Levels
I _{CC4} ^c	Average V _{CAP} Current during AutoStore Cycle		2		2	mA	All Inputs Don't Care
I _{SB1} ^d	Average V _{CC} Current (Standby, Cycling TTL Input Levels)		25 18		26 19	mA mA	t _{AVAV} = 25ns, $\bar{E} \geq V_{IH}$ t _{AVAV} = 45ns, $\bar{E} \geq V_{IH}$
I _{SB2} ^d	V _{CC} Standby Current (Standby, Stable CMOS Input Levels)		1.5		1.5	mA	$\bar{E} \geq (V_{CC} - 0.2V)$ All Others V _{IN} ≤ 0.2V or ≥ (V _{CC} - 0.2V)
I _{ILK}	Input Leakage Current		±1		±1	µA	V _{CC} = max V _{IN} = V _{SS} to V _{CC}
I _{OLK}	Off-State Output Leakage Current		±5		±5	µA	V _{CC} = max V _{IN} = V _{SS} to V _{CC} , \bar{E} or $\bar{G} \geq V_{IH}$
V _{IH}	Input Logic “1” Voltage	2.2	V _{CC} + .5	2.2	V _{CC} + .5	V	All Inputs
V _{IL}	Input Logic “0” Voltage	V _{SS} - .5	0.8	V _{SS} - .5	0.8	V	All Inputs
V _{OH}	Output Logic “1” Voltage	2.4		2.4		V	I _{OUT} = -4mA except HSB
V _{OL}	Output Logic “0” Voltage		0.4		0.4	V	I _{OUT} = 8mA except HSB
V _{BL}	Logic “0” Voltage on HSB Output		0.4		0.4	V	I _{OUT} = 3mA
T _A	Operating Temperature	0	70	-40	85	°C	

Note b: I_{CC1} and I_{CC3} are dependent on output loading and cycle rate. The specified values are obtained with outputs unloaded.

Note c: I_{CC2} and I_{CC4} are the average currents required for the duration of the respective STORE cycles (t_{STORE}).

Note d: $\bar{E} \geq V_{IH}$ will not produce standby current levels until any nonvolatile cycle in progress has timed out.

Note e: V_{CC} reference levels throughout this datasheet refer to V_{CCX} if that is where the power supply connection is made, or V_{CAP} if V_{CCX} is connected to ground.

AC TEST CONDITIONS

Input Pulse Levels	0V to 3V
Input Rise and Fall Times	≤ 5ns
Input and Output Timing Reference Levels	1.5V
Output Load	See Figure 1

CAPACITANCE^f (T_A = 25°C, f = 1.0MHz)

SYMBOL	PARAMETER	MAX	UNITS	CONDITIONS
C _{IN}	Input Capacitance	8	pF	ΔV = 0 to 3V
C _{OUT}	Output Capacitance	7	pF	ΔV = 0 to 3V

Note f: These parameters are guaranteed but not tested.

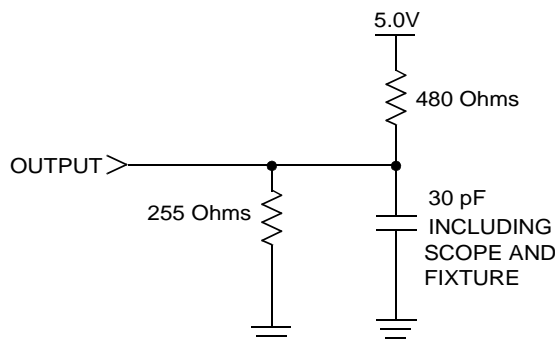


Figure 1: AC Output Loading

SRAM READ CYCLES #1 & #2

(V_{CC} = 5.0V ± 10%)^e

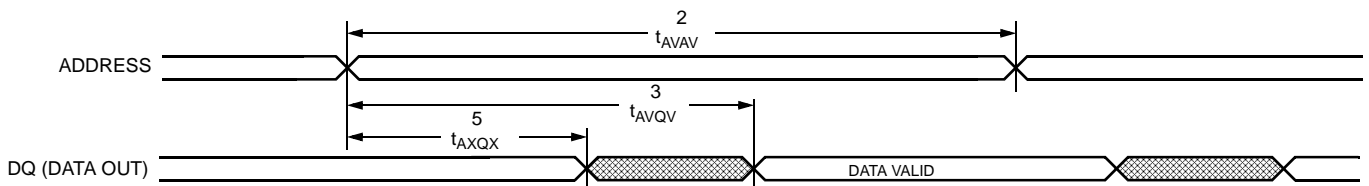
NO.	SYMBOLS		PARAMETER	STK22C48-25		STK22C48-45		UNITS
	#1, #2	Alt.		MIN	MAX	MIN	MAX	
1	t _{ELQV}	t _{ACS}	Chip Enable Access Time		25		45	ns
2	t _{AVAV} ^g	t _{RC}	Read Cycle Time	25		45		ns
3	t _{AVQV} ^h	t _{AA}	Address Access Time		25		45	ns
4	t _{GLQV}	t _{OE}	Output Enable to Data Valid		10		20	ns
5	t _{AXQX} ^h	t _{OH}	Output Hold after Address Change	5		5		ns
6	t _{ELQX}	t _{LZ}	Chip Enable to Output Active	5		5		ns
7	t _{EHQZ} ⁱ	t _{HZ}	Chip Disable to Output Inactive		10		15	ns
8	t _{GLQX}	t _{OLZ}	Output Enable to Output Active	0		0		ns
9	t _{GHQZ} ⁱ	t _{OHZ}	Output Disable to Output Inactive		10		15	ns
10	t _{ELICCH} ^f	t _{PA}	Chip Enable to Power Active	0		0		ns
11	t _{EHICCL} ^f	t _{PS}	Chip Disable to Power Standby		25		45	ns

Note g: \bar{W} and \bar{HSB} must be high during SRAM READ cycles.

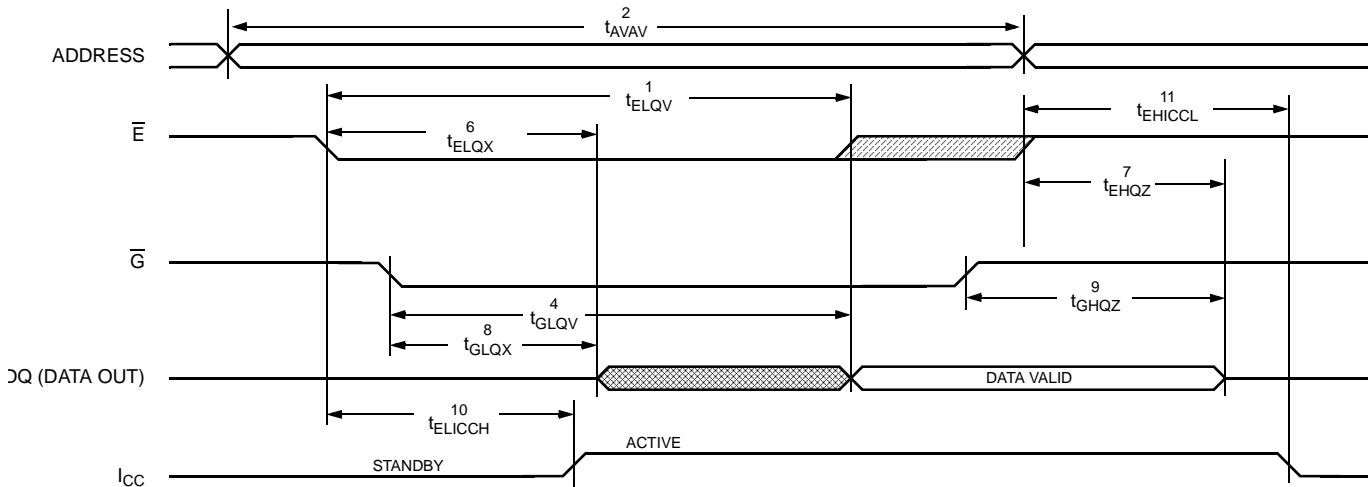
Note h: Device is continuously selected with \bar{E} and \bar{G} both low.

Note i: Measured ± 200mV from steady state output voltage.

SRAM READ CYCLE #1: Address Controlled^{g, h}



SRAM READ CYCLE #2: \bar{E} Controlled^g



SRAM WRITE CYCLES #1 & #2

(V_{CC} = 5.0V ± 10%)^e

NO.	SYMBOLS			PARAMETER	STK22C48-25		STK22C48-45		UNITS
	#1	#2	Alt.		MIN	MAX	MIN	MAX	
12	t _{AVAV}	t _{AVAV}	t _{WC}	Write Cycle Time	25		45		ns
13	t _{WLWH}	t _{WLEH}	t _{WP}	Write Pulse Width	20		30		ns

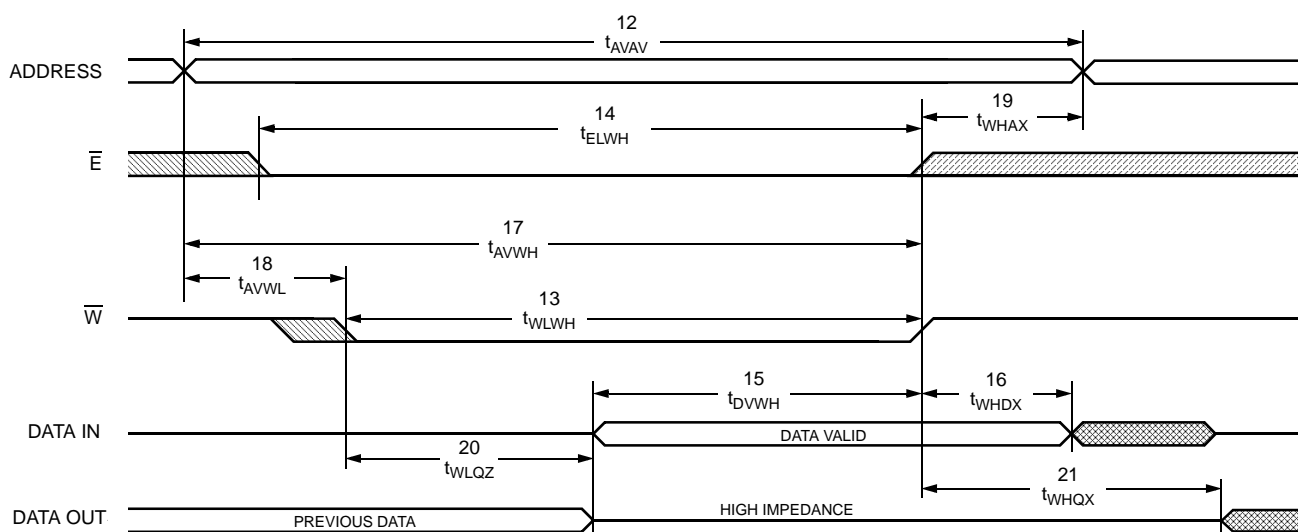
NO.	SYMBOLS			PARAMETER	STK22C48-25		STK22C48-45		UNITS
	#1	#2	Alt.		MIN	MAX	MIN	MAX	
14	t_{ELWH}	t_{ELEH}	t_{CW}	Chip Enable to End of Write	20		30		ns
15	t_{DVWH}	t_{DVEH}	t_{DW}	Data Set-up to End of Write	10		15		ns
16	t_{WHDX}	t_{EHDX}	t_{DH}	Data Hold after End of Write	0		0		ns
17	t_{AVWH}	t_{AVEH}	t_{AW}	Address Set-up to End of Write	20		30		ns
18	t_{AVWL}	t_{AVEL}	t_{AS}	Address Set-up to Start of Write	0		0		ns
19	t_{WHAX}	t_{EHAX}	t_{WR}	Address Hold after End of Write	0		0		ns
20	$t_{WLQZ}^{i,j}$		t_{WZ}	Write Enable to Output Disable		10		15	ns
21	t_{WHQX}		t_{OW}	Output Active after End of Write	5		5		ns

Note j: If \bar{W} is low when \bar{E} goes low, the outputs remain in the high-impedance state.

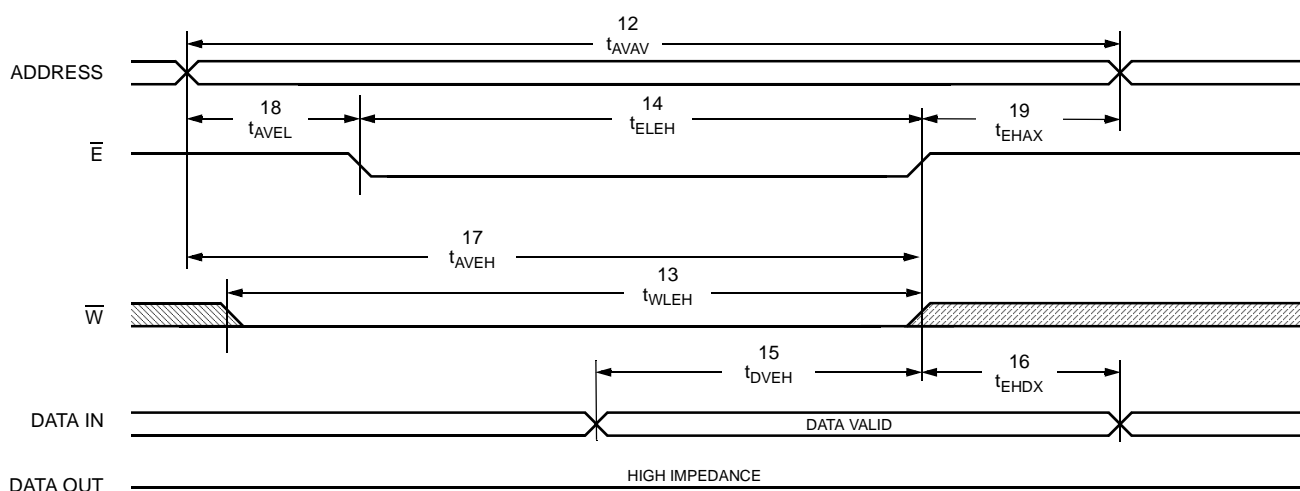
Note k: \bar{E} or \bar{W} must be $\geq V_{IH}$ during address transitions.

Note l: HSB must be high during SRAM WRITE cycles.

SRAM WRITE CYCLE #1: \bar{W} Controlled^{k, l}



SRAM WRITE CYCLE #2: \bar{E} Controlled^{k, l}



HARDWARE MODE SELECTION

\overline{E}	\overline{W}	\overline{HSB}	A ₁₂ - A ₀ (hex)	MODE	I/O	POWER	NOTES
H	X	H	X	Not Selected	Output High Z	Standby	
L	H	H	X	Read SRAM	Output Data	Active	n
L	L	H	X	Write SRAM	Input Data	Active	
X	X	L	X	Nonvolatile STORE	Output High Z	I _{CC2}	m

Note m: \overline{HSB} STORE operation occurs only if an SRAM write has been done since the last nonvolatile cycle. After the STORE (if any) completes, the part will go into standby mode, inhibiting all operations until \overline{HSB} rises.

Note n: I/O state assumes $\overline{G} \leq V_{IL}$. Activation of nonvolatile cycles does not depend on state of \overline{G} .

HARDWARE STORE CYCLE

(V_{CC} = 5.0V ± 10%)^e

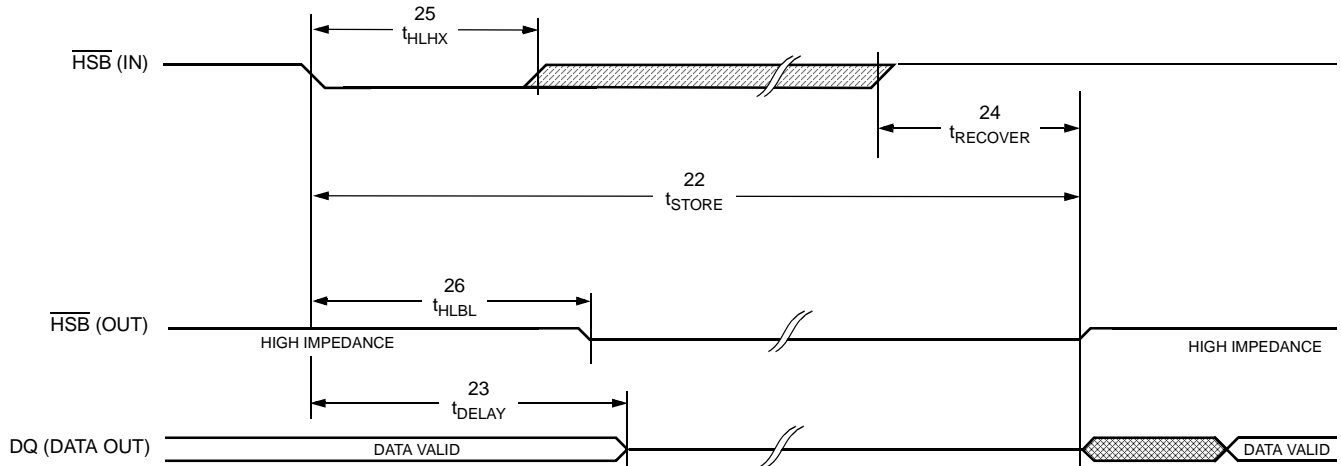
NO.	SYMBOLS		PARAMETER	STK22C48		UNITS	NOTES
	Standard	Alternate		MIN	MAX		
22	t _{STORE}	t _{HLHZ}	STORE Cycle Duration		10	ms	i, o
23	t _{DELAY}	t _{HLQZ}	Time Allowed to Complete SRAM Cycle	1		μs	i, p
24	t _{RECOVER}	t _{HHQX}	Hardware STORE High to Inhibit Off		700	ns	o, q
25	t _{HLHX}		Hardware STORE Pulse Width	15		ns	
26	t _{HLBL}		Hardware STORE Low to Store Busy		300	ns	

Note o: \overline{E} and \overline{G} low for output behavior.

Note p: \overline{E} and \overline{G} low and \overline{W} high for output behavior.

Note q: t_{RECOVER} is only applicable after t_{STORE} is complete.

HARDWARE STORE CYCLE



AutoStore / POWER-UP RECALL

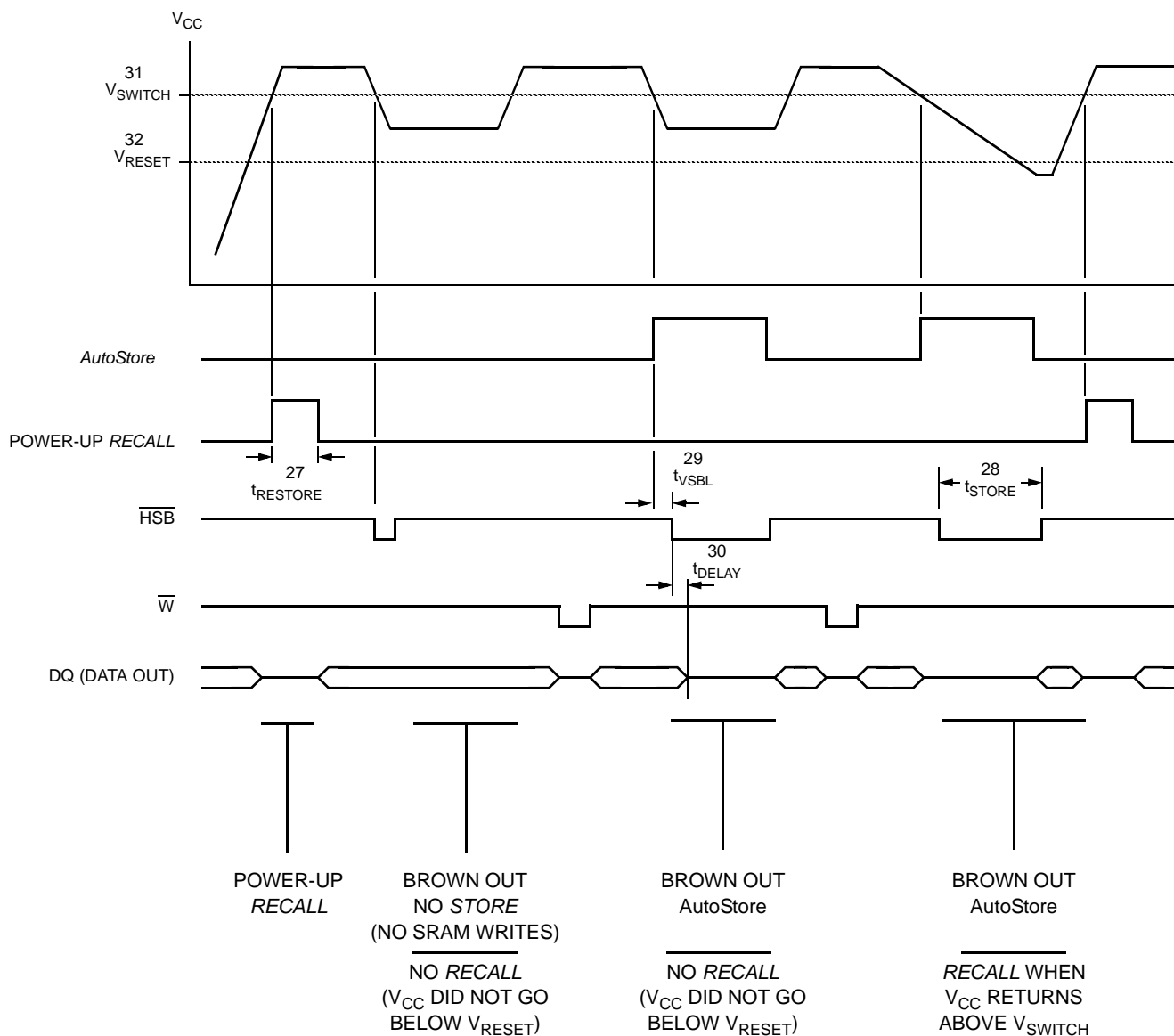
($V_{CC} = 5.0V \pm 10\%$)^e

NO.	SYMBOLS		PARAMETER	STK22C48		UNITS	NOTES
	Standard	Alternate		MIN	MAX		
27	$t_{RESTORE}$		Power-up <i>RECALL</i> Duration		550	μs	r
28	t_{STORE}	t_{HLHZ}	<i>STORE</i> Cycle Duration		10	ms	p, s
29	t_{VSBL}		Low Voltage Trigger (V_{SWITCH}) to \overline{HSB} Low		300	ns	l
30	t_{DELAY}	t_{BLQZ}	Time Allowed to Complete SRAM Cycle	1		μs	o
31	V_{SWITCH}		Low Voltage Trigger Level	4.0	4.5	V	
32	V_{RESET}		Low Voltage Reset Level		3.6	V	

Note r: $t_{RESTORE}$ starts from the time V_{CC} rises above V_{SWITCH} .

Note s: \overline{HSB} is asserted low for $1\mu s$ when V_{CAP} drops through V_{SWITCH} . If an SRAM write has not taken place since the last nonvolatile cycle, \overline{HSB} will be released and no *STORE* will take place.

AutoStore / POWER-UP RECALL



nvSRAM OPERATION

The STK22C48 has two separate modes of operation: SRAM mode and nonvolatile mode. In SRAM mode, the memory operates as a standard fast static RAM. In nonvolatile mode, data is transferred from SRAM to Nonvolatile Elements (the *STORE* operation) or from Nonvolatile Elements to SRAM (the *RECALL* operation). In this mode SRAM functions are disabled.

NOISE CONSIDERATIONS

The STK22C48 is a high-speed memory and so must have a high-frequency bypass capacitor of approximately 0.1 μ F connected between V_{CAP} and V_{SS} , using leads and traces that are as short as possible. As with all high-speed CMOS ICs, normal careful routing of power, ground and signals will help prevent noise problems.

SRAM READ

The STK22C48 performs a *READ* cycle whenever \overline{E} and \overline{G} are low and \overline{W} and \overline{HSB} are high. The address specified on pins A_{0-10} determines which of the 2,048 data bytes will be accessed. When the *READ* is initiated by an address transition, the outputs will be valid after a delay of t_{AVQV} (*READ* cycle #1). If the *READ* is initiated by \overline{E} or \overline{G} , the outputs will be valid at t_{ELQV} or at t_{GLQV} , whichever is later (*READ* cycle #2). The data outputs will repeatedly respond to address changes within the t_{AVQV} access time without the need for transitions on any control input pins, and will remain valid until another address change or until \overline{E} or \overline{G} is brought high, or \overline{W} or \overline{HSB} is brought low.

SRAM WRITE

A *WRITE* cycle is performed whenever \overline{E} and \overline{W} are low and \overline{HSB} is high. The address inputs must be stable prior to entering the *WRITE* cycle and must remain stable until either \overline{E} or \overline{W} goes high at the end of the cycle. The data on the common I/O pins DQ_{0-7} will be written into the memory if it is valid t_{DVWH} before the end of a \overline{W} controlled *WRITE* or t_{DVEH} before the end of an \overline{E} controlled *WRITE*.

It is recommended that \overline{G} be kept high during the entire *WRITE* cycle to avoid data bus contention on common I/O lines. If \overline{G} is left low, internal circuitry will turn off the output buffers t_{WLQZ} after \overline{W} goes low.

POWER-UP RECALL

During power up, or after any low-power condition ($V_{CAP} < V_{RESET}$), an internal *RECALL* request will be latched. When V_{CAP} once again exceeds the sense voltage of V_{SWITCH} , a *RECALL* cycle will automatically be initiated and will take $t_{RESTORE}$ to complete.

If the STK22C48 is in a *WRITE* state at the end of power-up *RECALL*, the SRAM data will be corrupted. To help avoid this situation, a 10K Ω resistor should be connected either between \overline{W} and system V_{CC} or between \overline{E} and system V_{CC} .

AutoStore OPERATION

The STK22C48 can be powered in one of three modes.

During normal AutoStore operation, the STK22C48 will draw current from V_{CCX} to charge a capacitor connected to the V_{CAP} pin. This stored charge will be used by the chip to perform a single *STORE* operation. After power up, when the voltage on the V_{CAP} pin drops below V_{SWITCH} , the part will automatically disconnect the V_{CAP} pin from V_{CCX} and initiate a *STORE* operation.

Figure 2 shows the proper connection of capacitors for automatic store operation. A charge storage capacitor having a capacity of between 68 μ F and 220 μ F ($\pm 20\%$) rated at 6V should be provided.

In system power mode (Figure 3), both V_{CCX} and V_{CAP} are connected to the +5V power supply without the 68 μ F capacitor. In this mode the AutoStore function of the STK22C48 will operate on the stored system charge as power goes down. The user must, however, guarantee that V_{CCX} does not drop below 3.6V during the 10ms *STORE* cycle.

If an automatic *STORE* on power loss is not required, then V_{CCX} can be tied to ground and +5V applied to V_{CAP} (Figure 4). This is the AutoStore Inhibit mode, in which the AutoStore function is disabled. If the STK22C48 is operated in this configuration, references to V_{CCX} should be changed to V_{CAP} throughout this data sheet. In this mode, *STORE* operations may be triggered with the \overline{HSB} pin. It is not permissible to change between these three options "on the fly."

In order to prevent unneeded *STORE* operations, automatic *STOREs* as well as those initiated by externally driving \overline{HSB} low will be ignored unless at

least one WRITE operation has taken place since the most recent STORE or RECALL cycle.

If the power supply drops faster than 20 $\mu\text{s}/\text{volt}$ before V_{CCX} reaches V_{SWITCH} , then a 2.2 ohm resistor should be inserted between V_{CCX} and the system supply to avoid momentary excess of current between V_{CCX} and V_{cap} .

HSB OPERATION

The STK22C48 provides the $\overline{\text{HSB}}$ pin for controlling and acknowledging the STORE operations. The $\overline{\text{HSB}}$ pin is used to request a hardware STORE cycle. When the $\overline{\text{HSB}}$ pin is driven low, the STK22C48 will conditionally initiate a STORE operation after t_{DELAY} ; an actual STORE cycle will only begin if a WRITE to the SRAM took place since the last STORE or RECALL cycle. The $\overline{\text{HSB}}$ pin acts as an open drain driver that is internally driven low to indicate a busy condition while the STORE (initiated by any means) is in progress. Pull up this pin with an external 10K ohm resistor to V_{CAP} if $\overline{\text{HSB}}$ is used as a driver.

SRAM READ and WRITE operations that are in progress when $\overline{\text{HSB}}$ is driven low by any means are given time to complete before the STORE operation is initiated. After $\overline{\text{HSB}}$ goes low, the STK22C48 will continue SRAM operations for t_{DELAY} . During t_{DELAY} , multiple SRAM READ operations may take place. If a WRITE is in progress when $\overline{\text{HSB}}$ is pulled low it will be allowed a time, t_{DELAY} to complete. However, any SRAM WRITE cycles requested after $\overline{\text{HSB}}$ goes low will be inhibited until $\overline{\text{HSB}}$ returns high.

The $\overline{\text{HSB}}$ pin can be used to synchronize multiple STK22C48s while using a single larger capacitor. To

operate in this mode the $\overline{\text{HSB}}$ pin should be connected together to the HSB pins from the other STK22C48s. An external pull-up resistor to + 5V is required since $\overline{\text{HSB}}$ acts as an open drain pull down. The V_{CAP} pins from the other STK22C48 parts can be tied together and share a single capacitor. The capacitor size must be scaled by the number of devices connected to it. When any one of the STK22C48s detects a power loss and asserts $\overline{\text{HSB}}$, the common $\overline{\text{HSB}}$ pin will cause all parts to request a STORE cycle (a STORE will take place in those STK22C48s that have been written since the last nonvolatile cycle).

During any STORE operation, regardless of how it was initiated, the STK22C48 will continue to drive the $\overline{\text{HSB}}$ pin low, releasing it only when the STORE is complete. Upon completion of the STORE operation the STK22C48 will remain disabled until the $\overline{\text{HSB}}$ pin returns high.

If $\overline{\text{HSB}}$ is not used, it should be left unconnected.

PREVENTING STORES

The STORE function can be disabled on the fly by holding $\overline{\text{HSB}}$ high with a driver capable of sourcing 30mA at a V_{OH} of at least 2.2V, as it will have to overpower the internal pull-down device that drives $\overline{\text{HSB}}$ low for 20 μs at the onset of a STORE. When the STK22C48 is connected for AutoStore operation (system V_{CC} connected to V_{CCX} and a 68 μF capacitor on V_{CAP}) and V_{CC} crosses V_{SWITCH} on the way down, the STK22C48 will attempt to pull $\overline{\text{HSB}}$ low; if $\overline{\text{HSB}}$ doesn't actually get below V_{IL} , the part will stop trying to pull $\overline{\text{HSB}}$ low and abort the STORE attempt.

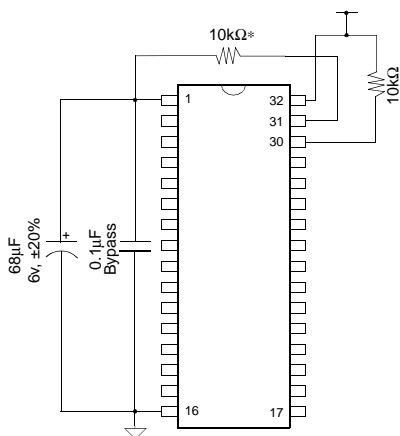


Figure 2: AutoStore Mode

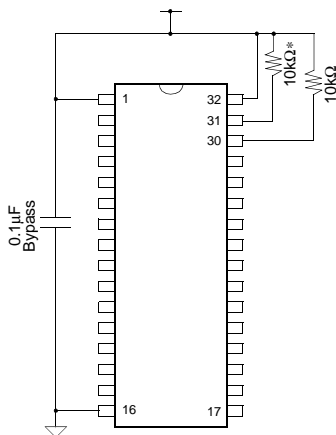


Figure 3: System Power Mode

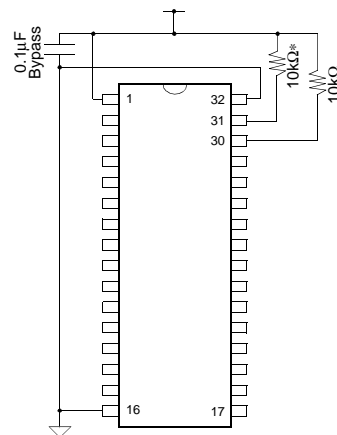


Figure 4: AutoStore Inhibit Mode

*If $\overline{\text{HSB}}$ is not used, it should be left unconnected.

HARDWARE PROTECT

The STK22C48 offers hardware protection against inadvertent *STORE* operation and SRAM WRITES during low-voltage conditions. When $V_{CAP} < V_{SWITCH}$, all externally initiated *STORE* operations and SRAM WRITES are inhibited.

AutoStore can be completely disabled by tying V_{CCX} to ground and applying + 5V to V_{CAP} . This is the *AutoStore* Inhibit mode; in this mode *STOREs* are only initiated by explicit request using the HSB pin.

LOW AVERAGE ACTIVE POWER

The STK22C48 draws significantly less current when it is cycled at times longer than 50ns. Figure 5

shows the relationship between I_{CC} and READ cycle time. Worst-case current consumption is shown for both CMOS and TTL input levels (commercial temperature range, $V_{CC} = 5.5V$, 100% duty cycle on chip enable). Figure 6 shows the same relationship for WRITE cycles. If the chip enable duty cycle is less than 100%, only standby current is drawn when the chip is disabled. The overall average current drawn by the STK22C48 depends on the following items: 1) CMOS vs. TTL input levels; 2) the duty cycle of chip enable; 3) the overall cycle rate for accesses; 4) the ratio of READs to WRITES; 5) the operating temperature; 6) the V_{CC} level; and 7) I/O loading.

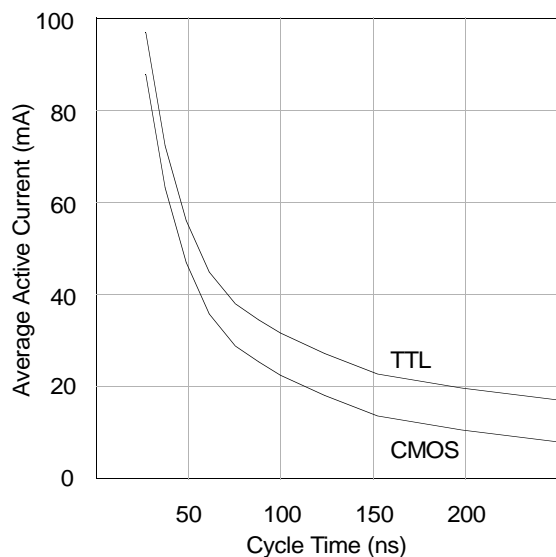


Figure 5: I_{CC} (max) Reads

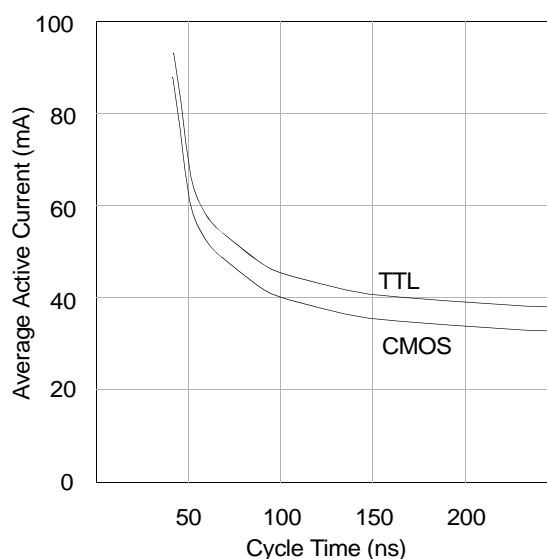
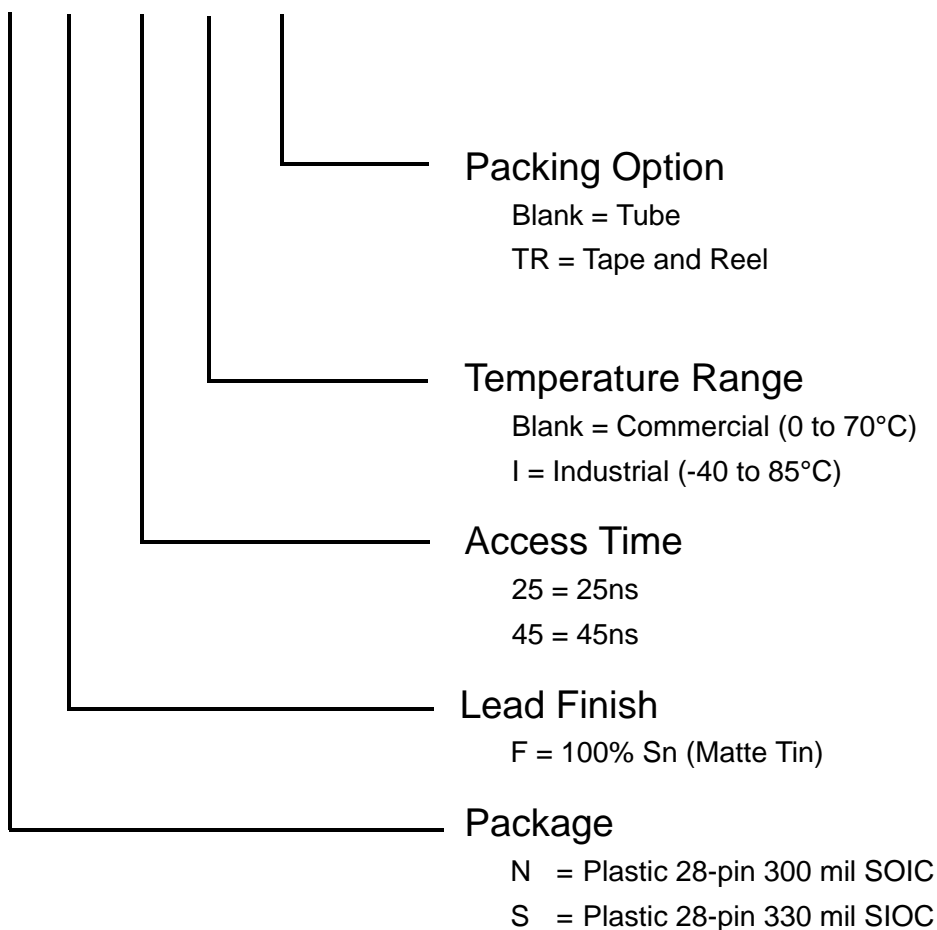


Figure 6: I_{CC} (max) Writes

ORDERING INFORMATION

STK22C48 - N F 45 I TR

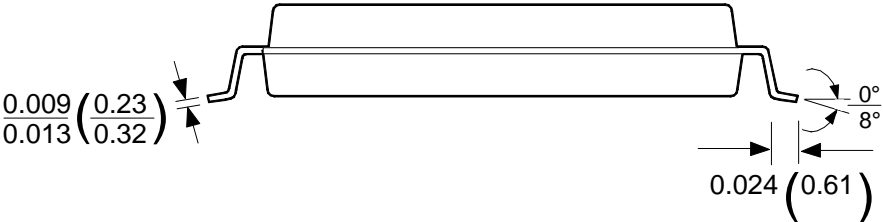
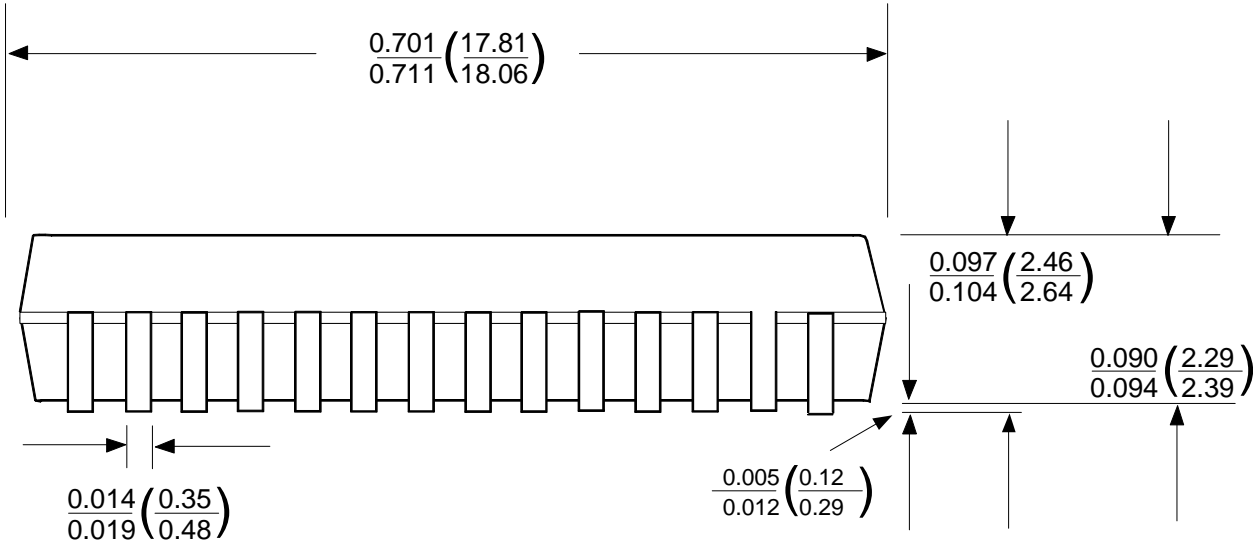
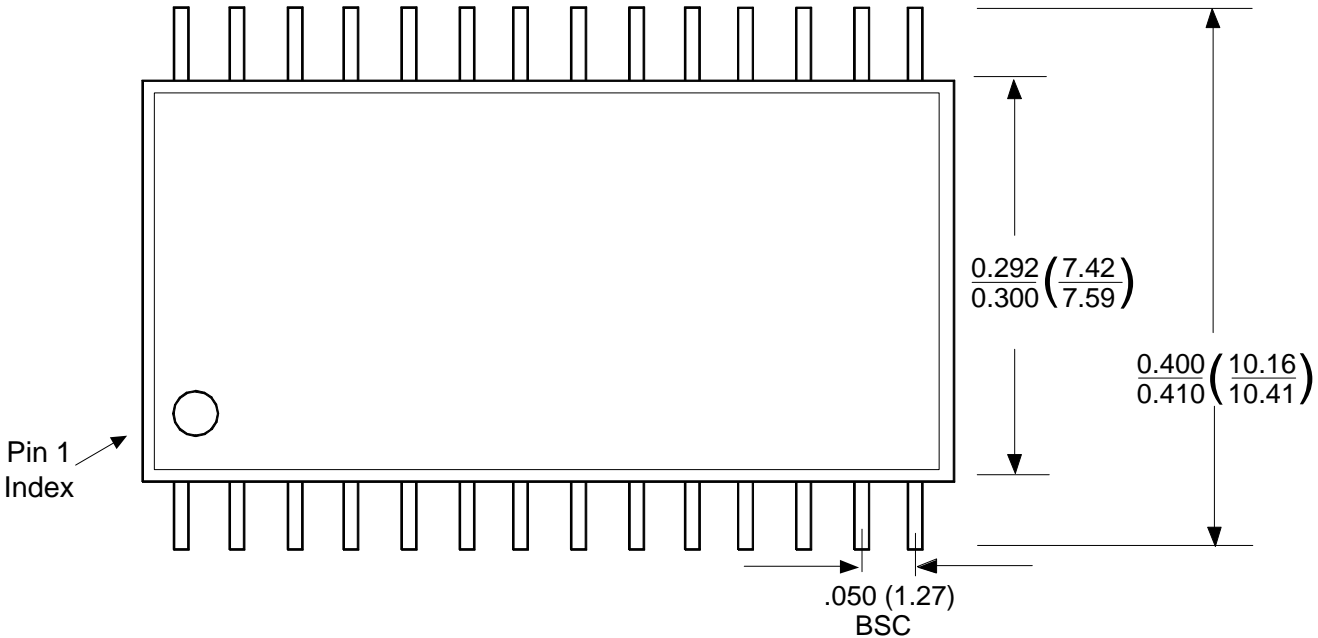


Ordering Information

Item Number	Item Name	Temperature
STK22C48-NF25	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Commercial
STK22C48-NF45	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Commercial
STK22C48-SF25	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Commercial
STK22C48-SF45	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Commercial
STK22C48-NF25TR	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Commercial
STK22C48-NF45TR	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Commercial
STK22C48-SF25TR	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Commercial
STK22C48-SF45TR	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Commercial
STK22C48-NF25I	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Industrial
STK22C48-NF45I	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Industrial
STK22C48-SF25I	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Industrial
STK22C48-SF45I	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Industrial
STK22C48-NF25ITR	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Industrial
STK22C48-NF45ITR	5V 2Kx 8 AutoStore nvSRAM SOP28-300	Industrial
STK22C48-SF25ITR	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Industrial
STK22C48-SF45ITR	5V 2Kx 8 AutoStore nvSRAM SOP28-330	Industrial

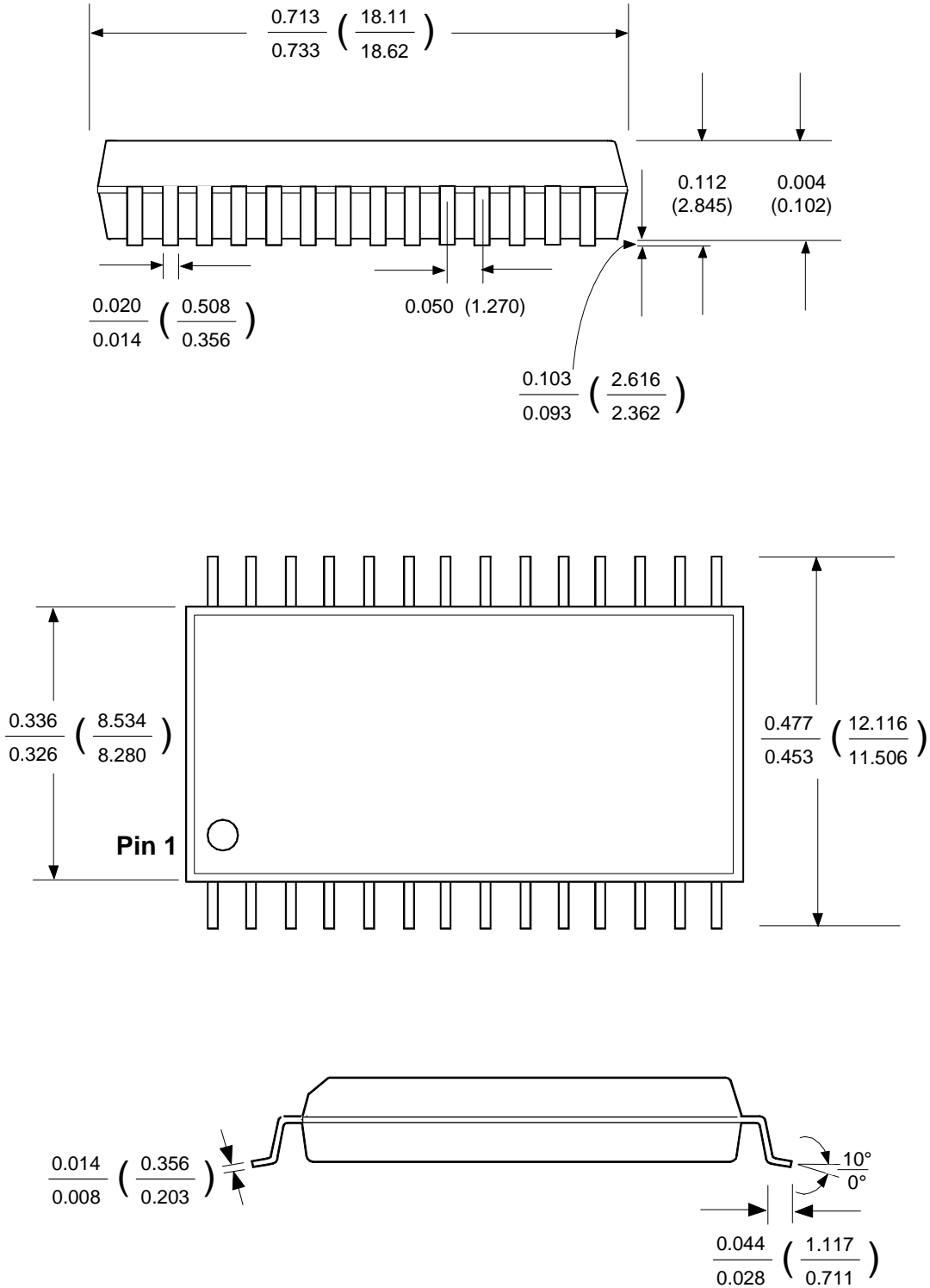
Package Diagrams

28-Lead, 300 mil SOIC Gull Wing



DIM = INCHES $\frac{\text{MIN}}{\text{MAX}}$
 DIM = mm $\left(\frac{\text{MIN}}{\text{MAX}} \right)$

28-Lead, 330 mil SOIC Gull Wing



DIM = INCHES $\frac{\text{MIN}}{\text{MAX}}$

DIM = mm $\left(\frac{\text{MIN}}{\text{MAX}} \right)$

Document Revision History

Revision	Date	Summary
0.0	December 2002	Removed 20 nsec device.
0.1	September 2003	Added lead-free lead finish
0.2	March 2006	Obsolete: 35ns speed grade, Plastic DIP packages and Leaded Lead Finish
0.3	February 2007	Add Fast Power-Down Slew Rate Information Add Tape Reel Ordering Options Add Product Ordering Code Listing Add Package Drawings Reformat Entire Document

SIMTEK STK22C48 Datasheet, February 2007

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