32K x 8 Bit Static RAM

FEATURES

- **Fast Access Time: 80,100,120 ns (max.)**
- **Low Power Dissipation**
  Standby (CMOS): 10μW (typ.) L/LL-Version
  Operating: 247.5mW (max.)
- **Single 5V ± 10% Power Supply**
- **TTL compatible inputs and outputs**
- **Fully Static Operation**
  —No clock or refresh required
- **Three State Output**
- **Low Data Retention Voltage: 2V (min.)**
- **JEDEC Standard pin Configuration**
  KM62256AP/ALP/ALP-L: 28-pin DIP (600 mil.)
  KM62256AG/ALG/ALG-L: 28-pin SOP (330 mil.)

GENERAL DESCRIPTION

The KM62256A/AL/AL-L is 262,144-bit high-speed Static Random Access Memory organized as 32,768 words by 8 bit.

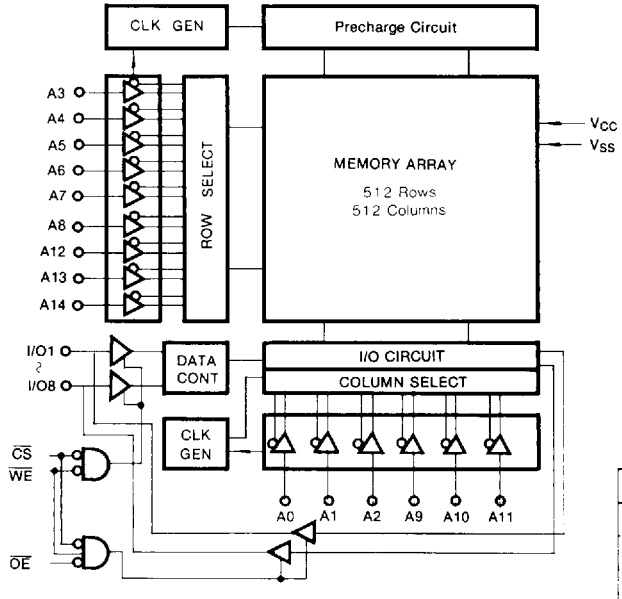
The device is fabricated using Samsung's advanced CMOS technology with polyresistors.

The KM62256A/AL/AL-L has an output enable input for precise control of the data outputs. It also has a chip select input for the minimum current power down mode.

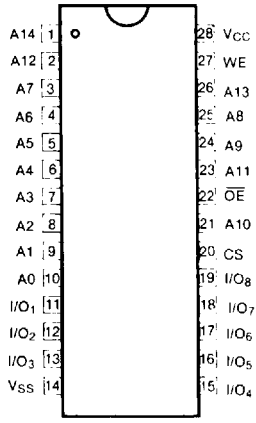
The KM62256A/AL/AL-L has been designed for high speed and low power applications.

It is particularly well suited for battery back-up non-volatile memory applications.

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



Pin Name	Pin Function
A_0-A_{14}	Address Inputs
$\overline{WE}$	Write Enable
$\overline{CS}$	Chip Select
$\overline{OE}$	Output Enable
I/O_1-I/O_8	Data Input/Outputs
V_{CC}	Power (+5V)
V_{SS}	Ground

ABSOLUTE MAXIMUM RATINGS*

Item	Symbol	Rating	Unit
Voltage on Any Pin Relative to V_{SS}	V_{IN}, V_{OUT}	−0.5 to 7.0	V
Voltage on V_{CC} Supply Relative to V_{SS}	V_{CC}	−0.5 to 7.0	V
Power Dissipation	P_D	1.0	W
Storage Temperature	T_{stg}	−65 to +150	°C
Operating Temperature	T_A	0 to 70	°C
Soldering Temperature and Time	T_{soider}	260°C, 10 sec (Lead only)	—

*Note: 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 operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

RECOMMENDED OPERATING CONDITIONS (T_A = 0 to 70°C)

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Ground	V_{SS}	0	0	0	V
Input High Voltage	V_{IH}	2.2		V_{CC}+0.5	V
Input Low Voltage	V_{IL}	−0.5*		0.8	V

* V_{IL}(min.) = −3.0V for ≤50ns pulse

DC AND OPERATING CHARACTERISTICS

(Ta = 0 to 70°C, V_{CC} = 5V ± 10%, unless otherwise specified)

Item	Symbol	Test Conditions		Min	Typ*	Max	Unit
Input Leakage Current	I_{LI}	V_{IN} = V_{SS} to V_{CC}		−1		1	μA
Output Leakage Current	I_{LO}	$\overline{CS}$ = V_{IH} or $\overline{OE}$ = V_{IH} or $\overline{WE}$ = V_{IL} $V_{I/O}$ = V_{SS} to V_{CC}		−1		1	μA
Operating Power Supply Current	I_{CC1}	$\overline{CS}$ = V_{IL}, V_{IN} = V_{IH} or V_{IL} $I_{I/O}$ = 0mA				45	mA
Average Operating Current	I_{CC2}	Min Cycle, 100% Duty, $\overline{CS}$ = V_{IL} $I_{I/O}$ = 0mA			35	70	mA
Standby Power Supply Current	I_{SB}	$\overline{CS}$ = V_{IH}				2	mA
	I_{SB1}	$\overline{CS}$ ≥ V_{CC} − 0.2V, V_{IN} ≥ V_{CC} − 0.2V or V_{IN} ≤ 0.2V				1	mA
			L		2	100	μA
			LL		2	50	μA
Output Low Voltage	V_{OL}	I_{OL} = 2.1mA				0.4	V
Output High Voltage	V_{OH}	I_{OH} = −1mA		2.4			V

* Typ.: V_{CC} = 5V, Ta = 25°C

CAPACITANCE ($f = 1MHz$, $T_A = 25°C$)

Item	Symbol	Test Condition	Min	Max	Unit
Input Capacitance	C_{IN}	$V_{IN} = 0V$	—	6	pF
Input/Output Capacitance	$C_{I/O}$	$V_{I/O} = 0V$	—	8	pF

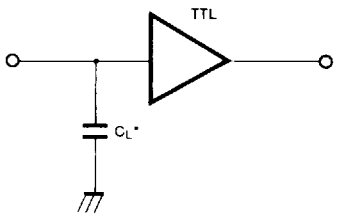
* Note: Capacitance is sampled and not 100% tested.

AC CHARACTERISTICS

TEST CONDITIONS ($Ta = 0$ to $70°C$, $V_{CC} = 5V \pm 10\%$, unless otherwise specified)

Parameter	Value
Input Pulse Level	0.8 to 2.4V
Input Rise and Fall Time	5ns
Input and Output Timing Reference Levels	1.5V
Output Load	$C_L = 100pF + 1$ TTL

TEST CIRCUIT



* Including Scope and Jig Capacitance

READ CYCLE

Parameter	Symbol	KM62256A-8 KM62256AL-8 KM62256AL-8L		KM62256A-10 KM62256AL-10 KM62256AL-10L		KM62256A-12 KM62256AL-12 KM62256AL-12L		Unit
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t_{RC}	80		100		120		ns
Address Access Time	t_{AA}		80		100		120	ns
Chip Select to Output	t_{CO}		80		100		120	ns
Output Enable to Valid Output	t_{OE}		40		50		60	ns
Chip Enable to Low-Z Output	t_{LZ}	5		10		10		ns
Output Enable to Low-Z Output	t_{OLZ}	5		5		5		ns
Chip Disable to High-Z Output	t_{HZ}	0	30	0	35	0	40	ns
Output Disable to High-Z Output	t_{OHZ}	0	30	0	35	0	40	ns
Output Hold from Address Change	t_{OH}	5		10		10		ns

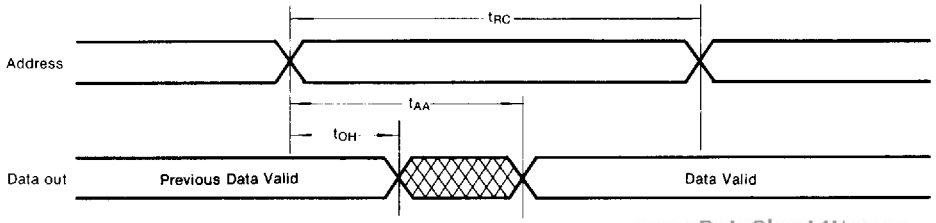
WRITE CYCLE

Parameter	Symbol	KM62256A-8 KM62256AL-8 KM62256AL-8L		KM62256A-10 KM62256AL-10 KM62256AL-10L		KM62256A-12 KM62256AL-12 KM62256AL-12L		Unit
		Min	Max	Min	Max	Min	Max	
Write Cycle Time	t_{WC}	80		100		120		ns
Chip Select to End of Write	t_{CW}	70		80		85		ns
Address Set-Up Time	t_{AS}	0		0		0		ns
Address Valid to End of Write	t_{AW}	70		80		85		ns
Write Pulse Width	t_{WP}	55		60		70		ns
Write Recovery Time	t_{WR}	0		0		0		ns
Write to Output High-Z	t_{WZ}	0	30	0	35	0	40	ns
Data to Write Time Overlap	t_{DW}	40		50		60		ns
Data Hold from Write Time	t_{DH}	0		0		0		ns
End Write to Output Low-Z	t_{OW}	5		10		10		ns

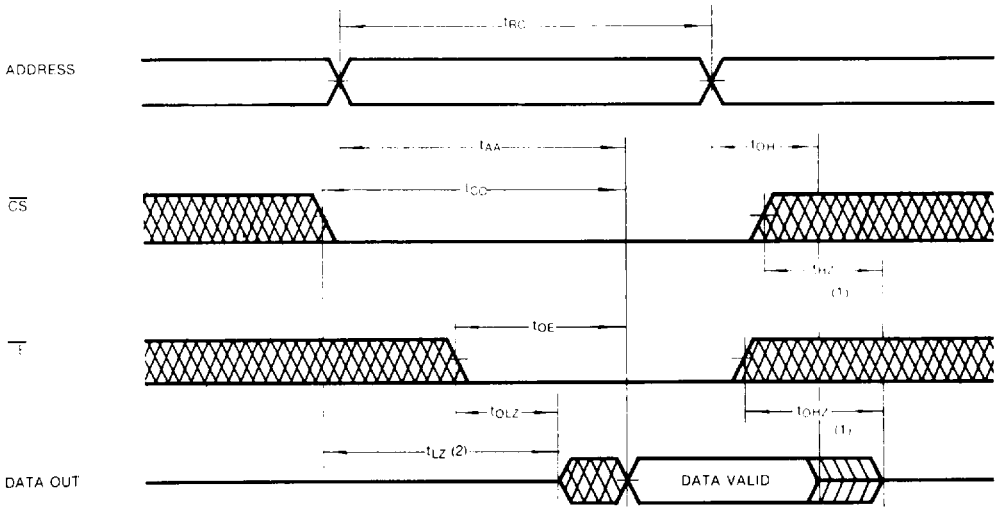
TIMING DIAGRAMS

TIMING WAVEFORM OF READ CYCLE NO: 1

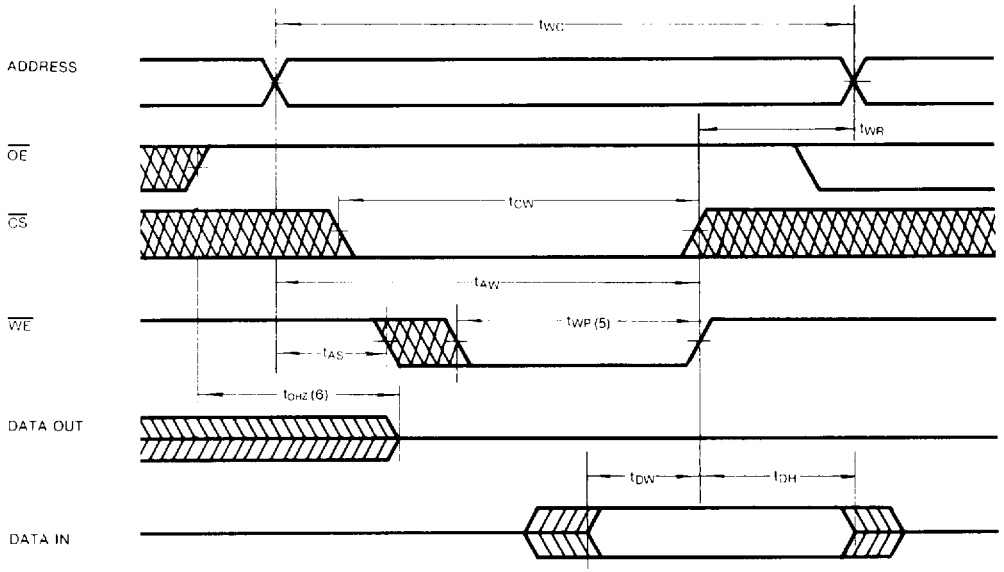
($\overline{CS} = \overline{OE} = V_{IL}$, $\overline{WE} = V_{IH}$)



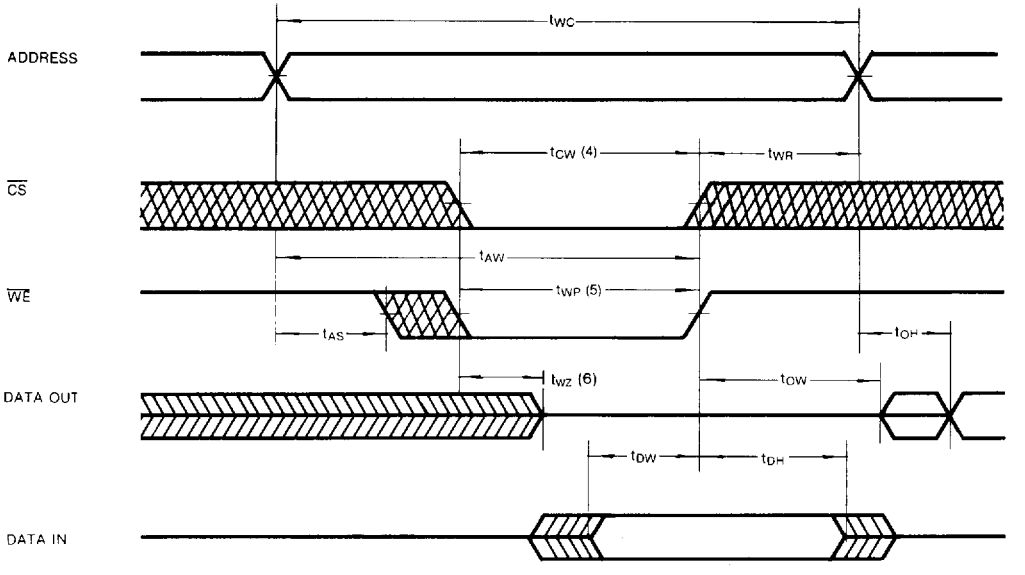
TIMING WAVEFORM OF READ CYCLE NO. 2 ($\overline{WE}$ = V_{IH}) (Note 1, 2, 3, 4)



TIMING WAVEFORM OF WRITE CYCLE NO. 3 ($\overline{OE}$ Clocked) (Note 5, 6, 7, 8)



TIMING WAVEFORM OF WRITE CYCLE NO. 4 ($\overline{OE}$ Low Fixed) (Note 5, 6, 7, 8, 9)



Notes: 1. t_{HZ} and t_{OHZ} are defined as the time at which the outputs achieve the open circuit condition and are not referenced to the V_{OH} or V_{OL} Level.
2. At any given temperature and voltage condition, t_{HZ}(max) is less than t_{LZ}(min) both for a given device and from device to device.
3. $\overline{WE}$ is high for Read Cycle.
4. Address valid prior to or coincident with $\overline{CS}$ transition Low.
5. A write occurs during the overlap (t_{WP}) of a low $\overline{CS}$ and low $\overline{WE}$.
6. During this period, I/O pins are in the output state. The input signals out of phase must not applied.
7. $\overline{CS}$ or $\overline{WE}$ must be high during address transition state.
8. If $\overline{OE}$ is high, I/O pins remain in a high-impedance state.
9. $\overline{OE}$ is continuously low. ($\overline{OE} = V_{IL}$)

FUNCTIONAL DESCRIPTION

$\overline{CS}$	$\overline{WE}$	$\overline{OE}$	Mode	I/O Pin	V_{CC} Current
H	X*	X	Power Down	High-Z	I_{SB}, I_{SB1}
L	H	H	Output Disable	High-Z	I_{CC}
L	H	L	Read	D_{OUT}	I_{CC}
L	L	X	Write	D_{IN}	I_{CC}

* Note: X means Don't Care.

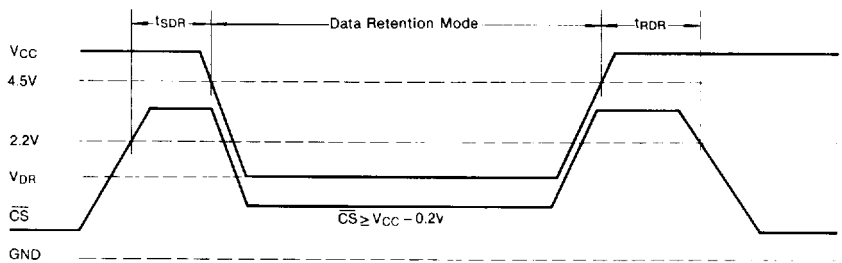
DATA RETENTION CHARACTERISTICS (T_A = 0 to 70°C)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
V_{CC} for Data Retention	V_{DR}	$\overline{CS} \geq V_{CC} - 0.2V$		2.0		5.5	V
Data Retention Current	I_{DR}	$V_{CC} = 3V$ $\overline{CS} \geq V_{CC} - 0.2V$	L		1	50	μA
			LL		1	20*	μA
Data Retention Set-up Time	t_{SDR}	See Data Retention Wave forms (below)		0			ns
Recovery Time	t_{RDR}			t_{RC}**			ns

* 3μA (max.) at 0°C ~ 40°C

** t_{RC} = Read cycle time

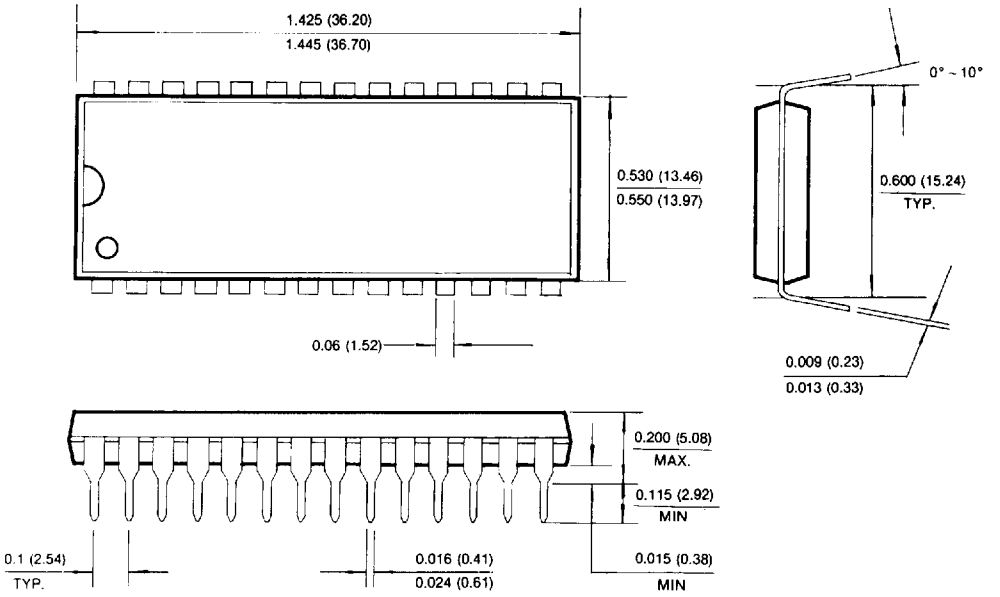
DATA RETENTION WAVEFORM ($\overline{CS}$ Controlled)



PACKAGE DIMENSIONS

28 PIN PLASTIC DUAL IN LINE PACKAGE

Unit: Inches (Millimeters)



28 PIN PLASTIC SMALL OUT LINE PACKAGE