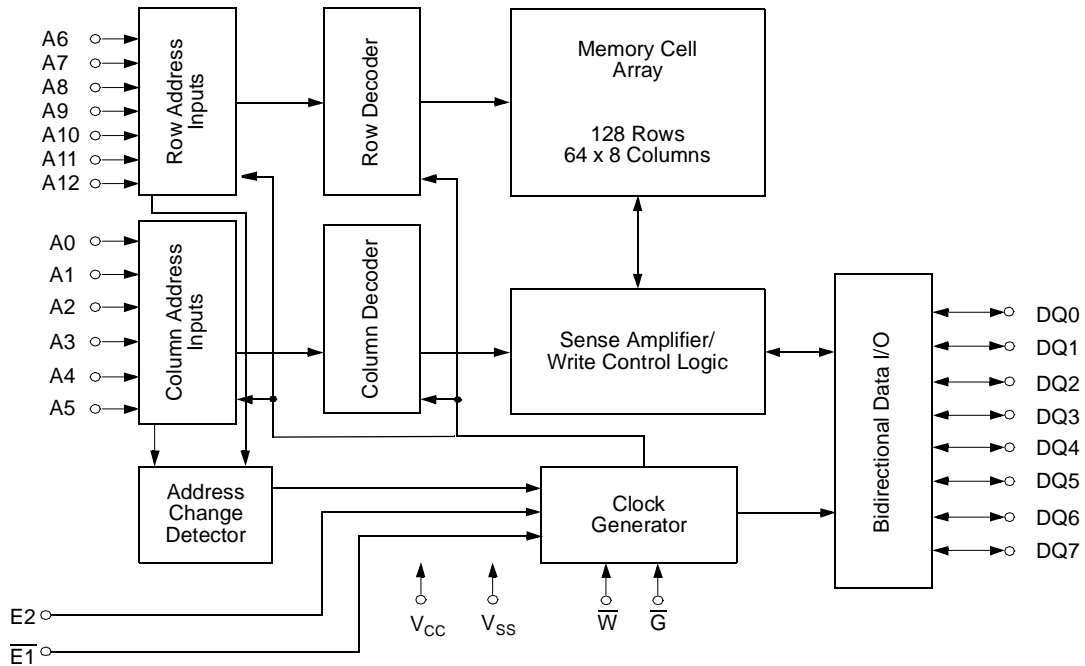




# U62H64SA

## Block Diagram



## Truth Table

Operating Mode	$\overline{E1}$	E2	$\overline{W}$	$\overline{G}$	DQ0 - DQ7
Standby/not selected	*	L	*	*	High-Z
	H	*	*	*	High-Z
Internal Read	L	H	H	H	High-Z
Read	L	H	H	L	Data Outputs Low-Z
Write	L	H	L	*	Data Inputs High-Z

\* H or L

## Characteristics

All voltages are referenced to  $V_{SS} = 0$  V (ground).

All characteristics are valid in the power supply voltage range and in the operating temperature range specified.

Dynamic measurements are based on a rise and fall time of  $\leq 5$  ns, measured between 10 % and 90 % of  $V_I$ , as well as

input levels of  $V_{IL} = 0$  V and  $V_{IH} = 3$  V. The timing reference level of all input and output signals is 1.5 V,

with the exception of the  $t_{dis}$ -times and  $t_{en}$ -times, in which cases transition is measured  $\pm 200$  mV from steady-state voltage.

Maximum Ratings	Symbol	Min.	Max.	Unit
Power Supply Voltage	$V_{CC}$	-0.3	7	V
Input Voltage	$V_I$	-0.3	$V_{CC} + 0.5$	V
Output Voltage	$V_O$	-0.3	$V_{CC} + 0.5$	V
Operating Temperature	$T_a$	-40	125	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-65	150	$^{\circ}\text{C}$
Output Short-Circuit Current at $V_{CC} = 5$ V and $V_O = 0$ V*	$ I_{OS} $		200	mA

\* Not more than 1 output should be shorted at one time. Duration of the short circuit should not exceed 30 s.

Recommended Operating Conditions	Symbol	Conditions	Min.	Max.	Unit
Power Supply Voltage	$V_{CC}$		4.5	5.5	V
Data Retention Voltage	$V_{CC(DR)}$		2.0	-	V
Input Low Voltage *	$V_{IL}$		-0.3	0.8	V
Input High Voltage	$V_{IH}$		2.2	$V_{CC}+0.3$	V

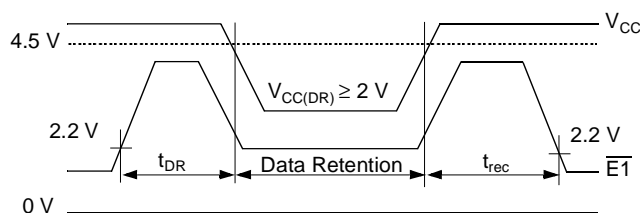
\* -2 V at Pulse Width 10 ns or -1 V at Pulse Width 50 ns

Electrical Characteristics	Symbol	Conditions	Min.	Max.	Unit
Supply Current - Operating Mode	$I_{CC(OP)}$	$V_{CC} = 5.5\text{ V}$ $V_{IL} = 0.8\text{ V}$ $V_{IH} = 2.2\text{ V}$ $t_{cW} = 35\text{ ns}$		50	mA
Supply Current - Standby Mode (CMOS level)	$I_{CC(SB)}$	$V_{CC} = 5.5\text{ V}$ $V_{E1} = V_{E2} = V_{CC} - 0.2\text{ V}$		100	$\mu\text{A}$
Supply Current - Standby Mode (TTL level)	$I_{CC(SB)1}$	$V_{CC} = 5.5\text{ V}$ $V_{E1} = V_{E2} = 2.2\text{ V}$		5 (typ. 2)	mA
Supply Current - Data Retention Mode	$I_{CC(DR)}$	$V_{CC(DR)} = 3.0\text{ V}$ $V_{E1} = V_{E2} = V_{CC(DR)} - 0.2\text{ V}$		50	$\mu\text{A}$
Output High Voltage	$V_{OH}$	$V_{CC} = 4.5\text{ V}$ $I_{OH} = -4.0\text{ mA}$	2.4	-	V
Output Low Voltage	$V_{OL}$	$V_{CC} = 4.5\text{ V}$ $I_{OL} = 8.0\text{ mA}$	-	0.4	V
Output High Current	$I_{OH}$	$V_{CC} = 4.5\text{ V}$ $V_{OH} = 2.4\text{ V}$	-	-4.0	mA
Output Low Current	$I_{OL}$	$V_{CC} = 4.5\text{ V}$ $V_{OL} = 0.4\text{ V}$	8.0	-	mA
Input High Leakage Current	$I_{IH}$	$V_{CC} = 5.5\text{ V}$ $V_{IH} = 5.5\text{ V}$	-	2	$\mu\text{A}$
Input Low Leakage Current	$I_{IL}$	$V_{CC} = 5.5\text{ V}$ $V_{IL} = 0\text{ V}$	-2	-	$\mu\text{A}$
Output Leakage Current High at Three-State Outputs	$I_{OHZ}$	$V_{CC} = 5.5\text{ V}$ $V_{OH} = 5.5\text{ V}$	-	2	$\mu\text{A}$
Low at Three-State Outputs	$I_{OLZ}$	$V_{CC} = 5.5\text{ V}$ $V_{OL} = 0\text{ V}$	-2	-	$\mu\text{A}$

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Switching Characteristics	Symbol		Min.	Max.	Unit
	Alt.	IEC	35	35	
Time to Output in Low-Z from $\overline{E1}$ LOW or E2 HIGH $\overline{G}$ LOW $\overline{W}$ HIGH	$t_{LZCE}$ $t_{LZOE}$ $t_{LZWE}$	$t_{en(E)}$ $t_{en(G)}$ $t_{en(W)}$	5 0 0		ns ns ns
Cycle Time Write Cycle Time Read Cycle Time	$t_{WC}$ $t_{RC}$	$t_{cW}$ $t_{cR}$	35 35		ns ns
Access Time $\overline{E1}$ LOW or E2 HIGH to Data Valid $\overline{G}$ LOW to Data Valid Address to Data Valid	$t_{ACE}$ $t_{OE}$ $t_{AA}$	$t_{a(E)}$ $t_{a(G)}$ $t_{a(A)}$		35 15 35	ns ns ns
Pulse Widths Write Pulse Width Chip Enable to End of Write	$t_{WP}$ $t_{CW}$	$t_{w(W)}$ $t_{w(E)}$	20 25		ns ns
Setup Times Address Setup Time Chip Enable to End of Write Write Pulse Width Data Setup Time	$t_{AS}$ $t_{CW}$ $t_{WP}$ $t_{DS}$	$t_{su(A)}$ $t_{su(E)}$ $t_{su(W)}$ $t_{su(D)}$	0 25 20 15		ns ns ns ns
Data Hold Time Address Hold from End of Write	$t_{DH}$ $t_{AH}$	$t_{h(D)}$ $t_{h(A)}$	0 0		ns ns
Output Hold Time from Address Change	$t_{OH}$	$t_{v(A)}$	5		ns
$\overline{E1}$ HIGH or E2 LOW to Output in High-Z $\overline{W}$ LOW to Output in High-Z $\overline{G}$ HIGH to Output in High-Z	$t_{HZCE}$ $t_{HZWE}$ $t_{HZOE}$	$t_{dis(E)}$ $t_{dis(W)}$ $t_{dis(G)}$		15 15 12	ns ns ns
$\overline{E1}$ LOW or E2 HIGH to Power-Up	$t_{PU}$		0		ns
$\overline{E1}$ HIGH or E2 LOW to Power-Down	$t_{PD}$			35	ns

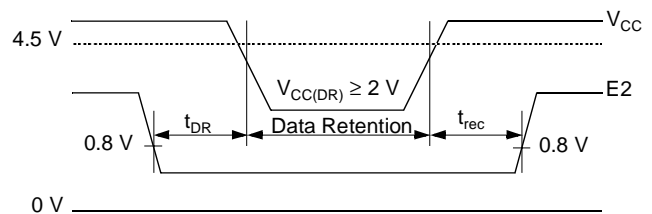
## Data Retention Mode $\overline{E1}$ -Controlled



$$V_{E2(DR)} \geq V_{CC(DR)} - 0.2 \text{ V or } V_{E2(DR)} \leq 0.2 \text{ V}$$

$$V_{CC(DR)} - 0.2 \text{ V} \leq V_{E1(DR)} \leq V_{CC(DR)} + 0.3 \text{ V}$$

## Data Retention Mode E2-Controlled

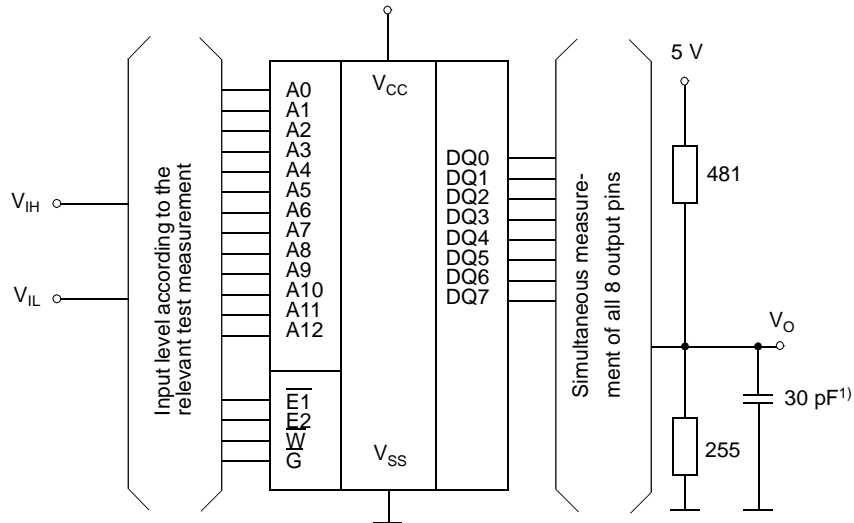


$$V_{E1(DR)} \geq V_{CC(DR)} - 0.2 \text{ V or } V_{E1(DR)} \leq 0.2 \text{ V}$$

$$V_{E2(DR)} \leq 0.2 \text{ V}$$

Chip Deselect to Data Retention Time  $t_{DR}$ : min 0 ns  
 Operating Recovery Time at  $V_{CC(DR)}$   $t_{rec}$ : min  $t_{cR}$

## Test Configuration for Functional Check



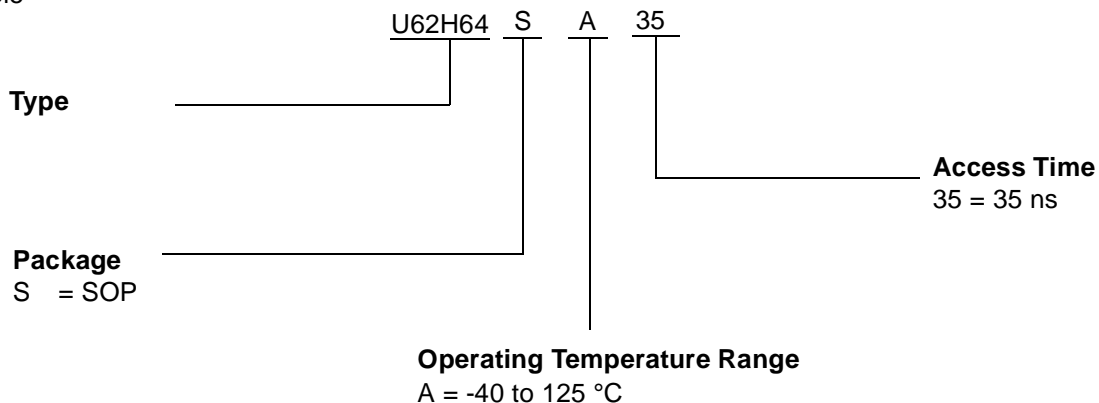
1) In measurement of  $t_{dis(E)}$ ,  $t_{dis(W)}$ ,  $t_{dis(G)}$ ,  $t_{en(E)}$ ,  $t_{en(W)}$ ,  $t_{en(G)}$  the capacitance is 5 pF.

Capacitance	Conditions	Symbol	Min.	Max.	Unit
Input Capacitance	$V_{CC} = 5.0\text{ V}$ $V_I = V_{SS}$	$C_I$		8	pF
Output Capacitance	$f = 1\text{ MHz}$ $T_a = 25\text{ °C}$	$C_O$		10	pF

All pins not under test must be connected with ground by capacitors.

## IC Code Number

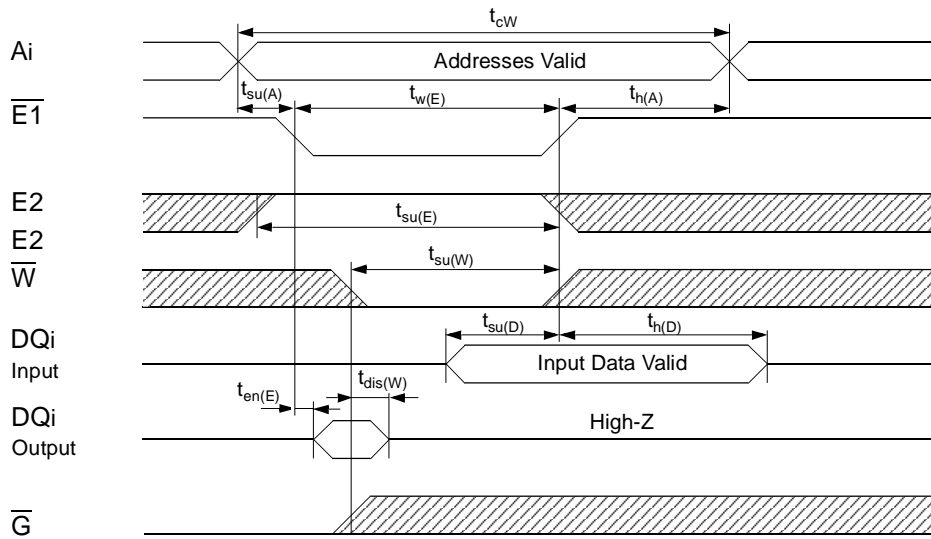
Example



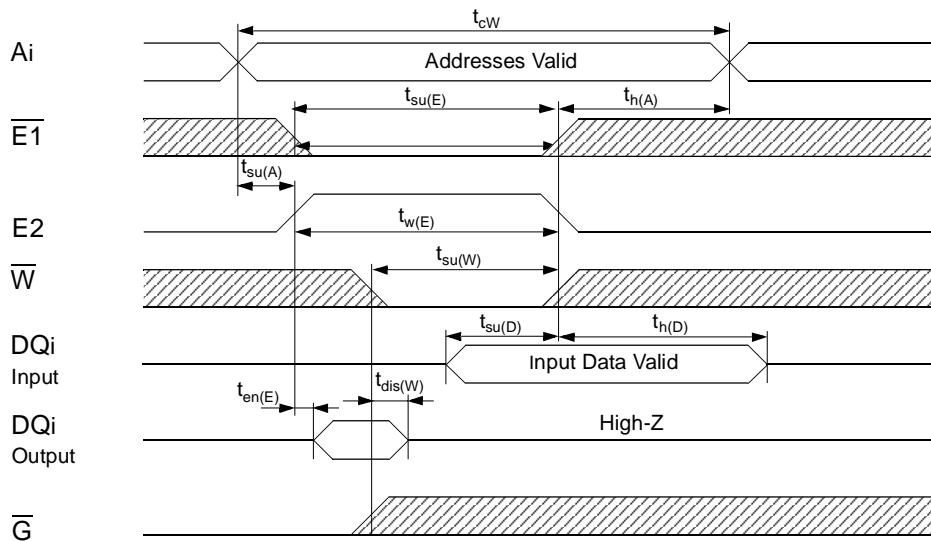
The date of manufacture is given by the last 4 digits of the mark, the first 2 digits indicating the year, and the last 2 digits the calendar week.



Write Cycle 2 ( $\overline{E1}$ -controlled)



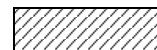
Write Cycle 3 (E2-controlled)



undefined



L- or H-level



The information describes the type of component and shall not be considered as assured characteristic. Terms of delivery and rights to change design reserved.

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