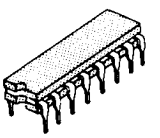
1024-word×1-bit Fully Decoded Random Access Memory

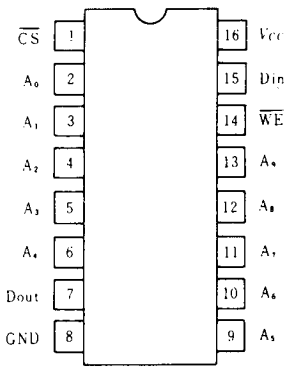
The HM2511 Series item is a 1024-word x 1-bit read/write random access memory with tri-state output developed for application to buffer memories, control memories, high-speed main memories, etc. It is a fully decoded, read/write, random access memory perfectly compatible with standard DTL and TTL logic families.

- Level ..... TTL compatible
- Construction ..... 1024-word x 1 bit
- Read access time ..... HM2511: 70ns (max)
  HM2511-1: 45ns (max)
- Chip select access time ..... HM2511: 40ns (max)
  HM2511-1: 30ns (max)
- Power consumption ..... 0.5 mW/bit
- Output ..... tri-state



(DG-16A)

■ PIN ARRANGEMENT



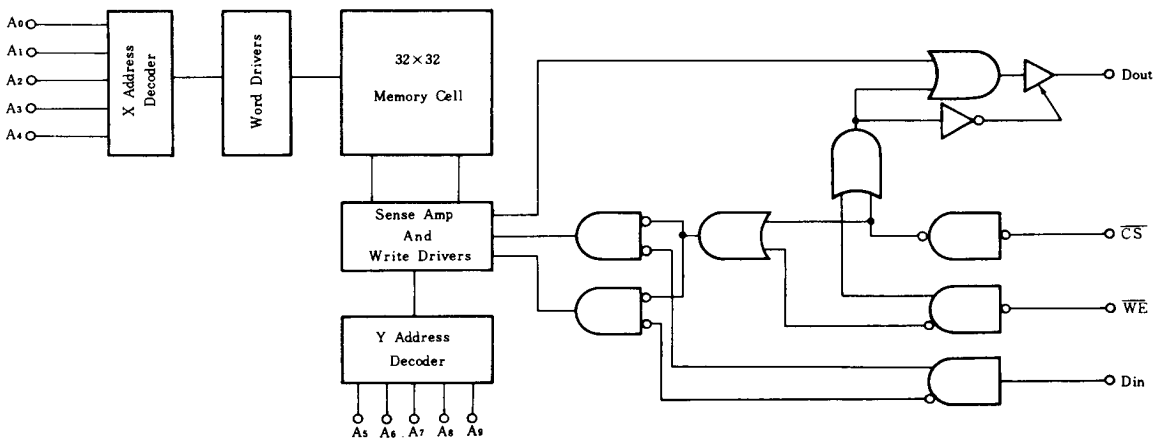
(Top View)

■ TRUTH TABLE

Input			Output Open Collector	Mode
$\overline{CS}$	$\overline{WE}$	Din		
H	×	×	High Z	Not Selected
L	L	L	High Z	Write "0"
L	L	H	High Z	Write "1"
L	H	×	Dout *	Read

× : Don't care
* : Read out noninverted

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	HM2511 Series	Unit
Supply Voltage	V_{CC}	−0.5 to +7.0	V
Input Voltage	V_{in}	−0.5 to +5.5	V
Input Current	I_{in}	− 12 to +5.0	mA
Output Voltage (Output High)	V_{out}	−0.5 to +5.5	V
Output Voltage (DC Output Low)	I_{out}	+20	mA
Storage Temperature	T_{stg}	−65 to +150	℃
Storage Temperature	T_{stg} (Bias)*	−55 to +125	℃

* Under Bias

■ ELECTRICAL CHARACTERISTICS

• DC CHARACTERISTICS (V_{CC}=5.0V±5%, Ta=0 to +75℃, air flow exceeding 2m/sec)

Item	Symbol	Test Condition	HM2511 Series min.	typ.	max.	Unit
Output Low Voltage	V_{OL}	V_{CC}=4.75V, I_{OL}=16mA	—	0.3	0.45	V
Input Voltage	V_{IH}	Guaranteed Input Voltage High	2.1	1.6	—	V
	V_{IL}	Guaranteed Input Voltage Low	—	1.5	0.8	V
Input Current	$I_{IH\ 1}$	V_{CC}=5.25V, V_{in}=4.5V	—	0	40	μA
	$I_{IH\ 2}$	V_{CC}=5.25V, V_{in}=5.25V	—	0	1.0	mA
	I_{IL}	V_{CC}=5.25V, V_{in}=0.4V	—	−250	−400	μA
Output Current (High Z)	$I_{OFF\ 1}$	V_{CC}=5.25V, V_{out}=2.4V	—	—	50	μA
	$I_{OFF\ 2}$	V_{CC}=5.25V, V_{out}=0.5V	—	—	−50	μA
Output Current Short Circuit to Ground	I_{OS}	V_{CC}=5.25V	—	—	−100	mA
Output High Voltage	V_{OH}	I_{OH}=−10.3mA, V_{CC}=5.0V±5%	2.4	—	—	V
Input Clamp Voltage	V_I	V_{CC}=5.25V, I_{in}=−10mA	—	−1.0	−1.5	V
Supply Current	I_{CC}	V_{CC}=5.25V, $0 \leq Ta < 25$℃	—	—	155	mA
		All input GND, $Ta \geq 25$℃	—	95	130	mA

• AC CHARACTERISTICS (V_{CC}=5.0V±5%, Ta=0 to +75℃, air flow exceeding 2m/sec)

1. READ MODE

Item	Symbol	Test Condition	HM2511 min.	typ.	max.	HM2511-1 min.	typ.	max.	Unit
Chip Select Access Time	t_{ACS}		—	15	40	—	—	30	ns
Chip Select to High Z	t_{ZRCS}		—	20	40	—	—	30	ns
Address Access Time	t_{AA}		—	40	70	—	35	45	ns

2. WRITE MODE

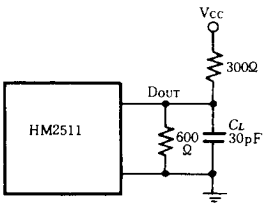
Item	Symbol	Test Condition	HM2511 min.	typ.	max.	HM2511-1 min.	typ.	max.	Unit
Write Pulse Width	t_W	t_{WSA}=min	50	25	—	35	10	—	ns
Data Setup Time	t_{WSD}		5	0	—	5	—	—	ns
Data Hold Time	t_{WHD}		5	0	—	5	—	—	ns
Address Setup Time	t_{WSA}	t_W=min	15	0	—	5	—	—	ns
Address Hold Time	t_{WHA}		5	0	—	5	—	—	ns
Chip Select Setup Time	t_{WSCS}		5	0	—	5	—	—	ns
Chip Select Hold Time	t_{WHCS}		5	0	—	5	—	—	ns
Write Disable to High Z	t_{ZWS}		—	20	40	—	20	35	ns
Write Recovery Time	t_{WR}		—	42	55	—	30	45	ns

3. CAPACITANCE

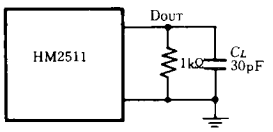
Item	Symbol	Test Condition	HM2511 Series			Unit
			min.	typ.	max.	
Input Capacitance	C_{in}		—	3	5	pF
Output Capacitance	C_{out}		—	9	11	pF

■ TEST CIRCUIT AND WAVEFORMS

1. LOADING CONDITION



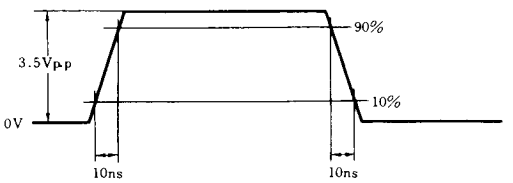
Load A



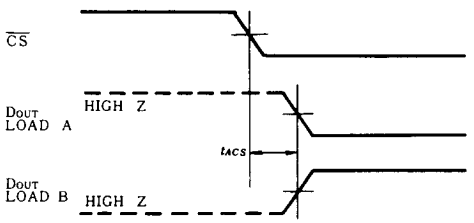
Load B

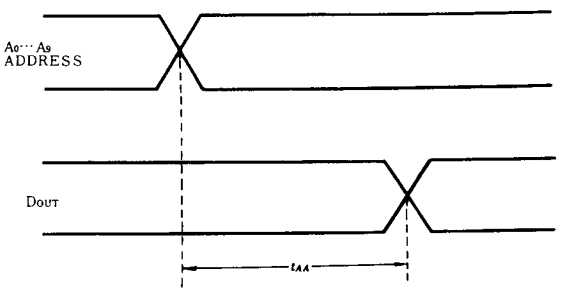
Note: C_L includes probe and stray capacitance

2. INPUT PULSE



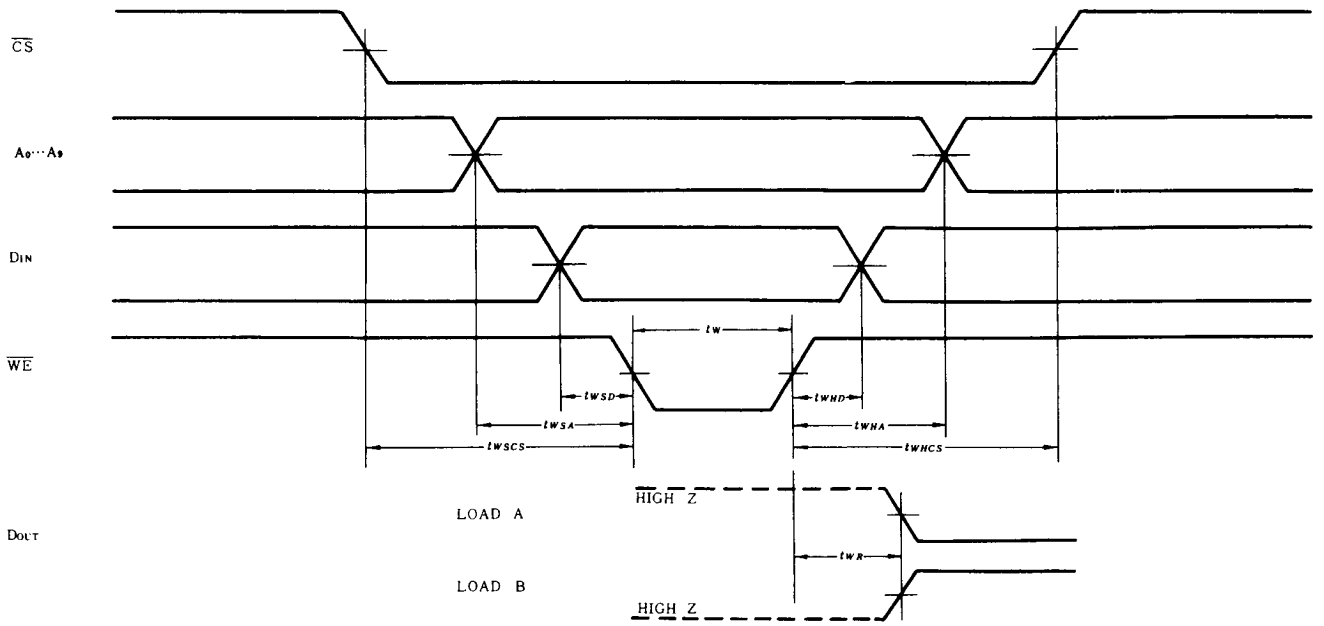
3. READ MODE





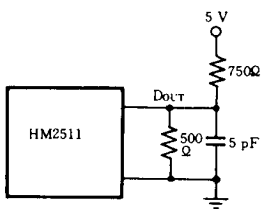
(All time measurements refer to 1.5V)

4. WRITE MODE

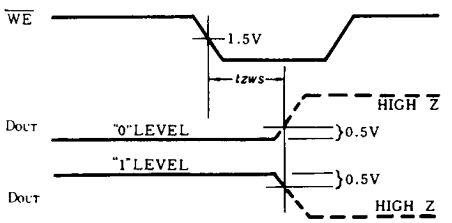


(All above measurements referenced to 1.5V)

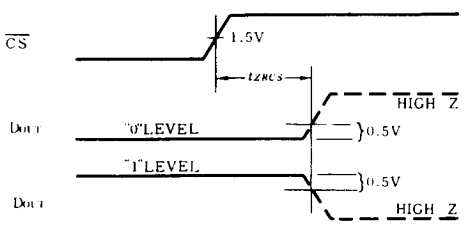
5. WRITE ENABLE TO HIGH Z DELAY



Load C



6. PROPAGATION DELAY FROM CHIP SELECT TO HIGH Z



(All t_{ZXXX} parameters are measured at a delta of 0.5V from the logic level and using Load C.)