intel®

Silicon Gate MOS **2102A**

1024 BIT FULLY DECODED STATIC MOS RANDOM ACCESS MEMORY

*Fast Access Time -- 350 ns max.

- **Single +5 Volts Supply Voltage**
- **Directly TTL Compatible — All Inputs and Output**
- **Static MOS — No Clocks or Refreshing Required**
- **Low Power — Typically 150 mW**
- **Three-State Output — OR-Tie Capability**
- **Simple Memory Expansion — Chip Enable Input**
- **Fully Decoded — On Chip Address Decode**
- **Inputs Protected — All Inputs Have Protection Against Static Charge**
- **Low Cost Packaging — 16 Pin Plastic Dual-In-Line Configuration**

The Intel 2102A is a high speed 1024 word by one bit static random access memory element using N-channel MOS devices integrated on a monolithic array. It uses fully DC stable (static) circuitry and therefore requires no clocks or refreshing to operate. The data is read out nondestructively and has the same polarity as the input data.

The 2102A is designed for memory applications where high performance, low cost, large bit storage, and simple interfacing are important design objectives. *A low standby power version (order as a 2102A/S1172) is also available. It has all the same operating characteristics of the 2102A with the added feature of 42 mW maximum power dissipation in standby.*

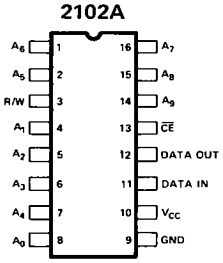
It is directly TTL compatible in all respects: inputs, output, and a single +5 volt supply. A separate chip enable ($\overline{CE}$) lead allows easy selection of an individual package when outputs are OR-tied.

The Intel 2102A is fabricated with N-channel silicon gate technology. This technology allows the design and production of high performance easy to use MOS circuits and provides a higher functional density on a monolithic chip than either conventional MOS technology or P-channel silicon gate technology.

Intel's silicon gate technology also provides excellent protection against contamination. This permits the use of low cost silicone packaging.

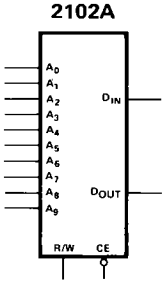
PIN CONFIGURATION

2102A

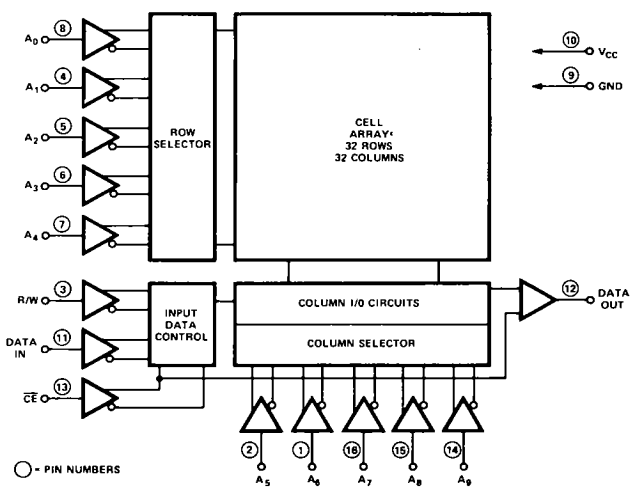


LOGIC SYMBOL

2102A



BLOCK DIAGRAM



PIN NAMES

D_{IN}	DATA INPUT	$\overline{CE}$	CHIP ENABLE
$A_0 - A_9$	ADDRESS INPUTS	D_{OUT}	DATA OUTPUT
R/W	READ/WRITE INPUT	V_{CC}	POWER (+5V)

Absolute Maximum Ratings*

Ambient Temperature Under Bias	0°C to 70°C
Storage Temperature	−65°C to +150°C
Voltage On Any Pin With Respect To Ground	−0.5V to +7V
Power Dissipation	1 Watt

*COMMENT:

Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or at any other condition above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

D. C. and Operating Characteristics

T_A = 0°C to + 70°C, V_{CC} = 5V ±5% unless otherwise specified.

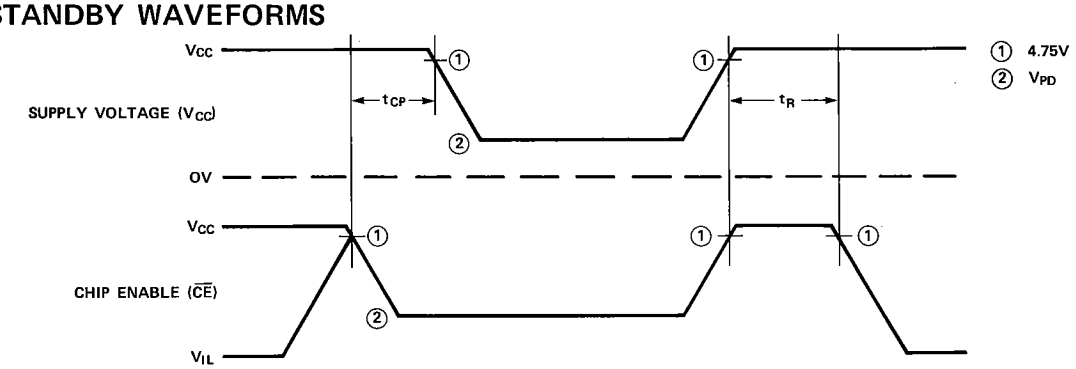
Symbol	Parameter	Limits			Unit	Test Conditions
		Min.	Typ.[1]	Max.		
I_{LI}	Input Load Current (All Input Pins)			10	μA	V_{IN} = 0 to 5.25V
I_{LOH}	Output Leakage Current			5	μA	$\overline{CE}$ = 2.0V, V_{OUT} = 2.4 to V_{CC}
I_{LOL}	Output Leakage Current			-10	μA	$\overline{CE}$ = 2.0V, V_{OUT} = 0.4V
I_{CC1}	Power Supply Current		30	60	mA	All Inputs = 5.25V Data Out Open T_A = 25°C
I_{CC2}	Power Supply Current			70	mA	All Inputs = 5.25V Data Out Open T_A = 0°C
V_{IL}	Input "Low" Voltage	-0.5		0.8	V	
V_{IH}	Input "High" Voltage	2.0		V_{CC}	V	
V_{OL}	Output "Low" Voltage			0.4	V	I_{OL} = 2.1mA
V_{OH}	Output "High" Voltage	2.4			V	I_{OH} = -100μA

Standby Characteristics (For 2102A Device Types–S1172, S1173, S1174)

T_A = 0°C to 70°C

Symbol	Parameter	Limits			Unit	Test Conditions
		Min.	Typ.[1]	Max.		
V_{PD}	V_{CC} in Standby	1.5			V	
V_{CES}	$\overline{CE}$ Bias in Standby	V_{PD}			V	
I_{PD1}	Standby Current Drain		15	28	mA	All Inputs = V_{PD1} = 1.5V
I_{PD2}	Standby Current Drain		20	38	mA	All Inputs = V_{PD2} = 2.0V
t_{CP}	Chip Deselect to Standby Time	0			ns	
t_R	Standby Recovery Time	T_{RC}			ns	

STANDBY WAVEFORMS



NOTE: 1. Typical values are for T_A = 25°C and nominal supply voltage.

A. C. Characteristics T_A = 0°C to 70°C, V_{CC} = 5V ±5% unless otherwise specified

Symbol	Parameter	Limits			Unit
		Min.	Typ.[1]	Max.	
READ CYCLE					
t_{RC}	Read Cycle	350			ns
t_A	Access Time			350	ns
t_{CO}	Chip Enable to Output Time			180	ns
t_{OH1}	Previous Read Data Valid with Respect to Address	40			ns
t_{OH2}	Previous Read Data Valid with Respect to Chip Enable	0			ns
WRITE CYCLE					
t_{WC}	Write Cycle	350			ns
t_{AW}	Address to Write Setup Time	20			ns
t_{WP}	Write Pulse Width	250			ns
t_{WR}	Write Recovery Time	0			ns
t_{DW}	Data Setup Time	250			ns
t_{DH}	Data Hold Time	0			ns
t_{CW}	Chip Enable to Write Setup Time	250			ns

NOTE: 1 Typical values are for T_A = 25°C and nominal supply voltage.

A.C. CONDITIONS OF TEST

Input Pulse Levels:		0.8 Volt to 2.0 Volt
Input Rise and Fall Times:		10nsec
Timing Measurement Reference Levels	Inputs:	1.5 Volts
	Output:	0.8 and 2.0 Volts
Output Load:		1 TTL Gate and C_L = 100 pF

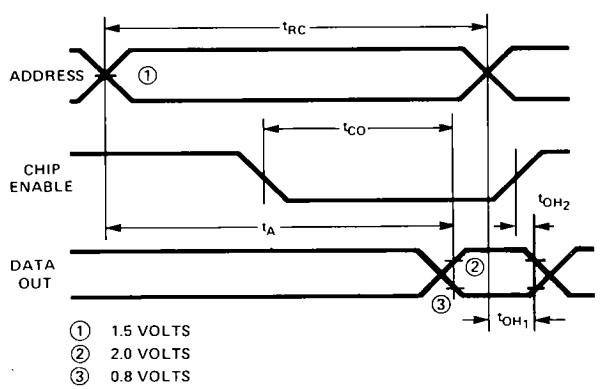
Capacitance[2] T_A = 25°C, f = 1 MHz

SYMBOL	TEST	LIMITS (pF)	
		TYP.[1]	MAX.
C_{IN}	INPUT CAPACITANCE (ALL INPUT PINS) V_{IN} = 0V	3	5
C_{OUT}	OUTPUT CAPACITANCE V_{OUT} = 0V	7	10

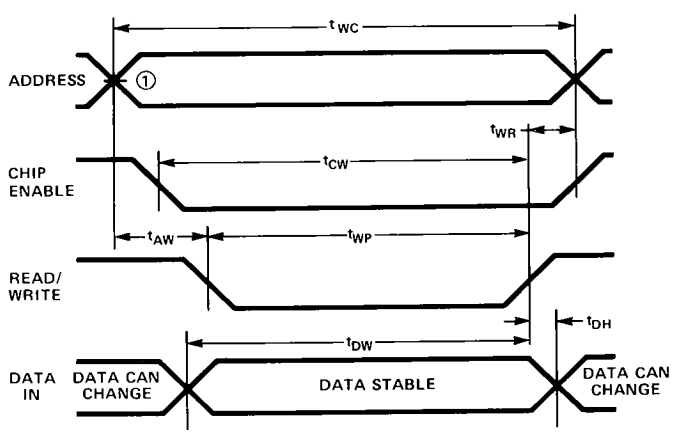
NOTE: 2. This parameter is periodically sampled and is not 100% tested.

Waveforms

READ CYCLE

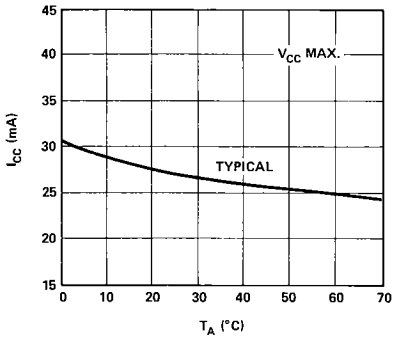


WRITE CYCLE

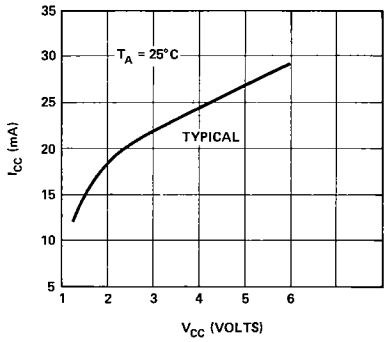


Typical D. C. and A. C. Characteristics

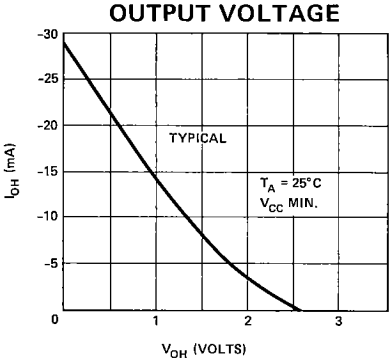
POWER SUPPLY CURRENT VS. AMBIENT TEMPERATURE



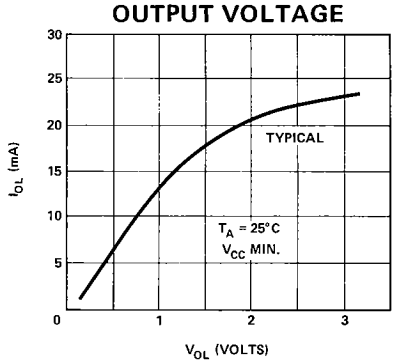
POWER SUPPLY CURRENT VS. SUPPLY VOLTAGE



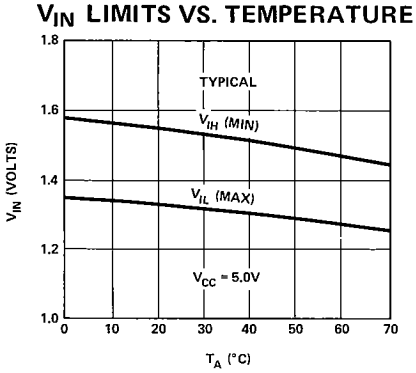
OUTPUT SOURCE CURRENT VS. OUTPUT VOLTAGE



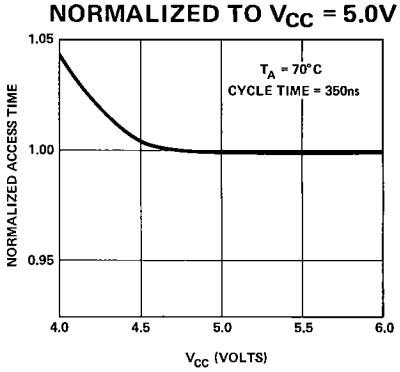
OUTPUT SINK CURRENT VS. OUTPUT VOLTAGE



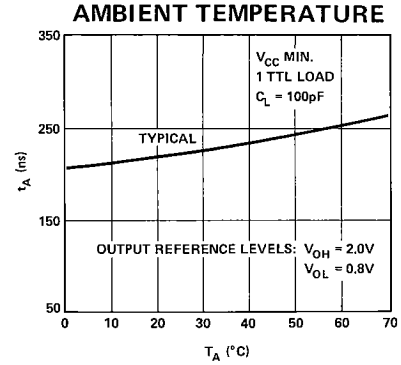
V_{IN} LIMITS VS. TEMPERATURE



ACCESS TIME VS. V_{CC} NORMALIZED TO V_{CC} = 5.0V



ACCESS TIME VS. AMBIENT TEMPERATURE



ACCESS TIME VS. LOAD CAPACITANCE