

1024 BIT FULLY DECODED STATIC MOS RANDOM ACCESS MEMORY

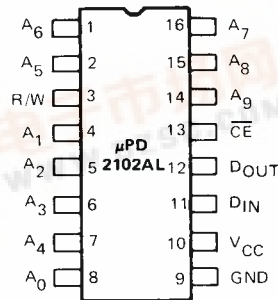
DESCRIPTION The μPD2102AL is a 1024 words by one bit static Random Access Memory requiring no clocks or refreshing. A family of devices with maximum access times ranging from 250 ns to 450 ns meet the requirements of microcomputer memory applications where speed, low cost and easy interfacing are prime design objectives.

All μPD2102AL inputs and outputs are TTL compatible. A single chip-enable (\overline{CE}) pin is provided for selection of an individual device in systems with OR-tied outputs. Output data is the same polarity as input data and is nondestructively read out. Only a single +5 volt supply is required. In standby mode, with the supply lowered to 1.5 volts, power dissipation is reduced to 42 mW max.

The μPD2102AL family is fabricated using NEC's N-channel MOS silicon gate process, providing excellent contamination protection. This process permits the use of a low cost plastic package (16 pin) and enables high performance, highly reliable MOS circuits to be produced.

- FEATURES**
- Access Time – μPD2102AL-2 – 250 ns Max
μPD2102AL – 350 ns Max
μPD2102AL-4 – 450 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
 - Low Standby Power – 42 mW max
 - 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

PIN CONFIGURATION

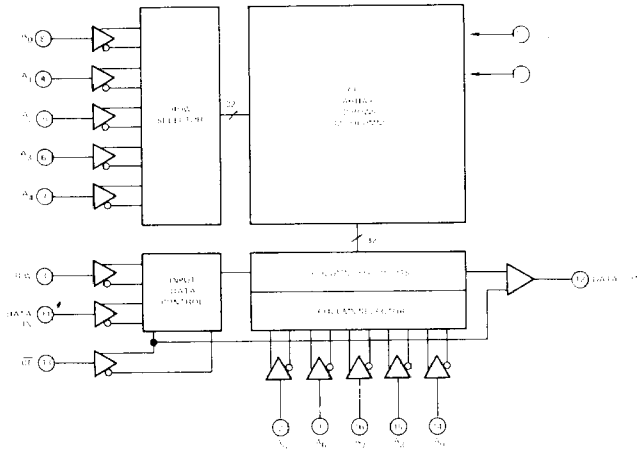


PIN NAMES

A ₀ – A ₉	Address Inputs
R/W	Read/Write
\overline{CE}	Chip Enable
VCC	Power (+5V)



μ PD2102AL



BLOCK DIAGRAM

Operating Temperature -10°C to 70°C
 Storage Temperature -65°C to +125°C
 Voltage On Any Pin -0.5 to +7 Volts ①

ABSOLUTE MAXIMUM RATINGS*

Note: ① With Respect to Ground

COMMENT: Stress above 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 device reliability

*T_a = 25°C

T_a = -10°C to +70°C; V_{CC} = 5V ± 5% unless otherwise specified.

DC CHARACTERISTICS

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP ①	MAX		
Input Leakage Current	I _{LI}			±10	μA	V _{IN} = 0 to 5.25V
I/O Leakage Current	I _{LOH}			+5	μA	CE = 2.0V, V _{OUT} = +2.4V to V _{CC}
I/O Leakage Current	I _{LOL}			-10	μA	CE = 2.0V, V _{OUT} = 0.4V
Power Supply Current	I _{CC1}		30	70	mA	All Inputs = 5.25V, Data Out Open
Input "Low" Voltage	V _{IL}	-0.5		+0.8	V	
Input "High" Voltage	V _{IH}	2.0		V _{CC}	V	
Output "Low" Voltage	V _{OL}			+0.4	V	I _{OL} = 2.1 mA
Output "High" Voltage	V _{OH}	2.4			V	I _{OH} = -100 μA

Note: ① Typical values are for T_a = 25°C and nominal supply voltage

T_a = 25°C; f = 1 MHz

CAPACITANCE

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP	MAX		
Input Capacitance	C _{IN}		3	5	pf	V _{IN} = 0V
Output Capacitance	C _{OUT}		7	10	pf	V _{OUT} = 0V



AC CHARACTERISTICS

READ CYCLE

μPD2102AL

T_a = -10°C to +70°C; V_{CC} = +5V ±5% unless otherwise noted

PARAMETER	SYMBOL	LIMITS						UNIT	TEST CONDITIONS
		2102AL-4		2102AL		2102AL-2			
		MIN	MAX	MIN	MAX	MIN	MAX		
Read Cycle	t _{RC}	450		350		250		ns	t _T = t _r = t _f = 100 ns C _L = 100 pF Load = 1 TTL Gate V _{ref} = 2.0 or 0.8V
Access Time	t _A		450		350		250	ns	
Chip Enable to Output Time	t _{CO}		230		180		130	ns	
Previous Read Data Valid in Respect to Address	t _{OH1}	40		40		40		ns	
Previous Read Data Valid in Respect to Chip Enable	t _{OH2}	0		0		0		ns	

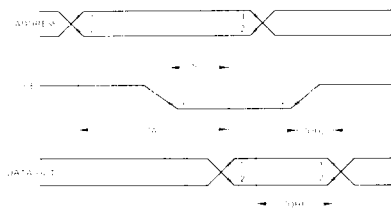
WRITE CYCLE

T_a = -10°C to +70°C; V_{CC} = +5V ±5% unless otherwise noted

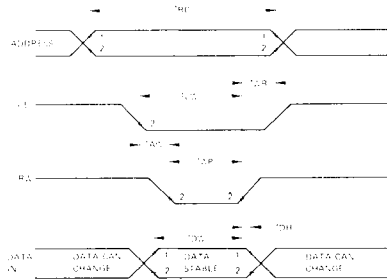
PARAMETER	SYMBOL	LIMITS						UNIT	TEST CONDITIONS
		2102AL-4		2102AL		2102AL-2			
		MIN	MAX	MIN	MAX	MIN	MAX		
Write Cycle	t _{WC}	450		350		250		ns	t _T = t _r = t _f = 100 ns C _L = 100 pF Load = 1 TTL Gate V _{ref} = 2.0 or 0.8V
Address to Write Setup Time	t _{AW}	20		20		20		ns	
Write Pulse Width	t _{WP}	300		250		180		ns	
Write Recovery Time	t _{WR}	0		0		0		ns	
Data Setup Time	t _{DW}	300		250		180		ns	
Data Hold Time	t _{DH}	0		0		0		ns	
Chip Enable to Write Setup Time	t _{CW}	300		250		180		ns	

TIMING WAVEFORMS

READ CYCLE



WRITE CYCLE



t_{CO} = 1.25 ns
t_{OH1} = 2.35 ns

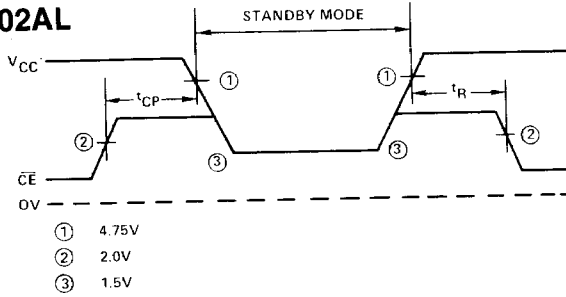
STANDBY CHARACTERISTICS

T_a = 0 to +70°C

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP	MAX		
V _{CC} in Standby	V _{PD}	1.5			V	
CE Bias in Standby	V _{CES}	2.0			V	-2.0V, V _{PD} = +5.25V
	V _{PD}				V	+1.5V, V _{PD} = +2.0V
Standby Current Drain	I _{PD1}	14	28		mA	All Inputs, V _{PD1} = +1.5V
Standby Current Drain	I _{PD2}	18	38		mA	All Inputs, V _{PD2} = +2.0V
Chip Dissip. to Standby Time	t _{CP}	0			ns	
Standby Recovery Time	t _R	t _{RC}			ns	

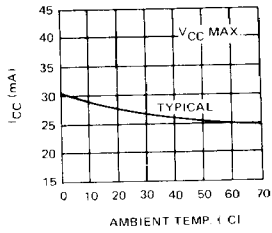


μPD2102AL

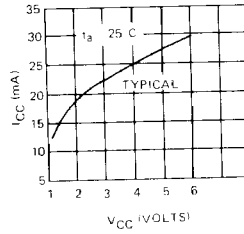


STANDBY MODE
TIMING WAVEFORM

POWER SUPPLY CURRENT VS
AMBIENT TEMPERATURE

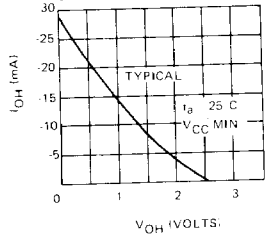


POWER SUPPLY CURRENT VS
SUPPLY VOLTAGE

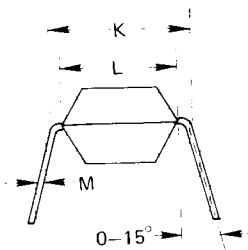
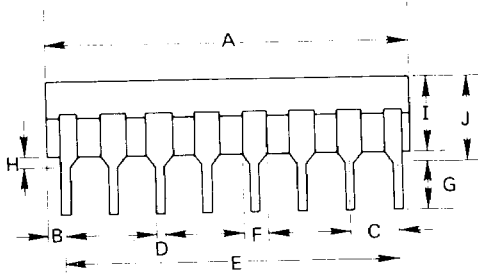
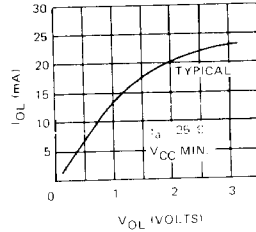


TYPICAL CHARACTERISTICS

OUTPUT SOURCE CURRENT VS
OUTPUT VOLTAGE



OUTPUT SINK CURRENT VS
OUTPUT VOLTAGE



PACKAGE OUTLINE
μPD2102ALC

ITEM	MILLIMETERS	INCHES
A	10.4 MAX	0.41 MAX
B	0.8	0.03
C	2.54	0.10
D	0.5	0.02
E	17.78	0.70
F	3.3	0.05
G	2.54 MIN	0.10 MIN
H	0.5 MIN	0.02 MIN
I	1.05 MAX	0.04 MAX
J	1.55 MAX	0.18 MAX
K	2.62	0.30
L	6.4	0.25
M	0.25 ^{+0.10} 0.05	0.01

