Am9214/Am3514

512 x 8 Read Only Memory

DISTINCTIVE CHARACTERISTICS

- Single 5-volt power supply
  Tolerances: ±5% commercial, ±10% military
- 512 x 8 organization
- Fully static operation — no clocks
- 4 programmable chip selects
- High-speed — 500ns access
- Three-state output buffers
- Low power dissipation — 263mW max.
- Logic voltage levels identical to TTL
- High noise immunity — full 400mV
- N-Channel silicon gate MOS technology
- Military and commercial temperature ranges available
- 100% MIL-STD-883 reliability assurance testing
- Directly plug-in compatible with FSC 3514, MOSTEK 2600

FUNCTIONAL DESCRIPTION

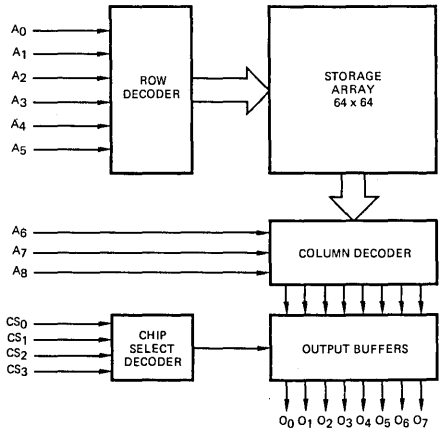
The Am9214/Am3514 devices are high performance; 4096-bit, static, read only memories. Each memory is implemented as 512 words by 8 bits per word. This organization simplifies the design of small memory systems and permits incremental memory sizes as small as 512 words.

Four Chip Select input signals are logically ANDed together to provide control of the output buffers. Each Chip Select polarity may be specified by the customer thus allowing the addressing of up to 16 memories without external gating. The outputs of unselected chips are turned off and assume a high impedance state. This permits wire-ORing with additional Am9214 devices and other three-state components.

These memories are fully static and require no clock signals of any kind. A selected chip will output data from a location specified by whatever address is present on the address input lines. Input and output voltage levels are identical to TTL specifications, providing simplified interfacing and standard worst-case noise immunity of 400mV. Only a single supply of +5 volts is required for power.

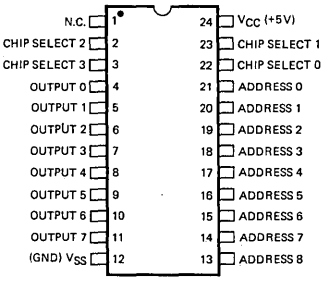
4

BLOCK DIAGRAM



MOS-382

CONNECTION DIAGRAM
Top View



Note: Pin 1 is marked for orientation.

MOS-383

ORDERING INFORMATION

Package Type	Ambient Temperature Specification	Access Time		
		1000ns	700ns	500ns
Hermetic DIP	0°C ≤ T_A ≤ +70°C	AM35142CC	AM35141CC	AM9214CC
		AM35142DC	AM35141DC	AM9214DC
	−55°C ≤ T_A ≤ +125°C			AM9214CM
				AM9214DM

MAXIMUM RATINGS (Above which the useful life may be impaired)

Storage Temperature	−65°C to +150°C
Temperature (Ambient) Under Bias	−55°C to +125°C
Supply Voltage to Ground Potential (Pin 10 to Pin 9) Continuous	−0.5V to +7.0V
DC Voltage Applied to Outputs	−0.5V to +7.0V
DC Input Voltage	−0.5V to +7.0V
Power Dissipation	1.0W

The products described by this specification include internal circuitry designed to protect input devices from excessive accumulations of static charge. It is suggested nevertheless, that conventional precautions be observed during storage, handling and use in order to avoid exposure to any voltages that exceed the maximum ratings.

ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Am9214DC
Am35141DC
Am35142DC

$T_A = 0°C$ to $+70°C$
$V_{CC} = +5V \pm 5\%$

Parameters	Description	Test Conditions	Am9214 Min.	Am9214 Max.	Am3514 Min.	Am3514 Max.	Units
V_{OH}	Output HIGH Voltage	$V_{CC} = 4.75V$, $I_{OH} = 500\mu A$	2.4	V_{CC}	2.4	V_{CC}	Volts
V_{OL}	Output LOW Voltage	$V_{CC} = 4.75V$, $I_{OL} = 2.4mA$		0.4		0.4	Volts
V_{IH}	Input HIGH Voltage		2.0	V_{CC}	$V_{CC}-2.75$	V_{CC}	Volts
V_{IL}	Input LOW Voltage	(See Note 1)	−0.5	0.8	−0.5	0.55	Volts
I_{LI}	Input Load Current	$V_{CC} = 5.25V$, $0V \leq V_{IN} \leq 5.25V$		1.0		1.0	μA
I_{LO}	Output Leakage Current	Output OFF, $V_{OUT} = 0.4$ to V_{CC}		1.0		1.0	μA
I_{CC}	Power Supply Current	Data Out Open $V_{CC} = 5.25V$ $V_{IN} = V_{CC}$		50		50	mA

ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Am9214DM $T_A = -55°C$ to $+125°C$ $V_{CC} = +5V \pm 10\%$

Parameters	Description	Test Conditions	Am9214 Min.	Am9214 Max.	Units
V_{OH}	Output HIGH Voltage	$V_{CC} = 4.5V$, $I_{OH} = 500\mu A$	2.2	V_{CC}	Volts
V_{OL}	Output LOW Voltage	$V_{CC} = 4.5V$, $I_{OL} = 2.4mA$		0.4	Volts
V_{IH}	Input HIGH Voltage		2.0	V_{CC}	Volts
V_{IL}	Input LOW Voltage	(See Note 1)	−0.5	0.8	Volts
I_{LI}	Input Load Current	$V_{CC} = 5.5V$, $0V \leq V_{IN} \leq 5.5V$		10	μA
I_{LO}	Output Leakage Current	Output OFF, $V_{OUT} = 0.4$ to V_{CC}		10	μA
I_{CC}	Power Supply Current	Data Out Open $V_{CC} = 5.5V$ $V_{IN} = V_{CC}$		70	mA

Notes: 1. Input Logic levels that swing more negative than −0.5 volts will be subject to clamping currents attempting to keep the input from falling.

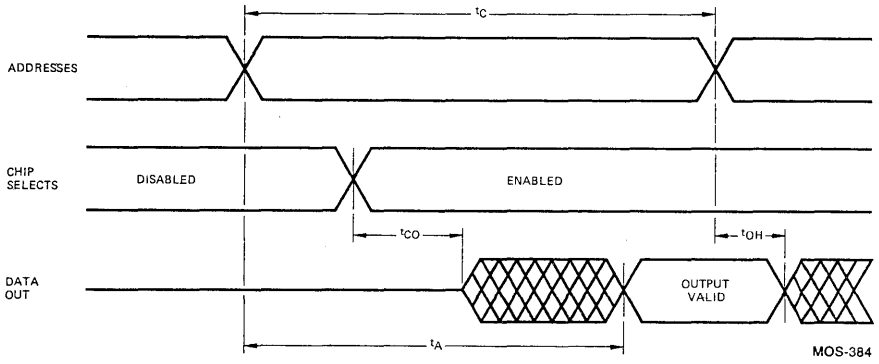
SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Output Load: 1.5 TTL Gate +100pF for Am9214, 1.5 TTL Gate only for Am3514
Transition Times: 10ns
Input Levels: 0.8V and 2.0V
Output Reference: 1.5V

Parameter	Description	Test Conditions	Am9214 Min.	Am9214 Max.	Am35141 Min.	Am35141 Max.	Am35142 Min.	Am35142 Max.	Units
t_C	Cycle Time		500						ns
t_A	Access Time			500		700		1000	ns
t_{CO}	Chip Select to Output On Delay			200		500		900	ns
t_{OH}	Previous Read Data Valid with Respect to Address Change		50						ns
C_I	Input Capacitance			6.0		8.0		8.0	pF
C_O	Output Capacitance			10		12		12	pF

4

TIMING DIAGRAM



GLOSSARY OF TERMS

Cycle Time – Specifies the maximum rate at which new read operations may be initiated, and thus the minimum time between successive address changes.

Access Time – Maximum delay from the arrival of the last stable address line to valid output data on a selected chip.

Output Enable Time (t_{CO}) – Maximum delay from the arrival of four active Chip Select signals to enabled output data. Unselected chips will have high impedance outputs. Active level definition for each of the four chip Select inputs may be either high or low and is programmed along with the data pattern.

Output Hold Time (t_{OH}) – Minimum delay which will elapse between a change of the input address and any consequent change in the output data.

PROGRAMMING INSTRUCTIONS

CUSTOM PATTERN ORDERING INFORMATION

The Am9214 (or Am3514) is programmed on IBM cards, IBM coding form, or on paper tape in card image form in the format as shown below.

Logic "1" = a more positive voltage (normally +5.0V)
Logic "0" = a more negative voltage (normally 0V)

FIRST CARD

Column Number	Description
10 thru 29	Customer Name
32 thru 37	Total number of "1's" contained in the data. This is optional and should be left blank if not used.
50 thru 62	9214 or 35141 or 35142
65 thru 72	Date

SECOND CARD

Column Number	Description
29	CS_3 input required (0 or 1) to select chip.
31	CS_2 input required to select chip.
33	CS_1 input required to select chip.
35	CS_0 input required to select chip.

Two options are provided for entering the data pattern with the remaining cards.

OPTION 1 is the Binary Option where the address and data are presented in Binary form on a one-word-per-card basis. With this option, 512 more cards are required:

Column Number	
10, 12, 14, 16, 18 20, 22, 24, 26	Address input pattern, the most significant bit (A_8) is in column 10.
40, 42, 44, 46, 48, 50, 52, 54	Output pattern, the most significant bit (O_7) is in column 40.
73 thru 80	Coding these columns is not essential and may be used for card identification purposes.

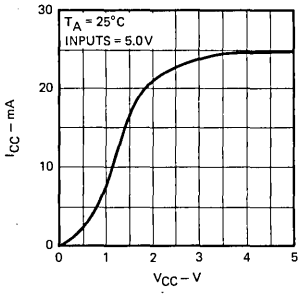
OPTION 2 is the Hexadecimal Option and is a much more compact way of presenting the data. This format requires only 32 data cards (see chart).

Each data card contains the 8-bit output information for 16 storage locations in the memory. The address indicated in columns 21, 22 and 23 is the address of the data presented in columns 30 and 31. Addresses for successive data are assumed to be in incremental ascending order from the initial address. Since the address in columns 21, 22 and 23 always points only to the first data on the card, column 23 is always zero. Columns 21 and 22 take all hex values from 00 through 1F: 32 cards in all. Data is also entered in hex values and may be any combination of 8 bits, that is, hex value from 00 through FF.

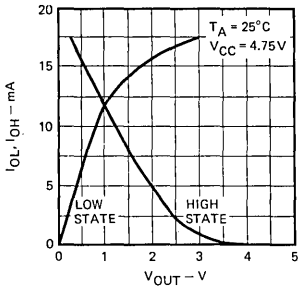
ADDR			OUTPUT VALUES FOR ADDR +																																													
			0			1			2			3			4			5			6			7			8			9			A			B			C			D			E			F	
21	22	23	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
0	0	0																																													
0	1	0																																													
0	2	0																																													
0	3	0																																													
0	4	0																																													
0	5	0																																													
0	6	0																																													
0	7	0																																													
0	8	0																																													
0	9	0																																													
0	A	0																																													
0	B	0																																													
0	C	0																																													
0	D	0																																													
0	E	0																																													
0	F	0																																													
1	0	0																																													
1	1	0																																													
1	2	0																																													
1	3	0																																													
1	4	0																																													
1	5	0																																													
1	6	0																																													
1	7	0																																													
1	8	0																																													
1	9	0																																													
1	A	0																																													
1	B	0																																													
1	C	0																																													
1	D	0																																													
1	E	0																																													
1	F	0																																													

Am9214 PERFORMANCE CURVES

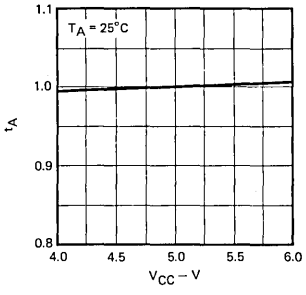
Typical Power Supply Current Versus Voltage



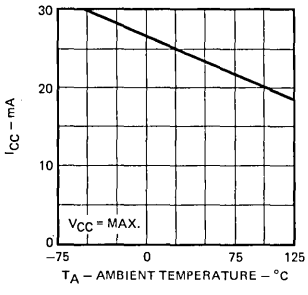
Typical Output Current Versus Voltage



Access Time Versus V_{CC} Normalized to V_{CC} at 5.0 V



Typical Power Supply Current Versus Ambient Temperature



MOS-385