SRAM 32K x 8 SRAM

FEATURES

- High speed: 20, 25, 30, 35, and 45ns
- High-performance, low-power, CMOS double metal process
- Single +5V (±10%) power supply
- Easy memory expansion with $\overline{CE}$ and $\overline{OE}$ options
- All inputs and outputs are TTL compatible

OPTIONS / MARKING

• Timing	
20ns access	-20
25ns access	-25
30ns access	-30
35ns access	-35
45ns access	-45
• Packages	
Plastic DIP (300 mil)	None
Plastic DIP (600 mil)	W
Ceramic DIP (300 mil)	C
Ceramic DIP (600 mil)	CW
Plastic SOJ (300 mil)	DJ
Ceramic LCC (28 pin)	EC
Ceramic LCC (32 pin)	ECW
• Two Volt Data Retention	L
• Temperature	
Industrial (-40°C to +85°C)	IT

GENERAL DESCRIPTION

The Micron SRAM family employs high-speed, low-power CMOS designs using a four-transistor memory cell. Micron SRAMs are fabricated using double-layer metal, double-layer polysilicon technology.

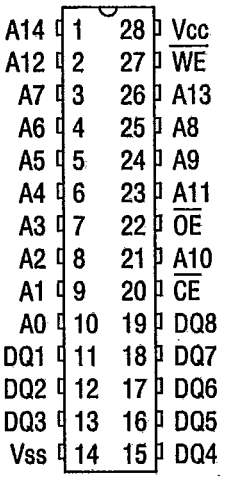
For flexibility in high speed memory applications, Micron offers chip enable ($\overline{CE}$) and output enable ($\overline{OE}$) on this organization. These enhancements can place the outputs in a high impedance state for additional flexibility in system design.

Writing to these devices is accomplished when write enable ($\overline{WE}$) and $\overline{CE}$ inputs are both LOW. Reading is accomplished when $\overline{WE}$ remains HIGH and $\overline{CE}$ and $\overline{OE}$ go LOW. The device offers a reduced power standby mode when disabled. This allows system designs to achieve low standby power requirements.

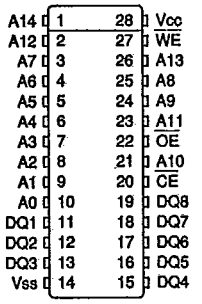
All devices operate from a single +5V power supply and all inputs and outputs are fully TTL compatible.

PIN ASSIGNMENT (Top View)

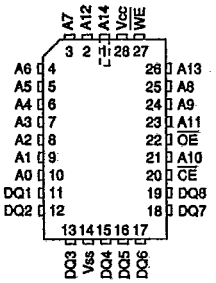
28L/300/600 DIP (A-9, A-11, B-9, B-11)



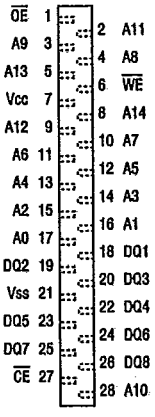
28L/300 SOJ (E-8)



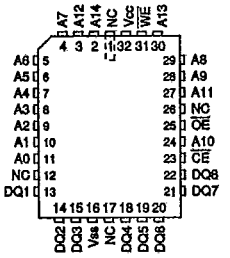
28L/LCC (F-4)



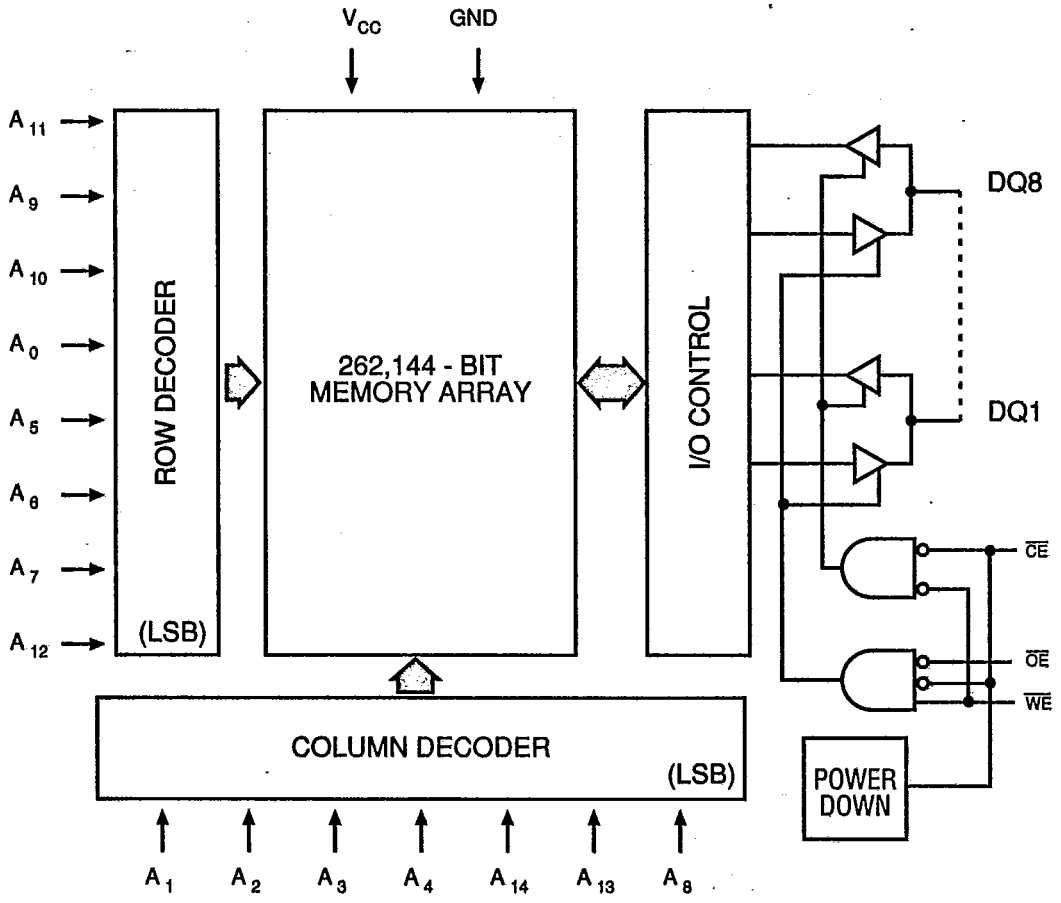
28L ZIP (C-5)



32L/LCC (F-6)



FUNCTIONAL BLOCK DIAGRAM



TRUTH TABLE

MODE	$\overline{OE}$	$\overline{CE}$	$\overline{WE}$	DQ	POWER
STANDBY	X	H	X	HIGH-Z	STANDBY
READ	L	L	H	Q	ACTIVE
READ	H	L	H	HIGH-Z	ACTIVE
WRITE	X	L	L	D	ACTIVE

ABSOLUTE MAXIMUM RATINGS*

Voltage on Vcc supply relative to Vss .....-1.0V to +7.0V
Storage Temperature (Ceramic).....-65°C to +150°C
Storage Temperature (Plastic) .....-55°C to +150°C
Power Dissipation 1W
Short Circuit Output Current 50mA

*Stresses greater than 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 reliability.

ELECTRICAL CHARACTERISTICS AND RECOMMENDED DC OPERATING CONDITIONS

($0°C \le T_A \le 70°C$; $V_{CC} = 5.0V \pm 10\%$)

DESCRIPTION	CONDITIONS	SYMBOL	MIN	MAX	UNITS	NOTES
Input High (Logic 1) Voltage		V_{IH}	2.2	Vcc+1	V	1
Input Low (Logic 0) Voltage		V_{IL}	-0.5	0.8	V	1, 2
Input Leakage Current	$0V \le V_{IN} \le V_{CC}$	I_{LI}	-5	5	µA	
Output Leakage Current	Output(s) Disabled, $0V \le V_{OUT} \le V_{CC}$	I_{LO}	-5	5	µA	
Output High Voltage	I_{OH} = -4.0mA	V_{OH}	2.4		V	1
Output Low Voltage	I_{OL} = 8.0mA	V_{OL}		0.4	V	1

			MAX						
DESCRIPTION	CONDITIONS	SYMBOL	-20	-25	-30	-35	-40	UNITS	NOTES
Power Supply Current: Operating	$\overline{CE} \le V_{IL}$; Vcc = MAX f = MAX = 1/ ^tRC, Outputs Open	I_{CC}	105	95	95	90	90	mA	3
Power Supply Current: Standby	$\overline{CE} \ge V_{IH}$; Vcc = MAX f = MAX = 1/ ^tRC, Outputs Open	I_{SB1}	30	25	25	25	25	mA	
	$\overline{CE} \ge V_{CC}$ -0.2V; Vcc = MAX $V_{IL} \le V_{SS}$ +0.2V; $V_{IH} \ge V_{CC}$ -0.2V; f = 0	I_{SB2}	5	5	5	7	7	mA	

CAPACITANCE

DESCRIPTION	CONDITIONS	SYMBOL	MIN	MAX	UNITS	NOTES
Input Capacitance	T_A = 25°C; f = 1MHz Vcc = 5V	C_I		7	pF	4
Output Capacitance		C_O		5	pF	4

FAST SRAM

ELECTRICAL CHARACTERISTICS AND RECOMMENDED AC OPERATING CONDITIONS

(Note 5, 13) ($0°C \le T_A \le 70°C$; $V_{CC} = 5V \pm 10\%$)

DESCRIPTION		-20		-25		-30		-35		-45			
	SYM	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	UNITS	NOTES
READ Cycle													
READ cycle time	t_{RC}	20		25		30		35		45		ns	
Address access time	t_{AA}		20		25		30		35		45	ns	
Chip Enable access time	t_{ACE}		20		25		30		35		45	ns	
Output hold from address change	t_{OH}	3		5		5		5		5		ns	
Chip Enable to output in Low-Z	t_{LZCE}	6		6		6		6		6		ns	
Chip Disable to output in High-Z	t_{HZCE}		9		9		12		15		18	ns	6, 7
Chip Enable to power-up time	t_{PU}	0		0		0		0		0		ns	
Chip Disable to power-down time	t_{PD}		20		25		30		35		45	ns	
Output Enable access time	t_{AOE}		8		8		10		12		15	ns	
Output Enable to output in Low-Z	t_{LZOE}	0		0		0		0		0		ns	
Output Disable to output in High-Z	t_{HZOE}		7		7		10		12		15	ns	
WRITE Cycle													
WRITE cycle time	t_{WC}	20		20		25		30		35		ns	
Chip Enable to end of write	t_{CW}	15		15		18		20		25		ns	
Address valid to end of write	t_{AW}	15		15		18		20		25		ns	
Address setup time	t_{AS}	0		0		0		0		0		ns	
Address hold from end of write	t_{AH}	0		0		0		0		0		ns	
Write pulse width	t_{WP}	15		15		18		20		25		ns	
Data setup time	t_{DS}	10		10		12		15		20		ns	
Data hold time	t_{DH}	0		0		0		0		0		ns	
Write Disable to output in Low-Z	t_{LZWE}	5		5		5		5		5		ns	
Write Enable to output in High-Z	t_{HZWE}		10		10		12		15		18	ns	6

AC TEST CONDITIONS

Input pulse levels	Vss to 3.0V
Input rise and fall times	5ns
Input timing reference levels	1.5V
Output reference levels	1.5V
Output load	See Figures 1 and 2

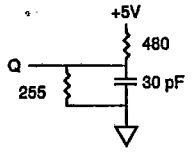


Fig. 1 OUTPUT LOAD EQUIVALENT

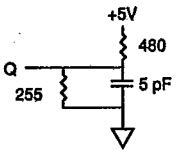


Fig. 2 OUTPUT LOAD EQUIVALENT

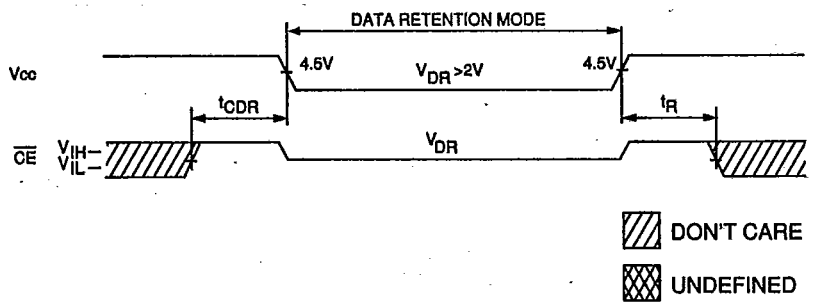
NOTES

1. All voltages referenced to Vss (GND).
2. -3.0V for pulse width < 20ns.
3. Icc is dependent on output loading and cycle rates.
4. This parameter is sampled.
5. Test conditions as specified with the output loading as shown in Fig. 1 unless otherwise noted.
6. ^tHZCE, ^tHZOE and ^tHZWE are specified with CL = 5pF as in Fig. 2. Transition is measured ± 500mV from steady state voltage.
7. At any given temperature and voltage condition, ^tHZCE is less than ^tLZCE.
8. $\overline{WE}$ is HIGH for READ cycle.
9. Device is continuously selected. All chip enables held in their active state.
10. Address valid prior to or coincident with latest occurring chip enable.
11. ^tRC = Read Cycle Time.
12. Chip enable ($\overline{CE}$) and write enable ($\overline{WE}$) can initiate and terminate a WRITE cycle.
13. For automotive, industrial and extended temperature specifications refer to page 4-169.

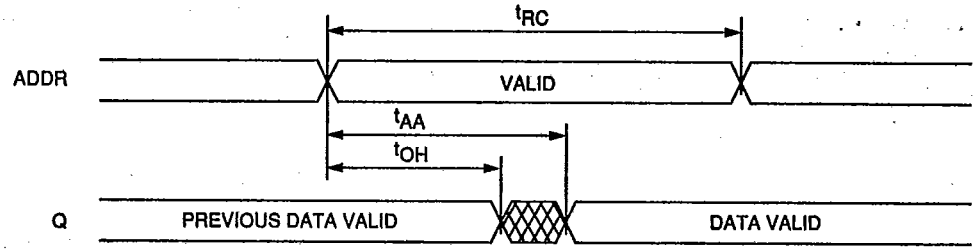
DATA RETENTION ELECTRICAL CHARACTERISTICS (L Version Only)

DESCRIPTION	CONDITIONS		SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Vcc for Retention Data			V_{DR}	2		—	V	
Data Retention Current	$\overline{CE}$ ≥ (Vcc -0.2V) VIN ≥ (Vcc -0.2V) or ≤ 0.2V	Vcc = 2v	I_{CCDR}		95	300	µA	
		Vcc = 3v			350	400	µA	
Chip Deselect to Data Retention Time			^tCDR	0		—	ns	4
Operation Recovery Time			^tR	^tRC			ns	4, 11

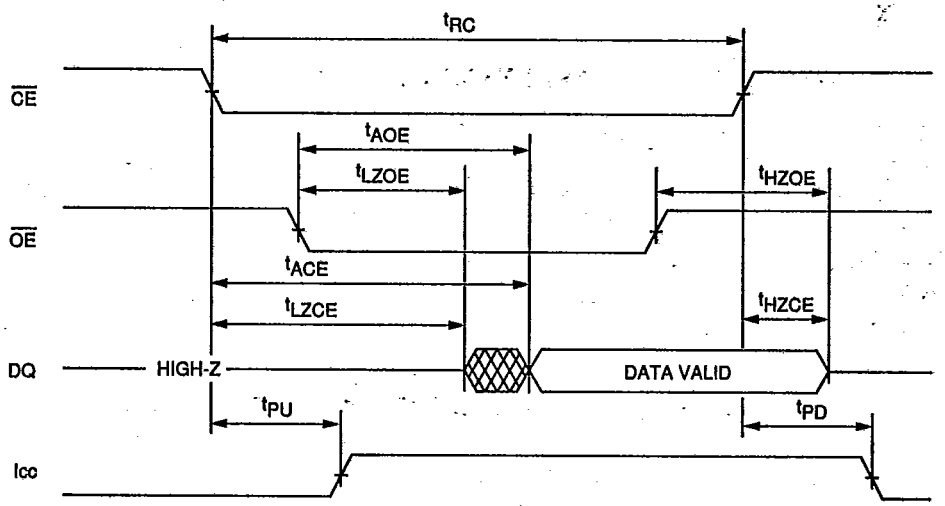
LOW Vcc DATA RETENTION WAVEFORM



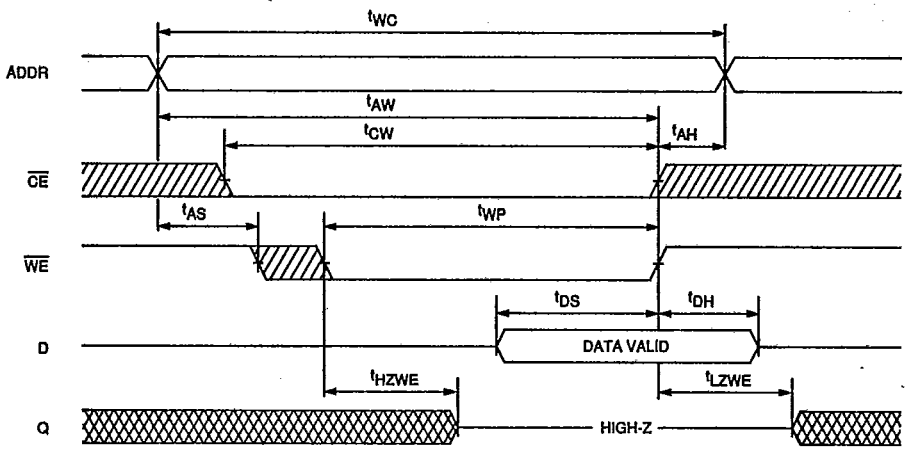
READ CYCLE NO. 1 [8, 9]



READ CYCLE NO. 2 [7, 8, 10]



WRITE CYCLE NO. 1
(Write Enable Controlled) [7, 12]



WRITE CYCLE NO. 2
(Chip Enable Controlled) [12]