

NEC

NEC Electronics Inc.

μPD46259
32,768 x 9-Bit
Static BiCMOS RAM

Preliminary Information

November 1993

Description

The μ PD46259 is a 32,768-word by 9-bit static RAM fabricated with advanced silicon-gate technology. Its unique design uses BiCMOS peripheral circuits and N-channel memory cells that make the μ PD46259 suitable as cache and buffer memory in applications requiring high speed, low voltage, and high density. The μ PD46259 is available in standard 32-pin plastic SOJ packaging.

Features

- ❑ Single +5.0-volt power supply
- ❑ Fully static operation—no clock or refreshing
- ❑ TTL-compatible inputs and outputs
- ❑ Common I/O using three-state outputs
- ❑ One CS pin and one OE pin for easy application
- ❑ Standard 32-pin plastic SOJ packaging
- ❑ Fast access times of 6, 7, and 8 ns (max)

Ordering Information

Part Number	Access Time (max)	Package
μPD46259LA-6	6 ns	32-pin plastic SOJ
LA-7	7 ns	
LA-8	8 ns	

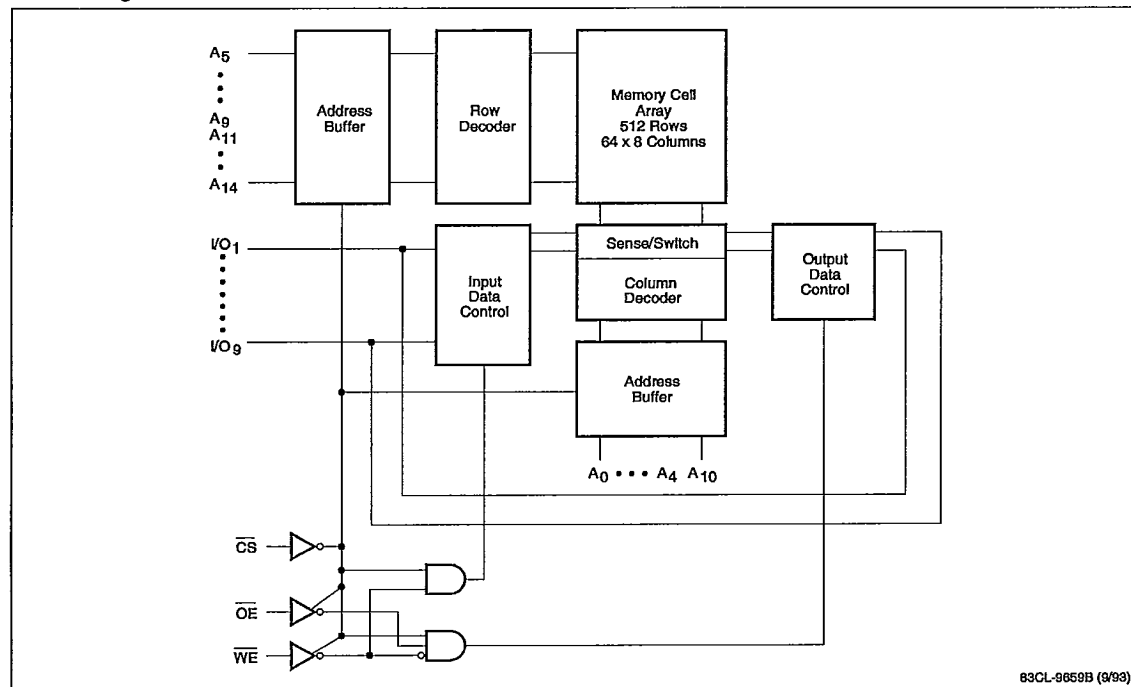
Pin Configuration

32-Pin Plastic SOJ

A ₃	1	32	A ₄
A ₂	2	31	A ₅
A ₁	3	30	A ₆
A ₀	4	29	OE
CS	5	28	I/O ₉
I/O ₁	6	27	I/O ₈
I/O ₂	7	26	I/O ₇
VCC	8	25	GND
GND	9	24	VCC
I/O ₃	10	23	I/O ₆
I/O ₄	11	22	I/O ₅
WE	12	21	A ₇
A ₁₄	13	20	A ₈
A ₁₃	14	19	A ₉
A ₁₂	15	18	A ₁₀
A ₁₁	16	17	NC

Pin Identification

Symbol	Function
$A_0 - A_{14}$	Address inputs
$I/O_1 - I/O_9$	Data Inputs and outputs
$\overline{CS}$	Chip select
$\overline{OE}$	Output enable
$\overline{WE}$	Write enable
GND	Ground
V_{CC}	+5.0-volt power supply

μPD46259**NEC****Block Diagram****Truth Table**

Function	$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	I/O	I_{CC}
Not selected	H	X	X	High-Z	Standby
Outputs disabled	L	H	H	High-Z	Active
Read	L	L	H	D_{OUT}	Active
Write	L	X	L	D_{IN}	Active

X = don't care.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Input voltage, low *	V_{IL}	-0.5		0.8	V
Input voltage, high	V_{IH}	2.0		$V_{CC} + 0.5$	V
Ambient temperature	T_A	0		70	°C

* -3.0 V minimum (pulse width = 3 ns).

DC Characteristics $T_A = 0 \text{ to } +70^\circ\text{C}; V_{CC} = +5.0 \text{ V} \pm 10\%$

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Input leakage current	I_{LI}	-10		10	μA	$V_{IN} = 0 \text{ V to } V_{CC}$
I/O leakage current	I_{LO}	-10		10	μA	$V_{IO} = 0 \text{ V to } V_{CC}; \overline{CS} \geq V_{IH} \text{ or } \overline{OE} \geq V_{IH} \text{ or } \overline{WE} \leq V_{IL}$
Operating supply current	I_{CC}			TBD	mA	$\overline{CS} \geq V_{IL}; V_{IO} = 0 \text{ mA}; 100 \text{ MHz}$
	I_{CC1}			TBD	mA	$\overline{CS} \geq V_{IL}; V_{IO} = 0 \text{ mA}; 0 \text{ MHz}$
Standby supply current	I_{SB}			TBD	mA	$\overline{CS} \geq V_{IH}; V_{IN} = V_{IH} \text{ or } V_{IL}$
	I_{SB1}			TBD	mA	$\overline{CS} \geq V_{CC} - 0.2 \text{ V}; V_{IN} \leq 0.2 \text{ V or } \geq V_{CC} - 0.2 \text{ V}$
Output voltage, low	V_{OL}			0.4	V	$I_{OL} = 4 \text{ mA}$
Output voltage, high	V_{OH}	2.4			V	$I_{OH} = -2.0 \text{ mA}$

NEC**μPD46259****Absolute Maximum Ratings**

Supply voltage, V_{CC} (Note 1)	-0.5 to +7.0 V
Input voltage, V_{IN} (Note 1)	-0.5 to $V_{CC} + 0.5$ V
Output voltage, V_{IO} (Note 1)	-0.5 to $V_{CC} + 0.5$ V
Operating temperature, T_{OPR}	0 to +70°C
Storage temperature, T_{STG}	-55 to +125°C

Exposure to Absolute Maximum Ratings for extended periods may affect device reliability; exceeding the ratings could cause permanent damage. The device should be operated within the limits specified under DC and AC Characteristics.

Note:

(1) -3.0 V minimum (pulse width = 3 ns).

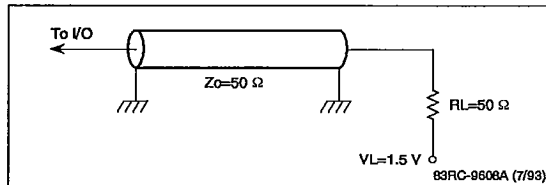
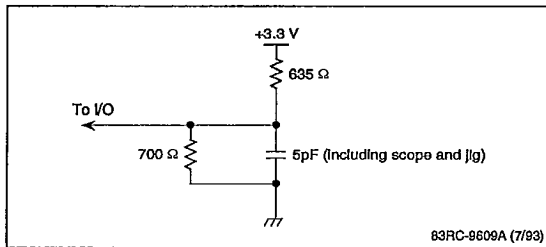
AC Characteristics

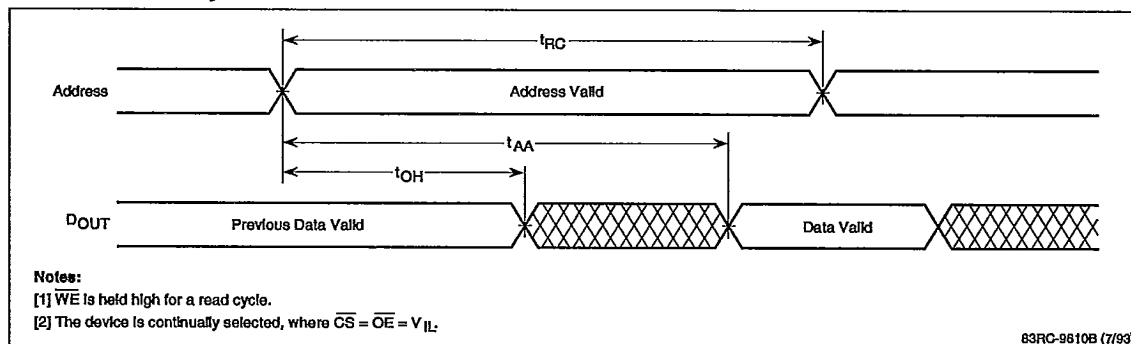
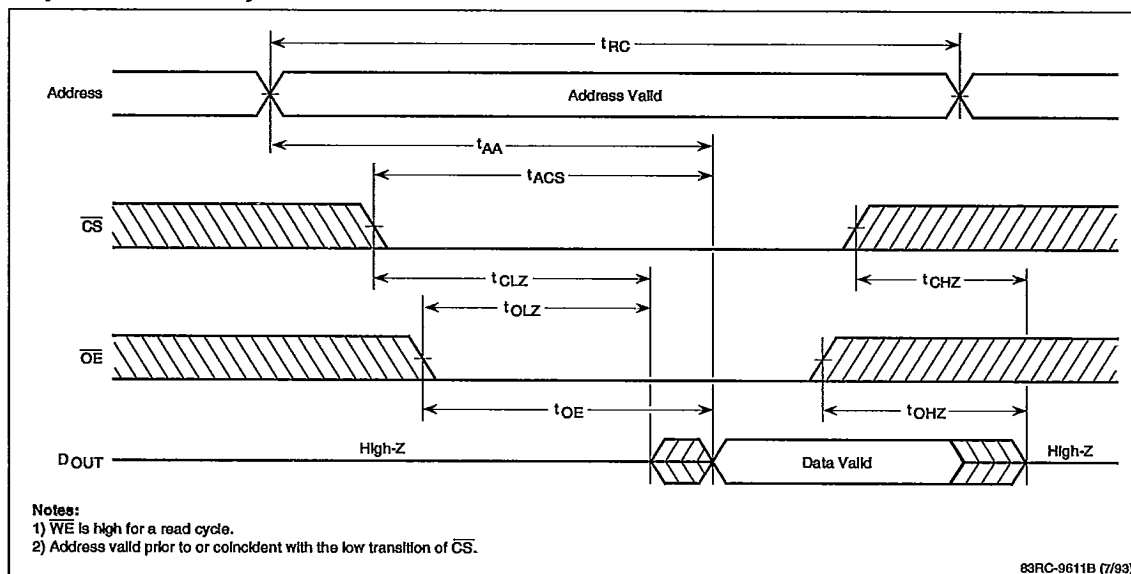
$T_A = 0$ to +70°C; $V_{CC} = +5.0$ V $\pm$ 10%

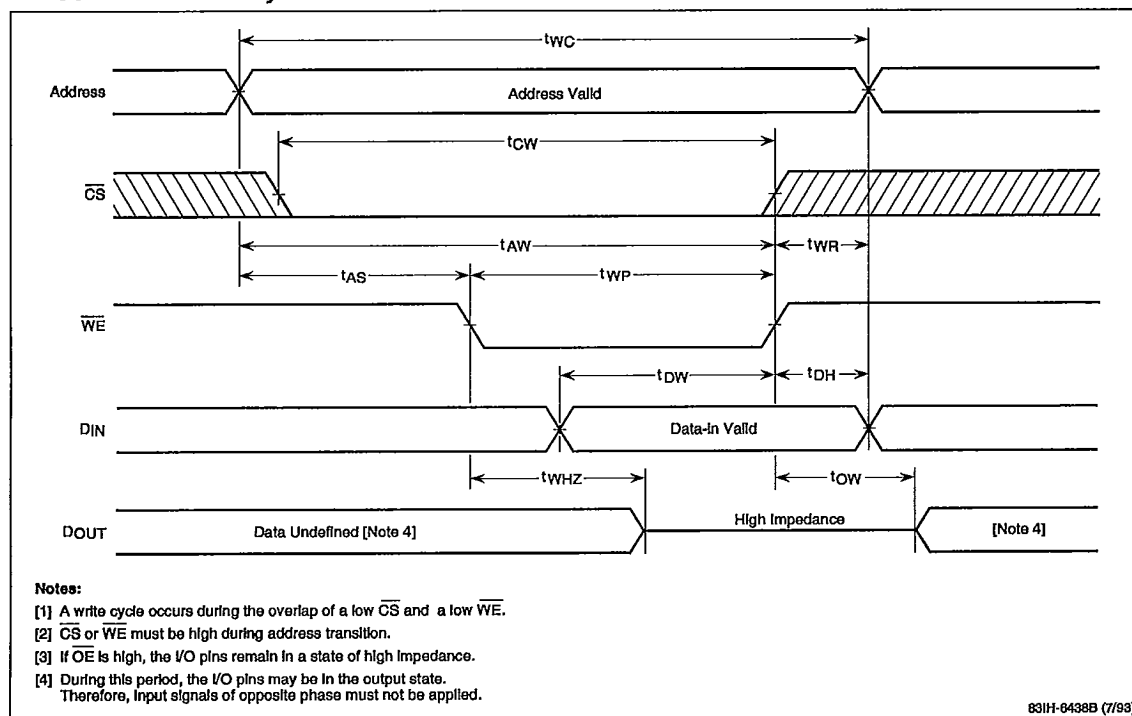
Parameter	Symbol	μPD46259-6		μPD46259-7		μPD46259-8		Unit	Test Conditions
		Min	Max	Min	Max	Min	Max		
Read Operation									
Read cycle time	t _{RC}	6		7		8		ns	(Note 2)
Address access time	t _{AA}		6		7		8	ns	(Note 2)
Chip select access time	t _{ACS}		6		7		8	ns	(Note 2)
Output enable to output valid	t _{OE}		4		5		5	ns	(Note 2)
Output hold from address change	t _{OH}	2		2		2		ns	(Note 2)
Chip select to output in low-Z	t _{CLZ}	2		2		2		ns	(Note 3)
Output enable to output in low-Z	t _{OLZ}	1		1		1		ns	(Note 3)
Chip select to output in high-Z	t _{CHZ}		3		4		4	ns	(Note 3)
Output enable to output in high-Z	t _{OHZ}		3		4		4	ns	(Note 3)
Write Operation									
Write cycle time	t _{WC}	6		7		8		ns	
Chip select to end of write	t _{CW}	4		5		6		ns	
Address valid to end of write	t _{AW}	4		5		6		ns	
Address setup time	t _{AS}	0		0		0		ns	
Write pulse width	t _{WP}	4		5		6		ns	
Write recovery time	t _{WR}	0		0		0		ns	
Data valid to end of write	t _{DW}	3.5		4		5		ns	
Data hold time	t _{DH}	0		0		0		ns	
Write enable to output in high-Z	t _{WHZ}		3		4		4	ns	(Note 3)
Output active from end of write	t _{OW}	1		1		1		ns	(Note 3)

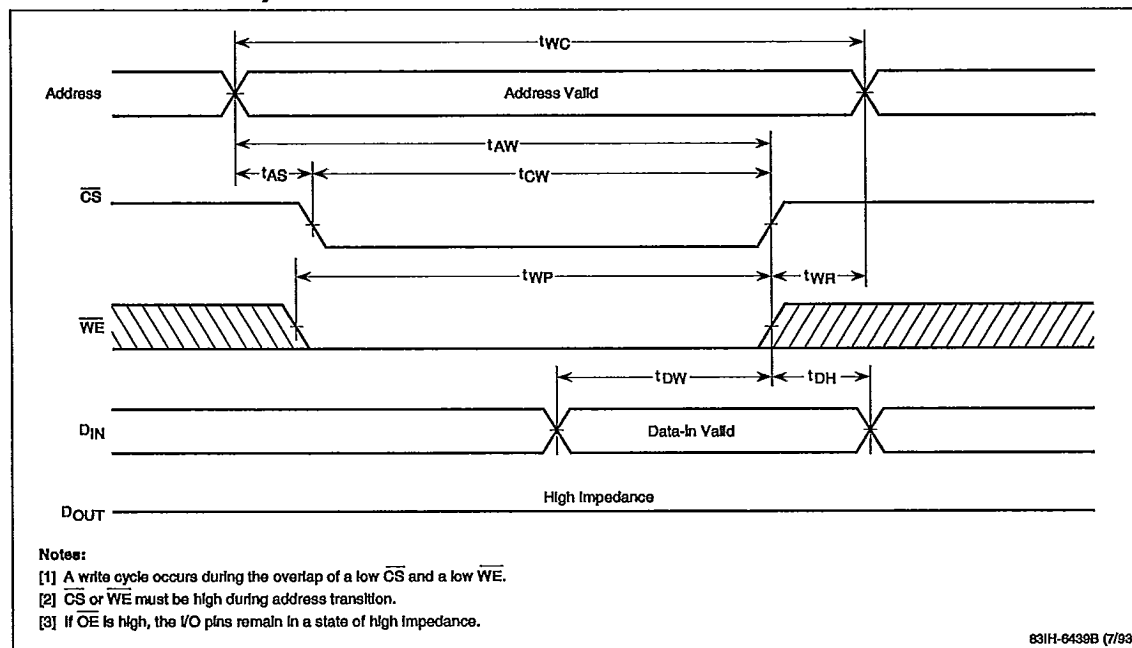
Notes:

- (1) Input pulse levels = GND to 3 V; input pulse rise and fall times = 2 ns; timing reference levels = 1.5 V.
- (2) See figure 1 for output load.
- (3) See figure 2 for output load.

μPD46259**NEC****Figure 1. Test Conditions (t_{AA} , t_{ACS} , t_{OE} , and t_{OH})****Figure 2. Test Conditions (t_{CLZ} , t_{OLZ} , t_{CHZ} , t_{OHZ} , t_{WHZ} , and t_{OW})**

NEC **μ PD46259****Timing Waveforms****Address Access Cycle****Chip Select Access Cycle**

μ PD46259**NEC****Timing Waveforms (cont)*****WE-Controlled Write Cycle***

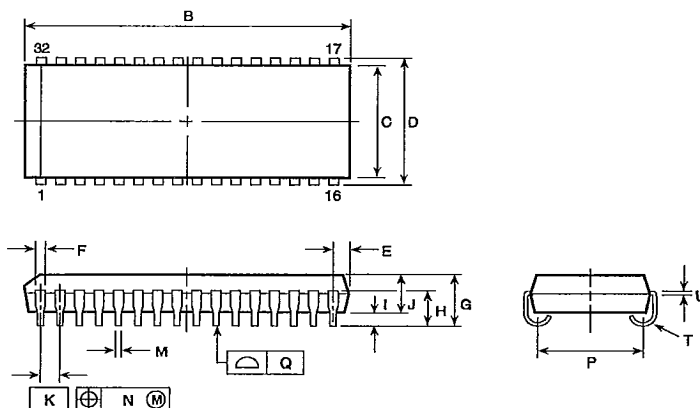
NEC **μ PD46259****Timing Waveforms (cont)** **$\overline{CS}$ -Controlled Write Cycle**

μPD46259**Package Drawing****32-Pin Plastic SOJ (300-mil)**

Item	Millimeters	Inches
B	21.21 ± 0.3 -0.35	.835 $\pm .009$ -.014
C	7.57	.298
D	8.47 ± 0.2	.333 $\pm .009$ -.008
E	1.08 ± 0.15	.043 $\pm .006$ -.007
F	0.74	.029
G	3.5 ± 0.2	.138 $\pm .008$
H	2.4 ± 0.2	.094 $\pm .009$ -.008
I	0.8 min	.031 min
J	2.55	.100
K	1.27 (TP)	.050 (TP)
M	0.40 ± 0.10	.016 $\pm .004$ -.005
N	0.12	.005
P*	6.73 ± 0.20	.265 $\pm .008$
Q	0.1	.004
T	0.85 rad	.033 rad
U	0.20 ± 0.10 -0.05	.008 $\pm .004$ -.002

* Item P to center of leads.

P32LA-300A



83NR-7544B (1/91)

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