OKI Semiconductor

1A

MR27V3255D

1,048,576-Double Word x 32-Bit or 2,097,152-Word x 16-Bit

8-Double Word x 32-Bit or 16-Word x 16-Bit Page Mode One Time PROM

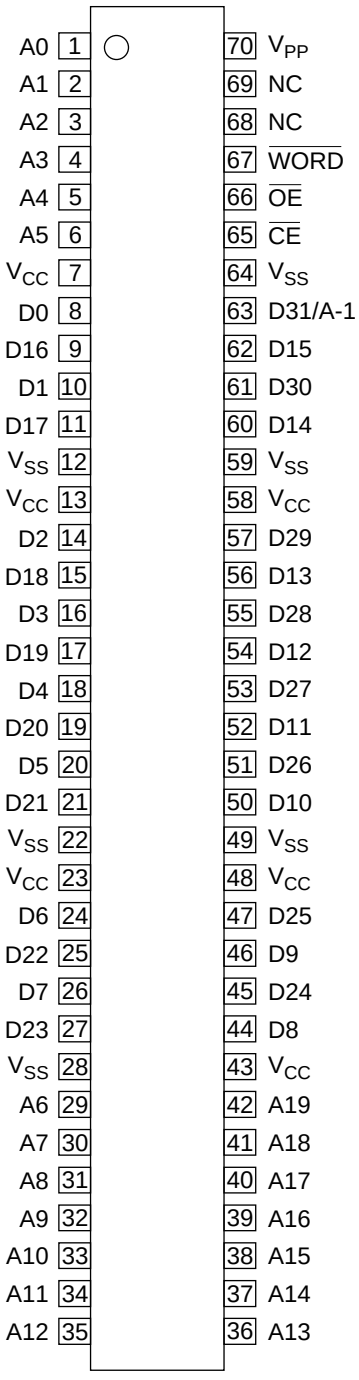
DESCRIPTION

The MR27V3255D is a 32Mbit electrically Programmable Read-Only Memory with page mode. Its configuration can be electrically switched between 1,048,576 double word x 32bit and 2,097,152 word x 16bit. The MR27V3255D operates on a single +3.3V power supply and is TTL compatible. The MR27V3255D provides Page mode which can greatly reduce the read access time. Since the MR27V3255D operates asynchronously , external clocks are not required , making this device easy-to-use. The MR27V3255D is suitable as large-capacity fixed memory for microcomputers and data terminals. It is manufactured using a CMOS double silicon gate technology and is offered in 70-pin SSOP or 70-pin TSOP packages.

FEATURES

- 1,048,576 double word x 32bit / 2,097,152 word x 16bit electrically switchable configuration
- Single +3.3V power supply
- Access time 80ns
  Page mode access time 25ns
- Input / Output TTL compatible
- Three-state output
- Packages
  70-pin plastic SSOP (SSOP70-P-500-0.80-K) (Product name : MR27V3255DMB)
  70-pin plastic TSOP (TSOP II 70-P-400-0.65-K) (Product name : MR27V3255DTA)

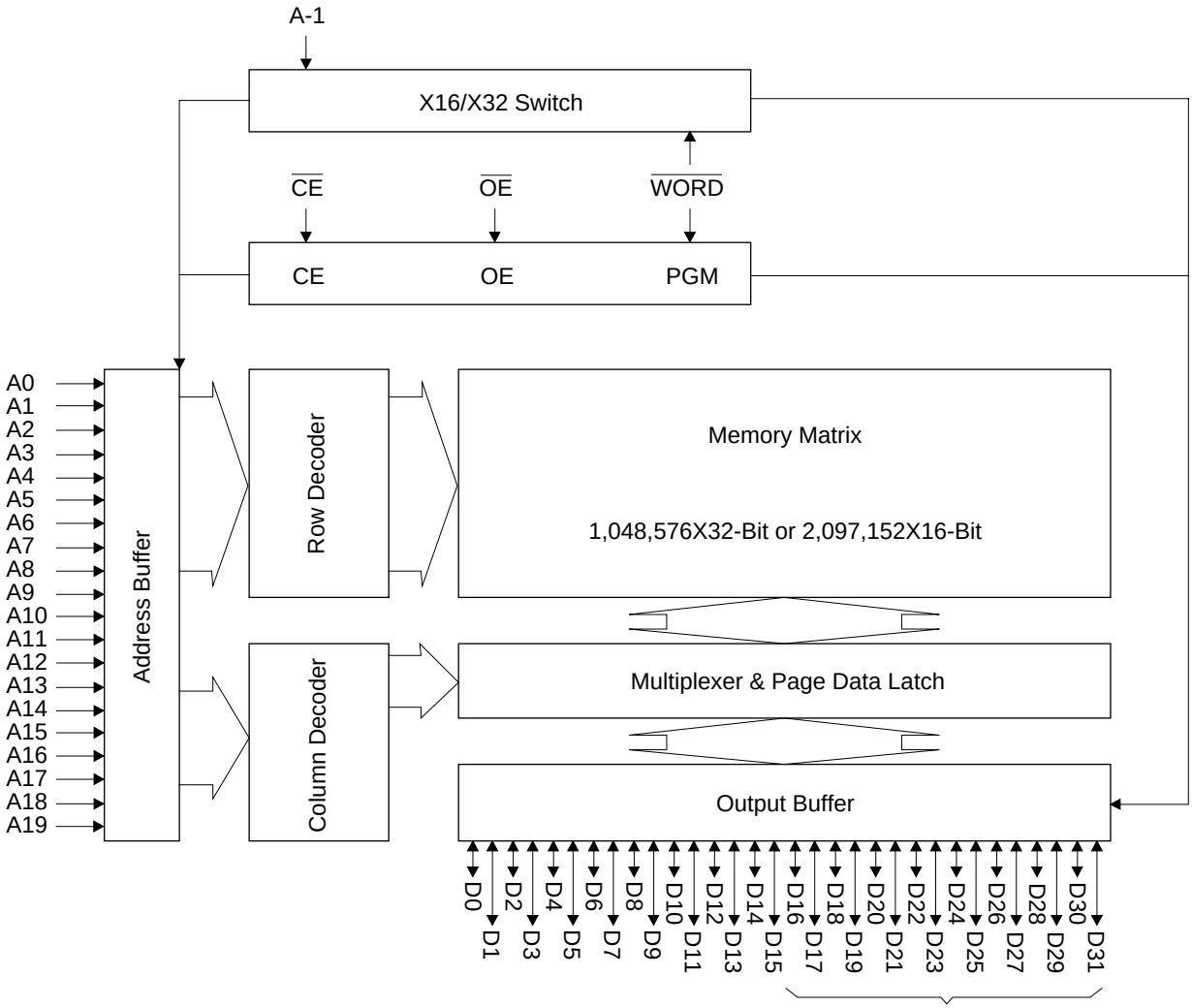
PIN CONFIGURATION (TOP VIEW)



70-pin SSOP , TSOP (II)

PIN NAMES	FUNCTIONS
D31/A-1	Data output / Address input
A0 - A19	Address input
D0 - D30	Data output
$\overline{CE}$	Chip enable
$\overline{OE}$	Output enable
V_{CC}	Power supply voltage
V_{SS}	GND
$\overline{WORD}$	Mode switch
V_{PP}	Program power supply voltage
NC	Non connection

BLOCK DIAGRAM



In 16-bit output mode, these pins are three-stated and pin D31 functions as the A-1 address pin.

FUNCTION TABLE

MODE	$\overline{CE}$	$\overline{OE}$	$\overline{WORD}$	V_{PP}	V_{CC}	D0 - D15	D16 - D30	D31/A-1
READ (32-Bit)	L	L	H	*	3.3V	D_{OUT}		
READ (16-Bit)	L	L	L			D_{OUT}	Hi-Z	L/H
OUTPUT DISABLE	L	H	H			Hi-Z		
			L					*
STAND-BY	H	*	H			Hi-Z		
			L					*
PROGRAM	L	H	L	9.75V	4.0V	D_{IN}	Hi-Z	L/H
PROGRAM INHIBIT	H	H				Hi-Z		
PROGRAM VERIFY	H	L				D_{OUT}	Hi-Z	L/H

* : Don't Care (H or L or Open)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Value	Unit
Operating temperature under bias	Topr	-	0 to 70	°C
Storage temperature	T_{stg}		-55 to 125	°C
Input voltage	V_I	relative to V_{SS}	-0.5 to V_{CC} + 0.5	V
Output voltage	V_O		-0.5 to V_{CC} + 0.5	V
Power supply voltage	V_{CC}		-0.5 to 5	V
Program power supply voltage	V_{PP}		-0.5 to 11.5	V
Power dissipation per package	P_D	-	1.0	W

RECOMMENDED OPERATING CONDITIONS FOR READ

(Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
V_{CC} power supply voltage	V_{CC}	V_{CC}=3.0V-3.6V	3.0	-	3.6	V
V_{PP} power supply voltage	V_{PP}		-0.5	-	V_{CC}+0.5	V
Input "H" level	V_{IH}		2.2	-	V_{CC}+0.5*	V
Input "L" level	V_{IL}		-0.5**	-	0.6	V

Voltage is relative to Vss

* : Vcc+1.5V (Max.) when pulse width of overshoot is less than 10nS.

** : -1.5V (Min.) when pulse width of undershoot is less than 10nS.

ELECTRICAL CHARACTERISTICS (Read operation)

DC Characteristics

(V_{CC}=3.3V±0.3V, Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I_{LI}	V_I=0 to Vcc	-	-	10	µA
Output leakage current	I_{LO}	V_O=0 to Vcc	-	-	10	µA
V_{CC} power supply current (Standby)	I_{CS1}	$\overline{CE}$=V_{CC}	-	-	50	µA
	I_{CS2}	$\overline{CE}$=V_{IH}	-	-	1	mA
V_{CC} power supply current (Read)	I_{CCA}	$\overline{CE}$=V_{IL}, $\overline{OE}$=V_{IH} tc=80ns	-	-	100	mA
V_{PP} power supply current	I_{PP}	V_{PP}=V_{CC}	-	-	10	µA
Input "H" level	V_{IH}	-	2.2	-	V_{CC}+0.5*	V
Input "L" level	V_{IL}	-	-0.5**	-	0.6	V
Output "H" level	V_{OH}	I_{OH}=-400µA	2.4	-	-	V
Output "L" level	V_{OL}	I_{OL}=2.1mA	-		0.4	V

Voltage is relative to Vss

* : Vcc+1.5V (Max.) when pulse width of overshoot is less than 10nS.

** : -1.5V (Min.) when pulse width of undershoot is less than 10nS.

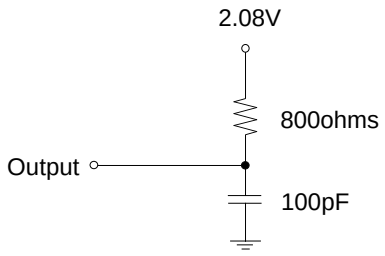
AC Characteristics

(V_{CC}=3.3V±0.3V, Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
Address access cycle time	T_C	-	80	-	ns
Address access time	T_{ACC}	$\overline{CE}$=$\overline{OE}$=V_{IL}	-	80	ns
Page access cycle time	T_{PC}	-	25	-	ns
Page access time	T_{PAC}	-	-	25	ns
$\overline{CE}$ access time	T_{CE}	$\overline{OE}$=V_{IL}	-	80	ns
$\overline{OE}$ access time	T_{OE}	$\overline{CE}$=V_{IL}	-	25	ns
Output disable time	T_{CHZ}	$\overline{OE}$=V_{IL}	0	25	ns
	T_{OHZ}	$\overline{CE}$=V_{IL}	0	20	ns
Output hold time	T_{OH}	$\overline{CE}$=$\overline{OE}$=V_{IL}	0	-	ns

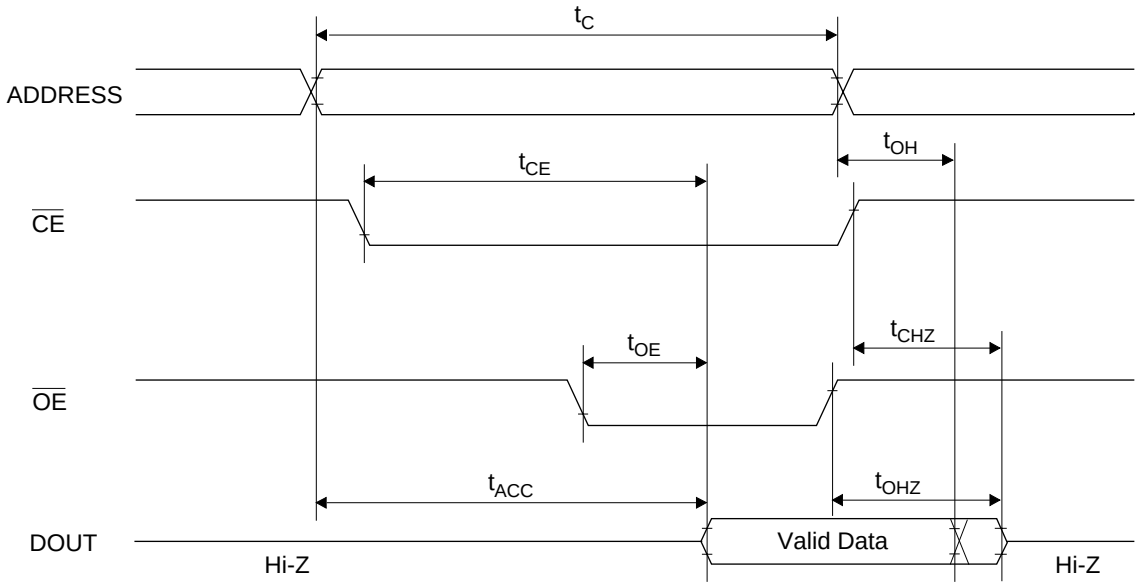
Measurement conditions

Input signal level ---------- 0V/3V
Input timing reference level ---------- 0.8V/2.0V
Output load ---------- 100pF
Output timing reference level ---------- 0.8V/2.0V

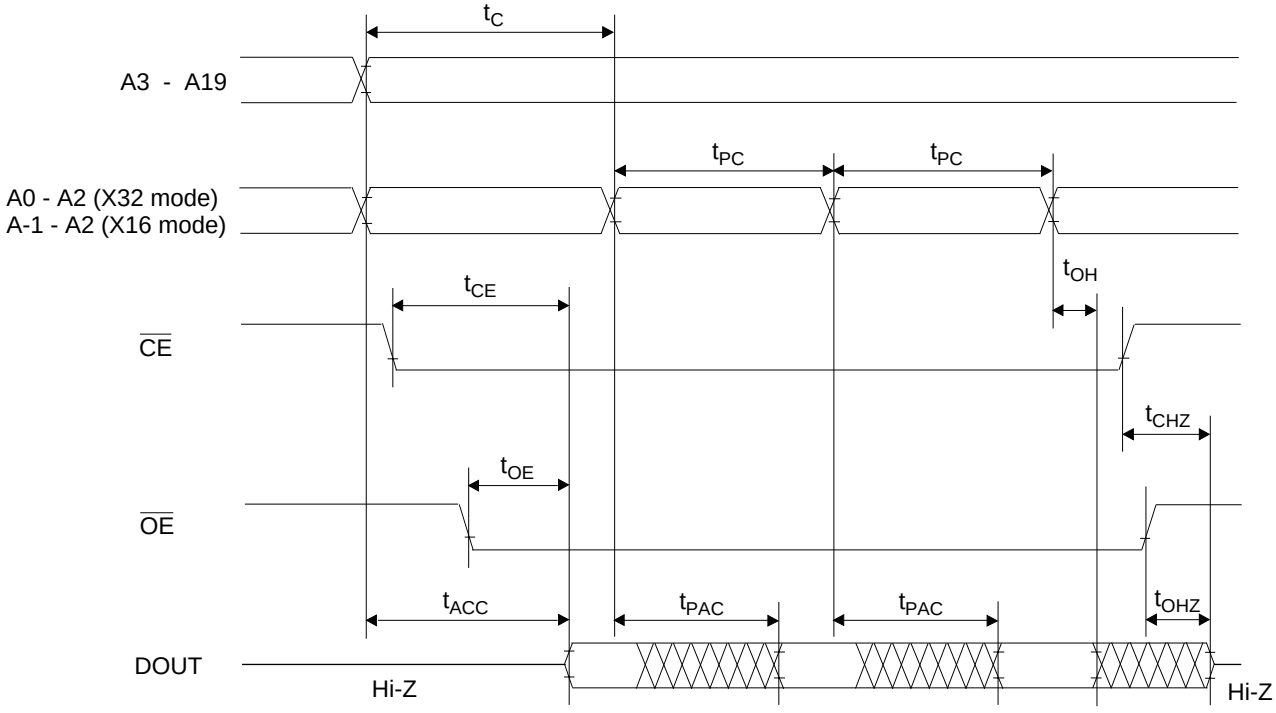


TIMING CHART

NORMAL MODE READ CYCLE



PAGE MODE READ CYCLE



ELECTRICAL CHARACTERISTICS (Programming operation)

DC Characteristics

(Ta=25°C±5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I_{LI}	$V_I=V_{CC}+0.5V$	-	-	10	µA
V_{PP} power supply current (Program)	I_{PP2}	$\overline{CE}=V_{IL}$	-	-	50	mA
V_{CC} power supply current	I_{CC}	-	-	-	80	mA
Input "H" level	V_{IH}	-	3.0	-	$V_{CC}+0.5$	V
Input "L" level	V_{IL}	-	-0.5	-	0.8	V
Output "H" level	V_{OH}	$I_{OH}=-400µA$	2.4	-	-	V
Output "L" level	V_{OL}	$I_{OL}=2.1mA$	-	-	0.45	V
Program voltage	V_{PP}	-	9.5	9.75	10.0	V
V_{CC} power supply voltage	V_{CC}	-	3.9	4.0	4.1	V

Voltage is relative to Vss

AC Characteristics

($V_{CC}=4.0V±0.1V$,$V_{PP}=9.75V±0.25V$,Ta=25°C±5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Address set-up time	T_{AS}	-	100	-	-	ns
$\overline{OE}$ set-up time	T_{OES}	-	2	-	-	µs
Data set-up time	T_{DS}	-	100	-	-	ns
Address hold time	T_{AH}	-	2	-	-	µs
Data hold time	T_{DH}	-	100	-	-	ns
Output float delay from $\overline{OE}$	T_{OHZ}	-	0	-	100	ns
V_{PP} voltage set-up time	T_{VS}	-	2	-	-	µs
Program pulse width	T_{PW}	-	9	10	11	µs
Data valid from $\overline{OE}$	T_{OE}	-	-	-	100	ns
Address hold from $\overline{OE}$ high	T_{AHO}	-	0	-	-	ns

Pin Check Function

Pin Check Function is to check contact between each device-pin and each socket-lead with EPROM programmer.

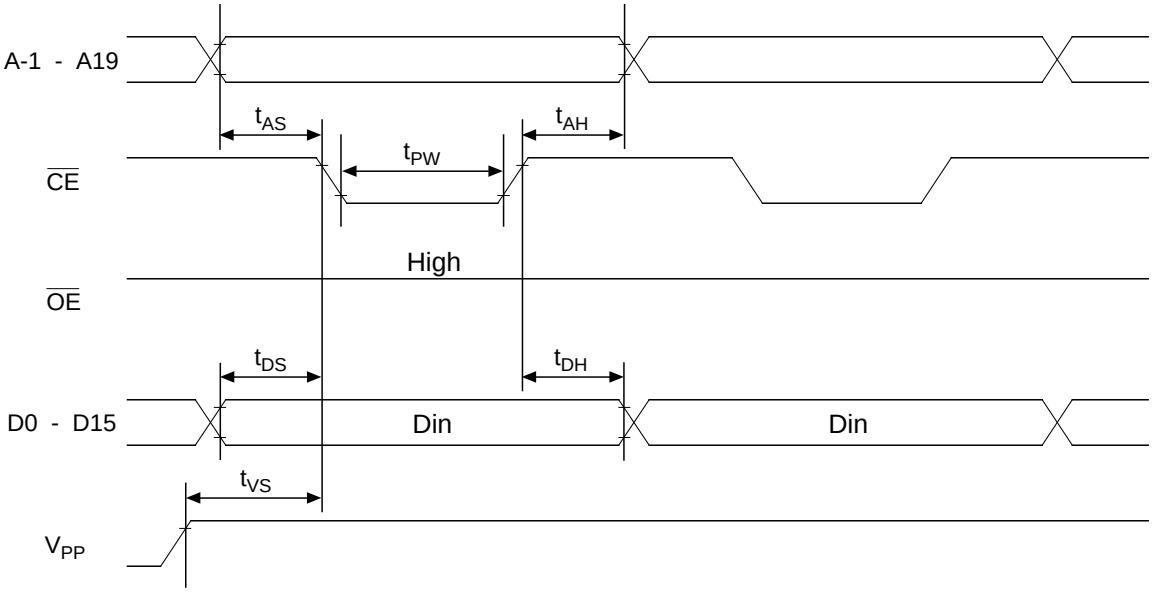
Setting up address as the following condition call the preprogrammed codes on device outputs.

($V_{CC}=3.3V±0.3V$,$\overline{CE}=\overline{OE}=V_{IL}$,$\overline{WORD}=V_{IL}$,Ta=25°C±5°C)

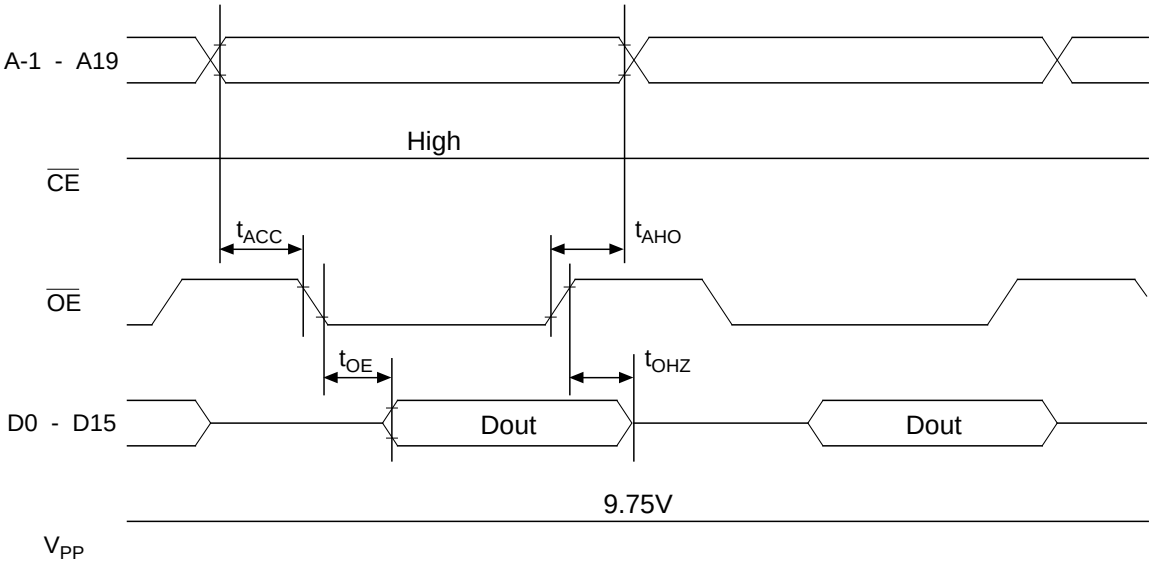
PA0	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9	PA10	PA11	PA12	PA13	PA14	PA15	PA16	PA17	PA18	PA19	PA20	DATA
A-1	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	
0	1	0	1	0	1	0	1	0	1	VH*	1	0	1	0	1	0	1	0	1	0	AAAA
1	0	1	0	1	0	1	0	1	0	VH*	0	1	0	1	0	1	0	1	0	1	5555
Other conditions																					FFFF

* :VH=8V±0.25V

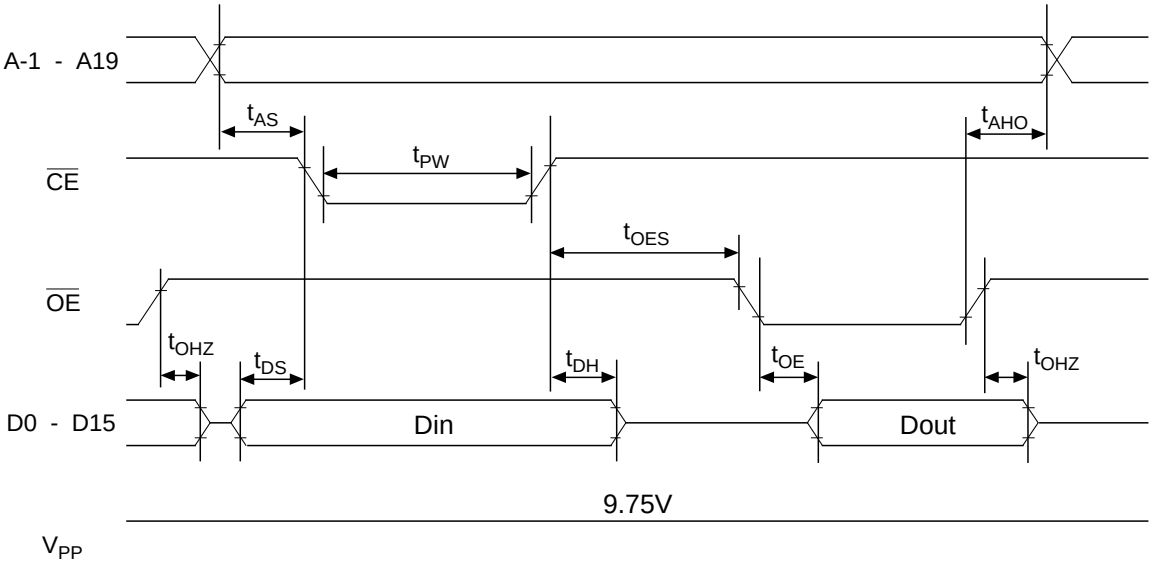
Consecutive Programming Waveforms



Consecutive Program Verify Waveforms



Program and Program Verify Cycle Waveforms



PIN Capacitance

(V_{CC}=3.3V, Ta=25°C, f=1MHz)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	C_{IN}	V_I=0V	-	-	8	pF
Output	C_{OUT}	V_O=0V	-	-	10	

Programming / Verify Flow Chart

