
MR27V452D

262,144-Word x 16-Bit or 524,288-Word x 8-Bit

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

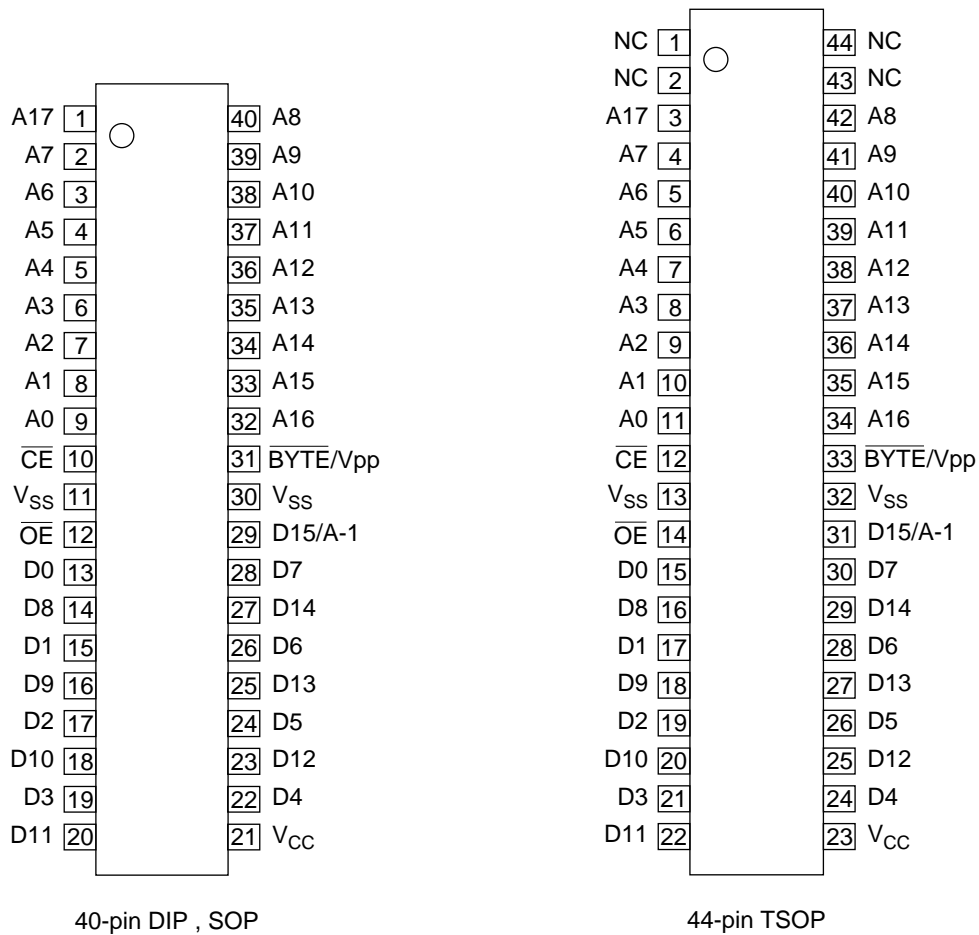
DESCRIPTION

The MR27V452D is a 4Mbit electrically Programmable Read-Only Memory with page mode. Its configuration can be electrically switched between 262,144 word x 16bit and 524,288 word x 8bit. The MR27V452D operates on a single +3.3V power supply and is TTL compatible. The MR27V452D provides Page mode which can greatly reduce the read access time. Since the MR27V452D operates asynchronously, external clocks are not required, making this device easy-to-use. The MR27V452D 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 40-pin DIP, 40-pin SOP or 44-pin TSOP packages.

FEATURES

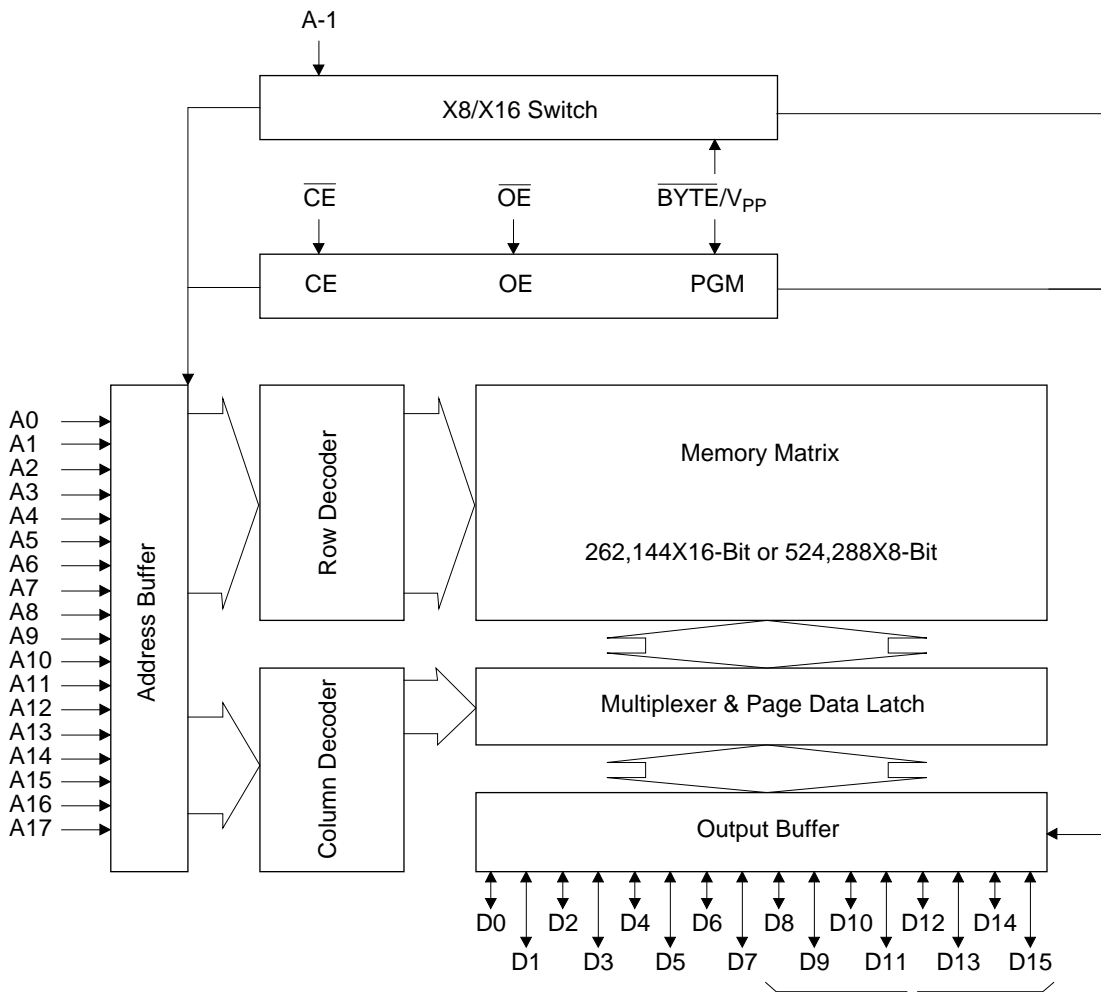
- 262,144 word x 16bit / 524,288 word x 8bit electrically switchable configuration
- Single +3.3V power supply
- Access time 70ns
 - Page mode access time 30ns
- Input / Output TTL compatible
- Three-state output
- Packages
 - 40-pin plastic DIP (DIP40-P-600-2.54)
 - 40-pin plastic SOP (SOP40-P-525-1.27-K)
 - 44-pin plastic TSOP (TSOP II 44-P-400-0.80-K)

PIN CONFIGURATION (TOP VIEW)



PIN NAMES	FUNCTIONS
D15/A-1	Data output / Address input
A0 - A17	Address input
D0 - D14	Data output
\overline{CE}	Chip enable
\overline{OE}	Output enable
V_{CC}	Power supply voltage
V_{SS}	GND
\overline{BYTE}/V_{pp}	Mode switch / Program power supply voltage
NC	Non connection

BLOCK DIAGRAM



In 8-bit output mode, these pins are three-stated and pin D15 functions as the A-1 address pin.

FUNCTION TABLE

MODE	$\overline{\text{CE}}$	$\overline{\text{OE}}$	BYTE/ V_{PP}	V_{CC}	D0 - D7	D8 - D14	D15/A-1
READ (16-Bit)	L	L	H	3.3V	D_{OUT}		
READ (8-Bit)	L	L	L		D_{OUT}	Hi-Z	L/H
OUTPUT DISABLE	L	H	H		Hi-Z		*
			L		Hi-Z		*
STAND-BY	H	*	H	Hi-Z		*	
			L	Hi-Z		*	
PROGRAM	L	H	9.75V	D_{IN}			
PROGRAM INHIBIT	H	H		Hi-Z			
PROGRAM VERIFY	H	L		D_{OUT}			

* : Don't Care

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Value	Unit
Operating temperature under bias	T_{opr}	-	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 V_{SS}

ELECTRICAL CHARACTERISTICS (Read operation)**DC Characteristics** $(V_{CC}=3.3V\pm 0.3V, T_a=0 \text{ to } 70^\circ\text{C})$

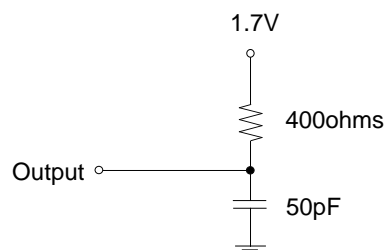
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I_{LI}	$V_I=0 \text{ to } V_{CC}$	-	-	10	μA
Output leakage current	I_{LO}	$V_O=0 \text{ to } V_{CC}$	-	-	10	μA
V_{CC} power supply current (Standby)	I_{CS1}	$\overline{CE}=V_{CC}$	-	-	50	μA
	I_{CS2}	$\overline{CE}=V_{IH}$	-	-	1	mA
V_{CC} power supply current (Read)	I_{CCA}	$\overline{CE}=V_{IL}, \overline{OE}=V_{IH}$ $t_c=70\text{ns}$	-	-	70	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}	$I_{OH}=-200\mu\text{A}$	$V_{CC}-0.4$	-	-	V
Output "L" level	V_{OL}	$I_{OL}=1\text{mA}$	-	-	0.4	V

Voltage is relative to V_{SS} **AC Characteristics** $(V_{CC}=3.3V\pm 0.3V, T_a=0 \text{ to } 70^\circ\text{C})$

Parameter	Symbol	Condition	Min.	Max.	Unit
Address access cycle time	T_C	-	70	-	ns
Address access time	T_{ACC}	$\overline{CE}=\overline{OE}=V_{IL}$	-	70	ns
Page access cycle time	T_{PC}	-	30	-	ns
Page access time	T_{PAC}	-	-	30	ns
\overline{CE} access time	T_{CE}	$\overline{OE}=V_{IL}$	-	70	ns
\overline{OE} access time	T_{OE}	$\overline{CE}=V_{IL}$	-	40	ns
Output disable time	T_{CHZ}	$\overline{OE}=V_{IL}$	0	30	ns
	T_{OHZ}	$\overline{CE}=V_{IL}$	0	25	ns
Output hold time	T_{OH}	$\overline{CE}=\overline{OE}=V_{IL}$	0	-	ns

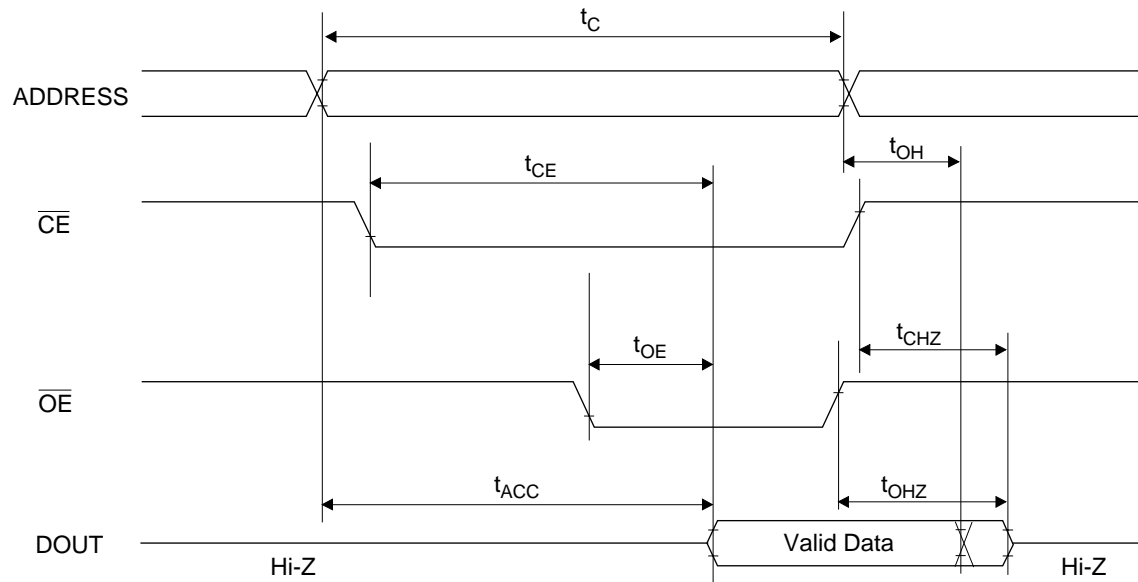
Measurement conditions

Input signal level	-----	0V/3V
Input timing reference level	-----	0.8V/2.0V
Output load	-----	50pF
Output timing reference level	-----	0.8V/2.0V

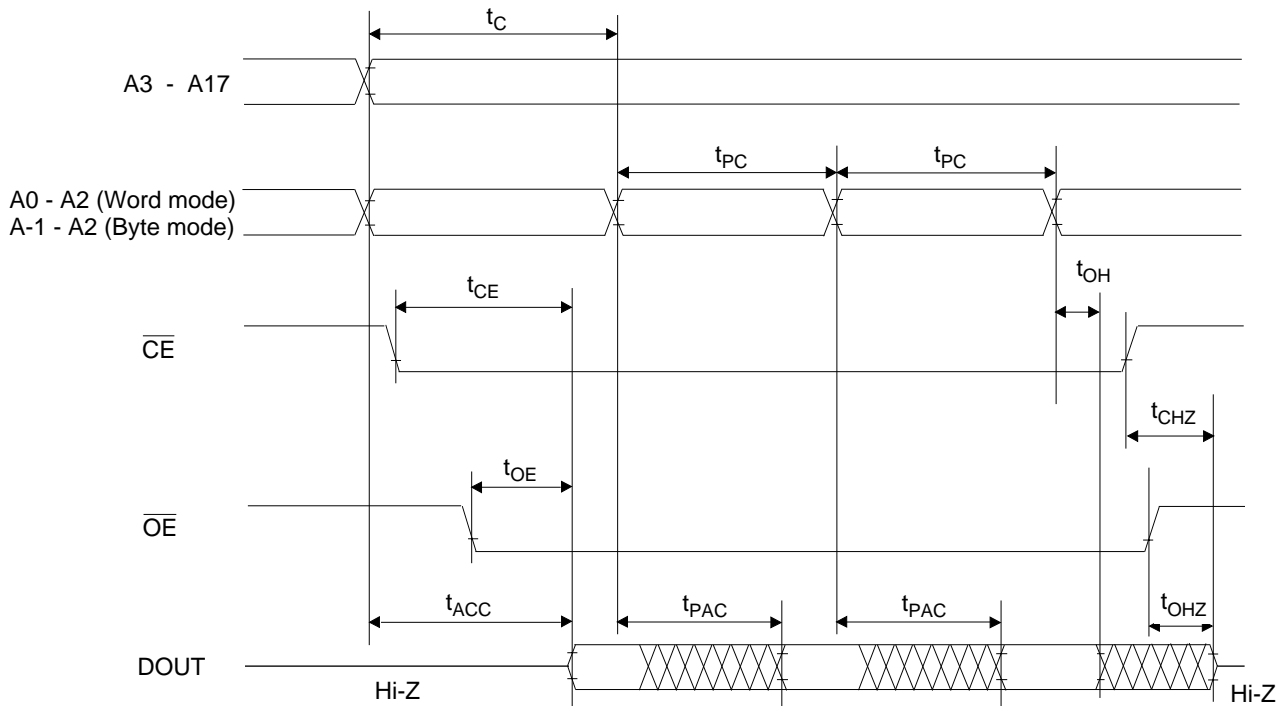


TIMING CHART

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.

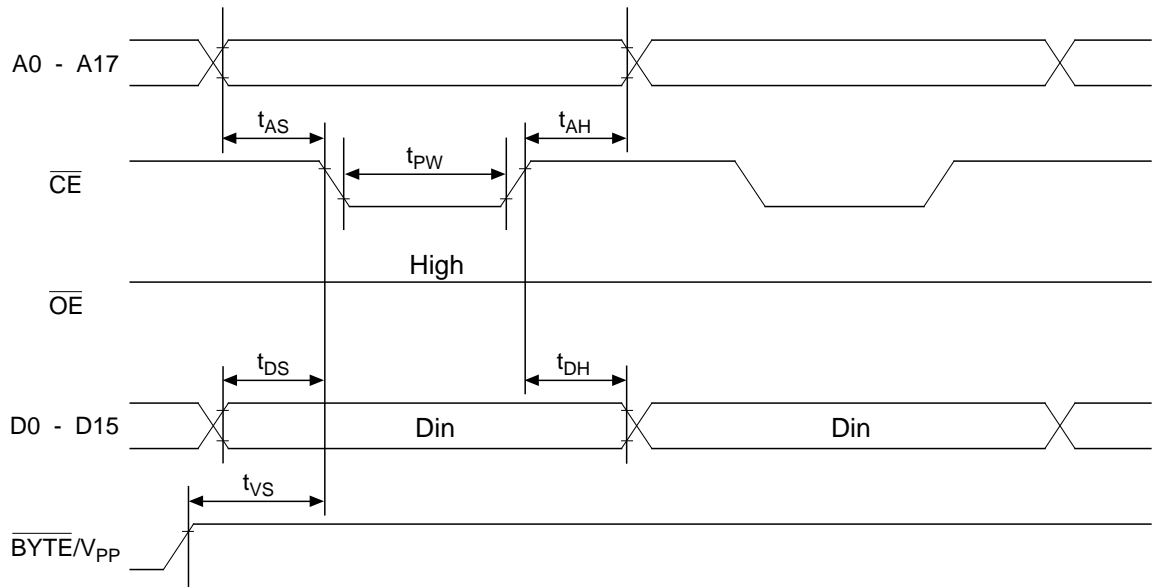
Setting up address as the following condition call the preprogrammed codes on device outputs.

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

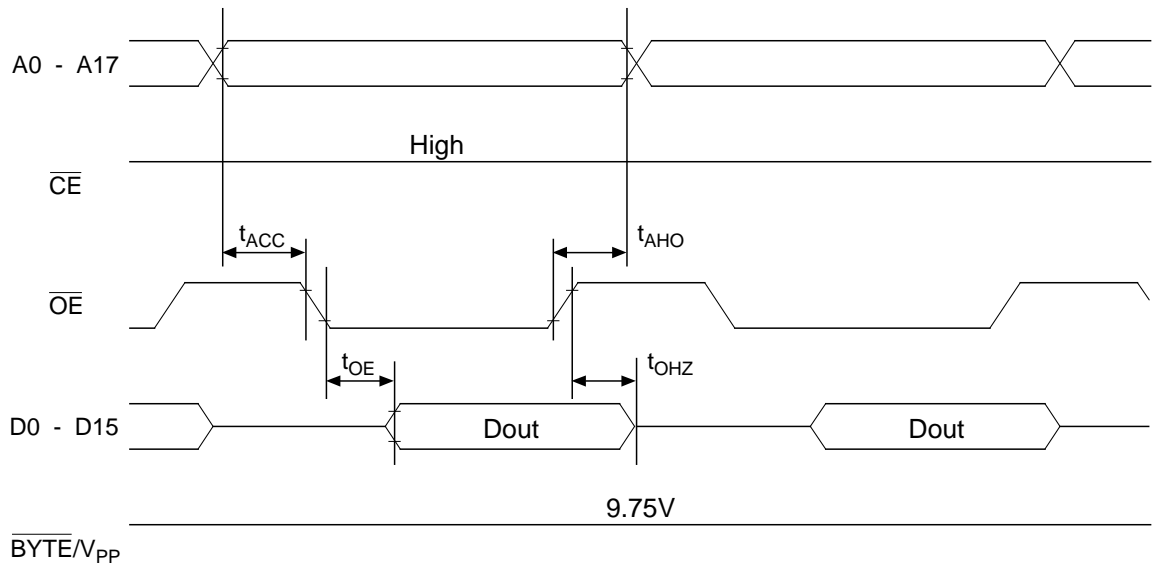
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	DATA
0	1	0	1	0	1	0	1	0	VH*	0	1	0	1	0	1	0	0	FF00
1	0	1	0	1	0	1	0	1	VH*	1	0	1	0	1	0	1	1	00FF
Other conditions																		FFFF

* :VH=8V±0.25V

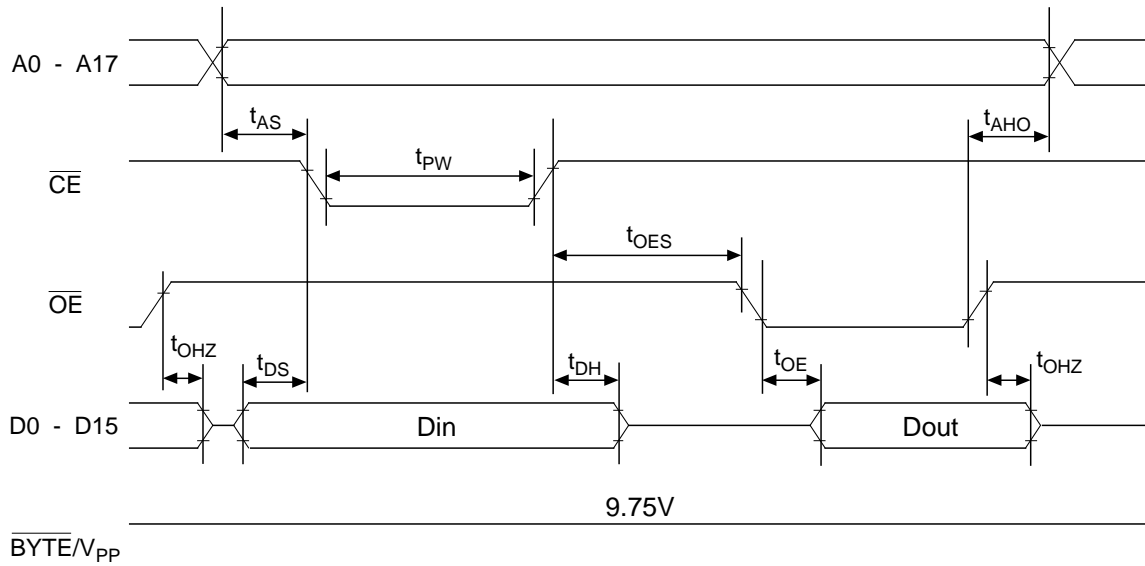
Consecutive Programming Waveforms



Consecutive Program Verify Waveforms



Program and Program Verify Cycle Waveforms



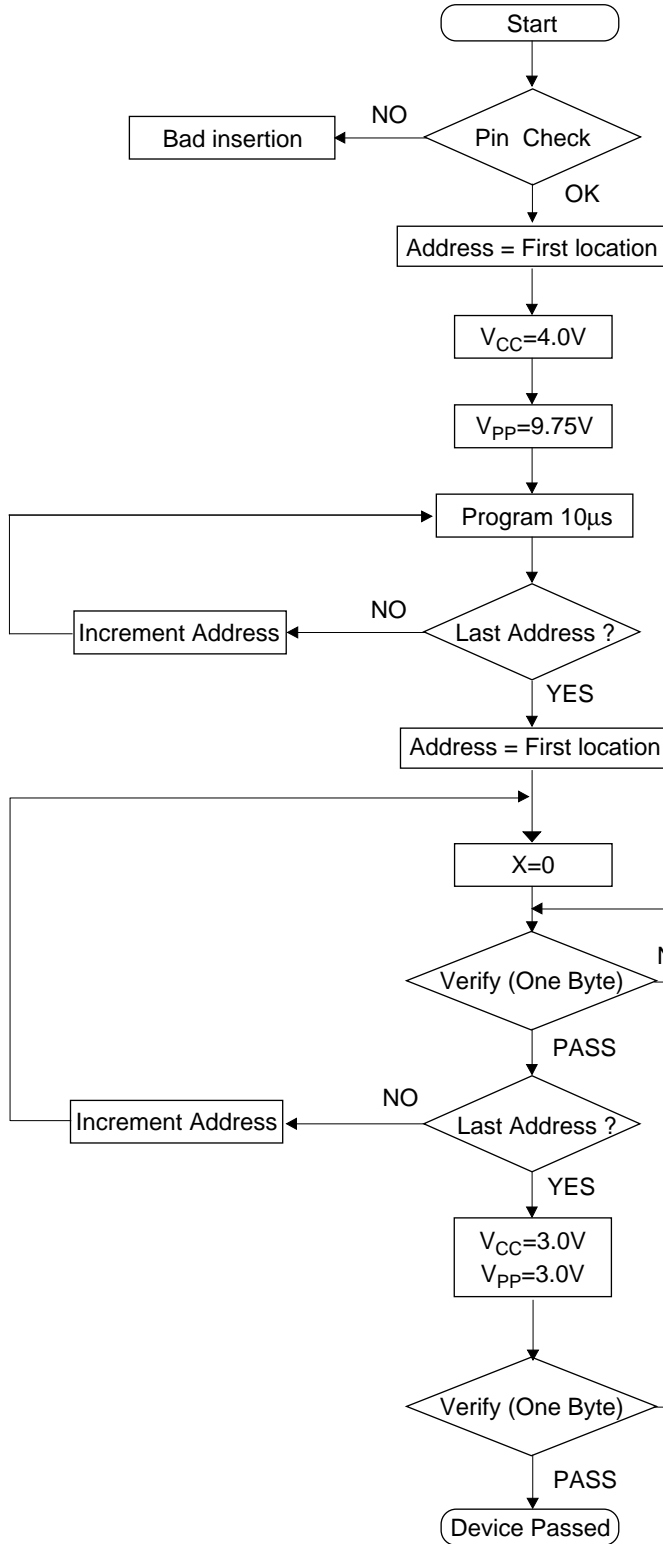
PIN Capacitance

(V_{CC}=3.3V, T_a=25°C, f=1MHz)

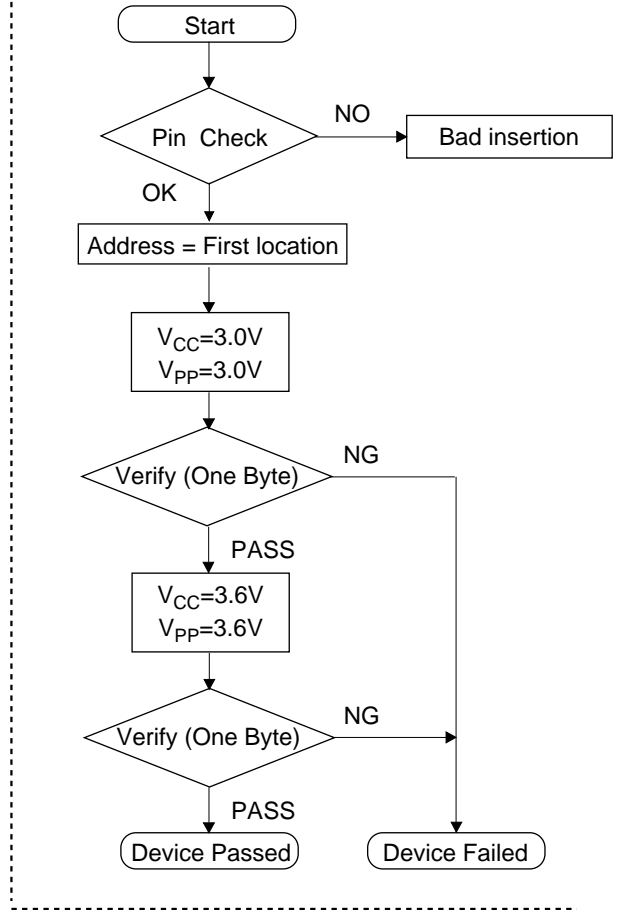
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	C _{IN1}	V _I =0V	-	-	12	pF
\overline{BYTE}/V_{PP}	C _{IN2}		-	-	60	
Output	C _{OUT}	V _O =0V	-	-	15	

Programming / Verify Flow Chart

Programming



Verify



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