OKI Semiconductor

1A

MR27V801D

1,048,576-Word x 8-Bit One Time PROM

DESCRIPTION

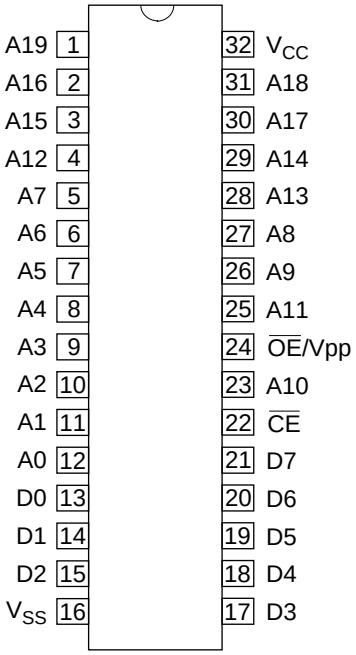
The MR27V801D is a 8Mbit electrically Programmable Read-Only Memory organized as 1,048,576 word x 8bit. The MR27V801D operates on a single +3V-3.3V power supply and is TTL compatible. Since the MR27V801D operates asynchronously , external clocks are not required , making this device easy-to-use. The MR27V801D 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 32-pin DIP, 32-pin SOP or 32-pin TSOP packages.

FEATURES

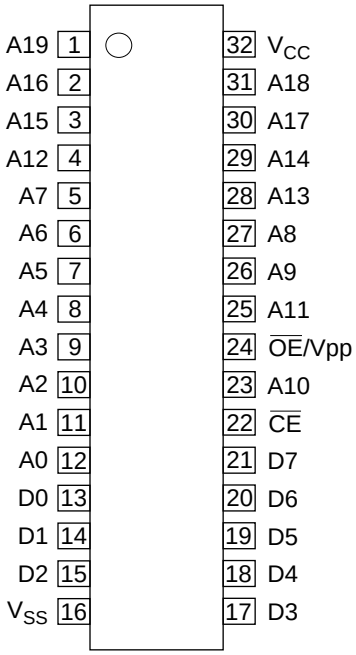
- 1,048,576 word x 8bit
- Single +3V-3.3V power supply
- Access time 100ns access time (Vcc=+3V)
  80ns access time (Vcc=+3.3V)
- Input / Output TTL compatible
- Three-state output
- Packages

32-pin plastic DIP (DIP32-P-600-2.54)	(Product name : MR27V801DRA)
32-pin plastic SOP (SOP32-P-525-1.27-K)	(Product name : MR27V801DMA)
32-pin plastic TSOP (TSOP I 32-P-814-0.50-K)	(Product name : MR27V801DTA)

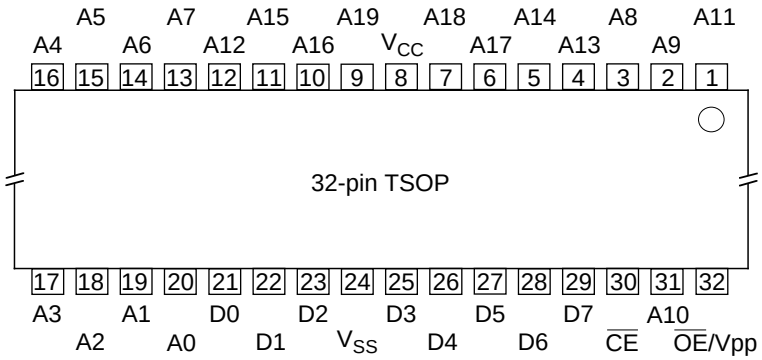
PIN CONFIGURATION (TOP VIEW)



32-pin DIP

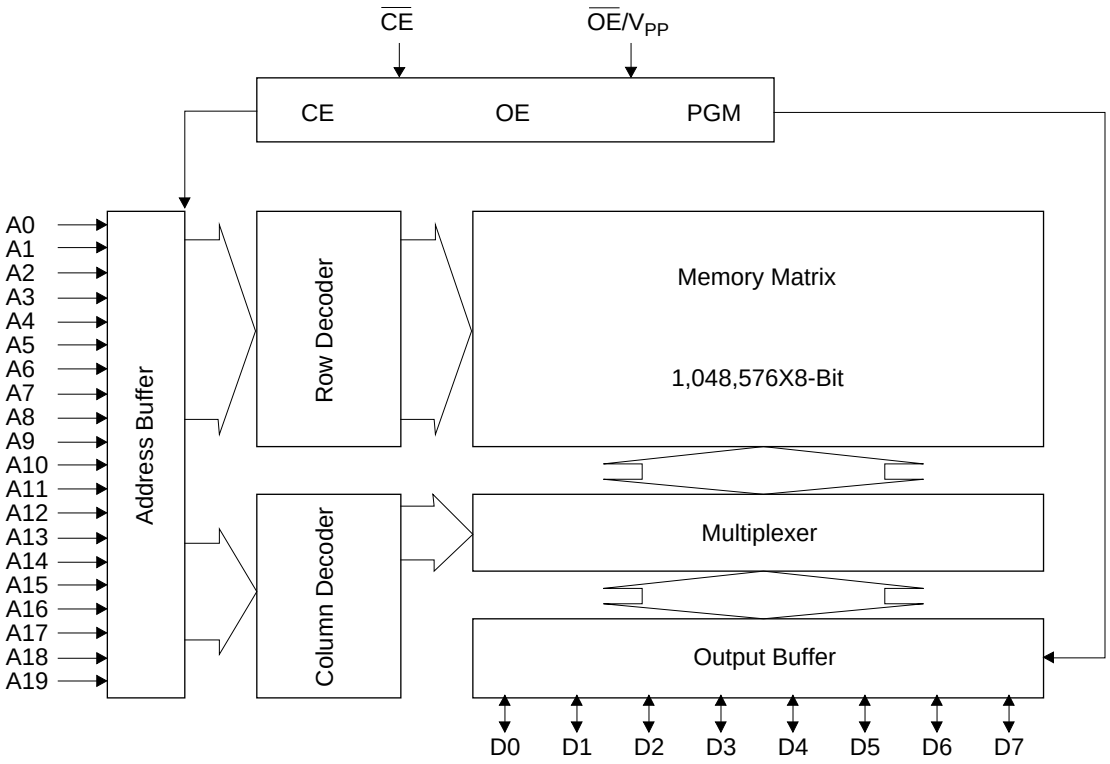


32-pin SOP



PIN NAMES	FUNCTIONS
A0 - A19	Address input
D0 - D7	Data output
$\overline{CE}$	Chip enable
$\overline{OE}/V_{PP}$	Output enable / Program power supply voltage
V_{CC}	Power supply voltage
V_{SS}	GND

BLOCK DIAGRAM



FUNCTION TABLE

MODE	$\overline{CE}$	$\overline{OE}/V_{PP}$	V_{CC}	D0 - D7
READ	L	L	3.0V to 3.3V	D_{OUT}
OUTPUT DISABLE	L	H		Hi-Z
STAND-BY	H	*		Hi-Z
PROGRAM	L	9.75V	4.0V	D_{IN}
PROGRAM INHIBIT	H			Hi-Z
PROGRAM VERIFY	L	L		D_{OUT}

*: Don't Care

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

(Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
V_{CC} power supply voltage	V_{CC}	V_{CC}=2.7V - 3.6V	2.7	-	3.6	V
V_{PP} power supply voltage	$\overline{OE}/V_{PP}$		-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 1

(V_{CC}=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_{CCSC}	$\overline{CE}$=V_{CC}	-	-	50	µA
	I_{CCST}	$\overline{CE}$=V_{IH}	-	-	1	mA
V_{CC} power supply current (Read)	I_{CCA}	$\overline{CE}$=V_{IL}, $\overline{OE}$/V_{PP}=V_{IH} tc=100ns	-	-	25	mA
V_{PP} power supply current	I_{PP}	$\overline{OE}$/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.

DC Characteristics 2

(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_{CCSC}	$\overline{CE}$=V_{CC}	-	-	50	µA
	I_{CCST}	$\overline{CE}$=V_{IH}	-	-	1	mA
V_{CC} power supply current (Read)	I_{CCA}	$\overline{CE}$=V_{IL}, $\overline{OE}$/V_{PP}=V_{IH} tc=80ns	-	-	30	mA
V_{PP} power supply current	I_{PP}	$\overline{OE}$/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 1

(V_{CC}=3V±0.3V, Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
Address cycle time	T_C	-	100	-	ns
Address access time	T_{ACC}	$\overline{CE}$=$\overline{OE}$/V_{PP}=V_{IL}	-	100	ns
$\overline{CE}$ access time	T_{CE}	$\overline{OE}$/V_{PP}=V_{IL}	-	100	ns
$\overline{OE}$ access time	T_{OE}	$\overline{CE}$=V_{IL}	-	50	ns
Output disable time	T_{CHZ}	$\overline{OE}$/V_{PP}=V_{IL}	0	30	ns
	T_{OHZ}	$\overline{CE}$=V_{IL}	0	25	ns
Output hold time	T_{OH}	$\overline{CE}$=$\overline{OE}$/V_{PP}=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

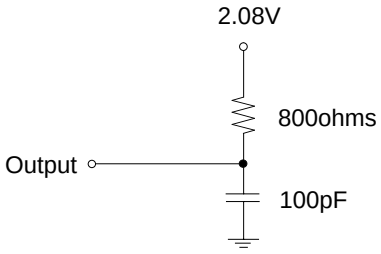
AC Characteristics 2

(V_{CC}=3.3V±0.3V, Ta=0 to 70°C)

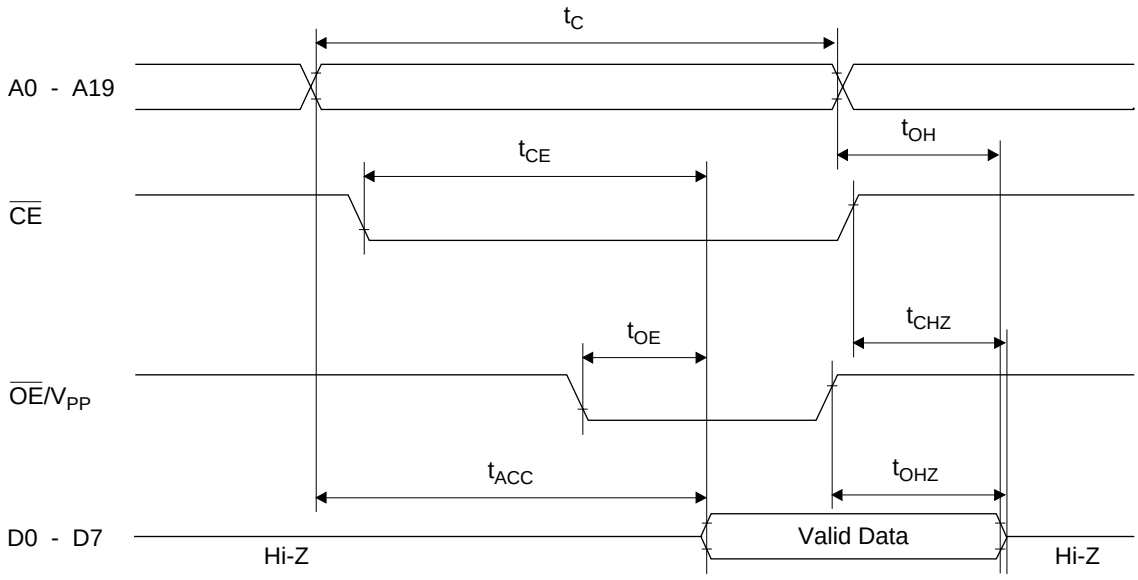
Parameter	Symbol	Condition	Min.	Max.	Unit
Address cycle time	T_C	-	80	-	ns
Address access time	T_{ACC}	$\overline{CE}$=$\overline{OE}$/V_{PP}=V_{IL}	-	80	ns
$\overline{CE}$ access time	T_{CE}	$\overline{OE}$/V_{PP}=V_{IL}	-	80	ns
$\overline{OE}$ access time	T_{OE}	$\overline{CE}$=V_{IL}	-	40	ns
Output disable time	T_{CHZ}	$\overline{OE}$/V_{PP}=V_{IL}	0	30	ns
	T_{OHZ}	$\overline{CE}$=V_{IL}	0	25	ns
Output hold time	T_{OH}	$\overline{CE}$=$\overline{OE}$/V_{PP}=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 (READ CYCLE)



PIN Capacitance

(V_{CC}=3.3V, Ta=25°C, f=1MHz)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	C_{IN1}	V_I=0V	-	-	8 (10)	pF
$\overline{OE}/V_{PP}$	C_{IN2}		-	-	60	
Output	C_{OUT}	V_O=0V	-	-	10 (12)	

( ) : DIP only

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}	-	-	-	50	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
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 $\overline{CE}$	T_{CHZ}	-	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 $\overline{CE}$	T_{CE}	-	-	-	100	ns
Address hold from $\overline{CE}$ high	T_{AHC}	-	0	-	-	ns
V_{PP} voltage recovery time	T_{VR}	-	2	-	-	µs

Pin Check Function

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

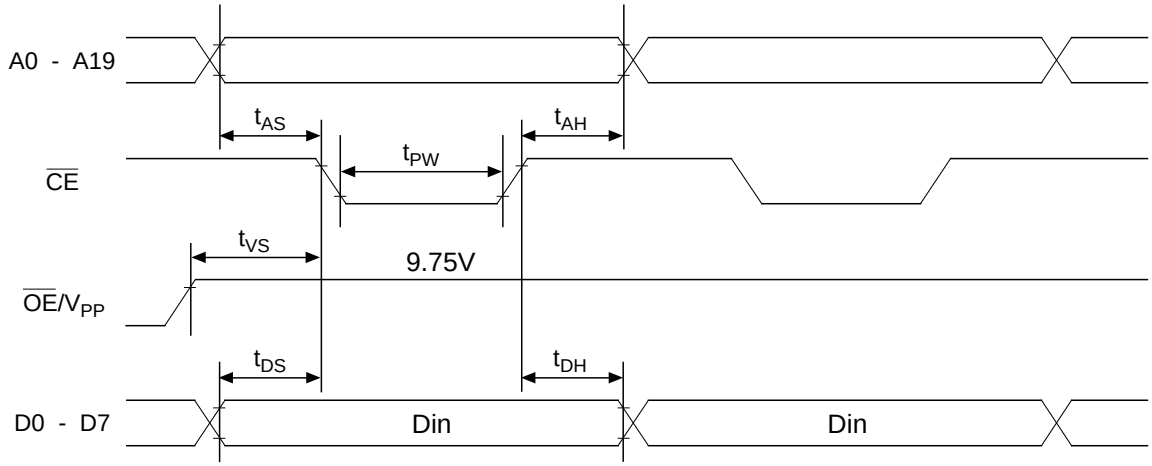
Setting up address as the following condition call the preprogrammed codes on device outputs.

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

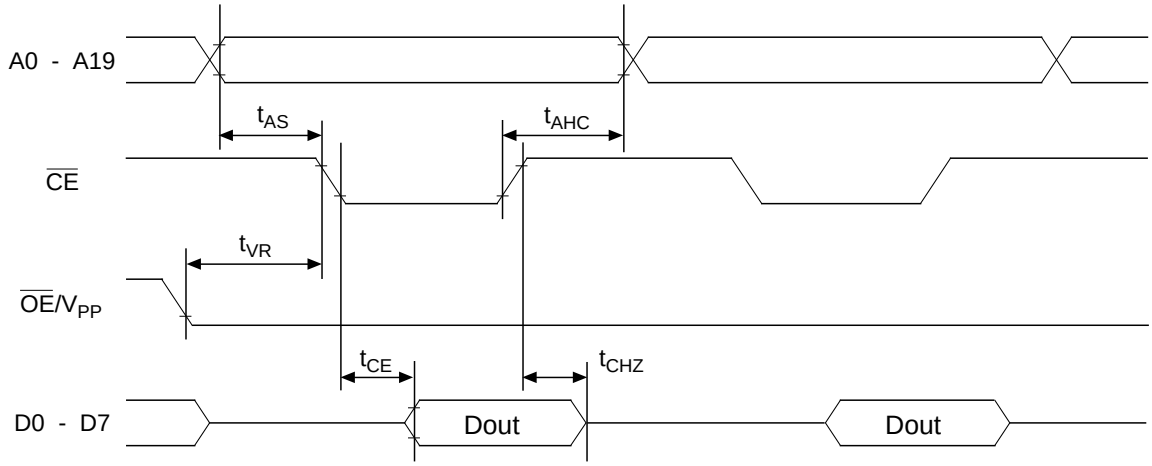
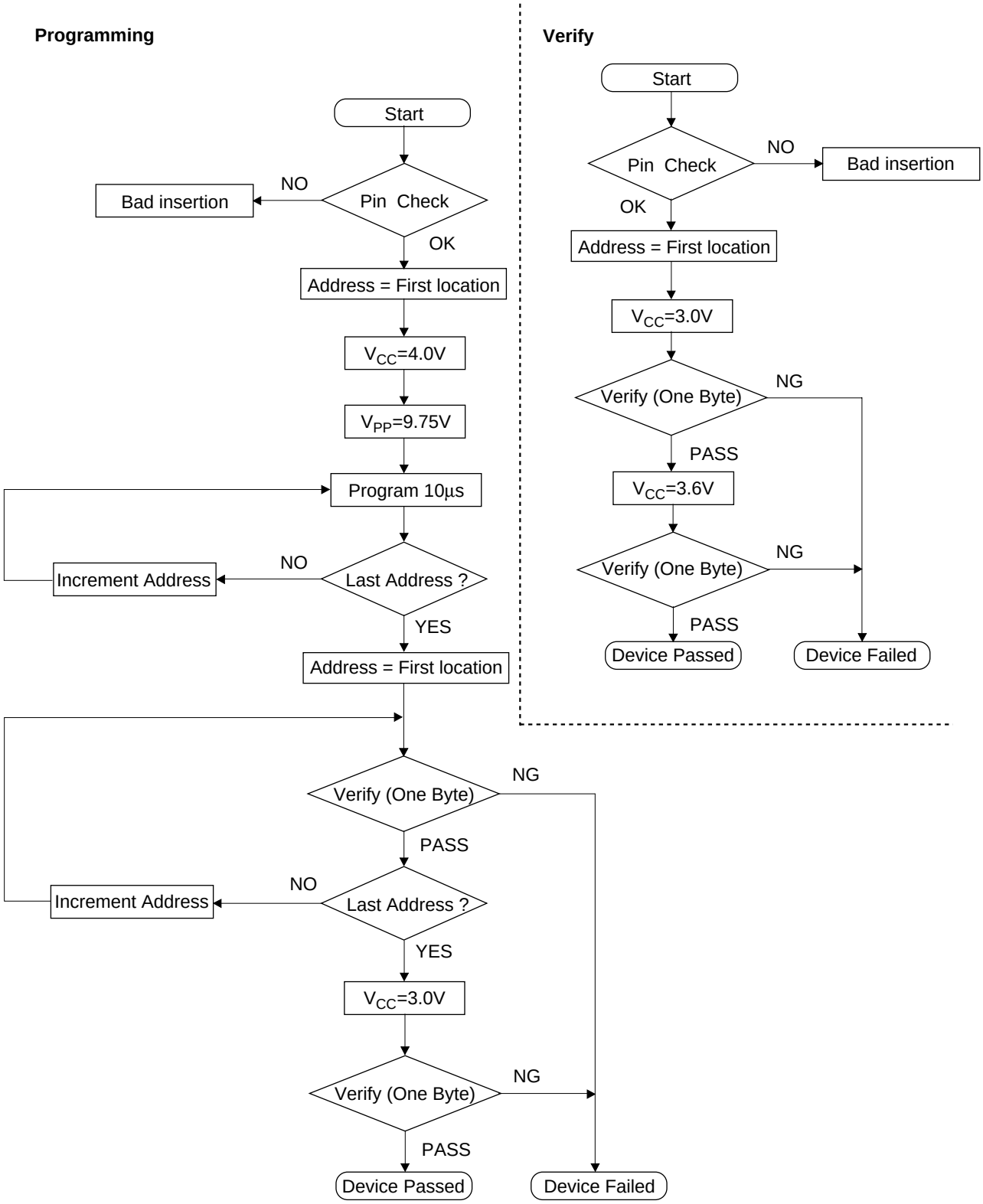
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	DATA
0	1	0	1	0	1	0	1	0	VH*	1	1	0	1	0	1	0	1	0	1	AA
1	0	1	0	1	0	1	0	1	VH*	0	0	1	0	1	0	1	0	1	0	55
Other conditions																				FF

* :VH=8V±0.25V

Consecutive Programming Waveforms



Consecutive Program Verify Waveforms



Programming / Verify Flow Chart