

Description

The μ PD75P56 and μ PD75P66 are 1024 x 8-bit, on-chip, one-time programmable (OTP) ROM versions of the mask ROMs, μ PD7556 and μ PD7566. They have the same functions as, and are pin-compatible with, their mask ROMs. Because of their programming capabilities, the μ PD75P56/P66 are suitable for evaluation and small lot production for system development. Their unique features will be described in this data sheet. For information about the base part μ PD7556/66, please refer to its data sheet.

Features

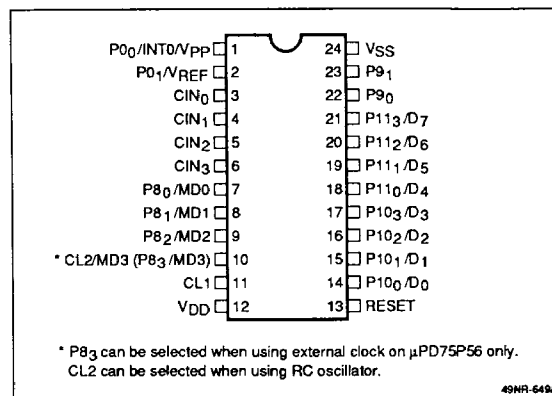
- 45 instructions (subset of μ PD7500 set B)
- Instruction cycle:
 - External clock (μ PD75P56): 2.86 μ s/700 kHz, 5 V
 - RC oscillator (μ PD75P56): 4 μ s/500 kHz, 5 V
 - Ceramic resonator (μ PD75P66): 2.86 μ s/700 kHz, 5 V
- Program memory (ROM) of 1024 x 8 bits
- Data memory (RAM) of 64 x 4 bits
- 8-bit timer/event counter
- 4-channel comparator
- I/O lines: 20- μ PD75P56; 19- μ PD75P66
- One-time programmable
 - No mask option available
- Data memory retention at low supply voltage
- Standby (STOP/HALT) functions
- CMOS technology
- Low-power consumption
- Single power supply
 - 4.5 to 6.0 V, normal operation

Ordering Information

Part Number	Package Type
μ PD75P56CS-001	24-pin plastic shrink DIP (OTP)
μ PD75P56CS-012	
μ PD75P66CS-001	
μ PD75P56G-511	24-pin plastic SOP (OTP)
μ PD75P56G-512	
μ PD75P66G-511	

Pin Configuration

24-Pin Plastic Shrink DIP or SOP (OTP)



Pin Identification

Symbol	Function
P0 ₀ /INT0/V _{PP}	2-bit input port 0/testable input pin/ programming voltage supply pin for program memory write/verify
V _{REF}	Comparator reference voltage input pin
CIN ₀ CIN ₁ CIN ₂ CIN ₃	4-channel comparator inputs
P8 ₀ -P8 ₂ /MD0-MD2 CL2/MD3 (P8 ₃ /MD3)	4-bit output port 8/OTP operation mode/ connection for RC oscillator or ceramic resonator (No P8 ₃ on μPD75P66) (Note 1)
CL1	Connection for ceramic resonator or RC oscillator
V _{DD}	Power supply. 4.5 to 6.0 V (normal); 6.0 V (OTP)
RESET	Reset input pin
P10 ₁ -P10 ₃ / D ₀ -D ₃	4-bit I/O port 10/D ₀ -D ₃ during programming write/verify
P11 ₀ -P11 ₃ / D ₄ -D ₇	4-bit I/O port 11/ D ₄ -D ₇ during programming write/verify
P9 ₀ -P9 ₁	2-bit output port 9
V _{SS}	Ground

Notes:

(1) MD0-MD3 are used as mode selection pins during programming.

PIN FUNCTIONS
P0₀/INT0/V_{PP}, V_{REF}
**(Port 0/Count clock input/Programming/
Comparator reference voltage input)**

Two-bit input port 0/count clock input/programming/comparator reference voltage input. INT0 is an edge-sensitive testable input pin that detects a signal at the rising edge. V_{PP} is the programming supply pin for programming memory write/verify. V_{REF} is the comparator reference voltage input pin. If P0₀/INT0/V_{REF} is unused; connect it to ground. The port is in the input state at reset.

CIN₀-CIN₃ (Comparator inputs)

Four-channel comparator inputs. Analog voltage input is compared with the reference voltage (V_{REF}). The comparison requires up to three machine cycles. To obtain the comparison result after changing the voltage applied to the V_{REF} pin by port output (OPL), and connecting the A/D converter via the resistor ladder, execute the input instruction (IP1 or IPL, L = 1) after waiting three machine cycles following the execution of OPL.

P8₀-P8₂/MD0-MD2, P₈/MD3 or CL2/MD3
(Port 8/Clock input 2/Mode selection for OTP)

Four-bit output port 8. This port can sink 15 mA and interface 12 V. P8₃ is a output port on the μPD75P56. On the μPD75P56, CL2 is one of the pins to which a resistor for RC oscillation is connected. On the μPD75P66 CL2 is one of the pins to which a ceramic resonator is connected. If any of P8₀-P8₂ pins are unused, leave them open. The port is in the high impedance state at reset. MD0-MD3 are used for OTP program memory write and read mode selection. There is no P8₃ on μPD75P66.

CL1 (Clock input 1)

On the μPD75P56, CL1 is one of the two pins to which a resistor for RC oscillation is connected. On the μPD75P66, CL1 is one of the two pins to which a ceramic resonator is connected.

V_{DD} (Power supply)

Positive power supply. 4.5 to 6.0 V for normal operation. 6.0 V for program memory write/verify.

RESET (Reset)

System reset input pin (active high). This pin is not internally connected to a pull-down resistor.

P10₀-P10₃/D₀-D₃ (Port 10/Data I/O)

Four-bit I/O port. This port can sink 10 mA and interface 12 V. If any of these pins are unused, connect them to ground or V_{DD} in the input state, or leave open in the output state. The port is in the high impedance or high-level output state at reset. D₀-D₃ are four-bit I/O pins for program memory write/verify.

P11₀-P11₃/D₄-D₇ (Port 11/Data I/O)

Four-bit I/O port. This port can sink 10 mA and interface 12 V. If any of these pins are unused, connect them to ground or V_{DD} in the input state, or leave open in the output state. The port is in the high impedance or high-level output state at reset. D₄-D₇ are four-bit I/O pins for program memory write/verify.

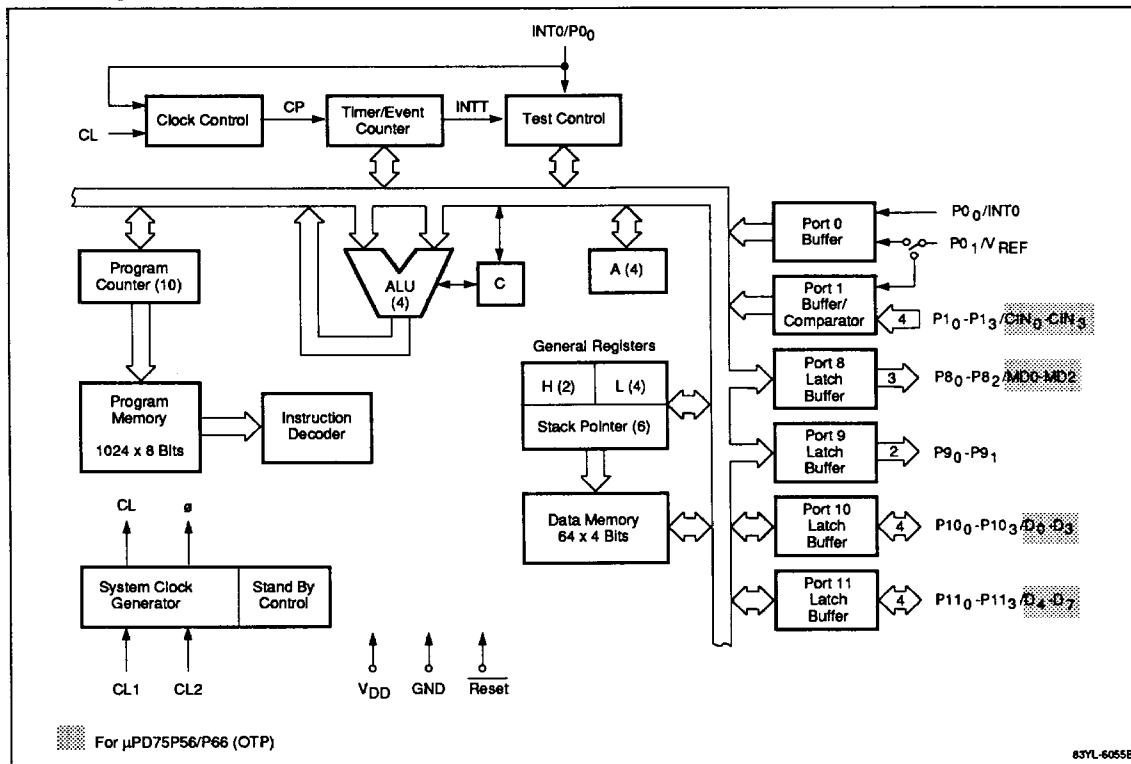
P9₀-P9₁ (Port 9)

Two-bit output port. This port sinks 15 mA and can interface to 12 V. If either of these pins is unused, leave it open. The port is in the high impedance state at reset.

V_{SS} (Ground)

Ground.

Block Diagram

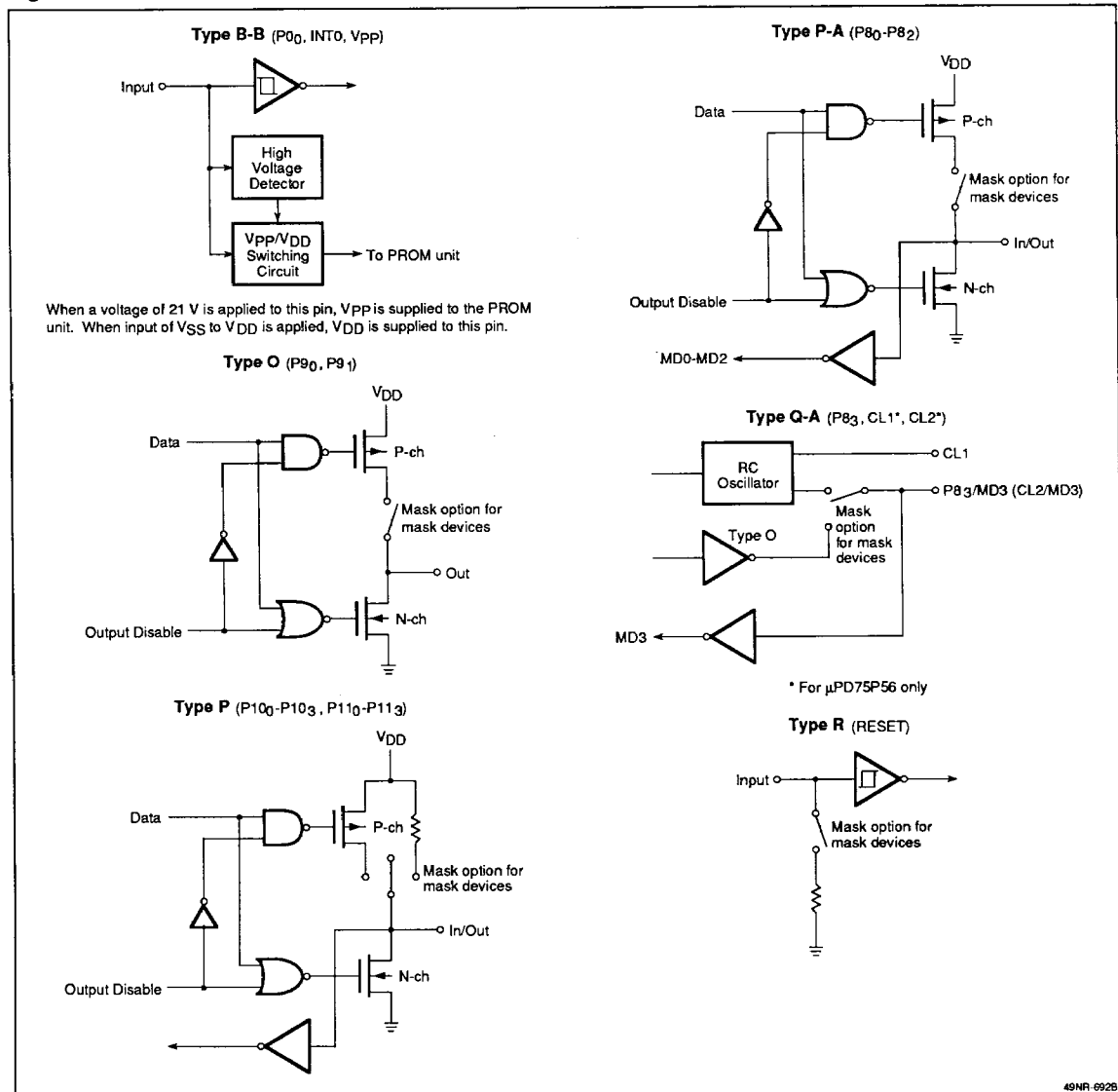


FUNCTIONAL DESCRIPTION

I/O Ports

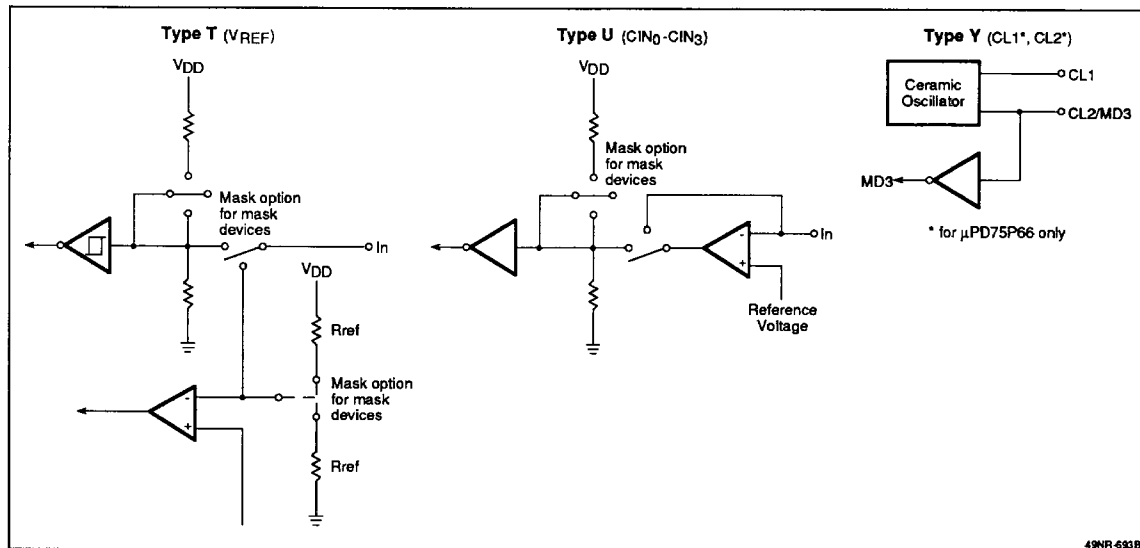
Figure 1 shows the internal circuits at the I/O ports.

Figure 1. Interface at I/O Ports



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Figure 1. Interface at I/O Ports (cont)



μPD75P56/P66 and μPD7556/66 Comparisons

Table 1 compares the features of OTP μPD75P56/P66 and their mask ROMs, μPD7556/66.

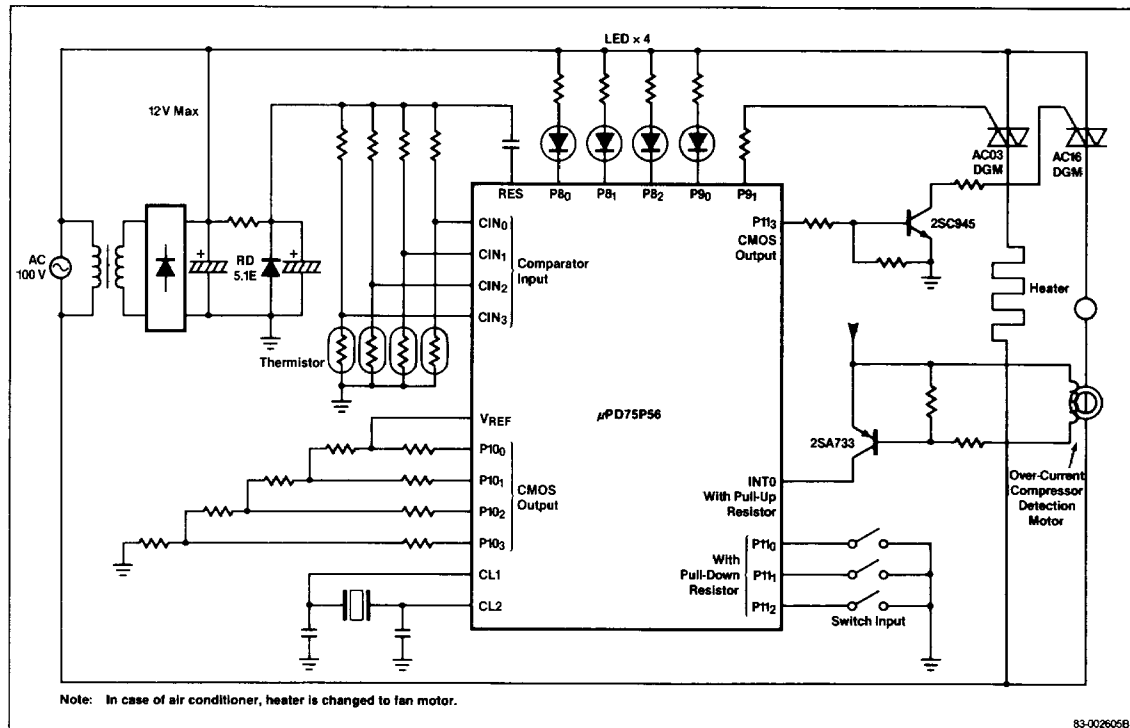
Table 1. Product Comparisons, μPD75P56/P66 and μPD7556/66

Item		μPD75P56 (OTP)	μPD75P66 (OTP)	μPD7556	μPD7566
Instruction cycle/system clock (5 V)	RC	4 μs/500 kHz		4 μs/500 kHz	
	External	2.86 μs/700 kHz		2.86 μs/700 kHz	
	Ceramic		2.86 μs/700 kHz		2.86 μs/700 kHz
Instruction set		45 (set B)	45 (set B)	45 (set B)	45 (set B)
ROM		1024 x 8	1024 x 8	1024 x 8	1024 x 8
RAM		64 x 4	64 x 4	64 x 4	64 x 4
I/O port total		20 (max)	19	20 (max)	19
Port 0		P0 ₀ -P0 ₁	P0 ₀ -P0 ₁	P0 ₀ -P0 ₁	P0 ₀ -P0 ₁
Port 1		CIN ₀ -CIN ₃	CIN ₀ -CIN ₃	P1 ₀ -P1 ₃	P1 ₁ -P1 ₃
Port 8		P8 ₀ -P8 ₂ /MD0-MD2 P8 ₃ /MD3	P8 ₀ -P8 ₂ /MD0-MD2 CL2/MD3	P8 ₀ -P8 ₂ P8 ₃ /CL2	P8 ₀ -P8 ₂ P8 ₂ /CL2
Port 9		P9 ₀ -P9 ₁	P9 ₀ -P9 ₁	P9 ₀ -P9 ₁	P9 ₀ -P9 ₁
Port 10		P10 ₀ -P10 ₃ /D ₀ -D ₃	P10 ₀ -P10 ₃ /D ₀ -D ₃	P10 ₀ -P10 ₃	P10 ₀ -P10 ₃
Port 11		P11 ₀ -P11 ₃ /D ₄ -D ₇	P11 ₀ -P11 ₃ /D ₄ -D ₇	P11 ₀ -P11 ₃	P11 ₀ -P11 ₃
Timer/Event counter		8-bit	8-bit	8-bit	8-bit
Output and I/O pins		No on-chip resistor	No on-chip resistor	Mask options available	Mask options available
RESET		No pull-down resistor	No pull-down resistor	Mask options available	Mask options available
Comparator		4-channel	4-channel	4-channel	4-channel
Process		CMOS	CMOS	CMOS	CMOS
Package		24-pin plastic SOP (OTP)	20-pin plastic SOP (OTP)	24-pin plastic SOP	24-pin plastic SOP
		24-pin shrink DIP (OTP)	20-pin shrink DIP (OTP)	24-pin shrink DIP	24-pin shrink DIP

μPD75P56 Application

Figure 2 gives an application example of a refrigerator or air conditioner circuitry.

Figure 2 Refrigerator or Air Conditioner Circuitry



OTP PROM (Program Memory Write and Verify)

The μPD75P56/P66 is a one-time programmable (OTP) PROM version of the μPD7556/66. The OTP is programmed by the pins and their functions listed in table 2. During OTP programming, addresses are updated by inputting clocks, instead of addresses, from the CL1 pin.

Table 2. OTP Access

Pin	Function
V _{PP}	OTP programming voltage pin (normally V _{DD})
CL1	Address update clock input during programming
MD0-MD3	Mode selection during OTP programming
D ₀ -D ₇	8-bit data I/O pins during OTP programming
V _{DD}	Supply voltage pin: 4.5 to 6.0 V during normal operation; 6 V during OTP programming

Notes:

The μPD75P56/P66 has no erasure window. The program memory data cannot be erased with ultraviolet light.

OTP Operation Mode

The μPD75P56/P66 operates in the program memory write/verify mode when +6 V is applied to V_{DD} and +21 V to V_{PP}. Mode pins MD0-MD3 select the operation modes shown in table 3.

Table 3. OTP Operation Mode Selection (Note 1)

V_{PP} = +21 V; V_{DD} = +6 V

MD0	MD1	MD2	MD3	Operating Mode
H	L	H	L	Program memory address clear (Note 2)
L	H	H	H	Program memory write (Note 3)
L	L	H	H	Program memory verify (Note 4)
H	X	H	H	Program inhibit (Note 5)

Notes:

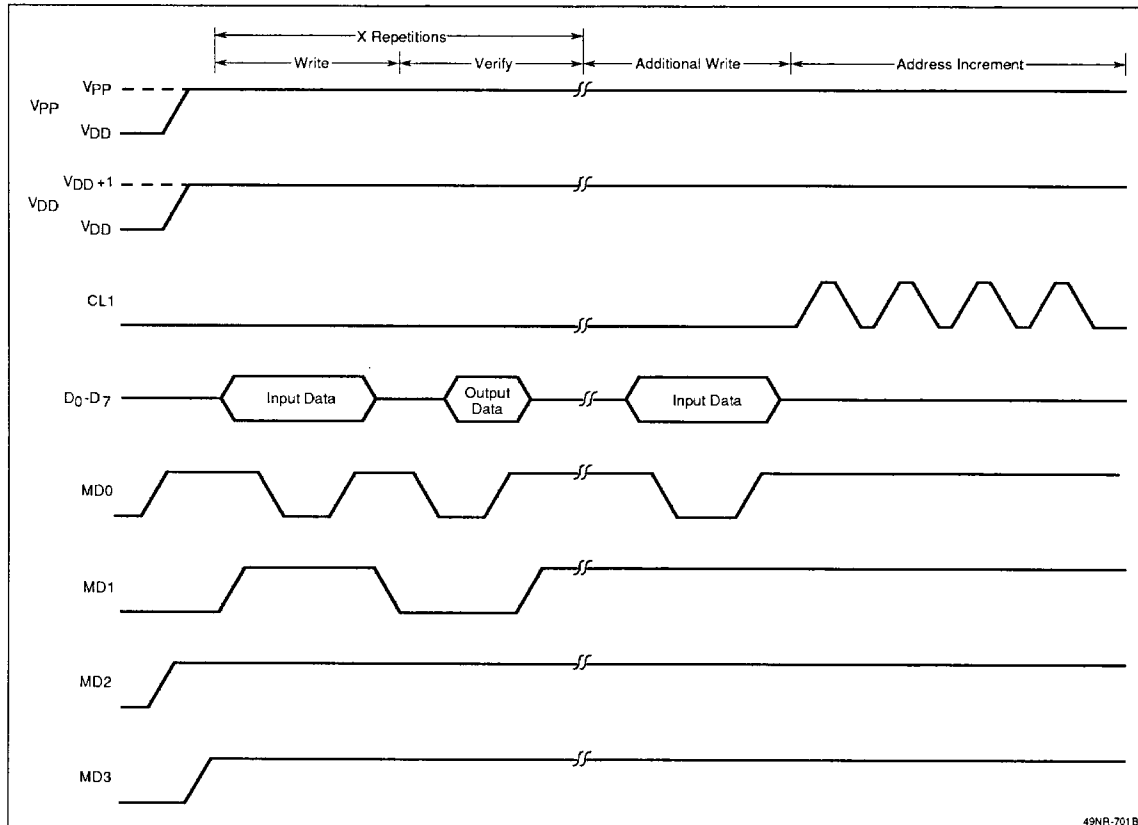
- (1) X = L or H.
- (2) While HLHL is applied, the program counter is cleared.
- (3) While LHHH is applied, data applied to D₀-D₇ is written to the OTP.
- (4) While LLHH is applied, the OTP contents at the address which the program counter indicates output to D₀-D₇.
- (5) While HXHH is applied, the OTP is nonaccessible, and D₀-D₇ are set to high impedance.

Program Memory Write Procedure. The program memory write procedure follows (Data can be written at high speeds.):

- (1) Connect unused pins to V_{SS} through a pull-down resistor. RESET is pulled up to V_{DD} through a resistor. Set CL1 low.
- (2) Supply 5 V to V_{DD} and V_{PP}.
- (3) Select the program memory address clear mode (HLHL).
- (4) Change the voltage on V_{DD} to 6 V, and on V_{PP} to 21 V.
- (5) Select the program inhibit mode (HXHH).
- (6) Write data in the 1 ms write mode (LHHH).
- (7) Select the program inhibit mode (HXHH).
- (8) Select the verify mode (LLHH). After data is written, proceed to step 9; if data is not written, repeat steps 6-8.
- (9) Perform one additional write.
- (10) Select the program inhibit mode (HXHH).
- (11) Increment the program memory address by one, by inputting four pulses to CL1.
- (12) Repeat steps 6-11 until the end address occurs.
- (13) Select the program memory address clear mode (HLHL).
- (14) Change the voltage on V_{DD} and V_{PP} to 5 V.
- (15) Turn off power.

The timing for steps 2-11 is shown in figure 3.

Figure 3. Timing Diagram for OTP Program Memory Write



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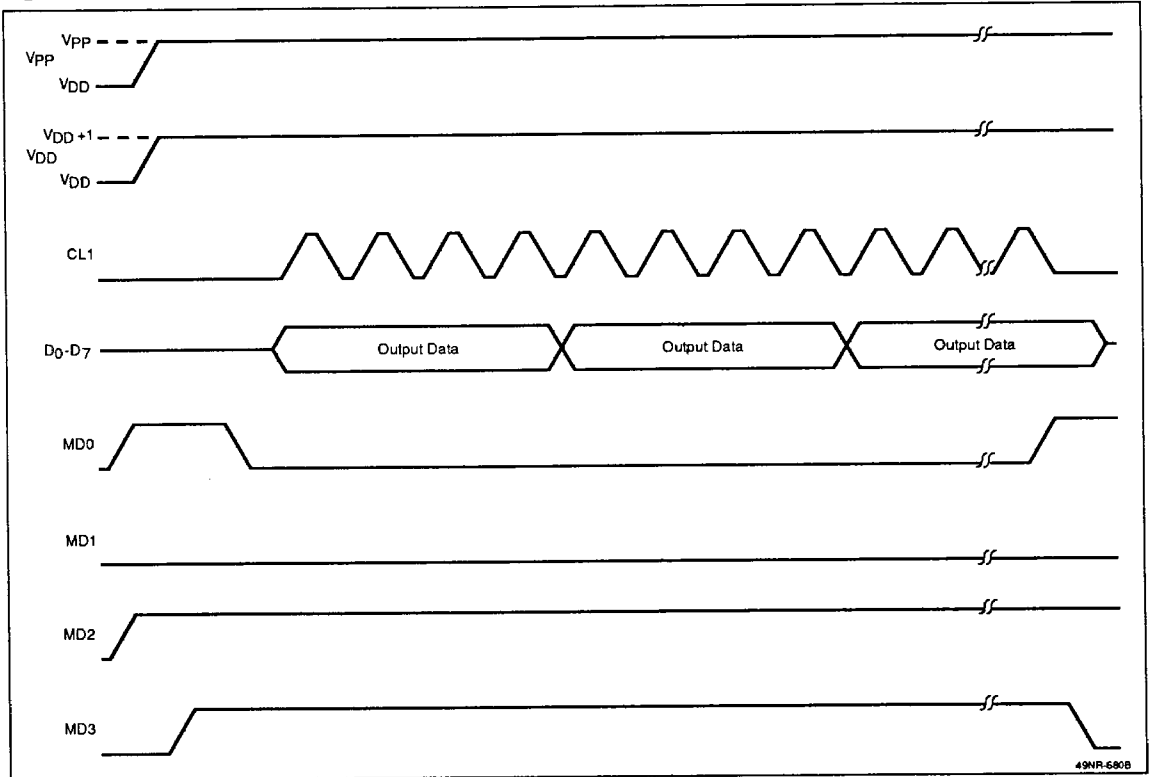
Program Memory Read Procedure. The program memory read procedure follows:

- (1) Connect unused pins to V_{SS} through a pull-down resistor. RESET is pulled up to V_{DD} through a resistor. Set CL1 low.
- (2) Supply 5 V to V_{DD} and V_{PP} .
- (3) Select the program memory address clear mode (HLHL).
- (4) Change the voltage on V_{DD} to 6 V, and on V_{PP} to 21 V.
- (5) Select the program inhibit mode (HXHH).

- (6) Select the verify mode (LLHH). Data is read from 000H. Each time four clock pulses are input to the X1 pin, data from one address is output.
- (7) Pulse input to the CL1. Program memory address is updated at the rising edge of the third pulse. Address after updated one (+1) is updated every four pulses. Repeat update to last address.
- (8) Select the program memory address clear mode (HLHL).
- (9) Change the voltage on V_{DD} and V_{PP} to 5 V.
- (10) Turn off power.

The timing for steps 2-9 is shown in figure 4.

Figure 4. Timing Diagram for Program Memory Read



ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

$T_A = 25^\circ\text{C}$

Operating temperature, T_{OPT}	-10 to +70°C
Storage temperature, T_{STG}	-65 to +150°C
Power supply voltage, V_{DD}	-0.3 to +7.0 V
Input voltage, V_{I}	
Except ports 10, 11	-0.3 to $V_{\text{DD}} + 0.3$ V
Ports 10, 11 (Note 1)	-0.3 to $V_{\text{DD}} + 0.3$ V
(Note 2)	-0.3 to +13 V
Output voltage, V_{O}	
Except ports 10, 11	-0.3 to $V_{\text{DD}} + 0.3$ V
Ports 10, 11 (Note 1)	-0.3 to $V_{\text{DD}} + 0.3$ V
(Note 2)	-0.3 to +13 V
Output current, high I_{OH}	
One port	-5 mA
All output ports, total	-15 mA
Output current, low I_{OL}	
Ports 8, 9	30 mA
Other ports	15 mA
All ports, total	100 mA
Power dissipation, P_{D} ($T_A = +70^\circ\text{C}$)	
Shrink DIP	480 mW
SOP	250 mW

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.

Notes:

- (1) CMOS I/O or N-channel open drain + internal pull-up resistor.
- (2) N-channel open drain I/O.

Capacitance

$T_A = 25^\circ\text{C}$, $V_{\text{DD}} = V_{\text{SS}} = 0$ V; $f = 1$ MHz

Unmeasured pins returned to V_{SS}

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Input capacitance	C_{I}			50	pF	P0 ₀ -P0 ₁ ; P1 ₀ -P1 ₃
				15		CIN ₀ -CIN ₃
Output capacitance	C_{O}			35	pF	Ports 8, 9
I/O capacitance	$C_{\text{I/O}}$			35	pF	Ports 10, 11

DC Characteristics, Normal Operation; $V_{DD} = 4.5$ to 6.0 V; $V_{SS} = 0$ V

$T_A = -10$ to $+70^\circ\text{C}$

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Input high voltage except CL1	V_{IH1}	$0.7 V_{DD}$		V_{DD}	V	
Input high voltage CL1	V_{IH2}	$V_{DD} - 0.5$		V_{DD}	V	
Input high voltage ports 10, 11 (Note 1)	V_{IH3}	$0.7 V_{DD}$		12	V	
Input low- and high-level voltage RESET	V_{IHDR}	$0.9 V_{DDDR}$		$V_{DDDR} + 0.2$	V	Data retention mode
Input low voltage except CL1	V_{IL1}	0		$0.3 V_{DD}$	V	
Input low voltage CL1	V_{IL2}	0		0.5	V	
Input leakage current except CL1	I_{L1}	-3		3	μA	$0\text{ V} < V_I < V_{DD}$
Input leakage current CL1	I_{L2}	-10		10	μA	$0\text{ V} < V_I < V_{DD}$
Input leakage current ports 10, 11 (Note 1)	I_{L3}			10	μA	$V_I = 12\text{ V}$
Output voltage high P0 ₁ , P0 ₂ , ports 8-11	V_{OH}	$V_{DD} - 2.0$			V	$I_{OH} = -1\text{ mA}$
Output voltage low ports 10, 11	V_{OL}			0.4	V	$I_{OL} = 1.6\text{ mA}$
				2.0	V	$I_{OL} = 10\text{ mA}$
Output voltage low ports 8, 9	V_{OL}			2.0	V	$I_{OL} = 15\text{ mA}$
Output leakage current	I_{LO1}	-3		3	μA	$0\text{ V} \leq V_O < V_{DD}$
Output leakage current, port 8-11 (Note 1)	I_{LO2}			10	μA	$V_O = 12\text{ V}$
Supply voltage, data retention mode	V_{DDDR}	2.0		6.0	V	
Supply current, normal operation	I_{DD1}		400	1400	μA	μPD75P56: $V_{DD} = 5\text{ V} \pm 10\%$; $R = 56\Omega \pm 2\%$
			700	2300	μA	μPD75P66: $V_{DD} = 5\text{ V} \pm 10\%$; $f_{CC} = 700\text{ kHz}$
Supply current, HALT mode	I_{DD2}		120	400	μA	μPD75P56: $V_{DD} = 5\text{ V} \pm 0.5\text{ V}$; $R = 56\Omega \pm 2\%$
			450	1500	μA	μPD75P66: $V_{DD} = 5\text{ V} \pm 10\%$; $f_{CC} = 700\text{ kHz}$
Supply current, STOP mode	I_{DD3}		0.1	10	μA	$V_{DD} = 5\text{ V} \pm 10\%$
			0.1	10	μA	$V_{DD} = 5\text{ V} \pm 10\%$
Supply current, data retention mode	I_{DDDR}		0.1	5	μA	$V_{DDDR} = 2.0\text{ V}$

Notes:

(1) N-channel, open-drain I/O ports.

DC Characteristics, Programming mode; $V_{DD} = 6.0 \text{ V} \pm 0.25 \text{ V}$; $V_{PP} = 21 \pm 0.5 \text{ V}$; $V_{SS} = 0 \text{ V}$

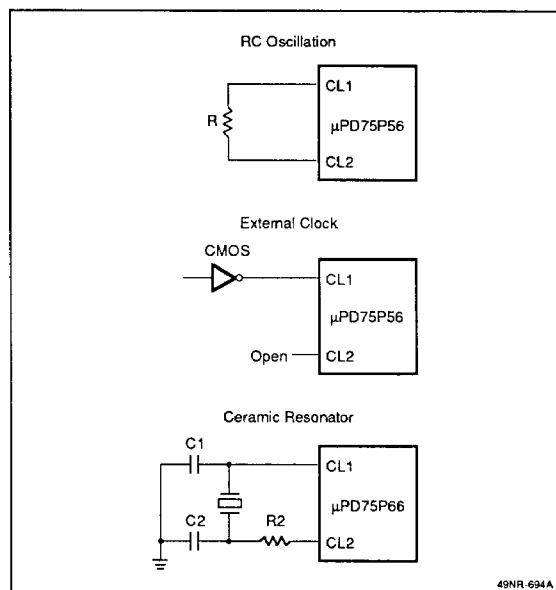
$T_A = 25^\circ\text{C}$; (Notes 1 and 2)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Input high voltage except CL1	V_{IH1}	$0.7 V_{DD}$		V_{DD}	V	
Input high voltage CL1	V_{IH2}	$V_{DD} - 0.5$		V_{DD}	V	
Input low voltage except CL1	V_{IL1}	0		$0.3 V_{DD}$	V	
Input low voltage CL1	V_{IL2}	0		0.5	V	
Input leakage current	I_{LI}			10	μA	$V_{IN} = V_{IL} \text{ or } V_{IH}$
Output voltage high	V_{OH}	$V_{DD} - 2.0$			V	$I_{OH} = -1 \text{ mA}$
Output voltage low	V_{OL}			0.4	V	$I_{OL} = 1.6 \text{ mA}$
V_{DD} supply current	I_{DD}			30	mA	
V_{PP} power current	I_{PP}			30	mA	$MD0 = V_{IL}, MD1 = V_{IH}$

Notes:

- (1) V_{PP} , including an overshoot, should not exceed +22 V.
- (2) Apply V_{DD} before V_{PP} , and cut off after V_{PP} .

Figure 5. Recommended Circuits



μ PD75P56/P66

Comparator

$T_A = -10$ to $+70^\circ\text{C}$; $V_{DD} = 4.5$ to 6.0 V , $V_{SS} = 0\text{ V}$

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Input voltage range	V_{CIN}/V_{REF}	0		V_{DD}	V	
Response time	T_{COMP}	2		4	MC(Note 1)	
Input voltage resolution	ΔV_{CIN}		10	50	mV	
Input leakage current	I_{CIN}/I_{REF}	-3		3	μA	
V_{REF} bias resistance	R_{REF}		100		k Ω	
Comparator circuit current (Note 2)	I_{DDCMP}		50		μA	$f_{CC} = 500\text{ kHz}$

Notes:

- (1) Machine cycle.
- (2) Excluding current through bias resistor.

AC Characteristics, Normal Operation; $V_{DD} = 4.5$ to 6.0 V ; $V_{SS} = 0\text{ V}$

$T_A = -10$ to $+70^\circ\text{C}$

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
System clock oscillation frequency CL1, CL2	f_{CC}	400	500	600	kHz	μ PD75P56: $R = 56\text{ k}\Omega \pm 2\%$
		290		710	kHz	μ PD75P66: ceramic resonator
System clock input frequency, CL1	f_C	10		710	kHz	μ PD75P56: 50% duty
Oscillation stabilization time	t_{OS}	20			ms	OS stabilization after minimum of operating voltage reached. (Note 1)
System clock rise time, CL1	t_{CR}			0.2	μs	
System clock fall time, CL1	t_{CF}			0.2	μs	
System clock pulse width, CL1	t_{CH}	0.7		50	μs	
System clock pulse width, CL1	t_{CL}	0.7		50	μs	
Event input frequency (P_{O0})	f_{P0}	0		710	kHz	50% duty
P_{O0} rise time	t_{POR}			0.2	μs	
P_{O0} fall time	t_{POF}			0.2	μs	
P_{O0} pulse width, high	t_{POH}	0.7			μs	
P_{O0} pulse width, low	t_{POL}	0.7			μs	
INT0 high time	t_{OH}	10			μs	
INT0 low time	t_{OL}	10			μs	
RESET high time	t_{RSH}	10			μs	
RESET low time	t_{RSL}	10			μs	
RESET setup time	t_{SRS}	0			μs	
RESET hold time	t_{HRS}	0			μs	

Notes:

- (1) Hold the RESET signal at a high level until oscillation becomes stable.

AC Characteristics, Programming Mode; $V_{DD} = 6.0 \pm 0.25$ V; $V_{PP} = 21 \pm 0.5$ V, $V_{SS} = 0$ V

$T_A = 25^\circ\text{C}$

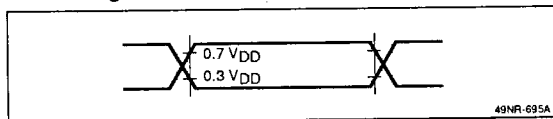
Parameter	Symbol	Note 1	Min	Typ	Max	Unit	Conditions
Address setup time for MD0 ↓ (Note 2)	t_{AS}	t_{AS}	2			μs	
MD1 setup time for MD0 ↓	t_{MIS}	t_{OES}	2			μs	
Data setup for MD0 ↓	t_{DS}	t_{DS}	2			μs	
Address hold time for MD0 ↑ (Note 2)	t_{AH}	t_{AH}	2			μs	
Data hold time for MD0↑	t_{DH}	t_{DH}	2			μs	
MD0 ↑ to data output float delay time	t_{DF}	t_{DF}	0		200	ns	
V_{PP} setup time for MD3 ↑	t_{VPS}	t_{VPS}	2			μs	
V_{DD} setup time for MD3 ↑	t_{VDS}	t_{VCS}	2			μs	
Initial program pulse width	t_{PW}	t_{PW}	0.95	1.0	1.05	ms	
Additional program pulse width	t_{OPW}	t_{OPW}	0.95		21.0	ms	
MD0 setup time for MD1 ↑	t_{MOS}	t_{CES}	2			μs	
MD0 ↓ to data output delay time	t_{DV}	t_{DV}			1 (Note 3)	μs	MD0 = MD1 = V_{IL}
MD1 hold time for MD0 ↑	t_{M1H}	t_{OEH}	2			μs	$t_{M1H} + t_{MIR} \geq 50$ μs
MD1 recovery time for MD0 ↓	t_{M1R}	t_{OR}	2			μs	
Program counter reset time	t_{PCR}		10			μs	
CL1 input low- and high-level widths	t_{XH}, t_{XL}		0.7			μs	
CL1 input frequency	f_X				710	kHz	
Initial mode set time	t_i		2			μs	
MD3 setup time for MD1 ↑	t_{M3S}		2			μs	
MD3 hold time for MD1 ↓	t_{M3H}		2			μs	
MD3 setup time for MD0 ↓	t_{M3SR}		2			μs	During program memory read
Address to data output delay time (Note 2)	t_{DAD}	t_{ACC}	2			μs	
Address to data output hold time (Note 2)	t_{HAD}	t_{OH}	0		300	ns	
MD3 hold time for MD0 ↑	t_{M3HR}		2			μs	
MD3 ↓ to data output float delay time	t_{DFR}		2			μs	

Notes:

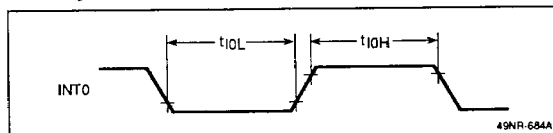
- (1) Symbol of the corresponding μPD27C256.
- (2) "1" is added to the internal address signal at the rising edge of the third CL1 input. The signal is not input to the pin.
- (3) During CMOS output.

Timing Waveforms

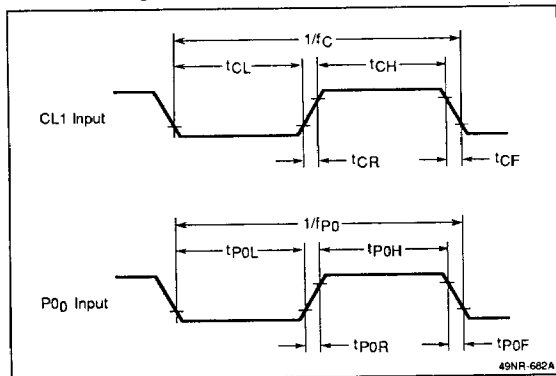
AC Timing Measurement Points



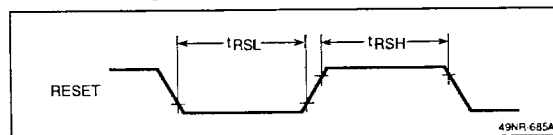
Test Input Timing



Clock Timing

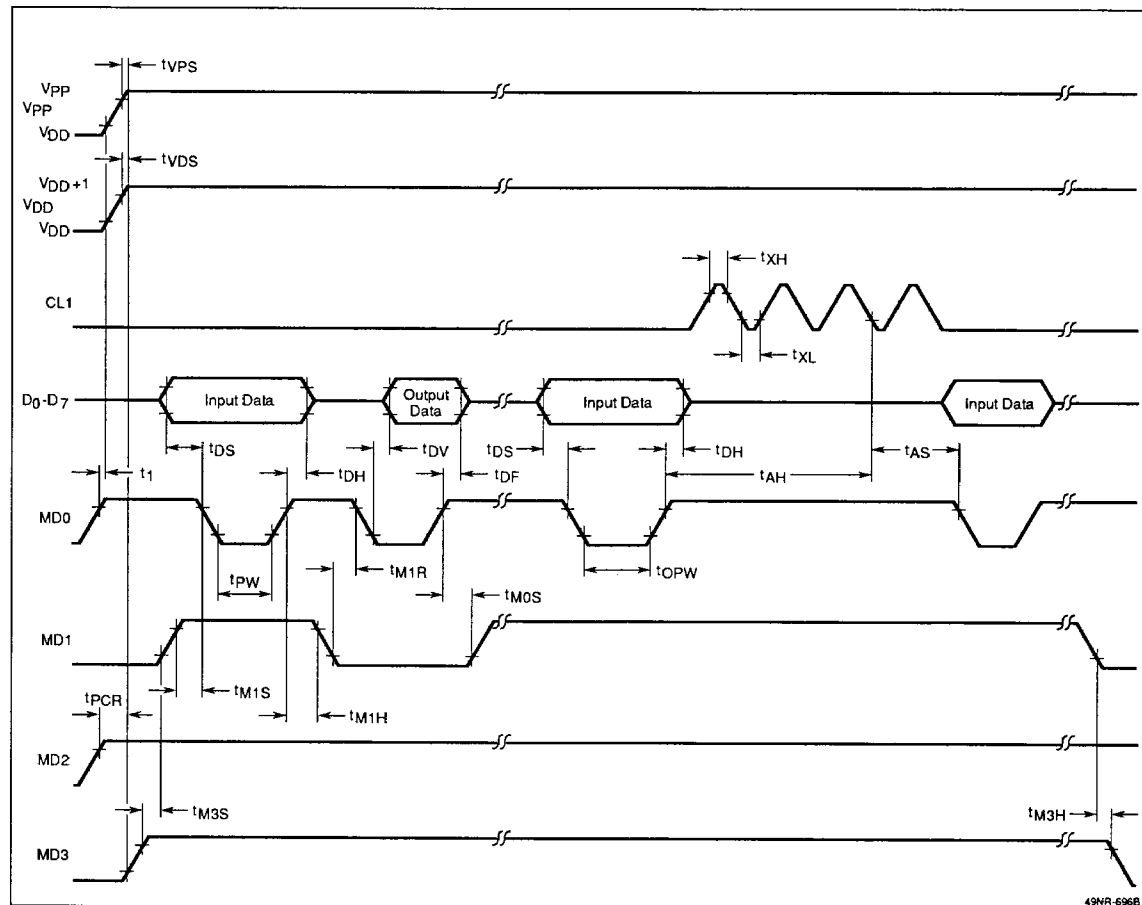


RESET Timing



Timing Waveforms (cont)

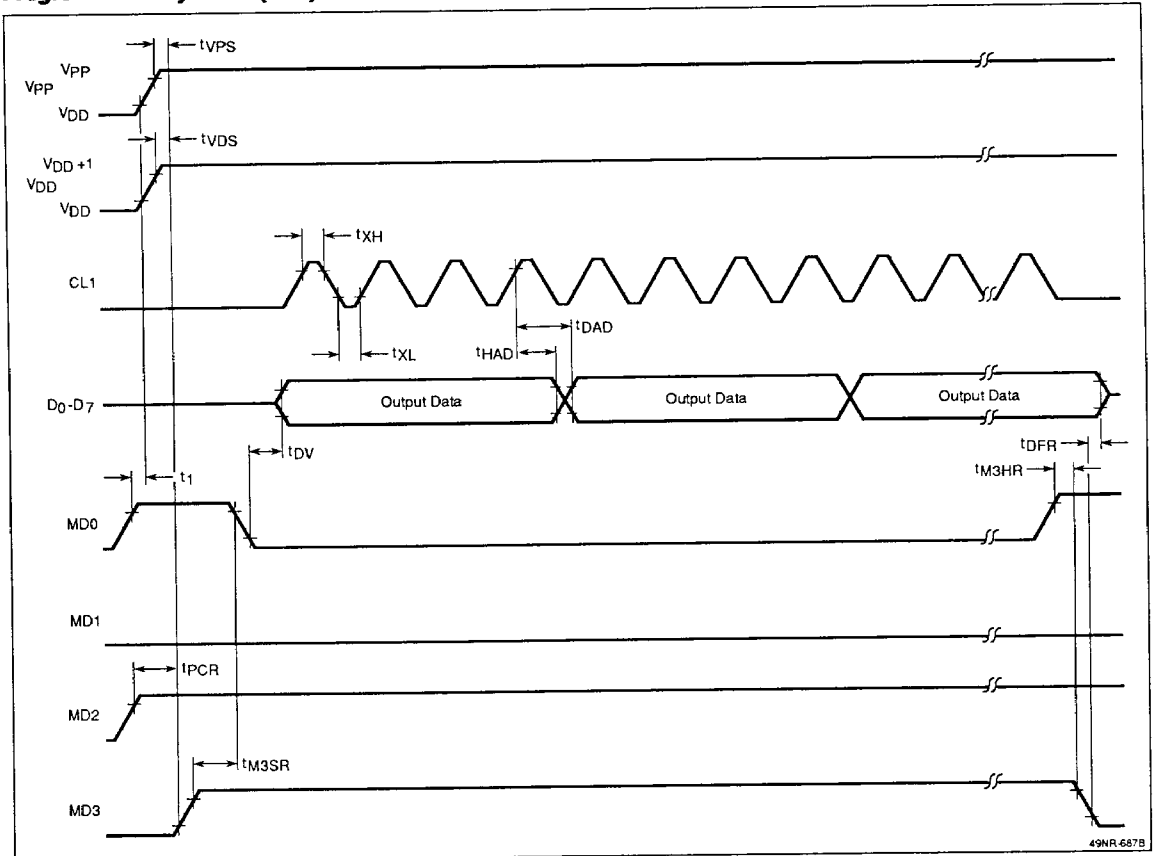
Program Memory Write (OTP)



3

Timing Waveforms (cont)

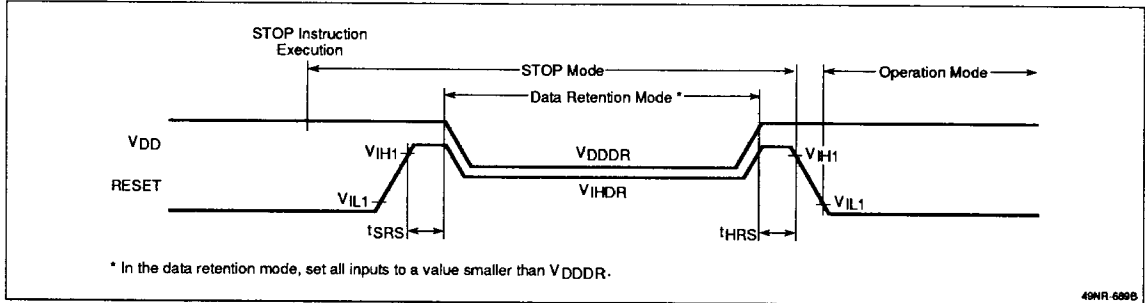
Program Memory Read (OTP)



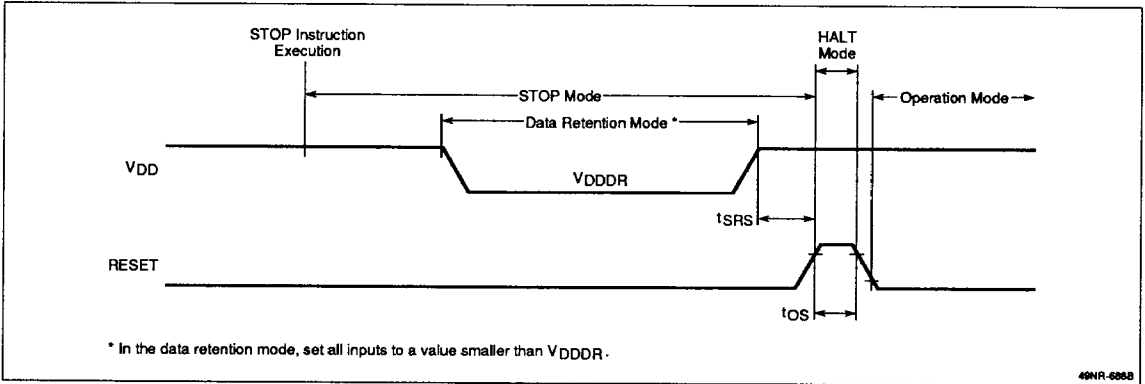
49NR 667B

Timing Waveforms (cont)

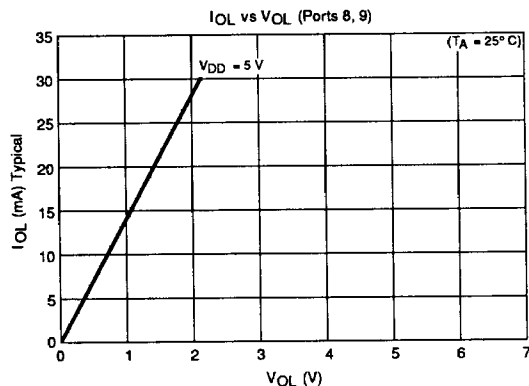
Data Retention Timing μPD75P56



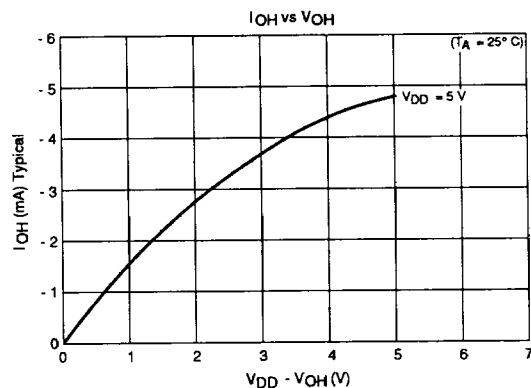
Data Retention Timing μPD75P66



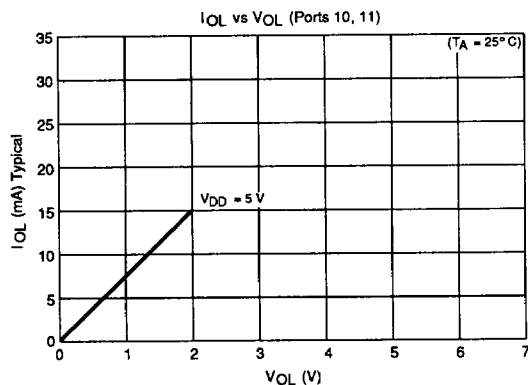
Operating Characteristics



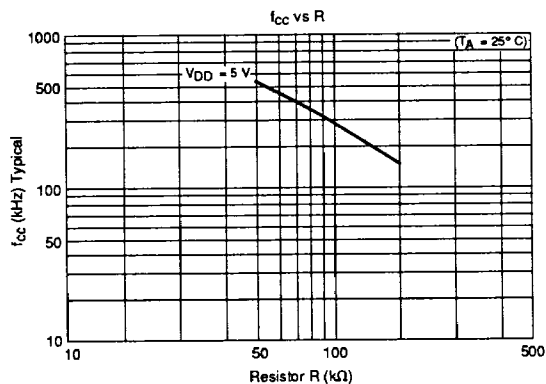
* The absolute maximum rating is 30 mA per pin.



* The absolute maximum rating is -5 mA per pin.



* The absolute maximum rating is 15 mA per pin.



* This curve shows a device characteristic example and does not guarantee the ratings.

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