

SPM27C256H_{20/25}

CMOS 256K-BIT UV EPROM

- Access Time 200ns/250ns
- 32,768 Words × 8 Bits
- Low Supply Current

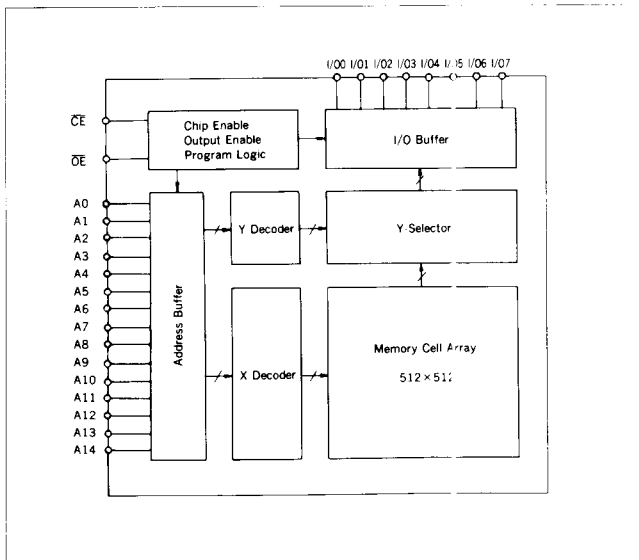
DESCRIPTION

The CMOS EPROM SPM27C256H_{20/25} is a 32,768 words × 8 bits erasable and electrically programmable ROM. The peripheral CMOS circuit realizes High-speed and Low supply current. The SPM27C256H_{20/25} is packaged in a 28-pin CERDIP with a transparent lid. The transparent lid allows the memory content to be erased with ultraviolet light, whereby a new pattern can then be written into the device.

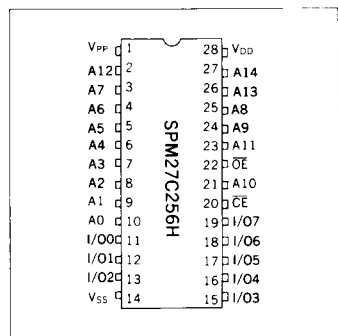
FEATURES

- Fast access time SPM27C256H₂₀ 200ns (Max)
SPM27C256H₂₅ 250ns (Max)
- Low supply current Standby : 1 μ A (Typ)
Operation : 8mA/MHz (Max)
- Simple programming Program voltage : 12.5V
- Completely static No clock required
- Single power supply 5V \pm 5%
- TTL compatible inputs and outputs
- 3-state output with wired-OR capability
- Package 28-pin CERDIP with transparent lid

BLOCK DIAGRAM



PIN CONFIGURATION



PIN DESCRIPTION

A0 to A14	Address Input
CE	Chip Enable
OE	Output Enable
I/O0 to I/O7	Data I/O
Vpp	Power Supply for Program
VDD	Power Supply (5V)
Vss	Power Supply (0V)

■ ABSOLUTE MAXIMUM RATINGS

(V_{SS} = 0V)

Parameter	Symbol	Ratings	Unit
Supply voltage *1	V _{DD}	-0.6 to 7.0	V
Supply voltage for programming *1	V _{PP}	-0.6 to 14	V
Input voltage *1	V _I	-1.0*2 to 7	V
Output voltage *1	V _O	-1.0*2 to 7	V
Operating temperature	T _{opr}	0 to 70	°C
Storage temperature	T _{stg}	-65 to 125	°C
Temperature under bias	T _{bias}	-10 to 80	°C

*1 With respect to V_{SS}. *2 Pulse width : 50ns, DC : V_{IL} (Min) = -0.6V

■ ELECTRICAL CHARACTERISTICS

Read Mode

● DC Electrical Characteristics

(V_{DD} = 5V ± 5%, V_{SS} = 0V, T_a = 0 to 70°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High level input voltage	V _{IH}		2.2	—	V _{DD} + 1.0	V
Low level input voltage	V _{IL}		-1.0*1	—	0.8	V
Input leakage current	I _{LI}	V _I = 5.25V	-2.0	—	2.0	μA
Standby supply current	I _{DD5}	$\overline{CE} = V_{IH}$	—	—	1	mA
	I _{DD51}	$\overline{CE} = V_{DD} \pm 0.3V$	—	1	20	μA
Operating supply current	I _{DD01}	$\overline{CE} = V_{IL}, I_O = 0mA$	—	—	30	mA
	I _{DD02}	f = 5MHz, I _O = 0mA	—	—	30	
	I _{DD03}	f = 1MHz, I _O = 0mA	—	—	8	
Programming supply current	I _{PP1}	V _{PP} = 5.5V	—	1	20	μA
Output leakage current	I _{LO}	V _O = 5.25V/0.4V	-2.0	—	2.0	μA
High level output voltage	V _{OH1}	I _{OH} = -400μA	2.4	—	—	V
	V _{OH2}	I _{OH} = -100μA	V _{DD} - 0.7	—	—	V
Low level output voltage	V _{OL}	I _{OL} = 2.1mA	—	—	0.45	V

*1 Pulse width : 50ns, DC : V_{IL} (Min) = -0.3V

● Terminal Capacitance *2

(f = 1.0MHz, T_a = 25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C _I	V _I = 0V	—	4	6	pF
Output capacitance	C _O	V _O = 0V	—	8	12	pF

*2 This parameter is sampled and not 100% tested.

● AC Electrical Characteristics

(V_{DD} = 5V ± 5%, V_{SS} = 0V, V_{PP} = V_{DD}, T_a = 0 to 70°C)

Parameter	Symbol	Conditions	SPM27C256H ₂₀		SPM27C256H ₂₅		Unit
			Min	Max	Min	Max	
Address access time	t _{ACC}	$\overline{CE} = \overline{OE} = V_{IL}$	—	200	—	250	ns
Chip enable access time	t _{ACE}	$\overline{OE} = V_{IL}$	—	200	—	250	ns
Output enable access time	t _{OE}	$\overline{CE} = V_{IL}$	10	70	10	100	ns
Output floating	t _{DF}	$\overline{CE} = V_{IL}$	0	50	0	60	ns
Output hold time	t _{OH}	$\overline{CE} = \overline{OE} = V_{IL}$	0	—	0	—	ns

*3 Input pulse level : 0.45V to 2.4V, Input rise and fall times ≤ 20ns, Output load : 1TTL + 100pF, Reference level for measuring timing : 0.8V and 2.0V

High Performance Programming Mode

DC Electrical Characteristics

($V_{DD} = 6 \pm 0.25V$, $V_{SS} = 0V$, $V_{PP} = 12.5 \pm 0.3V$, $T_a = 25 \pm 5^\circ C$)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High level input voltage	V_{IH}		2.2	—	V_{DD}	V
Low level input voltage	V_{IL}		-0.1	—	0.8	V
Input leakage current	I_{LI}	$V_I = 6.25V/0.45V$	-2.0	—	2.0	μA
Operating supply current	I_{DD02}		—	—	30	mA
Programming supply current	I_{PP2}	$\overline{CE} = V_{IL}$	—	—	40	mA
High level output voltage	V_{OH}	$I_{OH} = -400\mu A$	2.4	—	—	V
Low level output voltage	V_{OL}	$I_{OL} = 2.1mA$	—	—	0.45	V

AC Electrical Characteristics

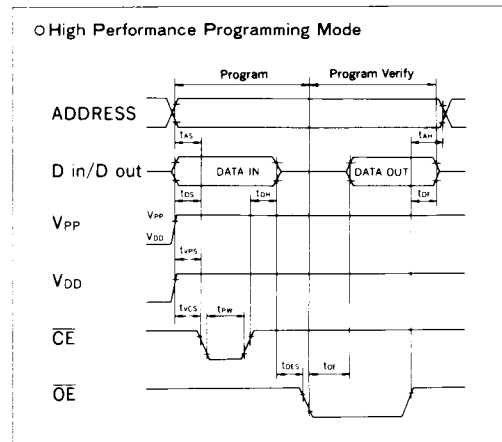
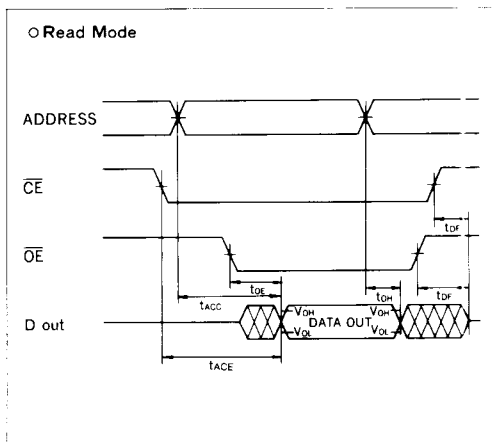
($V_{DD} = 6 \pm 0.25V$, $V_{SS} = 0V$, $V_{PP} = 12.5 \pm 0.3V$, $T_a = 25 \pm 5^\circ C$)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Address setup time	t_{AS}	Input pulse level : 0.45V to 2.4V	2	—	—	μS
Chip enable setup time	t_{CES}		2	—	—	μS
Output enable setup time	t_{OES}		2	—	—	μS
Data setup time	t_{DS}		2	—	—	μS
Address hold time	t_{AH}	Input rise and fall times : $\leq 20ns$	0	—	—	μS
Data hold time	t_{DH}		2	—	—	μS
Output floating*4	t_{DF}	Reference level for measuring timing : 0.8V and 2V	—	—	130	ns
Output enable access time	t_{OE}		0	—	150	ns
V_{PP} setup time	t_{VPS}		2	—	—	μS
V_{DD} setup time	t_{VCS}		2	—	—	μS
Programming pulse width	t_{PW}		0.95	1.0	1.05	ms
\overline{CE} overprogram pulse width*5	t_{OPW}		2.85	—	78.75	ms

*4 t_{DF} defines the time at which the output achieves the open circuit condition and data is no longer driven.

*5 t_{OPW} is defined as mentioned in flow chart.

Timing Chart



FUNCTIONS

Truth Table

Mode	Pin name	Address input A0 to A14	Data I/O I/O0 to I/O7	\overline{CE}	\overline{OE}	V_{DD}	V_{PP}
Read		Stable	Output data	L	L	V_{DD}	V_{DD}
Output disable		Stable	Hi-Z	L	H	V_{DD}	V_{DD}
Standby		X	Hi-Z	H	X	V_{DD}	V_{DD}
High performance program		Stable	Input data	L	H	V_{DD}	V_{PP}
Program verify		Stable	Output data	H	L	V_{DD}	V_{PP}
Optional verify		Stable	Output data	L	L	V_{DD}	V_{PP}
Program inhibit		X	Hi-Z	H	H	V_{DD}	V_{PP}

X: "H" or "L"

Read

Data is able to be read by setting addresses during holding $\overline{CE} = "L"$ and $\overline{OE} = "L"$

Output Disable

Data I/O terminals are Hi-Z when $\overline{OE} = "H"$

Standby

When \overline{CE} is "H" the SPM27C256H_{20/25} is in the standby mode. Then, Data I/O terminals are Hi-z, and all of address inputs are prohibited.

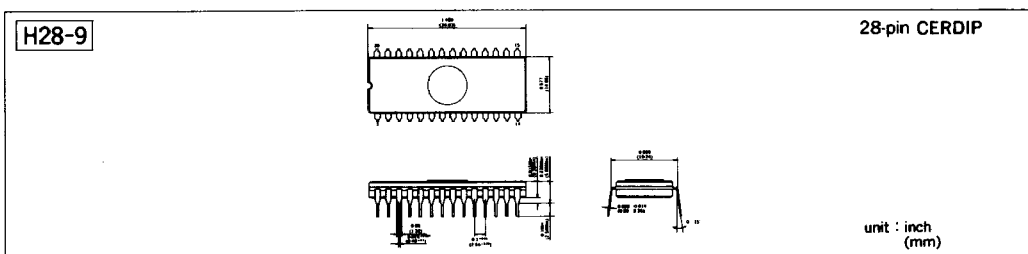
High Performance Programming

This device can be applied the High Performance Programming algorithm shown in following flowchart. This algorithm allows to obtain faster programming time without any voltage stress to the device nor deterioration in reliability of programmed data.

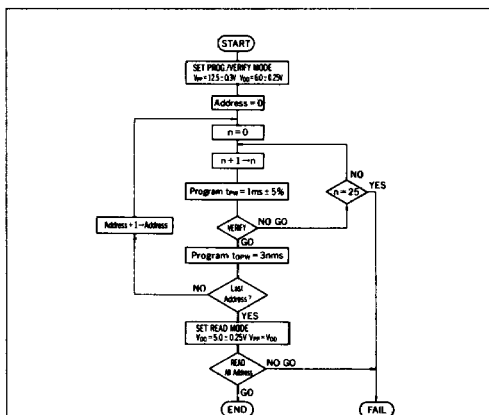
Erase

Erase of SPM27C256H_{20/25} is performed by exposure to ultraviolet light of 2737 Å and all the output data are changed to "1" after this erasure procedure. The minimum integrated dose (i.e. UV intensity x exposure time) for erasure is 15W. sec/cm²

PACKAGE DIMENSIONS



High Performance Program



High Performance Programming Flowchart

- *1 V_{DD} must be applied before V_{PP} and removed after V_{PP} .
- *2 V_{PP} must not exceed 13V including overshoot.
- *3 An influence may be had upon device reliability if the device is installed or removed while $V_{pp} = 12.5V$.
- *4 Do not alter V_{PP} either V_L to 12.5V or 12.5V to V_L when $\overline{CE} = Low$.