

M5M27C256AP,FP,VP,RV-12,-15

262144-BIT(32768-WORD BY 8-BIT)
CMOS ONE TIME PROGRAMMABLE ROM

DESCRIPTION

The Mitsubishi M5M27C256AP,FP,VP,RV are high-speed 262144-bit one time programmable read only memories. They are suitable for microprocessor programming applications where rapid turnaround is required. The M5M27C256AP,FP,VP,RV are fabricated by N-channel double polysilicon gate and CMOS technology for peripheral circuits, and are available in 28-pin plastic packages.

FEATURES

- 32768 Word × 8 bit organization
- Package
 - DIP M5M27C256AP
 - SOP M5M27C256AFP
 - TSOP M5M27C256AVP
 - TSOP (Reverse) M5M27C256ARV
- Access time
 - M5M27C256A-12 120ns (max.)
 - M5M27C256A-15 150ns (max.)
- Programming voltage : 12.5V
- Two line control \overline{OE} , \overline{CE}
- Lower power current (I_{cc}) : Active 30mA (max.)
Stand-by 1mA (max.)
- Single 5V power supply (read operation)
- 3-State output buffer
- Input and output TTL-compatible in read and program mode
- Standard 28-pin DIP
- Fast programming algorithm

APPLICATION

microcomputer systems and peripheral equipment

FUNCTION

Read

Set the \overline{CE} and \overline{OE} terminal to read mode (low level). Low level input to \overline{CE} and \overline{OE} and address signals to the address inputs ($A_0 \sim A_{14}$) mark the data contents of the designated address location available at the data input/output ($D_0 \sim D_7$). When the \overline{CE} or \overline{OE} signal is high, data input/output are in a floating state.

When the \overline{CE} signal is high, the device is the stand by mode or power-down mode.

Programming

(Fast programming algorithm)

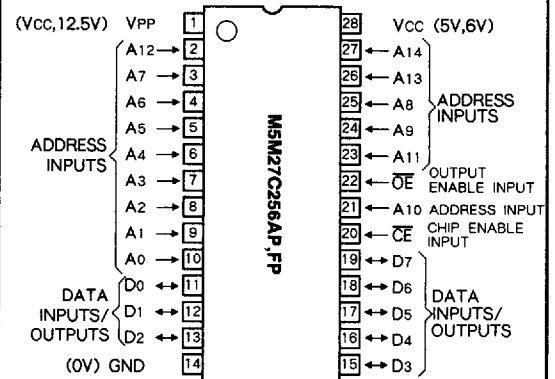
First set $V_{cc} = 6V$, $V_{pp} = 12.5V$ and then set an address to first address to be programmed. After applying 1ms program pulse (\overline{CE}) to the address, verified correctly, apply one more 1ms program pulse. The programmer continues 1ms pulse-then-verify routines until the device verify correctly or twenty five of these pulse-then-verify routines have been completed.

The programmer also address in register X. And then applied a program pulse 3 times of register X value long as an over program pulse. When the programming procedure above is finished, step to the next address and repeat this procedure till last address to be programmed.

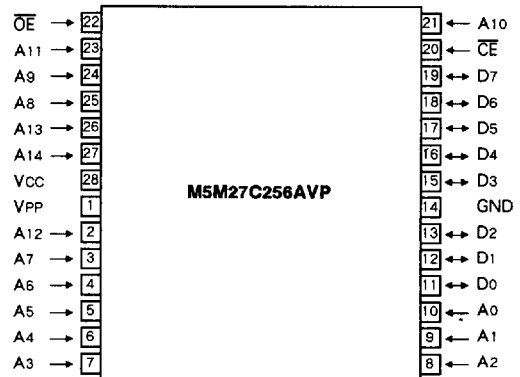
Erase

The M5M27C256AP,FP,VP,RV cannot be erased, because it is packaged in plastic without transparent lid.

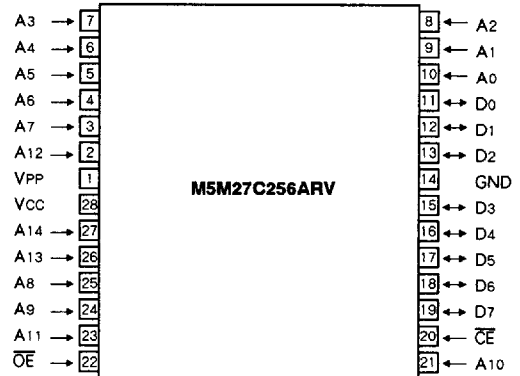
PIN CONFIGURATION (TOP VIEW)



Outline 28P4 (DIP : P)
28P2W-C (SOP : FP)



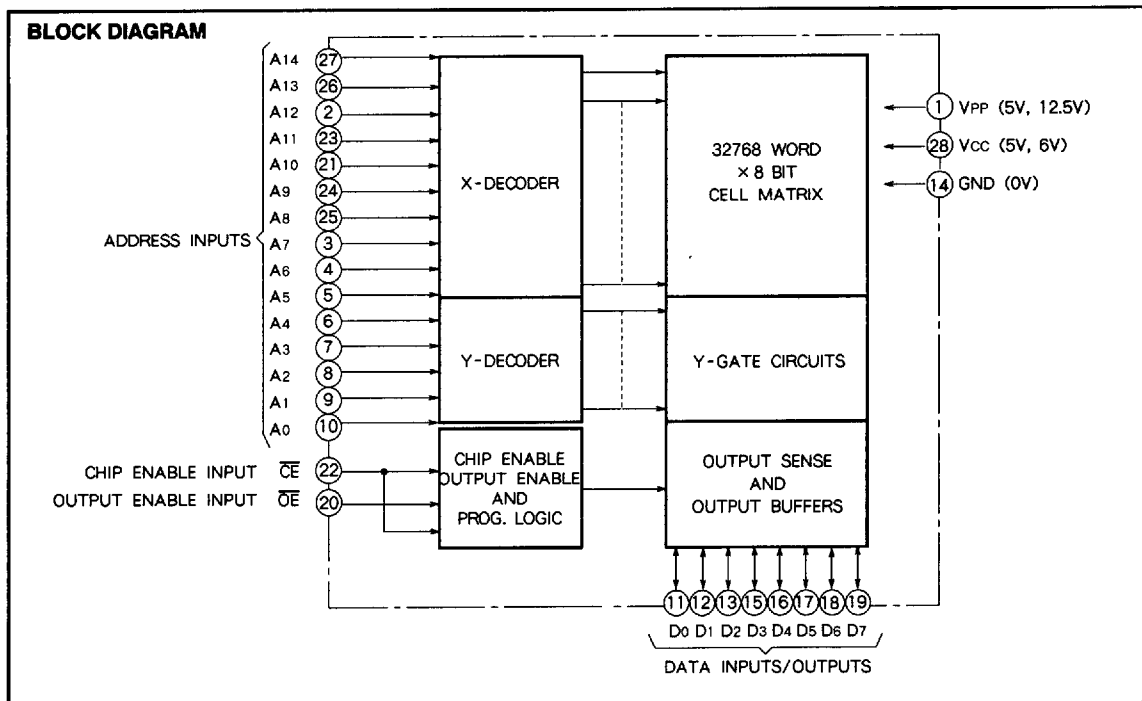
Outline 28P2C-A (TSOP : VP)



Outline 28P2C-B (TSOP : RV : Reverse)

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MODE SELECTION

Mode	Pins	\overline{CE}	\overline{OE}	V _{PP}	V _{CC}	Data I/O
Read *		V _{IL}	V _{IL}	5V	5V	Data out
Output disable		V _{IL}	V _{IH}	5V	5V	Floating
Stand-by (power-down)		V _{IH}	X *	5V	5V	Floating
Program		V _{IL}	V _{IH}	12.5V	6V	Data in
Program-verify		V _{IH}	V _{IL}	12.5V	6V	Data out
Program inhibit		V _{IH}	V _{IH}	12.5V	6V	Floating

* : X can be either V_{IL} or V_{IH}.

ABSOLUTE MAXIMUM RATING (Note 1)

Symbol	Parameter	Conditions	Ratings	Unit
V _{I1}	All input or output voltage	With respect to GND	-0.6~7	V
V _{I2}	V _{PP} supply voltage		-0.6~14.0	V
V _{I3}	A ₉ input voltage		-0.6~13.5	V
V	Output voltage		-0.6~7	V
T _{opr}	Operating temperature		-10~80	°C
T _{stg}	Storage temperature	-65~150	°C	

Note 1 : Stresses above listed may cause permanent damage to device. This is a stress rating only and functional operation of the device at these or at any conditions above those indicate in the operational sections of specification is not implied. Exsolute maximum rating conditions for extended periods affects device reliability.

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READ OPERATION

DC ELECTRICAL CHARACTERISTIC (Ta = 0~70°C, Vcc = 5V ± 10%, Vpp = Vcc, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
ILI	Input leakage current	VIN = 0~VCC			10	μA
ILO	Output leakage current	VOUT = 0~VCC			10	μA
ISB1	Vcc current stand-by	CE = VIH			1	mA
ISB2		CE = VCC		1	100	μA
Icc1	Vcc current active	CE = OE = VIL, DC, IOU = 0mA			30	mA
Icc2		CE = VIL, f = 8.3MHz, IOU = 0mA			30	mA
VIL	Input low voltage		-0.1		0.8	V
VIH	Input high voltage		2.0		Vcc+1	V
VOL	Output low voltage	IO = 2.1mA			0.45	V
VOH	Output high voltage	IO = -400 μA	2.4			V

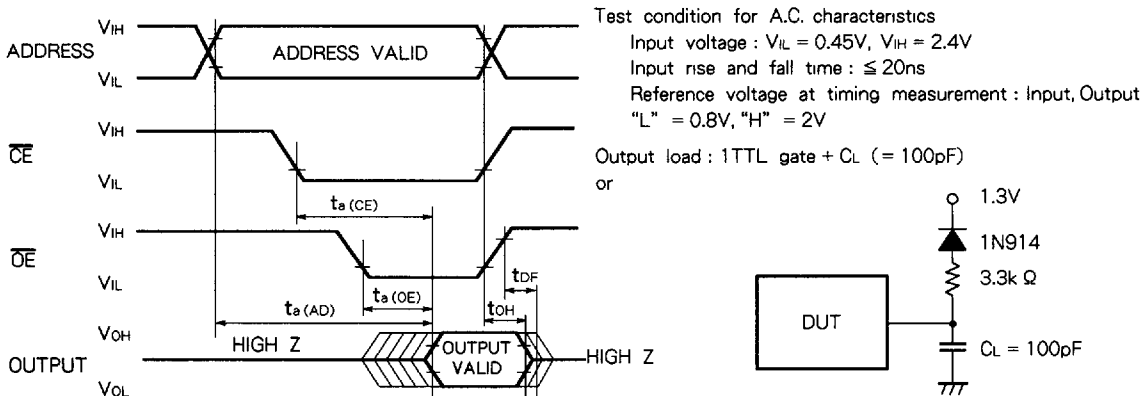
Note 2: Typical values are at Ta = 25°C and nominal voltages.

AC ELECTRICAL CHARACTERISTIC (Ta = 0~70°C, Vcc = 5V ± 10%, Vpp = Vcc, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits				Unit
			M5M27C256A-12		M5M27C256A-15		
			Min	Max	Min	Max	
ta(AD)	Address to output delay	CE = OE = VIL		120		150	ns
ta(CE)	CE to output delay	OE = VIL		120		150	ns
ta(OE)	OE to output delay	CE = VIL		60		75	ns
tDF	OE high to output float	CE = VIL		50		60	ns
tOH	Output hold from CE = OE or address		0		0		ns

Note 3: VCC must be applied simultaneously VPP and removed simultaneously VPP.

AC WAVEFORM



CAPACITANCE

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
CIN	Input capacitance	Ta = 25°C, f = 1MHz, Vi = Vo = 0V		4	6	pF
COU	Output capacitance			8	12	pF

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PROGRAM OPERATION

FAST PROGRAMMING ALGORITHM

DC ELECTRICAL CHARACTERISTICS (Ta=25±5°C, Vcc=6V±0.25V, Vpp=12.5V±0.3V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I _{LI}	Input leakage current	V _{IN} = 0~V _{CC}			10	μA
V _{OL}	Output low voltage (verify)	I _{OL} = 2.1mA			0.45	V
V _{OH}	Output high voltage (verify)	I _{OH} = -400 μA	2.4			V
V _{IL}	Input low voltage		-0.1		0.8	V
V _{IH}	Input high voltage		2.0		V _{CC}	V
I _{CC}	V _{CC} supply current				30	mA
I _{PP}	V _{PP} supply current	$\overline{CE} = V_{IL}$			30	mA

AC ELECTRICAL CHARACTERISTICS (Ta=25±5°C, Vcc=6V±0.25V, Vpp=12.5V±0.3V, unless otherwise noted)

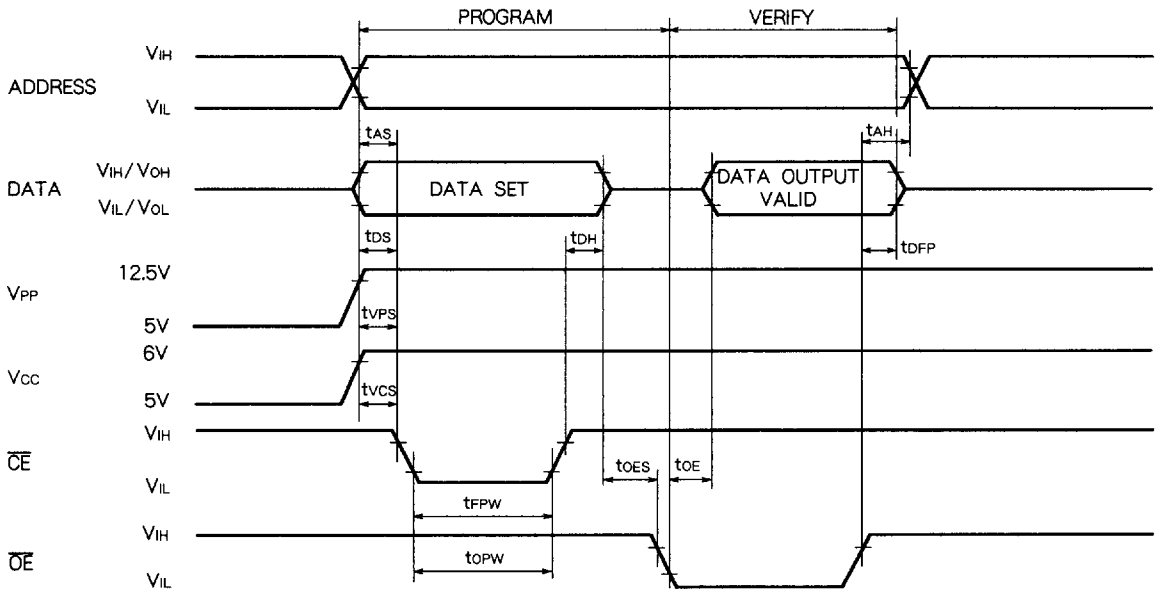
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t _{AS}	Address setup time		2			μs
t _{OES}	\overline{OE} setup time		2			μs
t _{DS}	Data setup time		2			μs
t _{AH}	Address hold time		0			μs
t _{DH}	Data hold time		2			μs
t _{DFP}	\overline{OE} to output float delay		0		130	ns
t _{VCS}	V _{CC} setup time		2			μs
t _{VPS}	V _{PP} setup time		2			μs
t _{FPW}	\overline{CE} initial program pulse width		0.95	1	1.05	ms
t _{OPW}	\overline{CE} over program pulse width		2.85		78.75	ms
t _{OE}	Data valid from \overline{OE}				150	ns

Note 4: V_{CC} must be applied simultaneously V_{PP} and removed simultaneously V_{PP}.

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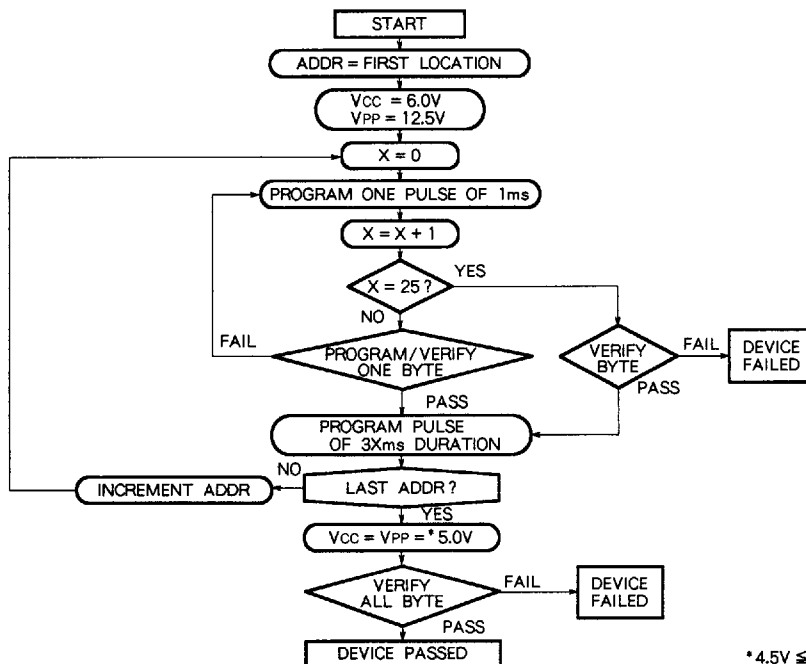
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AC WAVEFORMS



Test condition for A.C. characteristics
 Input voltage : $V_{IL} = 0.45V$, $V_{IH} = 2.4V$
 Input rise and fall times : $\leq 20ns$
 Reference voltage at timing measurement : Input, Output
 "L" = 0.8V, "H" = 2V

FAST PROGRAMMING ALGORITHM FLOW CHART



* $4.5V \leq V_{CC} = V_{PP} \leq 5.5V$

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CMOS ONE TIME PROGRAMMABLE ROM****DEVICE IDENTIFIER MODE**

The Device Identifier Mode allows the reading of a binary code from the OTP ROM that identifies the manufacturer and device type.

The PROM Programmer reads the manufacturer code and the device code and automatically selects the corresponding programming algorithm.

M5M27C256AP,FP,VP,RV DEVICE IDENTIFIER CODE

Code \ Pin	A ₀ (10)	D ₇ (19)	D ₆ (18)	D ₅ (17)	D ₄ (16)	D ₃ (15)	D ₂ (13)	D ₁ (12)	D ₀ (11)	Hex Data
Manufacturer code	V _{IL}	0	0	0	1	1	1	0	0	1C
Device code	V _{IH}	0	0	0	0	1	0	0	0	08

Note 5 : V_{CC} = V_{PP} = 5V ± 10%, A₉ = 12.0 ± 0.5V, A₁~A₈, A₁₀~A₁₄, $\overline{CE}, \overline{OE}$ = V_{IL}

RECOMMENDED SCREENING CONDITION

The following screening test is recommended before using.

