	No. ※ 5091A	LC372200PP, PM-10/LC372200PP, PM-20LV
		2 MEG (262144 words × 8 bits) Mask ROM Internal Clocked Silicon Gate

Preliminary

Overview

The LC372200PP, PM-10 and LC372200PP, PM-20LV are 2097152-bit Mask Programmable Read Only Memories organized as 262144 words by 8 bits.

The LC372200PP, PM-10 has a fast access time of 100 ns (t_{AA}) and 40 ns (t_{OA}) under 5 V supply voltage. So, it is suitable for the fast 5 V operating systems.

The LC372200PP, PM-20LV has an access time of 200 ns (t_{AA}) and 80 ns (t_{OA}) under 3 V supply voltage. So, it is suitable for the low power systems such as battery used ones. Moreover, the LC372200PP, PM-20LV offers a fast access time of 150 ns (t_{AA}) and 60 ns (t_{OA}) under 3.3 V (3.0 to 3.6 V) supply voltage.

Pin configurations are the 1 M MASK ROM type.

Pin 22 and pin31 are mask programmable and it is possible to select either active HIGH or LOW in order to eliminate bus contention in multiple-bus microprocessor systems.

Features

- 262144 words × 8 bits organization
- Power supply

LC372200PP, PM-10:	5.0 V ± 10%
LC372200PP, PM-20LV:	2.7 to 3.6 V
- Fast access time (t_{AA} , t_{CA})

LC372200PP, PM-10:	100 ns (max.)
LC372200PP, PM-20LV:	200 ns (max.)

150 ns
(V_{CC} = 3.0 to 3.6 V)
- Operating current

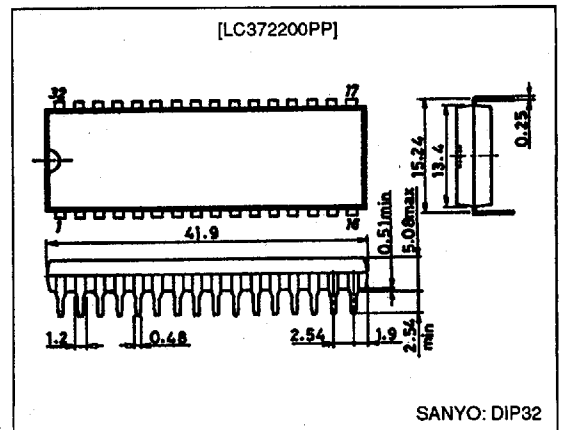
LC372200PP, PM-10:	70 mA (max.)
LC372200PP, PM-20LV:	20 mA (max.)
- Full static operation (internal clocked type)
- Fully TTL compatible (5 V supply)
- 3 state outputs
- 1 M MASK ROM type pin configuration
- Package type

LC372200PP-10/20LV:	DIP32 (600 mil)
LC372200PM-10/20LV:	SOP32 (525 mil)

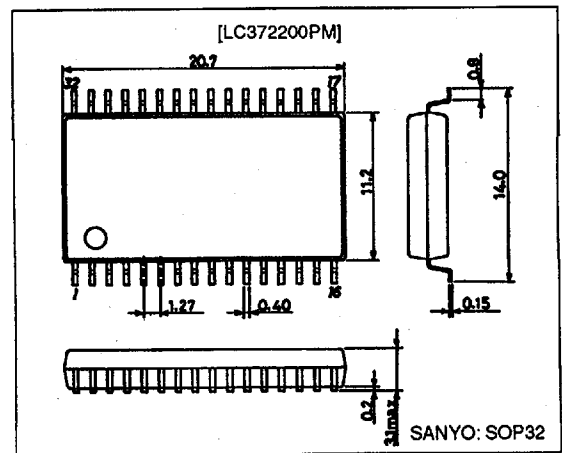
Package Dimensions

unit: mm

3192-DIP32



3205-SOP32

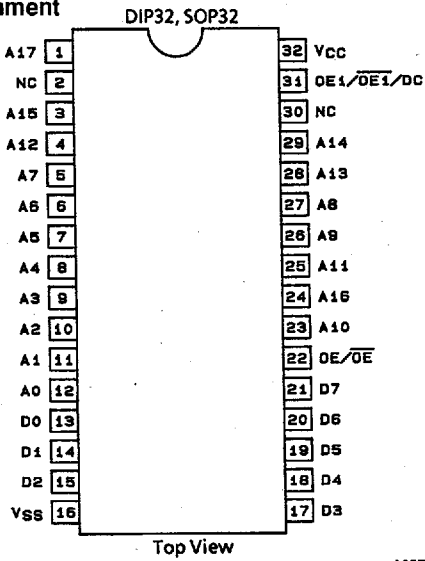


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LC372200PP, PM-10/LC372200PP, PM-20LV

Pin Assignment



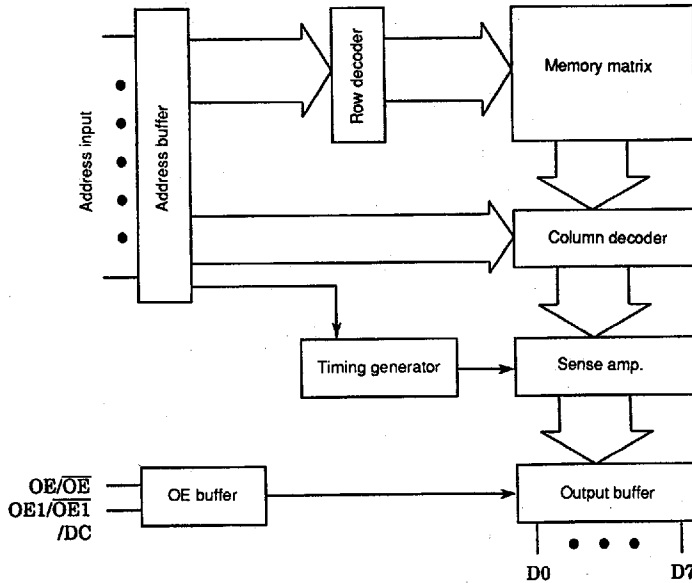
Pin Functions

A0 to A17	Address input
D0 to D7	Data output
OE/OE	Output enable input
OE1/OE1/DC	Output enable input/Don't care
V _{CC}	Power supply
V _{SS}	Ground

Top View

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Block Diagram



Truth Table

OE/OE	OE1/OE1	Output	V _{CC} current
L/H	X	High-Z	Operating mode
X	L/H	High-Z	Operating mode
H/L	H/L	DOUT	Operating mode

X: H or L level should be offered.

When OE1/OE1/DC is selected DC, fixed active level and DC pin should be offered H or L level.

Specifications

Absolute Maximum Ratings*1

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply voltage	$V_{CC\ max}$		-0.3 to +7.0	V
Supply input voltage	V_{IN}	Include DC	-0.3*2 to $V_{CC} + 0.3$	V
Supply output voltage	V_{OUT}		-0.3 to $V_{CC} + 0.3$	V
Allowable power dissipation	$Pd\ max$	$T_a = 25^\circ\text{C}$; Reference values for the SANYO DIP package	1.0	W
Operating temperature	T_{opr}		0 to +70	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +125	$^\circ\text{C}$

Note: 1. Permanent device damage may occur if Absolute Maximum Ratings are exceeded. Functional operation should be restricted to Recommended Operating Conditions.

2. V_{IN} (min) = -3.0 V (pulse width ≤ 30 ns)

Input/Output Capacitance* at $T_a = 25^\circ\text{C}$, $f = 1.0$ MHz

Parameter	Symbol	Conditions	min	typ	max	Unit
Input capacitance	C_{IN}	$V_{IN} = 0$ V; Reference values for the SANYO DIP package			8	pF
Output capacitance	C_{OUT}	$V_{OUT} = 0$ V; Reference values for the SANYO DIP package			10	pF

Note: * This parameter is periodically sampled and not 100% tested.

3 V Operation

DC Recommended Operating Ranges at $T_a = 0$ to $+70^\circ\text{C}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	$V_{CC\ max}$		2.7	3.0	3.6	V
Input high level voltage	V_{IH}		0.8 V_{CC}		$V_{CC} + 0.3$	V
Input low level voltage	V_{IL}		-0.3		+0.4	V

DC Electrical Characteristics at $T_a = 0$ to $+70^\circ\text{C}$, $V_{CC} = 2.7$ to 3.6 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating supply current	I_{CCA1}	$V_I = V_{CC} - 0.2$ V/0.2 V			15	mA
	I_{CCA2}	$I_O = 0$ mA, $V_I = V_{IH}/V_{IL}$, $f = 5$ MHz			20	mA
Input leakage current	I_{LI}	$V_{IN} = 0$ to V_{CC}	-1.0		+1.0	μA
Output leakage current	I_{LO}	\overline{OE} or $\overline{OE1} = V_{IH}$ (\overline{OE} or $\overline{OE1} = V_{IL}$), $V_{OUT} = 0$ to V_{CC}	-1.0		+1.0	μA
Output high level voltage	V_{OH}	$I_{OH} = -0.5$ mA	$V_{CC} - 0.2$			V
Output low level voltage	V_{OL}	$I_{OL} = 0.5$ mA			0.2	V

AC Characteristics at $T_a = 0$ to $+70^\circ\text{C}$, $V_{CC} = 2.7$ to 3.6 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Cycle time	t_{CYC}		200 (150*2)			ns
Address access time	t_{AA}				200 (150*2)	ns
Output enable access time	t_{OA}				80 (60*2)	ns
Output hold time	t_{OH}		25			ns
Output disable time*1	t_{OD}				50	ns

Note: 1. t_{OD} is measured from the earlier edge of the \overline{OE} (\overline{OE}) or $\overline{OE1}$ ($\overline{OE1}$) going high (low).

This parameter is periodically sampled and not 100% tested.

2. Guaranteed at $V_{CC} = 3.0$ to 3.6 V

5 V Operation

DC Recommended Operating Ranges at Ta = 0 to +70°C

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	V _{CC} max		4.5	5.0	5.5	V
Input high level voltage	V _{IH}		2.2		V _{CC} + 0.3	V
Input low level voltage	V _{IL}		-0.3		+0.8	V

DC Electrical Characteristics at Ta = 0 to +70°C, V_{CC} = 5.0 V ± 10%

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating supply current	I _{CCA1}	V _I = V _{CC} - 0.2 V/0.2 V			30	mA
	I _{CCA2}	I _O = 0 mA, V _I = V _{IH} /V _{IL} , f = 10 MHz			70	mA
Input leakage current	I _{LI}	V _{IN} = 0 to V _{CC}	-1.0		+1.0	µA
Output leakage current	I _{LO}	\overline{OE} or $\overline{OE1}$ = V _{IH} (OE or OE1 = V _{IL}), V _{OUT} = 0 to V _{CC}	-1.0		+1.0	µA
Output high level voltage	V _{OH}	I _{OH} = -1.0 mA	2.4			V
Output low level voltage	V _{OL}	I _{OL} = 2.0 mA			0.4	V

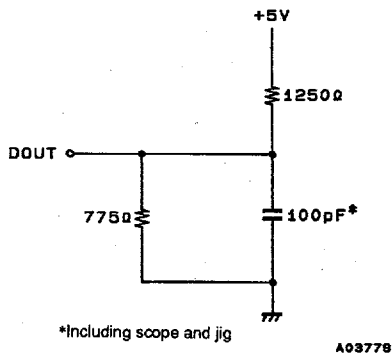
AC Characteristics at Ta = 0 to +70°C, V_{CC} = 5.0 V ± 10%

Parameter	Symbol	Conditions	min	typ	max	Unit
Cycle time	t _{CYC}		100			ns
Address access time	t _{AA}				100	ns
Output enable access time	t _{OA}				40	ns
Output hold time	t _{OH}		20			ns
Output disable time*	t _{OD}				30	ns

Note: * t_{OD} is measured from the earlier edge of the \overline{OE} (OE) or $\overline{OE1}$ (OE1) going high (low). This parameter is periodically sampled and not 100% tested.

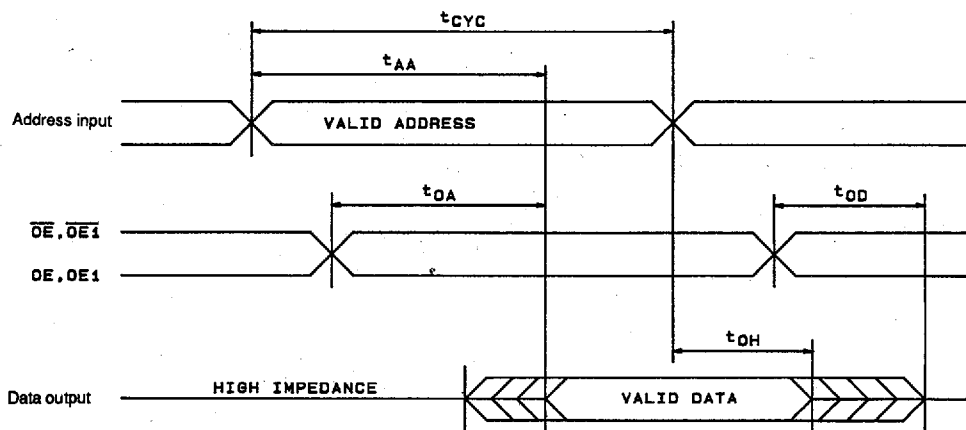
AC Test Conditions

Input pulse levels	0.4 V to 0.8 V _{CC} (3 V measurement), 0.6 V to 2.4 V (5 V measurement)
Input rise/fall time	5 ns
Input timing level	1.5 V
Output timing level	1.5 V
Output load	70 pF (3 V measurement) See figure (5 V measurement)



Output Load (5 V measurement)

Timing Chart



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Usage Notes

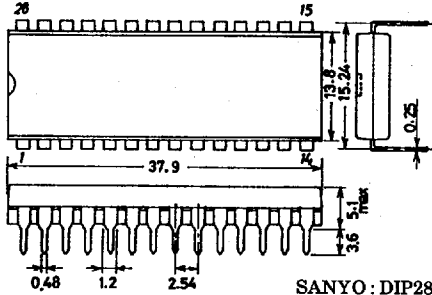
For the reasons of using ATD (Address Transition Detector) circuit, the output data of this LSI directly after supplying voltage are invalid.

The valid data would be offered after the transition of at least one of address signals under the stable supply voltage.

MEMORY PACKAGE DIMENSIONS

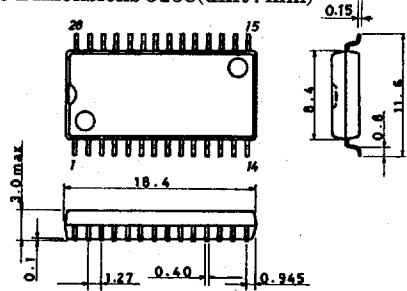
- All of Sanyo Memory package dimensions are illustrated below.
- All dimensions are in mm, and dimensions which are not followed by min. or max. are represented by typical values.
- No marking is indicated.

Package Dimensions 3012A(unit : mm)



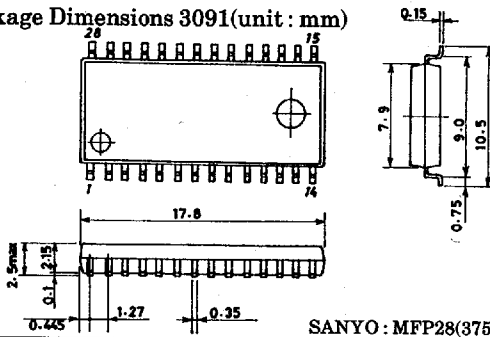
SANYO : DIP28(600mil)

Package Dimensions 3158(unit : mm)



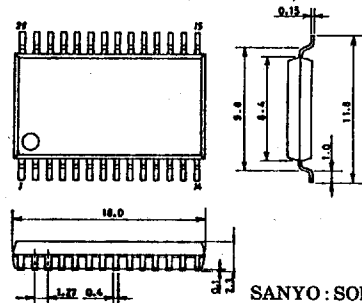
SANYO : SOP28(450mil)

Package Dimensions 3091(unit : mm)



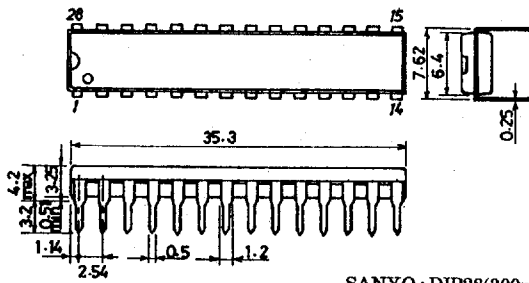
SANYO : MFP28(375mil)

Package Dimensions 3187(unit : mm)



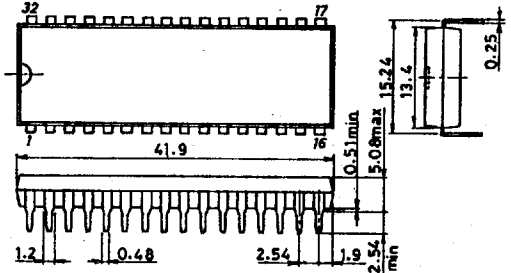
SANYO : SOP28D(450mil)

Package Dimensions 3123(unit : mm)



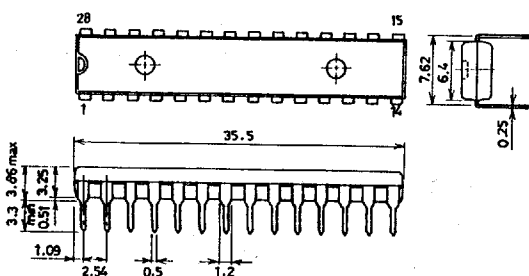
SANYO : DIP28(300mil)

Package Dimensions 3192(unit : mm)



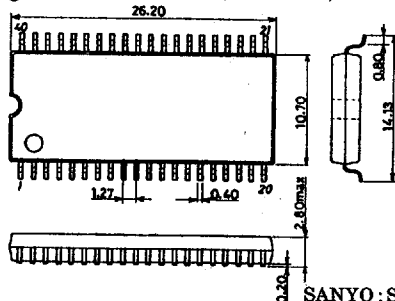
SANYO : DIP32(600mil)

Package Dimensions 3133 (unit : mm)



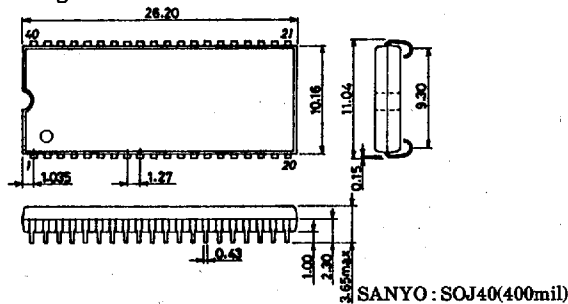
SANYO : DIP28(300mil)

Package Dimensions 3195(unit : mm)



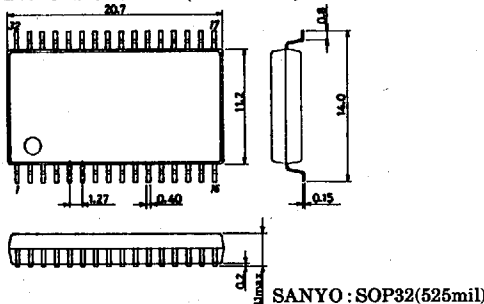
SANYO : SOP40(525mil)

Package Dimensions 3200(unit : mm)



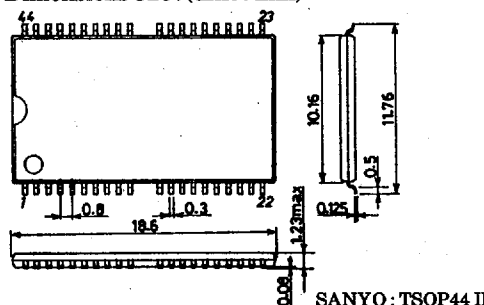
SANYO : SOJ40(400mil)

Package Dimensions 3205(unit : mm)



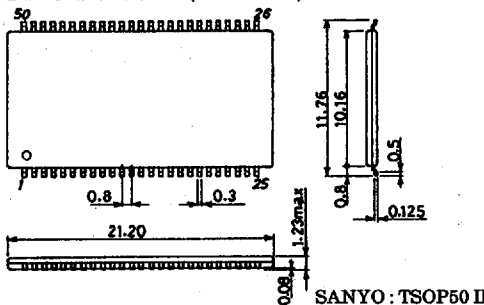
SANYO : SOP32(525mil)

Package Dimensions 3207(unit : mm)



SANYO : TSOP44 II

Package Dimensions 3211(unit : mm)



SANYO : TSOP50 II