

# TOSHIBA MOS MEMORY PRODUCTS

## TC531000CP-12, TC531000CP TC531000CF-12, TC531000CF

### DESCRIPTION

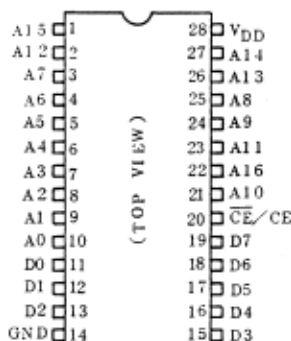
The TC531000CP/CF is a 1,048,576 bits read only memory organized as 131,072 words by 8 bits with a low bit cost, thus being suitable for use in program memory of micro-processor, especially character generator. The TC531000CP/CF using CMOS technology is most suitable for low power applications where battery operation are required. The TC531000CP/CF has one chip enable input  $\overline{CE}/CE$ , programmable for device selection.

### FEATURES

TC531000CP/CF	120ns Version	150ns Version
Access Time (max.)	120ns	150ns
Power Dissipation Operation Current (max.)	40mA	35mA
Power Dissipation Standby Current (max.)	20 $\mu$ A	20 $\mu$ A

- Single 5V Power Supply
- All Inputs and Outputs: TTL Compatible
- Three State Outputs
- Fully Static Operation
- Programmable Chip Enable
- Package  
Plastic DIP: TC531000CP  
Plastic FP : TC531000CF

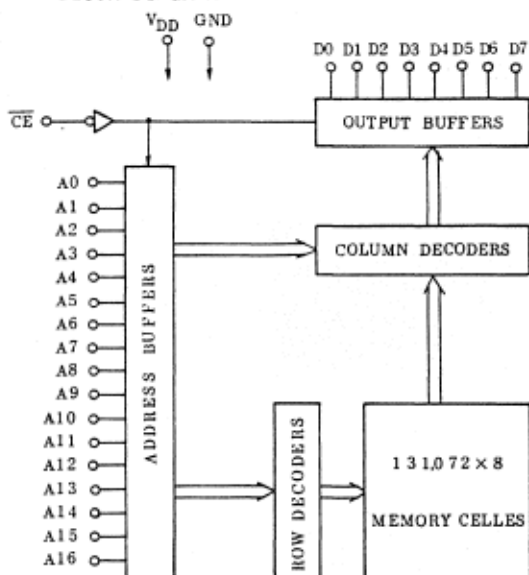
### PIN CONNECTION



### PIN NAMES

A0 ~ A16	Address Inputs
D0 ~ D7	Data Outputs
$\overline{CE}/CE$	Chip Enable Input
VDD	Power Supply
GND	Ground

### BLOCK DIAGRAM



# TC531000CP-12, TC531000CP

# TC531000CF-12, TC531000CF

## MAXIMUM RATINGS

SYMBOL	ITEM	RATING	UNIT
$V_{DD}$	Power Supply Voltage	-0.5 ~ 7.0	V
$V_{IN}$	Input Voltage	-0.5 ~ $V_{DD}$	
$V_{OUT}$	Output Voltage	0 ~ $V_{DD}$	
$P_D$	Power Dissipation	1.0/0.6 *	W
$T_{STG}$	Storage Temperature	-55 ~ 150	°C
$T_{OPR}$	Operating Temperature	-40 ~ 70	
$T_{SOLDER}$	Soldering Temperature • Time	260 • 10	°C•sec

Note: \* Plastic FP

## DC OPERATING CONDITIONS ( $T_a = -40 \sim 70^\circ\text{C}$ )

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
$V_{DD}$	Power Supply Voltage	4.5	5.0	5.5	V
$V_{IH}$	Input High Voltage	2.2	-	$V_{DD}+0.3$	
$V_{IL}$	Input Low Voltage	-0.3	-	0.8	

## DC and OPERATING CHARACTERISTICS ( $T_a = -40 \sim 70^\circ\text{C}$ , $V_{DD} = 5V \pm 10\%$ )

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX.	UNIT
I <sub>IL</sub>	Input Leakage Current	V <sub>IN</sub> =0 ~ V <sub>DD</sub>		-	±1.0	μA
I <sub>LO</sub>	Output Leakage Current	CE=V <sub>IH</sub> , V <sub>OUT</sub> =0 ~ V <sub>DD</sub>		-	±5.0	
I <sub>OH</sub>	Output High Current	V <sub>OH</sub> =2.4V		-1.0	-	mA
I <sub>OL</sub>	Output Low Current	V <sub>OL</sub> =0.4V		3.2	-	
I <sub>DDS1</sub>	Standby Current	CE=0.8V (CE=2.2V)		-	2	
I <sub>DDS2</sub>	Standby Current	CE=0.2V (CE=V <sub>DD</sub> -0.2V)		-	20	μA
I <sub>DDO1</sub>	Operating Current	V <sub>IN</sub> =V <sub>IH</sub> /V <sub>IL</sub> I <sub>OUT</sub> =0mA	t <sub>cycle</sub> =120ns	-	50	mA
			t <sub>cycle</sub> =150ns	-	45	
I <sub>DDO2</sub>		V <sub>IN</sub> =V <sub>DD</sub> -0.2V/0.2V I <sub>OUT</sub> =0mA	t <sub>cycle</sub> =120ns	-	40	
			t <sub>cycle</sub> =150ns	-	35	

## CAPACITANCE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$ , $T_a = 25^\circ\text{C}$	-	10	pF
$C_{OUT}$	Output Capacitance	$f = 1\text{MHz}$ , $T_a = 25^\circ\text{C}$	-	10	

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

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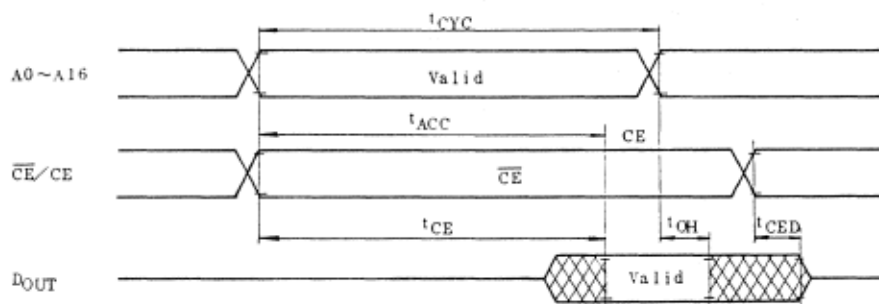
AC CHARACTERISTICS ( $V_{DD}=5V\pm10\%$ ,  $T_a=-40\sim70^{\circ}C$ )

SYMBOL	PARAMETER	120ns Version		150ns Version		UNIT
		MIN.	MAX.	MIN.	MAX.	
$t_{cycle}$	Cycle Time	120	-	150	-	ns
$t_{ACC}$	Access Time	-	120	-	150	
$t_{CE}$	Chip Enable Access Time	-	120	-	150	
$t_{CED}$	Output Disable Time	-	50	-	50	
$t_{OH}$	Output Hold Time	5	-	5	-	

## AC TEST CONDITION

- Output Load : 100pF + 1TTL
- Input Levels : 0.6V, 2.4V
- Timing Measurement Reference Levels  
Input : 0.8V, 2.2V  
Output : 0.8V, 2.0V
- Input Rise and Fall Time : 5ns

## TIMING WAVEFORMS



## OPERATING MODE

MODE	$\overline{CE}(CE)$	$A0 \sim 16$	Outputs	Power
Read	L(H)	Valid	Data Out	Operating
Standby	H(L)	*	High-Z	Standby

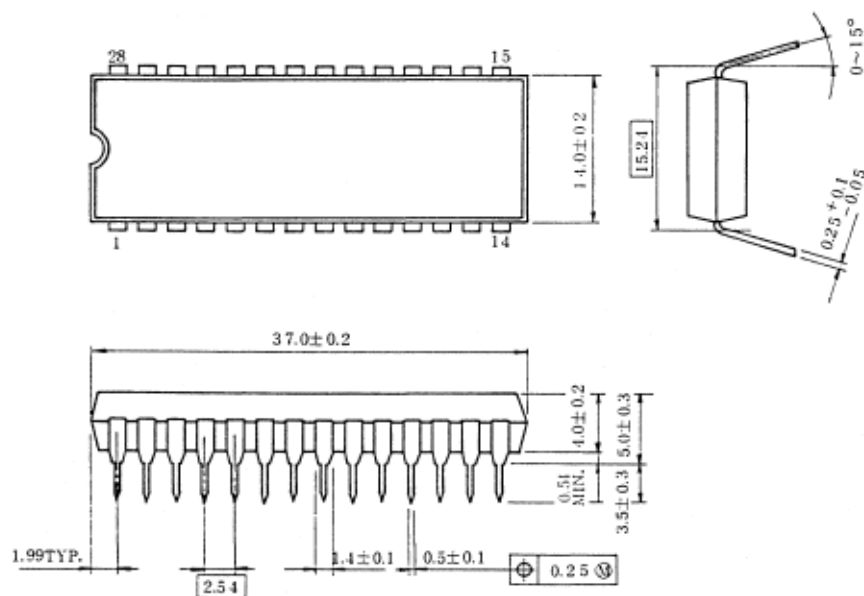
H:  $V_{IH}$ , L:  $V_{IL}$ , \*:  $V_{IH}$  or  $V_{IL}$

**TC531000CP-12, TC531000CP**  
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OUTLINE DRAWINGS

Plastic DIP (DIP28-P-600)

Unit in mm

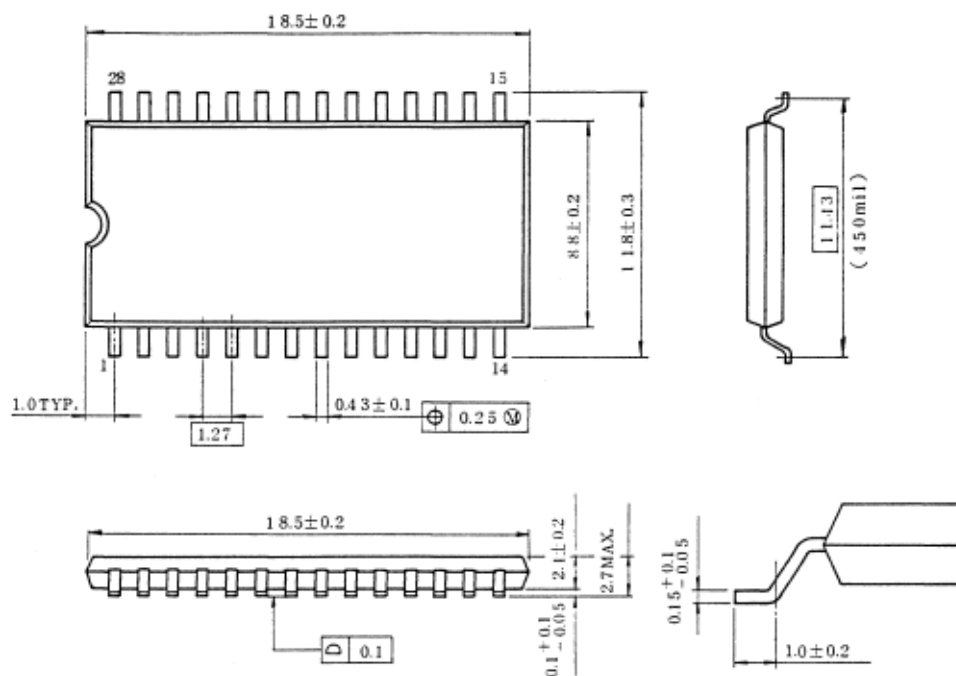


Note: Package width and length do not include mold protrusion, allowable mold protrusion is 0.15mm.

**TC531000CP-12, TC531000CP**  
**TC531000CF-12, TC531000CF**

Plastic FP (SOP28-P-450)

unit in mm



Note: Package width and length do not include mold protrusion, allowable mold protrusion is 0.15mm.