

1M BIT (65,536 WORD × 16 BIT) CMOS MASK ROM

**DESCRIPTION**

The TC531024P/F is a 1,048,576 bits read only memory organized as 65,536 words by 16 bits.

The TC531024P/F is fabricated using Toshiba's advanced CMOS technology which provides the high speed and low power features with access time of 120ns/150ns, an operation current of 40mA at 8.3MHz and a standby current of 20µA.

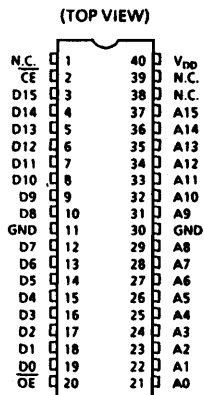
The TC531024P/F is packaged in a standard 600mil 40pin DIP, or 525mil 40pin SOP.

**FEATURES**

TC531024P/F	- 12	- 15
Power Supply	5V ± 5%	5V ± 10%
Access Time (Max.)	120ns	150ns
Power Dissipation : Operating Current (Max.)	40mA	35mA
Power Dissipation : Standby Current (Max.)	20µA	20µA

- Single 5V Power Supply
- Fully Static Operation
- All Input and Output : TTL Compatible
- Three State Output
- 40pin 600mil width Plastic DIP
- 40pin 525mil width Plastic SOP

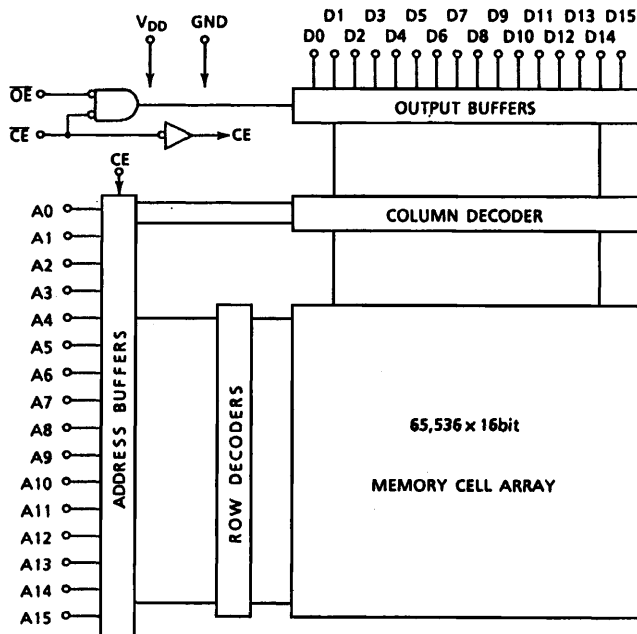
**PIN CONNECTION**



**PIN NAMES**

A0~A15	Address inputs
D0~D15	Data Outputs
OE	Output Enable Input
CE	Chip Enable Input
V <sub>DD</sub>	Power Supply
GND	Ground
N.C.	No Connection

**BLOCK DIAGRAM**



# TC531024P-12, TC531024P-15 TC531024F-12, TC531024F-15

## 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
$V_{OUT}$	Output Voltage	0~ $V_{DD}$	V
$P_D$	Power Dissipation	1.0/0.6*	W
$T_{STG}$	Storage Temperature	-55~150	°C
$T_{OPR}$	Operating Temperature	0~70	°C
$T_{SOLDER}$	Soldering Temperature - Time	260 · 10	°C · sec

Note : \* Plastic FP.

## D.C. OPERATING CONDITIONS ( $T_a = 0 \sim 70^\circ\text{C}$ )

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

## D.C. OPERATING CHARACTERISTICS ( $T_a = 0 \sim 70^\circ\text{C}$ , $V_{DD} = 5V \pm 10\%$ )

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT	
$I_{IL}$	Input Leakage Current	$0V \leq V_{IN} \leq V_{DD}$	-	$\pm 1.0$	$\mu\text{A}$	
$I_{LO}$	Output Leakage Current	$0V \leq V_{OUT} \leq V_{DD}$	-	$\pm 5.0$		
$I_{OH}$	Output High Current	$V_{OH} = 2.4V$	-1.0	-	mA	
$I_{OL}$	Output Low Current	$V_{OL} = 0.4V$	3.2	-		
$I_{DDS1}$	Standby Current	$\overline{CE} = 2.2V$	-	2.0	$\mu\text{A}$	
$I_{DDS2}$		$\overline{CE} = V_{DD} - 0.2V$	-	20		
$I_{DDO1}$	Operating Current	$\overline{CE} = V_{IL}$ , $V_{IN} = V_{IH} / V_{IL}$ $I_{OUT} = 0\text{mA}$	$t_{\text{cycle}} = 120\text{ns}$	-	50	mA
			$t_{\text{cycle}} = 150\text{ns}$	-	45	
$I_{DDO2}$		$\overline{CE} = 0.2V$ , $V_{IN} = V_{DD} - 0.2V / 0.2V$ $I_{OUT} = 0\text{mA}$	$t_{\text{cycle}} = 120\text{ns}$	-	40	
			$t_{\text{cycle}} = 150\text{ns}$	-	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	pF

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

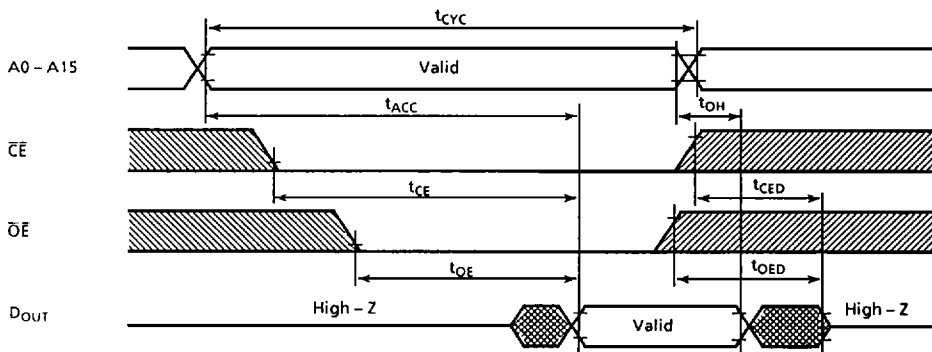
A.C. CHARACTERISTICS (Ta = 0°C~70°C)

SYMBOL	PARAMETER	V <sub>DD</sub> = 5V ± 5%		V <sub>DD</sub> = 5V ± 10%		UNIT
		MIN.	MAX.	MIN.	MAX.	
t <sub>ACC</sub>	Access Time	-	120	-	150	ns
t <sub>CE</sub>	Chip Enable Access Time	-	120	-	150	ns
t <sub>OE</sub>	Output Enable Access Time	-	70	-	70	ns
t <sub>CED</sub>	Output Disable Time from $\overline{CE}$	0	60	0	60	ns
t <sub>OED</sub>	Output Disable Time from $\overline{OE}$	0	60	0	60	ns
t <sub>OH</sub>	Output Hold Time	5	-	5	-	ns
t <sub>CYC</sub>	Cycle Time	120	-	150	-	ns

A.C. TEST CONDITIONS

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 (10%~90%) : 5ns

TIMING WAVEFORMS



OPERATION MODE

MODE	$\overline{CE}$	$\overline{OE}$	A0~A15	Outputs	Power
Read	L	L	Valid	Data Out	Operating
Standby	H	*	*	High-Z	Standby
Output Deselect	L	H	*	High-Z	Operating

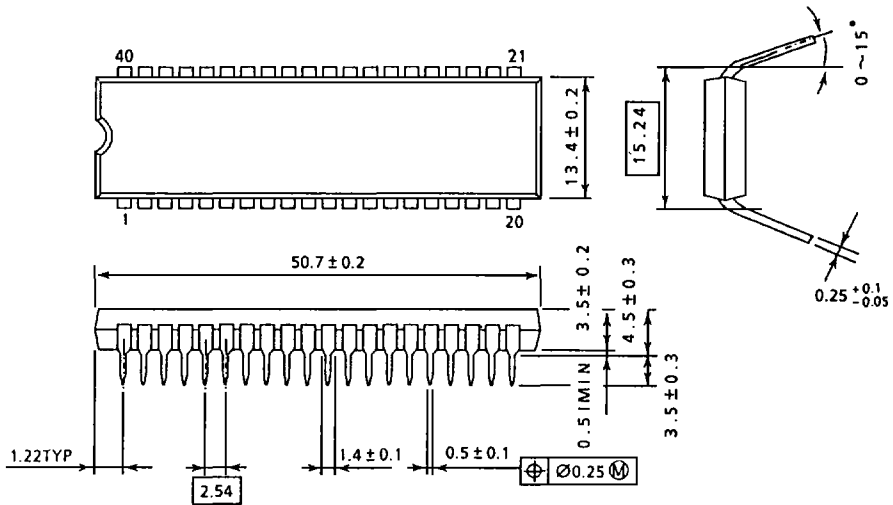
H : VIH L : VIL \* : VIH or VIL

# TC531024P-12, TC531024P-15 TC531024F-12, TC531024F-15

## OUTLINE DRAWINGS

Plastic DIP (DIP40-P-600)

單位 : mm

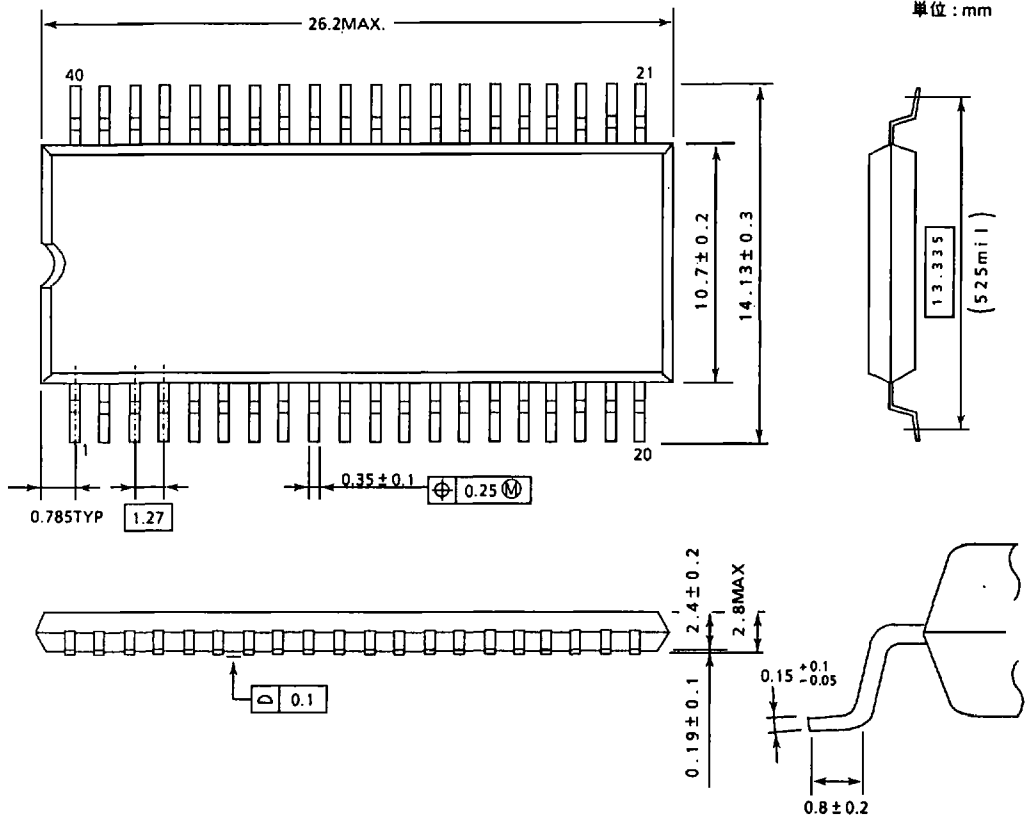


Note: Package width and length do not include mold protrusion, allowable mold protrusion is 0.15mm.

# TC531024P-12, TC531024P-15 TC531024F-12, TC531024F-15

## OUTLINE DRAWINGS

Plastic FP (SOP40-P-525)



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