

8 MBIT (512 K WORD BY 16 BITS/1 M WORD BY 8 BITS) CMOS MASK ROM

### DESCRIPTION

The TC538200AP/AF is a 8,388,608-bit Read Only Memory organized as 524,288 words by 16 bits when  $\overline{\text{BYTE}}$  is logical high, and as 1,048,576 words by 8 bits when  $\overline{\text{BYTE}}$  is logical low.

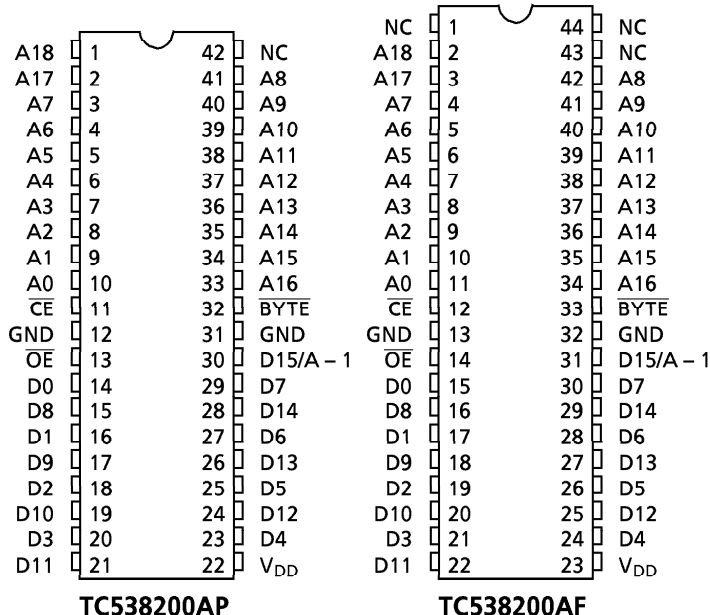
The TC538200AP/AF is most suitable for application such as program memory, data memory fast high speed from, and character generators.

The TC538200AP/AF is packaged in a standard 600 mil 42-pin DIP or 600 mil 44-pin SOP.

### FEATURES

- Single 5 V Power Supply
- Access Time: 150 ns (max)
- Power Dissipation
  - Operating Current: 60 mA (max)
  - Standby Current : 100  $\mu$ A (max)
- Fully Static Operation
- All Inputs and Outputs: TTL Compatible
- Three State Outputs
- TC538200AP: DIP42 – P – 600
- TC538200AF: SOP44 – P – 600

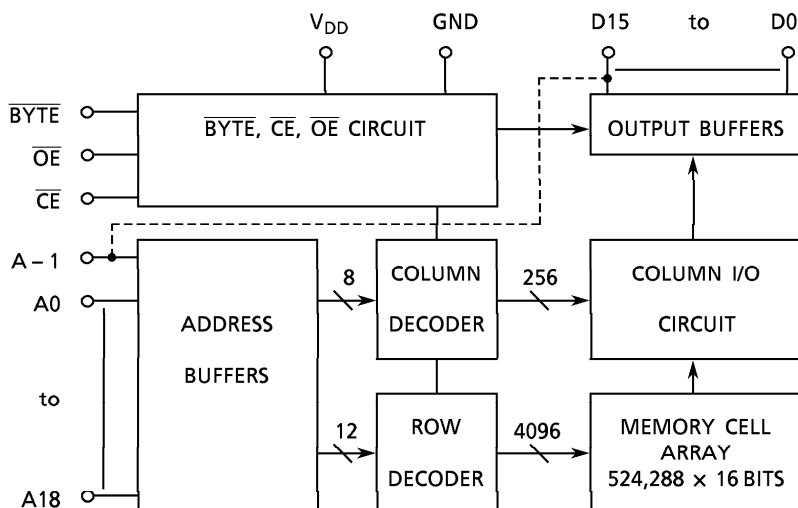
### PIN ASSIGNMENT (TOP VIEW)



### PIN NAMES

A0 to A18	Address Inputs
D0 to D14	Data Outputs
$\overline{\text{CE}}$	Chip Enable Input
$\overline{\text{OE}}$	Output Enable Input
D15/A – 1	Data Output/Address Input
$\overline{\text{BYTE}}$	Word, Byte Selection Input
V <sub>DD</sub>	Power Supply
GND	Ground
NC	No Connection

## BLOCK DIAGRAM



## MODE SELECTION

MODE	$\overline{CE}$	$\overline{OE}$	$\overline{BYTE}$	D0 to D7	D8 to D14	D15/A - 1	POWER
Read (16-Bit)	L	L	H	Data Out			Active
Read (8-Bit)	L	L	L	Data Out (Lower 8 bits)	High Impedance	L	Active
Read (8-Bit)	L	L	L	Data Out (Upper 8 bits)	High Impedance	H	Active
Output Deselect	L	H	*	High Impedance			Active
Standby	H	*	*	High Impedance			Standby

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

## ABSOLUTE MAXIMUM RATINGS

SYMBOL	RATING	VALUE	UNIT
$V_{DD}$	Power Supply Voltage	- 0.5 to 7.0	V
$V_{IN}$	Input Voltage	- 0.5 to $V_{DD}$	V
$V_{OUT}$	Output Voltage	0 to $V_{DD}$	V
$P_D$	Power Dissipation	1.0/0.6*	W
$T_{STG}$	Storage Temperature	- 55 to 150	°C
$T_{OPR}$	Operating Temperature	0 to 70	°C
$T_{SOLDER}$	Soldering Temperature (10 s)	260	°C

\* SOP

**DC RECOMMENDED OPERATING CONDITIONS** ( $T_a = 0^\circ$  to  $70^\circ\text{C}$ )

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
$V_{IL}$	Input Low Voltage	– 0.3	–	0.8	V

**DC CHARACTERISTICS** ( $T_a = 0^\circ$  to  $70^\circ\text{C}$ )

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
$I_{IL}$	Input Leakage Current	$V_{IN} = 0$ to $V_{DD}$	–	$\pm 1.0$	$\mu\text{A}$
$I_{LO}$	Output Leakage Current	$V_{OUT} = 0$ to $V_{DD}$	–	$\pm 5.0$	$\mu\text{A}$
$I_{OH}$	Output High Current	$V_{OH} = 2.4\text{ V}$	– 1.0	–	mA
$I_{OL}$	Output Low Current	$V_{OL} = 0.4\text{ V}$	2.0	–	mA
$I_{DDS1}$	Standby Current	$\overline{CE} = V_{IH}$	–	2	mA
$I_{DDS2}$		$\overline{CE} = V_{DD} - 0.2\text{ V}$	–	100	$\mu\text{A}$
$I_{DDO1}$	Operating Current	$V_{IN} = V_{IH}/V_{IL}$ , $t_{\text{cycle}} = 150\text{ ns}$	–	70	mA
$I_{DDO2}$		$V_{IN} = V_{DD} - 0.2\text{ V}/0.2\text{ V}$ , $t_{\text{cycle}} = 150\text{ ns}$	–	60	mA

**CAPACITANCE** ( $f = 1\text{ MHz}$ ,  $T_a = 25^\circ\text{C}$ )

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{ V}$	–	10	pF
$C_{OUT}$	Output Capacitance	$V_{OUT} = 0\text{ V}$	–	12	pF

Note: This parameter is periodically sampled and is not tested for every component.

## AC CHARACTERISTICS AND OPERATING CONDITIONS

( $T_a = 0^\circ$  to  $70^\circ\text{C}$ ,  $V_{DD} = 5\text{ V} \pm 10\%$ )

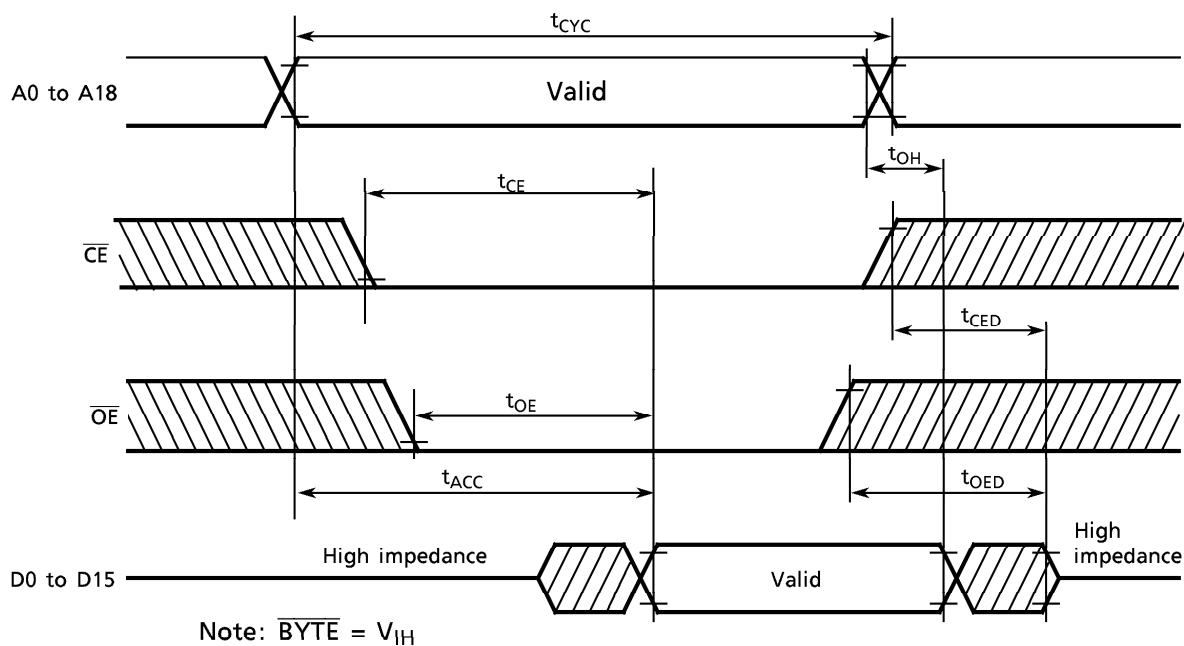
SYMBOL	PARAMETER	MIN	MAX	UNIT
$t_{CYC}$	Cycle Time	150	–	ns
$t_{ACC}$	Address Access Time	–	150	ns
$t_{CE}$	Chip Enable Access Time	–	150	ns
$t_{BT}$	BYTE Access Time	–	150	ns
$t_{OE}$	Output Enable Access Time	–	70	ns
$t_{CED}$	Output Disable Time from $\overline{CE}$	–	60	ns
$t_{OED}$	Output Disable Time from $\overline{OE}$	–	60	ns
$t_{BTD}$	Output Disable Time from BYTE	–	60	ns
$t_{OH}$	Output Hold Time	5	–	ns

## AC TEST CONDITIONS

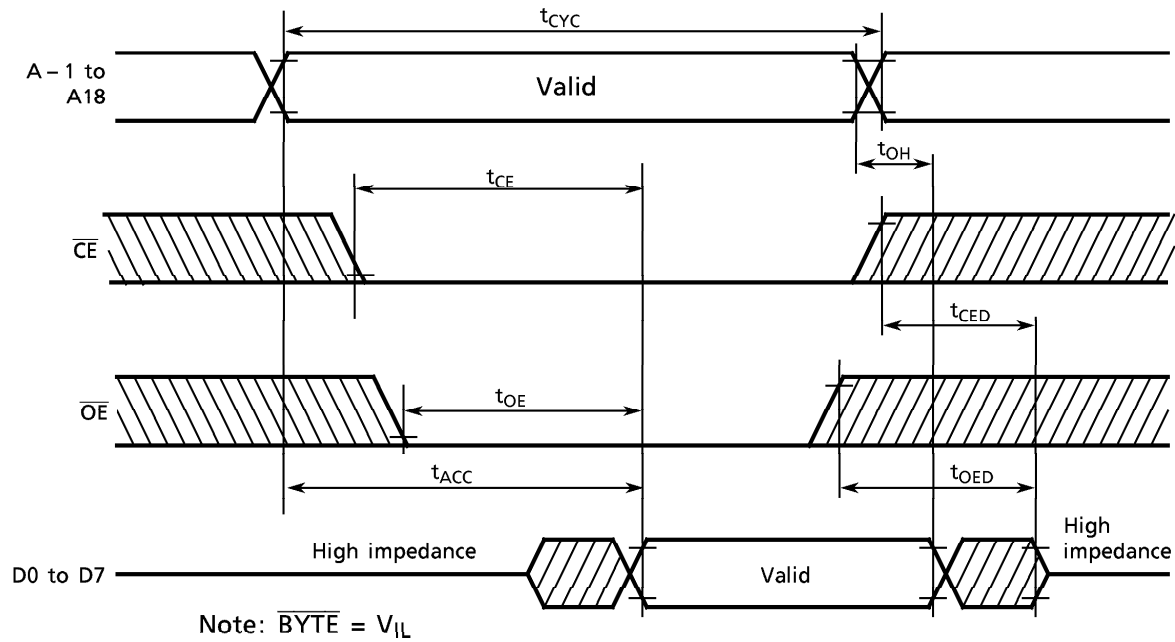
Output Load : 100 pF + 1 TTL  
 Input Levels : 0.6 V, 2.4 V  
 Timing Measurement Reference Levels Input : 0.8 V, 2.2 V  
 Output: 0.8 V, 2.0 V  
 Input Rise and Fall Time : 5 ns

## TIMING DIAGRAMS

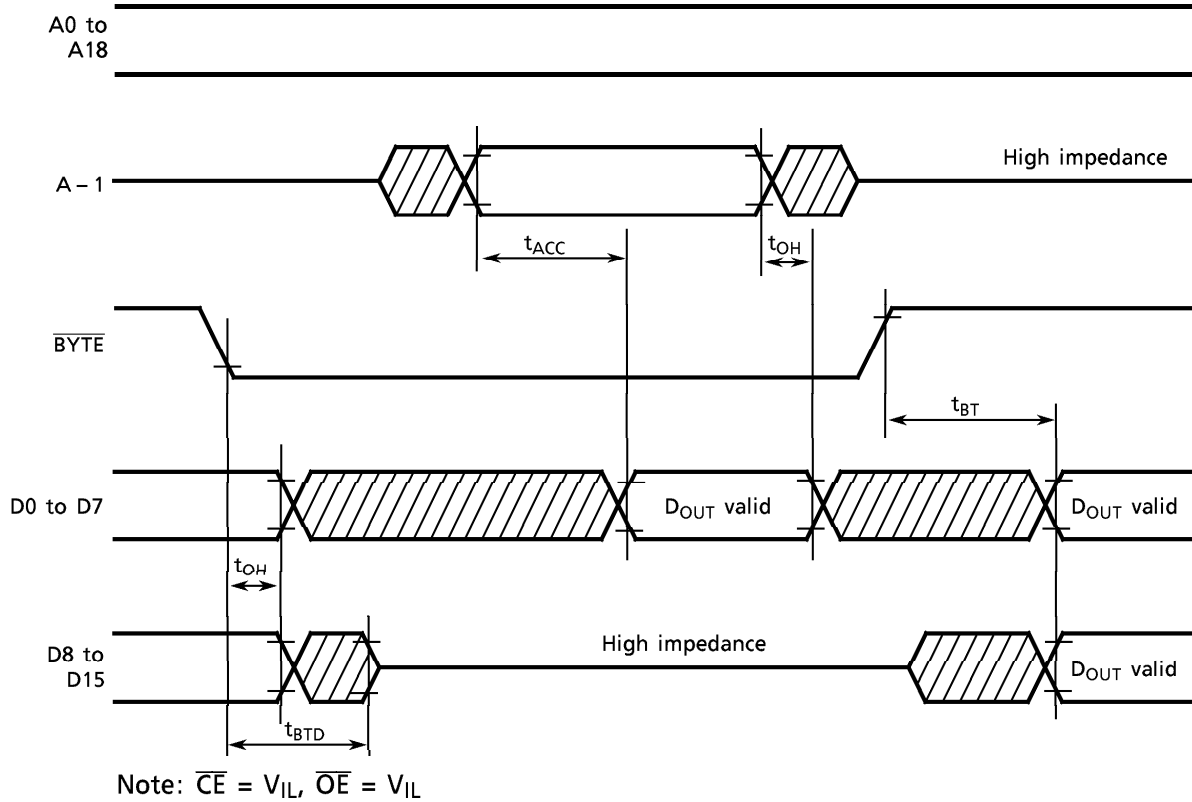
### WORD-WIDE READ MODE



BYTE-WIDE READ MODE



BYTE TRANSITION

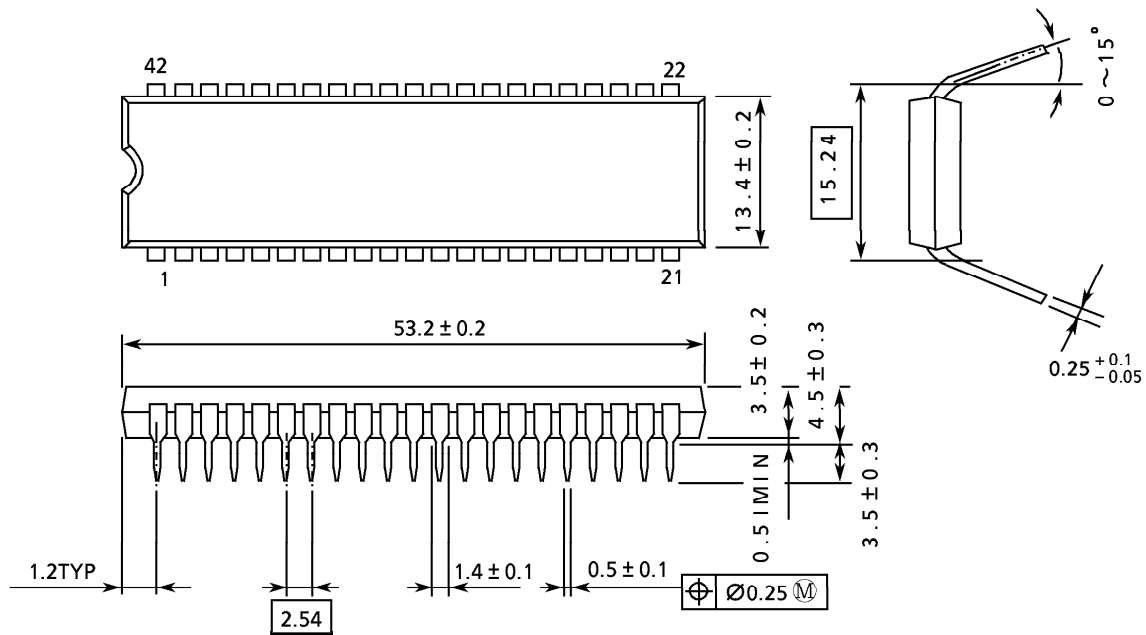


# PACKAGE DIMENSIONS

## • Plastic DIP

DIP42-P-600

UNITS: mm



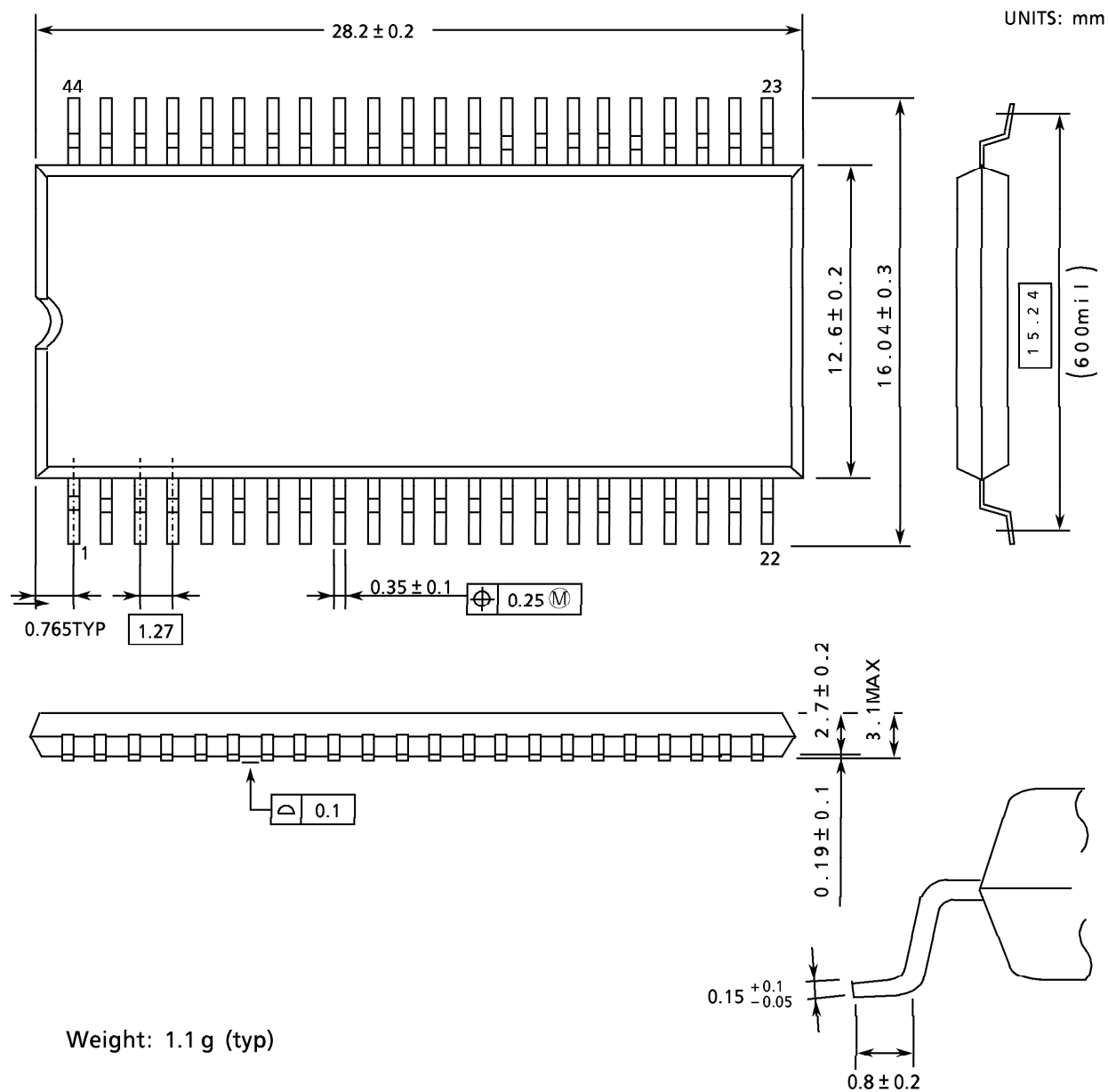
Weight: 5.7 g (typ)

Note: Package width and length do not include mold protrusion. The permissible mold protrusion is 0.15 mm.

## PACKAGE DIMENSIONS

### • Plastic SOP

SOP44-P-600



Weight: 1.1 g (typ)

Note: Package width and length do not include mold protrusion. The permissible mold protrusion is 0.15 mm.