TOSHIBA MOS INTEGRATED CIRCUIT

TC538200 AP / AF

SILICON GATE CMOS

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 $\overline{BYTE}$ is logical high, and as 1,048,576 words by 8 bits when $\overline{BYTE}$ 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.

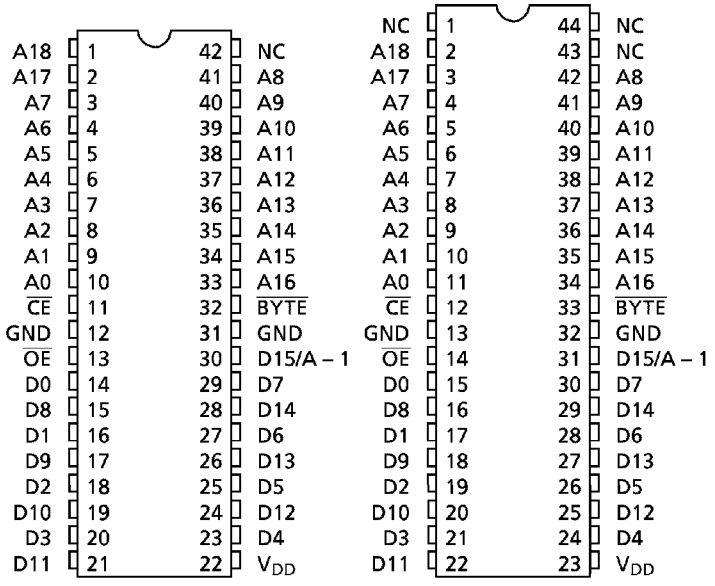
FEATURES

- Single 5 V Power Supply
- Access Time: 150 ns (max)
- Power Dissipation

  Operating Current: 60 mA (max)

  Standby Current : 100 μA (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)

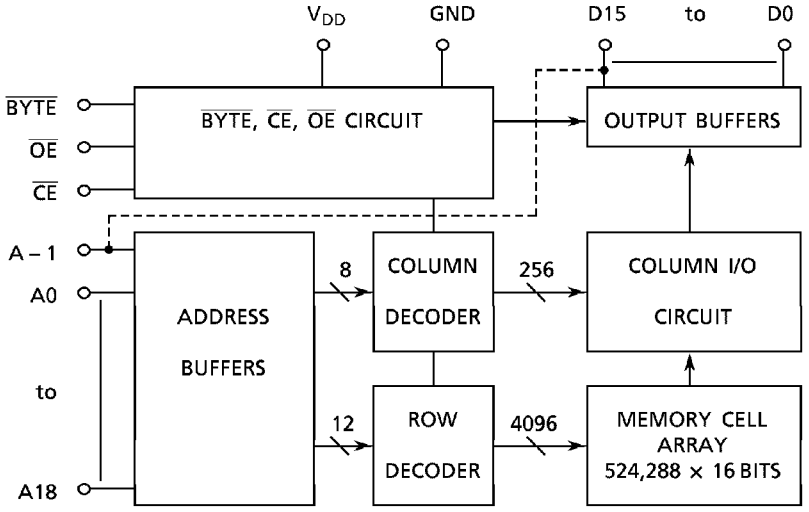


TC538200AP **TC538200AF**

PIN NAMES

A0 to A18	Address Inputs
D0 to D14	Data Outputs
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
D15/A − 1	Data Output/Address Input
$\overline{BYTE}$	Word, Byte Selection Input
V_{DD}	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 (Ta = 0° to 70°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 (Ta = 0° to 70°C)

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

CAPACITANCE (f = 1 MHz, Ta = 25°C)

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

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

AC CHARACTERISTICS AND OPERATING CONDITIONS

(Ta = 0° to 70°C, V_{DD} = 5 V ± 10%)

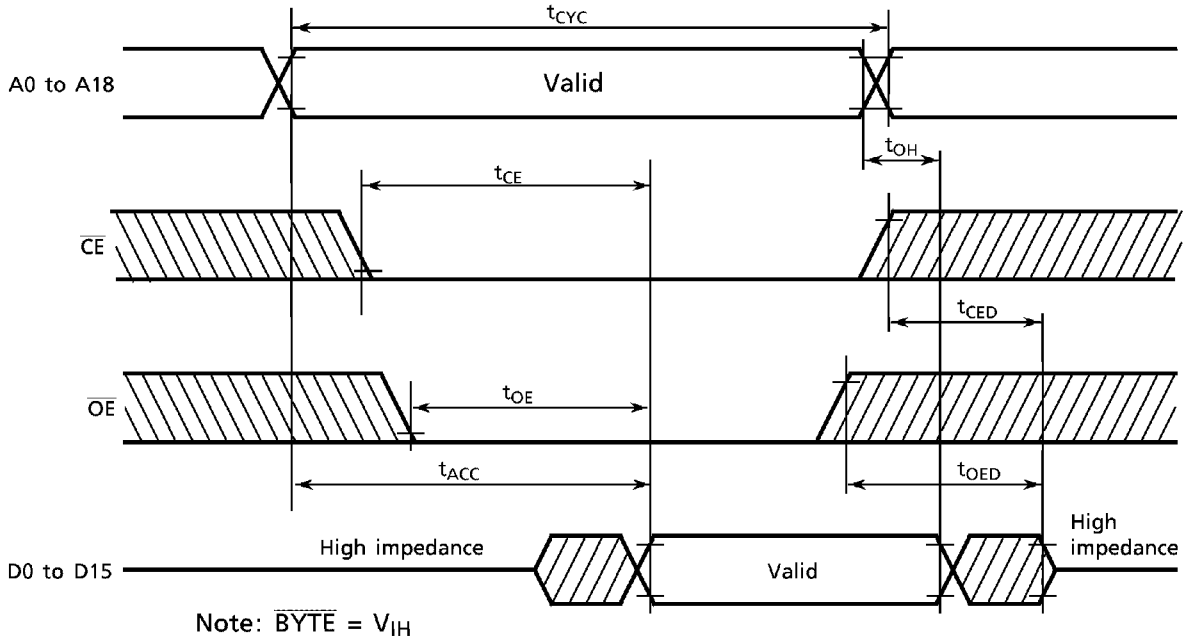
SYMBOL	PARAMETER	MIN	MAX	UNIT
t_{CYC}	Cycle Time	150	–	ns
t_{ACC}	Address Access Time	–	150	ns
t_{CE}	Chip Enable Access Time	–	150	ns
t_{BT}	$\overline{BYTE}$ Access Time	–	150	ns
t_{OE}	Output Enable Access Time	–	70	ns
t_{CED}	Output Disable Time from $\overline{CE}$	–	60	ns
t_{OED}	Output Disable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

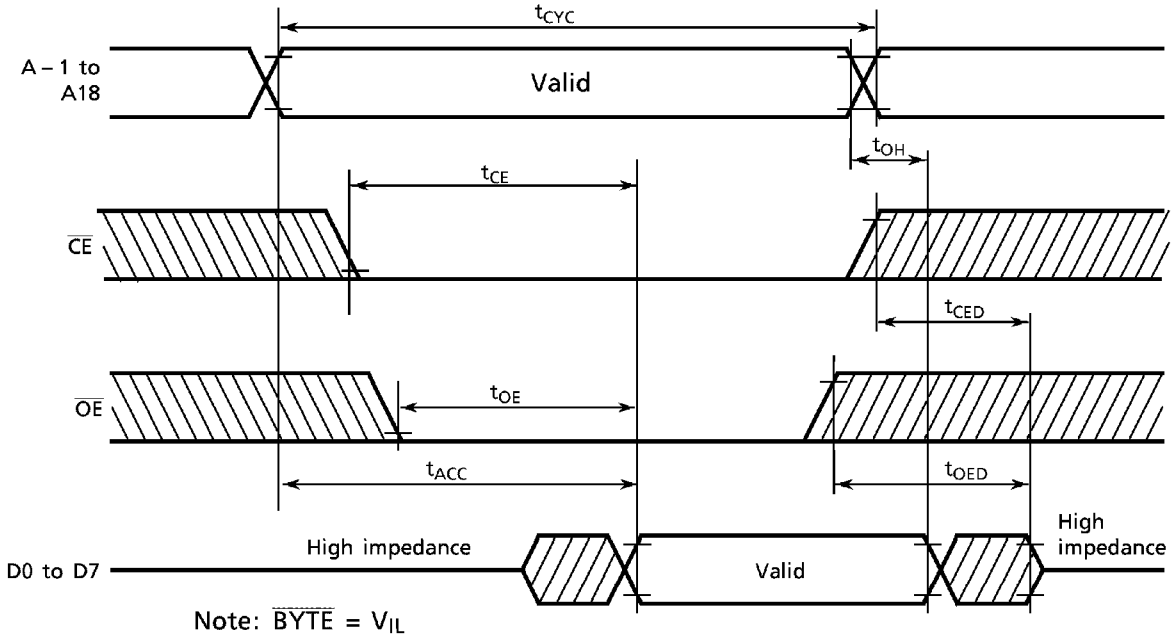
TIMING DIAGRAMS

WORD-WIDE READ MODE



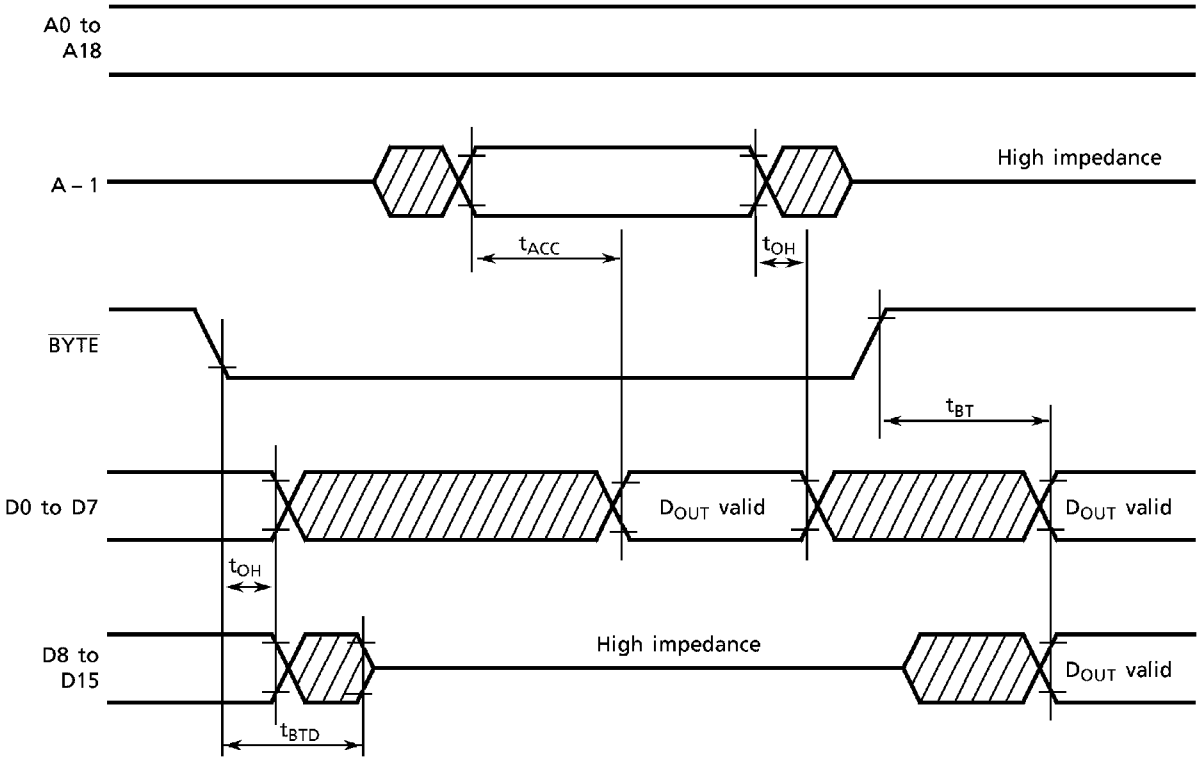
Note: $\overline{BYTE}$ = V_{IH}

BYTE-WIDE READ MODE



Note: $\overline{BYTE}$ = V_{IL}

$\overline{BYTE}$ TRANSITION



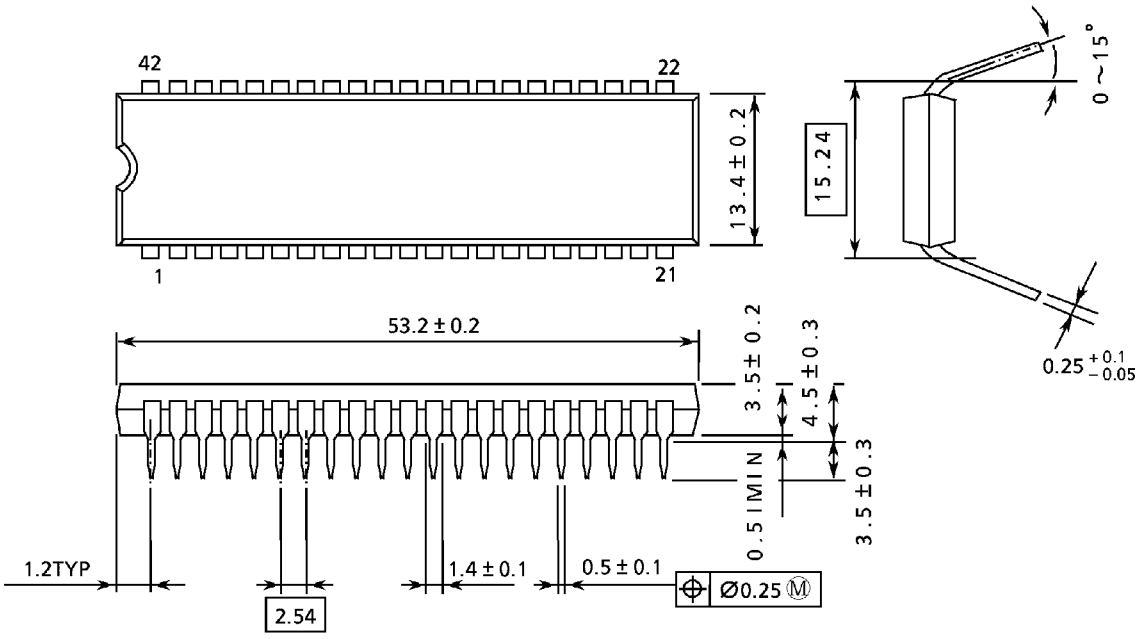
Note: $\overline{CE}$ = V_{IL}, $\overline{OE}$ = V_{IL}

PACKAGE DIMENSIONS

- Plastic DIP

DIP42-P-600

UNITS: mm



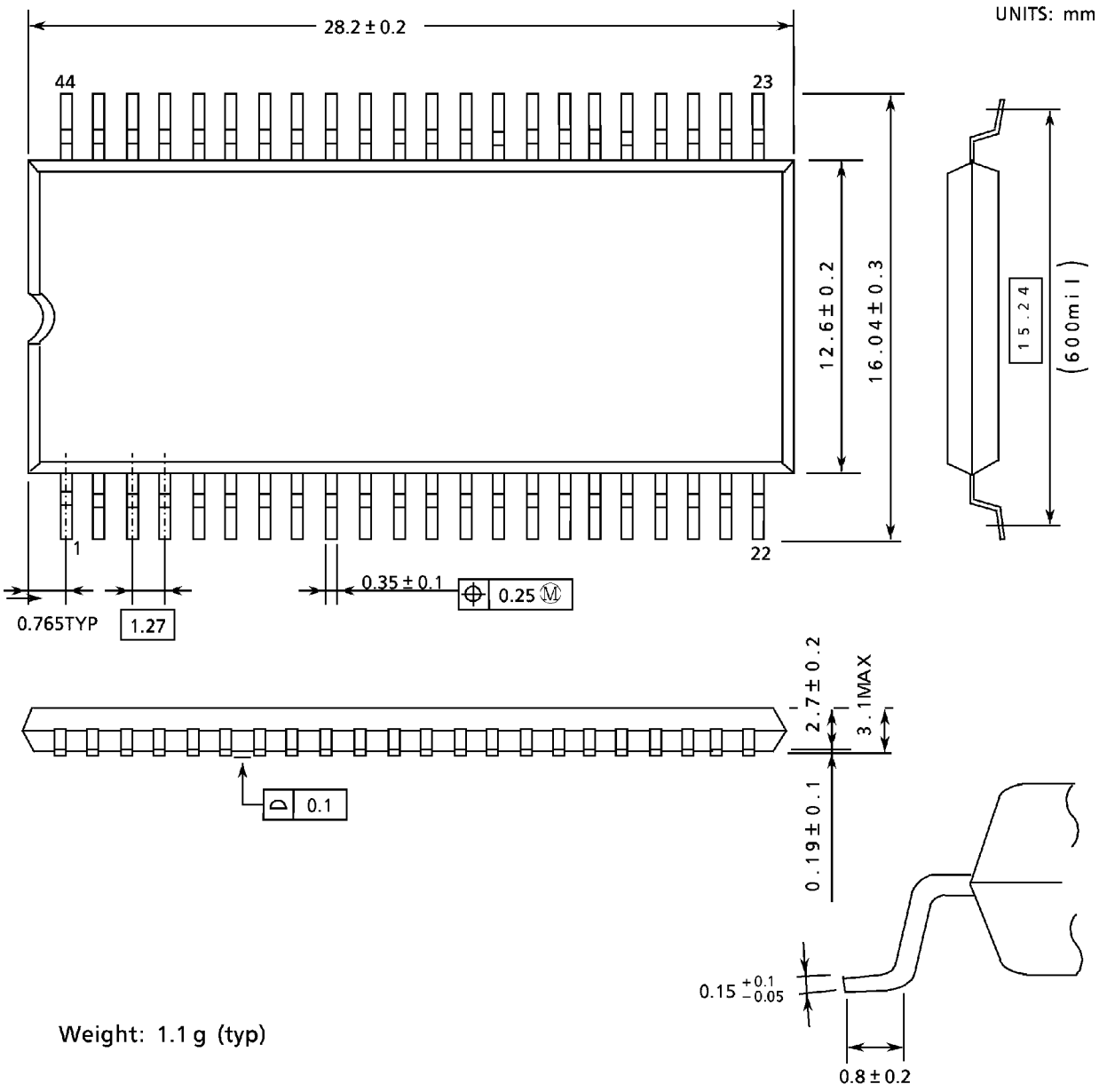
Weight: 5.7 g (typ)

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.