

# LH5332600

CMOS 32M (4M × 8/2M × 16) MROM

## FEATURES

- 4,194,304 × 8 bit organization  
(Byte mode:  $\overline{\text{BYTE}} = V_{\text{IL}}$ )  
2,097,152 × 16 bit organization  
(Word mode:  $\overline{\text{BYTE}} = V_{\text{IH}}$ )
- Access time: 100 ns (MAX.)
- Supply current:
  - Operating: 100 mA (MAX.)
  - Standby: 100  $\mu\text{A}$  (MAX.)
- TTL compatible I/O
- Three-state output
- Single +5 V power supply
- Static operation
- Packages:
  - 44-pin, 600-mil SOP
  - 48-pin, 12 mm × 18 mm<sup>2</sup> TSOP (Type I)
- Others:
  - Non programmable
  - Not designed or rated as radiation hardened
  - CMOS process (P type silicon substrate)

## DESCRIPTION

The LH5332600 is a 32M-bit mask-programmable ROM organized as 4,194,304 × 8 bits (Byte mode) or 2,097,152 × 16 bits (Word mode) that can be selected by a  $\overline{\text{BYTE}}$  input pin. It is fabricated using silicon-gate CMOS process technology.

## PIN CONNECTIONS

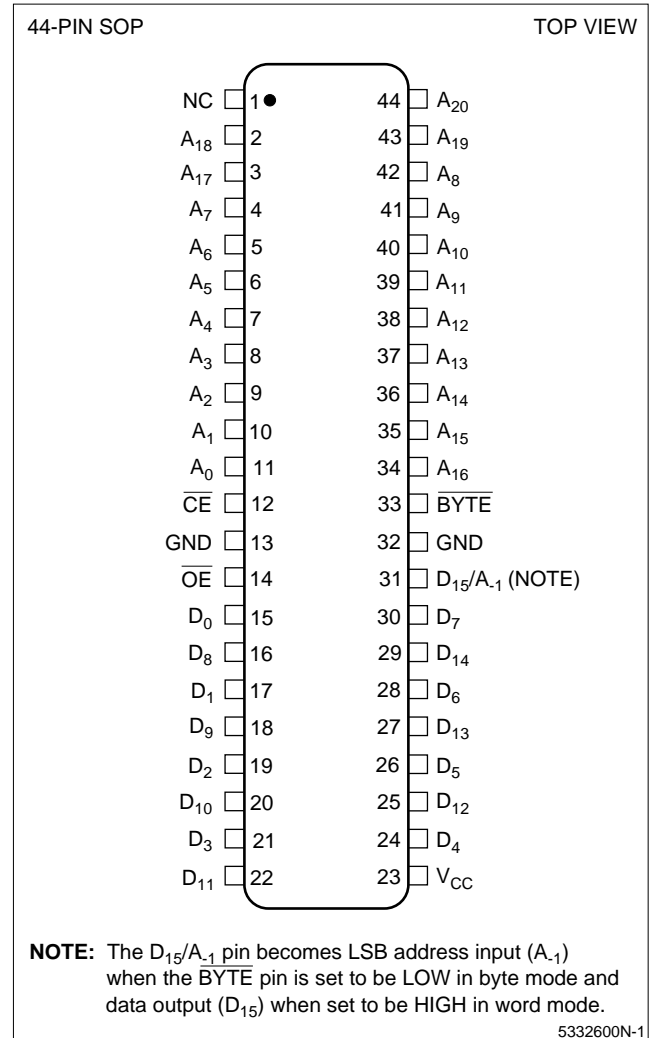


Figure 1. SOP Pin Connections

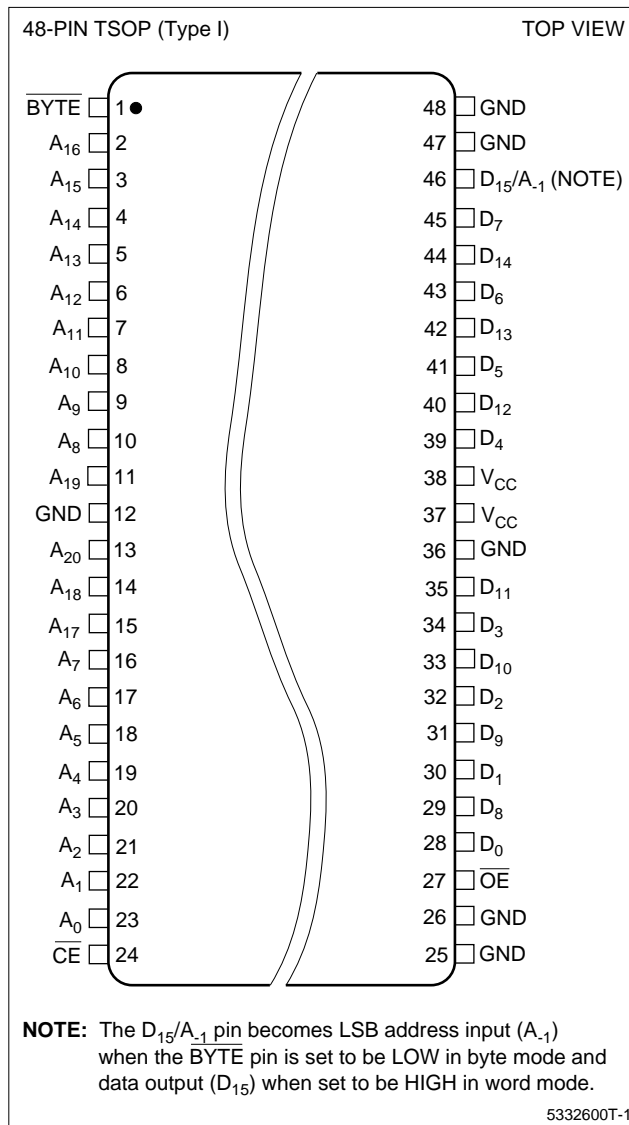
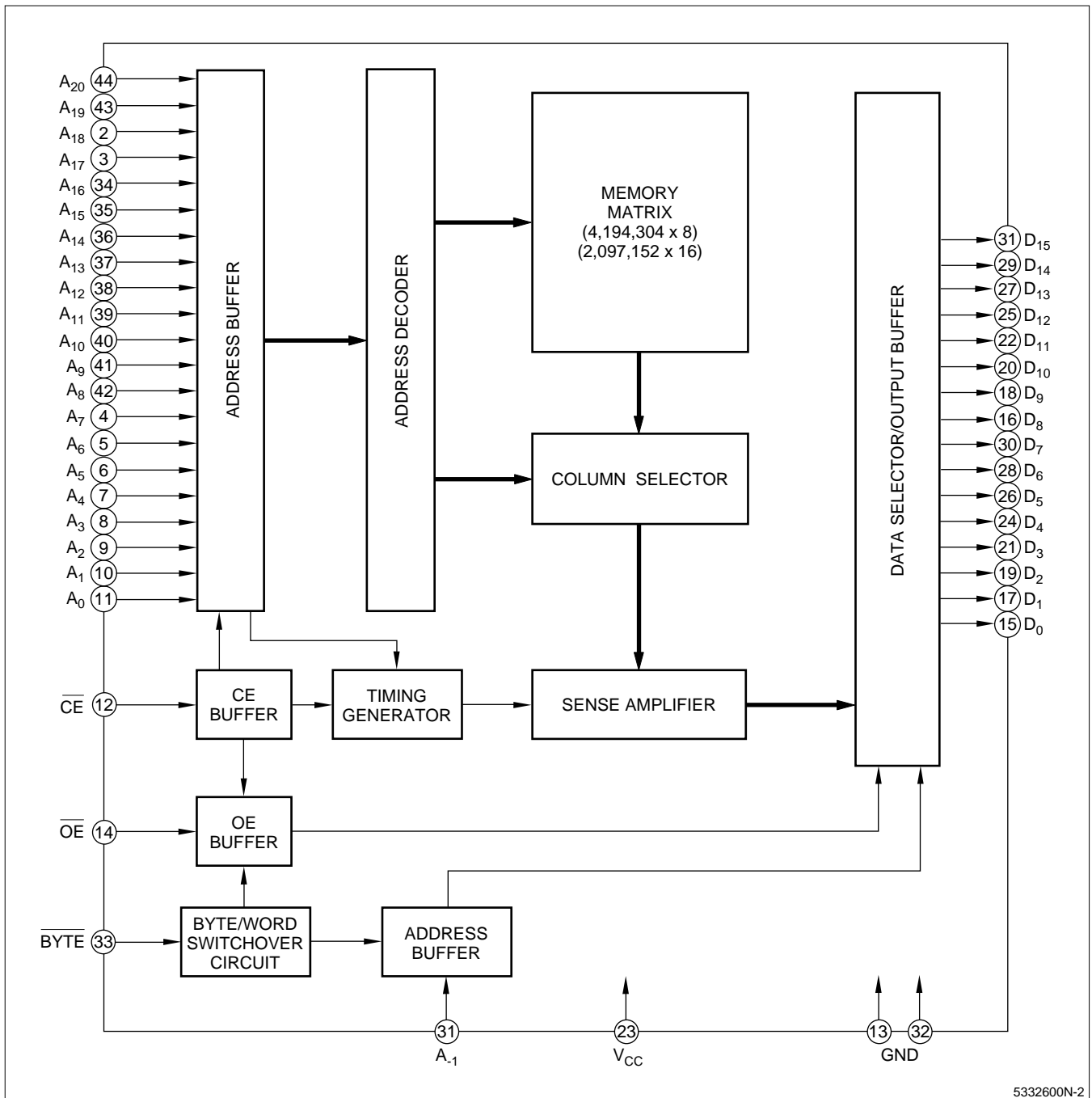


Figure 2. TSOP Pin Connections



5332600N-2

Figure 3. LH5332600 Block Diagram

**PIN DESCRIPTION**

SIGNAL	PIN NAME
A <sub>1</sub> - A <sub>20</sub>	Address input
D <sub>0</sub> - D <sub>15</sub>	Data output
BYTE	×8bit / ×16 bit (byte/word) mode select input
CE	Chip enable input

SIGNAL	PIN NAME
OE	Output enable input
V <sub>CC</sub>	Power supply
GND	Ground
NC	No connection (Non wire bonding)

## TRUTH TABLE

$\overline{CE}$	$\overline{OE}$	$\overline{BYTE}$	A-1 (D <sub>15</sub> )	DATA OUTPUT		ADDRESS INPUT		SUPPLY CURRENT
				D <sub>0</sub> - D <sub>7</sub>	D <sub>8</sub> - D <sub>15</sub>	LSB	MSB	
H	X	X	X	High-Z	High-Z	—	—	Standby (I <sub>SB</sub> )
L	H	X	X	High-Z	High-Z	—	—	Operating
L	L	H	—	D <sub>0</sub> - D <sub>7</sub>	D <sub>8</sub> - D <sub>15</sub>	A <sub>0</sub>	A <sub>20</sub>	Operating
L	L	L	L	D <sub>0</sub> - D <sub>7</sub>	High-Z	A-1	A <sub>20</sub>	Operating
L	L	L	H	D <sub>8</sub> - D <sub>15</sub>	High-Z	A-1	A <sub>20</sub>	Operating

## NOTES:

X = Don't care; High-Z = High-impedance

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply voltage	V <sub>CC</sub>	-0.3 to +7.0	V
Input voltage	V <sub>IN</sub>	-0.3 to V <sub>CC</sub> + 0.3	V
Output voltage	V <sub>OUT</sub>	-0.3 to V <sub>CC</sub> + 0.3	V
Operating temperature	T <sub>OPR</sub>	0 to +70	°C
Storage temperature	T <sub>STG</sub>	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 0 to +70°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage	V <sub>CC</sub>	4.5	5.0	5.5	V

DC ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 5 V ±10%, T<sub>A</sub> = 0 to +70°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	MAX.	UNIT	NOTE
Input 'High' voltage	V <sub>IH</sub>	—	2.2	V <sub>CC</sub> + 0.3	V	—
Input 'Low' voltage	V <sub>IL</sub>	—	-0.3	0.8	V	—
Output 'High' voltage	V <sub>OH</sub>	I <sub>OH</sub> = -400 μA	2.4	—	V	—
Output 'Low' voltage	V <sub>OL</sub>	I <sub>OL</sub> = 2.0 mA	—	0.4	V	—
Input leakage current	I <sub>LI</sub>	V <sub>IN</sub> = 0 V to V <sub>CC</sub>	—	10	μA	—
Output leakage current	I <sub>LO</sub>	V <sub>OUT</sub> = 0 V to V <sub>CC</sub>	—	10	μA	1
Operating current	I <sub>CC1</sub>	t <sub>RC</sub> = 100 ns	—	100	mA	2
	I <sub>CC2</sub>	t <sub>RC</sub> = 1 μs	—	90		
Standby current	I <sub>SB1</sub>	CE = V <sub>IH</sub>	—	2	mA	—
	I <sub>SB2</sub>	CE = V <sub>CC</sub> - 0.2 V	—	100		
Input capacitance	C <sub>IN</sub>	f = 1 MHz, T <sub>A</sub> = 25°C	—	10	pF	—
Output capacitance	C <sub>OUT</sub>		—	10		

## NOTES:

1. CE = V<sub>IH</sub>, OE = V<sub>IH</sub>
2. V<sub>IN</sub> = V<sub>IH</sub> or V<sub>IL</sub>, CE = V<sub>IL</sub>, output is open

**AC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $T_A = 0\text{ to }+70^\circ\text{C}$ )**

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	NOTE
Read cycle time	$t_{RC}$	100	—	ns	—
Address access time	$t_{AA}$	—	100	ns	—
Chip enable access time	$t_{ACE}$	—	100	ns	—
Output enable delay time	$t_{OE}$	—	50	ns	—
Output hold time	$t_{OH}$	5	—	ns	—
Output floating time	$t_{CHZ}$	—	40	ns	1
	$t_{OHZ}$	—	40	ns	

**NOTE:**

1. Determined by the time for the output to be opened. (Irrespective of output voltage)

**AC TEST CONDITIONS**

PARAMETER	RATING
Input voltage amplitude	0.4 V to 2.6 V
Input rise/fall time	10 ns
Input signal fall time	10 ns
Input reference level	1.5 V
Output reference level	1.5 V
Output load condition	1TTL + 100 pF

**CAUTION**

It is recommended that a decoupling capacitor be connected between  $V_{CC}$  and GND-Pin.

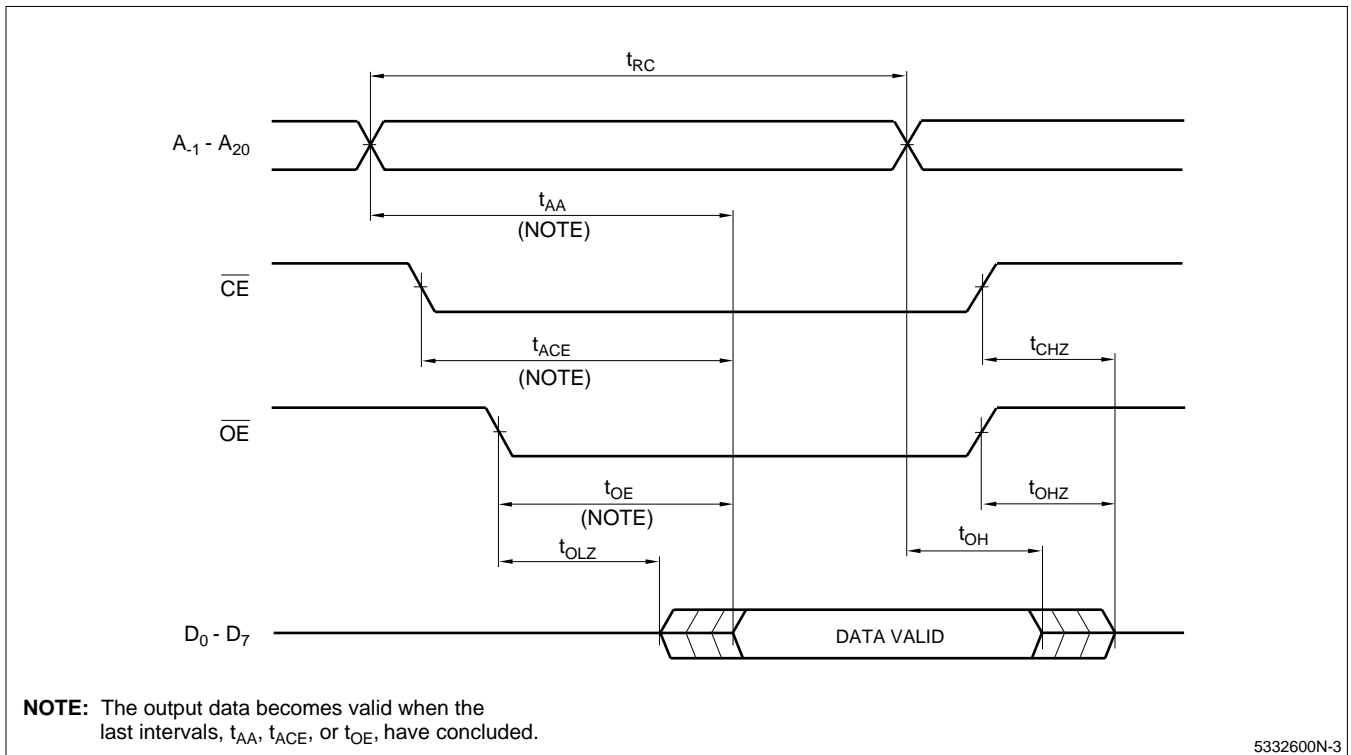


Figure 4. Byte Mode (BYTE = V<sub>IL</sub>)

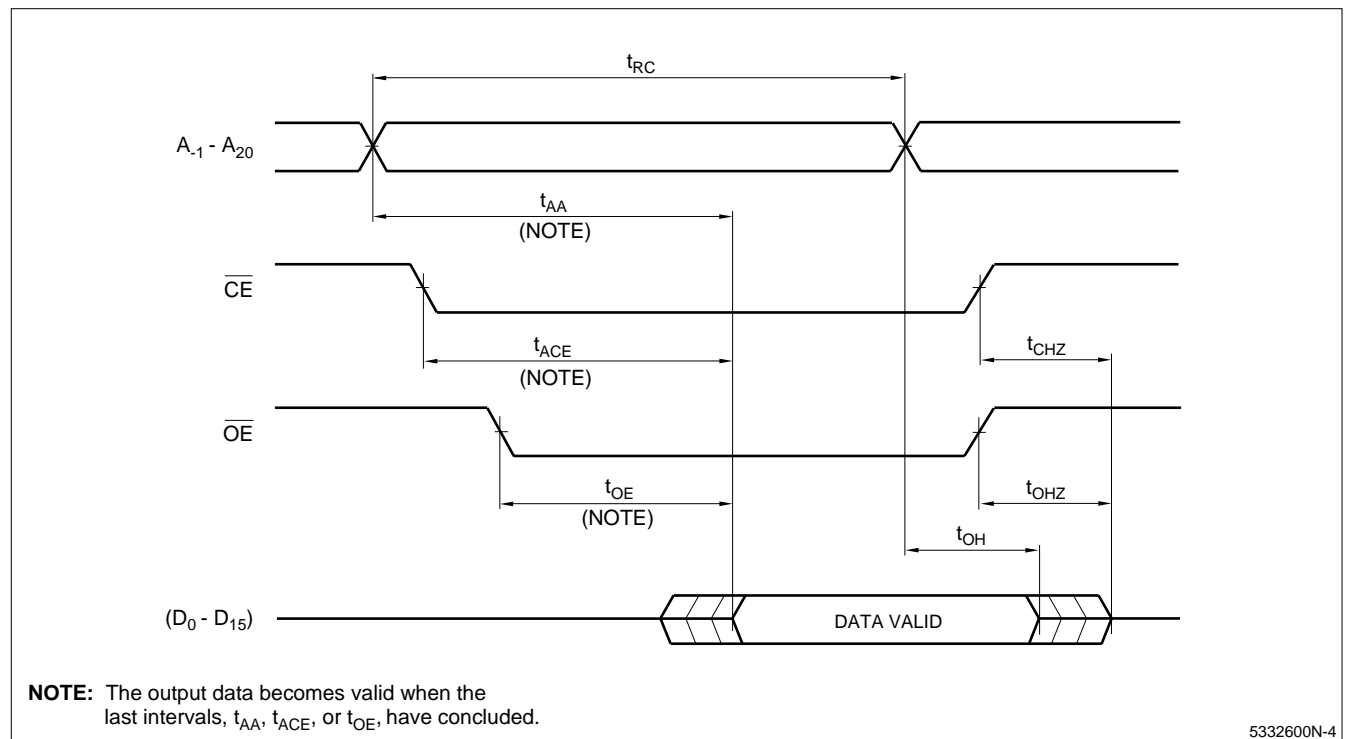
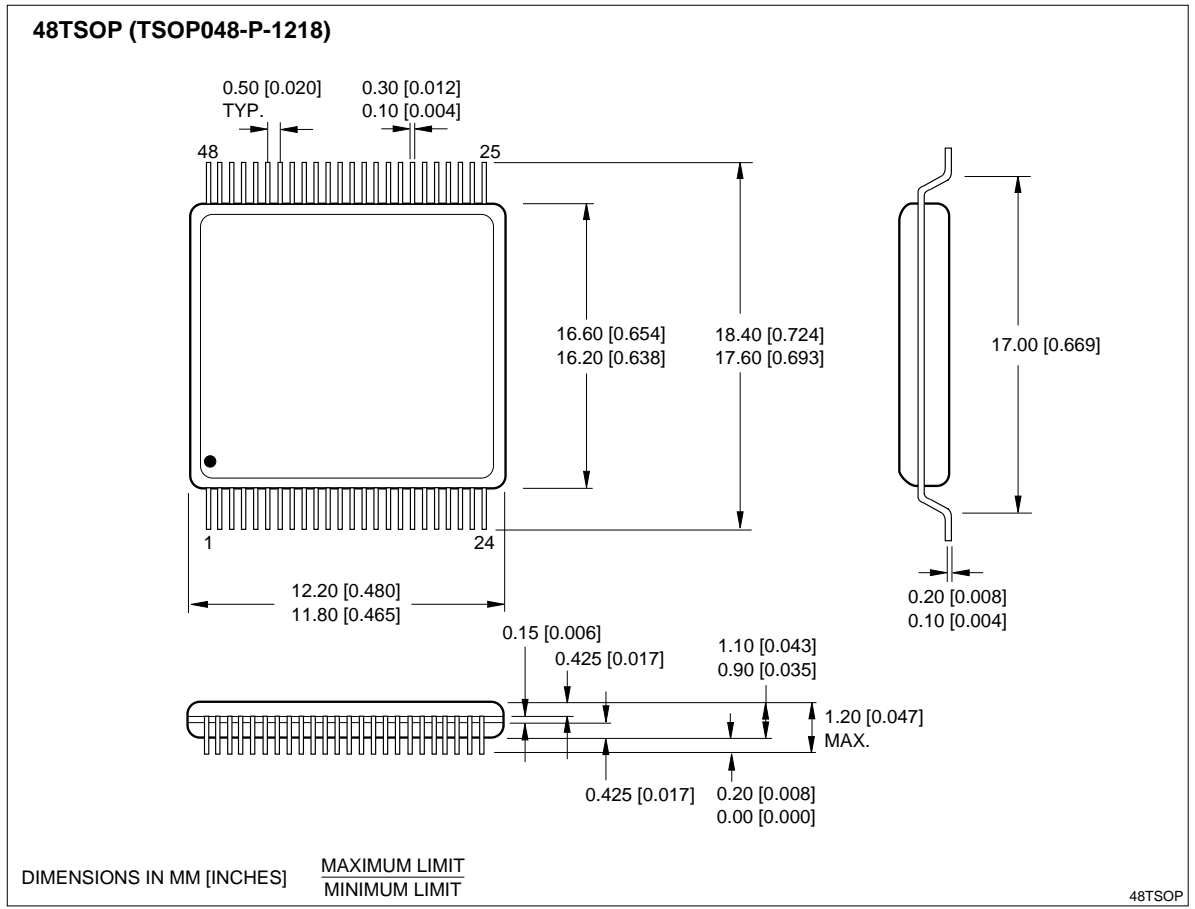
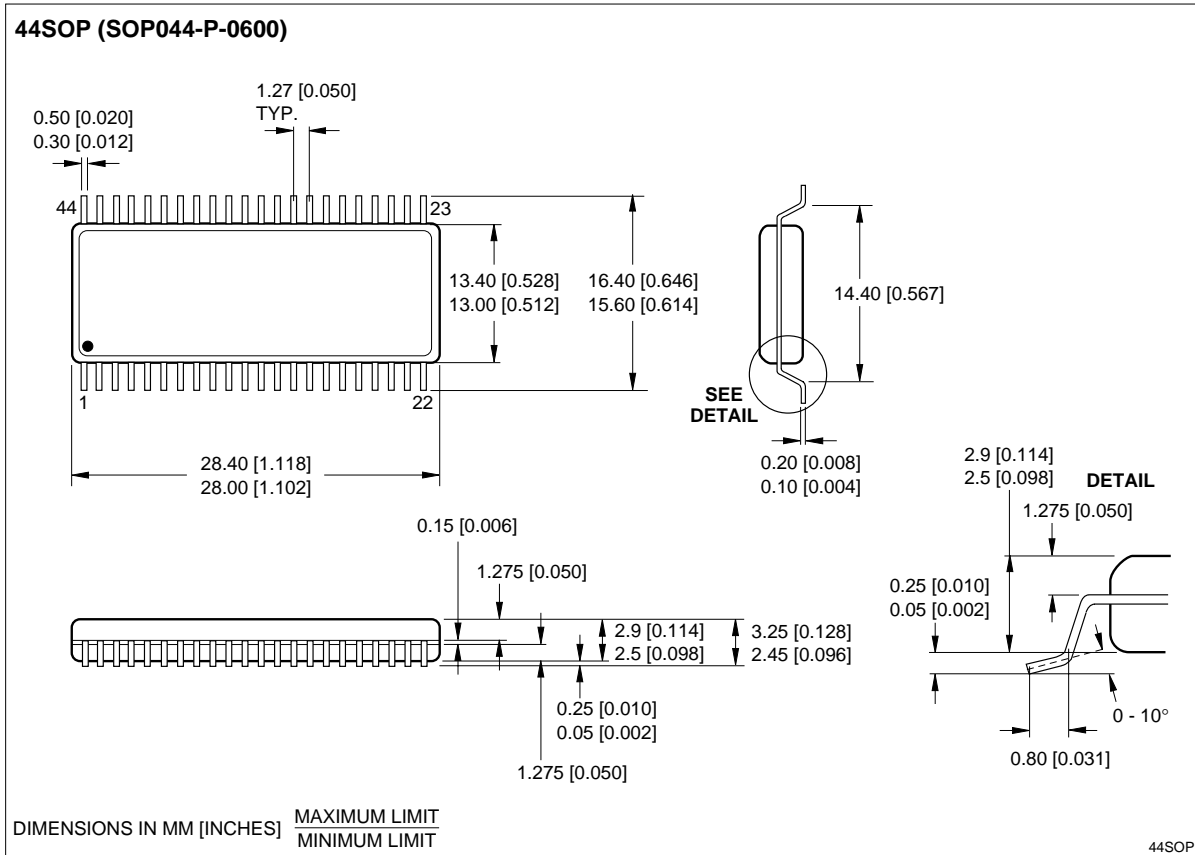
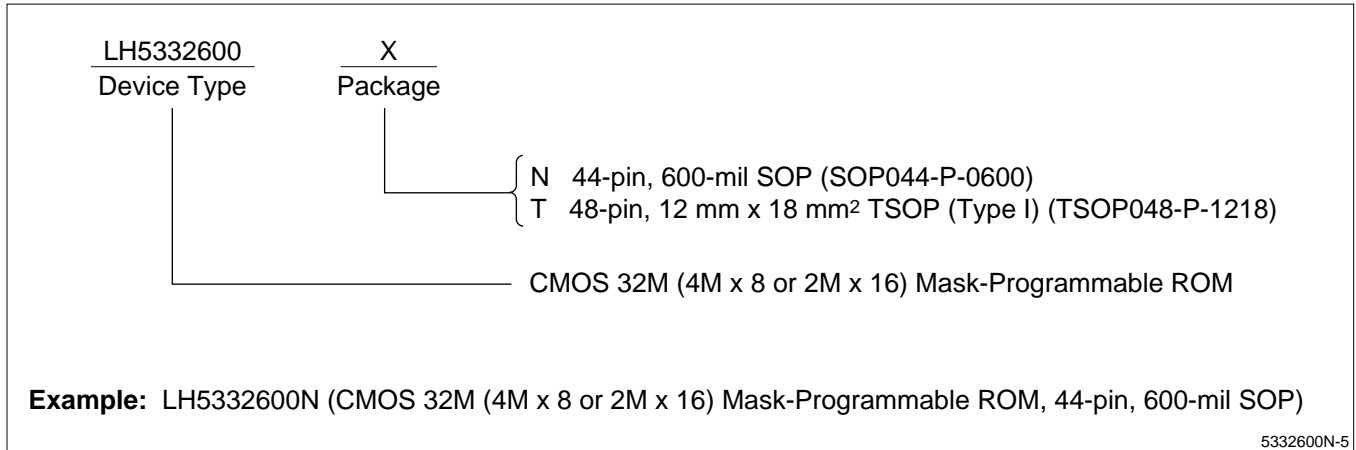


Figure 5. Word Mode (BYTE = V<sub>IH</sub>)

PACKAGE DIAGRAM



### ORDERING INFORMATION





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