

LH538500A

CMOS 8M (1M × 8 / 512K × 16)
Mask-Programmable ROM

FEATURES

- 1,048,576 × 8 bit organization (Byte mode)
524,288 × 16 bit organization (Word mode)
- $\overline{\text{BYTE}}$ input pin selects bit configuration
- Access time: 150 ns (MAX.)
- Power consumption:
Operating: 275 mW (MAX.)
Standby: 550 μ W (MAX.)
- Fully-static operation
- TTL compatible I/O
- Three-state outputs
- Single +5 V power supply
- Packages:
42-pin, 600-mil DIP
44-pin, 600-mil SOP
44-pin, 14 × 14 mm² QFP
64-pin, 14 × 20 mm² QFP
48-pin, 12 × 18 mm² TSOP (Type I)
- X16 word-wide pinout

DESCRIPTION

The LH538500A is a mask-programmable ROM organized as 1,048,576 × 8 bits (Byte mode) or 524,288 × 16 bits (Word mode) that can be selected by $\overline{\text{BYTE}}$ input pin. It is fabricated using silicon-gate CMOS process technology.

PIN CONNECTIONS

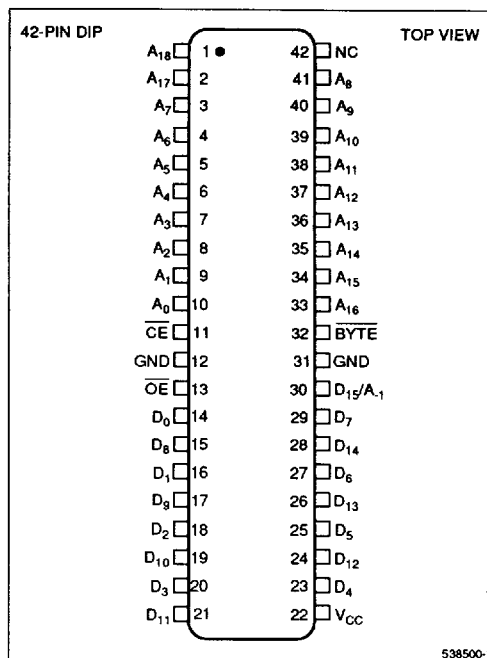


Figure 1. Pin Connections for DIP Package

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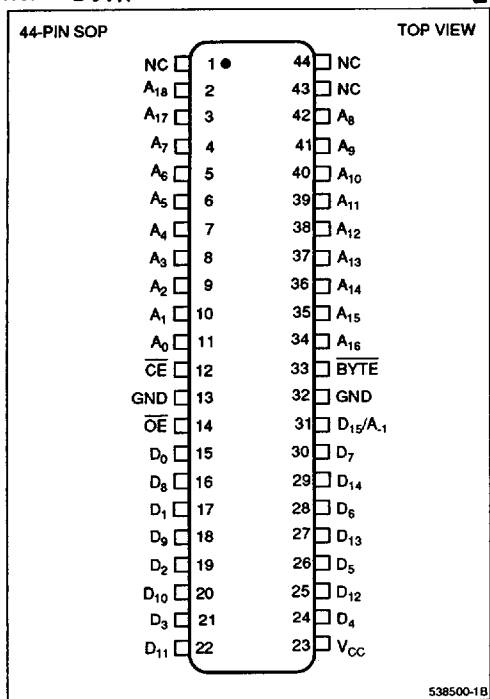


Figure 2. Pin Connections for SOP Package

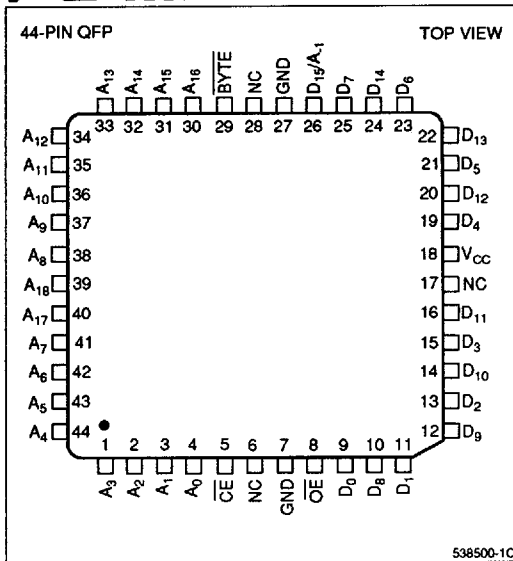


Figure 3. Pin Connections for 44-Pin QFP Package

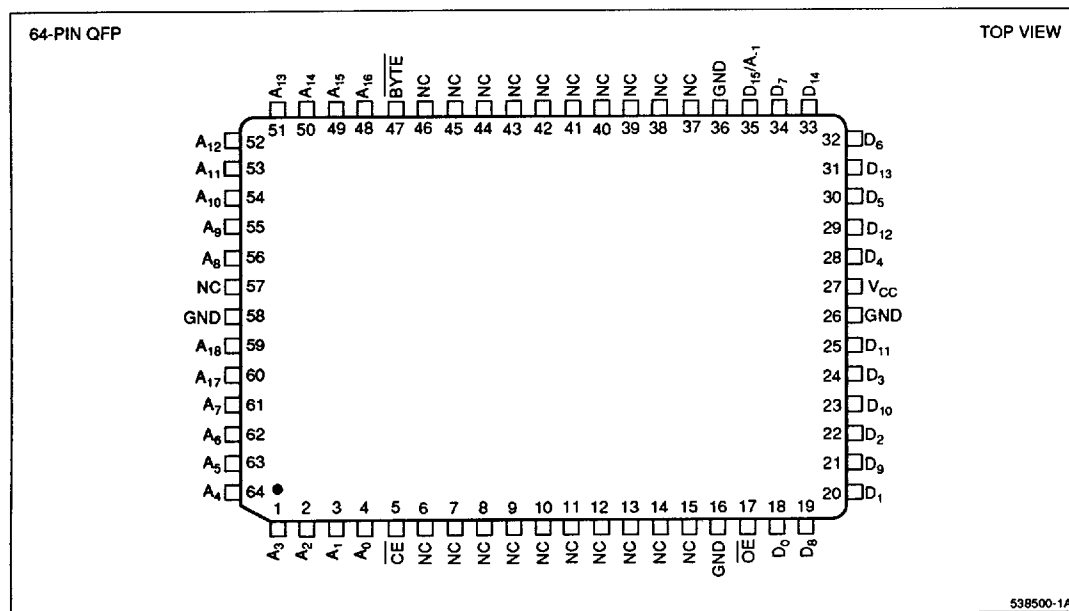


Figure 4. Pin Connections for 64-Pin QFP Package

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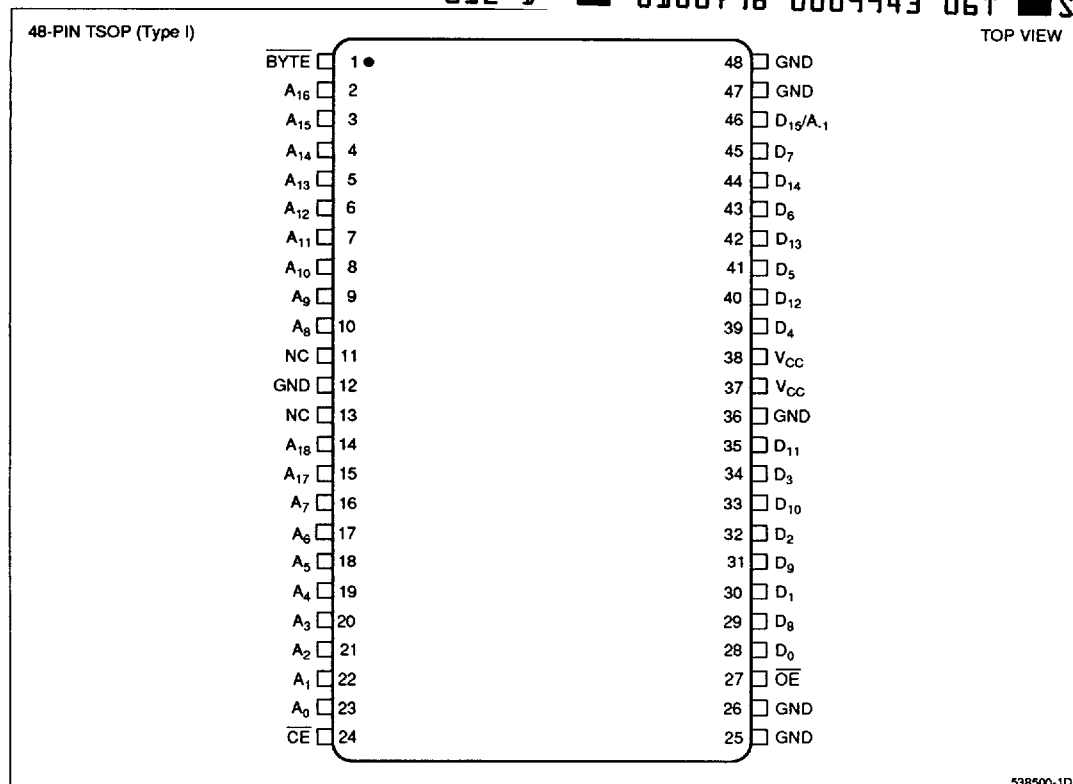


Figure 5. Pin Connections for TSOP Package

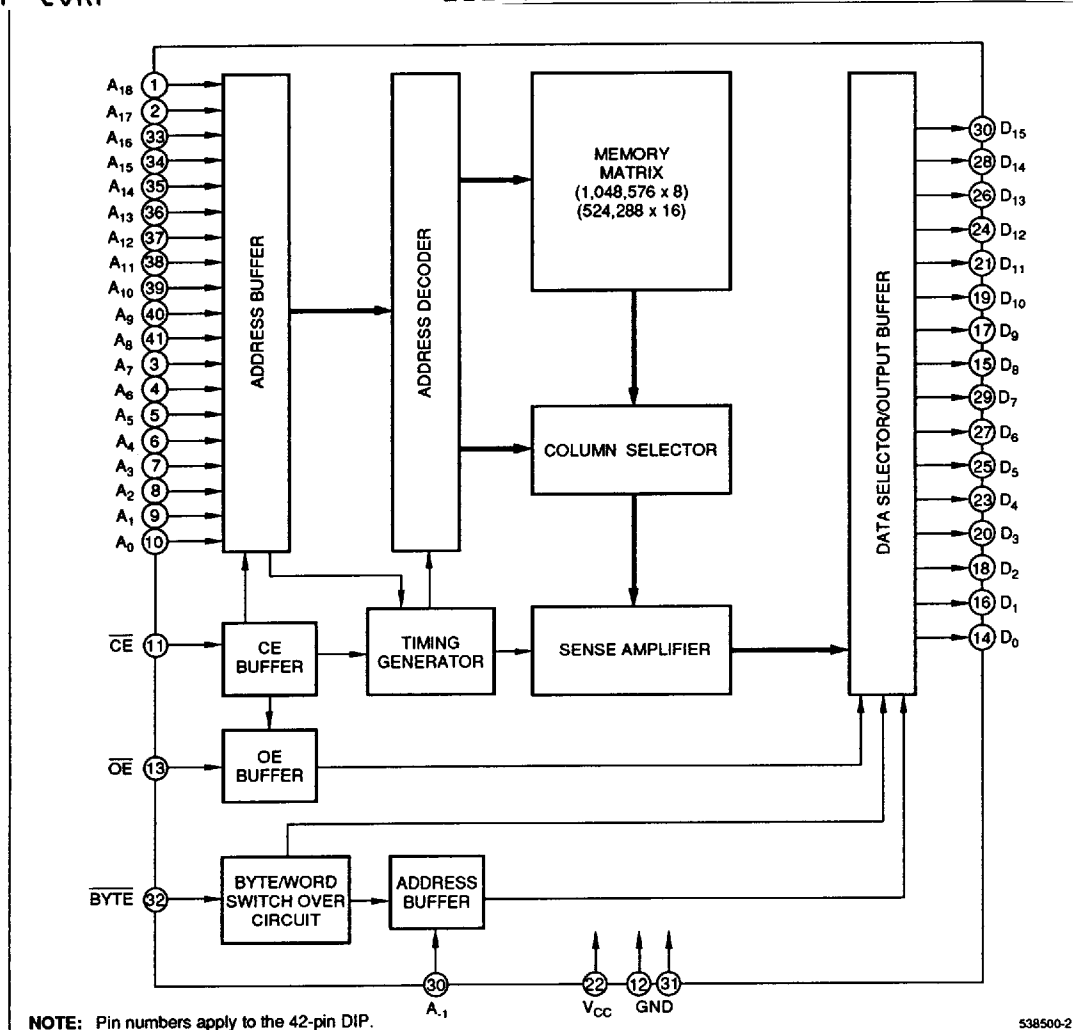


Figure 6. LH538500A Block Diagram

PIN DESCRIPTION

SIGNAL	PIN NAME	NOTE
A ₋₁	Address input (Byte mode)	1
A ₀ - A ₁₈	Address input	
D ₀ - D ₁₅	Data output	
CE	Chip Enable input	

SIGNAL	PIN NAME	NOTE
OE	Output Enable input	
BYTE	Byte/word switch	
V _{CC}	Power supply (+5 V)	
GND	Ground	

NOTE:

1. D₁₅/A₋₁ pin becomes LSB address input (A₋₁) when the bit configuration is set to byte mode, and data output (D₁₅) when in word mode. BYTE input pin selects bit configuration.

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TRUTH TABLE

CE	OE	BYTE *	A ₁	MODE	D ₀ - D ₇	D ₈ - D ₁₅	SUPPLY CURRENT	NOTE
H	X	X	X	Non selected	High-Z		Standby (I _{SB})	1
L	H	X	X	Non selected	High-Z		Operating (I _{CC})	
L	L	H	Input inhibit	Word	D ₀ - D ₇	D ₈ - D ₁₅	Operating (I _{CC})	
L	L	L	L	Byte	D ₀ - D ₇	High-Z	Operating (I _{CC})	
L	L	L	H	Byte	D ₈ - D ₁₅	High-Z	Operating (I _{CC})	

NOTE:

1. X = H or L

* BYTE input state must be set to H or L and must not be changed during operation.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT	NOTE
Supply voltage	V _{CC}	-0.3 to +7.0	V	1
Input voltage	V _{IN}	-0.3 to V _{CC} +0.3	V	
Output voltage	V _{OUT}	-0.3 to V _{CC} +0.3	V	
Operating temperature	T _{opr}	0 to +70	°C	
Storage temperature	T _{stg}	-55 to +150	°C	

NOTE:

1. The maximum applicable voltage on any pin with respect to GND.

RECOMMENDED OPERATING CONDITIONS (T_A = 0 to +70°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage	V _{CC}	4.5	5.0	5.5	V

DC CHARACTERISTICS (V_{CC} = 5 V ± 10%, T_A = 0 to +70°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	MAX.	UNIT	NOTE
Input 'Low' voltage	V _{IL}		-0.3	0.8	V	
Input 'High' voltage	V _{IH}		2.2	V _{CC} +0.3	V	
Output 'Low' voltage	V _{OL}	I _{OL} = 2.0 mA		0.4	V	
Output 'High' voltage	V _{OH}	I _{OH} = -400 μA	2.4		V	
Input leakage current	I _{LI}	V _{IN} = 0 V or V _{CC}		10	μA	
Output leakage current	I _{LO}	V _{OUT} = 0 V or V _{CC}		10	μA	1
Operating current	I _{CC1}	t _{RC} = 150 ns		50	mA	2
	I _{CC2}	t _{RC} = 1 μs		40		
Standby current	I _{SB1}	$\overline{CE} = V_{IH}$		3	mA	
	I _{SB2}	$\overline{CE} = V_{CC} - 0.2 V$		100		

NOTES:

1. $\overline{CE}/\overline{OE} = V_{IH}$ 2. V_{IN} = V_{IH}/V_{IL}, $\overline{CE} = V_{IL}$, outputs open

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AC 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}	150		ns	
Address access time	t_{AA}		150	ns	
Chip enable time	t_{ACE}		150	ns	
Output enable time	t_{OE}		70	ns	
Output hold time	t_{OH}	5		ns	
CE to output in High-Z	t_{CHZ}		70	ns	1
OE to output in High-Z	t_{OHZ}		70	ns	

NOTE:

1. This is the time required for the outputs to become high-impedance.

AC TEST CONDITIONS

PARAMETER	RATING
Input voltage amplitude	0.6 V to 2.4 V
Input rise/fall time	10 ns
Input reference level	1.5 V
Output reference level	0.8 V and 2.2 V
Output load condition	1TTL +100 pF

CAPACITANCE ($V_{CC} = 5\text{ V} \pm 10\%$, $f = 1\text{ MHz}$, $T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Input capacitance	C_{IN}			10	pF
Output capacitance	C_{OUT}			10	pF

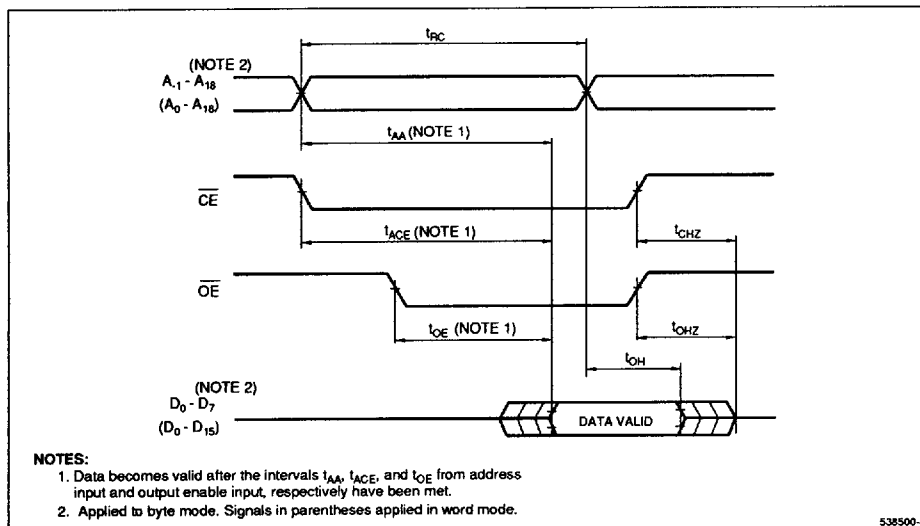


Figure 7. Timing Diagram

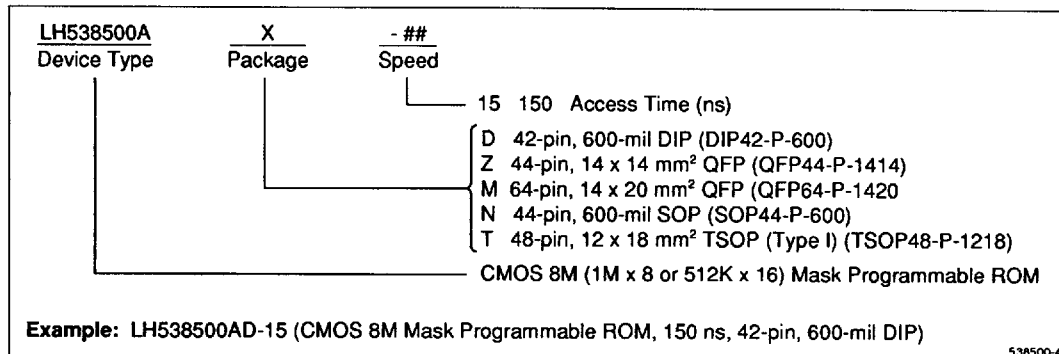
CAUTION

To stabilize the power supply, it is recommended that a high-frequency bypass capacitor be connected between the V_{CC} pin and the GND pin.

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ORDERING INFORMATION

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