

OKI Semiconductor

MSM538052E

524,288-Words x 16-bit or 1,048,576-Bytes x 8-bit MaskROM
8Words x 16-Bit or 16Bytes x 8-Bit/Page Mode MASKROM

■ DESCRIPTION

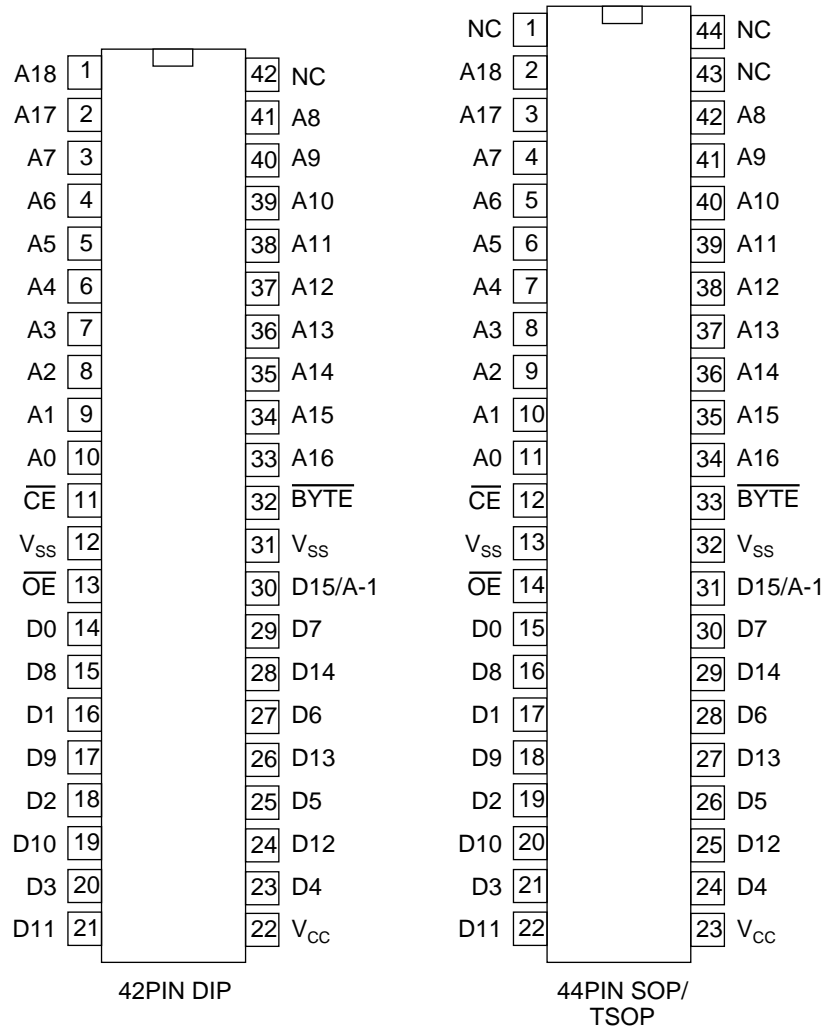
The OKI MSM538052E is a 524,288-words x 16-bit or 1,048,576-Bytes x 8-bit CMOS Mask ROM with an asynchronous page read mode. Each page is organized 8 words x 16-bit or 16 words x 8-bit. It operates on a single 5.0V power supply and is TTL compatible. The chip's asynchronous I/O requires no external clock assuring easy operation. A power-down mode provides low power dissipation when the chip is not selected. The CE and OE pins are provided as control signals that permit three-stated output allowing easy memory expansion on a system bus. The MSM538052E is suited for use as large capacity fixed memory for microcomputers and data terminals.

■ FEATURES

- Single 5.0V power supply
- 524,288-words x 16-bit / 1,048,576-Bytes x 8-bit
- 8-words(A2,A1,A0) or 16-Bytes(A2,A1,A0,A-1) / Page
- Access time
 - 100ns Max (Normal access)
 - 50ns Max (Page access)
- Input/Output TTL compatible
- Tri-State output configurations
- Internal powerdown function
- Packages:

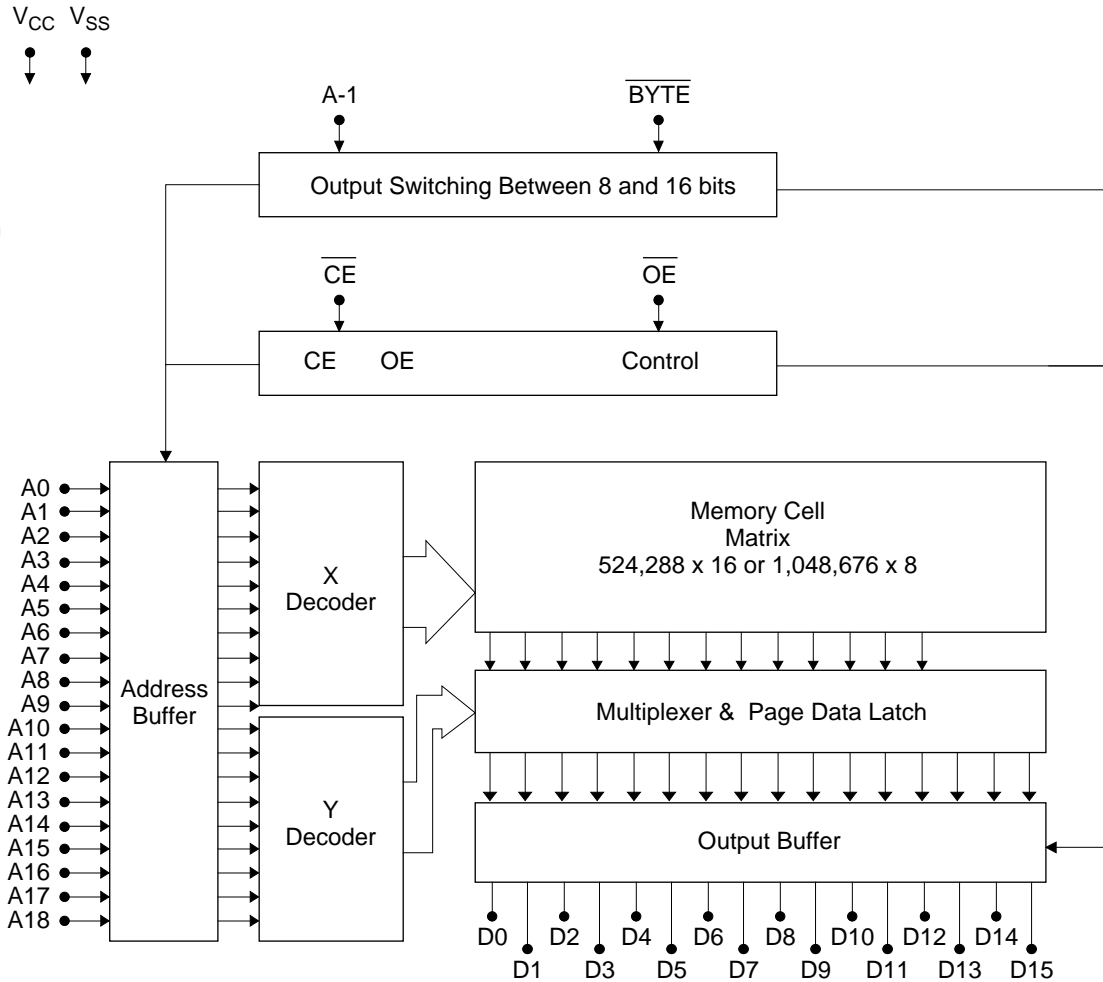
42-PIN PLASTIC DIP	(DIP42-P-600-2.54)	(MSM538052E-xxRS)
44-PIN PLASTIC SOP	(SOP44-P-600-1.27-K)	(MSM538052E-xxGS-K)
44-PIN PLASTIC TSOP	(TSOP44-P-400-0.80-1K)	(MSM538052E-xxTS-AK)
- Pin compatible OTP available

PIN CONFIGURATION



Pin Name	Function
D15/A-1	Data output / address input
A0 to A18	Address input
D0 to D15	Data output
\overline{CE}	Chip enable
\overline{OE}	Output enable
\overline{BYTE}	Mode switch
V _{CC} , V _{SS}	Power supply

BLOCK DIAGRAM



FUNCTION TABLE

$\overline{\text{CE}}$	$\overline{\text{OE}}$	$\overline{\text{BYTE}}$	A-1/D15	D0—D7	D8—D15	D_{OUT} Mode	LSB	MSB
H	X	X	X	Hi-Z	Hi-Z	Hi-Z	—	—
L	H	X	X	Hi-Z	Hi-Z		—	—
L	L	H	Input Inhibited (D15)	D0 to D7	D8 to D15	16 bit	A0	A18
L	L	H	Input Inhibited (D15)	D0 to D7	D8 to D15	16 bit(Page Mode)	A0	A2
L	L	L	L	D0 to D7	Hi-Z	8 bit	A-1	A18
L	L	L	H	D8 to D15	Hi-Z			
L	L	L	L	D0 to D7	Hi-Z	8 bit(Page Mode)	A-1	A2
L	L	L	H	D8 to D15	Hi-Z			

ABSOLUTE MAXIMUM LIMITS

Parameter	Symbol	Conditions	Limits	Unit
Power Supply Voltage	V_{CC}	to V_{SS}	-0.3 to 7	V
Input Voltage	V_I		-0.3 to $V_{CC} + 0.5$	V
Output Voltage	V_O		-0.3 to $V_{CC} + 0.5$	V
Power Dissipation	P_D	Per Package $T_{opr} = 25^\circ\text{C}$	1.0	W
Operating Temperature	T_{opr}	—	0 to 70	$^\circ\text{C}$
Storage Temperature	T_{stg}	—	-55 to 150	$^\circ\text{C}$

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Power Supply Voltage	V_{CC}	—	4.5	5.0	5.5	V
	V_{SS}	—	0.0	0.0	0.0	V
"H" Input Voltage	V_{IH}	—	2.2	5.0	5.5	V
"L" Input Voltage	V_{IL}	—	-0.3	0.0	0.8	V
Operating Temperature	T_{opr}	—	0	—	70	$^\circ\text{C}$

DC CHARACTERISTICS

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

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
"H" Output Voltage	V_{OH}	$I_{OH} = -400\mu\text{A}$	2.4	—	—	V
"L" Output Voltage	V_{OL}	$I_{OH} = 2.1\text{mA}$	—	—	0.4	V
Input Leakage Current	I_{LI}	$V_I = 0 \text{ to } V_{CC}$	-10	—	10	μA
Output Leakage Current	I_{LO}	$V_O = 0 \text{ to } V_{CC}$ $CE = V_{IH\text{ MIN}}$	-10	—	10	μA
Power Supply Current (Operating)	I_{CC}	$CE = V_{IL}, OE = V_{IH}, t_C = 100\text{ns}$	—	—	80	mA
Power Supply Current (Standby)	I_{CCS1}	$CE = V_{CC} - 0.2\text{V}$	—	—	50	μA
	I_{CCS}	$CE = V_{IH\text{ MIN}}$	—	—	500	μA

AC CHARACTERISTICS

Test conditions

Parameter	Conditions
Input Signal Level	$V_{IH}=3.0V, V_{IL}=0.0V$
Transtion Time	$t_r=t_f=5ns$
Timing Reference Level	Input Voltage=1.5V Output Voltage=0.8V&2.0V
Load Condition	CL=100pF+1TTL

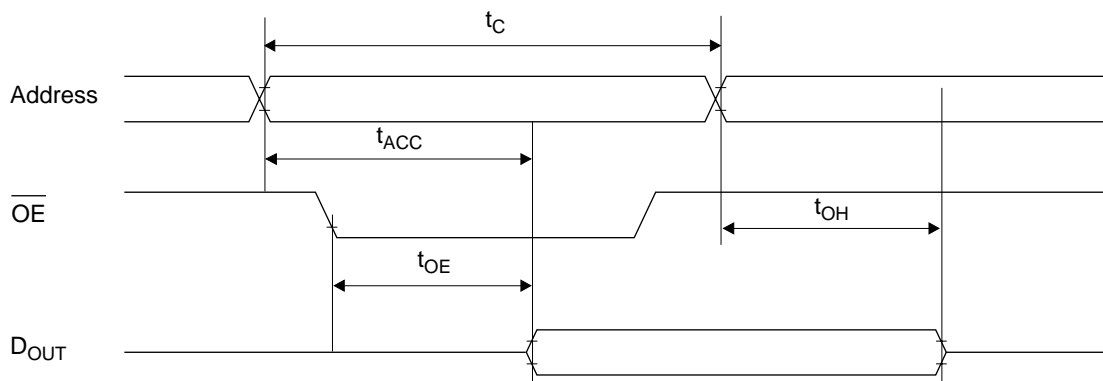
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Read Cycle

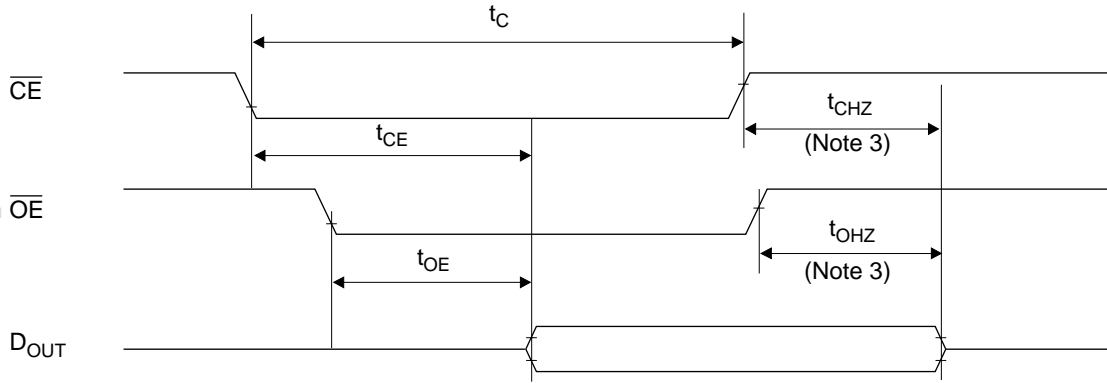
(Ta = 0 to 70°C)

Parameter	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Random Access Cycle time	t_C	—	100	—	—	ns
Random Address Access time	t_{ACC}	—	—	—	100	ns
Page Set up time	t_{PSET}	—	120	—	—	ns
Page Access Cycle time	t_{PC}	—	50	—	—	ns
Page Access time	t_{PAC}	—	—	—	50	ns
\overline{CE} Access time	t_{CE}	—	—	—	100	ns
\overline{OE} Access time	t_{OE}	—	—	—	50	ns
\overline{CE} Output Disable time	t_{CHZ}	—	0	—	40	ns
\overline{OE} Output Disable time	t_{OHZ}	—	0	—	30	ns
Output Hold time	t_{OH}	—	0	—	—	ns

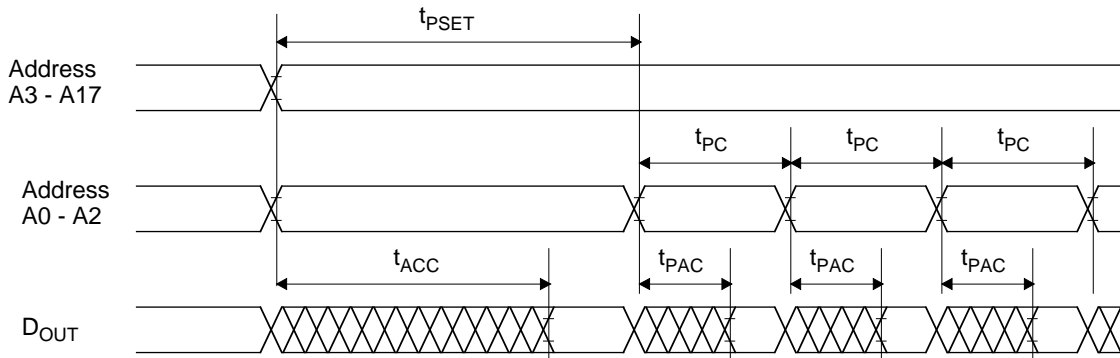
Read Cycle (Note1)



Read Cycle (Note2)



Page Mode Read Cycle (Note4)



- Note)
1. \overline{CE} is low level.
 2. Address is fixed before or at the same time when \overline{CE} level falls.
 3. t_{CHZ} & t_{OHZ} indicate the time until floating. They are not determined by the output level.
 4. \overline{CE} is low level and \overline{OE} is low level.

I/O CAPACITANCE

Parameter	Symbol	Conditions	Rated Value			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_I	$V_I=0V$	—	—	8	pF
Output Capacitance	C_O	$V_O=0V$	—	—	10	pF

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