

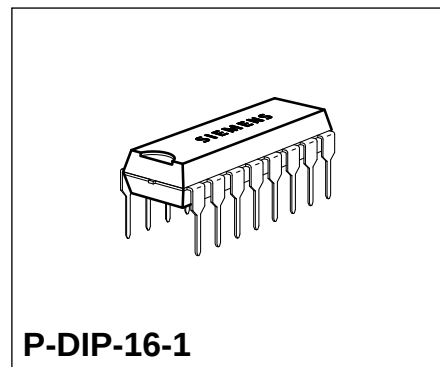
CMOS RAM

SAE 81C54

Preliminary Data CMOS IC

Features

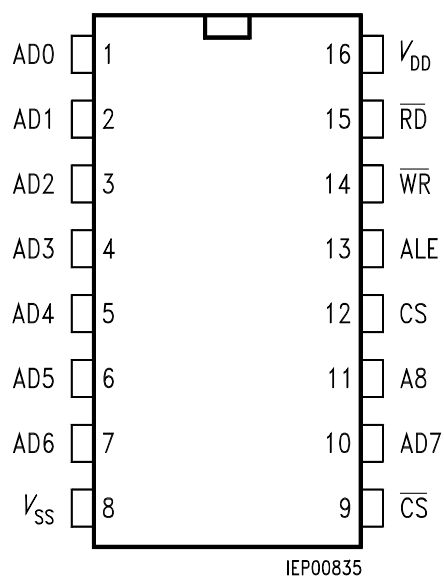
- 512 x 8 bit-organization
- Multiplexed address and data bus
- Tristate address and data lines
- On-chip address register
- Very low current consumption: 1 μ A at 5.5 V during standby
- Dual chip selection
- Wide supply voltage range from 2.5 V to 5.5 V
- Fully compatible 5 V $\pm$ 10 %
- Data retention up to 1.0 V
- Temperature range – 40 to 110 °C



Type	Ordering Code	Package
SAE 81C54 P	Q67100-H8486	P-DIP-16-1

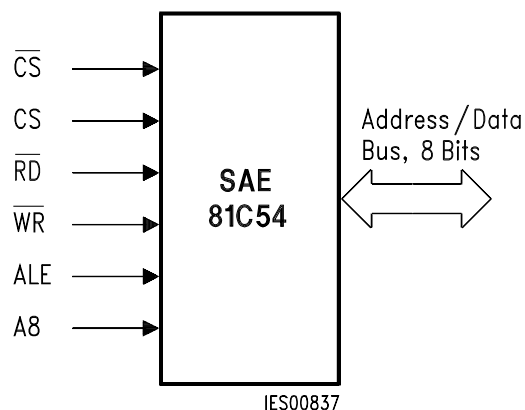
The SAE 81C54 P is a static 4096-bit RAM (512 words by 8 bits) in Advanced CMOS technology. The address and data bus in the multiplex operation allows directly interfaces to 8-bit microprocessors/microcontroller families, e.g. SAB 8086, SAB 8088, SAB 8051. Due to its low power dissipation of less than 1 μ A in standby mode this component requires only minimum supply current.

Pin Configurations (top view)



Pin Definitions and Functions

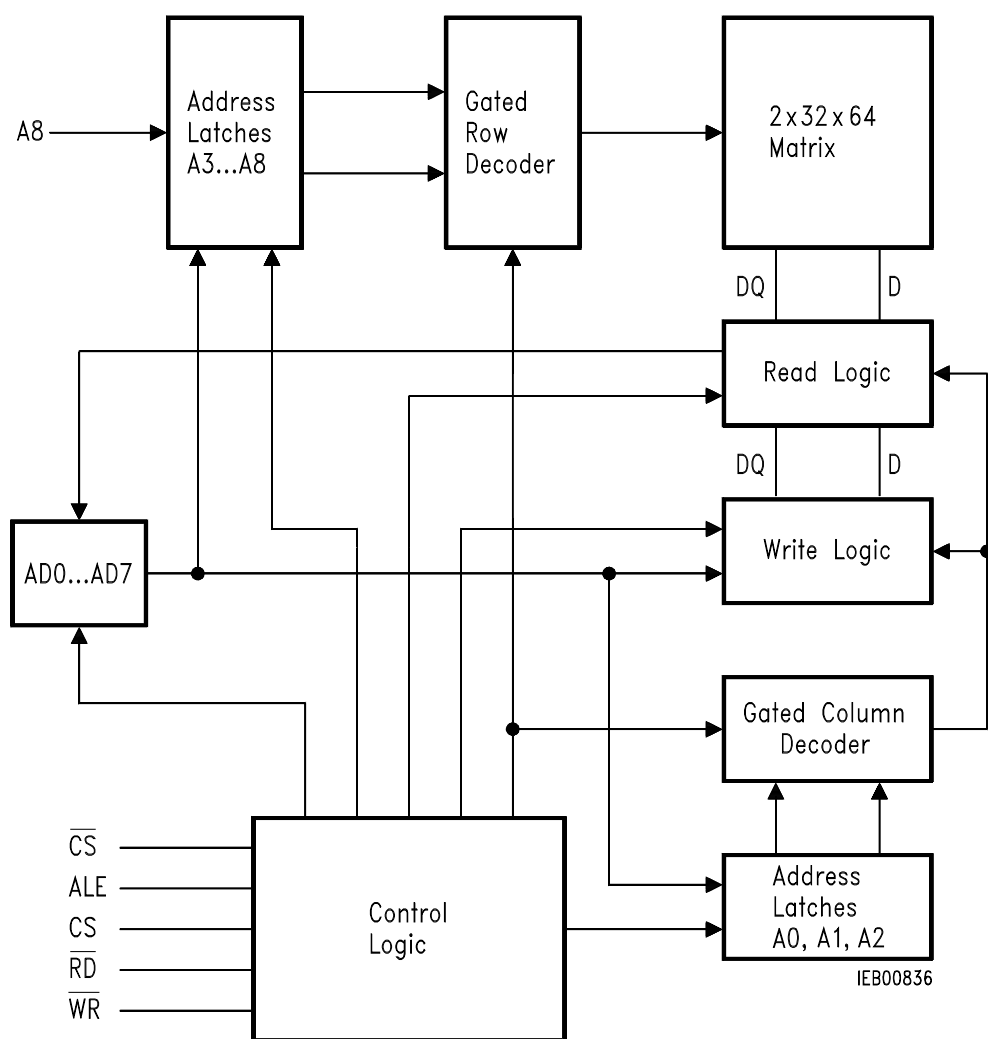
Pin No.	Symbol	Function
1-7, 10	AD0-7	Address/data lines
8	V_{SS}	Ground
9	$\overline{CS}$	Chip select
11	A8	Address line
12	CS	Chip select
13	ALE	Address signal latch enable
14	$\overline{WR}$	Write enable
15	$\overline{RD}$	Read enable
16	V_{DD}	Supply voltage



Logic Symbol

Truth Table for Control and Data Bus Pin Status

$\overline{CS}$	CS	$\overline{RD}$	$\overline{WR}$	AD0-7 During Data Phase	Function
H	X	X	X	Floating	None
X	L	X	X	Floating	None
L	H	L	H	Data from memory	Read
L	H	H	L	Data to memory	Write

**Block Diagram**

Absolute Maximum Ratings

Parameter	Symbol	Limit Values	Unit
Ambient temperature	T_A	– 40 to 110	°C
Storage temperature range	T_{stg}	– 55 to 125	°C
Thermal resistance system - air	$R_{th SA}$	70	K/W

DC Characteristics

$T_A = -40$ to 110 °C; $V_{DD} = 2.5$ to 5.5 V; $V_{SS} = 0$ V

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Standby supply current	I_{DD}			1	μA	$T_A = 25$ °C
Operating supply current	I_{DD}		500		μA	100-kHz ALE
Operating supply voltage	V_{DD}	2.5		5.5	V	
Standby supply voltage	V_{DD}	1.0		5.5	V	Data retention
Input current	I_{IL}			1	μA	$V_I = 0 - 5.5$ V
Output leakage current	I_{QL}			1	μA	$V_Q = 0 - 5.5$ V floating
L-input voltage ($V_{DD} < 4.5$ V)	V_I	– 0.8		0.6	V	
L-input voltage ($V_{DD} > 4.5$ V)	V_{IL}	– 0.8		0.8	V	
H-input voltage	V_{IH}	$0.6 \times V_{DD}$		$V_{DD} + 0.8$	V	
H-input voltage	V_{IH}			$V_{DD} + 0.8$	V	$V_{DD} = 5$ V

DC Characteristics (cont'd)

$T_A = -40$ to $110\text{ }^{\circ}\text{C}$; $V_{DD} = 2.5$ to 5.5 V ; $V_{SS} = 0\text{ V}$

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
L-output voltage ($V_{DD} < 4.5\text{ V}$)	V_{QL}			0.4	V	$I_{QL} = 1\text{ mA}$
L-output voltage ($V_{DD} > 4.5\text{ V}$)	V_{QL}			0.4	V	$I_{QL} = 2\text{ mA}$
H-output voltage ($V_{DD} < 4.5\text{ V}$)	V_{QH}	$0.75 \times V_{DD}$			V	$I_{QH} = 1\text{ mA}$
H-output voltage ($V_{DD} > 4.5\text{ V}$)	V_{QH}	$0.75 \times V_{DD}$			V	$I_{QH} = 2\text{ mA}$

AC Characteristics

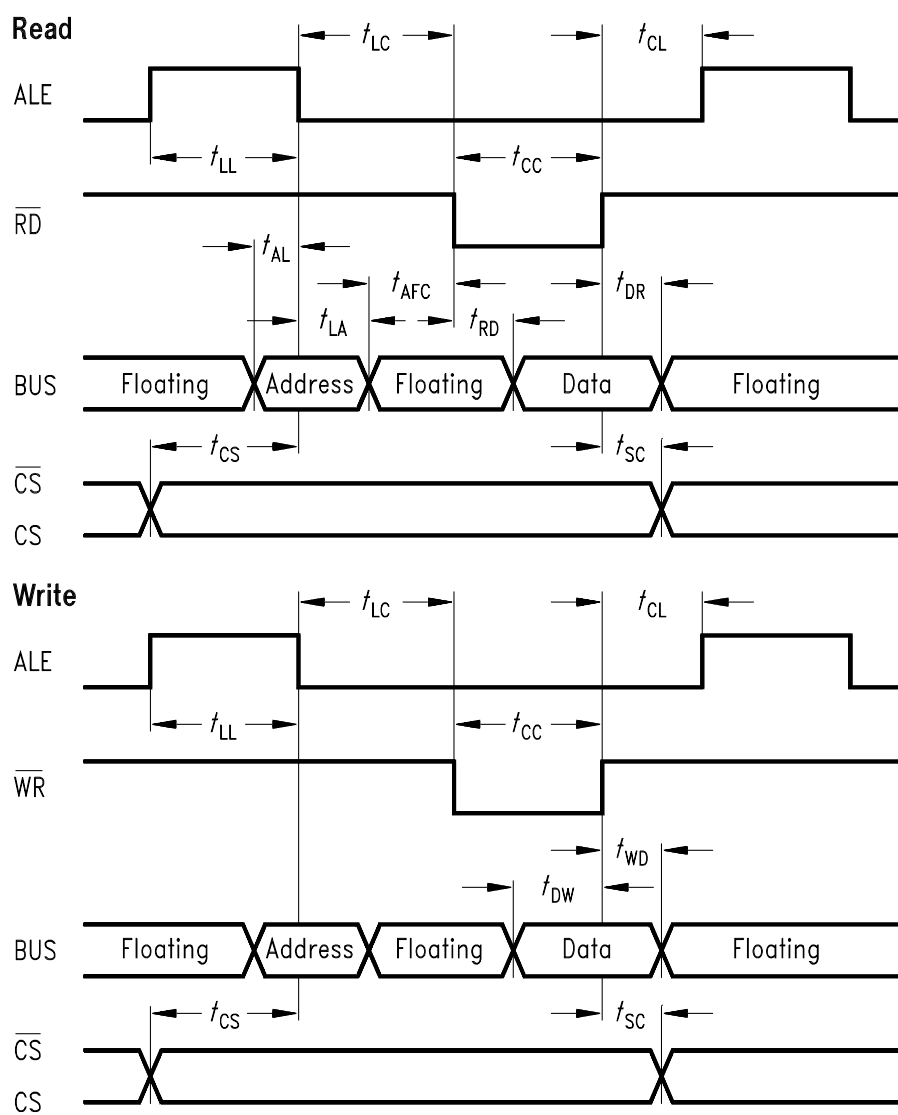
$T_A = -40$ to $110\text{ }^{\circ}\text{C}$; $V_{DD} = 4.5$ to 5.5 V ; $V_{SS} = 0\text{ V}$

Parameter	Symbol	Limit Values		Unit
		min.	max.	
ALE pulse width	t_{LL}	40		ns
Address setup before ALE	t_{AL}	25		ns
Address hold after ALE	t_{LA}	25		ns
$\overline{WR}$ pulse width	t_{CC}	60		ns
$\overline{RD}$ pulse width	t_{CW}	130		ns
Data setup before $\overline{WR}$	t_{DW}	70		ns
Data hold after $\overline{WR}$	t_{WD}	20		ns
Data hold after $\overline{RD}$	t_{DR}		30	ns
Access time $\overline{RD}$ to data output	t_{RD}		130	ns
Address floating to $\overline{RD}$	t_{AFC}	0		ns
CS before ALE	t_{CS}	30		ns
CS after $\overline{WR}$ or $\overline{RD}$	t_{SC}	10		ns
ALE to $\overline{RD}$ or $\overline{WR}$	t_{LC}	35		ns
$\overline{RD}$ or $\overline{WR}$ to ALE = high	t_{CL}	25		ns

AC Characteristics

$T_A = -40$ to $110\text{ }^{\circ}\text{C}$; $V_{DD} = 2.5$ to 5.5 V ; $V_{SS} = 0\text{ V}$

Parameter	Symbol	Limit Values		Unit
		min.	max.	
ALE pulse width	t_{LL}	60		ns
Address setup before ALE	t_{AL}	40		ns
Address hold after ALE	t_{LA}	60		ns
$\overline{WR}$ pulse width	t_{CC}	200		ns
$\overline{RD}$ pulse width	t_{CW}	350		ns
Data setup before $\overline{WR}$	t_{DW}	200		ns
Data hold after $\overline{WR}$	t_{WD}	60		ns
Data hold after $\overline{RD}$	t_{DR}		95	ns
Access time $\overline{RD}$ to data output	t_{RD}		350	ns
Address floating to $\overline{RD}$	t_{AFC}	0		ns
CS before ALE	t_{CS}	80		ns
CS after $\overline{WR}$ or $\overline{RD}$	t_{SC}	30		ns
ALE to $\overline{RD}$ or $\overline{WR}$	t_{LC}	60		ns
$\overline{RD}$ or $\overline{WR}$ to ALE = high	t_{CL}	30		ns



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Diagrams