
HB56A132 Series

1,048,576-word $\times$ 32-Bit High Density Dynamic RAM Module

HITACHI

ADE-203-
Rev. 0.0
Dec. 1, 1995

Description

The HB56A132 is a 1 M $\times$ 32 dynamic RAM module, mounted 8 pieces of (4-Mbit) DRAM (HM514400CS/CLS) sealed in SOJ package. An outline of the HB56A132 is 72-pin single in-line package. Therefore, the HB56A132 makes high density mounting possible without surface mount technology. The HB56A132 provides common data inputs and outputs. Decoupling capacitors are mounted beneath each SOJ.

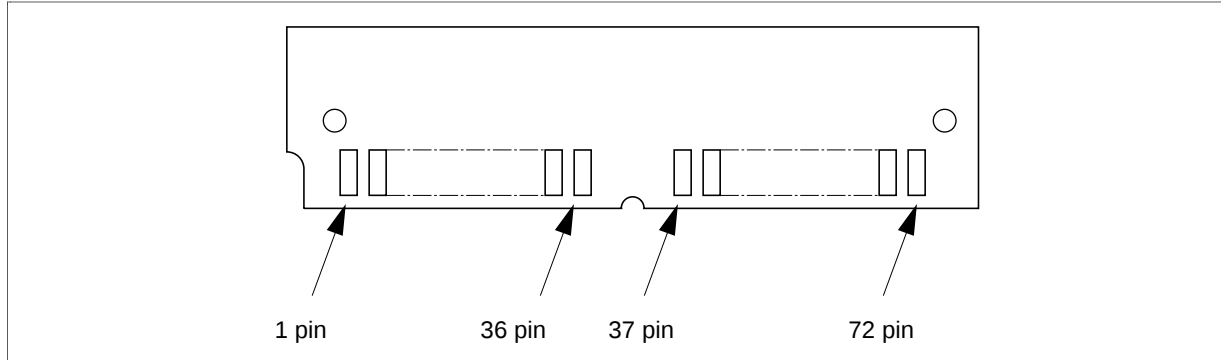
Features

- 72-pin single in-line package
 - Lead pitch: 1.27 mm
- Single 5 V ($\pm$ 5%) supply
- High speed
 - Access time: 60 ns/70 ns/80 ns (max)
- Low power dissipation
 - Active mode: 4.62W/4.20W/3.78W (max)
 - Standby mode: 84 mW (max)
4.2 mW (max) (L-version)
- Fast page mode capability
- 1,024 refresh cycle: 16 ms
128 ms (L-version)
- 2 variations of refresh
 - $\overline{\text{RAS}}$ only refresh
 - $\overline{\text{CAS}}$ before $\overline{\text{RAS}}$ refresh
- TTL compatible

HB56A132 Series

Ordering Information

Type No.	Access time	Package	Contact pad
HB56A132BW-6C	60 ns	72-pin SIP socket type	gold
HB56A132BW-7C	70 ns		
HB56A132BW-8C	80 ns		
HB56A132BW-6CL	60 ns		
HB56A132BW-7CL	70 ns		
HB56A132BW-8CL	80 ns		
HB56A132BU-6C	60 ns		
HB56A132BU-7C	70 ns		
HB56A132BU-8C	80 ns		
HB56A132BU-6CL	60 ns		
HB56A132BU-7CL	70 ns		
HB56A132BU-8CL	80 ns		
HB56A132SBW-6C	60 ns	72-pin SIP socket type	solder
HB56A132SBW-7C	70 ns		
HB56A132SBW-8C	80 ns		
HB56A132SBW-6CL	60 ns		
HB56A132SBW-7CL	70 ns		
HB56A132SBW-8CL	80 ns		

Pin Arrangement


Pin No.	Pin name	Pin No.	Pin name	Pin No.	Pin name	Pin No.	Pin name
1	V _{SS}	19	NC	37	NC	55	DC11
2	DQ0	20	DQ4	38	NC	56	DQ27
3	DQ16	21	DQ20	39	V _{SS}	57	DQ12
4	DQ1	22	DQ5	40	$\overline{\text{CAS0}}$	58	DQ28
5	DQ17	23	DQ21	41	$\overline{\text{CAS2}}$	59	V _{CC}
6	DQ2	24	DQ6	42	$\overline{\text{CAS3}}$	60	DQ29
7	DQ18	25	DQ22	43	$\overline{\text{CAS1}}$	61	DQ13
8	DQ3	26	DQ7	44	$\overline{\text{RAS0}}$	62	DQ30
9	DQ19	27	DQ23	45	NC	63	DQ14
10	V _{CC}	28	A7	46	NC	64	DQ31
11	NC	29	NC	47	$\overline{\text{WE}}$	65	DQ15
12	A0	30	V _{CC}	48	NC	66	NC
13	A1	31	A8	49	DQ8	67	PD1
14	A2	32	A9	50	DQ24	68	PD2
15	A3	33	NC	51	DQ9	69	PD3
16	A4	34	$\overline{\text{RAS2}}$	52	DQ25	70	PD4
17	A5	35	NC	53	DQ10	71	NC
18	A6	36	NC	54	DQ26	72	V _{SS}

HB56A132 Series

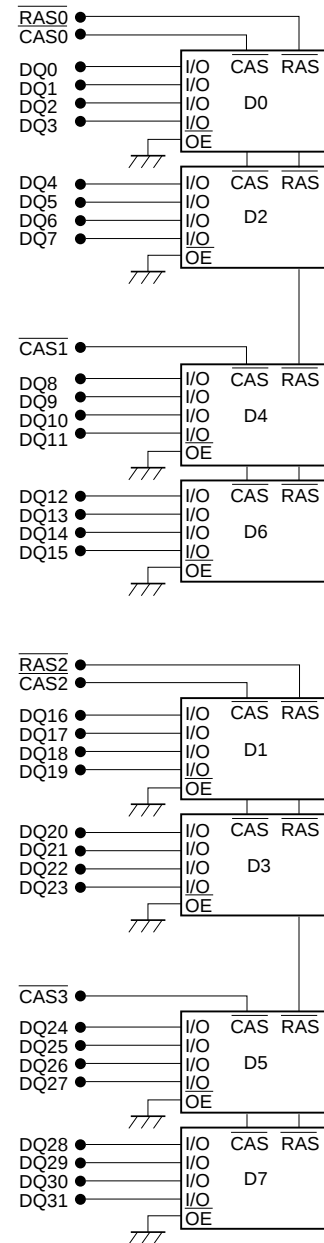
Pin Description

Pin name	Function
A0 – A9	Address input
A0 – A9	Refresh address input
DQ0 – DQ31	Data-in/data-out
$\overline{\text{CAS0}} - \overline{\text{CAS3}}$	Column address strobe
$\overline{\text{RAS0}}, \overline{\text{RAS2}}$	Row address strobe
$\overline{\text{WE}}$	Read/write enable
V _{CC}	Power supply (+5 V)
V _{SS}	Ground
PD1 – PD4	Presence detect pin
NC	No connection

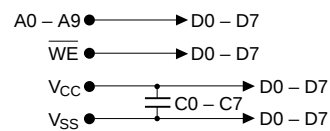
Presence Detect Pin Pinout

Pin No.	Pin name	HB56A132		
		60 ns	70 ns	80 ns
67	PD1	V _{SS}	V _{SS}	V _{SS}
68	PD2	V _{SS}	V _{SS}	V _{SS}
69	PD3	NC	V _{SS}	NC
70	PD4	NC	NC	V _{SS}

Block Diagram



Note : D0 – D7 : HM514400



HB56A132 Series

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Voltage on any pin relative to V_{SS}	V_T	-1.0 to +7.0	V
Supply voltage relative to V_{SS}	V_{CC}	-1.0 to +7.0	V
Short circuit output current	I_{out}	50	mA
Power dissipation	P_T	8	W
Operating temperature	T_{opr}	0 to +70	°C
Storage temperature	T_{stg}	-55 to +125	°C

Recommended DC Operating Conditions ($T_a = 0$ to +70°C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply voltage	V_{SS}	0	0	0	V	
	V_{CC}	4.75	5.0	5.25	V	1
Input high voltage	V_{IH}	2.4	—	5.5	V	1
Input low voltage	V_{IL}	-1.0	—	0.8	V	1

Note: 1. All voltage referred to V_{SS}

HB56A132 Series

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

		HB56A132								
		60 ns		70 ns		80 ns				
Parameter	Symbol	Min	Max	Min	Max	Min	Max	Unit	Test conditions	Notes
Operating current	I_{CC1}	—	880	—	800	—	720	ma	$t_{RC} = \min$	1, 2
Standby current	I_{CC2}	—	16	—	16	—	16	mA	TTL interface, $\overline{RAS}, \overline{CAS} = V_{IH}$, Dout = High-Z	
		—	8	—	8	—	8	mA	CMOS interface, $\overline{RAS}, \overline{CAS}$ $\geq V_{CC} - 0.2\text{ V}$ Dout = High-Z	
Standby current (L-version)	I_{CC2}	—	0.8	—	0.8	—	0.8	mA	CMOS interface, $\overline{RAS}, \overline{CAS} = V_{IH}$ $\overline{WE}$, Address., Din = V_{IH} or V_{IL} Dout = High-Z	4
$\overline{RAS}$ -only refresh current	I_{CC3}	—	880	—	800	—	720	mA	$t_{RC} = \min$	2
Standby current	I_{CC5}	—	40	—	40	—	40	mA	$\overline{RAS} = V_{IH}$, $\overline{CAS} = V_{IL}$ Dout = enable	1
$\overline{CAS}$ before $\overline{RAS}$ refresh current	I_{CC6}	—	880	—	800	—	720	mA	$t_{RC} = \min$	
Page mode current	I_{CC7}	—	880	—	800	—	720	mA	$t_{PC} = \min$	1, 3
Battery backup operation current (CBR refresh) (L-version)	I_{CC10}	—	1.6	—	1.6	—	1.6	mA	$t_{RC} = 125\text{ }\mu\text{s}$, $t_{RAS} \leq 1\text{ }\mu\text{s}$, $\overline{WE} = V_{IH}$, $\overline{CAS} = V_{IL}$, Address, Din = V_{IH} or V_{IL} Dout = High-Z	4
Input leakage current	I_{LI}	-10	10	-10	10	-10	10	μA	$0\text{ V} \leq V_{in} \leq 7\text{ V}$	
Output leakage current	I_{LO}	-10	10	-10	10	-10	10	μA	$0\text{ V} \leq V_{out} \leq 7\text{ V}$ Dout = disable	
Output high voltage	V_{OH}	2.4	V_{CC}	2.4	V_{CC}	2.4	V_{CC}	V	High Iout = -5 mA	
Output low voltage	V_{OL}	0	0.4	0	0.4	0	0.4	V	Low Iout = 4.2 mA	

Notes: 1. I_{CC} depends on output load condition when the device is selected. I_{CC} max is specified at the output open condition.

2. Address can be changed once or less while $\overline{RAS} = V_{IL}$.

3. Address can be changed once or less while $\overline{CAS} = V_{IH}$.

4. $V_{CC} - 0.2\text{ V} \leq V_{IH} \leq 6.5\text{ V}$, $0\text{ V} \leq V_{IL} \leq 0.2\text{ V}$

HB56A132 Series

Capacitance (Ta=25°C, V_{CC} =5 V±5%)

Parameter	Symbol	Typ	Max	Unit	Notes
Input capacitance (Address)	C ₁₁	—	68	pF	1
Input capacitance ($\overline{WE}$)	C ₁₂	—	76	pF	1
Input capacitance ($\overline{RAS}$)	C ₁₃	—	43	pF	1
Input capacitance ($\overline{CAS}$)	C ₁₄	—	29	pF	1
I/O capacitance (DQ0 - DQ31)	C _{I/O}	—	17	pF	1, 2

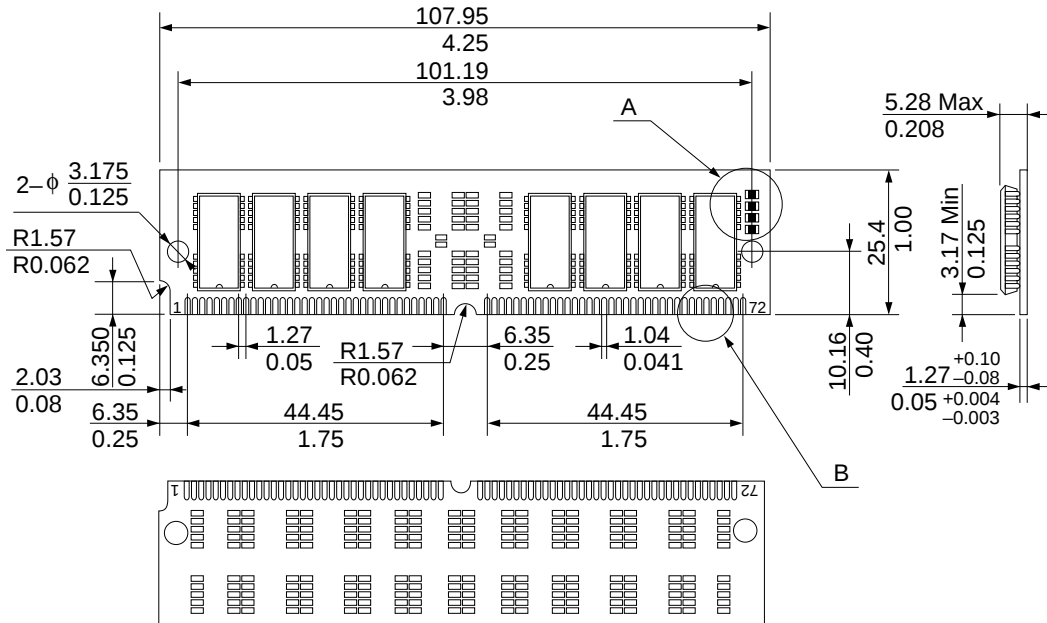
Notes: 1. Capacitance measured with Boonton Meter or effective capacitance measuring method.
2. $\overline{CAS}=V_{IH}$ to disable Dout.

AC Characteristics

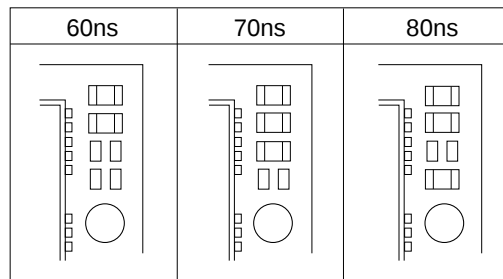
- Refer to the HM514400C Series data sheet.
- The HB56A132 writes data only in early write cycle ($t_{WCS} \geq t_{WCS}(\text{min})$).
Delayed write cycle is not available ($\overline{OE}$ pin is fixed to V_{SS}).

Physical Outline

Unit: mm/inch



Detail A



Detail B

