

HN25088L, HN25089L

1024-word × 8-bit Programmable Read Only Memories

The HITACHI HN25088L and HN25089L are low power and high speed electrically programmable, fully decoded TTL Bipolar 8192 bit read only memories organized as 1024 words by 8 bits with on-chip address decoding and four chip enable inputs.

The HN25088L and HN25089L are fabricated with logic level "zeros" (low); logic level "ones" (high) can be electrically programmed in the selected bit locations. The same address inputs are used for both programming and reading.

■ FEATURES

- 1024 words × 8 bits organization (fully decoded)
- TTL compatible inputs and outputs
- Fast read access time: 60ns typ. (100ns max.)
- Low power consumption: 350mW typ.
- Four chip enable inputs for memory expansion
- Open collector outputs (HN25088L)/Three-state outputs (HN25089L)

■ OPERATION

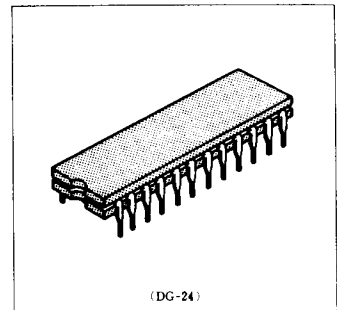
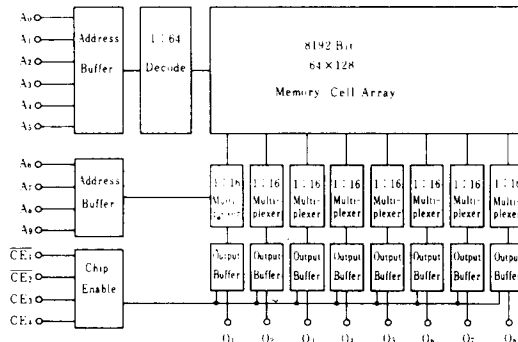
• Programming

A logic one can be permanently programmed into a selected bit location by using programming equipment. First, the desired word is selected by the ten address inputs in TTL level. The device is disabled by bringing $\overline{CE1}$ and/or $\overline{CE2}$ to a logic "one" or $\overline{CE3}$ and/or $\overline{CE4}$ to a logic "zero". Then a train of high current programming pulses is applied to the desired output. After the sensed voltage indicates that the selected bit is in the logic one state, an additional pulse train is applied, then is stopped.

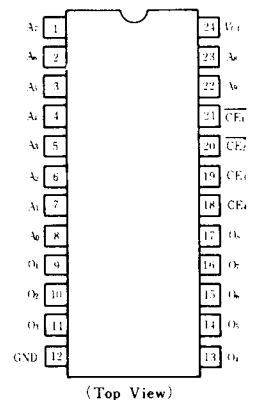
• Reading

To read the memory the device is enabled by bringing $\overline{CE1}$ and $\overline{CE2}$ to a logic "zero", $\overline{CE3}$ and $\overline{CE4}$ to a logic "one". The outputs then correspond to the data programmed in the selected word.

■ LOGIC DIAGRAM



■ PIN ARRANGEMENT



(Top View)

■ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	-0.5 to +7.0	V
Input Voltage	V_{in}	-0.5 to +5.5	V
Output Voltage	V_{out}	-0.5 to +5.5	V
Output Current	I_{out}	50	mA
Operating Temperature	T_{op}	-25 to +75	°C
Storage Temperature	T_{stg}	-65 to +150	°C

■DC CHARACTERISTICS ($V_{CC}=4.75$ to 5.25 V, $T_a=0$ to $+75^{\circ}\text{C}$)

Item	Symbol	Test Conditions	min	typ	max	Unit
Input Voltage	V_{IH}		2.0	—	—	V
	V_{IL}		—	—	0.8	V
Output Voltage	V_{OH}^*	$I_{OH} = -2\text{mA}$	2.4	—	—	V
	V_{OL}	$I_{OL} = 16\text{mA}$	—	—	0.45	V
Input Current	I_{IH}	$V_i = 2.7\text{V}$	—	—	40	μA
	$-I_{iL}$	$V_i = 0.4\text{V}$	—	—	0.4	mA
Output Leakage Current	I_{OLK}	$V_o = 5.25\text{V}$	—	—	100	μA
		$V_o = 0.4\text{V}$	—	—	40	
Supply Current	I_{CC}	Inputs Either Open or at Ground	—	70	100	mA
Output Short-circuit Current	$-I_{OS}^*$	$V_o = 0\text{V}$	8	—	30	mA
Input Clamp Voltage	V_i	$I_i = -18\text{mA}$	—	—	-1.2	V

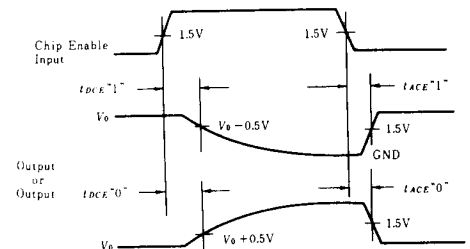
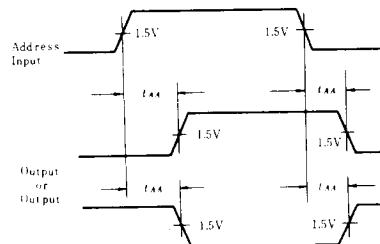
* Applicable to HN25089L only.

■AC CHARACTERISTICS ($V_{CC}=4.75$ to 5.25 V, $T_a=0$ to $+75^{\circ}\text{C}$)

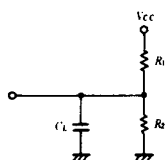
Item	Symbol	min	typ	max	Unit
Address Access Time	t_{AA}	—	60	100	ns
Chip Enable Access Time	t_{ACE}	—	40	70	ns
Chip Enable Disable Time	t_{DCE}	—	40	70	ns

Notes: 1. Output Load: See Test Circuit
2. Measurement Reference: 1.5V for both inputs and outputs

■SWITCHING WAVEFORMS



SWITCHING TIME TEST CONDITIONS



SWITCHING PARAMETER	HN25088L			HN25089L		
	R_1	R_2	C_L	R_1	R_2	C_L
t_{AA}	300 Ω	600 Ω	30pF	300 Ω	600 Ω	30pF
t_{ACE} "1"	—	—	—	∞	600 Ω	10pF
t_{ACE} "0"	300 Ω	600 Ω	10pF	300 Ω	600 Ω	10pF
t_{DCE} "1"	—	—	—	∞	600 Ω	30pF
t_{DCE} "0"	300 Ω	600 Ω	30pF	300 Ω	600 Ω	30pF

INPUT CONDITIONS

Amplitude—0V to 3V

Rise and Fall time—5ns from 1V to 2V

Frequency—1MHz

PROGRAMMING SPECIFICATION

Characteristic	Limit	Unit	Notes
Ambient Temperature	25 $\pm$ 5	$^{\circ}$ C	
Programming Pulse			
Amplitude	130 $\pm$ 5%	mA	
Clamp Voltage	20 $\pm$ 2%	V	
Ramp Rate	70max	V/ μ s	
Pulse Width	7.5 $\pm$ 5%	μ s	10V point/150 Ω load
Duty Cycle	70% min		
Sense Current			
Amplitude	20 $\pm$ 0.5	mA	
Clamp Voltage	20 $\pm$ 2%	V	
Ramp Rate	70max	V/ μ s	
Sense Current Interruption before and after address change	10min	μ s	
Programming V_{CC}	5.0+5%—0%	V	
Maximum Sensed Voltage for programmed "1"	7.5 $\pm$ 0.1	V	
Delay from trailing edge of programming pulse before sensing output voltage	0.7min	μ s	
Programming Pulse Number	100max	ms	
Additional Programming Pulse Number	4	Time	

