HN25088, HN25089

1024-word×8-bit Programmable Read Only Memories

The HITACHI HN25088 and HN25089 are 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 HN25088 and HN25089 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 x 8 bits organization (fully decoded)
- DTL/TTL compatible inputs and outputs
- Fast read access time: 40 ns (typ), 60 ns (max)
- Medium power consumption: 600 mW typ.
- Four chip enable inputs for memory expansion
- Open collector outputs (HN25088)/Three-state outputs (HN25089)
- Standard cerdip 24-pin dual in-line package

■ 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 as logic "one" or CE3 and/or 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.
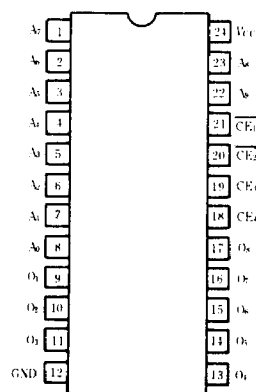
● Reading
To read the memory the device is enabled by bringing $\overline{CE1}$ and $\overline{CE2}$ to a logic "zero". CE3 and CE4 to a logic "one". The outputs them corresponed to the data programmed in the selected word.
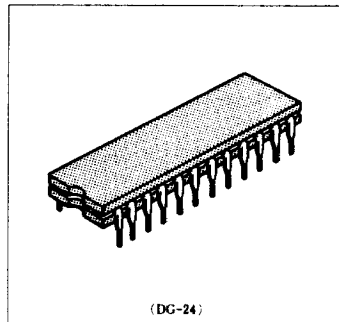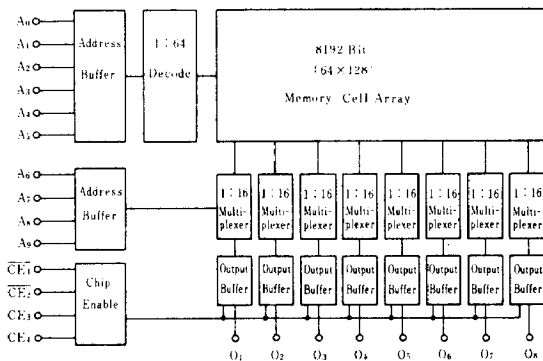
(DG-24)

■ PIN ARRANGEMENT

(Top View)

■ LOGIC DIAGRAM

■ 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_{opr}	−25 to +75	°C
Storage Temperature	T_{stg}	−65 to +150	°C

■ DC CHARACTERISTICS (V_{CC}=4.75 to 5.25V, Ta=0 to +75°C)

| Characteristic	Symbol	Test Conditions	min	typ	max	Unit
Input High Voltage	V_{IH}		2.0	—	—	V
Input Low Voltage	V_{IL}		—	—	0.8	V
Input High Current	I_{IH}	V_I=2.7V	—	—	40	μA
Input Low Current	$-I_{IL}$	V_I=0.4V	—	—	0.40	mA
Output Low Voltage	V_{OL}	I_{OL}=16mA	—	—	0.45	V
Output Leakage Current	I_{OLK1}	V_O=5.25V	—	—	100	μA
Output Leakage Current	I_{OLK2}	V_O=0.4V	—	—	40	μA
Input Clamp Voltage	V_I	I_I=−18mA	—	—	−1.2	V
Power Supply Current	I_{CC}	Inputs Either Open or at Ground	—	120	160	mA
Output High Voltage*	V_{OH}	I_{OH}=−2mA	2.4	—	—	V
Output Short Circuit Current*	$-I_{OS}$	V_O=0V	15	—	60	mA

＊ Note: Applicable to HN25089 only.
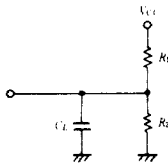
■ AC CHARACTERISTICS (V_{CC}=4.75 to 5.25V, Ta=0 to 75°C)

Characteristic	Symbol	Test Conditions	min	typ	max	Unit
Address Access Time	t_{AA}		—	40	60	ns
Chip Enable Access Time	t_{ACE}		—	20	35	ns
Chip Enable Disable Time	t_{DCE}		—	20	35	ns

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

■ SWITCHING WAVEFORMS
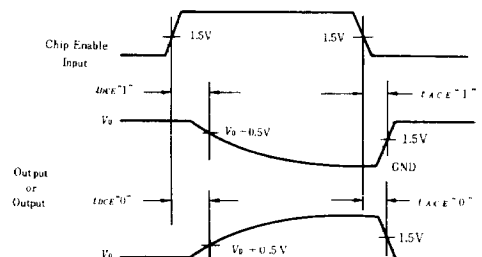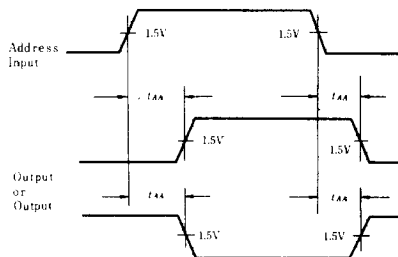
■ SWITCHING TIME TEST CONDITIONS

SWITCHING PARAMETER	HN25088			HN25089		
	R_1	R_2	C_L	R_1	R_2	C_L
t_{AA}	300Ω	600Ω	30pF	300Ω	600Ω	30pF
t_{ACE} "1"	—	—	—	∞	600Ω	10pF
t_{ACE} "0"	300Ω	600Ω	10pF	300Ω	600Ω	10pF
t_{DCE} "1"	—	—	—	∞	600Ω	30pF
t_{DCE} "0"	300Ω	600Ω	30pF	300Ω	600Ω	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±5	°C	
Programming Pulse			
Amplitude	130±5%	mA	
Clamp Voltage	20±2%	V	
Ramp Rate	70max	V/μs	
Pulse Width	7.5±5%	μs	10V point/150Ω load
Duty Cycle	70% min		
Sense Current			
Amplitude	20±0.5	mA	
Clamp Voltage	20±2%	V	
Ramp Rate	70max	V/μs	
Sense Current Interruption before and after address change	10min	μs	
Programming V_{CC}	5.0+5% −0%	V	
Maximum Sensed Voltage for programmed "1"	7.5±0.1	V	
Delay from trailing edge of programming pulse before sensing output voltage	0.7min	μs	
Programming Pulse Number	100max	ms	
Additional Programming Pulse Number	4	Time	