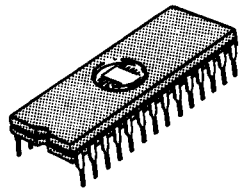
HN482764G, HN482764G-2, HN482764G-3

8192-word x 8-bit UV Erasable and Programmable Read Only Memory

The HN482764 is a 8192 word by 8 bit erasable and electrically programmable ROM. This device is packaged in a 28 pin dual-in-line package with transparent lid. The transparent lid on the package allows the memory content to be erased with ultraviolet light.

HN482764G, HN482764G-2
HN482764G-3

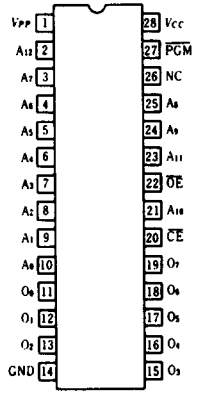


(DG-28)

■ FEATURES

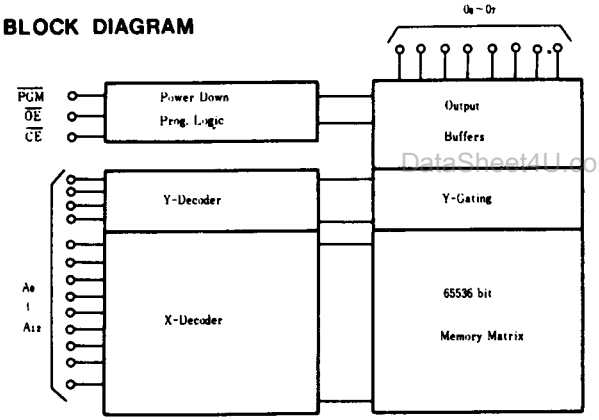
- Single Power Supply . . . . . +5V ± 5%
- Simple Programming . . . . . Program Voltage: +21V D.C.
  Program with one 50ms Pulse
- Static . . . . . No Clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Mode.
- Access Time . . . . . HN482764G-2 200ns max
  HN482764G 250ns max
  HN482764G-3 300ns max
- High Performance Programming Available
- Low Standby Current . . . . . 35mA max.
- Compatible with Intel 2764

■ PIN ARRANGEMENT



(Top View)

■ BLOCK DIAGRAM



■ MODE SELECTION

Mode \ Pins	$\overline{CE}$ (20)	$\overline{OE}$ (22)	$\overline{PGM}$ (27)	V_{PP} (1)	V_{CC} (28)	Outputs (11~13, 15~19)
Read	V_{IL}	V_{IL}	V_{IH}	V_{CC}	V_{CC}	Dout
Stand-by	V_{IH}	×	×	V_{CC}	V_{CC}	High Z
Program	V_{IL}	×	V_{IL}	V_{PP}	V_{CC}	Din
Program Verify	V_{IL}	V_{IL}	V_{IH}	V_{PP}	V_{CC}	Dout
Program Inhibit	V_{IH}	×	×	V_{PP}	V_{CC}	High Z

× : don't care

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value	Unit
Operating Temperature Range	T_{opr}	0 to +70	°C
Storage Temperature Range	T_{stg}	−65 to +125	°C
All Input and Output Voltage*	V_T	−0.6 to +7	V
V_{PP} Voltage	V_{PP}	−0.6 to +26.5	V

* : with respect to GND

HITACHI

■ READ OPERATION

● DC AND OPERATING CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, V_{PP}=V_{CC}±0.6V)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	V_{CC}=5.25V, V_{in}=5.25V	—	—	10	μA
Output Leakage Current	I_{LO}	V_{CC}=5.25V, V_{out}=5.25V/0.45V	—	—	10	μA
V_{PP} Current	I_{PP1}	V_{PP}=V_{CC}+0.6V	—	—	15	mA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE}$=V_{IH}	—	—	35	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{CE}$=$\overline{OE}$=V_{IL}	—	40	100	mA
Input Low Voltage	V_{IL}		−0.1	—	0.8	V
Input High Voltage	V_{IH}		2.0	—	V_{CC}+1	V
Output Low Voltage	V_{OL}	I_{OL}=2.1mA	—	—	0.45	V
Output High Voltage	V_{OH}	I_{OH}=−400μA	2.4	—	—	V

● AC CHARACTERISTICS (Ta=0 to +70°C, V_{CC}=5V±5%, V_{PP}=V_{CC}±0.6V)

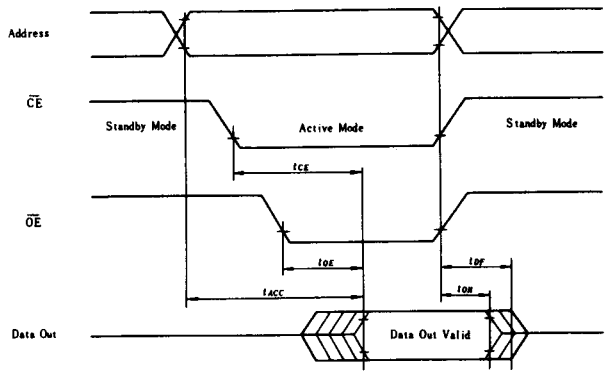
Parameter	Symbol	Test Conditions	HN482764G-2		HN482764G		HN482764G-3		Unit
			min	max	min	max	min	max	
Address to Output Delay	t_{ACC}	$\overline{CE}$=$\overline{OE}$=V_{IL}	—	200	—	250	—	300	ns
CE to Output Delay	t_{CE}	$\overline{OE}$=V_{IL}	—	200	—	250	—	300	ns
OE to Output Delay	t_{OE}	$\overline{CE}$=V_{IL}	10	80	10	100	10	150	ns
OE High to Output Float	t_{DF}	$\overline{CE}$=V_{IL}	0	60	0	90	0	130	ns
Address to Output Hold	t_{OH}	$\overline{CE}$=$\overline{OE}$=V_{IL}	0	—	0	—	0	—	ns

Note : t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Condition

Input Pulse Levels:	0.45V to 2.4V
Input Rise and Fall Time:	≤ 20ns
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	0.8V and 2.0V



● CAPACITANCE (Ta=25°C, f=1MHz)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_{in}	V_{in}=0V	—	4	6	pF
Output Capacitance	C_{out}	V_{out}=0V	—	8	12	pF

■ PROGRAMMING OPERATION

● DC PROGRAMMING CHARACTERISTICS (Ta=25℃±5℃, V_{CC}=5V±5%, V_{PP}=21V±0.5V)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	V_{in}=5.25V	—	—	10	μA
Output Low Voltage During Verify	V_{OL}	I_{OL}=2.1mA	—	—	0.45	V
Output High Voltage During Verify	V_{OH}	I_{OH}=−400μA	2.4	—	—	V
V_{CC} Current (Active)	I_{CC2}		—	—	100	mA
Input Low Level	V_{IL}		−0.1	—	0.8	V
Input High Level	V_{IH}		2.0	—	V_{CC}+1	V
V_{PP} Supply Current	I_{PP}	$\overline{CE}$=$\overline{PGM}$=V_{IL}	—	—	30	mA

● AC PROGRAMMING CHARACTERISTICS (Ta=25℃±5℃, V_{CC}=5V±5%, V_{PP}=21V±0.5V)

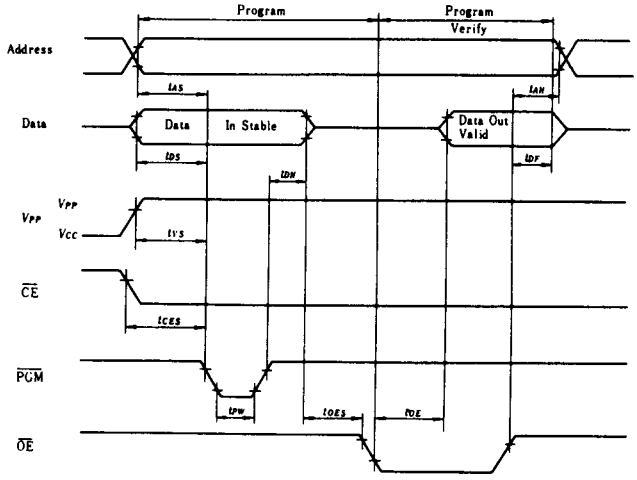
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address Setup Time	t_{AS}		2	—	—	μs
$\overline{OE}$ Setup Time	t_{OES}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		0	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
$\overline{OE}$ to Output Float Delay	t_{DF}		0	—	130	ns
V_{PP} Setup Time	t_{VS}		2	—	—	μs
$\overline{PGM}$ Pulse Width During Programming	t_{PW}		45	50	55	ms
$\overline{CE}$ Setup Time	t_{CES}		2	—	—	μs
Data Valid from $\overline{OE}$	t_{OE}		—	—	150	ns

Note : t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Condition

Input Pulse Level:	0.45V to 2.4V
Input Rise and Fall Time:	≤ 20 ns
Reference Level for Measuring Timing:	0.8V and 2V

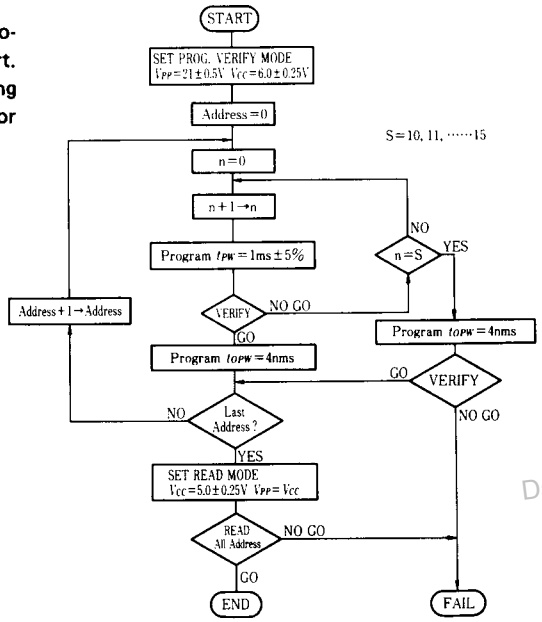


■ ERASE

Erasure of HN482764 is performed by exposure to Ultraviolet light of 2537Å, and all the output data are changed to "1" after this erasure procedure. The minimum integrated dose (i.e. UV intensity x exposure time) for erasure is 15W · sec/cm²

■ HIGH PERFORMANCE PROGRAMMING

This device can be applied the High Performance Programming algorithm shown in following flowchart. This algorithm allows to obtain faster programming time without any voltage stress to the device nor deterioration in reliability of programmed data.



High Performance Programming Flowchart

● AC PROGRAMMING CHARACTERISTICS (Ta=25℃±5℃, V_{CC}=6V±0.25V, V_{PP}=21V±0.5V)

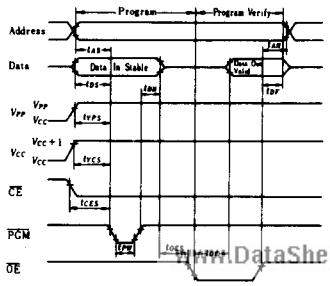
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address Setup Time	t_{AS}		2	—	—	μs
$\overline{OE}$ Setup Time	t_{OES}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		0	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
$\overline{OE}$ to Output Float Delay*	t_{DF}		0	—	130	ns
V_{PP} Setup Time	t_{VPS}		2	—	—	μs
V_{CC} Setup Time	t_{VCS}		2	—	—	μs
$\overline{PGM}$ Pulse Width during Initial Program	t_{PW}		0.95	1.0	1.05	ms
$\overline{PGM}$ Pulse Width during Over Program**	t_{OPW}		3.8	—	63	ms
$\overline{CE}$ Setup Time	t_{CES}		2	—	—	μs
Data Valid from $\overline{OE}$	t_{OE}		—	—	150	ns

Notes) * t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.
** t_{OPW} is defined as mentioned in flort chart.

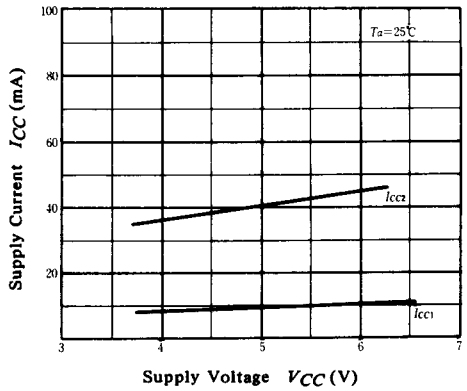
● SWITCHING CHARACTERISTICS

Test Condition

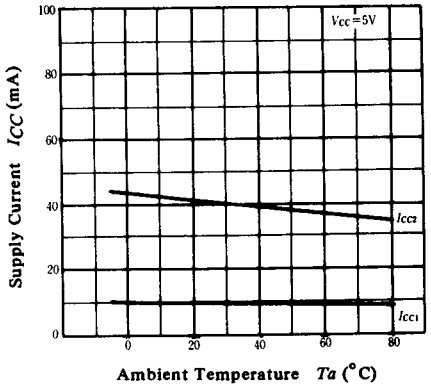
Input Pulse Level:	0.4V to 2.4V
Input Rise and Fall Time:	≤ 20 ns
Reference Level for Measuring Timing:	0.8V and 2V



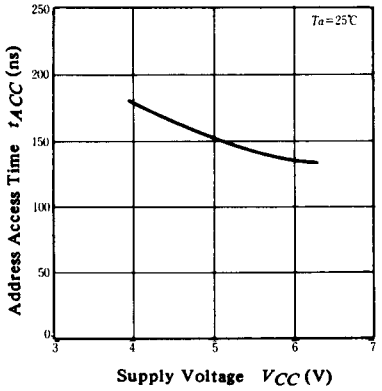
SUPPLY CURRENT VS. SUPPLY VOLTAGE



SUPPLY CURRENT VS. AMBIENT TEMPERATURE



ADDRESS ACCESS TIME VS. SUPPLY VOLTAGE



ADDRESS ACCESS TIME VS. AMBIENT TEMPERATURE