

HN482732AG-20, HN482732AG-25, HN482732AG-30

4096-word × 8-bit U. V. Erasable and Programmable Read Only Memory

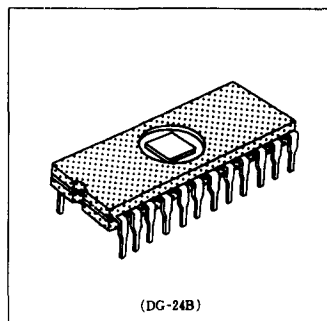
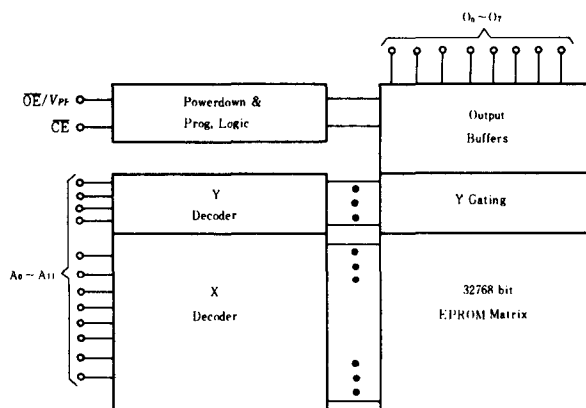
The HN482732A is a 4096-word by 8-bit erasable and electrically programmable ROM. This device is packaged in a 24 pin dual-in-line package with transparent lid.

The transparent lid on the package allow the memory content to be erased with ultraviolet light.

■ FEATURES

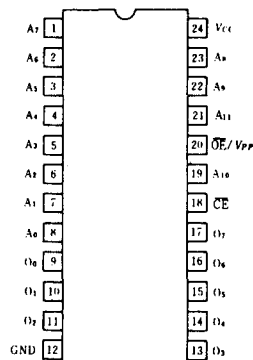
- Single Power Supply +5V ±5%
- Simple Programming Program Voltage: +21V D.C.
Program with one 50ms Pulse
- Static No clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Mode
- Access Time HN482732AG-20 200ns (max)
HN482732AG-25 250ns (max)
HN482732AG-30 300ns (max)
- Absolute Max. Rating of Vpp Pin . . . 26.5V
- Low Stand-by Current 35mA (max)
- Compatible with Intel 2732A

■ BLOCK DIAGRAM



(DG-24B)

■ PIN ARRANGEMENT



(Top View)

■ MODE SELECTION

MODE	Pins	CE (18)	OE/VPP (20)	VCC (24)	Outputs (9~11, 13~17)
Read		V _{IL}	V _{IL}	+5	D _{out}
Stand by		V _{IH}	Don't Care	+5	High Z
Program		V _{IL}	V _{PP}	+5	D _{in}
Program Verify		V _{IL}	V _{IL}	+5	D _{out}
Program Inhibit		V _{IH}	V _{PP}	+5	High Z

■ 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 Voltages*	V_{in}, V_{out}	-0.3 to +7	V
V_{PP} Voltage*	$\overline{OE}/V_{PP}$	-0.3 to 26.5	V
V_{CC} Voltage*	V_{CC}	-0.3 to +7	V

* with respect to GND

■ READ OPERATION

● D.C. AND OPERATING CHARACTERISTICS ($T_a=0$ to 70°C , $V_{CC}=5\text{V} \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6\text{V}$)

Parameter	Symbol	Test Conditions	min	typ	max	Unit
Input Leakage Current	I_{LI}	$V_{IN}=5.25\text{V}$	—	—	10	μA
Output Leakage Current	I_{LO}	$V_{out}=5.25\text{V}$	—	—	10	μA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE}=V_{IH}, \overline{OE}=V_{IL}$	—	—	35	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{OE}-\overline{CE}=V_{IL}$	—	—	150	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}	$I_{OL}=2.1\text{mA}$	—	—	0.45	V
Output High Voltage	V_{OH}	$I_{OH}=-400\mu\text{A}$	2.4	—	—	V

● AC CHARACTERISTICS ($T_a=0$ to 70°C , $V_{CC}=5\text{V} \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6\text{V}$)

Parameter	Symbol	Test Conditions	HN482732AG-20		HN482732AG-25		HN482732AG-30		Unit
			min	max	min	max	min	max	
Address to Output Delay	t_{ACC}	$\overline{CE}-\overline{OE}=V_{IL}$	—	200	—	250	—	300	ns
$\overline{CE}$ to Output Delay	t_{CE}	$\overline{OE}=V_{IL}$	—	200	—	250	—	300	ns
$\overline{OE}$ to Output Delay	t_{OE}	$\overline{CE}=V_{IL}$	10	90	10	100	10	150	ns
$\overline{OE}$ High to Output Float	t_{DF}	$\overline{CE}=V_{IL}$	0	80	0	90	0	130	ns
Address to Output Hold	t_{OH}	$\overline{CE}=\overline{OE}=V_{IL}$	0	—	0	—	0	—	ns

● SWITCHING CHARACTERISTICS

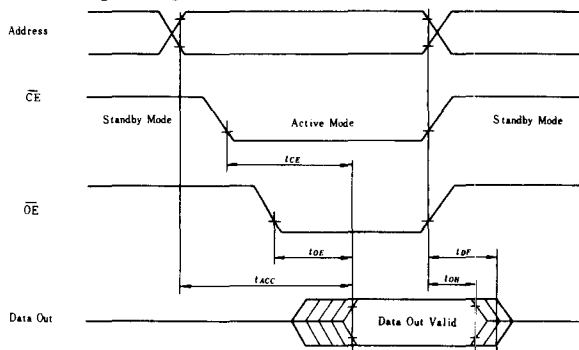
Test Conditions

Input Pulse Level: 0.8V to 2.2V

Input Rise and Fall Times: $\leq 20\text{ns}$

Output Load: 1 TTL Gate + 100PF

Reference Level for Measuring Timing Inputs, 1V and 2V, Outputs; 0.8V and 2V



● CAPACITANCE ($T_a=25^\circ\text{C}$, $f=1\text{MHz}$)

Parameter	Symbol	Test Conditions	min	typ	max	Unit
Input Capacitance (Except $\overline{OE}/V_{PP}$)	C_{IN1}	$V_{IN}=0\text{V}$	—	—	6	pF
$\overline{OE}/V_{PP}$ Input Capacitance	C_{IN2}	$V_{IN}=0\text{V}$	—	—	20	pF
Output Capacitance	C_{out}	$V_{out}=0\text{V}$	—	—	12	pF

■ PROGRAMMING OPERATION

● DC PROGRAMMING CHARACTERISTICS ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$, $V_{CC} = 5\text{V} \pm 5\%$, $V_{PP} = 21\text{V} \pm 0.5\text{V}$)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	$V_{IN} = V_{IL}$ or V_{IH}	—	—	10	μA
Output Low Voltage During Verify	V_{OL}	$I_{OL} = 2.1\text{mA}$	—	—	0.45	V
Output High Voltage During Verify	V_{OH}	$I_{OH} = -400\mu\text{A}$	2.4	—	—	V
V_{CC} Supply Current	I_{CC}		—	—	150	mA
Input Low Level	V_{IL}		-0.1	—	0.8	V
Input High Level (All Inputs Except $\overline{\text{OE}}/\overline{\text{VPP}}$)	V_{IH}		2.0	—	$V_{CC} + 1$	V
V_{PP} Supply Current	I_{PP}	$\overline{\text{CE}} = V_{IL}$, $\overline{\text{OE}} = V_{PP}$	—	—	30	mA

● AC PROGRAMMING CHARACTERISTICS ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$, $V_{CC} = 5\text{V} \pm 5\%$, $V_{PP} = 21\text{V} \pm 0.5\text{V}$)

Parameter	Symbol	Test Conditions	min	typ	max	Unit
Address Setup Time	t_{AS}		2	—	—	μs
$\overline{\text{OE}}$ Setup Time	t_{OES}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		0	—	—	μs
$\overline{\text{OE}}$ Hold Time	t_{OEH}		2	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
Chip Enable to Output Float Delay*	t_{DF}		0	—	130	ns
Data Valid from $\overline{\text{CE}}$	t_{DV}	$\overline{\text{CE}} = V_{IL}$, $\overline{\text{OE}} = V_{IL}$	—	—	1	μs
$\overline{\text{CE}}$ Pulse Width During Programming	t_{PW}		45	50	55	ms
$\overline{\text{OE}}$ Pulse Rise Time During Programming	t_{PRT}		50	—	—	ns
V_{PP} Recovery Time	t_{VR}		2	—	—	μs

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

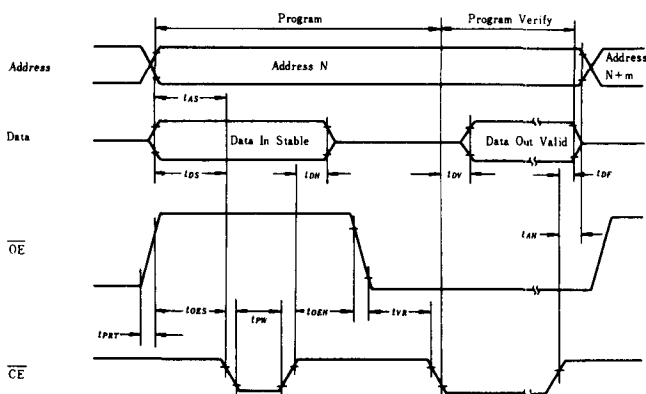
● SWITCHING CHARACTERISTICS

Test Condition

Input Pulse Level 0.8V to 2.2V

Input Rise and Fall Time $\leq 20\text{ns}$

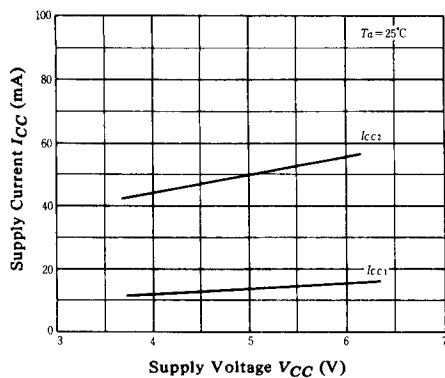
Reference Level for Measuring Timing: Inputs 1V and 2V; Outputs 0.8V and 2V



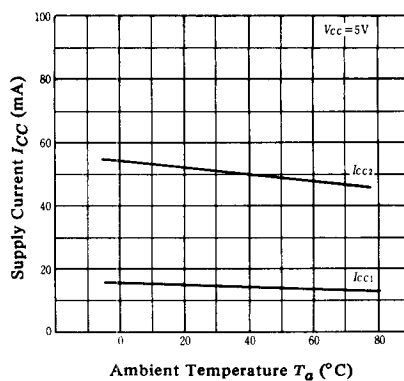
● ERASE

Erasure of HN482732A is performed by exposure to ultraviolet light of $2537\text{\AA}$ and all the output data are changed to "1" after this erasure procedure. The minimum integrated dose (i.e. UV intensity $\times$ exposure time) for erasure is 15W-sec/cm^2

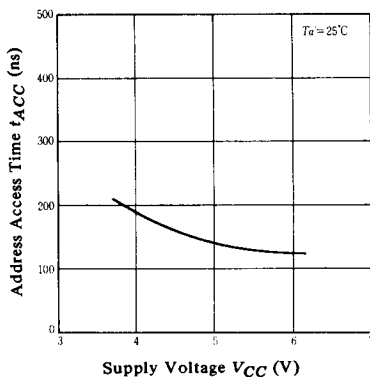
**SUPPLY CURRENT vs.
SUPPLY VOLTAGE**



**SUPPLY CURRENT vs.
AMBIENT TEMPERATURE**



**ADDRESS ACCESS TIME
vs. SUPPLY VOLTAGE**



**ADDRESS ACCESS TIME vs.
AMBIENT TEMPERATURE**

