



M2708

8K (1K x 8) UV ERASABLE PROM

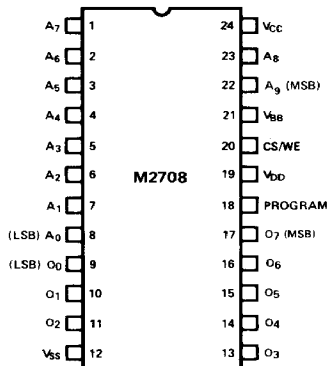
- **Extended Temperature Range:**
– 55°C to 100°C
- **Fast Programming: Typ. 100 sec. For All 8K Bits**
- **Low Power During Programming**
- **Access Time: 450 ns Max.**
- **Standard Power Supplies:**
+ 12V, + 5V, – 5V
- **Static: No Clocks Required**
- **Inputs and Outputs TTL Compatible During Both Read and Program Modes**
- **Three-State Output: OR-Tie Capability**
- **Hermetic Package: 24 Pin DIP**

The Intel M2708 is a high speed 8192 bit erasable and electrically reprogrammable ROM (EPROM) ideally suited where fast turn around and pattern experimentation are important requirements.

The M2708 is packaged in a 24-pin dual-in-line package with transparent lid. The transparent lid allows the user to expose the chip to ultraviolet light to erase the bit pattern. A new pattern can then be written into the devices.

The M2708 is fabricated with the time proven N-channel silicon gate technology.

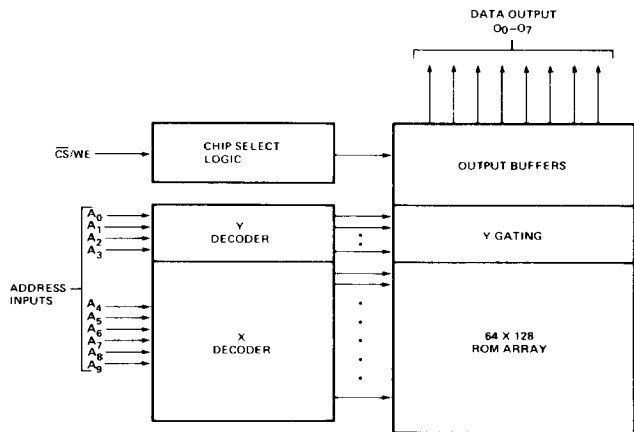
PIN CONFIGURATION



PIN NAMES

A ₀ - A ₉	ADDRESS INPUTS
O ₁ - O ₈	DATA OUTPUTS
CS/WE	CHIP SELECT/WRITE ENABLE INPUT

BLOCK DIAGRAM



PIN CONNECTION DURING READ OR PROGRAM

MODE	PIN NUMBER								
	DATA I/O 9-11, 13-17	ADDRESS INPUTS 1-8, 22, 23	V _{SS} 12	PROGRAM 18	V _{DD} 19	CS/WE 20	V _{BB} 21	V _{CC} 24	
READ	D _{OUT}	A _{IN}	GND	GND	+12	V _{IL}	-5	+5	
DESELECT	HIGH IMPEDANCE	DON'T CARE	GND	GND	+12	V _{IH}	-5	+5	
PROGRAM	D _{IN}	A _{IN}	GND	PULSED V _{IHP}	+12	V _{IHW}	-5	+5	

Absolute Maximum Ratings*

Temperature Under Bias	-65°C to 110°C
Storage Temperature	-65°C to +125°C
V _{DD} With Respect to V _{BB}	+20V to -0.3V
V _{CC} and V _{SS} With Respect to V _{BB}	+15V to -0.3V
All Input or Output Voltages With Respect to V _{BB} During Read	+15V to -0.3V
CS/WE Input With Respect to V _{BB} During Programming	+20V to -0.3V
Program Input With Respect to V _{BB}	+35V to -0.3V
Power Dissipation	1.8W

*COMMENT

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

READ OPERATION

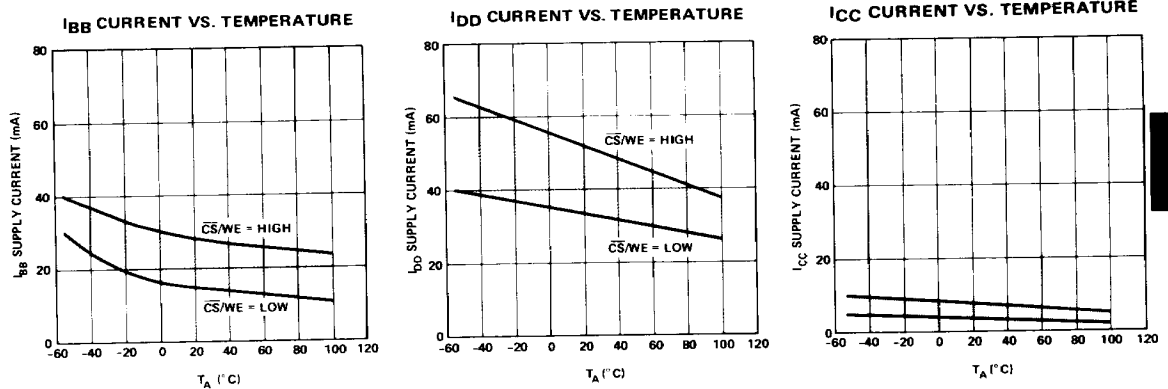
D.C. and Operating Characteristics

T_A = -55°C to 100°C, V_{CC} = +5V ±10%, V_{DD} = +12V ±10%, V_{BB}⁽¹⁾ = -5V ±10%, V_{SS} = 0V, unless otherwise noted.

Symbol	Parameter	Min.	Typ. ^[2]	Max.	Unit	Conditions
I _{LI}	Address and Chip Select Input Sink Current		1	10	μA	V _{IN} = 5.5 V or V _{IN} = V _{IL}
I _{LO}	Output Leakage Current		1	10	μA	V _{OUT} = 5.5 V, CS/WE = 5V
I _{DD} ^[3]	V _{DD} Supply Current		50	80	mA	Worst Case Supply Currents: All Inputs High CS/WE = 5V; T _A = -55°C
I _{CC} ^[3]	V _{CC} Supply Current		6	15	mA	
I _{BB} ^[3]	V _{BB} Supply Current		30	60	mA	
V _{IL}	Input Low Voltage	V _{SS}		0.65	V	
V _{IH}	Input High Voltage	3.0		V _{CC} +1	V	
V _{OL}	Output Low Voltage			0.45	V	I _{OL} = 1.6mA
V _{OH1}	Output High Voltage	3.7			V	I _{OH} = -100μA
V _{OH2}	Output High Voltage	2.4			V	I _{OH} = -1mA
P _D	Power Dissipation			750	mW	T _A = 100°C

- NOTES: 1. V_{BB} must be applied prior to V_{CC} and V_{DD}. V_{BB} must also be the last power supply switched off.
 2. Typical values are for T_A = 25°C and nominal supply voltages.
 3. The total power dissipation of the M2708 is specified at 750 mW. It is not calculated by summing the various currents (I_{DD}, I_{CC}, and I_{BB}) multiplied by their respective voltages since current paths exist between the various power supplies and V_{SS}. The I_{DD}, I_{CC}, and I_{BB} currents should be used to determine power supply capacity only.

Typical D.C. Characteristics



A.C. Characteristics

$T_A = -55^\circ\text{C}$ to 100°C , $V_{CC} = +5\text{V} \pm 10\%$, $V_{DD} = +12\text{V} \pm 10\%$, $V_{BB} = -5\text{V} \pm 10\%$, $V_{SS} = 0\text{V}$, Unless Otherwise Noted.

Symbol	Parameter	Min.	Typ. ^[1]	Max.	Unit
t_{ACC}	Address to Output Delay		280	450	ns
t_{CO}	Chip Select to Output Delay		60	120	ns
t_{DF}	Chip De-Select to Output Float	0		120	ns
t_{OH}	Address to Output Hold	0			ns

Note 1. Typical values are for $T_A = 25^\circ\text{C}$ and nominal supply voltages

Capacitance^[2] $T_A = 25^\circ\text{C}$, $f = 1\text{MHz}$

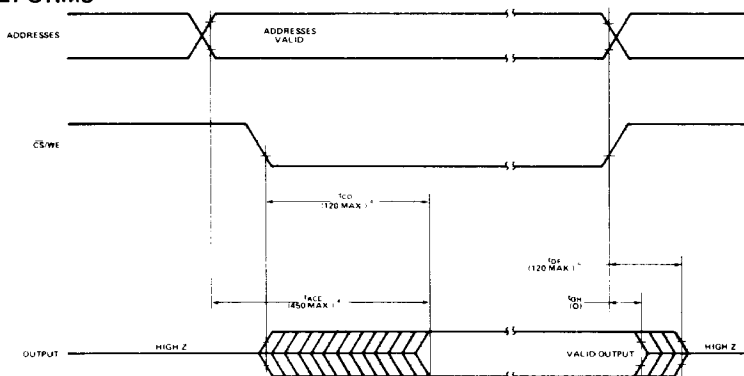
Symbol	Parameter	Typ.	Max.	Unit	Conditions
C_{IN}	Input Capacitance	4	6	pF	$V_{IN} = 0\text{V}$
C_{OUT}	Output Capacitance	8	12	pF	$V_{OUT} = 0\text{V}$

Note 2. This parameter is sampled and not 100% tested.

A.C. TEST CONDITIONS:

Output Load: 1 TTL gate and $C_L = 100\text{ pF}$
 Input Rise and Fall Times: $\leq 20\text{ ns}$
 Timing Measurement Reference Levels: 0.8V and 2.8V for inputs; 0.8V and 2.4V for outputs
 Input Pulse Levels: 0.65V to 3.0V

A.C. WAVEFORMS^[3]



- NOTES
 1. TYPICAL VALUES ARE FOR $T_A = 25^\circ\text{C}$ AND NOMINAL SUPPLY VOLTAGES
 2. THIS PARAMETER IS ONLY SAMPLED AND IS NOT 100% TESTED
 3. ALL TIMES SHOWN IN PARENTHESES ARE MINIMUM AND ARE RISE UNLESS OTHERWISE SPECIFIED
 4. CS MAY BE DELAYED UP TO t_{ACC} - t_{CO} AFTER ADDRESSES ARE VALID WITHOUT IMPACT ON t_{ACC}
 5. t_{OH} IS SPECIFIED FROM CS OR ADDRESS CHANGE WHICHEVER OCCURS FIRST

ERASURE CHARACTERISTICS

The erasure characteristics of the M2708 are such that erasure begins to occur when exposed to light with wavelengths shorter than approximately 4000 Angstroms (\AA). It should be noted that sunlight and certain types of fluorescent lamps have wavelengths in the 3000–4000 \AA range. Data show that constant exposure to room level fluorescent lighting could erase the typical M2708 in approximately 3 years, while it would take approximately 1 week to cause erasure when exposed to direct sunlight. If the M2708 is to be exposed to these types of lighting conditions for extended periods of time, opaque labels are available from Intel which should be placed over the M2708 window to prevent unintentional erasure.

The recommended erasure procedure (see Data Catalog PROM/ROM Programming Instructions section) for the M2708 is exposure to shortwave ultraviolet light which has a wavelength of 2537 Angstroms (\AA). The integrated dose (i.e., UV intensity X exposure time) for erasure should be a minimum of 15 W-sec/cm². The erasure time with this dosage is approximately 15 to 20 minutes using an ultraviolet lamp with a 1200 $\mu\text{W}/\text{cm}^2$ power rating. The M2708 should be placed within 1 inch of the lamp tubes during erasure. Some lamps have a filter on their tubes which should be removed before erasure.