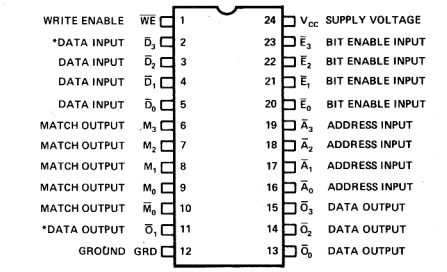
HIGH SPEED 16 BIT CONTENT ADDRESSABLE MEMORY

- **Organization – 4 Words x 4 Bits**
- **Max. Delay of 30 nsec Over 0° C to 75° C Temperature**
- **Open Collector Outputs – OR Tie Capability**
- **High Current Sinking Capability – 15 mA max.**
- **Low Input Load Current – 0.25 mA max.**
- **DTL & TTL Compatible**
- **Bit Enable Input – Bit Masking**
- **Standard 24 Pin Dual In-Line**

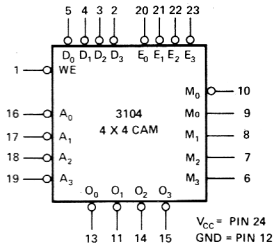
The Intel 3104 is a high speed 16 bit Content Addressable Memory (CAM). It is a linear select 4 word by 4 bit array which is designed to compare data on its inputs with data already stored in its memory and to indicate a match when these data are identical. This equality search is performed on all bits in parallel. The 3104 can also be used as a read/write RAM with linear selection addressing.

PIN CONFIGURATION

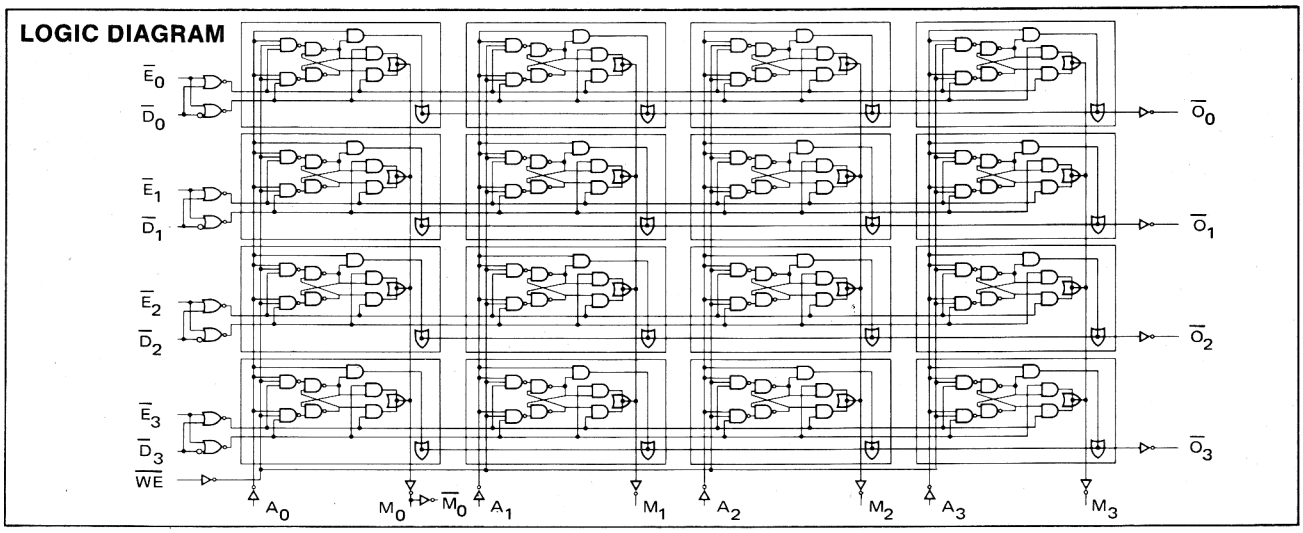


*DATA IN and DATA OUT are of the same logic levels. For a chip that is not selected, the data output is at a high level.

LOGIC SYMBOL



LOGIC DIAGRAM



Absolute Maximum Ratings*

Temperature Under Bias	−65°C to +125°C
Storage Temperature	−65°C to +160°C
All Output or Supply Voltages	−0.5 to +7 Volts
All Input Voltages	−1.0 to +5.5 Volts
Output Currents	100 mA

*COMMENT:

Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or at any other condition 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.

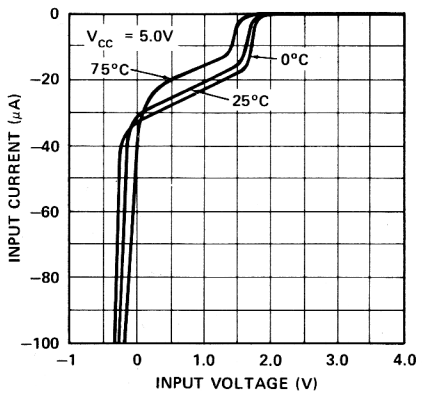
D.C. Characteristics T_A = 0°C to +75°C, V_{CC} = 5.0V ±5%; unless otherwise specified.

SYMBOL	PARAMETER	LIMIT MIN.	LIMIT TYP.	LIMIT MAX.	UNIT	TEST CONDITIONS
I_{FA}	ADDRESS INPUT LOAD CURRENT			−0.25	mA	V_{CC} = 5.25V V_A = .45V
I_{FE}	BIT ENABLE INPUT LOAD CURRENT			−0.25	mA	V_{CC} = 5.25V V_E = .45V
I_{FW}	WRITE ENABLE INPUT LOAD CURRENT			−0.25	mA	V_{CC} = 5.25V V_W = .45V
I_{FD}	DATA INPUT LOAD CURRENT			−0.25	mA	V_{CC} = 5.25V V_D = .45V
I_{RA}	ADDRESS INPUT LEAKAGE CURRENT			10	μA	V_{CC} = 5.25V V_A = 5.25V
I_{RE}	BIT ENABLE INPUT LEAKAGE CURRENT			10	μA	V_{CC} = 5.25V V_E = 5.25V
I_{RW}	WRITE ENABLE INPUT LEAKAGE CURRENT			10	μA	V_{CC} = 5.25V V_W = 5.25V
I_{RD}	DATA INPUT LEAKAGE CURRENT			10	μA	V_{CC} = 5.25V V_D = 5.25V
I_{CEX}	OUTPUT LEAKAGE CURRENT (ALL OUTPUTS)			50	μA	V_{CC} = 5.25V V_{CEX} = 5.25V
V_{OL}	OUTPUT "LOW" VOLTAGE (ALL OUTPUTS)			0.45	V	V_{CC} = 4.75V I_{OL} = 15mA (Three other Outputs Sink 15mA each)
V_{IL}	INPUT "LOW" VOLTAGE (ALL INPUTS)			0.85	V	V_{CC} = 5V
V_{IH}	INPUT "HIGH" VOLTAGE (ALL INPUTS)	2.0			V	V_{CC} = 5V
I_{CC}	POWER SUPPLY CURRENT			125	mA	V_{CC} = 5.25V
C_{IN}**	INPUT CAPACITANCE		5		pF	V_{IN} = +2.0V, V_{CC} = 0.0V f = 1 MHz
C_{OUT}**	OUTPUT CAPACITANCE		8		pF	V_{OUT} = +2.0V, V_{CC} = 0.0V f = 1 MHz

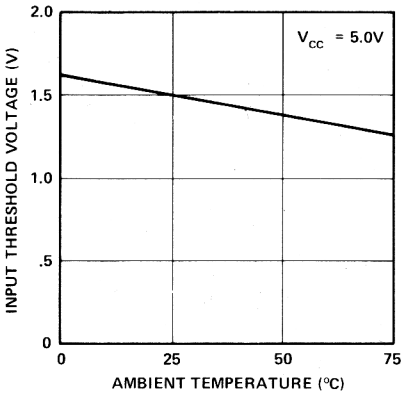
**This parameter is periodically sampled and is not 100% tested.

Typical D.C. Characteristics

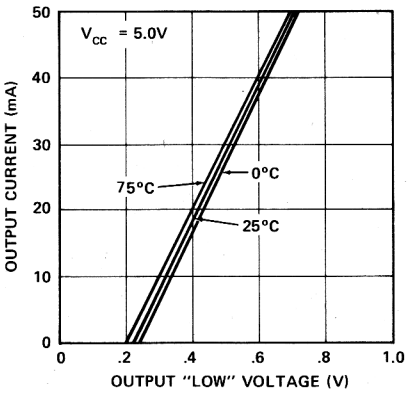
INPUT CURRENT VS. INPUT VOLTAGE



INPUT THRESHOLD VOLTAGE VS. TEMPERATURE



OUTPUT CURRENT VS. OUTPUT "LOW" VOLTAGE



Switching Characteristics

Conditions of Test:

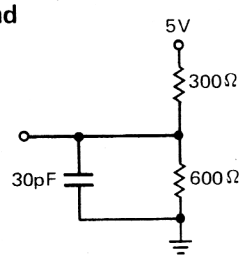
Input Pulse amplitudes · · 2.5V

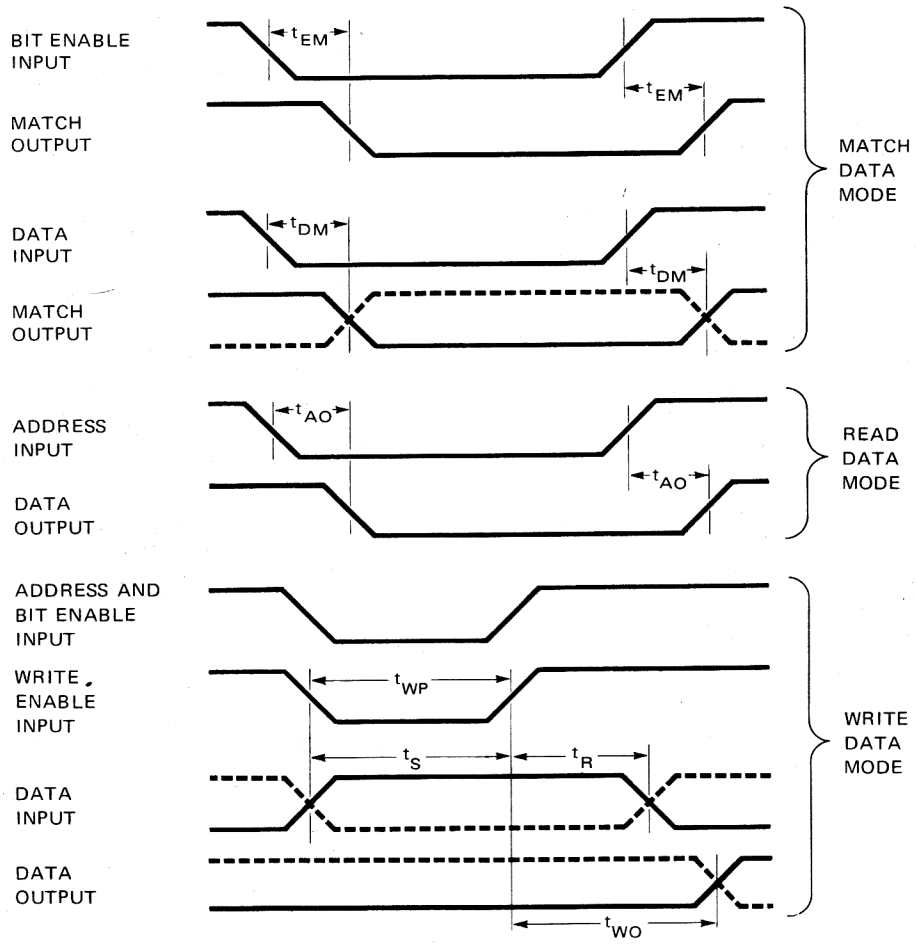
Input pulse rise and fall times of 5 nanoseconds between 1 volt and 2 volts

Speed measurements are made at 1.5 volt levels

Output loading is 15 mA and 30 pF

15mA Test Load





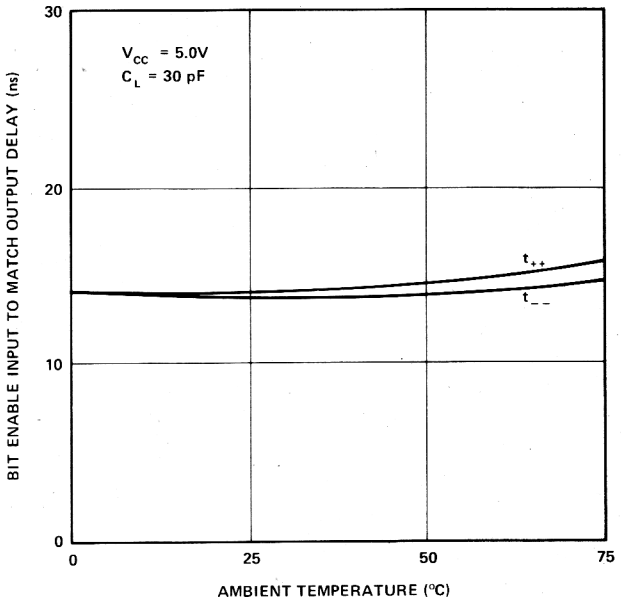
A.C. Characteristics T_A = 0°C to +75°C, V_{CC} = 5.0V ±5%; unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN.	TYP.(1)	MAX.	
t_{EM}	BIT ENABLE INPUT TO MATCH OUTPUT DELAY		15	30	ns
t_{DM}	DATA INPUT TO MATCH OUTPUT DELAY		16	30	ns
t_{AO}	ADDRESS INPUT TO OUTPUT DELAY		14	30	ns
t_{WP}	WRITE ENABLE PULSE WIDTH	40	25		ns
t_{WO}	WRITE ENABLE TO OUTPUT DELAY		–	40	ns
t_S	SET-UP TIME ON DATA INPUT		–	40	ns
t_R	RELEASE TIME ON DATA INPUT	0	–		ns

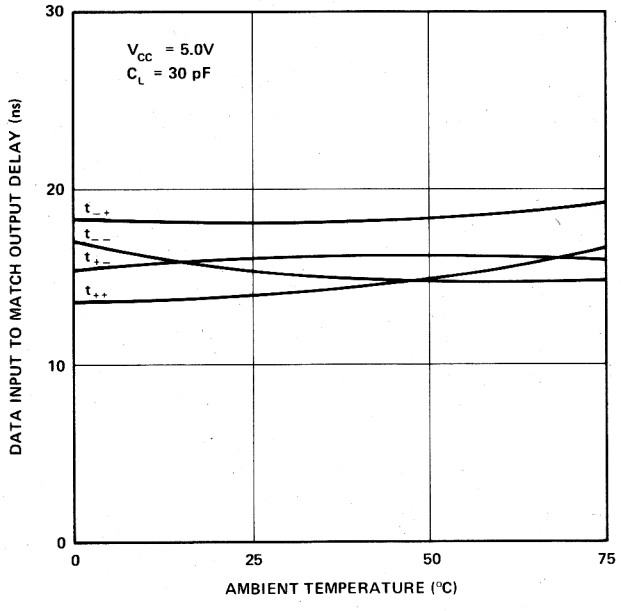
Note 1. Typical values are at nominal voltages and T_A = 25°C.

Typical A.C. Characteristics

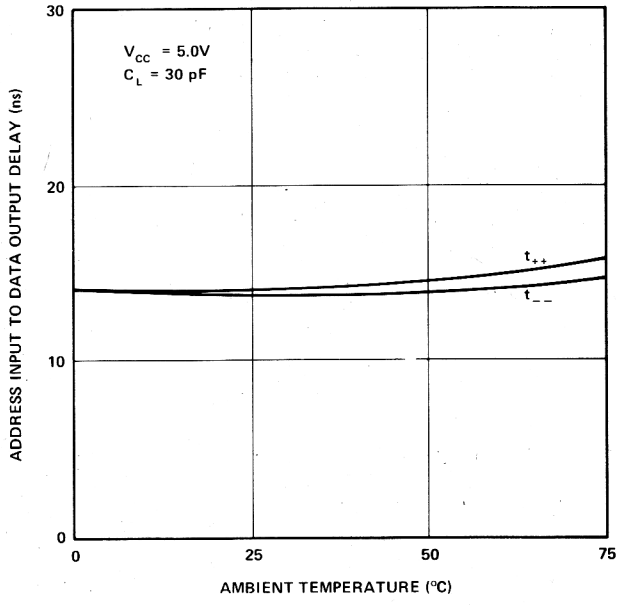
BIT ENABLE INPUT TO MATCH OUTPUT DELAY VS. TEMPERATURE



DATA INPUT TO MATCH OUTPUT DELAY VS. TEMPERATURE



ADDRESS INPUT TO DATA OUTPUT DELAY VS. TEMPERATURE



WRITE ENABLE PULSE WIDTH VS. TEMPERATURE