PRELIMINARY INFORMATION

DIGITAL 54/74 TTL SERIES

DESCRIPTION

The 10139 is an ECL 256-Bit Read Only Memory organized as 32 words with 8 bits per word. The words are selected by five binary address lines; full word decoding is incorporated on the chip. A chip enable input is provided for additional decoding flexibility, which causes all eight outputs to go to low state when the chip enable input is high. This device is fully compatible with all of Signetics series 10,000 products. Address to output access time is 15 ns typical. Power dissipation is 580 milliwatts typical with separate internal bond wires and metal systems for V_{CC1} and V_{CC2}. The 10139 may be programmed to any desired pattern by the user. The 10139 is suitable for use in high performance ECL systems. A Truth Table/Order Blank is attached.

TEMPERATURE RANGE

–30 to +85°C Operating Ambient

RECOMMENDED OPERATING VOLTAGE

V_{CC} = GND, V_{EE} = –5.2V ±5%

FEATURES

- 15 ns TYPICAL ACCESS TIME
- 16 PIN PACKAGE
- EASY PROGRAMMING
- FULLY DECODED
- FULLY COMPATIBLE WITH ECL 10,000 SERIES
- HIGH IMPEDANCE INPUTS 50K OHM PULLDOWN
- OPEN EMITTER OUTPUTS

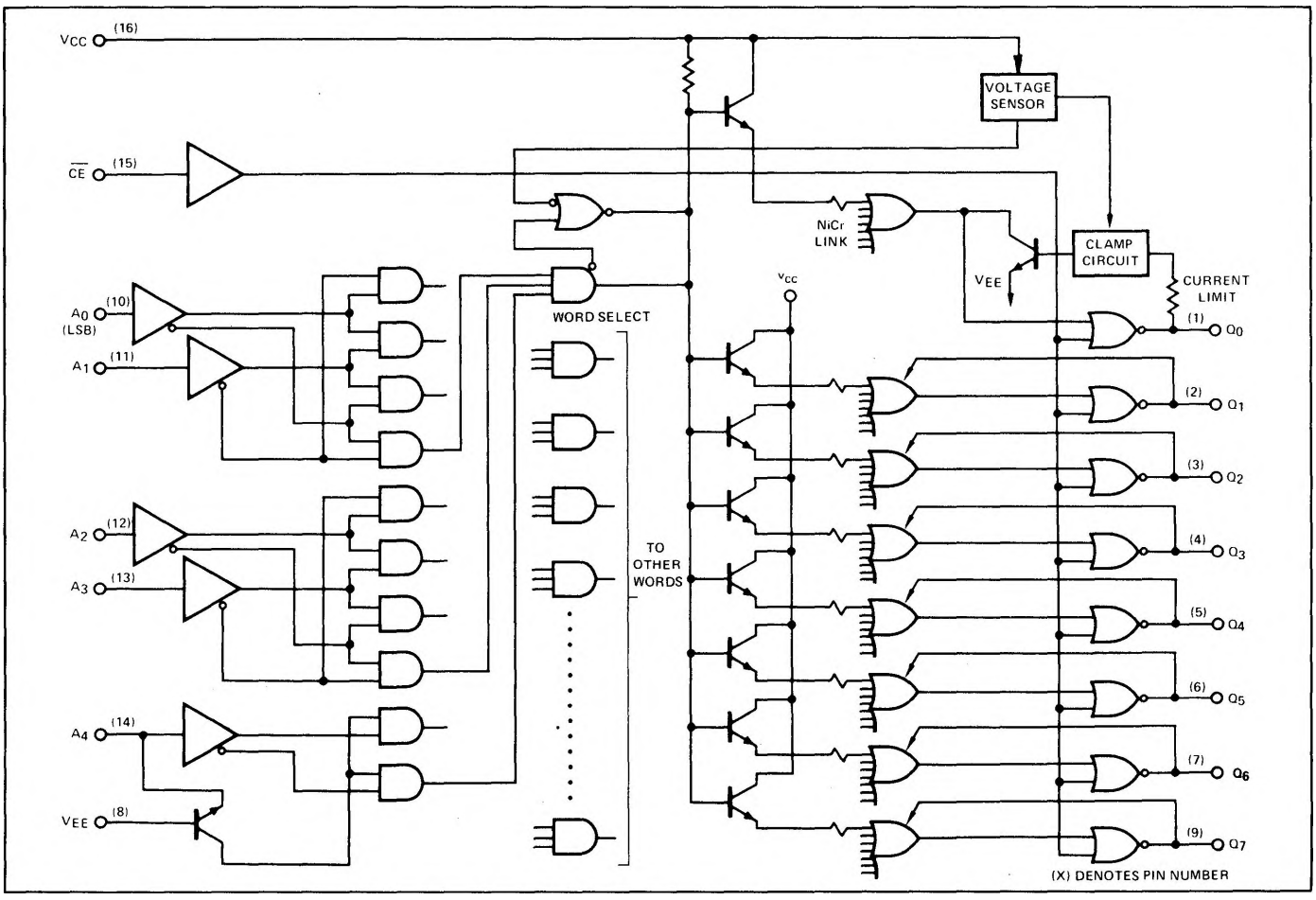
APPLICATIONS

PROGRAMMABLE LOGIC
CONTROL STORES
MICROPROGRAMMING
VOLUME PRODUCTION
HARDWIRED ALGORITHMS

PACKAGE TYPE

F: 16 Pin CERDIP

BLOCK DIAGRAM



PRELIMINARY ELECTRICAL CHARACTERISTICS (T_A = +25°C, V_{CC} = OV, R_L = 50Ω, V_{EE} = −5.2V)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Power Supply Drain Current	I_{EO}		110	145	mAdc
Input Current V_{IH} = −0.810V, V_{IL} = −1.850V	 $I_{in}H$ $I_{in}L$	 30		265	 μAdc μAdc
Output Voltage Logic "1" (V_{IH} = −0.810V, V_{IL} = −1.850V)	V_{OH}	−0.960		−0.810	Vdc
Logic "0" (V_{IH} = −0.810V, V_{ILA} = 1.850V)	V_{OL}	−1.990		−1.650	Vdc
Threshold Voltage Logic "1" (V_{IHA} = −1.105V, V_{ILA} = −1.475V)	V_{OHA}	−0.980			Vdc
Logic "0" (V_{IHA} = −1.105V, V_{ILA} = 1.475V)	V_{OLA}			−1.630	Vdc

PRELIMINARY ELECTRICAL CHARACTERISTICS (T_A = +25°C, V_{CC} = OV, V_{EE} = −5.2V, R_L = 50Ω)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Chip Enable Prop Delay			10	15	ns
Output Rise Time (20 to 80%) Output Fall Time (20 to 80%)			4.2 4.2		ns ns
Access Time Address to Output	T_{AD}		15	20	ns

RECOMMENDED PROGRAMMING PROCEDURE

The 10139 is shipped with all bits at logical "0" (low). To write logical "1's", proceed as follows:

MANUAL (see Fig. 1)

STEP 1

Connect V_{EE} (Pin 8) to ground and V_{CC} (Pin 16) to +5.2 volts. Address the word to be programmed by applying 4.0 to 4.6 volts for a logic "1" and 0.0 to 1.0 volts for a logic "0" to the appropriate address inputs.

STEP 2

Raise V_{CC} (Pin 16) to 12 volts.

STEP 3

After V_{CC} has stabilized at 12 volts (including any ringing which may be present on the V_{CC} line) apply a current pulse of 2.5 mA to the output pin corresponding to the bit to be programmed to a logic "1".

STEP 4

Return V_{CC} to 5.2 volts.

CAUTION: To prevent excessive chip temperature rise, V_{CC} should not be allowed to remain at 12 volts for more than 1 second.

STEP 5

Verify that the selected bit has programmed by connecting a 460Ω resistor to ground and measuring the voltage at the output pin. If a logic "1" is not detected at the output, the procedure should be repeated once.

STEP 6

If verification is positive, proceed to the next bit to be programmed.

AUTOMATIC (see Fig. 2)

STEP 1

Connect V_{EE} (Pin 8) to ground and V_{CC} (Pin 16) to +5.2 volts. Apply the proper address data and raise V_{CC} (Pin 16) to 12 volts.

STEP 2

After a minimum delay of 100 μs and a maximum delay of 1.0 ms, apply a 2.5 mA current pulse to the first bit to be programmed ($0.5 \leqslant PW \leqslant 1$ ms).

STEP 3

Repeat Step 2 for each bit of the selected word specified as a logic "1". (Program only one bit at a time; The delay between output programming pulses should be equal to or less than 1.0 ms.)

STEP 4

After all the desired bits of the selected word have been programmed, change address data and repeat Steps 2 and 3.

NOTE: If all the maximum times listed above are maintained, the entire memory will program in less than 1 second. Therefore, it would be permissible for V_{CC} to remain at 12 volts during the entire programming time.

STEP 5

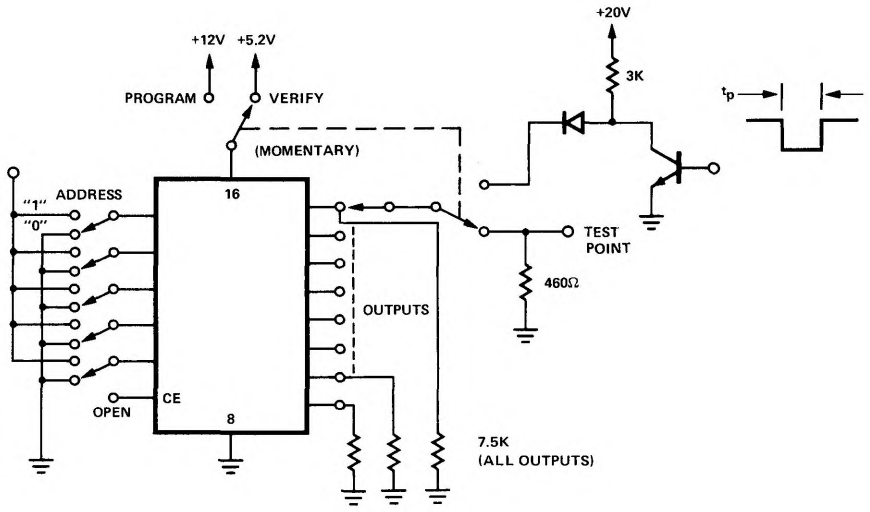
After stepping through all address words, return V_{CC} to +5.2 and verify that each bit has programmed. If one or more bits have not programmed, repeat the entire procedure once.

PROGRAMMING SPECIFICATIONS

CHARACTERISTIC	SYMBOL	LIMITS			UNITS	CONDITIONS
		MIN.	TYP.	MAX.		
Power Supply Voltage						
To Program	V_{CCP}	11.5	12.0	12.5	Volts	
To Verify	V_{CCV}	5.0	5.2	5.4	Volts	
Programming Supply Current	I_{CCP}			250	mA	V_{CC} = 12.0 Volts
Address Voltage						
logical "1"	V_{IH}	4.0		4.6	Volts	
logical "0"	V_{IL}	0.0		1.0	Volts	
Max. Time at $V_{CC} = V_{CCP}$				1.0	Sec.	
Output Programming Current	I_{OP}	2.0	2.5	3.0	mA	
Output Program Pulse Width	t_p	0.5		1.0	ms	
Output Pulse Rise Time				10	μs	
Programming Pulse Delay (1)						
following V_{CC} change	t_d	0.1		1.0	ms	
between output pulses	t_d1	0.01		1.0	ms	

NOTE:
(1) Maximum is specified to minimize the amount of time V_{CC} is at 12 volts.

MANUAL PROGRAMMING CIRCUIT



AUTOMATIC PROGRAMMING CIRCUIT