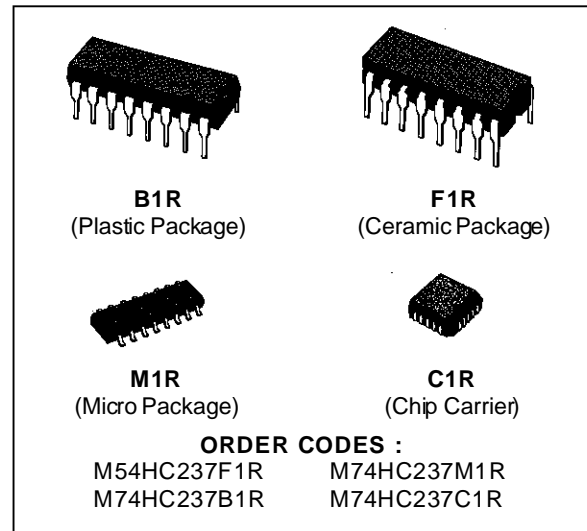


3 TO 8 LINE DECODER LATCH

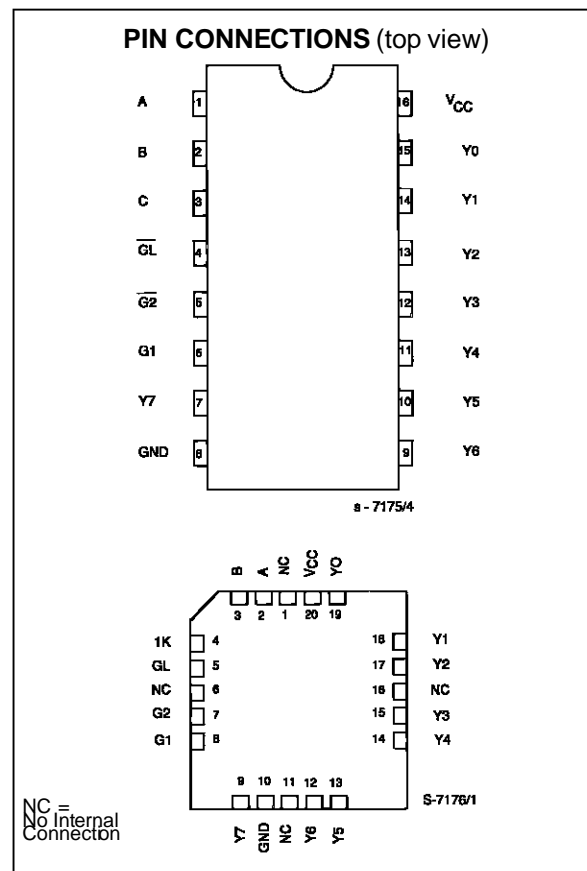
- HIGH SPEED
 $t_{PD} = 12 \text{ ns (TYP.) at } V_{CC} = 5 \text{ V}$
- LOW POWER DISSIPATION
 $I_{CC} = 4 \mu\text{A (MAX.) AT } T_A = 25 \text{ }^\circ\text{C}$
- HIGH NOISE IMMUNITY
 $V_{NIH} = V_{NIL} = 28 \% V_{CC} \text{ (MIN.)}$
- OUTPUT DRIVE CAPABILITY
 10 LSTTL LOADS
- SYMMETRICAL OUTPUT IMPEDANCE
 $|I_{OH}| = I_{OL} = 4 \text{ mA (MIN.)}$
- BALANCED PROPAGATION DELAYS
 $t_{PLH} = t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE
 $V_{CC} \text{ (OPR)} = 2 \text{ V TO } 6 \text{ V}$
- PIN AND FUNCTION COMPATIBLE
 WITH 54/74LS237



DESCRIPTION

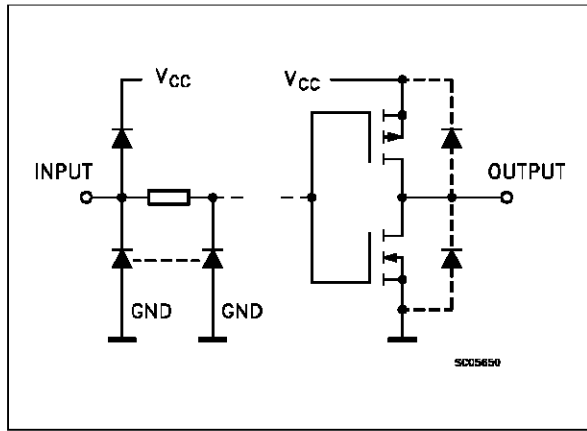
The M54/74HC237 is a high speed CMOS 3 TO 8 LINE DECODER LATCH fabricated in silicon gate C²MOS technology.

It has the same high speed performance of LSTTL combined with true CMOS low power consumption. When \overline{GL} goes from low to high, the address present at the select inputs (A, B, C) is stored in the latches. As long as \overline{GL} remains high no address changes will be recognized. Output enable controls, G1 and $\overline{G2}$ control the state of the outputs independantly of the select or latch-enable inputs. All of the outputs are low unless G1 is high and $\overline{G2}$ is low. The 'HC237 is ideally suited for the implementation of glitch-free decoders in stored-address applications in bus oriented systems. All inputs are equipped with protection circuits against static discharge and transient excess voltage.



M54/M74HC237

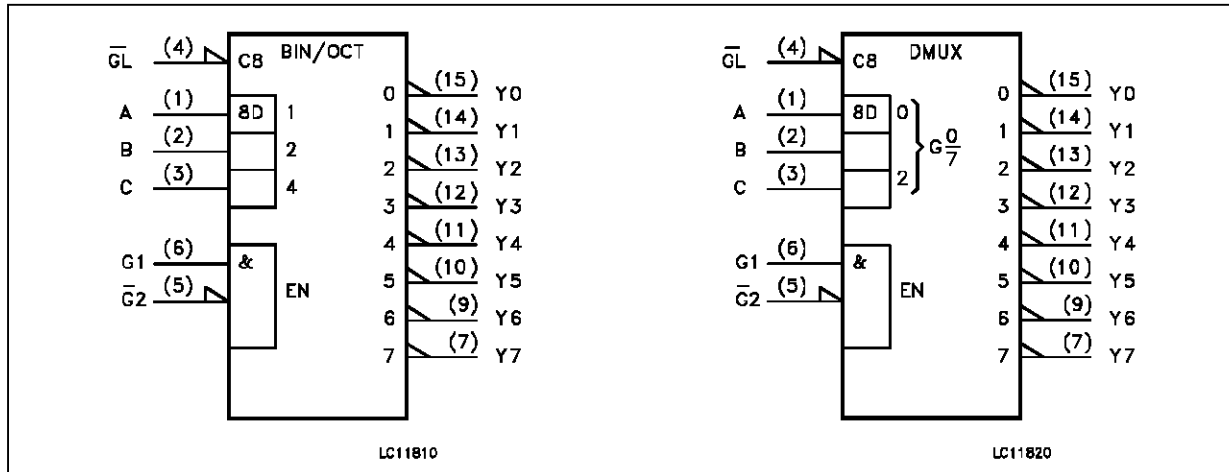
INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 2, 3	A, B, C	Data Inputs
4	\overline{GL}	Latch Enable Input (Active LOW)
5	$\overline{G2}$	Data Enable Input (Active LOW)
6	G1	Data Enable Input (Active HIGH)
15, 14, 13, 12, 11, 10, 9, 7	Y0 to Y7	Decoder Outputs
8	GND	Ground (0V)
16	Vcc	Positive Supply Voltage

IEC LOGIC SYMBOLS

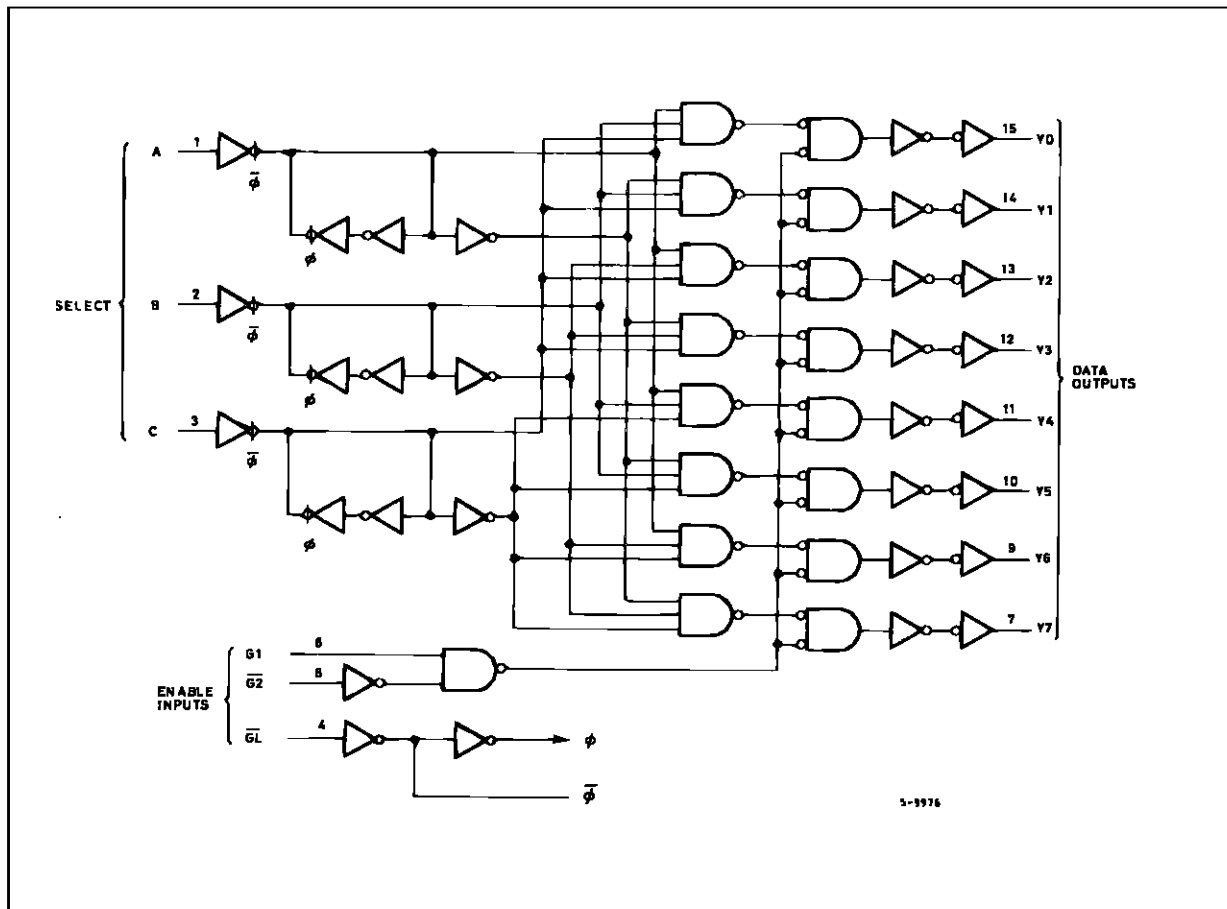


TRUTH TABLE

INPUTS						OUTPUTS							
ENABLE			SELECT										
\overline{GL}	$\overline{G2}$	G1	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	X	L	X	X	X	L	L	L	L	L	L	L	L
X	H	X	X	X	X	L	L	L	L	L	L	L	L
L	L	H	L	L	L	H	L	L	L	L	L	L	L
L	L	H	L	L	H	L	H	L	L	L	L	L	L
L	L	H	L	H	L	L	L	H	L	L	L	L	L
L	L	H	L	H	H	L	L	L	H	L	L	L	L
L	L	H	H	L	H	L	L	L	L	L	H	L	L
L	L	H	H	H	L	L	L	L	L	L	L	H	L
L	L	H	H	H	H	L	L	L	L	L	L	L	H
H	L	H	X	X	X	OUTPUT CORRESPONDING TO STORED ADDRESS, H: ALL OTHERS, L							

X: Don't Care

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7	V
V_I	DC Input Voltage	-0.5 to $V_{CC} + 0.5$	V
V_O	DC Output Voltage	-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Source Sink Current Per Output Pin	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	-65 to +150	$^{\circ}C$
T_L	Lead Temperature (10 sec)	300	$^{\circ}C$

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

(*) 500 mW: $\pm 65^{\circ}C$ derate to 300 mW by 10mW/ $^{\circ}C$: $65^{\circ}C$ to $85^{\circ}C$

M54/M74HC237

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit	
V_{CC}	Supply Voltage	2 to 6	V	
V_I	Input Voltage	0 to V_{CC}	V	
V_O	Output Voltage	0 to V_{CC}	V	
T_{op}	Operating Temperature: M54HC Series M74HC Series	-55 to +125 -40 to +85	°C °C	
t_r, t_f	Input Rise and Fall Time	$V_{CC} = 2\text{ V}$	0 to 1000	ns
		$V_{CC} = 4.5\text{ V}$	0 to 500	
		$V_{CC} = 6\text{ V}$	0 to 400	

DC SPECIFICATIONS

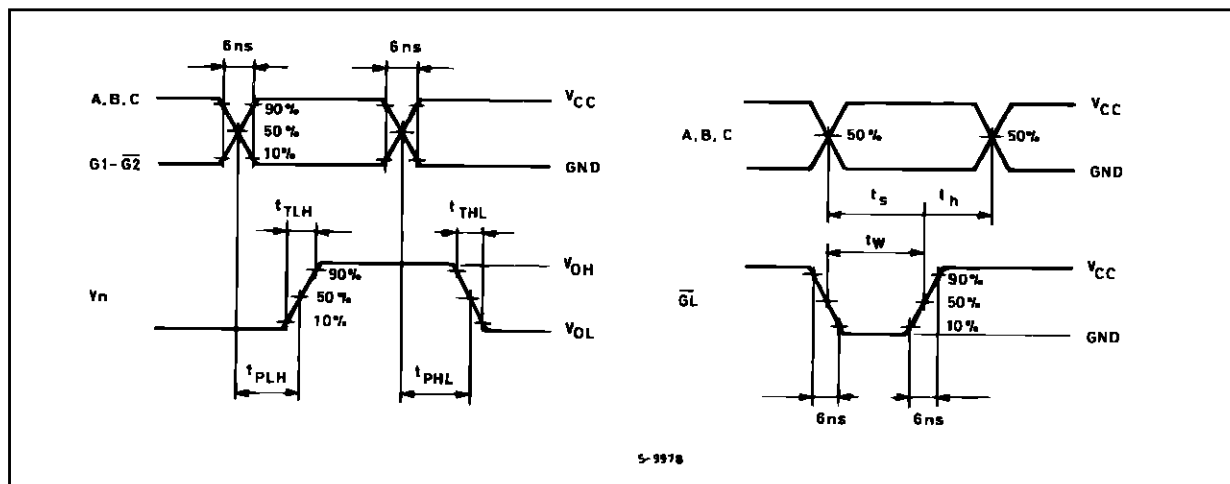
Symbol	Parameter	Test Conditions		Value						Unit		
		V_{CC} (V)		$T_A = 25\text{ °C}$ 54HC and 74HC			$-40\text{ to }85\text{ °C}$ 74HC		$-55\text{ to }125\text{ °C}$ 54HC			
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.	
V_{IH}	High Level Input Voltage	2.0		1.5			1.5		1.5		V	
		4.5		3.15			3.15		3.15			
		6.0		4.2			4.2		4.2			
V_{IL}	Low Level Input Voltage	2.0				0.5		0.5		0.5	V	
		4.5				1.35		1.35		1.35		
		6.0				1.8		1.8		1.8		
V_{OH}	High Level Output Voltage	2.0	$V_I = V_{IH}$ or V_{IL}	$I_O = -20\text{ }\mu\text{A}$	1.9	2.0		1.9		1.9	V	
		4.5			4.4	4.5		4.4		4.4		
		6.0			5.9	6.0		5.9		5.9		
		4.5	$I_O = -4.0\text{ mA}$	4.18	4.31		4.13		4.10			
		6.0		$I_O = -5.2\text{ mA}$	5.68	5.8		5.63		5.60		
V_{OL}	Low Level Output Voltage	2.0	$V_I = V_{IH}$ or V_{IL}	$I_O = 20\text{ }\mu\text{A}$		0.0	0.1		0.1		0.1	V
		4.5				0.0	0.1		0.1		0.1	
		6.0				0.0	0.1		0.1		0.1	
		4.5		$I_O = 4.0\text{ mA}$	0.17	0.26		0.33		0.40		
		6.0			$I_O = 5.2\text{ mA}$	0.18	0.26		0.33		0.40	
I_I	Input Leakage Current	6.0	$V_I = V_{CC}$ or GND			± 0.1		± 1		± 1	μA	
I_{CC}	Quiescent Supply Current	6.0	$V_I = V_{CC}$ or GND			4		40		80	μA	

AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, Input t_r = t_f = 6 ns)

Symbol	Parameter	Test Conditions		Value						Unit	
		V _{CC} (V)		T _A = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
t _{TLH} t _{THL}	Output Transition Time	2.0			30	75		95		115	ns
		4.5			8	15		19		22	
		6.0			7	13		16		19	
t _{PLH} t _{PHL}	Propagation Delay Time (A, B, C - Y)	2.0			60	180		225		270	ns
		4.5			19	36		45		54	
		6.0			16	31		38		46	
t _{PLH} t _{PHL}	Propagation Delay Time (G1 - Y)	2.0			45	140		175		210	ns
		4.5			15	28		35		42	
		6.0			13	24		30		36	
t _{PLH} t _{PHL}	Propagation Delay Time (G2 - Y)	2.0			45	140		175		210	ns
		4.5			15	28		35		42	
		6.0			13	24		30		36	
t _{PLH} t _{PHL}	Propagation Delay Time (GL - Y)	2.0			65	190		240		285	ns
		4.5			21	38		48		57	
		6.0			18	32		41		48	
t _{W(L)}	Minimum Pulse Width (GL)	2.0			10	75		95		110	ns
		4.5			6	15		19		22	
		6.0			6	13		16		19	
t _s	Minimum Set-up Time (A, B, C - $\overline{\text{GL}}$)	2.0			12	50		65		75	ns
		4.5			3	10		13		15	
		6.0			2	9		11		13	
t _h	Minimum Hold Time (A, B, C - $\overline{\text{GL}}$)	2.0				25		30		40	ns
		4.5				5		6		8	
		6.0				5		5		7	
C _{IN}	Input Capacitance				5	10		10		10	pF
C _{PD} (*)	Power Dissipation Capacitance				52						pF

(*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load.

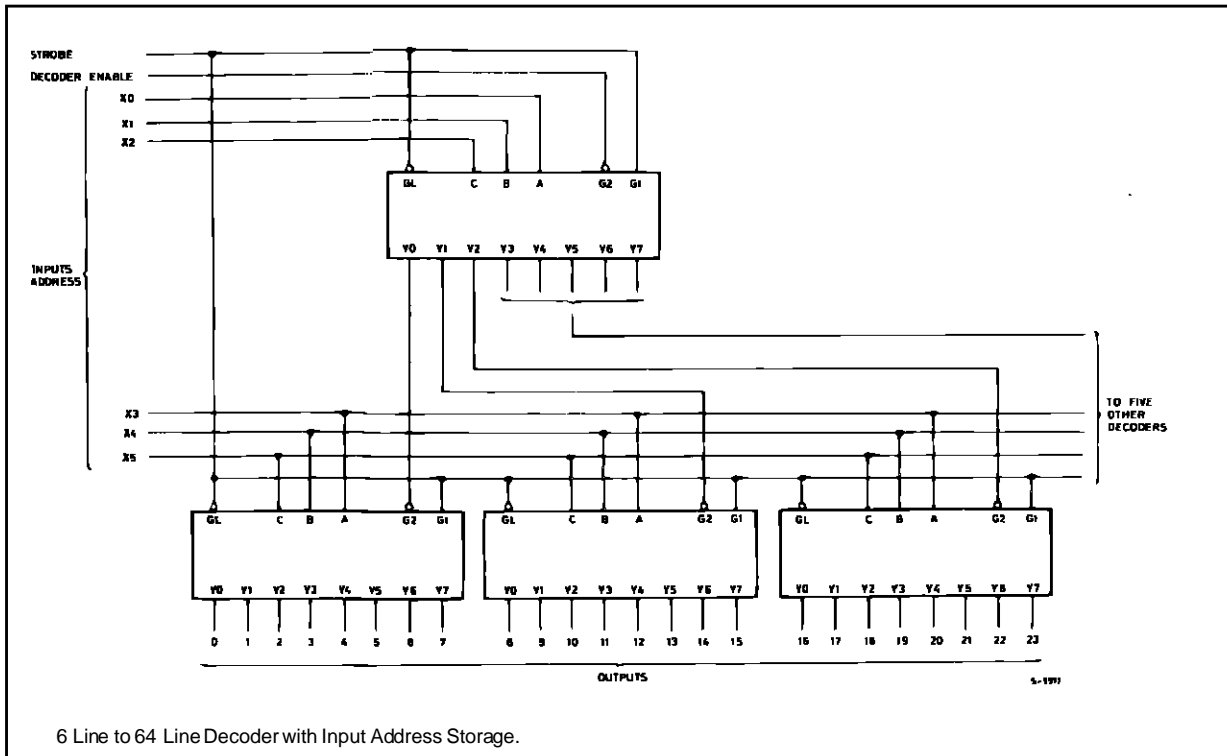
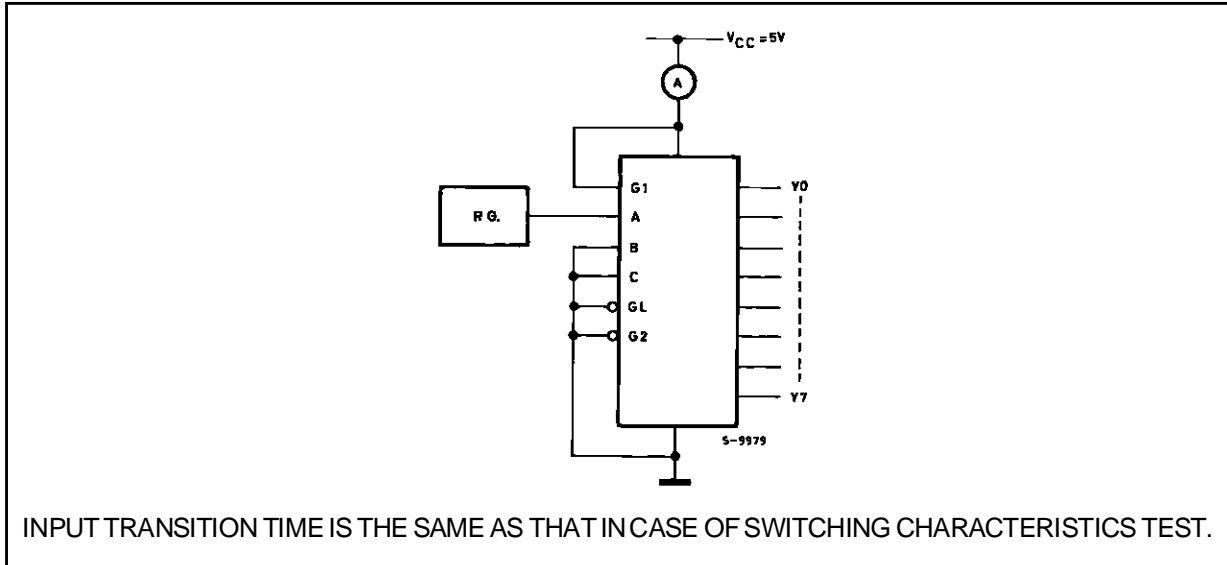
SWITCHING CHARACTERISTICS TEST WAVEFORM



S-9978

M54/M74HC237

TEST CIRCUIT I_{CC} (Opr.)



Plastic DIP16 (0.25) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



P001C

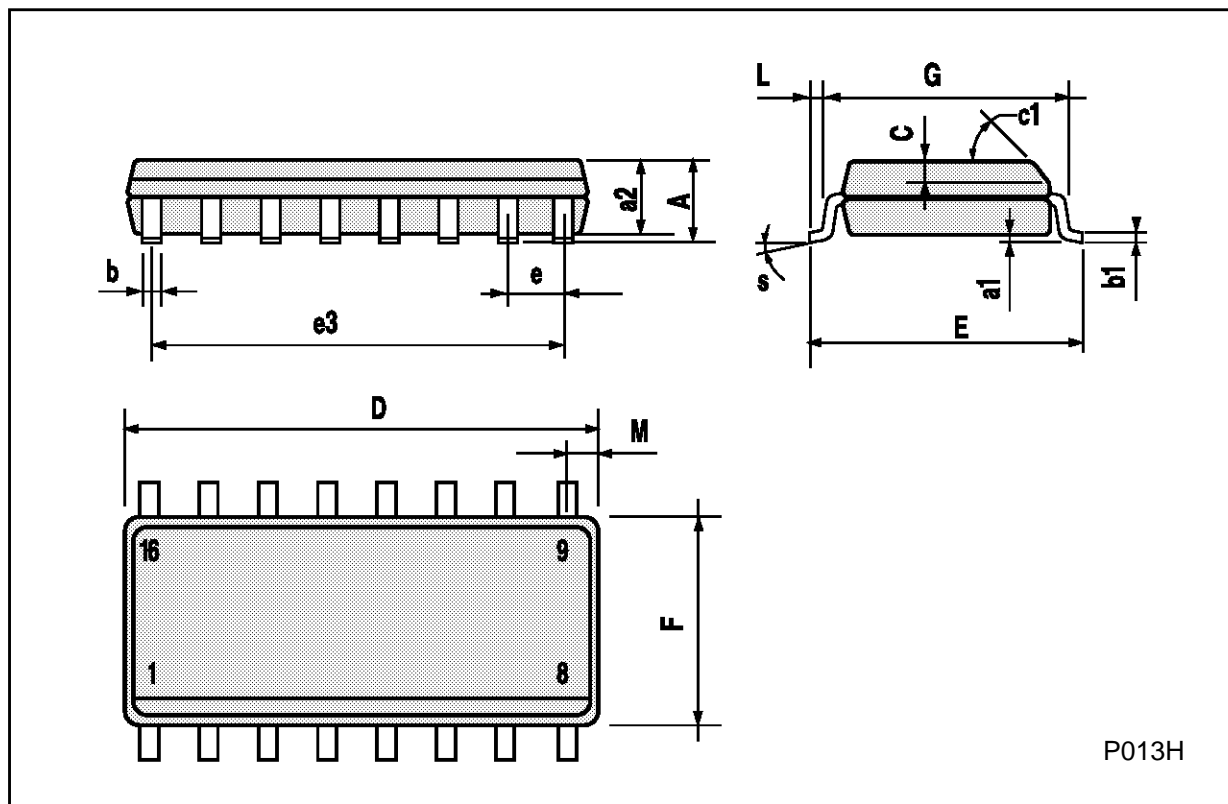
Ceramic DIP16/1 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		17.78			0.700	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	0.51		1.27	0.020		0.050
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q			5.08			0.200



SO16 (Narrow) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



PLCC20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	9.78		10.03	0.385		0.395
B	8.89		9.04	0.350		0.356
D	4.2		4.57	0.165		0.180
d1		2.54			0.100	
d2		0.56			0.022	
E	7.37		8.38	0.290		0.330
e		1.27			0.050	
e3		5.08			0.200	
F		0.38			0.015	
G			0.101			0.004
M		1.27			0.050	
M1		1.14			0.045	



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A