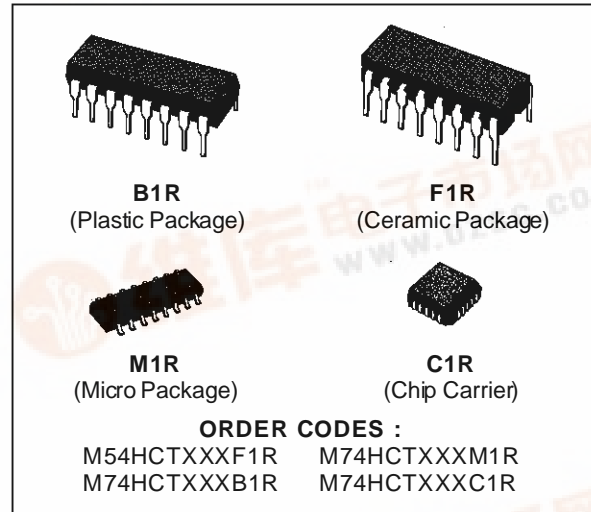




M54HCT157/158
M74HCT157/158

HCT157 QUAD 2 CHANNEL MULTIPLEXER
HCT158 QUAD 2 CHANNEL MULTIPLEXER (INV.)

- HIGH SPEED
t_{PD} = 21 ns (TYP.) AT V_{CC} = 5 V
- LOW POWER DISSIPATION
I_{CC} = 4 μA (MAX.) AT T_A = 25 °C
- COMPATIBLE WITH TTL OUTPUTS
V_{IH} = 2V (MIN.) V_{IL} = 0.8V (MAX)
- OUTPUT DRIVE CAPABILITY
10 LSTTL LOADS
- SYMMETRICAL OUTPUT IMPEDANCE
|I_{OH}| = I_{OL} = 4 mA (MIN.)
- BALANCED PROPAGATION DELAYS
t_{PLH} = t_{PHL}
- PIN AND FUNCTION COMPATIBLE
WITH 54/74LS157/158

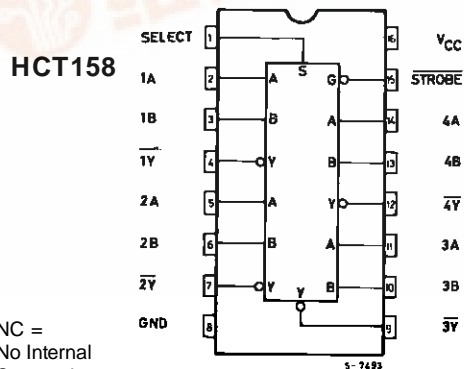
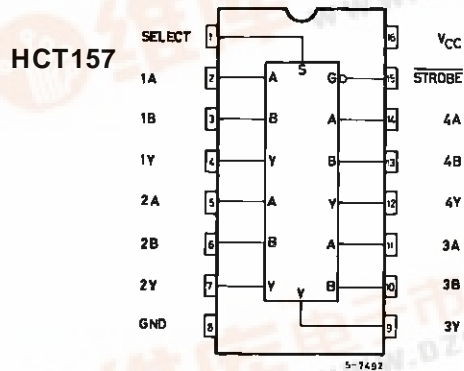


DESCRIPTION

The M54/74HCT157 and the M54/74HCT158 are high speed CMOS QUAD 2-CHANNEL MULTIPLEXERS fabricated with silicon gate C²MOS technology. They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

These devices consist of four 2-input digital multiplexers with common select and strobe inputs. The HCT158 is an inverting multiplexer while the HCT157 is a non-inverting multiplexer. When the STROBE input is held High, selection of data is inhibited and all the outputs become Low in the M74HCT157 and High in the M74HCT158. The SELECT decoding determines whether the A or B inputs get routed to their corresponding Y outputs. All inputs are equipped with protection circuits against static discharge and transient excess voltage. M54/74HCT devices are designed to directly interface HSC²MOS systems with TTL and NMOS components. They are also plug in replacements for LSTTL devices giving a reduction of power consumption.

PIN CONNECTIONS (top view)

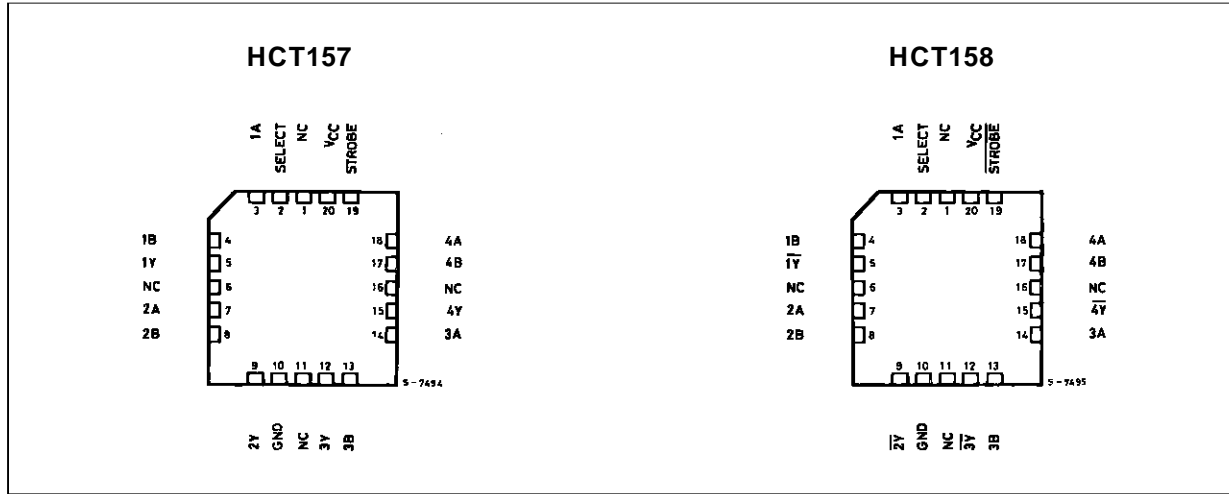


NC =
No Internal
Connection

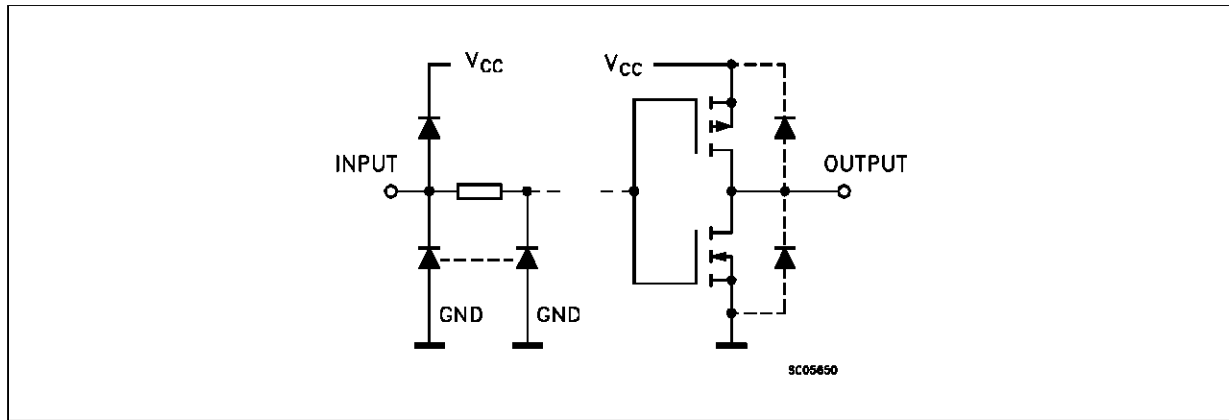


M54/M74HCT157 M54/M74HCT158

CHIP CARRIER



INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION (for HCT157)

PIN No	SYMBOL	NAME AND FUNCTION
1	SELECT	Common Data Select Input
2, 5, 11, 14	1A to 4A	Data Inputs From Source A
3, 6, 10, 13	1B to 4B	Data Inputs From Source B
4, 7, 9, 12	1Y to 4Y	Multiplexer Output
15	$\overline{\text{STROBE}}$	Strobe Input
8	GND	Ground (0V)
16	V _{cc}	Positive Supply Voltage

PIN DESCRIPTION (for HCT158)

PIN No	SYMBOL	NAME AND FUNCTION
1	SELECT	Common Data Select Input
2, 5, 11, 14	1A to 4A	Data Inputs From Source A
3, 6, 10, 13	1B to 4B	Data Inputs From Source B
4, 7, 9, 12	$\overline{1Y}$ to $\overline{4Y}$	Multiplexer Output
15	$\overline{\text{STROBE}}$	Strobe Input
8	GND	Ground (0V)
16	V _{cc}	Positive Supply Voltage

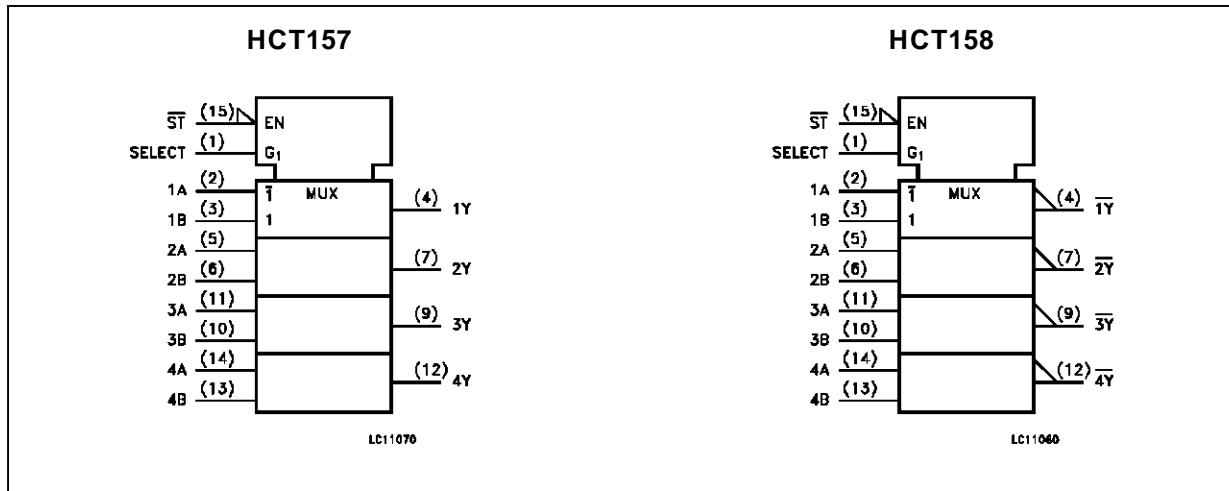
M54/M74HCT157 M54/M74HCT158

TRUTH TABLE

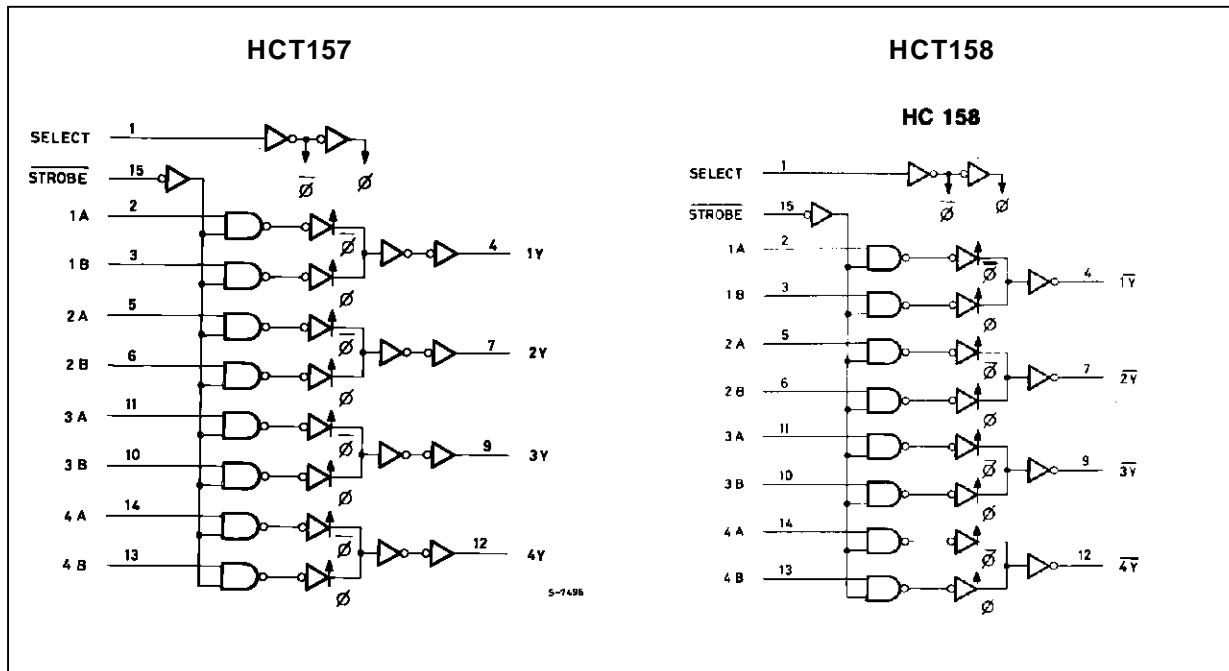
INPUTS				OUTPUTS	
$\overline{\text{STROBE}}$	SELECT	A	B	Y (HCT157)	$\overline{\text{Y}}$ (HCT158)
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

X: DON'T CARE

IEC LOGIC SYMBOL



LOGIC DIAGRAM



M54/M74HCT157 M54/M74HCT158

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	°C
T _L	Lead Temperature (10 sec)	300	°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: ≡ 65 °C derate to 300 mW by 10mW/°C: 65 °C to 85 °C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	4.5 to 5.5	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} = 4.5 to 5.5V)	0 to 500	ns

DC SPECIFICATIONS

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.	
V _{IH}	High Level Input Voltage	4.5 to 5.5		2.0			2.0		2.0		V	
V _{IL}	Low Level Input Voltage	4.5 to 5.5				0.8		0.8		0.8	V	
V _{OH}	High Level Output Voltage	4.5	V _I = V _{IH} or V _{IL}	I _O = -20 μA	4.4	4.5		4.4		4.4	V	
				I _O = -4.0 mA	4.18	4.31		4.13		4.10		
V _{OL}	Low Level Output Voltage	4.5	V _I = V _{IH} or V _{IL}	I _O = 20 μA		0.0	0.1		0.1		0.1	V
				I _O = 4.0 mA		0.17	0.26		0.33		0.4	
I _I	Input Leakage Current	5.5	V _I = V _{CC} or GND				±0.1		±1		±1	μA
I _{CC}	Quiescent Supply Current	5.5	V _I = V _{CC} or GND				4		40		80	μA
ΔI _{CC}	Additional worst case supply current	5.5	Per Input pin V _I = 0.5V or V _I = 2.4V Other Inputs at V _{CC} or GND I _O = 0				2.0		2.9		3.0	mA

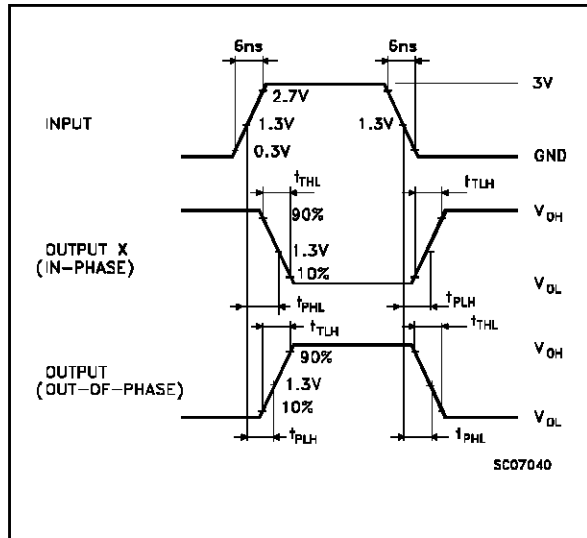
M54/M74HCT157 M54/M74HCT158

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

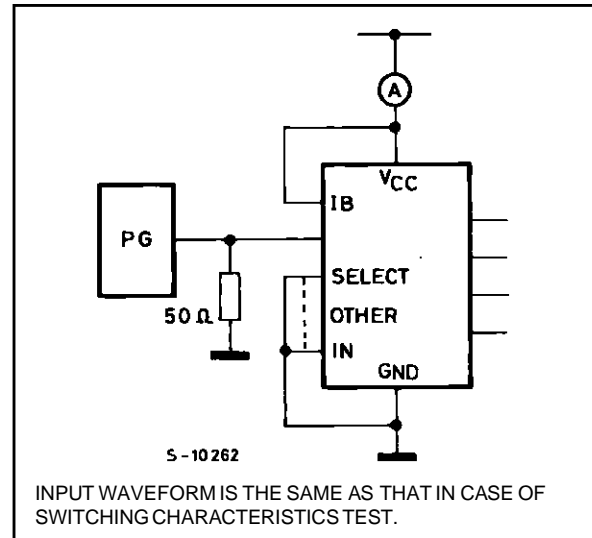
Symbol	Parameter	Test Conditions		Value						Unit	
		V_{CC} (V)		$T_A = 25 \text{ }^\circ\text{C}$ 54HC and 74HC			$-40 \text{ to } 85 \text{ }^\circ\text{C}$ 74HC		$-55 \text{ to } 125 \text{ }^\circ\text{C}$ 54HC		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
t_{TLH} t_{THL}	Output Transition Time	4.5			8	15		19		22	ns
t_{PLH} t_{PHL}	Propagation Delay Time (A, B - Y)	4.5			16	25		31		38	ns
t_{PLH} t_{PHL}	Propagation Delay Time (SELECT - Y)	4.5			19	30		38		45	ns
t_{PLH} t_{PHL}	Propagation Delay Time (STROBE - Y)	4.5			17	27		34		41	ns
C_{IN}	Input Capacitance				5	10		10		10	pF
$C_{PD} (*)$	Power Dissipation Capacitance		HCT157		50						pF
			HCT158		60						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. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4$ (per channel)

SWITCHING CHARACTERISTICS TEST CIRCUIT

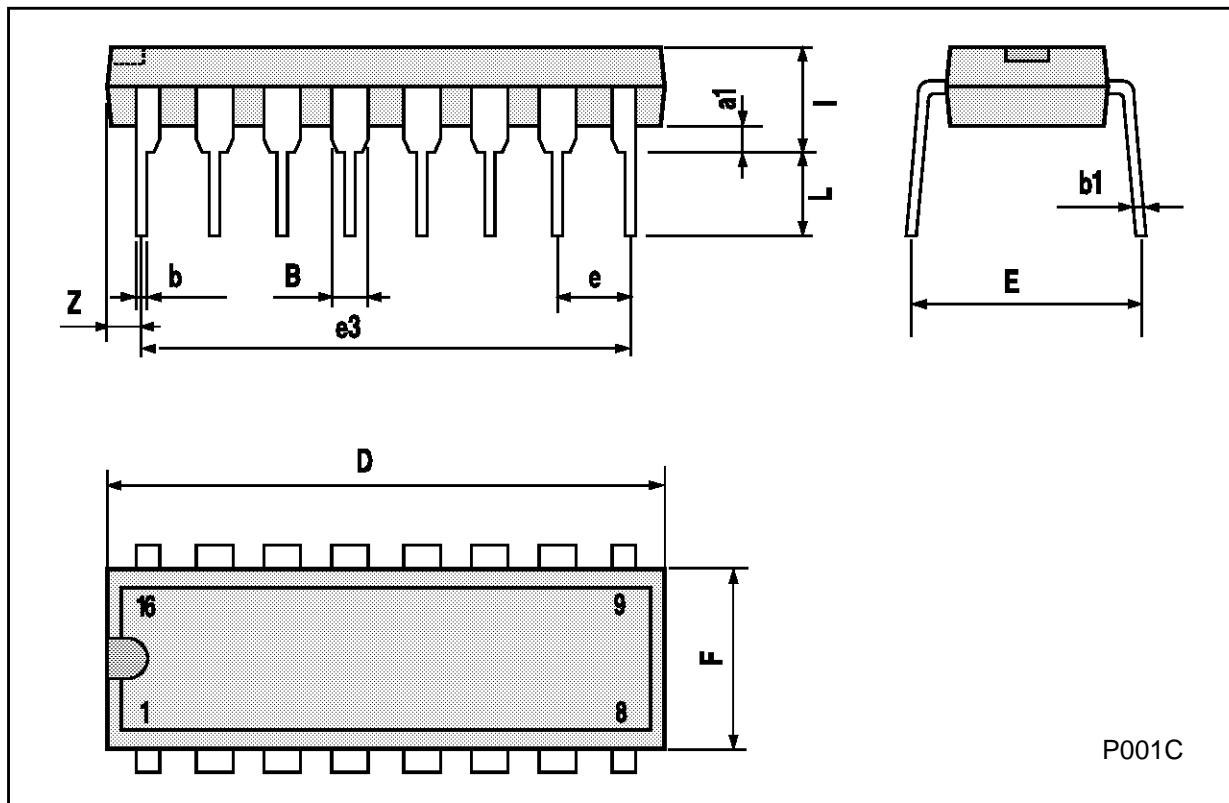


TEST CIRCUIT I_{CC} (Opr.)



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

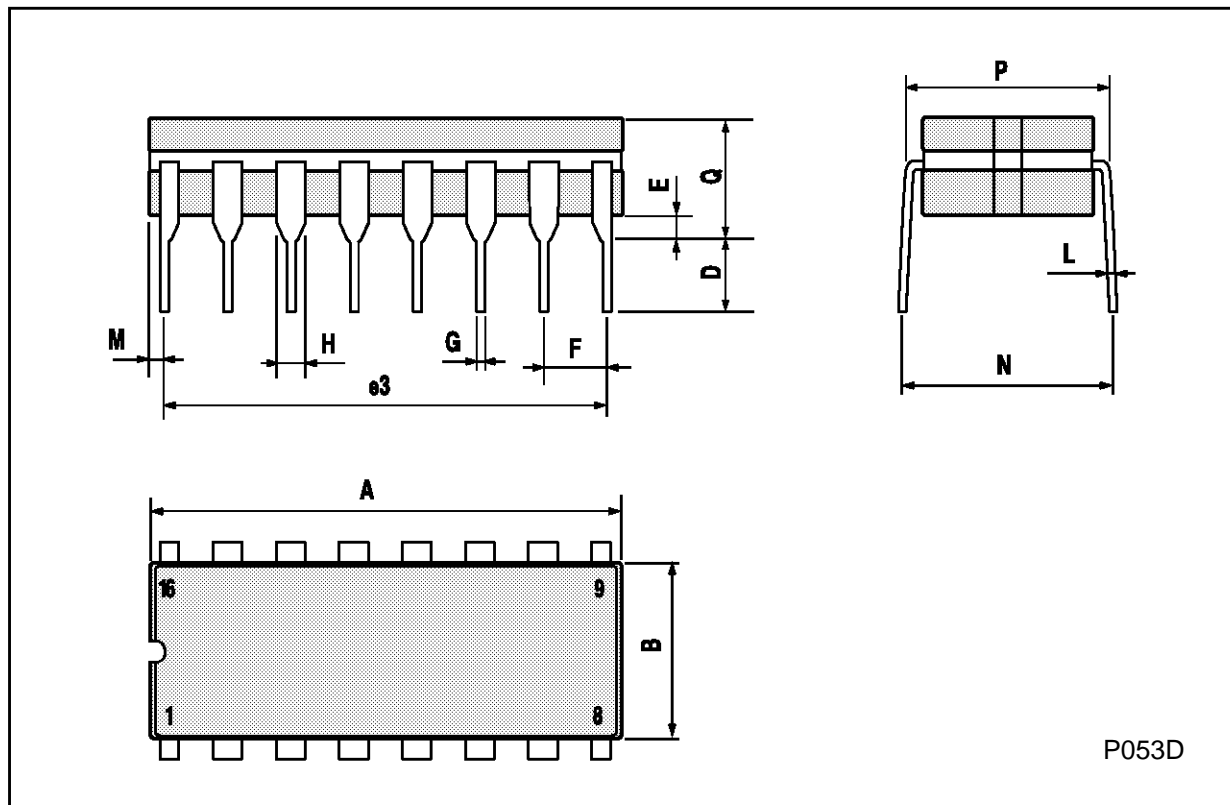


P001C

M54/M74HCT157 M54/M74HCT158

Ceramic DIP16/1 MECHANICAL DATA

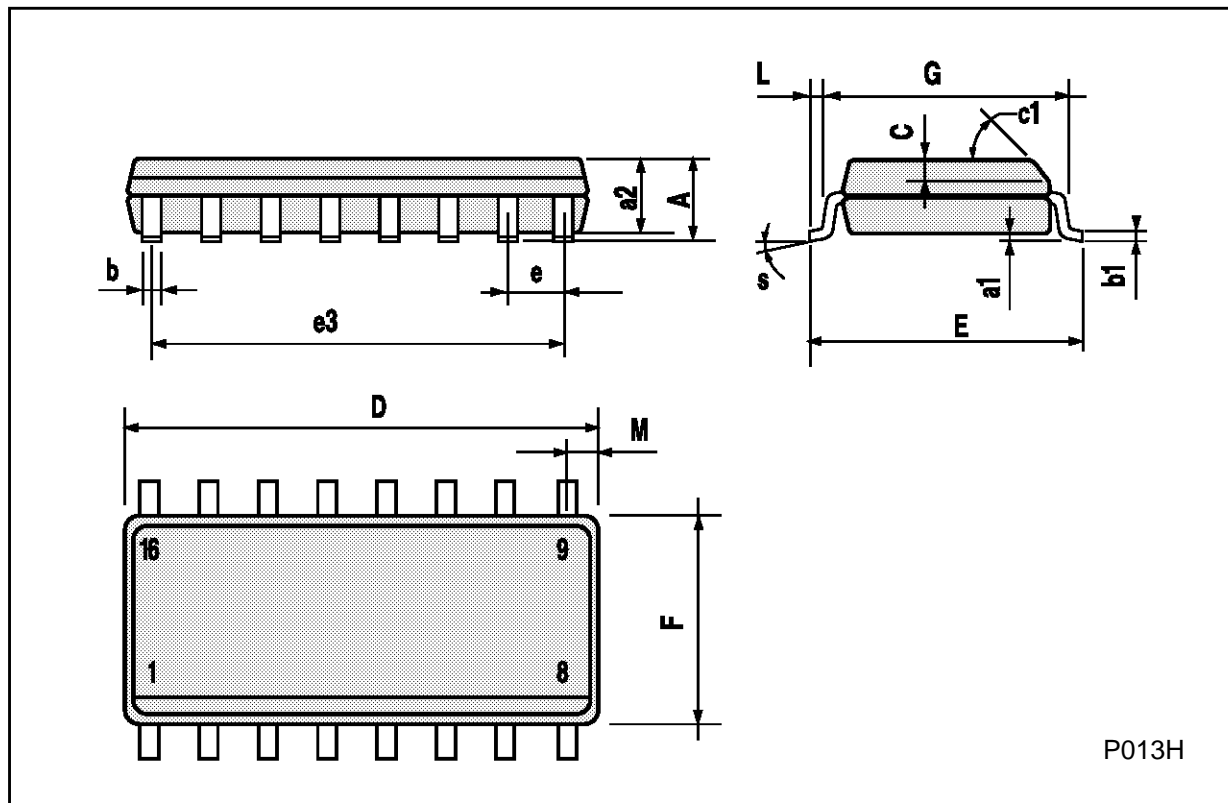
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		17.78			0.700	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	0.51		1.27	0.020		0.050
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q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



P053D

SO16 (Narrow) MECHANICAL DATA

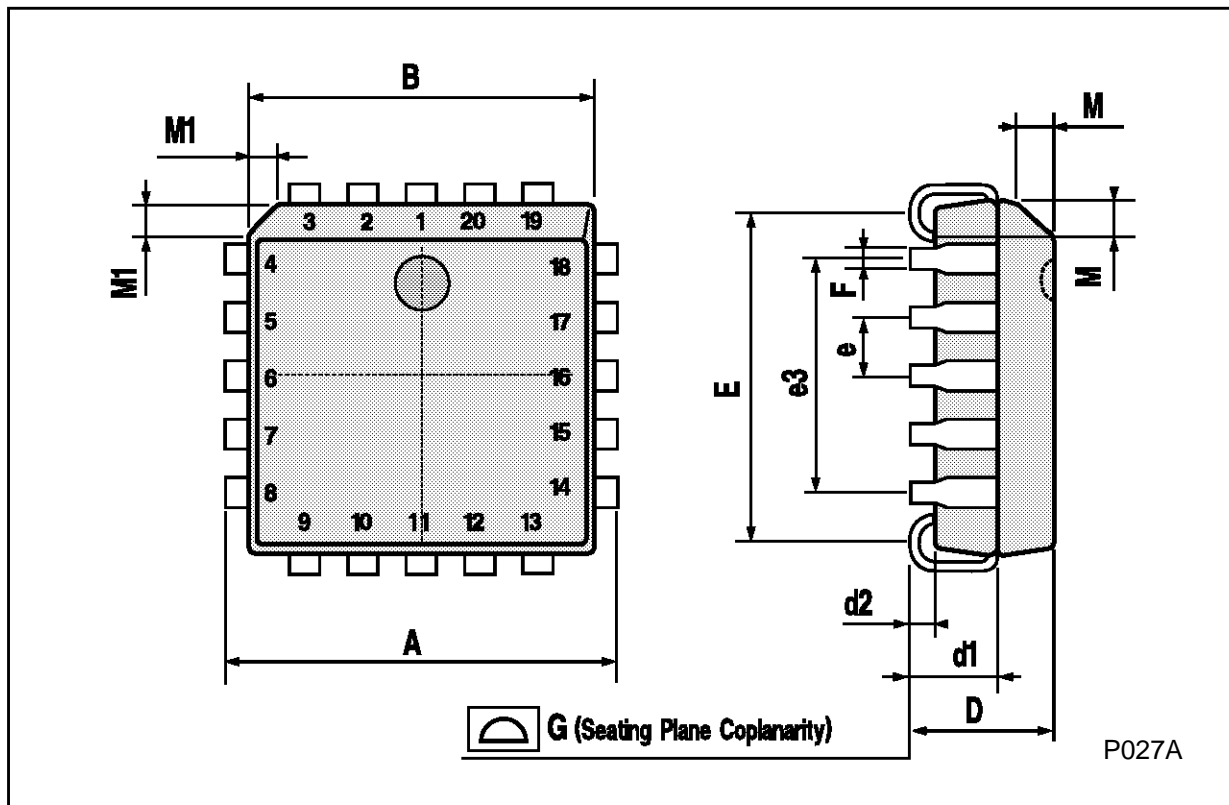
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157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



M54/M74HCT157 M54/M74HCT158

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	



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