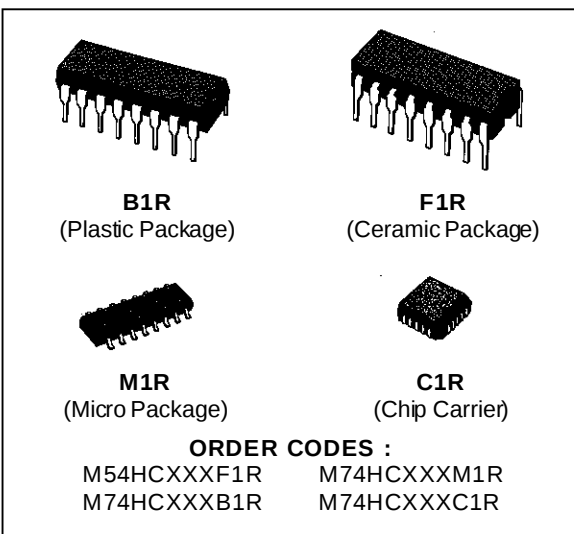


HC257 QUAD 2 CHANNEL MULTIPLEXER (3-STATE) HC258 QUAD 2 CHANNEL MULTIPLEXER (3-STATE, INVERTING)

- **HIGH SPEED**
 $t_{PD} = 10 \text{ ns (TYP.) at } V_{CC} = 5 \text{ V}$
- **LOW POWER DISSIPATION**
 $I_{CC} = 4 \mu\text{A (MAX.) at } T_A = 25^\circ\text{C}$
- **HIGH NOISE IMMUNITY**
 $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (MIN.)}$
- **OUTPUT DRIVE CAPABILITY**
 15 LSTTL LOADS
- **SYMMETRICAL OUTPUT IMPEDANCE**
 $|I_{OH}| = I_{OL} = 6 \text{ mA (MIN.)}$
- **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 54/74LS257/258



DESCRIPTION

The M54/74HC257 and the M54/74HC258 are high speed CMOS MULTIPLEXERS fabricated with silicon gate C²MOS technology.

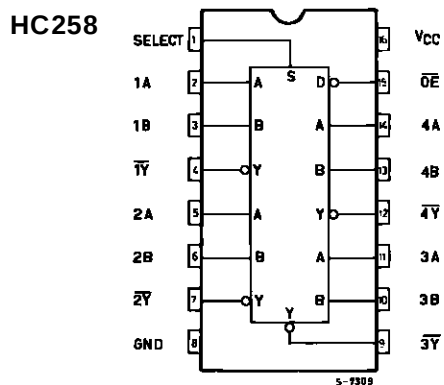
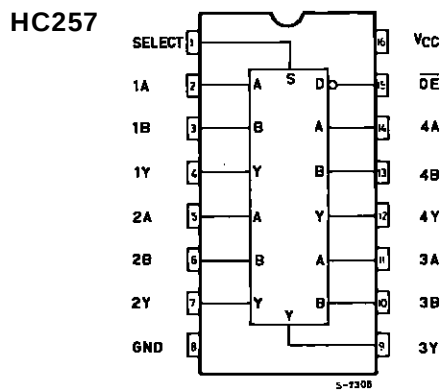
They have the same high speed performance of LSTTL combined with true CMOS low power consumption.

These IC's are composed of an independent 2-channel multiplexer with common SELECT and ENABLE INPUT.

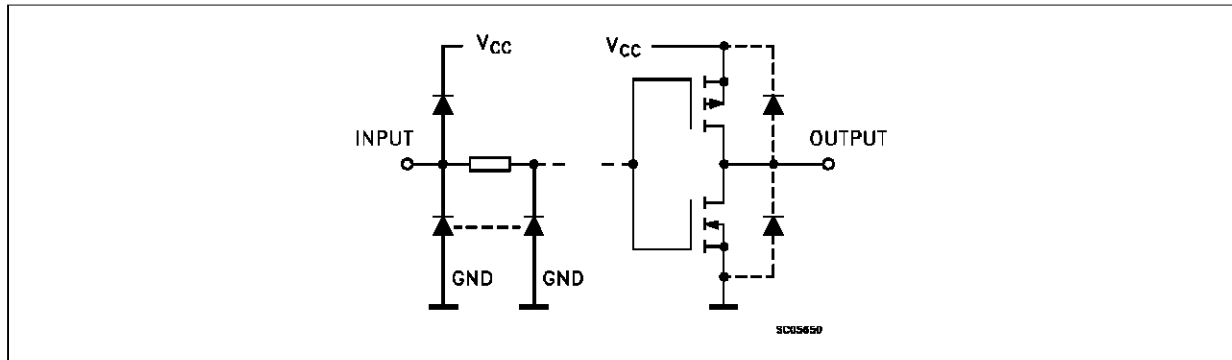
The M54/74HC258 is an inverting multiplexer while the M54/74HC257 is a non-inverting multiplexer. When the ENABLE INPUT is held "High", outputs of both IC's become high-impedance state. If SELECT INPUT is held "Low", "A" data is selected, when SELECT INPUT is high "H", "B" data is chosen.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

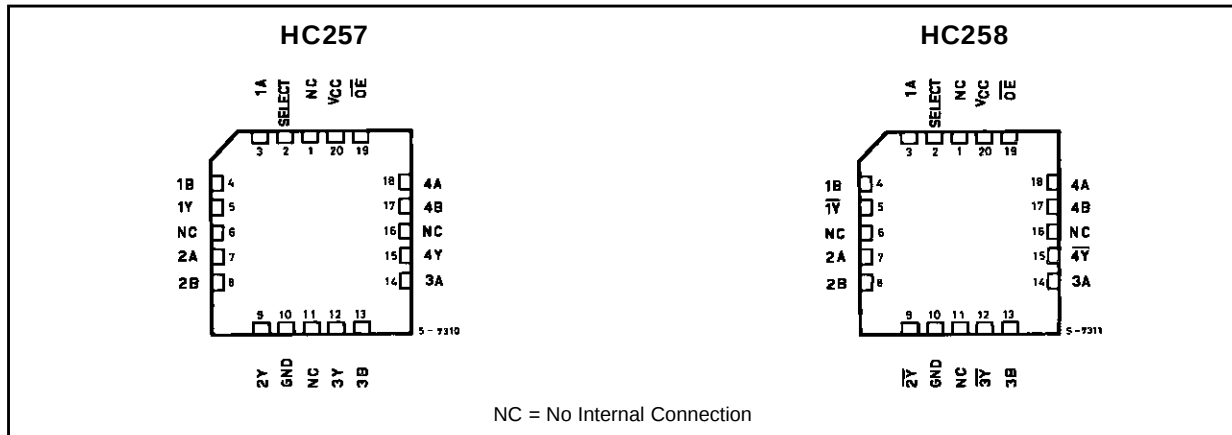
PIN CONNECTIONS (top view)



INPUT AND OUTPUT EQUIVALENT CIRCUIT



CHIP CARRIER



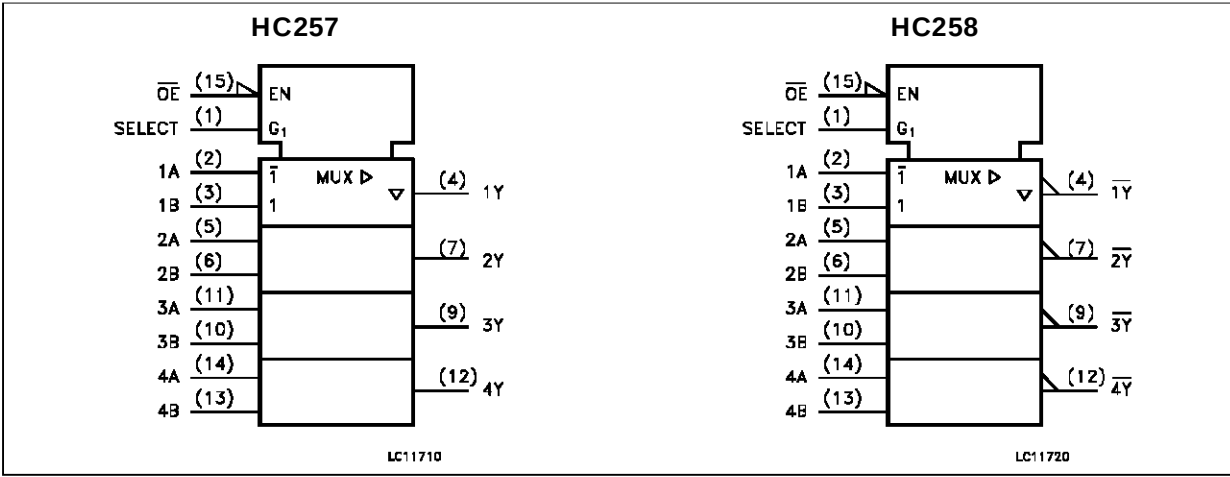
PIN DESCRIPTION (HC257)

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

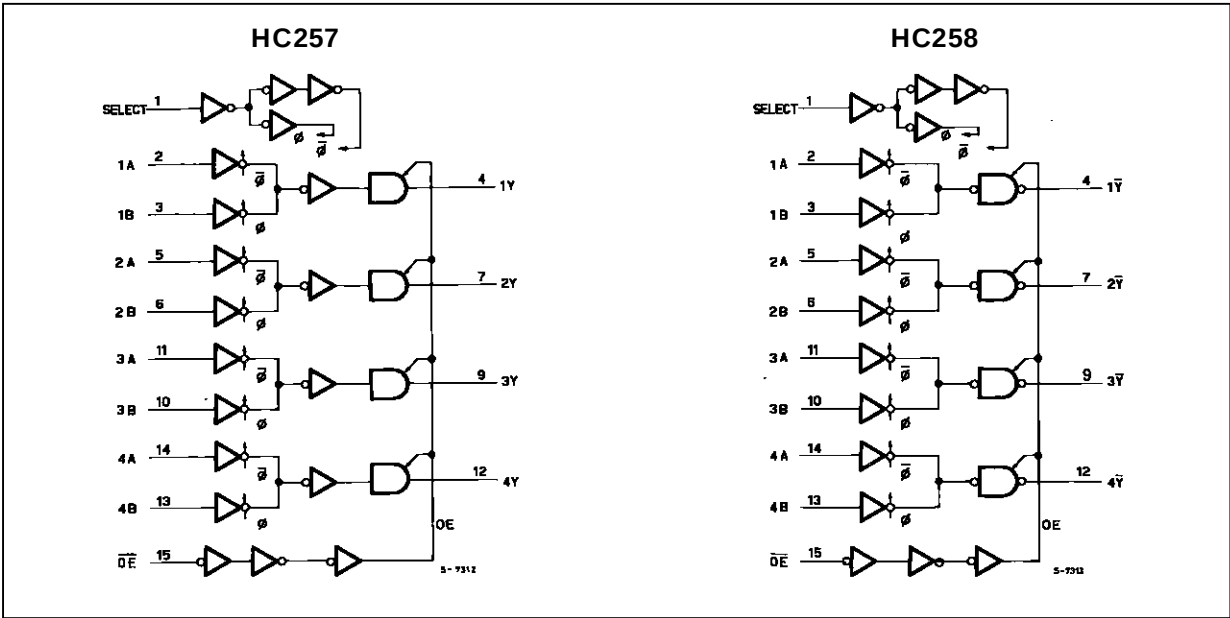
PIN DESCRIPTION (HC258)

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

IEC LOGIC SYMBOL



LOGIC DIAGRAM



TRUTH TABLE

INPUTS				OUTPUTS	
OE	SELECT	A	B	Y (257)	Y (258)
H	X	X	X	Z	Z
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 = DONT CARE Z = HIGH IMPEDANCE

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	± 35	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 70	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: $\equiv 65^\circ\text{C}$ derate to 300 mW by 10mW/°C: 65°C to 85°C

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	$V_{CC} = 2\text{ V}$ $V_{CC} = 4.5\text{ V}$ $V_{CC} = 6\text{ V}$	0 to 1000 0 to 500 0 to 400
			ns

DC SPECIFICATIONS

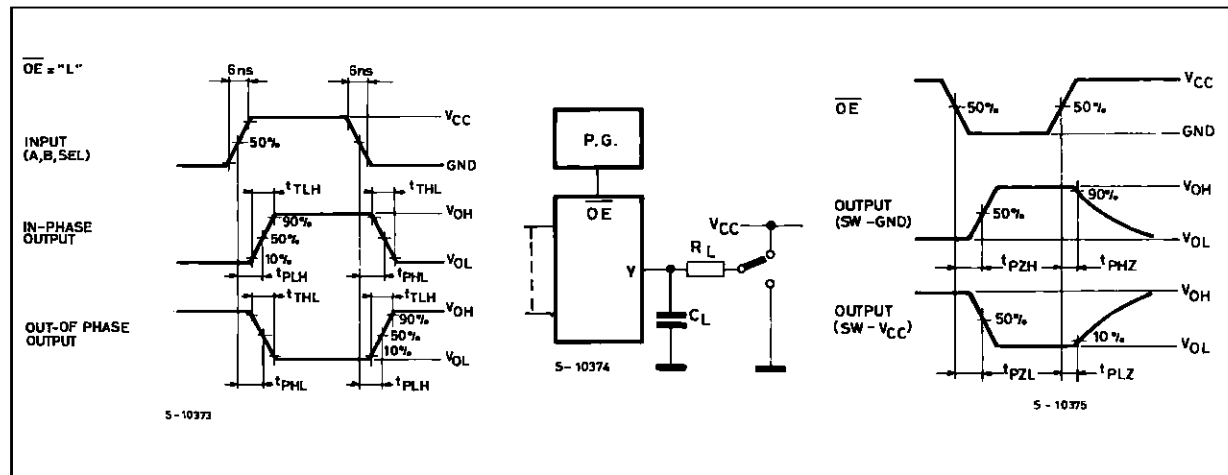
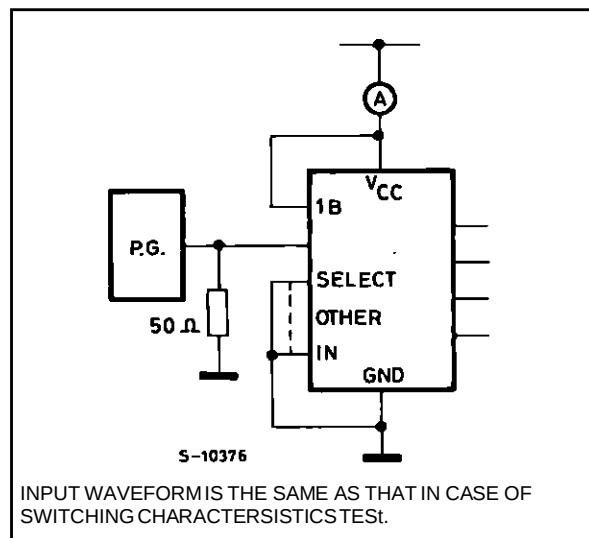
Symbol	Parameter	Test Conditions			Value						Unit			
		V _{CC} (V)			T _A = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC				
					Min.	Typ.	Max.	Min.	Max.	Min.		Max.		
V _{IH}	High Level Input Voltage	2.0			1.5			1.5		1.5		V		
		4.5			3.15			3.15		3.15				
		6.0			4.2			4.2		4.2				
V _{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 μA	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 =-6.0 mA		4.18	4.31		4.13		4.10			
		6.0		I _O =-7.8 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 μA		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 = 6.0 mA			0.17	0.26		0.33			0.40	
		6.0		I _O = 7.8 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 _{OZ}	Output Leakage Current	6.0	V _I = V _{IH} or V _{IL} V _O = V _{CC} or GND				±0.5		±5		±10	μA		
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND				4		40		80	μA		

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)	C _L (pF)		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 4.5 6.0	50			25 7 6	60 12 10		75 15 13		90 19 15	ns
t _{PLH} t _{PHL}	Propagation Delay Time (A, B - Y)	2.0 4.5 6.0 2.0 4.5 6.0	50 150			45 13 11 62 18 15	100 20 17 140 28 24		125 25 21 175 35 30		150 30 26 210 42 36	ns ns
t _{PLH} t _{PHL}	Propagation Delay Time (SELECT - Y)	2.0 4.5 6.0 2.0 4.5 6.0	50 150			45 13 11 62 18 15	100 20 17 140 28 24		125 25 21 175 35 30		150 30 26 210 42 36	ns ns
t _{PZL} t _{PZH}	Output Enable Time	2.0 4.5 6.0 2.0 4.5 6.0	50 150	R _L = 1 KΩ		40 12 10 57 17 14	110 22 19 150 30 26		140 28 24 190 38 32		165 33 28 225 45 38	ns ns
t _{PLZ} t _{PHZ}	Output Disable Time	2.0 4.5 6.0	50	R _L = 1 KΩ		28 14 13	140 28 24		175 35 30		210 42 36	ns
C _{IN}	Input Capacitance					5	10		10		10	pF
C _{OUT}	Output Capacitance					10						pF
C _{PD} (*)	Power Dissipation Capacitance					47						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. $I_{CC(opr)} = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}/4$ (per Channel)

SWITCHING CHARACTERISTICS TEST WAVEFORM

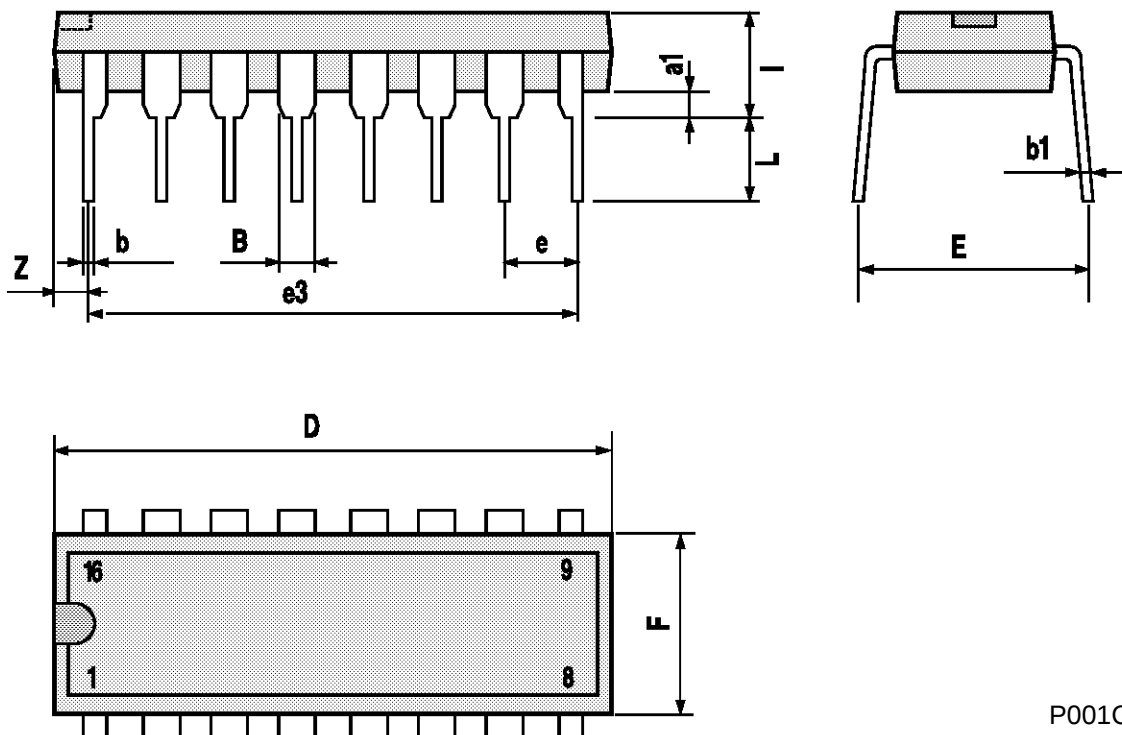
TEST CIRCUIT I_{CC} (Opr.) C_{PD} CALCULATION

C_{PD} is to be calculated with the following formula by using the measured value of I_{CC} (opr.) in the test circuit opposite.

$$C_{PD} = \frac{I_{CC} (opr)}{f_{IN} \times V_{CC}}$$

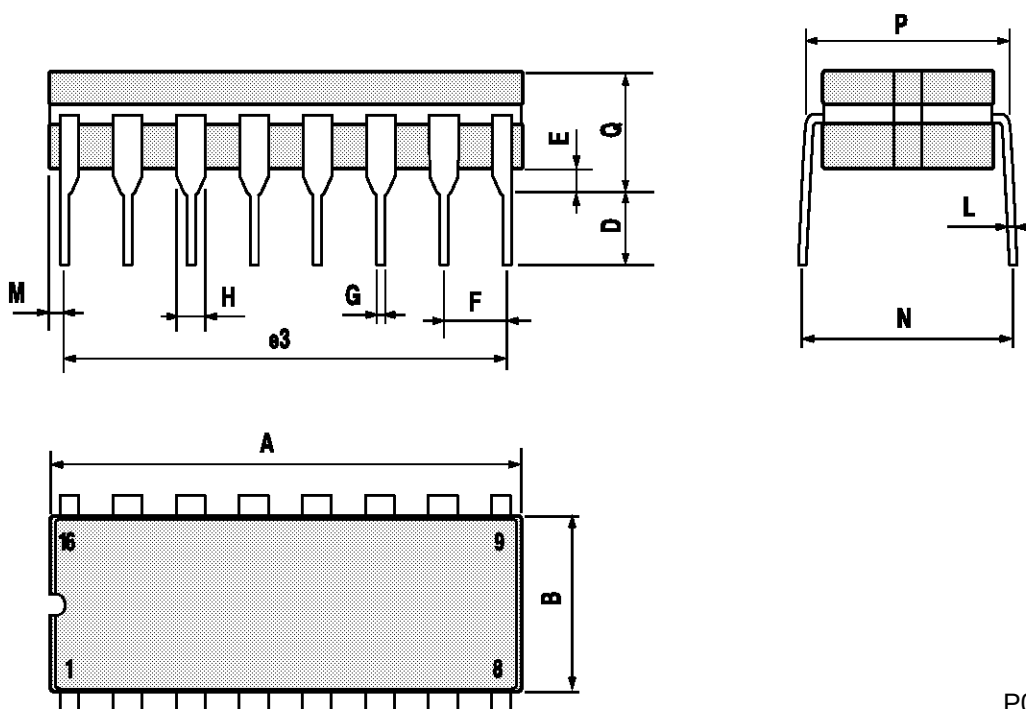
Plastic DIP16 (0.25) MECHANICAL DATA

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



Ceramic DIP16/1 MECHANICAL DATA

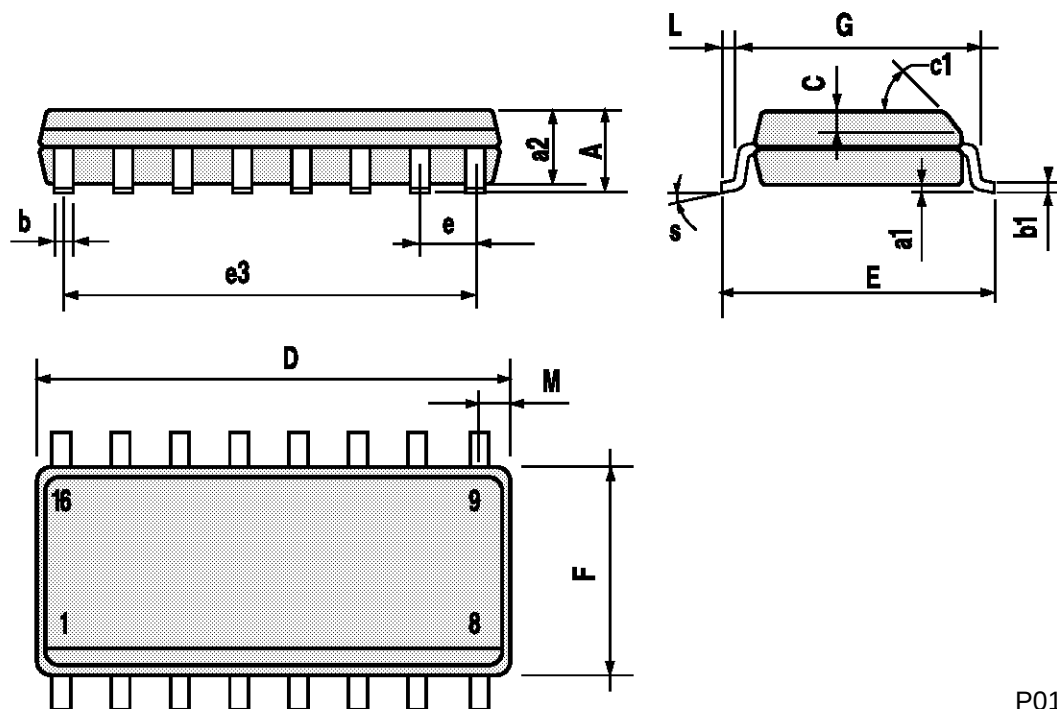
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		17.78			0.700	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	0.51		1.27	0.020		0.050
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q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



P013H

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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