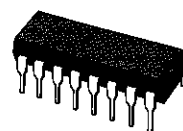


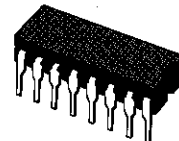
## HCT257 QUAD 2 CHANNEL MULTIPLEXER (3-STATE)

## HCT258 QUAD 2 CHANNEL MULTIPLEXER (3-STATE, INVERTING)

- HIGH SPEED  
 $t_{PD} = 16 \text{ ns (TYP.) at } V_{CC} = 5 \text{ V}$
- LOW POWER DISSIPATION  
 $I_{CC} = 4 \mu\text{A (MAX.) at } T_A = 25^\circ\text{C}$
- COMPATIBLE WITH TTL OUTPUTS  
 $V_{IH} = 2 \text{ V (MIN.) } V_{IL} = 0.8 \text{ V (MAX)}$
- OUTPUT DRIVE CAPABILITY  
 15 LSTTL LOADS
- SYMMETRICAL OUTPUT IMPEDANCE  
 $|I_{OH}| = I_{OL} = 6 \text{ mA (MIN.)}$
- BALANCED PROPAGATION DELAYS  
 $t_{PLH} = t_{PHL}$
- PIN AND FUNCTION COMPATIBLE  
 WITH 54/74LS257/258



**B1R**  
(Plastic Package)



**F1R**  
(Ceramic Package)



**M1R**  
(Micro Package)



**C1R**  
(Chip Carrier)

### ORDER CODES :

|              |              |
|--------------|--------------|
| M54HCTXXXF1R | M74HCTXXXM1R |
| M74HCTXXXB1R | M74HCTXXXC1R |

### DESCRIPTION

The M54/74HCT257 and the M54/74HCT258 are high speed CMOS MULTIPLEXERS fabricated with silicon gate C<sup>2</sup>MOS 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.

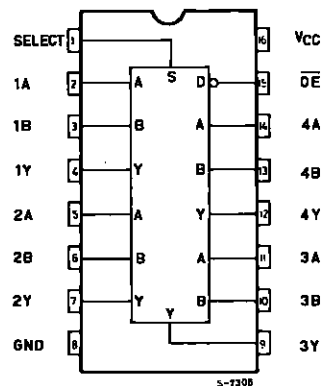
The M54/74HCT258 is an inverting multiplexer while the M54/74HCT257 is a non-inverting multiplexer. When the ENABLE INPUT is held "High", outputs of both IC's become high-impedance state. If SELECT INPUT is held "Low", "A" data is selected, when SELECT INPUT is high "H", "B" data is chosen.

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

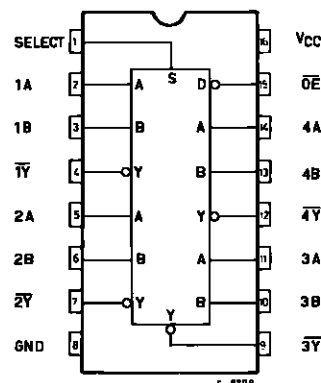
This integrated circuit has input and output characteristics that are fully compatible with 54/74 LSTTL logic families. M54/74HCT devices are designed to directly interface HSC<sup>2</sup>MOS systems with TTL and NMOS components. They are also plug in replace-

### PIN CONNECTIONS (top view)

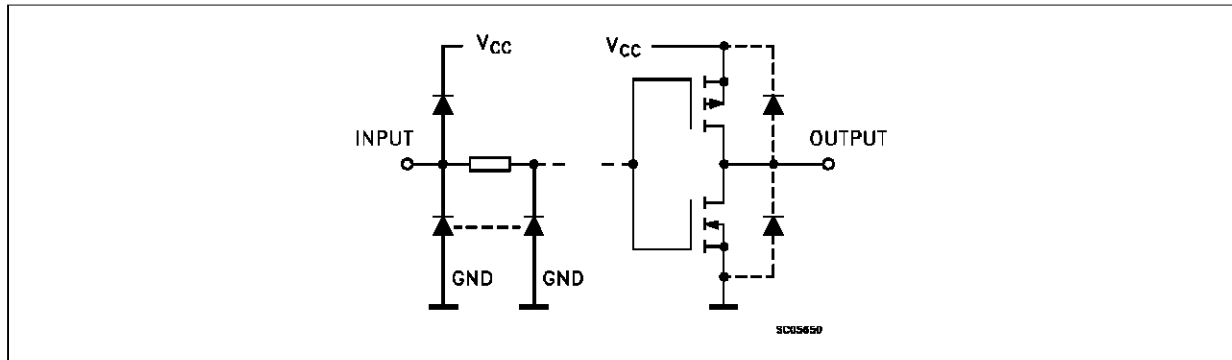
#### HCT257



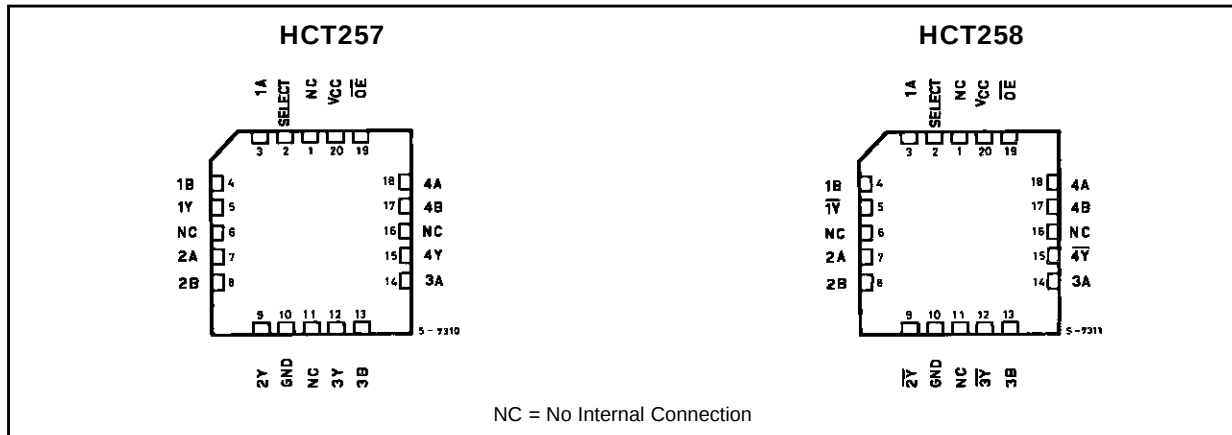
#### HCT258



## INPUT AND OUTPUT EQUIVALENT CIRCUIT



## CHIP CARRIER



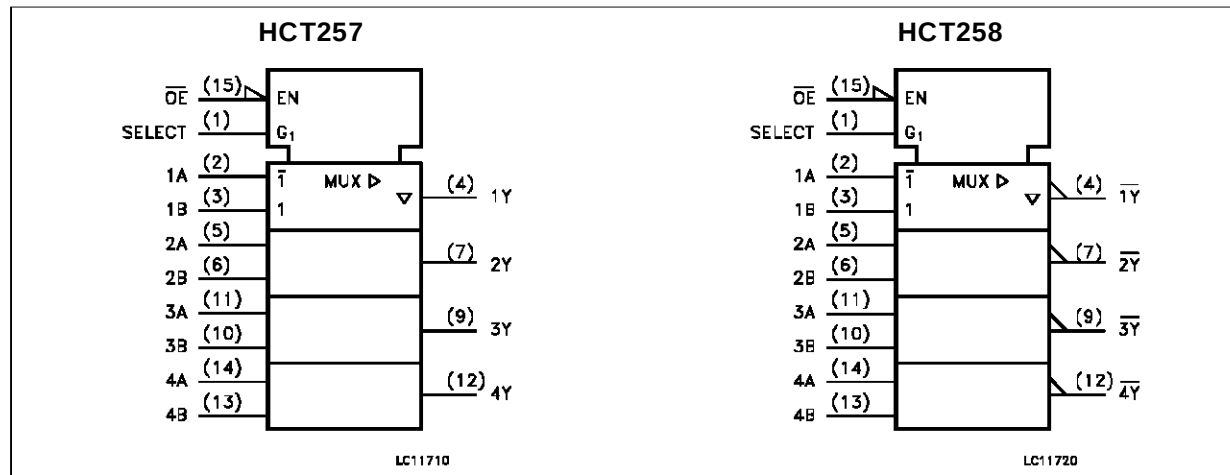
### PIN DESCRIPTION (HCT257)

| 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 <sub>CC</sub> | Positive Supply Voltage                   |

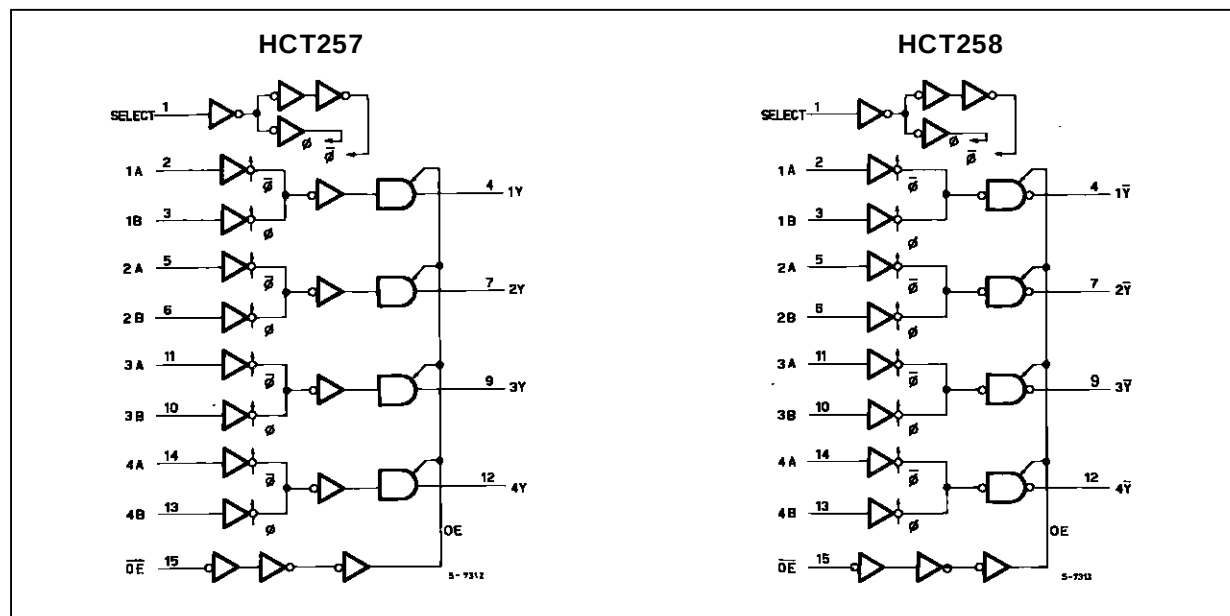
### PIN DESCRIPTION (HCT258)

| 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 <sub>CC</sub>                      | Positive Supply Voltage                   |

## IEC LOGIC SYMBOL



## LOGIC DIAGRAM



## TRUTH TABLE

| INPUTS          |        |   |   | OUTPUTS |                      |
|-----------------|--------|---|---|---------|----------------------|
| $\overline{OE}$ | SELECT | A | B | Y (257) | $\overline{Y}$ (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 <sub>CC</sub>                     | Supply Voltage                               | -0.5 to +7                    | V    |
| V <sub>I</sub>                      | DC Input Voltage                             | -0.5 to V <sub>CC</sub> + 0.5 | V    |
| V <sub>O</sub>                      | DC Output Voltage                            | -0.5 to V <sub>CC</sub> + 0.5 | V    |
| I <sub>IK</sub>                     | DC Input Diode Current                       | ± 20                          | mA   |
| I <sub>OK</sub>                     | DC Output Diode Current                      | ± 20                          | mA   |
| I <sub>O</sub>                      | DC Output Source Sink Current Per Output Pin | ± 35                          | mA   |
| I <sub>CC</sub> or I <sub>GND</sub> | DC V <sub>CC</sub> or Ground Current         | ± 70                          | mA   |
| P <sub>D</sub>                      | Power Dissipation                            | 500 (*)                       | mW   |
| T <sub>stg</sub>                    | Storage Temperature                          | -65 to +150                   | °C   |
| T <sub>L</sub>                      | 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 <sub>CC</sub>                 | Supply Voltage                                           | 4.5 to 5.5           | V    |
| V <sub>I</sub>                  | Input Voltage                                            | 0 to V <sub>CC</sub> | V    |
| V <sub>O</sub>                  | Output Voltage                                           | 0 to V <sub>CC</sub> | V    |
| T <sub>op</sub>                 | Operating Temperature: <b>M54HC Series</b>               | -55 to +125          | °C   |
|                                 | <b>M74HC Series</b>                                      | -40 to +85           | °C   |
| t <sub>r</sub> , t <sub>f</sub> | Input Rise and Fall Time (V <sub>CC</sub> = 4.5 to 5.5V) | 0 to 500             | ns   |

## DC SPECIFICATIONS

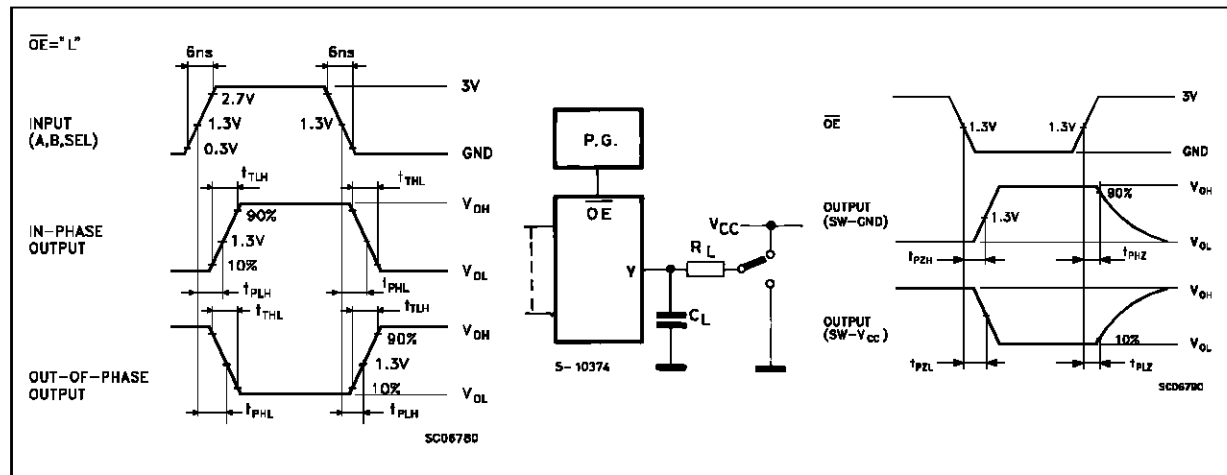
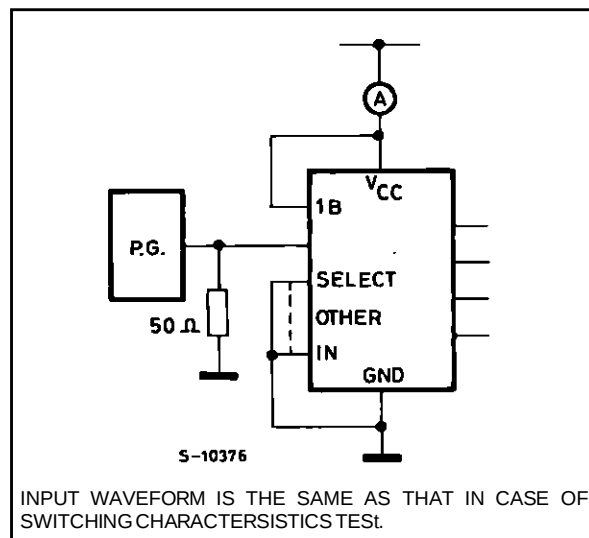
| Symbol           | Parameter                            | Test Conditions        |                                                                                                                 |                         |                                         | Value |      |                      |      |                       |      | Unit |
|------------------|--------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------|-------|------|----------------------|------|-----------------------|------|------|
|                  |                                      | V <sub>CC</sub><br>(V) |                                                                                                                 |                         | T <sub>A</sub> = 25 °C<br>54HC and 74HC |       |      | -40 to 85 °C<br>74HC |      | -55 to 125 °C<br>54HC |      |      |
|                  |                                      |                        |                                                                                                                 |                         | Min.                                    | Typ.  | Max. | Min.                 | Max. | Min.                  | Max. |      |
| V <sub>IH</sub>  | High Level Input Voltage             | 4.5 to 5.5             |                                                                                                                 |                         | 2.0                                     |       |      | 2.0                  |      | 2.0                   |      | V    |
| V <sub>IL</sub>  | Low Level Input Voltage              | 4.5 to 5.5             |                                                                                                                 |                         |                                         |       | 0.8  |                      | 0.8  |                       | 0.8  | V    |
| V <sub>OH</sub>  | High Level Output Voltage            | 4.5                    | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                             | I <sub>O</sub> =-20 μA  | 4.4                                     | 4.5   |      | 4.4                  |      | 4.4                   |      | V    |
|                  |                                      |                        |                                                                                                                 | I <sub>O</sub> =-4.0 mA | 4.18                                    | 4.31  |      | 4.13                 |      | 4.10                  |      |      |
| V <sub>OL</sub>  | Low Level Output Voltage             | 4.5                    | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                             | I <sub>O</sub> = 20 μA  |                                         | 0.0   | 0.1  |                      | 0.1  |                       | 0.1  | V    |
|                  |                                      |                        |                                                                                                                 | I <sub>O</sub> = 4.0 mA |                                         | 0.17  | 0.26 |                      | 0.33 |                       | 0.4  |      |
| I <sub>OZ</sub>  | 3-State Output Off State Current     | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                         |                         |                                         |       | ±0.5 |                      | ±5   |                       | ±10  | μA   |
| I <sub>I</sub>   | Input Leakage Current                | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                         |                         |                                         |       | ±0.1 |                      | ±1   |                       | ±1   | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current             | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                         |                         |                                         |       | 1    |                      | 10   |                       | 20   | μA   |
| ΔI <sub>CC</sub> | Additional worst case supply current | 5.5                    | Per Input pin<br>V <sub>I</sub> = 0.5V or<br>V <sub>I</sub> = 2.4V<br>Other Inputs at<br>V <sub>CC</sub> or GND |                         |                                         |       | 2.0  |                      | 2.9  |                       | 3.0  | mA   |

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

| Symbol                               | Parameter                              | Test Conditions        |                       | Value                                   |          |      |                      |      |                       | Unit |      |
|--------------------------------------|----------------------------------------|------------------------|-----------------------|-----------------------------------------|----------|------|----------------------|------|-----------------------|------|------|
|                                      |                                        | V <sub>CC</sub><br>(V) |                       | T <sub>A</sub> = 25 °C<br>54HC and 74HC |          |      | -40 to 85 °C<br>74HC |      | -55 to 125 °C<br>54HC |      |      |
|                                      |                                        |                        |                       | Min.                                    | Typ.     | Max. | Min.                 | Max. | Min.                  |      | Max. |
| t <sub>TLH</sub><br>t <sub>THL</sub> | Output Transition Time                 | 4.5                    |                       |                                         | 7        | 12   |                      | 15   |                       | 18   | ns   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time<br>(A, B - Y)   | 4.5                    | HCT257                |                                         | 19       | 30   |                      | 38   |                       | 45   | ns   |
|                                      |                                        |                        | HCT258                |                                         | 17       | 27   |                      | 34   |                       | 41   |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time<br>(SELECT - Y) | 4.5                    |                       |                                         | 20       | 30   |                      | 38   |                       | 45   | ns   |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable Time                     | 4.5                    | R <sub>L</sub> = 1 KΩ |                                         | 18       | 30   |                      | 38   |                       | 45   | ns   |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable Time                    | 4.5                    | R <sub>L</sub> = 1 KΩ |                                         | 16       | 30   |                      | 38   |                       | 45   | ns   |
| C <sub>IN</sub>                      | Input Capacitance                      |                        |                       |                                         | 5        | 10   |                      | 10   |                       | 10   | pF   |
| C <sub>OUT</sub>                     | Output Capacitance                     |                        |                       |                                         | 10       |      |                      |      |                       |      | pF   |
| C <sub>PD</sub> (*)                  | Power Dissipation Capacitance          |                        | HCT257<br>HCT258      |                                         | 34<br>33 |      |                      |      |                       |      | pF   |

(\*) C<sub>PD</sub> 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 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.

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

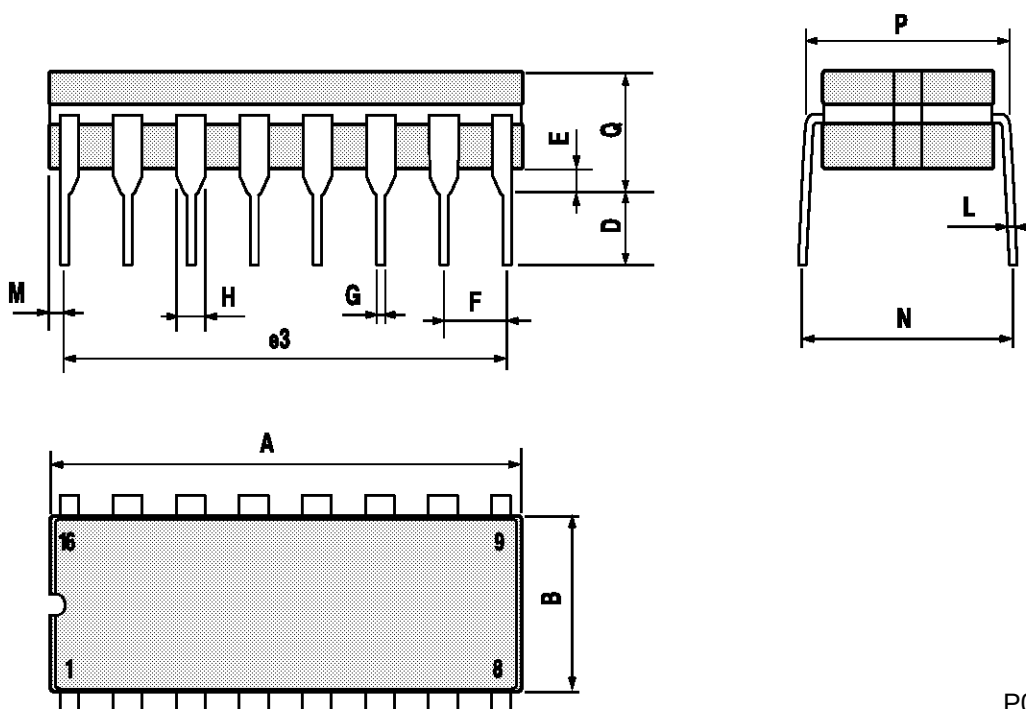
## Plastic DIP16 (0.25) MECHANICAL DATA

| 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

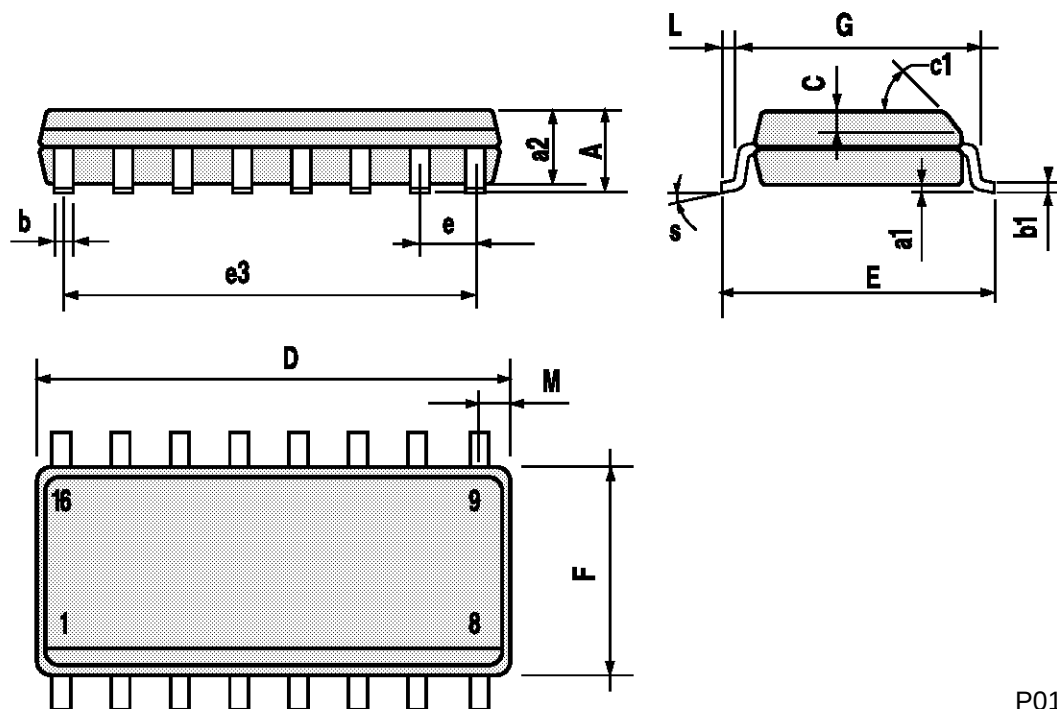
| DIM. | mm   |       |      | inch  |       |       |
|------|------|-------|------|-------|-------|-------|
|      | MIN. | TYP.  | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      |       | 20   |       |       | 0.787 |
| B    |      |       | 7    |       |       | 0.276 |
| D    |      | 3.3   |      |       | 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

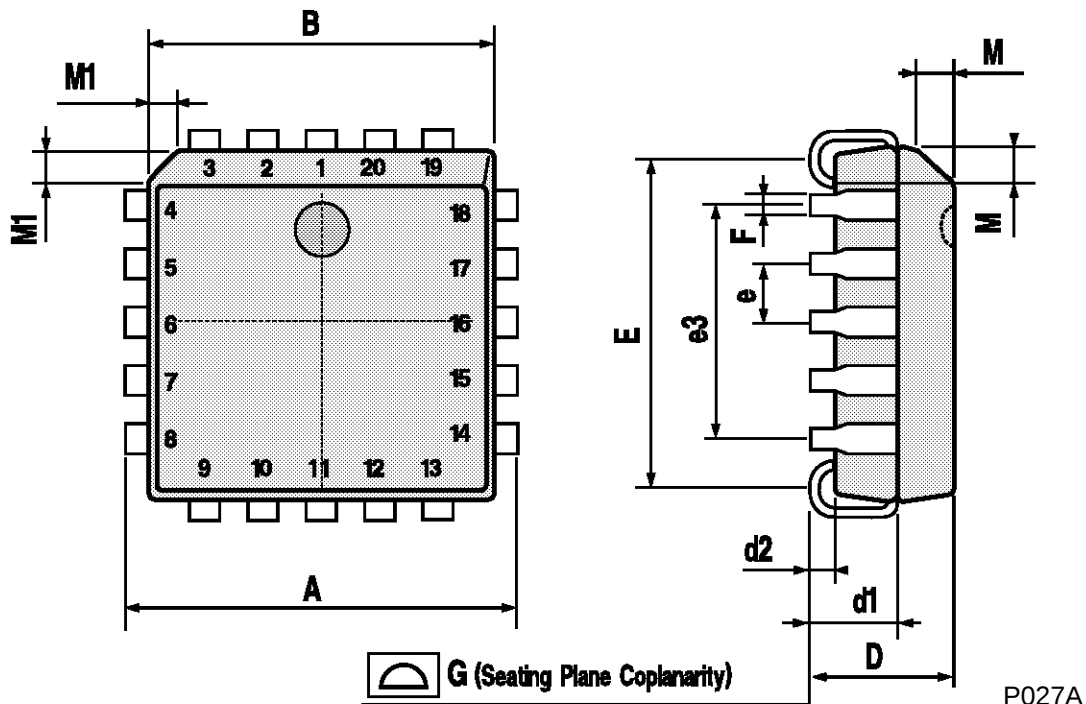
| DIM. | mm         |      |      | inch  |       |       |
|------|------------|------|------|-------|-------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |            |      | 1.75 |       |       | 0.068 |
| a1   | 0.1        |      | 0.2  | 0.004 |       | 0.007 |
| 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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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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**Факс:** 8 (812) 320-02-42

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**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.