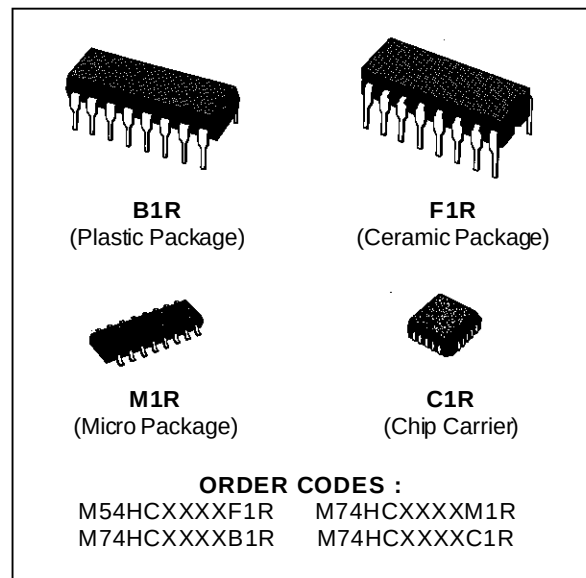


## ANALOG MULTIPLEXER/DEMULTIPLEXER: SINGLE 8 CHANNEL, DUAL 4 CHANNEL, TRIPLE 2 CHANNEL

- **LOW POWER DISSIPATION**  
 $I_{CC} = 4 \mu A$  (MAX.) AT  $T_A = 25^\circ C$
- **LOGIC LEVEL TRANSLATION TO ENABLE 5V LOGIC SIGNAL TO COMMUNICATE WITH  $\pm 5V$  ANALOG SIGNAL**
- **LOW "ON" RESISTANCE:**  
 $70\Omega$  TYP. ( $V_{CC} - V_{EE} = 4.5 V$ )  
 $50\Omega$  TYP. ( $V_{CC} - V_{EE} = 9 V$ )
- **WIDE ANALOG INPUT VOLTAGE RANGE:  $\pm 6V$**
- **FAST SWITCHING:**  
 $t_{pd} = 15 ns$  (TYP.) AT  $T_A = 25^\circ C$
- **LOW CROSSTALK BETWEEN SWITCHES**
- **HIGH ON/OFF OUTPUT VOLTAGE RATIO**
- **WIDE OPERATING VOLTAGE RANGE**  
 $(V_{CC} - V_{EE}) = 2V$  TO  $12V$
- **LOW SINE WAVE DISTORTION**  
 $0.02\%$  AT  $V_{CC} - V_{EE} = 9V$
- **HIGH NOISE IMMUNITY**  
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (MIN.)
- **PIN AND FUNCTION COMPATIBLE WITH HCC/HCF4051/4052/4053B**

### DESCRIPTION

These devices are analog multiplexer demultiplexers in high speed silicon gate  $C^2MOS$  technology and they are pin compatible with the equivalent metal gate CMOS "4000B" series. These analog switches are bidirectional and digitally

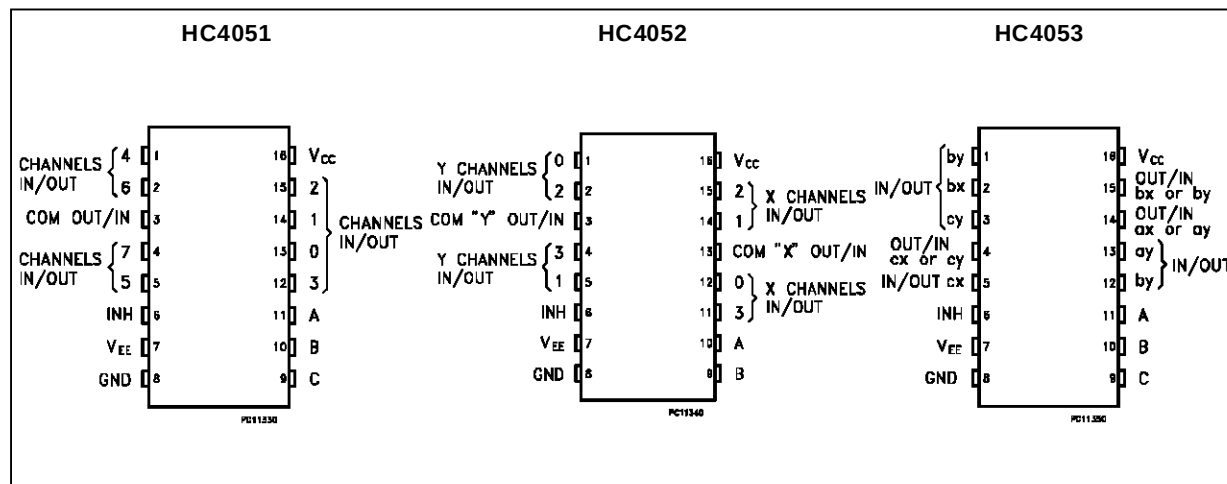


controlled.

A built-in level shifting is included to allow them an input range of up to  $\pm 6V$  (peak) for an analog signal with digital control signal of 0 to 6V.

$V_{EE}$  supply pin is provided for analog input signals. They have an inhibit (INH) input terminal to disable all the switches when high. For operation as a digital multiplexer/demultiplexer,  $V_{EE}$  is connected to GND.

### PIN CONNECTION (top view)



## DESCRIPTION

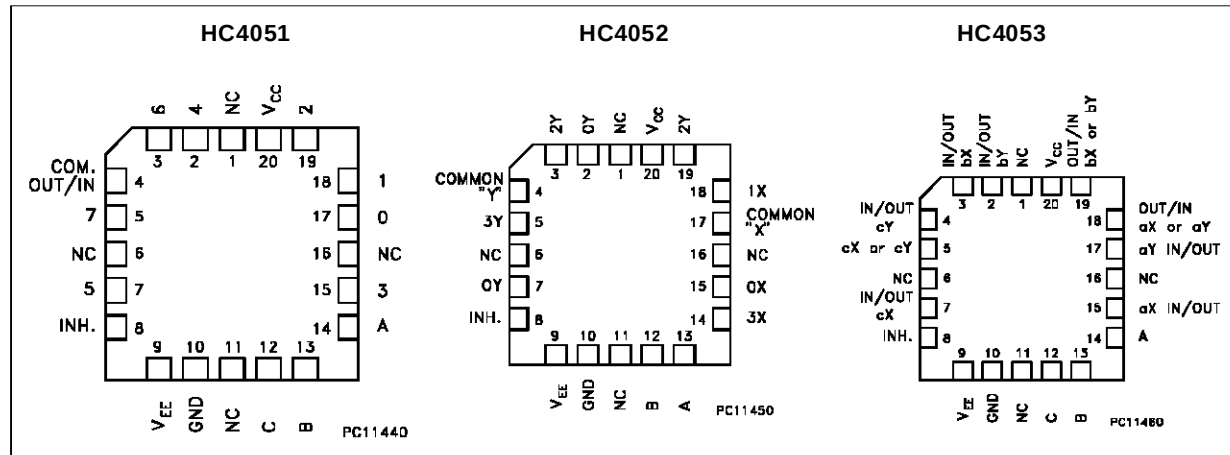
The HC4051 is a single 8 channel multiplexer demultiplexer having three binary control inputs A, B and C to select 1 of 8 to be turned on, and connected to the output.

The HC4052 has a pair of four channel multiplexer demultiplexer having two control inputs A and B that

select one of four channels of the two sections.

The HC4053 is a triple two channel multiplexer demultiplexer having three separate digital control inputs A, B and C to select independently one of a pair of channels.

## CHIP CARRIER



## TRUTH TABLE (HC4051)

| INPUT STATES |   |   |   | "ON" CHANNEL |
|--------------|---|---|---|--------------|
| INHIBIT      | C | B | A |              |
| L            | L | L | L | 0            |
| L            | L | L | H | 1            |
| L            | L | H | L | 2            |
| L            | L | H | H | 3            |
| L            | H | L | L | 4            |
| L            | H | L | H | 5            |
| L            | H | H | L | 6            |
| L            | H | H | H | 7            |
| H            | X | X | X | NONE         |

X: DON'T CARE

## TRUTH TABLE (HC4052)

| INPUT STATES |   |   | "ON" CHANNELS |
|--------------|---|---|---------------|
| INHIBIT      | B | A |               |
| L            | L | L | 0X, 0Y        |
| L            | L | H | 1X, 1Y        |
| L            | H | L | 2X, 2Y        |
| L            | H | H | 3X, 3Y        |
| H            | X | X | NONE          |

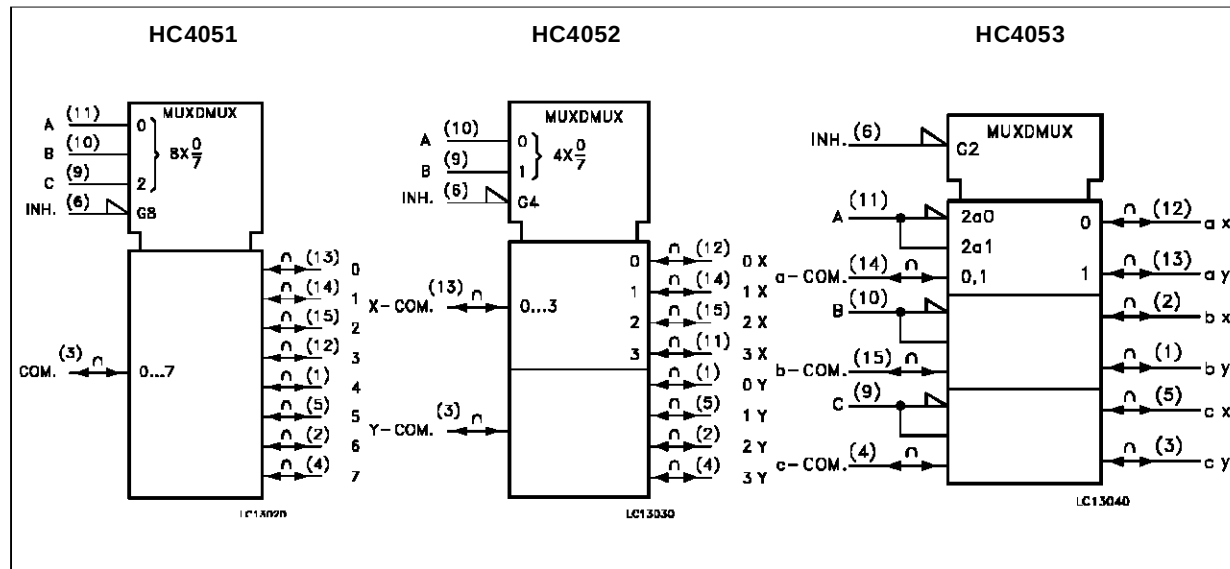
X: DON'T CARE

## TRUTH TABLE (HC4053)

| INPUT STATES |             | "ON" CHANNELS  |
|--------------|-------------|----------------|
| INHIBIT      | A or B or C |                |
| L            | L           | ax or bx or cx |
| L            | H           | ay or by or cy |
| H            | X           | NONE           |

X: DON'T CARE

## IEC LOGIC SYMBOLS



## PIN DESCRIPTION (HC4051)

| PIN No                     | SYMBOL          | NAME AND FUNCTION         |
|----------------------------|-----------------|---------------------------|
| 3                          | COM OUT/IN      | Common Output/input       |
| 6                          | INH             | INHIBIT Input             |
| 7                          | V <sub>EE</sub> | Negative Supply Voltage   |
| 11, 10, 9                  | A, B, C         | Select Inputs             |
| 13, 14, 15, 12, 1, 5, 2, 4 | 0 TO 7          | Independent Input/Outputs |
| 8                          | GND             | Ground (0V)               |
| 16                         | V <sub>CC</sub> | Positive Supply Voltage   |

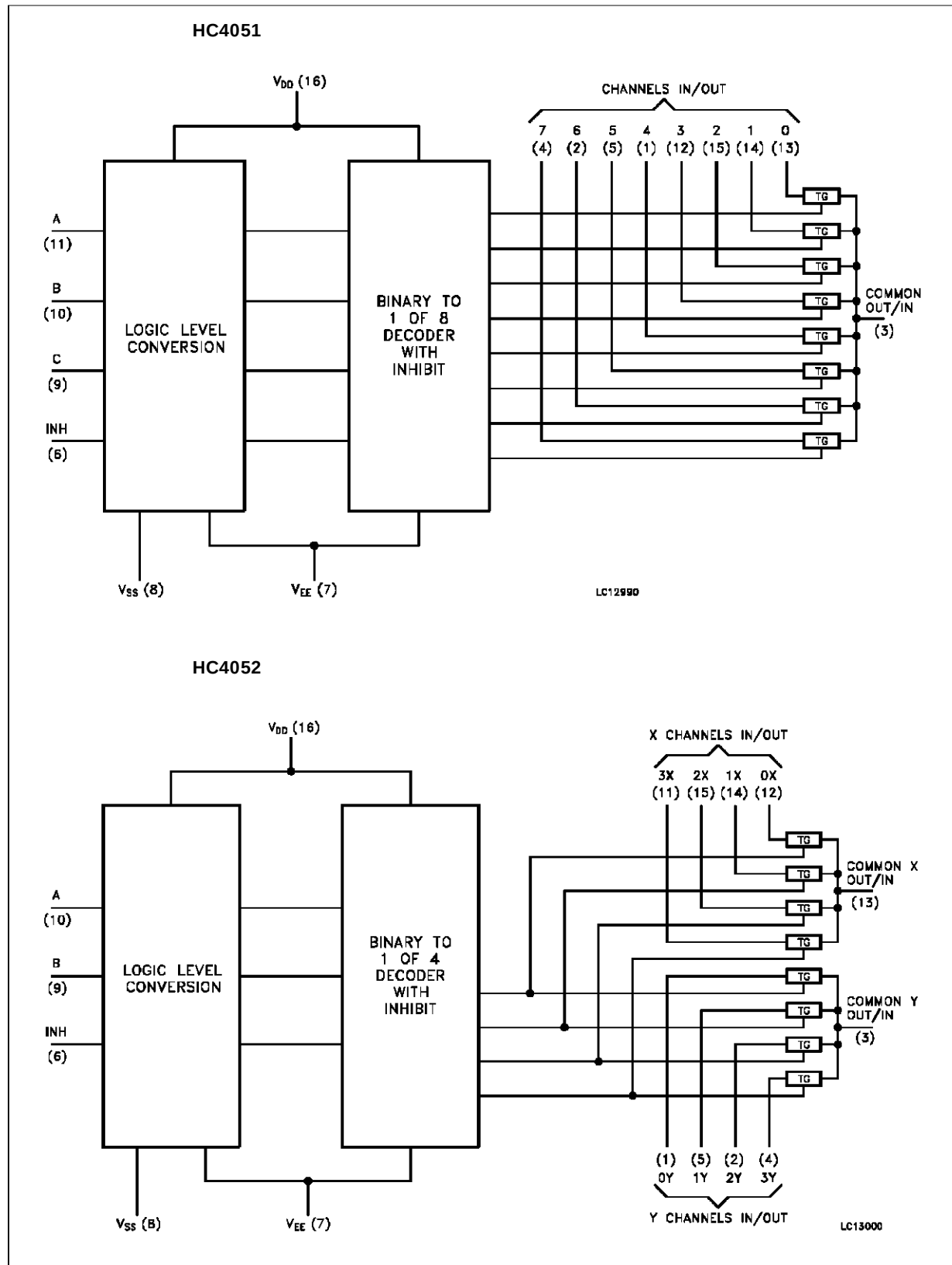
## PIN DESCRIPTION (HC4052)

| PIN No         | SYMBOL          | NAME AND FUNCTION         |
|----------------|-----------------|---------------------------|
| 1, 5, 2, 4     | 0Y TO 3Y        | Independent Input/Outputs |
| 6              | INH             | INHIBIT Input             |
| 7              | V <sub>EE</sub> | Negative Supply Voltage   |
| 10, 9          | A, B            | Select Inputs             |
| 12, 14, 15, 11 | 0X TO 3X        | Independent Input/Outputs |
| 3              | COM Y OUT/IN    | Common X Output/input     |
| 13             | COM X OUT/IN    | Common Y Output/input     |
| 8              | GND             | Ground (0V)               |
| 16             | V <sub>CC</sub> | Positive Supply Voltage   |

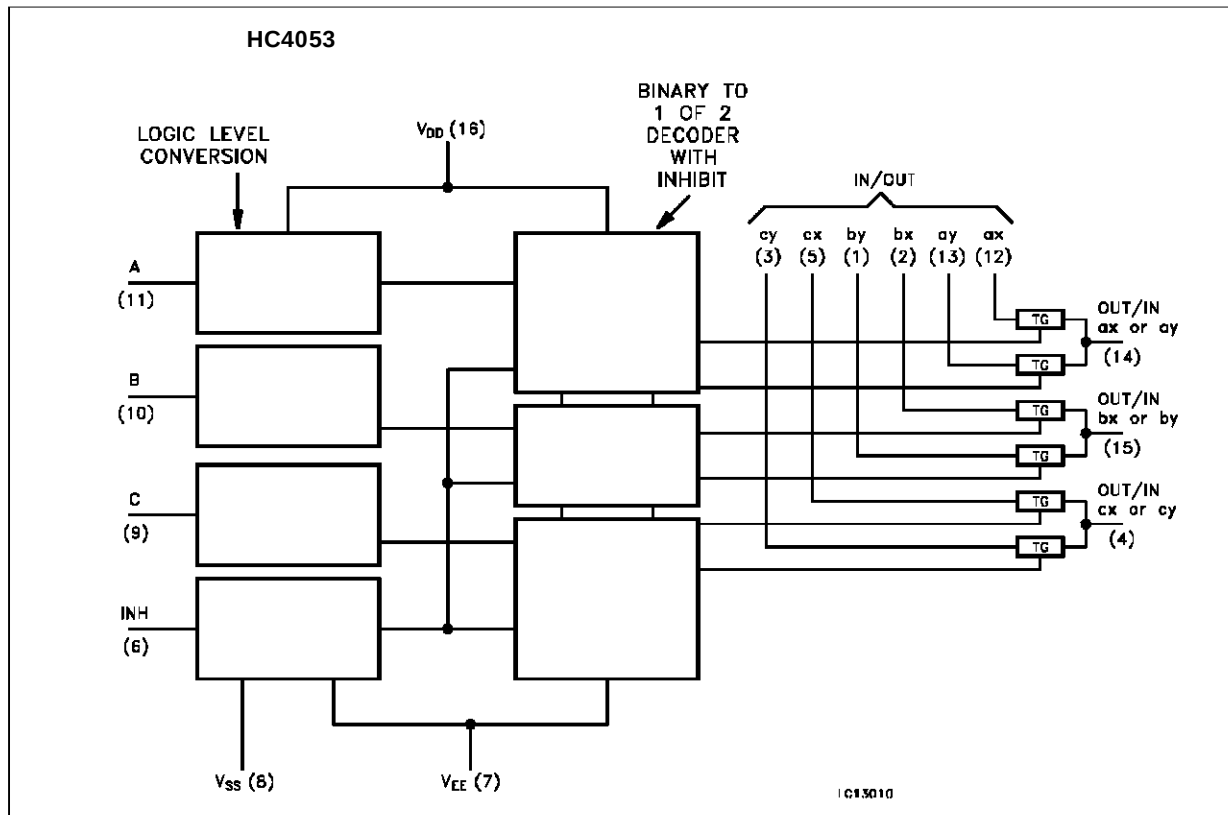
## PIN DESCRIPTION (HC4053)

| PIN No    | SYMBOL          | NAME AND FUNCTION         |
|-----------|-----------------|---------------------------|
| 2, 1      | bx, by          | Independent Input/Outputs |
| 5, 3      | cx, cy          | Independent Input/Outputs |
| 6         | INH             | INHIBIT Input             |
| 7         | V <sub>EE</sub> | Negative Supply Voltage   |
| 11, 10, 9 | A, B, C         | Select Inputs             |
| 12, 13    | ax, ay          | Independent Input/Outputs |
| 14, 15, 4 | ax TO cy        | Common Output/input       |
| 8         | GND             | Ground (0V)               |
| 16        | V <sub>CC</sub> | Positive Supply Voltage   |

FUNCTIONAL DIAGRAM



## FUNCTIONAL DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol                            | Parameter                            | Value                                          | Unit |
|-----------------------------------|--------------------------------------|------------------------------------------------|------|
| V <sub>CC</sub>                   | Supply Voltage Range                 | -0.5 to +7                                     | V    |
| V <sub>CC</sub> - V <sub>EE</sub> | Supply Voltage Range                 | -0.5 to 13                                     | V    |
| V <sub>IN</sub>                   | Control Input Voltage                | -0.5 to V <sub>CC</sub> + 0.5                  | V    |
| V <sub>I/O</sub>                  | Switch I/O Voltage                   | V <sub>EE</sub> - 0.5 to V <sub>CC</sub> + 0.5 | V    |
| I <sub>CK</sub>                   | Control Input Diode Current          | ± 20                                           | mA   |
| I <sub>IOK</sub>                  | I/O Diode Current                    | ± 20                                           | mA   |
| I <sub>T</sub>                    | Switch Through Current               | ± 25                                           | mA   |
| I <sub>CC</sub>                   | DC V <sub>CC</sub> or Ground Current | ± 50                                           | 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 conditions 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                                                    | 2 to 6                             | V        |
| V <sub>EE</sub>                   | Supply Voltage                                                    | -6 to 0                            | V        |
| V <sub>CC</sub> - V <sub>EE</sub> | Supply Voltage                                                    | 2 to 12                            | V        |
| V <sub>IN</sub>                   | Input Voltage                                                     | 0 to V <sub>CC</sub>               | V        |
| V <sub>I/O</sub>                  | Input/Output Voltage                                              | V <sub>EE</sub> to V <sub>CC</sub> | V        |
| T <sub>op</sub>                   | Operating Temperature: <b>M54HC Series</b><br><b>M74HC Series</b> | -55 to +125<br>-40 to +85          | °C<br>°C |
| t <sub>r</sub> , t <sub>f</sub>   | Input Rise and Fall Time                                          | V <sub>CC</sub> = 2 V              | ns       |
|                                   |                                                                   | V <sub>CC</sub> = 4.5 V            |          |
|                                   |                                                                   | V <sub>CC</sub> = 6 V              |          |

**DC SPECIFICATIONS**

| Symbol           | Parameter                                                      | Test Conditions        |                        |                                                                                                                                                   | Value                                   |      |       |                      |      |                       | Unit |      |  |
|------------------|----------------------------------------------------------------|------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------|-------|----------------------|------|-----------------------|------|------|--|
|                  |                                                                | V <sub>CC</sub><br>(V) | V <sub>EE</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>IHC</sub> | High Level<br>Control Input<br>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 <sub>ILC</sub> | Low Level<br>Control Input<br>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  |      |  |
| R <sub>ON</sub>  | ON Resistance                                                  | 4.5                    | GND                    | V <sub>IN</sub> = V <sub>IHC</sub> or V <sub>ILC</sub><br>V <sub>I/O</sub> = V <sub>CC</sub> to V <sub>EE</sub><br>I <sub>I/O</sub> ≤ 2 mA        |                                         | 85   | 180   |                      | 225  |                       | 270  | Ω    |  |
|                  |                                                                | 4.5                    | -4.5                   |                                                                                                                                                   |                                         | 55   | 120   |                      | 150  |                       | 180  |      |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         | 50   | 100   |                      | 125  |                       | 150  |      |  |
|                  |                                                                | 2.0                    | GND                    | V <sub>IN</sub> = V <sub>IHC</sub> or V <sub>ILC</sub><br>V <sub>I/O</sub> = V <sub>CC</sub> or V <sub>EE</sub><br>I <sub>I/O</sub> ≤ 2 mA        |                                         | 150  |       |                      |      |                       |      |      |  |
|                  |                                                                | 4.5                    | GND                    |                                                                                                                                                   |                                         | 70   | 150   |                      | 190  |                       | 230  |      |  |
|                  |                                                                | 4.5                    | -4.5                   |                                                                                                                                                   |                                         | 50   | 100   |                      | 125  |                       | 150  |      |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         | 45   | 80    |                      | 100  |                       | 120  |      |  |
| ΔR <sub>ON</sub> | Difference of<br>ON Resistance<br>Between<br>Switches          | 4.5                    | GND                    | V <sub>IN</sub> = V <sub>IHC</sub> or V <sub>ILC</sub><br>V <sub>I/O</sub> = V <sub>CC</sub> or V <sub>EE</sub><br>I <sub>I/O</sub> ≤ 2 mA        |                                         | 10   | 30    |                      | 35   |                       | 45   | Ω    |  |
|                  |                                                                | 4.5                    | -4.5                   |                                                                                                                                                   |                                         | 5    | 12    |                      | 15   |                       | 18   |      |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         | 5    | 10    |                      | 12   |                       | 15   |      |  |
| I <sub>OFF</sub> | Input/Output<br>Leakage<br>Current<br>(SWITCH OFF)             | 6.0                    | GND                    | V <sub>OS</sub> = V <sub>CC</sub> or<br>GND<br>V <sub>IS</sub> = GND or V <sub>CC</sub><br>V <sub>IN</sub> = V <sub>ILC</sub> or V <sub>IHC</sub> |                                         |      | ±0.06 |                      | ±0.6 |                       | ±1.2 | μA   |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         |      | ±0.1  |                      | ±1   |                       | ±2   |      |  |
| I <sub>IZ</sub>  | Switch Input<br>Leakage Current<br>(SWITCH ON,<br>OUTPUT OPEN) | 6.0                    | GND                    | V <sub>OS</sub> = V <sub>CC</sub> or<br>GND<br>V <sub>IN</sub> = V <sub>IHC</sub> or V <sub>ILC</sub>                                             |                                         |      | ±0.06 |                      | ±0.6 |                       | ±1.2 | μA   |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         |      | ±0.1  |                      | ±1   |                       | ±2   |      |  |
| I <sub>IN</sub>  | Control Input<br>Current                                       | 6.0                    | GND                    | V <sub>IN</sub> = V <sub>CC</sub> or GND                                                                                                          |                                         |      | ±0.1  |                      | ±0.1 |                       | ±1   | μA   |  |
| I <sub>CC</sub>  | Quiescent<br>Supply Current                                    | 6.0                    | GND                    | V <sub>IN</sub> = V <sub>CC</sub> or GND                                                                                                          |                                         |      | 4     |                      | 40   |                       | 80   | μA   |  |
|                  |                                                                | 6.0                    | -6.0                   |                                                                                                                                                   |                                         |      | 8     |                      | 80   |                       | 160  |      |  |

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) | V <sub>EE</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. |
| Φ <sub>I/O</sub>                     | Phase Difference<br>Between Input<br>and Output | 2.0                    | GND                    |                            |                                         | 25                   | 60             |                      | 75             |                       | 90             | ns   |
|                                      |                                                 | 4.5                    | GND                    |                            |                                         | 6                    | 12             |                      | 15             |                       | 18             |      |
|                                      |                                                 | 6.0                    | GND                    |                            |                                         | 5                    | 10             |                      | 13             |                       | 15             |      |
|                                      |                                                 | 4.5                    | -4.5                   |                            |                                         | 4                    |                |                      |                |                       |                |      |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable<br>Time<br>(for 4051/4052)        | 2.0                    | GND                    | R <sub>L</sub> = 1KΩ       |                                         | 64                   | 225            |                      | 280            |                       | 340            | ns   |
|                                      |                                                 | 4.5                    | GND                    |                            |                                         | 18                   | 45             |                      | 56             |                       | 68             |      |
|                                      |                                                 | 6.0                    | GND                    |                            |                                         | 15                   | 38             |                      | 48             |                       | 58             |      |
|                                      |                                                 | 4.5                    | -4.5                   |                            |                                         | 18                   |                |                      |                |                       |                |      |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable<br>Time<br>(for 4053)             | 2.0                    | GND                    | R <sub>L</sub> = 1KΩ       |                                         | 50                   | 225            |                      | 280            |                       | 340            | ns   |
|                                      |                                                 | 4.5                    | GND                    |                            |                                         | 14                   | 45             |                      | 56             |                       | 68             |      |
|                                      |                                                 | 6.0                    | GND                    |                            |                                         | 12                   | 38             |                      | 48             |                       | 58             |      |
|                                      |                                                 | 4.5                    | -4.5                   |                            |                                         | 14                   |                |                      |                |                       |                |      |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable<br>Time<br>(for 4051/4052)       | 2.0                    | GND                    | R <sub>L</sub> = 1KΩ       |                                         | 100                  | 250            |                      | 315            |                       | 375            | ns   |
|                                      |                                                 | 4.5                    | GND                    |                            |                                         | 33                   | 50             |                      | 63             |                       | 7              |      |
|                                      |                                                 | 6.0                    | GND                    |                            |                                         | 28                   | 43             |                      | 54             |                       | 64             |      |
|                                      |                                                 | 4.5                    | -4.5                   |                            |                                         | 29                   |                |                      |                |                       |                |      |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable<br>Time<br>(for 4053)            | 2.0                    | GND                    | R <sub>L</sub> = 1KΩ       |                                         | 95                   | 225            |                      | 280            |                       | 340            | ns   |
|                                      |                                                 | 4.5                    | GND                    |                            |                                         | 30                   | 45             |                      | 56             |                       | 68             |      |
|                                      |                                                 | 6.0                    | GND                    |                            |                                         | 26                   | 38             |                      | 48             |                       | 58             |      |
|                                      |                                                 | 4.5                    | -4.5                   |                            |                                         | 26                   |                |                      |                |                       |                |      |
| C <sub>IN</sub>                      | Input Capacitance                               |                        |                        |                            |                                         | 5                    | 10             |                      | 10             |                       | 10             | pF   |
| C <sub>I/O</sub>                     | Common Terminal<br>Capacitance                  | 5.0                    | -5.0                   | HC4051<br>HC4052<br>HC4053 |                                         | 36<br>19<br>11       | 70<br>40<br>20 |                      | 70<br>40<br>20 |                       | 70<br>40<br>20 | pF   |
| C <sub>I/O</sub>                     | Switch Terminal<br>Capacitance                  | 5.0                    | -5.0                   | HC4051<br>HC4052<br>HC4053 |                                         | 7<br>7<br>7          | 15<br>15<br>15 |                      | 15<br>15<br>15 |                       | 15<br>15<br>15 | pF   |
| C <sub>IOS</sub>                     | Feed Through<br>Capacitance                     | 5.0                    | -5.0                   | HC4051<br>HC4052<br>HC4053 |                                         | 0.95<br>0.85<br>0.75 | 2<br>2<br>2    |                      | 2<br>2<br>2    |                       | 2<br>2<br>2    | pF   |
| C <sub>PD</sub> (*)                  | Power Dissipation<br>Capacitance                | 5.0                    | GND                    | HC4051<br>HC4052<br>HC4053 |                                         | 70<br>71<br>67       |                |                      |                |                       |                | 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.  $I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$

**ANALOG SWITCH CHARACTERISTICS (GND = 0 V T<sub>A</sub> = 25 °C)**

| Symbol           | Parameter                                  | Test Conditions        |                        |                                                                                                                                                                                                                                |                                                                             | Value | Unit |
|------------------|--------------------------------------------|------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------|------|
|                  |                                            | V <sub>CC</sub><br>(V) | V <sub>EE</sub><br>(V) | V <sub>IN</sub><br>(Vp-p)                                                                                                                                                                                                      |                                                                             | Typ.  |      |
|                  | Sine Wave Distortion                       | 2.25                   | 2.25                   | 4                                                                                                                                                                                                                              | f <sub>IN</sub> = 1 KHz    R <sub>L</sub> = 10 KΩ    C <sub>L</sub> = 50 pF | 0.025 | %    |
|                  |                                            | 4.5                    | -4.5                   | 8                                                                                                                                                                                                                              |                                                                             | 0.020 |      |
|                  |                                            | 6.0                    | -6.0                   | 11                                                                                                                                                                                                                             |                                                                             | 0.018 |      |
| f <sub>MAX</sub> | Frequency Response (Switch ON)             | 2.25                   | -2.25                  | Adjust f <sub>IN</sub> voltage to Obtain 0 dBm at V <sub>OS</sub> .<br>Increase f <sub>IN</sub> Frequency until dB Meter Reads -3dB<br>R <sub>L</sub> = 50 Ω    C <sub>L</sub> = 10 pF    f <sub>IN</sub> = 1 KHz<br>sine wave | ALL (*)                                                                     | 120   | MHz  |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4051 (**)                                                                 | 45    |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4052 (**)                                                                 | 70    |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4053 (**)                                                                 | 95    |      |
|                  |                                            | 4.5                    | -4.5                   |                                                                                                                                                                                                                                | ALL (*)                                                                     | 190   |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4051 (**)                                                                 | 70    |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4052 (**)                                                                 | 110   |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4053 (**)                                                                 | 150   |      |
|                  |                                            | 6.0                    | -6.0                   |                                                                                                                                                                                                                                | ALL (*)                                                                     | 200   |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4051 (**)                                                                 | 85    |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4052 (**)                                                                 | 140   |      |
|                  |                                            |                        |                        |                                                                                                                                                                                                                                | HC4053 (**)                                                                 | 190   |      |
|                  | Feedthrough Attenuation (Switch OFF)       | 2.25                   | -2.25                  | V <sub>IN</sub> is centered at (V <sub>CC</sub> - V <sub>EE</sub> )/2.<br>Adjust input for 0 dBm<br>R <sub>L</sub> = 600 Ω    C <sub>L</sub> = 50 pF    f <sub>IN</sub> = 1 KHz sine wave                                      | -50                                                                         | dB    |      |
|                  |                                            | 4.5                    | -4.5                   |                                                                                                                                                                                                                                | -50                                                                         |       |      |
|                  |                                            | 6.0                    | -6.0                   |                                                                                                                                                                                                                                | -50                                                                         |       |      |
|                  | Crosstalk (Control Input to Signal Output) | 2.25                   | -2.25                  | Adjust R <sub>L</sub> at set up so that I <sub>S</sub> = 0A<br>R <sub>L</sub> = 600 Ω    C <sub>L</sub> = 50 pF<br>f <sub>IN</sub> = 1 MHz square wave                                                                         | 60                                                                          | mV    |      |
|                  |                                            | 4.5                    | -4.5                   |                                                                                                                                                                                                                                | 140                                                                         |       |      |
|                  |                                            | 6.0                    | -6.0                   |                                                                                                                                                                                                                                | 200                                                                         |       |      |
|                  | Crosstalk (Between Any Switches)           | 2.25                   | -2.25                  | Adjust V <sub>IN</sub> to Obtain 0 dBm at Input<br>R <sub>L</sub> = 600 Ω    C <sub>L</sub> = 50 pF    f <sub>IN</sub> = 1 MHz sine wave                                                                                       | -50                                                                         | dB    |      |
|                  |                                            | 4.5                    | -4.5                   |                                                                                                                                                                                                                                | -50                                                                         |       |      |
|                  |                                            | 6.0                    | -6.0                   |                                                                                                                                                                                                                                | -50                                                                         |       |      |

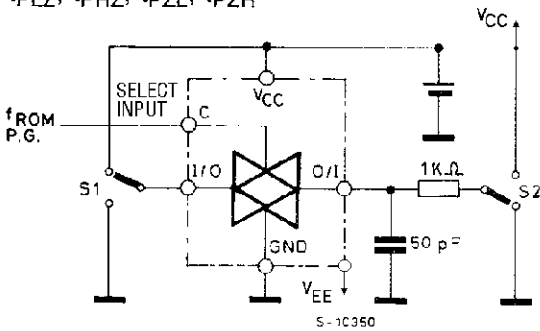
(\*): Input COMMON Terminal, and measured at SWITCH Terminal.

(\*\*): Input SWITCH Terminal, and measured at COMMON Terminal.

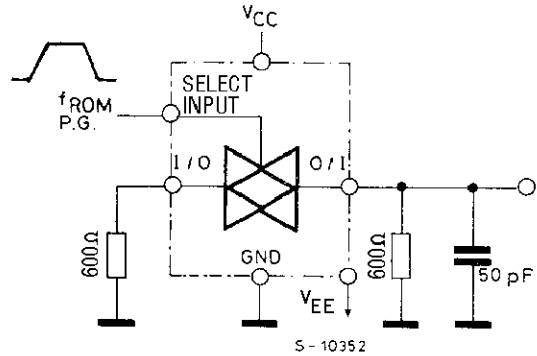
NOTE: These characteristics are determined by design of devices.



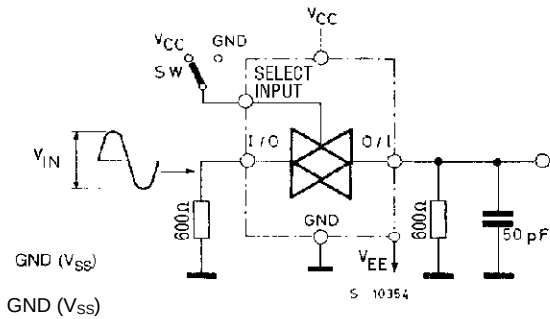
## SWITCHING CHARACTERISTICS TEST CIRCUIT

 $t_{PLZ}$ ,  $t_{PHZ}$ ,  $t_{PZL}$ ,  $t_{PZH}$ . $t_{PLZ}$ ,  $t_{PHZ}$ ,  $t_{PZL}$ ,  $t_{PZH}$ 

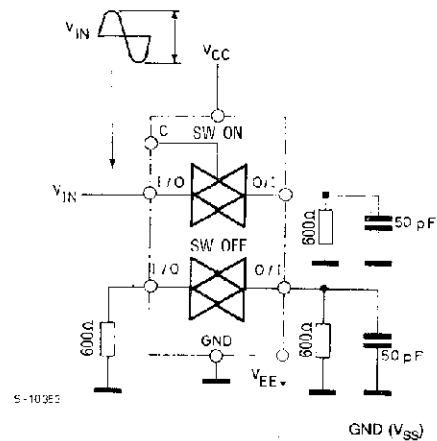
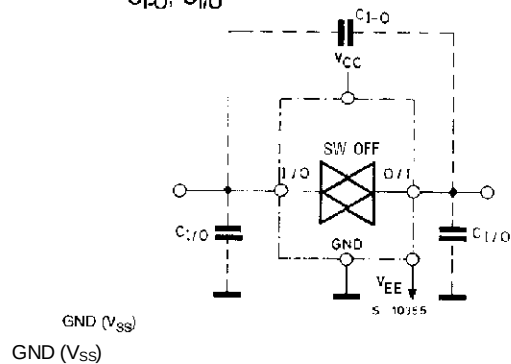
CROSSTALK (control to output)



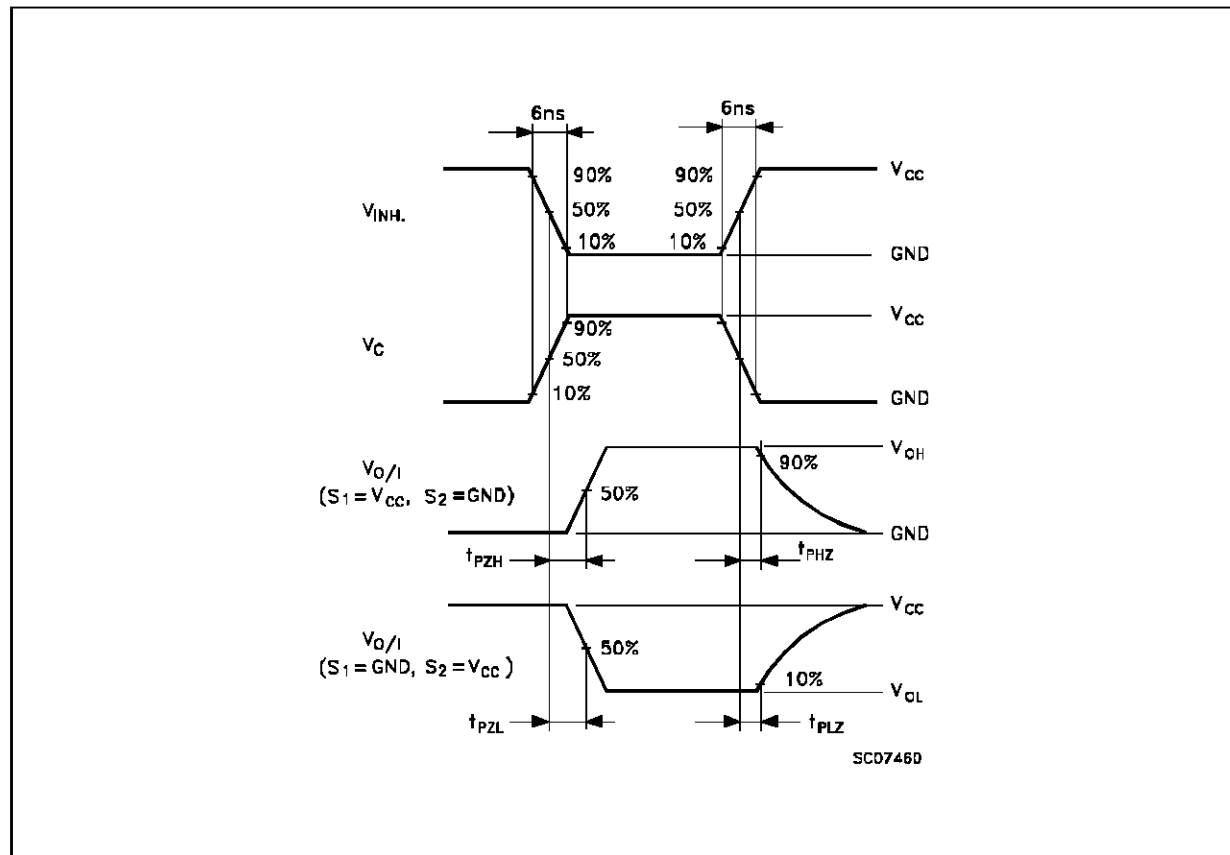
BANDWIDTH AND FEEDTHROUGH ATTENUATION



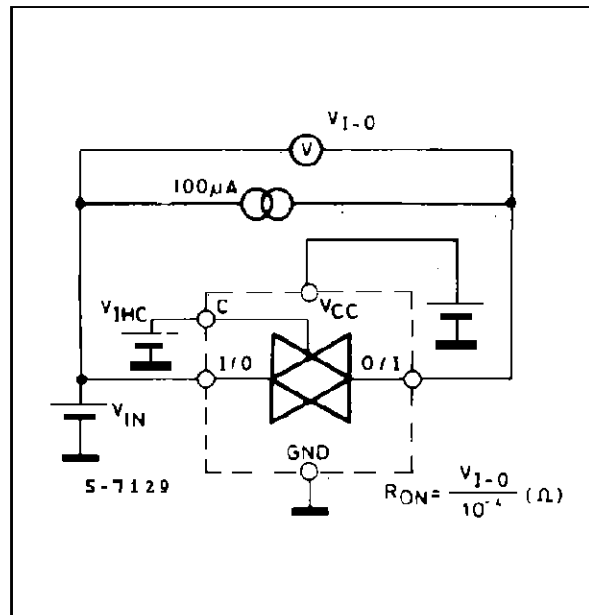
CROSSTALK BETWEEN ANY TWO SWITCHES

 $C_{I-O}$ ,  $C_{I/O}$  $C_{I-O}$ ,  $C_{I/O}$ 

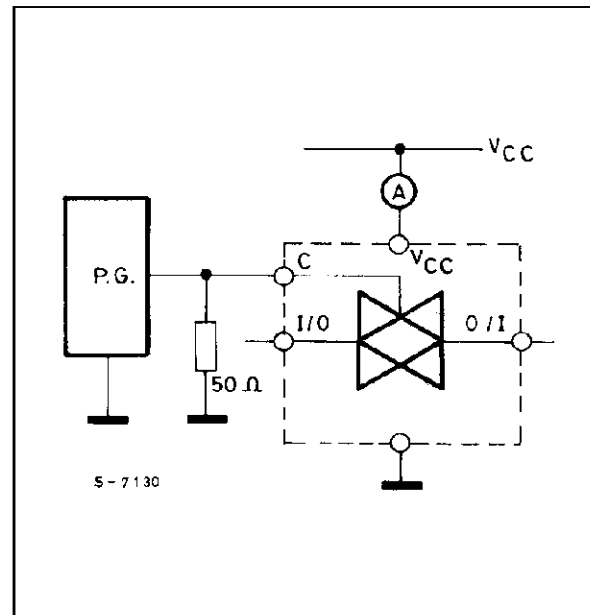
SWITCHING CHARACTERISTICS TEST WAVEFORM



CHANNEL RESISTANCE ( $R_{ON}$ )

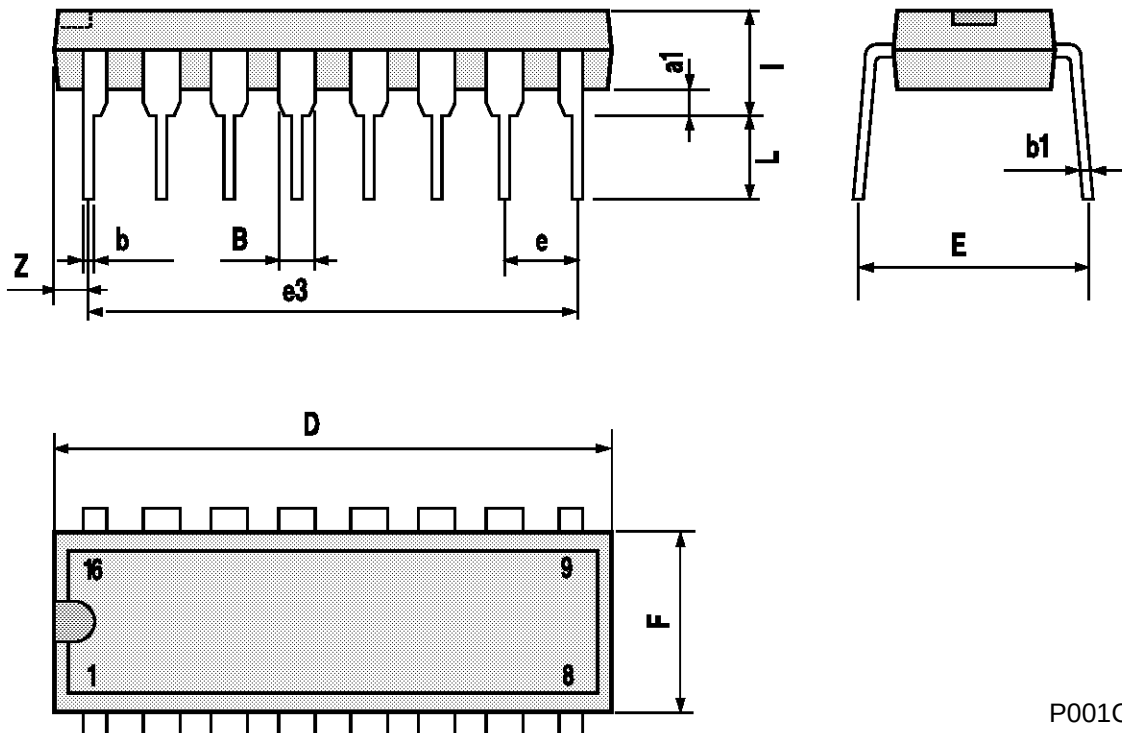


$I_{CC}$  (Opr.)



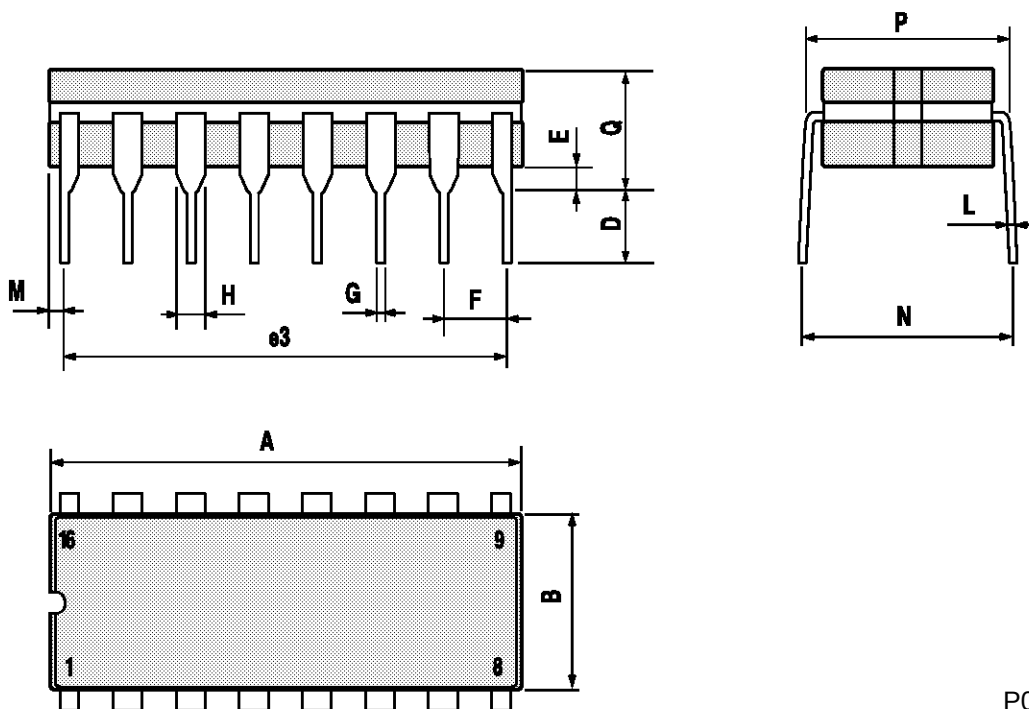
## Plastic DIP16 (0.25) MECHANICAL DATA

| 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 |



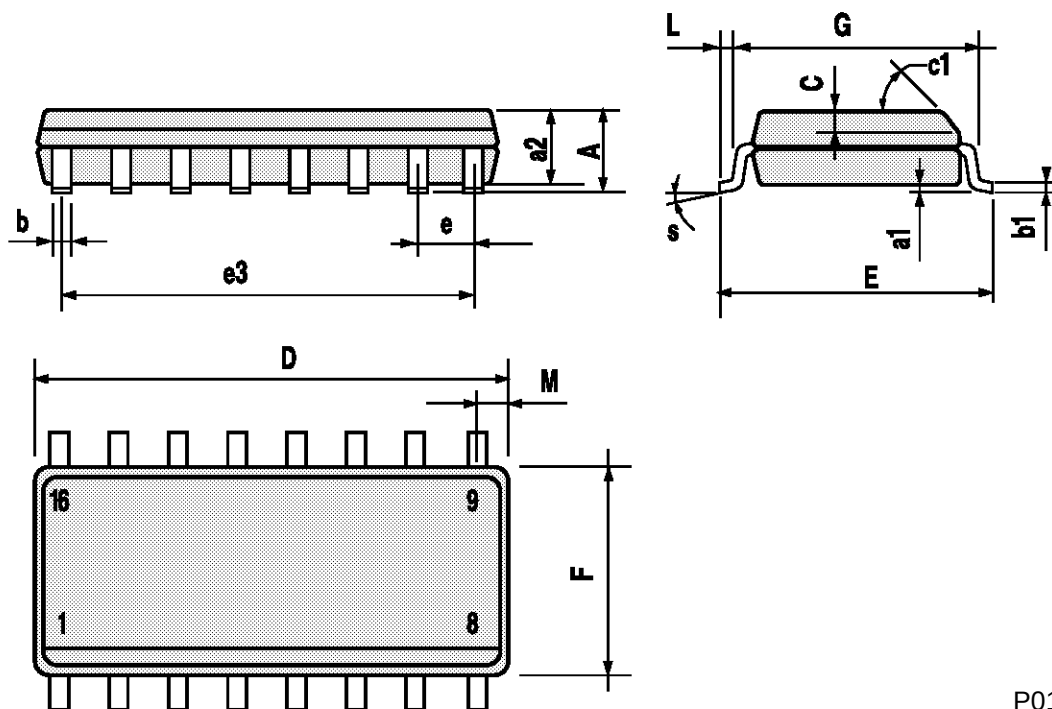
## Ceramic DIP16/1 MECHANICAL DATA

| 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

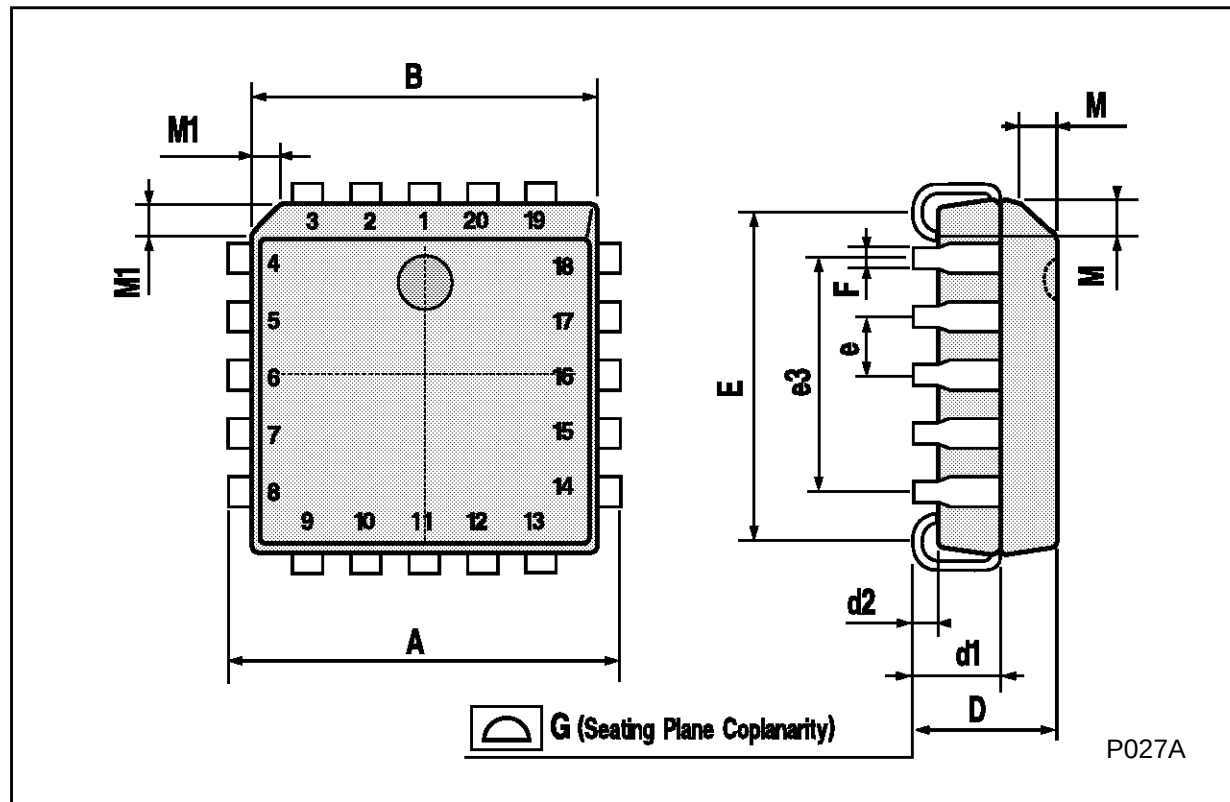
| DIM. | mm         |      |      | inch  |       |       |
|------|------------|------|------|-------|-------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |            |      | 1.75 |       |       | 0.068 |
| a1   | 0.1        |      | 0.2  | 0.004 |       | 0.007 |
| 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.)  |      |      |       |       |       |



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## 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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