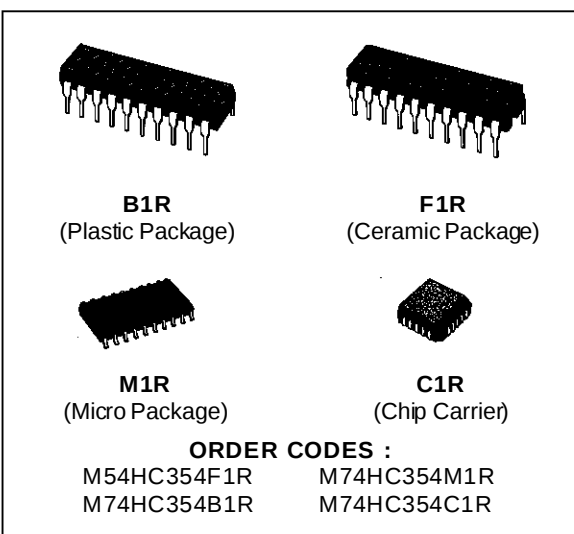


## 8 CHANNEL MULTIPLEXER/REGISTER (3 STATE)

- HIGH SPEED  
 $t_{PD} = 24 \text{ ns (TYP.) AT } V_{CC} = 5 \text{ V}$
- 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 54/74LS354



### DESCRIPTION

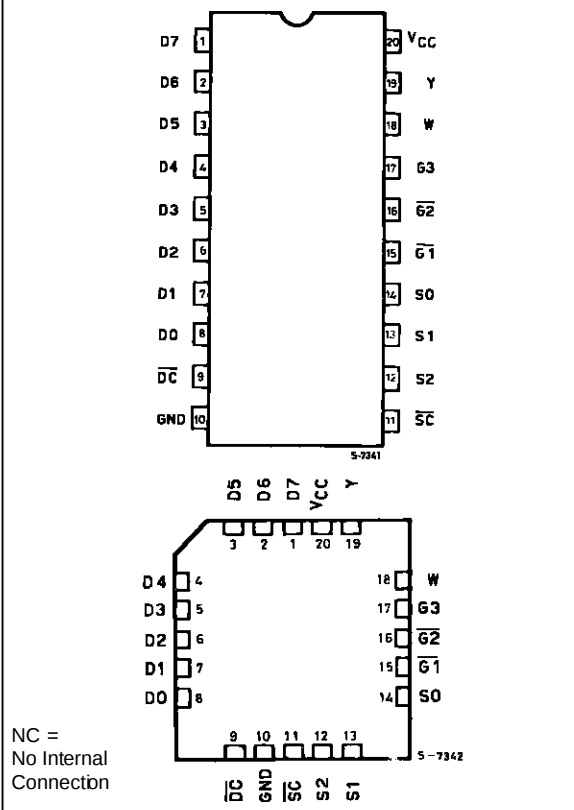
The M54/74HC354 is a high speed CMOS 8-CHANNEL MULTIPLEXER/REGISTER (3-state) fabricated in silicon gate C<sup>2</sup>MOS technology. It has the same high speed performance of LSTTL combined with true CMOS low consumption.

This device contains an 8 channel digital multiplexer with an 8-bit input data register and a 3-bit address input register with 3-state outputs. The one of eight input data will be provided on the Y output pin (non-inverted output) and W output pin (inverted output) determined by the address data.

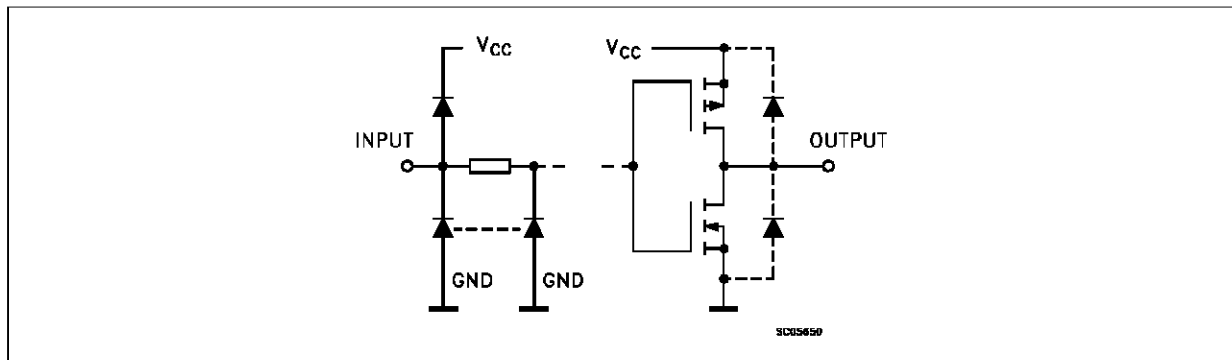
The information at the data inputs (D0 to D7) is stored in the 8-bit latch at the negative pulse on  $\overline{DC}$  input. The information at the address inputs (S0 to S2) is stored in the 3-bit latch at the negative pulse on  $\overline{SC}$  input. These outputs are disabled to be high-impedance when input G1 is held high, input G2 is held high or input G3 is held low. This device is suitable for interfacing with bus lines in a bus organized system.

The M54/74HC354 is similar in function to the M54/74HC356, which has an 8-bit flip-flop as the data register instead of an 8-bit latch. All inputs are equipped with protection circuits against static discharge and transient excess voltage.

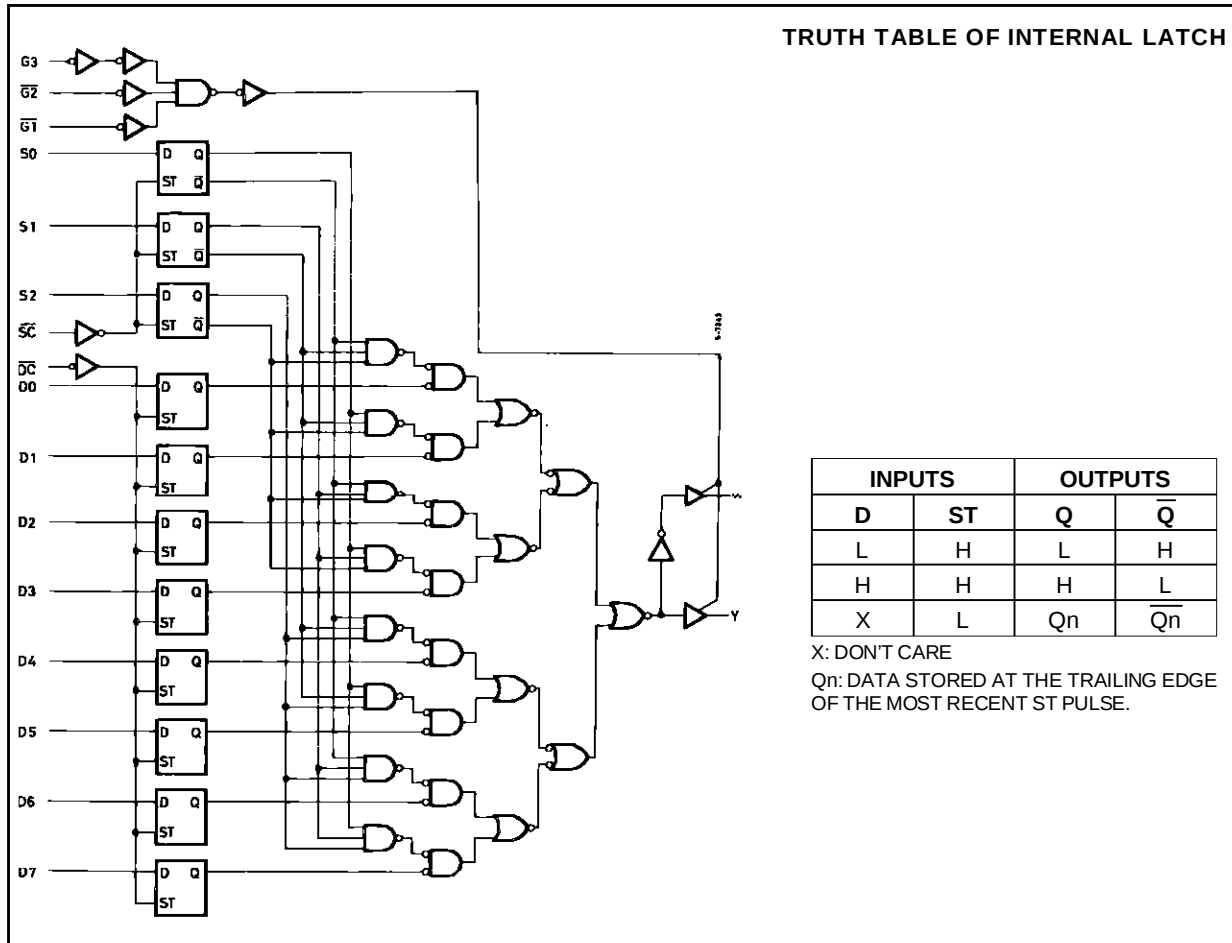
### PIN CONNECTIONS (top view)



INPUT AND OUTPUT EQUIVALENT CIRCUIT



LOGIC DIAGRAM



## TRUTH TABLE

| SELECT * |    |    | INPUTS |                |    |    | OUTPUTS          |     |
|----------|----|----|--------|----------------|----|----|------------------|-----|
|          |    |    | DC     | OUTPUT ENABLES |    |    | W                | Y   |
| S2       | S1 | S0 |        | G1             | G2 | G3 |                  |     |
| X        | X  | X  | X      | H              | X  | X  | Z                | Z   |
| X        | X  | X  | X      | X              | H  | X  | Z                | Z   |
| X        | X  | X  | X      | X              | X  | L  | Z                | Z   |
| L        | L  | L  | L      | L              | L  | H  | $\overline{D0}$  | D0  |
| L        | L  | L  | H      | L              | L  | H  | $\overline{D0n}$ | D0n |
| L        | L  | H  | L      | L              | L  | H  | $\overline{D1}$  | D1  |
| L        | L  | H  | H      | L              | L  | H  | $\overline{D1n}$ | D1n |
| L        | H  | L  | L      | L              | L  | H  | $\overline{D2}$  | D2  |
| L        | H  | L  | H      | L              | L  | H  | $\overline{D2n}$ | D2n |
| L        | H  | H  | L      | L              | L  | H  | $\overline{D3}$  | D3  |
| L        | H  | H  | H      | L              | L  | H  | $\overline{D3n}$ | D3n |
| H        | L  | L  | L      | L              | L  | H  | $\overline{D4}$  | D4  |
| H        | L  | L  | H      | L              | L  | H  | $\overline{D4n}$ | D4n |
| H        | L  | H  | L      | L              | L  | H  | $\overline{D5}$  | D5  |
| H        | L  | H  | H      | L              | L  | H  | $\overline{D5n}$ | D5n |
| H        | H  | L  | L      | L              | L  | H  | $\overline{D6}$  | D6  |
| H        | H  | L  | H      | L              | L  | H  | $\overline{D6n}$ | D6n |
| H        | H  | H  | L      | L              | L  | H  | $\overline{D7}$  | D7  |
| H        | H  | H  | H      | L              | L  | H  | $\overline{D7n}$ | D7n |

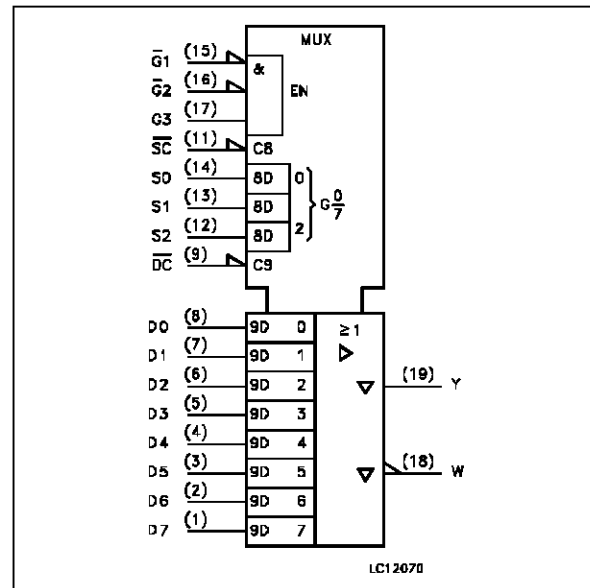
X: DON'T CARE Z: HIGH IMPEDANCE \*: THIS COLUMN SHOWS THE INPUT ADDRESS SETUP WITH SC LOW

D0n ....D7n: THE LEVEL OF STEADY-STATE INPUTS AT INPUT D0 THROUGH D7, RESPECTIVELY, BEFORE THE MOST RECENT LOW TO HIGH TRANSITION OF DATA CONTROL

## PIN DESCRIPTION

| PIN No                 | SYMBOL     | NAME AND FUNCTION                        |
|------------------------|------------|------------------------------------------|
| 8, 7, 6, 5, 4, 3, 2, 1 | D0 to D7   | Data Inputs                              |
| 9                      | DC         | Data Enable Input (Active LOW)           |
| 11                     | SC         | Latch Enable Input (Active LOW)          |
| 14, 13, 12             | S0, S1, S2 | Select Inputs                            |
| 15, 16                 | G1, G2     | Output Enable Inputs (Active LOW)        |
| 17                     | G3         | Output Enable Input (Active HIGH)        |
| 18                     | W          | 3 State Multiplexer Output (Active LOW)  |
| 19                     | Y          | 3 State Multiplexer Output (Active HIGH) |
| 10                     | GND        | Ground (0V)                              |
| 20                     | Vcc        | Positive Supply Voltage                  |

## IEC LOGIC SYMBOL



**ABSOLUTE MAXIMUM RATING**

| 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                       | $\pm 20$               | mA   |
| $I_{OK}$              | DC Output Diode Current                      | $\pm 20$               | mA   |
| $I_O$                 | DC Output Source Sink Current Per Output Pin | $\pm 35$               | mA   |
| $I_{CC}$ or $I_{GND}$ | DC $V_{CC}$ or Ground Current                | $\pm 70$               | 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:  $65^\circ\text{C}$  to  $85^\circ\text{C}$

**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: <b>M54HC Series</b><br><b>M74HC Series</b> | -55 to +125<br>-40 to +85                                                 | °C<br>°C                          |
| $t_r, t_f$ | Input Rise and Fall Time                                          | $V_{CC} = 2\text{ V}$<br>$V_{CC} = 4.5\text{ V}$<br>$V_{CC} = 6\text{ V}$ | 0 to 1000<br>0 to 500<br>0 to 400 |
|            |                                                                   |                                                                           | ns                                |

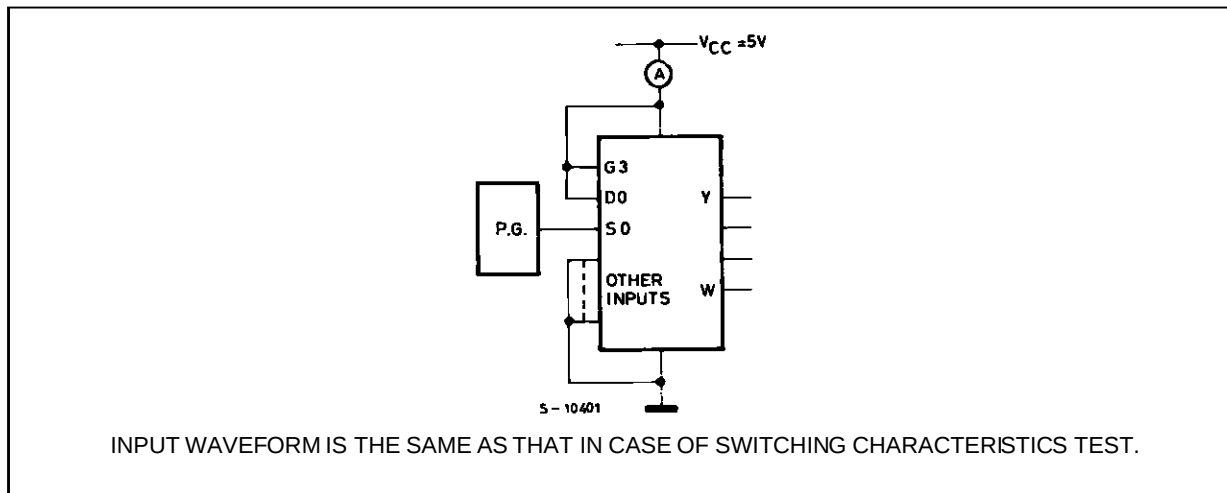
## DC SPECIFICATIONS

| 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         | 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>IL</sub> | 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 <sub>OH</sub> | High Level Output Voltage        | 2.0                    | V <sub>I</sub> =<br>V <sub>IH</sub><br>or<br>V <sub>IL</sub>                                   | I <sub>O</sub> =-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 <sub>O</sub> =-6.0 mA                 | 4.18  | 4.31 |                      | 4.13 |                       | 4.10 |      |   |
|                 |                                  | 6.0                    |                                                                                                | I <sub>O</sub> =-7.8 mA                 | 5.68  | 5.8  |                      | 5.63 |                       | 5.60 |      |   |
| V <sub>OL</sub> | Low Level Output Voltage         | 2.0                    | V <sub>I</sub> =<br>V <sub>IH</sub><br>or<br>V <sub>IL</sub>                                   | I <sub>O</sub> = 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 <sub>O</sub> = 6.0 mA                 |       | 0.17 | 0.26                 |      | 0.33                  |      | 0.40 |   |
|                 |                                  | 6.0                    |                                                                                                | I <sub>O</sub> = 7.8 mA                 |       | 0.18 | 0.26                 |      | 0.33                  |      | 0.40 |   |
| I <sub>I</sub>  | Input Leakage Current            | 6.0                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                                        |                                         |       | ±0.1 |                      | ±1   |                       | ±1   | μA   |   |
| I <sub>OZ</sub> | 3 State Output Off State Current | 6.0                    | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub><br>V <sub>O</sub> = V <sub>CC</sub> or GND |                                         |       | ±0.5 |                      | ±5.0 |                       | ±10  | μA   |   |
| I <sub>CC</sub> | Quiescent Supply Current         | 6.0                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                                        |                                         |       | 4    |                      | 40   |                       | 80   | μA   |   |

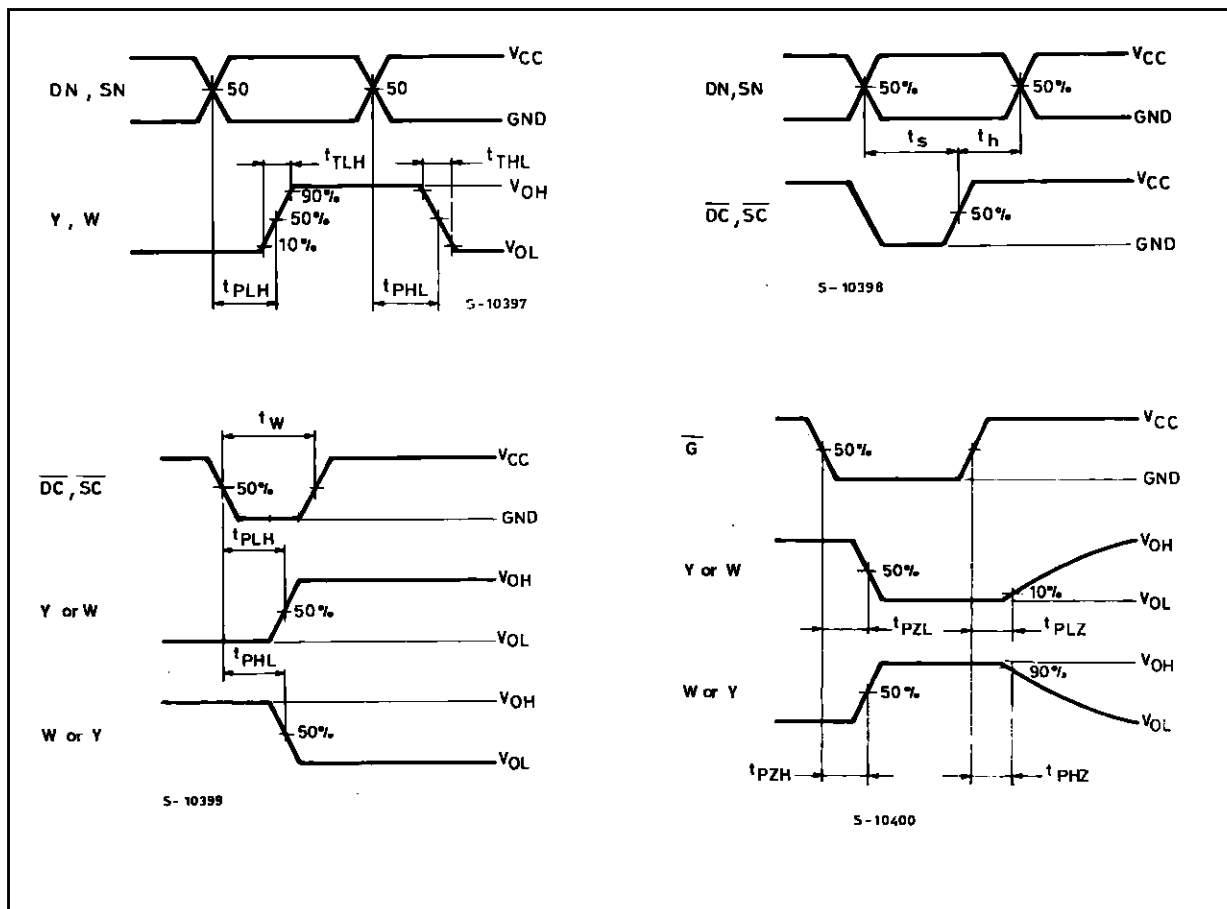
**AC ELECTRICAL CHARACTERISTICS** ( $C_L = 50 \text{ pF}$ , Input  $t_r = t_f = 6 \text{ ns}$ )

| Symbol                               | Parameter                                 | Test Conditions        |                        |                       | Value                                   |      |      |                      |      |                       | Unit |      |
|--------------------------------------|-------------------------------------------|------------------------|------------------------|-----------------------|-----------------------------------------|------|------|----------------------|------|-----------------------|------|------|
|                                      |                                           | V <sub>CC</sub><br>(V) | C <sub>L</sub><br>(pF) |                       | 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                    | 2.0                    | 50                     |                       |                                         | 25   | 60   |                      | 75   |                       | 90   | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 7    | 12   |                      | 15   |                       | 18   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 6    | 10   |                      | 13   |                       | 15   |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time<br>(Dn, DC - Y, W) | 2.0                    | 50                     |                       |                                         | 83   | 210  |                      | 265  |                       | 315  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 26   | 42   |                      | 53   |                       | 63   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 21   | 36   |                      | 45   |                       | 54   |      |
|                                      |                                           | 2.0                    | 150                    |                       |                                         | 99   | 250  |                      | 315  |                       | 375  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 31   | 50   |                      | 63   |                       | 75   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 25   | 43   |                      | 54   |                       | 64   |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time<br>(Sn - Y, W)     | 2.0                    | 50                     |                       |                                         | 98   | 260  |                      | 325  |                       | 390  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 30   | 52   |                      | 65   |                       | 78   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 25   | 44   |                      | 55   |                       | 66   |      |
|                                      |                                           | 2.0                    | 150                    |                       |                                         | 114  | 300  |                      | 375  |                       | 450  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 35   | 60   |                      | 75   |                       | 90   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 29   | 51   |                      | 64   |                       | 77   |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time<br>(SC - Y, W)     | 2.0                    | 50                     |                       |                                         | 102  | 270  |                      | 340  |                       | 405  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 31   | 54   |                      | 68   |                       | 81   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 27   | 46   |                      | 58   |                       | 69   |      |
|                                      |                                           | 2.0                    | 150                    |                       |                                         | 118  | 310  |                      | 390  |                       | 465  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 36   | 62   |                      | 78   |                       | 93   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 31   | 53   |                      | 66   |                       | 79   |      |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | 3 State Output Enable Time                | 2.0                    | 50                     | R <sub>L</sub> = 1 KΩ |                                         | 44   | 125  |                      | 155  |                       | 190  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 14   | 25   |                      | 31   |                       | 38   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 12   | 21   |                      | 26   |                       | 32   |      |
|                                      |                                           | 2.0                    | 150                    | R <sub>L</sub> = 1 KΩ |                                         | 60   | 165  |                      | 205  |                       | 250  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 19   | 33   |                      | 41   |                       | 50   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 16   | 28   |                      | 35   |                       | 43   |      |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | 3 State Output Disable Time               | 2.0                    | 50                     | R <sub>L</sub> = 1 KΩ |                                         | 42   | 155  |                      | 195  |                       | 235  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 20   | 31   |                      | 39   |                       | 47   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 17   | 26   |                      | 33   |                       | 40   |      |
| t <sub>W(L)</sub>                    | Minimum Pulse Width (DC) (SC)             | 2.0                    | 50                     |                       |                                         | 18   | 75   |                      | 95   |                       | 110  | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 6    | 15   |                      | 19   |                       | 22   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 6    | 13   |                      | 16   |                       | 19   |      |
| t <sub>s</sub>                       | Minimum Set-up Time (Dn) (Sn)             | 2.0                    | 50                     |                       |                                         | 10   | 50   |                      | 65   |                       | 75   | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         | 3    | 10   |                      | 13   |                       | 15   |      |
|                                      |                                           | 6.0                    |                        |                       |                                         | 3    | 9    |                      | 11   |                       | 13   |      |
| t <sub>h</sub>                       | Minimum Hold Time (Dn) (Sn)               | 2.0                    | 50                     |                       |                                         |      | 5    |                      | 5    |                       | 5    | ns   |
|                                      |                                           | 4.5                    |                        |                       |                                         |      | 5    |                      | 5    |                       | 5    |      |
|                                      |                                           | 6.0                    |                        |                       |                                         |      | 5    |                      | 5    |                       | 5    |      |
| C <sub>IN</sub>                      | Input Capacitance                         |                        |                        |                       |                                         | 5    | 10   |                      | 10   |                       | 10   | pF   |
| C <sub>PD</sub> (*)                  | Power Dissipation Capacitance             |                        |                        |                       |                                         | 77   |      |                      |      |                       |      | 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.  $I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$

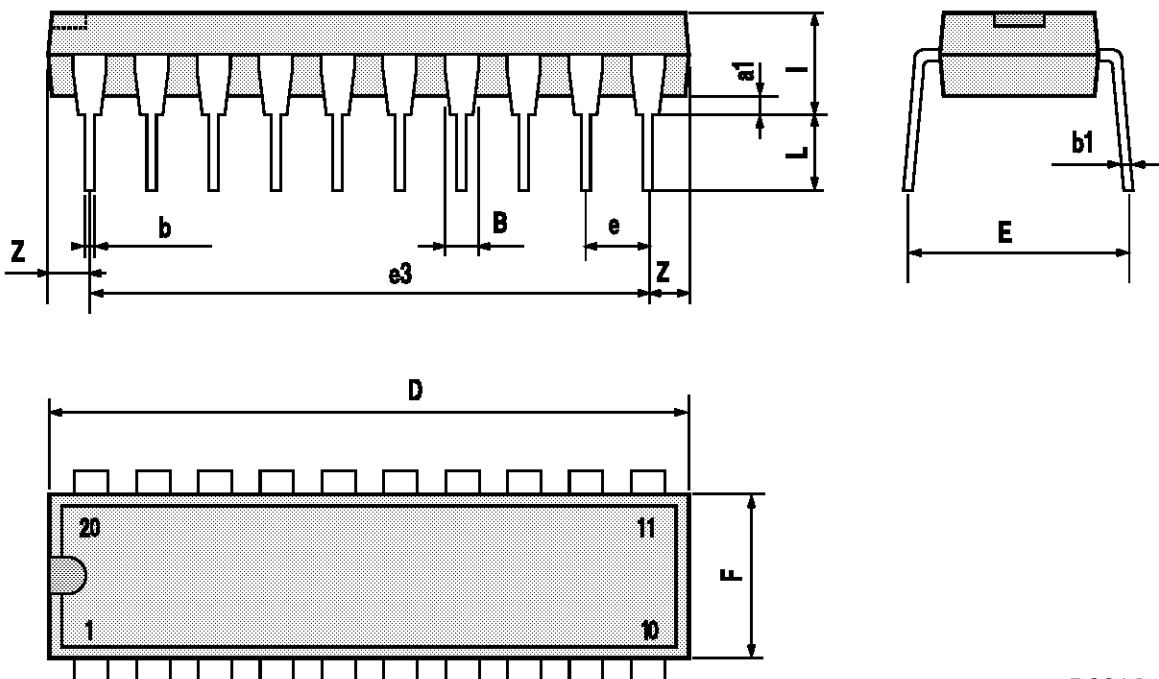
TEST CIRCUIT  $I_{CC}$  (Opr.)

## SWITCHING CHARACTERISTICS TEST WAVEFORM



## Plastic DIP20 (0.25) MECHANICAL DATA

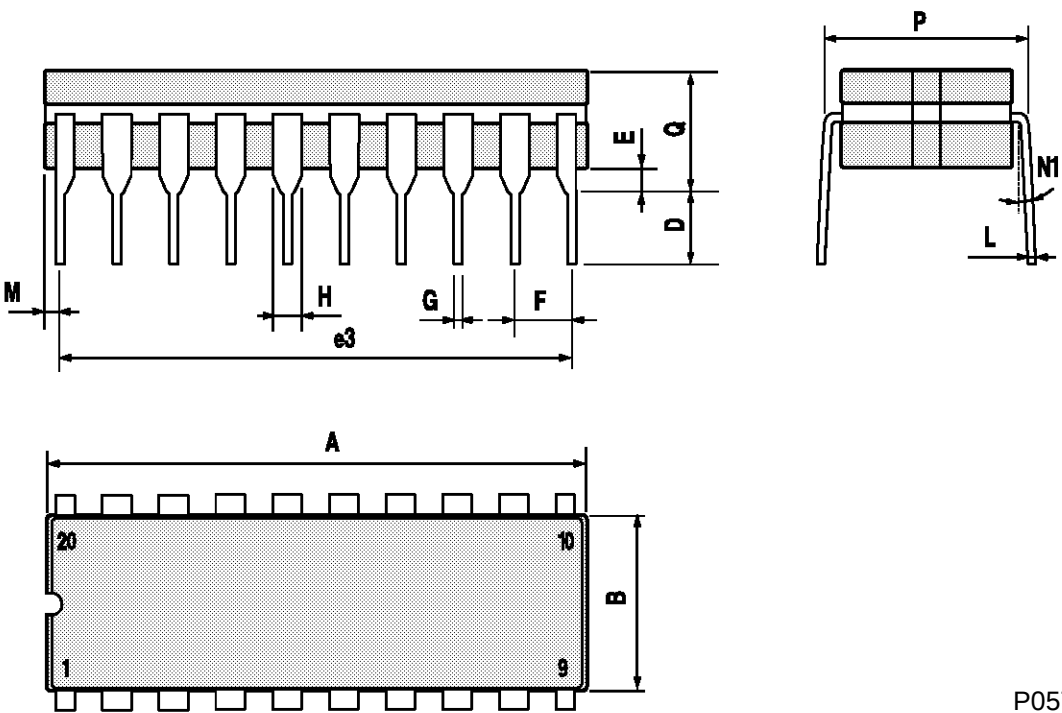
| DIM. | mm    |       |      | inch  |       |       |
|------|-------|-------|------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX. | MIN.  | TYP.  | MAX.  |
| a1   | 0.254 |       |      | 0.010 |       |       |
| B    | 1.39  |       | 1.65 | 0.055 |       | 0.065 |
| b    |       | 0.45  |      |       | 0.018 |       |
| b1   |       | 0.25  |      |       | 0.010 |       |
| D    |       |       | 25.4 |       |       | 1.000 |
| E    |       | 8.5   |      |       | 0.335 |       |
| e    |       | 2.54  |      |       | 0.100 |       |
| e3   |       | 22.86 |      |       | 0.900 |       |
| F    |       |       | 7.1  |       |       | 0.280 |
| I    |       |       | 3.93 |       |       | 0.155 |
| L    |       | 3.3   |      |       | 0.130 |       |
| Z    |       |       | 1.34 |       |       | 0.053 |



P001J

Ceramic DIP20 MECHANICAL DATA

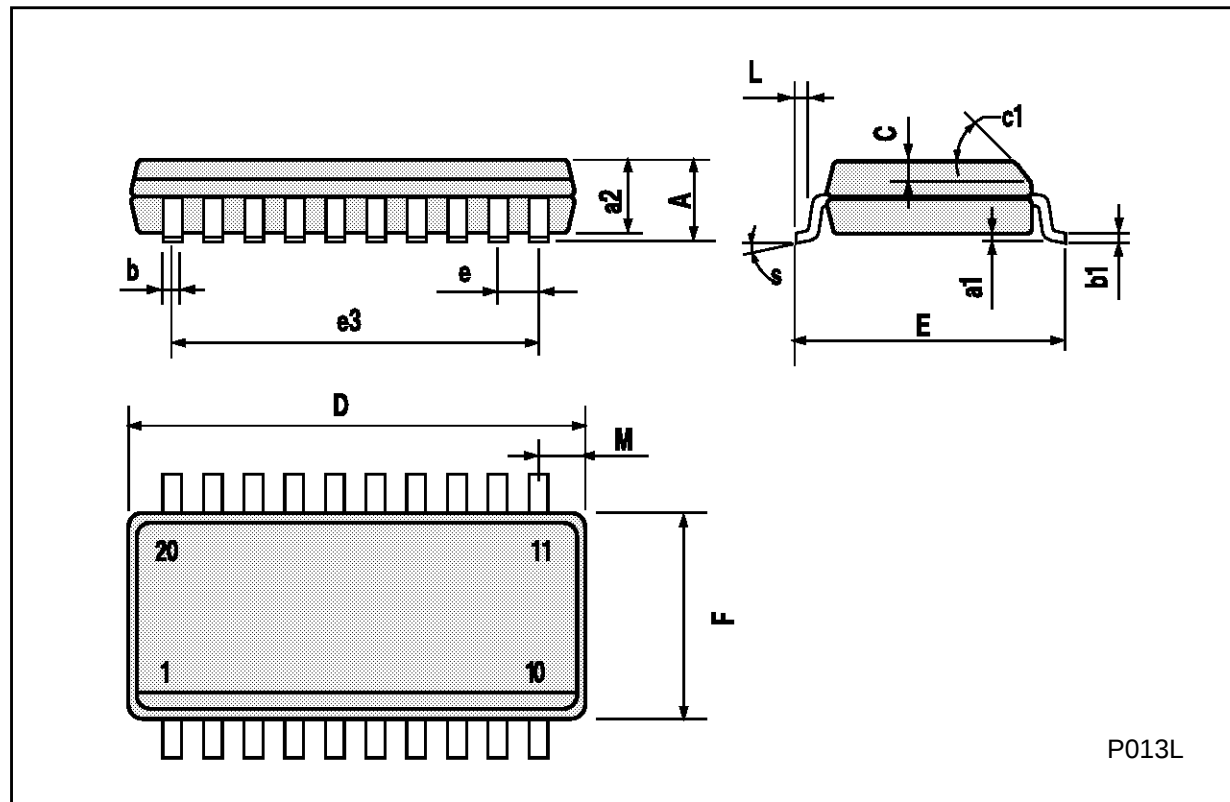
| DIM. | mm                    |       |      | inch  |       |       |
|------|-----------------------|-------|------|-------|-------|-------|
|      | MIN.                  | TYP.  | MAX. | MIN.  | TYP.  | MAX.  |
| A    |                       |       | 25   |       |       | 0.984 |
| B    |                       |       | 7.8  |       |       | 0.307 |
| D    |                       | 3.3   |      |       | 0.130 |       |
| E    | 0.5                   |       | 1.78 | 0.020 |       | 0.070 |
| e3   |                       | 22.86 |      |       | 0.900 |       |
| F    | 2.29                  |       | 2.79 | 0.090 |       | 0.110 |
| G    | 0.4                   |       | 0.55 | 0.016 |       | 0.022 |
| I    | 1.27                  |       | 1.52 | 0.050 |       | 0.060 |
| L    | 0.22                  |       | 0.31 | 0.009 |       | 0.012 |
| M    | 0.51                  |       | 1.27 | 0.020 |       | 0.050 |
| N1   | 4° (min.), 15° (max.) |       |      |       |       |       |
| P    | 7.9                   |       | 8.13 | 0.311 |       | 0.320 |
| Q    |                       |       | 5.71 |       |       | 0.225 |



P057H

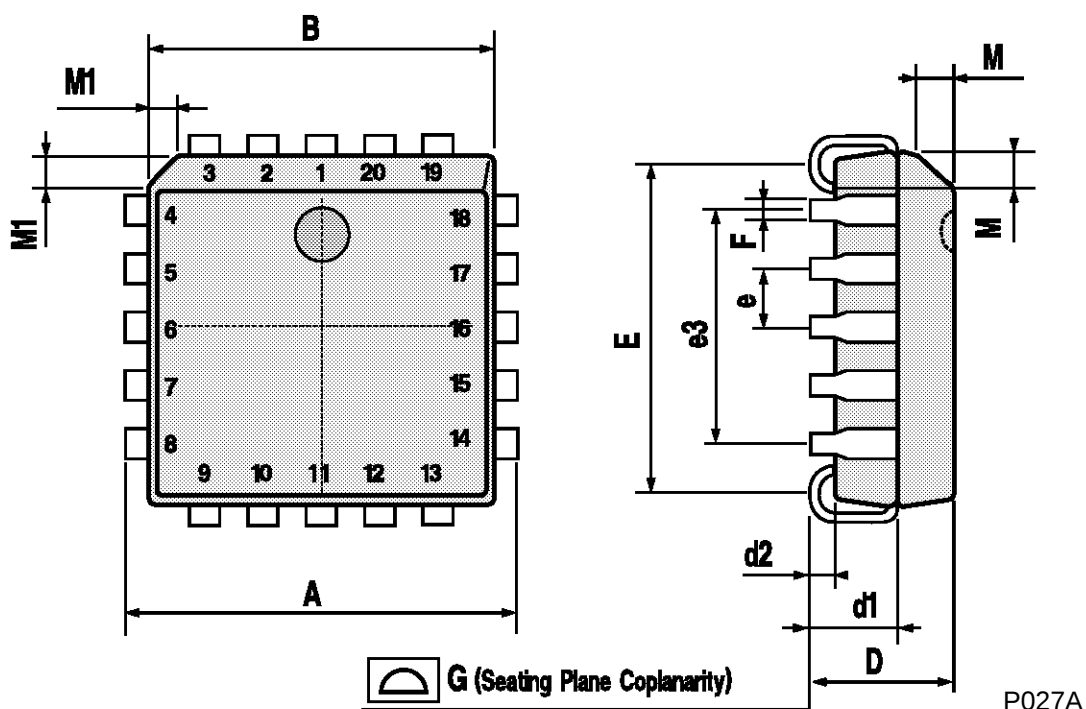
## SO20 MECHANICAL DATA

| DIM. | mm         |       |       | inch  |       |       |
|------|------------|-------|-------|-------|-------|-------|
|      | MIN.       | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |            |       | 2.65  |       |       | 0.104 |
| a1   | 0.10       |       | 0.20  | 0.004 |       | 0.007 |
| a2   |            |       | 2.45  |       |       | 0.096 |
| b    | 0.35       |       | 0.49  | 0.013 |       | 0.019 |
| b1   | 0.23       |       | 0.32  | 0.009 |       | 0.012 |
| C    |            | 0.50  |       |       | 0.020 |       |
| c1   | 45° (typ.) |       |       |       |       |       |
| D    | 12.60      |       | 13.00 | 0.496 |       | 0.512 |
| E    | 10.00      |       | 10.65 | 0.393 |       | 0.419 |
| e    |            | 1.27  |       |       | 0.050 |       |
| e3   |            | 11.43 |       |       | 0.450 |       |
| F    | 7.40       |       | 7.60  | 0.291 |       | 0.299 |
| L    | 0.50       |       | 1.27  | 0.19  |       | 0.050 |
| M    |            |       | 0.75  |       |       | 0.029 |
| S    | 8° (max.)  |       |       |       |       |       |



## PLCC20 MECHANICAL DATA

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



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