



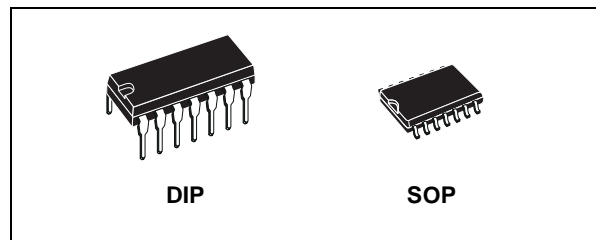
# HCF4075B

## TRIPLE 3 INPUT OR GATE

- MEDIUM SPEED OPERATION :  
 $t_{PD} = 60\text{ns}$  (TYP.) at  $V_{DD} = 10\text{V}$
- QUIESCENT CURRENT SPECIFIED UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT  
 $I_l = 100\text{nA}$  (MAX) AT  $V_{DD} = 18\text{V}$   $T_A = 25^\circ\text{C}$
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B "STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"

### DESCRIPTION

The HCF4075B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. The HCF4075B TRIPLE 3 INPUT OR GATE provides the system designer with direct

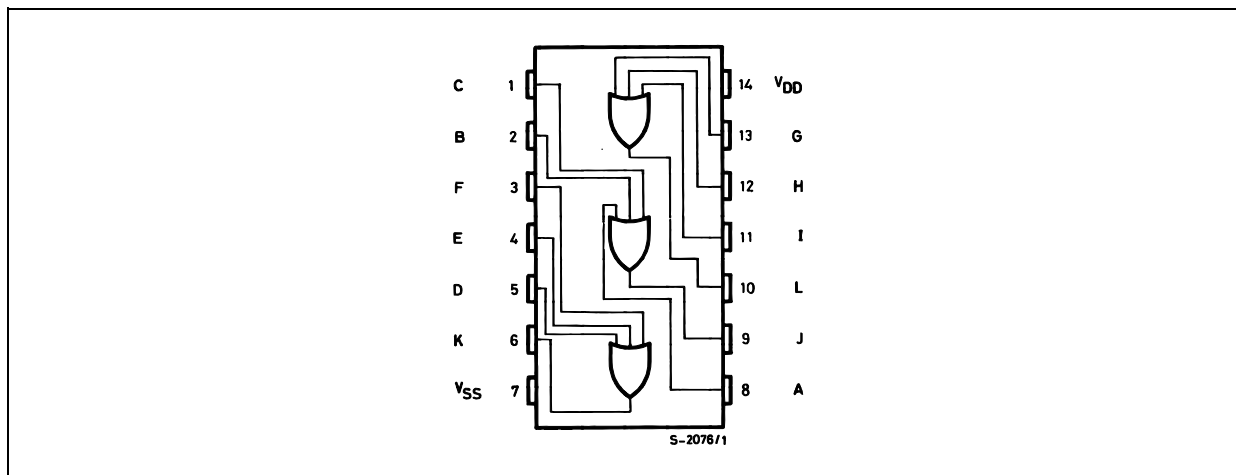


### ORDER CODES

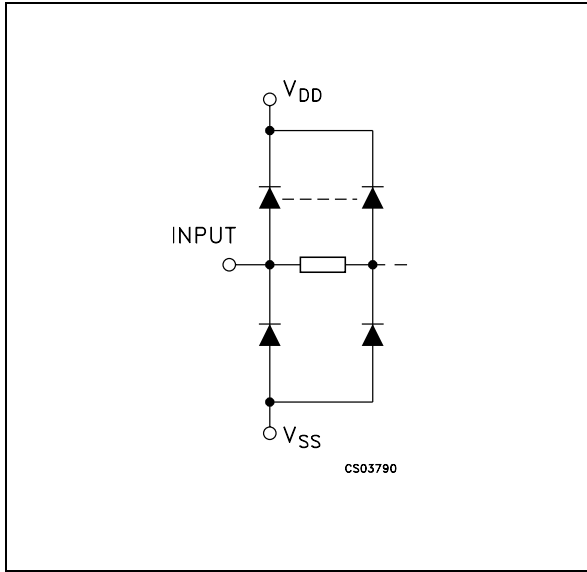
| PACKAGE | TUBE       | T & R         |
|---------|------------|---------------|
| DIP     | HCF4075BEY |               |
| SOP     | HCF4075BM1 | HCF4075M013TR |

implementation of the positive logic OR function and supplement the existing family of CMOS gates.

### PIN CONNECTION



**INPUT EQUIVALENT CIRCUIT**



**PIN DESCRIPTION**

| PIN No   | SYMBOL          | NAME AND FUNCTION       |
|----------|-----------------|-------------------------|
| 13, 8, 5 | G, A, D         | Data Inputs             |
| 12, 2, 4 | H, B, E         | Data Inputs             |
| 11, 1, 3 | I, C, F         | Data Inputs             |
| 10, 9, 6 | L, J, K         | Data Outputs            |
| 7        | V <sub>SS</sub> | Negative Supply Voltage |
| 14       | V <sub>DD</sub> | Positive Supply Voltage |

**TRUTH TABLE**

| INPUTS  |         |         | OUTPUTS |
|---------|---------|---------|---------|
| G, A, D | H, B, E | I, C, F | L, J, K |
| L       | X       | X       | L       |
| X       | L       | X       | H       |
| X       | X       | L       | H       |
| H       | H       | H       | H       |

X : Don't Care

**ABSOLUTE MAXIMUM RATINGS**

| Symbol           | Parameter                               | Value                         | Unit |
|------------------|---|-------------------------------|------|
| V <sub>DD</sub>  | Supply Voltage                          | -0.5 to +22                   | V    |
| V <sub>I</sub>   | DC Input Voltage                        | -0.5 to V <sub>DD</sub> + 0.5 | V    |
| I <sub>I</sub>   | DC Input Current                        | ± 10                          | mA   |
| P <sub>D</sub>   | Power Dissipation per Package           | 200                           | mW   |
|                  | Power Dissipation per Output Transistor | 100                           | mW   |
| T <sub>op</sub>  | Operating Temperature                   | -55 to +125                   | °C   |
| T <sub>stg</sub> | Storage Temperature                     | -65 to +150                   | °C   |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. All voltage values are referred to V<sub>SS</sub> pin voltage.

**RECOMMENDED OPERATING CONDITIONS**

| Symbol          | Parameter             | Value                | Unit |
|-----------------|-----------------------|----------------------|------|
| V <sub>DD</sub> | Supply Voltage        | 3 to 20              | V    |
| V <sub>I</sub>  | Input Voltage         | 0 to V <sub>DD</sub> | V    |
| T <sub>op</sub> | Operating Temperature | -55 to 125           | °C   |

## DC SPECIFICATIONS

| Symbol          | Parameter                 | Test Condition        |                       |                                 |                        | Value                 |               |           |             |         |              | Unit    |         |
|-----------------|---------------------------|-----------------------|-----------------------|---------------------------------|------------------------|-----------------------|---------------|-----------|-------------|---------|--------------|---------|---------|
|                 |                           | V <sub>I</sub><br>(V) | V <sub>O</sub><br>(V) | I <sub>ol</sub>  <br>( $\mu$ A) | V <sub>DD</sub><br>(V) | T <sub>A</sub> = 25°C |               |           | -40 to 85°C |         | -55 to 125°C |         |         |
|                 |                           |                       |                       |                                 |                        | Min.                  | Typ.          | Max.      | Min.        | Max.    | Min.         |         | Max.    |
| I <sub>L</sub>  | Quiescent Current         | 0/5                   |                       |                                 | 5                      |                       | 0.01          | 0.25      |             | 7.5     |              | 7.5     | $\mu$ A |
|                 |                           | 0/10                  |                       |                                 | 10                     |                       | 0.01          | 0.5       |             | 15      |              | 15      |         |
|                 |                           | 0/15                  |                       |                                 | 15                     |                       | 0.01          | 1         |             | 30      |              | 30      |         |
|                 |                           | 0/20                  |                       |                                 | 20                     |                       | 0.02          | 5         |             | 150     |              | 150     |         |
| V <sub>OH</sub> | High Level Output Voltage | 0/5                   |                       | <1                              | 5                      | 4.95                  |               |           | 4.95        |         | 4.95         |         | V       |
|                 |                           | 0/10                  |                       | <1                              | 10                     | 9.95                  |               |           | 9.95        |         | 9.95         |         |         |
|                 |                           | 0/15                  |                       | <1                              | 15                     | 14.95                 |               |           | 14.95       |         | 14.95        |         |         |
| V <sub>OL</sub> | Low Level Output Voltage  | 5/0                   |                       | <1                              | 5                      |                       | 0.05          |           |             | 0.05    |              | 0.05    | V       |
|                 |                           | 10/0                  |                       | <1                              | 10                     |                       | 0.05          |           |             | 0.05    |              | 0.05    |         |
|                 |                           | 15/0                  |                       | <1                              | 15                     |                       | 0.05          |           |             | 0.05    |              | 0.05    |         |
| V <sub>IH</sub> | High Level Input Voltage  |                       | 0.5/4.5               | <1                              | 5                      | 3.5                   |               |           | 3.5         |         | 3.5          |         | V       |
|                 |                           |                       | 1/9                   | <1                              | 10                     | 7                     |               |           | 7           |         | 7            |         |         |
|                 |                           |                       | 1.5/13.5              | <1                              | 15                     | 11                    |               |           | 11          |         | 11           |         |         |
| V <sub>IL</sub> | Low Level Input Voltage   |                       | 4.5/0.5               | <1                              | 5                      |                       |               | 1.5       |             | 1.5     |              | 1.5     | V       |
|                 |                           |                       | 9/1                   | <1                              | 10                     |                       |               | 3         |             | 3       |              | 3       |         |
|                 |                           |                       | 13.5/1.5              | <1                              | 15                     |                       |               | 4         |             | 4       |              | 4       |         |
| I <sub>OH</sub> | Output Drive Current      | 0/5                   | 2.5                   | <1                              | 5                      | -1.36                 | -3.2          |           | -1.15       |         | -1.1         |         | mA      |
|                 |                           | 0/5                   | 4.6                   | <1                              | 5                      | -0.44                 | -1            |           | -0.36       |         | -0.36        |         |         |
|                 |                           | 0/10                  | 9.5                   | <1                              | 10                     | -1.1                  | -2.6          |           | -0.9        |         | -0.9         |         |         |
|                 |                           | 0/15                  | 13.5                  | <1                              | 15                     | -3.0                  | -6.8          |           | -2.4        |         | -2.4         |         |         |
| I <sub>OL</sub> | Output Sink Current       | 0/5                   | 0.4                   | <1                              | 5                      | 0.44                  | 1             |           | 0.36        |         | 0.36         |         | mA      |
|                 |                           | 0/10                  | 0.5                   | <1                              | 10                     | 1.1                   | 2.6           |           | 0.9         |         | 0.9          |         |         |
|                 |                           | 0/15                  | 1.5                   | <1                              | 15                     | 3.0                   | 6.8           |           | 2.4         |         | 2.4          |         |         |
| I <sub>I</sub>  | Input Leakage Current     | 0/18                  | Any Input             |                                 | 18                     |                       | $\pm 10^{-5}$ | $\pm 0.1$ |             | $\pm 1$ |              | $\pm 1$ | $\mu$ A |
| C <sub>I</sub>  | Input Capacitance         |                       | Any Input             |                                 |                        |                       | 5             | 7.5       |             |         |              |         | pF      |

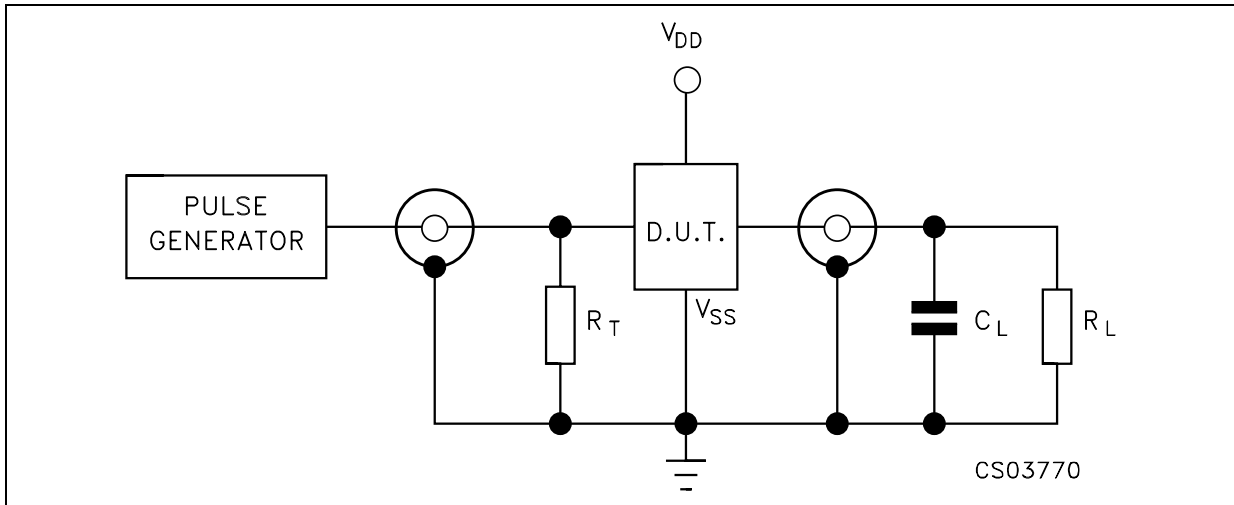
The Noise Margin for both "1" and "0" level is: 1V min. with V<sub>DD</sub>=5V, 2V min. with V<sub>DD</sub>=10V, 2.5V min. with V<sub>DD</sub>=15V

DYNAMIC ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25°C, C<sub>L</sub> = 50pF, R<sub>L</sub> = 200K $\Omega$ , t<sub>r</sub> = t<sub>f</sub> = 20 ns)

| Symbol                            | Parameter              | Test Condition      |  | Value (*) |      |      | Unit |
|-----------------------------------|------------------------|---------------------|--|-----------|------|------|------|
|                                   |                        | V <sub>DD</sub> (V) |  | Min.      | Typ. | Max. |      |
| t <sub>PHL</sub>                  | Propagation Delay Time | 5                   |  |           | 125  | 250  | ns   |
|                                   |                        | 10                  |  |           | 60   | 120  |      |
|                                   |                        | 15                  |  |           | 45   | 90   |      |
| t <sub>PLH</sub>                  | Propagation Delay Time | 5                   |  |           | 175  | 350  | ns   |
|                                   |                        | 10                  |  |           | 60   | 140  |      |
|                                   |                        | 15                  |  |           | 50   | 140  |      |
| t <sub>TLH</sub> t <sub>THL</sub> | Output Transition Time | 5                   |  |           | 100  | 200  | ns   |
|                                   |                        | 10                  |  |           | 50   | 100  |      |
|                                   |                        | 15                  |  |           | 40   | 80   |      |

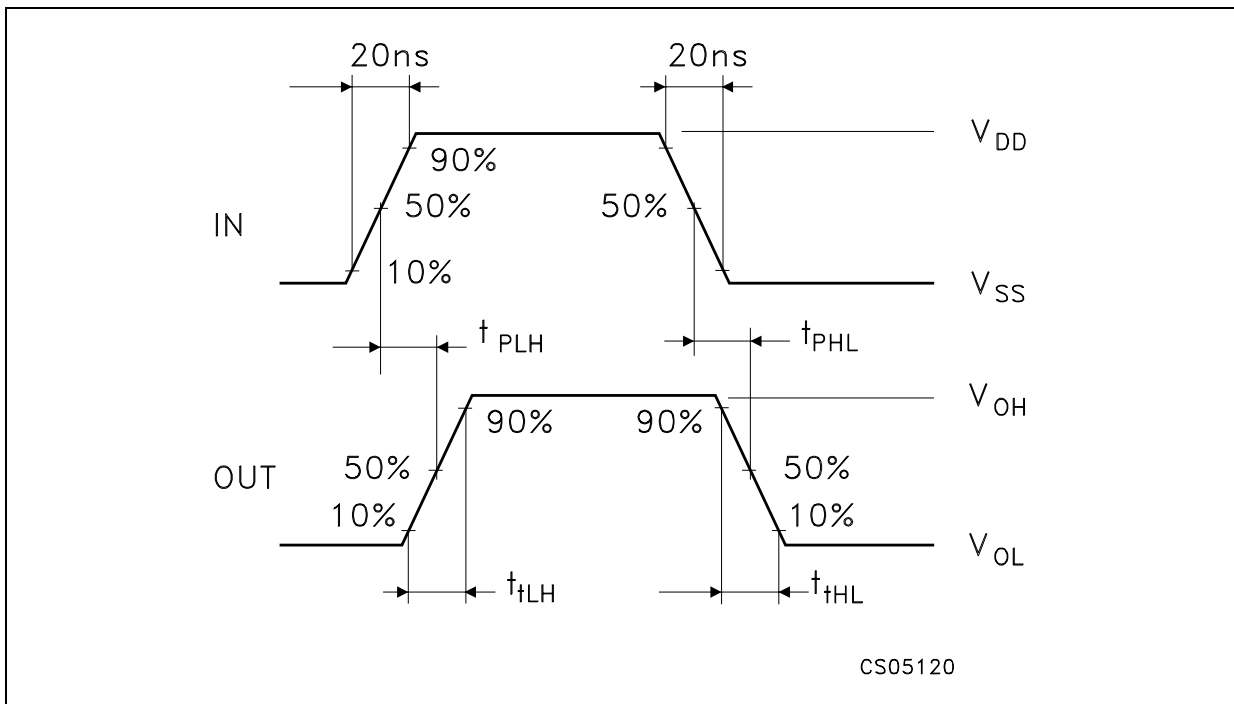
(\*) Typical temperature coefficient for all V<sub>DD</sub> value is 0.3 %/°C.

TEST CIRCUIT



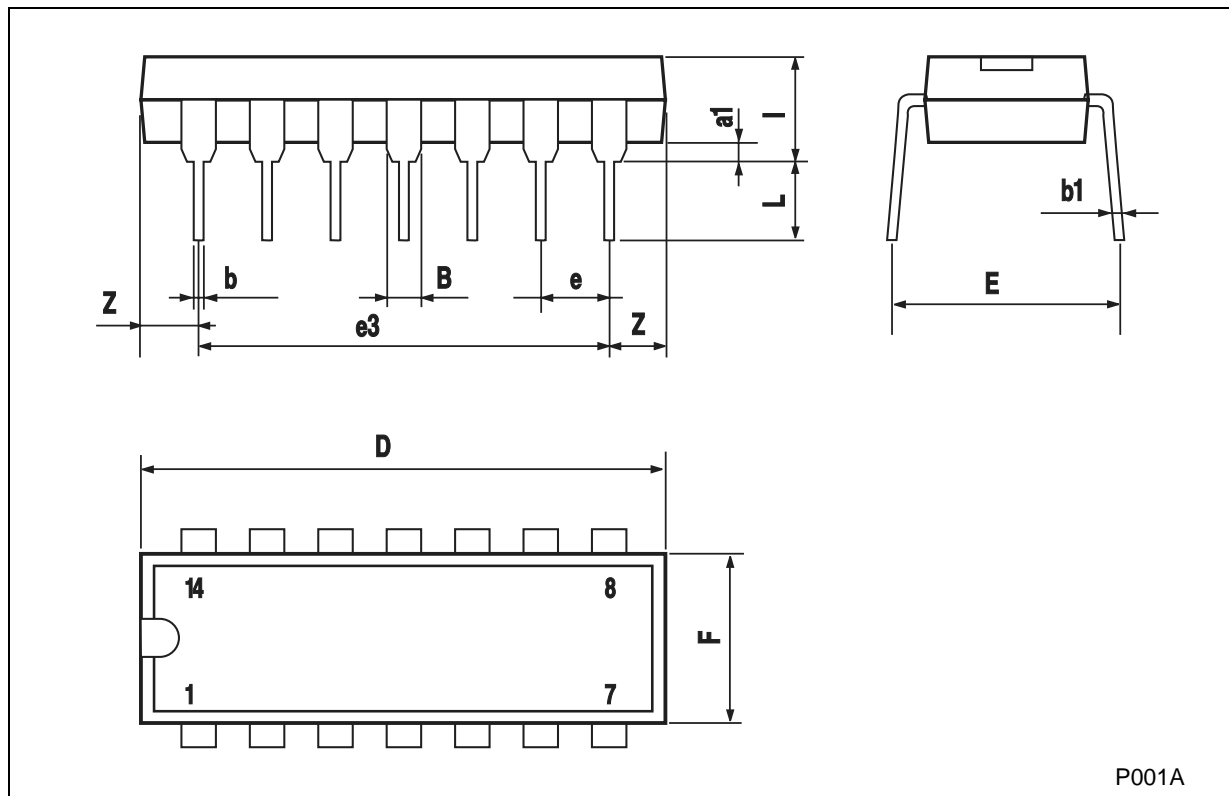
$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)  
 $R_L = 200\text{k}\Omega$   
 $R_T = Z_{\text{OUT}}$  of pulse generator (typically  $50\Omega$ )

WAVEFORM : PROPAGATION DELAY TIMES ( $f=1\text{MHz}$ ; 50% duty cycle)



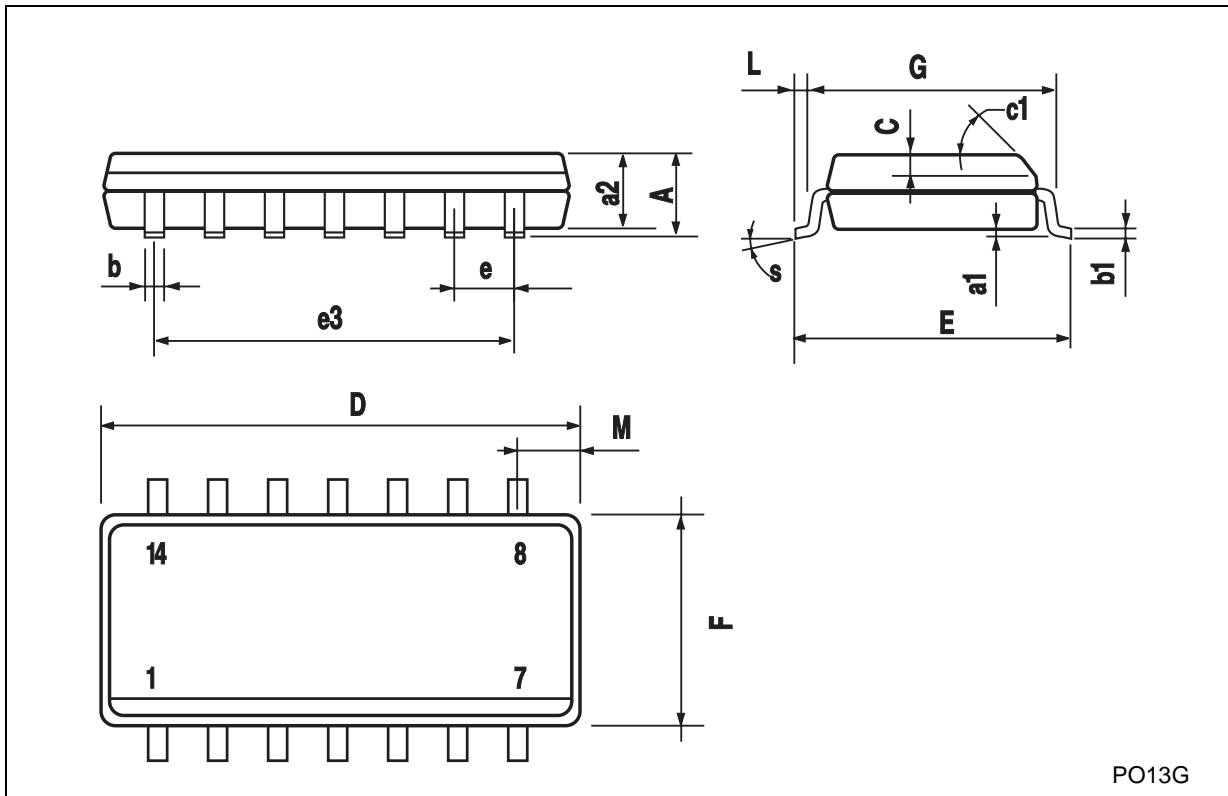
|                                       |  |  |  |  |  |  |
|---------------------------------------|--|--|--|--|--|--|
| <b>Plastic DIP-14 MECHANICAL DATA</b> |  |  |  |  |  |  |
|---------------------------------------|--|--|--|--|--|--|

| DIM. | mm.  |       |      | inch  |       |       |
|------|------|-------|------|-------|-------|-------|
|      | MIN. | TYP   | MAX. | MIN.  | TYP.  | MAX.  |
| a1   | 0.51 |       |      | 0.020 |       |       |
| B    | 1.39 |       | 1.65 | 0.055 |       | 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   |      | 15.24 |      |       | 0.600 |       |
| F    |      |       | 7.1  |       |       | 0.280 |
| I    |      |       | 5.1  |       |       | 0.201 |
| L    |      | 3.3   |      |       | 0.130 |       |
| Z    | 1.27 |       | 2.54 | 0.050 |       | 0.100 |



**SO-14 MECHANICAL DATA**

| DIM. | mm.        |      |      | inch  |       |       |
|------|------------|------|------|-------|-------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |            |      | 1.75 |       |       | 0.068 |
| a1   | 0.1        |      | 0.2  | 0.003 |       | 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    | 8.55       |      | 8.75 | 0.336 |       | 0.344 |
| E    | 5.8        |      | 6.2  | 0.228 |       | 0.244 |
| e    |            | 1.27 |      |       | 0.050 |       |
| e3   |            | 7.62 |      |       | 0.300 |       |
| 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    |            |      | 0.68 |       |       | 0.026 |
| S    | 8° (max.)  |      |      |       |       |       |



PO13G

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2001 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom

© <http://www.st.com>

