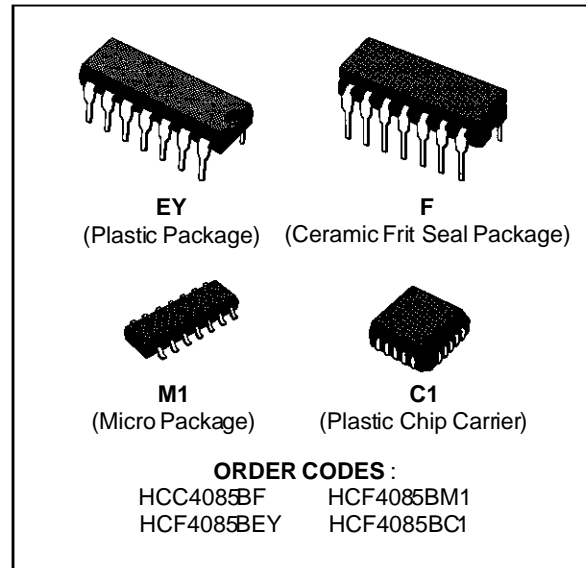


DUAL 2-WIDE 2-INPUT AND-OR-INVERTER GATE

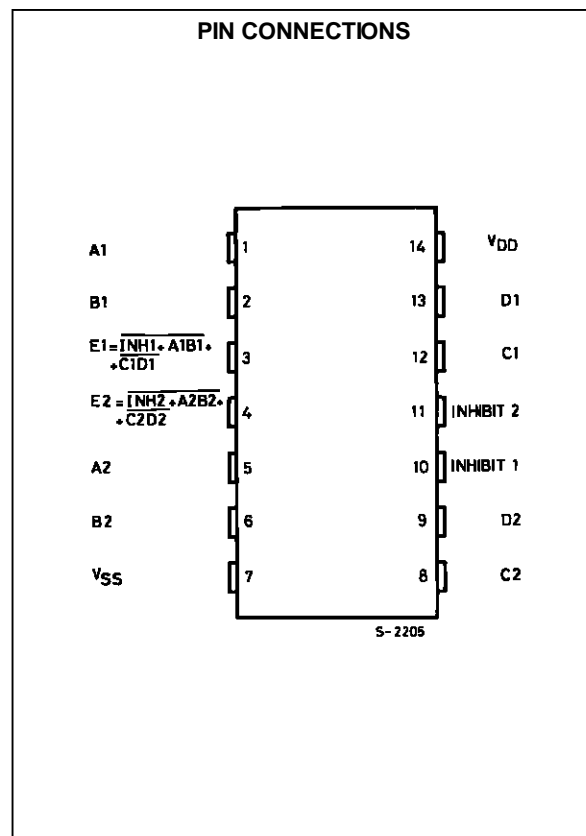
- MEDIUM-SPEED OPERATION – $t_{PHL} = 90\text{ns}$;
 $t_{PLH} = 125\text{ns}$ (TYP.) AT 10V
- INDIVIDUAL INHIBIT CONTROLS
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD N°. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"



DESCRIPTION

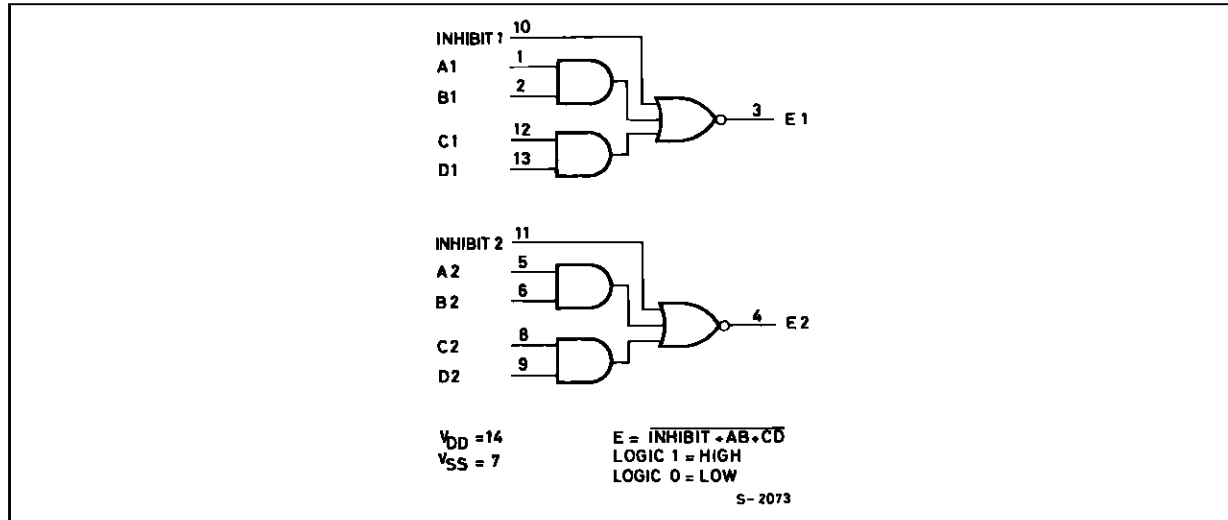
The **HCC4085B** (extended temperature range) and **HCF4085B** (intermediate temperature range) are monolithic integrated circuit, available in 14-lead dual in-line plastic or ceramic package and plastic micropackage.

The **HCC/HCF4085B** contains a pair of AND-OR-INVERT gates, each consisting of two 2-input AND gates driving a 3-input NOR gate. Individual inhibit controls are provided for both A-O-I gates.



HCC/HCF4085B

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------|
| V_{DD}^* | Supply Voltage : HCC Types HCF Types | - 0.5 to + 20 - 0.5 to + 18 | V V |
| V_i | Input Voltage | - 0.5 to $V_{DD} + 0.5$ | V |
| I_i | DC Input Current (any one input) | ± 10 | mA |
| P_{tot} | Total Power Dissipation (per package) Dissipation per Output Transistor for $T_{op} = \text{Full Package-temperature Range}$ | 200 100 | mW mW |
| T_{op} | Operating Temperature : HCC Types HCF Types | - 55 to + 125 - 40 to + 85 | $^{\circ}\text{C}$ $^{\circ}\text{C}$ |
| T_{stg} | Storage Temperature | - 65 to + 150 | $^{\circ}\text{C}$ |

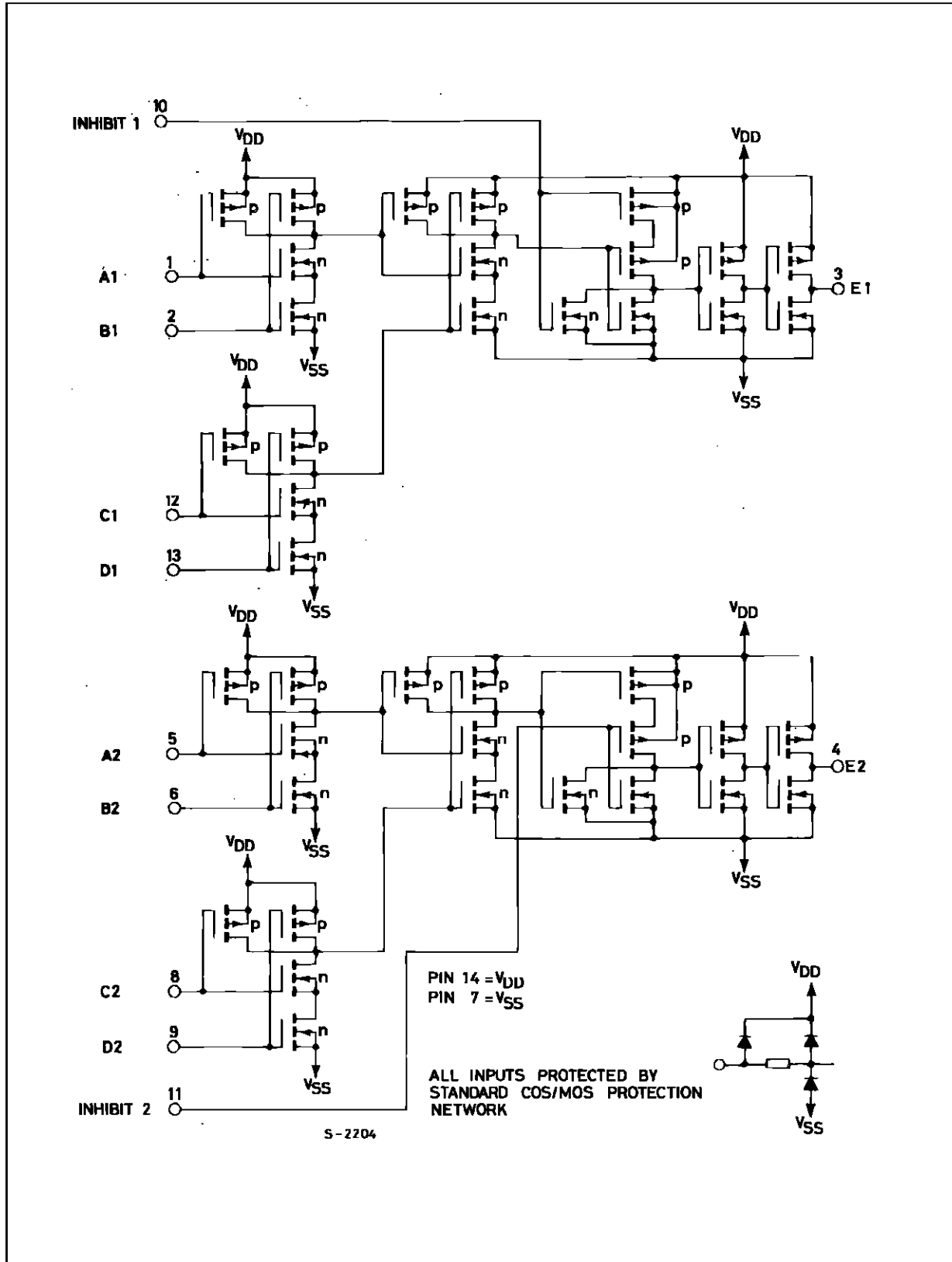
Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for external periods may affect device reliability.

* All voltage values are referred to V_{SS} pin voltage.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|----------|------------------------------------------------|-------------------------------|------------------------------------------|
| V_{DD} | Supply Voltage : HCC Types HCF Types | 3 to 18 3 to 15 | V V |
| V_i | Input Voltage | 0 to V_{DD} | V |
| T_{op} | Operating Temperature : HCC Types HCF Types | - 55 to + 125 - 40 to + 85 | $^{\circ}\text{C}$ $^{\circ}\text{C}$ |

SCHEMATIC DIAGRAM



STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

| Symbol | Parameter | | Test Conditions | | | | Value | | | | | | Unit | |
|-----------------------------------|-----------------------|-----------|-----------------------|-----------------------|--------------------------------|------------------------|--------------------|-----------|--------|------------------------|-----------|---------------------|---------|------|
| | | | V _I (V) | V _O (V) | I _O (μ A) | V _{DD} (V) | T _{Low} * | | 25°C | | | T _{High} * | | |
| | | | | | | | Min. | Max. | Min. | Typ. | Max. | Min. | | Max. |
| I _L | Quiescent Current | HCC Types | 0/ 5 | | | 5 | | 1 | | 0.02 | 1 | | 30 | |
| | | | 0/10 | | | 10 | | 2 | | 0.02 | 2 | | 60 | |
| | | | 0/15 | | | 15 | | 4 | | 0.02 | 4 | | 120 | |
| | | HCF Types | 0/20 | | | 20 | | 20 | | 0.04 | 20 | | 600 | |
| | | | 0/ 5 | | | 5 | | 4 | | 0.02 | 4 | | 30 | |
| | | | 0/10 | | | 10 | | 8 | | 0.02 | 8 | | 60 | |
| V _{OH} | Output High Voltage | | 0/ 5 | | < 1 | 5 | 4.95 | | 4.95 | | | 4.95 | | |
| | | | 0/10 | | < 1 | 10 | 9.95 | | 9.95 | | | 9.95 | | |
| | | | 0/15 | | < 1 | 15 | 14.95 | | 14.95 | | | 14.95 | | |
| V _{OL} | Output Low Voltage | | 5/0 | | < 1 | 5 | | 0.05 | | | 0.05 | | 0.05 | |
| | | | 10/0 | | < 1 | 10 | | 0.05 | | | 0.05 | | 0.05 | |
| | | | 15/0 | | < 1 | 15 | | 0.05 | | | 0.05 | | 0.05 | |
| V _{IH} | Input High Voltage | | | 0.5/4.5 | < 1 | 5 | 3.5 | | 3.5 | | | 3.5 | | |
| | | | | 1/9 | < 1 | 10 | 7 | | 7 | | | 7 | | |
| | | | | 1.5/13.5 | < 1 | 15 | 11 | | 11 | | | 11 | | |
| V _{IL} | Input Low Voltage | | | 4.5/0.5 | < 1 | 5 | | 1.5 | | | 1.5 | | 1.5 | |
| | | | | 9/1 | < 1 | 10 | | 3 | | | 3 | | 3 | |
| | | | | 13.5/1.5 | < 1 | 15 | | 4 | | | 4 | | 4 | |
| I _{OH} | Output Drive Current | HCC Types | 0/ 5 | 2.5 | | 5 | - 2 | | - 1.6 | - 3.2 | | - 1.15 | | |
| | | | 0/ 5 | 4.6 | | 5 | - 0.64 | | - 0.51 | - 1 | | - 0.36 | | |
| | | | 0/10 | 9.5 | | 10 | - 1.6 | | - 1.3 | - 2.6 | | - 0.9 | | |
| | | | 0/15 | 13.5 | | 15 | - 4.2 | | - 3.4 | - 6.8 | | - 2.4 | | |
| | | HCF Types | 0/ 5 | 2.5 | | 5 | - 1.53 | | - 1.36 | - 3.2 | | - 1.1 | | |
| | | | 0/ 5 | 4.6 | | 5 | - 0.52 | | - 0.44 | - 1 | | - 0.36 | | |
| | | | 0/10 | 9.5 | | 10 | - 1.3 | | - 1.1 | - 2.6 | | - 0.9 | | |
| | | | 0/15 | 13.5 | | 15 | - 3.6 | | - 3.0 | - 6.8 | | - 2.4 | | |
| I _{OL} | Output Sink Current | HCC Types | 0/ 5 | 0.4 | | 5 | 0.64 | | 0.51 | 1 | | 0.36 | | |
| | | | 0/10 | 0.5 | | 10 | 1.6 | | 1.3 | 2.6 | | 0.9 | | |
| | | | 0/15 | 1.5 | | 15 | 4.2 | | 3.4 | 6.8 | | 2.4 | | |
| | | HCF Types | 0/ 5 | 0.4 | | 5 | 0.52 | | 0.44 | 1 | | 0.36 | | |
| | | | 0/10 | 0.5 | | 10 | 1.3 | | 1.1 | 2.6 | | 0.9 | | |
| | | | 0/15 | 1.5 | | 15 | 3.6 | | 3.0 | 6.8 | | 2.4 | | |
| I _{IH} , I _{IL} | Input Leakage Current | HCC Types | 0/18 | Any Input | | 18 | | \pm 0.1 | | \pm 10 ⁻⁵ | \pm 0.1 | | \pm 1 | |
| | | HCF Types | 0/15 | Any Input | | 15 | | \pm 0.3 | | \pm 10 ⁻⁵ | \pm 0.3 | | \pm 1 | |
| C _I | Input Capacitance | | | Any Input | | | | | 5 | 7.5 | | | pF | |

* T_{Low} = - 55°C for HCC device : - 40°C for HCF device.

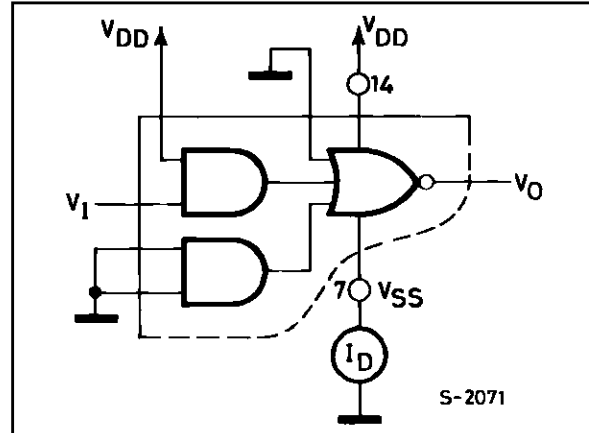
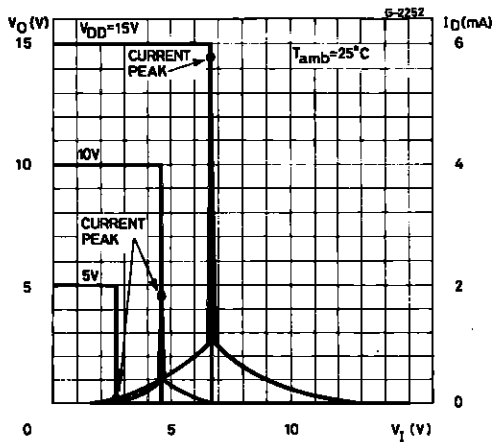
* T_{High} = + 125°C for HCC device : + 85°C for HCF device.

The Noise Margin for both "1" and "0" level is :1V min. with V_{DD} = 5V, 2V min. with V_{DD} = 10V, 2.5min. with V_{DD} = 15V.

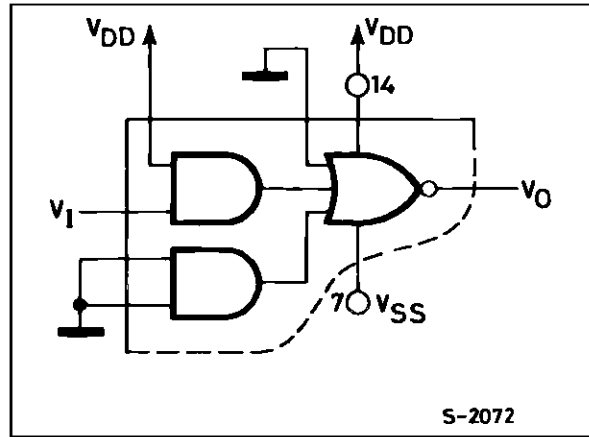
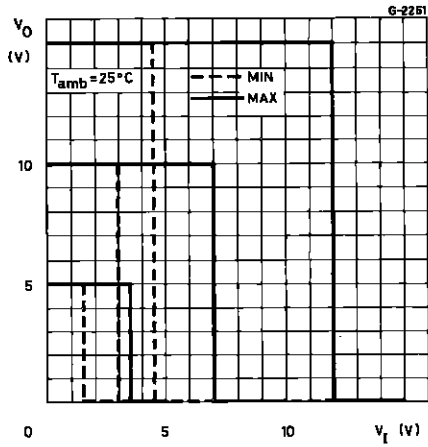
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, $C_L = 50\text{pF}$, $R_L = 200\text{k}\Omega$, typical temperature coefficient for all $V_{DD} = 0.3\%/^{\circ}\text{C}$ values, all input rise and fall time = 20ns)

| Symbol | Parameter | Test Conditions | | Value | | | Unit |
|--------------------|----------------------------------|-----------------|--------------|-------|------|------|------|
| | | | V_{DD} (V) | Min. | Typ. | Max. | |
| t_{PHL} | Propagation Delay Time (data) | | 5 | | 225 | 450 | ns |
| | | | 10 | | 90 | 180 | |
| | | | 15 | | 65 | 130 | |
| t_{PLH} | Propagation Delay Time (data) | | 5 | | 310 | 620 | ns |
| | | | 10 | | 125 | 250 | |
| | | | 15 | | 90 | 180 | |
| t_{PHL} | Propagation Delay Time (inhibit) | | 5 | | 150 | 300 | ns |
| | | | 10 | | 60 | 120 | |
| | | | 15 | | 40 | 80 | |
| t_{PLH} | Propagation Delay Time (inhibit) | | 5 | | 250 | 500 | ns |
| | | | 10 | | 100 | 200 | |
| | | | 15 | | 70 | 140 | |
| t_{TLH}, t_{THL} | Transition Time | | 5 | | 100 | 200 | ns |
| | | | 10 | | 50 | 100 | |
| | | | 15 | | 40 | 80 | |

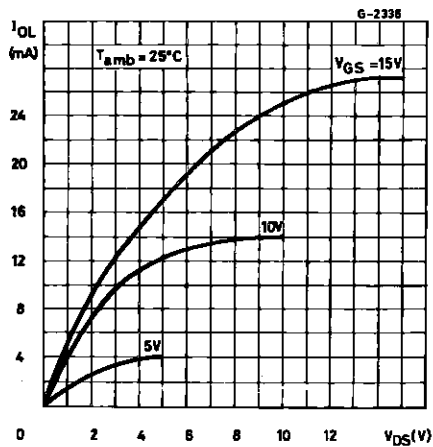
Typical Voltage and Current Transfer Characteristics with Test Circuit.



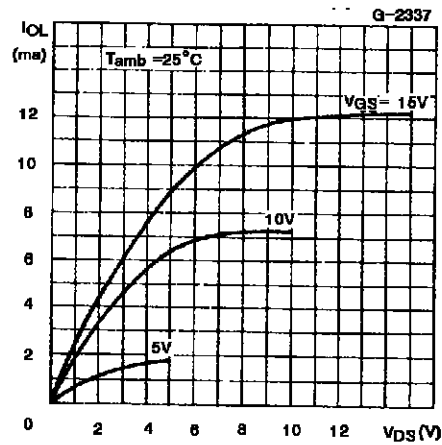
Minimum and Maximum Voltage Transfer Characteristics with Test Circuit.



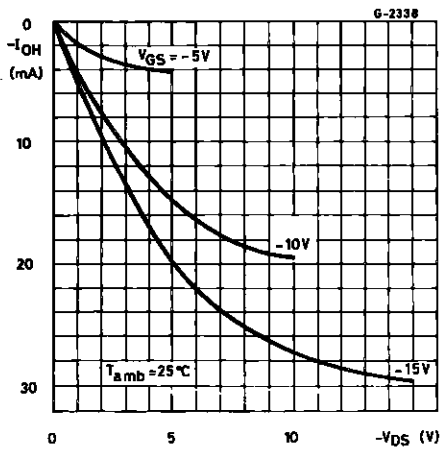
Typical Output Low (sink) Current Characteristics.



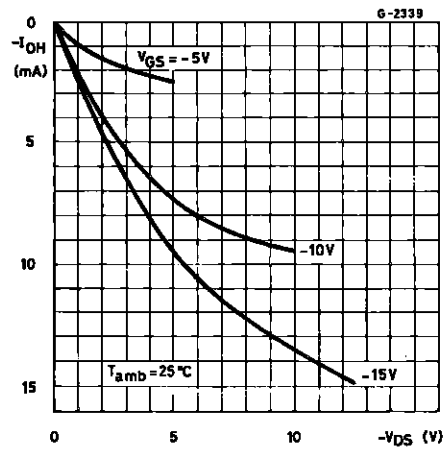
Minimum Output Low (sink) Current Characteristics.



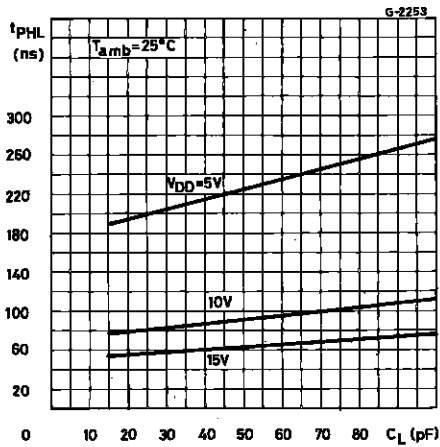
Typical Output High (source) Current Characteristics.



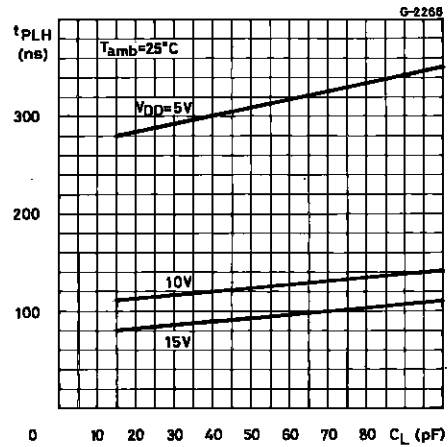
Minimum Output High (source) Current Characteristics.



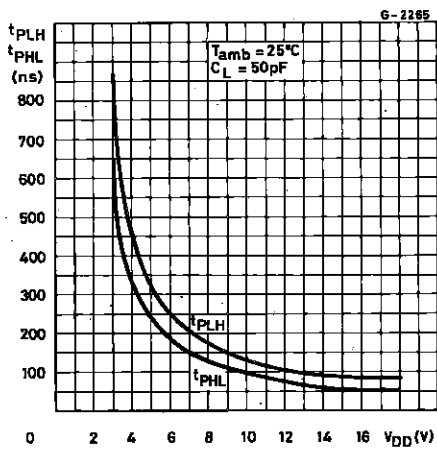
Typical Data High-to-low Level Propagation Delay Time vs. Load Capacitance.



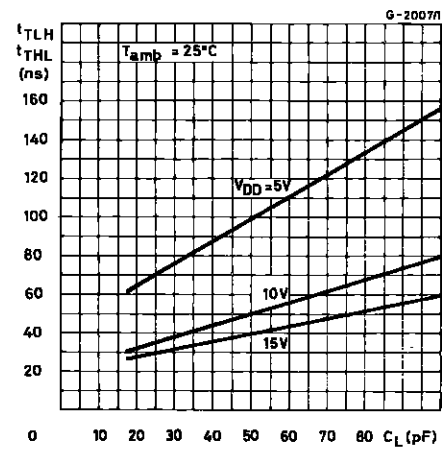
Typical Data Low-to-high Level Propagation Delay Time vs. Load Capacitance.



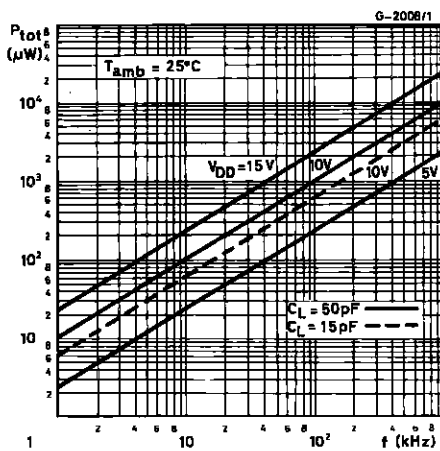
Typical Data Propagation Delay Time vs. Supply Voltage.



Typical Transition Time vs. Load Capacitance.

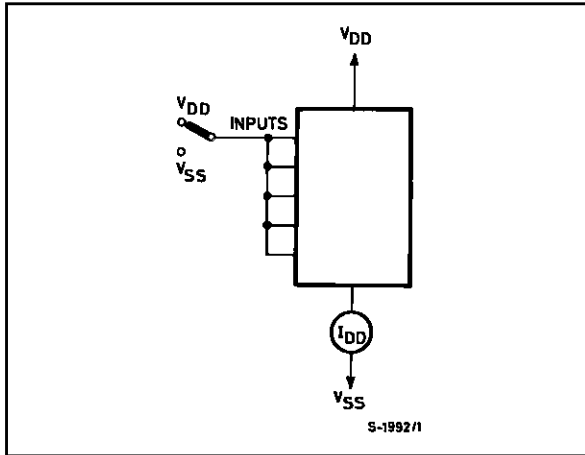


Typical Power Dissipation vs. Frequency.

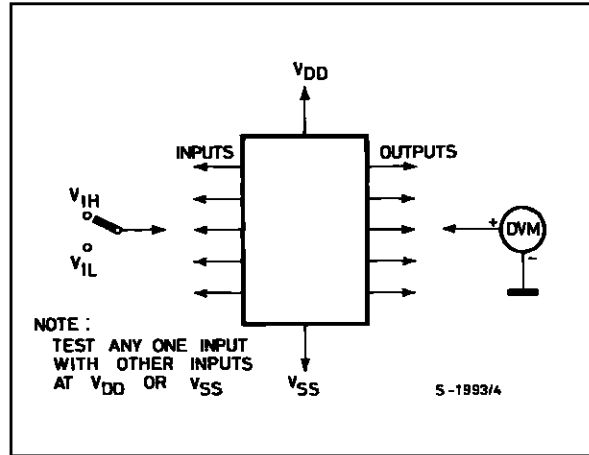


TEST CIRCUITS

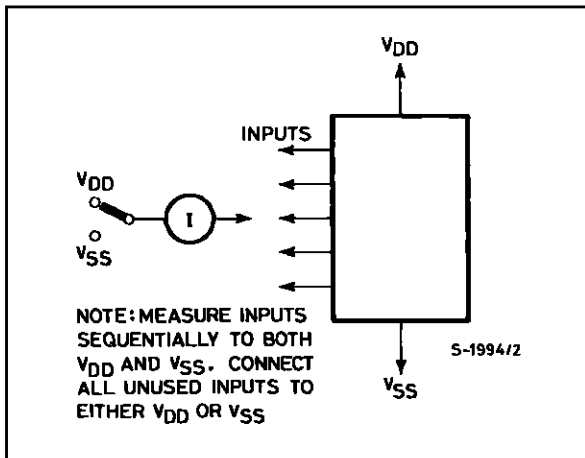
Quiescent Device Current



Input Voltage.

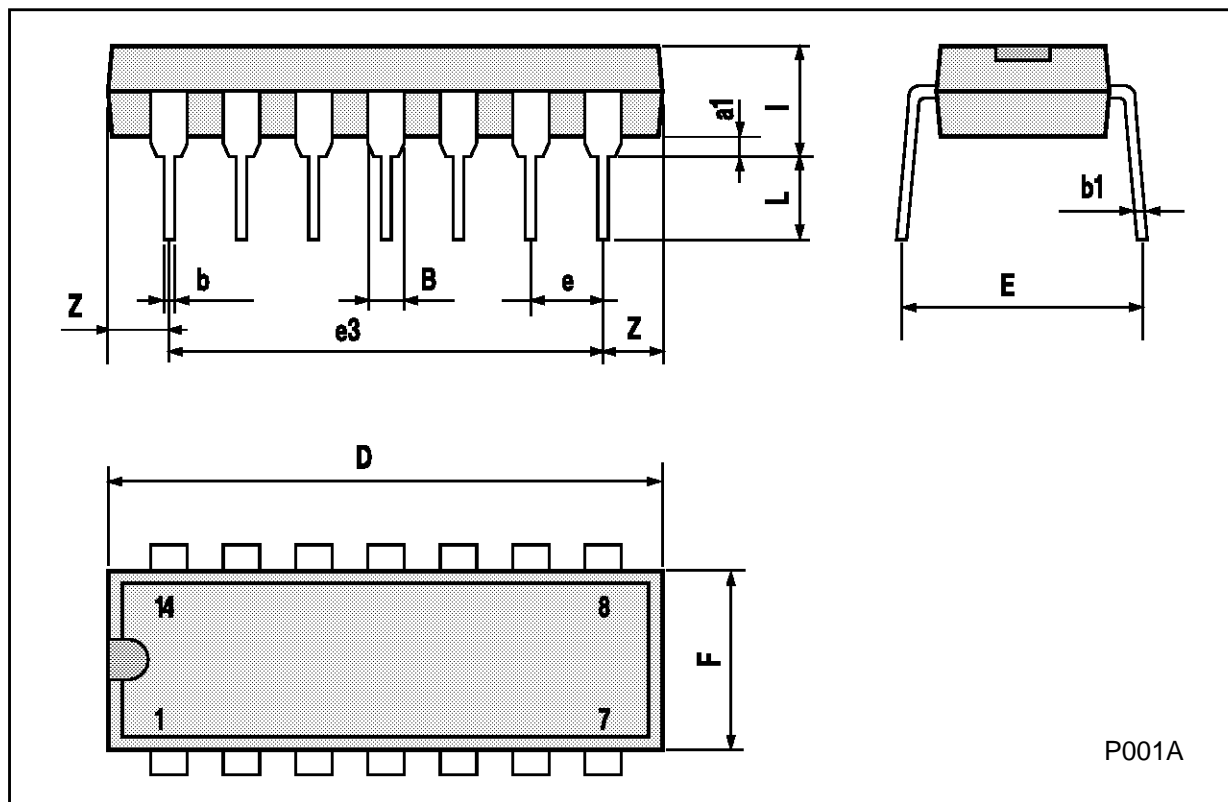


Input Current.



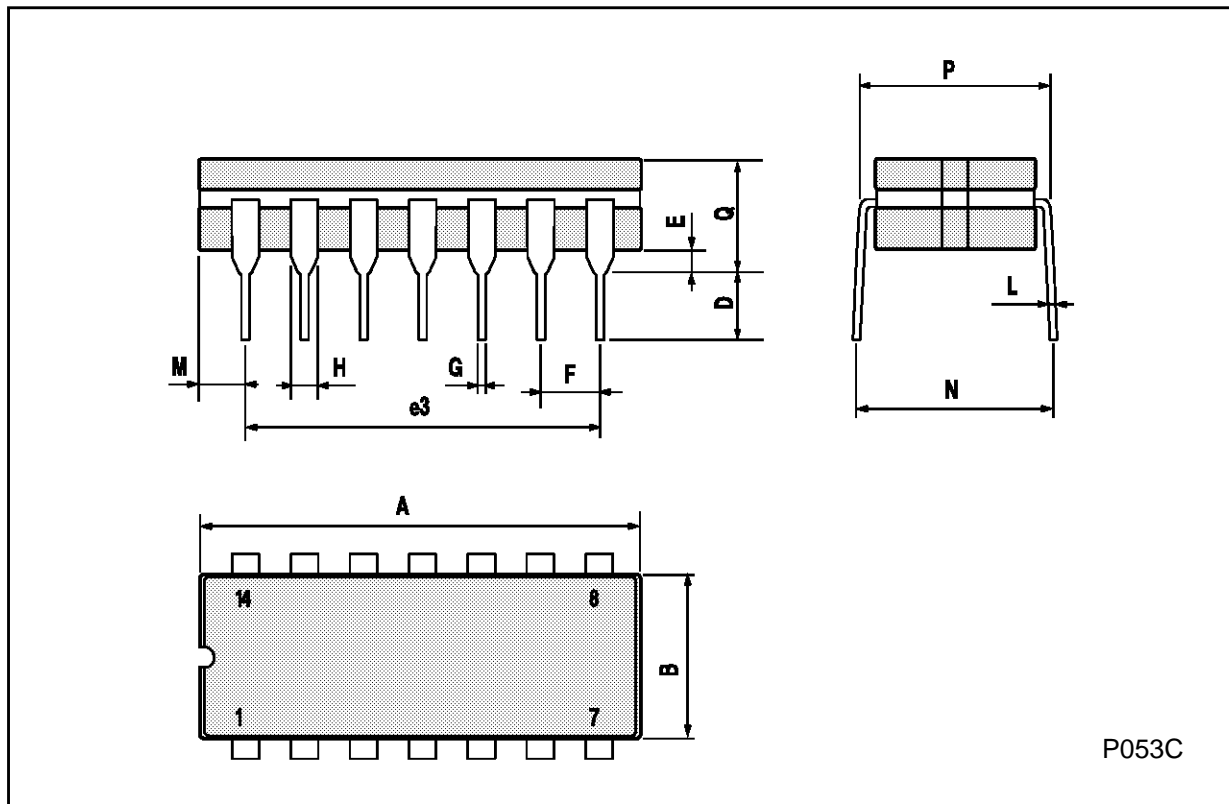
Plastic DIP14 MECHANICAL DATA

| 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 |



Ceramic DIP14/1 MECHANICAL DATA

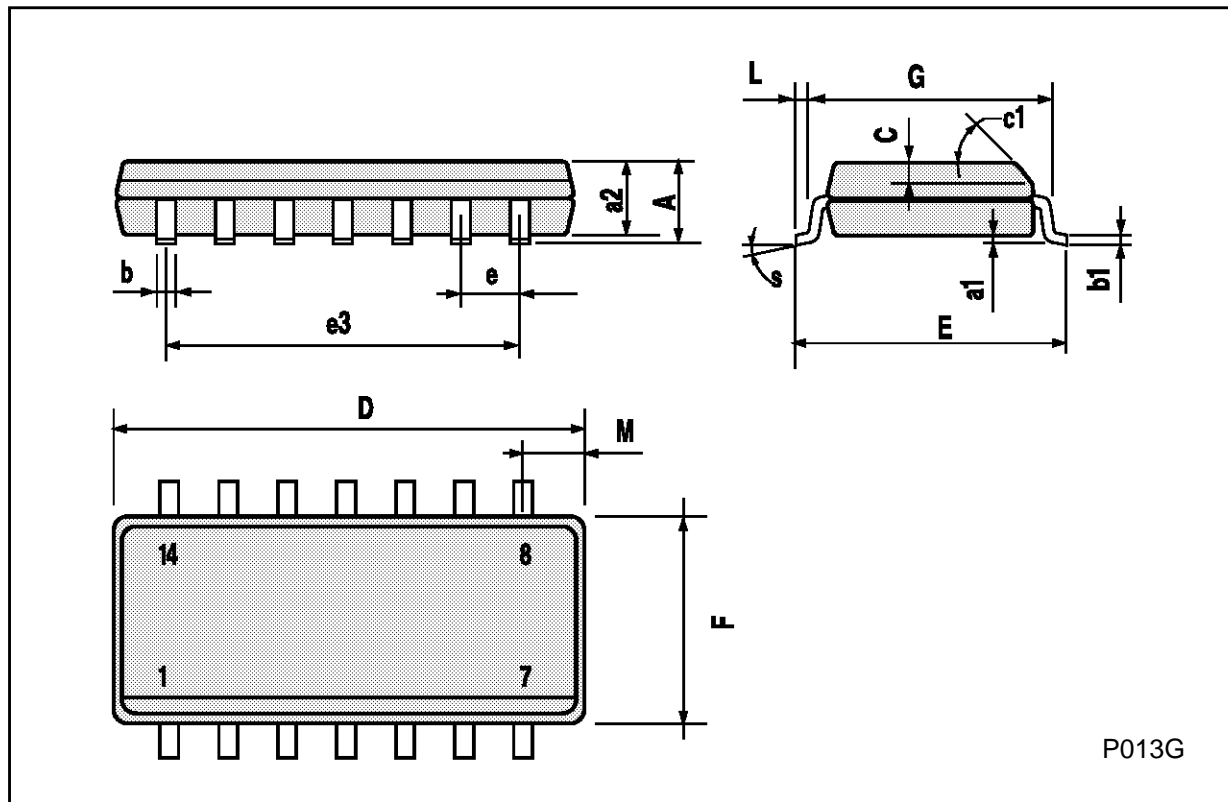
| DIM. | mm | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 20 | | | 0.787 |
| B | | | 7.0 | | | 0.276 |
| D | | 3.3 | | | 0.130 | |
| E | 0.38 | | | 0.015 | | |
| e3 | | 15.24 | | | 0.600 | |
| F | 2.29 | | 2.79 | 0.090 | | 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 | 1.52 | | 2.54 | 0.060 | | 0.100 |
| N | | | 10.3 | | | 0.406 |
| P | 7.8 | | 8.05 | 0.307 | | 0.317 |
| Q | | | 5.08 | | | 0.200 |



P053C

SO14 MECHANICAL DATA

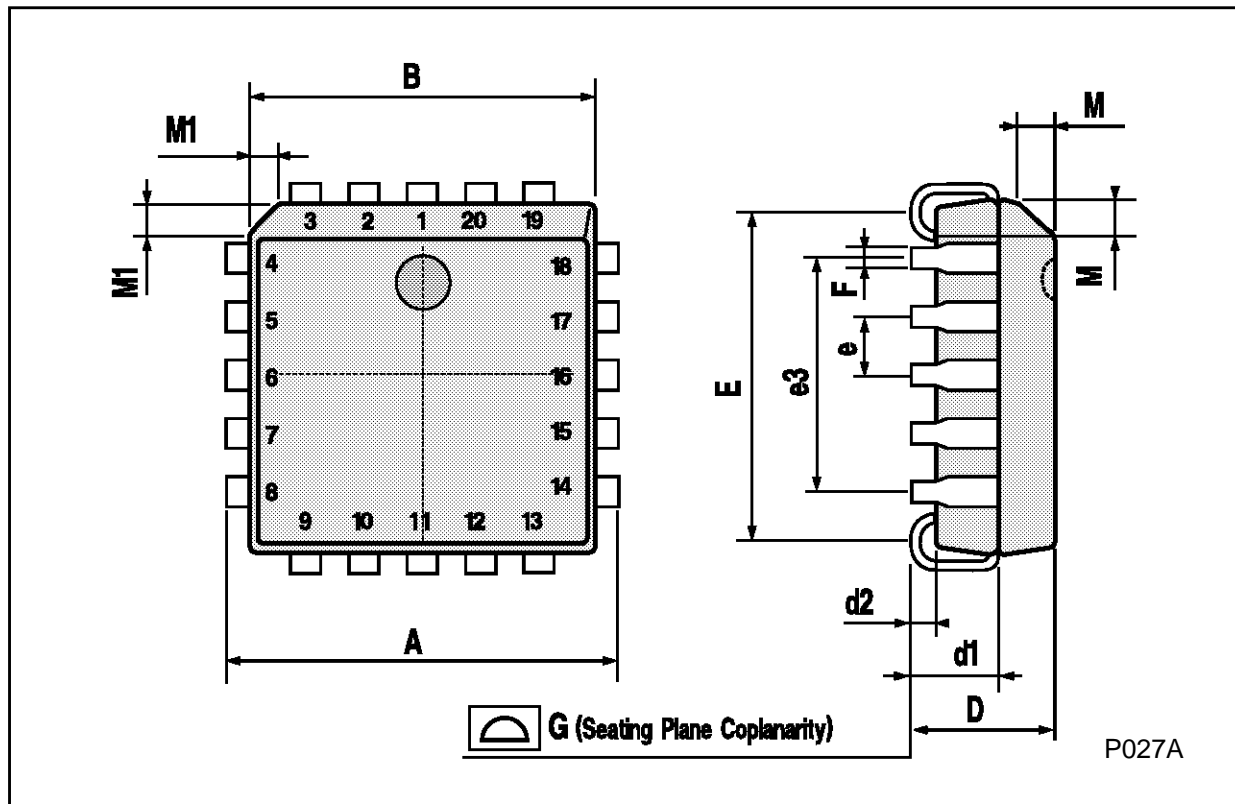
| DIM. | mm | | | inch | | |
|------|------------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.003 | | 0.007 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 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.) | | | | | |



P013G

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 | |



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics 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 SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A