



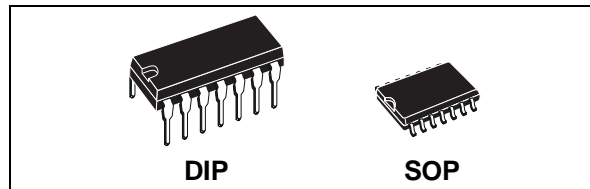
HCF4503

HEX BUFFER

- 1 TTL-LOAD OUTPUT DRIVE CAPABILITY
- 2 OUTPUT-DISABLE CONTROLS
- 3 STATE OUTPUTS
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- QUIESCENT CURRENT SPECIFIED UP TO 15V
- INPUT CURRENT OF 300nA AT 15V AND 25°C
- 100% TESTED FOR QUIESCENT CURRENT MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD N⁰. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

DESCRIPTION

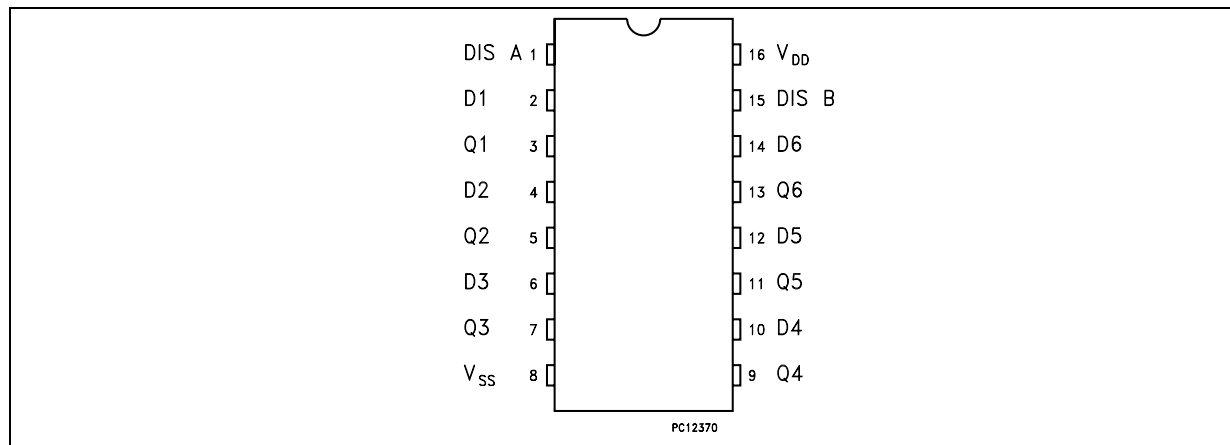
The HCF4503B is a monolithic integrated circuits, available in 16-lead dual in-line plastic package and plastic micro package.



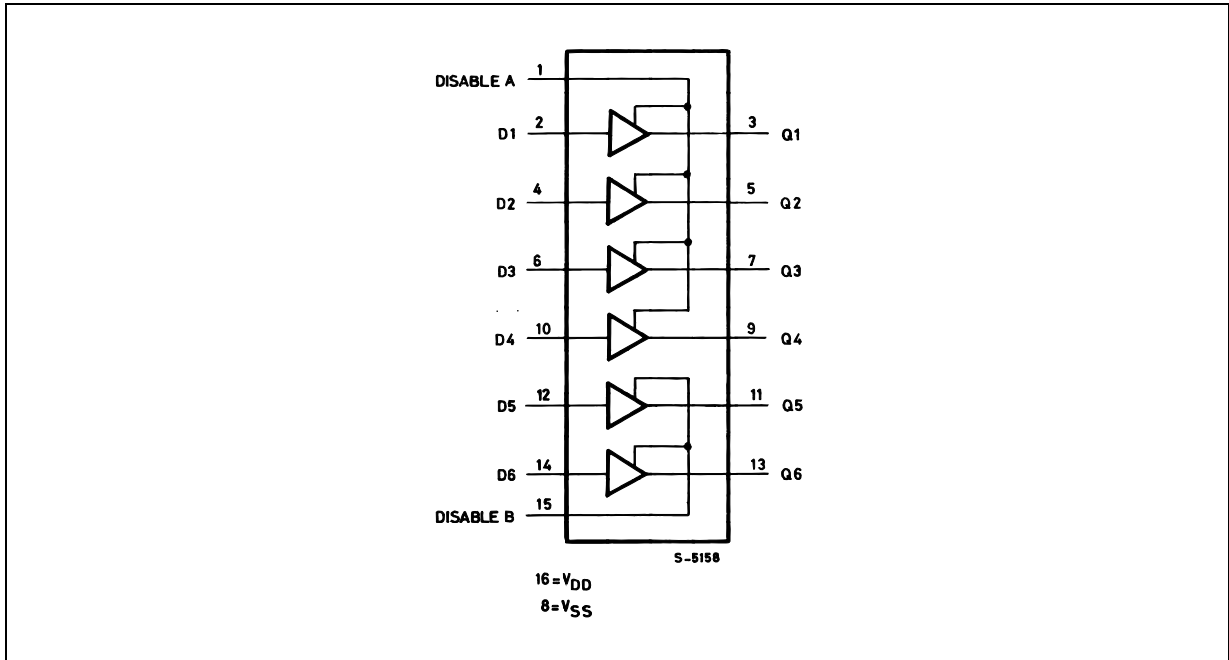
| ORDER CODES | | |
|-------------|------------|---------------|
| PACKAGE | TUBE | T & R |
| DIP | HCF4503BEY | |
| SOP | HCF4503BM1 | HCF4503M013TR |

The HCF4503B is a hex noninverting buffer with 3-state outputs having high sink and source-current capability. Two disable controls are provided, one of which controls four buffers and the other controls the remaining two buffers.

PIN CONNECTION



FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATING

| Symbol | Parameter | Value | Unit |
|-------------------|--|-------------------------------|------|
| V _{DD} * | Supply Voltage | -0.5 to +18 | 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) | 200 | mW |
| | Dissipation per Output Transistor for T _{op} = Full Package Temperature Range | 100 | mW |
| T _{op} | Operating Temperature | -40 to +85 | °C |
| T _{stg} | Storage Temperature | -65 to +150 | °C |

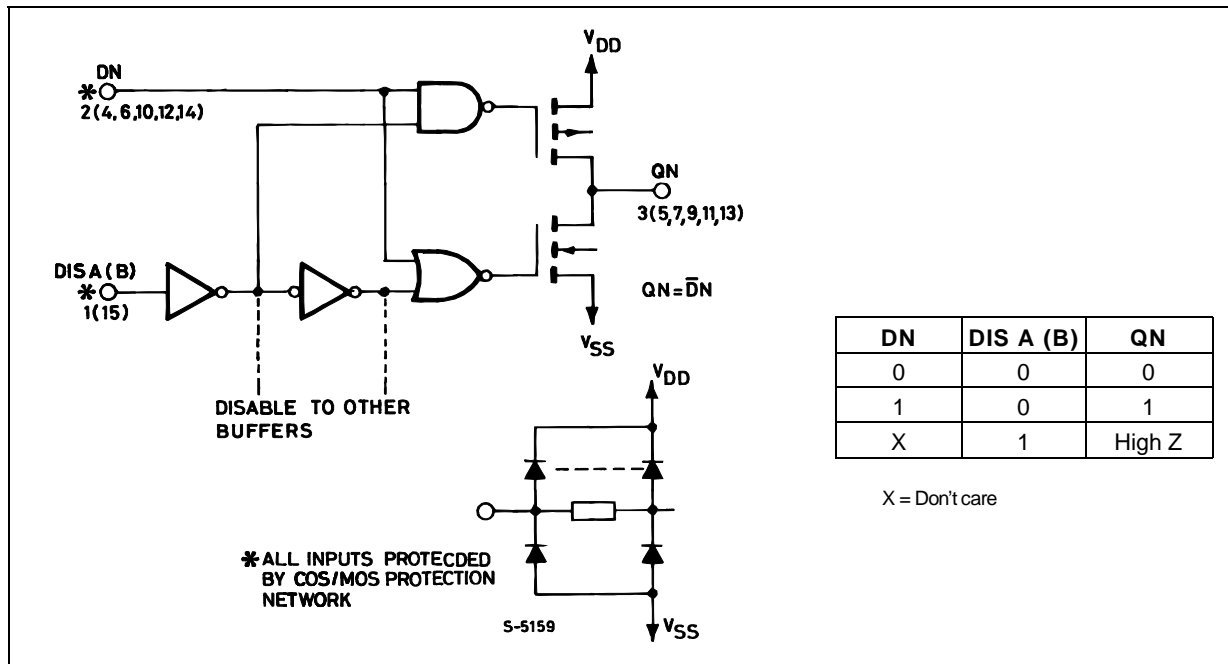
Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure 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 | 3 to 15 | V |
| V _I | Input Voltage | 0 to V _{DD} | V |
| T _{op} | Operating Temperature | -40 to +85 | °C |

LOGIC DIAGRAM AND TRUTH TABLE



STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

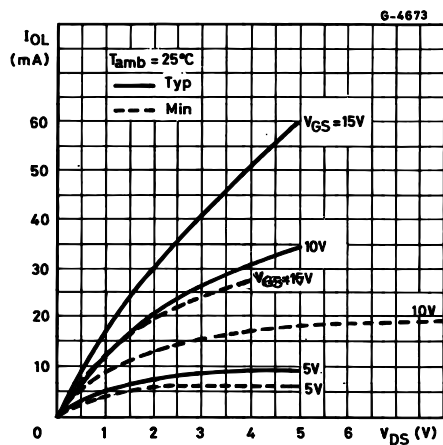
| Symbol | Parameter | Test Conditions | | | | Value | | | | | | Unit | |
|-----------------------------------|--------------------------------|-----------------------|-----------------------|--------------------------------|------------------------|--------|-----------|-------|---------------|-----------|-------|-----------|---------|
| | | V _I (V) | V _O (V) | I _o (μ A) | V _{DD} (V) | -40 °C | | 25 °C | | | 85 °C | | |
| | | | | | | Min. | Max. | Min. | Typ. | Max. | Min. | | Max. |
| I _L | Quiescent Current | 0/5 | | | 5 | | 4 | | 0.02 | 4 | | 30 | μ A |
| | | 0/10 | | | 10 | | 8 | | 0.02 | 8 | | 60 | |
| | | 0/15 | | | 15 | | 16 | | 0.02 | 16 | | 120 | |
| V _{OH} | Output High 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 _{OL} | Output Low 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 _{IH} | Input High 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 _{IL} | Input Low 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 _{OH} | Output Drive Current | 0/5 | 2.5 | | 5 | -4.8 | | -4.1 | -5.2 | | -2.9 | | mA |
| | | 0/5 | 4.6 | | 5 | -1 | | -0.8 | -1.6 | | -0.6 | | |
| | | 0/10 | 9.5 | | 10 | -2.5 | | -2.2 | -3.1 | | -1.6 | | |
| | | 0/15 | 13.5 | | 15 | -6.8 | | -5.8 | -11.9 | | -4.2 | | |
| I _{OL} | Output Sink Current | 0/5 | 0.4 | | 5 | 2.1 | | 1.8 | 1.9 | | 1.2 | | mA |
| | | 0/10 | 0.5 | | 10 | 5.4 | | 4.7 | 5.3 | | 3.3 | | |
| | | 0/15 | 1.5 | | 15 | 16 | | 13.7 | 19.5 | | 9.7 | | |
| I _{IH} , I _{IL} | Input Leakage Current | 0/15 | Any Input | | 15 | | ± 0.3 | | $\pm 10^{-5}$ | ± 0.3 | | ± 1 | μ A |
| I _{OZ} | 3-state Output Leakage Current | 0/15 | Any Input | | 15 | | ± 1.0 | | $\pm 10^{-4}$ | ± 1.0 | | ± 7.5 | μ A |
| C _I | Input Capacitance | | Any Input | | | | | | 5 | 7.5 | | | pF |

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

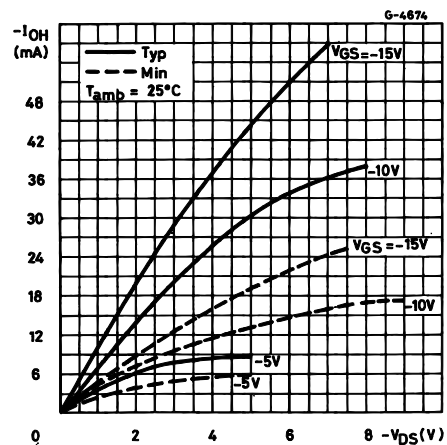
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ K}\Omega$, typical temperature coefficient for all V_{DD} values is $03\text{ }^{\circ}\text{C}$, all input rise and fall times = 20 ns)

| Symbol | Parameter | Test Conditions | Value | | | Unit | |
|------------------------|--------------------------------|-----------------|--------------|------|------|------|------|
| | | | V_{DD} (V) | Min. | Typ. | | Max. |
| t_{PLH} | Propagation Delay Time | | 5 | | 75 | 150 | ns |
| | | | 10 | | 35 | 70 | |
| | | | 15 | | 25 | 50 | |
| t_{PHL} | Propagation Delay Time | | 5 | | 55 | 110 | ns |
| | | | 10 | | 25 | 50 | |
| | | | 15 | | 17 | 35 | |
| t_{PHZ} t_{PZH} | 3-State Propagation Delay Time | | 5 | | 70 | 140 | ns |
| | | | 10 | | 30 | 60 | |
| | | | 15 | | 25 | 50 | |
| t_{PZL} t_{PLZ} | 3-State Propagation Delay Time | | 5 | | 90 | 180 | ns |
| | | | 10 | | 40 | 80 | |
| | | | 15 | | 35 | 70 | |
| t_{TLH} | Transition Time | | 5 | | 50 | 90 | ns |
| | | | 10 | | 30 | 45 | |
| | | | 15 | | 25 | 35 | |
| t_{THL} | Transition Time | | 5 | | 35 | 70 | ns |
| | | | 10 | | 20 | 40 | |
| | | | 15 | | 13 | 25 | |

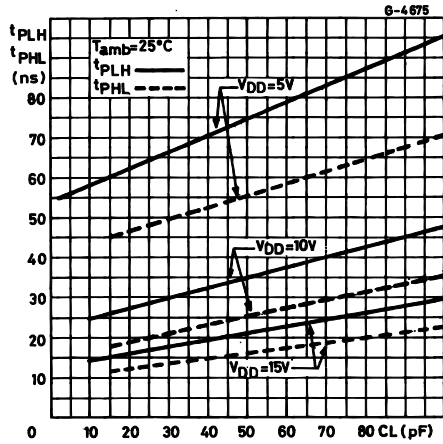
N-Channel Output Low (sink) Current Characteristics.



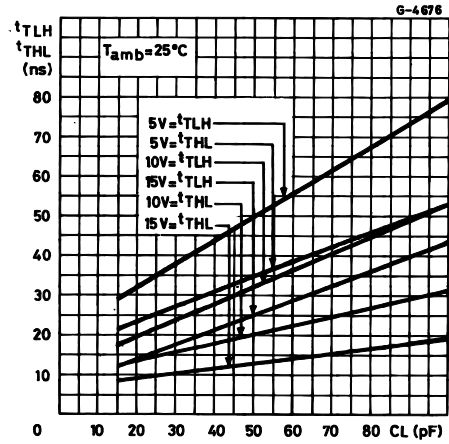
P-Channel Output High (source) Current Characteristics.



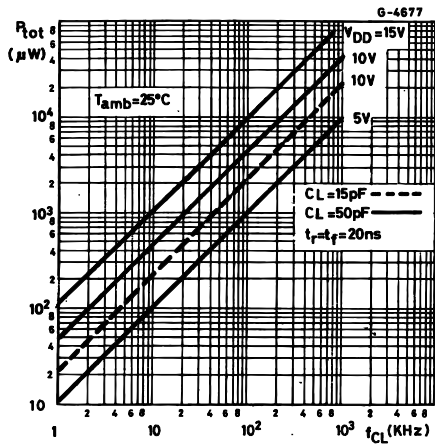
Typical Propagation Delay Time vs. Load Capacitance.



Typical Transition Time vs. Load Capacitance.

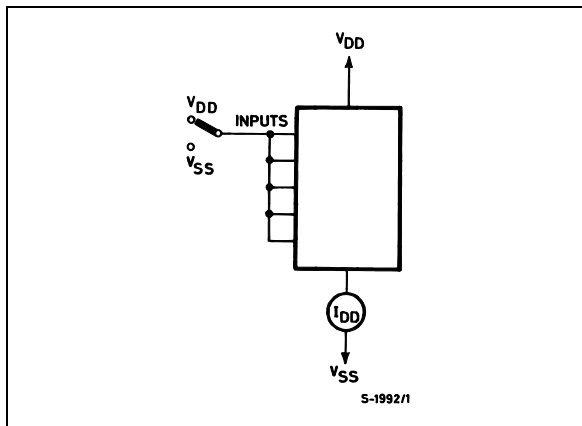


Typical Dynamic Power Dissipation vs.

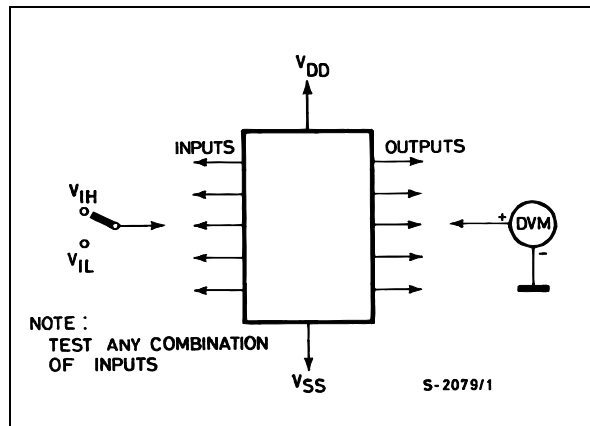


TEST CIRCUITS

Quiescent Device Current.

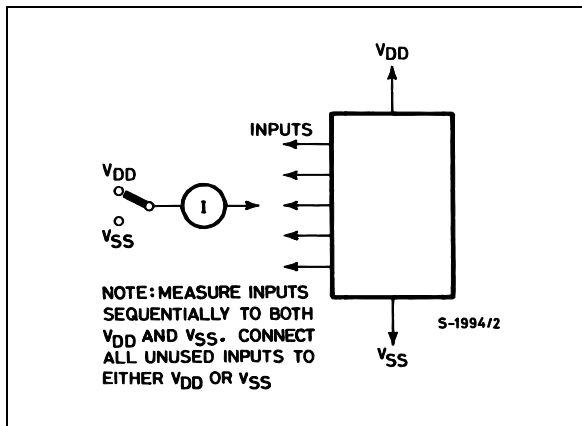


Input Voltage.

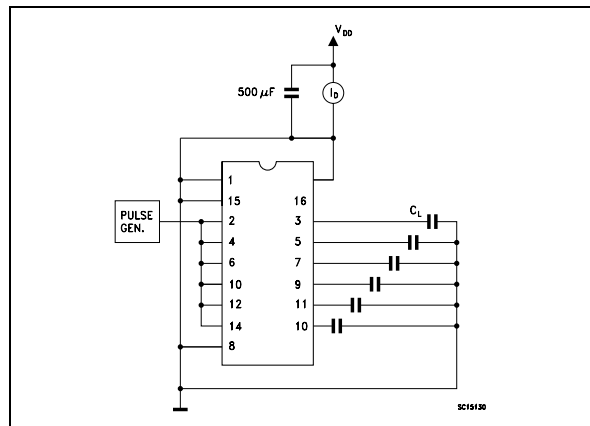


TEST CIRCUIT (continued)

Input Leakage Current.

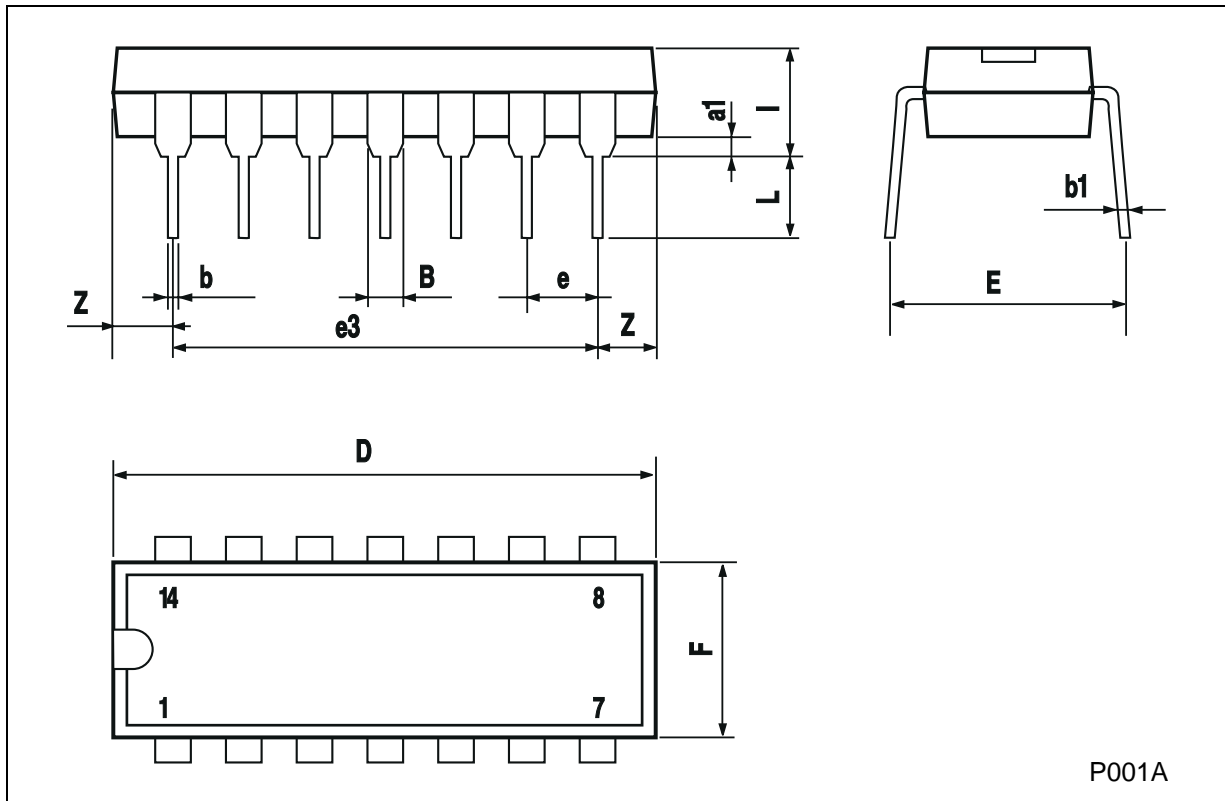


Dynamic Power Dissipation.



Plastic DIP-14 MECHANICAL DATA

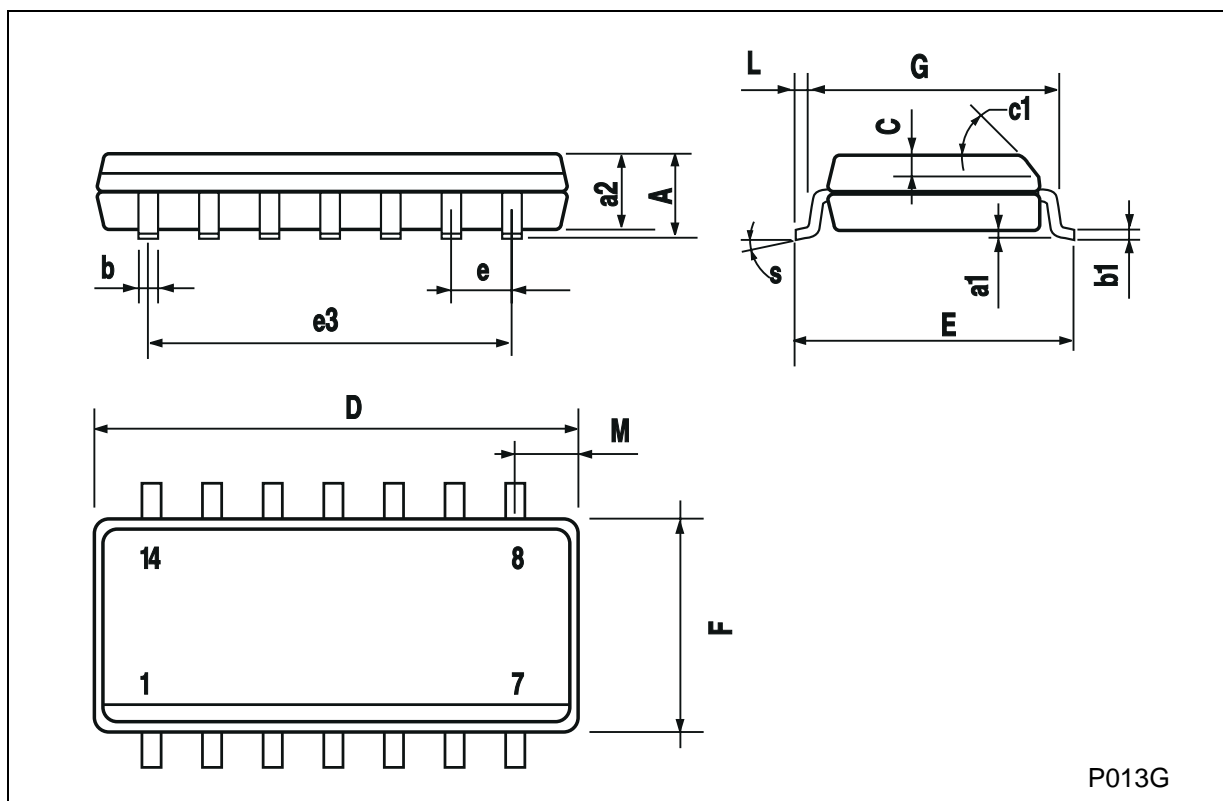
| DIM. | mm | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 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 |



P001A

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.) | | | | | |



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