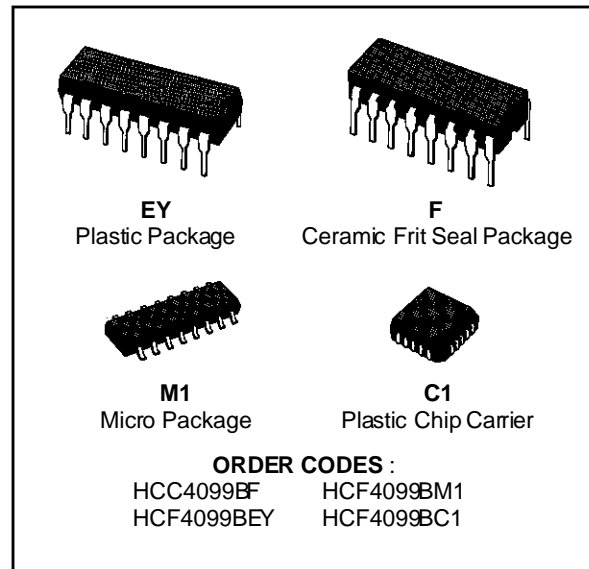


8-BIT ADDRESSABLE LATCH

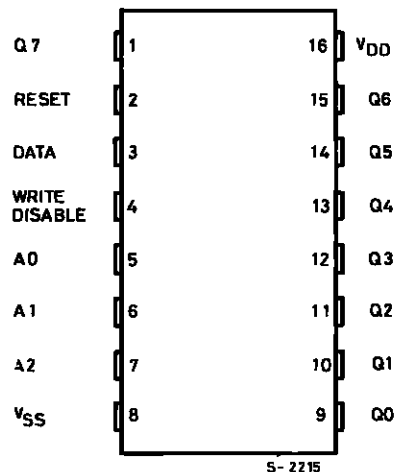
- SERIAL DATA INPUT - ACTIVE PARALLEL OUTPUT
- STORAGE REGISTER CAPABILITY - MASTER CLEAR
- CAN FUNCTION AS DEMULTIPLEXER
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C 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"



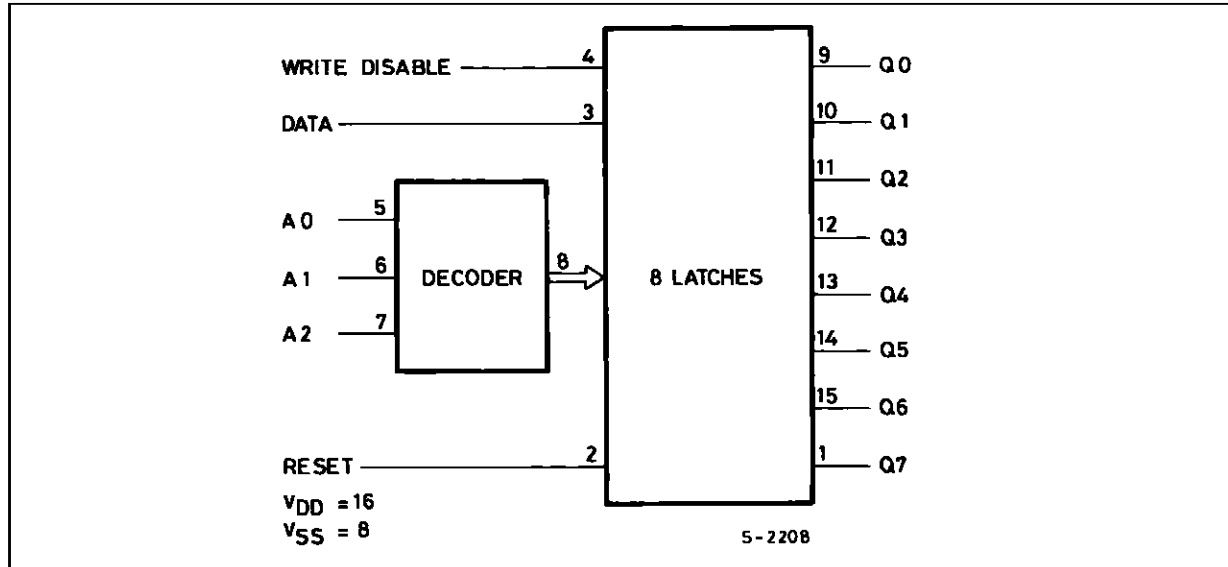
DESCRIPTION

The **HCC4099B** (extended temperature range) and **HCF4099B** (intermediate temperature range) are monolithic integrated circuits, available in 16-lead dual in-line plastic or ceramic package and plastic micro package. The HCC/HCF4099B 8-bit addressable latch is a serial-input, parallel-output storage register that can perform a variety of functions. Data are inputted to a particular bit in the latch when that bit is addressed (by means of inputs A0, A1, A2) and when WRITE DISABLE is at a low level. When WRITE DISABLE is high, data entry is inhibited ; however, all 8 outputs can be continuously read independent of WRITE DISABLE and address inputs. A master RESET input is available, which resets all bits to a logic "0" level when RESET and WRITE DISABLE are at a high level. When RESET is at a high level, and WRITE DISABLE is at a low level, the latch acts as a 1-of-8 demultiplexer ; the bit that is addressed has an active output which follows the data input, while all unaddressed bits are held to a logic "0" level.

PIN CONNECTIONS



FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-------------------|---|--------------------------------|------|
| V _{DD} * | Supply Voltage : HCC Types | - 0.5 to + 20 | V |
| | HCF Types | - 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 : HCC Types | - 55 to + 125 | °C |
| | HCF Types | - 40 to + 85 | °C |
| T _{stg} | Storage Temperature | - 65 to + 150 | °C |

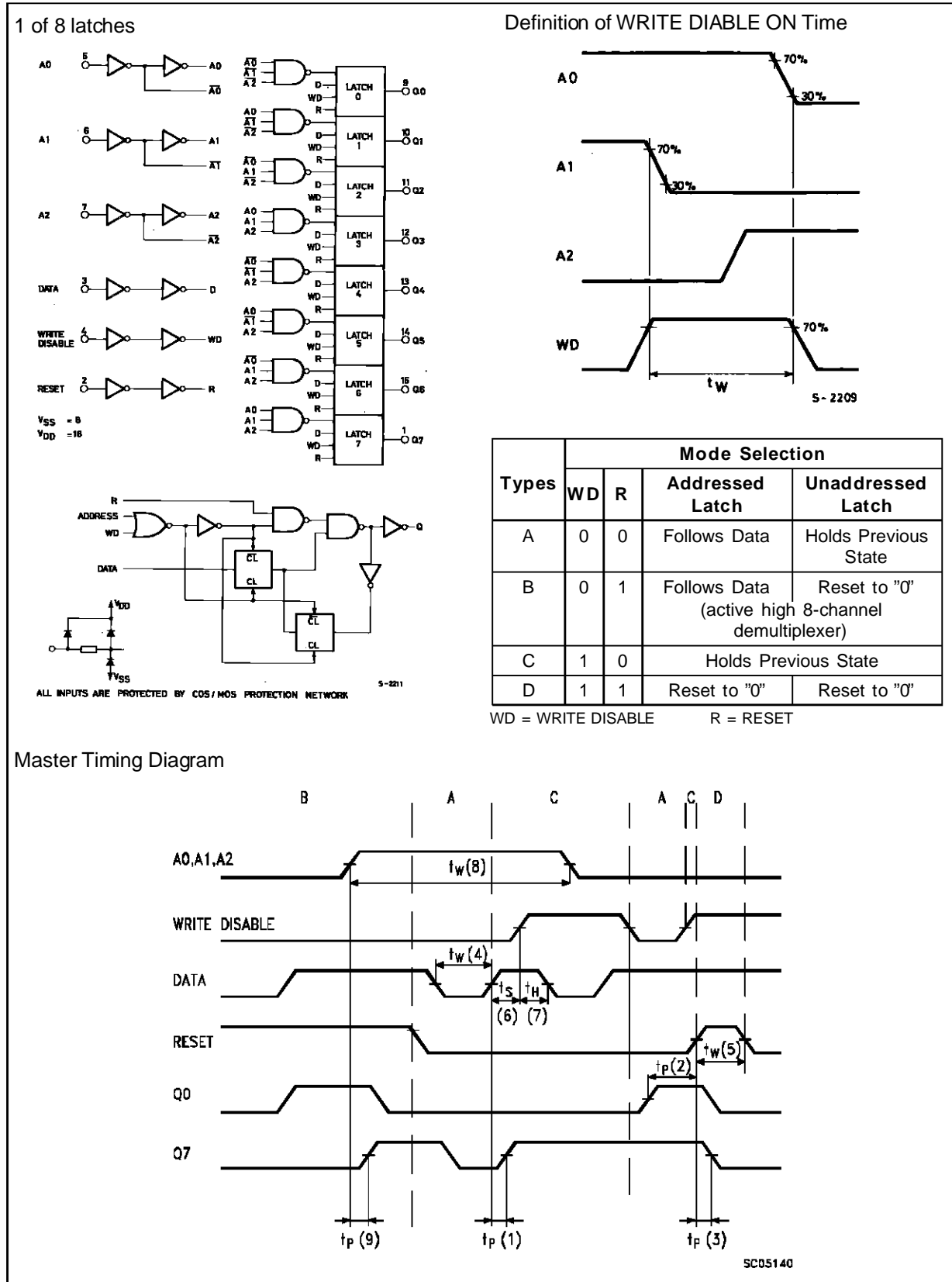
Stresses above listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute 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 : HCC Types | 3 to 18 | V |
| | HCF Types | 3 to 15 | V |
| V _I | Input Voltage | 0 to V _{DD} | V |
| T _{op} | Operating Temperature : HCC Types | - 55 to + 125 | °C |
| | HCF Types | - 40 to + 85 | °C |

LOGIC 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 | | 5 | | 0.04 | 5 | | 150 | μ A |
| | | | 0/10 | | | 10 | | 10 | | 0.04 | 10 | | 300 | |
| | | | 0/15 | | | 15 | | 20 | | 0.04 | 20 | | 600 | |
| | | | 0/20 | | | 20 | | 100 | | 0.08 | 100 | | 3000 | |
| | | HCF Types | 0/ 5 | | | 5 | | 20 | | 0.04 | 20 | | 150 | |
| | | | 0/10 | | | 10 | | 40 | | 0.04 | 40 | | 300 | |
| | | | 0/15 | | | 15 | | 80 | | 0.04 | 80 | | 600 | |
| 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 | HCC Types | 0/ 5 | 2.5 | | 5 | - 2 | | - 1.6 | - 3.2 | | - 1.15 | | mA |
| | | | 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 | mA | |
| | | | 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 | μ A |
| | | 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.

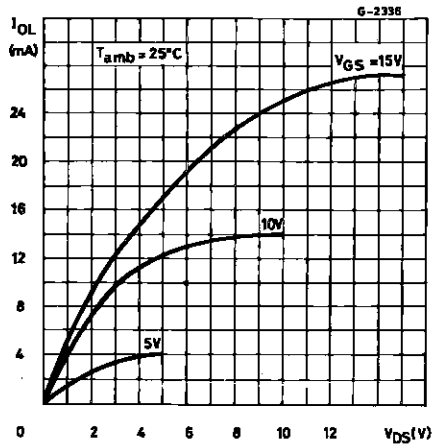
* T_{HIGH} = + 125°C for HCC device : + 85°C for HCF device.

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

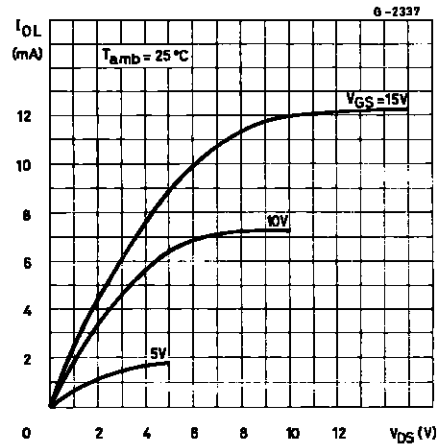
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, $C_L = 50\text{pF}$, $R_L = 200\text{k}\Omega$, typical temperature coefficient for all V_{DD} values is $0.3\%/^{\circ}\text{C}$, all input rise and fall times = 20ns)

| Symbol | Parameter | | Test Conditions (see master timing diagram) | Value | | | Unit | |
|-----------------------|------------------------|-------------------------|--|--------------|------|------|------|------|
| | | | | V_{DD} (V) | Min. | Typ. | | Max. |
| t_{PLH} , t_{PHL} | Propagation Delay Time | Data to Output | (1) | 5 | | 200 | 400 | ns |
| | | | | 10 | | 75 | 150 | |
| | | | | 15 | | 50 | 100 | |
| | | Write Disable to Output | (2) | 5 | | 200 | 400 | |
| | | | | 10 | | 80 | 160 | |
| | | | | 15 | | 60 | 120 | |
| | | Address to Output | (9) | 5 | | 225 | 450 | |
| | | | | 10 | | 100 | 200 | |
| | | | | 15 | | 75 | 150 | |
| t_{PHL} | Propagation Delay Time | Reset to Output | (3) | 5 | | 175 | 350 | ns |
| | | | | 10 | | 80 | 160 | |
| | | | | 15 | | 65 | 130 | |
| t_{THL} , t_{TLH} | Transition Time | Any Output | | 5 | | 100 | 200 | ns |
| | | | | 10 | | 50 | 100 | |
| | | | | 15 | | 40 | 80 | |
| t_w | Pulse Width | Data | (4) | 5 | 200 | 100 | | ns |
| | | | | 10 | 100 | 50 | | |
| | | | | 15 | 80 | 40 | | |
| | | Address | (8) | 5 | 400 | 200 | | |
| | | | | 10 | 200 | 100 | | |
| | | | | 15 | 125 | 65 | | |
| | | Reset | (5) | 5 | 150 | 75 | | |
| | | | | 10 | 75 | 40 | | |
| | | | | 15 | 50 | 25 | | |
| t_{setup} | Setup Time | Data to Write Disable | (6) | 5 | 100 | 50 | | ns |
| | | | | 10 | 50 | 25 | | |
| | | | | 15 | 35 | 20 | | |
| t_{hold} | Hold Time | Data to Write Disable | (7) | 5 | 150 | 75 | | ns |
| | | | | 10 | 75 | 40 | | |
| | | | | 15 | 50 | 25 | | |

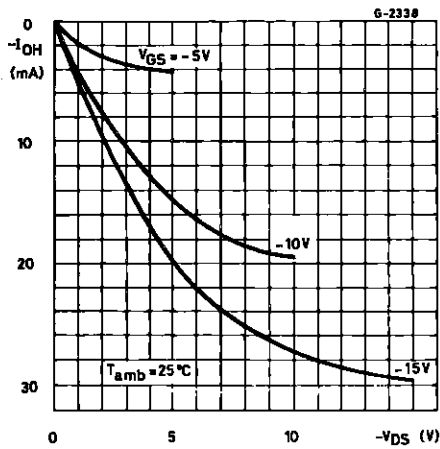
Typical Output Low (sink) Current Characteristics.



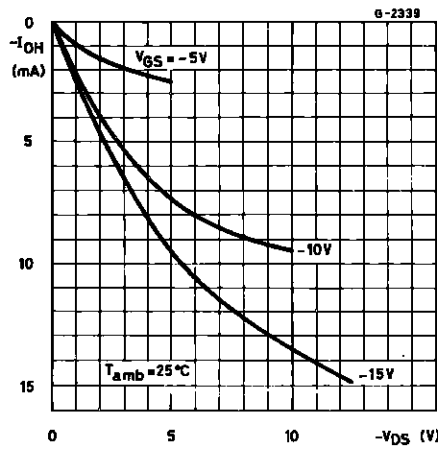
Minimum Output Low (sink) Current Characteristics.



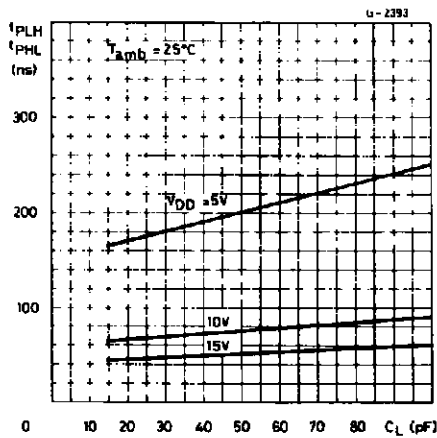
Typical Output High (source) Current Characteristics.



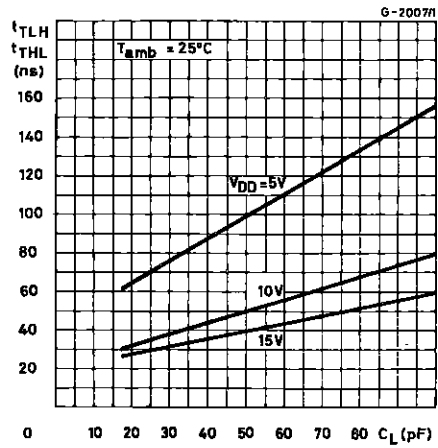
Minimum Output High (source) Current Characteristics.



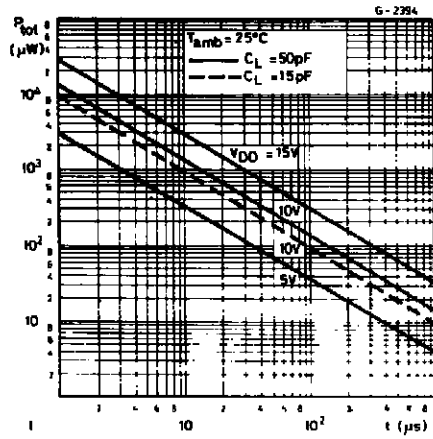
Typical Propagation Delay Time (data to Qn) vs. Load Capacitance.



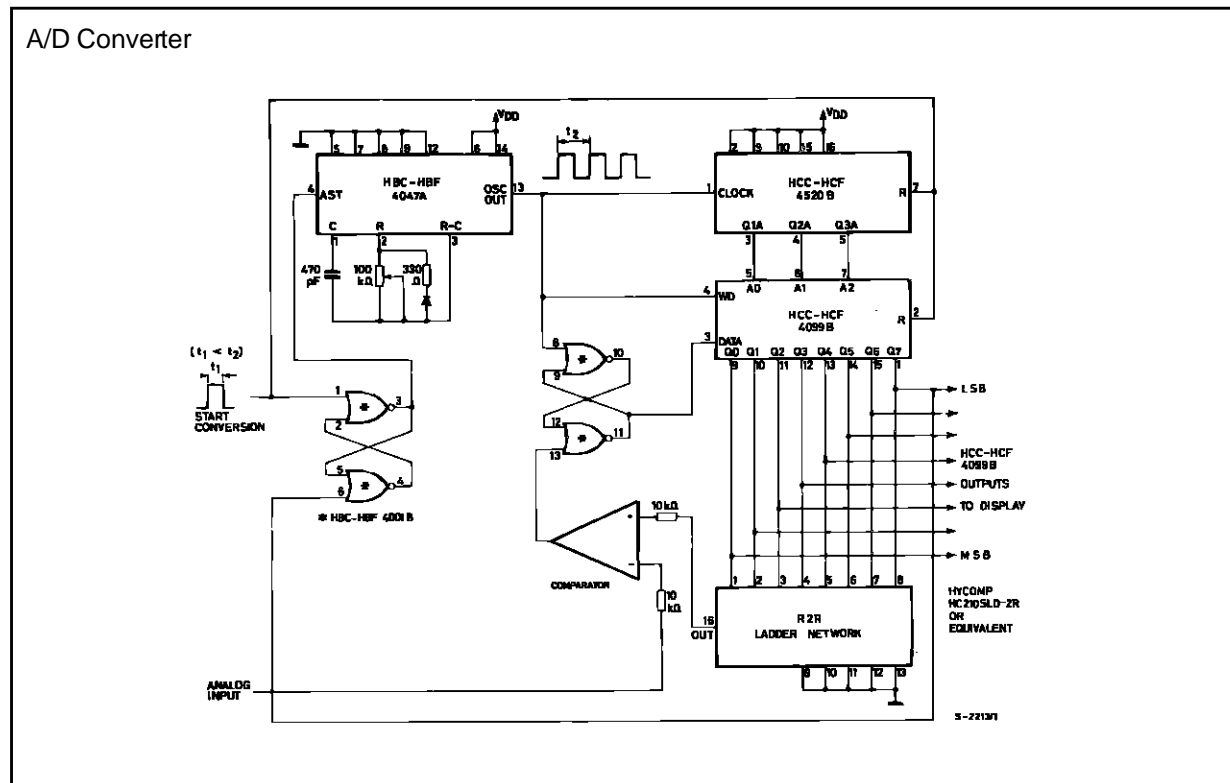
Typical Transition Time vs. Load Capacitance.



Typical Dynamic power Dissipation vs. Address Cycle Time.

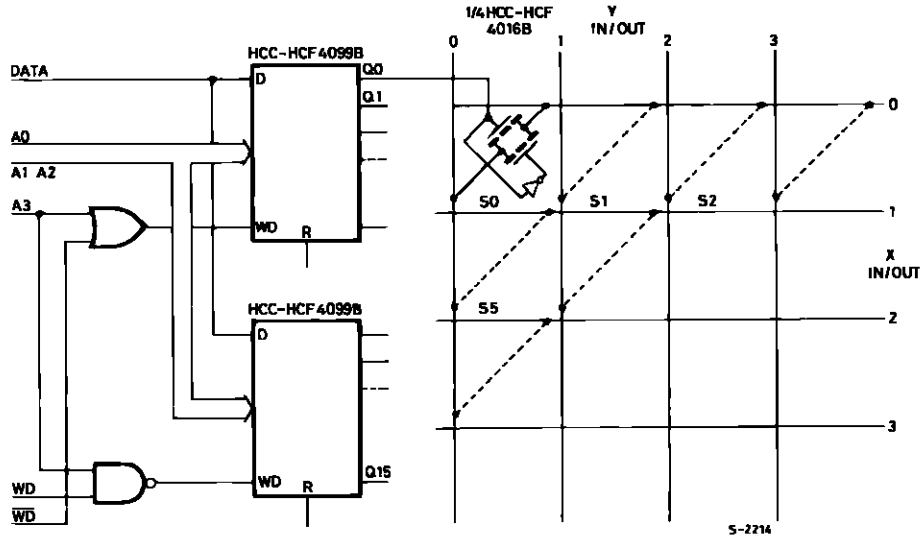


TYPICAL APPLICATIONS



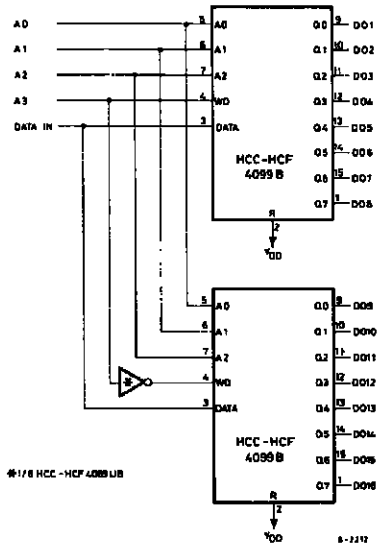
TYPICAL APPLICATIONS

Multiple Selection Decoding – 4x4 Crosspoint Switch



S-2214

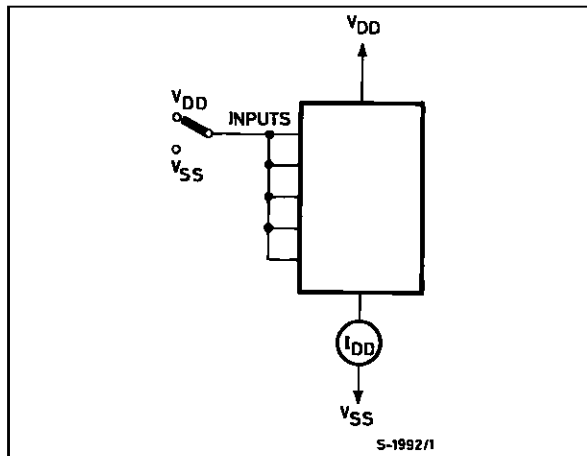
1 of 16 Decoder/demultiplexer



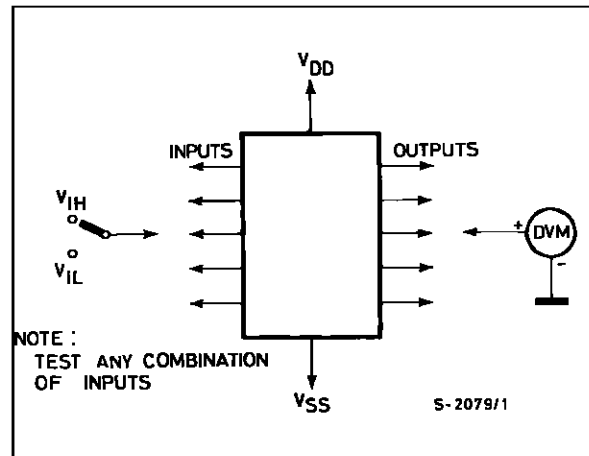
S-2212

TEST CIRCUITS

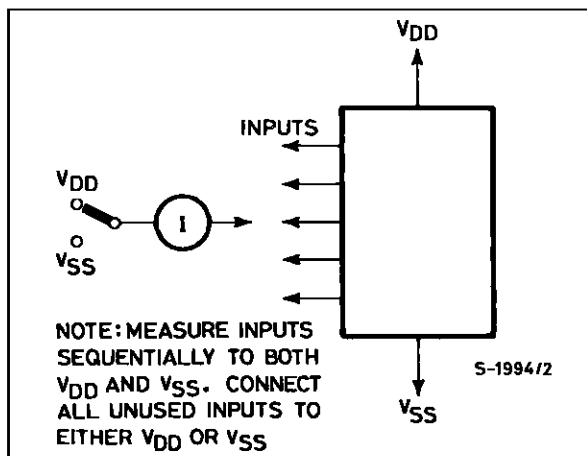
Quiescent Device Current



Input Voltage.

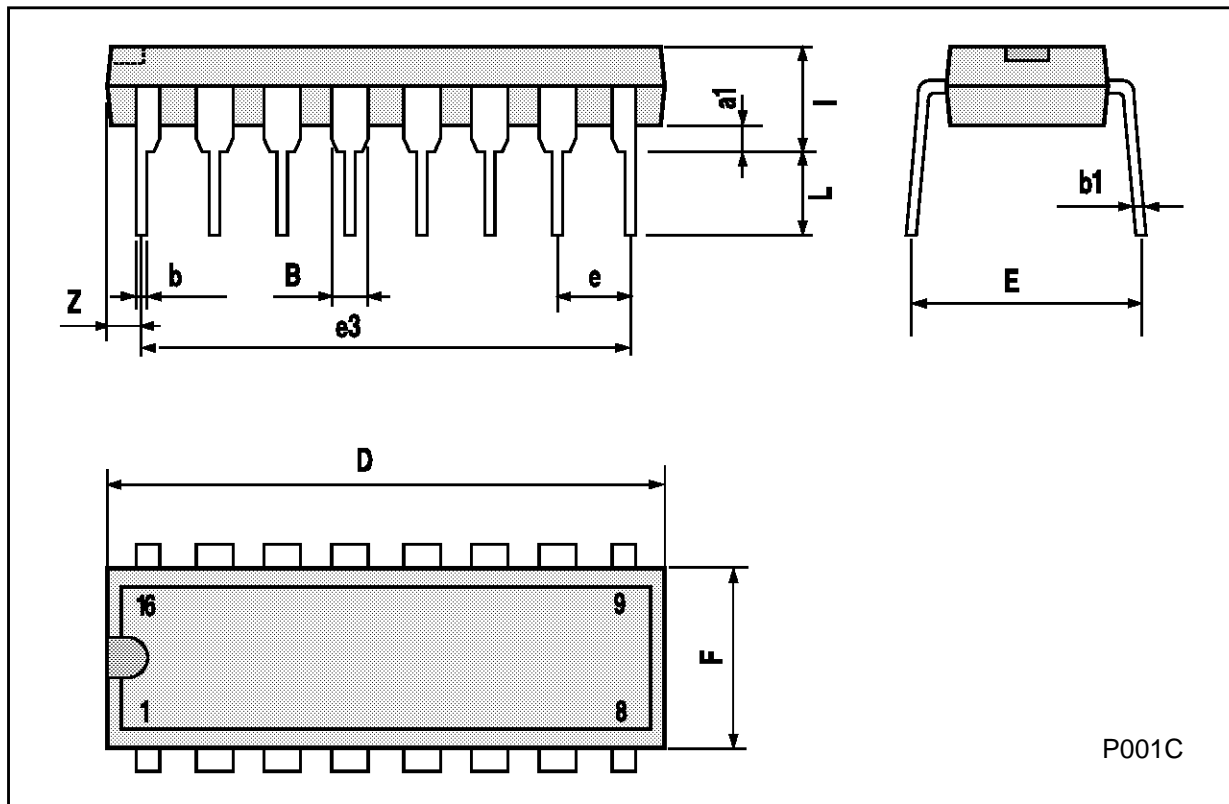


Input Current.



Plastic DIP16 (0.25) MECHANICAL DATA

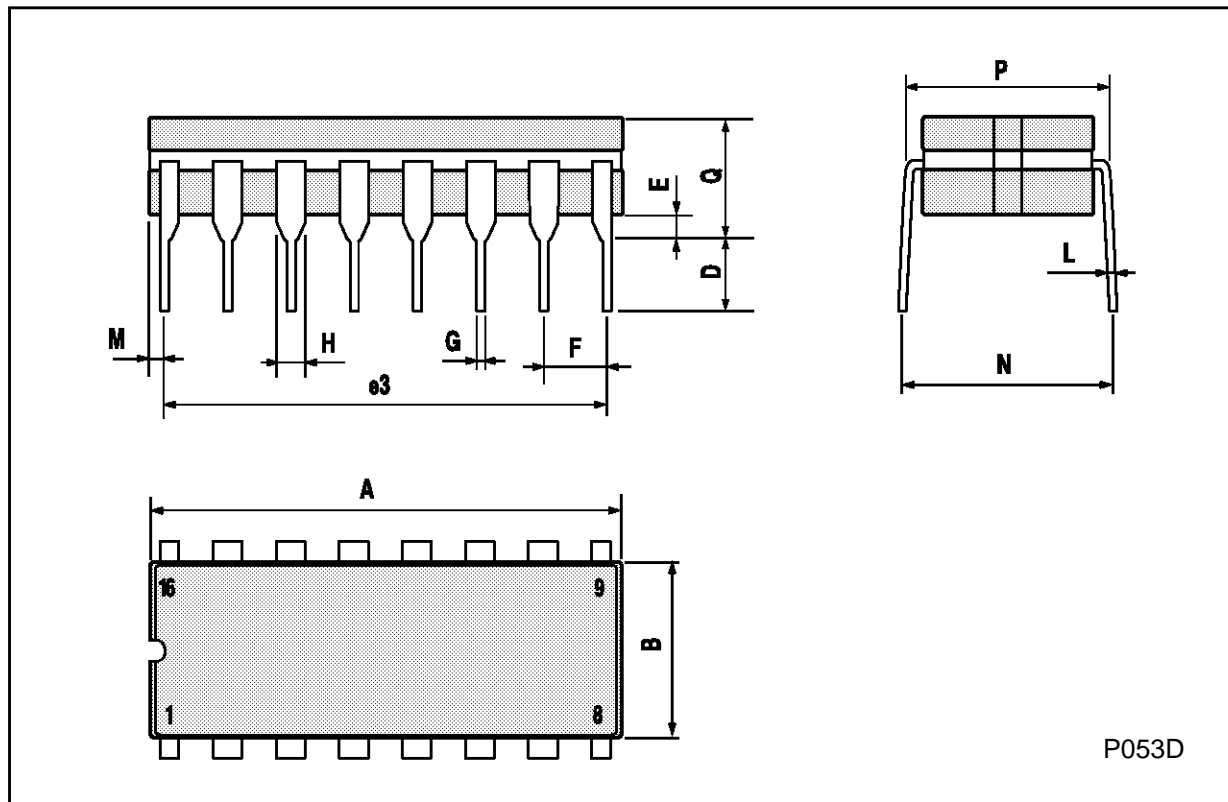
| DIM. | mm | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 0.77 | | 1.65 | 0.030 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 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 |



P001C

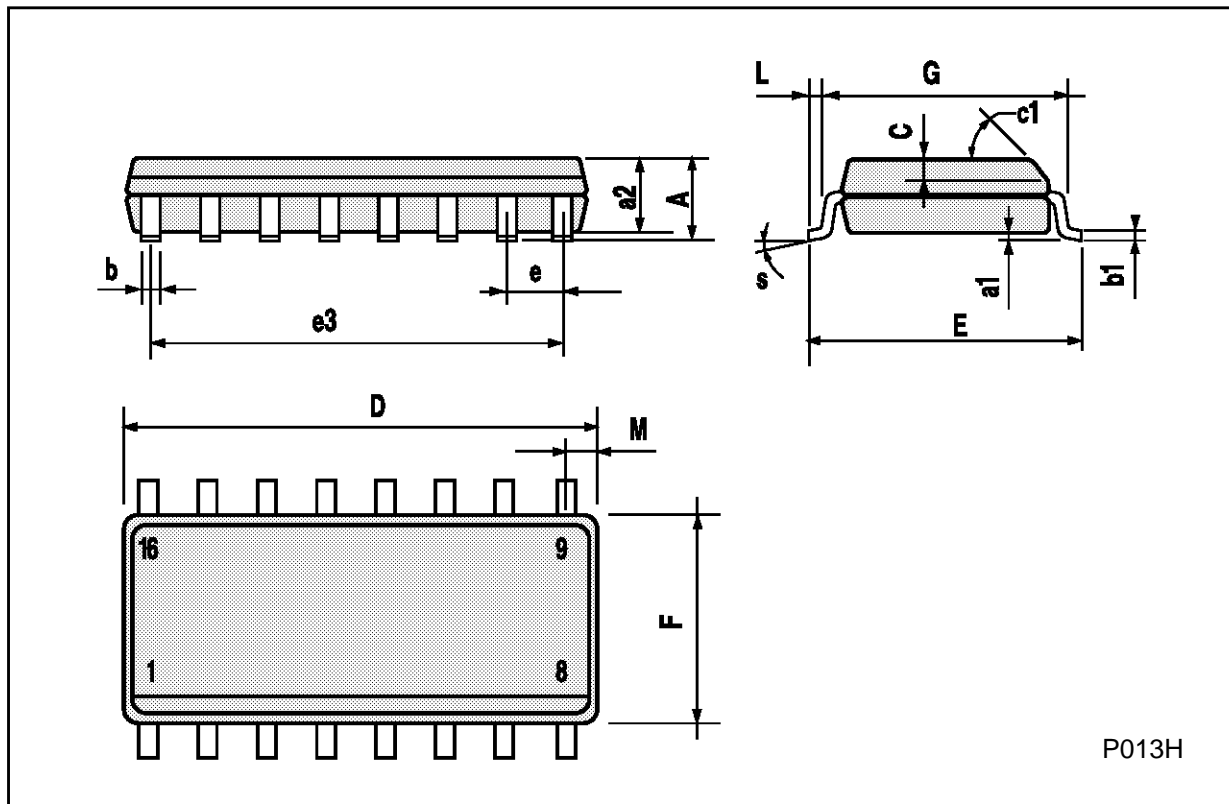
Ceramic DIP16/1 MECHANICAL DATA

| 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

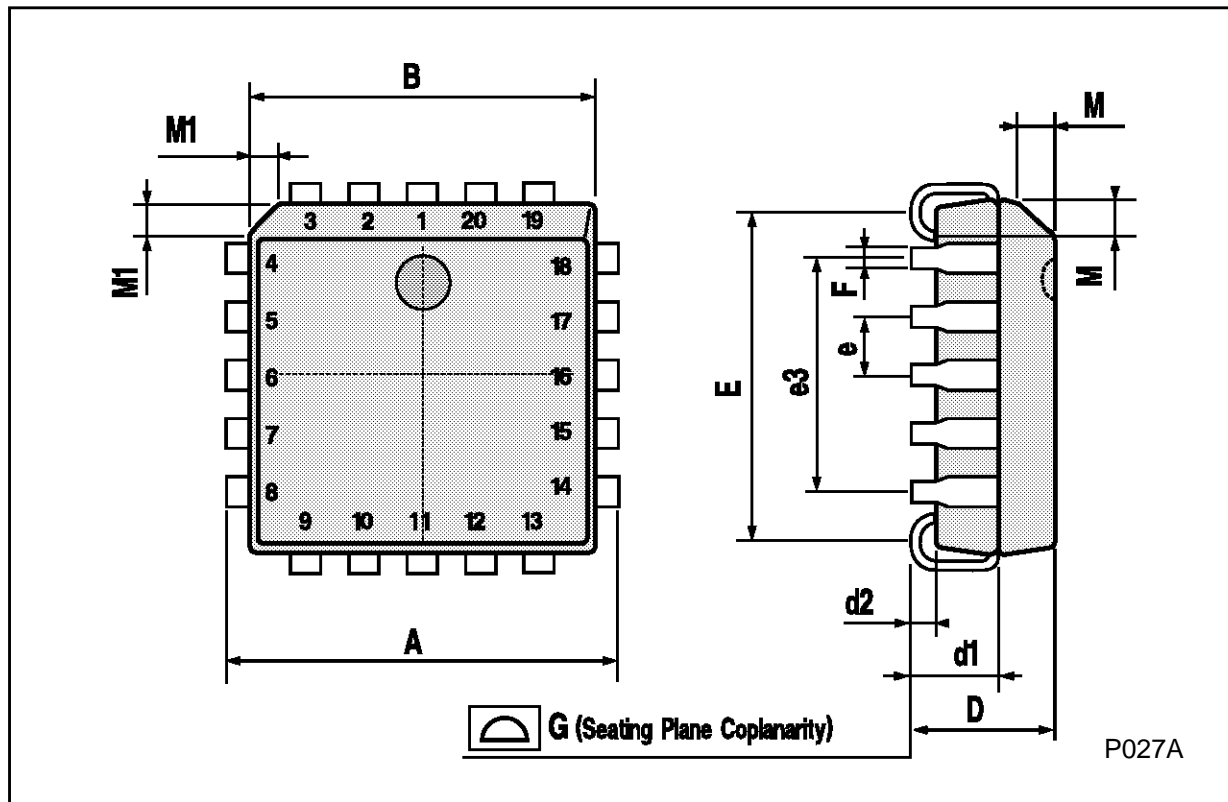
| DIM. | mm | | | inch | | |
|------|------------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.004 | | 0.007 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 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.) | | | | | |



P013H

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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