

|               |                       |
|---------------|-----------------------|
| Document No.  | 853-0055              |
| ECN No.       | 99494                 |
| Date of issue | April 27, 1990        |
| Status        | Product Specification |
| FAST Products |                       |

## FEATURES

- High-impedance NPN base inputs for reduced loading ( $20\mu\text{A}$  in High and Low states)
- Magnitude comparison of any binary words
- Serial or parallel expansion without extra gating

## DESCRIPTION

The 74F85 is a 4-bit magnitude comparator that can be expanded to almost any length. It compares two 4-bit binary, BCD, or other monotonic codes and presents the three possible magnitude results at the outputs. The 4-bit inputs are weighted ( $A_0$ - $A_3$ ) and ( $B_0$ - $B_3$ ) where  $A_3$  and  $B_3$  are the most significant bits. The operation of the 74F85 is described in the Function Table, showing all possible logic conditions. The upper part of the table describes the normal operation under all conditions that will occur in a single device or in a series expansion scheme. In the upper part of the table the three outputs are mutually exclusive. In the lower part of the table, the outputs reflect the feed-forward conditions that exists in the

# FAST 74F85

## Comparator

### 4-Bit Magnitude Comparator

| TYPE  | TYPICAL PROPAGATION DELAY | TYPICAL SUPPLY CURRENT (TOTAL) |
|-------|---------------------------|--------------------------------|
| 74F85 | 7.0ns                     | 40mA                           |

### ORDERING INFORMATION

| PACKAGES           | COMMERCIAL RANGE<br>$V_{CC} = 5V \pm 10\%$ ; $T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$ |
|--------------------|---------------------------------------------------------------------------------------------|
| 16-Pin Plastic DIP | N74F85N                                                                                     |
| 16-Pin Plastic SOL | N74F85D                                                                                     |

### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

| PINS                              | DESCRIPTION                    | 74F(U.L.) HIGH/LOW | LOAD VALUE HIGH/LOW           |
|-----------------------------------|--------------------------------|--------------------|-------------------------------|
| $A_0$ - $A_3$                     | Comparing inputs               | 1.0/0.033          | $20\mu\text{A}/20\mu\text{A}$ |
| $B_0$ - $B_3$                     | Comparing inputs               | 1.0/0.033          | $20\mu\text{A}/20\mu\text{A}$ |
| $I_{A<B}$ , $I_{A=B}$ , $I_{A>B}$ | Expansion inputs (active High) | 1.0/0.033          | $20\mu\text{A}/20\mu\text{A}$ |
| $A<B$ , $A=B$ , $A>B$             | Data outputs (active High)     | 50/33              | 1.0mA/20mA                    |

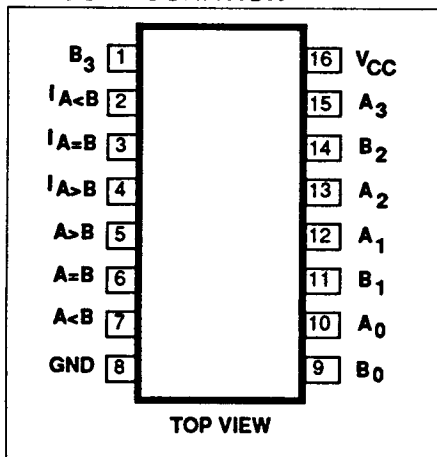
#### NOTE:

One (1.0) FAST Unit Load is defined as:  $20\mu\text{A}$  in the High state and  $0.6\text{mA}$  in the Low state.

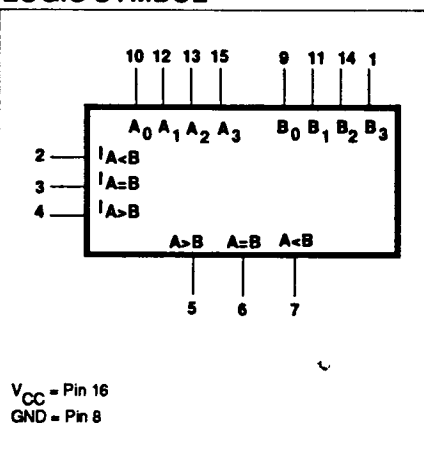
parallel expansion scheme. The expansion inputs  $I_{A>B}$ ,  $I_{A=B}$  and  $I_{A<B}$  are the least significant bit positions. When used for series expansion, the  $A>B$ ,  $A=B$  and  $A<B$  outputs of the least significant word are connected to the corresponding  $I_{A>B}$ ,  $I_{A=B}$  and  $I_{A<B}$  inputs of the next higher

stage. Stages can be added in this manner to any length, but a propagation delay penalty of about 15ns is added with each additional stage. For proper operation the expansion inputs of the least significant word should be tied as follows:  $I_{A>B}$  = Low,  $I_{A=B}$  = High and  $I_{A<B}$  = Low.

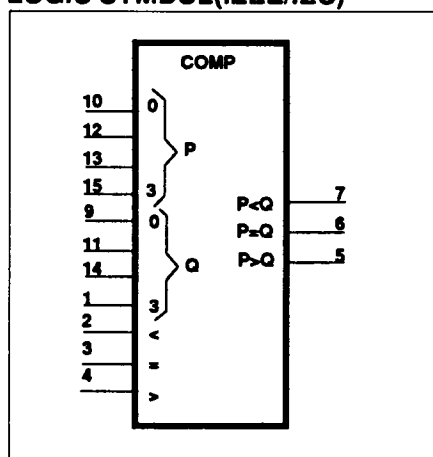
### PIN CONFIGURATION



### LOGIC SYMBOL



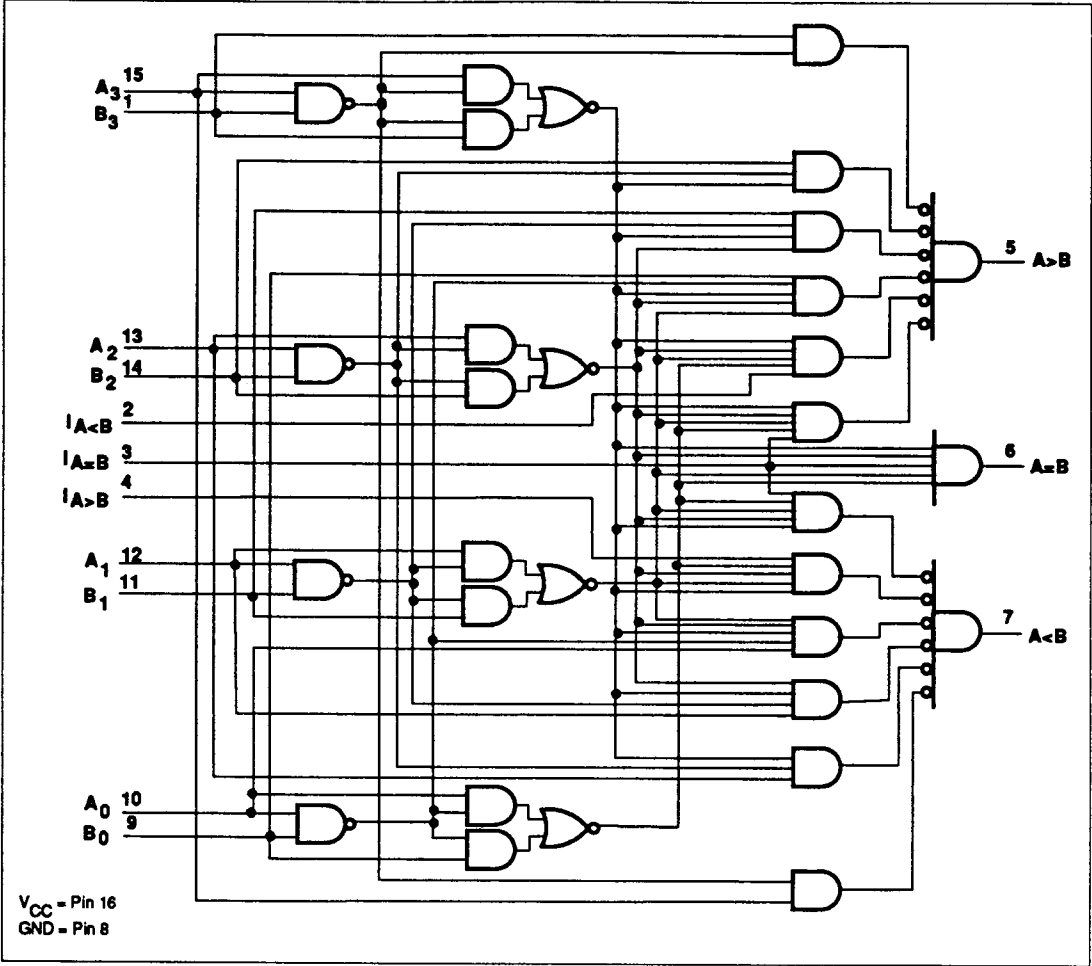
### LOGIC SYMBOL (IEEE/IEC)



Comparator

FAST 74F85

LOGIC DIAGRAM



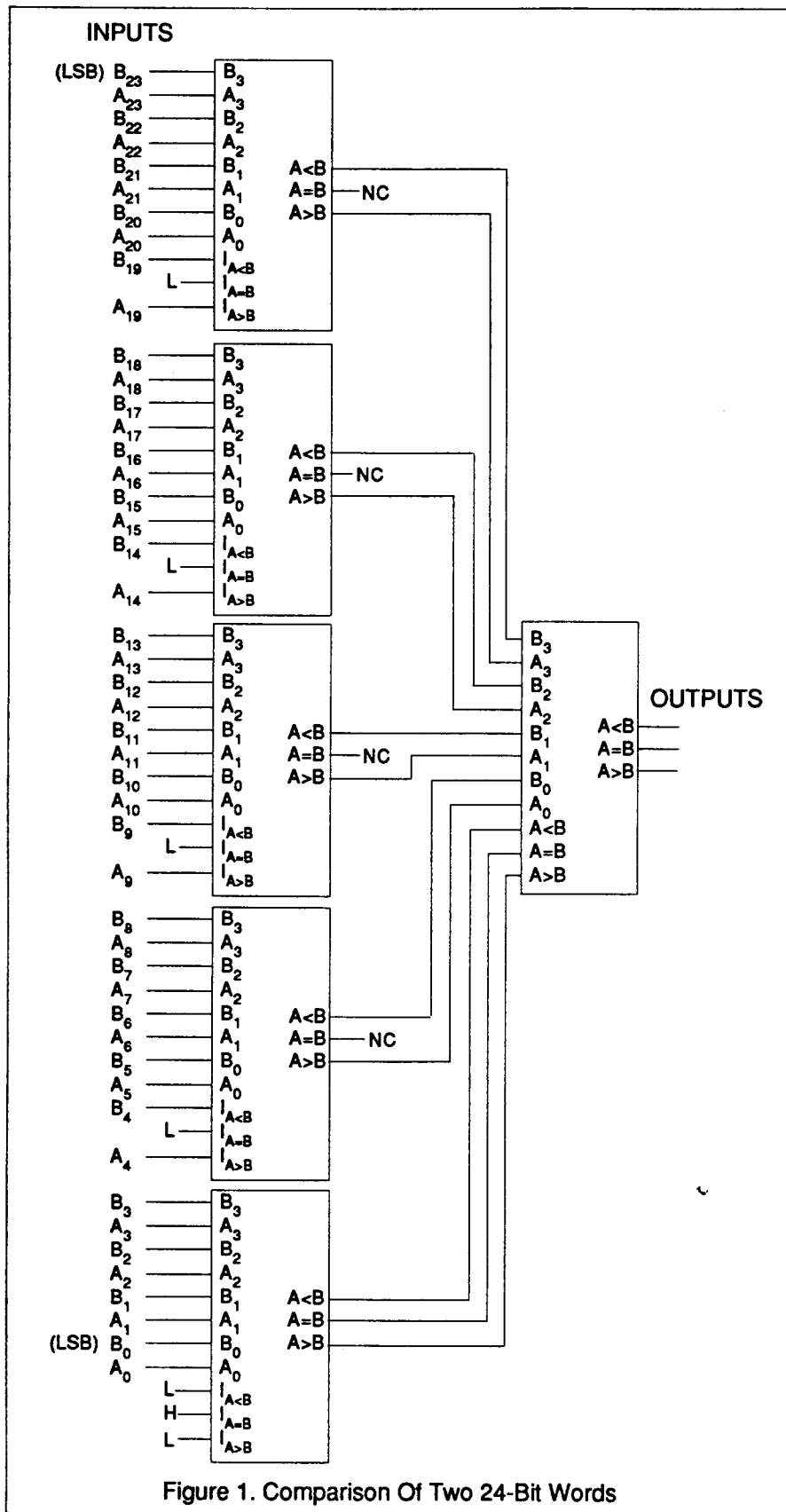
FUNCTION TABLE

| COMPARING INPUTS               |                                |                                |                                | EXPANSION INPUTS    |                     |                  | OUTPUTS |     |     | H = High voltage level<br>L = Low voltage level<br>X = Don't care |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------|---------------------|------------------|---------|-----|-----|-------------------------------------------------------------------|
| A <sub>3</sub> ,B <sub>3</sub> | A <sub>2</sub> ,B <sub>2</sub> | A <sub>1</sub> ,B <sub>1</sub> | A <sub>0</sub> ,B <sub>0</sub> | I <sub>A&gt;B</sub> | I <sub>A&lt;B</sub> | I <sub>A=B</sub> | A>B     | A<B | A=B |                                                                   |
| A <sub>3</sub> >B <sub>3</sub> | X                              | X                              | X                              | X                   | X                   | X                | H       | L   | L   |                                                                   |
| A <sub>3</sub> <B <sub>3</sub> | X                              | X                              | X                              | X                   | X                   | X                | L       | H   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> >B <sub>2</sub> | X                              | X                              | X                   | X                   | X                | H       | L   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> <B <sub>2</sub> | X                              | X                              | X                   | X                   | X                | L       | H   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> >B <sub>1</sub> | X                              | X                   | X                   | X                | H       | L   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> <B <sub>1</sub> | X                              | X                   | X                   | X                | L       | H   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> >B <sub>0</sub> | X                   | X                   | X                | H       | L   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> <B <sub>0</sub> | X                   | X                   | X                | L       | H   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | H                   | L                   | L                | H       | L   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | L                   | H                   | L                | L       | H   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | L                   | L                   | H                | L       | L   | H   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | X                   | X                   | H                | L       | L   | H   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | H                   | H                   | L                | L       | L   | L   |                                                                   |
| A <sub>3</sub> =B <sub>3</sub> | A <sub>2</sub> =B <sub>2</sub> | A <sub>1</sub> =B <sub>1</sub> | A <sub>0</sub> =B <sub>0</sub> | L                   | L                   | L                | H       | H   | L   |                                                                   |

## Comparator

FAST 74F85

## APPLICATION



The parallel expansion scheme shown in Figure 1 demonstrates the most efficient general use of these comparators. The expansion inputs can be used as a fifth input bit position except on the least significant device which must be connected as in the serial scheme. The expansion inputs used by labeling  $I_{A>B}$  as an "A" input,  $I_{A<B}$  as a "B" input and setting  $I_{A=B}$  = Low. The 'F85 can be used as 5-bit comparator only when the outputs are used to drive the ( $A_0$ - $A_3$ ) and ( $B_0$ - $B_3$ ) inputs of another 'F85 device. The parallel technique can be expanded to any number of bits as shown in Table 1.

Table1

| WORD LENGTH | NUMBER OF PACKAGES | TYPICAL SPEEDS 74F |
|-------------|--------------------|--------------------|
| 1-4 Bits    | 1                  | 12ns               |
| 5-24 Bits   | 2-6                | 22ns               |
| 25-120 Bits | 8-31               | 34ns               |

## Comparator

## FAST 74F85

**ABSOLUTE MAXIMUM RATINGS** (Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

| SYMBOL    | PARAMETER                                      | RATING           | UNIT |
|-----------|------------------------------------------------|------------------|------|
| $V_{CC}$  | Supply voltage                                 | -0.5 to +7.0     | V    |
| $V_{IN}$  | Input voltage                                  | -0.5 to +7.0     | V    |
| $I_{IN}$  | Input current                                  | -30 to +5        | mA   |
| $V_{OUT}$ | Voltage applied to output in High output state | -0.5 to $V_{CC}$ | V    |
| $I_{OUT}$ | Current applied to output in Low output state  | 40               | mA   |
| $T_A$     | Operating free-air temperature range           | 0 to +70         | °C   |
| $T_{STG}$ | Storage temperature                            | -65 to +150      | °C   |

**RECOMMENDED OPERATING CONDITIONS**

| SYMBOL   | PARAMETER                            | LIMITS |     |     | UNIT |
|----------|--------------------------------------|--------|-----|-----|------|
|          |                                      | Min    | Nom | Max |      |
| $V_{CC}$ | Supply voltage                       | 4.5    | 5.0 | 5.5 | V    |
| $V_H$    | High-level input voltage             | 2.0    |     |     | V    |
| $V_L$    | Low-level input voltage              |        |     | 0.8 | V    |
| $I_{IK}$ | Input clamp current                  |        |     | -18 | mA   |
| $I_{OH}$ | High-level output current            |        |     | -1  | mA   |
| $I_{OL}$ | Low-level output current             |        |     | 20  | mA   |
| $T_A$    | Operating free-air temperature range | 0      |     | 70  | °C   |

**DC ELECTRICAL CHARACTERISTICS** (Over recommended operating free-air temperature range unless otherwise noted.)

| SYMBOL           | PARAMETER                                 |                                                                                                       | TEST CONDITIONS <sup>1</sup>                              |                      | LIMITS |                  |      | UNIT |
|------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------|--------|------------------|------|------|
|                  |                                           |                                                                                                       |                                                           |                      | Min    | Typ <sup>2</sup> | Max  |      |
| V <sub>OH</sub>  | High-level output voltage                 |                                                                                                       | V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX              | ±10%V <sub>CC</sub>  | 2.5    |                  |      | V    |
|                  |                                           |                                                                                                       | V <sub>IH</sub> = MIN, I <sub>OH</sub> = MAX              | ±5%V <sub>CC</sub>   | 2.7    | 3.4              |      | V    |
| V <sub>OL</sub>  | Low-level output voltage                  |                                                                                                       | V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX              | ±10%V <sub>CC</sub>  |        | 0.30             | 0.50 | V    |
|                  |                                           |                                                                                                       | V <sub>IH</sub> = MIN, I <sub>OL</sub> = MAX              | ±5%V <sub>CC</sub>   |        | 0.30             | 0.50 | V    |
| V <sub>IK</sub>  | Input clamp voltage                       |                                                                                                       | V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>   |                      |        | -0.73            | -1.2 | V    |
| I <sub>I</sub>   | Input current at maximum input voltage    |                                                                                                       | V <sub>CC</sub> =0.0V, V <sub>I</sub> = 7.0V              |                      |        |                  | 100  | μA   |
| I <sub>IH</sub>  | High-level input current                  |                                                                                                       | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V              |                      |        |                  | 20   | μA   |
| I <sub>ILL</sub> | Low-level input current                   |                                                                                                       | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V <sub>L</sub> |                      |        |                  | -20  | μA   |
| I <sub>OS</sub>  | Short-circuit output current <sup>3</sup> |                                                                                                       | V <sub>CC</sub> = MAX                                     |                      | -60    |                  | -150 | mA   |
| I <sub>CC</sub>  | Supply current (total)                    | I <sub>CCH</sub>                                                                                      | V <sub>CC</sub> = MAX                                     | V <sub>IN</sub> =GND |        | 36               | 50   | mA   |
|                  |                                           | A <sub>n</sub> =B <sub>n</sub> =I <sub>A=B</sub> =GND, I <sub>A&gt;B</sub> =I <sub>A&lt;B</sub> =4.5V |                                                           |                      | 40     | 54               | mA   |      |

**NOTES:**

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at  $V_{CC} = 5V, T_A = 25^\circ C$ .
- Not more than one output should be shorted at a time. For testing  $I_{OS}$ , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests,  $I_{OS}$  tests should be performed last.

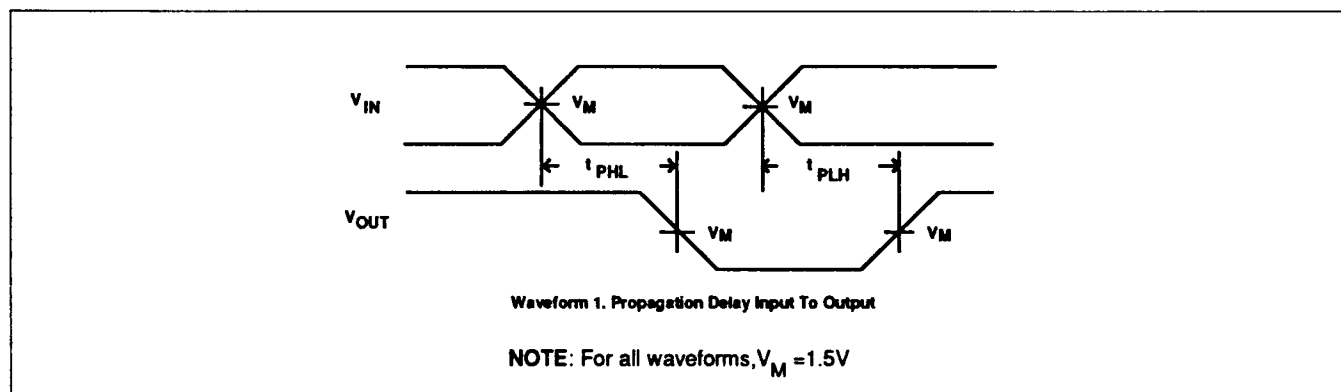
## Comparator

FAST 74F85

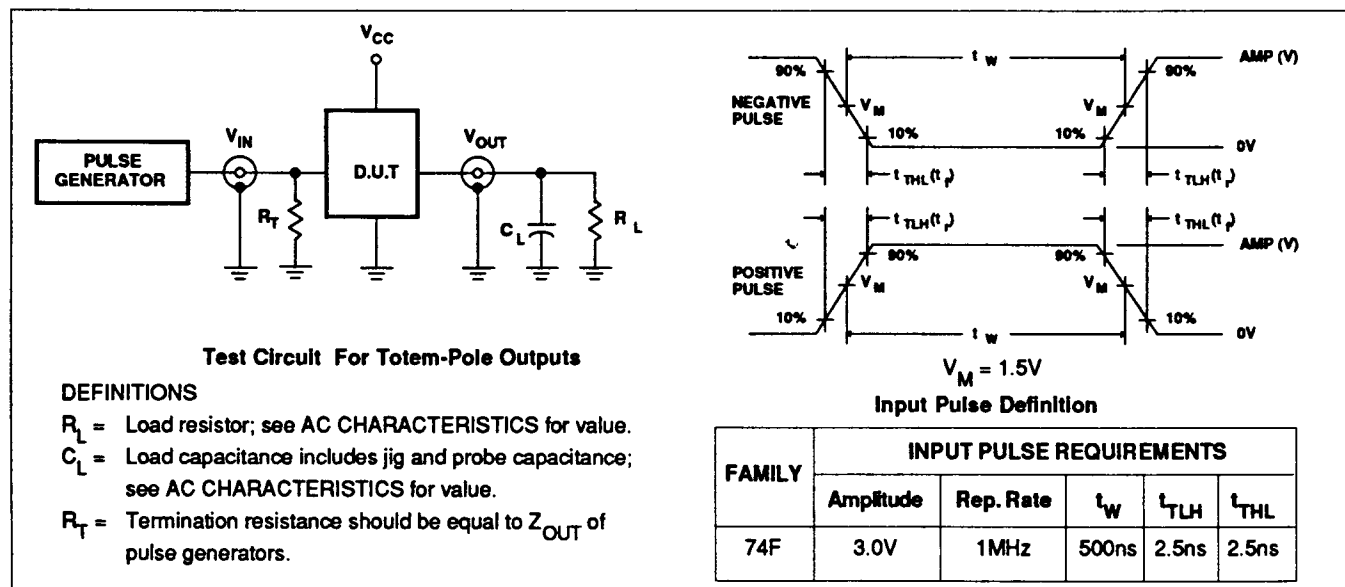
## AC ELECTRICAL CHARACTERISTICS

| SYMBOL                 | PARAMETER                                           | TEST CONDITION               | LIMITS                                                                                          |            |              |                                                                                                                                |              | UNIT |
|------------------------|-----------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------|------------|--------------|--------------------------------------------------------------------------------------------------------------------------------|--------------|------|
|                        |                                                     |                              | $T_A = +25^{\circ}\text{C}$<br>$V_{CC} = 5\text{V}$<br>$C_L = 50\text{pF}$<br>$R_L = 500\Omega$ |            |              | $T_A = 0^{\circ}\text{C to } +70^{\circ}\text{C}$<br>$V_{CC} = 5\text{V} \pm 10\%$<br>$C_L = 50\text{pF}$<br>$R_L = 500\Omega$ |              |      |
|                        |                                                     |                              | Min                                                                                             | Typ        | Max          | Min                                                                                                                            | Max          |      |
| $t_{PLH}$<br>$t_{PLH}$ | Propagation delay<br>A or B to A<B, A>B             | Waveform 1<br>3 logic levels | 6.0<br>7.0                                                                                      | 8.5<br>9.5 | 11.0<br>14.0 | 5.5<br>6.5                                                                                                                     | 13.0<br>15.5 | ns   |
| $t_{PLH}$<br>$t_{PLH}$ | Propagation delay<br>A or B to A=B                  | Waveform 1<br>4 logic levels | 6.5<br>7.0                                                                                      | 9.0<br>9.5 | 11.5<br>14.0 | 6.0<br>6.5                                                                                                                     | 14.0<br>14.5 | ns   |
| $t_{PLH}$<br>$t_{PLH}$ | Propagation delay<br>$I_{A<B}$ and $I_{A=B}$ to A>B | Waveform 1<br>1 logic level  | 3.0<br>3.0                                                                                      | 5.0<br>6.0 | 7.5<br>9.0   | 2.5<br>2.5                                                                                                                     | 9.0<br>10.0  | ns   |
| $t_{PLH}$<br>$t_{PLH}$ | Propagation delay<br>$I_{A=B}$ to A=B               | Waveform 1<br>2 logic levels | 2.5<br>3.5                                                                                      | 4.5<br>7.5 | 7.0<br>10.0  | 2.0<br>2.5                                                                                                                     | 9.0<br>12.0  | ns   |
| $t_{PLH}$<br>$t_{PLH}$ | Propagation delay<br>$I_{A>B}$ and $I_{A=B}$ to A<B | Waveform 1<br>1 logic level  | 3.0<br>3.0                                                                                      | 5.0<br>6.0 | 8.0<br>9.0   | 3.0<br>2.0                                                                                                                     | 9.5<br>9.5   | ns   |

## AC WAVEFORMS



## TEST CIRCUIT AND WAVEFORMS



## VI. COMMERCIAL PRODUCT SPECIAL PROCESSING T-90-20

## SUPR II LEVEL B PRICING ADDERS

## SUPR II LEVEL B

Signetics Upgraded Product Reliability (SUPR) program is designed to provide customers whose systems require an infant mortality level less than that of our non-burned-in products (which is typically below 1000 PPM).

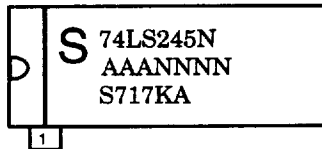
## DEVICE AVAILABILITY

Products available for Level B processing are identified in the Price Book with a "B" suffix to the basic part number.

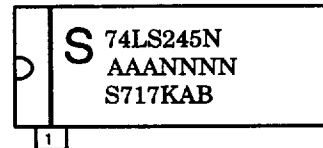
| PRODUCT FAMILY | SUGGESTED RESALE ADDERS     |         |           |
|----------------|-----------------------------|---------|-----------|
|                | 1-99                        | 100-999 | OVER 1000 |
| LIN            | .14                         | .14     | .11       |
| LOG (TTL)      |                             |         |           |
| (SSl)          | .12                         | .10     | .08       |
| (MSl)          | .16                         | .14     | .11       |
| (OCT)          | .16                         | .14     | .11       |
| (CTM)          | .16                         | .14     | .11       |
| LOG (ECL)      |                             |         |           |
| (SSl)          | .25                         | .23     | .20       |
| (MSl)          | .25                         | .23     | .20       |
| LOG (LSI)      | Consult Factory for Pricing |         |           |
| (RAM)          |                             |         |           |
| MIC (8X)       |                             |         |           |
| PLD            | Consult Factory for Pricing |         |           |
| MCG            | Consult Factory for Pricing |         |           |
| DAT            | Not Available               |         |           |
| MIC            |                             |         |           |

## MARKING FORMAT EXAMPLES

Standard (no Burn-In) Products (Dual-in-line)



SUPR II (Burned-In) Products (Dual-in-line)



NOTE: The "B" in the 7<sup>th</sup> position on the 3<sup>rd</sup> line, when present, is the SUPR II Burn-In indicator.

## TAPE AND REEL PACKAGING

## SPECIFICATIONS

Tape and Reel specifications conform to Electronic Industries Association (EIA) Proposed Specification #EIA-481-A using 13 inch reels. Current incremental quantities reflect the quantities per reel. As more customers are able to handle a larger quantity per reel, this quantity will be increased.

## DEVICE AVAILABILITY

Products available in tape and reel packaging are identified in the Price Book with a "T" suffix to the basic part number and are only offered as a product for sale by the reel. Return of product is limited to full reels with unbroken quality seals.

## TAPE AND REEL PRICING ADDERS

| PRODUCT FAMILY | SUGGESTED RESALE ADDER                                                             |
|----------------|------------------------------------------------------------------------------------|
| MCG            | .07                                                                                |
| LIN            | .07                                                                                |
| LOG            | .07                                                                                |
| DAT<br>MIC     | PACKAGE A28 = .20<br>A44 = .25<br>A52 = .30<br>A68 = .40<br>A84 = .45<br>D24 = .17 |

## VII. PACKING QUANTITY INFORMATION

T-90-20

## CERAMIC DUAL IN-LINE (CERDIP)

| PACKAGE CODE           | PIN COUNT        | QUANTITIES       |                 |
|------------------------|------------------|------------------|-----------------|
|                        |                  | DEVICES PER TUBE | DEVICES PER BOX |
| F/FE, BPA, PA          | 8-pin (300-mil)  | 48               | 1920            |
| F, BCA, CA             | 14-pin (300-mil) | 25               | 1000            |
| F, BEA, EA             | 16-pin (300-mil) | 25               | 1000            |
| F, BVA, MVA            | 18-pin (300-mil) | 21               | 840             |
| F/FA, BRA, RA          | 20-pin (300-mil) | 20               | 800             |
| F, BWA, WA             | 22-pin (400-mil) | 17               | 544             |
| F/FA/F6, BJA, JA       | 24-pin (600-mil) | 15               | 360             |
| F/FA/F3/F24, BLA, LA   | 24-pin (300-mil) | 15               | 600             |
| F, BXA, XA             | 24-pin (400-mil) | 15               | 480             |
| F/FA/F28, BXA, XA      | 28-pin (600-mil) | 13               | 312             |
| FA                     | 32-pin (600-mil) | 11               | 264             |
| F/FA/F40, BQA, MQA, QA | 40-pin (600-mil) | 9                | 216             |

## CERPAC

| PACKAGE CODE | PIN COUNT | QUANTITIES       |  |
|--------------|-----------|------------------|--|
|              |           | DEVICES PER TUBE |  |
| BDA/DA/W     | 14-pin    | 145              |  |
| BFA/FA/W     | 16-pin    | 145              |  |
| BXA/BYA/W    | 18-pin    | 100              |  |
| BSA/SA/W/WB  | 20-pin    | 100              |  |
| BKA/KA/W     | 24-pin    | 120              |  |
| BYA/YA/W     | 28-pin    | 50               |  |

## CERQUAD

| PACKAGE CODE | PIN COUNT | QUANTITIES       |                 |
|--------------|-----------|------------------|-----------------|
|              |           | DEVICES PER TRAY | DEVICES PER BOX |
| KA/K44       | 44-pin    | 6                | 6               |
| KA/K68       | 68-pin    | 4                | 4               |
| KA           | 84-pin    | 42               | 210             |

## LEADLESS CHIP CARRIER

| PACKAGE CODE            | PIN COUNT | QUANTITIES       |  |
|-------------------------|-----------|------------------|--|
|                         |           | DEVICES PER TUBE |  |
| B2A/2A/GA               | 20-pin    | 55               |  |
| B3A/3A/GA/GC1           | 28-pin    | 43               |  |
| YA/YA/GC2               | 32-pin    | 35               |  |
| BUA/MXA/MUA/UA/XA/GA/GC | 44-pin    | 27               |  |
| BZA/BUA/UA/ZA/GA/GC     | 68-pin    | 19               |  |

QUANTITIES SHOWN IN GRAY REQUIRE PURCHASE TO BE MADE IN EXACT MULTIPLES OF THAT QUANTITY.

## VII. PACKING QUANTITY INFORMATION

T-90-20

## PLASTIC DUAL IN-LINE

| PACKAGE CODE | PIN COUNT            | QUANTITIES       |                 |
|--------------|----------------------|------------------|-----------------|
|              |                      | DEVICES PER TUBE | DEVICES PER BOX |
| N/N8         | 8-pin (300-mil)      | 50               | 2000            |
| N/N14/N16    | 14- 16-pin (300-mil) | 25               | 1000            |
| N            | 18-pin (300-mil)     | 20               | 800             |
| N/N20        | 20-pin (300-mil)     | 18               | 720             |
| N            | 22-pin (400-mil)     | 17               | 544             |
| N/N6         | 24-pin (600-mil)     | 15               | 360             |
| N/N3/N24     | 24-pin (300-mil)     | 15               | 600             |
| N/N24        | 24-pin (400-mil)     | 15               | 480             |
| N/N28        | 28-pin (600-mil)     | 13               | 312             |
| N/N3         | 28-pin (300-mil)     | 13               | 520             |
| N            | 32-pin (600-mil)     | 11               | 264             |
| N/N40        | 40-pin (600-mil)     | 9                | 216             |
| NB (Shrink)  | 42-pin (600-mil)     | 12               | 288             |
| N/N48        | 48-pin (600-mil)     | 7                | 168             |
| N            | 50-pin (900-mil)     | 7                | 112             |
| N/N64        | 64-pin (900-mil)     | 5                | 80              |

## PLASTIC LEADED CHIP CARRIER (PLCC)

| PACKAGE CODE | PIN COUNT | QUANTITIES       |                 |                  |
|--------------|-----------|------------------|-----------------|------------------|
|              |           | DEVICES PER TUBE | DEVICES PER BOX | DEVICES PER REEL |
| A            | 20-pin    | 46               | 3680            | 1000             |
| A/A28        | 28-pin    | 37               | 2368            | 750              |
| A            | 32-pin    | 31               | 2232            | 750              |
| A/A44        | 44-pin    | 26               | 1248            | 500              |
| A/A52        | 52-pin    | 23               | 1012            | 500              |
| A/A68        | 68-pin    | 18               | 648             | 250              |
| A/A84        | 84-pin    | 15               | 420             | 250              |

QUANTITIES SHOWN IN GRAY REQUIRE PURCHASE TO BE MADE IN EXACT MULTIPLES OF THAT QUANTITY.

## VII. PACKING QUANTITY INFORMATION

T-90-20

## PLASTIC SMALL OUTLINE (SO)

| PACKAGE CODE | PIN COUNT        | QUANTITIES       |                 |                        |
|--------------|------------------|------------------|-----------------|------------------------|
|              |                  | DEVICES PER TUBE | DEVICES PER BOX | DEVICES PER REEL       |
| D/D8         | 8-pin (150-mil)  | 100              | 10000           | 2500                   |
| D            | 8-pin (300-mil)  | 64               | 2560            | 1000 - 13"<br>700 - 7" |
| D/D14        | 14-pin (150-mil) | 57               | 5700            | 2500                   |
| D            | 16-pin (150-mil) | 50               | 5000            | 2500                   |
| D            | 16-pin (300-mil) | 48               | 1920            | 1000                   |
| DK(SSOP)     | 20-pin (170-mil) | 75               | 6750            | 2500                   |
| D            | 20-pin (300-mil) | 38               | 1520            | 1000                   |
| D/D24        | 24-pin (300-mil) | 32               | 1280            | 1000                   |
| D            | 28-pin (300-mil) | 27               | 1080            | 1000                   |
| D            | 40-pin (VSO-40)  | 31               | 1240            | 1000 - 13"<br>300 - 7" |
| D            | 56-pin (VSO-56)  | 22               | 616             | 1000                   |

## QUAD FLAT PACK\*

| PACKAGE CODE | PIN COUNT                | QUANTITIES       |                 |
|--------------|--------------------------|------------------|-----------------|
|              |                          | DEVICES PER TRAY | DEVICES PER BOX |
| B/B44        | 44-pin                   | 50               | 500             |
| B/B44        | 44-pin                   | 96               | 480             |
| B            | 52-pin                   | 119              | 595             |
| B            | 80-pin                   | 66               | 330             |
| B            | 100-pin                  | 50               | 250             |
| B            | 120-pin                  | 24               | 120             |
| B            | 120-pin (Philips source) | 30               | 150             |

- \* Quad Flat Pack parts require dry pack handling according to EIA Standard - 583.  
These parts are identified in part list section with DRY PACK in the Cross Ref Part No field.

QUANTITIES SHOWN IN GRAY REQUIRE PURCHASE TO BE MADE IN EXACT MULTIPLES OF THAT QUANTITY.