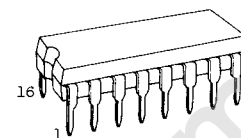


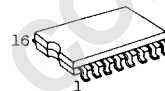
## TC4019BP/TC4019BF QUAD AND/OR SELECT GATE

TC4019BP/BF is four circuit AND-OR SELECT GATE. The basic circuit consists of two 2 input AND gates and an OR gate receiving two outputs from the AND gates. The input signals applied to An and Bn (n=1~4) are selected by the common selection input to all the four circuits, KA and KB and the outputs are obtained at Dn.

This is suitable for data selectors and multiplexers of 4 bits 2 channels.



DIP16(3D16A-P)

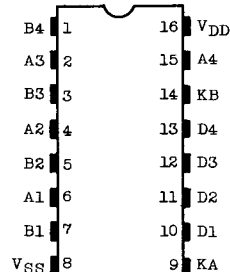


MFP16(F16GC-P)

### ABSOLUTE MAXIMUM RATINGS

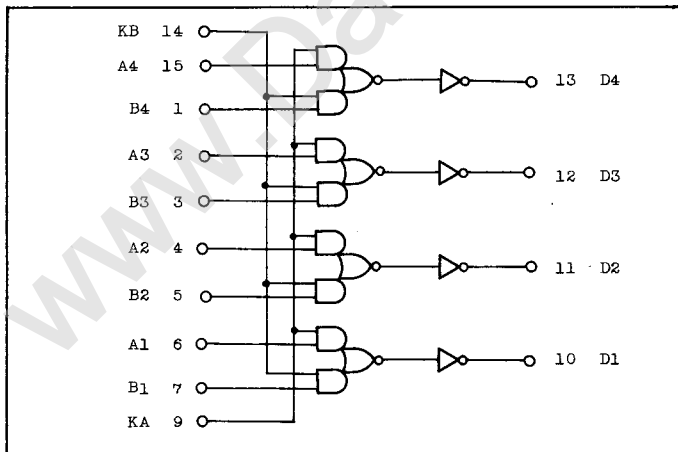
| CHARACTERISTIC              | SYMBOL           | RATING  | UNIT |
|-----------------------------|------------------|---|------|
| DC Supply Voltage           | V <sub>DD</sub>  | V <sub>SS</sub> - 0.5 ~ V <sub>SS</sub> + 20  | V    |
| Input Voltage               | V <sub>IN</sub>  | V <sub>SS</sub> - 0.5 ~ V <sub>DD</sub> + 0.5 | V    |
| Output Voltage              | V <sub>OUT</sub> | V <sub>SS</sub> - 0.5 ~ V <sub>DD</sub> + 0.5 | V    |
| DC Input Current            | I <sub>IN</sub>  | ±10   | mA   |
| Power Dissipation           | P <sub>D</sub>   | 300(DIP)/180(MFP)                             | mW   |
| Operating Temperature Range | T <sub>A</sub>   | -40 ~ 85                                      | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -65 ~ 150                                     | °C   |
| Lead Temp./Time             | T <sub>sol</sub> | 260°C · 10 sec                                |      |

### PIN ASSIGNMENT



(TOP VIEW)

### LOGIC DIAGRAM



### TRUTH TABLE

| INPUTS |    |                |                | OUTPUT         |
|--------|----|----------------|----------------|----------------|
| KA     | KB | A <sub>n</sub> | B <sub>n</sub> | D <sub>n</sub> |
| H      | L  | H              | *              | H              |
| H      | L  | L              | *              | L              |
| L      | H  | *              | H              | H              |
| L      | H  | *              | L              | L              |
| L      | L  | *              | *              | L              |
| H      | H  | L              | L              | L              |
| H      | H  | L              | H              | H              |
| H      | H  | H              | L              | H              |
| H      | H  | H              | H              | H              |

L : LOW LEVEL  
H : HIGH LEVEL  
\* : DON'T CARE

# TC4019BP/BF

## RECOMMENDED OPERATING CONDITIONS (V<sub>SS</sub>=0V)

| CHARACTERISTIC    | SYMBOL          | MIN. | TYP. | MAX.            | UNITS |
|-------------------|-----------------|------|------|-----------------|-------|
| DC Supply Voltage | V <sub>DD</sub> | 3    | -    | 18              | V     |
| Input Voltage     | V <sub>IN</sub> | 0    | -    | V <sub>DD</sub> | V     |

## STATIC ELECTRICAL CHARACTERISTICS (V<sub>SS</sub>=0V)

| CHARACTERISTIC            | SYMBOL          | TEST CONDITIONS   | V <sub>DD</sub><br>(V) | -40°C |      | 25°C  |       |                   | 85°C  |      | UNITS |    |
|---------------------------|-----------------|---|------------------------|-------|------|-------|-------|-------------------|-------|------|-------|----|
|                           |                 |   |                        | MIN.  | MAX. | MIN.  | TYP.  | MAX.              | MIN.  | MAX. |       |    |
| High-Level Output Voltage | V <sub>OH</sub> | I <sub>OUT</sub>   < 1μA<br>V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>  | 5                      | 4.95  | -    | 4.95  | 5.00  | -                 | 4.95  | -    | V     |    |
|                           |                 |   | 10                     | 9.95  | -    | 9.95  | 10.00 | -                 | 9.95  | -    |       |    |
|                           |                 |   | 15                     | 14.95 | -    | 14.95 | 15.00 | -                 | 14.95 | -    |       |    |
| Low-Level Output Voltage  | V <sub>OL</sub> | I <sub>OUT</sub>   < 1μA<br>V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>  | 5                      | -     | 0.05 | -     | 0.00  | 0.05              | -     | 0.05 | V     |    |
|                           |                 |   | 10                     | -     | 0.05 | -     | 0.00  | 0.05              | -     | 0.05 |       |    |
|                           |                 |   | 15                     | -     | 0.05 | -     | 0.00  | 0.05              | -     | 0.05 |       |    |
| Output High Current       | I <sub>OH</sub> | V <sub>OH</sub> =4.6V<br>V <sub>OH</sub> =2.5V<br>V <sub>OH</sub> =9.5V<br>V <sub>OH</sub> =13.5V<br>V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub> | 5                      | -0.61 | -    | -0.51 | -1.0  | -                 | -0.42 | -    | mA    |    |
|                           |                 |   | 5                      | -2.5  | -    | -2.1  | -4.0  | -                 | -1.7  | -    |       |    |
|                           |                 |   | 10                     | -1.5  | -    | -1.3  | -2.2  | -                 | -1.1  | -    |       |    |
|                           |                 |   | 15                     | -4.0  | -    | -3.4  | -9.0  | -                 | -2.8  | -    |       |    |
| Output Low Current        | I <sub>OL</sub> | V <sub>OL</sub> =0.4V<br>V <sub>OL</sub> =0.5V<br>V <sub>OL</sub> =1.5V<br>V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>                           | 5                      | 0.61  | -    | 0.51  | 1.2   | -                 | 0.42  | -    | mA    |    |
|                           |                 |   | 10                     | 1.5   | -    | 1.3   | 3.2   | -                 | 1.1   | -    |       |    |
|                           |                 |   | 15                     | 4.0   | -    | 3.4   | 12.0  | -                 | 2.8   | -    |       |    |
|                           |                 |   |                        |       |      |       |       |                   |       |      |       |    |
| Input High Voltage        | V <sub>IH</sub> | V <sub>OUT</sub> =0.5V, 4.5V<br>V <sub>OUT</sub> =1.0V, 9.0V<br>V <sub>OUT</sub> =1.5V, 13.5V<br> I <sub>OUT</sub>   < 1μA                              | 5                      | 3.5   | -    | 3.5   | 2.75  | -                 | 3.5   | -    | V     |    |
|                           |                 |   | 10                     | 7.0   | -    | 7.0   | 5.5   | -                 | 7.0   | -    |       |    |
|                           |                 |   | 15                     | 11.0  | -    | 11.0  | 8.25  | -                 | 11.0  | -    |       |    |
|                           |                 |   |                        |       |      |       |       |                   |       |      |       |    |
| Input Low Voltage         | V <sub>IL</sub> | V <sub>OUT</sub> =0.5V, 4.5V<br>V <sub>OUT</sub> =1.0V, 9.0V<br>V <sub>OUT</sub> =1.5V, 13.5V<br> I <sub>OUT</sub>   < 1μA                              | 5                      | -     | 1.5  | -     | 2.25  | 1.5               | -     | 1.5  | V     |    |
|                           |                 |   | 10                     | -     | 3.0  | -     | 4.5   | 3.0               | -     | 3.0  |       |    |
|                           |                 |   | 15                     | -     | 4.0  | -     | 6.75  | 4.0               | -     | 4.0  |       |    |
|                           |                 |   |                        |       |      |       |       |                   |       |      |       |    |
| Input Current             | "H" Level       | I <sub>IH</sub>   | V <sub>IH</sub> =18V   | 18    | -    | 0.1   | -     | 10 <sup>-5</sup>  | 0.1   | -    | 1.0   | μA |
|                           | "L" Level       | I <sub>IL</sub>   | V <sub>IL</sub> =0V    | 18    | -    | -0.1  | -     | -10 <sup>-5</sup> | -0.1  | -    | -1.0  |    |
| Quiescent Device Current  | I <sub>DD</sub> | V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub><br>*   | 5                      | -     | 0.25 | -     | 0.001 | 0.25              | -     | 7.5  | μA    |    |
|                           |                 |   | 10                     | -     | 0.5  | -     | 0.001 | 0.5               | -     | 15   |       |    |
|                           |                 |   | 15                     | -     | 1.0  | -     | 0.002 | 1.0               | -     | 30   |       |    |

\* All valid input combinations

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, VSS=0V, CL=50pF)

| CHARACTERISTIC                          | SYMBOL                               | TEST CONDITION | VDD(V) | MIN. | TYP. | MAX. | UNITS |
|---|--------------------------------------|----------------|--------|------|------|------|-------|
|   |                                      |                |        |      |      |      |       |
| Output Transition Time<br>(Low to High) | t <sub>TLH</sub>                     |                | 5      | -    | 70   | 200  | ns    |
|   |                                      |                | 10     | -    | 35   | 100  |       |
|   |                                      |                | 15     | -    | 30   | 80   |       |
| Propagation Delay Time<br>(A, B - D)    | t <sub>pLH</sub><br>t <sub>pHL</sub> |                | 5      | -    | 75   | 300  |       |
|   |                                      |                | 10     | -    | 40   | 120  |       |
|   |                                      |                | 15     | -    | 30   | 100  |       |
| Propagation Delay Time<br>(KA, KB - D)  | t <sub>pLH</sub><br>t <sub>pHL</sub> |                | 5      | -    | 75   | 300  |       |
|   |                                      |                | 10     | -    | 40   | 120  |       |
|   |                                      |                | 15     | -    | 30   | 100  |       |
| Input Capacitance                       | C <sub>IN</sub>                      | An, Bn Input   |        | -    | 5    | 7.5  |       |
|   |                                      | KA, KB Input   |        | -    | 12   | 20   |       |

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

