

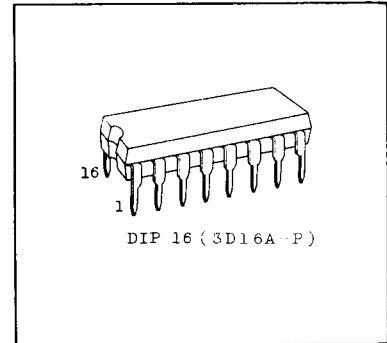
# TC5066BP, TC5067BP

C<sup>2</sup>MOS DIGITAL INTEGRATED CIRCUIT  
SILICON MONOLITHIC

TC5066BP 7-HIGH VOLTAGE BUFFER/NON INVERTING TYPE  
TC5067BP 7-HIGH VOLTAGE BUFFER/INVERTING TYPE

TC5066BP and TC5067BP contain seven independent circuits of buffers. TC5066BP in non-inverting type and TC5067BP is inverting type.

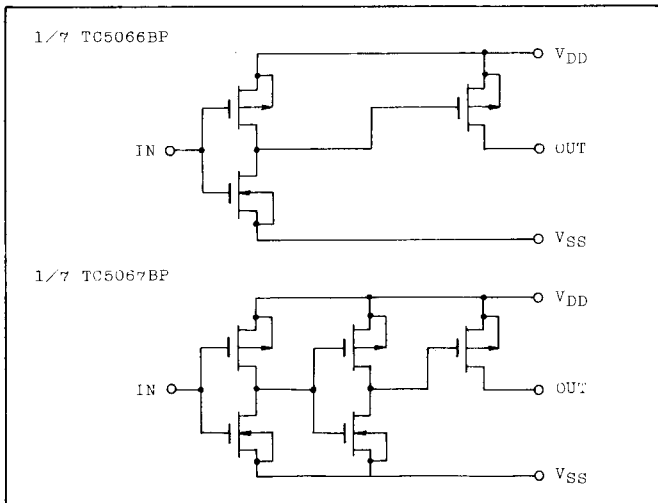
As both have the output of open drain structure with high breakdown voltage P-channel MOS FET (-50 volts.. . . . .Maximum Rating), these are suitable for driving fluorescent display tubes and for interfacing with high voltage MOS LSI's.



## ABSOLUTE MAXIMUM RATINGS

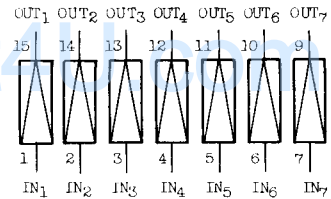
| CHARACTERISTIC            | SYMBOL           | RATING                                      | UNIT |
|---------------------------|------------------|---|------|
| DC Supply Voltage         | V <sub>DD</sub>  | V <sub>SS</sub> -0.5 ~ V <sub>SS</sub> +20  | V    |
| Input Voltage             | V <sub>IN</sub>  | V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5 | V    |
| Output Voltage            | V <sub>OUT</sub> | V <sub>DD</sub> -50 ~ V <sub>DD</sub> +0.5  | V    |
| Power Dissipation         | PD               | 300   | mW   |
| DC Input Current          | I <sub>IN</sub>  | ±10   | mA   |
| Storage Temperature Range | T <sub>stg</sub> | -65 ~ 150                                   | °C   |
| Lead Temp./Time           | T <sub>sol</sub> | 260°C · 10sec                               |      |

## LOGIC DIAGRAM



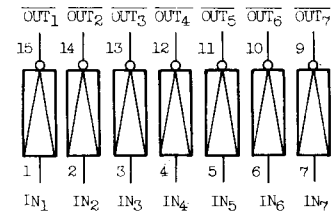
## PIN ASSIGNMENT

TC5066BP



V<sub>DD</sub> : 16 , V<sub>SS</sub> : 8

TC5067BP



V<sub>DD</sub> : 16 , V<sub>SS</sub> : 8

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

| CHARACTERISTIC  | SYMBOL           | MIN. | TYP. | MAX.            | UNIT |
|-----------------|------------------|------|------|-----------------|------|
| Supply Voltage  | V <sub>DD</sub>  | 3    |      | 18              | V    |
| Input Voltage   | V <sub>IN</sub>  | 0    |      | V <sub>DD</sub> | V    |
| Operating Temp. | T <sub>opr</sub> | -40  |      | 85              | °C   |

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

| CHARACTERISTIC                      | SYMBOL           | TEST CONDITIONS  | V <sub>DD</sub><br>(V) | -40°C |      | 25°C  |       |                  | 85°C  |      | UNIT |    |
|-------------------------------------|------------------|--|------------------------|-------|------|-------|-------|------------------|-------|------|------|----|
|                                     |                  |  |                        | 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> or 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 | -    |      |    |
| High Level Output Current           | I <sub>OH</sub>  | V <sub>OH</sub> =3V (V <sub>DD</sub> -2V)<br>V <sub>OH</sub> =2V (V <sub>DD</sub> -3V)<br>V <sub>OH</sub> =7V (V <sub>DD</sub> -3V)<br>V <sub>OH</sub> =12V (V <sub>DD</sub> -3V)<br>V <sub>IN</sub> =V <sub>SS</sub> or V <sub>DD</sub> | 5                      | -6    | -    | -5    | -10   | -                | -4    | -    | mA   |    |
|                                     |                  |  | 5                      | -9    | -    | -8    | -13   | -                | -6    | -    |      |    |
|                                     |                  |  | 10                     | -12   | -    | -10   | -25   | -                | -8    | -    |      |    |
|                                     |                  |  | 15                     | -17   | -    | -15   | -35   | -                | -12   | -    |      |    |
|                                     |                  |  |                        |       |      |       |       |                  |       |      |      |    |
| High Level Input Voltage (TC5066BP) | V <sub>IH</sub>  | V <sub>OUT</sub> =4.5V<br>V <sub>OUT</sub> =9.0V<br>V <sub>OUT</sub> =13.5V<br>*   | 5                      | 4.0   | -    | 4.0   |       | -                | 4.0   | -    | V    |    |
|                                     |                  |  | 10                     | 8.0   | -    | 8.0   |       | -                | 8.0   | -    |      |    |
|                                     |                  |  | 15                     | 12.5  | -    | 12.5  |       | -                | 12.5  | -    |      |    |
|                                     |                  |  |                        |       |      |       |       |                  |       |      |      |    |
| Low Level Input Voltage (TC5066BP)  | V <sub>IL</sub>  | V <sub>OUT</sub> =0.5V<br>V <sub>OUT</sub> =1.0V<br>V <sub>OUT</sub> =1.5V<br>*  | 5                      | -     | 1.0  | -     |       | 1.0              | -     | 1.0  | V    |    |
|                                     |                  |  | 10                     | -     | 2.0  | -     |       | 2.0              | -     | 2.0  |      |    |
|                                     |                  |  | 15                     | -     | 2.5  | -     |       | 2.5              | -     | 2.5  |      |    |
|                                     |                  |  |                        |       |      |       |       |                  |       |      |      |    |
| High Level Input Voltage (TC5067BP) | V <sub>IH</sub>  | V <sub>OUT</sub> =0.5V<br>V <sub>OUT</sub> =1.0V<br>V <sub>OUT</sub> =1.5V<br>*  | 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  | -    |      |    |
|                                     |                  |  |                        |       |      |       |       |                  |       |      |      |    |
| Low Level Input Voltage (TC5067BP)  | V <sub>IL</sub>  | V <sub>OUT</sub> =4.5V<br>V <sub>OUT</sub> =9.0V<br>V <sub>OUT</sub> =13.5V<br>*   | 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  |      |    |
|                                     |                  |  |                        |       |      |       |       |                  |       |      |      |    |
| Output OFF Leak Current             | I <sub>OFF</sub> | V <sub>OUT</sub> = 0V<br>V <sub>OUT</sub> = -30V   | 15                     | -     | 3    | -     | 0.01  | 3                | -     | 10   | μA   |    |
|                                     |                  |  | 15                     | -     | 10   | -     | 1     | 10               | -     | 20   |      |    |
| Input Current                       | H Level          | I <sub>IH</sub>  | V <sub>IH</sub> = 18V  | 18    | -    | 0.3   | -     | 10 <sup>5</sup>  | 0.3   | -    | 1.0  | μA |
|                                     | L Level          | I <sub>IL</sub>  | V <sub>IL</sub> = 0V   | 18    | -    | -0.3  | -     | 10 <sup>-5</sup> | -0.3  | -    | -1.0 |    |
| Quiescent Supply Current            | I <sub>DD</sub>  | V <sub>IN</sub> = V <sub>DD</sub> , V <sub>SS</sub><br>Outputs Open  | 5                      | -     | 4.0  | -     | 0.005 | 4.0              | -     | 30   | μA   |    |
|                                     |                  |  | 10                     | -     | 8.0  | -     | 0.010 | 8.0              | -     | 60   |      |    |
|                                     |                  |  | 15                     | -     | 16.0 | -     | 0.015 | 16.0             | -     | 120  |      |    |

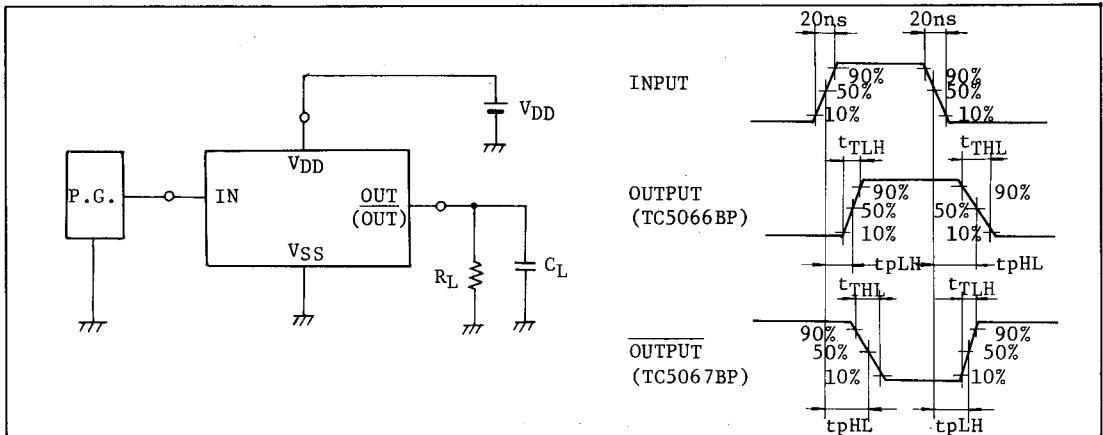
\* R<sub>L</sub> = 20 kΩ

# TC5066BP, TC5067BP

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

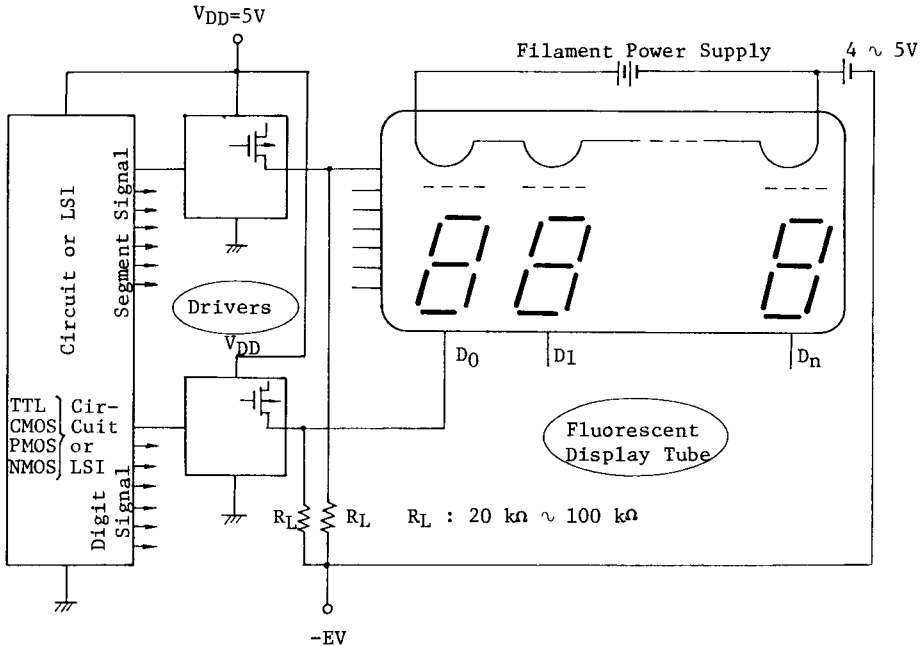
| CHARACTERISTIC                       | SYMBOL    | TEST CONDITIONS           | VDD(V) | MIN. | TYP. | MAX. | UNIT          |
|--------------------------------------|-----------|---------------------------|--------|------|------|------|---------------|
|                                      |           |                           |        |      |      |      |               |
| Output Rise Time                     | $t_{TLH}$ | $R_L = 20\text{ k}\Omega$ | 5      | -    | 100  | 200  | ns            |
|                                      |           |                           | 10     | -    | 50   | 100  |               |
|                                      |           |                           | 15     | -    | 40   | 80   |               |
| Output Fall Time                     | $t_{THL}$ | $R_L = 20\text{ k}\Omega$ | 5      | -    | 5.0  | 8.0  | $\mu\text{s}$ |
|                                      |           |                           | 10     | -    | 5.0  | 8.0  |               |
|                                      |           |                           | 15     | -    | 5.0  | 8.0  |               |
| (LOW-HIGH)<br>Propagation Delay Time | $t_{pLH}$ | $R_L = 20\text{ k}\Omega$ | 5      | -    | 200  | 500  | ns            |
|                                      |           |                           | 10     | -    | 100  | 250  |               |
|                                      |           |                           | 15     | -    | 80   | 200  |               |
| (HIGH-LOW)<br>Propagation Delay Time | $t_{pHL}$ | $R_L = 20\text{ k}\Omega$ | 5      | -    | 2.0  | 4.0  | $\mu\text{s}$ |
|                                      |           |                           | 10     | -    | 2.0  | 4.0  |               |
|                                      |           |                           | 15     | -    | 2.0  | 4.0  |               |
| Input Capacity                       | $C_{IN}$  |                           |        | -    | 5    | 7.5  | pF            |

## SWITCHING TIME TEST CIRCUIT AND WAVEFORM



EXAMPLES OF APPLICABLE CIRCUITS

(1) Fluorescent Display Tube Driving Circuit



(2) Interface between CMOS and PMOS

