

## MM74C906 • MM74C907

### Hex Open Drain N-Channel Buffers • Hex Open Drain P-Channel Buffers

#### General Description

The MM74C906 and MM74C907 buffers employ monolithic CMOS technology in achieving open drain outputs. The MM74C906 consists of six inverters driving six N-channel devices; and the MM74C907 consists of six inverters driving six P-channel devices. The open drain feature of these buffers makes level shifting or wire AND and wire OR functions by just the addition of pull-up or pull-down resistors. All inputs are protected from static discharge by diode clamps to  $V_{CC}$  and to ground.

#### Features

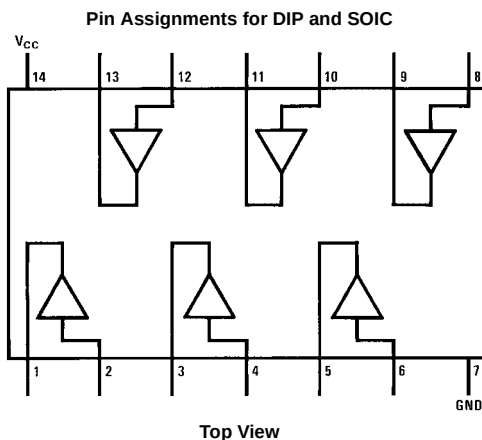
- Wide supply voltage range: 3V to 15V
- Guaranteed noise margin: 1V
- High noise immunity:  $0.45 V_{CC}$  (typ.)
- High current sourcing and sinking open drain outputs

#### Ordering Code:

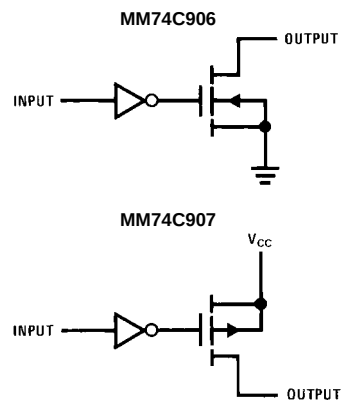
| Order Number | Package Number | Package Description                                                          |
|--------------|----------------|------------------------------------------------------------------------------|
| MM74C906M    | M14A           | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow |
| MM74C906N    | N14A           | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide       |
| MM74C907N    | N14A           | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide       |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

#### Connection Diagram



#### Logic Diagrams



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**Absolute Maximum Ratings**(Note 1)

|                             |                         |
|-----------------------------|-------------------------|
| Voltage at Any Input Pin    | −0.3V to $V_{CC}$ +0.3V |
| Voltage at Any Output Pin   |                         |
| Operating Temperature Range | −40°C to +85°C          |
| Storage Temperature Range   | −65°C to +150°C         |
| Power Dissipation           |                         |
| Dual-In-Line                | 700 mW                  |
| Small Outline               | 500 mW                  |

|                            |           |
|----------------------------|-----------|
| Operating $V_{CC}$ Range   | 3V to 15V |
| Absolute Maximum $V_{CC}$  | 18V       |
| Lead Temperature ( $T_L$ ) |           |
| (Soldering, 10 seconds)    | 260°C     |

**Note 1:** "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

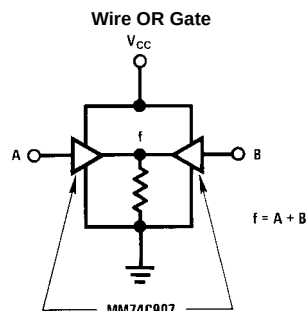
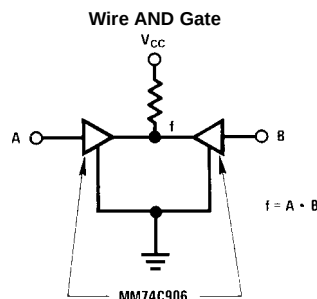
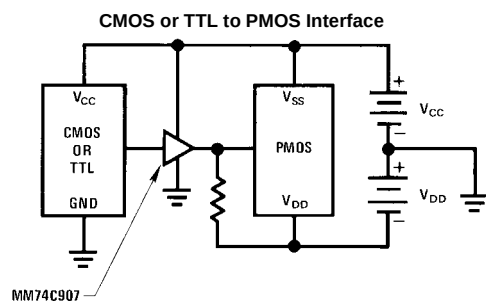
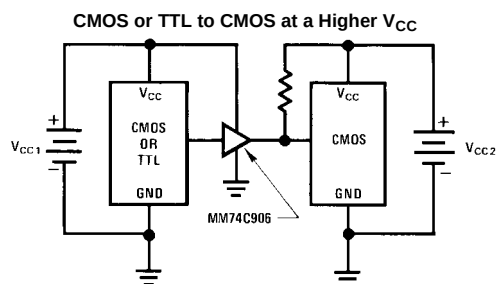
**DC Electrical Characteristics**

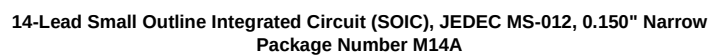
Min/Max limits apply across temperature range unless otherwise noted

| Symbol                      | Parameter                 | Conditions                                                                                                                       | Min             | Typ          | Max      | Units    |
|-----------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|----------|----------|
| <b>CMOS TO CMOS</b>         |                           |                                                                                                                                  |                 |              |          |          |
| $V_{IN(1)}$                 | Logical "1" Input Voltage | $V_{CC} = 5V$<br>$V_{CC} = 10V$                                                                                                  | 3.5<br>8.0      |              |          | V<br>V   |
| $V_{IN(0)}$                 | Logical "0" Input Voltage | $V_{CC} = 5V$<br>$V_{CC} = 10V$                                                                                                  |                 |              | 1.5<br>2 | V<br>V   |
| $I_{IN(1)}$                 | Logical "1" Input Current | $V_{CC} = 15V, V_{IN} = 15V$                                                                                                     |                 | 0.005        | 1        | $\mu A$  |
| $I_{IN(0)}$                 | Logical "0" Input Current | $V_{CC} = 15V, V_{IN} = 0V$                                                                                                      | −1.0            | −0.005       |          | $\mu A$  |
| $I_{CC}$                    | Supply Current            | $V_{CC} = 15V$ , Output Open                                                                                                     |                 | 0.05         | 15       | $\mu A$  |
|                             | Output Leakage            |                                                                                                                                  |                 |              |          |          |
|                             | MM74C906                  | $V_{CC} = 4.75V, V_{IN} = V_{CC} - 1.5V$<br>$V_{CC} = 4.75V, V_{OUT} = 18V$                                                      |                 | 0.005        | 5        | $\mu A$  |
|                             | MM74C907                  | $V_{CC} = 4.75V, V_{IN} = 1V + 0.1 V_{CC}$<br>$V_{CC} = 4.75V, V_{OUT} = V_{CC} - 18V$                                           |                 | 0.005        | 5        | $\mu A$  |
| <b>CMOS/LPTTL INTERFACE</b> |                           |                                                                                                                                  |                 |              |          |          |
| $V_{IN(1)}$                 | Logical "1" Input Voltage | $V_{CC} = 4.75V$                                                                                                                 | $V_{CC} - 1.5V$ |              |          | V        |
| $V_{IN(0)}$                 | Logical "0" Input Voltage | $V_{CC} = 4.75V$                                                                                                                 |                 |              | 0.8      | V        |
| <b>OUTPUT DRIVE CURRENT</b> |                           |                                                                                                                                  |                 |              |          |          |
|                             | MM74C906                  | $V_{CC} = 4.75V, V_{IN} = 1V + 0.1 V_{CC}$<br>$V_{CC} = 4.75V, V_{OUT} = 0.5V$<br>$V_{CC} = 4.75V, V_{OUT} = 1.0V$               | 2.1<br>4.2      | 8.0<br>12.0  |          | mA<br>mA |
|                             | MM74C907                  | $V_{CC} = 4.75V, V_{IN} = V_{CC} - 1.5V$<br>$V_{CC} = 4.75V, V_{OUT} = V_{CC} - 0.5V$<br>$V_{CC} = 4.75V, V_{OUT} = V_{CC} - 1V$ | −1.05<br>−2.1   | −1.5<br>−3.0 |          | mA<br>mA |
|                             | MM74C906                  | $V_{CC} = 10V, V_{IN} = 2V$<br>$V_{CC} = 10V, V_{OUT} = 0.5V$<br>$V_{CC} = 10V, V_{OUT} = 1V$                                    | 4.2<br>8.4      | 20<br>30     |          | mA<br>mA |
|                             | MM74C907                  | $V_{CC} = 10V, V_{IN} = 8V$<br>$V_{CC} = 10V, V_{OUT} = 9.5V$<br>$V_{CC} = 10V, V_{OUT} = 9V$                                    | −2.1<br>−4.2    | −4.0<br>−8.0 |          | mA<br>mA |

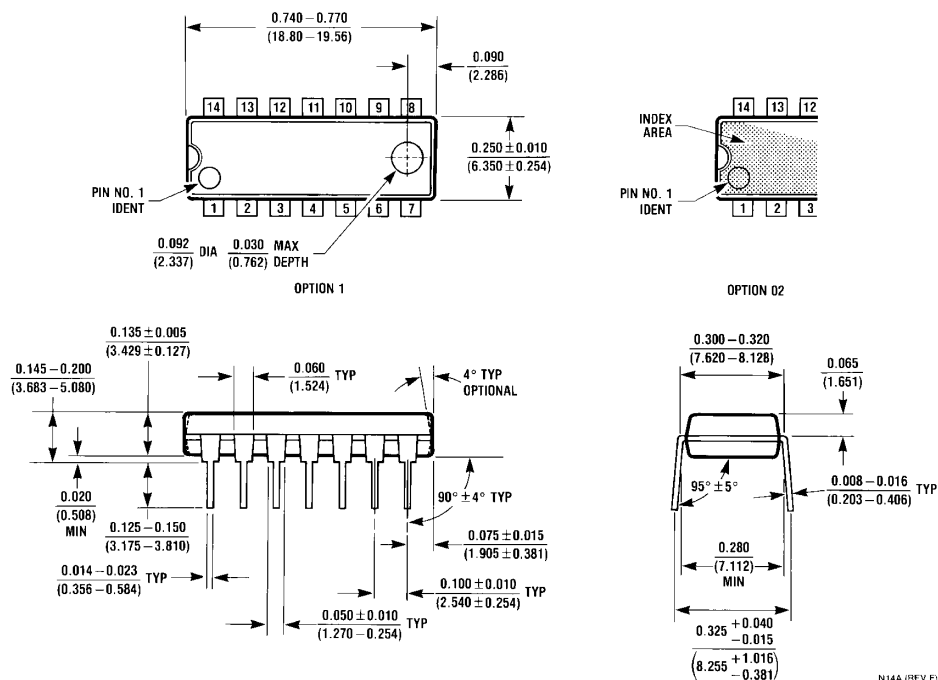
**AC Electrical Characteristics** (Note 2) $T_A = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$ , unless otherwise specified

| Symbol    | Parameter                                              | Conditions                                | Min | Typ | Max            | Units |
|-----------|--------------------------------------------------------|-------------------------------------------|-----|-----|----------------|-------|
| $t_{pd}$  | Propagation Delay Time<br>to a Logical "0"<br>MM74C906 | $V_{CC} = 5.0\text{V}$ , $R = 10\text{k}$ |     |     | 150            | ns    |
|           |                                                        | $V_{CC} = 10\text{V}$ , $R = 10\text{k}$  |     |     | 75             | ns    |
|           |                                                        | $V_{CC} = 5.0\text{V}$ (Note 3)           |     |     | $150 + 0.7 RC$ | ns    |
|           |                                                        | $V_{CC} = 10\text{V}$ (Note 3)            |     |     | $75 + 0.7 RC$  | ns    |
| $t_{pd}$  | Propagation Delay Time<br>to a Logical "1"<br>MM74C906 | $V_{CC} = 5.0\text{V}$ (Note 3)           |     |     | $150 + 0.7 RC$ | ns    |
|           |                                                        | $V_{CC} = 10\text{V}$ (Note 3)            |     |     | $75 + 0.7 RC$  | ns    |
|           |                                                        | $V_{CC} = 5.0\text{V}$ , $R = 10\text{k}$ |     |     | 150            | ns    |
|           |                                                        | $V_{CC} = 10\text{V}$ , $R = 10\text{k}$  |     |     | 75             | ns    |
| $C_{IN}$  | Input Capacitance                                      | (Note 4)                                  |     | 5.0 |                | pF    |
| $C_{OUT}$ | Output Capacity                                        | (Note 4)                                  |     | 20  |                | pF    |
| $C_{PD}$  | Power Dissipation Capacity                             | (Note 5) Per Buffer                       |     | 30  |                | pF    |

**Note 2:** AC Parameters are guaranteed by DC correlated testing.**Note 3:** "C" used in calculating propagation includes output load capacity ( $C_L$ ) plus device output capacity ( $C_{OUT}$ ).**Note 4:** Capacitance is guaranteed by periodic testing.**Note 5:**  $C_{PD}$  determines the no load AC power consumption of any CMOS device. For complete explanation see Family Characteristics Application Note, AN-90. (Assumes outputs are open).**Typical Applications****Note:** Can be extended to more than 2 inputs.**Note:** Can be extended to more than 2 inputs.**Note:**  $V_{CC} + V_{DD} \leq 18\text{V}$  $V_{CC} \leq 15\text{V}$ 



# Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide  
Package Number N14A

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