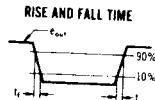
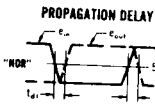
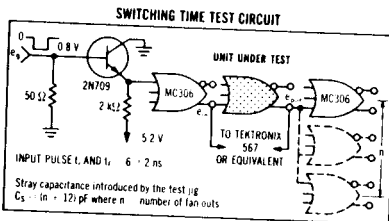
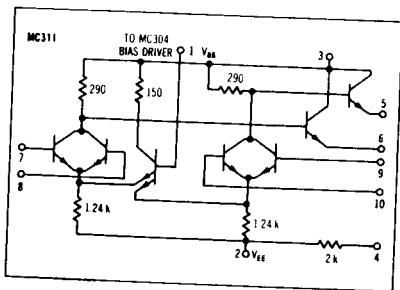
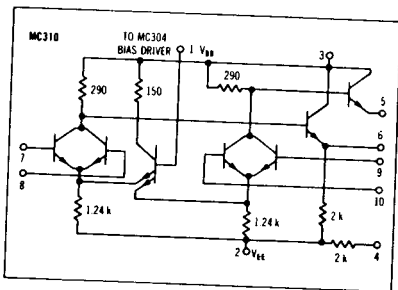
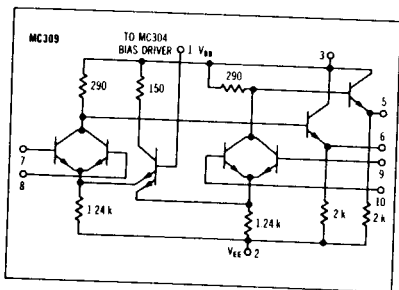
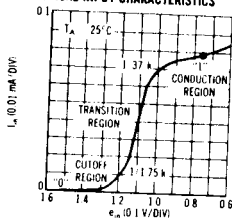


MC309 · MC310 · MC311

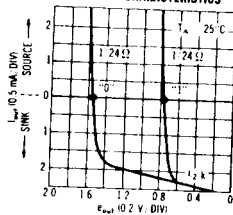
Dual 2-input gates that provide the positive logic "NOR" function. MC309 has two output pull-down resistors; MC310 has one of the output pull-down resistors optional; MC311 omits one output pull-down resistor and has the second optional.



TYPICAL INPUT CHARACTERISTICS



TYPICAL OUTPUT CHARACTERISTICS



# MC309, MC310, MC311 (continued)

## ELECTRICAL CHARACTERISTICS

| Characteristic                                      | Test Conditions        |                        |                        |                        |                        |                        |                        |                        |                        |                        | Test Limits |        |        |        |        |        | Unit |      |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------|--------|--------|--------|--------|--------|------|------|
|   | V <sub>CC</sub> ± 1%   |                        |                        |                        |                        |                        |                        |                        |                        |                        | -55°C       |        | +25°C  |        | +125°C |        |      |      |
|   | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | V <sub>CC</sub> Pin No | Min         | Max    | Min    | Max    | Min    | Max    |      |      |
| Power Supply  | MC309, MC310           | —                      | —                      | —                      | 2.7 A, 10              | 1                      | —                      | —                      | —                      | 3                      | 1/2 (7)     | —      | 13.0   | —      | 13.0   | —      | 17.0 | mAdc |
| Stable Current                                      | MC311                  | —                      | —                      | —                      | 2.7 A, 9, 10           | 1                      | —                      | —                      | 3                      | 1/2 (7)                | —           | 10.1   | —      | 10.1   | —      | 9.3    | mAdc |      |
| Input Current                                       | 7                      | —                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | I <sub>in</sub> (7)    | —           | —      | —      | —      | —      | —      | μA   |      |
|   | 8                      | —                      | —                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | I <sub>in</sub> (8)    | —           | —      | —      | —      | —      | —      | μA   |      |
|   | 9                      | —                      | —                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | I <sub>in</sub> (9)    | —           | —      | —      | —      | —      | —      | μA   |      |
|   | 10                     | —                      | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | —                      | 3                      | I <sub>in</sub> (10)   | —           | —      | —      | —      | —      | —      | μA   |      |
| "1000" Legend "1" Output Voltage                    | —                      | —                      | 7                      | 2.8, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (8)     | -0.825      | -0.845 | -0.860 | -0.785 | -0.825 | -0.855 | Vdc  |      |
|   | —                      | —                      | 8                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (8)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
|   | —                      | —                      | 9                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (9)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
|   | —                      | —                      | 10                     | 2.7, 9, 9              | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (9)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
| "1000" Legend "0" Output Voltage                    | —                      | 7                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (8)     | -1.560      | -1.850 | -1.660 | -1.750 | -1.360 | -1.675 | Vdc  |      |
|   | —                      | 8                      | —                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (8)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
|   | —                      | 9                      | —                      | 2.7, 9, 10             | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (9)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
|   | —                      | 10                     | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | —                      | 3                      | V <sub>o</sub> (9)     | ↓           | ↓      | ↓      | ↓      | ↓      | ↓      | Vdc  |      |
| "1000" Output Voltage Change (No load to full load) | —                      | —                      | —                      | 2.7, 9, 9, 10          | 1                      | —                      | 0⊙                     | 3                      | ΔV <sub>o</sub> (8)    | —                      | -0.055      | —      | -0.055 | —      | -0.050 | —      | Vdc  |      |
|   | —                      | —                      | —                      | 2.7, 9, 9, 10          | 1                      | —                      | 0⊙                     | 3                      | ΔV <sub>o</sub> (9)    | —                      | -0.055      | —      | -0.055 | —      | -0.050 | —      | Vdc  |      |
| "1000" Extension Input/Output Voltage               | —                      | —                      | —                      | 2.8, 9, 10             | 1                      | 7⊙                     | —                      | 3                      | V <sub>o</sub> (8)     | —                      | -0.60       | —      | -0.35  | —      | -0.60  | —      | Vdc  |      |
|   | —                      | —                      | —                      | 2.7, 9, 10             | 1                      | 8⊙                     | —                      | 3                      | V <sub>o</sub> (8)     | —                      | —           | —      | —      | —      | —      | —      | Vdc  |      |
|   | —                      | —                      | —                      | 2.7, 9, 10             | 1                      | 9⊙                     | —                      | 3                      | V <sub>o</sub> (9)     | —                      | —           | —      | —      | —      | —      | —      | Vdc  |      |
|   | —                      | —                      | —                      | 2.7, 9, 9              | 1                      | 10⊙                    | —                      | 3                      | V <sub>o</sub> (9)     | —                      | —           | —      | —      | —      | —      | —      | Vdc  |      |
| Bunching Times                                      | Pulse In               | Pulse Out              |                        |                        |                        |                        |                        |                        |                        |                        |             |        |        |        |        |        |      |      |
| Propagation Delay Time                              | 7                      | 6                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | 3                      | t <sub>pd</sub> (8)    | Typ                    | Max         | Typ    | Max    | Typ    | Max    | ns     |      |      |
|   | 10                     | 8                      | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | 3                      | t <sub>pd</sub> (9)    | 5.5                    | 10.0        | 6.0    | 11.0   | 7.0    | 12.0   |        |      |      |
|   | 7                      | 6                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | 3                      | t <sub>pd</sub> (8)    | 5.5                    | 10.0        | 6.0    | 11.0   | 7.0    | 12.0   |        |      |      |
|   | 10                     | 8                      | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | 3                      | t <sub>pd</sub> (9)    | 6.5                    | 13.0        | 7.0    | 13.5   | 9.5    | 15.0   |        |      |      |
| Rise Time   | 7                      | 6                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | 3                      | t <sub>r</sub> (8)     | 6.0                    | 12.0        | 6.0    | 12.0   | 7.0    | 13.5   | ns     |      |      |
|   | 10                     | 8                      | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | 3                      | t <sub>r</sub> (9)     | 6.0                    | 12.0        | 6.0    | 12.0   | 7.0    | 13.5   |        |      |      |
| Fall Time   | 7                      | 6                      | —                      | 2.8, 9, 10             | 1                      | —                      | —                      | 3                      | t <sub>f</sub> (8)     | 7.0                    | 13.0        | 7.5    | 14.0   | 9.5    | 17.0   | ns     |      |      |
|   | 10                     | 8                      | —                      | 2.7, 9, 9              | 1                      | —                      | —                      | 3                      | t <sub>f</sub> (9)     | 7.0                    | 13.0        | 7.5    | 14.0   | 9.5    | 17.0   |        |      |      |

Pins not listed are left open. For MC310, connect pin 4 to pin 5 for all tests. ⊙ Input voltage is adjusted to obtain dv<sup>1000</sup>/dv<sub>in</sub> = 6.  
 ⊙ Current test conditions: no load = 0; full load = -2.5 mA; dc = 5%.

## SWITCHING CHARACTERISTICS (10% to 90% distribution)

