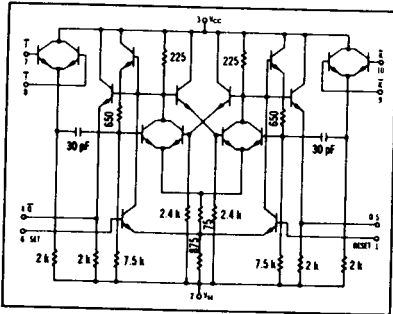


MC308

AC-coupled J-K flip-flop with dc Set and Reset inputs and buffered outputs for counter and shift register applications up to 15 MHz.



TRANSFER CHARACTERISTICS

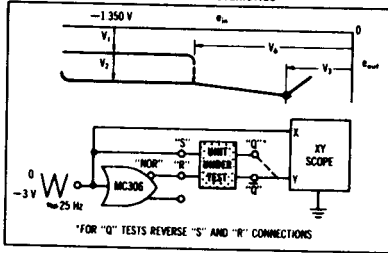


FIGURE 1 — SWITCHING TIME TEST CIRCUIT AND WAVEFORMS

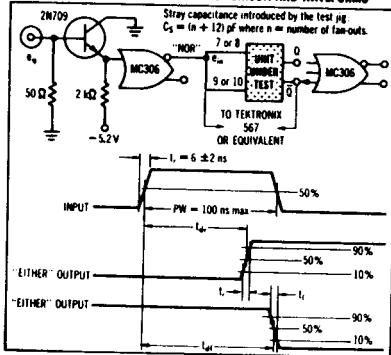


FIGURE 2 — INPUT WAVEFORM TO ESTABLISH MINIMUM TOGGLE FREQUENCY

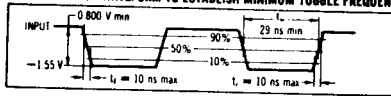


FIGURE 3 — SENSITIVITY (NO TOGGLE)

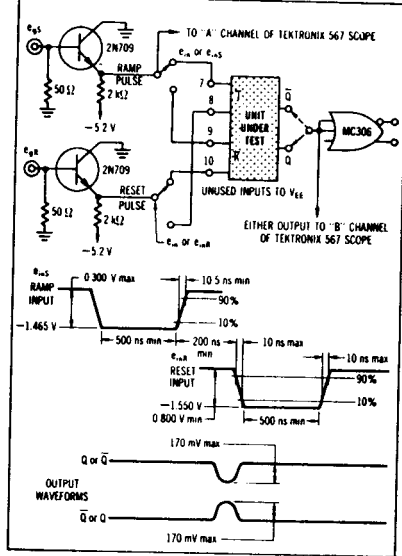
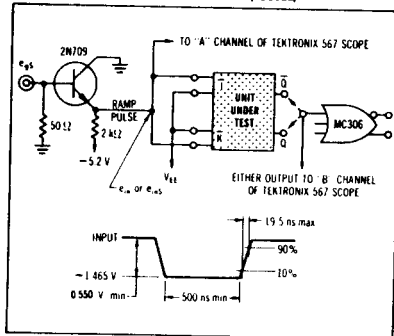


FIGURE 4 — SENSITIVITY (TOGGLE)



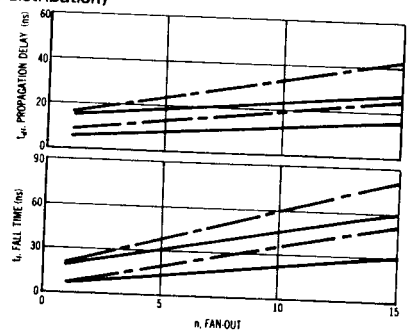
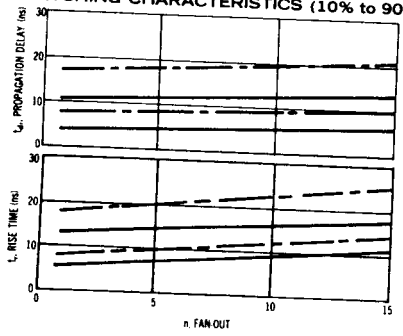
MC308 (continued)

ELECTRICAL CHARACTERISTICS

| Characteristic                    | Test Conditions            |                                 |                            |                            |                            | dV <sub>OL</sub> | I <sub>OL</sub> | Ground | Symbol                 | Test Limits |        |       |        |        |        | Unit            |
|-----------------------------------|----------------------------|---------------------------------|----------------------------|----------------------------|----------------------------|------------------|-----------------|--------|------------------------|-------------|--------|-------|--------|--------|--------|-----------------|
|                                   | V <sub>CC</sub> = 1%       |                                 |                            |                            |                            |                  |                 |        |                        | Test Limits |        |       |        |        |        |                 |
|                                   | V <sub>OL</sub><br>Pin No. | V <sub>OL(max)</sub><br>Pin No. | V <sub>OL</sub><br>Pin No. | V <sub>OL</sub><br>Pin No. | V <sub>OL</sub><br>Pin No. |                  |                 |        |                        | -55°C       |        | +25°C |        | +125°C |        |                 |
| Power Supply Drain Current        | ---                        | 7, 10                           | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | V <sub>OL</sub> (1)    | Min         | Max    | Min   | Max    | Min    | Max    | mA              |
| Input Current                     | 7                          | ---                             | ---                        | ---                        | 1, 2, 6, 8, 9, 10          | ---              | ---             | 3      | I <sub>IL</sub> (7)    | ---         | 22.0   | ---   | ---    | ---    | ---    | μA              |
|                                   | 8                          | ---                             | ---                        | ---                        | 1, 2, 6, 7, 9, 10          | ---              | ---             | 3      | I <sub>IL</sub> (8)    | ---         | ---    | ---   | ---    | ---    | ---    | μA              |
|                                   | 9                          | ---                             | ---                        | ---                        | 1, 2, 6, 7, 8, 10          | ---              | ---             | 3      | I <sub>IL</sub> (9)    | ---         | ---    | ---   | ---    | ---    | ---    | μA              |
|                                   | 10                         | ---                             | ---                        | ---                        | 1, 2, 6, 7, 8, 9           | ---              | ---             | 3      | I <sub>IL</sub> (10)   | ---         | ---    | ---   | ---    | ---    | ---    | μA              |
| "0" Logical "1" Output Voltage    | ---                        | ---                             | 6, 8                       | ---                        | 1, 2, 7, 8, 9, 10          | ---              | ---             | 3      | V <sub>O</sub> (5)     | -0.825      | -0.945 | 0.690 | 0.795  | 0.525  | 0.655  | V <sub>CC</sub> |
| "0" Logical "0" Output Voltage    | ---                        | ---                             | 10                         | ---                        | 2, 6, 7, 8, 9, 10          | ---              | ---             | 3      | V <sub>O</sub> (5)     | -1.560      | -1.890 | 1.465 | 1.750  | -1.340 | -1.675 | V <sub>CC</sub> |
| "1" Logical "1" Output Voltage    | ---                        | ---                             | 10                         | ---                        | 2, 6, 7, 8, 9, 10          | ---              | ---             | 3      | V <sub>O</sub> (4)     | -0.825      | -0.945 | 0.690 | 0.795  | 0.525  | 0.655  | V <sub>CC</sub> |
| "1" Logical "0" Output Voltage    | ---                        | ---                             | 6, 8                       | ---                        | 1, 2, 7, 8, 9, 10          | ---              | ---             | 3      | V <sub>O</sub> (4)     | -1.560      | -1.850 | 1.465 | -1.750 | -1.340 | -1.675 | V <sub>CC</sub> |
| "0" Output Voltage Change         | ---                        | 6                               | ---                        | ---                        | 1, 2, 7, 8, 9, 10          | ---              | 5, 10           | 3      | ΔV <sub>O</sub> (5)    | ---         | 0.055  | ---   | 0.055  | ---    | 0.060  | Volts           |
| "1" Output Voltage Change         | ---                        | 3                               | ---                        | ---                        | 2, 6, 7, 8, 9, 10          | ---              | 4, 10           | 3      | ΔV <sub>O</sub> (4)    | ---         | 0.055  | ---   | -0.055 | ---    | -0.060 | Volts           |
| "0" Saturation Breakpoint Voltage | ---                        | ---                             | ---                        | ---                        | 1, 2, 7, 8, 9, 10          | 6, 11            | ---             | 3      | V <sub>I</sub> (5)     | ---         | -0.50  | ---   | -0.65  | ---    | 0.75   | V <sub>CC</sub> |
| "1" Saturation Breakpoint Voltage | ---                        | ---                             | ---                        | ---                        | 2, 6, 7, 8, 9, 10          | 1, 11            | ---             | 3      | V <sub>I</sub> (4)     | ---         | 0.50   | ---   | 0.65   | ---    | 0.75   | V <sub>CC</sub> |
| "0" or "1" Latch Voltage          | ---                        | ---                             | ---                        | ---                        | 2, 7, 8, 9, 10             | 1, 6, 11         | ---             | 3      | V <sub>I</sub> (1, 6)  | -1.316      | -1.34  | -1.09 | -1.21  | -0.93  | 1.07   | V <sub>CC</sub> |
| Toggle Frequency                  | Pulse In                   | Pulse Out                       | ---                        | ---                        | 1, 2, 6, 8                 | ---              | ---             | 3      | f <sub>TOG</sub>       | ---         | ---    | 15    | ---    | ---    | ---    | MHz             |
| Sensitivity (No Toggle)           | 7, 10                      | 5                               | ---                        | ---                        | 1, 2, 6, 8                 | ---              | ---             | 3      | ---                    | ---         | ---    | ---   | ---    | ---    | ---    | ---             |
| Sensitivity (No Toggle)           | 7, 10                      | 4                               | ---                        | ---                        | 1, 2, 6, 8                 | ---              | ---             | 3      | ---                    | ---         | ---    | ---   | ---    | ---    | ---    | ---             |
| Sensitivity (Toggle)              | 8, 9                       | 5                               | ---                        | ---                        | 1, 2, 6, 7, 10             | ---              | ---             | 3      | ---                    | ---         | ---    | ---   | ---    | ---    | ---    | ---             |
| Sensitivity (Toggle)              | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | ---                    | ---         | ---    | ---   | ---    | ---    | ---    | ---             |
| Switching Times                   | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | t <sub>PL</sub> (4, 5) | Typ         | Max    | Typ   | Max    | Typ    | Max    | ns              |
| Propagation Delay                 | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | t <sub>PL</sub> (4, 5) | 7.0         | 11.5   | 7.0   | 12.5   | 9.5    | 18.5   | ns              |
| Rise Time                         | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | t <sub>R</sub> (4, 5)  | 8.5         | 14.0   | 8.5   | 14.5   | 10.0   | 16.5   | ns              |
| Fall Time                         | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | t <sub>F</sub> (4, 5)  | 8.5         | 13.0   | 8.5   | 13.0   | 10.0   | 18.5   | ns              |
|                                   | 7, 10                      | 4, 5                            | ---                        | ---                        | 1, 2, 6, 8, 9              | ---              | ---             | 3      | t <sub>F</sub> (4, 5)  | 7.5         | 14.5   | 8.5   | 15.5   | 11.5   | 20.0   | ns              |

Pin# not listed is a left open  
 1) Input voltage is adjusted to obtain dV<sub>OL</sub> of 0.  
 2) Apply momentary V<sub>OL</sub> to set output, then V<sub>OL</sub> for measurement.  
 3) Current test conditions, no load -- 0 to full load -- 2.5 mA ΔCC = 5%.  
 4) Input voltage is adjusted to obtain dV<sub>OL</sub>/dV<sub>IN</sub> = ∞.

SWITCHING CHARACTERISTICS (10% to 90% distribution)



— -55°C and +25°C  
 - - - +125°C