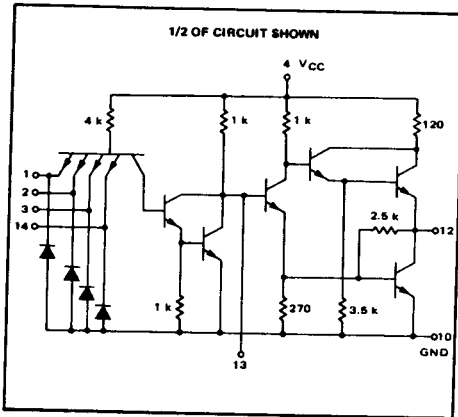


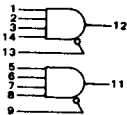
"OR" EXPANDABLE
DUAL 4-INPUT "AND" GATE

MTTL | MC500/400 series

MC527 · MC577
MC427 · MC477



This device consists of two 4-input logical AND gates. Each gate has a single point connected externally which enables a single wire OR expansion using the MC528 expander. Up to 10 input gates can be OR'ed together without adversely affecting fan out, noise immunity, or dynamic characteristics.



Positive Logic:

$$12 = 1 \cdot 2 \cdot 3 \cdot 14 + \text{Exp.}$$

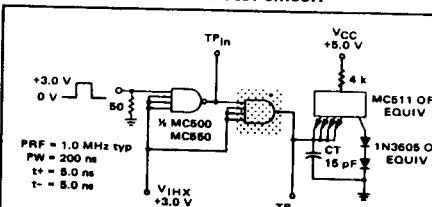
Negative Logic:

$$12 = 1 + 2 + 3 + 14 + \text{Exp.}$$

Total Power Dissipation = 38 mW typ/pkg
Propagation Delay Time = 10 ns typ

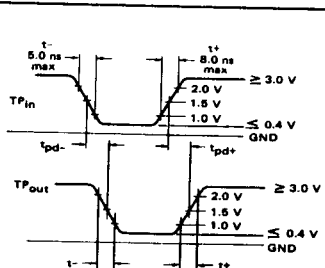
| TYPE NO. | INPUT LOADING FACTOR | (I _I) | OUTPUT DRIVE | (I _{OL}) | TEMPERATURE RANGE |
|----------|----------------------|-------------------|-----------------------|--------------------|-------------------|
| MC527 | 1 | (-1.33 mA) | 15 MC500 series Gates | (20 mA) | -55°C to +125°C |
| MC577 | | | 7 MC500 series Gates | (10 mA) | |
| MC427 | 1 | (-1.66 mA) | 12 MC400 series Gates | (20 mA) | 0° to +75°C |
| MC477 | | | 6 MC400 series Gates | (10 mA) | |

SWITCHING TIME TEST CIRCUIT



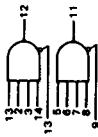
C_T = the total parasitic capacitance which includes probe, wiring and load capacitances.
Scope rise time < 1.0 ns
Probe capacitance < 8.0 pF
Ground inputs to all gates not under test.
*Expander pins should be open during test.

VOLTAGE WAVEFORMS AND DEFINITIONS



ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates is tested in the same manner. Further test procedures are shown for only one input of the gates under test. To complete testing, sequence through remaining inputs.



TEST CURRENT - VOLTAGE VALUES

| Characteristic | Symbol | Pin Under Test | -55°C | | +25°C | | +125°C | | 0°C | | +25°C | | +75°C | | TEST CURRENT - VOLTAGE VALUES | | | | | | | | | | | | | |
|-----------------------------------|--------------|----------------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------------------------------|----------|----------|----------|----------|----------|----------|-------------|-------------|-------------|-----------|-----------|---|---|
| | | | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | | | | |
| Forward Current | I_F | 1 | -1.33 | -1.33 | -1.33 | -1.33 | -1.66 | -1.66 | -1.66 | -1.66 | -1.66 | -1.66 | -1.66 | -1.66 | I_{CC} | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | |
| Leakage Current | I_L | 1 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | Pr | Std | Std | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | | |
| Inverse Beta Current | I_{β} | 1 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | Pr | Std | Std | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | | |
| Breaddown Voltage | $BV_{in(0)}$ | 1 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | Pr | Std | Std | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | | |
| Breaddown Voltage | $BV_{in(1)}$ | 1 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | Pr | Std | Std | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | | |
| Output Voltage | $V_{out(0)}$ | 12 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 12 | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | |
| Short-Circuit Current | I_{SC} | 12 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 12 | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | |
| Output Voltage | V_{OL} | 12 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | -0.40 | 12 | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | |
| Output Voltage | V_{OH} | 12 | 2.8 | 3.1 | 3.3 | 3.0 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 12 | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} | | |
| Power Requirements (Total Device) | I_{max} | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Maximum Power Supply Current | I_{PDR} | 4 | 20 | 20 | 20 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Power Supply Drain | I_{PDL} | 4 | 22 | 22 | 22 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Switching Parameters | t_{pd} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Turn-On Delay | t_{on} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Turn-Off Delay | t_{off} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Rise Time | t_r | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Fall Time | t_f | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW:

| Characteristic | Symbol | Pin Under Test | I_{CC} | I_{OH} | I_{OL} | I_{in} | V_{IH} | V_{IL} | V_{OH} | V_{OL} | $V_{IH(0)}$ | $V_{OL(0)}$ | V_{CC} | V_{max} |
|-----------------------------------|--------------|----------------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|-------------|----------|-----------|
| Forward Current | I_F | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Leakage Current | I_L | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Inverse Beta Current | I_{β} | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Breaddown Voltage | $BV_{in(0)}$ | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Breaddown Voltage | $BV_{in(1)}$ | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Output Voltage | $V_{out(0)}$ | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Short-Circuit Current | I_{SC} | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Output Voltage | V_{OL} | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Output Voltage | V_{OH} | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Power Requirements (Total Device) | I_{max} | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Maximum Power Supply Current | I_{PDR} | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Power Supply Drain | I_{PDL} | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Switching Parameters | t_{pd} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Turn-On Delay | t_{on} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Turn-Off Delay | t_{off} | 1,12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Rise Time | t_r | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| Fall Time | t_f | 12 | - | - | - | - | - | - | - | - | - | - | - | - |

* Prime Fan-Out

570

570