

8-INPUT NOR/OR GATE

GENERAL DESCRIPTION

The MMC 4078 (intermediate or extended temperature range) are monolithic integrated circuits available in 14-lead dual-in-line plastic or ceramic package.

The MMC 4078 NOR/OR Gate provides the system designer with direct implementation of the positive-logic-8-input NOR and OR function and supplements the existing family of CMOS/MOS gates.

FEATURES

- Medium-speed operation t_{PHL} , $t_{PLH} = 75$ ns (typ.) at $V_{DD} = 10$ V
- 100% tested for quiescent current

ABSOLUTE MAXIMUM RATINGS

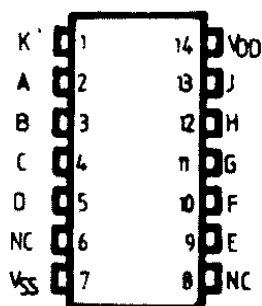
| | | | | |
|------------|--|---------|----------------|----|
| V_{DD}^* | Supply voltage: G and H types | -0.5 to | 20 | V |
| | E and F types | -0.5 to | 18 | V |
| V_i | Input voltage | -0.5 to | $V_{DD} + 0.5$ | V |
| I_i | DC input current (any one input) | | ± 10 | mA |
| P_{tot} | Total power dissipation (per package) | | 200 | mW |
| | Dissipation per output transistor for $T_A =$ full package-temperature range | | 100 | mW |
| T_A | Operating temperature: G and H types | -55 to | 125 | °C |
| | E and F types | -40 to | 85 | °C |
| T_{stg} | Storage temperature | -65 to | 150 | °C |

* All voltage values are referred to V_{SS} pin voltage

RECOMMENDED OPERATING CONDITIONS

| | | | | |
|------------|--------------------------------------|--------|----------|----|
| V_{DD}^* | Supply voltage: G and H types | 3 to | 18 | V |
| | E and F types | 3 to | 15 | V |
| V_i | Input voltage | 0 to | V_{DD} | V |
| T_A | Operating temperature: G and H types | -55 to | 125 | °C |
| | E and F types | -40 to | 85 | °C |

CONNECTION DIAGRAM



STATIC ELECTRICAL CHARACTERISTICS

(over recommended operating conditions)

| PARAMETER | | TEST CONDITIONS | | | | VALUES | | | | | | UNIT | | | |
|-----------------------------------|-----------------------|-----------------------|-----------------------|--------------------------------|------------------------|------------------|-------|-----------|-------|---------------|-------------------|-------|------|---------|---------|
| | | V _I (V) | V _O (V) | I _o (μ A) | V _{DD} (V) | T _{LOW} | | 25°C | | | T _{HIGH} | | | | |
| | | | | | | min. | max. | min. | typ. | max. | min. | | max. | | |
| I _L | Quiescent current | G, H types | 0/5 | | | 5 | | 0.25 | | 0.01 | 0.25 | | 7.5 | μ A | |
| | | | 0/10 | | | 10 | | 0.5 | | 0.01 | 0.5 | | 15 | | |
| | | | 0/15 | | | 15 | | 1 | | 0.01 | 1 | | 30 | | |
| | | | 0/20 | | | 20 | | 5 | | 0.02 | 5 | | 150 | | |
| | | E, F types | 0/5 | | | 5 | | 1 | | 0.01 | 1 | | 7.5 | | |
| | | | 0/10 | | | 10 | | 2 | | 0.01 | 2 | | 15 | | |
| | | | 0/15 | | | 15 | | 4 | | 0.01 | 4 | | 30 | | |
| V _{OH} | Output high voltage | | 0/5 | | < 1 | 5 | 4.95 | | 4.95 | | | 4.95 | | | V |
| | | | 0/10 | | < 1 | 10 | 9.95 | | 9.95 | | | 9.95 | | | |
| | | | 0/15 | | < 1 | 15 | 14.95 | | 14.95 | | | 14.95 | | | |
| V _{OL} | Output low voltage | | 5/0 | | < 1 | 5 | | 0.05 | | | 0.05 | | 0.05 | V | |
| | | | 10/0 | | < 1 | 10 | | 0.05 | | | 0.05 | | 0.05 | | |
| | | | 15/0 | | < 1 | 15 | | 0.05 | | | 0.05 | | 0.05 | | |
| V _{IH} | Input high voltage | | | 0.5/4.5 | < 1 | 5 | 3.5 | | 3.5 | | | 3.5 | | V | |
| | | | | 1/9 | < 1 | 10 | 7 | | 7 | | | 7 | | | |
| | | | | 1.5/13.5 | < 1 | 15 | 11 | | 11 | | | 11 | | | |
| V _{IL} | Input low voltage | | | 4.5/0.5 | < 1 | 5 | | 1.5 | | | 1.5 | | 1.5 | V | |
| | | | | 9/1 | < 1 | 10 | | 3 | | | 3 | | 3 | | |
| | | | | 13.5/1.5 | < 1 | 15 | | 4 | | | 4 | | 4 | | |
| I _{OH} | Output drive current | G, H types | 0/5 | 25 | | 5 | -2 | | -1.6 | -3.2 | | -1.15 | | mA | |
| | | | 0/5 | 46 | | 5 | -0.64 | | -0.51 | -1 | | -0.36 | | | |
| | | | 0/10 | 95 | | 10 | -1.6 | | -1.3 | -2.6 | | -0.9 | | | |
| | | | 0/15 | 135 | | 15 | -4.2 | | -3.4 | -6.8 | | -2.4 | | | |
| | | E, F types | 0/5 | 25 | | 5 | -1.53 | | -1.36 | -3.2 | | -1.1 | | | |
| | | | 0/5 | 46 | | 5 | -0.52 | | -0.44 | -1 | | -0.36 | | | |
| | | | 0/10 | 95 | | 10 | -1.3 | | -1.1 | -2.6 | | -0.9 | | | |
| | | | 0/15 | 135 | | 15 | -3.6 | | -3.0 | -6.8 | | -2.4 | | | |
| I _{OL} | Output sink current | G, H types | 0/5 | 0.4 | | 5 | 0.64 | | 0.51 | 1 | | 0.36 | mA | | |
| | | | 0/10 | 0.5 | | 10 | 1.6 | | 1.3 | 2.6 | | 0.9 | | | |
| | | | 0/15 | 1.5 | | 15 | 4.2 | | 3.4 | 6.8 | | 2.4 | | | |
| | | E, F types | 0/5 | 0.4 | | 5 | 0.52 | | 0.44 | 1 | | 0.36 | | | |
| | | | 0/10 | 0.5 | | 10 | 1.3 | | 1.1 | 2.6 | | 0.9 | | | |
| | | | 0/15 | 1.5 | | 15 | 3.6 | | 3.0 | 6.8 | | 2.4 | | | |
| I _{IH} / I _{IL} | Input leakage current | G, H types | 0/18 | Any input | | 18 | | ± 0.1 | | $\pm 10^{-5}$ | ± 0.1 | | | ± 1 | μ A |
| | | | | | | 15 | | ± 0.3 | | $\pm 10^{-5}$ | ± 0.3 | | | ± 1 | |
| C _i | Input capacitance | | | Any input | | | | | | 5 | 75 | | pF | | |

* T_{LOW} = -55°C for G, H devices; -40°C for E, F devices* T_{HIGH} = +125°C for G, H devices; +85°C for E, F devices

The Noise Margin for both "1" and "0" level is:

1 V min. with V_{DD} = 5 V2 V min. with V_{DD} = 10 V2.5 V min. with V_{DD} = 15 V

DYNAMIC ELECTRICAL CHARACTERISTICS

$t_A = 25^\circ\text{C}$, $C_L = 50 \text{ pF}$, $R_L = 200 \text{ kohm}$, typical temperature coefficient, for all $V_{DD} = 0.3\%/^\circ\text{C}$, all input rise and fall times = 20 ns).

| PARAMETER | TEST CONDITIONS | VALUES | | | UNIT | |
|---|-----------------|--------------|-----|------|------|-----|
| | | V_{DD} (V) | min | typ. | | max |
| t_{PHL} Propagation delay time t_{PLH} | | 5 | | 150 | 300 | ns |
| | | 10 | | 75 | 150 | |
| | | 15 | | 55 | 110 | |
| t_{TLH} Transition time t_{THL} | | 5 | | 100 | 200 | ns |
| | | 10 | | 50 | 100 | |
| | | 15 | | 40 | 80 | |

LOGIC DIAGRAM

