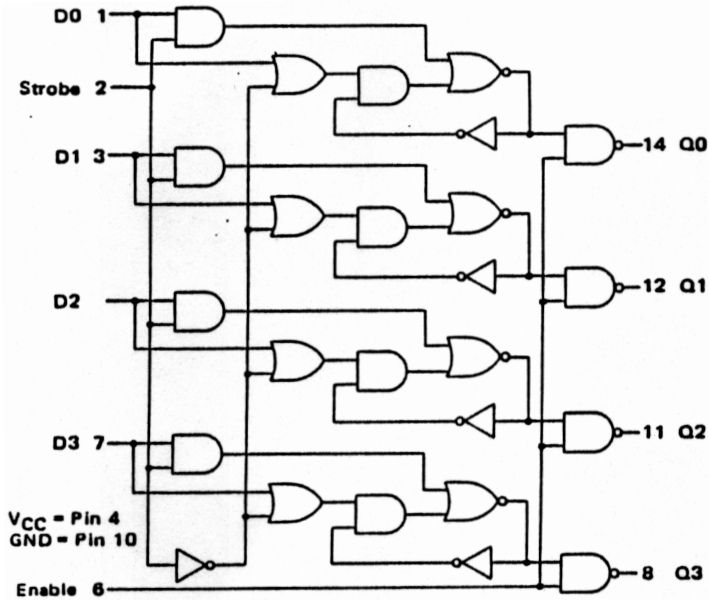


Legacy Device: *Motorola MC4335*



Two 5.0 k ohm pullup resistors are internally connected to V_{CC} and brought out on pins 9 and 13.

This monolithic device consists of four latch circuits with open collector outputs common Strobe input, and output enable input. The output of each latch will follow the data input when the Strobe input is in a logical "1" state. When the Strobe is in a logical "0" state, the latch will store the logic state of the data input just prior to the change of the Strobe from a "1" level to a "0" level.

The open collector outputs make this device useful for bussing or wire ORing outputs together. Two 5.0 k ohm resistor are available in the package to provide the passive pullup function in wired-OR or bussed operation. The output enable is useful where it is desirable to gate information out of the latches according to a predetermined timing scheme.

Input Loading Factor (MTTL 1 Loads):

Data Input (Strobe High) – 4335 = 4.2

Data Input (Strobe Low) – 4335 = 1.1

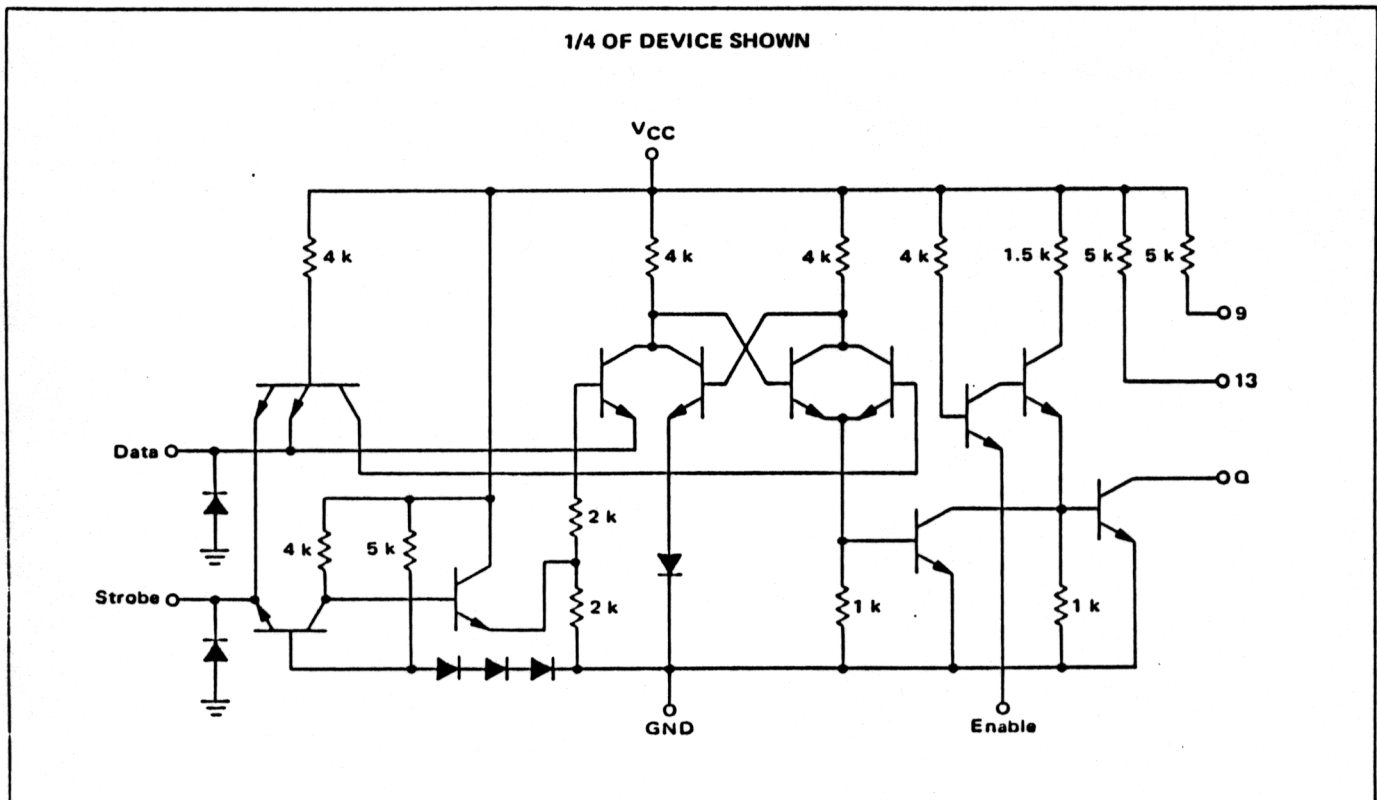
Output Enable – 4335 = 4.0

Output Loading Factor (TTL 1 Loads):

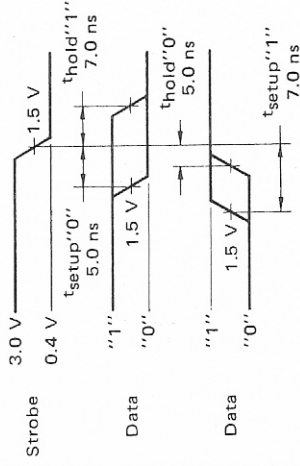
4335 = 7 (IOL = 9.3 mAdc)

Total Power Dissipation = 140 mW typ/pkg
 Propagation Delay Time - 25 ns typ

CIRCUIT SCHEMATIC



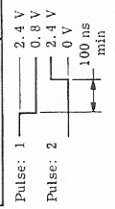
This quad latch consists of four gated latches that store data on the negative edge of the strobe input. Information must be present at the data inputs prior to the setup time and remain at the data inputs through the hold time to insure that it will be stored by the latch when the negative edge of the strobe occurs. The setup time is 7.0 ns for a logical "1" and 5.0 ns for a logical "0". Hold time is 7.0 ns after the strobe edge for a logical "1" and 5.0 ns prior to the strobe edge for a logical "0".



ELECTRICAL CHARACTERISTICS

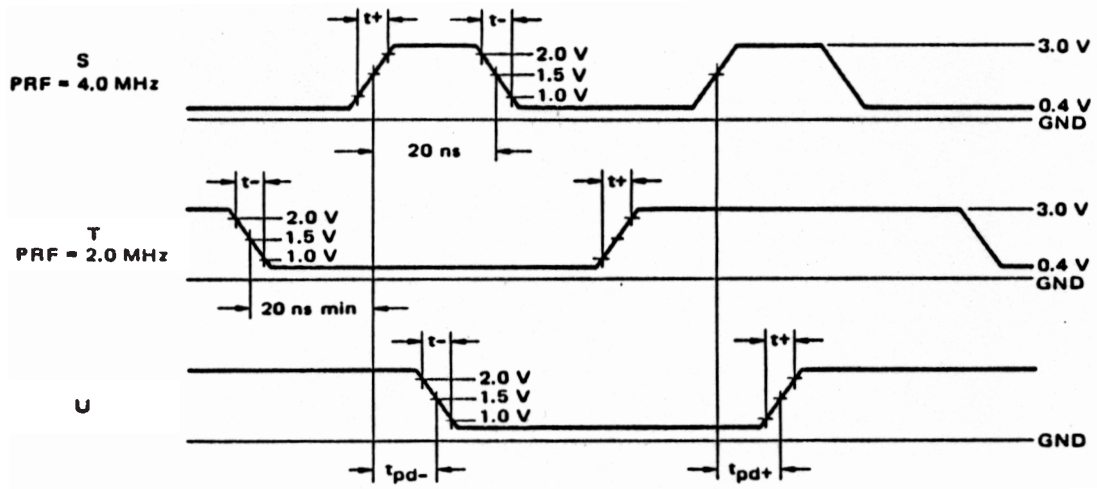
Test procedures are shown for the Strobe, Enable, and only one data input, and for one output. Other data inputs and outputs are tested in the same manner.

| Characteristic | Symbol | Pin Under Test | MC4335 Test Limits | | | | | | TEST CURRENT/VOLTAGE VALUES (All Temperatures) | | | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------|----------------|--------------------|------|-------|------|--------|------|--|-----------------|-----------------|-----------------|-----------------|----------------|----------------|------------------|------------------|-----------------|------------------|------------------|---|---|---|------------|--------------|--------------|
| | | | -55°C | | +25°C | | +125°C | | mA | | Volts | | | | | | | | Pulse | | | | | | | |
| | | | Min | Max | Min | Max | Min | Max | I _{OL} | I _{OH} | I _{in} | V _{IL} | V _{IH} | V _F | V _G | V _{out} | V _{max} | V _{CC} | V _{ccl} | V _{CCH} | 1 | 2 | | | | |
| Input | Forward Current | 1 | -5.6 | -5.6 | -5.6 | -5.6 | -5.6 | -5.6 | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | | | |
| | | 1 | -1.5 | -1.5 | -1.5 | -1.5 | -1.5 | -1.5 | - | - | - | 2 | - | - | 1 | 2 | - | - | - | - | - | - | - | 10 | | |
| | | 2 | -7.0 | -7.0 | -7.0 | -7.0 | -7.0 | -7.0 | - | - | - | - | - | - | 2 | 3,5,7 | - | - | - | - | - | - | - | - | - | |
| | | 6 | -5.3 | -5.3 | -5.3 | -5.3 | -5.3 | -5.3 | - | - | - | - | - | - | 6 | 1,3,5,6,7 | - | - | - | - | - | - | - | - | - | |
| Leakage Current | I _R | 1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 2,10 | | |
| | | 6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 1,3,5,7,10 | | |
| Breakdown Voltage | BV _{in} | 1 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,2,3,5,7,10 | |
| | | 6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2,10 | |
| Output | Output Voltage | 14 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 14 | - | - | - | - | 6 | 2,3,5,7 | - | - | - | - | - | - | - | - | - | 1,10 | |
| | | 14 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 14 | - | - | - | 1 | 2,6 | - | - | - | - | - | - | - | - | - | - | 10 | |
| Leakage Current | I _{CEX} | 14 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | - | 14 | - | 6 | 1,2,6 | - | 2 | - | - | - | - | - | - | - | - | - | 1,3,5,7,10 | |
| | | 14 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | - | 14 | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 | |
| Power Requirements (Total Device) | Maximum Power Supply Current | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6,10 |
| | | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,3,5,6,7,10 |
| Power Supply Drain | I _{PDH} | 4 | - | 42 | - | 42 | - | 42 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 |
| | | 4 | - | 34 | - | 34 | - | 34 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,3,5,6,7,10 |

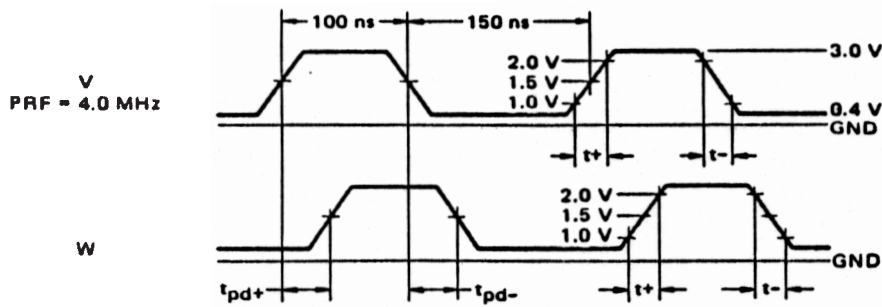


VOLTAGE WAVEFORMS

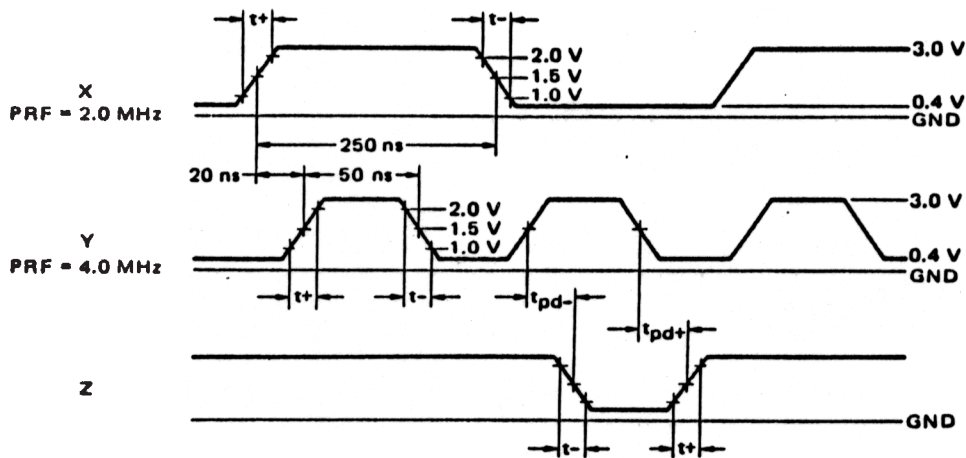
Strobe Input



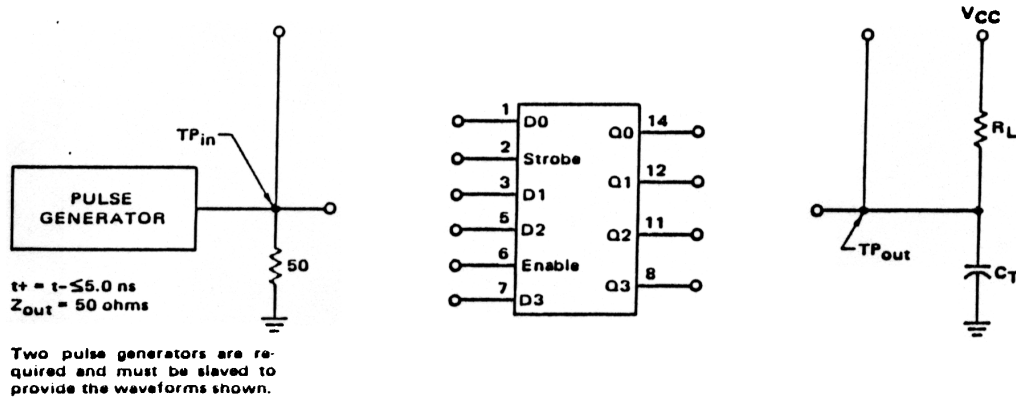
Data Inputs



Enable Inputs



SWITCHING TIME TEST CIRCUIT



R_L value given in Switching Time Test Procedures table.
 $C_T = 15 \text{ pF}$ = total parasitic capacitance, which includes probe, wiring, and load capacitances.
 High impedance probes ($>1.0 \text{ Megohm}$) must be used.

SWITCHING TIME TEST PROCEDURES ($T_A = 25^\circ\text{C}$)
 (Letters shown in test columns refer to waveforms.)

| TEST | SYMBOL | PIN UNDER TEST (In/Out) | INPUT | | | OUTPUT Pin 14 D0 | R_L Ohms | LIMITS (ns) Max |
|--------------------------|------------|-------------------------|----------|--------------|--------------|------------------|--------------|-----------------|
| | | | Pin 1 D0 | Pin 2 Strobe | Pin 6 Enable | | | |
| Strobe Propagation Delay | t_{pd+1} | 2/14 | T | S | 2.4 V | U | 510 | 25 |
| | t_{pd-1} | 2/14 | T | S | 2.4 V | U | 510 | 40 |
| | t_{pd+2} | 2/14 | T | S | 2.4 V | U | 5.0 k | 50 |
| | t_{pd-2} | 2/14 | T | S | 2.4 V | U | 5.0 k | 34 |
| Rise Time | t^+ | 14 | T | S | 2.4 V | U | 510 or 5.0 k | 0.3 RC |
| Fall Time | t^- | 14 | T | S | 2.4 V | U | 510 | 9.0 |
| Data Propagation Delay | t_{pd+3} | 1/14 | V | 2.4 V | 2.4 V | W | 510 | 20 |
| | t_{pd-3} | 1/14 | V | 2.4 V | 2.4 V | W | 510 | 30 |
| | t_{pd+4} | 1/14 | V | 2.4 V | 2.4 V | W | 5.0 k | 50 |
| | t_{pd-4} | 1/14 | V | 2.4 V | 2.4 V | W | 5.0 k | 25 |
| Enable Propagation Delay | t_{pd+3} | 1/14 | X | 2.4 V | Y | Z | 510 | 20 |
| | t_{pd-3} | 1/14 | X | 2.4 V | Y | Z | 510 | 30 |
| | t_{pd+4} | 1/14 | X | 2.4 V | Y | Z | 5.0 k | 50 |
| | t_{pd-4} | 1/14 | X | 2.4 V | Y | Z | 5.0 k | 25 |
| Minimum Strobe Enable | - | 1/14 | T ① | 1.8 V | 2.4 V | ② | 5.0 k | ③ |
| Maximum Strobe Inhibit | - | 1/14 | T ① | 1.0 V | 2.4 V | ③ | 5.0 k | ③ |

- ① Pulse T conditions changed: $V_L = 1.0 \text{ V}$, $V_H = 1.8 \text{ V}$
- ② Output shall follow data input.
- ③ Output shall not toggle.

Lansdale Semiconductor reserves the right to make changes without further notice to any products herein to improve reliability, function or design. Lansdale does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others. "Typical" parameters which may be provided in Lansdale data sheets and/or specifications can vary in different applications, and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by the customer's technical experts. Lansdale Semiconductor is a registered trademark of Lansdale Semiconductor, Inc.