

SN74LS273

Octal D Flip-Flop with Clear

The SN74LS273 is a high-speed 8-Bit Register. The register consists of eight D-Type Flip-Flops with a Common Clock and an asynchronous active LOW Master Reset. This device is supplied in a 20-pin package featuring 0.3 inch lead spacing.

- 8-Bit High Speed Register
- Parallel Register
- Common Clock and Master Reset
- Input Clamp Diodes Limit High-Speed Termination Effects

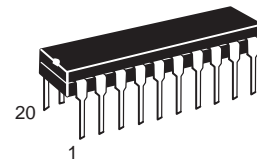
GUARANTEED OPERATING RANGES

| Symbol | Parameter | Min | Typ | Max | Unit |
|-----------------|-------------------------------------|------|-----|------|------|
| V _{CC} | Supply Voltage | 4.75 | 5.0 | 5.25 | V |
| T _A | Operating Ambient Temperature Range | 0 | 25 | 70 | °C |
| I _{OH} | Output Current – High | | | –0.4 | mA |
| I _{OL} | Output Current – Low | | | 8.0 | mA |

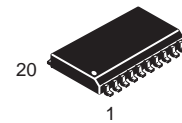


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**LOW
POWER
SCHOTTKY**



**PLASTIC
N SUFFIX
CASE 738**



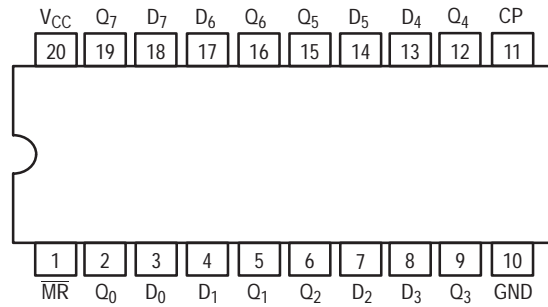
**SOIC
DW SUFFIX
CASE 751D**

ORDERING INFORMATION

| Device | Package | Shipping |
|-------------|------------|------------------|
| SN74LS273N | 16 Pin DIP | 1440 Units/Box |
| SN74LS273DW | 16 Pin | 2500/Tape & Reel |

SN74LS273

CONNECTION DIAGRAM DIP (TOP VIEW)



PIN NAMES

| | |
|---------------------------------|--------------------------------------|
| CP | Clock (Active HIGH Going Edge) Input |
| D ₀ - D ₇ | Data Inputs |
| $\overline{\text{MR}}$ | Master Reset (Active LOW) Input |
| Q ₀ - Q ₇ | Register Outputs |

LOADING (Note a)

| | HIGH | LOW |
|---------------------------------|----------|-----------|
| CP | 0.5 U.L. | 0.25 U.L. |
| D ₀ - D ₇ | 0.5 U.L. | 0.25 U.L. |
| $\overline{\text{MR}}$ | 0.5 U.L. | 0.25 U.L. |
| Q ₀ - Q ₇ | 10 U.L. | 5 U.L. |

NOTES:

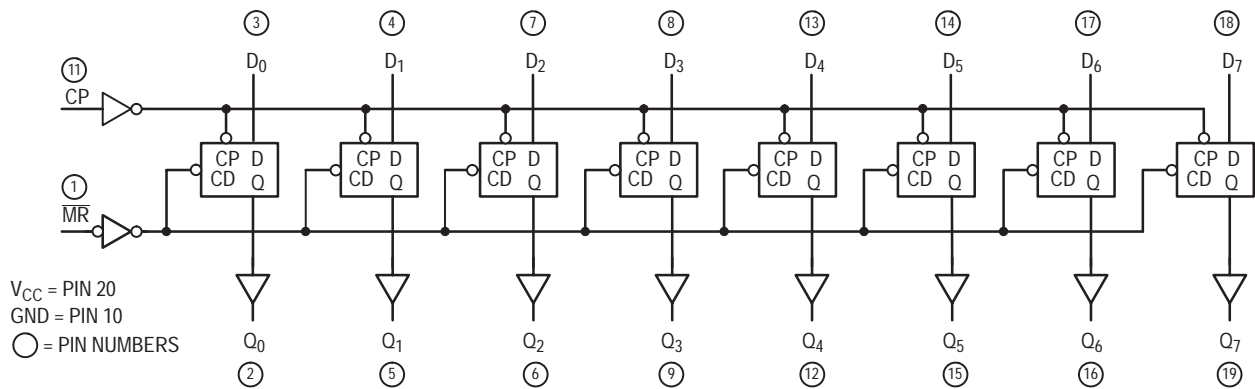
a) 1 TTL Unit Load (U.L.) = 40 μ A HIGH/1.6 mA LOW.

TRUTH TABLE

| $\overline{\text{MR}}$ | CP | D _x | Q _x |
|------------------------|----|----------------|----------------|
| L | X | X | L |
| H | | H | H |
| H | | L | L |

H = HIGH Logic Level
L = LOW Logic Level
X = Immaterial

LOGIC DIAGRAM



SN74LS273

FUNCTIONAL DESCRIPTION

The SN74LS273 is an 8-Bit Parallel Register with a common Clock and common Master Reset.

When the \overline{MR} input is LOW, the Q outputs are LOW, independent of the other inputs. Information meeting the

setup and hold time requirements of the D inputs is transferred to the Q outputs on the LOW-to-HIGH transition of the clock input.

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|----------|--------------------------------|--------|-------|------|---------------|--|
| | | Min | Typ | Max | | |
| V_{IH} | Input HIGH Voltage | 2.0 | | | V | Guaranteed Input HIGH Voltage for All Inputs |
| V_{IL} | Input LOW Voltage | | | 0.8 | V | Guaranteed Input LOW Voltage for All Inputs |
| V_{IK} | Input Clamp Diode Voltage | | -0.65 | -1.5 | V | $V_{CC} = \text{MIN}$, $I_{IN} = -18 \text{ mA}$ |
| V_{OH} | Output HIGH Voltage | 2.7 | 3.5 | | V | $V_{CC} = \text{MIN}$, $I_{OH} = \text{MAX}$, $V_{IN} = V_{IH}$ or V_{IL} per Truth Table |
| V_{OL} | Output LOW Voltage | | 0.25 | 0.4 | V | $I_{OL} = 4.0 \text{ mA}$ $V_{CC} = V_{CC} \text{ MIN}$, $V_{IN} = V_{IL}$ or V_{IH} per Truth Table |
| | | | 0.35 | 0.5 | V | |
| I_{IH} | Input HIGH Current | | | 20 | μA | $V_{CC} = \text{MAX}$, $V_{IN} = 2.7 \text{ V}$ |
| | | | | 0.1 | mA | $V_{CC} = \text{MAX}$, $V_{IN} = 7.0 \text{ V}$ |
| I_{IL} | Input LOW Current | | | -0.4 | mA | $V_{CC} = \text{MAX}$, $V_{IN} = 0.4 \text{ V}$ |
| I_{OS} | Short Circuit Current (Note 1) | -20 | | -100 | mA | $V_{CC} = \text{MAX}$ |
| I_{CC} | Power Supply Current | | | 27 | mA | $V_{CC} = \text{MAX}$ |

Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

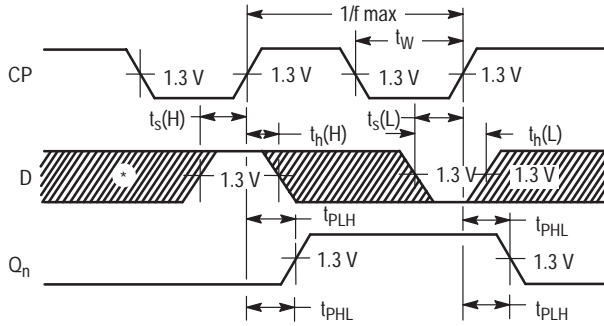
AC CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 5.0 \text{ V}$)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|------------------------|--|--------|----------|----------|------|-----------------|
| | | Min | Typ | Max | | |
| f_{MAX} | Maximum Input Clock Frequency | 30 | 40 | | MHz | Figure 1 |
| t_{PHL} | Propagation Delay, \overline{MR} to Q Output | | 18 | 27 | ns | Figure 2 |
| t_{PLH} t_{PHL} | Propagation Delay, Clock to Output | | 17 18 | 27 27 | ns | Figure 1 |

AC SETUP REQUIREMENTS ($T_A = 25^\circ\text{C}$, $V_{CC} = 5.0 \text{ V}$)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|-----------|-----------------------------|--------|-----|-----|------|-----------------|
| | | Min | Typ | Max | | |
| t_w | Pulse Width, Clock or Clear | 20 | | | ns | Figure 1 |
| t_s | Data Setup Time | 20 | | | ns | Figure 1 |
| t_h | Hold Time | 5.0 | | | ns | Figure 1 |
| t_{rec} | Recovery Time | 25 | | | ns | Figure 2 |

AC WAVEFORMS



*The shaded areas indicate when the input is permitted to change for predictable output performance.

Figure 1. Clock to Output Delays, Clock Pulse Width, Frequency, Setup and Hold Times Data to Clock

DEFINITION OF TERMS

SETUP TIME (t_s) — is defined as the minimum time required for the correct logic level to be present at the logic input prior to the clock transition from LOW-to-HIGH in order to be recognized and transferred to the outputs.

HOLD TIME (t_h) — is defined as the minimum time following the clock transition from LOW-to-HIGH that the logic level must be maintained at the input in order to ensure

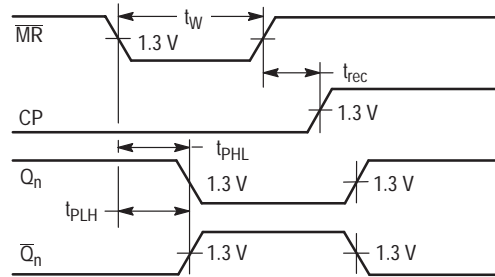


Figure 2. Master Reset to Output Delay, Master Reset Pulse Width, and Master Reset Recovery Time

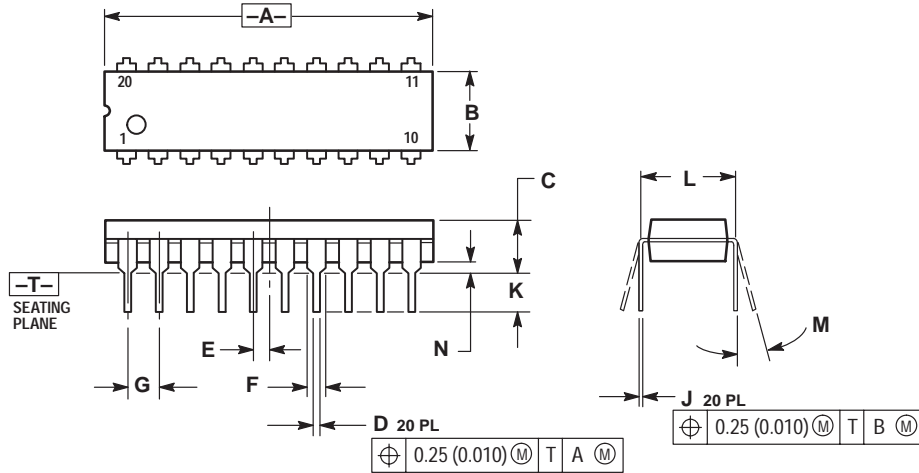
continued recognition. A negative HOLD TIME indicates that the correct logic level may be released prior to the clock transition from LOW-to-HIGH and still be recognized.

RECOVERY TIME (t_{rec}) — is defined as the minimum time required between the end of the reset pulse and the clock transition from LOW-to-HIGH in order to recognize and transfer HIGH data to the Q outputs.

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PACKAGE DIMENSIONS

N SUFFIX
PLASTIC PACKAGE
CASE 738-03
ISSUE E

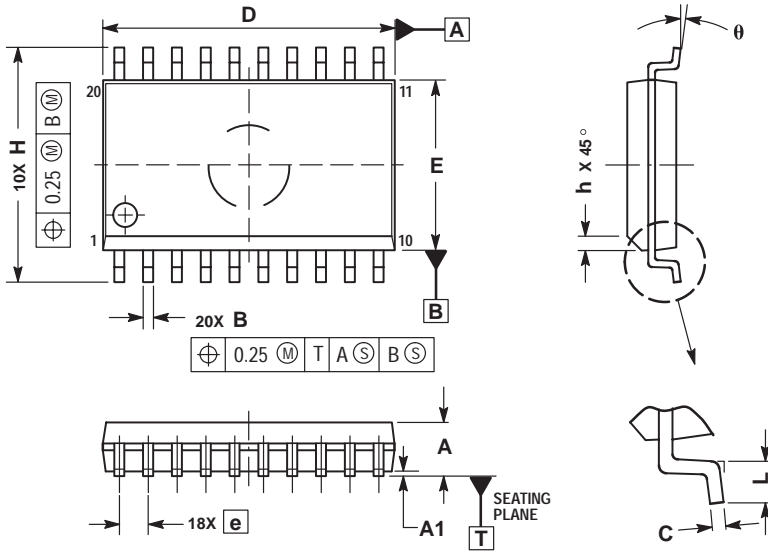


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
 4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.010 | 1.070 | 25.66 | 27.17 |
| B | 0.240 | 0.260 | 6.10 | 6.60 |
| C | 0.150 | 0.180 | 3.81 | 4.57 |
| D | 0.015 | 0.022 | 0.39 | 0.55 |
| E | 0.050 BSC | | 1.27 BSC | |
| F | 0.050 | 0.070 | 1.27 | 1.77 |
| G | 0.100 BSC | | 2.54 BSC | |
| J | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.110 | 0.140 | 2.80 | 3.55 |
| L | 0.300 BSC | | 7.62 BSC | |
| M | 0° | 15° | 0° | 15° |
| N | 0.020 | 0.040 | 0.51 | 1.01 |

SN74LS273

D SUFFIX PLASTIC SOIC PACKAGE CASE 751D-05 ISSUE F




NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN | MAX |
| A | 2.35 | 2.65 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.23 | 0.32 |
| D | 12.65 | 12.95 |
| E | 7.40 | 7.60 |
| e | 1.27 BSC | |
| H | 10.05 | 10.55 |
| h | 0.25 | 0.75 |
| L | 0.50 | 0.90 |
| θ | 0° | 7° |

Notes

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