

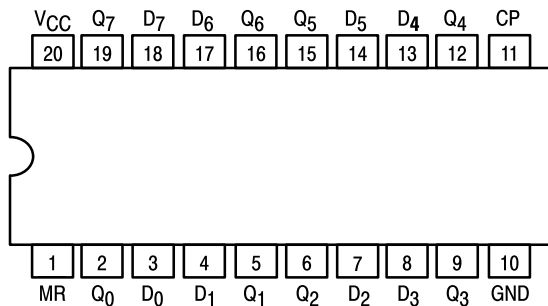


# OCTAL D FLIP-FLOP WITH CLEAR

The SN54/74LS273 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

## CONNECTION DIAGRAM DIP (TOP VIEW)



### PIN NAMES

CP Clock (Active HIGH Going Edge) Input  
 D<sub>0</sub>-D<sub>7</sub> Data Inputs  
 MR Master Reset (Active LOW) Input  
 Q<sub>0</sub>-Q<sub>7</sub> Register Outputs (Note b)

### LOADING (Note a)

	HIGH	LOW
CP	0.5 U.L.	0.25 U.L.
D <sub>0</sub> -D <sub>7</sub>	0.5 U.L.	0.25 U.L.
MR	0.5 U.L.	0.25 U.L.
Q <sub>0</sub> -Q <sub>7</sub>	10 U.L.	5 (2.5) U.L.

### NOTES:

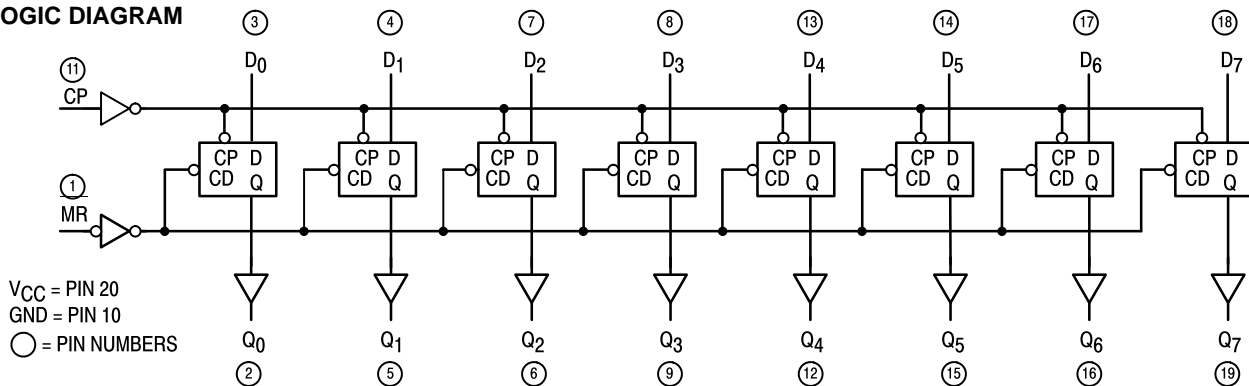
- a) 1 TTL Unit Load (U.L.) = 40  $\mu$ A HIGH/1.6 mA LOW.  
 b) The Output LOW drive factor is 2.5 U.L. for Military (54) and 5 U.L. for Commercial (74) Temperature Ranges.

### TRUTH TABLE

MR	CP	D <sub>x</sub>	Q <sub>x</sub>
L	X	X	L
H		H	H
H		L	L

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

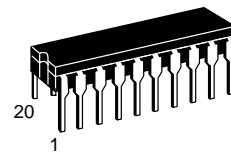
### LOGIC DIAGRAM



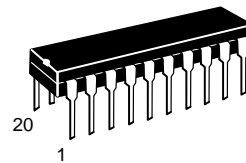
V<sub>CC</sub> = PIN 20  
 GND = PIN 10  
 ○ = PIN NUMBERS

## SN54/74LS273

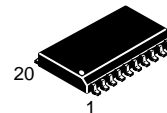
OCTAL D FLIP-FLOP WITH CLEAR  
 LOW POWER SCHOTTKY



J SUFFIX  
 CERAMIC  
 CASE 732-03



N SUFFIX  
 PLASTIC  
 CASE 738-03



DW SUFFIX  
 SOIC  
 CASE 751D-03

### ORDERING INFORMATION

SN54LSXXXJ Ceramic  
 SN74LSXXXN Plastic  
 SN74LSXXXDW SOIC

# SN54/74LS273

## FUNCTIONAL DESCRIPTION

The SN54/74LS273 is an 8-Bit Parallel Register with a common Clock and common Master Reset.

When the 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.

## GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V <sub>CC</sub>	Supply Voltage	54	4.5	5.0	5.5	V
		74	4.75	5.0	5.25	
T <sub>A</sub>	Operating Ambient Temperature Range	54	-55	25	125	°C
		74	0	25	70	
I <sub>OH</sub>	Output Current — High	54, 74			-0.4	mA
I <sub>OL</sub>	Output Current — Low	54			4.0	mA
		74			8.0	

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		Limits			Unit	Test Conditions
			Min	Typ	Max		
V <sub>IH</sub>	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage for All Inputs
V <sub>IL</sub>	Input LOW Voltage	54			0.7	V	Guaranteed Input LOW Voltage for All Inputs
		74			0.8		
V <sub>IK</sub>	Input Clamp Diode Voltage			-0.65	-1.5	V	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18 mA
V <sub>OH</sub>	Output HIGH Voltage	54	2.5	3.5		V	V <sub>CC</sub> = MIN, I <sub>OH</sub> = MAX, V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table
		74	2.7	3.5		V	
V <sub>OL</sub>	Output LOW Voltage	54, 74		0.25	0.4	V	V <sub>CC</sub> = V <sub>CC</sub> MIN, V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> per Truth Table
		74		0.35	0.5	V	
I <sub>IH</sub>	Input HIGH Current				20	μA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V
					0.1	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V
I <sub>IL</sub>	Input LOW Current				-0.4	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V
I <sub>OS</sub>	Short Circuit Current (Note 1)		-20		-100	mA	V <sub>CC</sub> = MAX
I <sub>CC</sub>	Power Supply Current				27	mA	V <sub>CC</sub> = MAX

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

## AC CHARACTERISTICS (T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0 V)

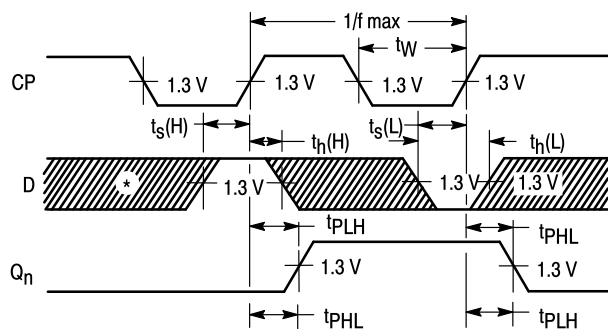
Symbol	Parameter		Limits			Unit	Test Conditions
			Min	Typ	Max		
f <sub>MAX</sub>	Maximum Input Clock Frequency		30	40		MHz	Figure 1
t <sub>PHL</sub>	Propagation Delay, MR to Q Output			18	27	ns	Figure 2
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay, Clock to Output			17	27	ns	Figure 1
				18	27		

# SN54/74LS273

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

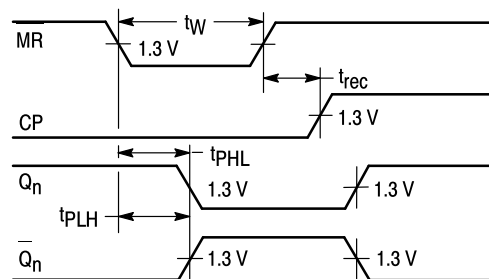
Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
$t_w$	Pulse Width, Clock or Clear	20			ns	Figure 1
$t_s$	Data Setup Time	20			ns	Figure 1
$t_h$	Hold Time	5.0			ns	Figure 1
$t_{rec}$	Recovery Time	25			ns	Figure 2

## 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**



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

## DEFINITION OF TERMS

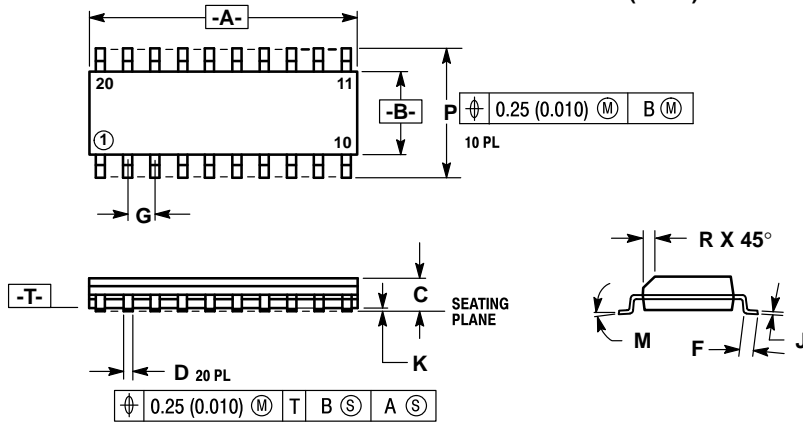
**SETUP TIME ( $t_s$ )** — is defined as the minimum time required for the correct logic level to be present at the logic input prior to the clock transition from LOW-to-HIGH in order to be recognized and transferred to the outputs.

**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 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.

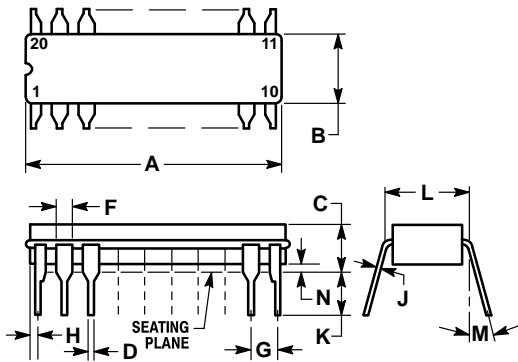
**Case 751D-03 DW Suffix  
20-Pin Plastic  
SO-20 (WIDE)**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
  5. 751D-01, AND -02 OBSOLETE, NEW STANDARD 751D-03.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

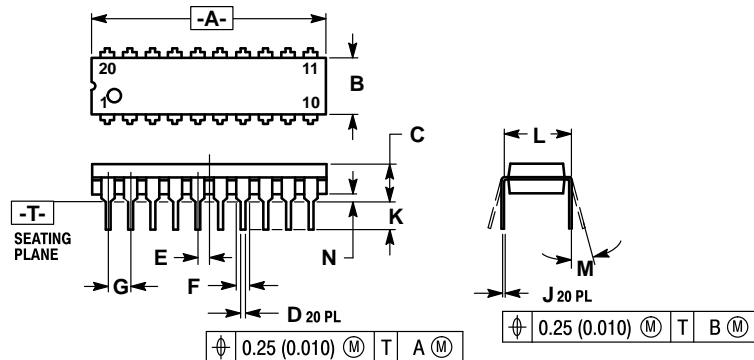
**Case 732-03 J Suffix  
20-Pin Ceramic Dual In-Line**



- NOTES:
1. LEADS WITHIN 0.25 mm (0.010) DIA., TRUE POSITION AT SEATING PLANE, AT MAXIMUM MATERIAL CONDITION.
  2. DIM L TO CENTER OF LEADS WHEN FORMED PARALLEL.
  3. DIM A AND B INCLUDES MENISCUS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	23.88	25.15	0.940	0.990
B	6.60	7.49	0.260	0.295
C	3.81	5.08	0.150	0.200
D	0.38	0.56	0.015	0.022
F	1.40	1.65	0.055	0.065
G	2.54 BSC		0.100 BSC	
H	0.51	1.27	0.020	0.050
J	0.20	0.30	0.008	0.012
K	3.18	4.06	0.125	0.160
L	7.62 BSC		0.300 BSC	
M	0°	15°	0°	15°
N	0.25	1.02	0.010	0.040

**Case 738-03 N Suffix  
20-Pin Plastic**



- 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.
  5. 738-02 OBSOLETE, NEW STANDARD 738-03.

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

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and <sup>TM</sup> are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**Literature Distribution Centers:**

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.

JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.

SYMBOL	SW1	SW2
tpZH	Open	Closed
tpZL	Closed	Open
tpLZ	Closed	Closed

