

## DM64ALS273/DM74ALS273 Octal D-Type Edge-Triggered Flip-Flop with Clear

### General Description

These monolithic, positive-edge-triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic with a direct clear input.

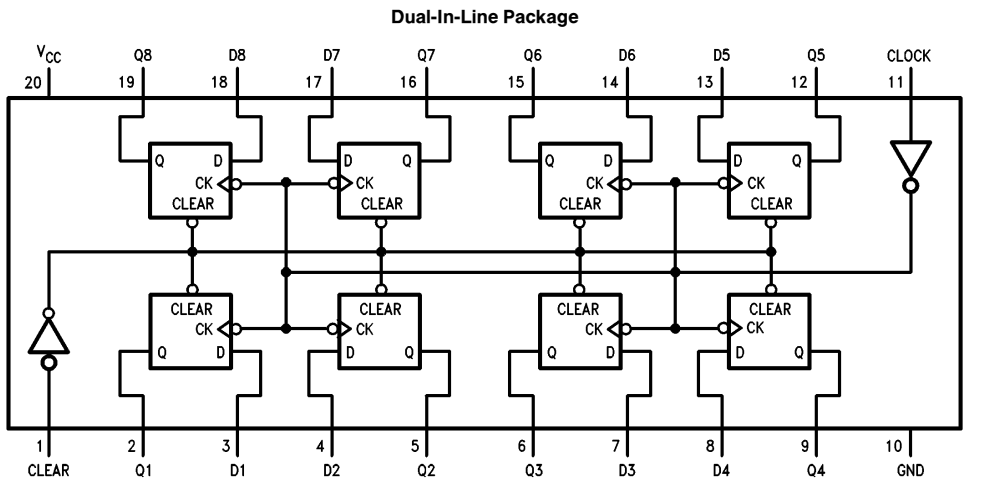
Information at the D inputs meeting the setup requirements is transferred to the Q outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the high or low level, the D input signal has no effect at the output.

The DM64ALS273 version features the same performance as the standard version DM74ALS273 with a guarantee over an extended temperature range (–40°C to +85°C)

### Features

- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Buffer-type outputs and improved AC offer significant advantage over 'LS273.
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin-for-pin compatible with 'LS273.
- DM64ALS273 guarantee over extended temperature –40°C to +85°C

### Connection Diagram



Order Number DM64ALS273N, DM64ALS273WM, DM74ALS273WM,  
DM74ALS273N, DM74ALS273SJ or DM74ALS273MSA  
See NS Package Number M20B, M20D, MSA20 or N20A

DM64ALS273/DM74ALS273 Octal D-Type Edge-Triggered Flip-Flop with Clear

## Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM64ALS	−40°C to +85°C
DM74ALS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical $\theta_{JA}$	
N Package	60.0°C/W
M Package	79.0°C/W

Note: The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the “Electrical Characteristics” table are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Note: This product meets application requirements of 500 temperature cycles from −65°C to +150°C.

## Recommended Operating Conditions

Symbol	Parameter	DM64ALS273			DM74ALS273			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8			0.8	V
I <sub>OH</sub>	High Level Output Current			−2.6			−2.6	mA
I <sub>OL</sub>	Low Level Output Current			24			24	mA
f <sub>CLK</sub>	Clock Frequency	0		35	0		35	MHz
t <sub>w(CLK)</sub>	Width of Clock Pulse	High	14		14			ns
		Low	14		14			ns
t <sub>w</sub>	Width of Clear Pulse	Low	10		10			ns
t <sub>SU</sub>	Data Setup Time		10 ↑		10 ↑			ns
		Clear Inactive	15 ↑		15 ↑			
t <sub>H</sub>	Data Hold Time		0 ↑		0 ↑			ns
T <sub>A</sub>	Free Air Operating Temperature		−40		85		70	°C

The (↑) arrow indicates the positive edge of the Clock is used for reference.

## Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.5V, I <sub>I</sub> = −18 mA			−1.5	V	
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = 4.5V	I <sub>OH</sub> = −2.6 mA	2.4	3.3		V
		V <sub>CC</sub> = 4.5V to 5.5V	I <sub>OH</sub> = −400 μA	V <sub>CC</sub> − 2			V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = 4.5V	I <sub>OL</sub> = 12 mA		0.25	0.4	V
			I <sub>OL</sub> = 24 mA		0.35	0.5	V
I <sub>I</sub>	Input Current @ Max. Input Voltage	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 7V			0.1	mA	
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 2.7V			20	μA	
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IL</sub> = 0.4V			−0.2	mA	
I <sub>O</sub>	Output Drive Current	V <sub>CC</sub> = 5.5V	V <sub>O</sub> = 2.25V	−30		−112	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 5.5V	Outputs High		11	20	mA
			Outputs Low		19	29	mA

## Switching Characteristics

over recommended operating free air temperature range (Note 1).

Symbol	Parameter	Conditions	From	To	DM64ALS273		DM74ALS273		Units
					Min	Max	Min	Max	
f <sub>MAX</sub>	Maximum Clock Frequency	V <sub>CC</sub> = 4.5V to 5.5V R <sub>L</sub> = 500Ω C <sub>L</sub> = 50 pF			35		35		MHz
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		Clear	Any Q	4	18	4	18	ns
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output		Clock	Any Q	2	12	2	12	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		Clock	Any Q	3	15	3	15	ns

**Note 1:** See Section 5 for test waveforms and output load.

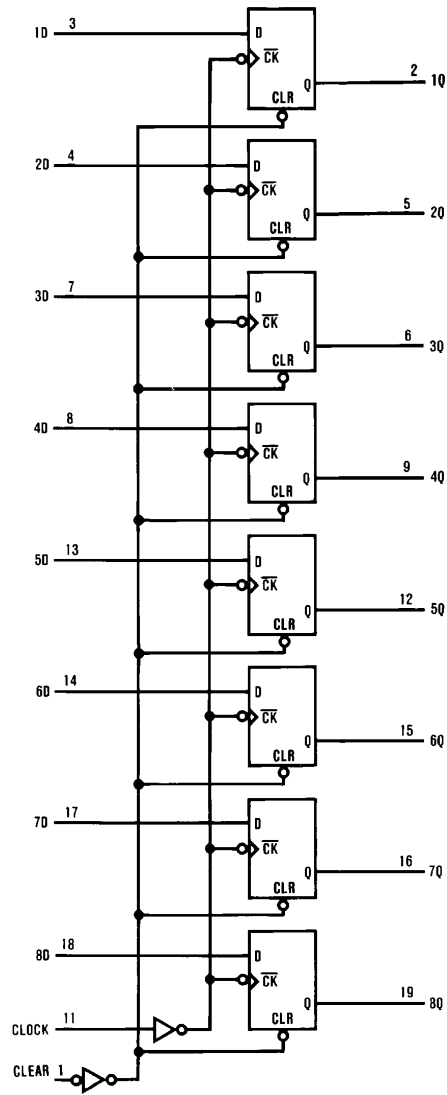
## Function Table (Each Flip-Flop)

Inputs			Output Q
Clear	Clock	D	
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q <sub>0</sub>

L = Low State, H = High State, X = Don't Care

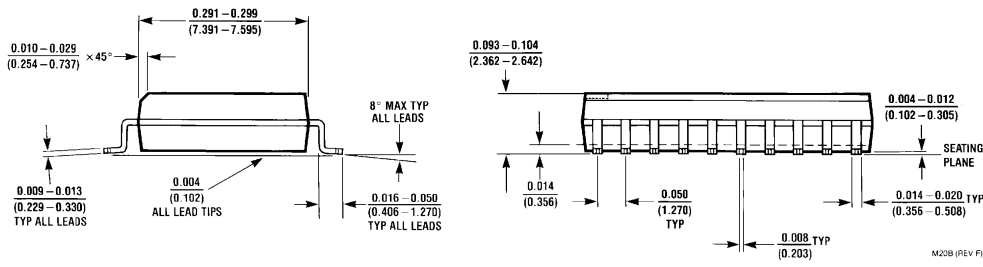
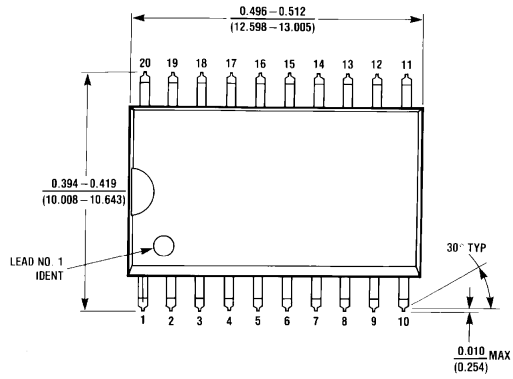
↑ = Positive Edge Transition, Q<sub>0</sub> = Previous Condition of Q

# Logic Diagram

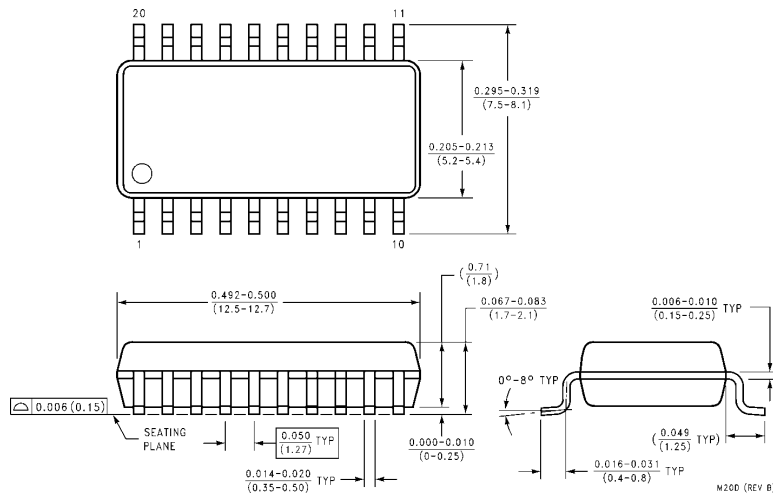


TL/F/6216-2

**Physical Dimensions** inches (millimeters)

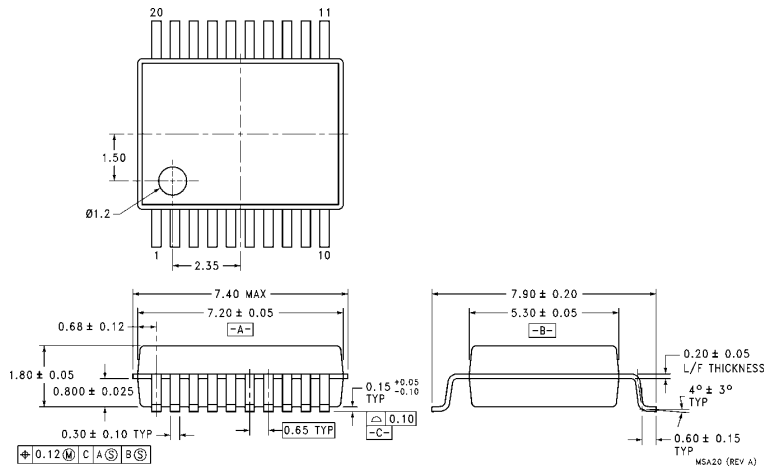


**S.O. Package (M)**  
**Order Number DM74ALS273WM, DM64ALS273WM**  
**NS Package Number M20B**

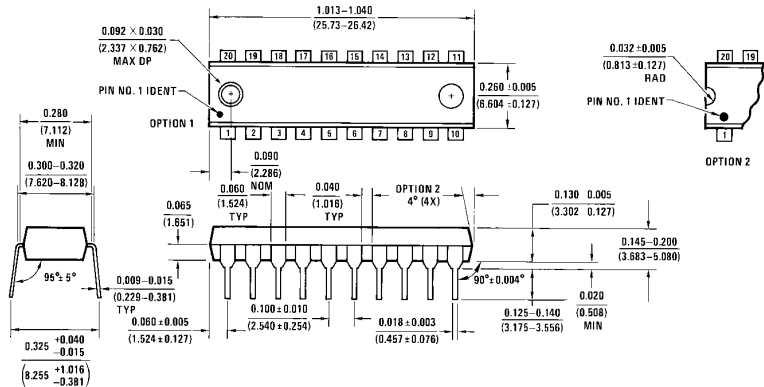


**Small Outline Package (SJ)**  
**Order Number DM74ALS273SJ**  
**NS Package Number M20D**

**Physical Dimensions** inches (millimeters) (Continued)



**Molded Shrink Small Outline Package (MSA)**  
**Order Number DM74ALS273MSA**  
**NS Package Number MSA20**



**Molded Dual-In-Line Package (N)**  
**Order Number DM74ALS273N, DM64ALS273N**  
**NS Package Number N20A**

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