

## DM74AS873 Dual 4-Bit D-Type Transparent Latch with 3-STATE Outputs

### General Description

These dual 4-bit registers feature totem-pole 3-STATE outputs designed specifically for driving highly-capacitive or relatively low-impedance loads. The high-impedance state and increased high-logic-level drive provide these registers with the capability of being connected directly to and driving the bus lines in a bus-organized system without need for interface or pull-up components. They are particularly attractive for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The eight latches of the AS873 are transparent D-type latches meaning that while the enable (G) is high the Q outputs will follow the data (D) inputs. When the enable is taken low the output will be latched at the level of the data that was set up.

A buffered output control input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state the outputs neither load nor drive the bus lines significantly.

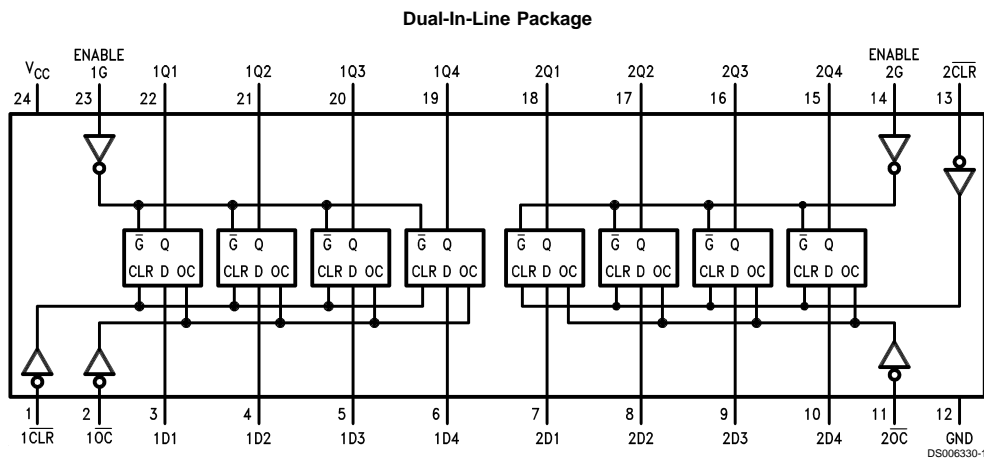
The output control does not affect the internal operation of the latches. That is, the old data can be retained or new data can be entered even while the outputs are off.

The pinout is arranged to ease printed circuit board layout. All data inputs are on one side of the package while all outputs are on the other side.

### Features

- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- 3-STATE buffer-type outputs drive bus lines directly
- Space Saving 300 Mil Wide Package
- Bus structured pinout

### Connection Diagram



Order Number DM74AS873NT  
See Package Number N24C

## Absolute Maximum Ratings (Note 2)

Supply Voltage	7V	Range	0°C to +70°C
Input Voltage	7V	Storage Temperature Range	-65°C to +150°C
Voltage Applied to Disabled Output	5.5V	Typical $\theta_{JA}$	
Operating Free Air Temperature		N Package	47.0°C/W

## Recommended Operating Conditions

Symbol	Parameter	Min	Nom	Max	Units
$V_{CC}$	Supply Voltage	4.5	5	5.5	V
$V_{IH}$	High Level Input Voltage	2			V
$V_{IL}$	Low Level Input Voltage			0.8	V
$I_{OH}$	High Level Output Current			-15	mA
$I_{OL}$	Low Level Output Current			48	mA
$t_w$	Pulse Width	Enable High	5.5		ns
		Clear Low	3.5		
$t_{SU}$	Data Setup Time (Note 3)	2↓			ns
$t_H$	Data Hold Time (Note 3)	3↓			ns
$T_A$	Free Air Operating Temperature	0		70	°C

**Note 1:** This product meets application requirements of 500 temperature cycles from -65°C to +150°C.

**Note 2:** 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 3:** The (↓) arrow indicates the negative edge of the enable is used for reference.

## Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{IK}$	Input Clamp Voltage	$V_{CC} = 4.5V$ , $I_I = -18 mA$			-1.2	V
$V_{OH}$	High Level Output Voltage	$V_{CC} = 4.5V$ , $V_{IL} = Max$ $I_{OH} = Max$	2.4	3.3		V
		$I_{OH} = -2 mA$ , $V_{CC} = 4.5V$ to $5.5V$	$V_{CC} - 2$			V
$V_{OL}$	Low Level Output Voltage	$V_{CC} = 4.5V$ , $V_{IH} = 2V$ $I_{OL} = Max$		0.35	0.5	V
$I_I$	Input Current at Max Input Voltage	$V_{CC} = 5.5V$ , $V_{IH} = 7V$			0.1	mA
$I_{IH}$	High Level Input Current	$V_{CC} = 5.5V$ , $V_{IH} = 2.7V$			20	$\mu A$
$I_{IL}$	Low Level Input Current	$V_{CC} = 5.5V$ , $V_{IL} = 0.4V$			-0.5	mA
$I_O$ (Note 4)	Output Drive Current	$V_{CC} = 5.5V$ , $V_O = 2.25V$	-30		-112	mA
$I_{OZH}$	Off-State Output Current, High Level Voltage Applied	$V_{CC} = 5.5V$ , $V_{IH} = 2V$ $V_O = 2.7V$			50	$\mu A$
$I_{OZL}$	Off-State Output Current, Low Level Voltage Applied	$V_{CC} = 5.5V$ , $V_{IH} = 2V$ $V_O = 0.4V$			-50	$\mu A$
$I_{CC}$	Supply Current	$V_{CC} = 5.5V$				
		Outputs High		68	110	mA
		Outputs Low		67	109	mA
	Outputs Disabled		80	129	mA	

**Note 4:** The output conditions have been chosen to produce a current that closely approximates one half of the true short circuit current,  $I_{OS}$ .

## Switching Characteristics

over recommended operating free air temperature range (Note 5). All typical values are measured at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

Symbol	Parameter	Conditions	From	To	Min	Max	Units
$t_{PLH}$	Propagation Delay Time Low to High Level Output	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$ $C_L = 50$ pF	Data	Any Q	3	6.5	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output		Data	Any Q	3	6	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output		Enable	Any Q	6	11.5	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output		Enable	Any Q	4	7.5	ns
$t_{PZH}$	Output Enable Time to High Level Output		$\overline{\text{Output Control}}$	Any Q	2	6.5	ns
$t_{PZL}$	Output Enable Time to Low Level Output		Output Control	Any Q	4	9.5	ns
$t_{PHZ}$	Output Disable Time from High Level Output		$\overline{\text{Output Control}}$	Any Q	2	6.5	ns
$t_{PLZ}$	Output Disable Time from Low Level Output		Output Control	Any Q	2	7.5	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output		Clear	Any Q	3	8.5	ns

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

## Function Table

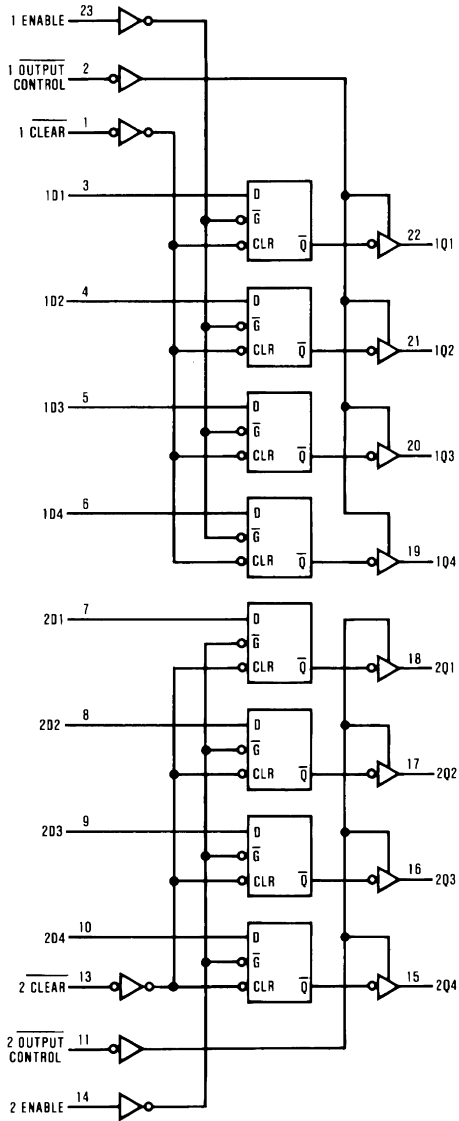
$\overline{\text{CLR}}$	Inputs			$\overline{\text{OC}}$	Output Q
	D	EN			
X	X	X		H	Z
L	X	X		L	L
H	H	H		L	H
H	L	H		L	L
H	X	L		L	$Q_0$

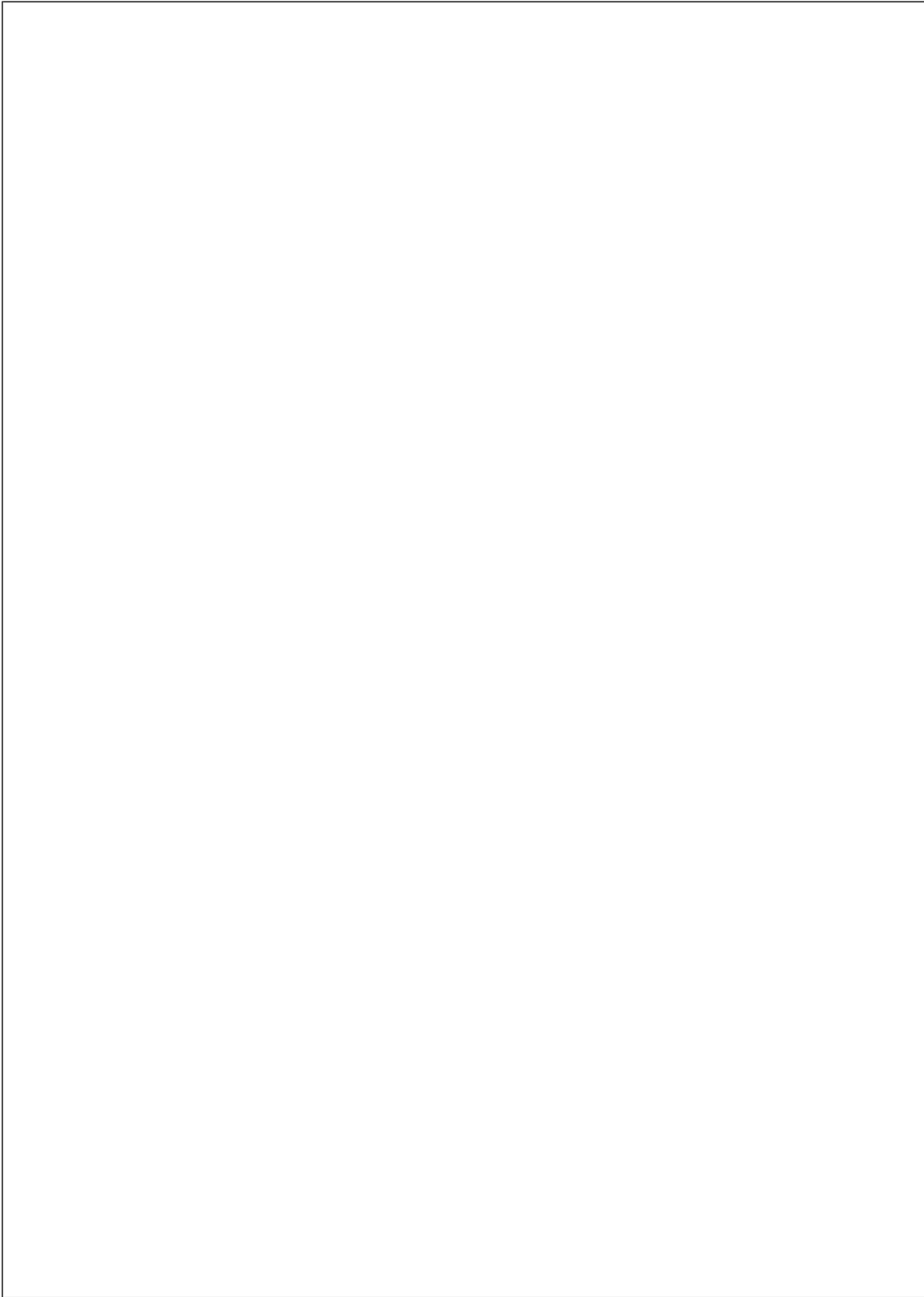
L = Low State, H = High State, X = Don't Care

Z = High Impedance State

$Q_0$  = Previous Condition of Q

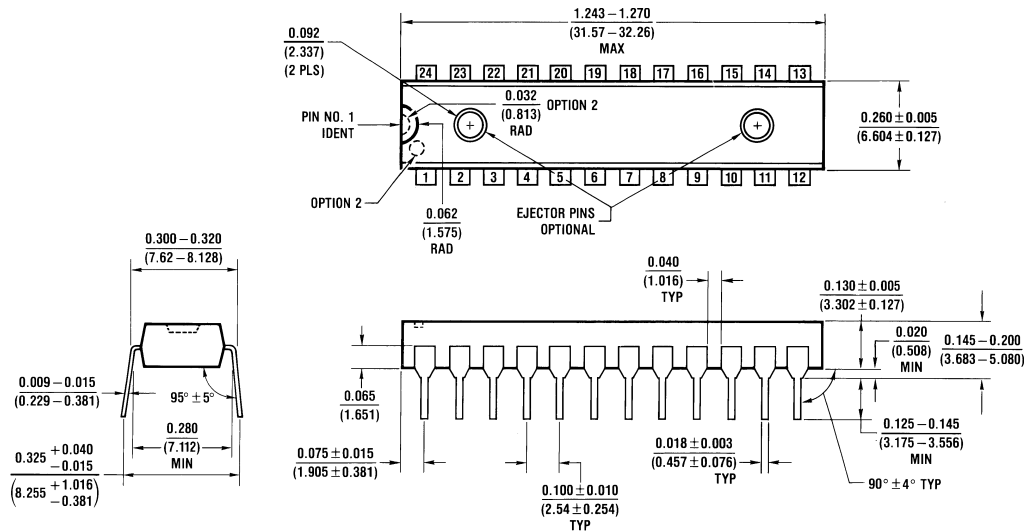
# Logic Diagram





**DM74AS873 Dual 4-Bit D-Type Transparent Latch with 3-STATE Outputs**

**Physical Dimensions** inches (millimeters) unless otherwise noted



N24C (REV F)

**Molded Dual-In-Line Package (N)**  
**Order Number DM74AS873NT**  
**Package Number N24C**

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**Fairchild Semiconductor Corporation Americas**  
 Customer Response Center  
 Tel: 1-888-522-5372

**Fairchild Semiconductor Europe**  
 Fax: +49 (0) 1 80-530 85 86  
 Email: europe.support@nsc.com  
 Deutsch Tel: +49 (0) 8 141-35-0  
 English Tel: +44 (0) 1 793-85-68-56  
 Italy Tel: +39 (0) 2 57 5631

**Fairchild Semiconductor Hong Kong Ltd.**  
 13th Floor, Straight Block,  
 Ocean Centre, 5 Canton Rd.  
 Tsimshatsui, Kowloon  
 Hong Kong  
 Tel: +862 2737-7200  
 Fax: +852 2314-0061

**National Semiconductor Japan Ltd.**  
 Tel: 81-3-5620-6175  
 Fax: 81-3-5620-6179

[www.fairchildsemi.com](http://www.fairchildsemi.com)