

DM74ALS574A

Octal D-Type Edge-Triggered Flip-Flop with 3-STATE Outputs

General Description

These 8-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 flip-flops of the ALS574A are edge-triggered D-type flip-flops. On the positive transition of the clock, the Q outputs will be set to the logic states that were set up at the D inputs.

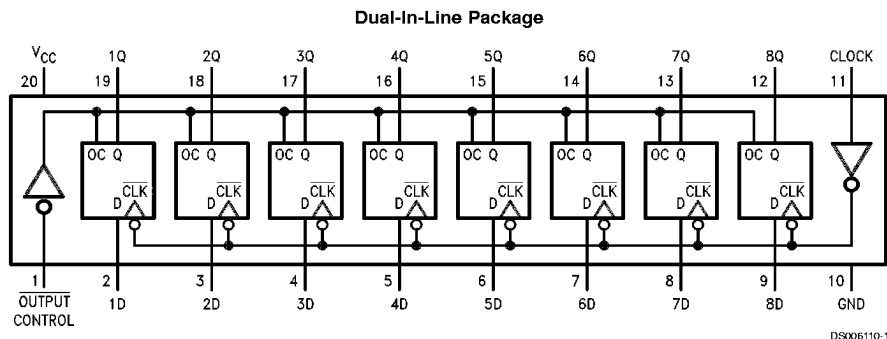
A buffered output control input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state the outputs neither load nor drive the bus lines significantly.

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

Features

- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally equivalent with LS374
- Improved AC performance over LS374 at approximately half the power
- 3-STATE buffer-type outputs drive bus lines directly

Connection Diagram



Order Number DM74ALS574AWM, DM74ALS574AN or DM74ALS574ASJ
See Package Number M20B, M20D or N20A

DM74ALS574A Octal D-Type Edge-Triggered Flip-Flop with 3-STATE Outputs

Function Table

Output Control	Clock	D	Output Q
L	↑	H	H
L	↑	L	L
L	L	X	Q ₀
H	X	X	Z

L = Low State, H = High State, X = Don't Care
↑ = Positive Edge Transition
Z = High Impedance State
Q₀ = Previous Condition of Q

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range DM74ALS	0°C to +70°C

Storage Temperature Range

–65°C to +150°C

Typical θ_{JA}

N Package

56.0°C/W

M Package

75.0°C/W

Recommended Operating Conditions

Symbol	Parameter		DM74ALS574A			Units
			Min	Nom	Max	
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				–2.6	mA
I_{OL}	Low Level Output Current				24	mA
f_{CLOCK}	Clock Frequency		0		35	MHz
t_w	Width of Clock Pulse	High	14			ns
		Low	14			ns
t_{SU}	Data Setup Time		15 \uparrow			ns
t_H	Data Hold Time		0 \uparrow			ns
T_A	Free Air Operating Temperature		0		70	°C

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

Note 1: 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.

Electrical Characteristicsover 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	$V_{CC} = 4.5V$, $I_I = -18\text{ mA}$			–1.2	V
V_{OH}	High Level Output Voltage	$V_{CC} = 4.5V$ $V_{IL} = V_{IL\text{ Max}}$	2.4	3.2		V
		$V_{CC} = 4.5V$ to $5.5V$ $I_{OH} = -400\text{ }\mu A$			$V_{CC} - 2$	
V_{OL}	Low Level Output Voltage	$V_{CC} = 4.5V$ $V_{IH} = 2V$		0.25	0.4	V
		74ALS $I_{OL} = 12\text{ mA}$ 74ALS $I_{OL} = 24\text{ mA}$		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	μA
I_{IL}	Low Level Input Current	$V_{CC} = 5.5V$, $V_{IL} = 0.4V$			–0.2	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$, $V_O = 2.25V$	–30		–112	mA
I_{OZH}	Off-State Output Current High Level Voltage Applied	$V_{CC} = 5.5V$, $V_{IH} = 2V$ $V_O = 2.7V$			20	μA
I_{OZL}	Off-State Output Current Low Level Voltage Applied	$V_{CC} = 5.5V$, $V_{IH} = 2V$ $V_O = 0.4V$			–20	μA
I_{CC}	Supply Current	$V_{CC} = 5.5V$ Outputs Open		11	18	mA
		Outputs High		17	27	mA
		Outputs Low		17	28	mA

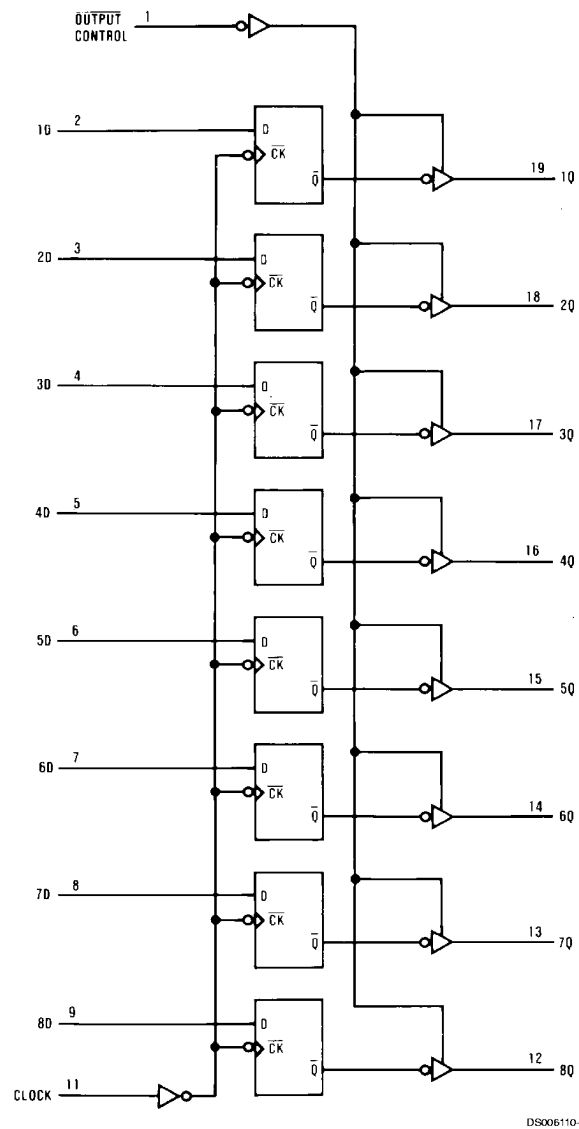
Switching Characteristics

over recommended operating free air temperature range (Note 2)

Symbol	Parameter	Conditions	From	To	DM74ALS574A		Units
					Min	Max	
f_{MAX}	Maximum Clock Frequency	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$ $C_L = 50$ pF			35		MHz
t_{PLH}	Propagation Delay Time Low to High Level Output		Clock	Any Q	4	14	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		Clock	Any Q	4	14	ns
t_{PZH}	Output Enable Time to High Level Output		Output Control	Any Q	4	18	ns
t_{PZL}	Output Enable Time to Low Level Output		Output Control	Any Q	4	18	ns
t_{PHZ}	Output Disable Time from High Level Output		Output Control	Any Q	2	10	ns
t_{PLZ}	Output Disable Time from Low Level Output		Output Control	Any Q	2	12	ns

Note 2: See Section 1 for test waveforms and output load.

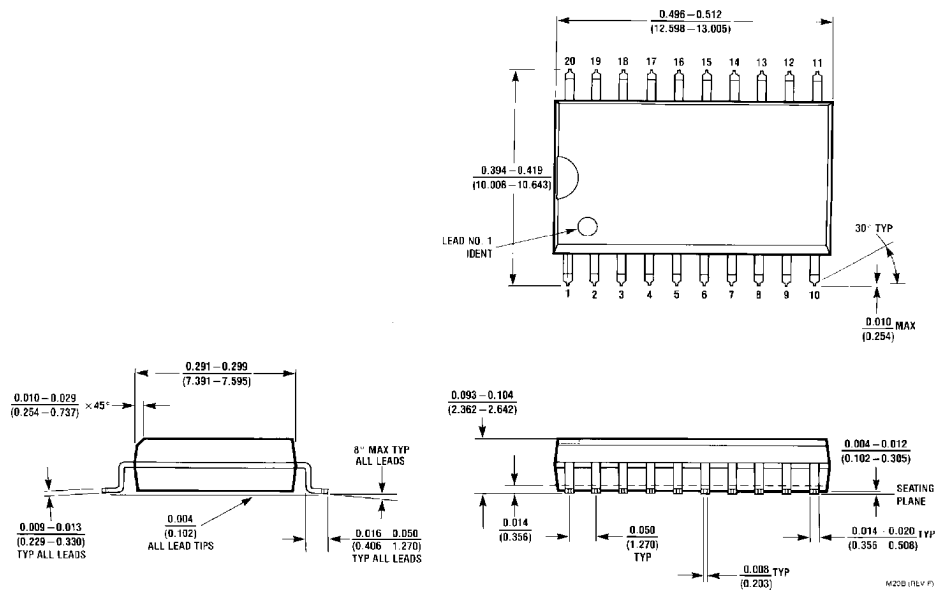
Logic Diagram



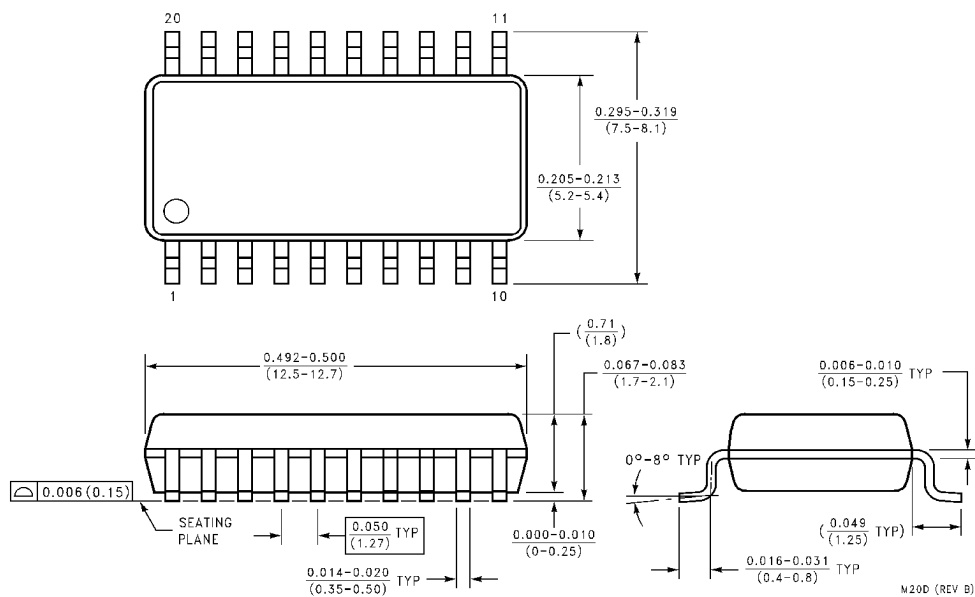
DS006110-2



Physical Dimensions inches (millimeters) unless otherwise noted

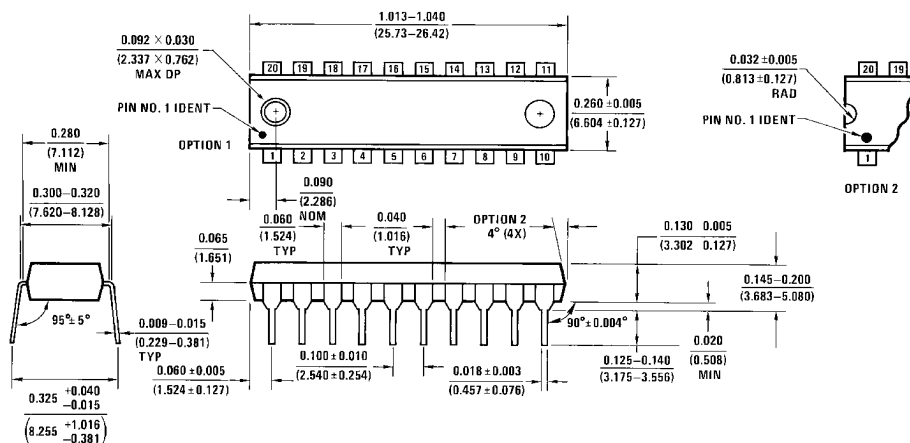


S.O. Package (M)
Order Number DM64ALS574AWM or DM74ALS574AWM
Package Number M20B



Small Outline Package (SJ)
Order Number DM64ALS574ASJ or DM74ALS574ASJ
Package Number M20D

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



N20A (REV G)

Molded Dual-In-Line Package (N)
Order Number DM64ALS574AN or DM74ALS574AN
Package Number N20A

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

www.fairchildsemi.com

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: +852 2737-7200
 Fax: +852 2314-0061

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

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.