

SN74LV74A-Q1 Automotive Dual Positive-Edge-Triggered D-Type Flip-Flop

1 Features

- Qualified for automotive applications
- Operation of 2-V to 5.5-V V_{CC}
- Max t_{pd} of 13 ns at 5 V
- Typical V_{OLP} (output ground bounce) <0.8 V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$
- Typical V_{OHV} (output V_{OH} undershoot) >2.3 V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$
- Support mixed-mode voltage operation on all ports
- I_{off} supports partial-power-down mode operation
- Latch-up performance exceeds 250 mA per JESD 17

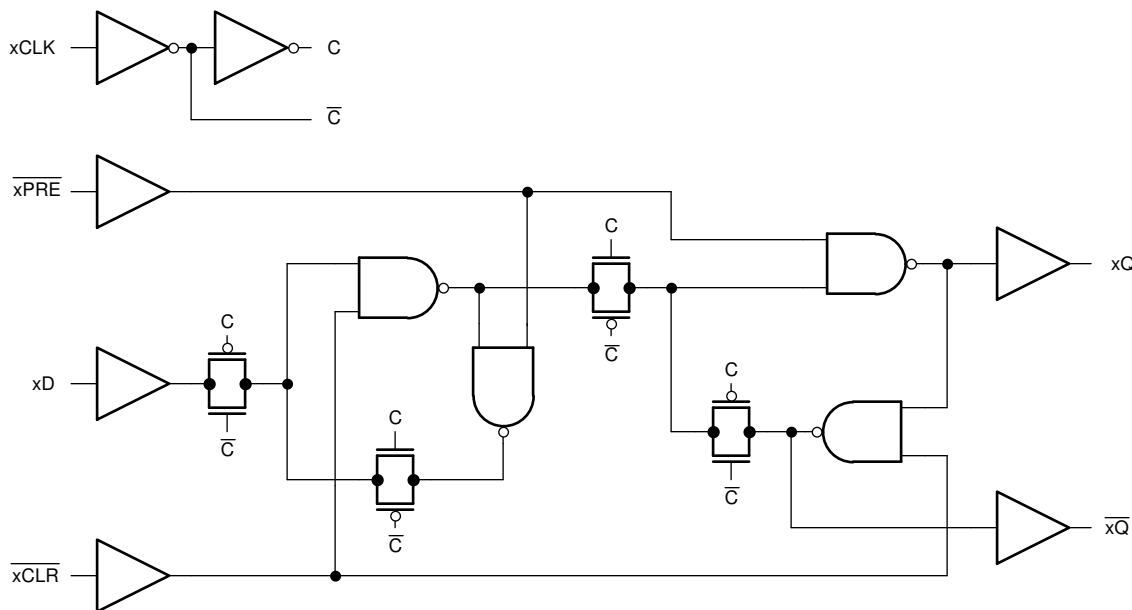
2 Description

This dual positive-edge-triggered D-type flip-flop is designed for 2-V to 5.5-V V_{CC} operation.

Package Information

PART NUMBER	PACKAGE ¹	PACKAGE SIZE ²
SN74LV74A-Q1	PW (TSSOP, 14)	5.00 mm × 6.4 mm
	D (SOIC, 14)	8.65 mm × 6 mm

- (1) For all available packages, see the orderable addendum at the end of the data sheet.
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.



Logic Diagram, Each Flip-flop (Positive Logic)



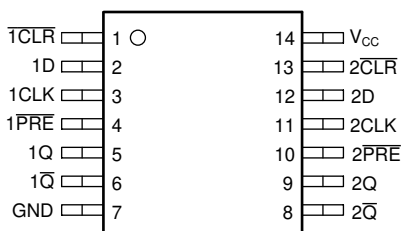
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3 Revision History

Changes from Revision B (April 2008) to Revision C (August 2023)	Page
Added <i>Package Information</i> table, <i>Pin Functions</i> table, <i>ESD Ratings</i> table, <i>Thermal Information</i> table, <i>Device Functional Modes</i>, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section	1

4 Pin Configuration and Functions



**Figure 4-1. D and PW Package
14-Pin SOIC and TSSOP
(Top View)**

Table 4-1. Pin Functions

PIN			
NO.	NAME	TYPE ¹	DESCRIPTION
1	1 $\overline{\text{CLR}}$	I	1 clear
2	1D	I	1D input
3	1CLK	I	1 clock
4	1 $\overline{\text{PRE}}$	I	1 preset
5	1Q	O	1Q output
6	1 $\overline{\text{Q}}$	O	1 $\overline{\text{Q}}$ output
7	GND	–	GND
8	2 $\overline{\text{Q}}$	O	2 $\overline{\text{Q}}$ output
9	2Q	O	2Q output
10	2 $\overline{\text{PRE}}$	I	2 preset
11	2CLK	I	2 clock
12	2D	I	2D input
13	2 $\overline{\text{CLR}}$	I	2 clear
14	Vcc	–	Supply voltage input

1. Signal Types: I = Input, O = Output, I/O = Input or Output.

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature (unless otherwise noted)⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		−0.5	7	V
V _I	Input voltage range ⁽²⁾		−0.5	7	V
V _O	Voltage applied to any output in the high-impedance or power-off state ⁽²⁾		−0.5	7	V
V _O	Output voltage range ⁽²⁾ ⁽³⁾		−0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	V _I < 0		−20	mA
I _{OK}	Output clamp current	V _O < 0		−50	mA
I _O	Continuous output current	V _O = 0 to V _{CC}	−25	25	mA
	Continuous current through V _{CC} or GND		−50	50	mA
T _{stg}	Storage temperature		−65	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The value is limited to 5.5-V maximum.

5.2 ESD Ratings

		VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human-body model (HBM), per AEC Q100-002 ¹	±2000
		Charged device model (CDM), per AEC Q100-011	±1000
			V

(1) AEC Q100-002 indicates that HBM stressing must be in accordance with the ANSI/ESDA/JEDEC JS-001 specification.

5.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)¹

		MIN	MAX	UNIT
V _{CC}	Supply voltage	2	5.5	V
V _{IH}	High-level input voltage	V _{CC} = 2 V	1.5	V
		V _{CC} = 2.3 V to 2.7 V	V _{CC} × 0.7	
		V _{CC} = 3 V to 3.6 V	V _{CC} × 0.7	
		V _{CC} = 4.5 V to 5.5 V	V _{CC} × 0.7	
V _{IL}	Low-level input voltage	V _{CC} = 2 V	0.5	V
		V _{CC} = 2.3 V to 2.7 V	V _{CC} × 0.3	
		V _{CC} = 3 V to 3.6 V	V _{CC} × 0.3	
		V _{CC} = 4.5 V to 5.5 V	V _{CC} × 0.3	
V _I	Input voltage	0	5.5	V
V _O	Output voltage	0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 2 V	−50	μA
		V _{CC} = 2.3 V to 2.7 V	−2	mA
		V _{CC} = 3 V to 3.6 V	−6	
		V _{CC} = 4.5 V to 5.5 V	−12	
I _{OL}	Low-level output current	V _{CC} = 2 V	50	μA
		V _{CC} = 2.3 V to 2.7 V	2	mA
		V _{CC} = 3 V to 3.6 V	6	
		V _{CC} = 4.5 V to 5.5 V	12	

over operating free-air temperature range (unless otherwise noted)¹

		MIN	MAX	UNIT
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		200
		$V_{CC} = 3 \text{ V to } 3.6 \text{ V}$		100
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$		20
T_A	Operating free-air temperature	-40	125	°C

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. See the TI application report, *Implications of Slow or Floating CMOS Inputs*, [SCBA004](#).

5.4 Thermal Information

over operating free-air temperature range (unless otherwise noted)

THERMAL METRIC ⁽¹⁾		D	PW	UNIT
		14 PINS	14 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	86	113	°C/W

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, [SPRA953](#).

5.5 Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V _{CC}	MIN	TYP	MAX	UNIT
V _{OH}	High level output voltage	I _{OH} = −50 μA	2 to 5.5 V	V _{CC} − 0.1		V
		I _{OH} = −2 mA	2.3 V	2		
		I _{OH} = −6 mA	3 V	2.48		
		I _{OH} = −12 mA	4.5 V	3.8		
V _{OL}	Low level output voltage	I _{OL} = 50 μA	2 to 5.5 V		0.1	V
		I _{OL} = 2 mA	2.3 V		0.4	
		I _{OL} = 6 mA	3 V		0.44	
		I _{OL} = 12 mA	4.5 V		0.55	
I _I	Input leakage current	V _I = 5.5 V or GND	0 to 5.5 V		±1	μA
I _{CC}	Supply current	V _I = V _{CC} or GND, I _O = 0	5.5 V		20	μA
I _{off}	Input/Output Power-Off Leakage Current	V _I or V _O = 0 to 5.5 V	0		5	μA
C _i	Input Capacitance	V _I = V _{CC} or GND	3.3 V	2		pF
			5 V	2		

5.6 Timing Requirements, $V_{CC} = 2.5 \text{ V} \pm 0.2 \text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 2.5 \text{ V} \pm 0.2 \text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER		$T_A = 25^\circ C$		MIN	MAX	UNIT
		MIN	MAX			
t_w	Pulse duration	$\overline{PRE}$ or $\overline{CLR}$ low		8	9	ns
		CLK		8	9	
t_{su}	Setup time before CLK $\uparrow$	Data		8	9	ns
		$\overline{PRE}$ or $\overline{CLR}$ low		7	7	
t_h	Hold time, data after CLK $\uparrow$	0.5		0.5		ns

5.7 Timing Requirements, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER			$T_A = 25^\circ\text{C}$		MIN	MAX	UNIT
			MIN	MAX			
t_W	Pulse duration	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low	6	7			ns
		CLK	6	7			
t_{su}	Setup time before CLK $\uparrow$	Data	6	7			ns
		$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low	5	5			
t_h	Hold time, data after CLK $\uparrow$		0.5	0.5			ns

5.8 Timing Requirements, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER			$T_A = 25^\circ\text{C}$		MIN	MAX	UNIT
			MIN	MAX			
t_W	Pulse duration	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low	5	5			ns
		CLK	5	5			
t_{su}	Setup time before CLK $\uparrow$	Data	5	5			ns
		$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$ low	3	3			
t_h	Hold time, data after CLK $\uparrow$		0.5	0.5			ns

5.9 Switching Characteristics, $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
f_{max}			$C_L = 50\text{ pF}$	30	70		25		MHz
t_{pd}	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$	Q or $\overline{Q}$	$C_L = 50\text{ pF}$		13	17.4	1	20	ns
	CLK				14.2	20	1	23	

5.10 Switching Characteristics, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
f_{max}			$C_L = 50\text{ pF}$	50	90		45		MHz
t_{pd}	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$	Q or $\overline{Q}$	$C_L = 50\text{ pF}$		9.2	15.8	1	18	ns
	CLK				10.2	15.4	1	18	

5.11 Switching Characteristics, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
f_{max}			$C_L = 50\text{ pF}$	90	140		75		MHz
t_{pd}	$\overline{\text{PRE}}$ or $\overline{\text{CLR}}$	Q or $\overline{Q}$	$C_L = 50\text{ pF}$		6.6	9.7	1	12	ns
	CLK				7.2	9.3	1	13	

5.12 Noise Characteristics

$V_{CC} = 3.3\text{ V}$, $C_L = 50\text{ pF}$, $T_A = 25^\circ\text{C}$ ⁽¹⁾

PARAMETER		MIN	TYP	MAX	UNIT
$V_{OL(P)}$	Quiet output, maximum dynamic V_{OL}		0.1	0.8	V
$V_{OL(V)}$	Quiet output, minimum dynamic V_{OL}		0	–0.8	
$V_{OH(V)}$	Quiet output, minimum dynamic V_{OH}		3.2		
$V_{IH(D)}$	High-level dynamic input voltage	2.31			
$V_{IL(D)}$	Low-level dynamic input voltage			0.99	

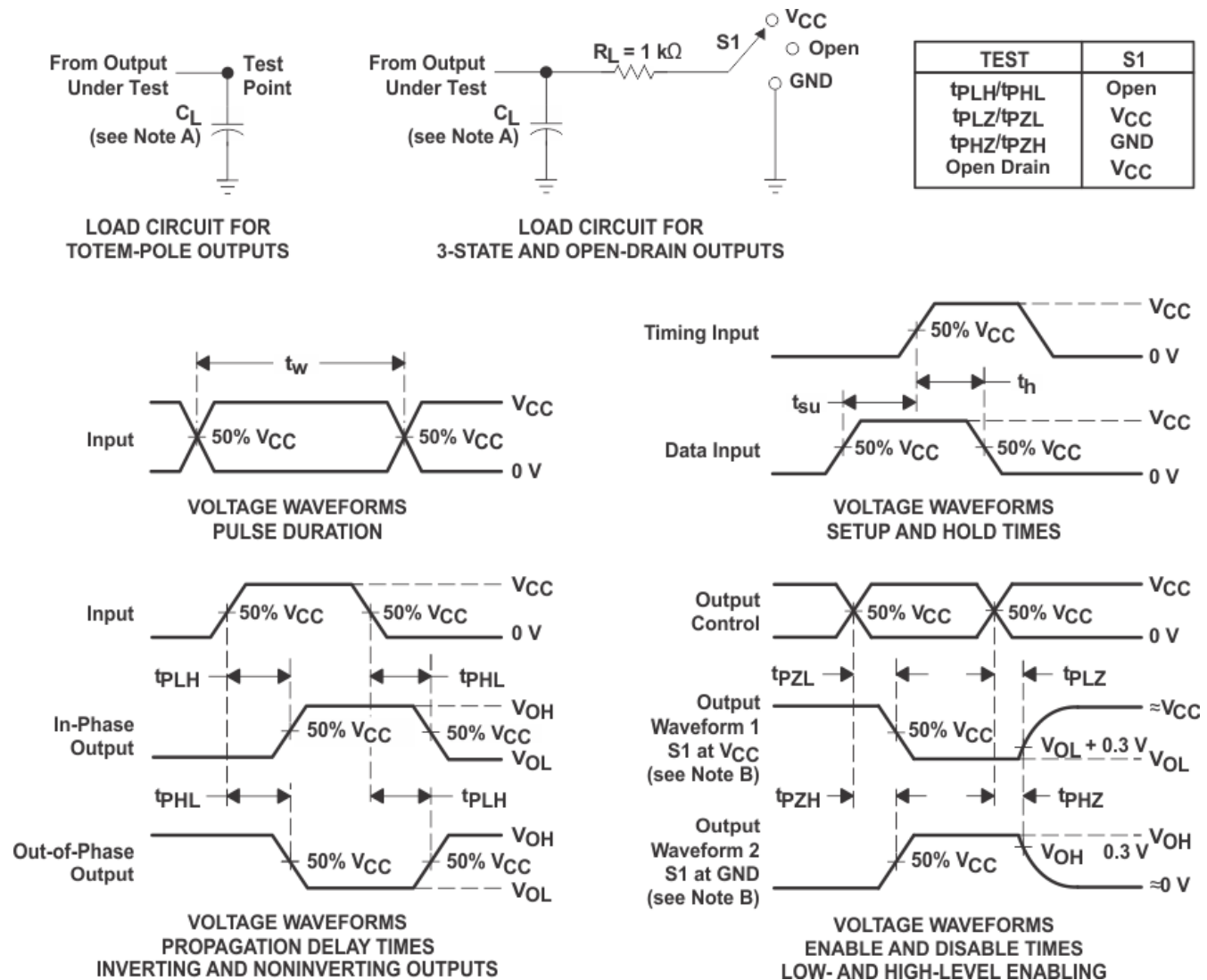
(1) Characteristics are for surface-mount packages only.

5.13 Operating Characteristics

$T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	V_{CC}	TYP	UNIT
C_{pd}	Power dissipation capacitance	$C_L = 50\text{ pF}$, $f = 10\text{ MHz}$	3.3 V	21	pF
			5 V	23	

6 Parameter Measurement Information



- A. C_L includes probe and jig capacitance.
- B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 3\text{ ns}$, $t_f \leq 3\text{ ns}$.
- D. The outputs are measured one at a time, with one input transition per measurement.
- E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
- F. t_{PZL} and t_{PZH} are the same as t_{en} .
- G. t_{PHL} and t_{PLH} are the same as t_{pd} .
- H. All parameters and waveforms are not applicable to all devices.

Figure 6-1. Load Circuit and Voltage Waveforms

7 Detailed Description

7.1 Overview

This dual positive-edge-triggered D-type flip-flop is designed for 2-V to 5.5-V V_{CC} operation.

A low level at the preset ($\overline{PRE}$) or clear ($\overline{CLR}$) inputs sets or resets the outputs, regardless of the levels of the other inputs. When $\overline{PRE}$ and $\overline{CLR}$ are inactive (high), data at the data (D) inputs meeting the setup-time requirements is transferred to the outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a voltage level and is not directly related to the rise time of the clock pulse. Following the hold-time interval, data at the D input can be changed without affecting the levels at the outputs.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

7.2 Functional Block Diagram

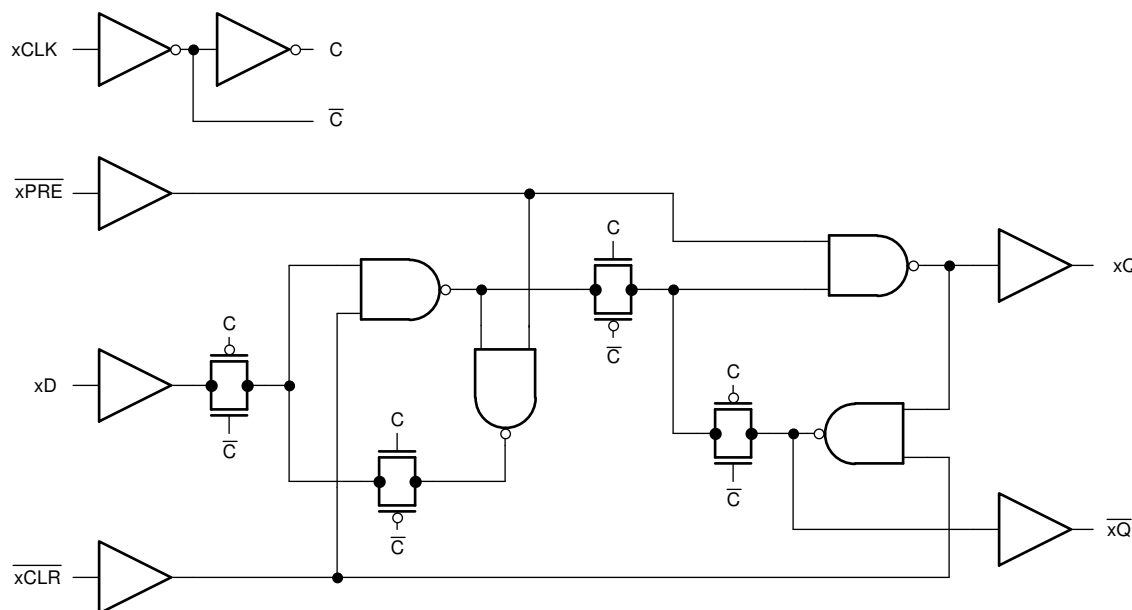


Figure 7-1. Logic Diagram, Each Flip-flop (Positive Logic)

7.3 Device Functional Modes

Table 7-1. Function Table

INPUTS ⁽¹⁾				OUTPUTS ⁽²⁾	
$\overline{PRE}$	$\overline{CLR}$	CLK	D	Q	$\overline{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H ⁽³⁾	H ⁽³⁾
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q_0	$\overline{Q}_0$

- (1) H = High Voltage Level, L = Low Voltage Level, X = Don't Care
 (2) H = Driving High, L = Driving Low, Z = High Impedance State
 (3) This configuration is nonstable; that is, it does not persist when $\overline{PRE}$ or $\overline{CLR}$ returns to its inactive (high) level.

8 Device and Documentation Support

8.1 Documentation Support

8.1.1 Related Documentation

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 8-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN74LV74A-Q1	Click here	Click here	Click here	Click here	Click here

8.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.3 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

8.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

9 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74LV74AQDRG4Q1	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A
SN74LV74AQDRG4Q1.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A
SN74LV74AQDRQ1	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A
SN74LV74AQDRQ1.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A
SN74LV74AQPWRG4Q1	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A
SN74LV74AQPWRG4Q1.A	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	LV74A

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LV74A-Q1 :

- Catalog : [SN74LV74A](#)
- Enhanced Product : [SN74LV74A-EP](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LV74AQPWRG4Q1	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LV74AQPWRG4Q1	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LV74AQPWRG4Q1	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74LV74AQPWRG4Q1	TSSOP	PW	14	2000	353.0	353.0	32.0

D0014A**PACKAGE OUTLINE****SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
5. Reference JEDEC registration MS-012, variation AB.

EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

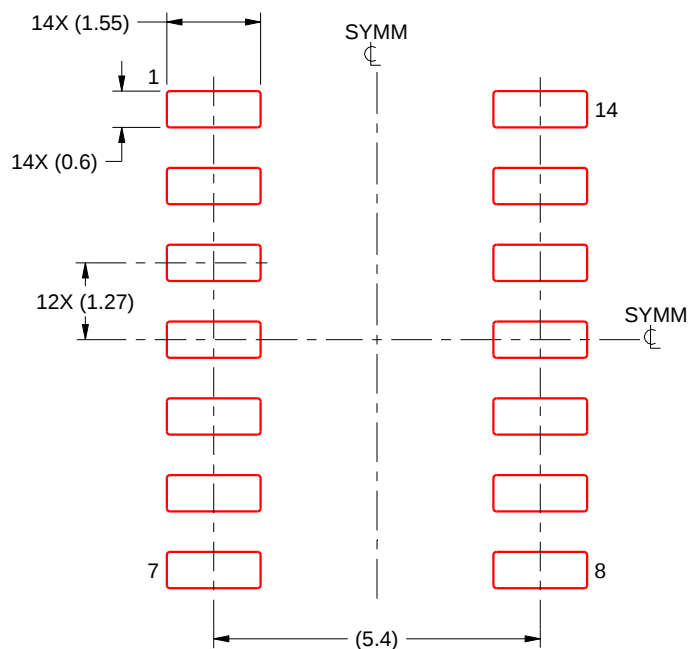
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

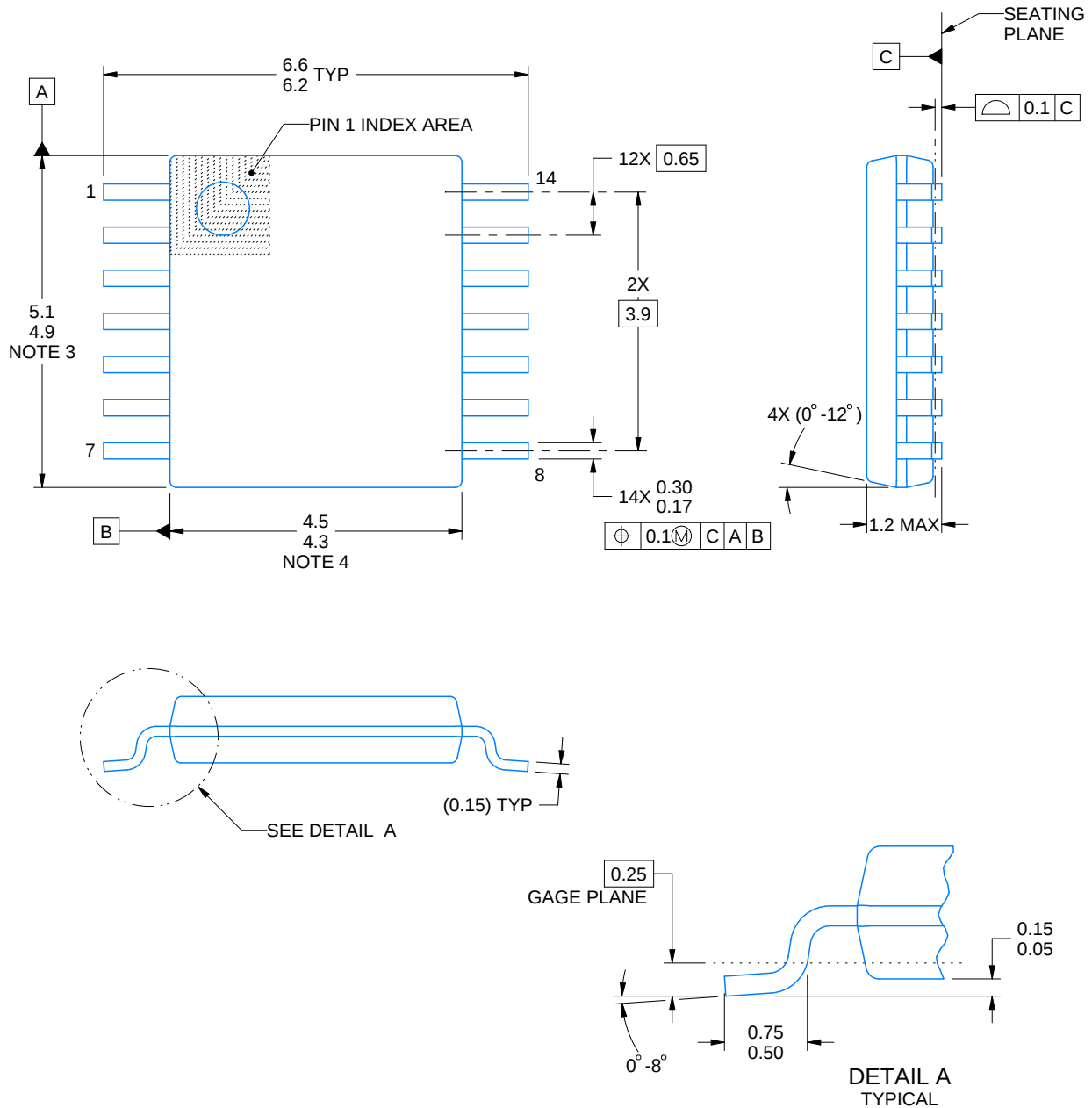
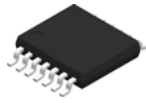


SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.



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NOTES:

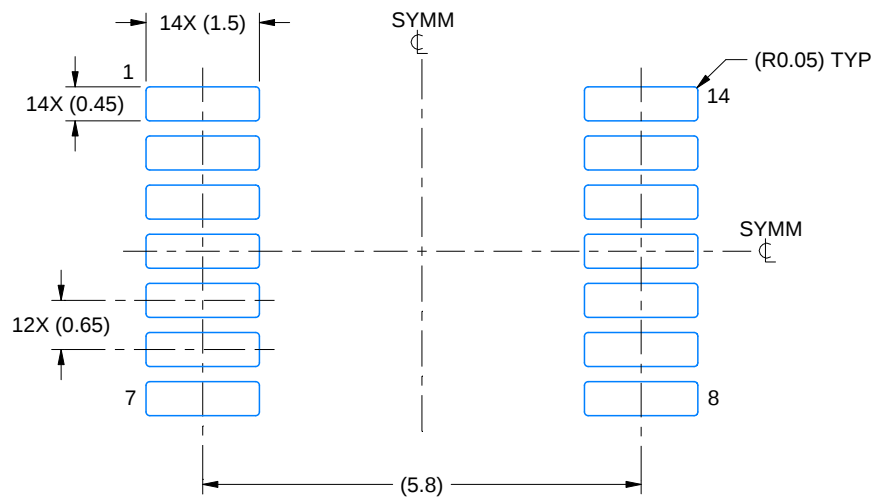
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153.

EXAMPLE BOARD LAYOUT

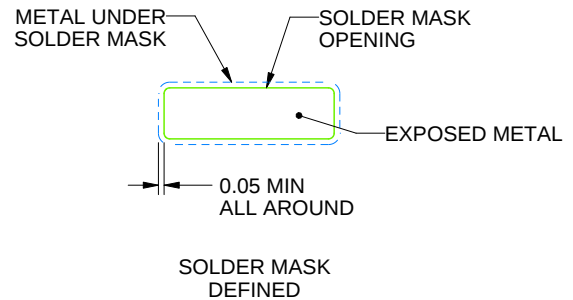
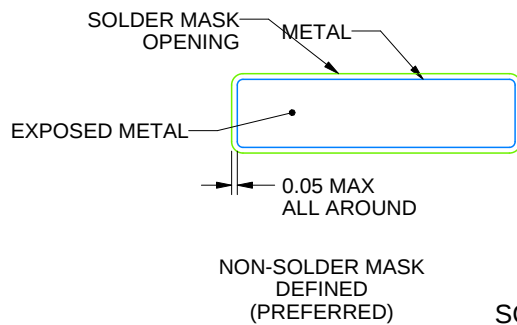
PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

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NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

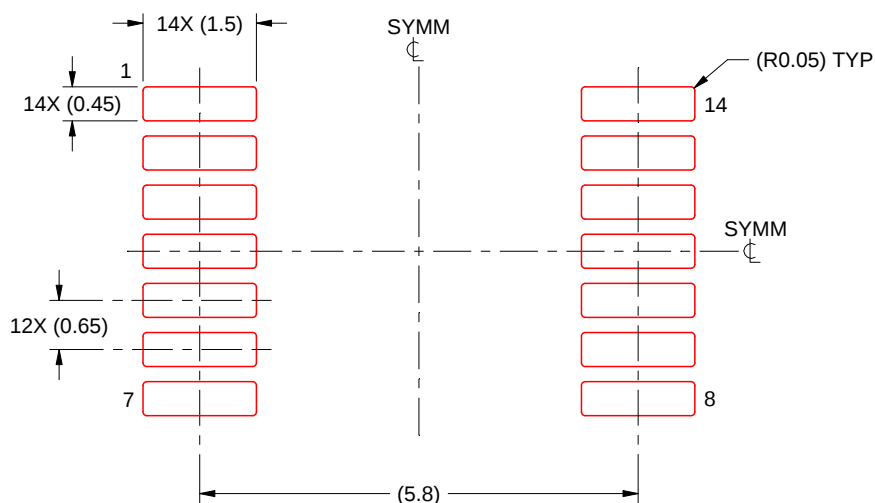
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

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NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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