

## SN74LV393A デュアル 4 ビット・バイナリ・カウンタ

### 1 特長

- 2V~5.5V の  $V_{CC}$  で動作
- 最大  $t_{pd}$  10ns (5V 時)
- 標準  $V_{OLP}$  (出力グランド・バウンス)  $< 0.8V$  ( $V_{CC} = 3.3V, T_A = 25^\circ C$ )
- 標準  $V_{OHV}$  (出力  $V_{OH}$  アンダーシュート)  $> 2.3V$  ( $V_{CC} = 3.3V, T_A = 25^\circ C$ )
- $I_{off}$  により部分的パワーダウン・モードでの動作をサポート
- 個別のクロックを備えたデュアル 4 ビット・バイナリ・カウンタ
- 4 ビット・カウンタごとにダイレクト・クリア
- カウンタ・パッケージ数を 50% 削減することで、システム密度を大幅に向上できます
- JESD 78、Class II 準拠で 100mA 超のラッチアップ性能

### 2 アプリケーション

- 反転クロック入力との同期
- スイッチのデバウンス
- デジタル信号の反転

### 3 説明

LV393A デバイスには 8 つのフリップ・フロップと追加のゲート処理が搭載されており、2 つの個別 4 ビット・カウンタを 1 つのパッケージに実装します。これらのデバイスは、2V~5.5V  $V_{CC}$  動作用に設計されています。

#### パッケージ情報

部品番号	パッケージ <sup>(1)</sup>	本体サイズ (公称)
SN74LV393A	D (SOIC, 14)	8.65mm × 3.9mm
	NS (SOP, 14)	10.3mm × 5.3mm
	DB (SSOP, 14)	6.2mm × 5.3mm
	PW (TSSOP, 14)	5mm × 4.4mm
	DGV (TVSOP, 14)	3.6mm × 4.4mm

- (1) 利用可能なパッケージについては、このデータシートの末尾にある注文情報を参照してください。

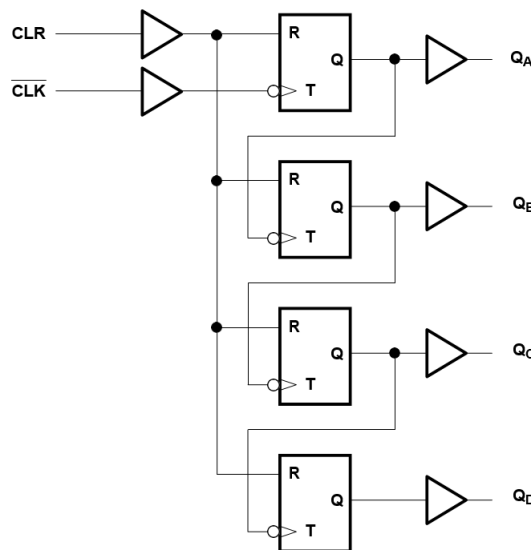


図 3-1. 各カウンタの論理図 (正論理)

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## 4 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

### Changes from Revision D (February 2001) to Revision E (March 2023)

Page

- 「アプリケーション」、「パッケージ情報」表、「ピンの機能」表、「ESD 定格」表、「熱に関する情報」表、「デバイスの機能モード」、「アプリケーションと実装」セクション、「電源に関する推奨事項」セクション、「レイアウト」セクション、「デバイスおよびドキュメントのサポート」セクション、および「メカニカル、パッケージ、および注文情報」セクションを追加 ..... 1

## 5 Pin Configuration and Functions

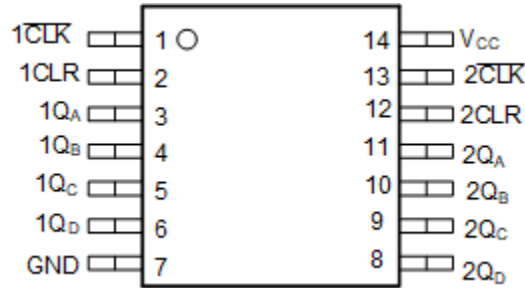


图 5-1. D, DB, DGV, NS, or PW Package (Top View)

表 5-1. Pin Functions

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
1CLK	1	I	Counter 1 Clock Input
1CLR	2	I	Counter 1 Clear Input
1Q <sub>A</sub>	3	O	Counter 1 A Output
1Q <sub>B</sub>	4	O	Counter 1 B Output
1Q <sub>C</sub>	5	O	Counter 1 B Output
1Q <sub>D</sub>	6	O	Counter 1 B Output
GND	7	G	Ground
2Q <sub>D</sub>	8	O	Counter 2 D Output
2Q <sub>C</sub>	9	O	Counter 2 C Output
2Q <sub>B</sub>	10	O	Counter 2 B Output
2Q <sub>A</sub>	11	O	Counter 2 A Output
2CLR	12	I	Counter 2 Clear Input
2CLK	13	I	Counter 2 Clock Input
V <sub>CC</sub>	14	P	V <sub>CC</sub>

(1) I = Input, O = Output, I/O = Input or Output, G = Ground, P = Power.

## 6 Specifications

### 6.1 Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage	-0.5	7	V
V <sub>I</sub>	Input voltage <sup>(1)</sup>	-0.5	7	V
V <sub>O</sub>	Output voltage range applied in high or low state <sup>(1) (2)</sup>	-0.5	V <sub>CC</sub> + 0.5	V
V <sub>O</sub>	Output voltage range applied in power-off state <sup>(1)</sup>	-0.5	7	V
I <sub>IK</sub>	Input clamp current	V <sub>I</sub> < 0	-20	mA
I <sub>OK</sub>	Output clamp current	V <sub>O</sub> < 0	-50	mA
I <sub>O</sub>	Continuous output current	V <sub>O</sub> = 0 to V <sub>CC</sub>	±25	mA
Continuous current through V <sub>CC</sub> or GND			±50	mA
T <sub>stg</sub>	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, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- This value is limited to 7 V maximum.

### 6.2 ESD Ratings

		VALUE	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human-Body Model (A114-A) <sup>(1)</sup>	±2000
		Charged-Device Model (C101) <sup>(2)</sup>	±1000
		Machine Model (A115-A)	±200

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage		2	5.5	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 2 V	1.5		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	V <sub>CC</sub> × 0.7		
		V <sub>CC</sub> = 3 V to 3.6 V	V <sub>CC</sub> × 0.7		
		V <sub>CC</sub> = 4.5 V to 5.5 V	V <sub>CC</sub> × 0.7		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 2 V	0.5		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	V <sub>CC</sub> × 0.3		
		V <sub>CC</sub> = 3 V to 3.6 V	V <sub>CC</sub> × 0.3		
		V <sub>CC</sub> = 4.5 V to 5.5 V	V <sub>CC</sub> × 0.3		
V <sub>I</sub>	Input voltage		0	5.5	V
V <sub>O</sub>	Output voltage	High or low state	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 2 V	-50		μA
		V <sub>CC</sub> = 2.3 V to 2.7 V	-2		
		V <sub>CC</sub> = 3 V to 3.6 V	-6		mA
		V <sub>CC</sub> = 4.5 V to 5.5 V	-12		
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 2 V	50		μA
		V <sub>CC</sub> = 2.3 V to 2.7 V	2		
		V <sub>CC</sub> = 3 V to 3.6 V	6		mA
		V <sub>CC</sub> = 4.5 V to 5.5 V	12		
Δt/Δv	Input transition rise or fall rate	V <sub>CC</sub> = 2.3 V to 2.7 V	200		ns/V
		V <sub>CC</sub> = 3 V to 3.6 V	100		
		V <sub>CC</sub> = 4.5 V to 5.5 V	20		
T <sub>A</sub>	Operating free-air temperature		-40	85	°C

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. See [Implications of Slow or Floating CMOS Inputs](#).

### 6.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74LV393A					UNIT
		D (SOIC)	NS (SOP)	DB (SSOP)	PW (TSSOP)	DGV (TVSOP)	
		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	86	96	127	76	113	°C/W

(1) For more information about traditional and new thermal metrics, see [Semiconductor and IC Package Thermal Metrics](#).

## 6.5 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	MIN	TYP	MAX	UNIT
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	2 V to 5.5 V	V <sub>CC</sub> - 0.1			V
	I <sub>OH</sub> = -2 mA	2.3 V	2			
	I <sub>OH</sub> = -6 mA	3 V	2.48			
	I <sub>OH</sub> = -12 mA	4.5 V	3.8			
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	2 V to 5.5 V			0.1	V
	I <sub>OL</sub> = 2 mA	2.3 V			0.4	
	I <sub>OL</sub> = 6 mA	3 V			0.44	
	I <sub>OL</sub> = 12 mA	4.5 V			0.55	
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	0 V to 5.5 V			±1	μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V			20	μA
I <sub>off</sub>	V <sub>I</sub> or V <sub>O</sub> = 0 to 5.5 V	0 V			5	μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3 V		1.8		pF

## 6.6 Timing Requirements, V<sub>CC</sub> = 2.5 V ± 0.2 V

timing requirements over recommended operating free-air temperature range, V<sub>CC</sub> = 2.5 V ± 0.2 V (unless otherwise noted)

			T <sub>A</sub> = 25°C		SN74LV393A		UNIT
			MIN	MAX	MIN	MAX	
t <sub>w</sub>	Pulse duration	CLK high or low	5		5		ns
		CLR high	5		5		
t <sub>su</sub>	Setup time	CLR inactive before CLK ↓	6		6		ns

## 6.7 Timing Requirements, V<sub>CC</sub> = 3.3 V ± 0.3 V

timing requirements over recommended operating free-air temperature range, V<sub>CC</sub> = 3.3 V ± 0.3 V (unless otherwise noted)

			T <sub>A</sub> = 25°C		SN74LV393A		UNIT
			MIN	MAX	MIN	MAX	
t <sub>w</sub>	Pulse duration	CLK high or low	5		5		ns
		CLR high	5		5		
t <sub>su</sub>	Setup time	CLR inactive before CLK ↓	5		5		ns

## 6.8 Timing Requirements, V<sub>CC</sub> = 5 V ± 0.5 V

timing requirements over recommended operating free-air temperature range, V<sub>CC</sub> = 5 V ± 0.5 V (unless otherwise noted)

			T <sub>A</sub> = 25°C		SN74LV393A		UNIT
			MIN	MAX	MIN	MAX	
t <sub>w</sub>	Pulse duration	CLK high or low	5		5		ns
		CLR high	5		5		
t <sub>su</sub>	Setup time	CLR inactive before CLK ↓	4		4		ns

### 6.9 Switching Characteristics, $V_{CC} = 2.5 V \pm 0.2 V$

over operating free-air temperature range,  $V_{CC} = 2.5 V \pm 0.2 V$  (unless otherwise noted)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	TA = 25°C			SN74LV393A		UNIT
				MIN	TYP	MAX	MIN	MAX	
f <sub>max</sub>			C <sub>L</sub> = 15 pF	50 <sup>1</sup>	90 <sup>1</sup>		40		MHz
			C <sub>L</sub> = 50 pF	30	70		25		
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 15 pF		7.1 <sup>1</sup>	17.7 <sup>1</sup>	1	20.5	ns
		Q <sub>B</sub>			8.5 <sup>1</sup>	20.3 <sup>1</sup>	1	23.5	
		Q <sub>C</sub>			10 <sup>1</sup>	122.5 <sup>1</sup>	1	26	
		Q <sub>D</sub>			11.1 <sup>1</sup>	24.2 <sup>1</sup>	1	28	
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		6.7 <sup>1</sup>	14.8 <sup>1</sup>	1	17		
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 50 pF		9.3	21.3	1	24.5	ns
		Q <sub>B</sub>			10.9	23.9	1	27.5	
		Q <sub>C</sub>			12.3	26.1	1	30	
		Q <sub>D</sub>			13.4	27.8	1	32	
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		9.1	17.4	1	20		

1. On products compliant to MIL-PRF-38535, this parameter is not production tested.

### 6.10 Switching Characteristics, $V_{CC} = 3.3 V \pm 0.3 V$

over operating free-air temperature range,  $V_{CC} = 3.3 V \pm 0.3 V$  (unless otherwise noted)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	TA = 25°C			SN74LV393A		UNIT
				MIN	TYP	MAX	MIN	MAX	
f <sub>max</sub>			C <sub>L</sub> = 15 pF	75 <sup>1</sup>	130 <sup>1</sup>		65		MHz
			C <sub>L</sub> = 50 pF	45	105		35		
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 15 pF		5.1 <sup>1</sup>	13.2 <sup>1</sup>	1	15.5	ns
		Q <sub>B</sub>			6 <sup>1</sup>	15.8 <sup>1</sup>	1	18.5	
		Q <sub>C</sub>			7 <sup>1</sup>	18 <sup>1</sup>	1	21	
		Q <sub>D</sub>			7.7 <sup>1</sup>	19.7 <sup>1</sup>	1	23	
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		5.1 <sup>1</sup>	12.3 <sup>1</sup>	1	14.5		
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 50 pF		6.7	16.7	1	19	ns
		Q <sub>B</sub>			7.8	19.3	1	22	
		Q <sub>C</sub>			8.7	21.5	1	24.5	
		Q <sub>D</sub>			9.5	23.2	1	26.5	
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		6.8	15.8	1	18		

1. On products compliant to MIL-PRF-38535, this parameter is not production tested.

### 6.11 Switching Characteristics, $V_{CC} = 5 V \pm 0.5 V$

over operating free-air temperature range,  $V_{CC} = 5 V \pm 0.5 V$  (unless otherwise noted)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	TA = 25°C			SN74LV393A		UNIT
				MIN	TYP	MAX	MIN	MAX	
f <sub>max</sub>			C <sub>L</sub> = 15 pF	125 <sup>1</sup>	185 <sup>1</sup>		105		MHz
			C <sub>L</sub> = 50 pF	85	150		75		

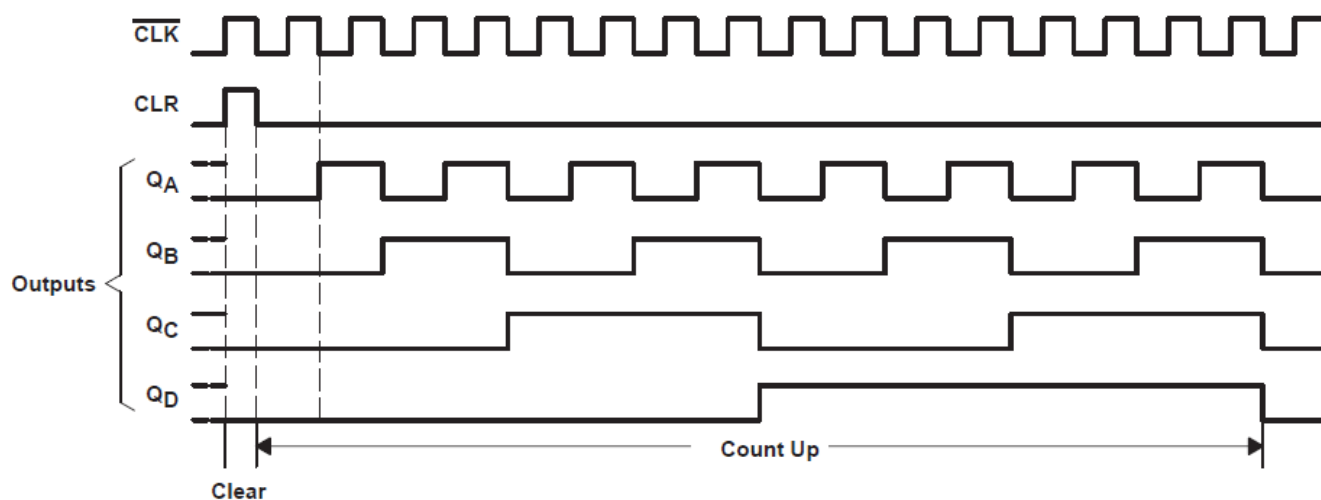
### 6.11 Switching Characteristics, $V_{CC} = 5 V \pm 0.5 V$ (continued)

over operating free-air temperature range,  $V_{CC} = 5 V \pm 0.5 V$  (unless otherwise noted)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	TA = 25°C			SN74LV393A		UNIT
				MIN	TYP	MAX	MIN	MAX	
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 15 pF		3.7 <sup>1</sup>	8.5 <sup>1</sup>	1	10	ns
		Q <sub>B</sub>		4.3 <sup>1</sup>	9.8 <sup>1</sup>	1	11.5		
		Q <sub>C</sub>		4.9 <sup>1</sup>	11.2 <sup>1</sup>	1	13		
		Q <sub>D</sub>		5.3 <sup>1</sup>	12.5 <sup>1</sup>	1	14.5		
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		3.9 <sup>1</sup>	8.1 <sup>1</sup>	1	9.5		
t <sub>pd</sub>	CLK	Q <sub>A</sub>	C <sub>L</sub> = 50 pF		4.9	10.5	1	12	ns
		Q <sub>B</sub>		5.6	11.8	1	13.5		
		Q <sub>C</sub>		6.2	13.2	1	15		
		Q <sub>D</sub>		6.6	14.5	1	16.5		
t <sub>PHL</sub>	CLR	Q <sub>n</sub>		5.2	10.1	1	11.5		

1. On products compliant to MIL-PRF-38535, this parameter is not production tested.

### 6.12 Timing Diagrams



6-1. Timing Diagram

### 6.13 Noise Characteristics

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

PARAMETER <sup>(1)</sup>		SN74LV393A			UNIT
		MIN	TYP	MAX	
V <sub>OL(P)</sub>	Quiet output, maximum dynamic V <sub>OL</sub>		0.3	0.8	V
V <sub>OL(V)</sub>	Quiet output, minimum dynamic V <sub>OL</sub>		-0.2	-0.8	V
V <sub>OH(V)</sub>	Quiet output, minimum dynamic V <sub>OH</sub>		2.8		V
V <sub>IH(D)</sub>	High-level dynamic input voltage	2.31			V
V <sub>IL(D)</sub>	Low-level dynamic input voltage			0.99	V

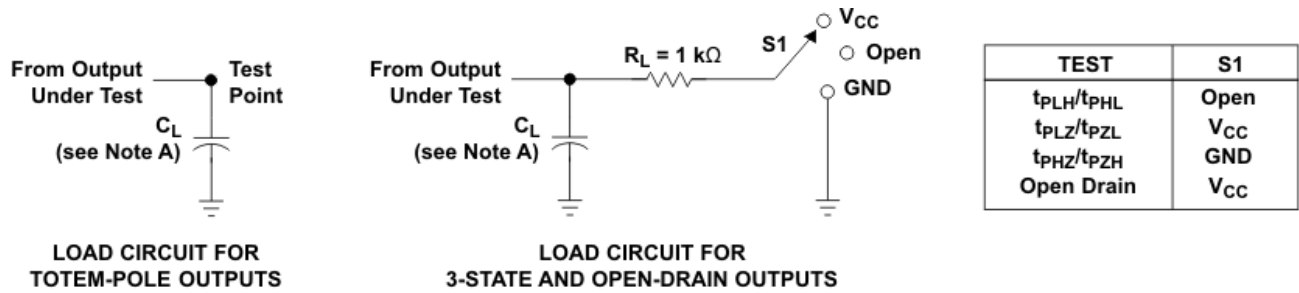
(1) Characteristics for surface-mount packages only.

## 6.14 Operating Characteristics

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

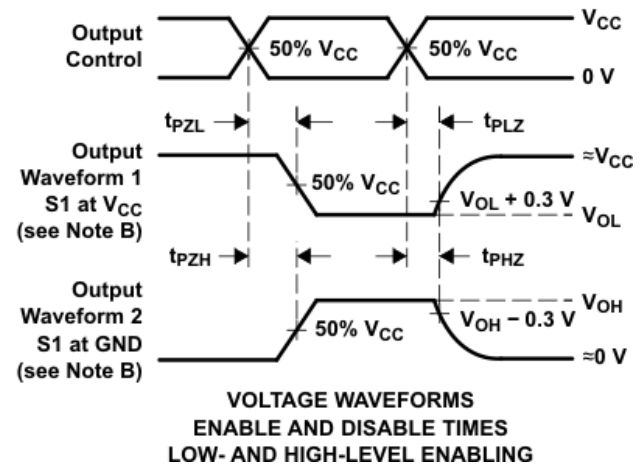
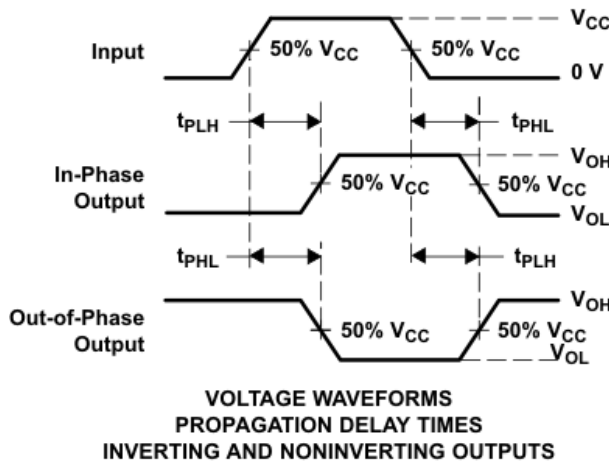
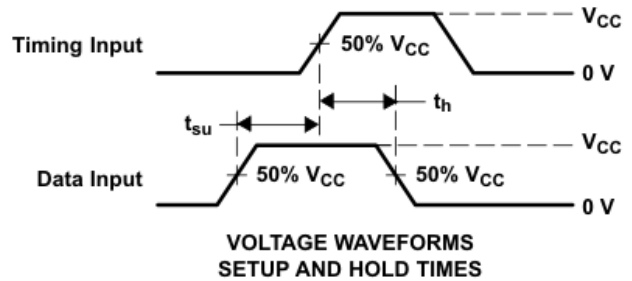
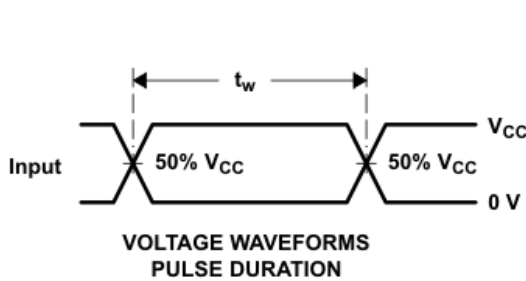
PARAMETER		TEST CONDITIONS	$V_{CC}$	TYP	UNIT
$C_{pd}$	Power dissipation capacitance (outputs enabled)	$C_L = 50\text{ pF}, f = 10\text{ MHz}$	3.3 V	15.2	pF
			5 V	17.3	

## 7 Parameter Measurement Information



LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS

LOAD CIRCUIT FOR 3-STATE AND OPEN-DRAIN OUTPUTS



- 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:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 3 \text{ ns}$ , and  $t_f \leq 3 \text{ ns}$ .
- 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.

### 7-1. Load Circuit and Voltage Waveforms

## 8 Detailed Description

### 8.1 Overview

These devices comprise two independent 4-bit binary counters, each having a clear (CLR) and a clock ( $\overline{\text{CLK}}$ ) input. These devices change state on the negative-going transition of the  $\overline{\text{CLK}}$  pulse. N-bit binary counters can be implemented with each package, providing the capability of divide by 256. The 'LV393A devices have parallel outputs from each counter stage so that any submultiple of the input count frequency is available for system timing signals.

These devices are fully specified for partial-power-down applications using  $I_{\text{off}}$ . The  $I_{\text{off}}$  circuitry disables the outputs, preventing damaging current backflow through the devices when they are powered down.

### 8.2 Functional Block Diagram

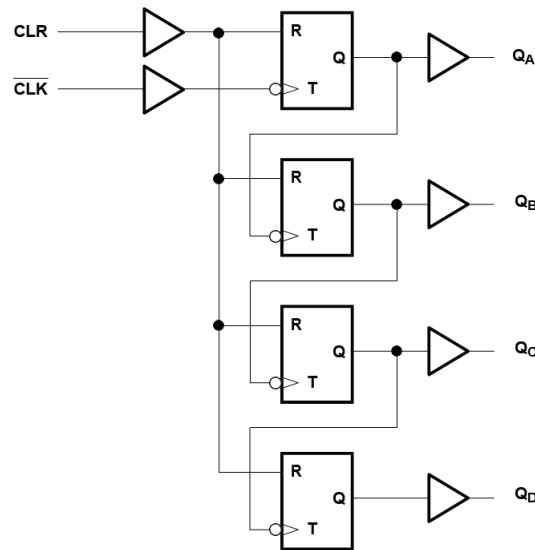


图 8-1. Logic Diagram, Each Counter (Positive Logic)

### 8.3 Device Functional Modes

表 8-1. Function Table

INPUTS		FUNCTION
$\overline{\text{CLK}}$	CLR	
↑	L	No change
↓	L	Advance to next stage
X	H	All outputs L

## 9 Application and Implementation

### 注

以下のアプリケーション情報は、テキサス・インスツルメンツの製品仕様に含まれるものではなく、テキサス・インスツルメンツではその正確性または完全性を保証いたしません。個々の目的に対する製品の適合性については、お客様の責任で判断していただくことになります。また、お客様は自身の設計実装を検証しテストすることで、システムの機能を確認する必要があります。

### 9.1 Power Supply Recommendations

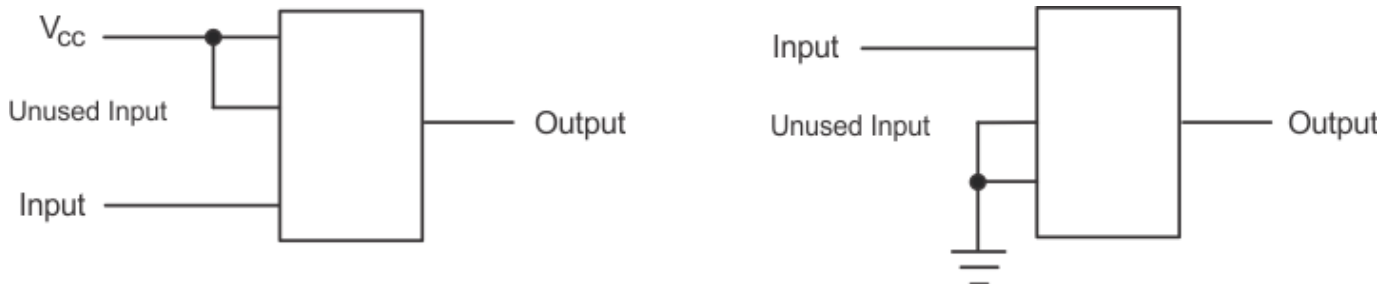
The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Absolute Maximum Ratings* section. Each  $V_{CC}$  terminal must have a good bypass capacitor to prevent power disturbance. For devices with a single supply, TI recommends a 0.1- $\mu\text{F}$  capacitor; if there are multiple  $V_{CC}$  terminals, then TI recommends a 0.01- $\mu\text{F}$  or 0.022- $\mu\text{F}$  capacitor for each power terminal. Multiple bypass capacitors can be paralleled to reject different frequencies of noise. Frequencies of 0.1  $\mu\text{F}$  and 1  $\mu\text{F}$  are commonly used in parallel. The bypass capacitor must be installed as close as possible to the power terminal for best results.

### 9.2 Layout

#### 9.2.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or  $V_{CC}$ , whichever makes more sense for the logic function or is more convenient.

##### 9.2.1.1 Layout Example



☒ 9-1. Layout Diagram

## 10 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

### 10.1 Documentation Support

#### 10.1.1 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.

表 10-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN74LV393A	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>

### 10.2 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、[ti.com](http://ti.com) のデバイス製品フォルダを開いてください。「更新の通知を受け取る」をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取れます。変更の詳細については、修正されたドキュメントに含まれている改訂履歴をご覧ください。

### 10.3 サポート・リソース

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### 10.4 Trademarks

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ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

### 10.6 用語集

[テキサス・インスツルメンツ用語集](#)

この用語集には、用語や略語の一覧および定義が記載されています。

## 11 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)
<a href="#">SN74LV393AD</a>	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 85	LV393A
<a href="#">SN74LV393ADBR</a>	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393ADBR.A	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
<a href="#">SN74LV393ADGVR</a>	NRND	Production	TVSOP (DGV)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393ADGVR.A	NRND	Production	TVSOP (DGV)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
<a href="#">SN74LV393ADR</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393ADR.A	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
<a href="#">SN74LV393ANSR</a>	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	74LV393A
SN74LV393ANSR.A	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	74LV393A
<a href="#">SN74LV393APW</a>	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 85	LV393A
<a href="#">SN74LV393APWR</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393APWR.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
<a href="#">SN74LV393APWRG4</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	No	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
<a href="#">SN74LV393APWRG4</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393APWRG4.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A
SN74LV393APWRG4.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	No	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LV393A

(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.

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**OTHER QUALIFIED VERSIONS OF SN74LV393A :**

- Automotive : [SN74LV393A-Q1](#)
- Enhanced Product : [SN74LV393A-EP](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*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
SN74LV393ADBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74LV393ADGVR	TVSOP	DGV	14	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74LV393ADR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LV393ANSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74LV393APWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LV393APWRG4	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)
SN74LV393ADBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74LV393ADGVR	TVSOP	DGV	14	2000	353.0	353.0	32.0
SN74LV393ADR	SOIC	D	14	2500	353.0	353.0	32.0
SN74LV393ANSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74LV393APWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74LV393APWRG4	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.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

DGV (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.  
 D. Falls within JEDEC: 24/48 Pins – MO-153  
 14/16/20/56 Pins – MO-194

# DB0014A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



### 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. Reference JEDEC registration MO-150.

# EXAMPLE BOARD LAYOUT

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4220762/A 05/2024

NOTES: (continued)

- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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

4220762/A 05/2024

NOTES: (continued)

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



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



4220202/B 12/2023

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

4220202/B 12/2023

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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