

# SNx4AHC273 Octal D-Type Flip-Flops With Clear

## 1 Features

- Operating range 2V to 5.5V  $V_{CC}$
- Contain eight flip-flops with single-rail outputs
- Direct clear input
- Individual data input to each flip-flop
- Latch-up performance exceeds 250mA per JESD 17
- ESD protection exceeds JESD 22
  - 2000V human-body model (A114-A)
  - 1000V charged-device model (C101)
- On products compliant to MIL-PRF-38535, All parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

## 2 Applications

- Buffers and Storage Registers
- Shift Registers
- Pattern Generators
- Servers
- PCs and Notebooks
- Network Switches
- Memory Systems
- Databases

## 3 Description

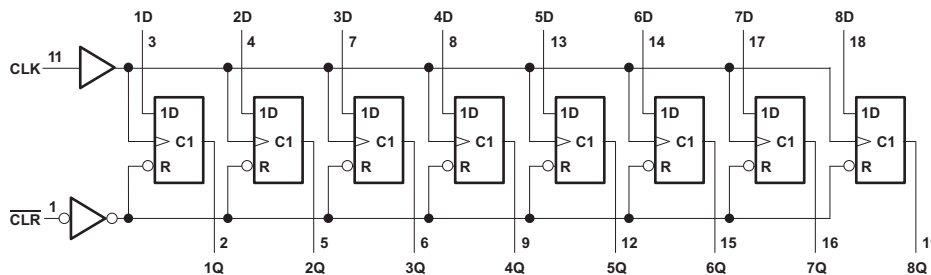
These devices are positive-edge-triggered D-type flip-flops with a direct clear ( $\overline{CLR}$ ) input.

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

### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	PACKAGE SIZE <sup>(2)</sup>	BODY SIZE <sup>(3)</sup>
SNx4AHC273	N (PDIP, 20)	24.33mm × 9.4mm	25.40mm × 6.35mm
	DB (SSOP, 20)	7.2mm × 7.8mm	7.50mm × 5.30mm
	NS (SOP, 20)	12.60mm × 7.8mm	12.6mm × 5.30mm
	PW (TSSOP, 20)	6.50mm × 6.4mm	6.50mm × 4.40mm
	DGV (TVSOP, 20)	5.00mm × 6.4mm	5.00mm × 4.40mm
	DW (SOIC, 20)	12.80mm × 10.3mm	12.8mm × 7.5mm

- (1) For more information, see [Section 11](#).
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.
- (3) The body size (length × width) is a nominal value and does not include pins.



**Simplified Schematics**

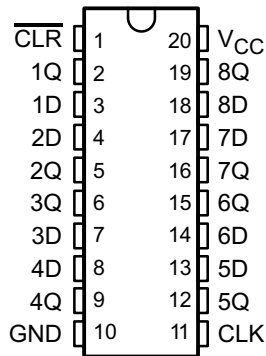


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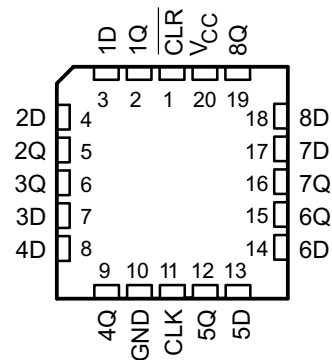
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## 4 Pin Configuration and Functions

**SN54AHC273 . . . J OR W PACKAGE  
SN74AHC273 . . . DB, DGV, DW, N, NS, OR PW PACKAGE  
(TOP VIEW)**



**SN54AHC273 . . . FK PACKAGE  
(TOP VIEW)**



PIN		I/O	DESCRIPTION
NO.	NAME		
1	$\overline{\text{CLR}}$	I	Clear Pin
2	1Q	O	1Q Output
3	1D	I	1D Input
4	2D	I	2D Input
5	2Q	O	2Q Output
6	3Q	O	3Q Output
7	3D	I	3D Input
8	4D	I	4D Input
9	4Q	O	4Q Output
10	GND	—	Ground Pin
11	CLK	I	Clock Pin
12	5Q	O	5Q Output
13	5D	I	5D Input
14	6D	I	6D Input
15	6Q	O	6Q Output
16	7Q	O	7Q Output
17	7D	I	7D Input
18	8D	I	8D Input
19	8Q	O	8Q Output
20	VCC	—	Power Pin

## 5 Specifications

### 5.1 Absolute Maximum Ratings

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

		MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage range	-0.5	7	V
V <sub>I</sub>	Input voltage range <sup>(2)</sup>	-0.5	7	V
V <sub>O</sub>	Output voltage range <sup>(2)</sup>	-0.5	V <sub>CC</sub> + 0.5	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 or V <sub>O</sub> > V <sub>CC</sub>	±20	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		±75	mA
T <sub>stg</sub>	Storage temperature range	-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 voltage ratings may be exceeded if the input and output current ratings are observed.

### 5.2 ESD Ratings

		VALUE	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins <sup>(1)</sup>	±2000
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup>	±1000

- (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.

### 5.3 Recommended Operating Conditions

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

		SN54AHC273		SN74AHC273		UNIT
		MIN	MAX	MIN	MAX	
V <sub>CC</sub>	Supply voltage	2	5.5	2	5.5	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 2 V	1.5	1.5		V
		V <sub>CC</sub> = 3 V	2.1	2.1		
		V <sub>CC</sub> = 5.5 V	3.85	3.85		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 2 V		0.5	0.5	V
		V <sub>CC</sub> = 3 V		0.9	0.9	
		V <sub>CC</sub> = 5.5 V		1.65	1.65	
V <sub>I</sub>	Input voltage	0	5.5	0	5.5	V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 2 V		-50	-50	μA
		V <sub>CC</sub> = 3 V ± 0.3 V		-4	-4	mA
		V <sub>CC</sub> = 5.5 V ± 0.5 V		-8	-8	
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 2 V		50	50	μA
		V <sub>CC</sub> = 3 V ± 0.3 V		4	4	mA
		V <sub>CC</sub> = 5.5 V ± 0.5 V		8	8	
Δt/Δv	Input transition rise and fall time	V <sub>CC</sub> = 3 V ± 0.3 V		100	100	ns/V
		V <sub>CC</sub> = 5.5 V ± 0.5 V		20	20	

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

		SN54AHC273		SN74AHC273		UNIT
		MIN	MAX	MIN	MAX	
T <sub>A</sub>	Operating free-air temperature	-55	125	-40	125	°C

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, (SCBA004).

## 5.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74AHC273						UNIT
		N	DW	NS	DB	PW	DGV	
		20 PINS						
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	53.9	81.1	79.4	98.7	116.8	118.1	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	38.8	48.9	45.9	60.4	58.5	33.4	
R <sub>θJB</sub>	Junction-to-board thermal resistance	34.7	53.8	46.9	56.9	78.7	59.6	
ψ <sub>JT</sub>	Junction-to-top characterization parameter	26.9	19.5	19.1	21.6	12.6	1.1	
ψ <sub>JB</sub>	Junction-to-board characterization parameter	34.7	53.1	46.5	53.5	77.9	58.9	
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	N/A	N/A	

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

## 5.5 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54AHC273		SN74AHC273		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	2 V	1.9			1.9		1.9		V
		3 V	2.9			2.9		2.9		
		4.5 V	4.4			4.4		4.4		
	I <sub>OH</sub> = -4 mA	3 V	2.58			2.48		2.48		
	I <sub>OH</sub> = -8 mA	4.5 V	3.94			3.8		3.8		
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	2 V	0.1			0.1		0.1		V
		3 V	0.1			0.1		0.1		
		4.5 V	0.1			0.1		0.1		
	I <sub>OL</sub> = 4 mA	3 V	0.36			0.5		0.44		
	I <sub>OL</sub> = 8 mA	4.5 V	0.36			0.5		0.44		
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	0 to 5.5 V	±0.1			±1 <sup>(1)</sup>		±1		μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND I <sub>O</sub> = 0	5.5 V	4			40		40		μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V	2.5 10					10		pF

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V<sub>CC</sub> = 0 V.

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

over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

		SN54AHC273				SN74AHC273				UNIT
		T <sub>A</sub> = 25°C		MIN	MAX	T <sub>A</sub> = 25°C		MIN	MAX	
		MIN	MAX			MIN	MAX			
t <sub>w</sub>	CLR low	5		6	5		6		ns	
	CLK high or low	5			5		6.5			

**SN54AHC273, SN74AHC273**

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 over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

		SN54AHC273				SN74AHC273				UNIT
		T <sub>A</sub> = 25°C		MIN	MAX	T <sub>A</sub> = 25°C		MIN	MAX	
		MIN	MAX			MIN	MAX			
t <sub>su</sub>	Setup time	Data before CLK↑	5.5	6.5	5.5	6.5	ns			
		CLR before CLK↑	2.5	2.5	2.5	2.5				
t <sub>h</sub>	Hold time, data after CLK↑	1.5	2	1	1	ns				

**5.7 Timing Requirements, V<sub>CC</sub> = 5 V ± 0.5 V**

 over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

		SN54AHC273				SN74AHC273				UNIT
		T <sub>A</sub> = 25°C		MIN	MAX	T <sub>A</sub> = 25°C		MIN	MAX	
		MIN	MAX			MIN	MAX			
t <sub>w</sub>	Pulse Duration	CLR low	5	5	5	5	ns			
		CLK high or low	5	5	5	5				
t <sub>su</sub>	Setup time	Data before CLK↑	4.5	4.5	4.5	4.5	ns			
		CLR before CLK↑	2	2	2	2				
t <sub>h</sub>	Hold time, data after CLK↑	1.5	2	1	1	ns				

**5.8 Switching Characteristics, V<sub>CC</sub> = 3.3 V ± 0.3 V**

 over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54AHC273		SN74AHC273		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
f <sub>max</sub>			C <sub>L</sub> = 15 pF	75 <sup>(1)</sup>	120 <sup>(1)</sup>		65 <sup>(1)</sup>		65	MHz	
			C <sub>L</sub> = 50 pF	50	75		45		45		
t <sub>PHL</sub>	CLR	Q	C <sub>L</sub> = 15 pF		8.9 <sup>(1)</sup>	13.6 <sup>(1)</sup>	1 <sup>(1)</sup>	16 <sup>(1)</sup>	1	16	ns
t <sub>PLH</sub>	CKL	Q	C <sub>L</sub> = 15 pF		8.7 <sup>(1)</sup>	13.6 <sup>(1)</sup>	1 <sup>(1)</sup>	16 <sup>(1)</sup>	1	16	
t <sub>PHL</sub>				CLR	Q	C <sub>L</sub> = 50 pF		8.7 <sup>(1)</sup>	13.6 <sup>(1)</sup>	1 <sup>(1)</sup>	16 <sup>(1)</sup>
t <sub>PHL</sub>	CLK	Q	C <sub>L</sub> = 50 pF		11.4	17.1	1	19.5	1	19.5	
t <sub>PLH</sub>								11.2	17.1	1	19.5
t <sub>PHL</sub>					11.2	17.1	1	19.5	1	19.5	
t <sub>sk(o)</sub>			C <sub>L</sub> = 50 pF			1.5 <sup>(2)</sup>				1.5	ns

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

(2) On products compliant to MIL-PRF-38535, this parameter does not apply.

**5.9 Switching Characteristics, V<sub>CC</sub> = 5 V ± 0.5 V**

 over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54AHC273		SN74AHC273		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
f <sub>max</sub>			C <sub>L</sub> = 15 pF	120 <sup>(1)</sup>	165 <sup>(1)</sup>		100 <sup>(1)</sup>		100	MHz	
			C <sub>L</sub> = 50 pF	80	110		70		70		
t <sub>PHL</sub>	CLR	Q	C <sub>L</sub> = 15 pF		5.2 <sup>(1)</sup>	8.5 <sup>(1)</sup>	1 <sup>(1)</sup>	10 <sup>(1)</sup>	1	10	ns
t <sub>PLH</sub>	CKL	Q	C <sub>L</sub> = 15 pF		5.8 <sup>(1)</sup>	9 <sup>(1)</sup>	1 <sup>(1)</sup>	10.5 <sup>(1)</sup>	1	10.5	
t <sub>PHL</sub>				CLR	Q	C <sub>L</sub> = 50 pF		5.8 <sup>(1)</sup>	9 <sup>(1)</sup>	1 <sup>(1)</sup>	10.5 <sup>(1)</sup>
t <sub>PHL</sub>	CLK	Q	C <sub>L</sub> = 50 pF		6.7	10.5	1	12	1	12	
t <sub>PLH</sub>								7.3	11	1	12.5
t <sub>PHL</sub>					7.3	11	1	12.5	1	12.5	

over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54AHC273		SN74AHC273		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>sk(o)</sub>			C <sub>L</sub> = 50 pF			1 <sup>(2)</sup>				1	ns

- (1) On products compliant to MIL-PRF-38535, this parameter is not production tested.
- (2) On products compliant to MIL-PRF-38535, this parameter does not apply.

### 5.10 Noise Characteristics

V<sub>CC</sub> = 5 V, C<sub>L</sub> = 50 pF, T<sub>A</sub> = 25°C

PARAMETER		SN74AHC273			UNIT	
		MIN	TYP	MAX		
V <sub>OL(P)</sub>	Quiet output, maximum dynamic V <sub>OL</sub>		0.7		V	
V <sub>OL(V)</sub>	Quiet output, minimum dynamic V <sub>OL</sub>		-0.7		V	
V <sub>OH(V)</sub>	Quiet output, minimum dynamic V <sub>OH</sub>		4.7		V	
V <sub>IH(D)</sub>	High-level dynamic input voltage	3.5			V	
V <sub>IL(D)</sub>	Low-level dynamic input voltage				1.5	V

### 5.11 Operating Characteristics

T<sub>A</sub> = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance	No load, f = 1 MHz	31	pF

### 5.12 Typical Characteristics

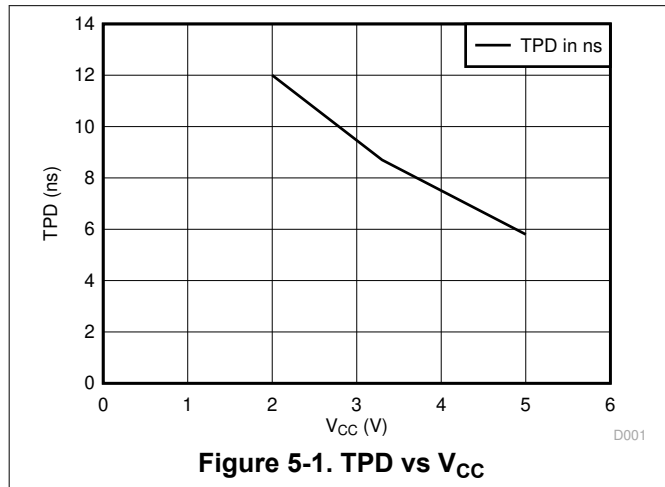


Figure 5-1. TPD vs V<sub>CC</sub>

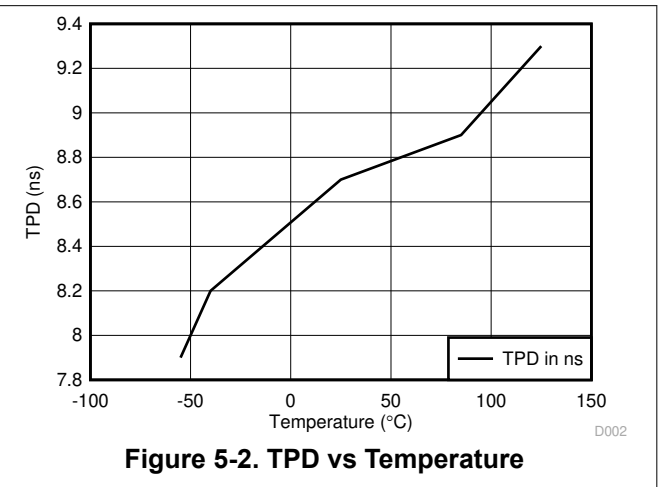
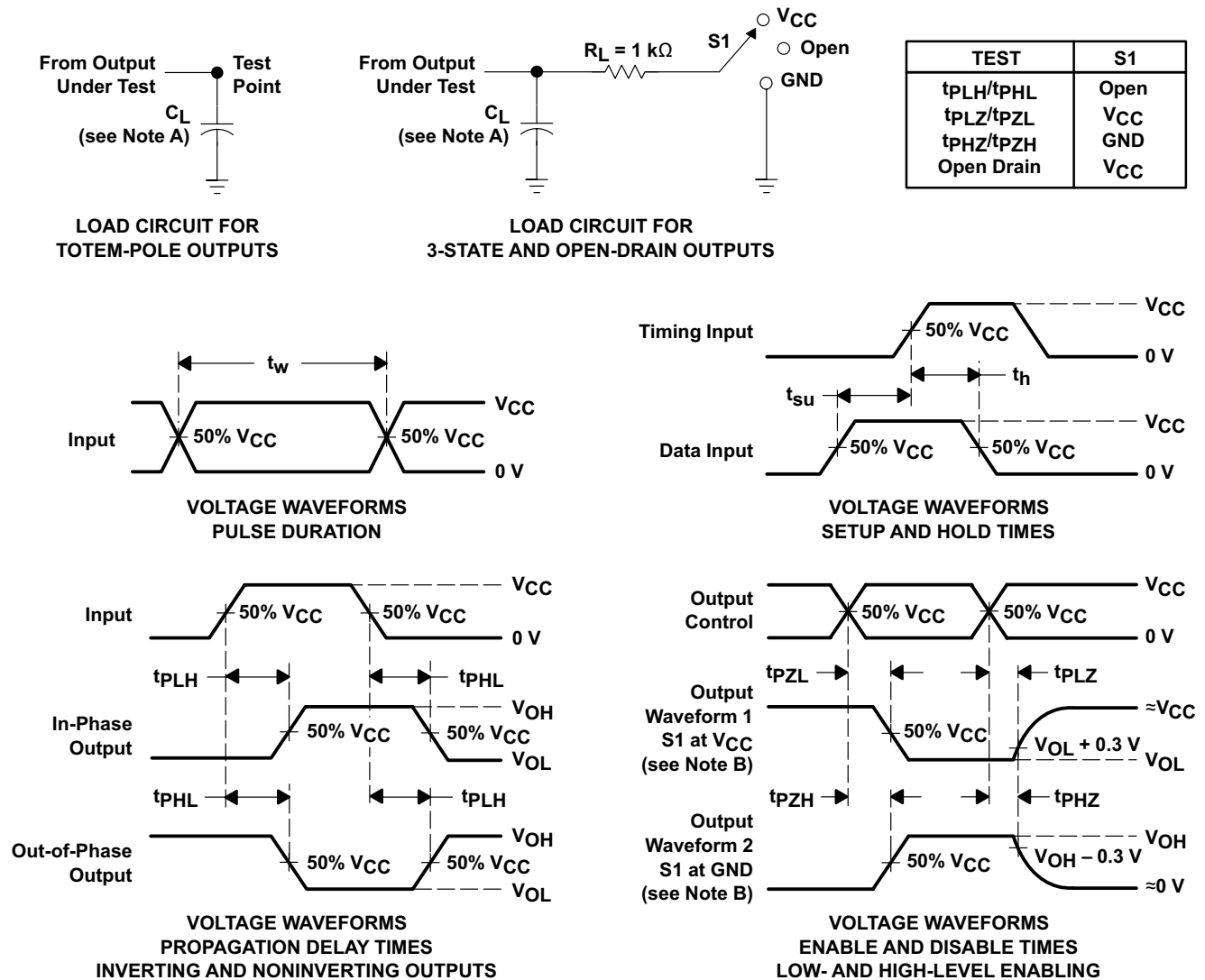


Figure 5-2. TPD vs Temperature

## 6 Parameter Measurement Information



- NOTES: 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. All parameters and waveforms are not applicable to all devices.

**Figure 6-1. Load Circuit and Voltage Waveforms**

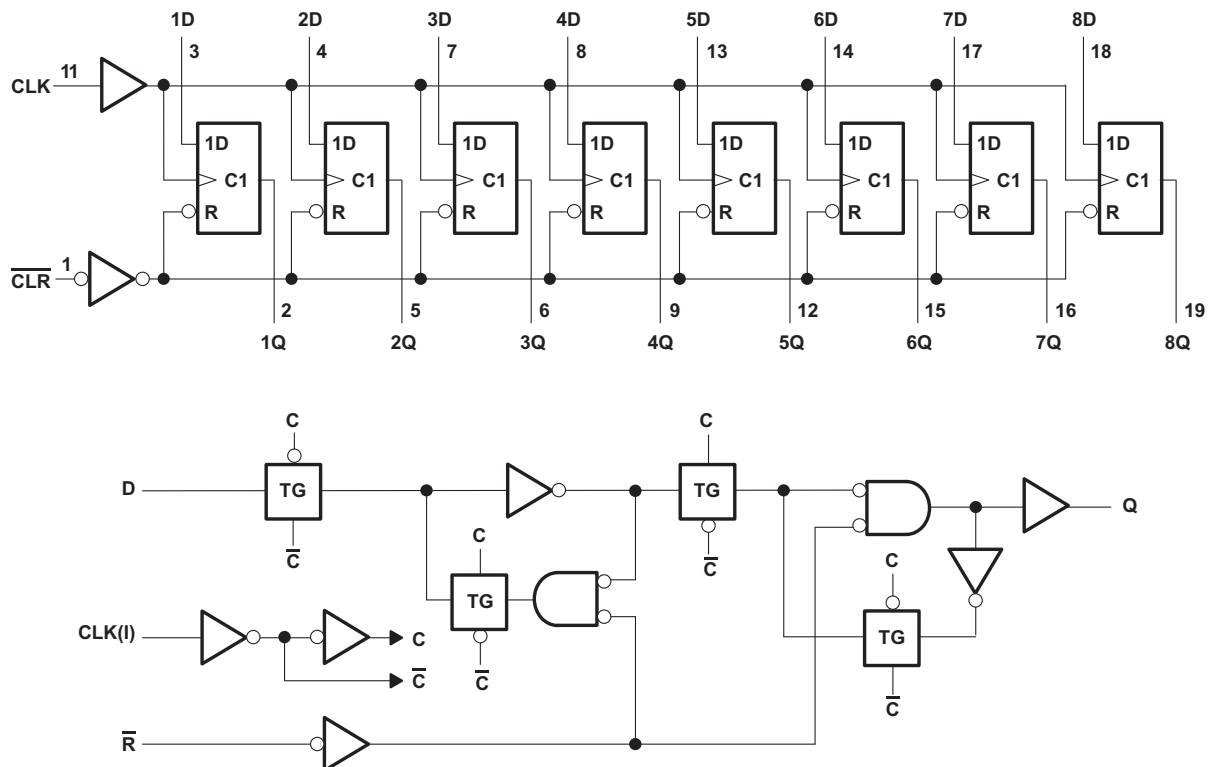
## 7 Detailed Description

### 7.1 Overview

These circuits are positive-edge-triggered D-type flip-flops with a direct clear ( $\overline{\text{CLR}}$ ) input. Information at the data (D) inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock (CLK) pulse. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When CLK is at either the high or low level, the D input has no effect at the output.

The inputs are 5 V tolerant and can be driven from 5-V devices. This feature allows the use of these devices as down translators in a mixed 5-V to 3.3-V system environment.

### 7.2 Functional Block Diagrams



### 7.3 Feature Description

- Wide operating voltage range
  - Operates from 2 V to 5.5 V
- Allows down voltage translation
  - Inputs accept voltages to 5.5 V
- Slow edge rates minimize output ringing

### 7.4 Device Functional Modes

Table 7-1. Function Table

INPUTS			OUTPUT Y
CLR	CLK	D	
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q <sub>0</sub>

## 8 Application and Implementation

### 8.1 Application Information

The SNx4AHC273 is a low-drive CMOS device that can be used for a multitude of applications where output ringing is a concern. The low drive and slow edge rates will minimize overshoot and undershoot on the outputs. The inputs are tolerant to 5.5 V at any valid  $V_{CC}$ . This feature makes the device ideal for translating down to the  $V_{CC}$  level. Figure 8-2 shows the reduction in ringing compared to higher drive parts such as AC.

### 8.2 Typical Application

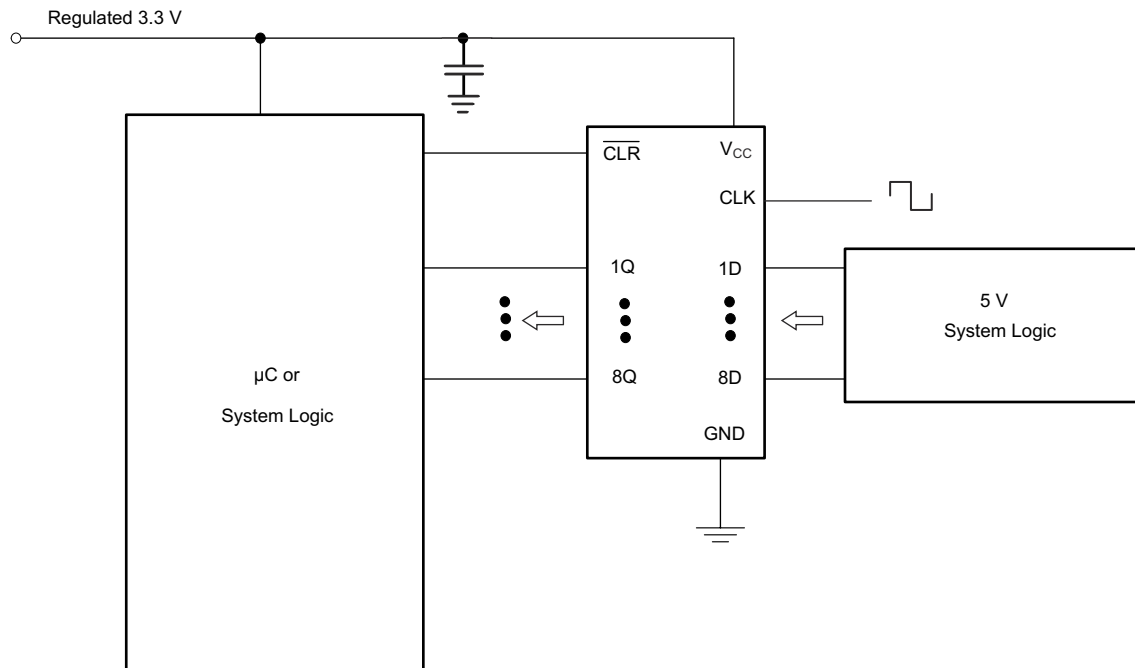


Figure 8-1. Specific Application Schematic

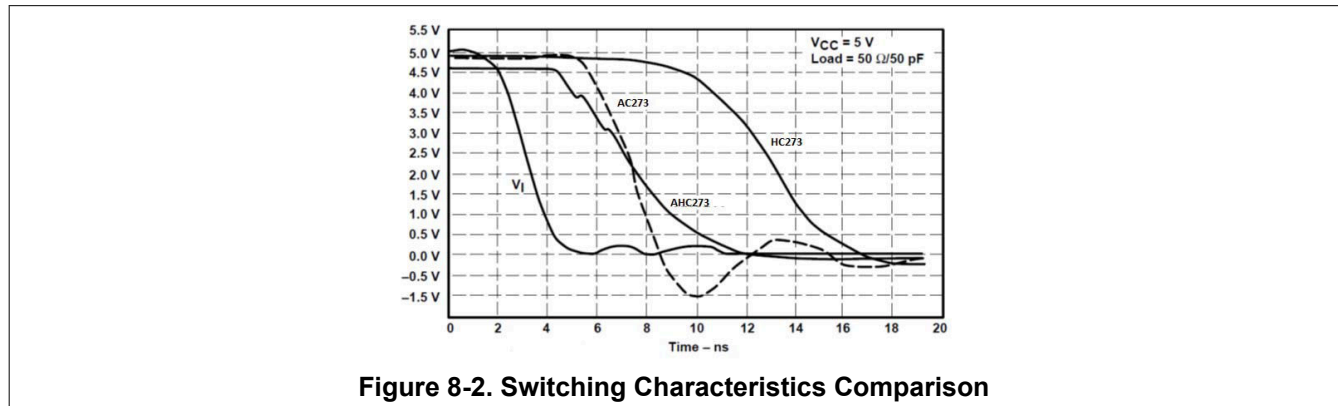
#### 8.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads, so routing and load conditions should be considered to prevent ringing.

#### 8.2.2 Detailed Design Procedure

1. Recommended input conditions
  - Rise time and fall time specs: See  $(\Delta t/\Delta V)$  in the [Section 5.3](#) table.
  - Specified High and low levels: See  $(V_{IH}$  and  $V_{IL})$  in the [Section 5.3](#) table.
  - Inputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid  $V_{CC}$
2. Recommend output conditions
  - Load currents should not exceed 25 mA per output and 75 mA total for the part
  - Outputs should not be pulled above  $V_{CC}$

### 8.2.3 Application Curves



### 8.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [Recommended Operating Conditions](#) table.

Each VCC pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1  $\mu\text{f}$  is recommended; if there are multiple VCC pins, then 0.01  $\mu\text{f}$  or 0.022  $\mu\text{f}$  is recommended for each power pin. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. A 0.1  $\mu\text{f}$  and a 1  $\mu\text{f}$  are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

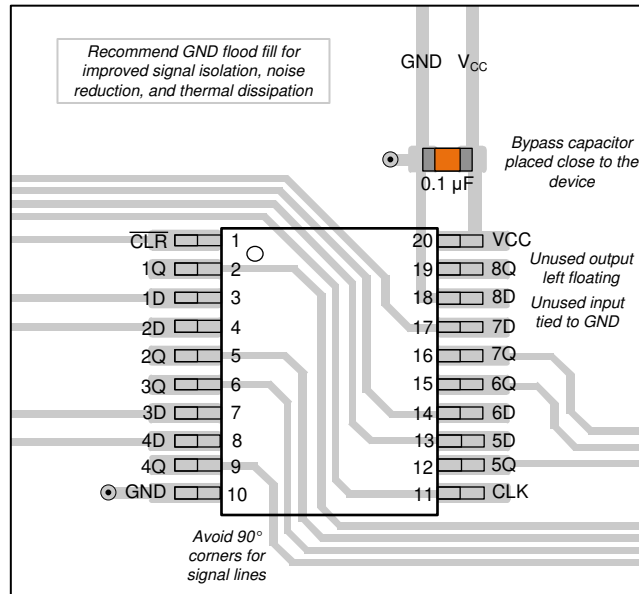
### 8.4 Layout

#### 8.4.1 Layout Guidelines

When using multiple bit logic devices inputs should not ever float.

In many cases, functions or parts of functions of digital logic devices are unused, for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. Specified in [Figure 8-3](#) are the rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally inputs will be tied to GND or  $V_{CC}$ , whichever makes more sense or is more convenient. It is generally acceptable to float outputs unless the part is a transceiver.

### 8.4.2 Layout Example



**Figure 8-3. Layout Diagram**

## 9 Device and Documentation Support

### 9.1 Documentation Support

#### 9.1.1 Related Links

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 9-1. Related Links**

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54AHC273	<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>
SN74AHC273	<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>

### 9.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](http://ti.com). Click on *Notifications* 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.

### 9.3 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](#).

### 9.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.  
All trademarks are the property of their respective owners.

### 9.5 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.

### 9.6 Glossary

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

## 10 Revision History

### Changes from Revision I (March 2015) to Revision J (July 2024) Page

- Added NS package to *Device Information* table..... [1](#)
- Updated RθJA values: PW = 104.7 to 116.8, DW = 81.8 to 81.1; Updated PW and DW packages for RθJC(top), RθJB, ΨJT, ΨJB, and RθJC(bot), all values in °C/W ..... [5](#)
- Updated *Layout Example* image..... [12](#)

### Changes from Revision H (July 2014) to Revision I (March 2015) Page

- Changed I<sub>OH</sub> test conditions for V<sub>OH</sub> from mA to μA to fix typographical error. .... [5](#)

## **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="#">5962-9853001Q2A</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9853001Q2A SNJ54AHC 273FK
<a href="#">5962-9853001QRA</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9853001QR A SNJ54AHC273J
<a href="#">5962-9853001QSA</a>	Active	Production	CFP (W)   20	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9853001QS A SNJ54AHC273W
<a href="#">SN74AHC273DBR</a>	Active	Production	SSOP (DB)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SN74AHC273DBR.A</a>	Active	Production	SSOP (DB)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SN74AHC273DGVR</a>	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SN74AHC273DGVR.A</a>	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SN74AHC273DW</a>	Obsolete	Production	SOIC (DW)   20	-	-	Call TI	Call TI	-40 to 125	AHC273
<a href="#">SN74AHC273DWR</a>	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC273
<a href="#">SN74AHC273DWR.A</a>	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC273
<a href="#">SN74AHC273N</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC273N
<a href="#">SN74AHC273N.A</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC273N
<a href="#">SN74AHC273NSR</a>	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC273
<a href="#">SN74AHC273NSR.A</a>	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC273
<a href="#">SN74AHC273PW</a>	Obsolete	Production	TSSOP (PW)   20	-	-	Call TI	Call TI	-40 to 125	HA273
<a href="#">SN74AHC273PWR</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SN74AHC273PWR.A</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA273
<a href="#">SNJ54AHC273FK</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9853001Q2A SNJ54AHC 273FK
<a href="#">SNJ54AHC273J</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9853001QR A SNJ54AHC273J

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="#">SNJ54AHC273W</a>	Active	Production	CFP (W)   20	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9853001QS A SNJ54AHC273W

(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.

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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 SN54AHC273, SN74AHC273 :**

● Catalog : [SN74AHC273](#)

● Military : [SN54AHC273](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense 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
SN74AHC273DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74AHC273DGVR	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHC273DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74AHC273DWR	SOIC	DW	20	2000	330.0	24.4	10.9	13.3	2.7	12.0	24.0	Q1
SN74AHC273NSR	SOP	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1
SN74AHC273PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74AHC273PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHC273DBR	SSOP	DB	20	2000	356.0	356.0	35.0
SN74AHC273DGVR	TVSOP	DGV	20	2000	356.0	356.0	35.0
SN74AHC273DWR	SOIC	DW	20	2000	356.0	356.0	45.0
SN74AHC273DWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74AHC273NSR	SOP	NS	20	2000	367.0	367.0	45.0
SN74AHC273PWR	TSSOP	PW	20	2000	353.0	353.0	32.0
SN74AHC273PWR	TSSOP	PW	20	2000	356.0	356.0	35.0

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-9853001Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9853001QSA	W	CFP	20	25	506.98	26.16	6220	NA
SN74AHC273N	N	PDIP	20	20	506	13.97	11230	4.32
SN74AHC273N.A	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54AHC273FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC273W	W	CFP	20	25	506.98	26.16	6220	NA

# DB0020A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4214851/B 08/2019

### 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-150.

# EXAMPLE BOARD LAYOUT

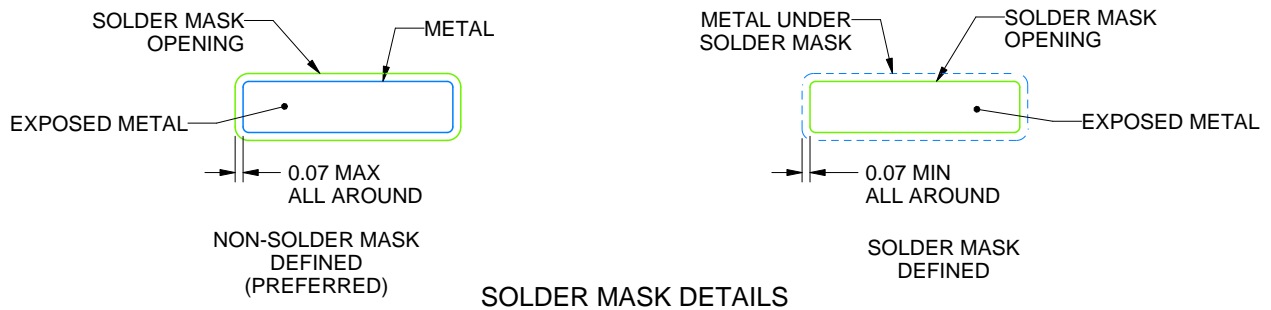
DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4214851/B 08/2019

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

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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

4214851/B 08/2019

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.

J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

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

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



4073251/E 08/00

- 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

N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - The 20 pin end lead shoulder width is a vendor option, either half or full width.

# DW0020A



# PACKAGE OUTLINE

## SOIC - 2.65 mm max height

SOIC



4220724/A 05/2016

**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-013.

# EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

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

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

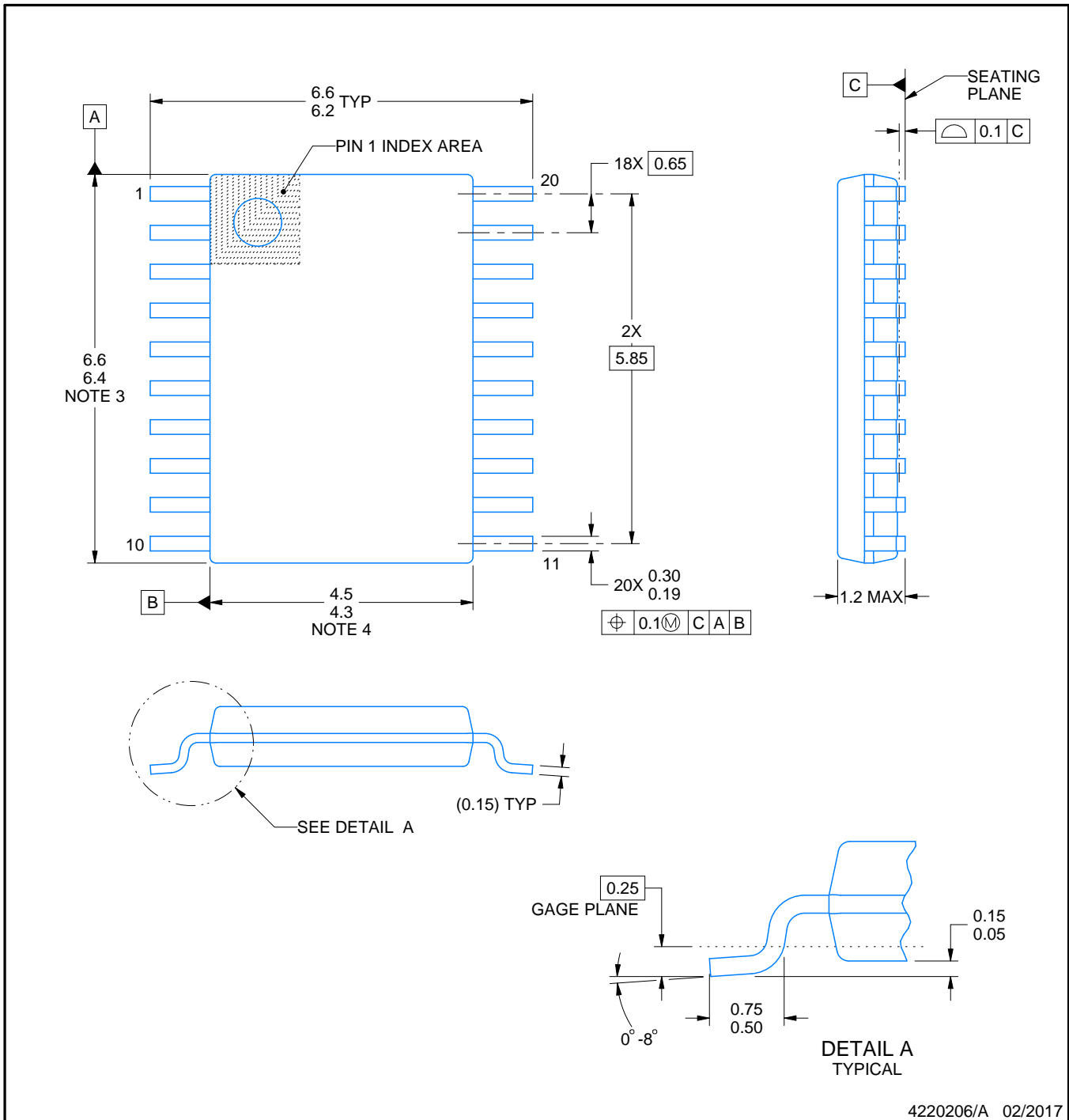
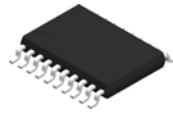
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within Mil-Std 1835 GDFP2-F20



4220206/A 02/2017

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

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

4220206/A 02/2017

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

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220206/A 02/2017

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.

## GENERIC PACKAGE VIEW

**FK 20**

**LCCC - 2.03 mm max height**

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4229370VA\

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