

SN74AC564 Octal D-Type Edge-Triggered Flip-Flops with 3-State Outputs

1 Features

- Operation of 2V to 6V V_{CC}
- Inputs accept voltages to 6V
- Max t_{pd} of 9ns at 5V
- 3-state inverting outputs drive bus lines directly
- Full parallel access for loading
- Flow-through architecture to optimize PCB layout

2 Description

The 'AC564 devices are octal D-type edge-triggered flip-flops that feature inverting 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

Package Information

PART NUMBER	PACKAGE ⁽¹⁾	PACKAGE SIZE ⁽²⁾	BODY SIZE ⁽³⁾
SN74AC564	DB (SSOP, 20)	7.2mm x 7.8mm	7.2mm x 5.30mm
	DW (SOIC, 20)	12.80mm x 10.3mm	12.80mm x 7.50mm
	N (PDIP, 20)	24.33mm x 9.4mm	24.33mm x 6.35mm
	PW (TSSOP, 20)	6.50mm x 6.4mm	6.50mm x 4.40mm

(1) For more information, see [Section 10](#).

(2) The package size (length x width) is a nominal value and includes pins, where applicable.

(3) The body size (length x width) is a nominal value and does not include pins.

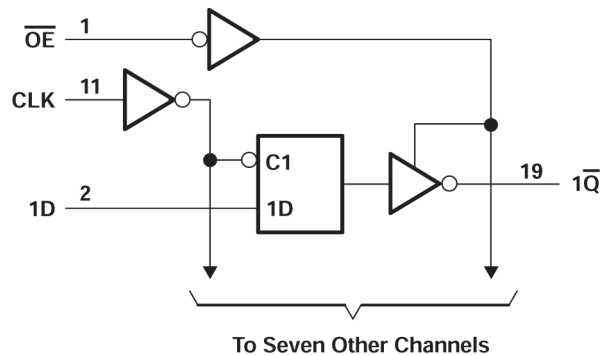


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3 Pin Configuration and Functions

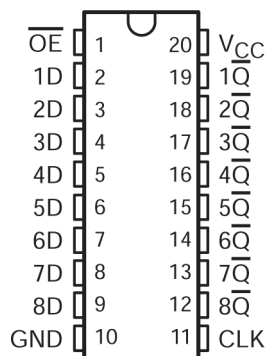


Figure 3-1. SN74AC564 DB, DW, N, NS, or PW Package (Top View)

Table 3-1. Pin Functions

PIN		I/O	DESCRIPTION
NAME	NO.		
\overline{OE}	1	Input	Output enable for all channels, active low
D1	2	Input	Input for channel 1
D2	3	Input	Input for channel 2
D3	4	Input	Input for channel 3
D4	5	Input	Input for channel 4
D5	6	Input	Input for channel 5
D6	7	Input	Input for channel 6
D7	8	Input	Input for channel 7
D8	9	Input	Input for channel 8
GND	10	—	Ground
CLK	11	Input	Clock input for all channels, rising edge triggered
Q8	12	Output	Output for channel 8
Q7	13	Output	Output for channel 7
Q6	14	Output	Output for channel 6
Q5	15	Output	Output for channel 5
Q4	16	Output	Output for channel 4
Q3	17	Output	Output for channel 3
Q2	18	Output	Output for channel 2
Q1	19	Output	Output for channel 1
V _{CC}	20	—	Positive supply

4 Specifications

4.1 Absolute Maximum Ratings

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

		MIN	MAX	UNIT
V _{CC}	Supply voltage range	-0.5	7	V
V _I ²	Input voltage range	-0.5	V _{CC} + 0.5	V
V _O ²	Output voltage range	-0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	(V _I < 0 or V _I > V _{CC})		±20 mA
I _{OK}	Output clamp current	(V _O < 0 or V _O > V _{CC})		±20 mA
I _O	Continuous output current	(V _O = 0 to V _{CC})		±50 mA
	Continuous current through V _{CC} or GND			±200 mA
T _{stg}	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, 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.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

4.2 Recommended Operating Conditions

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

		MIN	MAX	UNIT
V _{CC}	Supply voltage	2	6	V
V _{IH}	High-level input voltage	V _{CC} = 3 V	2.1	V
		V _{CC} = 4.5 V	3.15	
		V _{CC} = 5.5 V	3.85	
V _{IL}	Low-level input voltage	V _{CC} = 3 V	0.9	V
		V _{CC} = 4.5 V	1.35	
		V _{CC} = 5.5 V	1.65	
V _I	Input voltage	0	V _{CC}	V
V _O	Output voltage	0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 3 V	-12	mA
		V _{CC} = 4.5 V	-24	
		V _{CC} = 5.5 V	-24	
I _{OL}	Low-level output current	V _{CC} = 3 V	12	mA
		V _{CC} = 4.5 V	24	
		V _{CC} = 5.5 V	24	
Δt/Δv	Input transition rise or fall rate		8	ns/V
T _A	Operating free-air temperature	-40	85	°C

- (1) All unused inputs of the device must be held at V_{CC} or GND for proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

4.3 Thermal Information

THERMAL METRIC ⁽¹⁾		SN74AC564					UNIT
		DB (SSOP)	DW (SOIC)	N (PDIP)	NS (SOP)	PW (TSSOP)	
		20 PINS					
R _{θJA}	Junction-to-ambient thermal resistance	70	58	69	60	126.2	°C/W

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

4.4 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN74AC564		UNIT
			MIN	TYP	MAX	MIN	MAX	
V _{OH}	I _{OH} = –50 µA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I _{OH} = –12 mA	3 V	2.56			2.46		
		4.5 V	3.86			3.76		
		5.5 V	4.86			4.76		
V _{OL}	I _{OL} = 50 µA	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I _{OL} = 12 mA	3 V			0.36		0.44	
		4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
I _I	V _I = V _{CC} or GND	5.5 V			±0.1		±1	µA
I _{OZ}	V _O = V _{CC} or GND	5.5 V			±0.5		±5	µA
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V			4		40	µA
C _i	V _I = V _{CC} or GND	5 V		4.5				pF

4.5 Timing Requirements, V_{CC} = 3.3 V ± 0.3 V

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

		T _A = 25°C		SN74AC564		UNIT
		MIN	MAX	MIN	MAX	
f _{clock}	Clock frequency		75		60	MHz
t _w	Pulse duration, CLK high or low	6		7		ns
t _{su}	Setup time, data before CLK↑	2.5		3		ns
t _h	Hold time, data after CLK↑	2		2		ns

4.6 Timing Requirements, V_{CC} = 5 V ± 0.5 V

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

		T _A = 25°C		SN74AC564		UNIT
		MIN	MAX	MIN	MAX	
f _{clock}	Clock frequency		95		85	MHz
t _w	Pulse duration, CLK high or low	4		5		ns
t _{su}	Setup time, data before CLK↑	2		2.5		ns
t _h	Hold time, data after CLK↑	2		2		ns

4.7 Switching Characteristics, V_{CC} = 3.3 V ± 0.3 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T _A = 25°C			SN74AC564		UNIT
			MIN	TYP	MAX	MIN	MAX	
f _{max}			75			60		MHz

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)	$T_A = 25^\circ\text{C}$			SN74AC564		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	CLK	\bar{Q}	3.5	8.1	14	3.5	15.5	ns
t_{PHL}			3.5	8.2	12.5	3.5	14	
t_{PZH}	\bar{OE}	\bar{Q}	2.5	7.2	11.5	2.5	12.5	ns
t_{PZL}			3	7.7	11	3.5	12	
t_{PHZ}	\bar{OE}	\bar{Q}	4	8.6	12.5	4.5	13.5	ns
t_{PLZ}			2	7.3	9.5	2.5	10.5	

4.8 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](#))

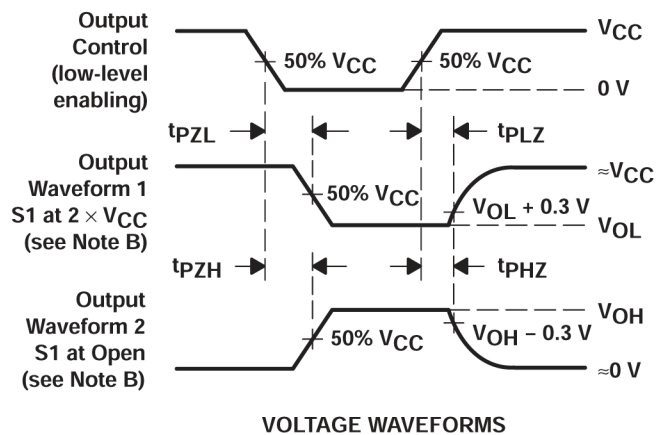
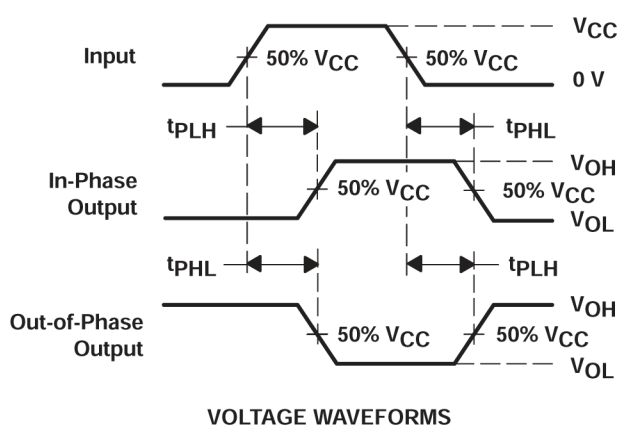
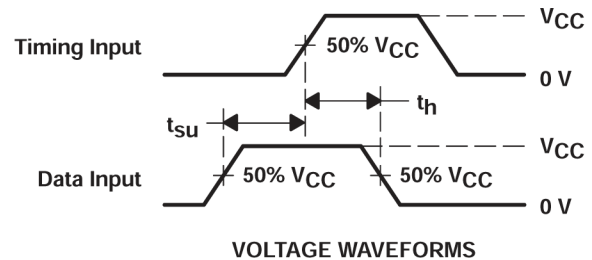
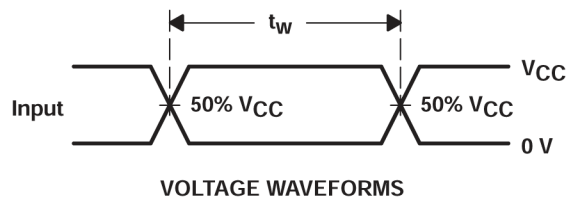
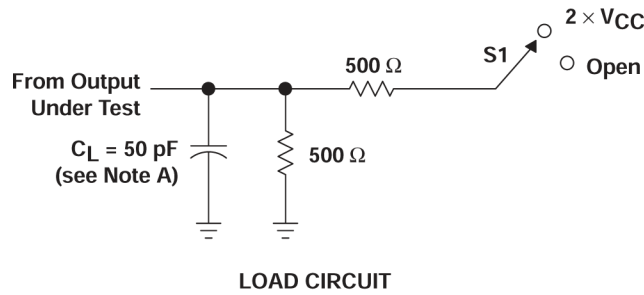
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			SN74AC564		UNIT
			MIN	TYP	MAX	MIN	MAX	
f_{max}			95			85		MHz
t_{PLH}	CLK	\bar{Q}	2	4.9	10.5	2	11.5	ns
t_{PHL}			2	5	9.5	2	10.5	
t_{PZH}	\bar{OE}	\bar{Q}	2	5.1	9	2	9.5	ns
t_{PZL}			1.5	5.2	8.5	2	9.5	
t_{PHZ}	\bar{OE}	\bar{Q}	2	5.7	10.5	2	11.5	ns
t_{PLZ}			1.5	4.8	8	1.5	9	

4.9 Operating Characteristics

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	$C_L = 50\text{ pF}$, $f = 1\text{ MHz}$	50	pF

5 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: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
- D. The outputs are measured one at a time with one input transition per measurement.

Figure 5-1. Load Circuit and Voltage Waveforms

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	Open

6 Detailed Description

6.1 Overview

On the positive transition of the clock (CLK) input, the \bar{Q} outputs are set to the inverse logic levels set up at the data (D) inputs.

A buffered output-enable (\overline{OE}) input places the eight outputs in either a normal logic state (high or low logic levels) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without interface or pullup components.

\overline{OE} does not affect internal operations of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

For the specified high-impedance state during power up or power down, \overline{OE} must be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

6.2 Functional Block Diagram

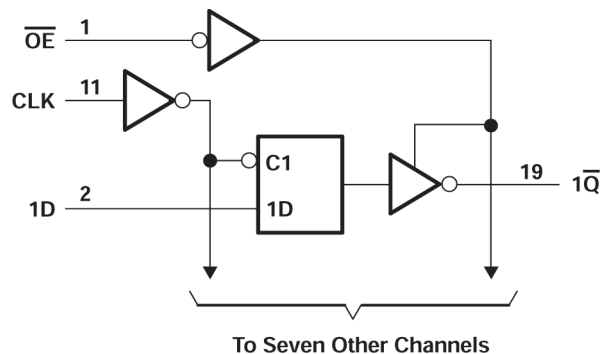


Figure 6-1. Logic Diagram (Positive Logic)

6.3 Device Functional Modes

Table 6-1. Function Table (Each Flip-flop)

INPUTS			OUTPUT \bar{Q}
\overline{OE}	CLK	D	
L	\uparrow	H	L
L	\uparrow	L	H
L	H or L	X	Q_0
H	X	X	Z

7 Application and Implementation

Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

7.1 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- μ F capacitor; if there are multiple V_{CC} terminals, then TI recommends a 0.01- μ F or 0.022- μ F capacitor for each power terminal. Multiple bypass capacitors can be paralleled to reject different frequencies of noise. Frequencies of 0.1 μ F and 1 μ F are commonly used in parallel. The bypass capacitor must be installed as close as possible to the power terminal for best results.

7.2 Layout

7.2.1 Layout Guidelines

Reflections and matching are closely related to the loop antenna theory but are different enough to be discussed separately from the theory. When a PCB trace turns a corner at a 90° angle, a reflection can occur. A reflection occurs primarily because of the change of width of the trace. At the apex of the turn, the trace width increases to 1.414 times the width. This increase upsets the transmission-line characteristics, especially the distributed capacitance and self-inductance of the trace, which results in the reflection. Not all PCB traces can be straight; therefore, some traces must turn corners. [Layout example for the SN74AC564](#) shows progressively better techniques of rounding corners. Only the last example (BEST) maintains constant trace width and minimizes reflections.

7.2.2 Layout Example

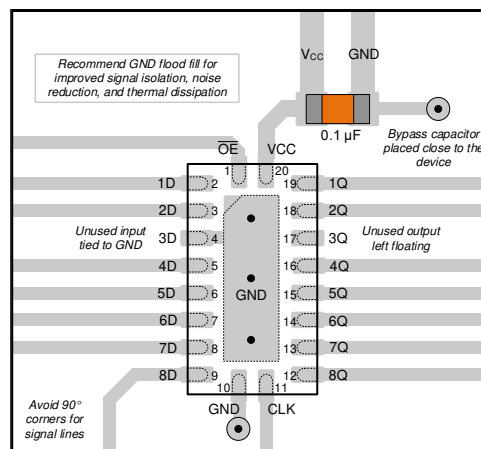


Figure 7-1. Layout example for the SN74AC564

8 Device and Documentation Support

8.1 Documentation Support (Analog)

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
SN74AC564	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](https://www.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.

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 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision E (August 2023) to Revision F (February 2024)	Page
• Updated RθJA value: PW = 83 to 126.2, all values in °C/W	4

Changes from Revision D (October 2003) to Revision E (August 2023)	Page
• Added <i>Package Information</i> table, <i>Pin Functions</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

10 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)
SN74AC564DBR	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564DBR.A	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564DW	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564DW.A	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564DWG4	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564N	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74AC564N
SN74AC564N.A	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74AC564N
SN74AC564PW	Obsolete	Production	TSSOP (PW) 20	-	-	Call TI	Call TI	-40 to 85	AC564
SN74AC564PWR	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564
SN74AC564PWR.A	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC564

⁽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.

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
SN74AC564DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74AC564PWR	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)
SN74AC564DBR	SSOP	DB	20	2000	353.0	353.0	32.0
SN74AC564PWR	TSSOP	PW	20	2000	353.0	353.0	32.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74AC564DW	DW	SOIC	20	25	507	12.83	5080	6.6
SN74AC564DW.A	DW	SOIC	20	25	507	12.83	5080	6.6
SN74AC564DWG4	DW	SOIC	20	25	507	12.83	5080	6.6
SN74AC564N	N	PDIP	20	20	506	13.97	11230	4.32
SN74AC564N.A	N	PDIP	20	20	506	13.97	11230	4.32

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS **	14	16	18	20
DIM				
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



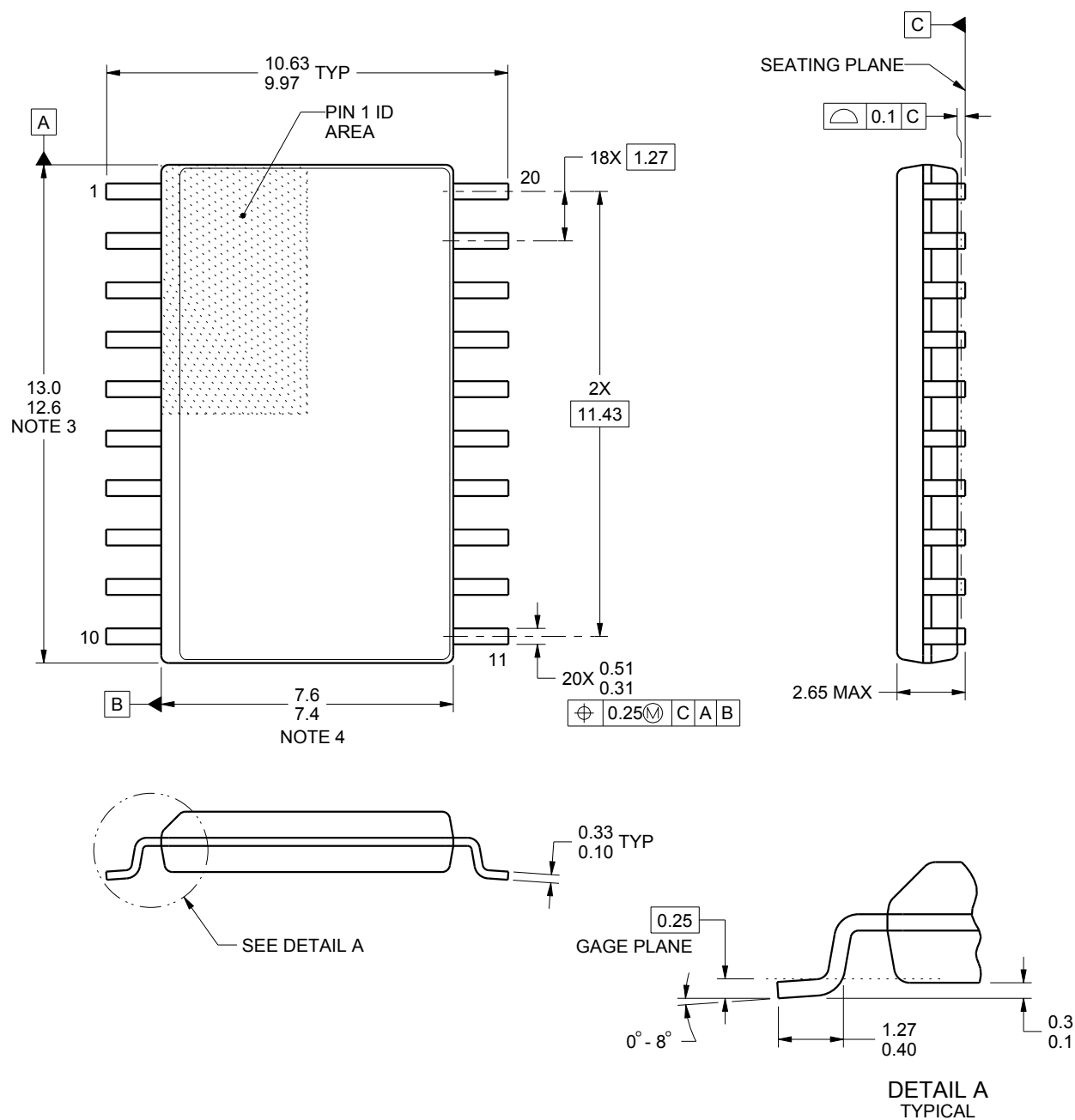
14/18 Pin Only
20 Pin vendor option

4040049/E 12/2002

- 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.

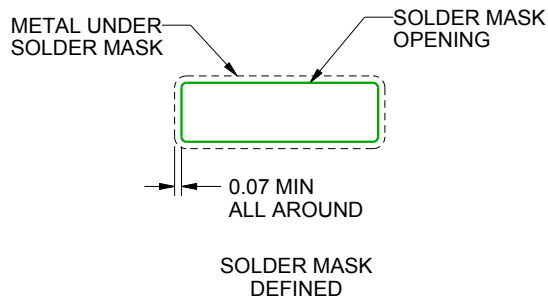
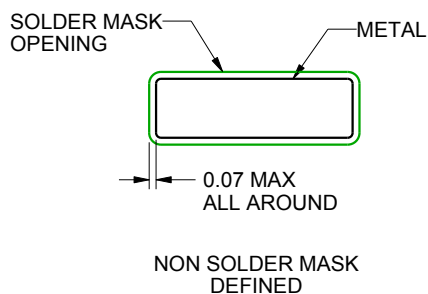
DW0020A

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.



TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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



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

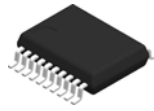


SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

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.



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

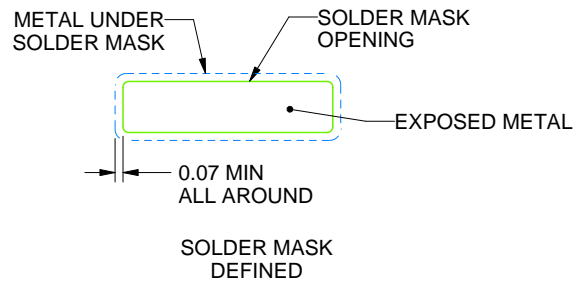
DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

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.

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