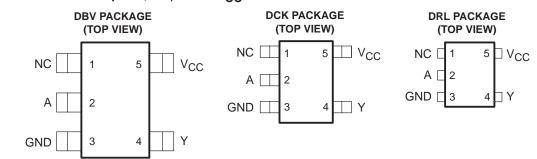
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- Operating Range of 2 V to 5.5 V
- Max t<sub>pd</sub> of 10 ns at 5 V
- Low Power Consumption, 10-μA Max I<sub>CC</sub>
- ±8-mA Output Drive at 5 V
- Latch-Up Performance Exceeds 250 mA Per JESD 17



NC - No internal connection

See mechanical drawings for dimensions.

### description/ordering information

The SN74AHC1G14 contains one inverter gate. The device performs the Boolean function  $Y = \overline{A}$ .

The device functions as an independent inverter gate, but because of the Schmitt action, gates may have different input threshold levels for positive-  $(V_{T+})$  and negative-going  $(V_{T-})$  signals.

#### **ORDERING INFORMATION**

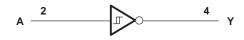
TA	PACKAGE	<u>e</u> t	ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>‡</sup>	
		Reel of 3000	SN74AHC1G14DBVR		
	SOT (SOT-23) – DBV	Reel of 250	SN74AHC1G14DBVT	A14_	
–40°C to 85°C	00T (00 T0) - D0/(	Reel of 3000	SN74AHC1G14DCKR	A.E.	
	SOT (SC-70) – DCK	Reel of 250	SN74AHC1G14DCKT	AF_	
	SOT (SOT-553) – DRL	Reel or 4000	SN74AHC1G14DRLR	AF_	

<sup>†</sup> Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

<sup>‡</sup>The actual top-side marking has one additional character that designates the assembly/test site.

FUNCTIO	FUNCTION TABLE										
INPUT	OUTPUT										
A	Y										
н	L										
L	Н										

## logic diagram (positive logic)





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#### SCLS321N - MARCH 1996 - REVISED JUNE 2005

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$ Input voltage range, $V_I$ (see Note 1) Output voltage range, $V_O$ (see Note 1) Input clamp current, $I_{IK}$ ( $V_I < 0$ ) Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) Continuous current through $V_{CC}$ or GND Package thermal impedance, $\theta_{JA}$ (see Note 2): DBV package	$\begin{array}{c} -0.5 \ \text{V to 7 V} \\ -0.5 \ \text{V to 7 V} \\ -20 \ \text{mA} \\ \pm 20 \ \text{mA} \\ \pm 25 \ \text{mA} \\ \pm 50 \ \text{mA} \\ 206^{\circ}\text{C/W} \end{array}$
DRL package Storage temperature range, T <sub>stg</sub>	

<sup>†</sup> 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions (see Note 3)

			MIN	MAX	UNIT			
VCC	Supply voltage		2	5.5	V			
VI	VI Input voltage							
Vo	Output voltage		0	VCC	V			
		$V_{CC} = 2 V$		-50	μΑ			
ЮН	High-level output current	$V_{CC}$ = 3.3 V ± 0.3 V		-4	<b>m</b> A			
		$V_{CC}$ = 5 V ± 0.5 V		-8	mA			
		$V_{CC} = 2 V$		50	μΑ			
IOL	Low-level output current	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		4				
		$V_{CC}$ = 5 V ± 0.5 V		8	mA			
Т <sub>А</sub>	Operating free-air temperature		-40	85	°C			

NOTE 3: 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, literature number SCBA004.



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

DADAMETED			T,	<b>₄ = 25°C</b>	;			
PARAMETER	TEST CONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	UNIT
V <sub>T+</sub>		3 V	1.2		2.2	1.2	2.2	
Positive-going		4.5 V	1.75		3.15	1.75	3.15	V
input threshold voltage		5.5 V	2.15		3.85	2.15	3.85	
V <sub>T</sub> _		3 V	0.9		1.9	0.9	1.9	
Negative-going		4.5 V	1.35		2.75	1.35	2.75	V
input threshold voltage		5.5 V	1.65		3.35	1.65	3.35	
$\Delta V_T$ Hysteresis (V <sub>T+</sub> – V <sub>T–</sub> )		3 V	0.3		1.2	0.3	1.2	
		4.5 V	0.4		1.4	0.4	1.4	V
		5.5 V	0.5		1.6	0.5	1.6	
		2 V	1.9	2		1.9		
	I <sub>OH</sub> = -50 μA	3 V	2.9	3		2.9		V
VOH		4.5 V	4.4	4.5		4.4		
	$I_{OH} = -4 \text{ mA}$	3 V	2.58			2.48		
	$I_{OH} = -8 \text{ mA}$	4.5 V	3.94			3.8		
		2 V			0.1		0.1	
	I <sub>OL</sub> = 50 μA	3 V			0.1		0.1	
VOL		4.5 V			0.1		0.1	V
	I <sub>OL</sub> = 4 mA	3 V			0.36		0.44	
	I <sub>OL</sub> = 8 mA	4.5 V			0.36		0.44	
Ц	$V_{I} = 5.5 V \text{ or GND}$	0 V to 5.5 V			±0.1		±1	μA
ICC	$V_{I} = V_{CC} \text{ or } GND,  I_{O} = 0$	5.5 V			1		10	μΑ
Ci	$V_I = V_{CC}$ or GND	5 V		2	10		10	pF

# switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 3.3 V $\pm$ 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	то	LOAD	T <sub>A</sub> =	= 25°C	;	MIN	MAX	
	(INPUT)	(OUTPUT)	CAPACITANCE	MIN	ТҮР	MAX	MIN		UNIT
<sup>t</sup> PLH			0.45.5		8.3	12.8	1	15	
<sup>t</sup> PHL	A	Ŷ	C <sub>L</sub> = 15 pF		8.3	12.8	1	15	ns
<sup>t</sup> PLH	•	V			10.8	16.3	1	18.5	
<sup>t</sup> PHL	A	Ť	C <sub>L</sub> = 50 pF		10.8	16.3	1	18.5	ns

# switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 5 V $\pm$ 0.5 V (unless otherwise noted) (see Figure 1)

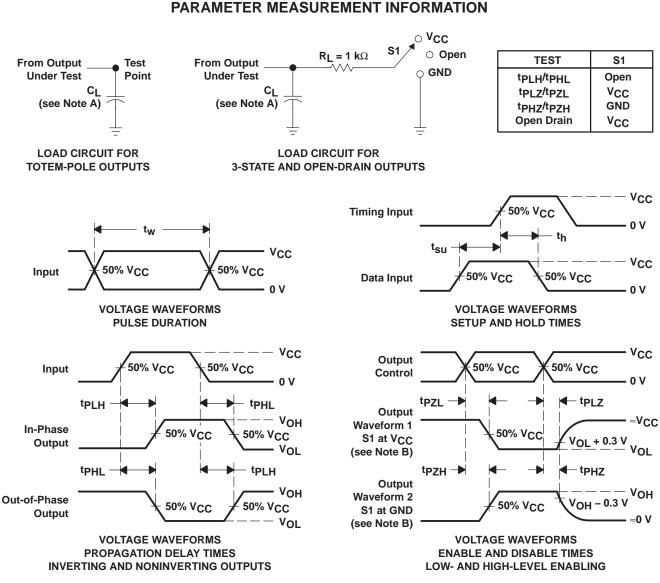
Γ	PARAMETER	FROM	то	LOAD	Τ <sub>4</sub>	λ = 25°C	;	MAINI	MAX	UNIT
	PARAMETER	(INPUT)	(OUTPUT)	CAPACITANCE	MIN	TYP	MAX	MIN		
	<sup>t</sup> PLH	•	V	0. 45 = 5		5.5	8.6	1	10	
Γ	<sup>t</sup> PHL	A	Ŷ	C <sub>L</sub> = 15 pF		5.5	8.6	1	10	ns
	<sup>t</sup> PLH	٨	V	C <sub>L</sub> = 50 pF		7	10.6	1	12	20
	<sup>t</sup> PHL	A	Y			7	10.6	1	12	ns



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## operating characteristics, $V_{CC} = 5 V$ , $T_A = 25^{\circ}C$

	PARAMETER	TEST CO	ONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance	No load,	f = 1 MHz	9	pF



NOTES: A. CI 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 MHz, Z<sub>O</sub> = 50  $\Omega$ , t<sub>f</sub>  $\leq$  3 ns, t<sub>f</sub>  $\leq$  3 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.







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## **PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/ Ball Finish	MSL Peak Temp <sup>(3)</sup>	Samples (Requires Login)
SN74AHC1G14DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74AHC1G14DRLRG4	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	

<sup>(1)</sup> The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.



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<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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# PACKAGE MATERIALS INFORMATION

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## TAPE AND REEL INFORMATION

### REEL DIMENSIONS

TEXAS INSTRUMENTS





#### TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

#### TAPE AND REEL INFORMATION

#### \*All dimensions are nominal

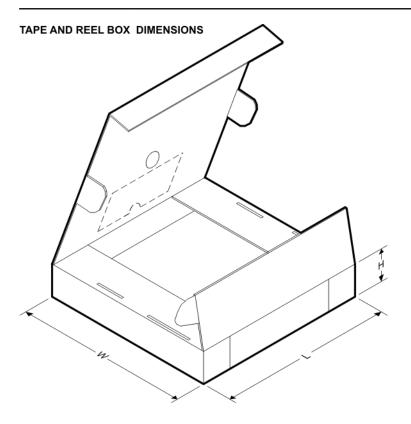
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	180.0	9.2	3.17	3.23	1.37	4.0	8.0	Q3
SN74AHC1G14DBVT	SOT-23	DBV	5	250	180.0	9.2	3.17	3.23	1.37	4.0	8.0	Q3
SN74AHC1G14DBVT	SOT-23	DBV	5	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G14DBVT	SOT-23	DBV	5	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHC1G14DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHC1G14DCKR	SC70	DCK	5	3000	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHC1G14DCKR	SC70	DCK	5	3000	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHC1G14DCKT	SC70	DCK	5	250	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHC1G14DCKT	SC70	DCK	5	250	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHC1G14DCKT	SC70	DCK	5	250	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHC1G14DRLR	SOT	DRL	5	4000	180.0	8.4	1.98	1.78	0.69	4.0	8.0	Q3

TEXAS INSTRUMENTS

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# PACKAGE MATERIALS INFORMATION

14-Mar-2012



*All dimensions are nominal							
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHC1G14DBVR	SOT-23	DBV	5	3000	205.0	200.0	33.0
SN74AHC1G14DBVT	SOT-23	DBV	5	250	205.0	200.0	33.0
SN74AHC1G14DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHC1G14DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHC1G14DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHC1G14DCKR	SC70	DCK	5	3000	205.0	200.0	33.0
SN74AHC1G14DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHC1G14DCKT	SC70	DCK	5	250	205.0	200.0	33.0
SN74AHC1G14DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHC1G14DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHC1G14DRLR	SOT	DRL	5	4000	202.0	201.0	28.0

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



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. Mold flash and protrusion shall not exceed 0.15 per side.

D. Falls within JEDEC MO-178 Variation AA.



DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE



NOTES:

A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.

- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- 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. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-203 variation AA.



# LAND PATTERN DATA



NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



DRL (R-PDSO-N5)

PLASTIC SMALL OUTLINE



NOTES:

All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994. Α. B. This drawing is subject to change without notice.

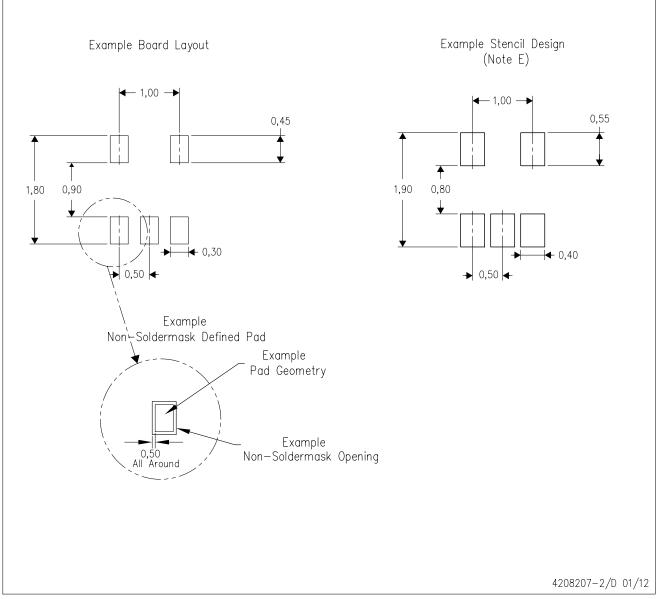
🖄 Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs. Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0,15 per end or side.





DRL (R-PDSO-N5)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
- E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
- F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
- G. Side aperture dimensions over-print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.



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