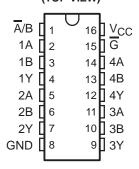
SCLS113D - DECEMBER 1982 - REVISED SEPTEMBER 2003

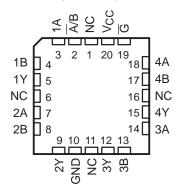
- Wide Operating Voltage Range of 2 V to 6 V
- **Outputs Can Drive Up To 15 LSTTL Loads**
- Low Power Consumption, 80-µA Max ICC

SN54HC157...J OR W PACKAGE SN74HC157...D, DB, N, NS, OR PW PACKAGE (TOP VIEW)



- Typical $t_{pd} = 11 \text{ ns}$
- ±6-mA Output Drive at 5 V
- Low Input Current of 1 µA Max

SN54HC157 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

description/ordering information

These data selectors/multiplexers contain inverters and drivers to supply full data selection to the four output gates. A separate strobe (\overline{G}) input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'HC157 devices present true data.

ORDERING INFORMATION

TA	PACKAGE [†]	PACKAGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube of 25	SN74HC157N	SN74HC157N
	SOIC - D	Reel of 2500	HC157	
		Reel of 250	SN74HC157DT	
-40°C to 85°C	SOP - NS	Reel of 2000	SN74HC157NSR	HC157
	SSOP – DB	Reel of 2000	SN74HC157DBR	HC157
		Tube of 90	SN74HC157PW	
	TSSOP - PW	Reel of 2000	SN74HC157PWR	HC157
		Reel of 250	SN74HC157PWT	
	CDIP – J	Tube of 25	SNJ54HC157J	SNJ54HC157J
-55°C to 125°C	CFP – W	Tube of 150	SNJ54HC157W	SNJ54HC157W
	LCCC – FK	Tube of 55	SNJ54HC157FK	SNJ54HC157FK

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



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

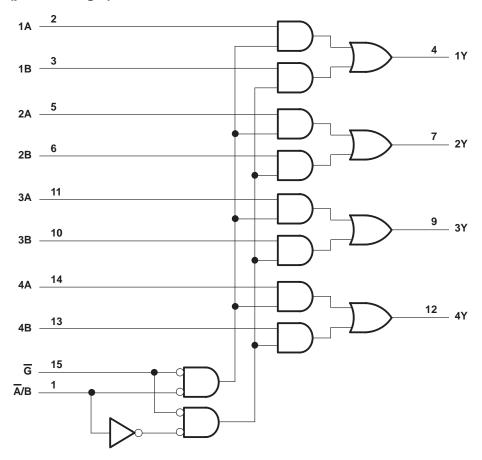


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FUNCTION TABLE

	INPU	ΓS		
G	SELECT	DA	TΑ	OUTPUT
G	A/B	Α	В	·
Н	Х	Х	Х	L
L	L	L	X	L
L	L	Н	X	Н
L	Н	Х	L	L
L	Н	Х	Н	Н

logic diagram (positive logic)



Pin numbers shown are for the D, DB, J, N, NS, PW, and W packages.

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V _{CC}		0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see	e Note 1)	±20 mA
Output clamp current, IOK (VO < 0 or VO > VCC	;) (see Note 1)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})		
Continuous current through V _{CC} or GND		±70 mA
Package thermal impedance, θ_{JA} (see Note 2):	D package	73°C/W
•	DB package	82°C/W
	N package	67°C/W
	NS package	64°C/W
	PW package	108°C/W
Storage temperature range, T _{stg}		–65°C to 150°C

[†] 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 package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

			SN	N54HC15	7	SN	174HC15	57	
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage		2	5	6	2	5	6	V
		V _{CC} = 2 V	1.5			1.5			
٧ _{IH}	High-level input voltage	V _{CC} = 4.5 V	3.15			3.15			V
		VCC = 6 V	4.2			4.2			
		V _{CC} = 2 V			0.5			0.5	
VIL	Low-level input voltage	V _{CC} = 4.5 V			1.35			1.35	V
		$V_{CC} = 6 V$			1.8			1.8	
VI	Input voltage		0		VCC	0		VCC	V
Vo	Output voltage		0		VCC	0		VCC	V
		V _{CC} = 2 V			1000			1000	
Δt/Δν	Input transition rise/fall time	$V_{CC} = 4.5 \text{ V}$			500			500	ns
		V _{CC} = 6 V			400			400	
TA	Operating free-air temperature		-55		125	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

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

		NIDITIONS	.,	Т	A = 25°C	;	SN54H	C157	SN74H	IC157	V V nA μA
PARAMETER	IESI CC	ONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	
			2 V	1.9	1.998		1.9		1.9		
		$I_{OH} = -20 \mu A$	4.5 V	4.4	4.499		4.4		4.4		
Voн	VI = VIH or VIL		6 V	5.9	5.999		5.9		5.9		V
		$I_{OH} = -6 \text{ mA}$	4.5 V	3.98	4.3		3.7		3.84		
		$I_{OH} = -7.8 \text{ mA}$	6 V	5.48	5.8		5.2		5.34		
			2 V		0.002	0.1		0.1		0.1	
		I _{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	
VOL	VI = VIH or VIL		6 V		0.001	0.1		0.1		0.1	V
		I _{OL} = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
		I _{OL} = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
lį	$V_I = V_{CC}$ or 0		6 V		±0.1	±100		±1000		±1000	nA
ICC	$V_I = V_{CC}$ or 0,	IO = 0	6 V			8		160		80	μΑ
Ci			2 V to 6 V		3	10		10		10	pF

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

DADAMETED	FROM	то	\ \ \	T,	ղ = 25°C	;	SN54H	IC157	SN74H	IC157	LINUT																				
PARAMETER	(INPUT)	(OUTPUT)	vcc	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT																				
			2 V		63	125		190		160																					
	A or B	Υ	4.5 V		13	25		38		32																					
			6 V		11	21		32		27																					
			2 V		67	125		190		160																					
t _{pd}	Ā/B	Υ	4.5 V		18	25		38		31	ns																				
			6 V		14	21		32		27																					
			2 V		59	115		170		145																					
	G	Υ	4.5 V		16	23		34		29																					
			6 V		13	20		29		25																					
			2 V		28	60		90		75																					
t _t		Y	Y	Y	Y	Υ	Y	Υ	Υ	Y	Y	Y	Y	Y	Υ	Y	Y	Y	Y	Y	Y	Υ	4.5 V		8	12		18		15	ns
			6 V		6	10		15		13																					

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switching characteristics over recommended operating free-air temperature range, $C_L = 150 \text{ pF}$ (unless otherwise noted) (see Figure 1)

212115	FROM	то	.,	T,	ղ = 25°C	;	SN54H	IC157	SN74H	C157	
PARAMETER	(INPUT)	(OUTPUT)	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
			2 V		81	190		290		235	
	A or B	Υ	4.5 V		23	38		58		47	
			6 V		18	33		49		41	
			2 V		81	210		320		260	
t _{pd}	Ā/B	Υ	4.5 V		23	42		64		52	ns
·			6 V		18	36		54		45	
			2 V		91	190		290		235	
	G	Υ	4.5 V		24	38		58		47	
			6 V		18	33		49		41	
			2 V		45	210		315		265	
t _t		Υ	4.5 V		17	42		63		53	ns
			6 V		13	36		53		45	

operating characteristics, T_A = 25°C

	PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load	40	pF

PARAMETER MEASUREMENT INFORMATION **From Output VCC Test** Input 50% 50% **Under Test Point** 0 V C_L - tPHL (see Note A) VOH In-Phase 90% 90% 50% Output 10% _{VOL} **LOAD CIRCUIT** - tPHL - VCC Vон Input 90% **Out-of-Phase** 10% 10% Output VOL **VOLTAGE WAVEFORM VOLTAGE WAVEFORMS** PROPAGATION DELAY AND OUTPUT TRANSITION TIMES **INPUT RISE AND FALL TIMES**

- NOTES: A. C_L includes probe and test-fixture capacitance.
 - B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50 \ \Omega$, $t_f = 6 \ ns$, $t_f = 6 \ ns$.
 - C. The outputs are measured one at a time with one input transition per measurement.
 - D. tpLH and tpHL are the same as tpd.

Figure 1. Load Circuit and Voltage Waveforms







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PACKAGING INFORMATION

Orderable Device	Status	Package Type		Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
5962-86061012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 86061012A SNJ54HC 157FK	Sample
5962-8606101EA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-8606101EA SNJ54HC157J	Sample
5962-8606101VEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type		5962-8606101VE A SNV54HC157J	Samples
5962-8606101VFA	ACTIVE	CFP	W	16	25	TBD	A42	N / A for Pkg Type		5962-8606101VF A SNV54HC157W	Samples
SN54HC157J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	SN54HC157J	Samples
SN74HC157D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DBR	ACTIVE	SSOP	DB	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157DTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC157N	Samples
SN74HC157N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	-40 to 85		
SN74HC157NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC157N	Samples





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Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish (6)	MSL Peak Temp	Op Temp (°C)	Device Marking (4/5)	Samples
SN74HC157NSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157NSRG4	ACTIVE	so	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157PW	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157PWR	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157PWRG4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157PWT	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SN74HC157PWTG4	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC157	Samples
SNJ54HC157FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 86061012A SNJ54HC 157FK	Samples
SNJ54HC157J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-8606101EA SNJ54HC157J	Samples
SNJ54HC157W	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	SNJ54HC157W	Samples

⁽¹⁾ 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.

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)

⁽²⁾ 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.

PACKAGE OPTION ADDENDUM



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- (3) MSL, Peak Temp. The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead/Ball Finish Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF SN54HC157, SN54HC157-SP, SN74HC157:

Catalog: SN74HC157, SN54HC157

Military: SN54HC157

• Space: SN54HC157-SP

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications
- Space Radiation tolerant, ceramic packaging and qualified for use in Space-based application

PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

All differsions are norminal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74HC157DBR	SSOP	DB	16	2000	330.0	16.4	8.2	6.6	2.5	12.0	16.0	Q1
SN74HC157DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC157PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC157PWT	TSSOP	PW	16	250	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

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*All dimensions are nominal

7 III dillionorio di o richimal							
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC157DBR	SSOP	DB	16	2000	367.0	367.0	38.0
SN74HC157DR	SOIC	D	16	2500	333.2	345.9	28.6
SN74HC157PWR	TSSOP	PW	16	2000	367.0	367.0	35.0
SN74HC157PWT	TSSOP	PW	16	250	367.0	367.0	35.0

14 LEADS SHOWN



- 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.

W (R-GDFP-F16)

CERAMIC DUAL FLATPACK



- 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-F16



FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- 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 metal lid.
- D. Falls within JEDEC MS-004



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- 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.



D (R-PDS0-G16)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.



PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- 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. 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 other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 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.

D. Falls within JEDEC MO-150

MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- 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.



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