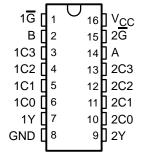
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- AC Types Feature 1.5-V to 5.5-V Operation and Balanced Noise Immunity at 30% of the Supply
- Speed of Bipolar F, AS, and S, With Significantly Reduced Power Consumption
- Balanced Propagation Delays
- ±24-mA Output Drive Current
 - Fanout to 15 F Devices
- SCR-Latchup-Resistant CMOS Process and Circuit Design
- Exceeds 2-kV ESD Protection Per MIL-STD-883, Method 3015

CD54AC153...F PACKAGE CD74AC153...E OR M PACKAGE (TOP VIEW)



description/ordering information

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate strobe (\overline{G}) inputs are provided for each of the two 4-line sections.

ORDERING INFORMATION

TA	PACKA	AGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – E	Tube	CD74AC153E	CD74AC153E
EE°C to 12E°C	SOIC – M	Tube	CD74AC153M	AC153M
–55°C to 125°C	SOIC - IVI	Tape and reel	CD74AC153M96	AC 155IVI
	CDIP – F	Tube	CD54AC153F3A	CD54AC153F3A

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

FUNCTION TABLE

	INPUTS												
SELE	ЕСТ‡		DA	·ΤΑ		G	OUTPUT Y						
В	Α	C0 C1 C2 C3		C3	Ğ								
Х	Χ	Х	Χ	Х	Χ	Н	L						
L	L	L	X	X	X	L	L						
L	L	Н	Χ	X	Χ	L	Н						
L	Н	Х	L	X	Χ	L	L						
L	Н	Х	Н	X	Χ	L	Н						
н	L	Х	Χ	L	Χ	L	L						
н	L	Х	Χ	Н	Χ	L	Н						
Н	Н	Х	Χ	Χ	L	L	L						
Н	Н	Х	Χ	Χ	Н	L	Н						

[‡] Select inputs A and B are common to both sections.

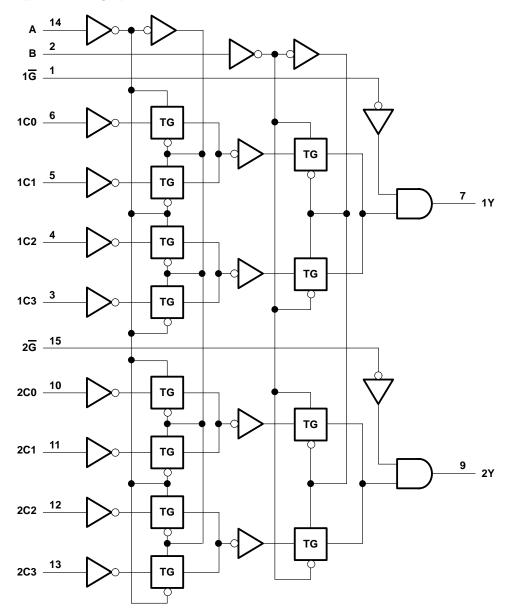


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logic diagram (positive logic)



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absolute maximum ratings over operating free-air temperature range†

Supply voltage range, V _{CC}	
Input clamp current, $I_{ K }(V_1 < 0 \text{ or } V_1 > V_{CC})$ (see Note 1)	±20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1)	±50 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±50 mA
Continuous current through V _{CC} or GND	±100 mA
Package thermal impedance, θ_{JA} (see Note 2): E package	67°C/W
M package	
Storage temperature range, T _{stg}	

[†] 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.

recommended operating conditions (see Note 3)

			T _A = 25°C		–55°C to 125°C		–40°C to 85°C		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
Vсс	Supply voltage		1.5	5.5	1.5	5.5	1.5	5.5	V
		V _{CC} = 1.5 V	1.2		1.2		1.2		
ViH	High-level input voltage	V _{CC} = 3 V	2.1		2.1		2.1		V
		V _{CC} = 5.5 V	3.85		3.85		3.85		
		V _{CC} = 1.5 V		0.3		0.3		0.3	
VIL	Low-level input voltage	VCC = 3 V		0.9		0.9		0.9	V
		V _{CC} = 5.5 V		1.65		1.65		1.65	
٧ _I	Input voltage		0	VCC	0	VCC	0	VCC	V
٧o	Output voltage		0	VCC	0	VCC	0	VCC	V
lон	High-level output current	V _{CC} = 4.5 V to 5.5 V		-24		-24		-24	mA
loL	Low-level output current	V _{CC} = 4.5 V to 5.5 V		24		24		24	mA
Δt/Δν	Input transition rise or fall rate	V _{CC} = 1.5 V to 3 V		50		50		50	ns/V
ΔυΔν	Input transition rise or fall rate	$V_{CC} = 3.6 \text{ V to } 5.5 \text{ V}$		20		20		20	115/V

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.

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

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

PARAMETER	TEST CONI	Vcc	T _A = 2	T _A = 25°C		C to ∘C	–40°C to 85°C		UNIT	
				MIN	MAX	MIN	MAX	MIN	MAX	
			1.5 V	1.4		1.4		1.4		
		$I_{OH} = -50 \mu A$	3 V	2.9		2.9		2.9		
			4.5 V	4.4		4.4		4.4		
Voн	VI = VIH or VIL	I _{OH} = -4 mA	3 V	2.58		2.4		2.48		V
		I _{OH} = -24 mA	4.5 V	3.94		3.7		3.8		
		$I_{OH} = -50 \text{ mA}^{\dagger}$	5.5 V			3.85				
		$I_{OH} = -75 \text{ mA}^{\dagger}$	5.5 V					3.85		
			1.5 V		0.1		0.1		0.1	-
		I _{OL} = 50 μA	3 V		0.1		0.1		0.1	
			4.5 V		0.1		0.1		0.1	
VOL	VI = VIH or VIL	I _{OL} = 12 mA	3 V		0.36		0.5		0.44	V
		I _{OL} = 24 mA	4.5 V		0.36		0.5		0.44	
		$I_{OL} = 50 \text{ mA}^{\dagger}$	5.5 V				1.65			
		I _{OL} = 75 mA [†]	5.5 V						1.65	
lį	V _I = V _{CC} or GND		5.5 V		±0.1		±1		±1	μΑ
Icc	$V_I = V_{CC}$ or GND,	IO = 0	5.5 V		8		160		80	μΑ
Ci					10		10		10	pF

[†] Test one output at a time, not exceeding 1-second duration. Measurement is made by forcing indicated current and measuring voltage to minimize power dissipation. Test verifies a minimum 50-Ω transmission-line drive capability at 85°C and 75-Ω transmission-line drive capability at 125°C.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 1.5 V, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–55°C to 125°C	–40°C to 85°C	UNIT	
	(HAPOT)	(001F01)	MIN MAX	MIN MAX		
^t PLH	A or B	v	250	227	no.	
^t PHL		ı	250	227	7 ns	
^t PLH	Any C	v	166	151	ne	
^t PHL	Ally C	'	166	151	ns	
^t PLH	ĪG	~	148	134	ns	
t _{PHL}	9	r	148	134		

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switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–55°(125		–40°0 85°	UNIT	
	(1141 01)	(6611 61)	MIN	MAX	MIN	MAX	
^t PLH	A or B	V	7	28	7.2	25.5	ns
^t PHL		1	7	28	7.2	25.5	113
t _{PLH}	A C	V	4.7	18.6	4.8	16.9	ne
^t PHL	Any C	1	4.7	18.6	4.8	16.9	ns
^t PLH	G		4.1	16.5	4.3	15	ne
^t PHL	G	ĭ	4.1	16.5	4.3	15	ns

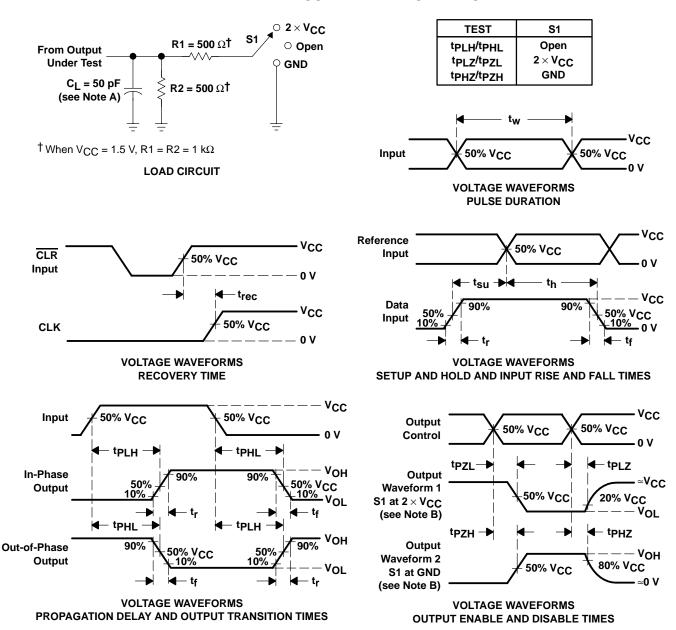
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–55°(125		–40°(85°	UNIT	
	(1141 01)	(6611 61)	MIN	MAX	MIN	MAX	
^t PLH	A or B	~	5	20	5.2	18.2	ns
^t PHL		1	5	20	5.2	18.2	113
t _{PLH}	Any C	~	3.3	13.3	3.4	12.1	ne
^t PHL	Ally C	1	3.3	13.3	3.4	12.1	ns
^t PLH	G	·	3	11.8	3.1	10.7	ne
tPHL	9	r	3	11.8	3.1	10.7	ns

operating characteristics, $T_A = 25^{\circ}C$

	PARAMETER					
C _{pd}	Power dissipation capacitance	93	pF			

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and test-fixture 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, $Z_O = 50 \ \Omega$, $t_f = 3 \ ns$, $t_f = 3 \ ns$. Phase relationships between waveforms are arbitrary.
- D. For clock inputs, f_{max} is measured with the input duty cycle at 50%.
- E. The outputs are measured one at a time with one input transition per measurement.
- F. tpLH and tpHL are the same as tpd.
- G. tpzL and tpzH are the same as ten.
- H. tpLZ and tpHZ are the same as tdis.
- I. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms







10-Jun-2014

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
CD54AC153F3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54AC153F3A	Samples
CD74AC153E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC153E	Samples
CD74AC153EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC153E	Samples
CD74AC153M	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC153M	Samples
CD74AC153M96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC153M	Samples
CD74AC153M96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC153M	Samples
CD74AC153M96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC153M	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.

(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.

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)

⁽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.



PACKAGE OPTION ADDENDUM

10-Jun-2014

(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 CD54AC153, CD74AC153:

Catalog: CD74AC153

Military: CD54AC153

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications



TAPE AND REEL INFORMATION



TAPE DIMENSIONS + K0 - P1 - B0 W Cavity - A0 -

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

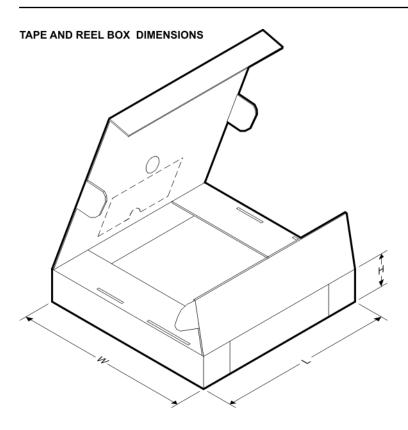
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device		Package Drawing			Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74AC153M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1





*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74AC153M96	SOIC	D	16	2500	333.2	345.9	28.6

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.

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.



D (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.



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