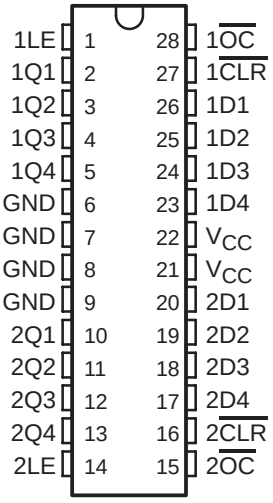
- **3-State Buffer-Type Outputs Drive Bus Lines Directly**
- **Bus-Structured Pinout**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC***™ **(Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**

DW PACKAGE
(TOP VIEW)



description

This dual 4-bit transparent D-type latch features 3-state outputs designed specifically for bus driving. This makes these devices particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

When the latch-enable (1LE or 2LE) input is high, the Q outputs will follow the data (D) inputs in true form, according to the function table. When LE is taken low, the outputs will be latched. When the clear (1$\overline{CLR}$ or 2$\overline{CLR}$) input goes low, the Q outputs go low independently of LE. The outputs are in a high-impedance state when the output-control (1$\overline{OC}$ or 2$\overline{OC}$) input is at a high logic level.

The 74AC11873 is characterized for operation from −40°C to 85°C.

FUNCTION TABLE
(each 4-bit latch)

INPUTS				OUTPUT
$\overline{OC}$	$\overline{CLR}$	LE	D	Q
L	L	X	X	L
L	H	H	H	H
L	H	H	L	L
L	H	L	X	Q_0
H	X	X	X	Z

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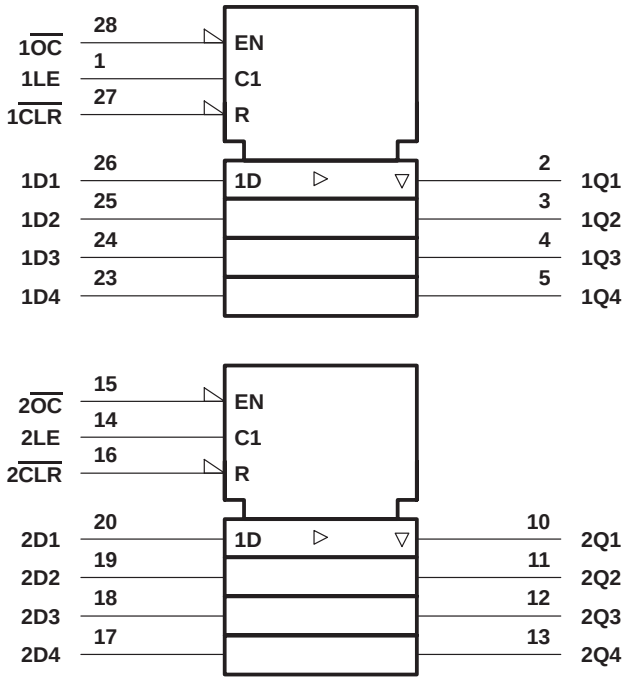
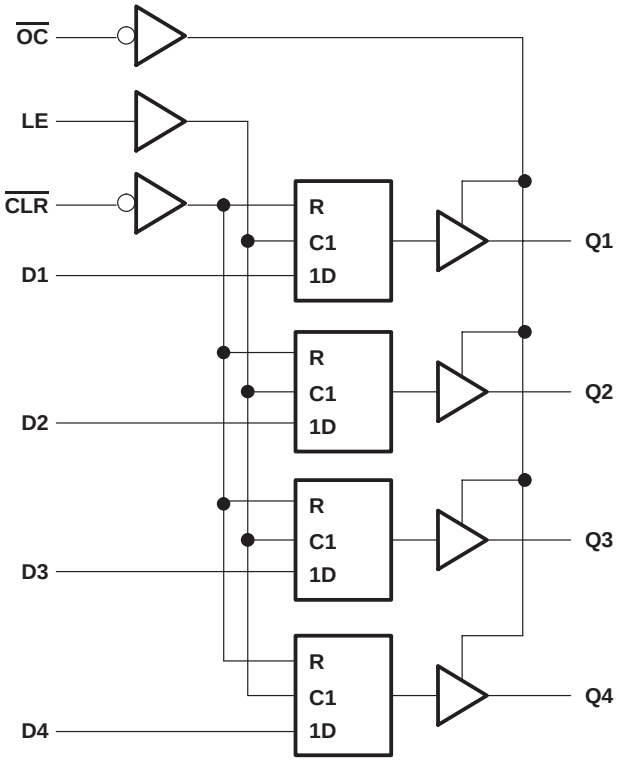
logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram, each quad latch (positive logic)



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

Supply voltage range, V_{CC} . . . . . −0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . . −0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1) . . . . . −0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0 or V_I > V_{CC}) . . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . . ±200 mA
Storage temperature range . . . . . −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.

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

recommended operating conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	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			−4	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	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		10	ns/V
T_A	Operating free-air temperature		−40		85	°C

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	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} = − 4 mA	3 V	2.58			2.48		
	I_{OH} = − 24 mA	4.5 V	3.94			3.8		
		5.5 V	4.94			4.8		
	I_{OH} = −75 mA†	5.5 V				3.85		
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	
	I_{OL} = 24 mA	4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
	I_{OL} = 75 mA†	5.5 V					1.65	
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			8		80	µA
C_i	V_I = V_{CC} or GND	5 V		4.5				pF
C_o	V_O = V_{CC} or GND	5 V		13.5				pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

timing requirements over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

			T_A = 25°C		MIN	MAX	UNIT
			MIN	MAX			
t_w	Pulse duration	$\overline{CLR}$ low	5		5		ns
		LE high	5		5		
t_{su}	Setup time, data before LE↓	HIgh	3		3		ns
		Low	4		4		
t_h	Hold time, data after LE↓	High	1		1		ns
		Low	1		1		

timing requirements over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

			T_A = 25°C		MIN	MAX	UNIT
			MIN	MAX			
t_w	Pulse duration	$\overline{CLR}$ low	5		5		ns
		LE high	5		5		
t_{su}	Setup time, data before LE↓	HIgh	2		2		ns
		Low	3		3		
t_h	Hold time, data after LE↓	High	1		1		ns
		Low	1		1		

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	D	Q	2.8	8.8	11.2	2.8	13	ns
t_{PHL}			2.8	9	11.2	2.8	12.7	
t_{PLH}	LE	Q	3	9.4	11.8	3	13.6	ns
t_{PHL}			2.9	9.4	11.7	2.9	13.2	
t_{PHL}	$\overline{CLR}$	Q	2.3	8.2	10.3	2.3	11.5	ns
t_{PZH}	$\overline{OC}$	Q	1.8	6.4	8.4	1.8	9.7	ns
t_{PZL}			2.7	9.9	12.5	2.7	14.4	
t_{PHZ}	$\overline{OC}$	Q	3.8	6.8	8.4	3.8	9	ns
t_{PLZ}			3.5	6.8	8.5	3.5	9.1	

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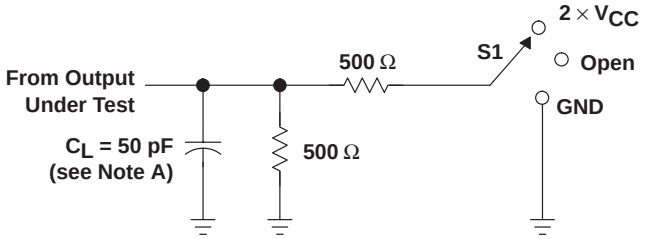
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	D	Q	2.2	5.5	7.3	2.2	8.4	ns
t_{PHL}			2.1	5.5	7.2	2.1	8.2	
t_{PLH}	LE	Q	2.4	5.9	7.8	2.4	8.9	ns
t_{PHL}			2.2	5.8	7.6	2.2	8.7	
t_{PHL}	$\overline{CLR}$	Q	1.7	5.1	6.8	1.7	7.6	ns
t_{PZH}	$\overline{OC}$	Q	1.2	4.1	5.6	1.2	6.4	ns
t_{PZL}			1.9	5.5	7.3	1.9	8.5	
t_{PHZ}	$\overline{OC}$	Q	3.5	5.9	7.4	3.5	7.9	ns
t_{PLZ}			3.3	5.5	7	3.3	7.6	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

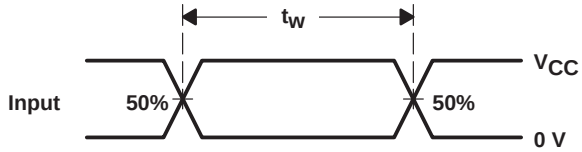
PARAMETER			TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per latch	Outputs enabled	C_L = 50 pF,	f = 1 MHz	43	pF
		Outputs disabled			9	

PARAMETER MEASUREMENT INFORMATION

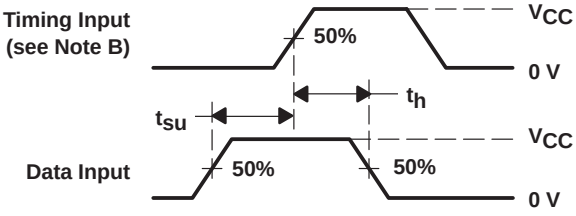


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT



VOLTAGE WAVEFORMS



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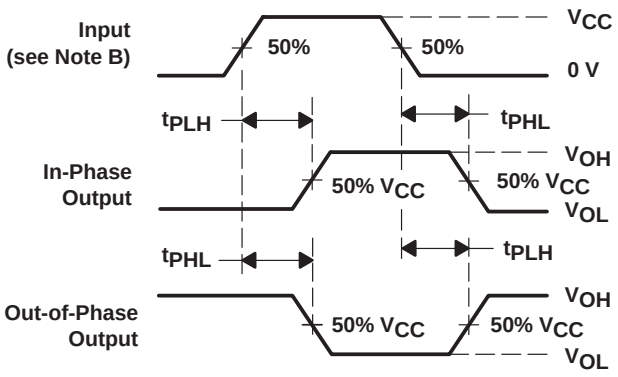
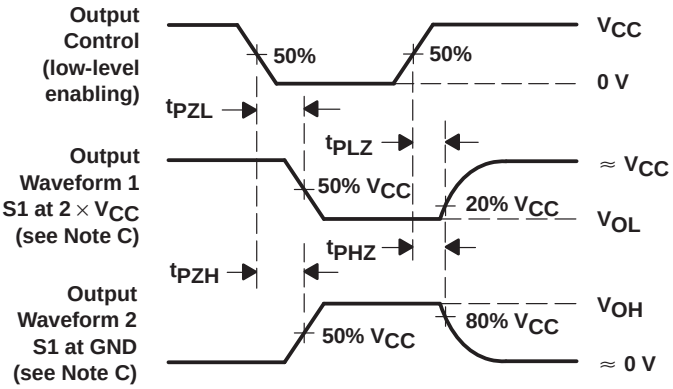


VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. 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.
D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
74AC11873DW	OBSOLETE	SOIC	DW	28		TBD	Call TI	Call TI
74AC11873NT	OBSOLETE	PDIP	NT	28		TBD	Call TI	Call TI
74AC11873NT	OBSOLETE	PDIP	NT	28		TBD	Call TI	Call TI

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

[2] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) 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.
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.

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