

Octal Transparent Latch, 3-State

CD54/74AC/ACT563 - Inverting CD54/74AC/ACT573 - Non-Inverting

Type Features:

- Buffered inputs
- Typical propagation delay: 4.3 ns @ V_{CC} = 5 V, T_A = 25° C, C_L = 50 pF

The RCA-CD54/74AC563 and CD54/74AC573 and the CD54/74ACT563 and CD54/74ACT573 octal transparent 3-state latches use the RCA ADVANCED CMOS technology. The outputs are transparent to the inputs when the Latch Enable (LE) is HIGH. When the Latch Enable (LE) goes LOW, the data is latched. The Output Enable (OE) controls the 3-state outputs. When the Output Enable (OE) is HIGH, the outputs are in the high-impedance state. The latch operation is independent of the state of the Output Enable.

The CD74AC/ACT563 and CD74AC/ACT573 are supplied in 20-lead dual-in-line plastic packages (E suffix) and in 20-lead dual-in-line small-outline plastic packages (M suffix). Both package types are operable over the following temperature ranges: Commercial (0 to 70°C); Industrial (-40 to +85°C); and Extended Industrial/Military (-55 to +125°C).

The CD54AC/ACT563 and CD54AC/ACT573, available in chip form (H suffix), are operable over the -55 to +125°C temperature range.

Family Features:

- Exceeds 2-kV ESD Protection MIL-STD-883, Method 3015
- SCR-Latchup-resistant CMOS process and circuit design
- Speed of bipolar FAST*/AS/S with significantly reduced power consumption
- Balanced propagation delays
- AC types feature 1.5-V to 5.5-V operation and balanced noise immunity at 30% of the supply
- ± 24-mA output drive current
 - Fanout to 15 FAST* ICs
 - Drives 50-ohm transmission lines

TRUTH TABLE

Output Enable	Latch Enable	Data	AC/ACT563 Output	AC/ACT573 Output
L	н	н	L	Н
L	н	L	Н	L
L	L	1	н	L
L	L	h	L	Н
Н	Х	Х	Z	Z

Note:

- L = Low voltage level
- H = High voltage level
- Low voltage level one set-up time prior to the high to low latch enable transition
- h ≈ High voltage level one set-up time prior to the high to low latch enable transition.
- X = Don't Care
- Z ≈ High Impedance State

This data sheet is applicable to the CD74AC563, CD54/74AC573, and CD54/74ACT573. The CD54AC563 and CD54/74ACT563 were not acquired from Harris Semiconductor.

^{*}FAST is a Registered Trademark of Fairchild Semiconductor Corp.

RECOMMENDED OPERATING CONDITIONS:

For maximum reliability, normal operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIN	LIMITS		
	MIN.	MAX.	UNITS	
Supply-Voltage Range, V _{Cc} *: (For T _A = Full Package-Temperature Range) AC Types ACT Types	1.5 4.5	5.5 5.5	V	
DC Input or Output Voltage, V _I , V _O	0	Vcc	V	
Operating Temperature, T _A :	-55	+125	°C	
Input Rise and Fall Slew Rate, dt/dv at 1.5 V to 3 V(AC Types) at 3.6 V to 5.5 V(AC Types) at 4.5 V to 5.5 V(ACT Types)	0 0	50 20 10	ns/V ns/V	

^{*}Unless otherwise specified, all voltages are referenced to ground.

TERMINAL ASSIGNMENT DIAGRAMS



CD54/74AC563, CD54/74ACT563

CD54/74AC573, CD54/74ACT573

STATIC ELECTRICAL CHARACTERISTICS: AC Series

						AMBIEN	TEMPE	RATURE	(T _A) - °(C	Ţ <u></u>	
CHARACTERISTICS	S	TEST COM	IDITIONS	V _{cc}	+:	25	-40 to	o +85	-55 to	+125	UNITS	
		V, (V)	l _o (mA)	(V)	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
High-Level Input				1.5	1.2	_	1.2	_	1.2			
Voltage	V_{iH}			3	2.1	_	2.1		2.1		V	
				5.5	3.85		3.85	_	3.85			
Low-Level Input				1.5	_	0.3	_	0.3		0.3		
• Voltage	V_{IL}			3		0.9	_	0.9	'	0.9	V	
				5.5	_	1.65	_	1.65	<u> </u>	1.65		
High-Level Output			-0.05	1.5	1.4		1.4		1.4			
Voltage	V_{OH}	ViH	-0.05	3	2.9	_	2.9	_	2.9	_		
		or	-0.05	4.5	4.4		4.4	_	4.4		1	
		VıL	-4	3	2.58	_	2.48	_	2.4	_	V	
		_	-24	4.5	3.94	_	3.8		3.7	_	1	
		. (-75	5.5	_	_	3.85	_	-	l –	1	
		#. * {	-50	5.5		_	_	_	3.85	_	1	
Low-Level Output			0.05	1.5		0.1		0.1		0.1		
Voltage	Vol	V_{OL}	V _{IH}	0.05	3	_	0.1		0.1	_	0.1	1
		or	0.05	4.5	_	0.1		0.1	_	0.1	1	
		VıL	12	3	_	0.36	-	0.44	_	0.5	v	
			24	4.5	_	0.36		0.44	_	0.5	1	
•		(75	5.5		_		1.65	_	_	1	
		#, * {	50	5.5	_	_			_	1.65	1	
Input Leakage Current	1,	V _{cc} or GND		5.5	_	±0.1	_	±1	_	±1	μΑ	
3-State Leakage		ViH										
Current	loz	or										
		Vic									ļ	
		Vo=		5.5	_	±0.5	—	±5	_	±10	μΑ	
	-	Vcc										
		or										
		GND										
Quiescent Supply Current, MSI	Icc	V _{cc} or GND	0	5.5		8		80		160	μΑ	

[#]Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

* Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

STATIC ELECTRICAL CHARACTERISTICS: ACT Series

						AMBIEN	T TEMP	ERATURE	E (T _A) - °	С	
CHARACTERIST	ice.	TEST CO	NDITIONS	V _{cc}	+	25	-40 1	o +85	-55 t	o +125	
or introduction		V, (V)	I _o (mA)	(V)	MIN.	MAX. MIN. MAX. MIN.		MIN.	MAX.	UNITS	
High-Level Input Voltage	V _{IH}			4.5 to 5.5	2	_	2	_	2	-	v
Low-Level Input Voltage	Vil			4.5 to 5.5		0.8	_	0.8	_	0.8	v
High-Level Output		V _{IH}	-0.05	4.5	4.4		4.4	_	4.4	_	
Voltage	V _{OH}	or V _{IL}	-24	4.5	3.94		3.8	_	3.7	-	V.
		#, * {	-75	5.5	_		3.85	_		_] v .
			-50	5.5					3.85		
Low-Level Output Voltage	Vol	V _{IH}	0.05	4.5		0.1	_	0.1	_	0.1	
vollago	Vil. #, *		24	4.5	_	0.36	l —	0.44	_	0.5]
		# * {	75	5.5		_	_	1.65	_	_	\ \
		<u>"'</u>	50	5.5		_	_	_	_	1.65	
Input Leakage Current	l _t	V∞ or GND		5.5	_	±0.1	_	±1	_	±1	μΑ
3-State Leakage Current	loz	V _{IH} or									
		V _{IL} V _O = V _{CC}		5.5		±0.5	_	±5	-	±10	μΑ
		or GND			·						
Quiescent Supply Current, MSI	Icc	V _{cc} or GND	0	5.5		8	 .	80	_	160	μΑ
Additional Quiescent Current per Input P TTL Inputs High 1 Unit Load	Supply in ΔI _{cc}	V _{cc} -2.1		4.5 to 5.5	_	2.4	_	2.8		3	, mA

[#]Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

*Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

ACT INPUT LOADING TABLE

INPUT	UNIT LOAD*						
INPUI	ACT563	ACT573					
ŌĒ	0.87	0.87					
Dn	0.5	0.5					
LE	0.8	0.8					

*Unit load is ΔI_{CC} limit specified in Static Characteristics Chart, e.g., 2.4 mA max. @ 25°C.

PREREQUISITE FOR SWITCHING: AC Series

		.,	AMBI	Γ _Λ) -° C			
CHARACTERISTICS	SYMBOL	V _{cc} (V)	-40 to +85		-55 to +125		UNITS
		(*)	MIN.	MAX.	MIN.	MAX.	
LE Pulse		1.5	44	_	50	_	
Width	tw	3.3* 5†	4.9 3.5		5.6 4	_	ns
Setup Time Data to LE	ts∪	1.5 3.3 5	2 2 2		2 2 2		ns
Hold Time Data to LE	t _H	1.5 3.3 5	33 3.7 2.6		38 4.2 3	=	ns

*3.3 V: min. is @ 3 V †5 V: min. is @ 4.5 V

SWITCHING CHARACTERISTICS: AC Series; t, t, = 3 ns, C, = 50 pF

			AMBII	ENT TEMPE	RATURE (T	۸) - °C	_
CHARACTERISTICS	SYMBOL	V _{cc} (V)	-40 t	o +85	-55 to	+125	UNITS
	1	(*)	MIN.	MAX.	MIN.	MAX.	
Propagation Delays: Data to Qn AC563	t _{PLH} t _{PHL}	1.5 3.3* 5†	3.8 2.7	119 13.4 9.5	3.7 2.6	131 14.7 10.5	ns
AC573	t _{PLH} t _{PHL}	1.5 3.3 5	3.1 2.2	96 10.8 7.7	 3 2.1	106 11.9 8.5	ns
LE on Qn AC563	t _{PLH}	1.5 3.3 5	4.3 3.1	136 15.3 10.9	- 4.2 3	150 16.8 12	ns
AC573	tern tehr	1.5 3.3 5	4.3 3.1	136 15.3 10.9	4.2 3	150 16.8 12	ns
Output Enable Times	t _{PZL} t _{PZH}	1.5 3.3 5	4.1 2.7	119 14.4 9.5	- 4 2.6	131 15.8 10.5	ns
Output Disable Times	t _{PLZ} t _{PHZ}	1.5 3.3 5	3.7 3	131 13.1 10.5	3.6 2.9	144 14.4 11.5	ns
Power Dissipation Capacitance	C _{PO} §	_	63	Тур.	63	Тур.	рF
Min. (Valley) V _{OH} During Switching of Other Outputs (Output Under Test Not Switching)	V _{онv} See Fig. 1	5		4 Typ. @ 25°C			
Max. (Peak) V _{OL} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OLP} See Fig. 1	5	:	7 1 Typ. (@ 25°C		V
Input Capacitance	Cı			10		10	pF
3-State Output Capacitance	Co	_		15		15	pF

*3.3 V: min. is @ 3.6 V max. is @ 3 V

†5 V: min. is @ 5.5 V max. is @ 4.5 V

§C_{PO} is used to determine the dynamic power consumption, per latch.

 $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where $f_i = input$ frequency

C_L = output load capacitance

 V_{CC} = supply voltage.

PREREQUISITE FOR SWITCHING: ACT Series

		V _{cc} (V)	AMBI				
CHARACTERISTICS	SYMBOL		-40 to +85		-55 to	+125	UNITS
		(*/	MIN.	MAX.	MIN.	MAX.	
LE Pulse Width	tw	5†	3.5	_	4	_	ns
Setup Time Data to LE	t _{su}	5	2	_	2	_	ns
Hold Time Data to LE	tн	5	2.6	_	3	_	ns

†5 V: min. is @ 4.5 V

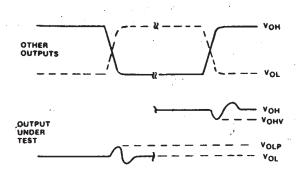
SWITCHING CHARACTERISTICS: ACT Series; t,, t, = 3 ns, C, = 50 pF

			AMBI	Γ _A) - °C				
CHARACTERISTICS	SYMBOL	V _{cc} (V)		-40 to +85		-55 to +125		
		(*)	MIN.	MAX.	MIN.	MAX.	1	
Propagation Delays: Data to Qn 563	t _{PLH}		2.9	10.4	2.9	11.4		
573		5†	2.7	9.4	2.6	10.4	ns	
LE to Qn 563 573	t _{PLH} t _{PHL}	5	3.2	11.4	3.1	12.5	ns	
Output Enable Times	t _{PZL} t _{PZH}	5	3.5	12.3	3.4	13.5	ns	
Output Disable Times	t _{PLZ}	5	3.2	11.4	3.1	12.5	ns	
Power Dissipation Capacitance	CPO§		63	L Гур.	63	<u>I</u>	pF	
Min. (Valley) V _{OH} During Switching of Other Outputs (Output Under Test Not Switching)	V _{онv} See Fig. 1	5			@ 25°C		٧	
Max. (Peak) V _{OL} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OLP} See Fig. 1	5		1 Тур. (@ 25°C		V	
Input Capacitance	C _i			10	_	10	ρF	
3-State Output Capacitance	Co	_	_	15		15	pF	

†5 V: min. is @ 5.5 V max. is @ 4.5 V

§CPD is used to determine the dynamic power consumption, per latch. $P_D = V_{cc}^2 f_c (C_{PD} + C_L) + V_{cc} \Delta I_{cc}$ where $f_c = input$ frequency $C_L = output$ load capacitance $V_{cc} = supply voltage$.

PARAMETER MEASUREMENT INFORMATION

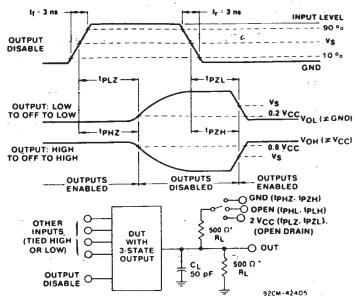


NOTES:

- 1. V_{OHV} AND V_{OLP} ARE MEASURED WITH RESPECT TO A GROUND REFERENCE NEAR THE OUTPUT UNDER TEST.
- 2. INPUT PULSES HAVE THE FOLLOWING CHARACTERISTICS:

9205-42406

Fig. 1 - Simultaneous switching transient waveforms.



*FOR AC SERIES ONLY: WHEN $V_{CC} = 1.5~V_{\rm t} R_L = 1~k\Omega$

Fig. 2 - Three-state propagation delay waveforms and test circuit.

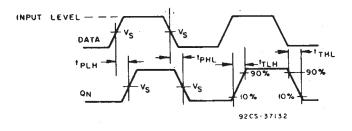


Fig. 3 - Data to Qn output propagation delays.

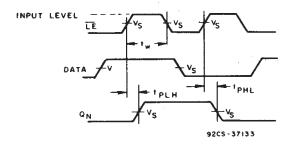


Fig. 4 - Latch enable propagation delays.

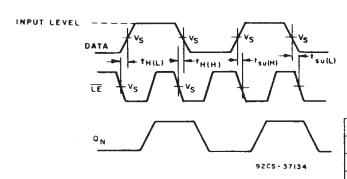


Fig. 5 - Latch enable prerequisite times.

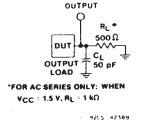


Fig. 6 - Test circuit.

	CD54/74AC	CD54/74ACT
Input Level	V _{cc}	3 V
Input Switching Voltage, Vs	0.5 V _{cc}	1.5 V
Output Switching Voltage, Vs	0.5 V _{cc}	0.5 V _{CC}





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PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Sample
CD54AC573F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54AC573F3A	Sample
CD54ACT573F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54ACT573F3A	Sample
CD74AC573E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC573E	Sample
CD74AC573EE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC573E	Sample
CD74AC573M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sample
CD74AC573M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sampl
CD74AC573M96E4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sampl
CD74AC573M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sampl
CD74AC573ME4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sampl
CD74AC573MG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC573M	Sampl
CD74ACT573E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT573E	Sampl
CD74ACT573EE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT573E	Sampl
CD74ACT573M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Sampl
CD74ACT573M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Sampl
CD74ACT573M96E4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Sampl
CD74ACT573M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Sampl
CD74ACT573ME4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Sampl



PACKAGE OPTION ADDENDUM

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Orderable Device	Status	Package Type	_	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing			(2)		(3)		(4)	
CD74ACT573MG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT573M	Samples

(1) The marketing status values are defined as follows:

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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) Only one of markings shown within the brackets will appear on the physical device.

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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.

OTHER QUALIFIED VERSIONS OF CD54AC573, CD54ACT573, CD74AC573, CD74ACT573:

Catalog: CD74AC573, CD74ACT573

Military: CD54AC573, CD54ACT573

NOTE: Qualified Version Definitions:





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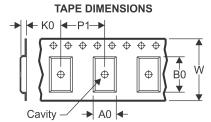
- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

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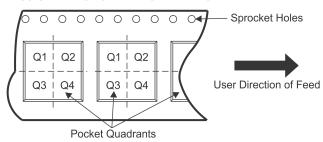
TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
	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

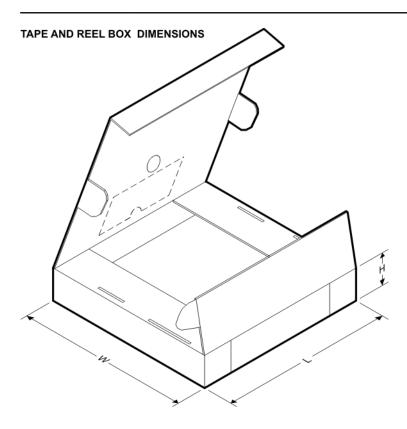
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74AC573M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
CD74ACT573M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74AC573M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT573M96	SOIC	DW	20	2000	367.0	367.0	45.0

14 LEADS SHOWN



NOTES:

- 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



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.



DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS-013 variation AC.



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> Sales:

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

Customer Service :

Email service@ameya360.com

Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com