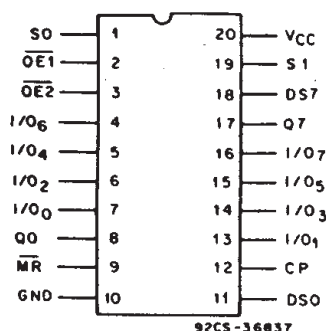


# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323


**TERMINAL ASSIGNMENT**

## 8-Input Universal Shift/Storage Register with Common Parallel I/O Pins

CD54/74AC/ACT299 - Asynchronous Reset

CD54/74AC/ACT323 - Synchronous Reset

**Type Features:**

- Buffered inputs
- Typical propagation delay:  
6 ns @  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$

The RCA CD54/74AC299 and CD54/74AC323 and the CD54/74ACT299 and CD54/74ACT323 are 3-state, 8-input universal shift/storage registers with common parallel I/O pins. These devices use the RCA ADVANCED CMOS technology. These registers have four synchronous-operating modes controlled by the two select inputs as shown in the Mode Select (S0, S1) table. The Mode Select, the Serial Data (DS0, DS7), and the Parallel Data (I/O<sub>0</sub> - I/O<sub>7</sub>) respond only to the LOW-TO-HIGH transition of the clock (CP) pulse. S0, S1 and Data inputs must be present one setup time prior to the positive transition of the clock.

With the CD54/74AC/ACT299, the Master Reset ( $\overline{\text{MR}}$ ) is an asynchronous active-LOW input. When  $\overline{\text{MR}}$  is LOW, the register is cleared regardless of the status of all other inputs. With the CD54/74AC/ACT323, the Master Reset ( $\overline{\text{MR}}$ ) clears the register in sync with the clock input. The register can be expanded by cascading same units by tying the serial output (Q0) to the serial data (DS7) input of the preceding register, and tying the serial output (Q7) to the serial data (DS0) input of the following register. Recirculating the (n x 8) bits is accomplished by tying the Q7 of the last stage to the DSO of the first stage.

The 3-state input/output (I/O) port has three modes of operation:

1. Both Output Enable ( $\overline{\text{OE1}}$  and  $\overline{\text{OE2}}$ ) inputs are LOW and S0 or S1 or both are LOW; the data in the register is present at the eight outputs.
2. When both S0 and S1 are HIGH, I/O terminals are in the high-impedance state but being input ports, ready for parallel data to be loaded into eight registers with one clock transition regardless of the status of  $\overline{\text{OE1}}$  and  $\overline{\text{OE2}}$ .

**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
- $\pm 24\text{-mA}$  output drive current
  - Fanout to 15 FAST\* ICs
  - Drives 50-ohm transmission lines

\*FAST is a Registered Trademark of Fairchild Semiconductor Corp.

3. Either one of the two Output Enable inputs being HIGH will force I/O terminals to be in the off state. It is noted that each I/O terminal is a 3-state output and a CMOS buffer input.

The CD74AC/ACT299 and CD74AC/ACT323 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/ACT299 and CD54AC/ACT323, available in chip form (H suffix), are operable over the -55 to +125°C temperature range.

**9**

# **CD54/74AC299, CD54/74AC323** **CD54/74ACT299, CD54/74ACT323**

## **MODE SELECT — FUNCTION TABLE** **REGISTER OPERATING MODES**

FUNCTION	INPUTS							REGISTER OUTPUTS				
	MR	CP	S0	S1	DS0	DS7	I/O <sub>n</sub>	Q0	Q1	...	Q6	Q7
Reset (Clear)	L	X*	X	X	X	X	X	L	L	...	L	L
Shift Right	H		h	l	l	X	X	L	q <sub>0</sub>	...	q <sub>5</sub>	q <sub>6</sub>
	H		h	l	h	X	X	H	q <sub>0</sub>	...	q <sub>5</sub>	q <sub>6</sub>
Shift Left	H		l	h	X	l	X	q <sub>1</sub>	q <sub>2</sub>	...	q <sub>7</sub>	L
	H		l	h	X	h	X	q <sub>1</sub>	q <sub>2</sub>	...	q <sub>7</sub>	H
Hold (do nothing)	H		l	l	X	X	X	q <sub>0</sub>	q <sub>1</sub>	...	q <sub>6</sub>	q <sub>7</sub>
Parallel Load	H		h	h	X	X	l	L	L	...	L	L
	H		h	h	X	X	h	H	H	...	H	H

\*On CD54/74AC/ACT323, CP must be in transition from the LOW-to-HIGH state to Reset (Clear).

## **MODE SELECT — FUNCTION TABLE** **3-STATE I/O PORT OPERATING MODE**

FUNCTION	INPUTS					INPUTS/OUTPUTS
	OE1	OE2	S0	S1	Q <sub>n</sub> (Register)	I/O <sub>0</sub> ... I/O <sub>7</sub>
Read Register	L	L	L	X	L	L
	L	L	L	X	H	H
	L	L	X	L	L	L
	L	L	X	L	H	H
Load Register	X	X	H	H	Q <sub>n</sub> = I/O <sub>n</sub>	I/O <sub>n</sub> = Inputs
Disable I/O	H	X	X	X	X	(Z)
	X	H	X	X	X	(Z)

H = Input voltage high level.

h = Input voltage high one set-up time prior clock transition.

L = Input voltage low level.

l = Input voltage low one set-up time prior clock transition.

q<sub>n</sub> = Lower case letters indicate the state of the referenced output one set-up time prior clock transition.

X = Voltage level on logic status don't care.

Z = Output in high-impedance state.

= Low-to-high clock transition.

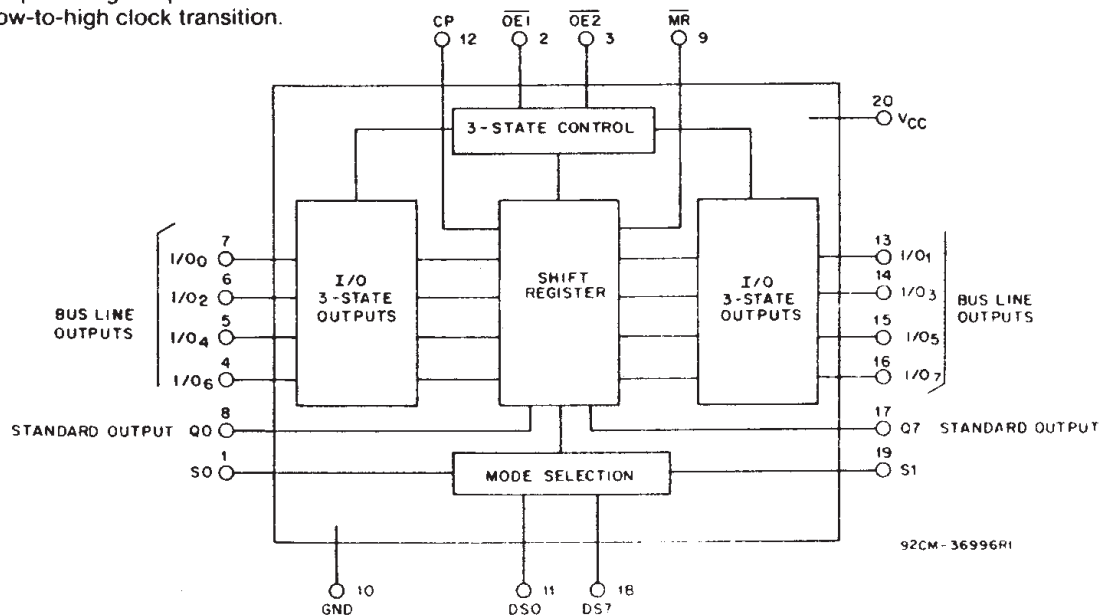


Fig. 1 - Functional diagram.

# CD54/74AC299, CD54/74AC323

## CD54/74ACT299, CD54/74ACT323

**MAXIMUM RATINGS, Absolute-Maximum Values:**

DC SUPPLY-VOLTAGE ( $V_{CC}$ )	-0.5 to 6 V
DC INPUT DIODE CURRENT, $I_{IK}$ (for $V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V)	$\pm 20$ mA
DC OUTPUT DIODE CURRENT, $I_{OK}$ (for $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V)	$\pm 50$ mA
DC OUTPUT SOURCE OR SINK CURRENT per Output Pin, $I_O$ (for $V_O > -0.5$ V or $V_O < V_{CC} + 0.5$ V)	$\pm 50$ mA
DC $V_{CC}$ or GROUND CURRENT ( $I_{CC}$ or $I_{GND}$ )	$\pm 100$ mA*
POWER DISSIPATION PER PACKAGE ( $P_D$ ):	
For $T_A = -55$ to $+100^\circ\text{C}$ (PACKAGE TYPE E)	500 mW
For $T_A = +100$ to $+125^\circ\text{C}$ (PACKAGE TYPE E)	Derate Linearly at 8 mW/ $^\circ\text{C}$ to 300 mW
For $T_A = -55$ to $+70^\circ\text{C}$ (PACKAGE TYPE M)	400 mW
For $T_A = +70$ to $+125^\circ\text{C}$ (PACKAGE TYPE M)	Derate Linearly at 6 mW/ $^\circ\text{C}$ to 70 mW
OPERATING-TEMPERATURE RANGE ( $T_A$ )	$-55$ to $+125^\circ\text{C}$
STORAGE TEMPERATURE ( $T_{stg}$ )	$-65$ to $+150^\circ\text{C}$
LEAD TEMPERATURE (DURING SOLDERING):	
At distance $1/16 \pm 1/32$ in. ( $1.59 \pm 0.79$ mm) from case for 10 s maximum	$+265^\circ\text{C}$
Unit inserted into PC board min. thickness $1/16$ in. ( $1.59$ mm) with solder contacting lead tips only	$+300^\circ\text{C}$

\*For up to 4 outputs per device; add  $\pm 25$  mA for each additional output.

**RECOMMENDED OPERATING CONDITIONS:**

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

CHARACTERISTICS	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range, $V_{CC}$ *: (For $T_A$ = Full Package-Temperature Range)			
AC Types	1.5	5.5	V
ACT Types	4.5	5.5	V
DC Input or Output Voltage, $V_I$ , $V_O$	0	$V_{CC}$	V
Operating Temperature, $T_A$	$-55$	$+125$	$^\circ\text{C}$
Input Rise and Fall Slew Rate, $dt/dv$			
at 1.5 V to 3 V (AC Types)	0	50	ns/V
at 3.6 V to 5.5 V (AC Types)	0	20	ns/V
at 4.5 V to 5.5 V (ACT Types)	0	10	ns/V

\*Unless otherwise specified, all voltages are referenced to ground.

# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323

## STATIC ELECTRICAL CHARACTERISTICS: AC Series

CHARACTERISTICS	TEST CONDITIONS		V <sub>CC</sub> (V)	AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C						UNITS
				+25		-40 to +85		-55 to +125		
	V <sub>I</sub> (V)	I <sub>O</sub> (mA)		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
High-Level Input Voltage V <sub>IH</sub>			1.5 3 5.5	1.2 2.1 3.85	— — —	1.2 2.1 3.85	— — —	1.2 2.1 3.85	— — —	V
Low-Level Input Voltage V <sub>IL</sub>			1.5 3 5.5	— — —	0.3 0.9 1.65	— — —	0.3 0.9 1.65	— — —	0.3 0.9 1.65	V
High-Level Output Voltage V <sub>OH</sub>	V <sub>IH</sub> or V <sub>IL</sub>	-0.05	1.5	1.4	—	1.4	—	1.4	—	V
		-0.05	3	2.9	—	2.9	—	2.9	—	
		-0.05	4.5	4.4	—	4.4	—	4.4	—	
		-4	3	2.58	—	2.48	—	2.4	—	
		-24	4.5	3.94	—	3.8	—	3.7	—	
	#, * {	-75	5.5	—	—	3.85	—	—	—	
		-50	5.5	—	—	—	—	3.85	—	
Low-Level Output Voltage V <sub>OL</sub>	V <sub>IH</sub> or V <sub>IL</sub>	0.05	1.5	—	0.1	—	0.1	—	0.1	V
		0.05	3	—	0.1	—	0.1	—	0.1	
		0.05	4.5	—	0.1	—	0.1	—	0.1	
		12	3	—	0.36	—	0.44	—	0.5	
		24	4.5	—	0.36	—	0.44	—	0.5	
	#, * {	75	5.5	—	—	—	1.65	—	—	
		50	5.5	—	—	—	—	—	1.65	
Input Leakage Current I <sub>I</sub>	V <sub>CC</sub> or GND		5.5	—	±0.1	—	±1	—	±1	μA
3-Stage Leakage Current I <sub>OZ</sub>	V <sub>IH</sub> or V <sub>IL</sub> V <sub>O</sub> = V <sub>CC</sub> or GND		5.5	—	±0.5	—	±5	—	±10	μA
Quiescent Supply Current, MSI I <sub>CC</sub>	V <sub>CC</sub> or GND	0	5.5	—	8	—	80	—	160	μA

#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.

# CD54/74AC299, CD54/74AC323

## CD54/74ACT299, CD54/74ACT323

## STATIC ELECTRICAL CHARACTERISTICS: ACT Series

CHARACTERISTICS	TEST CONDITIONS	$V_{CC}$ (V)	AMBIENT TEMPERATURE ( $T_A$ ) - °C						UNITS	
			+25		-40 to +85		-55 to +125			
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
High-Level Input Voltage $V_{IH}$			4.5 to 5.5	2	—	2	—	2	—	V
Low-Level Input Voltage $V_{IL}$			4.5 to 5.5	—	0.8	—	0.8	—	0.8	V
High-Level Output Voltage $V_{OH}$	$V_{IH}$ or $V_{IL}$ #, * {	-0.05	4.5	4.4	—	4.4	—	4.4	—	V
		-24	4.5	3.94	—	3.8	—	3.7	—	
		-75	5.5	—	—	3.85	—	—	—	
		-50	5.5	—	—	—	—	3.85	—	
Low-Level Output Voltage $V_{OL}$	$V_{IH}$ or $V_{IL}$ #, * {	0.05	4.5	—	0.1	—	0.1	—	0.1	V
		24	4.5	—	0.36	—	0.44	—	0.5	
		75	5.5	—	—	—	1.65	—	—	
		50	5.5	—	—	—	—	—	1.65	
Input Leakage Current $I_i$	$V_{CC}$ or GND		5.5	—	±0.1	—	±1	—	±1	μA
3-State Leakage Current $I_{OZ}$	$V_{IH}$ or $V_{IL}$ $V_O$ $V_{CC}$ or GND		5.5	—	±0.5	—	±5	—	±10	μA
Quiescent Supply Current, MSI $I_{CC}$	$V_{CC}$ or GND	0	5.5	—	8	—	80	—	160	μA
Additional Quiescent Supply Current per Input Pin. TTL Inputs High 1 Unit Load $\Delta I_{CC}$	$V_{CC}-2.1$		4.5 to 5.5	—	2.4	—	2.8	—	3	mA

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#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 LOADS*	
	299	323
S1, S0, $\overline{OE}1$ , $\overline{OE}2$	0.83	0.83
I/O <sub>0</sub> - I/O <sub>7</sub> , CP, DS0, DS7	0.67	0.67
$\overline{MR}$	1.33	0.67

\*Unit load is  $\Delta I_{cc}$  limit specified in Static Characteristics Chart, e.g., 2.4 mA max. @ 25°C.

# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323

PREREQUISITE FOR SWITCHING: AC Series

CHARACTERISTICS	SYMBOL	V <sub>CC</sub> (V)	AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Setup Time S1, S0, to CP	t <sub>su</sub>	1.5 3.3* 5†	99 11.1 7.9	— — —	113 12.6 9	— — —	ns
Hold Time S1, S0 to CP	t <sub>h</sub>	1.5 3.3 5	0 0 0	— — —	0 0 0	— — —	ns
Setup Time (I/O)n, DS0, DS7 to CP	t <sub>su</sub>	1.5 3.3 5	49 5.5 3.9	— — —	56 6.3 4.5	— — —	ns
Hold Time (I/O)n, DS0, DS7 to CP	t <sub>su</sub>	1.5 3.3 5	0 0 0	— — —	0 0 0	— — —	ns
Setup Time MR to CP (323)	t <sub>su</sub>	1.5 3.3 5	61 6.8 4.8	— — —	69 7.8 5.5	— — —	ns
Hold Time MR to CP (323)	t <sub>h</sub>	1.5 3.3 5	0 0 0	— — —	0 0 0	— — —	ns
Maximum CP Frequency	f <sub>max</sub>	1.5 3.3 5	9 78 108	— — —	8 68 95	— — —	MHz
CP Pulse Width	t <sub>w</sub>	1.5 3.3 5	57 6.4 4.6	— — —	65 7.3 5.2	— — —	ns
MR Pulse Width	t <sub>w</sub>	1.5 3.3 5	55 6.1 4.4	— — —	63 7 5	— — —	ns
Recovery Time MR to CP 299	t <sub>rec</sub>	1.5 3.3 5	55 6.1 4.4	— — —	63 7 5	— — —	ns

\*3.3 V: min. is @ 3 V

†5 V: min is @ 4.5 V

Technical Data

# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323

SWITCHING CHARACTERISTICS: AC Series;  $t_r, t_f = 3 \text{ ns}$ ,  $C_L = 50 \text{ pF}$

CHARACTERISTICS	SYMBOL	V <sub>CC</sub> (V)	AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: CP to Q0, Q7	t <sub>PLH</sub> t <sub>PHL</sub>	1.5 3.3* 5†	— 4.7 3.3	147 16.5 11.7	— 4.5 3.2	162 18.1 12.9	ns
CP to (I/O)n	t <sub>PLH</sub> t <sub>PHL</sub>	1.5 3.3 5	— 4.9 3.5	154 17.2 12.3	— 4.7 3.4	169 18.9 13.5	ns
MR to Q0, Q7 (299 only)	t <sub>PLH</sub> t <sub>PHL</sub>	1.5 3.3 5	— 4 2.9	127 14.3 10.2	— 3.9 2.8	140 15.7 11.2	ns
MR to (I/O)n	t <sub>PLH</sub> t <sub>PHL</sub>	1.5 3.3 5	— 5 3.6	158 17.7 12.6	— 4.9 3.5	174 19.5 13.9	ns
Enable and Disable Times	t <sub>PZL</sub> t <sub>PZH</sub> t <sub>PLZ</sub> t <sub>PHZ</sub>	1.5 3.3 5	— 5.8 3.8	169 20.4 13.5	— 5.6 3.7	186 22.4 14.9	ns
Power Dissipation Capacitance	C <sub>PD</sub> §	—	280 Typ.		280 Typ.		pF
Input Capacitance	C <sub>I</sub>	—	—	10	—	10	pF
3-State Output Capacitance	C <sub>O</sub>	—	—	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

§ $C_{PD}$  is used to determine the dynamic power consumption, per function.  
 $P_D = C_{PD}V_{CC}^2 f_i + \Sigma (C_L V_{CC}^2 f_o)$  where  $f_i$  = input frequency  
 $f_o$  = output frequency  
 $C_L$  = output load capacitance  
 $V_{CC}$  = supply voltage.

## PREREQUISITE FOR SWITCHING: ACT Series

CHARACTERISTICS	SYMBOL	V <sub>CC</sub> (V)	AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Setup Time S1, S0 to CP	t <sub>SU</sub>	5*	7.9	—	9	—	ns
Hold Time S1, S0 to CP	t <sub>H</sub>	5	0	—	0	—	ns
Setup Time (I/O)n, DS0, DS7 to CP	t <sub>SU</sub>	5	3.9	—	4.5	—	ns
Hold Time (I/O)n, DS0, DS7 to CP	t <sub>H</sub>	5	0	—	0	—	ns
Setup Time MR to CP (323)	t <sub>SU</sub>	5*	4.8	—	5.5	—	ns
Hold Time MR to CP (323)	t <sub>H</sub>	5	0	—	0	—	ns
Maximum CP Frequency	f <sub>max</sub>	5	103	—	90	—	MHz
CP Pulse Width	t <sub>w</sub>	5	4.8	—	5.5	—	ns
MR Pulse Width	t <sub>w</sub>	5	4.4	—	5	—	ns
Recovery Time MR to CP (299)	t <sub>REC</sub>	5	4.4	—	5	—	ns

\*5 V: min. is @ 4.5 V

# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323

SWITCHING CHARACTERISTICS: ACT Series;  $t_r, t_f = 3 \text{ ns}$ ,  $C_L = 50 \text{ pF}$ 

CHARACTERISTICS	SYMBOL	V <sub>CC</sub> (V)	AMBIENT TEMPERATURE (T <sub>A</sub> ) - °C				UNITS
			-40° to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: CP to Q0, Q7	t <sub>PLH</sub> t <sub>PHL</sub>	5*	3.3	11.7	3.2	12.9	ns
CP to (I/O)n	t <sub>PLH</sub> t <sub>PHL</sub>	5	3.7	13.2	3.6	14.5	ns
$\overline{MR}$ to Q0, Q7 (299 only)	t <sub>PLH</sub> t <sub>PHL</sub>	5	3.1	11.1	3.1	12.2	ns
$\overline{MR}$ to (I/O)n	t <sub>PLH</sub> t <sub>PHL</sub>	5	4.8	16.9	4.7	18.6	ns
Enable and Disable Times	t <sub>PLZ</sub> t <sub>PHZ</sub> t <sub>PZL</sub> t <sub>PZH</sub>	5	3.8	13.5	3.7	14.9	ns
Power Dissipation Capacitance	C <sub>PD</sub> §	—	280 Typ.		280 Typ.		pF
Input Capacitance	C <sub>I</sub>	—	—	10	—	10	pF
3-State Output Capacitance	C <sub>O</sub>	—	—	15	—	15	pF

\*5 V: min. is @ 5.5 V  
max. is @ 4.5 V

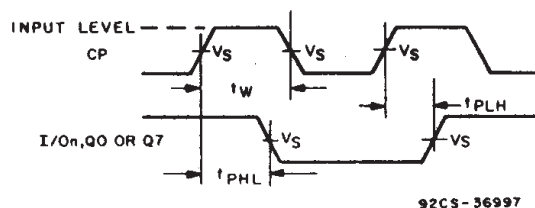
$\S C_{PD}$  is used to determine the dynamic power consumption, per function.

$$P_D = C_{PD} V_{CC}^2 f_i + \sum (C_L V_{CC}^2 f_o) + V_{CC} \Delta I_{CC} \text{ where } f_i = \text{input frequency}$$

$$f_o = \text{output frequency}$$

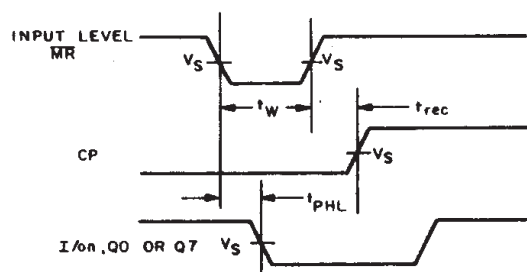
$$C_L = \text{output load capacitance}$$

$$V_{CC} = \text{supply voltage.}$$



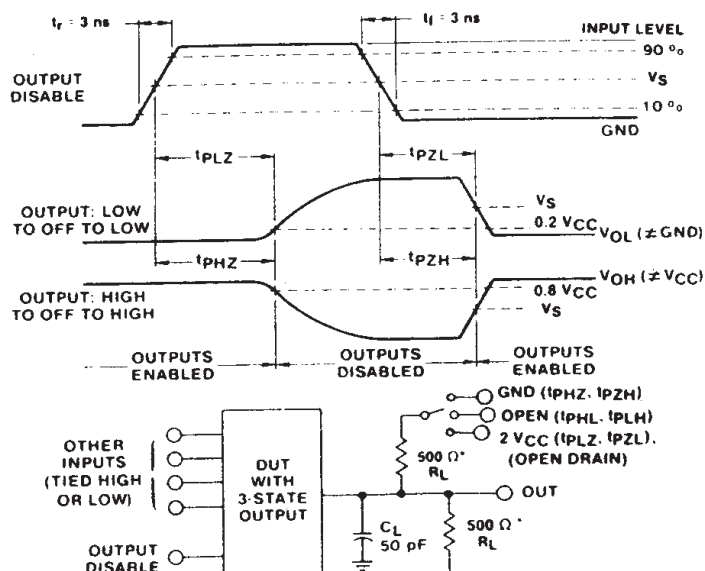
92CS-36997

Fig. 2 - Clock prerequisite and propagation delays.



92CS-36998

Fig. 3 - Master Reset prerequisite and propagation delays.



92CM-42405

\*FOR AC SERIES ONLY: WHEN  $V_{CC} = 1.5 \text{ V}$ ,  $R_L = 1 \text{ k}\Omega$ 

Fig. 4 - Three-state propagation delay times and test circuit.



# CD54/74AC299, CD54/74AC323 CD54/74ACT299, CD54/74ACT323

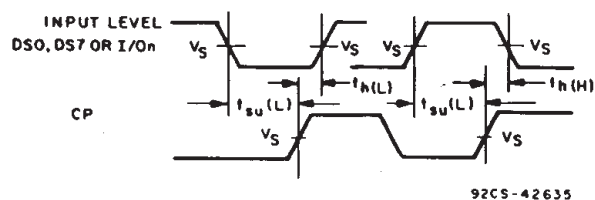
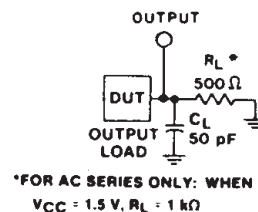


Fig. 5 - Data prerequisite times.



92CS-42589

Fig. 6 - Test circuit.

	CD54/74AC	CD54/74ACT
Input Level	$V_{CC}$	3 V
Input Switching Voltage, $V_S$	$0.5 V_{CC}$	1.5 V
Output Switching Voltage, $V_S$	$0.5 V_{CC}$	$0.5 V_{CC}$

## PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD54AC299F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54AC299F3A	<a href="#">Samples</a>
CD54ACT299F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54ACT299F3A	<a href="#">Samples</a>
CD74AC299M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC299M	<a href="#">Samples</a>
CD74AC299M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC299M	<a href="#">Samples</a>
CD74AC323M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC323M	<a href="#">Samples</a>
CD74ACT299M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT299M	<a href="#">Samples</a>
CD74ACT299M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT299M	<a href="#">Samples</a>
CD74ACT299M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT299M	<a href="#">Samples</a>

(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.

(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 CD54AC299, CD54ACT299, CD74AC299, CD74ACT299 :**

- Catalog: [CD74AC299](#), [CD74ACT299](#)
- Military: [CD54AC299](#), [CD54ACT299](#)

**NOTE: Qualified Version Definitions:**

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

**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
CD74AC299M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
CD74ACT299M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74AC299M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT299M96	SOIC	DW	20	2000	367.0	367.0	45.0

J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE

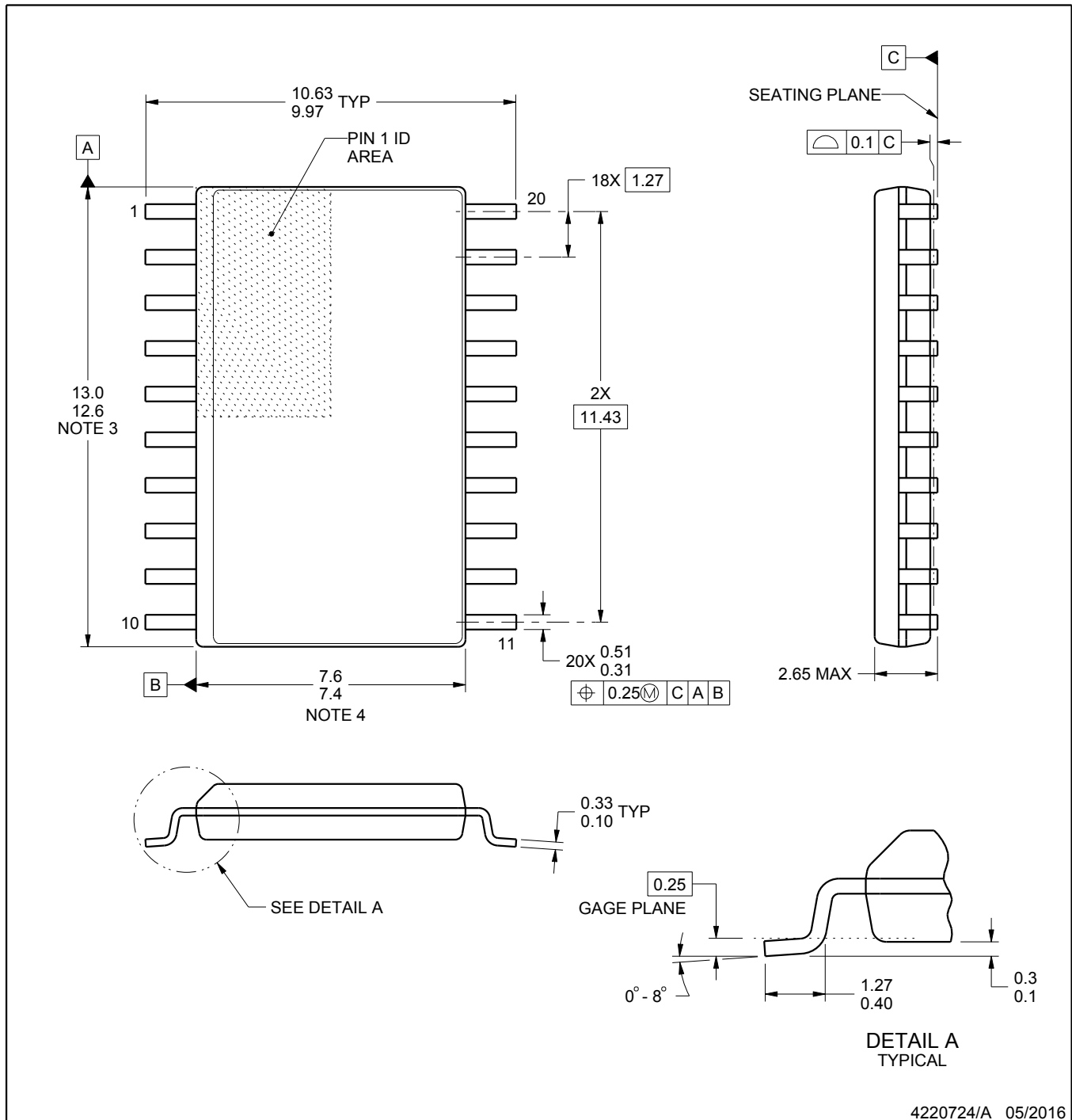


PINS ** DIM	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- 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.



## NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

**DW0020A**

## SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



## SOLDER MASK DETAILS

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NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.  
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



## EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

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NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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