



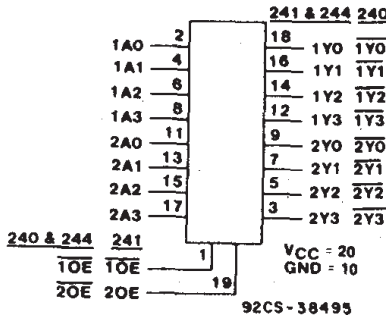
# THE DATASHEET OF CD74AC240E



# CD54/74AC240/241/244 CD54/74ACT240/241/244



Data sheet acquired from Harris Semiconductor  
SCHS287B - Revised January 2004



### FUNCTIONAL DIAGRAM & TERMINAL ASSIGNMENT

The RCA CD54/74AC240, CD54/74AC241, and CD54/74AC244 and the CD54/74ACT240, CD54/74ACT241, and CD54/74ACT244 3-state octal buffer/line drivers use the RCA ADVANCED CMOS technology. The CD54/74AC/ACT240 and CD54/74AC/ACT244 have active-LOW output enables ( $\overline{1OE}$ ,  $\overline{2OE}$ ). The CD54/74AC/ACT241 has one active-LOW ( $\overline{1OE}$ ) and one active-HIGH (2OE) output enable.

The CD74AC240 and CD74ACT240 are supplied in 20-lead dual-in-line plastic packages (E suffix) and 20-lead small-outline packages (M and M96 suffixes). The CD74AC241 is supplied in 20-lead dual-in-line plastic packages (E suffix) and the CD74ACT241 is supplied in 20-lead dual-in-line plastic packages (E suffix) and 20-lead small-outline packages (M96 suffix). The CD74AC244 and CD74ACT244 are supplied in 20-lead dual-in-line plastic packages (E suffix), 20-lead small-outline packages (M and M96 suffixes), and 20-lead shrink small-outline packages (SM96 suffix). These 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 CD54AC240 and CD54AC244 and the CD54ACT240, CD54ACT241, and CD54ACT244 are supplied in 20-lead hermetic dual-in-line ceramic packages (F3A suffix) and are operable over the -55 to +125°C temperature range.

## Octal Buffer/Line Drivers, 3-State

- CD54/74AC/ACT240 - Inverting
- CD54/74AC/ACT241 - Non-Inverting
- CD54/74AC/ACT244 - Non-Inverting

### Type Features:

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

### Family Features:

- Exceeds 2-kV ESD Protection - MIL-STD-883, Method 3015
- SCR-Latch-up-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
- $\pm 24$ -mA output drive current
  - Fanout to 15 FAST\* ICs
  - Drives 50-ohm transmission lines

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

### TRUTH TABLES

INPUTS		OUTPUT	
$\overline{1OE}$ , $\overline{2OE}$	A	Y	
L	L	H	
L	H	L	
H	X	Z	

(AC/ACT240)

INPUTS		OUTPUT	
$\overline{1OE}$ , $\overline{2OE}$	A	Y	
L	L	L	
L	H	H	
H	X	Z	

(AC/ACT244)

INPUTS		OUTPUT		INPUTS		OUTPUT	
$\overline{1OE}$	1A	1Y	2OE	2A	2Y		
L	L	L	L	X	Z		
L	H	H	H	L	L		
H	X	Z	H	H	H		

(AC/ACT241)

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = HIGH Impedance

This data sheet is applicable to the CD54/74AC240, CD54ACT240, and CD54/74ACT241. The CD54/74AC241 were not acquired from Harris Semiconductor. See SCHS244 for information on the CD74ACT240, CD74AC244, and CD74ACT244.

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# CD54/74AC240/241/244 CD54/74ACT240/241/244

**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*
<b>POWER DISSIPATION PER PACKAGE (<math>P_D</math>):</b>	
For $T_A = -40$ to $+85^\circ\text{C}$ (Package Type E)	500 mW
For $T_A = -40$ to $+70^\circ\text{C}$ (Package Type M)	400 mW
For $T_A = +70$ to $+85^\circ\text{C}$ (Package Type M)	Derate Linearly at 6 mW/ $^\circ\text{C}$ to 310 mW
<b>OPERATING-TEMPERATURE RANGE (<math>T_A</math>):</b>	
CD54	-55 to $+125^\circ\text{C}$
CD74	-40 to $+85^\circ\text{C}$
<b>STORAGE TEMPERATURE (<math>T_{Stg}</math>)</b>	
	-65 to $+150^\circ\text{C}$
<b>LEAD TEMPERATURE (DURING SOLDERING):</b>	
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.

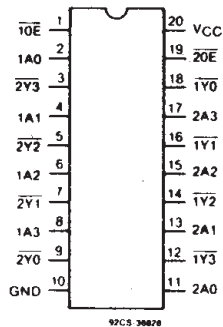
**RECOMMENDED OPERATING CONDITIONS:**

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

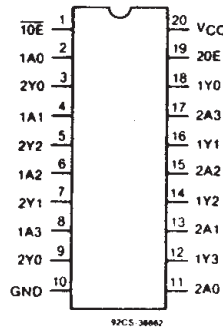
CHARACTERISTIC	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range, $V_{CC}$ *: (For $T_A =$ Full Package-Temperature Range) AC Types ACT Types	1.5	5.5	V
	4.5	5.5	V
DC Input or Output Voltage, $V_I, V_O$	0	$V_{CC}$	V
Operating Temperature, $T_A$	CD54	$+125$	$^\circ\text{C}$
	CD74	$+85$	
Input Rise and Fall 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	50	ns/V
	0	20	ns/V
	0	10	ns/V

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

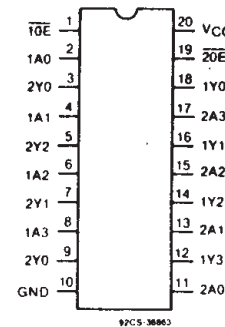
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**CD54/74AC, ACT240 TYPES  
TERMINAL ASSIGNMENT**



**CD54/74AC, ACT241 TYPES  
TERMINAL ASSIGNMENT**



**CD54/74AC, ACT244 TYPES  
TERMINAL ASSIGNMENT**

# CD54/74AC240/241/244

## CD54/74ACT240/241/244

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	1.2	—	1.2	—	1.2	—	V
			3	2.1	—	2.1	—	2.1	—	
			5.5	3.85	—	3.85	—	3.85	—	
Low-Level Input Voltage V <sub>IL</sub>			1.5	—	0.3	—	0.3	—	0.3	V
			3	—	0.9	—	0.9	—	0.9	
			5.5	—	1.65	—	1.65	—	1.65	
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	—	—	—	
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	—	—	
Input Leakage Current I <sub>I</sub>	V <sub>CC</sub> or GND		5.5	—	±0.1	—	±1	—	±1	μA
3-State 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.

# CD54/74AC240/241/244

## CD54/74ACT240/241/244

### STATIC ELECTRICAL CHARACTERISTICS: ACT 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>		4.5 to 5.5	2	—	2	—	2	—	V	
Low-Level Input Voltage	V <sub>IL</sub>		4.5 to 5.5	—	0.8	—	0.8	—	0.8	V	
High-Level Output Voltage	V <sub>OIH</sub>	V <sub>IH</sub> or V <sub>IL</sub> #, *	-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 <sub>OOL</sub>	V <sub>IH</sub> or V <sub>IL</sub> #, *	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 <sub>I</sub>	V <sub>CC</sub> or GND	5.5	—	±0.1	—	±1	—	±1	μA	
3-State 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
Additional Quiescent Supply Current per Input Pin TTL Inputs High 1 Unit Load	ΔI <sub>CC</sub>	V <sub>CC</sub> -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 TABLES

CD54/74ACT240	
INPUT	UNIT LOADS*
nA0 - A3	1.42
10E	0.83
20E	0.83

CD54/74ACT241	
INPUT	UNIT LOADS*
nA0 - A3	0.5
10E	0.83
20E	1.67

CD54/74ACT244	
INPUT	UNIT LOADS*
nA0 - A3	0.5
10E	0.83
20E	0.83

\*Unit load is ΔI<sub>CC</sub> limit specified in Static Characteristics Chart, e.g., 2.4 mA max. @ 25°C.

# CD54/74AC240/241/244

## CD54/74ACT240/241/244

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

CHARACTERISTICS	SYMBOL	$V_{CC}$ (V)	AMBIENT TEMPERATURE ( $T_A$ ) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: Data to Outputs AC240	$t_{PLH}$	1.5	—	82	—	90	ns
	$t_{PHL}$	3.3*	2.6	9.2	2.5	10.1	
AC241, 244	$t_{PLH}$	1.5	—	93	—	103	ns
	$t_{PHL}$	3.3	3	10.5	2.9	11.5	
Output Enable Times	$t_{PZL}$	1.5	—	136	—	150	ns
	$t_{PZH}$	3.3	4.6	16.4	4.5	18	
Output Disable Times	$t_{PLZ}$	1.5	—	136	—	150	ns
	$t_{PHZ}$	3.3	3.9	13.6	3.8	15	
Power Dissipation Capacitance AC240 AC241, 244	$C_{PD}\ddagger$	—	65 Typ.		65 Typ.		pF
		—	71 Typ.		71 Typ.		
Min. (Valley) $V_{OH}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OHV}$ See Fig. 1	5	4 Typ. @ 25°C				V
Max. (Peak) $V_{OL}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OLP}$ See Fig. 1	5	1 Typ. @ 25°C				V
Input Capacitance	$C_i$	—	—	10	—	10	pF
3-State Output Capacitance	$C_o$	—	—	15	—	15	pF

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

CHARACTERISTICS	SYMBOL	$V_{CC}$ (V)	AMBIENT TEMPERATURE ( $T_A$ ) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: Data to Outputs ACT240	$t_{PLH}$	5†	2.3	7.8	2.2	8.6	ns
	$t_{PHL}$	5	2.5	8.7	2.4	9.6	
ACT241, 244	$t_{PLH}$	5	2.5	8.7	2.4	9.6	ns
	$t_{PHL}$	5	2.5	8.7	2.4	9.6	
Output Enable Times	$t_{PZL}$	5	3.5	12.2	3.4	13.4	ns
	$t_{PZH}$	5	3.5	12.2	3.4	13.4	
Output Disable Times	$t_{PLZ}$	5	3.5	12.2	3.4	13.4	ns
	$t_{PHZ}$	5	3.5	12.2	3.4	13.4	
Power Dissipation Capacitance ACT240 ACT241, 244	$C_{PD}\ddagger$	—	65 Typ.		65 Typ.		pF
		—	71 Typ.		71 Typ.		
Min. (Valley) $V_{OH}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OHV}$ See Fig. 1	5	4 Typ. @ 25°C				V
Max. (Peak) $V_{OL}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OLP}$ See Fig. 1	5	1 Typ. @ 25°C				V
Input Capacitance	$C_i$	—	—	10	—	10	pF
3-State Output Capacitance	$C_o$	—	—	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 package.

For AC series:  $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$

For ACT series:  $P_D = V_{CC}^2 f_i (C_{PD} + C_L) + V_{CC} \Delta I_{CC}$  where  $f_i$  = input frequency

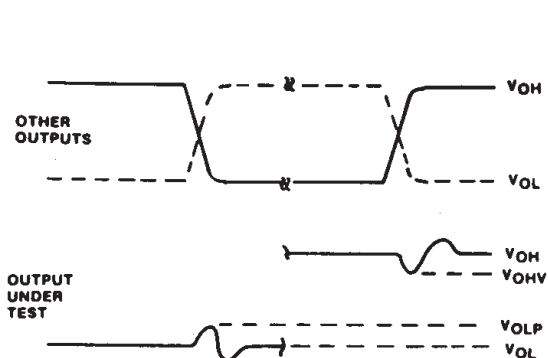
$C_L$  = output load capacitance

$V_{CC}$  = supply voltage.

# Technical Data

## CD54/74AC240/241/244 CD54/74ACT240/241/244

### 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:  
PRR  $\leq$  1 MHz,  $t_r = 3$  ns,  $t_f = 3$  ns, SKEW 1 ns.
  3. R.F. FIXTURE WITH 700-MHz DESIGN RULES REQUIRED. IC SHOULD BE SOLDERED INTO TEST BOARD AND BYPASSED WITH  $0.1 \mu\text{F}$  CAPACITOR. SCOPE AND PROBES REQUIRE 700-MHz BANDWIDTH.

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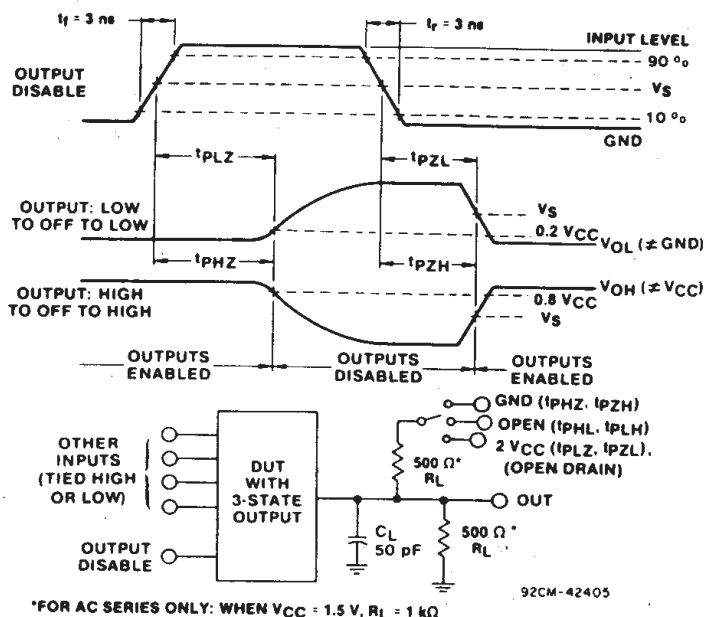


Fig. 1 - Simultaneous switching transient waveforms.

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

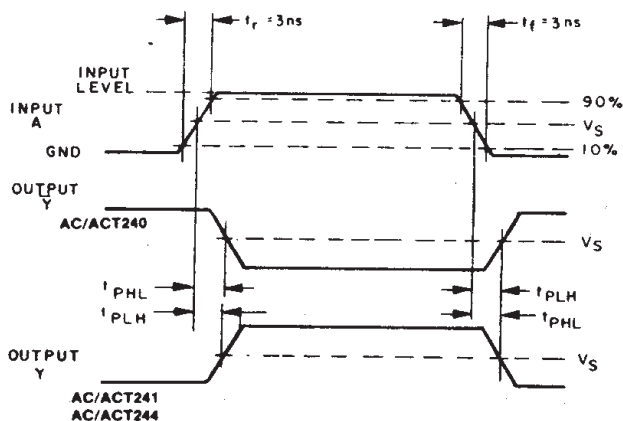
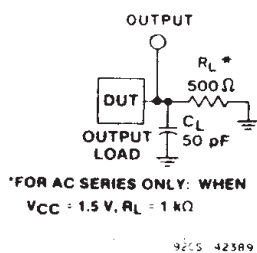


Fig. 3 - Propagation delay times and test circuit.

	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
CD54AC240F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54AC240F3A	<a href="#">Samples</a>
CD54AC244F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54AC244F3A	<a href="#">Samples</a>
CD54ACT240F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54ACT240F3A	<a href="#">Samples</a>
CD54ACT241F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54ACT241F3A	<a href="#">Samples</a>
CD54ACT244F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54ACT244F3A	<a href="#">Samples</a>
CD74AC240E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC240E	<a href="#">Samples</a>
CD74AC240EE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC240E	<a href="#">Samples</a>
CD74AC240M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC240M	<a href="#">Samples</a>
CD74AC240M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC240M	<a href="#">Samples</a>
CD74AC244E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC244E	<a href="#">Samples</a>
CD74AC244M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC244M	<a href="#">Samples</a>
CD74AC244M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC244M	<a href="#">Samples</a>
CD74ACT240E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT240E	<a href="#">Samples</a>
CD74ACT240M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT240M	<a href="#">Samples</a>
CD74ACT240M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT240M	<a href="#">Samples</a>
CD74ACT240M96E4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT240M	<a href="#">Samples</a>
CD74ACT241E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT241E	<a href="#">Samples</a>
CD74ACT241M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT241M	<a href="#">Samples</a>

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
CD74ACT244E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT244E	<a href="#">Samples</a>
CD74ACT244M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT244M	<a href="#">Samples</a>
CD74ACT244M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT244M	<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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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 CD54AC240, CD54AC244, CD54ACT240, CD54ACT241, CD54ACT244, CD74AC240, CD74AC244, CD74ACT240, CD74ACT241, CD74ACT244 :**

- Catalog: [CD74AC240](#), [CD74AC244](#), [CD74ACT240](#), [CD74ACT241](#), [CD74ACT244](#)
- Military: [CD54AC240](#), [CD54AC244](#), [CD54ACT240](#), [CD54ACT241](#), [CD54ACT244](#)

## NOTE: Qualified Version Definitions:

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

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*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
CD74AC240M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
CD74AC244M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
CD74ACT240M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
CD74ACT241M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
CD74ACT244M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	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)
CD74AC240M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74AC244M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT240M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT241M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT244M96	SOIC	DW	20	2000	367.0	367.0	45.0

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

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	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.

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.

# DW0020A



# PACKAGE OUTLINE

## SOIC - 2.65 mm max height

SOIC



4220724/A 05/2016

### 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.

# EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

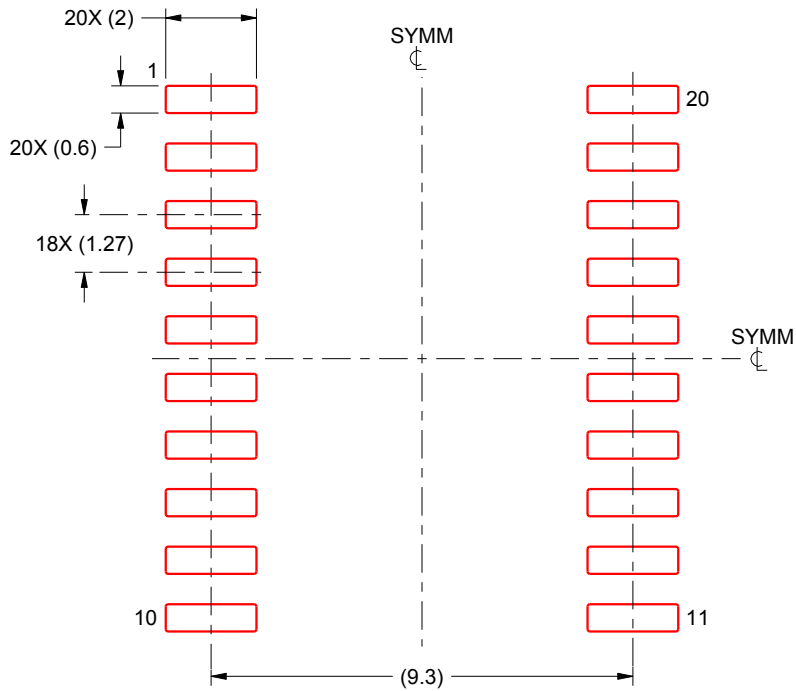
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



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

4220724/A 05/2016

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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