MC74AC574, MC74ACT574

Octal D Flip-Flop with 3-State Outputs

The MC74AC574/74ACT574 is a high−speed, low power octal flip−flop with a buffered common Clock (CP) and a buffered common Output Enable ($\overline{OE}$). The information presented to the D inputs is stored in the flip−flops on the LOW−to−HIGH Clock (CP) transition.

The MC74AC574/74ACT574 is functionally identical to the MC74AC374/74ACT374 except for the pinouts.

Features

- Inputs and Outputs on Opposite Sides of Package Allowing Easy Interface with Microprocessors
- Useful as Input or Output Port for Microprocessors
- Functionally Identical to MC74AC374/74ACT374
- 3-State Outputs for Bus-Oriented Applications
- Outputs Source/Sink 24 mA
- ′ACT574 Has TTL Compatible Inputs
- Pb−Free Packages are Available

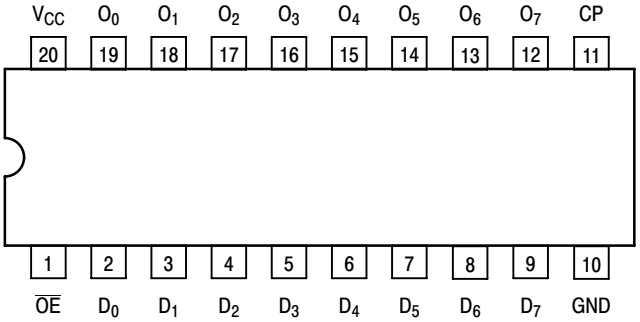
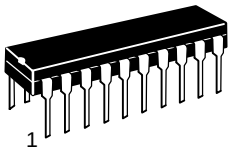


Figure 1. Pinout: 20−Lead Packages Conductors
(Top View)

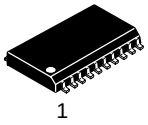
PIN ASSIGNMENT

PIN	FUNCTION
D_0−D_7	Data Inputs
CP	Clock Pulse Input
$\overline{OE}$	3−State Output Enable Input
O_0−O_7	3−State Outputs

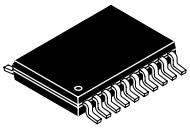
ON Semiconductor®



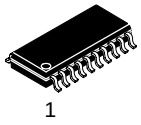
PDIP−20
N SUFFIX
CASE 738



SOIC−20W
DW SUFFIX
CASE 751D



TSSOP−20
DT SUFFIX
CASE 948E



SOEIAJ−20
M SUFFIX
CASE 967

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 6 of this data sheet.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

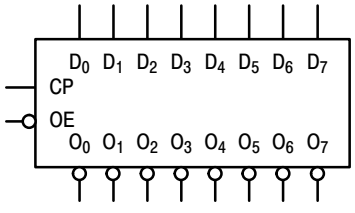


Figure 2. Logic Symbol

Publication Order Number:
MC74AC574/D

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	′AC	2.0	5.0	6.0	V
		′ACT	4.5	5.0	5.5	
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage (Ref. to GND)		0	−	V_{CC}	V
t_r, t_f	Input Rise and Fall Time (Note 1) ′AC Devices except Schmitt Inputs	V_{CC} @ 3.0 V	−	150	−	ns/V
		V_{CC} @ 4.5 V	−	40	−	
		V_{CC} @ 5.5 V	−	25	−	
t_r, t_f	Input Rise and Fall Time (Note 2) ′ACT Devices except Schmitt Inputs	V_{CC} @ 4.5 V	−	10	−	ns/V
		V_{CC} @ 5.5 V	−	8.0	−	
T_J	Junction Temperature (PDIP)		−	−	140	°C
T_A	Operating Ambient Temperature Range		−40	25	85	°C
I_{OH}	Output Current − High		−	−	−24	mA
I_{OL}	Output Current − Low		−	−	24	mA

1. V_{IN} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. V_{IN} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

DC CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	74AC T_A = +25°C	74AC T_A = −40°C to +85°C		Unit	Conditions
			Typ	Guaranteed Limits			
V_{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V_{IL}	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V_{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I_{OUT} = −50 μA
		4.5	4.49	4.4	4.4		
		5.5	5.49	5.4	5.4		
		3.0	−	2.56	2.46	V	*V_{IN} = V_{IL} or V_{IH} I_{OH} −12 mA
		4.5	−	3.86	3.76		I_{OH} −24 mA
		5.5	−	4.86	4.76		I_{OH} −24 mA
V_{OL}	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I_{OUT} = 50 μA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
		3.0	−	0.36	0.44	V	*V_{IN} = V_{IL} or V_{IH} 12 mA
		4.5	−	0.36	0.44		I_{OL} 24 mA
		5.5	−	0.36	0.44		I_{OL} 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	−	±0.1	±1.0	μA	V_I = V_{CC}, GND
I_{OLD}	†Minimum Dynamic Output Current	5.5	−	−	75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5	−	−	−75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	−	8.0	80	μA	V_{IN} = V_{CC} or GND

* All outputs loaded; thresholds on input associated with output under test.
†Maximum test duration 2.0 ms, one output loaded at a time.

NOTE: Note: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

DC CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	74ACT T_A = +25°C	74ACT T_A = −40°C to +85°C		Unit	Conditions
			Typ	Guaranteed Limits			
V_{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V_{OUT} = 0.1 V or V_{CC} − 0.1 V
V_{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I_{OUT} = −50 μA
		4.5 5.5	− −	3.86 4.86	3.76 4.76	V	*V_{IN} = V_{IL} or V_{IH} I_{OH} −24 mA −24 mA
V_{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I_{OUT} = 50 μA
		4.5 5.5	− −	0.36 0.36	0.44 0.44	V	*V_{IN} = V_{IL} or V_{IH} I_{OL} 24 mA 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	−	±0.1	±1.0	μA	V_I = V_{CC}, GND
ΔI_{CCT}	Additional Max. I_{CC}/Input	5.5	0.6		1.5	mA	V_I = V_{CC} − 2.1 V
I_{OZ}	Maximum 3-State Current	5.5	−	±0.5	±5.0	μA	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND
I_{OLD}	†Minimum Dynamic Output Current	5.5	−	−	75	mA	V_{OLD} = 1.65 V Max
I_{OHD}		5.5	−	−	−75	mA	V_{OHD} = 3.85 V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	−	8.0	80	μA	V_{IN} = V_{CC} or GND

*All outputs loaded; thresholds on input associated with output under test.
†Maximum test duration 2.0 ms, one output loaded at a time.

AC CHARACTERISTICS

Symbol	Parameter	V_{CC}* (V)	74ACT T_A = +25°C, C_L = 50 pF			74ACT T_A = −40°C to +85°C, C_L = 50 pF		Unit	Fig. No.
			Min	Typ	Max	Min	Max		
f_{max}	Maximum Clock Frequency	5.0	100	−	−	85	−	ns	3−3
t_{PLH}	Propagation Delay CP to O_n	5.0	2.5	−	11	2.0	12	ns	3−6
t_{PHL}	Propagation Delay CP to O_n	5.0	2.0	−	10	1.5	11	ns	3−6
t_{PZH}	Output Enable Time	5.0	2.0	−	9.5	1.5	10	ns	3−7
t_{PZL}	Output Enable Time	5.0	2.0	−	9.0	1.5	10	ns	3−8
t_{PHZ}	Output Disable Time	5.0	2.0	−	10.5	1.5	11.5	ns	3−7
t_{PLZ}	Output Disable Time	5.0	2.0	−	8.5	1.5	9.0	ns	3−8

*Voltage Range 5.0 V is 5.0 V ±0.5 V.

AC OPERATING REQUIREMENTS

Symbol	Parameter	V_{CC}* (V)	74ACT		74ACT	Unit	Fig. No.
			T_A = +25°C C_L = 50 pF		T_A = −40°C to +85°C C_L = 50 pF		
			Typ	Guaranteed Minimum			
t_s	Setup Time, HIGH or LOW D_n to CP	5.0	−	2.5	2.5	ns	3−9
t_h	Hold Time, HIGH or LOW D_n to CP	5.0	−	1.0	1.0	ns	3−9
t_w	CP Pulse Width HIGH or LOW	5.0	−	3.0	4.0	ns	3−6

*Voltage Range 3.3 V is 3.3 V ±0.3 V.
Voltage Range 5.0 V is 5.0 V ±0.5 V.

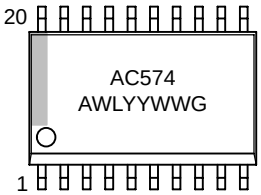
CAPACITANCE

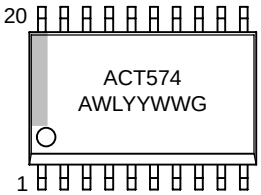
Symbol	Parameter	Value Typ	Unit	Test Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = 5.0 V
C_{PD}	Power Dissipation Capacitance	40	pF	V_{CC} = 5.0 V

MARKING DIAGRAMS

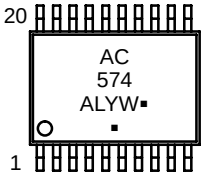
PDIP−20

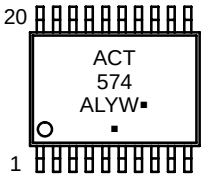
SOIC−20W



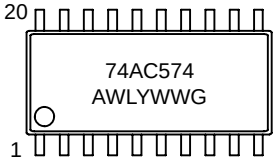


TSSOP−20





SOEIAJ−20



A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week
G or ▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

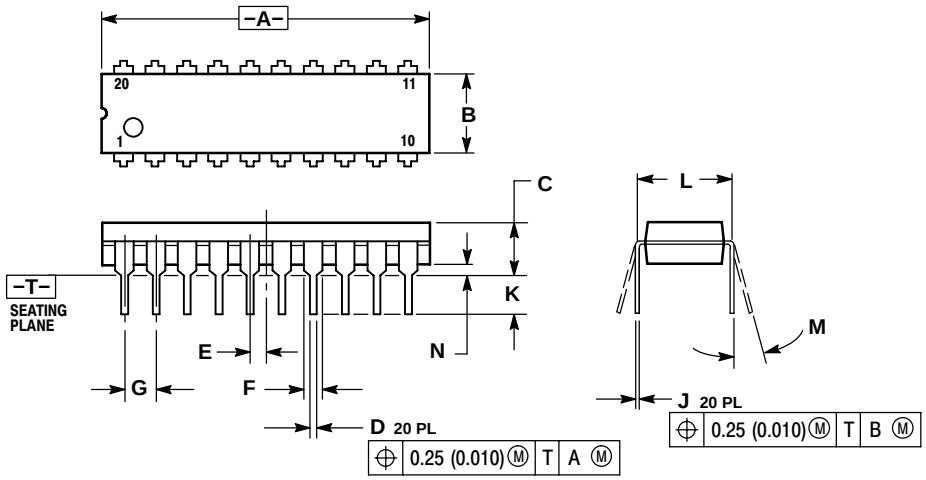
Device	Package	Shipping†
MC74AC574N	PDIP−20	18 Units / Rail
MC74AC574NG	PDIP−20 (Pb−Free)	
MC74ACT574N	PDIP−20	
MC74ACT574NG	PDIP−20 (Pb−Free)	
MC74AC574DW	SOIC−20	38 Units / Rail
MC74AC574DWG	SOIC−20 (Pb−Free)	
MC74AC574DWR2	SOIC−20	1000 / Tape & Reel
MC74AC574DWR2G	SOIC−20 (Pb−Free)	
MC74ACT574DW	SOIC−20	38 Units / Rail
MC74ACT574DWG	SOIC−20 (Pb−Free)	
MC74ACT574DWR2	SOIC−20	1000 / Tape & Reel
MC74ACT574DWR2G	SOIC−20 (Pb−Free)	
MC74AC574DTR2	TSSOP−20*	2500 / Tape & Reel
MC74AC574DTR2G	TSSOP−20*	
MC74ACT574DTR2	TSSOP−20*	2500 / Tape & Reel
MC74ACT574DTR2G	TSSOP−20*	
MC74AC574M	SOEIAJ−20	40 Units / Rail
MC74AC574MG	SOEIAJ−20 (Pb−Free)	
MC74AC574MEL	SOEIAJ−20	2000 / Tape & Reel
MC74AC574MELG	SOEIAJ−20 (Pb−Free)	
MC74ACT574M	SOEIAJ−20	40 Units / Rail
MC74ACT574MG	SOEIAJ−20 (Pb−Free)	
MC74ACT574MEL	SOEIAJ−20	2000 / Tape & Reel
MC74ACT574MELG	SOEIAJ−20 (Pb−Free)	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*These packages are inherently Pb−Free.

PACKAGE DIMENSIONS

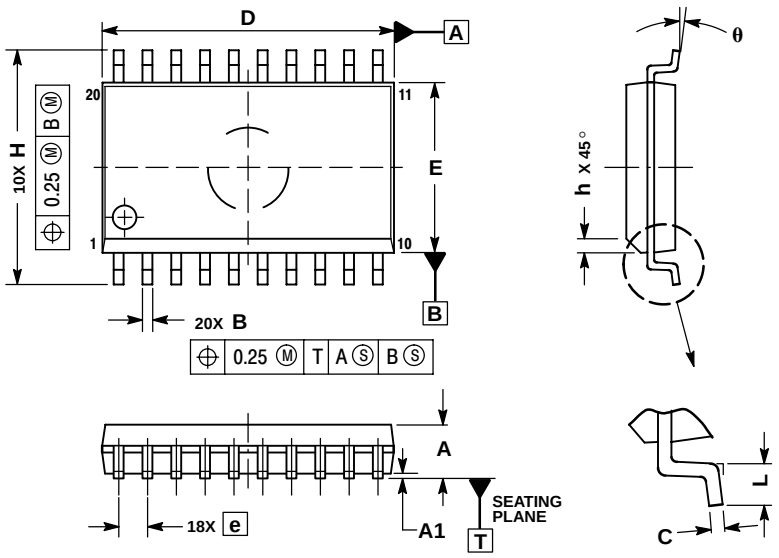
PDIP−20
N SUFFIX
PLASTIC DIP PACKAGE
CASE 738−03
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.010	1.070	25.66	27.17
B	0.240	0.260	6.10	6.60
C	0.150	0.180	3.81	4.57
D	0.015	0.022	0.39	0.55
E	0.050 BSC		1.27 BSC	
F	0.050	0.070	1.27	1.77
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.140	2.80	3.55
L	0.300 BSC		7.62 BSC	
M	0 °	15 °	0 °	15 °
N	0.020	0.040	0.51	1.01

SOIC−20W
DW SUFFIX
CASE 751D−05
ISSUE G



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0 °	7 °