Octal Bidirectional Transceiver with 3-State Inputs/Outputs

The MC74AC245/74ACT245 contains eight non–inverting bidirectional buffers with 3–state outputs and is intended for bus–oriented applications. Current sinking capability is 24 mA at both the A and B ports. The Transmit/Receive (T/\overline{R}) input determines the direction of data flow through the bidirectional transceiver. Transmit (active–HIGH) enables data from A ports to B ports; Receive (active–LOW) enables data from B ports to A ports. The Output Enable input, when HIGH, disables both A and B ports by placing them in a High Z condition.

Features

- Noninverting Buffers
- Bidirectional Data Path
- A and B Outputs Source/Sink 24 mA
- 'ACT245 has TTL Compatible Inputs
- These are Pb-Free Devices

PIN ASSIGNMENT

PIN	FUNCTION
ŌĒ	Output Enable Input
T/R	Transmit/Receive Input
A ₀ -A ₇	Side A 3–State Inputs or 3–State Outputs
B ₀ –B ₇	Side B 3–State Inputs or 3–State Outputs

TRUTH TABLES

Inp	uts	Outmute
ŌĒ	T/R	Outputs
L	L	Bus B Data to Bus A
L	Н	Bus A Data to Bus B
Н	Χ	High Z State

H = HIGH Voltage Level L = LOW Voltage Level

X = Immaterial



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SOIC-20W DW SUFFIX CASE 751D



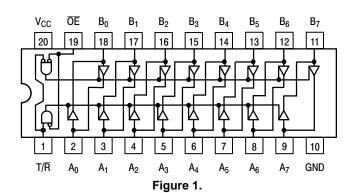
TSSOP-20 DT SUFFIX CASE 948E

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 7 of this data sheet.



MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V _{IN}	DC Input Voltage (Referenced to GND)	-0.5 to V _{CC} +0.5	V
V _{OUT}	DC Output Voltage (Referenced to GND) (Note 1)	-0.5 to V _{CC} +0.5	V
I _{IK}	DC Input Diode Current	±20	mA
I _{OK}	DC Output Diode Current	±50	mA
I _{OUT}	DC Output Sink/Source Current	±50	mA
I _{CC}	DC Supply Current, per Output Pin	±50	mA
I _{GND}	DC Ground Current, per Output Pin	±100	mA
T _{STG}	Storage Temperature Range	-65 to +150	°C
TL	Lead temperature, 1 mm from Case for 10 Seconds	260	°C
T_J	Junction Temperature Under Bias	140	°C
$\theta_{\sf JA}$		OIC 65.8 SOP 110.7	°C/W
MSL	Moisture Sensitivity	Level 1	
F _R	Flammability Rating Oxygen Index: 30% – 3	35% UL 94 V–0 @ 0.125 in	
V _{ESD}	ESD Withstand Voltage Human Body Model (Not Machine Model (Not Charged Device Model (Not Charge	e 4) > 200	V
I _{Latchup}	Latchup Performance Above V _{CC} and Below GND at 85°C (Not	e 6) ±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- I_{OUT} absolute maximum rating must be observed.
- The package thermal impedance is calculated in accordance with JESD 51–7.
- 3. Tested to EIA/JESD22-A114-A.
- 4. Tested to EIA/JESD22-A115-A.
- Tested to JESD22-C101-A.
- 6. Tested to EIA/JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter			Тур	Max	Unit
V	Complex Voltage	'AC	2.0	5.0	6.0	
V _{CC}	Supply Voltage	'ACT	4.5	5.0	5.5	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage (Ref. to GND)		0	_	V _{CC}	V
		V _{CC} @ 3.0 V	_	150	-	
t _r , t _f	Input Rise and Fall Time (Note 7) 'AC Devices except Schmitt Inputs	V _{CC} @ 4.5 V	_	40	-	ns/V
	The Borness except commit inpute	V _{CC} @ 5.5 V	_	25	-	
	Input Rise and Fall Time (Note 8)	V _{CC} @ 4.5 V	_	10	-	
t _r , t _f	'ACT Devices except Schmitt Inputs	V _{CC} @ 5.5 V	_	8.0	-	ns/V
T _A	Operating Ambient Temperature Range		-40	25	85	°C
I _{OH}	Output Current – High		_	_	-24	mA
I _{OL}	Output Current – Low			_	24	mA

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

 ^{7.} V_{IN} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.
 8. 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

			74	AC	74AC		
Symbol	Parameter	V _{CC} (V)	T _A = +25°C		T _A = -40°C to +85°C	Unit	Conditions
			Тур	Guar	anteed Limits		
V _{IH}	Minimum High Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
V _{IL}	Maximum Low Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
V _{OH}	Minimum High Level Output Voltage	3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	V	I _{OUT} = -50 μA
		3.0 4.5 5.5	- - -	2.56 3.86 4.86	2.46 3.76 4.76	V	$^{*}V_{IN} = V_{IL} \text{ or } V_{IH}$ -12 mA $I_{OH} -24 \text{ mA}$ -24 mA
V _{OL}	Maximum Low Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V	I _{OUT} = 50 μA
		3.0 4.5 5.5	- - -	0.36 0.36 0.36	0.44 0.44 0.44	V	* V _{IN} = V _{IL} or V _{IH} 12 mA I OL 24 mA 24 mA
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_I = V_{CC}$, GND
I _{OZT}	Maximum 3-State Current	5.5	_	±0.6	±6.0	μΑ	$\begin{aligned} &V_{I}\left(OE\right) = V_{IL}, V_{IH} \\ &V_{I} = V_{CC}, GND \\ &V_{O} = V_{CC}, GND \end{aligned}$
I _{OLD}	†Minimum Dynamic	5.5	_	_	75	mA	V _{OLD} = 1.65 V Max
I _{OHD}	Output Current	5.5	-	_	-75	mA	V _{OHD} = 3.85 V Min
Icc	Maximum Quiescent Supply Current	5.5	-	8.0	80.0	μΑ	$V_{IN} = V_{CC}$ 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: 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} .

AC CHARACTERISTICS (For Figures and Waveforms – See AND8277/D at www.onsemi.com)

			74AC			74AC			
Symbol	Parameter	V _{CC} * (V)	T _A = +25°C C _L = 50 pF			$T_A = -40^{\circ}C$ $to +85^{\circ}C$ $C_L = 50 \text{ pF}$		Unit	Fig. No.
			Min	Тур	Max	Min	Max		
t _{PLH}	Propagation Delay A _n to B _n or B _n to A _n	3.3 5.0	1.5 1.5	5.0 3.5	8.5 6.5	1.0 1.0	9.0 7.0	ns	3–5
t _{PHL}	Propagation Delay A _n to B _n or B _n to A _n	3.3 5.0	1.5 1.5	5.0 3.5	8.5 6.0	1.0 1.0	9.0 7.0	ns	3–5
t _{PZH}	Output Enable Time	3.3 5.0	2.5 1.5	7.0 5.0	11.5 8.5	2.0 1.0	12.5 9.0	ns	3–7
t _{PZL}	Output Enable Time	3.3 5.0	2.5 1.5	7.5 5.5	12.0 9.0	2.0 1.0	13.5 9.5	ns	3–8
t _{PHZ}	Output Disable Time	3.3 5.0	2.0 1.5	6.5 5.5	12.0 9.0	1.0 1.0	12.5 10.0	ns	3–7
t _{PLZ}	Output Disable Time	3.3 5.0	2.0 1.5	7.0 5.5	11.5 9.0	1.5 1.0	13.0 10.0	ns	3–8

^{*}Voltage Range 3.3 V is 3.3 V ± 0.3 V. Voltage Range 5.0 V is 5.0 V ± 0.5 V.

DC CHARACTERISTICS

			74 <i>A</i>	CT	74ACT			
Symbol	Parameter	V _{CC} (V)	T _A = +25°C		T _A = -40°C to +85°C	Unit	Conditions	
			Тур	Guar	anteed 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	$V_{OUT} = 0.1 \text{ V}$ or $V_{CC} - 0.1 \text{ V}$	
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	٧	$^*V_{IN} = V_{IL} \text{ or } V_{IH}$ 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	$^*V_{IN} = V_{IL} \text{ or } V_{IH}$ $^{24} \text{ mA}$ $^{1}_{OL}$ $^{24} \text{ mA}$	
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_I = V_{CC}$, GND	
ΔI_{CCT}	Additional Max. I _{CC} /Input	5.5	0.6	-	1.5	mA	$V_{I} = V_{CC} - 2.1 \text{ V}$	
I _{OZT}	Maximum 3–State Current	5.5	_	±0.6	±6.0	μΑ	$\begin{aligned} &V_{I}\left(OE\right) = V_{IL}, V_{IH} \\ &V_{I} = V_{CC}, GND \\ &V_{O} = V_{CC}, GND \end{aligned}$	
I _{OLD}	†Minimum Dynamic	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}	Output Current	5.5	-	-	-75	mA	V _{OHD} = 3.85 V Mir	
I _{CC}	Maximum Quiescent Supply Current	5.5	-	8.0	80.0	μΑ	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 (For Figures and Waveforms – See AND8277/D at www.onsemi.com)

				74ACT		744	CT		
Symbol	Parameter		T_{CC}^* $T_A = +25^{\circ}C$ $C_L = 50 \text{ pF}$		T _A = - to +8 C _L = 8	35°C	Unit	Fig. No.	
			Min	Тур	Max	Min	Max		
t _{PLH}	Propagation Delay, A _n to B _n or B _n to A _n	5.0	1.5	4.0	7.5	1.5	8.0	ns	3–5
t _{PHL}	Propagation Delay, A _n to B _n or B _n to A _n	5.0	1.5	4.0	8.0	1.0	9.0	ns	3–5
t _{PZH}	Output Enable Time	5.0	1.5	5.0	10	1.5	11.0	ns	3–7
t _{PZL}	Output Enable Time	5.0	1.5	5.5	10	1.5	12.0	ns	3–8
t _{PHZ}	Output Disable Time	5.0	1.5	5.5	10	1.0	11.0	ns	3–7
t _{PLZ}	Output Disable Time	5.0	2.0	5.0	10	1.5	11.0	ns	3–8

^{*}Voltage Range 5.0 V is 5.0 V ±0.5 V.

CAPACITANCE

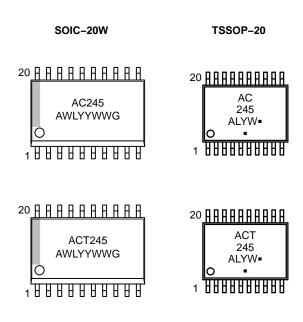
Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.0 V
C _{I/O}	Input/Output Capacitance	15	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	45	pF	V _{CC} = 5.0 V

ORDERING INFORMATION

Device	Package	Shipping [†]
MC74AC245DWG	SOIC-20 (Pb-Free)	38 Units / Rail
MC74AC245DWR2G	SOIC-20 (Pb-Free)	1000 / Tape & Reel
MC74ACT245DWG	SOIC-20 (Pb-Free)	38 Units / Rail
MC74ACT245DWR2G	SOIC-20 (Pb-Free)	1000 / Tape & Reel
MC74AC245DTG	TSSOP-20 (Pb-Free)	75 Units / Rail
MC74AC245DTR2G	TSSOP-20 (Pb-Free)	2500 / Tape & Reel
MC74ACT245DTG	TSSOP-20 (Pb-Free)	75 Units / Rail
MC74ACT245DTR2G	TSSOP-20 (Pb-Free)	2500 / Tape & Reel

[†]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.

MARKING DIAGRAMS



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)

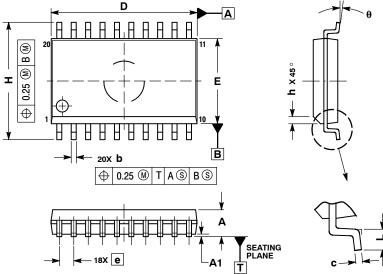




SOIC-20 WB CASE 751D-05 **ISSUE H**

DATE 22 APR 2015

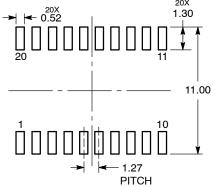
SCALE 1:1



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

	MILLIMETERS						
DIM	MIN	MAX					
Α	2.35	2.65					
A1	0.10	0.25					
b	0.35	0.49					
С	0.23	0.32					
D	12.65	12.95					
E	7.40	7.60					
е	1.27	BSC					
Н	10.05	10.55					
h	0.25	0.75					
L	0.50	0.90					
A	0 °	7 °					

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code = Assembly Location

WL = Wafer Lot ΥY = Year WW = Work Week = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

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^{*}For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



TSSOP-20 WB CASE 948E ISSUE D

DATE 17 FEB 2016





NOTES:

- DIMENSIONING AND TOLERANCING PER
- ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
- 3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
- FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K
- (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
- TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

 7. DIMENSION A AND B ARE TO BE
- DETERMINED AT DATUM PLANE -W-

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	6.40	6.60	0.252	0.260
В	4.30	4.50	0.169	0.177
С		1.20		0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
Н	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

SOLDERING FOOTPRINT



GENERIC MARKING DIAGRAM*



= Assembly Location

= Wafer Lot

= Year

= Work Week

= Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

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MC74AC245N MC74AC245NG MC74ACT245DT MC74ACT245DTG MC74ACT245DTR2 MC74ACT245DTR2G

MC74ACT245DW MC74ACT245DWG MC74ACT245DWR2 MC74ACT245DWR2G MC74ACT245M

MC74ACT245MEL MC74ACT245MELG MC74ACT245MG MC74ACT245NG MC74ACT245NG