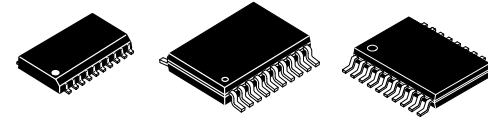


# Octal 3-State Transceiver

## MM74HCT245



SOIC-20 WB CASE 751D-05    TSSOP-20 WB CASE 948E    TSSOP-20 WB CASE 948AQ

### Description

The MM74HCT245 3-STATE bi-directional buffer utilizes advanced silicon-gate CMOS technology and is intended for two-way asynchronous communication between data buses. It has high drive current outputs which enable high speed operation even when driving large bus capacitances. This circuit possesses the low power consumption of CMOS circuitry, yet has speeds comparable to low power Schottky TTL circuits.

This device is TTL input compatible and can drive up to 15 LS-TTL loads, and all inputs are protected from damage due to static discharge by diodes to V<sub>CC</sub> and ground.

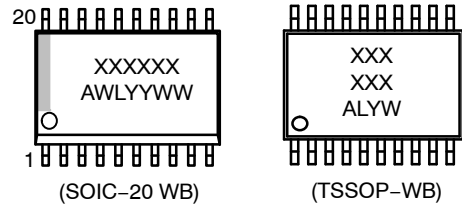
The MM74HCT245 has one active low enable input (G), and a direction control (DIR). When the DIR input is HIGH, data flows from the A inputs to the B outputs. When DIR is LOW, data flows from B to A.

MM74HCT devices are intended to interface between TTL and NMOS components and standard CMOS devices. These parts are also plug-in replacements for LS-TTL devices and can be used to reduce power consumption in existing designs.

### Features

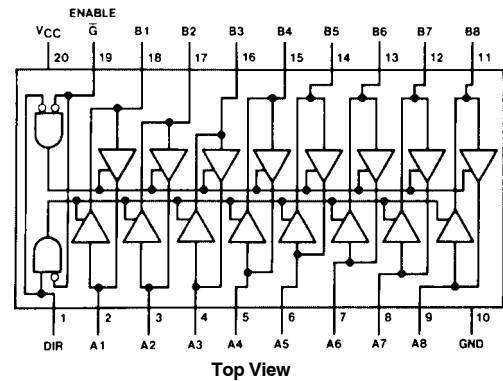
- TTL Input Compatible
- 3-STATE Outputs for connection to system busses
- High Output Drive Current: 6 mA (min)
- High Speed: 16 ns Typical propagation delay
- Low Power: 160 μA (74HCT Series)

### MARKING DIAGRAMS



XXXXXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week

### CONNECTION DIAGRAM



### TRUTH TABLE

Control Inputs		Operation
$\bar{G}$	DIR	245
L	L	B data to A bus
L	L	A data to B bus
H	H	isolation

H = HIGH Level  
L = LOW Level  
X = Irrelevant

### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.



# MM74HCT245

## ABSOLUTE MAXIMUM RATINGS (Note 1) (Note 2)

Symbol	Parameter	Rating	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +6.5	V
V <sub>IN</sub>	DC Input Voltage	-0.5 to V <sub>CC</sub> +0.5	V
V <sub>OUT</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> +0.5	V
I <sub>IK</sub> , I <sub>OK</sub>	Clamp Diode Current	±20	mA
I <sub>OUT</sub>	DC Output Current, per pin	±35	mA
I <sub>CC</sub>	Maximum Junction Temperature	±70	mA
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Power Dissipation	SOIC TSSOP 1302 833	mW
T <sub>L</sub>	Lead Temperature (Soldering 10 seconds)	260	°C

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.

1. Absolute Maximum Ratings are those values beyond which damage to the device may occur.
2. Unless otherwise specified all voltages are referenced to ground.

## RECOMMENDED OPERATING RANGES

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply Voltage	4.5	5.5	V
V <sub>IN</sub> , V <sub>OUT</sub>	DC Input or Output Voltage	0	V <sub>CC</sub>	V
T <sub>A</sub>	Operating Temperature Range	-55	+125	°C
t <sub>r</sub> , t <sub>f</sub>	Input Rise or Fall Times	-	500	ns

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.

# MM74HCT245

## DC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$	$T_A = -55^\circ\text{C}$ to $125^\circ\text{C}$	Unit
			Typ.	Guaranteed Limits			
$V_{IH}$	Minimum HIGH Level Input Voltage	–	–	2.0	2.0	2.0	V
$V_{IL}$	Maximum LOW Level Input Voltage	–	–	0.8	0.8	0.8	V
$V_{OH}$	Minimum HIGH Level Output Voltage	$V_{IN} = V_{IH}$ or $V_{IL}$ , $ I_{OUT}  = 20\ \mu\text{A}$ $ I_{OUT}  = 6.0\ \text{mA}, V_{CC} = 4.5\ \text{V}$ $ I_{OUT}  = 7.2\ \text{mA}, V_{CC} = 5.5\ \text{V}$	$V_{CC}$ 4.2 5.2	$V_{CC} - 0.1$ 3.98 4.98	$V_{CC} - 0.1$ 3.84 4.84	$V_{CC} - 0.1$ 3.7 4.7	V
$V_{OL}$	Maximum LOW Level Output Voltage	$V_{IN} = V_{IH}$ or $V_{IL}$ , $ I_{OUT}  = 20\ \mu\text{A}$ $ I_{OUT}  = 6.0\ \text{mA}, V_{CC} = 4.5\ \text{V}$ $ I_{OUT}  = 7.2\ \text{mA}, V_{CC} = 5.5\ \text{V}$	0 0.2 0.2	0.1 0.26 0.26	0.1 0.33 0.33	0.1 0.4 0.4	V
$I_{IN}$	Maximum Input Current	$V_{IN} = V_{CC}$ or GND $V_{IH}$ or $V_{IL}$ , Pin 1 or 19	–	$\pm 0.1$	$\pm 1.0$	$\pm 1.0$	$\mu\text{A}$
$I_{OZ}$	Maximum 3-STATE Output Leakage Current	$V_{out} = V_{CC}$ or GND $\bar{G} = V_{IH}$	–	$\pm 0.5$	$\pm 5.0$	$\pm 10$	$\mu\text{A}$
$I_{CC}$	Maximum Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0\ \mu\text{A}$	–	8	80	160	$\mu\text{A}$
		$V_{IN} = 2.4\ \text{V}$ or $0.5\ \text{V}$ (Note 4)	0.6	1.0	1.3	1.5	mA

3. Measured per input. All other inputs at  $V_{CC}$  or ground.

## AC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5.0\ \text{V}$ , $t_r = t_f = 6\ \text{ns}$ , $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Typ.	Guaranteed Limit	Unit
$t_{PHL}, t_{PLH}$	Maximum Output Propagation Delay	$C_L = 45\ \text{pF}$	16	20	ns
$t_{PZL}, t_{PZH}$	Maximum Output Enable Time	$C_L = 45\ \text{pF}$ $R_L = 1\ \text{k}\Omega$	29	40	ns
$t_{PLZ}, t_{PHZ}$	Maximum Output Disable Time	$C_L = 5\ \text{pF}$ $R_L = 1\ \text{k}\Omega$	20	25	ns

# MM74HCT245

## AC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5.0\text{ V} \pm 10\%$ , $t_r = t_f = 6\text{ ns}$ , unless otherwise specified)

Symbol	Parameter	Test Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$	$T_A = -55^\circ\text{C}$ to $125^\circ\text{C}$	Unit
			Typ.	Guaranteed Limits			
$t_{PHL}, t_{PLH}$	Maximum Output Propagation Delay	$C_L = 50\text{ pF}$	17	23	29	34	ns
		$C_L = 150\text{ pF}$	24	30	38	45	
$t_{PZL}$	Maximum Output Enable Time	$R_L = 1\text{ k}\Omega$ $C_L = 50\text{ pF}$	31	42	53	63	ns
$t_{PZH}$	Maximum Output Enable Time	$R_L = 1\text{ k}\Omega$ $C_L = 50\text{ pF}$	23	33	41	49	ns
$t_{PHZ}, t_{PLZ}$	Maximum Output Disable Time	$R_L = 1\text{ k}\Omega$ $C_L = 50\text{ pF}$	21	30	38	45	ns
$t_{THL}, t_{TLH}$	Maximum Output Rise and Fall Time	$C_L = 50\text{ pF}$	8	12	15	18	ns
$C_{IN}$	Maximum Input Capacitance	–	10	15	15	15	pF
$C_{OUT}$	Maximum Output/Input Capacitance	–	20	25	25	25	pF
$C_{PD}$	Power Dissipation Capacitance	$\bar{G} = V_{CC}$ (Note 5)	7	–	–	–	pF pF
		$\bar{G} = \text{GND}$	100	–	–	–	

4.  $C_{PD}$  determines the no load dynamic power consumption,  $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$ , and the no load dynamic current consumption,  $I_S = C_{PD} V_{CC} f + I_{CC}$ .

## ORDERING INFORMATION

Product Number	Marking	Package	Shipping <sup>†</sup>
MM74HCT245MTC	HCT 245A	TSSOP–20 WB, Case, 948E (Pb–Free)	75 Units / Tube
MM74HCT245MTCX	HCT 245A	TSSOP–20 WB, 948AQ (Pb–Free)	2500 Units / Tape and Reel
MM74HCT245WM	HCT245A	SOIC–20 WB (Pb–Free)	38 Units / Tube
MM74HCT245WMX	HCT245A	SOIC–20 WB (Pb–Free)	1000 Units / Tape and Reel

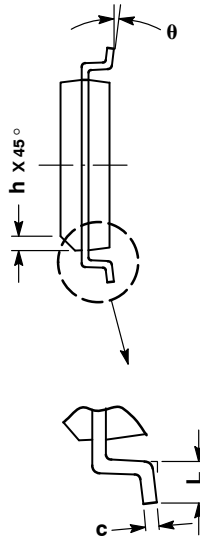
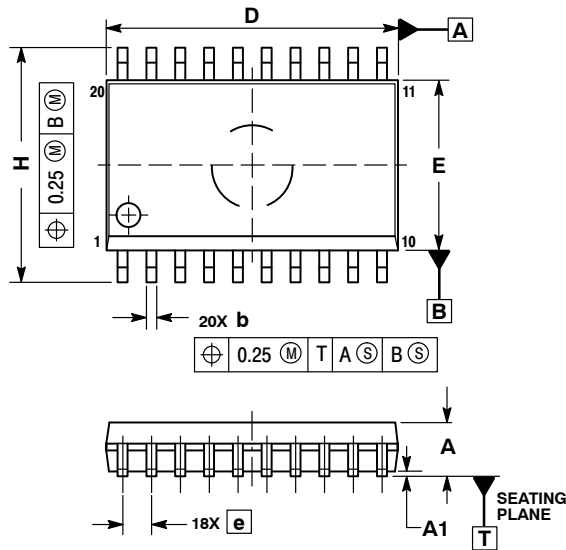
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).



SCALE 1:1

SOIC-20 WB  
CASE 751D-05  
ISSUE H

DATE 22 APR 2015

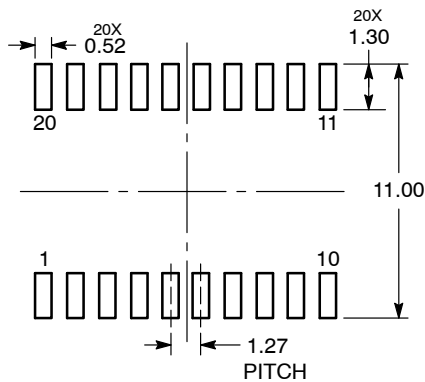


NOTES:

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.

DIM	MILLIMETERS	
	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°

RECOMMENDED  
SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC  
MARKING DIAGRAM\*



- XXXXXX = Specific Device Code
- A = Assembly Location
- WL = Wafer Lot
- YY = Year
- WW = Work Week
- G = 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. Some products may not follow the Generic Marking.

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



TSSOP-20 WB  
CASE 948E  
ISSUE D

DATE 17 FEB 2016

SCALE 2:1



NOTES:

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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	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	
H	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\*



- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

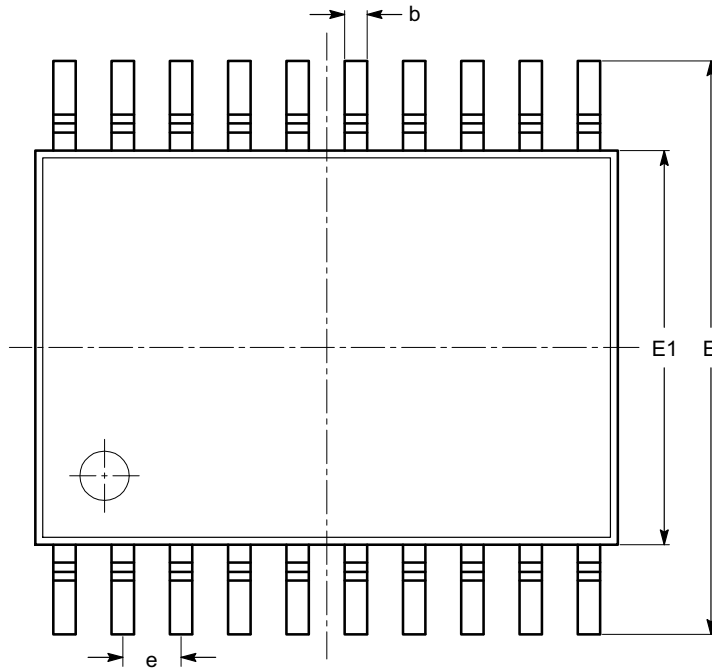
\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

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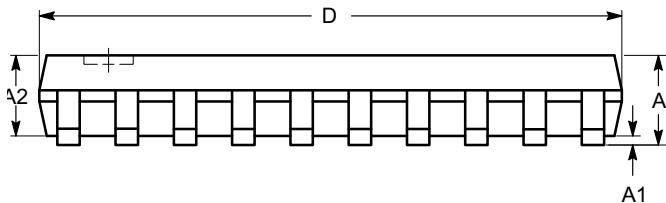
**TSSOP20, 4.4x6.5**  
**CASE 948AQ**  
**ISSUE A**

DATE 19 MAR 2009

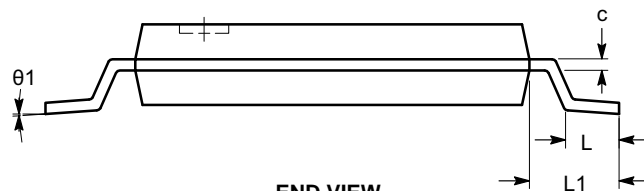


**TOP VIEW**

SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80		1.05
b	0.19		0.30
c	0.09		0.20
D	6.40	6.50	6.60
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e	0.65 BSC		
L	0.45	0.60	0.75
L1	1.00 REF		
$\theta$	0°		8°



**SIDE VIEW**



**END VIEW**

**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-153.

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