

8 Bits Octal 3-state Non-inverting Bus Transceiver

Description

The 74HC245 is a 3-state non-inverting transceiver that is used for 2-way asynchronous communication between data buses. The device has an active-low pin $\overline{OE}$, which is used to place the I/O ports into high-impedance states. The pin DIR control determines whether data flows from A to B or from B to A.

Features

- Designed for 2.0 to 6V VCC Operation
- Outputs Directly Interface to COMS, NMOS, and TTL
- Low Input Current is Typical 0.1uA
- High Noise Immunity Characteristic of CMOS Devices
- 2-way 3 states Output
- ESD Performance:
 - Human Body Model >2000V
 - Machine Model >200V
- These Devices are Pb. Free, Halogen Free/BFR Free and are RoHS Compliant
- Part No. and Package

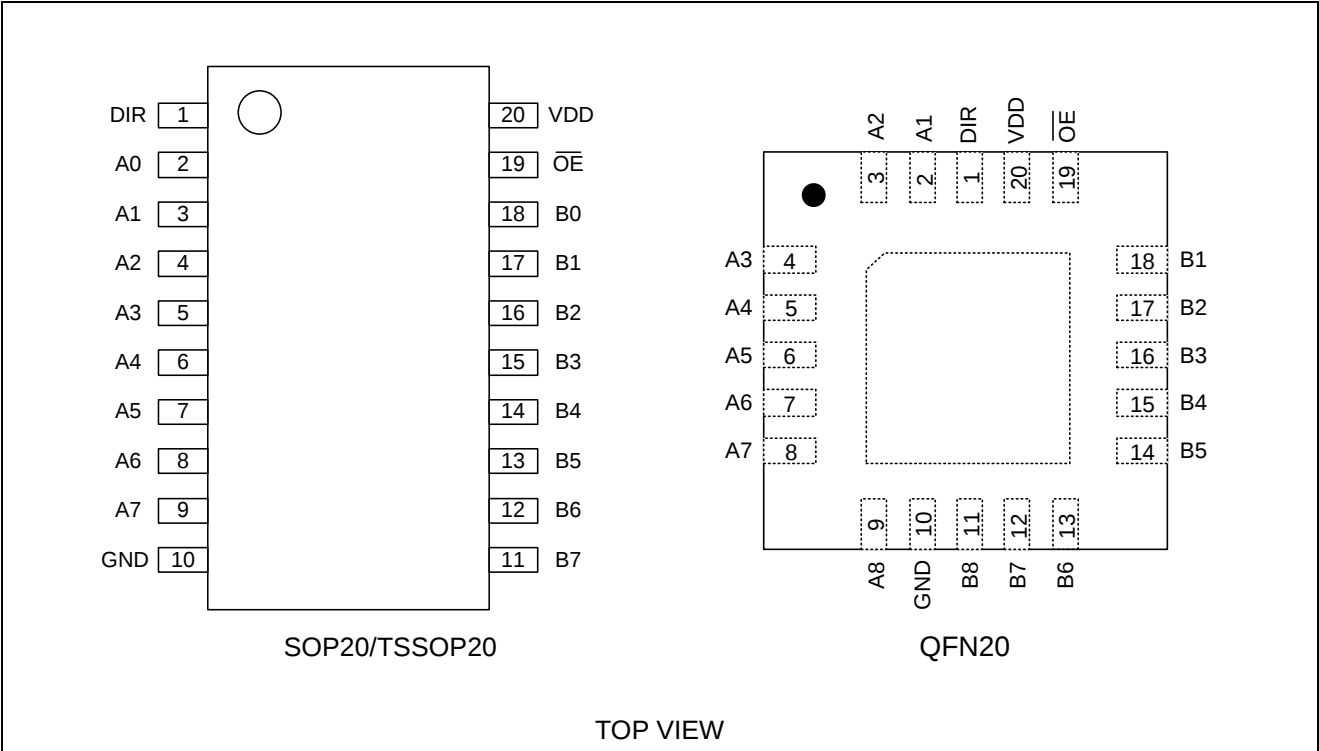
Product Name	Package
74HC245M	SOP20
74HC245V	TSSOP20
74HC245Y	QFN20 (4mm×4mm)

Applications

- Memory chip select decoding
- Data transmission system

74HC245

Pin Configuration

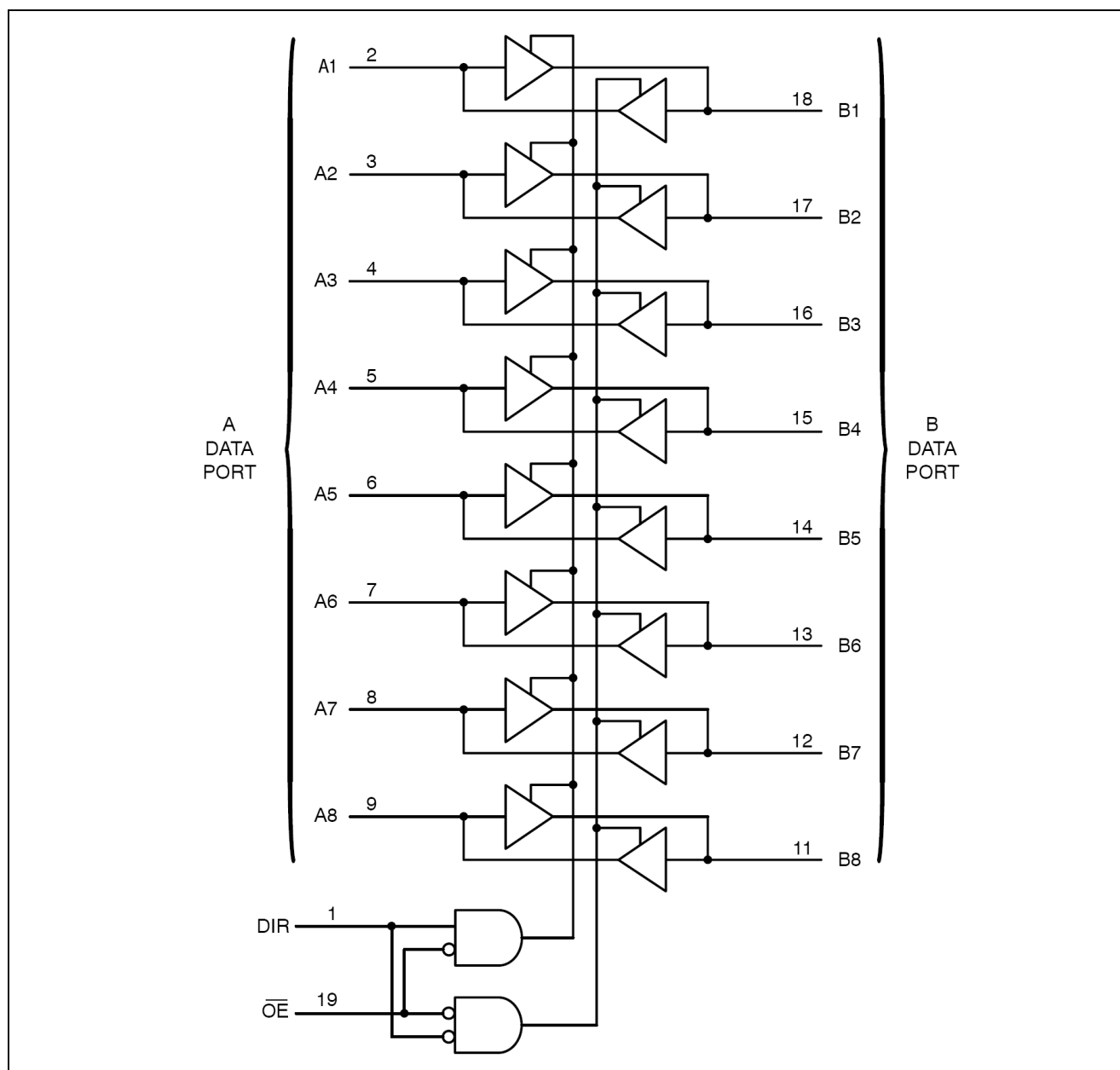


Pin Function

Pin Number	Symbol	Description
1	DIR	Direction control: DIR=1, A→B, DIR=0, B→A。
2-9	A0-A7	Data input/output
10	GND	GND
11-18	B7-B0	Data input/output
19	$\overline{OE}$	Output Enable
20	VDD	Supply Voltage

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Block Diagram



Functional Description

$\overline{\text{OE}}$	DIR	Input/Output	
L	L	A=B	Input
L	H	Input	B=A
H	X	Z	Z

Note: H = High voltage level ,
 L = Low voltage level ,
 X = Don't care ,
 Z = High-impedance OFF-state.

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Absolute Maximum Ratings

Symbol	Parameter	Min/Max	Unit
V_{CC}	Supply Voltage	-0.5~7.0	V
V_I	Input Voltage	-0.5~ $V_{DD}+0.5$	V
V_O	Output Voltage	-0.5~ $V_{DD}+0.5$	V
P_D	Max Power Dissipation (TSSOP20)	400	mW
T_A	Operate Temperature Range	-40~85	°C
T_{STG}	Storage Temperature Range	-50~150	°C

Electrical Characteristics

DC Electrical Characteristics

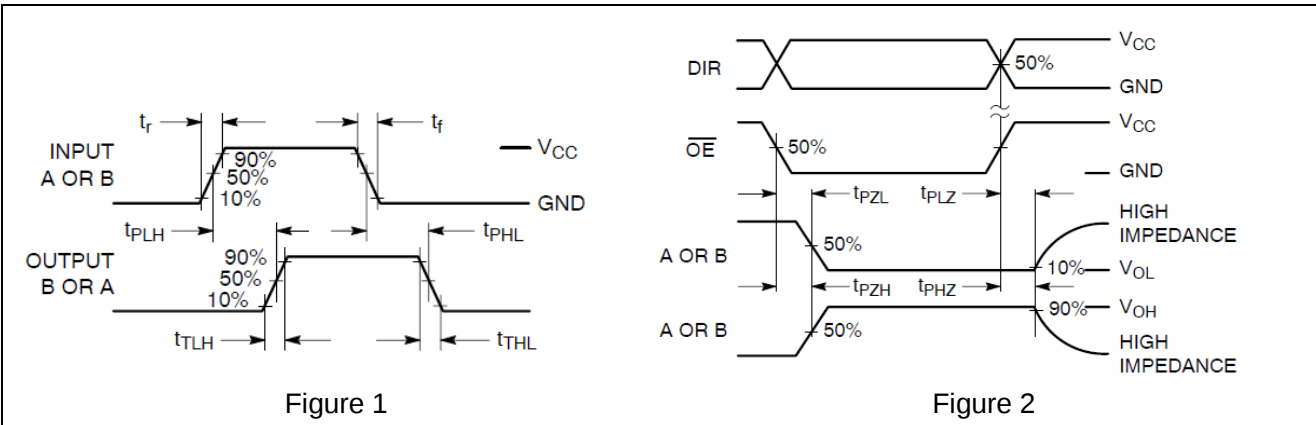
Symbol	Parameter	Test condition	V_{CC} (V)	$T_A=+25^{\circ}\text{C}$		$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$		$T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$		Unit
				Min	Max	Min	Max	Min	Max	
V_{CC}	Supply Voltage			2.0	6.0	2.0	6.0	2.0	6.0	V
V_{IH}	Minimum High-Level Input Voltage	$V_{OUT} = V_{CC} - 0.1\text{V}$ $ I_{OUT} \leq 20\mu\text{A}$	2.0	1.5		1.5		1.5		V
			3.0	2.1		2.1		2.1		
			4.5	3.15		3.15		3.15		
			6.0	4.0		4.0		4.0		
V_{IL}	Maximum Low-Level Input Voltage	$V_{OUT} = 0.1\text{V}$ $ I_{OUT} \leq 20\mu\text{A}$	2.0		0.5		0.5		0.5	V
			3.0		0.9		0.9		0.9	
			4.5		1.35		1.35		1.35	
			6.0		1.6		1.6		1.6	
V_{OH}	Minimum High-Level Output Voltage	$V_{IN} = V_{IH}$ $ I_{OUT} \leq 20\mu\text{A}$	2.0	1.9		1.9		1.9		V
			4.5	4.4		4.4		4.4		
			6.0	5.9		5.9		5.9		
		$V_{IN} = V_{IH}$ $ I_{OUT} \leq 2.4\text{mA}$ $ I_{OUT} \leq 6.0\text{mA}$ $ I_{OUT} \leq 7.8\text{mA}$	3.0	2.48		2.34		2.2		V
			4.5	3.98		3.84		3.7		
			6.0	5.48		5.34		5.2		
V_{OL}	Minimum Low-Level Output Voltage	$V_{IN} = V_{IL}$ $ I_{OUT} \leq 20\mu\text{A}$	2.0		0.1		0.1		0.1	V
			4.5		0.1		0.1		0.1	
			6.0		0.1		0.1		0.1	
		$V_{IN} = V_{IH}$ $ I_{OUT} \leq 2.4\text{mA}$ $ I_{OUT} \leq 6.0\text{mA}$ $ I_{OUT} \leq 7.8\text{mA}$	3.0		0.26		0.33		0.4	V
			4.5		0.26		0.33		0.4	
			6.0		0.26		0.33		0.4	
I_{IN}	Maximum Input Leakage Current	$V_{IN} = V_{CC}$ or GND	6.0		± 0.1		± 1.0		± 1.0	μA
I_{OZ}	Maximum Three-State Leakage Current	Output in High-Impedance State $V_{IN} = V_{IL}$ or V_{IH} $V_{OUT} = V_{CC}$ or GND	6.0		± 0.5		± 5.0		± 10	μA
I_{CC}	Maximum Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND $I_{OUT} = 0\mu\text{A}$	6.0		4.0		40		40	μA

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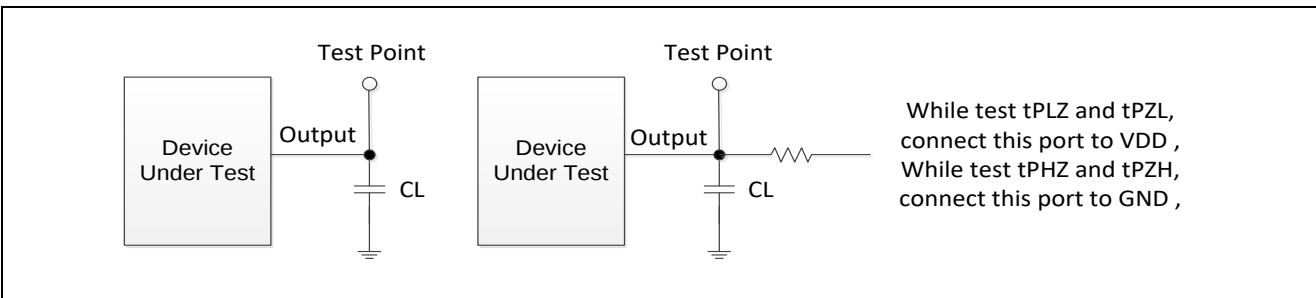
AC Electrical Characteristics (C_L=50pF)

Symbol	Parameter	V _{CC} (V)	T _A =+25°C		T _A = -40°C to +85°C		T _A = -55°C to +125°C		Unit
			Min	Max	Min	Max	Min	Max	
t _{PLH} , t _{PHL}	Maximum Propagation Delay, A to B, B to A (Figure 1)	2.0 3.0 4.5 6.0		40 20 12 10		50 25 16 14		60 30 20 18	ns
t _{PLZ} , t _{PHZ}	Maximum Propagation Delay, Direction or Output Enable to A or B (Figure 2)	2.0 3.0 4.5 6.0		20 15 12 10		30 20 17 14		40 25 22 18	ns
t _{PZL} , t _{PZH}	Maximum Propagation Delay, Output Enable to A or B (Figure 2)	2.0 3.0 4.5 6.0		35 15 12 10		45 20 17 14		55 25 22 18	ns
T _{TLH} , T _{THL}	Maximum Output Transition Time, Any Output (Figure 1)	2.0 3.0 4.5 6.0		12 8 6 5		22 13 10 9		32 18 14 13	ns
C _{IN}	Maximum Input Capacitance (Pin 1 or Pin 19)	-		10		10		10	pF
C _{OUT}	Maximum Three-State I/O Capacitance (I/O in High-Impedance State)	-		15		15		15	pF

AC Characteristics Test Waveform



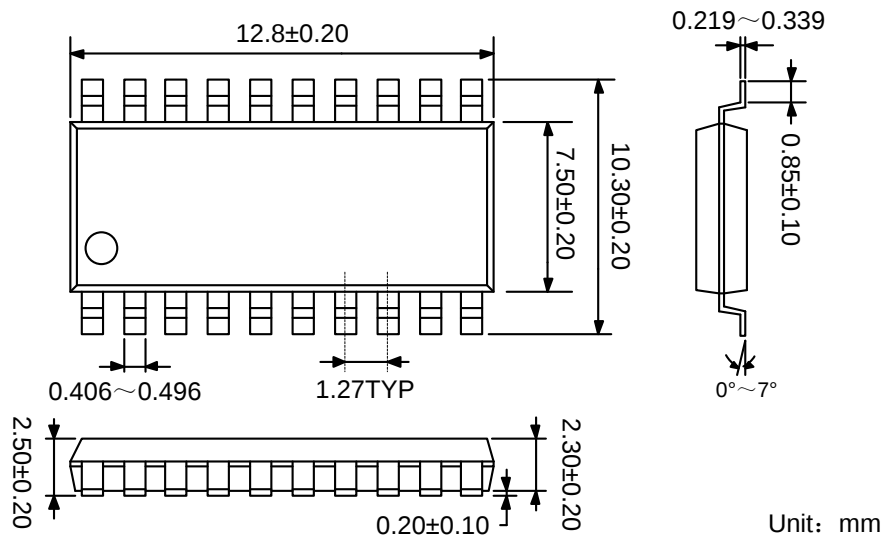
Test Circuit



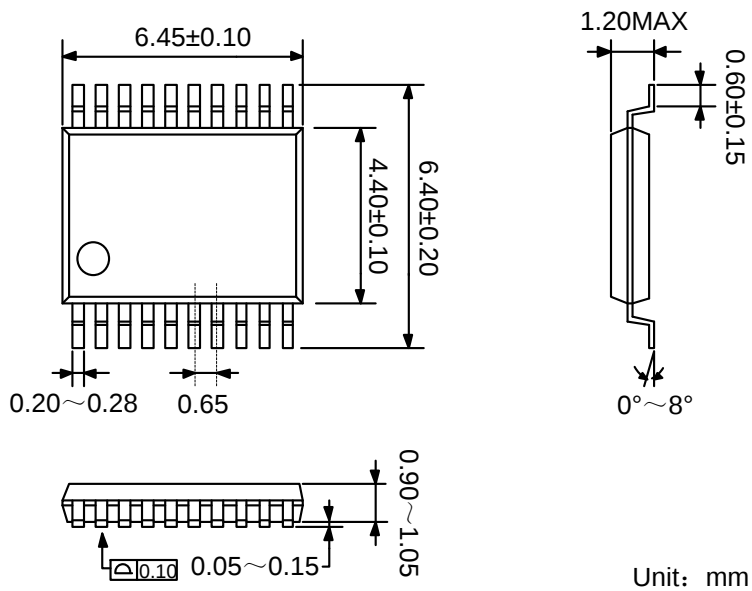
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Package Dimension

SOP20(74HC245M)

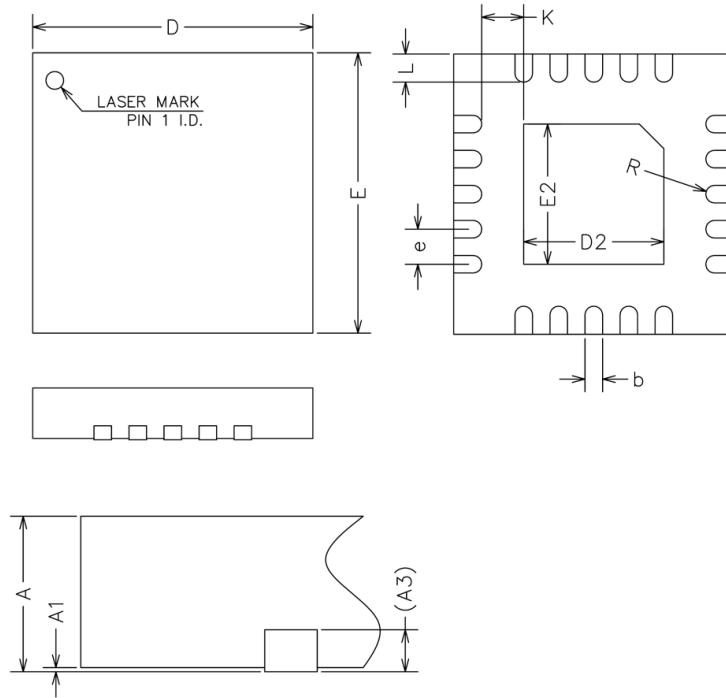


TSSOP20(74HC245V)



74HC245

QFN20 (74HC245Y)



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
A3	0.20REF		
b	0.18	0.25	0.30
D	3.90	4.00	4.10
E	3.90	4.00	4.10
D2	1.90	2.00	2.10
E2	1.90	2.00	2.10
e	0.40	0.50	0.60
K	0.20	—	—
L	0.35	0.40	0.45
R	0.09	—	—

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2016-06-23	Original version	Shi Liang Jun	Shi Liang Jun	Zhu Jun Li
1.1	2020-6-23	Update the Electrical Characteristics	Shibo	Shi Liang Jun	Zhu Jun Li
1.2	2022-9-2	Update Typeset	Shibo	Shibo	Shibo