



U74HCT245

CMOS IC

OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

DESCRIPTION

The **U74HCT245** is designed for the asynchronous communication between data buses. While the direction-control(DIR) is high, data transmits from the A bus to the B bus. Data transmits from the B bus to the A bus if DIR is low.

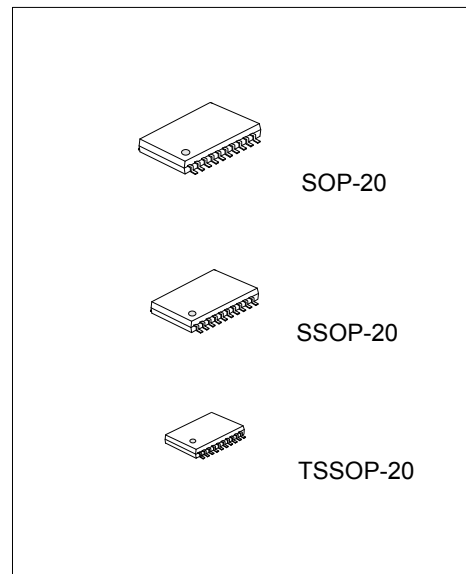
The output-enable \overline{OE} will isolate the device from the buses when high voltage is applied on it.

FEATURES

- * Operate from 4.5V to 5.5V
- * Typical t_{PD} is 14ns at 5.5V
- * Inputs are TTL Voltage Compatible

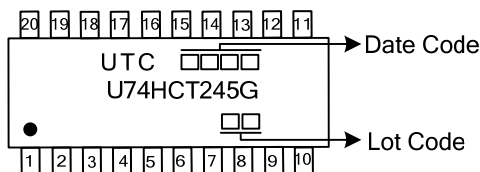
ORDERING INFORMATION

| Ordering Number | Package | Packing |
|------------------|----------|-----------|
| U74HCT245G-P20-R | TSSOP-20 | Tape Reel |
| U74HCT245G-R20-R | SSOP-20 | Tape Reel |
| U74HCT245G-S20-R | SOP-20 | Tape Reel |

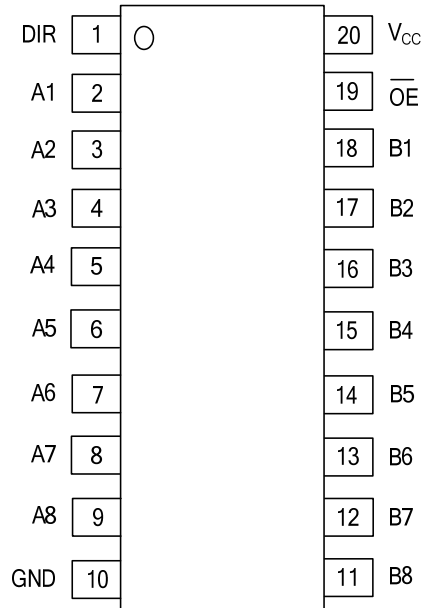


| | |
|--|--|
| <p>U74HCT245G-P20-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p> | <p>(1) R: Tape Reel</p> <p>(2) P20: TSSOP-20, R20: SSOP-20, S20: SOP-20</p> <p>(3) G: Halogen Free and Lead Free</p> |
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MARKING



■ PIN CONFIGURATION

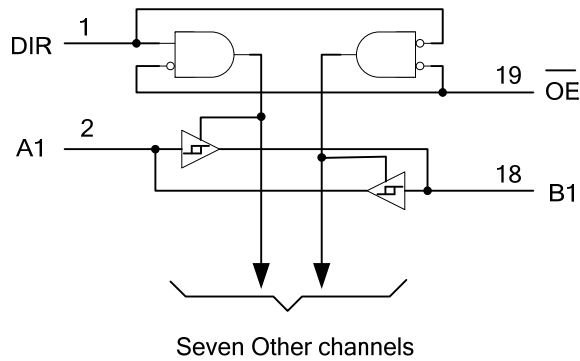


■ FUNCTION TABLE

| INPUT | | FUNCTION |
|-----------------|-----|-----------------------------------|
| \overline{OE} | DIR | |
| H | X | Isolation |
| L | H | Transmit data from A bus to B bus |
| L | L | Transmit data from B bus to A bus |

Note: H: HIGH voltage level; L: LOW voltage level.

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--------------------------------------|-----------|------------|-------------|
| Supply Voltage | V_{CC} | -0.5~7.0 | V |
| Input Clamp Current ($V_{IN}<0$) | I_{IK} | ± 20 | mA |
| Output Clamp Current ($V_{OUT}<0$) | I_{OK} | ± 20 | mA |
| Output Current | I_{OUT} | ± 35 | mA |
| V_{CC} or GND Current | I_{CC} | ± 70 | mA |
| Storage Temperature | T_{STG} | -65 ~ +150 | $^{\circ}C$ |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|------------------------------------|-----------|-----|-----|----------|-------------|
| Supply Voltage | V_{CC} | 4.5 | 5 | 5.5 | V |
| Input Voltage | V_{IN} | 0 | | V_{CC} | V |
| Output Voltage | V_{OUT} | 0 | | V_{CC} | V |
| Input Transition Rise or Fall Rate | t_T | | | 500 | ns |
| Operating Temperature | T_{OPR} | -40 | | 85 | $^{\circ}C$ |

■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}C$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|-----------------|--|------|------------|-----------|---------|
| High-Level input voltage | V_{IH} | $V_{CC}=4.5V\sim 5.5V$ | 2.0 | 1.6 | | V |
| Low-Level output voltage | V_{OL} | $V_{CC}=4.5V\sim 5.5V$ | | 1.2 | 0.8 | V |
| High-Level Output Voltage | V_{OH} | $V_{CC}=4.5V, I_{OH}=-20\mu A$ | 4.4 | 4.499 | | V |
| | | $V_{CC}=4.5V, I_{OH}=-6mA$ | 3.98 | 4.3 | | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=4.5V, I_{OL}=20\mu A$ | | 0.001 | 0.1 | V |
| | | $V_{CC}=4.5V, I_{OL}=6mA$ | | 0.17 | 0.26 | V |
| Input Current of DIR or \overline{OE} | $I_{I(LEAK)}$ | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND | | ± 0.1 | ± 100 | nA |
| Output OFF -state current | I_{OZ} | $V_{CC}=5.5V, V_{OUT}=V_{CC}$ or GND | | ± 0.01 | ± 0.5 | μA |
| Quiescent Supply Current | I_{CC} | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ | | | 8 | μA |
| Additional Quiescent Supply Current | ΔI_{CC} | $V_{CC}=5.5V$, One input at 0.5V or 2.4V, other inputs at 0 or V_{CC} | | 1.4 | 2.4 | mA |
| Input Capacitance of DIR or \overline{OE} | C_{IN} | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND | | 3 | 10 | pF |

■ SWITCHING CHARACTERISTICS (T_A=25°C, R_L=1kΩ, unless otherwise specified)

C_L=50pF

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|-----------------------|-----|-----|-----|------|
| Propagation delay from input (A or B) to output (B or A) | t _{PD} (t _{PLH} /t _{PHL}) | V _{CC} =4.5V | | 16 | 22 | ns |
| | | V _{CC} =5.5V | | 14 | 20 | ns |
| 3-state output enable time from input (\overline{OE}) to output (A or B) | t _{EN} (t _{PZL} /t _{PZH}) | V _{CC} =4.5V | | 25 | 46 | ns |
| | | V _{CC} =5.5V | | 22 | 41 | ns |
| 3-state output disable time from input (\overline{OE}) to output (A or B) | t _{DIS} (t _{PLZ} /t _{PHZ}) | V _{CC} =4.5V | | 26 | 40 | ns |
| | | V _{CC} =5.5V | | 23 | 36 | ns |
| Output transition time, (A or B) | t _r (t _R /t _F) | V _{CC} =4.5V | | 9 | 12 | ns |
| | | V _{CC} =5.5V | | 8 | 11 | ns |

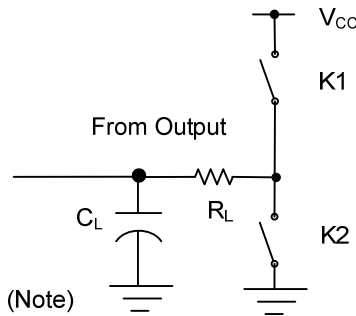
C_L=150pF

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--|-----------------------|-----|-----|-----|------|
| Propagation delay from input (A or B) to output (B or A) | t _{PD} (t _{PLH} /t _{PHL}) | V _{CC} =4.5V | | 20 | 30 | ns |
| | | V _{CC} =5.5V | | 18 | 27 | ns |
| 3-state output enable time from input (\overline{OE}) to output (A or B) | t _{EN} (t _{PZL} /t _{PZH}) | V _{CC} =4.5V | | 36 | 59 | ns |
| | | V _{CC} =5.5V | | 30 | 53 | ns |
| Output transition time, (A or B) | t _r (t _R /t _F) | V _{CC} =4.5V | | 17 | 42 | ns |
| | | V _{CC} =5.5V | | 14 | 38 | ns |

■ OPERATING CHARACTERISTICS

| PARAMETER | SYMBOL | TEST CONDITIONS | RATINGS | UNIT |
|-------------------------------|-----------------|-----------------|---------|------|
| Power Dissipation Capacitance | C _{PD} | No load | 40 | pF |

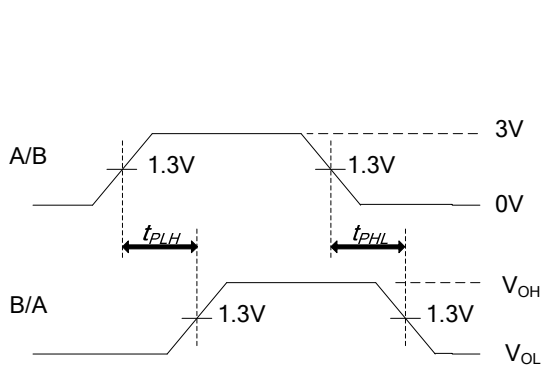
■ TEST CIRCUIT AND WAVEFORMS



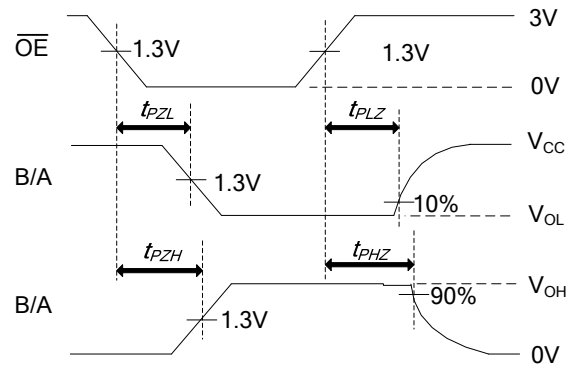
| TEST | K1 | K2 |
|-------------------|-------|-------|
| t_{PLH}/t_{PHL} | Open | Open |
| t_{PHZ}/t_{PZH} | Open | Close |
| t_{PLZ}/t_{PZL} | Close | Open |

Note: C_L includes probe and jig capacitance.

$$P_{RR} \leq 1\text{MHz}, Z_O = 50\Omega, t_R \leq 6\text{ns}, t_F \leq 6\text{ns}$$



Propagation Delay Times



Enable and Disable Times

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