

## Octal Bus Transceiver: 3-state

# CJ74HC/HCT245

## Logic

### 1 Introduction

The CJ74HC/HCT245 is an 8-bit transceiver with 3-state outputs. The device features an output enable (/OE) and send/receive (DIR) for direction control. A HIGH on /OE causes the outputs to assume a high-impedance OFF-state. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

### 2 Available Packages

| PART NUMBER | PACKAGE        |
|-------------|----------------|
| CJ74HC245   | SOP20          |
|             | TSSOP20        |
|             | QFN4.5x2.5-20L |
| CJ74HCT245  | SOP20          |
|             | TSSOP20        |
|             | QFN4.5x2.5-20L |

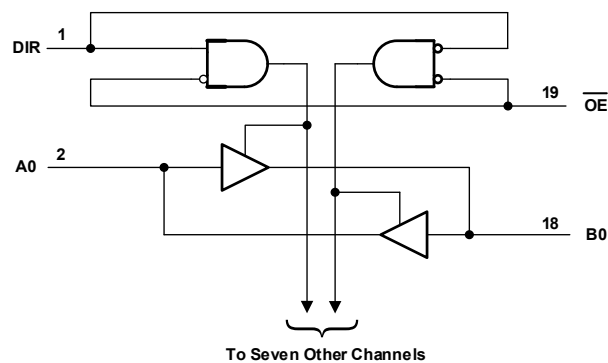
**Note:** For all available packages, please refer to the part Orderable Information.

### 3 Features

- Input levels:
  - For CJ74HC245: CMOS level
  - For CJ74HCT245: TTL level
- Octal bidirectional bus interface
- Non-inverting 3-state outputs
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

### 4 Applications

- Servers
- PCs and Notebooks
- Network Switches
- Wearable Health and Fitness Devices
- Telecom Infrastructures
- Electronic Points of Sale



Typical Application Circuit

## 5 Orderable Information

| DEVICE        | PACKAGE        | OP TEMP   | ECO PLAN     | MSL              | PACKING OPTION                     | SORT   |
|---------------|----------------|-----------|--------------|------------------|------------------------------------|--------|
| CJ74HC245AGN  | SOP20          | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>2000 Units / Reel | Active |
| CJ74HCT245AGN | SOP20          | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>2000 Units / Reel | Active |
| CJ74HC245BGN  | TSSOP20        | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>4000 Units / Reel | Active |
| CJ74HCT245BGN | TSSOP20        | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>4000 Units / Reel | Active |
| CJ74HC245QDN  | QFN4.5x2.5-20L | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>3000 Units / Reel | Active |
| CJ74HCT245QDN | QFN4.5x2.5-20L | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>3000 Units / Reel | Active |

### Note:

**ECO PLAN:** For the RoHS and Green certification standards of this product, please refer to the official report provided by JSCJ.

**MSL:** Moisture Sensitivity Level. Determined according to JEDEC industry standard classification.

**SORT:** Specifically defined as follows:

Active: Recommended for new products;

Customized: Products manufactured to meet the specific needs of customers;

Preview: The device has been released and has not been fully mass produced. The sample may or may not be available;

NoRD: It is not recommended to use the device for new design. The device is only produced for the needs of existing customers;

Obsolete: The device has been discontinued.

## 6 Pin Configuration and Marking Information

### 6.1 Pin Configuration

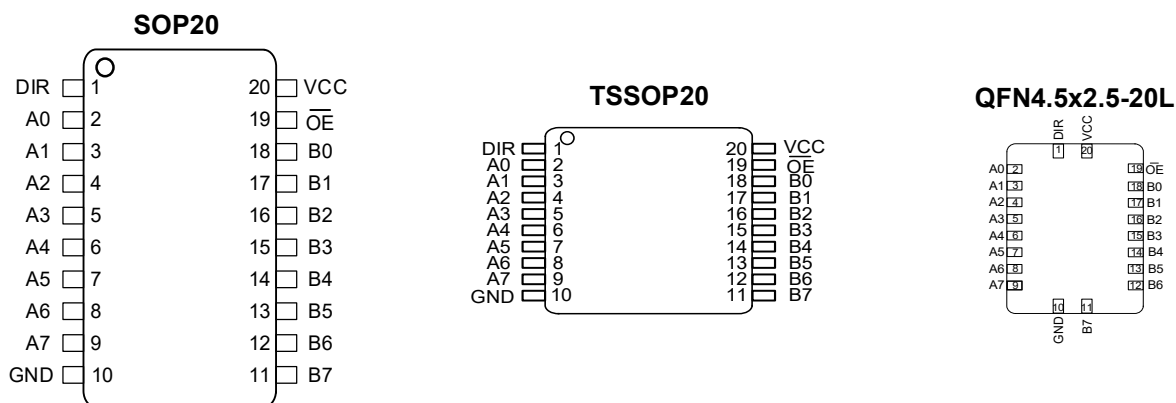


Figure 6-1 Pin Configuration

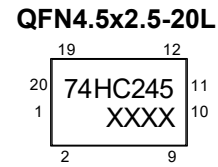
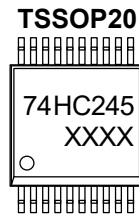
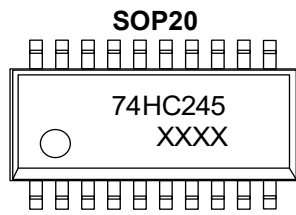
### 6.2 Pin Function

| PIN |      | I/O <sup>(1)</sup> | DESCRIPTION                      |
|-----|------|--------------------|----------------------------------|
| No. | NAME |                    |                                  |
| 1   | DIR  | I                  | Direction control                |
| 2   | A0   | I/O                | Data input/output                |
| 3   | A1   | I/O                | Data input/output                |
| 4   | A2   | I/O                | Data input/output                |
| 5   | A3   | I/O                | Data input/output                |
| 6   | A4   | I/O                | Data input/output                |
| 7   | A5   | I/O                | Data input/output                |
| 8   | A6   | I/O                | Data input/output                |
| 9   | A7   | I/O                | Data input/output                |
| 10  | GND  | G                  | Ground (0V)                      |
| 11  | B7   | I/O                | Data input/output                |
| 12  | B6   | I/O                | Data input/output                |
| 13  | B5   | I/O                | Data input/output                |
| 14  | B4   | I/O                | Data input/output                |
| 15  | B3   | I/O                | Data input/output                |
| 16  | B2   | I/O                | Data input/output                |
| 17  | B1   | I/O                | Data input/output                |
| 18  | B0   | I/O                | Data input/output                |
| 19  | OE   | I                  | Output enable input (active LOW) |
| 20  | VCC  | P                  | Supply voltage                   |

(1) I-Input, O-Output, P-Power, G-Ground.

### 6.3 Marking Information

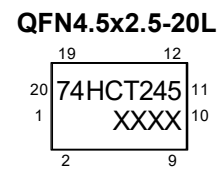
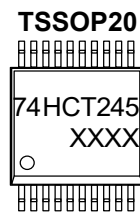
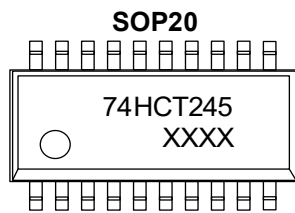
#### 6.3.1 CJ74HC245



74HC245: Device number.

XXXX: Code, indicates weekly record information.

#### 6.3.2 CJ74HCT245



74HCT245: Device number.

XXXX: Code, indicates weekly record information.

## 7 Specifications

### 7.1 Absolute Maximum Ratings

Voltages are referenced to GND(ground=0V), unless otherwise specified.

| SYMBOL    | CHARACTERISTIC          | CONDITIONS                           |               | MIN. | MAX.     | UNIT |
|-----------|-------------------------|--------------------------------------|---------------|------|----------|------|
| $V_{CC}$  | Supply voltage          | -                                    |               | -0.5 | +7.0     | V    |
| $I_{IK}$  | Input clamping current  | $V_I < -0.5V$ or $V_I > V_{CC}+0.5V$ |               | -    | $\pm 20$ | mA   |
| $I_{OK}$  | Output clamping current | $V_O < -0.5V$ or $V_O > V_{CC}+0.5V$ |               | -    | $\pm 20$ | mA   |
| $I_O$     | Output current          | $-0.5V < V_O < V_{CC}+0.5V$          |               | -    | $\pm 35$ | mA   |
| $I_{CC}$  | Supply current          | -                                    |               | -    | 70       | mA   |
| $I_{GND}$ | Ground current          | -                                    |               | -70  | -        | mA   |
| $T_{stg}$ | Storage temperature     | -                                    |               | -65  | +150     | °C   |
| $P_{tot}$ | Total power dissipation | -                                    |               | -    | 500      | mW   |
| $T_L$     | Soldering temperature   | 10s                                  | SOP/TSSOP/QFN | -    | 260      | °C   |

**Note:** Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to GND. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

### 7.2 Recommended Operating Conditions

| SYMBOL              | PARAMETER                           | CONDITIONS    | MIN. | TYP. | MAX.     | UNIT |
|---------------------|-------------------------------------|---------------|------|------|----------|------|
| <b>CJ74HC245</b>    |                                     |               |      |      |          |      |
| $V_{CC}$            | Supply voltage                      | -             | 2.0  | 5.0  | 6.0      | V    |
| $V_I$               | Input voltage                       | -             | 0    | -    | $V_{CC}$ | V    |
| $V_O$               | Output voltage                      | -             | 0    | -    | $V_{CC}$ | V    |
| $\Delta t/\Delta V$ | Input transition rise and fall rate | $V_{CC}=2.0V$ | -    | -    | 625      | ns/V |
|                     |                                     | $V_{CC}=4.5V$ | -    | 1.67 | 139      | ns/V |
|                     |                                     | $V_{CC}=6.0V$ | -    | -    | 83       | ns/V |
| $T_{amb}$           | Ambient temperature                 | -             | -40  | -    | +125     | °C   |
| <b>CJ74HCT245</b>   |                                     |               |      |      |          |      |
| $V_{CC}$            | Supply voltage                      | -             | 4.5  | 5.0  | 5.5      | V    |
| $V_I$               | Input voltage                       | -             | 0    | -    | $V_{CC}$ | V    |
| $V_O$               | Output voltage                      | -             | 0    | -    | $V_{CC}$ | V    |
| $\Delta t/\Delta V$ | Input transition rise and fall rate | $V_{CC}=4.5V$ | -    | 1.67 | 139      | ns/V |
| $T_{amb}$           | Ambient temperature                 | -             | -40  | -    | +125     | °C   |

### 7.3 ESD Ratings

| SYMBOL        | ESD RATINGS             |                                       | VALUE      | UNIT |
|---------------|-------------------------|---------------------------------------|------------|------|
| $V_{ESD-HBM}$ | Electrostatic discharge | Human body model (HBM) <sup>(1)</sup> | $\pm 4000$ | V    |

(1) JEDEC document JEP155 states that 500-V H1BM allows safe manufacturing with a standard ESD control process.

## 7.4 Electrical Characteristics

### 7.4.1 DC Characteristics 1

$T_{amb}=25^{\circ}\text{C}$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL           | CHARACTERISTIC            | CONDITIONS                                                                                                         |                                               | MIN. | TYP. | MAX. | UNIT |
|------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|------|------|------|
| CJ74HC245        |                           |                                                                                                                    |                                               |      |      |      |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> =2.0V                                                                                              |                                               | 1.5  | 1.2  | -    | V    |
|                  |                           | V <sub>CC</sub> =4.5V                                                                                              |                                               | 3.15 | 2.4  | -    | V    |
|                  |                           | V <sub>CC</sub> =6.0V                                                                                              |                                               | 4.2  | 3.2  | -    | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> =2.0V                                                                                              |                                               | -    | 0.8  | 0.5  | V    |
|                  |                           | V <sub>CC</sub> =4.5V                                                                                              |                                               | -    | 2.1  | 1.35 | V    |
|                  |                           | V <sub>CC</sub> =6.0V                                                                                              |                                               | -    | 2.8  | 1.8  | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                 | I <sub>O</sub> =-20uA; V <sub>CC</sub> =2.0V  | 1.9  | 2.0  | -    | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =-20uA; V <sub>CC</sub> =4.5V  | 4.4  | 4.5  | -    | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =-20uA; V <sub>CC</sub> =6.0V  | 5.9  | 6.0  | -    | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =-6.0mA; V <sub>CC</sub> =4.5V | 3.98 | 4.32 | -    | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =-7.8mA; V <sub>CC</sub> =6.0V | 5.48 | 5.81 | -    | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                 | I <sub>O</sub> =20uA; V <sub>CC</sub> =2.0V   | -    | 0    | 0.1  | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =20uA; V <sub>CC</sub> =4.5V   | -    | 0    | 0.1  | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =20uA; V <sub>CC</sub> =6.0V   | -    | 0    | 0.1  | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =6.0mA; V <sub>CC</sub> =4.5V  | -    | 0.15 | 0.26 | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =7.8mA; V <sub>CC</sub> =6.0V  | -    | 0.16 | 0.26 | V    |
| I <sub>I</sub>   | Input leakage current     | V <sub>I</sub> =V <sub>CC</sub> or GND; V <sub>CC</sub> =6.0V                                                      |                                               | -    | -    | ±1.0 | uA   |
| I <sub>OZ</sub>  | OFF-state output current  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =6.0V; V <sub>O</sub> =V <sub>CC</sub> or GND |                                               | -    | -    | ±1.0 | uA   |
| I <sub>CC</sub>  | Supply current            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A; V <sub>CC</sub> =6.0V                                  |                                               | -    | -    | 8.0  | uA   |
| C <sub>I</sub>   | Input capacitance         | -                                                                                                                  |                                               | -    | 3.5  | -    | pF   |
| C <sub>I/O</sub> | Input/output capacitance  | -                                                                                                                  |                                               | -    | 10   | -    | pF   |
| CJ74HCT245       |                           |                                                                                                                    |                                               |      |      |      |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> =4.5V to 5.5V                                                                                      |                                               | 2.0  | 1.6  | -    | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> =4.5V to 5.5V                                                                                      |                                               | -    | 1.2  | 0.8  | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =4.5V                                         | I <sub>O</sub> =-20uA                         | 4.4  | 4.5  | -    | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =-6.0mA                        | 3.98 | 4.32 | -    | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =4.5V                                         | I <sub>O</sub> =20uA                          | -    | 0    | 0.1  | V    |
|                  |                           |                                                                                                                    | I <sub>O</sub> =6.0mA                         | -    | 0.15 | 0.26 | V    |
| I <sub>I</sub>   | Input leakage current     | V <sub>I</sub> =V <sub>CC</sub> or GND; V <sub>CC</sub> =5.5V                                                      |                                               | -    | -    | ±1.0 | uA   |
| I <sub>OZ</sub>  | OFF-state output current  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =5.5V; V <sub>O</sub> =V <sub>CC</sub> or GND |                                               | -    | -    | ±1.0 | uA   |
| I <sub>CC</sub>  | Supply current            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A; V <sub>CC</sub> =5.5V                                  |                                               | -    | -    | 8.0  | uA   |

|                 |                           |                                                                                                              |                       |   |     |     |         |
|-----------------|---------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------|---|-----|-----|---------|
| $\Delta I_{CC}$ | Additional supply current | Per input pin; $V_I=V_{CC}-2.1V$ ;<br>Other inputs at $V_{CC}$ or GND;<br>$V_{CC}=4.5V$ to $5.5V$ ; $I_O=0A$ | An or Bn inputs       | - | -   | 144 | $\mu A$ |
|                 |                           |                                                                                                              | $\overline{OE}$ input | - | -   | 540 | $\mu A$ |
|                 |                           |                                                                                                              | DIR input             | - | -   | 324 | $\mu A$ |
| $C_I$           | Input capacitance         | -                                                                                                            |                       | - | 3.5 | -   | pF      |
| $C_{I/O}$       | Input/output capacitance  | -                                                                                                            |                       | - | 10  | -   | pF      |

#### 7.4.2 DC Characteristics 2

$T_{amb}=-40^{\circ}C$  to  $+85^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL          | CHARACTERISTIC            | CONDITIONS                                                                                                            |                                               | MIN. | TYP. | MAX. | UNIT |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|------|------|------|
| CJ74HC245       |                           |                                                                                                                       |                                               |      |      |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> =2.0V                                                                                                 |                                               | 1.5  | -    | -    | V    |
|                 |                           | V <sub>CC</sub> =4.5V                                                                                                 |                                               | 3.15 | -    | -    | V    |
|                 |                           | V <sub>CC</sub> =6.0V                                                                                                 |                                               | 4.2  | -    | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> =2.0V                                                                                                 |                                               | -    | -    | 0.5  | V    |
|                 |                           | V <sub>CC</sub> =4.5V                                                                                                 |                                               | -    | -    | 1.35 | V    |
|                 |                           | V <sub>CC</sub> =6.0V                                                                                                 |                                               | -    | -    | 1.8  | V    |
| V <sub>OH</sub> | HIGH-level output voltage | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                    | I <sub>O</sub> =-20uA; V <sub>CC</sub> =2.0V  | 1.9  | -    | -    | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =-20uA; V <sub>CC</sub> =4.5V  | 4.4  | -    | -    | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =-20uA; V <sub>CC</sub> =6.0V  | 5.9  | -    | -    | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =-6.0mA; V <sub>CC</sub> =4.5V | 3.84 | -    | -    | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =-7.8mA; V <sub>CC</sub> =6.0V | 5.34 | -    | -    | V    |
| V <sub>OL</sub> | LOW-level output voltage  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                    | I <sub>O</sub> =20uA; V <sub>CC</sub> =2.0V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =20uA; V <sub>CC</sub> =4.5V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =20uA; V <sub>CC</sub> =6.0V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =6.0mA; V <sub>CC</sub> =4.5V  | -    | -    | 0.33 | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =7.8mA; V <sub>CC</sub> =6.0V  | -    |      | 0.33 | V    |
| I <sub>I</sub>  | Input leakage current     | V <sub>I</sub> =V <sub>CC</sub> or GND; V <sub>CC</sub> =6.0V                                                         |                                               | -    | -    | ±1.0 | uA   |
| I <sub>OZ</sub> | OFF-state output current  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =6.0V;<br>V <sub>O</sub> =V <sub>CC</sub> or GND |                                               | -    | -    | ±5.0 | uA   |
| I <sub>CC</sub> | Supply current            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A; V <sub>CC</sub> =6.0V                                     |                                               | -    | -    | 80   | uA   |
| CJ74HCT245      |                           |                                                                                                                       |                                               |      |      |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> =4.5V to 5.5V                                                                                         |                                               | 2.0  | -    | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> =4.5V to 5.5V                                                                                         |                                               | -    | -    | 0.8  | V    |
| V <sub>OH</sub> | HIGH-level output voltage | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>CC</sub> =4.5V                                         | I <sub>O</sub> =-20uA                         | 4.4  | -    | -    | V    |
|                 |                           |                                                                                                                       | I <sub>O</sub> =-6.0mA                        | 3.84 | -    | -    | V    |
| V <sub>OL</sub> | LOW-level output          | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ;                                                                  | I <sub>O</sub> =20uA                          | -    | -    | 0.1  | V    |

|                 |                           |                                                                   |                       |   |   |           |         |
|-----------------|---------------------------|-------------------------------------------------------------------|-----------------------|---|---|-----------|---------|
|                 | voltage                   | $V_{CC}=4.5V$                                                     | $I_O=6.0mA$           | - | - | 0.33      | V       |
| $I_I$           | Input leakage current     | $V_I=V_{CC}$ or GND; $V_{CC}=5.5V$                                |                       | - | - | $\pm 1.0$ | $\mu A$ |
| $I_{OZ}$        | OFF-state output current  | $V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=5.5V$ ;<br>$V_O=V_{CC}$ or GND |                       | - | - | $\pm 5.0$ | $\mu A$ |
| $I_{CC}$        | Supply current            | $V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$                     |                       | - | - | 80        | $\mu A$ |
| $\Delta I_{CC}$ | Additional supply current | Per input pin; $V_I=V_{CC}-2.1V$ ;                                | An or Bn inputs       | - | - | 180       | $\mu A$ |
|                 |                           | Other inputs at $V_{CC}$ or GND;                                  | $\overline{OE}$ input | - | - | 675       | $\mu A$ |
|                 |                           | $V_{CC}=4.5V$ to $5.5V$ ; $I_O=0A$                                | DIR input             | - | - | 405       | $\mu A$ |

### 7.4.3 DC Characteristics 3

$T_{amb}=-40^{\circ}C$  to  $+125^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL          | CHARACTERISTIC            | CONDITIONS                                                                                                         |                                               | MIN. | TYP. | MAX. | UNIT |
|-----------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|------|------|------|
| CJ74HC245       |                           |                                                                                                                    |                                               |      |      |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> =2.0V                                                                                              |                                               | 1.5  | -    | -    | V    |
|                 |                           | V <sub>CC</sub> =4.5V                                                                                              |                                               | 3.15 | -    | -    | V    |
|                 |                           | V <sub>CC</sub> =6.0V                                                                                              |                                               | 4.2  | -    | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> =2.0V                                                                                              |                                               | -    | -    | 0.5  | V    |
|                 |                           | V <sub>CC</sub> =4.5V                                                                                              |                                               | -    | -    | 1.35 | V    |
|                 |                           | V <sub>CC</sub> =6.0V                                                                                              |                                               | -    | -    | 1.8  | V    |
| V <sub>OH</sub> | HIGH-level output voltage | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                 | I <sub>O</sub> =-20uA; V <sub>CC</sub> =2.0V  | 1.9  | -    | -    | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =-20uA; V <sub>CC</sub> =4.5V  | 4.4  | -    | -    | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =-20uA; V <sub>CC</sub> =6.0V  | 5.9  | -    | -    | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =-6.0mA; V <sub>CC</sub> =4.5V | 3.7  | -    | -    | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =-7.8mA; V <sub>CC</sub> =6.0V | 5.2  | -    | -    | V    |
| V <sub>OL</sub> | LOW-level output voltage  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>                                                                 | I <sub>O</sub> =20uA; V <sub>CC</sub> =2.0V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =20uA; V <sub>CC</sub> =4.5V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =20uA; V <sub>CC</sub> =6.0V   | -    | -    | 0.1  | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =6.0mA; V <sub>CC</sub> =4.5V  | -    | -    | 0.4  | V    |
|                 |                           |                                                                                                                    | I <sub>O</sub> =7.8mA; V <sub>CC</sub> =6.0V  | -    | -    | 0.4  | V    |
| I <sub>I</sub>  | Input leakage current     | V <sub>I</sub> =V <sub>CC</sub> or GND; V <sub>CC</sub> =6.0V                                                      |                                               | -    | -    | ±1.0 | uA   |
| I <sub>OZ</sub> | OFF-state output current  | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> =6.0V; V <sub>O</sub> =V <sub>CC</sub> or GND |                                               | -    | -    | ±10  | uA   |
| I <sub>CC</sub> | Supply current            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A; V <sub>CC</sub> =6.0V                                  |                                               | -    | -    | 160  | uA   |
| CJ74HCT245      |                           |                                                                                                                    |                                               |      |      |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> =4.5V to 5.5V                                                                                      |                                               | 2.0  | -    | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> =4.5V to 5.5V                                                                                      |                                               | -    | -    | 0.8  | V    |
| V <sub>OH</sub> | HIGH-level output         | V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ;                                                               | I <sub>O</sub> =-20uA                         | 4.4  | -    | -    | V    |

|                 |                           |                                                                                                              |                       |     |   |           |         |
|-----------------|---------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------|-----|---|-----------|---------|
|                 | voltage                   | $V_{CC}=4.5V$                                                                                                | $I_O=-6.0mA$          | 3.7 | - | -         | V       |
| $V_{OL}$        | LOW-level output voltage  | $V_I=V_{IH}$ or $V_{IL}$ ;<br>$V_{CC}=4.5V$                                                                  | $I_O=20\mu A$         | -   | - | 0.1       | V       |
|                 |                           |                                                                                                              | $I_O=6.0mA$           | -   | - | 0.4       | V       |
| $I_I$           | Input leakage current     | $V_I=V_{CC}$ or GND; $V_{CC}=5.5V$                                                                           |                       | -   | - | $\pm 1.0$ | $\mu A$ |
| $I_{OZ}$        | OFF-state output current  | $V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=5.5V$ ; $V_O=V_{CC}$ or GND                                               |                       | -   | - | $\pm 10$  | $\mu A$ |
| $I_{CC}$        | Supply current            | $V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$                                                                |                       | -   | - | 160       | $\mu A$ |
| $\Delta I_{CC}$ | Additional supply current | Per input pin; $V_I=V_{CC}-2.1V$ ;<br>Other inputs at $V_{CC}$ or GND;<br>$V_{CC}=4.5V$ to $5.5V$ ; $I_O=0A$ | An or Bn inputs       | -   | - | 196       | $\mu A$ |
|                 |                           |                                                                                                              | $\overline{OE}$ input | -   | - | 735       | $\mu A$ |
|                 |                           |                                                                                                              | DIR input             | -   | - | 441       | $\mu A$ |

#### 7.4.4 AC Characteristics 1

$T_{amb}=25^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL                              | PARAMETER                              | CONDITIONS                            |                                                | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------------------------|---------------------------------------|------------------------------------------------|------|------|------|------|
| CJ74HC245                           |                                        |                                       |                                                |      |      |      |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | An to Bn or Bn to An propagation delay | See Figure 8-4                        | V <sub>CC</sub> =2.0V                          | -    | 25   | 90   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V                          | -    | 9    | 18   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =5.0V;<br>C <sub>L</sub> =15pF | -    | 7    | -    | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V                          | -    | 7    | 15   | ns   |
| t <sub>PZL</sub> , t <sub>PZH</sub> | OE̅ to An or Bn enable time            | See Figure 8-5                        | V <sub>CC</sub> =2.0V                          | -    | 30   | 150  | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V                          | -    | 11   | 30   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V                          | -    | 9    | 26   | ns   |
| t <sub>PLZ</sub> , t <sub>PHZ</sub> | OE̅ to An or Bn disable time           | See Figure 8-5                        | V <sub>CC</sub> =2.0V                          | -    | 41   | 150  | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V                          | -    | 15   | 30   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V                          | -    | 12   | 26   | ns   |
| t <sub>THL</sub> , t <sub>TLH</sub> | Transition time                        | See Figure 8-4                        | V <sub>CC</sub> =2.0V                          | -    | 14   | 60   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V                          | -    | 5    | 12   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V                          | -    | 4    | 10   | ns   |
| CJ74HCT245                          |                                        |                                       |                                                |      |      |      |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | An to Bn or Bn to An propagation delay | See Figure 8-4                        | V <sub>CC</sub> =4.5V                          | -    | 12   | 22   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =5.0V;<br>C <sub>L</sub> =15pF | -    | 10   | -    | ns   |
| t <sub>PZL</sub> , t <sub>PZH</sub> | OE̅ to An or Bn enable time            | V <sub>CC</sub> =4.5V; See Figure 8-5 |                                                | -    | 16   | 30   | ns   |
| t <sub>PLZ</sub> , t <sub>PHZ</sub> | OE̅ to An or Bn disable time           | V <sub>CC</sub> =4.5V; See Figure 8-5 |                                                | -    | 16   | 30   | ns   |
| t <sub>THL</sub> , t <sub>TLH</sub> | Transition time                        | V <sub>CC</sub> =4.5V; See Figure 8-4 |                                                | -    | 5    | 12   | ns   |

**7.4.5 AC Characteristics 2**

$T_{amb} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL             | PARAMETER                                | CONDITIONS                     |               | MIN. | TYP. | MAX. | UNIT |
|--------------------|------------------------------------------|--------------------------------|---------------|------|------|------|------|
| CJ74HC245          |                                          |                                |               |      |      |      |      |
| $t_{PLH}, t_{PHL}$ | An to Bn or Bn to An propagation delay   | See Figure 8-4                 | $V_{CC}=2.0V$ | -    | -    | 115  | ns   |
|                    |                                          |                                | $V_{CC}=4.5V$ | -    | -    | 23   | ns   |
|                    |                                          |                                | $V_{CC}=6.0V$ | -    | -    | 20   | ns   |
| $t_{PZL}, t_{PZH}$ | $\overline{OE}$ to An or Bn enable time  | See Figure 8-5                 | $V_{CC}=2.0V$ | -    | -    | 190  | ns   |
|                    |                                          |                                | $V_{CC}=4.5V$ | -    | -    | 38   | ns   |
|                    |                                          |                                | $V_{CC}=6.0V$ | -    | -    | 33   | ns   |
| $t_{PLZ}, t_{PHZ}$ | $\overline{OE}$ to An or Bn disable time | See Figure 8-5                 | $V_{CC}=2.0V$ | -    | -    | 190  | ns   |
|                    |                                          |                                | $V_{CC}=4.5V$ | -    | -    | 38   | ns   |
|                    |                                          |                                | $V_{CC}=6.0V$ | -    | -    | 33   | ns   |
| $t_{THL}, t_{TLH}$ | Transition time                          | See Figure 8-4                 | $V_{CC}=2.0V$ | -    | -    | 75   | ns   |
|                    |                                          |                                | $V_{CC}=4.5V$ | -    | -    | 15   | ns   |
|                    |                                          |                                | $V_{CC}=6.0V$ | -    | -    | 13   | ns   |
| CJ74HCT245         |                                          |                                |               |      |      |      |      |
| $t_{PLH}, t_{PHL}$ | An to Bn or Bn to An propagation delay   | See Figure 8-4                 | $V_{CC}=4.5V$ | -    | -    | 28   | ns   |
| $t_{PZL}, t_{PZH}$ | $\overline{OE}$ to An or Bn enable time  | $V_{CC}=4.5V$ ; See Figure 8-5 |               | -    | -    | 38   | ns   |
| $t_{PLZ}, t_{PHZ}$ | $\overline{OE}$ to An or Bn disable time | $V_{CC}=4.5V$ ; See Figure 8-5 |               | -    | -    | 38   | ns   |
| $t_{THL}, t_{TLH}$ | Transition time                          | $V_{CC}=4.5V$ ; See Figure 8-4 |               | -    | -    | 15   | ns   |

## 7.4.6 AC Characteristics 3

T<sub>amb</sub>=−40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL                              | PARAMETER                              | CONDITIONS                            |                       | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------------------------|---------------------------------------|-----------------------|------|------|------|------|
| CJ74HC245                           |                                        |                                       |                       |      |      |      |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | An to Bn or Bn to An propagation delay | See Figure 8-4                        | V <sub>CC</sub> =2.0V | -    | -    | 135  | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V | -    | -    | 27   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V | -    | -    | 23   | ns   |
| t <sub>PZL</sub> , t <sub>PZH</sub> | OE to An or Bn enable time             | See Figure 8-5                        | V <sub>CC</sub> =2.0V | -    | -    | 225  | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V | -    | -    | 45   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V | -    | -    | 38   | ns   |
| t <sub>PLZ</sub> , t <sub>PHZ</sub> | OE to An or Bn disable time            | See Figure 8-5                        | V <sub>CC</sub> =2.0V | -    | -    | 225  | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V | -    | -    | 45   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V | -    | -    | 38   | ns   |
| t <sub>THL</sub> , t <sub>TLH</sub> | Transition time                        | See Figure 8-4                        | V <sub>CC</sub> =2.0V | -    | -    | 90   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =4.5V | -    | -    | 18   | ns   |
|                                     |                                        |                                       | V <sub>CC</sub> =6.0V | -    | -    | 15   | ns   |
| CJ74HCT245                          |                                        |                                       |                       |      |      |      |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | An to Bn or Bn to An propagation delay | See Figure 8-4                        | V <sub>CC</sub> =4.5V | -    | -    | 33   | ns   |
| t <sub>PZL</sub> , t <sub>PZH</sub> | OE to An or Bn enable time             | V <sub>CC</sub> =4.5V; See Figure 8-5 |                       | -    | -    | 45   | ns   |
| t <sub>PLZ</sub> , t <sub>PHZ</sub> | OE to An or Bn disable time            | V <sub>CC</sub> =4.5V; See Figure 8-5 |                       | -    | -    | 45   | ns   |
| t <sub>THL</sub> , t <sub>TLH</sub> | Transition time                        | V <sub>CC</sub> =4.5V; See Figure 8-4 |                       | -    | -    | 18   | ns   |

## 8 Detailed Description

### 8.1 Overview

The CJ74HC/HCT245 is an 8-bit transceiver with 3-state outputs. The device features an output enable ( $\overline{OE}$ ) and send/receive (DIR) for direction control. A HIGH on  $\overline{OE}$  causes the outputs to assume a high-impedance OFF-state. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

### 8.2 Functional Block Diagram

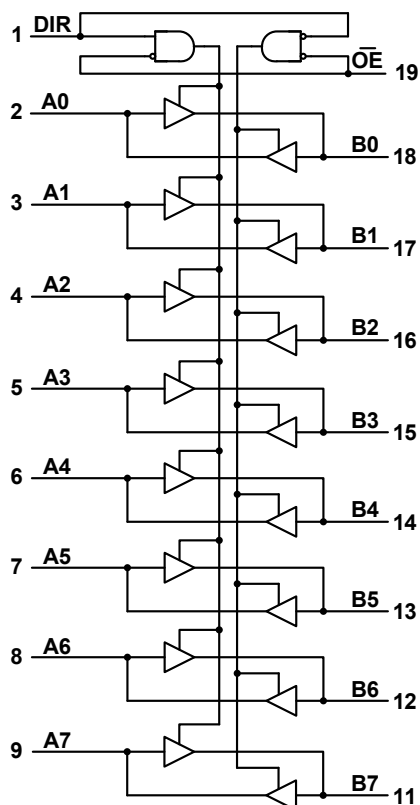


Figure 8-1 Logic symbol

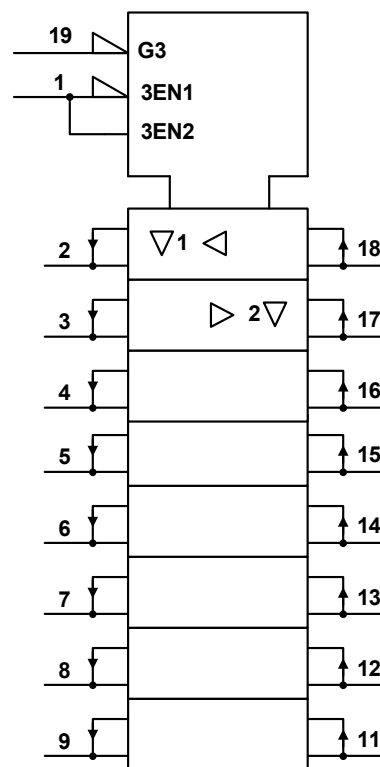


Figure 8-2 IEC logic symbol

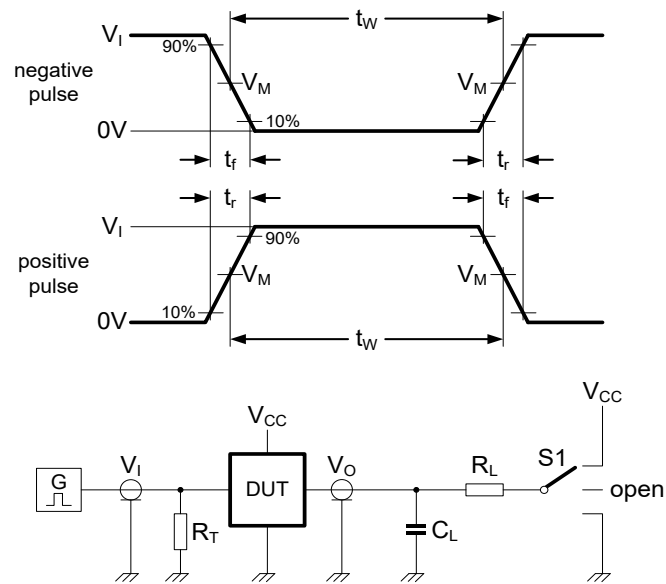
### 8.3 Function Table<sup>(1)</sup>

| INPUT           |     | OUTPUT |       |
|-----------------|-----|--------|-------|
| $\overline{OE}$ | DIR | $A_n$  | $B_n$ |
| L               | L   | $A=B$  | Input |
| L               | H   | Input  | $B=A$ |
| H               | X   | Z      | Z     |

(1) H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

## 8.4 Testing Circuit

### 8.4.1 AC Testing Circuit



**Figure 8-3 Test circuit for measuring switching times**

Definitions for test circuit:

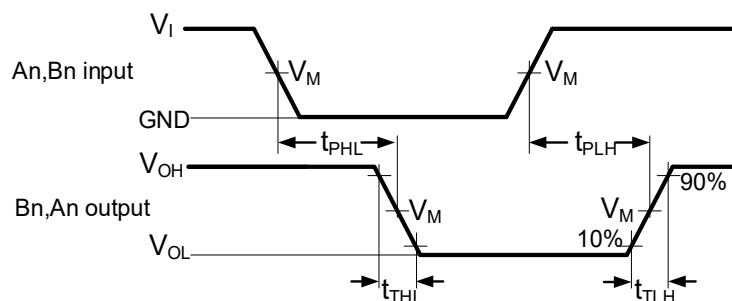
$C_L$ =Load capacitance including jig and probe capacitance.

$R_T$ =Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator.

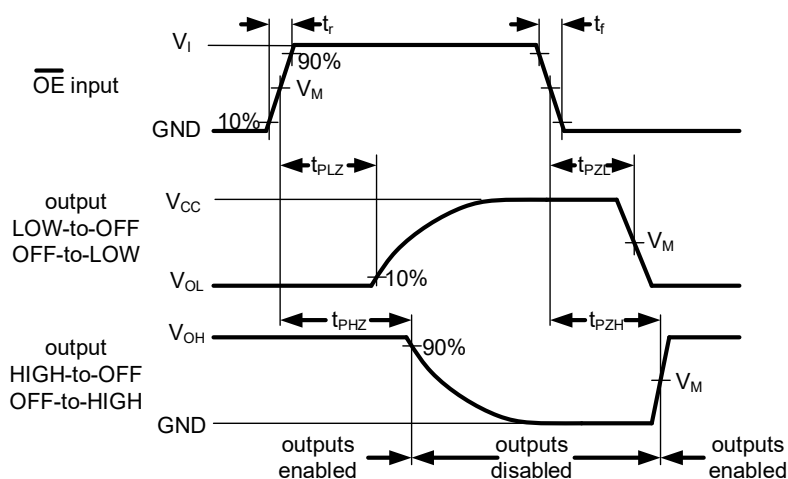
$R_L$ =Load resistance.

$S1$ =Test selection switch.

### 8.4.2 AC Testing Waveforms



**Figure 8-4 Input (An, Bn) to output (Bn, An) propagation delays and output transition times**



**Figure 8-5 3-state enable and disable times**

## 8.4.3 Measurement Points

| TYPE       | INPUT               | OUTPUT              |
|------------|---------------------|---------------------|
|            | $V_M$               | $V_M$               |
| CJ74HC245  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| CJ74HCT245 | 1.3V                | 1.3V                |

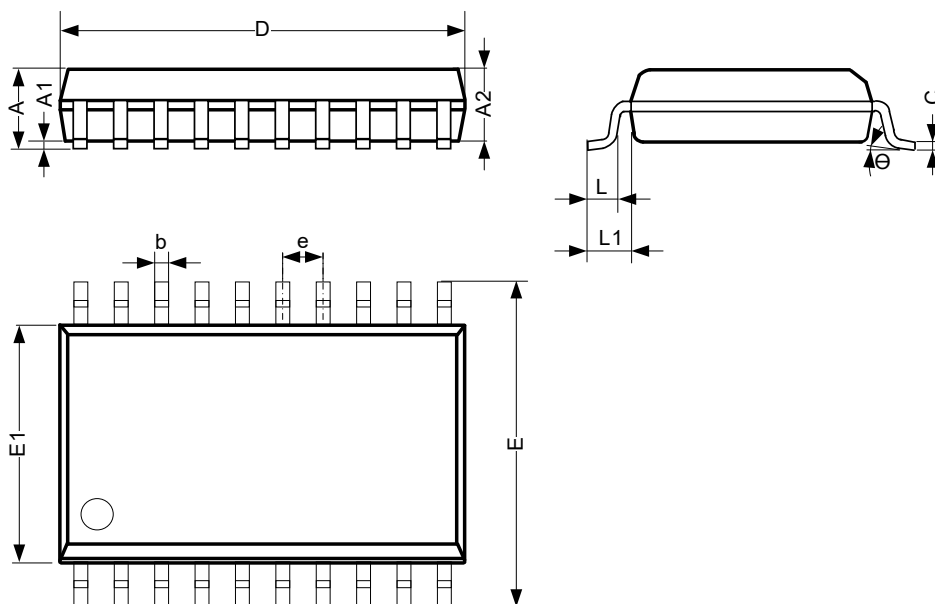
## 8.4.4 Test Data

| TYPE       | INPUT    |            | LOAD       |             | S1 POSITION        |                    |                    |
|------------|----------|------------|------------|-------------|--------------------|--------------------|--------------------|
|            | $V_I$    | $t_r, t_f$ | $C_L$      | $R_L$       | $t_{PHL}, t_{PLH}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| CJ74HC245  | $V_{CC}$ | 6ns        | 15pF, 50pF | 1k $\Omega$ | Open               | GND                | $V_{CC}$           |
| CJ74HCT245 | 3V       | 6ns        | 15pF, 50pF | 1k $\Omega$ | Open               | GND                | $V_{CC}$           |

## 9 Mechanical Information

### 9.1 SOP20 Mechanical Information

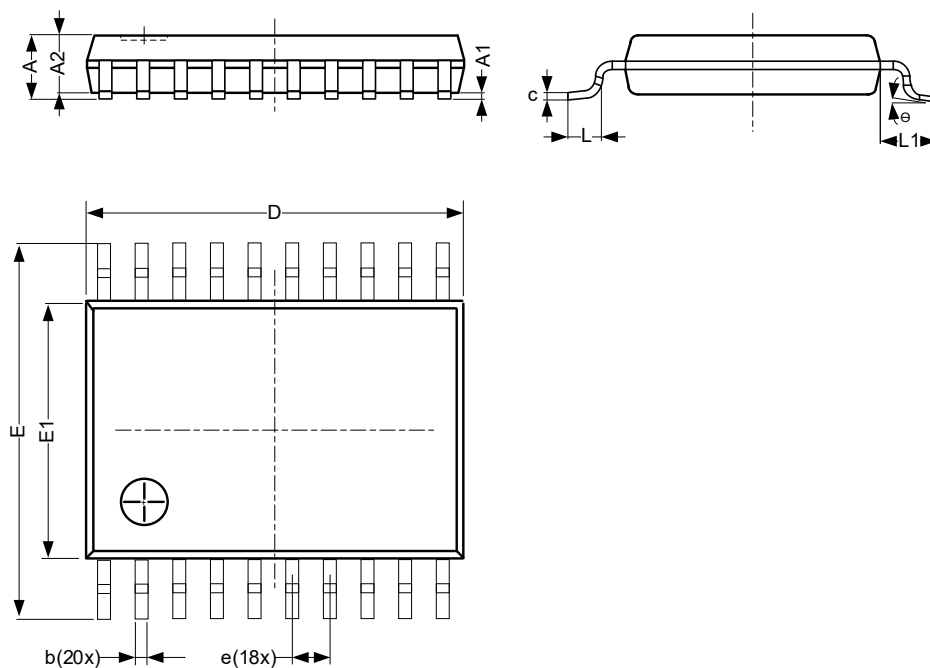
#### 9.1.1 SOP20 Outline Dimensions



| SYMBOL   | Dimensions In Millimeters |      |       |
|----------|---------------------------|------|-------|
|          | Min.                      | Typ. | Max.  |
| A        | 2.47                      | -    | 2.65  |
| A1       | 0.05                      | -    | 0.30  |
| A2       | 2.20                      | -    | 2.44  |
| b        | 0.35                      | -    | 0.50  |
| c        | 0.15                      | -    | 0.30  |
| D        | 12.54                     | -    | 12.94 |
| E        | 10.00                     | -    | 10.60 |
| E1       | 7.30                      | -    | 7.70  |
| e        | 1.27 BSC                  |      |       |
| L        | 0.40                      | -    | 1.05  |
| L1       | 1.30                      | -    | 1.50  |
| θ        | 0°                        | -    | 8°    |
| Unit: mm |                           |      |       |

## 9.2 TSSOP20 Mechanical Information

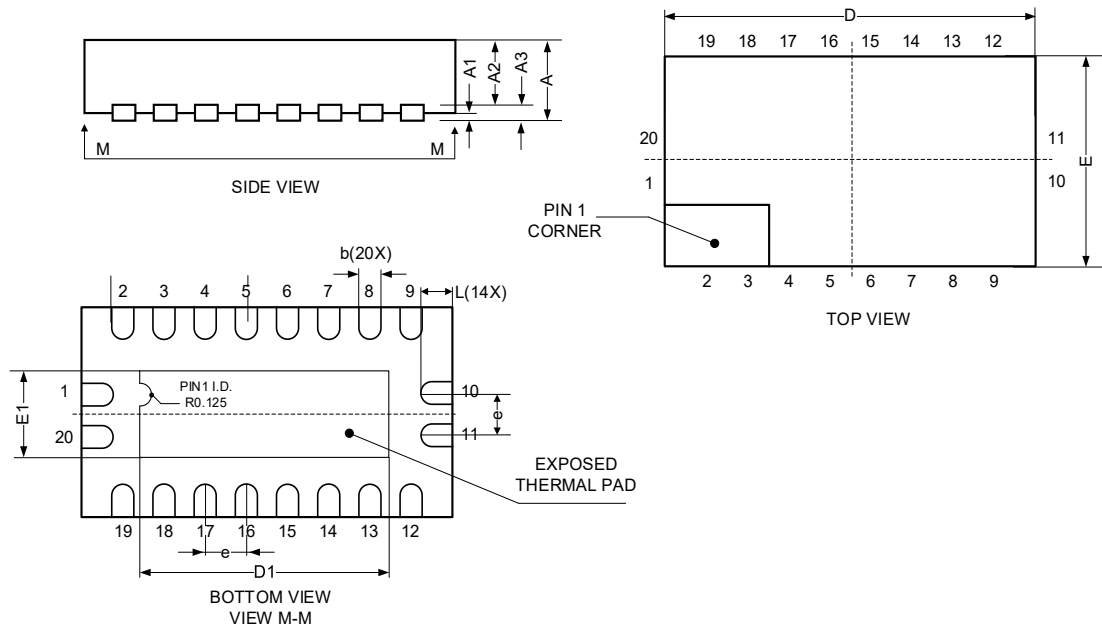
### 9.2.1 TSSOP20 Outline Dimensions



| SYMBOL   | Dimensions In Millimeters |      |      |
|----------|---------------------------|------|------|
|          | Min.                      | Typ. | 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                      | -    | 6.60 |
| E        | 6.20                      | -    | 6.60 |
| E1       | 4.30                      | -    | 4.50 |
| e        | 0.65 BSC                  |      |      |
| L1       | -                         | 1.00 | -    |
| L        | 0.45                      | -    | 0.75 |
| θ        | 0°                        | -    | 8°   |
| Unit: mm |                           |      |      |

### 9.3 QFN4.5x2.5-20L Mechanical Information

#### 9.3.1 QFN4.5x2.5-20L Outline Dimensions



| SYMBOL   | Dimensions In Millimeters |      |      |
|----------|---------------------------|------|------|
|          | Min.                      | Typ. | Max. |
| A        | 0.80                      | -    | 1.00 |
| A1       | 0.00                      | -    | 0.05 |
| A2       | 0.60                      | -    | 0.70 |
| A3       | -                         | 0.20 | -    |
| D        | 4.40                      | -    | 4.60 |
| E        | 2.40                      | -    | 2.60 |
| e        | 0.50 BSC                  |      |      |
| b        | 0.18                      | -    | 0.30 |
| L        | 0.30                      | -    | 0.50 |
| D1       | 2.70                      |      | 3.15 |
| E1       | 0.70                      |      | 1.15 |
| Unit: mm |                           |      |      |

## **10 Notes and Revision History**

### **10.1 Associated Product Family and Others**

To view other products of the same type or IC products of other types, click the official website of JSCJ -- <https://www.jscj-elec.com> for more details.

### **10.2 Notes**

#### **Electrostatic Discharge Caution**



This IC may be damaged by ESD. Relevant personnel shall comply with correct installation and use specifications to avoid ESD damage to the IC. If appropriate measures are not taken to prevent ESD damage, the hazards caused by ESD include but are not limited to degradation of integrated circuit performance or complete damage of integrated circuit. For some precision integrated circuits, a very small parameter change may cause the whole device to be inconsistent with its published specifications.

### **10.3 Revision History**

June, 2025: rev - 1.3, Correct parameter typo in Figure 8-4.

# DISCLAIMER

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