# Dual Bus Buffer Gate With 3-State Outputs

## General Description

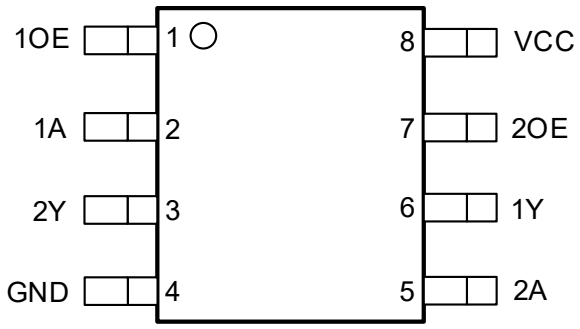
The ET74HC2G126 is a dual bus buffer gate with 3-state outputs operating from a 1.65V to 5.5V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

## Features

- Designed for 2V to 6V $V_{CC}$ Operation
- Over-voltage Tolerant Inputs Accept Voltages to 6V
- ±5.2mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and RoHS Compliant
- ESD Protection Complies with JESD22 Standard
  -- HBM: ±2000V Pass (JEDEC JS-001)
  -- CDM: ±1000V Pass (JEDEC JS-002)
- Latch-up Performance Exceeds ±100mA per JEDEC JESD78F
- Part No. and Package Information

| Part No. | Package | Packing Option | MSL |
|---|---|---|---|
| ET74HC2G126U | VSSOP8 (2.0mm × 2.3mm) | Tape and Reel, 3K/Reel | 3 |

## Pin Configuration




VSSOP8

Figure1. Pin Configuration

## Pin Function

| Pin No. | Pin Name | Function |
|---|---|---|
| 1 | 1OE | Channel 1, Enable Input |
| 2 | 1A | Channel 1, Input A |
| 3 | 2Y | Channel 2, Output Y |
| 4 | GND | Ground |
| 5 | 2A | Channel 2, Input A |
| 6 | 1Y | Channel 1, Output Y |
| 7 | 2OE | Channel 2, Enable Input |
| 8 | VCC | Supply Voltage |

## Block Diagram

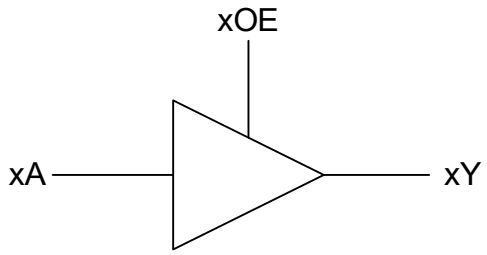



Figure2. Logic Symbol

## Functional Table

| Input | | Output |
|---|---|---|
| xOE | xA | xY |
| H | L | L |
| H | H | H |
| L | L | Z |
| L | H | Z |

## Absolute Maximum Ratings

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{CC}$ | DC Supply Voltage (VCC Pin) | | -0.5 to 7.0 | V |
| $I_{IK}$ | DC Input Diode Current, $V_I$ < GND | | -50 | mA |
| $V_I$ | DC Input Voltage (1) | | -0.5 ≤ $V_I$ ≤ 7.0 | V |
| $I_{OK}$ | DC Output Diode Current, $V_O$ < GND | | ±50 | mA |
| $V_O$ | DC Output Voltage Output in Higher or Low State | | -0.5 to $V_{CC}$ + 0.5 | V |
| $I_O$ | DC Output Sink Current, $V_O$ = -0.5V to $V_{CC}$ + 0.5V | | ±50 | mA |
| $I_{CC}$ | DC Supply Current per Supply Pin | | 100 | mA |
| $I_{GND}$ | DC Ground Current per Supply Pin | | -100 | mA |
| $T_J$ | Max Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -65 to 150 | °C |
| $V_{ESD}$ | ESD Classification | Human Body Model (2) | ±2000 | V |
| | | Charged Device Model (3) | ±1000 | |
| $I_{LU}$ | Max Latch Up Current Above $V_{CC}$ and GND at 125°C (4) | | ±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.

***Note1:*** $I_O$ absolute maximum rating must be observed.

***Note2:*** HBM tested per JEDEC JS-001;

***Note3:*** CDM tested per JEDEC JS-002;

***Note4:*** Latch up Current Maximum Rating tested per JEDEC JESD78F.

## Recommended Operating Conditions

| Symbol | Parameter | | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | DC Supply Voltage Operating | | 2 | 6 | V |
| $V_I$ | DC Input Voltage | | 0 | $V_{CC}$ | V |
| $V_O$ | DC Output Voltage (High or Low State) | | 0 | $V_{CC}$ | V |
| $T_A$ | Operating Temperature Range | | -40 | 125 | °C |
| $t_r$, $t_f$ | Input Rise and Fall Time | $V_{CC}$ = 2.0V | | 625 | ns/V |
| | | $V_{CC}$ = 4.5V | | 139 | |
| | | $V_{CC}$ = 6.0V | | 83 | |

## Electrical Characteristics

### DC Electrical Characteristics

| Symbol | Parameter | Condition | $V_{CC}$ (V) | $T_A$ = 25°C | | | -40°C ≤ $T_A$ ≤ 125°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | Min | Max | |
| $V_{IH}$ | High-Level Input Voltage | | 2.0 | 1.5 | 1.2 | | 1.5 | | V |
| | | | 4.5 | 3.15 | 2.4 | | 3.15 | | |
| | | | 6.0 | 4.2 | 3.2 | | 4.2 | | |
| $V_{IL}$ | Low-Level Input Voltage | | 2.0 | | 0.8 | 0.5 | | 0.5 | V |
| | | | 4.5 | | 2.1 | 1.35 | | 1.35 | |
| | | | 6.0 | | 2.8 | 1.8 | | 1.8 | |
| $V_{OH}$ | High-Level Output Voltage | $I_{OH}$ = -20uA | 2.0 | 1.9 | 2.0 | | 1.9 | | V |
| | | $I_{OH}$ = -20uA | 4.5 | 4.4 | 4.5 | | 4.4 | | |
| | | $I_{OH}$ = -20uA | 6.0 | 5.9 | 6.0 | | 4.4 | | |
| | | $I_{OH}$ = -6.0mA | 4.5 | 3.84 | 4.32 | | 3.7 | | |
| | | $I_{OH}$ = -7.8mA | 6.0 | 5.34 | 5.81 | | 5.2 | | |
| $V_{OL}$ | Low-Level Output Voltage | $I_{OL}$ = 20uA | 2.0 | | 0 | 0.1 | | 0.1 | V |
| | | $I_{OL}$ = 20uA | 4.5 | | 0 | 0.1 | | 0.1 | |
| | | $I_{OL}$ = 20uA | 6.0 | | 0 | 0.1 | | 0.1 | |
| | | $I_{OL}$ = 6.0mA | 4.5 | | 0.15 | 0.33 | | 0.4 | |
| | | $I_{OL}$ = 7.8mA | 6.0 | | 0.16 | 0.33 | | 0.4 | |
| $I_I$ | Input Leakage Current | $V_I$ = 6.0V or GND | 6.0 | | | ±1 | | ±1 | uA |
| $I_{OZ}$ | OFF-state output current | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_O$ = $V_{CC}$ or GND | 6.0 | | | ±5 | | ±10 | uA |
| $I_{CC}$ | Quiescent Supply Current | per pin: $V_I$ = 6.0V or GND; $I_O$ = 0mA | 6.0 | | | 10 | | 20 | uA |

### AC Electrical Characteristics

| Symbol | Parameter | Condition | $V_{CC}$(V) | $T_A$ = 25 °C | | | -40°C ≤ $T_A$ ≤ 125°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | Min | Max | |
| $t_{PHL}$, $t_{PLH}$ | Propagation Delay (xA to xY; See Figure3) | $C_L$ = 50pF | 2.0 | | 10.9 | 14.2 | | 14.7 | ns |
| | | $C_L$ = 50pF | 4.5 | | 3.4 | 4.4 | | 4.8 | |
| | | $C_L$ = 15pF | 5.0 | | 3.0 | 3.9 | | 4.2 | |
| | | $C_L$ = 50pF | 6.0 | | 12.1 | 15.8 | | 16.2 | |
| $t_{PZL}$, $t_{PZH}$ | Output Enable Time (xOE to xY; See Figure4) | $C_L$ = 50pF | 2.0 | | 3.7 | 4.8 | | 5.2 | ns |
| | | $C_L$ = 50pF | 4.5 | | 3.1 | 4.1 | | 4.4 | |
| | | $C_L$ = 50pF | 6.0 | | 9.9 | 12.9 | | 13.3 | |
| $t_{PLZ}$, $t_{PHZ}$ | Output Disable Time (xOE to xY; See Figure4) | $C_L$ = 50pF | 2.0 | | 3.3 | 4.3 | | 4.6 | ns |
| | | $C_L$ = 50pF | 4.5 | | 2.8 | 3.7 | | 4.0 | |
| | | $C_L$ = 50pF | 6.0 | | 10.9 | 14.2 | | 14.7 | |

### Capacitance Characteristics

| Symbol | Parameter | Condition | Typ | Unit |
|---|---|---|---|---|
| $C_{IN}$ | Input Capacitance | $V_{CC}$ = 6V, $V_I$ = 0V or $V_{CC}$ | 5 | pF |
| $C_{PD}$ | Power Dissipation Capacitance (5) | 10MHz, $V_{CC}$ = 3.3V, $V_I$ = 0V or $V_{CC}$ | 25 | pF |

***Note5:*** $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ where:

$f_i$ = input frequency in MHz;

$f_o$ = output frequency in MHz;

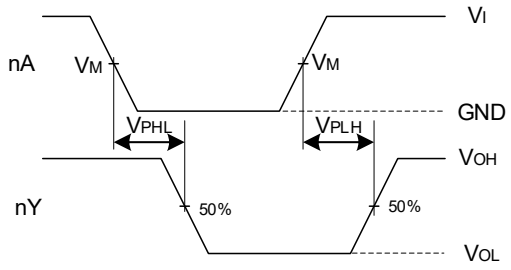
$C_L$ = output load capacitance in pF;

$V_{CC}$ = supply voltage in V;

N = number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

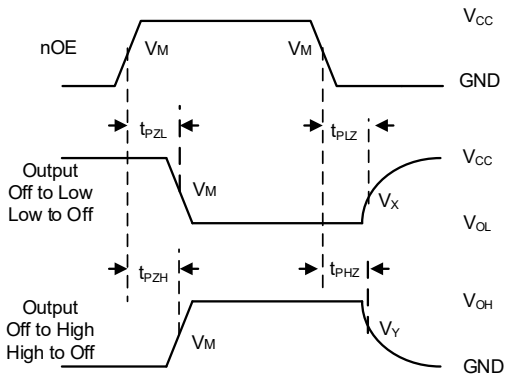
## Test Waveform




Measurement points are given in Table1.

$V_{OL}$ and $V_{OH}$ is typical output voltage levels that occur with the output load.

Figure3. Input xA to Output xY Propagation Delay Times




Measurement points are given in Table1.

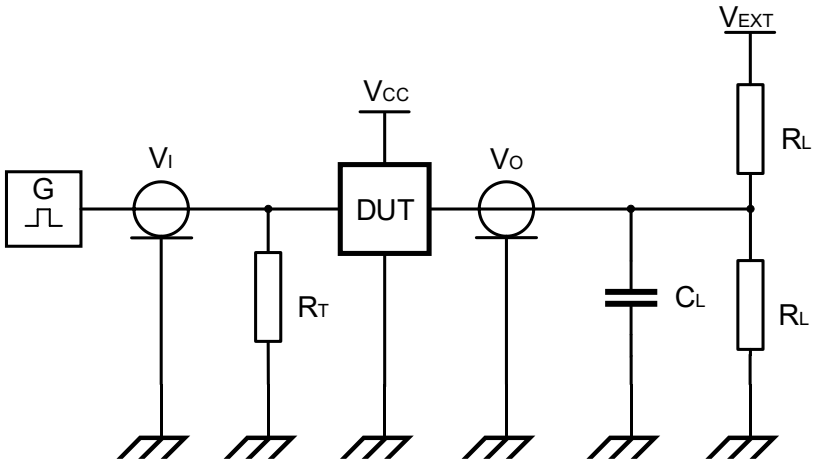
$V_{OL}$ and $V_{OH}$ is typical output voltage levels that occur with the output load.

Figure4. 3-state Output Enable and Disable Times

Table1. Measurement Points

| Supply Voltage | Input | Output | | |
|---|---|---|---|---|
| $V_{CC}$ | $V_M$ | $V_M$ | $V_X$ | $V_Y$ |
| 2V | 0.5 × $V_{CC}$ | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.3V | $V_{OH}$ - 0.3V |
| 4.5V | 0.5 × $V_{CC}$ | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.3V | $V_{OH}$ - 0.3V |
| 5V | 0.5 × $V_{CC}$ | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.3V | $V_{OH}$ - 0.3V |
| 6V | 0.5 × $V_{CC}$ | 0.5 × $V_{CC}$ | $V_{OL}$ + 0.3V | $V_{OH}$ - 0.3V |

## Test Circuit




Measurement points are given in Table 2.

Definitions test circuit:

$R_L$ = Load resistance;

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

$R_T$ = Termination resistance should be equal to output impedance $Z_O$ of the pulse generator;

$V_{EXT}$ = External voltage for measuring switching times.

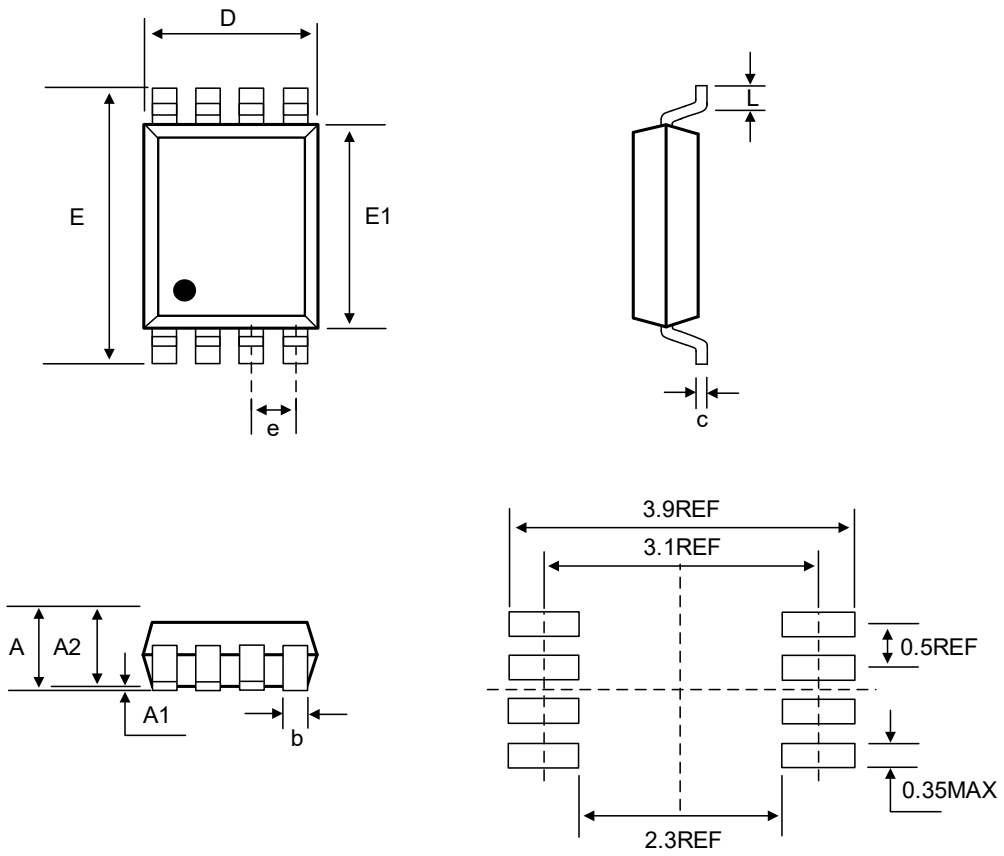
Figure5. Test Circuit for Measuring Switching Times

Table2. Test Data

| Supply Voltage | Input | | Load | | $V_{EXT}$ | | |
|---|---|---|---|---|---|---|---|
| $V_{CC}$ | $V_I$ | $t_r = t_f$ | $C_L$ | $R_L$ | $t_{PLH}$, $t_{PHL}$ | $t_{PZH}$, $t_{PHZ}$ | $t_{PZL}$, $t_{PLZ}$ |
| 2V | $V_{CC}$ | 3.0ns | 50pF | 1kΩ | OPEN | GND | $V_{CC}$ |
| 4.5V | $V_{CC}$ | 3.0ns | 50pF | 1kΩ | OPEN | GND | $V_{CC}$ |
| 5V | $V_{CC}$ | 3.0ns | 15pF | 1kΩ | OPEN | GND | $V_{CC}$ |
| 6V | $V_{CC}$ | 3.0ns | 50pF | 1kΩ | OPEN | GND | $V_{CC}$ |

## Package Dimension

VSSOP8 (2.0mm × 2.3mm)



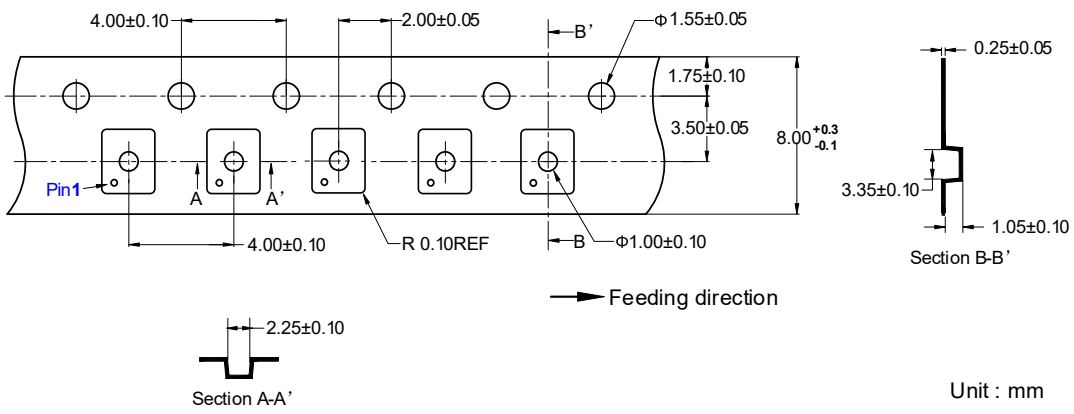

COMMON DIMENSIONS

(Unit: mm)

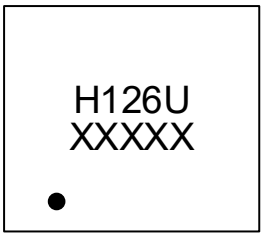
| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | - | - | 0.90 |
| A1 | 0.00 | - | 0.10 |
| A2 | 0.65 | 0.75 | 0.80 |
| b | 0.17 | - | 0.27 |
| c | 0.08 | - | 0.20 |
| D | 1.90 | 2.00 | 2.10 |
| E | 3.00 | 3.10 | 3.20 |
| E1 | 2.20 | 2.30 | 2.40 |
| e | 0.50BSC | | |
| L | 0.20 | - | 0.35 |

## Tape Information

VSSOP8 (2.0mm × 2.3mm)




## Marking Information




ET74HC2G126U

H126U = Part Number

XXXXX = Tracking Number

## Revision History and Checking Table

| Version | Date | Revision Item | Modifier | Function & Spec Checking | Package & Tape Checking |
|---|---|---|---|---|---|
| 1.0 | 2025-11-17 | Official Version | Xu tao | Yang xiaoxu | Liu jiaying |