

芯伯乐®
X I N B O L E

Product Specification

XBLW CD4025

Triple 3-Input NOR Gate

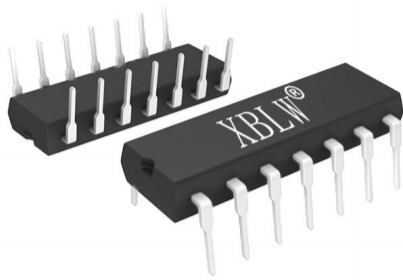
WEB | www.xinboleic.com



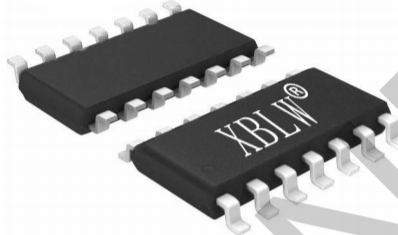
Description

The CD4025 is a triple 3-input NOR gate. The outputs are fully buffered for the highest noise immunity and pattern insensitivity to output impedance.

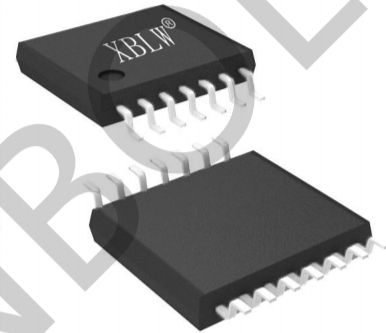
It operates over a recommended V_{DD} power supply range of 3V to 15V referenced to V_{SS} (usually ground). Unused inputs must be connected to V_{DD} , V_{SS} , or another input.



DIP-14



SOP-14



TSSOP-14

Feature

- Wide supply voltage range from 3V to 15V
- Fully static operation
- 5V, 10V, and 15V parametric ratings
- Standardized symmetrical output characteristics
- Inputs and outputs are protected against electrostatic effects
- Specified from -40°C to +105°C
- Packaging information: DIP14/SOP14/TSSOP14

Ordering Information

| Product Model | Package Type | Marking | Packing | Packing Qty |
|-----------------|--------------|----------|---------|--------------|
| XBLW CD4025BE | DIP-14 | CD4025BE | Tube | 1000Pcs/Box |
| XBLW CD4025BDTR | SOP-14 | CD4025B | Tape | 2500Pcs/Reel |
| XBLW CD4025BDTR | TSSOP-14 | CD4025B | Tape | 3000Pcs/Reel |

Block Diagram

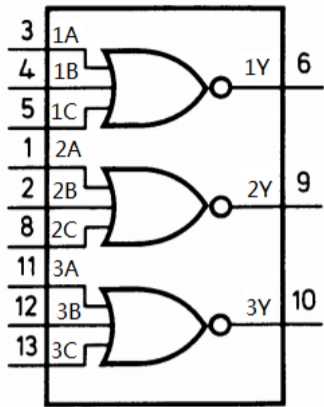


Figure 1. Functional diagram

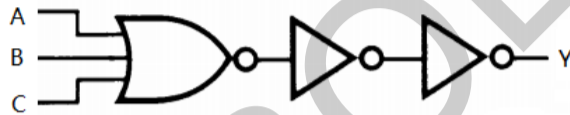
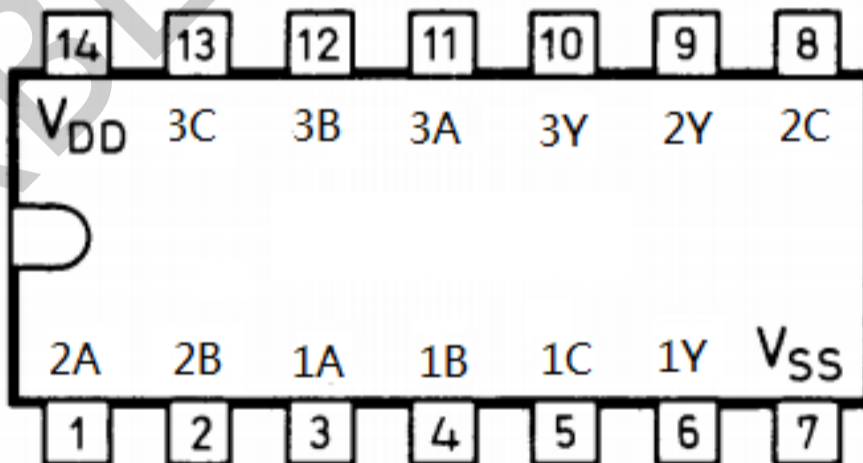


Figure 2. Logic diagram(one flip-flop)

Pin Configurations



Pin Description

| Pin No. | Pin Name | Description |
|---------|-----------------|----------------|
| 1 | 2A | data input |
| 2 | 2B | data input |
| 3 | 1A | data input |
| 4 | 1B | data input |
| 5 | 1C | data input |
| 6 | 1Y | data output |
| 7 | V _{SS} | ground (0V) |
| 8 | 2C | data input |
| 9 | 2Y | data output |
| 10 | 3Y | data output |
| 11 | 3A | data input |
| 12 | 3B | data input |
| 13 | 3C | data input |
| 14 | V _{DD} | supply voltage |

Function Table

| Input | | | Output |
|-------|----|----|--------|
| nA | nB | nC | nY |
| L | L | L | H |
| H | X | X | L |
| X | H | X | L |
| X | X | H | L |

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

Electrical Parameter

Absolute Maximum Ratings (Voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | Min. | Max. | Unit |
|-------------------------|------------------|-----------------------|------|----------------------|------|
| supply voltage | V _{DD} | - | -0.5 | +18 | V |
| DC input current | I _{IK} | any one input | - | ±10 | mA |
| input voltage | V _I | all inputs | -0.5 | V _{DD} +0.5 | V |
| storage temperature | T _{stg} | - | -65 | +150 | °C |
| total power dissipation | P _{tot} | - | - | 500 | mW |
| device dissipation | P | per output transistor | - | 100 | mW |
| Soldering temperature | T _L | 10s | DIP | 245 | °C |
| | | | SOP | 250 | °C |

Note:

- [1] For DIP14 packages: above 70°C the value of P_{tot} derates linearly with 12mW/K.
- [2] For SOP14 packages: above 70°C the value of P_{tot} derates linearly with 8mW/K.
- [3] For (T)SSOP14 packages: above 60°C the value of P_{tot} derates linearly with 5.5mW/K.

Recommended Operating Conditions

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------|-------------|------|------|------|------|
| supply voltage | V _{DD} | - | 3 | - | 15 | V |
| ambient temperature | T _{amb} | in free air | -40 | - | +105 | °C |

Electrical Characteristics

DC Characteristics 1 (Tamb=25°C, voltages are referenced to Vss (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions(V) | | | Tamb=25°C | | | Unit |
|---------------------------|--------|---------------|-------|-----|-----------|-------------------|------|------|
| | | Vo | VIN | VDD | Min. | Typ. | Max. | |
| supply current | IDD | - | 0, 5 | 5 | - | 0.01 | 0.25 | μA |
| | | - | 0, 10 | 10 | - | 0.01 | 0.5 | μA |
| | | - | 0, 15 | 15 | - | 0.01 | 1 | μA |
| LOW-level output current | IOL | 0.4 | 0, 5 | 5 | 0.51 | 1 | - | mA |
| | | 0.5 | 0, 10 | 10 | 1.3 | 2.6 | - | mA |
| | | 1.5 | 0, 15 | 15 | 3.4 | 6.8 | - | mA |
| HIGH-level output current | IOH | 4.6 | 0, 5 | 5 | -0.51 | -1 | - | mA |
| | | 2.5 | 0, 5 | 5 | -1.6 | -3.2 | - | mA |
| | | 9.5 | 0, 10 | 10 | -1.3 | -2.6 | - | mA |
| | | 13.5 | 0, 15 | 15 | -3.4 | -6.8 | - | mA |
| LOW-level output voltage | VOL | - | 0, 5 | 5 | - | 0 | 0.05 | V |
| | | - | 0, 10 | 10 | - | 0 | 0.05 | V |
| | | - | 0, 15 | 15 | - | 0 | 0.05 | V |
| HIGH-level output voltage | VOH | - | 0, 5 | 5 | 4.95 | 5 | - | V |
| | | - | 0, 10 | 10 | 9.95 | 10 | - | V |
| | | - | 0, 15 | 15 | 14.95 | 15 | - | V |
| LOW-level input voltage | VIL | 0.5, 4.5 | - | 5 | - | - | 1.5 | V |
| | | 1, 9 | - | 10 | - | - | 3 | V |
| | | 1.5, 13.5 | - | 15 | - | - | 4 | V |
| HIGH-level input voltage | VIH | 0.5 | - | 5 | 3.5 | - | - | V |
| | | 1 | - | 10 | 7 | - | - | V |
| | | 1.5 | - | 15 | 11 | - | - | V |
| put leakage current | II | - | 0, 15 | 15 | - | ±10 ⁻⁵ | ±0.1 | μA |

DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+105^{\circ}\text{C}$, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions(V) | | | $T_{amb} = -40^{\circ}\text{C}$ | | $T_{amb} = +85^{\circ}\text{C}$ | | $T_{amb} = +105^{\circ}\text{C}$ | | Unit |
|---------------------------|----------|---------------|----------|----------|---------------------------------|-----------|---------------------------------|-----------|----------------------------------|-----------|---------------|
| | | V_o | V_{IN} | V_{DD} | Min. | Max. | Min. | Max. | Min. | Max. | |
| supply current | I_{DD} | - | 0, 5 | 5 | - | 5 | - | 7.5 | - | 7.5 | μA |
| | | - | 0, 10 | 10 | - | 10 | - | 15 | - | 15 | μA |
| | | - | 0, 15 | 15 | - | 20 | - | 30 | - | 30 | μA |
| LOW-level output current | I_{OL} | 0.4 | 0, 5 | 5 | 0.61 | - | 0.42 | - | 0.36 | - | mA |
| | | 0.5 | 0, 10 | 10 | 1.5 | - | 1.1 | - | 0.9 | - | mA |
| | | 1.5 | 0, 15 | 15 | 4 | - | 2.8 | - | 2.4 | - | mA |
| HIGH-level output current | I_{OH} | 4.6 | 0, 5 | 5 | -0.61 | - | -0.42 | - | -0.36 | - | mA |
| | | 2.5 | 0, 5 | 5 | -1.8 | - | -1.3 | - | -1.15 | - | mA |
| | | 9.5 | 0, 10 | 10 | -1.5 | - | -1.1 | - | -0.9 | - | mA |
| | | 13.5 | 0, 15 | 15 | -4 | - | -2.8 | - | -2.4 | - | mA |
| LOW-level output voltage | V_{OL} | - | 0, 5 | 5 | - | 0.05 | - | 0.05 | - | 0.05 | V |
| | | - | 0, 10 | 10 | - | 0.05 | - | 0.05 | - | 0.05 | V |
| | | - | 0, 15 | 15 | - | 0.05 | - | 0.05 | - | 0.05 | V |
| HIGH-level output voltage | V_{OH} | - | 0, 5 | 5 | 4.95 | - | 4.95 | - | 4.95 | - | V |
| | | - | 0, 10 | 10 | 9.95 | - | 9.95 | - | 9.95 | - | V |
| | | - | 0, 15 | 15 | 14.95 | - | 14.95 | - | 14.95 | - | V |
| LOW-level input voltage | V_{IL} | 0.5, 4.5 | - | 5 | - | 1.5 | - | 1.5 | - | 1.5 | V |
| | | 0.5, 9 | - | 10 | - | 3 | - | 3 | - | 3 | V |
| | | 0.5, 13.5 | - | 15 | - | 4 | - | 4 | - | 4 | V |
| HIGH-level input voltage | V_{IH} | 0.5 | - | 5 | 3.5 | - | 3.5 | - | 3.5 | - | V |
| | | 1 | - | 10 | 7 | - | 7 | - | 7 | - | V |
| | | 1.5 | - | 15 | 11 | - | 11 | - | 11 | - | V |
| input leakage current | I_I | - | 0, 15 | 15 | - | ± 0.1 | - | ± 1.0 | - | ± 1.0 | μA |

AC Characteristics ($T_{amb} = 25^{\circ}\text{C}$, $V_{SS} = 0\text{V}$, $t_r, t_f = 20\text{ns}$, $C_L = 50\text{pF}$, $R_L = 200\text{K}\Omega$, unless otherwise specified.)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|------------------------|--------------------|--------------------------------------|------|------|------|------|
| propagation delay time | t_{PHL}, t_{PLH} | see Figure 4 $V_{DD} = 5\text{V}$ | - | 125 | 250 | ns |
| | | $V_{DD} = 10\text{V}$ | - | 60 | 120 | ns |
| | | $V_{DD} = 15\text{V}$ | - | 45 | 90 | ns |
| transition time | t_{THL}, t_{TLH} | see Figure 4 $V_{DD} = 5\text{V}$ | - | 100 | 200 | ns |
| | | $V_{DD} = 10\text{V}$ | - | 50 | 100 | ns |
| | | $V_{DD} = 15\text{V}$ | - | 40 | 80 | ns |
| input capacitance | C_I | any input | - | 5 | 7.5 | pF |

Testing Circuit

AC Testing Circuit

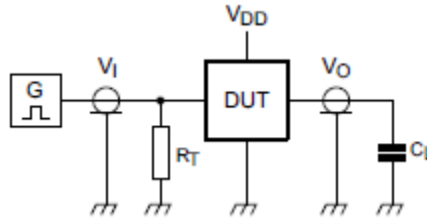


Figure 3. Test circuit for switching times

Definitions for test

circuit: DUT=Device

Under Test

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.

AC Testing Waveforms

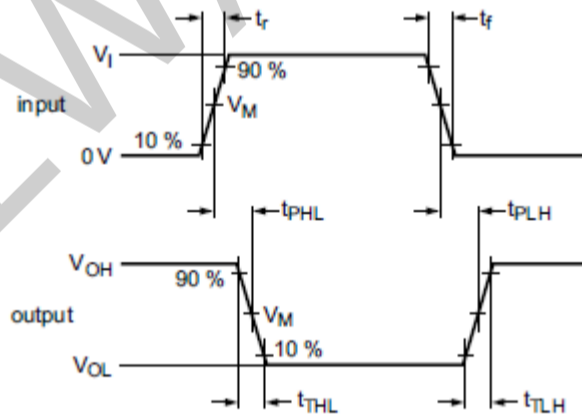


Figure 4. Propagation delay, output transition time

Measurement Points

| Supply voltage | Input | Output |
|----------------|---------------------|---------------------|
| V_{DD} | V_M | V_M |
| 5V to 15V | $0.5 \times V_{DD}$ | $0.5 \times V_{DD}$ |

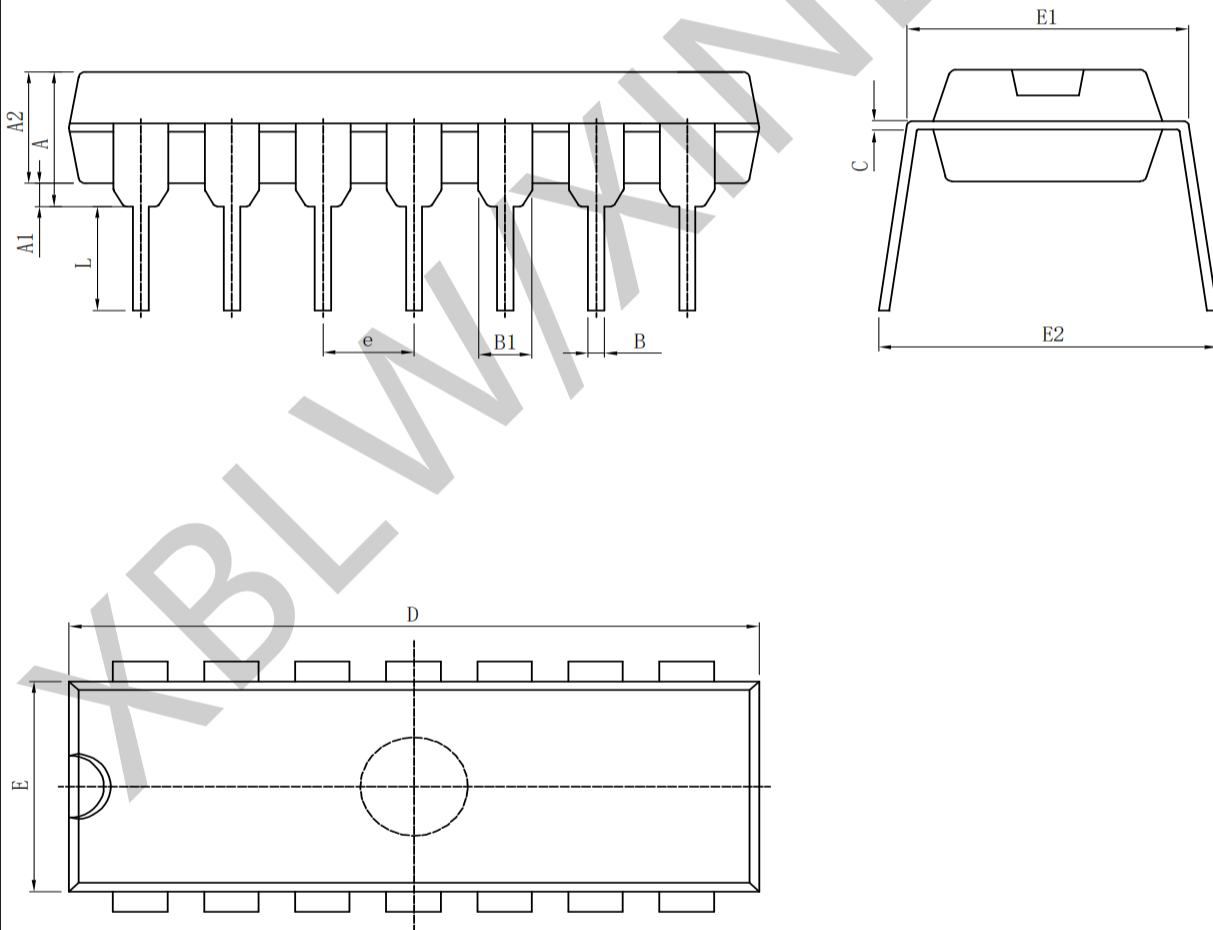
Test Data

| Supply voltage | Input | | Load |
|----------------|----------------------|--------------------|-------|
| V_{DD} | V_I | t_r, t_f | C_L |
| 5V to 15V | V_{SS} or V_{DD} | $\leq 20\text{ns}$ | 50pF |

Package Information

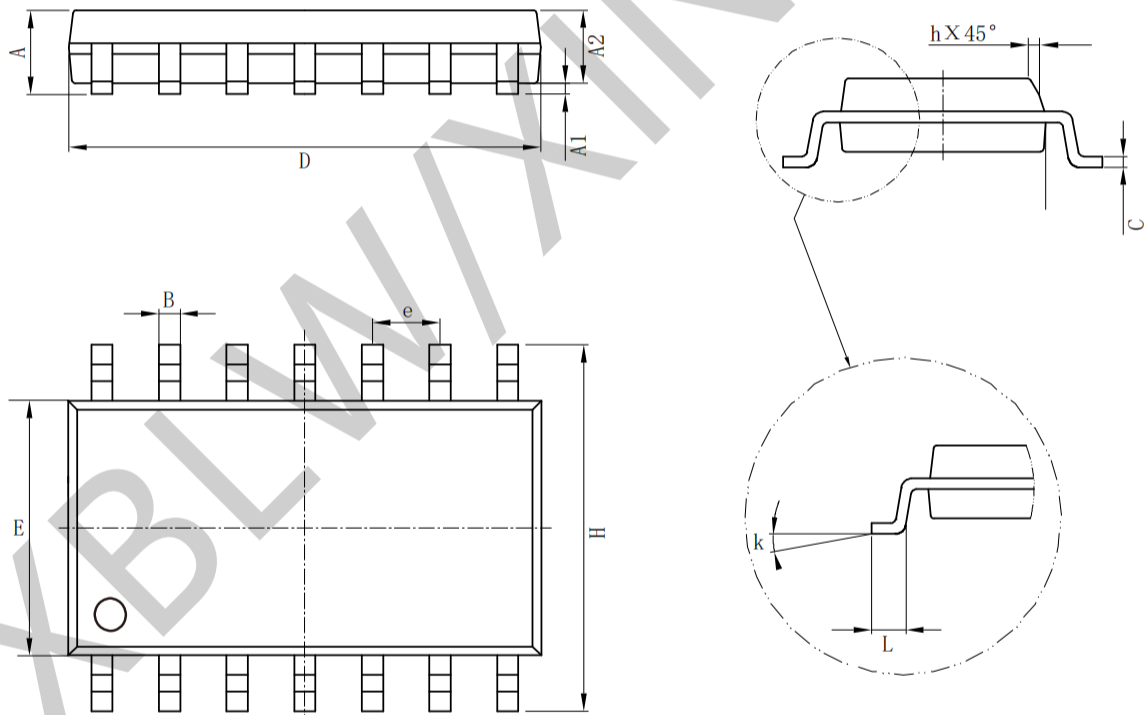
· DIP-14

| Symbol | Size | Dimensions In Millimeters | | Symbol | Size | Dimensions In Inches | |
|--------|------|---------------------------|----------|--------|------|----------------------|----------|
| | | Min (mm) | Max (mm) | | | Min (in) | Max (in) |
| A | | 3.710 | 4.310 | A | | 0.146 | 0.170 |
| A1 | | 0.510 | | A1 | | 0.020 | |
| A2 | | 3.200 | 3.600 | A2 | | 0.126 | 0.142 |
| B | | 0.380 | 0.570 | B | | 0.015 | 0.022 |
| B1 | | 1.524 (BSC) | | B1 | | 0.060 (BSC) | |
| C | | 0.204 | 0.360 | C | | 0.008 | 0.014 |
| D | | 18.800 | 19.200 | D | | 0.740 | 0.756 |
| E | | 6.200 | 6.600 | E | | 0.244 | 0.260 |
| E1 | | 7.320 | 7.920 | E1 | | 0.288 | 0.312 |
| e | | 2.540 (BSC) | | e | | 0.100 (BSC) | |
| L | | 3.000 | 3.600 | L | | 0.118 | 0.142 |
| E2 | | 8.400 | 9.000 | E2 | | 0.331 | 0.354 |



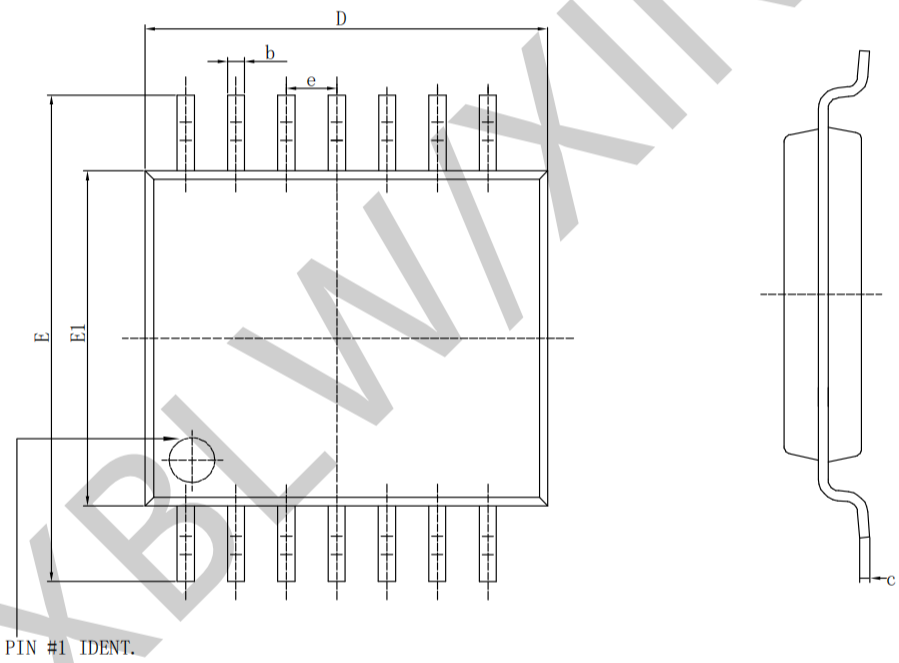
· SOP-14

| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Inches | |
|--------|---------------------------|------------|--------|----------------------|------------|
| | Min (mm) | Max (mm) | | Min (in) | Max (in) |
| A | 1.350 | 1.750 | A | 0.050 | 0.068 |
| A1 | 0.100 | 0.250 | A1 | 0.004 | 0.009 |
| A2 | 1.100 | 1.650 | A2 | 0.040 | 0.060 |
| B | 0.330 | 0.510 | B | 0.010 | 0.020 |
| C | 0.190 | 0.250 | C | 0.007 | 0.009 |
| D | 8.550 | 8.750 | D | 0.330 | 0.340 |
| E | 3.800 | 4.000 | E | 0.150 | 0.150 |
| e | 1.27 | | e | 0.05 | |
| H | 5.800 | 6.200 | H | 0.220 | 0.240 |
| h | 0.250 | 0.500 | h | 0.009 | 0.020 |
| L | 0.400 | 1.270 | L | 0.015 | 0.050 |
| k | 8° (max) | | k | 8° (max) | |

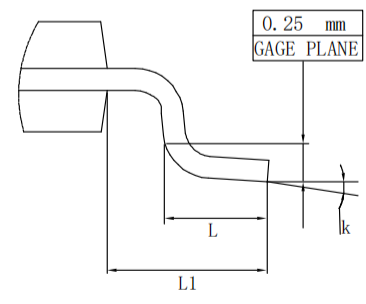
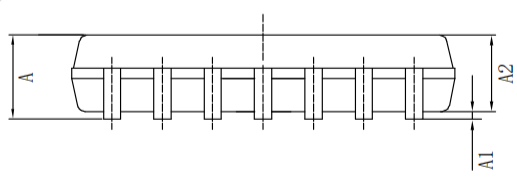


· TSSOP-14

| Size Symbol | Dimensions In Millimeters | | Size Symbol | Dimensions In Inches | |
|----------------|---------------------------|----------|----------------|----------------------|----------|
| | Min (mm) | Max (mm) | | Min (in) | Max (in) |
| A | | 1.200 | A | | 0.047 |
| A1 | 0.050 | 0.150 | A1 | 0.002 | 0.006 |
| A2 | 0.800 | 1.050 | A2 | 0.031 | 0.041 |
| b | 0.190 | 0.300 | b | 0.007 | 0.012 |
| c | 0.090 | 0.200 | c | 0.004 | 0.0089 |
| D | 4.900 | 5.100 | D | 0.193 | 0.201 |
| E | 6.200 | 6.600 | E | 0.244 | 0.260 |
| E1 | 4.300 | 4.500 | E1 | 0.169 | 0.176 |
| e | 0.65 | | e | 0.0256 | |
| L | 0.450 | 0.750 | L | 0.018 | 0.030 |
| L1 | 1.00 | | L1 | 0.039 | |
| k | 0° | 8° | k | 0° | 8° |



PIN #1 IDENT.



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