

**HEX BUFFERS WITH OPEN DRAIN OUTPUTS**

NEW PRODUCT

**Description**

The 74LV07A provides provides six independent buffers with open drain outputs. The device is designed for operation with a power supply range of 2.0V to 5.5V.

The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment. The device is fully specified for partial power down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output preventing damaging current backflow when the device is powered down.

The gates perform the Boolean function:

$$Y = A$$

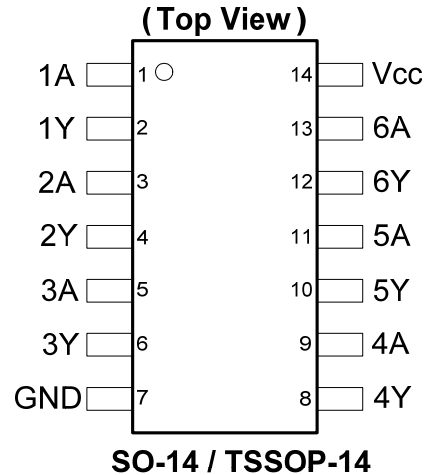
**Features**

- Wide Supply Voltage Range from 2.0V to 5.5V
- Sinks 12mA at V<sub>CC</sub> = 4.5V
- CMOS low power consumption
- IOFF Supports Partial -Power Down Operation
- Inputs or Outputs accept up to 5.5V
- Inputs can be driven by 3.3V or 5V allowing for voltage translation applications.
- Schmitt Trigger Action at All Inputs
- ESD Protection Tested per JESD 22
  - Exceeds 200-V Machine Model (A115)
  - Exceeds 2000-V Human Body Model (A114)
  - Exceeds 1000-V Charged Device Model (C101)
  - Latch-Up Exceeds 100mA per JESD 78, Class I
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

**Pin Assignments**



**Applications**

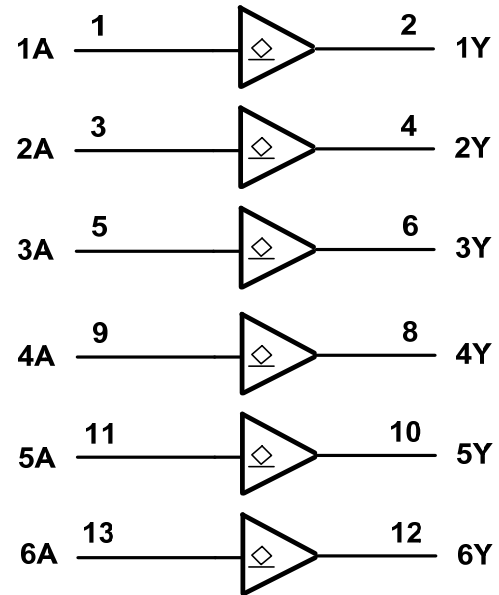
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
  - PCs, networking, notebooks, ultrabooks, netbooks
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box

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**Pin Descriptions**

| Pin Number | Pin Name | Description    |
|------------|----------|----------------|
| 1          | 1A       | Data Input     |
| 2          | 1Y       | Data Output    |
| 3          | 2A       | Data Input     |
| 4          | 2Y       | Data Output    |
| 5          | 3A       | Data Input     |
| 6          | 3Y       | Data Output    |
| 7          | GND      | Ground         |
| 8          | 4Y       | Data Output    |
| 9          | 4A       | Data Input     |
| 10         | 5Y       | Data Output    |
| 11         | 5A       | Data Input     |
| 12         | 6Y       | Data Output    |
| 13         | 6A       | Data Input     |
| 14         | Vcc      | Supply Voltage |

**Logic Diagram**



**Function Table**

| Input | Output |
|-------|--------|
| A     | Y      |
| H     | Z      |
| L     | L      |

**Absolute Maximum Ratings** (Note 4) (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Symbol           | Parameter  | Rating       | Unit |
|------------------|--|--------------|------|
| ESD HBM          | Human Body Model ESD Protection  | 2            | kV   |
| ESD CDM          | Charged Device Model ESD Protection                                      | 1            | kV   |
| ESD MM           | Machine Model ESD Protection   | 200          | V    |
| V <sub>CC</sub>  | Supply Voltage Range   | -0.5 to +7.0 | V    |
| V <sub>I</sub>   | Input Voltage Range (Note 4)   | -0.5 to +7.0 | V    |
| I <sub>IK</sub>  | Input Clamp Current V <sub>I</sub> < 0V                                  | -20          | mA   |
| I <sub>OK</sub>  | Output Clamp Current V <sub>O</sub> < 0V                                 | -50          | mA   |
| I <sub>O</sub>   | Continuous Output Current -0.5V < V <sub>O</sub> < V <sub>CC</sub> +0.5V | - 25         | mA   |
| I <sub>CC</sub>  | Continuous Current Through V <sub>CC</sub>                               | 50           | mA   |
| I <sub>GND</sub> | Continuous Current Through GND   | -50          | mA   |
| T <sub>J</sub>   | Operating Junction Temperature   | -40 to +150  | °C   |
| T <sub>STG</sub> | Storage Temperature  | -65 to +150  | °C   |
| P <sub>TOT</sub> | Total Power Dissipation  | 500          | mW   |

Note: 4. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

**Recommended Operating Conditions** (Note 5) (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Symbol          | Parameter                          | Conditions   | Min | Max | Unit |
|-----------------|------------------------------------|--------------|-----|-----|------|
| V <sub>CC</sub> | Supply Voltage                     | —            | 2.0 | 5.5 | V    |
| V <sub>I</sub>  | Input Voltage                      | —            | 0   | 5.5 | V    |
| V <sub>O</sub>  | Output Voltage                     | —            | 0   | 5.5 | V    |
| I <sub>OL</sub> | Low-Level Output Current           | 2.0V         | —   | 50  | μA   |
|                 |                                    | 2.3V to 2.7V | —   | 2   | mA   |
|                 |                                    | 3.0V to 3.6V | —   | 6   | mA   |
|                 |                                    | 4.5V to 5.5V | —   | 12  | mA   |
| Δt/ΔV           | Input Transition Rise or Fall Rate | 2.3V to 2.7V | —   | 200 | ns/V |
|                 |                                    | 3.0V to 3.6V | —   | 100 |      |
|                 |                                    | 4.5V to 5.5V | —   | 20  |      |
| T <sub>A</sub>  | Operating Free-Air Temperature     | —            | -40 | 125 | °C   |

Note: 5. Unused inputs should be held at V<sub>CC</sub> or Ground.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Symbol           | Parameter                  | Test Conditions   | V <sub>CC</sub> | T <sub>A</sub> = -40°C to +85°C |                       | T <sub>A</sub> = -40°C to +125°C |                       | Unit |
|------------------|----------------------------|---|-----------------|---------------------------------|-----------------------|----------------------------------|-----------------------|------|
|                  |                            |   |                 | Min                             | Max                   | Min                              | Max                   |      |
| V <sub>IH</sub>  | High-Level Input Voltage   | —   | 2.0V            | 1.5                             | —                     | 1.5                              | —                     | V    |
|                  |                            | —   | 2.3V to 2.7V    | V <sub>CC</sub> X 0.7           | —                     | V <sub>CC</sub> X 0.7            | —                     |      |
|                  |                            | —   | 3.0V to 3.6V    | V <sub>CC</sub> X 0.7           | —                     | V <sub>CC</sub> X 0.7            | —                     |      |
|                  |                            | —   | 4.5V to 5.5V    | V <sub>CC</sub> X 0.7           | —                     | V <sub>CC</sub> X 0.7            | —                     |      |
| V <sub>IL</sub>  | Low-Level Input Voltage    | —   | 2.0V            | —                               | 0.5                   | —                                | 0.5                   | V    |
|                  |                            | —   | 2.3V to 2.7V    | —                               | V <sub>CC</sub> X 0.3 | —                                | V <sub>CC</sub> X 0.3 |      |
|                  |                            | —   | 3.0V to 3.6V    | —                               | V <sub>CC</sub> X 0.3 | —                                | V <sub>CC</sub> X 0.3 |      |
|                  |                            | —   | 4.5V to 5.5V    | —                               | V <sub>CC</sub> X 0.3 | —                                | V <sub>CC</sub> X 0.3 |      |
| V <sub>OL</sub>  | Low-Level Output Voltage   | I <sub>OL</sub> = 50μA  | 2.0V to 5.5V    | —                               | 0.1                   | —                                | 0.1                   | V    |
|                  |                            | I <sub>OL</sub> = 2mA   | 2.3V            | —                               | 0.4                   | —                                | 0.4                   |      |
|                  |                            | I <sub>OL</sub> = 6mA   | 3.0V            | —                               | 0.44                  | —                                | 0.44                  |      |
|                  |                            | I <sub>OL</sub> = 12mA  | 4.5V            | —                               | 0.55                  | —                                | 0.55                  |      |
| I <sub>OFF</sub> | Power Down Leakage Current | V <sub>I</sub> or V <sub>O</sub> = 0 to 5.5V                  | 0V              | —                               | 5                     | —                                | 5                     | μA   |
| I <sub>I</sub>   | Input Current              | V <sub>I</sub> = GND or 5.5V                                  | 0 to 5.5V       | —                               | ±1                    | —                                | ±1                    | μA   |
| I <sub>CC</sub>  | Supply Current             | V <sub>I</sub> = GND or V <sub>CC</sub><br>I <sub>O</sub> = 0 | 5.5V            | —                               | 20                    | —                                | 20                    | μA   |

### Switching Characteristics

V<sub>CC</sub> = 2.5V ± 0.2V

| Symbol           | Parameter  | Test Conditions                   | T <sub>A</sub> = +25°C |      |      | -40°C to +85°C |     | -40°C to +125°C |     | Unit |
|------------------|--|-----------------------------------|------------------------|------|------|----------------|-----|-----------------|-----|------|
|                  |  |                                   | Min                    | Typ  | Max  | Min            | Max | Min             | Max |      |
| t <sub>PLZ</sub> | Propagation Delay A <sub>N</sub> to Y <sub>N</sub> | Figure 1<br>C <sub>L</sub> = 15pF | —                      | 6.6  | 10.4 | 1              | 13  | 1               | 13  | ns   |
| t <sub>PZL</sub> |  |                                   | —                      | 7.5  | 10.4 | 1              | 13  | 1               | 13  |      |
| t <sub>PLZ</sub> |  | Figure 1<br>C <sub>L</sub> = 50pF | —                      | 11.1 | 15.2 | 1              | 18  | 1               | 18  | ns   |
| t <sub>PZL</sub> |  |                                   | —                      | 9.6  | 15.2 | 1              | 18  | 1               | 18  |      |

V<sub>CC</sub> = 3.3V ± 0.3V

| Symbol           | Parameter  | Test Conditions                   | T <sub>A</sub> = +25°C |     |      | -40°C to +85°C |     | -40°C to +125°C |     | Unit |
|------------------|--|-----------------------------------|------------------------|-----|------|----------------|-----|-----------------|-----|------|
|                  |  |                                   | Min                    | Typ | Max  | Min            | Max | Min             | Max |      |
| t <sub>PLZ</sub> | Propagation Delay A <sub>N</sub> to Y <sub>N</sub> | Figure 1<br>C <sub>L</sub> = 15pF | —                      | 5   | 7.1  | 1              | 8.5 | 1               | 8.5 | ns   |
| t <sub>PZL</sub> |  |                                   | —                      | 5   | 7.1  | 1              | 8.5 | 1               | 8.5 |      |
| t <sub>PLZ</sub> |  | Figure 1<br>C <sub>L</sub> = 50pF | —                      | 8.2 | 10.6 | 1              | 12  | 1               | 12  | ns   |
| t <sub>PZL</sub> |  |                                   | —                      | 6.6 | 10.6 | 1              | 12  | 1               | 12  |      |

V<sub>CC</sub> = 5.0V ± 0.5V

| Symbol           | Parameter  | Test Conditions                    | T <sub>A</sub> = +25°C |     |     | -40°C to +85°C |     | -40°C to +125°C |     | Unit |
|------------------|--|------------------------------------|------------------------|-----|-----|----------------|-----|-----------------|-----|------|
|                  |  |                                    | Min                    | Typ | Max | Min            | Max | Min             | Max |      |
| t <sub>PLZ</sub> | Propagation Delay A <sub>N</sub> to Y <sub>N</sub> | Figure 1<br>C <sub>L</sub> = 15pF  | —                      | 3.8 | 5.5 | 1              | 6.5 | 1               | 6.5 | ns   |
| t <sub>PZL</sub> |  |                                    | —                      | 3.4 | 5.5 | 1              | 6.5 | 1               | 6.5 |      |
| t <sub>PLZ</sub> |  | Figure 1<br>C <sub>L</sub> = 50 pF | —                      | 5.7 | 7.5 | 1              | 8.5 | 1               | 8.5 | ns   |
| t <sub>PZL</sub> |  |                                    | —                      | 4.5 | 7.5 | 1              | 8.5 | 1               | 8.5 |      |

### Operating Characteristics

T<sub>A</sub> = +25°C

| Parameter       |  | Test Conditions                    | V <sub>CC</sub> | Typ | Unit |
|-----------------|--|------------------------------------|-----------------|-----|------|
| C <sub>pd</sub> | Power Dissipation Capacitance per Gate | f = 10MHz<br>C <sub>L</sub> = 50pF | 3.3V            | 2.9 | pF   |
|                 |  |                                    | 5.0V            | 5.3 |      |

### Noise Characteristics

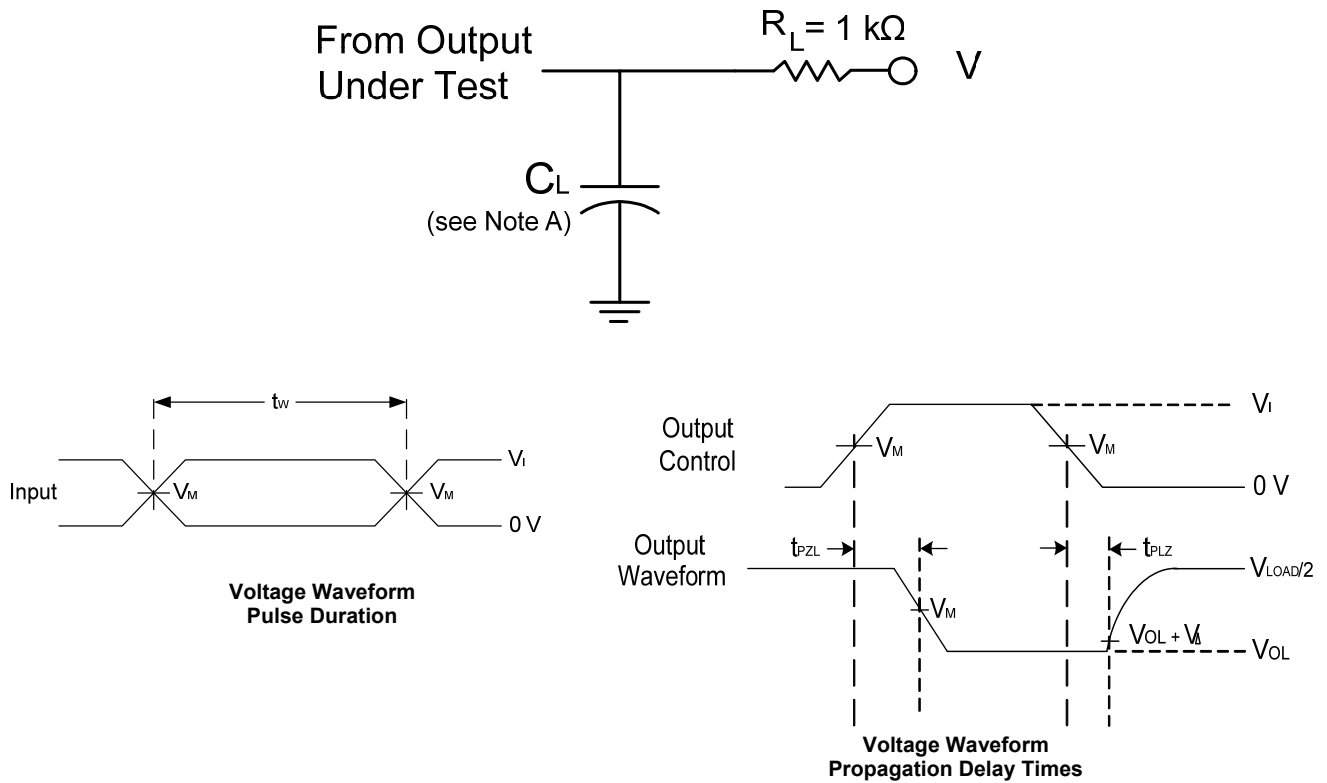
V<sub>CC</sub> = 3V, C<sub>L</sub> = 50pF, T<sub>A</sub> = +25°C

| Symbol             | Parameter                                     | Min  | Typ  | Max  | Unit |
|--------------------|---|------|------|------|------|
| V <sub>OL(p)</sub> | Quiet output, maximum dynamic V <sub>OL</sub> | —    | 0.2  | 0.8  | V    |
| V <sub>OL(v)</sub> | Quiet output, minimum dynamic V <sub>OL</sub> | —    | -0.1 | -0.8 | V    |
| V <sub>OH(v)</sub> | Quiet output, minimum dynamic V <sub>OH</sub> | —    | 3.1  | —    | V    |
| V <sub>IH(D)</sub> | High Level dynamic input voltage              | 2.31 | —    | —    | V    |
| V <sub>IL(D)</sub> | Low Level dynamic input voltage               | —    | —    | 0.99 | V    |

### Package Characteristics

| Symbol         | Parameter         | Test Conditions                           | V <sub>CC</sub> | Min | Typ | Max | Unit |
|----------------|-------------------|---|-----------------|-----|-----|-----|------|
| C <sub>i</sub> | Input Capacitance | V <sub>i</sub> = V <sub>CC</sub> – or GND | 2.0 to 5.5V     | —   | 3.3 | 10  | pF   |

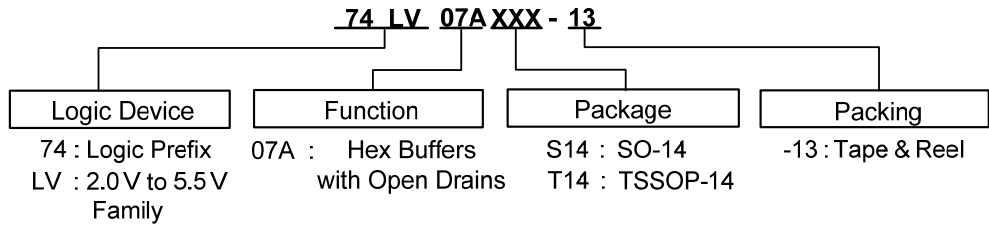
**Parameter Measurement Information**



- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 10\text{ MHz}$ .
  - C. The inputs are measured one at a time with one transition per measurement.
  - D. For the open drain device  $t_{PLZ}$  and  $t_{PZL}$  are the same as  $t_{PD}$ .
  - E.  $t_{PZL}$  is measured at  $V_M$ .
  - D.  $t_{PLZ}$  is measured at  $V_{OL} + V_\Delta$  where  $V_\Delta = 0.3\text{ V}$ .

**Figure 1 Load Circuit and Voltage Waveforms**

**Ordering Information**

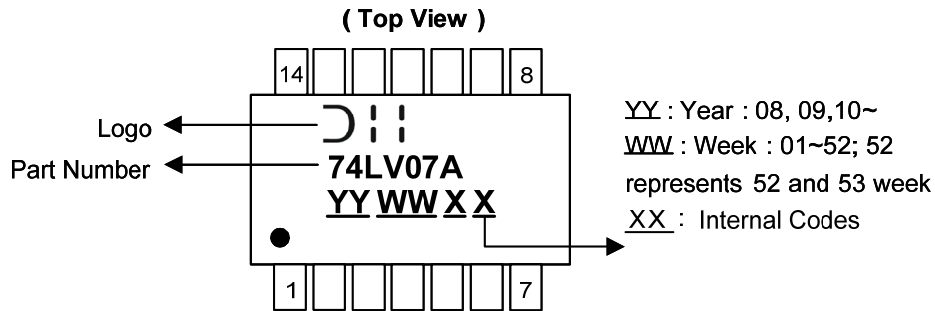


| Device        | Package Code | Packaging (Note 6) | 13" Tape and Reel |                    |
|---------------|--------------|--------------------|-------------------|--------------------|
|               |              |                    | Quantity          | Part Number Suffix |
| 74LV07AS14-13 | S14          | SO-14              | 2500/Tape & Reel  | -13                |
| 74LV07AT14-13 | T14          | TSSOP-14           | 2500/Tape & Reel  | -13                |

Note: 6. The taping orientation and tape details can be found at <http://www.diodes.com/datasheets/ap02007.pdf>

**Marking Information**

(1) SO14, TSSOP14



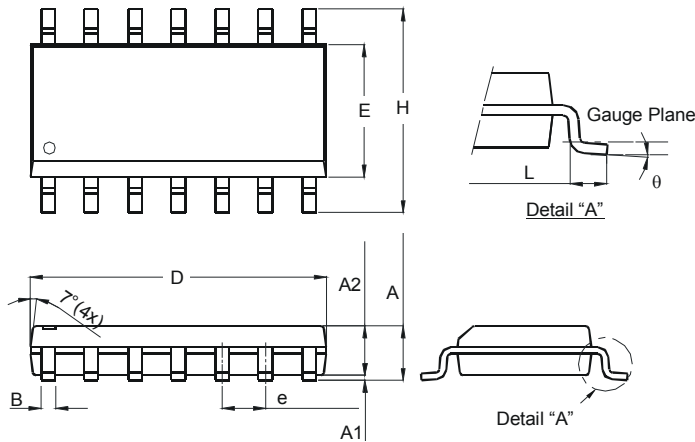
| Part Number | Package  |
|-------------|----------|
| 74LV07AS14  | SO-14    |
| 74LV07AT14  | TSSOP-14 |

NEW PRODUCT

**Package Outline Dimensions** (All Dimensions in mm)

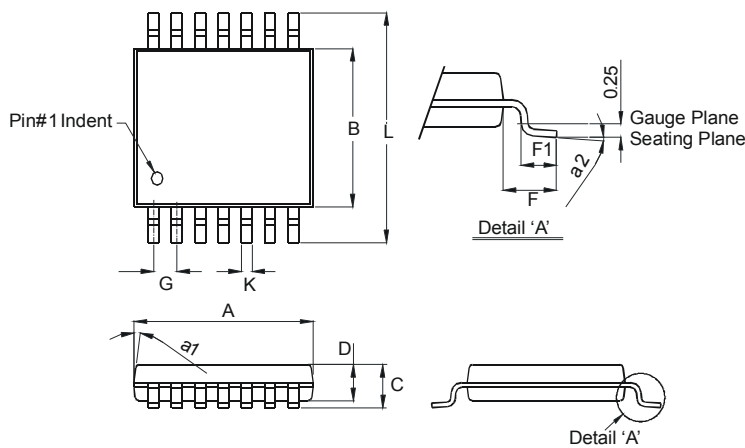
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

Package Type: SO-14



| SO-14                |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 1.47     | 1.73 |
| A1                   | 0.10     | 0.25 |
| A2                   | 1.45 Typ |      |
| B                    | 0.33     | 0.51 |
| D                    | 8.53     | 8.74 |
| E                    | 3.80     | 3.99 |
| e                    | 1.27 Typ |      |
| H                    | 5.80     | 6.20 |
| L                    | 0.38     | 1.27 |
| θ                    | 0°       | 8°   |
| All Dimensions in mm |          |      |

Package Type: TSSOP-14

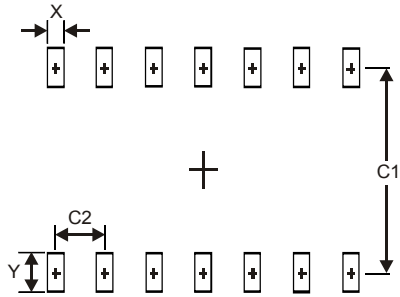


| TSSOP-14             |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| a1                   | 7° (4X)  |      |
| a2                   | 0°       | 8°   |
| A                    | 4.9      | 5.10 |
| B                    | 4.30     | 4.50 |
| C                    | —        | 1.2  |
| D                    | 0.8      | 1.05 |
| F                    | 1.00 Typ |      |
| F1                   | 0.45     | 0.75 |
| G                    | 0.65 Typ |      |
| K                    | 0.19     | 0.30 |
| L                    | 6.40 Typ |      |
| All Dimensions in mm |          |      |

**Suggested Pad Layout**

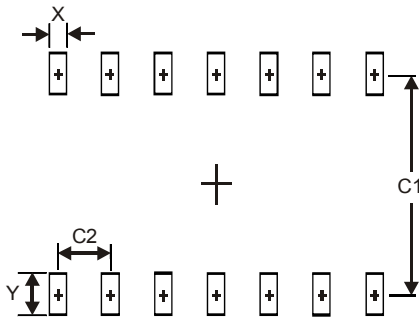
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

**Package Type: SO-14**



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.60          |
| Y          | 1.50          |
| C1         | 5.4           |
| C2         | 1.27          |

**Package Type: TSSOP-14**



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.45          |
| Y          | 1.45          |
| C1         | 5.9           |
| C2         | 0.65          |



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[NLU3G16AMX1TCG](#) [NLV27WZ125USG](#) [MC74HCT365ADTR2G](#) [BCM6306KMLG](#) [54FCT240CTDB](#) [Le87401NQC](#) [Le87402MQC](#)  
[028192B](#) [042140C](#) [051117G](#) [070519XB](#) [065312DB](#) [091056E](#) [098456D](#) [NL17SG07DFT2G](#) [NL17SG17DFT2G](#) [NL17SG34DFT2G](#)  
[NL17SZ07P5T5G](#) [NL17SZ125P5T5G](#) [NLU1GT126AMUTCG](#) [NLV27WZ16DFT2G](#) [5962-8982101PA](#) [5962-9052201PA](#) [74LVC07ADR2G](#)  
[MC74VHC1G125DFT1G](#) [NL17SH17P5T5G](#) [NL17SZ125CMUTCG](#) [NLV17SZ07DFT2G](#) [NLV37WZ17USG](#) [NLVHCT244ADTR2G](#)  
[NC7WZ17FHX](#) [74HCT126T14-13](#) [NL17SH125P5T5G](#) [NLV14049UBDTR2G](#) [NLV37WZ07USG](#) [74VHC541FT\(BE\)](#) [RHFAC244K1](#)  
[74LVC1G17FW4-7](#) [74LVC1G126FZ4-7](#) [BCM6302KMLG](#) [74LVC1G07FZ4-7](#) [74LVC1G125FW4-7](#)