

## Description

The Advanced Ultra Low Power (AUP) CMOS logic family is designed for low power and extended battery life in portable applications.

The 74AUP1G125 is a single non-inverting buffer/bus driver designed for operation over a power supply range of 0.8V to 3.6V. The device has a 3-state output that enters a high impedance state when a HIGH-level is applied to the output enable ( $\overline{OE}$ ) pin. The device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output preventing damaging current backflow when the device is powered down.

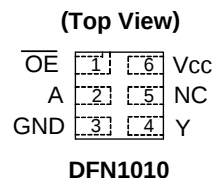
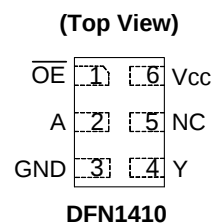
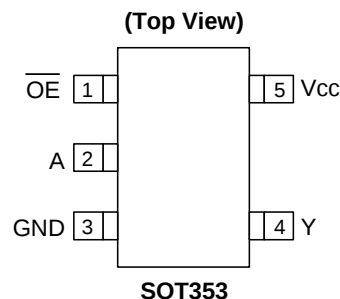
## Features

- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- $\pm 4\text{mA}$  Output Drive at 3.0V
- Low Static power consumption
  - $I_{CC} < 0.9\mu\text{A}$
- Low Dynamic Power Consumption
  - $C_{PD} = 6.3\text{pF}$  (Typical at 3.6V)
- Schmitt Trigger Action at All Inputs Make the Circuit Tolerant for Slower Input Rise and Fall Time. The hysteresis is typically 250mV at  $V_{CC} = 3.0\text{V}$
- $I_{OFF}$  Supports Partial-Power-Down Mode Operation
- ESD Protection Exceeds JESD 22
  - 2000-V Human Body Model (A114-A)
  - Exceeds 1000-V Charged Device Model (C101C)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- Range of Package Options SOT353, DFN1410, and DFN1010
- Leadless packages per JESD30E
  - DFN1010 denoted as X2-DFN1010-6
  - DFN1014 denoted as X2-DFN1014-6
- **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> 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

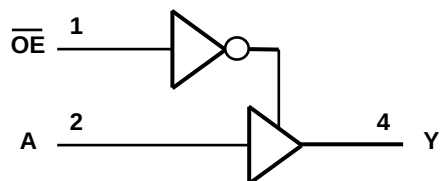
- Suited for battery and low power needs
- Wide array of products such as:
  - Tablets, E-readers
  - Cell Phones, Personal Navigation / GPS
  - MP3 players, Cameras, Video Recorders
  - PCs ultrabooks, notebooks, netbooks,
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box

[Click here for ordering information, located at the end of datasheet](#)

## Pin Descriptions

| Pin Name               | Function       |
|------------------------|----------------|
| $\overline{\text{OE}}$ | Output Enable  |
| A                      | Data Input     |
| GND                    | Ground         |
| Y                      | Data Output    |
| V <sub>CC</sub>        | Supply Voltage |

## Logic Diagram



## Function Table

| Inputs                 |   | Output |
|------------------------|---|--------|
| $\overline{\text{OE}}$ | A | Y      |
| L                      | H | H      |
| L                      | L | L      |
| H                      | X | Z      |

## 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   |
| V <sub>CC</sub>  | Supply Voltage Range                                               | -0.5 to +4.6                 | V    |
| V <sub>I</sub>   | Input Voltage Range                                                | -0.5 to +4.6                 | V    |
| V <sub>O</sub>   | Voltage applied to output in high or low state                     | -0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>IK</sub>  | Input Clamp Current V <sub>I</sub> < 0                             | 50                           | mA   |
| I <sub>OK</sub>  | Output Clamp Current (V <sub>O</sub> < 0)                          | 50                           | mA   |
| I <sub>O</sub>   | Continuous Output Current (V <sub>O</sub> = 0 to V <sub>CC</sub> ) | ±20                          | 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   |

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                          | Min                            | Max             | Unit |
|-----------------|------------------------------------|--------------------------------|-----------------|------|
| V <sub>CC</sub> | Operating Voltage                  | 0.8                            | 3.6             | V    |
| V <sub>I</sub>  | Input Voltage                      | 0                              | 3.6             | V    |
| V <sub>O</sub>  | Output Voltage                     | 0                              | V <sub>CC</sub> | V    |
| I <sub>OH</sub> | High-Level Output Current          | V <sub>CC</sub> = 0.8V         | -20             | μA   |
|                 |                                    | V <sub>CC</sub> = 1.1V         | -1.1            | mA   |
|                 |                                    | V <sub>CC</sub> = 1.4V         | -1.7            |      |
|                 |                                    | V <sub>CC</sub> = 1.65V        | -1.9            |      |
|                 |                                    | V <sub>CC</sub> = 2.3V         | -3.1            |      |
|                 |                                    | V <sub>CC</sub> = 3.0V         | -4              |      |
| I <sub>OL</sub> | Low-Level Output Current           | V <sub>CC</sub> = 0.8V         | 20              | μA   |
|                 |                                    | V <sub>CC</sub> = 1.1V         | 1.1             | mA   |
|                 |                                    | V <sub>CC</sub> = 1.4V         | 1.7             |      |
|                 |                                    | V <sub>CC</sub> = 1.65V        | 1.9             |      |
|                 |                                    | V <sub>CC</sub> = 2.3V         | 3.1             |      |
|                 |                                    | V <sub>CC</sub> = 3.0V         | 4               |      |
| Δt/ΔV           | Input Transition Rise or Fall Rate | V <sub>CC</sub> = 0.8V to 3.6V | 200             | ns/V |
| 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> = +25°C |                        | T <sub>A</sub> = -40°C to +85°C |                        | Unit |
|-------------------|----------------------------------|------------------------------------------------------------------------------------------------|-----------------|------------------------|------------------------|---------------------------------|------------------------|------|
|                   |                                  |                                                                                                |                 | Min                    | Max                    | Min                             | Max                    |      |
| V <sub>IH</sub>   | High-Level Input Voltage         |                                                                                                | 0.8V to 1.65V   | 0.80 X V <sub>CC</sub> |                        | 0.80 X V <sub>CC</sub>          |                        | V    |
|                   |                                  |                                                                                                | 1.65V to 1.95V  | 0.65 X V <sub>CC</sub> |                        | 0.65 X V <sub>CC</sub>          |                        |      |
|                   |                                  |                                                                                                | 2.3V to 2.7V    | 1.6                    |                        | 1.6                             |                        |      |
|                   |                                  |                                                                                                | 3.0V to 3.6V    | 2.0                    |                        | 2.0                             |                        |      |
| V <sub>IL</sub>   | Low-Level Input Voltage          |                                                                                                | 0.8V to 1.65V   |                        | 0.30 X V <sub>CC</sub> |                                 | 0.30 X V <sub>CC</sub> | V    |
|                   |                                  |                                                                                                | 1.65V to 1.95V  |                        | 0.35 X V <sub>CC</sub> |                                 | 0.35 X V <sub>CC</sub> |      |
|                   |                                  |                                                                                                | 2.3V to 2.7V    |                        | 0.7                    |                                 | 0.7                    |      |
|                   |                                  |                                                                                                | 3.0V to 3.6V    |                        | 0.9                    |                                 | 0.9                    |      |
| V <sub>OH</sub>   | High-Level Output Voltage        | I <sub>OH</sub> = -20μA                                                                        | 0.8V to 3.6V    | V <sub>CC</sub> - 0.1  |                        | V <sub>CC</sub> - 0.1           |                        | V    |
|                   |                                  | I <sub>OH</sub> = -1.1mA                                                                       | 1.1V            | 0.75 X V <sub>CC</sub> |                        | 0.7 X V <sub>CC</sub>           |                        |      |
|                   |                                  | I <sub>OH</sub> = -1.7mA                                                                       | 1.4V            | 1.11                   |                        | 1.03                            |                        |      |
|                   |                                  | I <sub>OH</sub> = -1.9mA                                                                       | 1.65V           | 1.32                   |                        | 1.3                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -2.3mA                                                                       | 2.3V            | 2.05                   |                        | 1.97                            |                        |      |
|                   |                                  | I <sub>OH</sub> = -3.1mA                                                                       |                 | 1.9                    |                        | 1.85                            |                        |      |
|                   |                                  | I <sub>OH</sub> = -2.7mA                                                                       | 3V              | 2.72                   |                        | 2.67                            |                        |      |
|                   |                                  | I <sub>OH</sub> = -4mA                                                                         |                 | 2.6                    |                        | 2.55                            |                        |      |
| V <sub>OL</sub>   | High-Level Input Voltage         | I <sub>OL</sub> = 20μA                                                                         | 0.8V to 3.6V    |                        | 0.1                    |                                 | 0.1                    | V    |
|                   |                                  | I <sub>OL</sub> = 1.1mA                                                                        | 1.1V            |                        | 0.3 X V <sub>CC</sub>  |                                 | 0.3 X V <sub>CC</sub>  |      |
|                   |                                  | I <sub>OL</sub> = 1.7mA                                                                        | 1.4V            |                        | 0.31                   |                                 | 0.37                   |      |
|                   |                                  | I <sub>OL</sub> = 1.9mA                                                                        | 1.65V           |                        | 0.31                   |                                 | 0.35                   |      |
|                   |                                  | I <sub>OL</sub> = 2.3mA                                                                        | 2.3V            |                        | 0.31                   |                                 | 0.33                   |      |
|                   |                                  | I <sub>OL</sub> = 3.1 mA                                                                       |                 |                        | 0.44                   |                                 | 0.45                   |      |
|                   |                                  | I <sub>OL</sub> = 2.7 mA                                                                       | 3V              |                        | 0.31                   |                                 | 0.33                   |      |
|                   |                                  | I <sub>OL</sub> = 4 mA                                                                         |                 |                        | 0.44                   |                                 | 0.45                   |      |
| I <sub>I</sub>    | Input Current                    | A or B Input<br>V <sub>I</sub> = GND to 3.6V                                                   | 0 to 3.6V       |                        | ±0.1                   |                                 | ±0.5                   | μA   |
| I <sub>OFF</sub>  | Power Down Leakage Current       | V <sub>I</sub> or V <sub>O</sub> = 0V to 3.6V                                                  | 0               |                        | ±0.2                   |                                 | ±0.5                   | μA   |
| I <sub>OZ</sub>   | Z State Leakage Current          | V <sub>O</sub> = 3.6V<br>V <sub>I</sub> = 3.6V                                                 | 3.6V            |                        | ±0.2                   |                                 | ±0.5                   | μA   |
| ΔI <sub>OFF</sub> | Delta Power Down Leakage Current | V <sub>I</sub> or V <sub>O</sub> = 0V to 3.6V                                                  | 0 to 0.2V       |                        | 0.2                    |                                 | 0.6                    | μA   |
| I <sub>CC</sub>   | Supply Current                   | V <sub>I</sub> = GND or V <sub>CC</sub> , I <sub>O</sub> = 0                                   | 0.8V to 3.6V    |                        | 0.5                    |                                 | 0.9                    | μA   |
| ΔI <sub>CC</sub>  | Additional Supply Current        | Data input at V <sub>CC</sub> -0.6V<br>OE= GND I <sub>O</sub> =0 A                             | 3.3V            |                        | 40                     |                                 | 50                     | μA   |
|                   |                                  | OE input at V <sub>CC</sub> -0.6V<br>Data Input = GND or V <sub>CC</sub> , I <sub>O</sub> =0 A | 3.3V            |                        | 110                    |                                 | 120                    | μA   |
|                   |                                  | OE input at V <sub>CC</sub><br>Data Input = GND to 3.6V<br>I <sub>O</sub> = 0A                 | 0.8V to 3.6V    |                        | 1                      |                                 | 1                      | μA   |

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

| Symbol            | Parameter                        | Test Conditions                                                                                 | V <sub>CC</sub> | T <sub>A</sub> = -40°C to +125°C |                        | Unit |
|-------------------|----------------------------------|-------------------------------------------------------------------------------------------------|-----------------|----------------------------------|------------------------|------|
|                   |                                  |                                                                                                 |                 | Min                              | Max                    |      |
| V <sub>IH</sub>   | High-Level Input Voltage         |                                                                                                 | 0.8V to 1.65V   | 0.80 X V <sub>CC</sub>           |                        | V    |
|                   |                                  |                                                                                                 | 1.65V to 1.95V  | 0.70 X V <sub>CC</sub>           |                        |      |
|                   |                                  |                                                                                                 | 2.3V to 2.7V    | 1.6                              |                        |      |
|                   |                                  |                                                                                                 | 3.0V to 3.6V    | 2.0                              |                        |      |
| V <sub>IL</sub>   | Low-Level Input Voltage          |                                                                                                 | 0.8V to 1.65V   |                                  | 0.25X V <sub>CC</sub>  | V    |
|                   |                                  |                                                                                                 | 1.65V to 1.95V  |                                  | 0.35 X V <sub>CC</sub> |      |
|                   |                                  |                                                                                                 | 2.3V to 2.7V    |                                  | 0.7                    |      |
|                   |                                  |                                                                                                 | 3.0V to 3.6V    |                                  | 0.9                    |      |
| V <sub>OH</sub>   | High-Level Output Voltage        | I <sub>OH</sub> = -20μA                                                                         | 0.8V to 3.6V    | V <sub>CC</sub> – 0.11           |                        | V    |
|                   |                                  | I <sub>OH</sub> = -1.1mA                                                                        | 1.1V            | 0.6 X V <sub>CC</sub>            |                        |      |
|                   |                                  | I <sub>OH</sub> = -1.7mA                                                                        | 1.4V            | 0.93                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -1.9mA                                                                        | 1.65V           | 1.17                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -2.3mA                                                                        | 2.3V            | 1.77                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -3.1mA                                                                        |                 | 1.67                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -2.7mA                                                                        | 3V              | 2.40                             |                        |      |
|                   |                                  | I <sub>OH</sub> = -4mA                                                                          |                 | 2.30                             |                        |      |
| V <sub>OL</sub>   | High-Level Input Voltage         | I <sub>OL</sub> = 20μA                                                                          | 0.8V to 3.6V    |                                  | 0.11                   | V    |
|                   |                                  | I <sub>OL</sub> = 1.1mA                                                                         | 1.1V            |                                  | 0.3 X V <sub>CC</sub>  |      |
|                   |                                  | I <sub>OL</sub> = 1.7mA                                                                         | 1.4V            |                                  | 0.41                   |      |
|                   |                                  | I <sub>OL</sub> = 1.9mA                                                                         | 1.65V           |                                  | 0.39                   |      |
|                   |                                  | I <sub>OL</sub> = 2.3mA                                                                         | 2.3V            |                                  | 0.36                   |      |
|                   |                                  | I <sub>OL</sub> = 3.1mA                                                                         |                 |                                  | 0.50                   |      |
|                   |                                  | I <sub>OL</sub> = 2.7mA                                                                         | 3V              |                                  | 0.36                   |      |
|                   |                                  | I <sub>OL</sub> = 4mA                                                                           |                 |                                  | 0.50                   |      |
| I <sub>I</sub>    | Input Current                    | A or B Input<br>V <sub>I</sub> = GND to 3.6V                                                    | 0 to 3.6V       |                                  | ±0.75                  | μA   |
| I <sub>OFF</sub>  | Power Down Leakage Current       | V <sub>I</sub> or V <sub>O</sub> = 0V to 3.6V                                                   | 0               |                                  | ±3.5                   | μA   |
| I <sub>OZ</sub>   | Z State Leakage Current          | V <sub>O</sub> = 3.6V<br>V <sub>I</sub> = 3.6V                                                  | 3.6V            |                                  | ±1.5                   | μA   |
| ΔI <sub>OFF</sub> | Delta Power Down Leakage Current | V <sub>I</sub> or V <sub>O</sub> = 0 to 3.6V                                                    | 0 to 0.2V       |                                  | ±2.5                   | μA   |
| I <sub>CC</sub>   | Supply Current                   | V <sub>I</sub> = GND or V <sub>CC</sub> , I <sub>O</sub> = 0                                    | 0.8V to 3.6V    |                                  | 3.0                    | μA   |
| ΔI <sub>CC</sub>  | Additional Supply Current        | Data input at V <sub>CC</sub> -0.6V<br>OE = GND I <sub>O</sub> = 0A                             | 3.3V            |                                  | 75                     | μA   |
|                   |                                  | OE input at V <sub>CC</sub> -0.6V<br>Data Input = GND or V <sub>CC</sub><br>I <sub>O</sub> = 0A | 3.3V            |                                  | 180                    | μA   |
|                   |                                  | OE input at V <sub>CC</sub><br>Data Input = GND to 3.6V<br>I <sub>O</sub> = 0 A                 | 0.8V to 3.6V    |                                  | 1                      | μA   |

## Switching Characteristics

$C_L=5\text{pF}$  see Figure 1

| Parameter | From Input             | TO OUTPUT | $V_{CC}$                       | $T_A = +25^\circ\text{C}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +125^\circ\text{C}$ |      | Unit |
|-----------|------------------------|-----------|--------------------------------|---------------------------|------|------|-------------------------------------------------|------|--------------------------------------------------|------|------|
|           |                        |           |                                | Min                       | Typ  | Max  | Min                                             | Max  | Min                                              | Max  |      |
| $t_{pd}$  | A                      | Y         | 0.8V                           |                           | 20.6 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 2.8                       | 5.5  | 10.5 | 2.5                                             | 11.7 | 2.5                                              | 12.9 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.0                       | 3.9  | 6.1  | 1.9                                             | 7.3  | 1.9                                              | 8.1  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 1.9                       | 3.2  | 4.8  | 1.7                                             | 6.1  | 1.7                                              | 6.7  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.6                       | 2.6  | 3.6  | 1.4                                             | 4.3  | 1.4                                              | 4.9  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.2                       | 2.4  | 3.1  | 1.2                                             | 3.9  | 1.2                                              | 4.4  |      |
| $t_{en}$  | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 69.9 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.1                       | 6.1  | 11.8 | 2.9                                             | 13.9 | 2.9                                              | 15.4 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.3                       | 4.2  | 6.6  | 2.2                                             | 7.7  | 2.2                                              | 8.3  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.0                       | 3.4  | 5.1  | 1.9                                             | 6.2  | 1.9                                              | 6.8  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.8                       | 2.6  | 3.7  | 1.7                                             | 4.5  | 1.7                                              | 5.0  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.7                       | 2.4  | 3.1  | 1.7                                             | 3.5  | 1.7                                              | 3.9  |      |
| $t_{dis}$ | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 14.3 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 2.7                       | 4.3  | 6.5  | 2.7                                             | 7.3  | 2.7                                              | 8.2  |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.1                       | 3.2  | 5.1  | 2.1                                             | 5.7  | 2.1                                              | 5.7  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.0                       | 3.0  | 4.9  | 2.0                                             | 5.4  | 2.0                                              | 5.7  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.4                       | 2.7  | 3.9  | 1.4                                             | 4.0  | 1.4                                              | 4.1  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.3                       | 2.5  | 3.2  | 1.3                                             | 3.4  | 1.3                                              | 3.9  |      |

$C_L=10\text{pF}$  see Figure 1

| Parameter | From Input             | TO OUTPUT | $V_{CC}$                       | $T_A = +25^\circ\text{C}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +125^\circ\text{C}$ |      | Unit |
|-----------|------------------------|-----------|--------------------------------|---------------------------|------|------|-------------------------------------------------|------|--------------------------------------------------|------|------|
|           |                        |           |                                | Min                       | Typ  | Max  | Min                                             | Max  | Min                                              | Max  |      |
| $t_{pd}$  | A                      | Y         | 0.8V                           |                           | 24.0 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.2                       | 6.4  | 12.3 | 3.0                                             | 13.8 | 3.0                                              | 15.2 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.1                       | 4.5  | 7.3  | 1.9                                             | 8.5  | 1.9                                              | 9.4  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 1.9                       | 3.8  | 5.5  | 1.7                                             | 6.8  | 1.7                                              | 7.6  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.7                       | 3.2  | 4.2  | 1.6                                             | 5.3  | 1.6                                              | 5.9  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.4                       | 3.0  | 3.8  | 1.4                                             | 4.6  | 1.4                                              | 5.2  |      |
| $t_{en}$  | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 73.7 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.6                       | 6.9  | 13.5 | 3.4                                             | 15.8 | 3.4                                              | 17.5 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.3                       | 4.8  | 7.7  | 2.2                                             | 8.6  | 2.2                                              | 9.4  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.0                       | 3.9  | 5.8  | 1.9                                             | 6.8  | 1.9                                              | 7.4  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.8                       | 3.2  | 4.3  | 1.7                                             | 5.3  | 1.7                                              | 5.9  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.7                       | 3.0  | 3.9  | 1.7                                             | 4.3  | 1.7                                              | 4.8  |      |
| $t_{dis}$ | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 32.7 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.4                       | 5.4  | 7.9  | 3.4                                             | 8.8  | 3.4                                              | 9.9  |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.2                       | 4.1  | 5.5  | 2.2                                             | 6.2  | 2.2                                              | 7.1  |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.2                       | 4.2  | 5.6  | 1.9                                             | 6.3  | 1.9                                              | 7.1  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 1.7                       | 3.0  | 5.2  | 1.7                                             | 5.5  | 1.7                                              | 6.1  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.9                       | 3.8  | 4.8  | 1.7                                             | 5.0  | 1.7                                              | 5.6  |      |

# Switching Characteristics (cont.)

$C_L=15\text{pF}$  see Figure 1

| Parameter | From Input             | TO OUTPUT | $V_{CC}$                       | $T_A = +25^\circ\text{C}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +125^\circ\text{C}$ |      | Unit |
|-----------|------------------------|-----------|--------------------------------|---------------------------|------|------|-------------------------------------------------|------|--------------------------------------------------|------|------|
|           |                        |           |                                | Min                       | Typ  | Max  | Min                                             | Max  | Min                                              | Max  |      |
| $t_{pd}$  | A                      | Y         | 0.8V                           |                           | 27.4 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.6                       | 7.2  | 14.1 | 3.3                                             | 15.8 | 3.3                                              | 17.5 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 3.0                       | 5.1  | 8.1  | 2.5                                             | 9.8  | 2.5                                              | 10.9 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.2                       | 4.3  | 6.3  | 2.0                                             | 7.9  | 2.0                                              | 8.8  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.0                       | 3.7  | 4.9  | 1.8                                             | 6.0  | 1.8                                              | 6.7  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.5                       | 3.5  | 4.4  | 1.5                                             | 5.4  | 1.5                                              | 6.1  |      |
| $t_{en}$  | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 77.5 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 4.0                       | 7.7  | 15.2 | 3.7                                             | 17.6 | 3.7                                              | 19.6 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 3.0                       | 5.3  | 8.4  | 2.5                                             | 9.8  | 2.5                                              | 10.7 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.3                       | 4.4  | 6.5  | 2.1                                             | 7.7  | 2.1                                              | 8.5  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.1                       | 3.6  | 5.0  | 2.0                                             | 6.1  | 2.0                                              | 6.8  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 2.0                       | 3.5  | 4.5  | 1.9                                             | 4.9  | 1.9                                              | 5.5  |      |
| $t_{dis}$ | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 60.8 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 3.8                       | 6.5  | 12.3 | 3.7                                             | 13.3 | 3.7                                              | 13.3 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.8                       | 5.8  | 10.1 | 2.5                                             | 10.5 | 2.5                                              | 10.5 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.2                       | 5.3  | 9.0  | 2.1                                             | 9.4  | 2.1                                              | 9.9  |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.1                       | 5.1  | 7.9  | 2.0                                             | 8.1  | 2.0                                              | 8.4  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 1.9                       | 5.0  | 7.0  | 1.9                                             | 7.5  | 1.9                                              | 7.5  |      |

$C_L=30\text{pF}$  see Figure 1

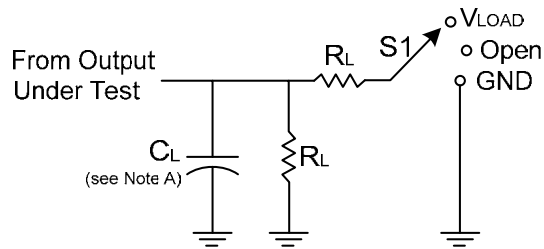
| Parameter | From Input             | TO OUTPUT | $V_{CC}$                       | $T_A = +25^\circ\text{C}$ |      |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +125^\circ\text{C}$ |      | Unit |
|-----------|------------------------|-----------|--------------------------------|---------------------------|------|------|-------------------------------------------------|------|--------------------------------------------------|------|------|
|           |                        |           |                                | Min                       | Typ  | Max  | Min                                             | Max  | Min                                              | Max  |      |
| $t_{pd}$  | A                      | Y         | 0.8V                           |                           | 37.4 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 4.8                       | 9.5  | 19.0 | 4.4                                             | 21.6 | 4.4                                              | 24.0 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 4.0                       | 6.7  | 10.8 | 3.0                                             | 13.0 | 3.0                                              | 14.5 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.4                       | 5.6  | 8.4  | 2.4                                             | 10.3 | 2.4                                              | 11.5 |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.1                       | 4.8  | 6.3  | 2.1                                             | 7.8  | 2.1                                              | 8.7  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 2.0                       | 4.6  | 5.8  | 2.0                                             | 7.5  | 2.0                                              | 8.3  |      |
| $t_{en}$  | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 88.9 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 5.2                       | 9.9  | 19.8 | 4.8                                             | 22.8 | 4.8                                              | 25.3 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 4.0                       | 6.8  | 10.8 | 3.1                                             | 12.6 | 3.1                                              | 14.1 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 3.0                       | 5.6  | 8.5  | 2.8                                             | 10.2 | 2.8                                              | 11.3 |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.2                       | 4.8  | 6.5  | 2.2                                             | 8.1  | 2.2                                              | 8.8  |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 2.1                       | 4.6  | 6.0  | 2.1                                             | 7.5  | 2.1                                              | 7.7  |      |
| $t_{dis}$ | $\overline{\text{OE}}$ | Y         | 0.8V                           |                           | 49.9 |      |                                                 |      |                                                  |      | ns   |
|           |                        |           | $1.2\text{V} \pm 0.1\text{V}$  | 6.0                       | 9.9  | 13.3 | 4.8                                             | 16.5 | 4.8                                              | 16.5 |      |
|           |                        |           | $1.5\text{V} \pm 0.1\text{V}$  | 2.8                       | 9.0  | 12.0 | 3.1                                             | 13.2 | 3.1                                              | 14.2 |      |
|           |                        |           | $1.8\text{V} \pm 0.15\text{V}$ | 2.6                       | 8.8  | 11.1 | 2.8                                             | 12.4 | 2.8                                              | 13.8 |      |
|           |                        |           | $2.5\text{V} \pm 0.2\text{V}$  | 2.6                       | 8.7  | 10.9 | 2.6                                             | 11.6 | 2.6                                              | 13.5 |      |
|           |                        |           | $3.3\text{V} \pm 0.3\text{V}$  | 2.5                       | 8.6  | 10.5 | 2.5                                             | 10.8 | 2.5                                              | 13.1 |      |

## Operating and Package Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Parameter       |                                        | Test Conditions                         |          | V <sub>CC</sub> | Typ | Unit |
|-----------------|----------------------------------------|-----------------------------------------|----------|-----------------|-----|------|
| C <sub>pd</sub> | Power Dissipation Capacitance          | f = 1MHz<br>No Load                     |          | 0.8V            | 6.9 | pF   |
|                 |                                        |                                         |          | 1.2V ± 0.1V     | 6.7 |      |
|                 |                                        |                                         |          | 1.5V ± 0.1V     | 6.6 |      |
|                 |                                        |                                         |          | 1.8V ± 0.15V    | 6.5 |      |
|                 |                                        |                                         |          | 2.5V ± 0.2V     | 6.4 |      |
|                 |                                        |                                         |          | 3.3V ± 0.3V     | 6.3 |      |
| C <sub>i</sub>  | Input Capacitance                      | V <sub>i</sub> = V <sub>CC</sub> or GND |          | 0 or 3.3V       | 1.5 | pF   |
| θ <sub>JA</sub> | Thermal Resistance Junction-to-Ambient | SOT353                                  | (Note 6) |                 | 371 | °C/W |
|                 |                                        | X2-DFN1410-6                            |          |                 | 430 |      |
|                 |                                        | X2-DFN1010-6                            |          |                 | 445 |      |
| θ <sub>JC</sub> | Thermal Resistance Junction-to-Case    | SOT353                                  | (Note 6) |                 | 143 | °C/W |
|                 |                                        | X2-DFN1410-6                            |          |                 | 190 |      |
|                 |                                        | X2-DFN1010-6                            |          |                 | 250 |      |

Note: 6. Test condition for SOT353, DFN1410, and DFN1010 devices mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

## Parameter Measurement Information



| TEST              | S1         | $R_L$       |
|-------------------|------------|-------------|
| $t_{PLH}/t_{PHL}$ | Open       | 1M $\Omega$ |
| $t_{PLZ}/t_{PZL}$ | $V_{LOAD}$ | 5K $\Omega$ |
| $t_{PHZ}/t_{PZH}$ | GND        | 5K $\Omega$ |

| $V_{CC}$         | Inputs   |            | $V_M$      | $V_{LOAD}$        | $C_L$           | $V_{\Delta}$ |
|------------------|----------|------------|------------|-------------------|-----------------|--------------|
|                  | $V_I$    | $t_r/t_f$  |            |                   |                 |              |
| 0.8V             | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.1V         |
| $1.2V \pm 0.1V$  | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.1V         |
| $1.5V \pm 0.1V$  | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.1V         |
| $1.8V \pm 0.15V$ | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.15V        |
| $2.5V \pm 0.2V$  | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.15V        |
| $3.3V \pm 0.3V$  | $V_{CC}$ | $\leq 3ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 5, 10, 15, 30pF | 0.3V         |

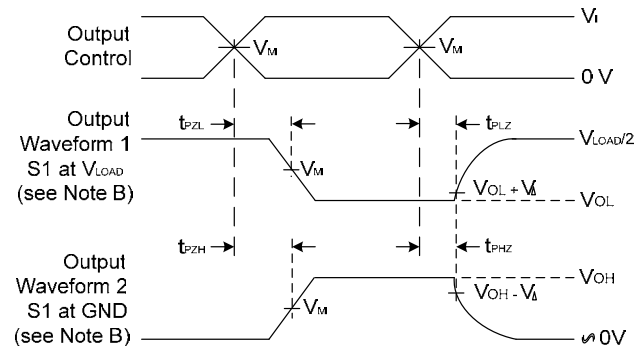
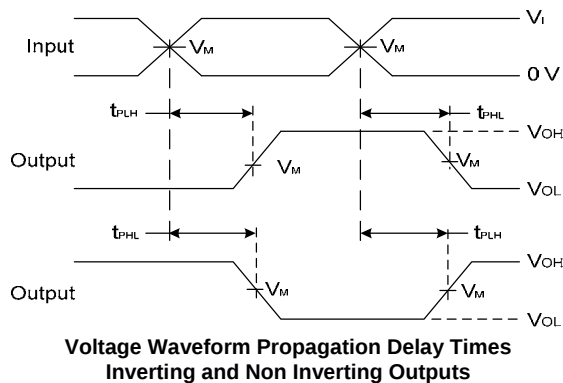
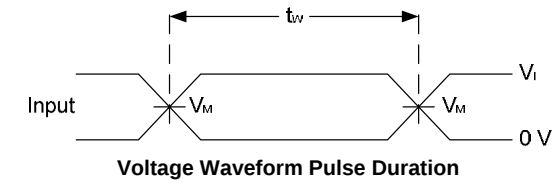
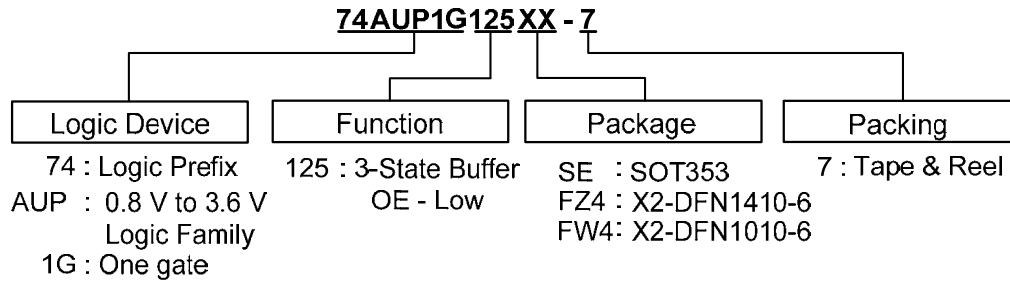


Figure 1. Load Circuit and Voltage Waveforms

- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 10$  MHz.
  - C. Inputs are measured separately one transition per measurement.
  - D.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - E.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{EN}$ .
  - F.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{PD}$ .

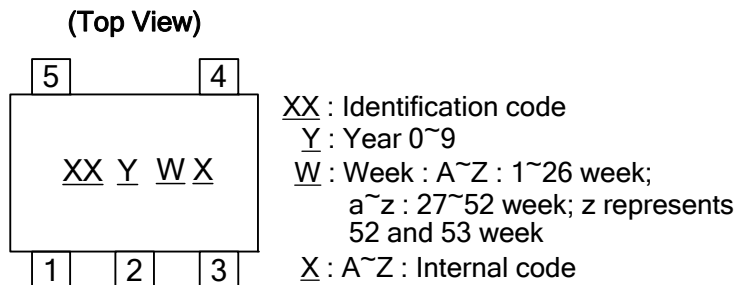
## Ordering Information



| Part Number     | Package Code | Packaging    | 7" Tape and Reel |                    |
|-----------------|--------------|--------------|------------------|--------------------|
|                 |              |              | Quantity         | Part Number Suffix |
| 74AUP1G125SE-7  | SE           | SOT353       | 3000/Tape & Reel | -7                 |
| 74AUP1G125FZ4-7 | FZ4          | X2-DFN1410-6 | 5000/Tape & Reel | -7                 |
| 74AUP1G125FW4-7 | FW4          | X2-DFN1010-6 | 5000/Tape & Reel | -7                 |

## Marking Information

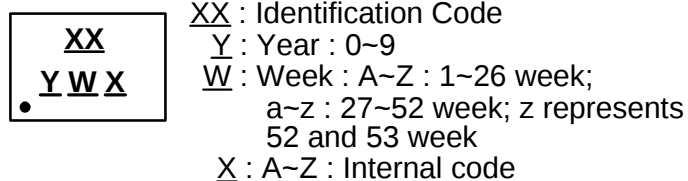
### (1) SOT353



| Part Number  | Package | Identification Code |
|--------------|---------|---------------------|
| 74AUP1G125SE | SOT353  | XY                  |

### (2) X2-DFN1410-6 and X2-DFN1010-6

#### (Top View)

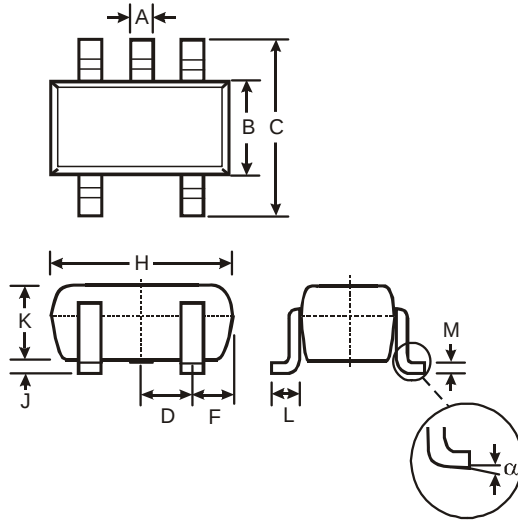


| Part Number   | Package      | Identification Code |
|---------------|--------------|---------------------|
| 74AUP1G125FZ4 | X2-DFN1410-6 | XY                  |
| 74AUP1G125FW4 | X2-DFN1010-6 | XY                  |

## Package Outline Dimensions (All dimensions in mm.)

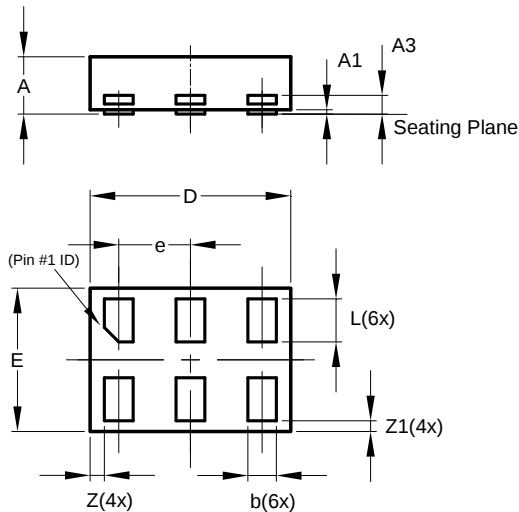
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

### (1) SOT353



| SOT353               |          |      |       |
|----------------------|----------|------|-------|
| Dim                  | Min      | Max  | Typ   |
| A                    | 0.10     | 0.30 | 0.25  |
| B                    | 1.15     | 1.35 | 1.30  |
| C                    | 2.00     | 2.20 | 2.10  |
| D                    | 0.65 Typ |      |       |
| F                    | 0.40     | 0.45 | 0.425 |
| H                    | 1.80     | 2.20 | 2.15  |
| J                    | 0        | 0.10 | 0.05  |
| K                    | 0.90     | 1.00 | 1.00  |
| L                    | 0.25     | 0.40 | 0.30  |
| M                    | 0.10     | 0.22 | 0.11  |
| $\alpha$             | 0°       | 8°   | -     |
| All Dimensions in mm |          |      |       |

### (2) X2-DFN1410-6

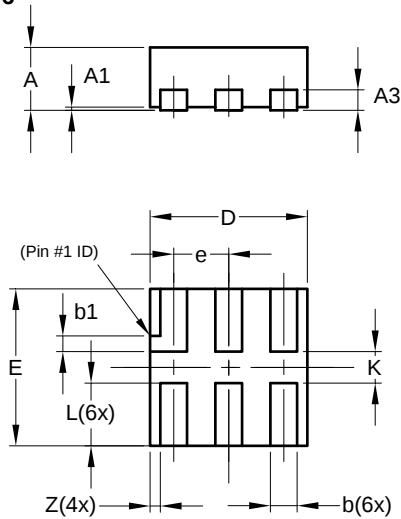


| X2-DFN1410-6         |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | —     | 0.40  | 0.39  |
| A1                   | 0.00  | 0.05  | 0.02  |
| A3                   | —     | —     | 0.13  |
| b                    | 0.15  | 0.25  | 0.20  |
| D                    | 1.35  | 1.45  | 1.40  |
| E                    | 0.95  | 1.05  | 1.00  |
| e                    | —     | —     | 0.50  |
| L                    | 0.25  | 0.35  | 0.30  |
| Z                    | —     | —     | 0.10  |
| Z1                   | 0.045 | 0.105 | 0.075 |
| All Dimensions in mm |       |       |       |

## Package Outline Dimensions (cont.) (All dimensions in mm.)

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

### (3) X2-DFN1010-6

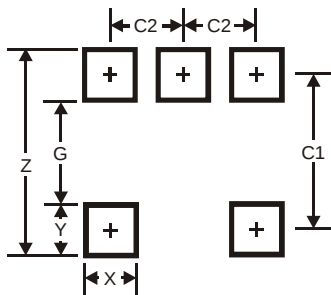


| X2-DFN1010-6         |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | —    | 0.40 | 0.39  |
| A1                   | 0.00 | 0.05 | 0.02  |
| A3                   | —    | —    | 0.13  |
| b                    | 0.14 | 0.20 | 0.17  |
| b1                   | 0.05 | 0.15 | 0.10  |
| D                    | 0.95 | 1.05 | 1.00  |
| E                    | 0.95 | 1.05 | 1.00  |
| e                    | —    | —    | 0.35  |
| L                    | 0.35 | 0.45 | 0.40  |
| K                    | 0.15 | —    | —     |
| Z                    | —    | —    | 0.065 |
| All Dimensions in mm |      |      |       |

## Suggested Pad Layout

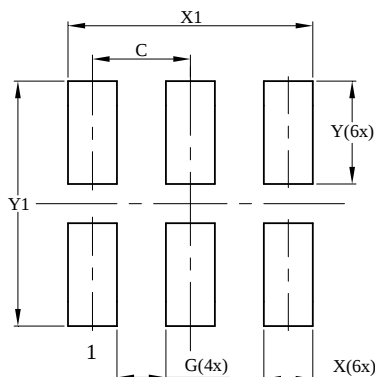
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version

### (1) SOT353



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

### (2) X2-DFN1410-6

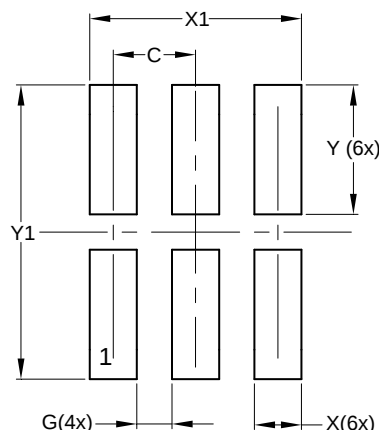


| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.500         |
| G          | 0.250         |
| X          | 0.250         |
| X1         | 1.250         |
| Y          | 0.525         |
| Y1         | 1.250         |

## Suggested Pad Layout (cont.)

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

### (3) X2-DFN1010-6



| Dimensions | Value<br>(in mm) |
|------------|------------------|
| C          | 0.350            |
| G          | 0.150            |
| X          | 0.200            |
| X1         | 0.900            |
| Y          | 0.550            |
| Y1         | 1.250            |

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Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

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## Данный компонент на территории Российской Федерации

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В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

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