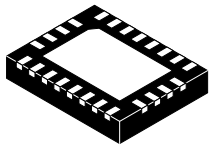
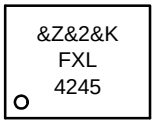
# Low-Voltage, Dual-Supply, 8-Bit, Signal Translator with Configurable Voltage Supplies, Signal Levels, and 3-State Outputs

# FXL4245



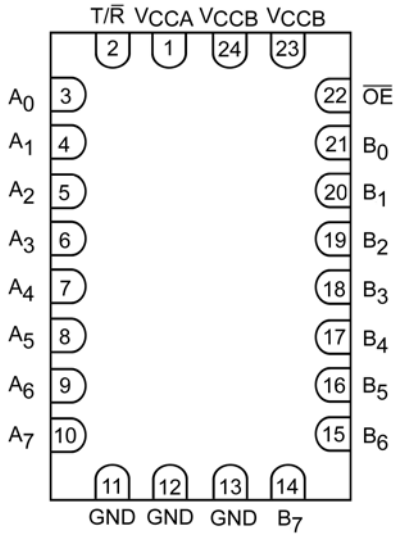
**WQFN24 4.5x3.5, 0.5P**
**CASE 510CE**

## MARKING DIAGRAM




FXL4245 = Specific Device Code
&Z = Assembly Plant Code
&2 = 2-Digit Date Code
&K = 2-Digits Lot Run Traceability Code

## PIN CONFIGURATION




Top Through View

## ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

### General Description

The FXL4245 is a configurable dual-voltage-supply translator designed for bi-directional voltage translation of signals between two voltage levels. The device allows translation between voltages as high as 3.6 V to as low as 1.1 V. The A port tracks the $V_{CCA}$ level and the B port tracks the $V_{CCB}$ level. Both ports are designed to accept supply voltage levels from 1.1 V to 3.6 V. This allows for bi-directional voltage translation over a variety of voltage levels: 1.2 V, 1.5 V, 1.8 V, 2.5 V, and 3.3 V.

The device remains in 3-state until both $V_{CC}$s reach active levels, allowing either $V_{CC}$ to be powered-up first. The device also contains power-down control circuits that place the device in 3-state if either $V_{CC}$ is removed.

The Transmit/Receive (T/$\overline{R}$) input determines the direction of data flow through the device. The $\overline{OE}$ input, when HIGH, disables both the A and B ports by placing them in a 3-state condition. The FXL4245 is designed with the control pins (T/$\overline{R}$ and $\overline{OE}$) supplied by $V_{CCA}$.

### Features

- Bi-Directional Interface between Two Levels from 1.1 V to 3.6 V
- Fully Configurable, Inputs Track $V_{CC}$ Level
- Non-Preferential Power-up; Either $V_{CC}$ May Be Powered-up First
- Outputs Remain in 3-State until Active $V_{CC}$ Level is Reached
- Outputs Switch to 3-State if Either $V_{CC}$ is at GND
- Power-Off Protection
- Control Inputs (T/$\overline{R}$, $\overline{OE}$) Levels are Referenced to $V_{CCA}$ Voltage
- Packaged in 24-Pin MLP
- ESD Protection Exceeds:
  - 4 kV Human Body Model (per JESD22-A114 & Mil Std 883e 3015.7)
  - 8 kV Human Body Model I/O to GND (per JESD22-A114 & Mil Std 883e 3015.7)
  - 1 kV Charge Device Model (per ESD STM 5.3)
  - 200 V Machine Model (per JESD22-A115 & ESD STM5.2)
- This Device is Pb-Free, Halide Free and is RoHS Compliant

© Semiconductor Components Industries, LLC, 2004


Downloaded from Arrow.com.

## PIN DESCRIPTIONS

| Pin # | Name | Description |
|---|---|---|
| 1 | $V_{CCA}$ | Side-A Power Supply |
| 2 | T/$\overline{R}$ | Transmit / Receive Input |
| 3, 4, 5, 6, 7, 8, 9, 10 | $A_0$, $A_1$, $A_2$, $A_3$, $A_4$, $A_5$, $A_6$, $A_7$ | Side-A Inputs or 3-State Outputs |
| 11, 12, 13 | GND | Ground |
| 14, 15, 16, 17, 18, 19, 20, 21 | $B_7$, $B_6$, $B_5$, $B_4$, $B_3$, $B_2$, $B_1$, $B_0$ | Side-B Inputs or 3-State Outputs |
| 22 | $\overline{OE}$ | Output Enable Input |
| 23, 24 | $V_{CCB}$ | Side-B Power Supply |
| DAP | No Connect | No Connect |

## TRUTH TABLE

| Inputs | | Description |
|---|---|---|
| $\overline{OE}$ | T/$\overline{R}$ | |
| LOW Voltage Level | LOW Voltage Level | Bus B Data to Bus A |
| LOW Voltage Level | HIGH Voltage Level | Bus A Data to Bus B |
| HIGH Voltage Level | Don't Care | 3-State |

## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CCA}$ | Supply Voltage | | | −0.5 | 4.6 | V |
| $V_{CCB}$ | | | | −0.5 | 4.6 | |
| $V_I$ | DC Input Voltage | I/O Port A | | −0.5 | 4.6 | V |
| | | I/O Port B | | −0.5 | 4.6 | |
| | | Control Inputs (T/$\overline{R}$, $\overline{OE}$) | | −0.5 | 4.6 | |
| $V_O$ | Output Voltage (Note 1) | Output 3-State | | −0.5 | 4.6 | V |
| | | Output Active ($A_n$) | | −0.5 to $V_{CCA}$ | 0.5 | |
| | | Output Active ($B_n$) | | −0.5 to $V_{CCB}$ | 0.5 | |
| $I_{IK}$ | DC Input Diode Current | $V_I$ < 0 V | | − | −50 | mA |
| $I_{OK}$ | DC Output Diode Current | $V_O$ < 0 V | | − | −50 | mA |
| | | $V_O$ > $V_{CC}$ | | − | 50 | |
| $I_{OH}/I_{OL}$ | DC Output Source/Sink Current | | | − | ±50 | mA |
| $I_{CC}$ | DC $V_{CC}$ or Ground Current per Supply Pin | | | − | ±100 | mA |
| $T_{STG}$ | Storage Temperature Range | | | −65 | +150 | °C |
| ESD | Electrostatic Discharge Capability | Human Body Model, JESD22-A114, Mil Std 883e 3015.7 | | − | 4 | kV |
| | | | I/O to GND | − | 8 | |
| | | Charged Device Model, JESD22-C101,STM 5.3 | | − | 1 | |
| | | Machine Model, JESD22-A115,STM 5.2 | | − | 200 | V |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. $I_O$ Absolute Maximum Rating must be observed.



Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

## RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | Power Supply | Operating $V_{CCA}$ or $V_{CCB}$ | | 1.1 | 3.6 | V |
| $V_I$ | Input Voltage | Port A | | 0 | 3.6 | V |
| | | Port B | | 0 | 3.6 | |
| | | Control Inputs (T/$\overline{R}$, $\overline{OE}$) | | 0 | $V_{CCA}$ | |
| $I_{OH}/I_{OL}$ | Output Current | $V_{CC0}$ | 3.0 V to 3.6 V | − | ±24 | mA |
| | | | 2.3 V to 2.7 V | − | ±18 | |
| | | | 1.65 V to 1.95 V | − | ±6 | |
| | | | 1.40 V to 1.65 V | − | ±2 | |
| | | | 1.1 V to 1.4 V | − | ±0.5 | |
| $T_A$ | Operating Temperature, Free Air | | | −40 | +85 | °C |
| $\Delta V/\Delta t$ | Minimum Input Edge Rate | $V_{CCA/B}$ = 1.1 V to 3.6 V | | − | 10 | ns/V |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.
2. All unused inputs must be held at $V_{CCI}$ or GND.

## ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Conditions | $V_{CCI}$ (V) | $V_{CCO}$ (V) | Min | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{IH}$ | HIGH Level Input (Note 3) | Data Inputs $A_n$, $B_n$ | 2.70 to 3.60 | 1.1 to 3.6 | 2.0 | − | V |
| | | | 2.30 to 2.70 | | 1.6 | − | |
| | | | 1.65 to 2.30 | | 0.65 x $V_{CCI}$ | − | |
| | | | 1.40 to 1.65 | | 0.65 x $V_{CCI}$ | − | |
| | | | 1.10 to 1.40 | | 0.9 x $V_{CCI}$ | − | |
| | | Control Pins $\overline{OE}$, T/$\overline{R}$ (Referenced to $V_{CCA}$) | 2.70 to 3.6 | 1.1 to 3.6 | 2.0 | − | |
| | | | 2.30 to 2.70 | | 1.6 | − | |
| | | | 1.65 to 2.30 | | 0.65 x $V_{CCA}$ | − | |
| | | | 1.40 to 1.65 | | 0.65 x $V_{CCA}$ | − | |
| | | | 1.10 to 1.40 | | 0.9 x $V_{CCA}$ | − | |
| $V_{IL}$ | LOW Level Input (Note 3) | Data Inputs $A_n$, $B_n$ | 2.70 to 3.60 | 1.1 to 3.6 | − | 0.8 | V |
| | | | 2.30 to 2.70 | | − | 0.7 | |
| | | | 1.65 to 2.30 | | − | 0.35 x $V_{CCI}$ | |
| | | | 1.40 to 1.65 | | − | 0.35 x $V_{CCI}$ | |
| | | | 1.10 to 1.40 | | − | 0.10 x $V_{CCI}$ | |
| | | Control Pins /$\overline{OE}$, T/$\overline{R}$ (Referenced to $V_{CCA}$) | 2.70 to 3.60 | 1.1 to 3.6 | − | 0.8 | |
| | | | 2.30 to 2.70 | | − | 0.7 | |
| | | | 1.65 to 2.30 | | − | 0.35 x $V_{CCI}$ | |
| | | | 1.40 to 1.65 | | − | 0.35 x $V_{CCI}$ | |
| | | | 1.10 to 1.40 | | − | 0.10 x $V_{CCI}$ | |



Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

**ELECTRICAL CHARACTERISTICS** (continued)

| Symbol | Parameter | Conditions | $V_{CCI}$ (V) | $V_{CCO}$ (V) | Min | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{OH}$ | HIGH Level Output (Note 4) | $I_{OH}$ = −100 μA | 1.1 to 3.6 | 1.1 to 3.6 | $V_{CC0}$ − 0.2 | − | V |
| | | $I_{OH}$ = −12 mA | 2.7 | 2.7 | 2.2 | − | |
| | | $I_{OH}$ = −18 mA | 3.0 | 3.0 | 2.4 | − | |
| | | $I_{OH}$ = −24 mA | 3.0 | 3.0 | 2.2 | − | |
| | | $I_{OH}$ = −6 mA | 2.3 | 2.3 | 2.0 | − | |
| | | $I_{OH}$ = −12 mA | 2.3 | 2.3 | 1.8 | − | |
| | | $I_{OH}$ = −18 mA | 2.3 | 2.3 | 1.7 | − | |
| | | $I_{OH}$ = −6 mA | 1.65 | 1.65 | 1.25 | − | |
| | | $I_{OH}$ = −2 mA | 1.4 | 1.4 | 1.05 | − | |
| | | $I_{OH}$ = −0.5 mA | 1.1 | 1.1 | 0.75 x $V_{CC0}$ | − | |
| $V_{OL}$ | LOW Level Output (Note 4) | $I_{OL}$ = 100 μA | 1.1 to 3.6 | 1.1 to 3.6 | − | 0.2 | V |
| | | $I_{OL}$ = 12 mA | 2.7 | 2.7 | − | 0.4 | |
| | | $I_{OL}$ = 18 mA | 3.0 | 3.0 | − | 0.4 | |
| | | $I_{OL}$ = 24 mA | 3.0 | 3.0 | − | 0.55 | |
| | | $I_{OL}$ = 12 mA | 2.3 | 2.3 | − | 0.4 | |
| | | $I_{OL}$ = 18 mA | 2.3 | 2.3 | − | 0.6 | |
| | | $I_{OL}$ = 6 mA | 1.65 | 1.65 | − | 0.3 | |
| | | $I_{OL}$ = 2 mA | 1.4 | 1.4 | − | 0.35 | |
| | | $I_{OL}$ = 0.5 mA | 1.1 | 1.1 | − | 0.3 x $V_{CC0}$ | |
| $I_L$ | Input Leakage Current, Control Pins | $V_I$ = $V_{CCA}$ or GND | 1.1 to 3.6 | 3.6 | − | ±1.0 | μA |
| $I_{OFF}$ | Power Off Leakage Current | $A_n$, $V_I$ or $V_O$ = 0 V to 3.6 V | 0 | 3.6 | − | ±10 | μA |
| | | $B_n$, $V_I$ or $V_O$ = 0 V to 3.6 V | 3.6 | 0 | − | ±10 | |
| $I_{OZ}$ | 3-State Output Leakage (0 ≤ $V_O$ ≤ 3.6 V, $V_I$ = $V_{IH}$ or $V_{IL}$) | $A_n$, $B_n$, /OE = $V_{IH}$ | 3.6 | 3.6 | − | ±10 | μA |
| | | $B_n$, /OE = Don't Care (Note 5) | 0 | 3.6 | − | ±10 | |
| | | $A_n$, /OE = Don't Care (Note 5) | 3.6 | 0 | − | ±10 | |
| $I_{CCA/B}$ | Quiescent Supply Current (Note 6) | $V_I$ = $V_{CCI}$ or GND; $I_O$ = 0 | 1.1 to 3.6 | 1.1 to 3.6 | − | 20 | μA |
| $I_{CCZ}$ | | | 1.1 to 3.6 | 1.1 to 3.6 | − | 20 | |
| $I_{CCA}$ | | $V_I$ = $V_{CCA}$ or GND; $I_O$ = 0 | 0 | 1.1 to 3.6 | − | −10 | |
| | | | 1.1 to 3.6 | 0 | − | 10 | |
| $I_{CCB}$ | | $V_I$ = $V_{CCB}$ or GND; $I_O$ = 0 | 1.1 to 3.6 | 0 | − | −10 | |
| | | | 0 | 1.1 to 3.6 | − | 10 | |
| $\Delta I_{CCA/B}$ | Increase in $I_{CC}$ per Input; Other Inputs at $V_{CC}$ or GND | $V_{IH}$ = 3.0 | 3.6 | 3.6 | − | 500 | μA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. $V_{CCI}$ = the $V_{CC}$ associated with the data input under test.
4. $V_{CCO}$ = the $V_{CC}$ associated with the output under test.
5. Don't care = Any valid logic level.
6. Reflects current per supply, $V_{CCA}$ or $V_{CCB}$.



Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

## AC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | $T_A$ = −40 °C to +85 °C | | | | | | | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $V_{CCB}$ = 3.0 V to 3.6 V | | $V_{CCB}$ = 2.3 V to 2.7 V | | $V_{CCB}$ = 1.65 V to 1.95 V | | $V_{CCB}$ = 1.4 V to 1.6 V | | $V_{CCB}$ = 1.1 V to 1.3 V | | |
| | | Typ | Max | Typ | Max | Typ | Max | Typ | Max | Typ | Typ | |
| **$V_{CCA}$ = 3.0 V to 3.6 V** | | | | | | | | | | | | |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay A to B | 0.2 | 3.5 | 0.3 | 3.9 | 0.5 | 5.4 | 0.6 | 6.8 | 1.4 | 22.0 | ns |
| | Propagation Delay B to A | 0.2 | 3.5 | 0.2 | 3.8 | 0.3 | 4.0 | 0.5 | 4.3 | 0.8 | 13.0 | |
| $t_{PZH}$, $t_{PZL}$ | Output Enable /OE to B | 0.5 | 4.0 | 0.7 | 4.4 | 1.0 | 5.9 | 1.0 | 6.4 | 1.5 | 17.0 | ns |
| | Output Enable /OE to A | 0.5 | 4.0 | 0.5 | 4.0 | 0.5 | 4.0 | 0.5 | 4.0 | 0.5 | 4.0 | |
| $t_{PHZ}$, $t_{PLZ}$ | Output Disable /OE to B | 0.2 | 3.8 | 0.2 | 4.0 | 0.7 | 4.8 | 1.5 | 6.2 | 2.0 | 17.0 | ns |
| | Output Disable /OE to A | 0.2 | 3.7 | 0.2 | 3.7 | 0.2 | 3.7 | 0.2 | 3.7 | 0.2 | 3.7 | |
| **$V_{CCA}$ = 2.3 V to 2.7 V** | | | | | | | | | | | | |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay A to B | 0.2 | 3.8 | 0.4 | 4.2 | 0.5 | 5.6 | 0.8 | 6.9 | 1.4 | 22.0 | ns |
| | Propagation Delay B to A | 0.3 | 3.9 | 0.4 | 4.2 | 0.5 | 4.5 | 0.5 | 4.8 | 1.0 | 7.0 | |
| $t_{PZH}$, $t_{PZL}$ | Output Enable /OE to B | 0.6 | 4.2 | 0.8 | 4.6 | 1.0 | 6.0 | 1.0 | 6.8 | 1.5 | 17.0 | ns |
| | Output Enable /OE to A | 0.6 | 4.5 | 0.6 | 4.5 | 0.6 | 4.5 | 0.6 | 4.5 | 0.6 | 4.5 | |
| $t_{PHZ}$, $t_{PLZ}$ | Output Disable /OE to B | 0.2 | 4.1 | 0.2 | 4.3 | 0.7 | 4.8 | 1.5 | 6.7 | 2.0 | 17.0 | ns |
| | Output Disable /OE to A | 0.2 | 4.0 | 0.2 | 4.0 | 0.2 | 4.0 | 0.2 | 4.0 | 0.2 | 4.0 | |
| **$V_{CCA}$ = 1.65 V to 1.95 V** | | | | | | | | | | | | |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay A to B | 0.3 | 4.0 | 0.5 | 4.5 | 0.8 | 5.7 | 0.9 | 7.1 | 1.5 | 22.0 | ns |
| | Propagation Delay B to A | 0.5 | 5.4 | 0.5 | 5.6 | 0.8 | 5.7 | 1.0 | 6.0 | 1.2 | 8.0 | |
| $t_{PZH}$, $t_{PZL}$ | Output Enable /OE to B | 0.6 | 5.2 | 0.8 | 5.4 | 1.2 | 6.9 | 1.2 | 7.2 | 1.5 | 18.0 | ns |
| | Output Enable /OE to A | 1.0 | 6.7 | 1.0 | 6.7 | 1.0 | 6.7 | 1.0 | 6.7 | 1.0 | 6.7 | |
| $t_{PHZ}$, $t_{PLZ}$ | Output Disable /OE to B | 0.2 | 5.1 | 0.2 | 5.2 | 0.8 | 5.2 | 1.5 | 7.0 | 2.0 | 17.0 | ns |
| | Output Disable /OE to A | 0.5 | 5.0 | 0.5 | 5.0 | 0.5 | 5.0 | 0.5 | 5.0 | 0.5 | 5.0 | |
| **$V_{CCA}$ = 1.4 V to 1.6 V** | | | | | | | | | | | | |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay A to B | 0.5 | 4.3 | 0.5 | 4.8 | 1.0 | 6.0 | 1.0 | 7.3 | 1.5 | 22.0 | ns |
| | Propagation Delay B to A | 0.6 | 6.8 | 0.8 | 6.9 | 0.9 | 7.1 | 1.0 | 7.3 | 1.3 | 9.5 | |
| $t_{PZH}$, $t_{PZL}$ | Output Enable /OE to B | 1.1 | 7.5 | 1.1 | 7.6 | 1.3 | 7.7 | 1.4 | 7.9 | 2.0 | 20.0 | ns |
| | Output Enable /OE to A | 1.0 | 7.5 | 1.0 | 7.5 | 1.0 | 7.5 | 1.0 | 7.5 | 1.0 | 7.5 | |
| $t_{PHZ}$, $t_{PLZ}$ | Output Disable /OE to B | 0.4 | 6.1 | 0.4 | 6.2 | 0.9 | 6.2 | 1.5 | 7.5 | 2.0 | 18.0 | ns |
| | Output Disable /OE to A | 1.0 | 6.0 | 1.0 | 6.0 | 1.0 | 6.0 | 1.0 | 6.0 | 1.0 | 6.0 | |
| **$V_{CCA}$ = 1.1 V to 1.3 V** | | | | | | | | | | | | |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay A to B | 0.8 | 13.0 | 1.0 | 7.0 | 1.2 | 8.0 | 1.3 | 9.5 | 2.0 | 24.0 | ns |
| | Propagation Delay B to A | 1.4 | 22.0 | 1.4 | 22.0 | 1.5 | 22.0 | 1.5 | 22.0 | 2.0 | 24.0 | |
| $t_{PZH}$, $t_{PZL}$ | Output Enable /OE to B | 1.0 | 12.0 | 1.0 | 9.0 | 2.0 | 10.0 | 2.0 | 11.0 | 2.0 | 24.0 | ns |
| | Output Enable /OE to A | 2.0 | 22.0 | 2.0 | 22.0 | 2.0 | 22.0 | 2.0 | 22.0 | 2.0 | 22.0 | |
| $t_{PHZ}$, $t_{PLZ}$ | Output Disable /OE to B | 1.0 | 15.0 | 0.7 | 7.0 | 1.0 | 8.0 | 2.0 | 10.0 | 2.0 | 20.0 | ns |
| | Output Disable /OE to A | 2.0 | 15.0 | 2.0 | 12.0 | 2.0 | 12.0 | 2.0 | 12.0 | 2.0 | 12.0 | |

## CAPACITANCE

| Symbol | Parameter | Conditions | $T_A$ = +25 °C | Unit |
|---|---|---|---|---|
| | | | Typical | |
| $C_{IN}$ | Input Capacitance | $V_{CCA}$ = $V_{CCB}$ = 0 V, $V_I$ = 0 V or $V_{CCA/B}$ | 4 | pF |
| $C_{I/O}$ | Input/Output Capacitance | $V_{CCA}$ = $V_{CCB}$ = 3.3 V, $V_I$ = 0 V or $V_{CCA/B}$ | 5 | pF |
| $C_{PD}$ | Power Dissipation Capacitance | $V_{CCA}$ = $V_{CCB}$ = 3.3 V, $V_I$ = 0 V or $V_{CC}$, f = 10 MHz | 20 | pF |



Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

## AC LOADINGS AND WAVEFORMS

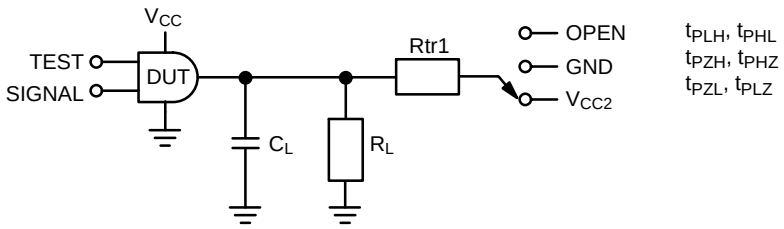
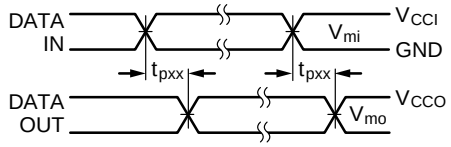



**Figure 1. AC Test Circuit**

| Test | Switch |
|---|---|
| $t_{PLH}$, $t_{PHL}$ | OPEN |
| $t_{PLZ}$, $t_{PZL}$ | $V_{CC0}$ · 2 at $V_{CCO}$ = 3.3 ±0.3 V, 2.5 V ±0.2 V, 1.8 V ±0.15 V, 1.5 V ±0.1 V, 1.2 V ±0.1 V |
| $t_{PHZ}$, $t_{PZH}$ | GND |

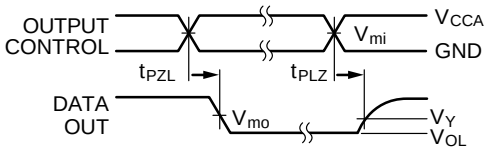
**Table 1. AC LOAD TABLE**

| $V_{CC0}$ | $C_L$ | $R_L$ | Rtr1 |
|---|---|---|---|
| 1.2 V ±0.1 V | 15 pF | 2 kΩ | 2 kΩ |
| 1.5 V ±0.1 V | 15 pF | 2 kΩ | 2 kΩ |
| 1.8 V ±0.15 V | 30 pF | 500 kΩ | 500 kΩ |
| 2.5 V ±0.2 V | 30 pF | 500 kΩ | 500 kΩ |
| 3.3 V ±0.3 V | 30 pF | 500 kΩ | 500 kΩ |



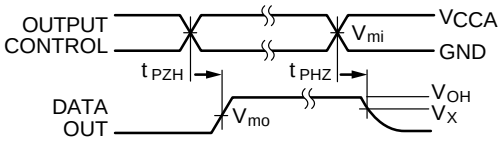

NOTE:
7. Input $t_R = t_F$ = 2.0 ns, 10% to 90%

**Figure 2. Waveform for Inverting and Non-Inverting Functions**




NOTE:
8. Input $t_R = t_F$ = 2.0 ns, 10% to 90%

**Figure 3. 3-State Output Low Enable and Disable for Low Voltage Logic**




NOTE:
9. Input $t_R = t_F$ = 2.0 ns, 10% to 90%

**Figure 4. 3-State Output High Enable and Disable for Low Voltage Logic**

| Symbol | $V_{CC}$ | | | | |
|---|---|---|---|---|---|
| | 3.3 V ±0.3 V | 2.5 V ±0.2 V | 1.8 V ±0.15 V | 1.5 V ±0.1 V | 1.2 V ±0.1 V |
| $V_{MI}$ | $V_{CCI}$ / 2 | $V_{CCI}$ / 2 | $V_{CCI}$ / 2 | $V_{CCI}$ / 2 | $V_{CCI}$ / 2 |
| $V_{MO}$ | $V_{CCO}$ / 2 | $V_{CCO}$ / 2 | $V_{CCO}$ / 2 | $V_{CCO}$ / 2 | $V_{CCO}$ / 2 |
| $V_X$ | $V_{OH}$ − 0.3 V | $V_{OH}$ − 0.15 V | $V_{OH}$ − 0.15 V | $V_{OH}$ − 0.1 V | $V_{OH}$ − 0.1 V |
| $V_Y$ | $V_{OL}$ + 0.3 V | $V_{OL}$ + 0.15 V | $V_{OL}$ + 0.15 V | $V_{OL}$ + 0.1 V | $V_{OL}$ + 0.1 V |

10. For $V_{MI}$ $V_{CCO}$ = $V_{CCA}$ for Control Pins T/$\overline{R}$ and $\overline{OE}$ or $V_{CCA}$ / 2.



Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

## FUNCTIONAL DESCRIPTION

### Power-Up/Power-Down Sequencing

FXL translators offer an advantage in that either $V_{CC}$ may be powered up first. This benefit derives from the chip design. When either $V_{CC}$ is at 0 V, outputs are in a High-impedance state. The control inputs (T/$\overline{R}$ and $\overline{OE}$) are designed to track the $V_{CCA}$ supply. A pull-up resistor tying $\overline{OE}$ to $V_{CCA}$ should be used to ensure that bus contention, excessive currents, or oscillations do not occur during power-up/power-down. The size of the pull-up resistor is based upon the current-sinking capability of the OE driver.

The recommended power-up sequence is:

1. Apply power to either $V_{CC}$.
2. Apply power to the T/$\overline{R}$ input (logic HIGH for A-to-B operation; logic LOW for B-to-A operation) and to the respective data inputs (A port or B port). This may occur at the same time as step 1.
3. Apply power to the other $V_{CC}$.
4. Drive the $\overline{OE}$ input LOW to enable the device.

The recommended power-down sequence is:

1. Drive $\overline{OE}$ input HIGH to disable the device.
2. Remove power from either $V_{CC}$.
3. Remove power from the other $V_{CC}$.

## ORDERING INFORMATION

| Order Number | Package Description | Shipping† |
|---|---|---|
| FXL4245MPX | 24-Pin Molded Leadless Package (MLP), JEDEC MO-220, 3.5 x 4.5 mm (Pb-Free, Halide Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

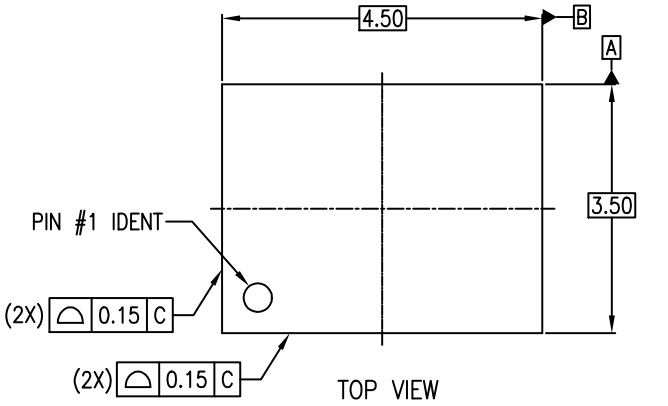


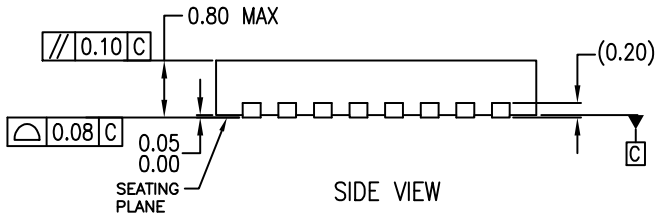
Share Feedback
Your Opinion Matters

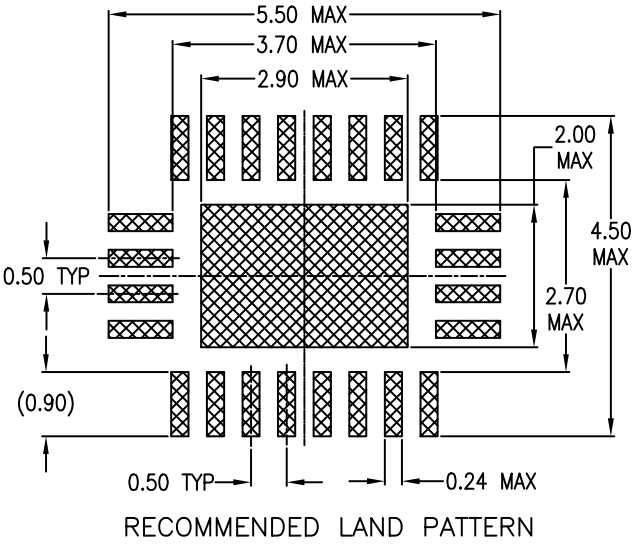
Downloaded from Arrow.com.

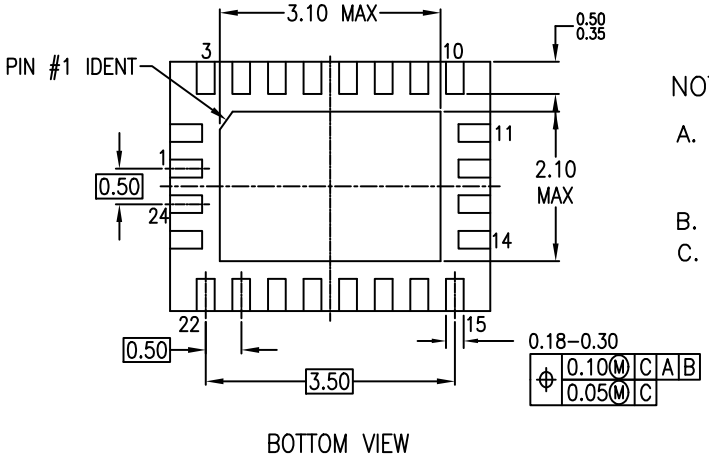
**WQFN24 4.5x3.5, 0.5P**
CASE 510CE
ISSUE O

DATE 31 AUG 2016




NOTES:

A. CONFORMS TO JEDEC REGISTRATION MO−220, VARIATION WFSD−2 FOR DIMENSIONS ONLY. PIN NUMBERING DOES NOT COMPLY.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

| | | | |
|---|---|---|---|
| **DOCUMENT NUMBER:** | **98AON13646G** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. | |
| **DESCRIPTION:** | **WQFN24 4.5X3.5, 0.5P** | | **PAGE 1 OF 1** |

**onsemi** and onsemi are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. **onsemi** does not convey any license under its patent rights nor the rights of others.



Downloaded from Arrow.com.

**onsemi**, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales

◊

Downloaded from Arrow.com.