



Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (\_), the underscore (\_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (\_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at [www.onsemi.com](http://www.onsemi.com). Please email any questions regarding the system integration to [Fairchild\\_questions@onsemi.com](mailto:Fairchild_questions@onsemi.com).

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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 ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor 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 ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## FXL5T244

### Low Voltage Dual Supply 5-Bit Signal Translator with Configurable Voltage Supplies and Signal Levels and 3-STATE Outputs

#### General Description

The FXL5T244 is a configurable dual-voltage-supply translator designed for one-way (unidirectional) voltage translation of signals between two voltage levels. The device allows translation between voltages as high as 3.6V to as low as 1.1V. A Inputs and the  $\overline{OE}$  Control Pin track the  $V_{CCI}$  level, and Y Outputs track the  $V_{CCO}$  level. Both inputs and outputs are designed to accept supply voltage levels from 1.1V to 3.6V. This allows for unidirectional voltage translation over a variety of voltage levels: 1.2V, 1.5V, 1.8V, 2.5V, and 3.3V.

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  $\overline{OE}$  input, when HIGH, disables the outputs by placing them in 3-STATE condition.

#### Features

- One-way (unidirectional) translation between any 2 levels from 1.1V to 3.6V
- Fully configurable, inputs and outputs track respective  $V_{CC}$  levels
- Non-preferential power-up sequencing; 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 input ( $\overline{OE}$ ) level is referenced to  $V_{CCI}$  voltage
- Packaged in 14-terminal DQFN (2.5mm x 3.0mm) package
- ESD protection exceeds:
  - 4kV HBM ESD (per JESD22-A114 & Mil Std 883e 3015.7)
  - 8kV HBM I/O to GND ESD (per JESD22-A114 & Mil Std 883e 3015.7)
  - 1kV CDM ESD (per ESD STM 5.3)
  - 200V MM ESD (per JESD22-A115 & ESD STM5.2)

#### Ordering Code:

Order Number	Package Number	Package Description
FXL5T244BQX	MLP014A	14-Terminal Depopulated Quad Very-Thin Flat Pack No Leads (DQFN), JEDEC MO-241, 2.5 x 3.0mm

FXL5T244 Low Voltage Dual Supply 5-Bit Signal Translator with Configurable Voltage Supplies and Signal Levels and 3-STATE Outputs

### Terminal Descriptions

Terminal Names	Description
$\overline{OE}$	Output Enable Input
$A_n$	Data Inputs
$Y_n$	3-STATE Outputs
$V_{CCI}$	Inputs Power Supply
$V_{CCO}$	Outputs Power Supply
GND	Ground

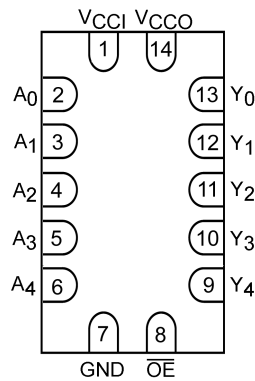
### Truth Table

Inputs		Outputs
$\overline{OE}$	$A_n$	$Y_n$
L	L	L
L	H	H
H	X	3-STATE

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Don't Care

### Connection Diagram

Terminal Assignments for DQFN



(Top View)

### Terminal Assignment

Terminal Number	Terminal Name
1	$V_{CCI}$
2	$A_0$
3	$A_1$
4	$A_2$
5	$A_3$
6	$A_4$
7	GND
8	$\overline{OE}$
9	$Y_4$
10	$Y_3$
11	$Y_2$
12	$Y_1$
13	$Y_0$
14	$V_{CCO}$

### 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 volts, outputs are in a HIGH-Impedance state. The control input,  $\overline{OE}$ , is designed to track the  $V_{CCI}$  supply. A pull-up resistor tying  $\overline{OE}$  to  $V_{CCI}$  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  $\overline{OE}$  driver.

The recommended power-up sequence is the following:

1. Apply power to either  $V_{CC}$ .
2. Apply power to the  $\overline{OE}$  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 other  $V_{CC}$ .
4. Drive the  $\overline{OE}$  input LOW to enable the device.

The recommended power-down sequence is the following:

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

Absolute Maximum Ratings (Note 1)		Recommended Operating Conditions (Note 3)	
Supply Voltage		Power Supply Operating ( $V_{CC1}$ or $V_{CC0}$ )	1.1V to 3.6V
$V_{CC1}$	-0.5V to +4.6V	Input Voltage	
$V_{CC0}$	-0.5V to +4.6V	$A_n$	0.0V to 3.6V
DC Input Voltage ( $V_I$ )	-0.5V to +4.6V	Control Inputs ( $\overline{OE}$ )	0.0V to 3.6V
Output Voltage ( $V_O$ ) (Note 2)		Output Current in $I_{OH}/I_{OL}$	
Outputs 3-STATE	-0.5V to +4.6V	$V_{CC0} = 3.0V$ to $3.6V$	$\pm 24$ mA
Outputs Active	-0.5V to $V_{CC0} + 0.5V$	$V_{CC0} = 2.3V$ to $2.7V$	$\pm 18$ mA
DC Input Diode Current ( $I_{IK}$ ) $V_I < 0V$	-50 mA	$V_{CC0} = 1.65V$ to $1.95V$	$\pm 6$ mA
DC Output Diode Current ( $I_{OK}$ )		$V_{CC0} = 1.4V$ to $1.65V$	$\pm 2$ mA
$V_O < 0V$	-50 mA	$V_{CC0} = 1.1V$ to $1.4V$	$\pm 0.5$ mA
$V_O > V_{CC}$	+50 mA	Free Air Operating Temperature ( $T_A$ )	-40°C to +85°C
DC Output Source/Sink Current ( $I_{OH}/I_{OL}$ )	-50 mA / +50 mA	Minimum Input Edge Rate ( $\Delta V/\Delta t$ )	10 ns/V
DC $V_{CC}$ or Ground Current per Supply Pin ( $I_{CC}$ or GND)	$\pm 100$ mA	$V_{CCA/B} = 1.1V$ to $3.6V$	
Storage Temperature Range ( $T_{STG}$ )	-65°C to +150°C		

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Note 2:**  $I_O$  Absolute Maximum Rating must be observed.

**Note 3:** All unused inputs must be held at  $V_{CC1}$  or GND.

### DC Electrical Characteristics

Symbol	Parameter	Conditions	$V_{CC1}$ (V)	$V_{CC0}$ (V)	Min	Max	Units
$V_{IH}$	High Level Input Voltage		2.7 - 3.6	1.1 - 3.6	2.0		V
			2.3 - 2.7		1.6		
			1.65 - 2.3		$0.65 \times V_{CC1}$		
			1.4 - 1.65		$0.65 \times V_{CC1}$		
			1.1 - 1.4		$0.9 \times V_{CC1}$		
$V_{IL}$	Low Level Input Voltage		2.7 - 3.6	1.1 - 3.6		0.8	V
			2.3 - 2.7			0.7	
			1.65 - 2.3			$0.35 \times V_{CC1}$	
			1.4 - 1.65			$0.35 \times V_{CC1}$	
			1.1 - 1.4			$0.1 \times V_{CC1}$	
$V_{OH}$	High Level Output Voltage	$I_{OH} = -100 \mu A$	1.1 - 3.6	1.1 - 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	$0.75 \times V_{CC0}$				

## DC Electrical Characteristics (Continued)

Symbol	Parameter	Conditions	V <sub>CC1</sub> (V)	V <sub>CC0</sub> (V)	Min	Max	Units
V <sub>OL</sub>	Low Level Output Voltage	I <sub>OL</sub> = 100μA	1.1 - 3.6	1.1 - 3.6		0.2	V
		I <sub>OL</sub> = 12 mA	2.7	2.7		0.4	
		I <sub>OL</sub> = 18 mA	3.0	3.0		0.4	
		I <sub>OL</sub> = 24 mA	3.0	3.0		0.55	
		I <sub>OL</sub> = 12 mA	2.3	2.3		0.4	
		I <sub>OL</sub> = 18 mA	2.3	2.3		0.6	
		I <sub>OL</sub> = 6 mA	1.65	1.65		0.3	
		I <sub>OL</sub> = 2 mA	1.4	1.4		0.35	
		I <sub>OL</sub> = 0.5 mA	1.1	1.1		0.3 x V <sub>CC1</sub>	
I <sub>I</sub>	Input Leakage Current	V <sub>I</sub> = V <sub>CC1</sub> or GND	1.1 - 3.6	3.6		±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current	A <sub>n</sub> ; $\overline{OE} = 0V$ to 3.6V	0	3.6		±10.0	μA
		Y <sub>n</sub> = 0V to 3.6V	3.6	0		±10.0	
I <sub>OZ</sub> (Note 4)	3-STATE Output Leakage 0 ≤ V <sub>O</sub> ≤ 3.6V V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	$\overline{OE} = V_{IH}$	3.6	3.6		±10.0	μA
		$\overline{OE} = \text{Don't Care}$	0	3.6		+10.0	
		$\overline{OE} = \text{Don't Care}$	3.6	0		+10.0	
I <sub>CC1/O</sub> (Note 4)	Quiescent Supply Current	V <sub>I</sub> = V <sub>CC1</sub> or GND; I <sub>O</sub> = 0	1.1 - 3.6	1.1 - 3.6		20.0	μA
I <sub>CCZ</sub> (Note 5)	Quiescent Supply Current	V <sub>I</sub> = V <sub>CC1</sub> or GND; I <sub>O</sub> = 0	1.1 - 3.6	1.1 - 3.6		20.0	μA
I <sub>CC1</sub>	Quiescent Supply Current	V <sub>I</sub> = V <sub>CC1</sub> or GND; I <sub>O</sub> = 0	0	1.1 - 3.6		-10.0	μA
		V <sub>I</sub> = V <sub>CC1</sub> or GND; I <sub>O</sub> = 0	1.1 - 3.6	0		10.0	μA
I <sub>CC0</sub>	Quiescent Supply Current	V <sub>I</sub> = V <sub>CC0</sub> or GND; I <sub>O</sub> = 0	1.1 - 3.6	0		-10.0	μA
		V <sub>I</sub> = V <sub>CC0</sub> or GND; I <sub>O</sub> = 0	0	1.1 - 3.6		10.0	μA
ΔI <sub>CC1/O</sub>	Increase in I <sub>CC</sub> per Input; Other Inputs at V <sub>CC</sub> or GND	V <sub>IH</sub> = 3.0	3.6	3.6		500	μA

**Note 4:** Don't Care = Any valid logic level.

**Note 5:** Reflects current per supply, V<sub>CC1</sub> or V<sub>CC0</sub>.

AC Electrical Characteristics $V_{CCI} = 3.0V$ to $3.6V$												
Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCO} = 3.0V$ to $3.6V$		$V_{CCO} = 2.3V$ to $2.7V$		$V_{CCO} = 1.65V$ to $1.95V$		$V_{CCO} = 1.4V$ to $1.6V$		$V_{CCO} = 1.1V$ to $1.3V$		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PLH}, t_{PHL}$	Propagation Delay A to Y	0.2	3.5	0.3	3.9	0.7	5.4	0.8	6.8	1.4	22.0	ns
$t_{PZH}, t_{PZL}$	Output Enable $\overline{OE}$ to Y	0.5	4.0	0.7	4.4	1.0	5.9	1.0	6.4	1.5	17.0	ns
$t_{PHZ}, t_{PLZ}$	Output Disable $\overline{OE}$ to Y	0.2	3.8	0.2	4.0	0.7	4.8	1.5	6.2	2.0	17.0	ns

AC Electrical Characteristics $V_{CCI} = 2.3V$ to $2.7V$												
Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCO} = 3.0V$ to $3.6V$		$V_{CCO} = 2.3V$ to $2.7V$		$V_{CCO} = 1.65V$ to $1.95V$		$V_{CCO} = 1.4V$ to $1.6V$		$V_{CCO} = 1.1V$ to $1.3V$		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PLH}, t_{PHL}$	Propagation Delay A to Y	0.2	3.8	0.4	4.2	0.5	5.6	0.8	6.9	1.4	22.0	ns
$t_{PZH}, t_{PZL}$	Output Enable $\overline{OE}$ to Y	0.6	4.2	0.8	4.6	1.0	6.0	1.0	6.8	1.5	17.0	ns
$t_{PHZ}, t_{PLZ}$	Output Disable $\overline{OE}$ to Y	0.2	4.1	0.2	4.3	0.7	4.8	1.5	6.7	2.0	17.0	ns

AC Electrical Characteristics $V_{CCI} = 1.65V$ to $1.95V$												
Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCO} = 3.0V$ to $3.6V$		$V_{CCO} = 2.3V$ to $2.7V$		$V_{CCO} = 1.65V$ to $1.95V$		$V_{CCO} = 1.4V$ to $1.6V$		$V_{CCO} = 1.1V$ to $1.3V$		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PLH}, t_{PHL}$	Propagation Delay A to Y	0.3	4.0	0.5	4.5	0.8	5.7	0.9	7.1	1.5	22.0	ns
$t_{PZH}, t_{PZL}$	Output Enable $\overline{OE}$ to Y	0.6	5.2	0.8	5.4	1.2	6.9	1.2	7.2	1.5	18.0	ns
$t_{PHZ}, t_{PLZ}$	Output Disable $\overline{OE}$ to Y	0.2	5.1	0.2	4.0	0.8	5.2	1.5	7.0	2.0	17.0	ns

AC Electrical Characteristics $V_{CCI} = 1.4V$ to $1.6V$												
Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCO} = 3.0V$ to $3.6V$		$V_{CCO} = 2.3V$ to $2.7V$		$V_{CCO} = 1.65V$ to $1.95V$		$V_{CCO} = 1.4V$ to $1.6V$		$V_{CCO} = 1.1V$ to $1.3V$		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PLH}, t_{PHL}$	Propagation Delay A to Y	0.5	4.3	0.5	4.8	1.0	6.0	1.0	7.3	1.5	22.0	ns
$t_{PZH}, t_{PZL}$	Output Enable $\overline{OE}$ to Y	1.1	7.5	1.1	7.6	1.3	7.7	1.4	7.9	2.0	20.0	ns
$t_{PHZ}, t_{PLZ}$	Output Disable $\overline{OE}$ to Y	0.4	6.1	0.4	6.2	0.9	6.2	1.5	7.5	2.0	18.0	ns

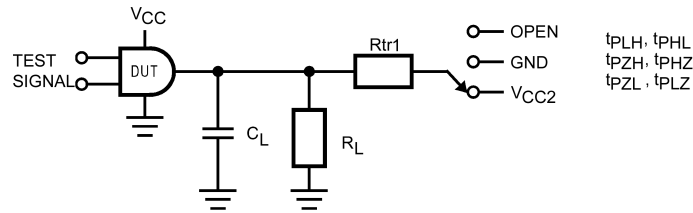
  

AC Electrical Characteristics $V_{CCI} = 1.1V$ to $1.3V$												
Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCO} = 3.0V$ to $3.6V$		$V_{CCO} = 2.3V$ to $2.7V$		$V_{CCO} = 1.65V$ to $1.95V$		$V_{CCO} = 1.4V$ to $1.6V$		$V_{CCO} = 1.1V$ to $1.3V$		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$t_{PLH}, t_{PHL}$	Propagation Delay A to Y	0.8	13.0	1.0	7.0	1.2	8.0	1.3	9.5	2.0	24.0	ns
$t_{PZH}, t_{PZL}$	Output Enable $\overline{OE}$ to Y	1.0	12.0	1.0	9.0	2.0	10.0	2.0	11.0	2.0	24.0	ns
$t_{PHZ}, t_{PLZ}$	Output Disable $\overline{OE}$ to Y	1.0	15.0	0.7	7.0	1.0	8.0	2.0	10.0	2.0	20.0	ns

Capacitance				
Symbol	Parameter	Conditions	$T_A = +25^{\circ}C$	Units
			Typical	
$C_{IN}$	Input Capacitance $A_n$ Control Pin ( $\overline{OE}$ )	$V_{CCI} = V_{CCO} = 3.3V, V_I = 0V$ or $V_{CCI}$	4.0	pF
$C_{OUT}$	Output Capacitance $Y_n$	$V_{CCI} = V_{CCO} = 3.3V, V_I = 0V$ or $V_{CCI}$	5.0	pF
$C_{PD}$	Power Dissipation Capacitance	$V_{CCI} = V_{CCO} = 3.3V, V_I = 0V$ or $V_{CCI}, F = 10$ MHz	20.0	pF

## AC Loading and Waveforms

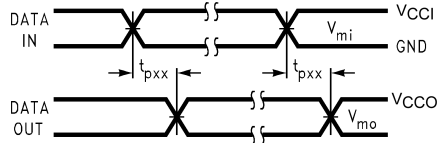


TEST	SWITCH
$t_{PLH}$ , $t_{PHL}$	OPEN
$t_{PZH}$ , $t_{PHZ}$	$V_{CCO} \times 2$ at $V_{CCO} = 3.3 \pm 0.3V, 2.5V \pm 0.2V, 1.8V \pm 0.15V, 1.5V \pm 0.1V, 1.2V \pm 0.1V$
$t_{PZL}$ , $t_{PLZ}$	GND

FIGURE 1. AC Test Circuit

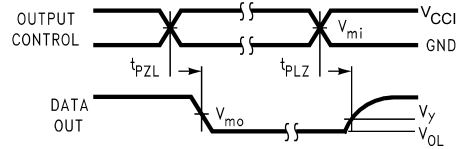
AC Load Table

$V_{CCO}$	$C_L$	$R_L$	$R_{tr1}$
$1.2V \pm 0.1V$	15 pF	2 k $\Omega$	2 k $\Omega$
$1.5V \pm 0.1V$	15 pF	2 k $\Omega$	2 k $\Omega$
$1.8V \pm 0.15V$	15 pF	2 k $\Omega$	2 k $\Omega$
$2.5V \pm 0.2V$	15 pF	2 k $\Omega$	2 k $\Omega$
$3.3V \pm 0.3V$	15 pF	2 k $\Omega$	2 k $\Omega$



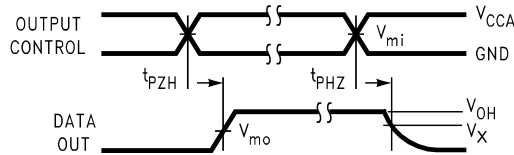
Note: Input  $t_R = t_F = 2.0$  ns, 10% to 90%  
 Input  $t_R = t_F = 2.5$  ns, 10% to 90%, @  $V_I = 3.0V$  to  $3.6V$  only

FIGURE 2. Waveform for Inverting and Non-Inverting Functions



Note: Input  $t_R = t_F = 2.0$  ns, 10% to 90%  
 Input  $t_R = t_F = 2.5$  ns, 10% to 90%, @  $V_I = 3.0V$  to  $3.6V$  only

FIGURE 3. 3-STATE Output Low Enable and Disable Times for Low Voltage Logic



Note: Input  $t_R = t_F = 2.0$  ns, 10% to 90%  
 Input  $t_R = t_F = 2.5$  ns, 10% to 90%, @  $V_I = 3.0V$  to  $3.6V$  only

FIGURE 4. 3-STATE Output High Enable and Disable Times for Low Voltage Logic

Symbol	$V_{CC}$				
	$3.3V \pm 0.3V$	$2.5V \pm 0.2V$	$1.8V \pm 0.15V$	$1.5V \pm 0.1V$	$1.2V \pm 0.1V$
$V_{mi}$	$V_{CCi}/2$	$V_{CCi}/2$	$V_{CCi}/2$	$V_{CCi}/2$	$V_{CCi}/2$
$V_{mo}$	$V_{CCO}/2$	$V_{CCO}/2$	$V_{CCO}/2$	$V_{CCO}/2$	$V_{CCO}/2$
$V_X$	$V_{OH} - 0.3V$	$V_{OH} - 0.15V$	$V_{OH} - 0.15V$	$V_{OH} - 0.1V$	$V_{OH} - 0.1V$
$V_Y$	$V_{OL} + 0.3V$	$V_{OL} + 0.15V$	$V_{OL} + 0.15V$	$V_{OL} + 0.1V$	$V_{OL} + 0.1V$

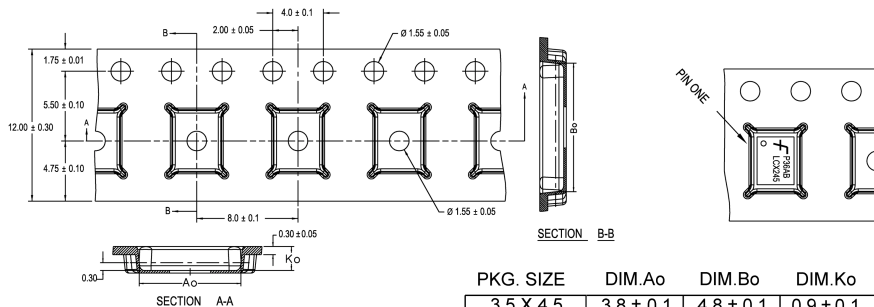
Note: For  $V_{mi}$ :  $V_{CCi} = V_{CCA}$  for Control Pins  $T/\bar{R}$  and  $OE$ , or  $V_{CCA}/2$

## Tape and Reel Specification

### Tape Format for DQFN

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
BQX	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

### TAPE DIMENSIONS inches (millimeters)



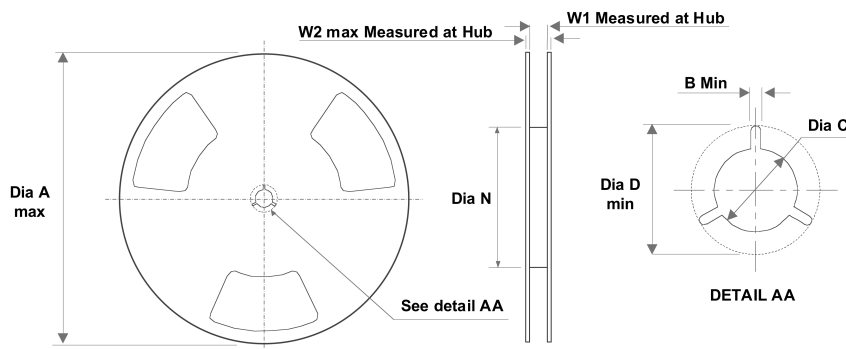
PKG. SIZE	DIM.Ao	DIM.Bo	DIM.Ko
3.5 X 4.5	3.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
3.0 X 3.0	3.3 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 4.5	2.8 ± 0.1	4.8 ± 0.1	0.9 ± 0.1
2.5 X 3.5	2.8 ± 0.1	3.8 ± 0.1	0.9 ± 0.1
2.5 X 3.0	2.8 ± 0.1	3.3 ± 0.1	0.9 ± 0.1
2.5 X 2.5	2.8 ± 0.1	2.8 ± 0.1	0.9 ± 0.1

DIMENSIONS ARE IN MILLIMETERS

NOTES: unless otherwise specified

1. Cumulative pitch for feeding holes and cavities (chip pockets) not to exceed 0.008[0.20] over 10 pitch span.
2. Smallest allowable bending radius.
3. Thru hole inside cavity is centered within cavity.
4. Tolerance is  $\pm 0.002[0.05]$  for these dimensions on all 12mm tapes.
5. Ao and Bo measured on a plane 0.120[0.30] above the bottom of the pocket.
6. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
7. Pocket position relative to sprocket hole measured as true position of pocket. Not pocket hole.
8. Controlling dimension is millimeter. Dimension in inches rounded.

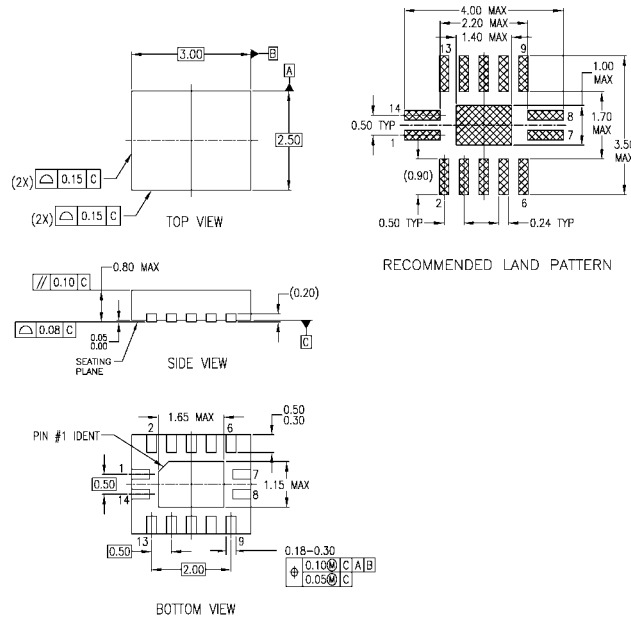
### REEL DIMENSIONS inches (millimeters)



Tape Size	A	B	C	D	N	W1	W2
12 mm	13.0 (330.0)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	0.488 (12.4)	0.724 (18.4)



**Physical Dimensions** inches (millimeters) unless otherwise noted



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-241, VARIATION AA
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

MLP014ArevA

**14-Terminal Depopulated Quad Very-Thin Flat Pack No Leads (DQFN), JEDEC MO-241, 2.5 x 3.0mm Package Number MLP014A**


Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

[www.fairchildsemi.com](http://www.fairchildsemi.com)

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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 ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor 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 ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative