



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
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. Please email any questions regarding the system integration to 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. 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.



FXL2TD245

Low Voltage Dual Supply 2-Bit Signal Translator with Configurable Voltage Supplies and Signal Levels and 3-STATE Outputs and Independent Direction Controls

General Description

The FXL2TD245 is a configurable dual-voltage-supply translator designed for both uni-directional and bi-directional voltage translation between two logic levels. The device allows translation between voltages as high as 3.6V to as low as 1.1V. The A Port tracks the V_{CCA} level, and the B Port tracks the V_{CCB} level. This allows for bi-directional 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. Internal power down control circuits place the device in 3-STATE if either V_{CC} is removed.

The Transmit/Receive inputs independently determine the direction of data through each of the two bits. The \overline{OE} input, when HIGH, disables both the A and B Ports by placing them in a 3-STATE condition. The FXL2TD245 is designed so that the control pins (T/\overline{R} and \overline{OE}) are supplied by V_{CCA} .

Features

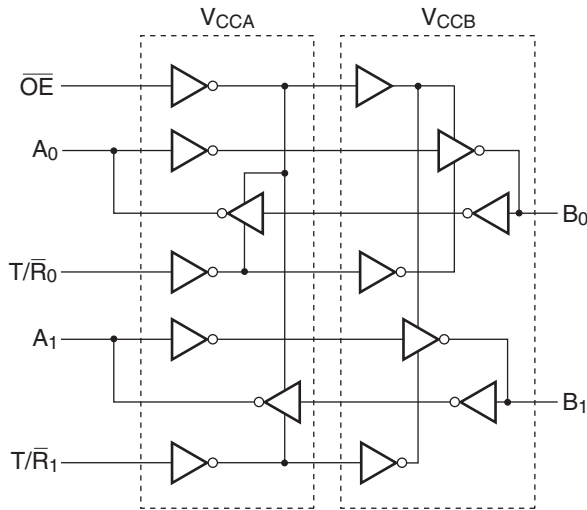
- Bi-directional interface between any 2 levels from 1.1V to 3.6V
- Fully configurable: Inputs track V_{CC} level
- Non-preferential power-up sequencing; either V_{CC} may be powered-up first
- Outputs remain in 3-STATE until active V_{CC} level is reached
- Outputs switch to 3-STATE if either V_{CC} is at GND
- Power-off protection
- Control inputs (T/\overline{R}_n , \overline{OE}) levels are referenced to V_{CCA} voltage
- Packaged in the Chipscale MicroPak10 (1.6mm x 2.1mm)
- ESD protections 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 Information

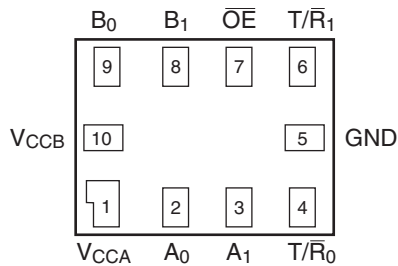
Order Number	Package Number	Pb-Free	Package Description
FXL2TD245L10X	MAC010A	Yes	10-Lead MicroPak, 1.6mm x 2.1mm

Pb-Free package per JEDEC J-STD-020B.

Functional Diagram



Connection Diagram



(Top View)

Pin Assignment

Pin Number	Terminal Name
1	V_{CCA}
2	A_0
3	A_1
4	T/R_0
5	GND
6	T/R_1
7	\overline{OE}
8	B_1
9	B_0
10	V_{CCB}

Pin Descriptions

Pin Names	Description
\overline{OE}	Output Enable Input
T/\overline{R}_n	Transmit/Receive Inputs
A_n	Side A Inputs or 3-STATE Outputs
B_n	Side B Inputs or 3-STATE Outputs
V_{CCA}	Side A Power Supply
V_{CCB}	Side B Power Supply

Truth Table

Inputs			Outputs
\overline{OE}	T/\overline{R}_0	T/\overline{R}_1	
L	L	X	B_0 Data to A_0 Output
L	H	X	A_0 Data to B_0 Output
L	X	L	B_1 Data to A_1 Output
L	X	H	A_1 Data to B_1 Output
H	X	X	3-STATE

H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

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 inputs (T/\overline{R}_n 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 \overline{OE} driver.

The recommended power-up sequence is the following:

1. Apply power to either V_{CC} .
2. Apply power to the T/\overline{R}_n inputs (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

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.

Symbol	Parameter	Rating
V_{CCA}, V_{CCB}	Supply Voltage	-0.5V to +4.6V
V_I	DC Input Voltage I/O Port A I/O Port B Control Inputs ($T/\bar{R}_n, \bar{OE}$)	-0.5V to +4.6V -0.5V to +4.6V -0.5V to +4.6V
V_O	Output Voltage ⁽¹⁾ Outputs 3-STATE Outputs Active (A_n) Outputs Active (B_n)	-0.5V to +4.6V -0.5V to $V_{CCA} + 0.5V$ -0.5V to $V_{CCB} + 0.5V$
I_{IK}	DC Input Diode Current @ $V_I < 0V$	-50mA
I_{OK}	DC Output Diode Current @ $V_O < 0V$ $V_O > V_{CC}$	-50mA +50mA
I_{OH}/I_{OL}	DC Output Source/Sink Current	-50mA / +50mA
I_{CC}	DC V_{CC} or Ground Current per Supply Pin	$\pm 100mA$
T_{STG}	Storage Temperature Range	-65°C to +150°C

Recommended Operating Conditions⁽²⁾

Symbol	Parameter	Rating
V_{CCA} or V_{CCB}	Power Supply Operating	1.1V to 3.6V
	Input Voltage Port A Port B Control Inputs ($T/\bar{R}_n, \bar{OE}$)	0.0V to 3.6V 0.0V to 3.6V 0.0V to V_{CCA}
	Output Current in I_{OH}/I_{OL} with V_{CC} @ 3.0V to 3.6V 2.3V to 2.7V 1.65V to 1.95V 1.4V to 1.65V 1.1V to 1.4V	$\pm 24mA$ $\pm 18mA$ $\pm 6mA$ $\pm 2mA$ $\pm 0.5mA$
T_A	Free Air Operating Temperature	-40°C to +85°C
$\Delta t/\Delta V$	Maximum Input Edge Rate $V_{CCA/B} = 1.1V$ to 3.6V	10ns/V

Notes:

- I_O Absolute Maximum Rating must be observed.
- All unused inputs and input/output pins must be held at V_{CC1} or GND.

DC Electrical Characteristics

Symbol	Parameter	Conditions	V _{CCI} (V)	V _{CC0} (V)	Min.	Max.	Units
V _{IH}	High Level Input Voltage ⁽³⁾	Data Inputs A _n , B _n	2.7–3.6	1.1–3.6	2.0		V
			2.3–2.7		1.6		
			1.65–2.3		0.65 x V _{CCI}		
			1.4–1.65		0.65 x V _{CCI}		
			1.1–1.4		0.9 x V _{CCI}		
		Control Pins \overline{OE} , T/ \overline{R}_n (Referenced to V _{CCA})	2.7–3.6	1.1–3.6	2.0		
			2.3–2.7		1.6		
			1.65–2.3		0.65 x V _{CCA}		
			1.4–1.65		0.65 x V _{CCA}		
			1.1–1.4		0.9 x V _{CCA}		
V _{IL}	Low Level Input Voltage ⁽³⁾	Data Inputs A _n , B _n	2.7–3.6	1.1–3.6		0.8	V
			2.3–2.7			0.7	
			1.65–2.3			0.35 x V _{CCI}	
			1.4–1.65			0.35 x V _{CCI}	
			1.1–1.4			0.1 x V _{CCI}	
		Control Pins \overline{OE} , T/ \overline{R}_n (Referenced to V _{CCA})	2.7–3.6	1.1–3.6		0.8	
			2.3–2.7			0.7	
			1.65–2.3			0.35 x V _{CCA}	
			1.4–1.65			0.35 x V _{CCA}	
			1.1–1.4			0.1 x V _{CCA}	
V _{OH}	High Level Output Voltage ⁽⁴⁾	I _{OH} = -100μA	1.1–3.6	1.1–3.6	V _{CC0} -0.2		V
		I _{OH} = -12mA	2.7	2.7	2.2		
		I _{OH} = -18mA	3.0	3.0	2.4		
		I _{OH} = -24mA	3.0	3.0	2.2		
		I _{OH} = -6mA	2.3	2.3	2.0		
		I _{OH} = -12mA	2.3	2.3	1.8		
		I _{OH} = -18mA	2.3	2.3	1.7		
		I _{OH} = -6mA	1.65	1.65	1.25		
		I _{OH} = -2mA	1.4	1.4	1.05		
		I _{OH} = -0.5mA	1.1	1.1	0.75 x V _{CC0}		
V _{OL}	Low Level Output Voltage ⁽⁴⁾	I _{OL} = 100μA	1.1–3.6	1.1–3.6		0.2	V
		I _{OL} = 12mA	2.7	2.7		0.4	
		I _{OL} = 18mA	3.0	3.0		0.4	
		I _{OL} = 24mA	3.0	3.0		0.55	
		I _{OL} = 12mA	2.3	2.3		0.4	
		I _{OL} = 18mA	2.3	2.3		0.6	
		I _{OL} = 6mA	1.65	1.65		0.3	
		I _{OL} = 2mA	1.4	1.4		0.35	
		I _{OL} = 0.5mA	1.1	1.1		0.3 x V _{CC0}	
I _I	Input Leakage Current Control Pins	V _I = V _{CCA} or GND	1.1–3.6	3.6		±1.0	μA

DC Electrical Characteristics (Continued)

Symbol	Parameter	Conditions	V _{CCI} (V)	V _{CCO} (V)	Min.	Max.	Units
I _{OFF}	Power Off Leakage Current	A _n , V _I or V _O = 0V to 3.6V	0	3.6		±10.0	μA
		B _n , V _I or V _O = 0V to 3.6V	3.6	0		±10.0	
I _{OZ}	3-STATE Output Leakage ⁽⁵⁾ 0 ≤ V _O ≤ 3.6V V _I = V _{IH} or V _{IL}	A _n , B _n $\overline{OE} = V_{IH}$	3.6	3.6		±10.0	μA
		B _n , $\overline{OE} = \text{Don't Care}$	0	3.6		+10.0	
		A _n , $\overline{OE} = \text{Don't Care}$	3.6	0		+10.0	
I _{CCA/B}	Quiescent Supply Current ⁽⁶⁾	V _I = V _{CCI} or GND; I _O = 0	1.1–3.6	1.1–3.6		20.0	μA
I _{CCZ}	Quiescent Supply Current ⁽⁶⁾	V _I = V _{CCI} or GND; I _O = 0	1.1–3.6	1.1–3.6		20.0	μA
I _{CCA}	Quiescent Supply Current	V _I = V _{CCA} or GND; I _O = 0	0	1.1–3.6		-10.0	μA
		V _I = V _{CCA} or GND; I _O = 0	1.1–3.6	0		10.0	μA
I _{CCB}	Quiescent Supply Current	V _I = V _{CCB} or GND; I _O = 0	1.1–3.6	0		-10.0	μA
		V _I = V _{CCB} or GND; I _O = 0	0	1.1–3.6		10.0	μA
ΔI _{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

Notes:

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}.

AC Electrical Characteristics

$V_{CCA} = 3.0V$ to $3.6V$

Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCB} = 3.0V$ to $3.6V$		$V_{CCB} = 2.3V$ to $2.7V$		$V_{CCB} = 1.65V$ to $1.95V$		$V_{CCB} = 1.4V$ to $1.6V$		$V_{CCB} = 1.1V$ to $1.3V$		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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 \overline{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 \overline{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 \overline{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 \overline{OE} to A	0.2	3.7	0.2	3.7	0.2	3.7	0.2	3.7	0.2	3.7	

$V_{CCA} = 2.3V$ to $2.7V$

Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCB} = 3.0V$ to $3.6V$		$V_{CCB} = 2.3V$ to $2.7V$		$V_{CCB} = 1.65V$ to $1.95V$		$V_{CCB} = 1.4V$ to $1.6V$		$V_{CCB} = 1.1V$ to $1.3V$		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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 \overline{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 \overline{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 \overline{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 \overline{OE} to A	0.2	4.0	0.2	4.0	0.2	4.0	0.2	4.0	0.2	4.0	

$V_{CCA} = 1.65V$ to $1.95V$

Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCB} = 3.0V$ to $3.6V$		$V_{CCB} = 2.3V$ to $2.7V$		$V_{CCB} = 1.65V$ to $1.95V$		$V_{CCB} = 1.4V$ to $1.6V$		$V_{CCB} = 1.1V$ to $1.3V$		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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 \overline{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 \overline{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 \overline{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 \overline{OE} to A	0.5	5.0	0.5	5.0	0.5	5.0	0.5	5.0	0.5	5.0	

AC Electrical Characteristics (Continued)

$V_{CCA} = 1.4V$ to $1.6V$

Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCB} = 3.0V$ to $3.6V$		$V_{CCB} = 2.3V$ to $2.7V$		$V_{CCB} = 1.65V$ to $1.95V$		$V_{CCB} = 1.4V$ to $1.6V$		$V_{CCB} = 1.1V$ to $1.3V$		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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 \overline{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 \overline{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 \overline{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 \overline{OE} to A	1.0	6.0	1.0	6.0	1.0	6.0	1.0	6.0	1.0	6.0	

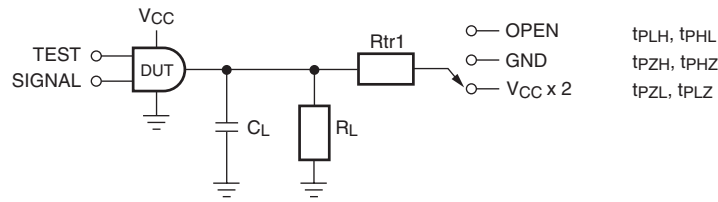
$V_{CCA} = 1.1V$ to $1.3V$

Symbol	Parameter	$T_A = -40^{\circ}C$ to $+85^{\circ}C$										Units
		$V_{CCB} = 3.0V$ to $3.6V$		$V_{CCB} = 2.3V$ to $2.7V$		$V_{CCB} = 1.65V$ to $1.95V$		$V_{CCB} = 1.4V$ to $1.6V$		$V_{CCB} = 1.1V$ to $1.3V$		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
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 \overline{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 \overline{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 \overline{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 \overline{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	$T_A = +25^{\circ}C$	Units
			Typical	
C_{IN}	Input Capacitance Control Pins (\overline{OE} , T/\overline{Rn})	$V_{CCA} = V_{CCB} = 3.3V, V_I = 0V$ or $V_{CCA/B}$	4.0	pF
$C_{I/O}$	Input/Output Capacitance A_n, B_n Ports	$V_{CCA} = V_{CCB} = 3.3V, V_I = 0V$ or $V_{CCA/B}$	5.0	pF
C_{PD}	Power Dissipation Capacitance	$V_{CCA} = V_{CCB} = 3.3V, V_I = 0V$ or V_{CC} , $F = 10MHz$	20.0	pF

AC Loading and Waveforms

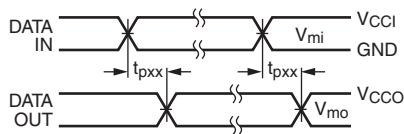


Test	Switch
t_{PLH} , t_{PHL}	OPEN
t_{PLZ} , t_{PZL}	$V_{CCO} \times 2$ at $V_{CCO} = 3.3V \pm 0.3V, 2.5V \pm 0.2V, 1.8V \pm 0.15V, 1.5V \pm 0.1V, 1.2V \pm 0.1V$
t_{PHZ} , t_{PZH}	GND

Figure 1. AC Test Circuit

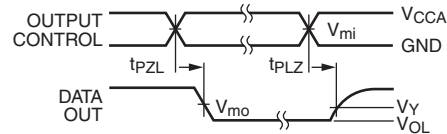
AC Load Table

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



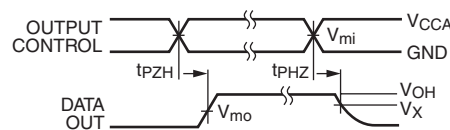
Input $t_R = t_F = 2.0$ ns, 10% to 90%
 Input $t_R = t_F = 2.5$ ns, 10% to 90%, @ $V_I = 3.0V$ to $3.6V$ only

Figure 2. Waveform for Inverting and Non-Inverting Functions



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



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	$V_{OL} + 0.3V$	$V_{OL} + 0.15V$	$V_{OL} + 0.15V$	$V_{OL} + 0.1V$	$V_{OL} + 0.1V$

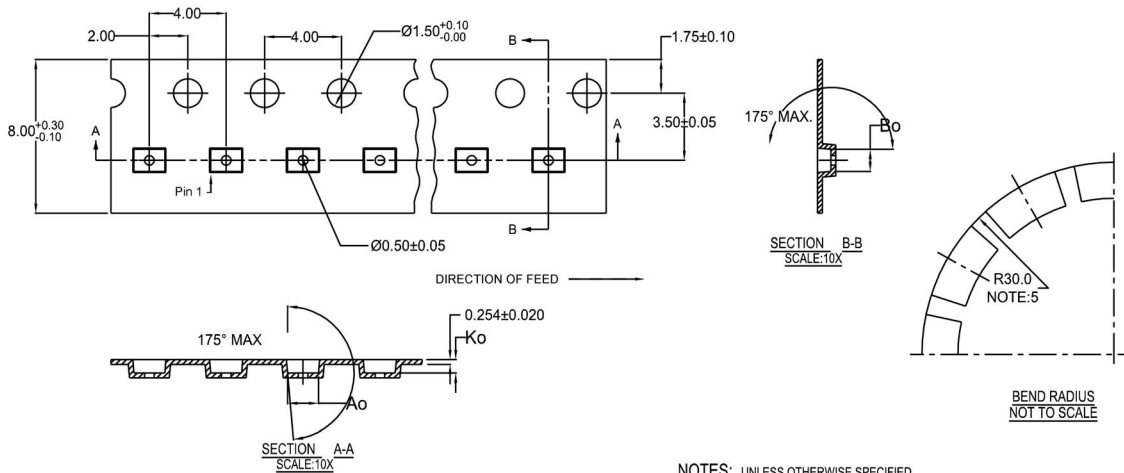
For V_{mi} : $V_{CCI} = V_{CCA}$ for Control Pins $\overline{T/R}$ and \overline{OE} , or $V_{CCA}/2$

Tape and Reel Specification

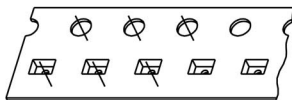
Tape Format for MicroPak 10

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
L10X	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

Tape Dimensions inches (millimeters)



10	300056	2.30 ± 0.05	1.78 ± 0.05	0.68 ± 0.05
8	300038	1.78 ± 0.05	1.78 ± 0.05	0.68 ± 0.05
6	300033	1.60 ± 0.05	1.15 ± 0.05	0.70 ± 0.05

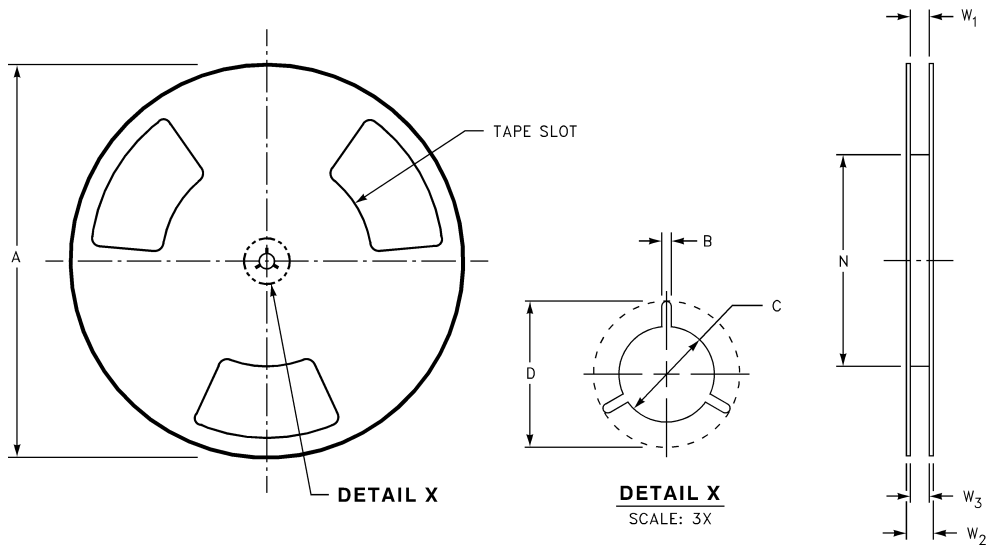


SCALE: 6X

NOTES: UNLESS OTHERWISE SPECIFIED

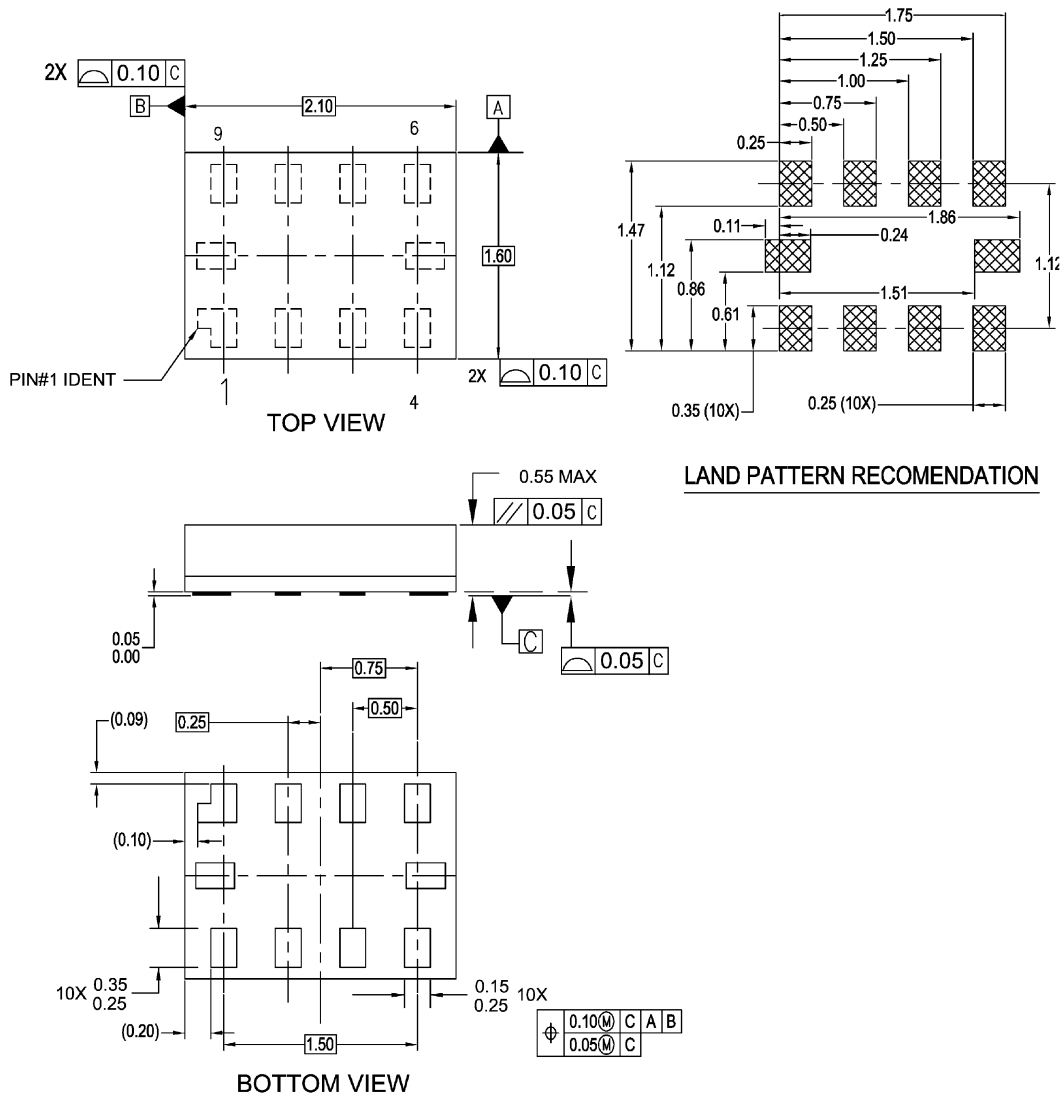
1. ACCUMULATED 50 SPROCKETS, SPROCKET HOLE PITCH IS 200.00 ± 0.30MM
2. NO INDICATED CORNER RADIUS IS 0.127MM
3. CAMBER NOT TO EXCEED 1MM IN 100MM
4. SMALLEST ALLOWABLE BENDING RADIUS
5. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE

MicroPak 10 Reel Dimensions inches (millimeters)



Tape Size	A	B	C	D	N	W1	W2	W3
8 mm	7.0 (177.8)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	$0.331 + 0.059/-0.000$ (8.40 + 1.50/-0.00)	0.567 (14.40)	$W1 + 0.078/-0.039W$ (W1 + 2.00/-1.00)

Physical Dimensions inches (millimeters) unless otherwise noted



NOTES:

- A. PACKAGE CONFORMS TO JEDEC MO255, VARIATION UABD
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES CONFORMS TO ASME Y14.5M, 1994.

MAC010ARevC

**Pb-Free 10-Lead MicroPak, 1.6mm x 2.1mm
Package Number MAC010A**

FAIRCHILD SEMICONDUCTOR TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FACT Quiet Series™	OCX™	SILENT SWITCHER®	UniFET™
ActiveArray™	GlobalOptoisolator™	OCXPro™	SMART START™	UltraFET®
Bottomless™	GTO™	OPTOLOGIC®	SPM™	VCX™
Build it Now™	HiSeC™	OPTOPLANAR™	Stealth™	Wire™
CoolFET™	I ² C™	PACMAN™	SuperFET™	
CROSSVOLT™	i-Lo™	POP™	SuperSOT™-3	
DOMET™	ImpliedDisconnect™	Power247™	SuperSOT™-6	
EcoSPARK™	IntelliMAX™	PowerEdge™	SuperSOT™-8	
E ² CMOS™	ISOPLANAR™	PowerSaver™	SyncFET™	
EnSigna™	LittleFET™	PowerTrench®	TCM™	
FACT®	MICROCOUPLER™	QFET®	TinyBoost™	
FAST®	MicroFET™	QS™	TinyBuck™	
FASTr™	MicroPak™	QT Optoelectronics™	TinyPWM™	
FPS™	MICROWIRE™	Quiet Series™	TinyPower™	
FRFET™	MSX™	RapidConfigure™	TinyLogic®	
	MSXPro™	RapidConnect™	TINYOPTO™	
Across the board. Around the world.™		µSerDes™	TruTranslation™	
The Power Franchise®		ScalarPump™	UHC®	
Programmable Active Droop™				

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

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 FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

- 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, or (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 significant injury to the user.
- A critical component is 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.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

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. 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

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
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative