ComLink™ Series
CY2LL8423

High-drive Dual 2-Channel LVDS Repeater/Mux

Features

- **ANSI TIA/EIA-644-1995-compliant**
- **Designed for data rates to ≥ 650 Mbps = (325 MHz)**
- **Single 2 × 2 with high-drive output drivers**
  - **Low-voltage Differential Signaling with output voltages of ± 350 mV into 50-ohm load version (Bus LVDS)**
- **Single 3.3V supply**
- **Accepts ±350-mV differential inputs**
- **Output drivers are high impedance when disabled or when VDD ≤1.5V**
- **28-pin SSOP/TSSOP packages**
- **Industrial version available**

Description

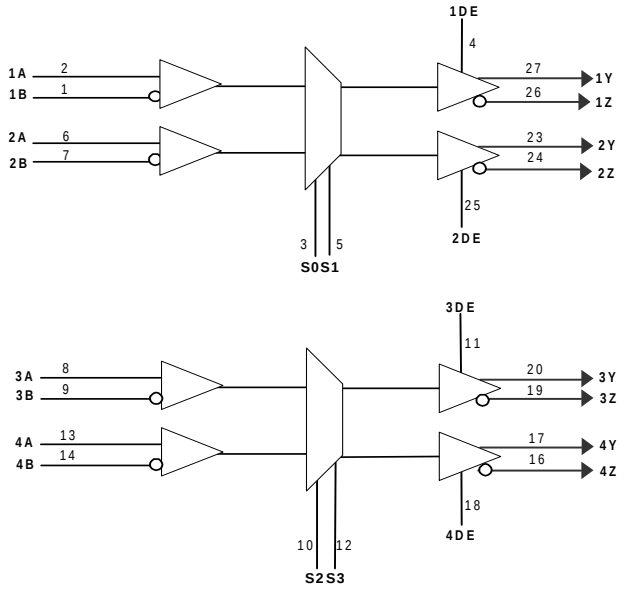
The Cypress CY2LL8423 are differential line drivers and receivers that utilize low-voltage differential signaling (LVDS) to achieve signaling rates of 650 Mbps. The receiver outputs can be switched to either or both drivers through the multiplexer control signals S2/S3. This provides flexibility in application for either a splitter or router configuration with a single device.

The Cypress CY2LL8423 are configured as a dual 2-channel repeater/Mux. The LVDS standard provides a minimum differential output voltage of 247 mV into a 50-ohm load and receipt of as little as 100-mV signals with up to 1V of DC offset between transmitter and receiver.

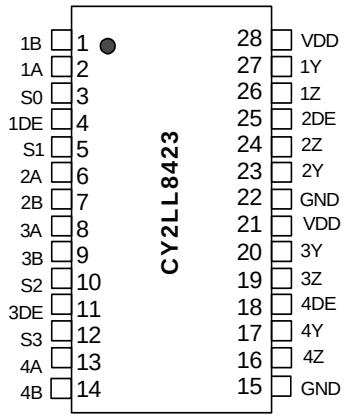
A doubly-terminated Bus LVDS line enables multipoint configurations.

Designed for both point-to-point based-B and multipoint data transmission over controlled impedance lines.

Block Diagram



Pin Configuration



28 pin TSSOP/SSOP

Pin Description

Pin Number	Pin Name	Description
15, 22	GND	Ground
2, 1	1A, 1B	Differential Input Channel 1
3	S0	Function Select Channel 1&2
4	1DE	Data Enable Channel 1
5	S1	Function Select Channel 1& 2
6, 7	2A, 2B	Differential Input Channel 2
21, 28	VDD	Power Supply
8, 9	3A, 3B	Differential Input Channel 3
10	S2	Function Select Channel 3 & 4
11	3DE	Data Enable Channel 3
12	S3	Function Select Channel 3 & 4
13, 14	4A, 4B	Differential Input Channel 4
17, 16	4Y, 4Z	Differential Output Channel 4
18	4DE	Data Enable Channel 4
20, 19	3Y, 3Z	Differential Output Channel 3
23, 24	2Y, 2Z	Differential Output Channel 2
25	2DE	Data Enable Channel 2
27, 26	1Y, 1Z	Differential Output Channel 1

Table 1. Mux Function Table

Input		Output		Function
S0	**S1**	**1Y/1Z**	**2Y/2Z**	
0	0	1A/1B	1A/1B	Splitter A
1	0	2A/2B	2A/2B	Splitter B
0	1	1A/1B	2A/2B	Pass Thru Router
1	1	2A/2B	1A/1B	Cross Point Router
S2	**S3**	**3Y/3Z**	**4Y/4Z**	
0	0	3A/3B	3A/3B	Splitter A
1	0	4A/4B	4A/4B	Splitter B
0	1	3A/3B	4A/4B	Pass Thru Router
1	1	4A/4B	3A/3B	Cross Point Router

Table 2. Absolute Maximum Rating Over Operating Free-Air Temperature[1]

Supply Voltage Range, V_{DD}(1)	–0.5V to 4V
Voltage Range (DE,S0,S1)	–0.5V to 6.0V
Input Voltage Range, VIN (A or B)	–0.5V to V_{DD} + 0.5V
ESD (All pins)	Class 3, A: 2KV, B: 500V
Storage Temperature Range	–65°C to 150°C

Note:

1. Stresses greater than those listed under absolute maximum ratings may cause permanent damage to the device. This is intended to be a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Table 3. Recommended Operating Conditions[2]

Parameter	Description		Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage		3	3.3	3.6	V
V_{IH}	High Level Input Voltage	(S0,S1,1DE,2DE) (S2,S3,3DE,4DE)	2			
V_{IL}	Low Level Input Voltage	(S0,S1,1DE,2DE) (S2,S3,3DE,4DE)			0.8	
V_{ID}	Magnitude of Differential Input Voltage		0.1		0.6	
V_{IC}	Common Mode Input Voltage		$V_{ID}/2$		$2.4 – (V_{ID}/2)$	
T_A	Operating Free Air Temperature	Industrial	–40		85	°C
		Commercial	0		70	

Table 4. Receiver Electrical Characteristics Over Recommended Operating Conditions

Parameter	Description	Condition	Min.	Typ.	Max.	Unit
V_{ITH+}	Positive-going Differential Input Voltage Threshold	V_{CM} = 1.2V			100	mV
V_{ITH-}	Negative-going Differential Input Voltage Threshold	V_{CM} = 1.2V	–100			mV
I_I	Input Current (A Inputs) [FAIL SAFE]	V_I = 0V	–0.5		–10	µA
		V_I = 2.4V			–10	µA
I_I	Input Current (B Inputs) [FAIL SAFE]	V_I = 0.8V	0.5		10	µA
		V_I = 2.4V			10	µA
I_I (Off)	Power Off Current (A or B Inputs)	V_{DD} = 0V		0.1	10	µA

Table 5. Receiver Electrical Characteristics Over Recommended Operating Conditions

Parameter	Description	Condition		Min.	Typ.	Max.	Unit
V_{OD}	Differential Output Voltage Swing	RL = 50 Ohm	See *Figure 3*	247	340	454	mV
~V_{OD}	Change in Differential Output Voltage Swing between Logic States			–50		50	mV
V_{OC}(SS)	Steady State Common-mode Output Voltage		See *Figure 4*	1.125		1.375	V
~V_{OC}(SS)	Change in Steady State Common-mode Output between Logic States			–50	3	50	mV
V_{OC}(PP)	Peak-to-Peak Common-mode Output Voltage					150	mV
I_{CC}	Supply Current	No load			20	28	mA
		RL = 50 ohm@3.3V Fin =75MHz			42	54	mA
		Both channels disabled			16	24	mA
I_{IH}	High-Level Input Current	(S0,S1,1DE,2DE) (S2,S3,3DE,4DE)	V_{IH} = 5V		15		µA
I_{IL}	Low-Level Input Current	(S0,S1,1DE,2DE) (S2,S3,3DE,4DE)	V_{IL} = 0.8V		5		µA
I_{OS}	Short Circuit Current		V_{OY} or V_{0Z} = 0V			20	mA
			V_{OD} = 0V			20	
I_{OZ}	High Impedance Output Current		V_{OD} = 600 mV		0.1	1	µA
			V_O = 0V or V_{DD}		0.1	1	
$I_{O(OFF)}$	Power-Off Output Current		V_{DD} = 0V, V0 = 3.6V		0.1	10	µA
C_{in}	Input Capacitance		1A,1B,2A,2B,3A, 3B,4A,4B		3		pF
	Control Input Capacitance		(S0,S1,1DE,2DE) (S2,S3,3DE,4DE)		6		pF

Note:
2. Multiple supplies: The voltage on any input or I/O pin cannot exceed the power pin during power-up. Power supply sequencing is NOT required.

Table 6. Differential Receiver to Driver Switching Characteristics Over Recommended Operating Conditions[3,4]

Parameter	Description	Test Conditions	Min.	Typ.[3]	Max.	Unit
T_{PLH}	Differential Propagation delay, low to high	CL = 10 pF (see *Figure 5* and *Figure 6*)		4	6	ns
T_{PHL}	Differential Propagation delay, high to low			4	6	ns
$T_{sk(p)}$	Pulse Skew (T_{PHL}–T_{PLH})			0.2		ns
T_r	Transition Low to High				700	ps
T_f	Transition High to Low				700	ps
T_{PHZ}	Propagation delay, high level to high impedance output	(see *Figure 6*)		4	10	ns
T_{PLZ}	Propagation delay, low level to high impedance output			4.3	10	ns
T_{PZH}	Propagation delay, high impedance to high level output			3	10	ns
T_{PZL}	Propagation delay, high impedance to low level output			2	10	ns
$T_{PHL\_skR1\_Dx}$	Channel to Channel skew-receiver 1 to Any mux related drivers			95		ps
$T_{PLH\_skR1\_Dx}$	Channel to Channel skew-receiver 1 to Any mux related drivers			95		ps
$T_{PPHL\_skR2\_Dx}$	Channel to Channel skew-receiver 2 to Any mux related drivers			95		ps
$T_{PLH\_skR2\_Dx}$	Channel to Channel skew-receiver 2 to Any mux related drivers			95		ps
$T_{PHL\_skR3\_Dx}$	Channel to Channel skew-receiver 3 to Any mux related drivers			95		ps
$T_{PLH\_skR3\_Dx}$	Channel to Channel skew-receiver 3 to Any mux related drivers			95		ps
$T_{PHL\_skR4\_Dx}$	Channel to Channel skew-receiver 4 to Any mux related drivers			95		ps
$T_{PLH\_skR4\_Dx}$	Channel to Channel skew-receiver 4 to Any mux related drivers			95		ps

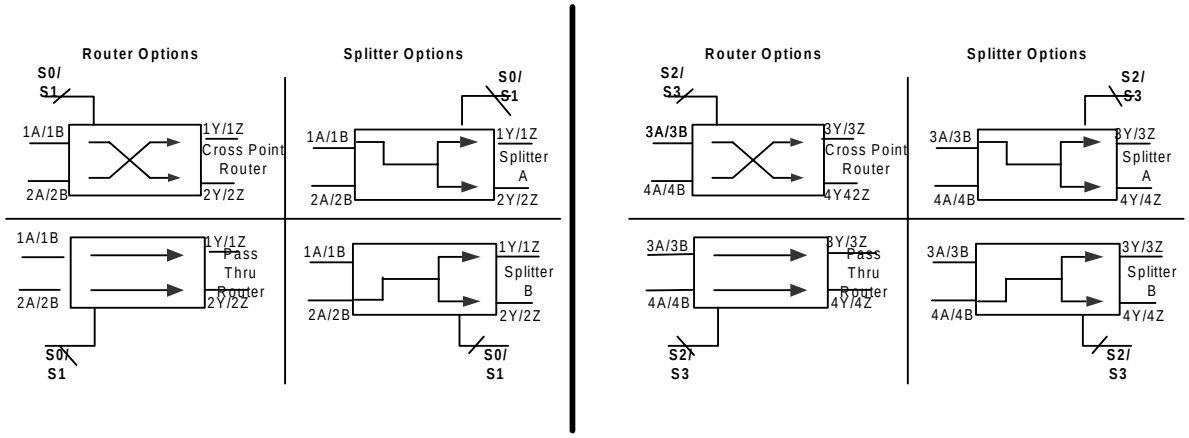


Figure 1. Dual - 2 Channel Cross Point Switch/Mux

Notes:
3. All typical values are measured at 25°C with a 3.3V supply.
4. These parameters are measured over supply voltage and temperature ranges recommended for the device.

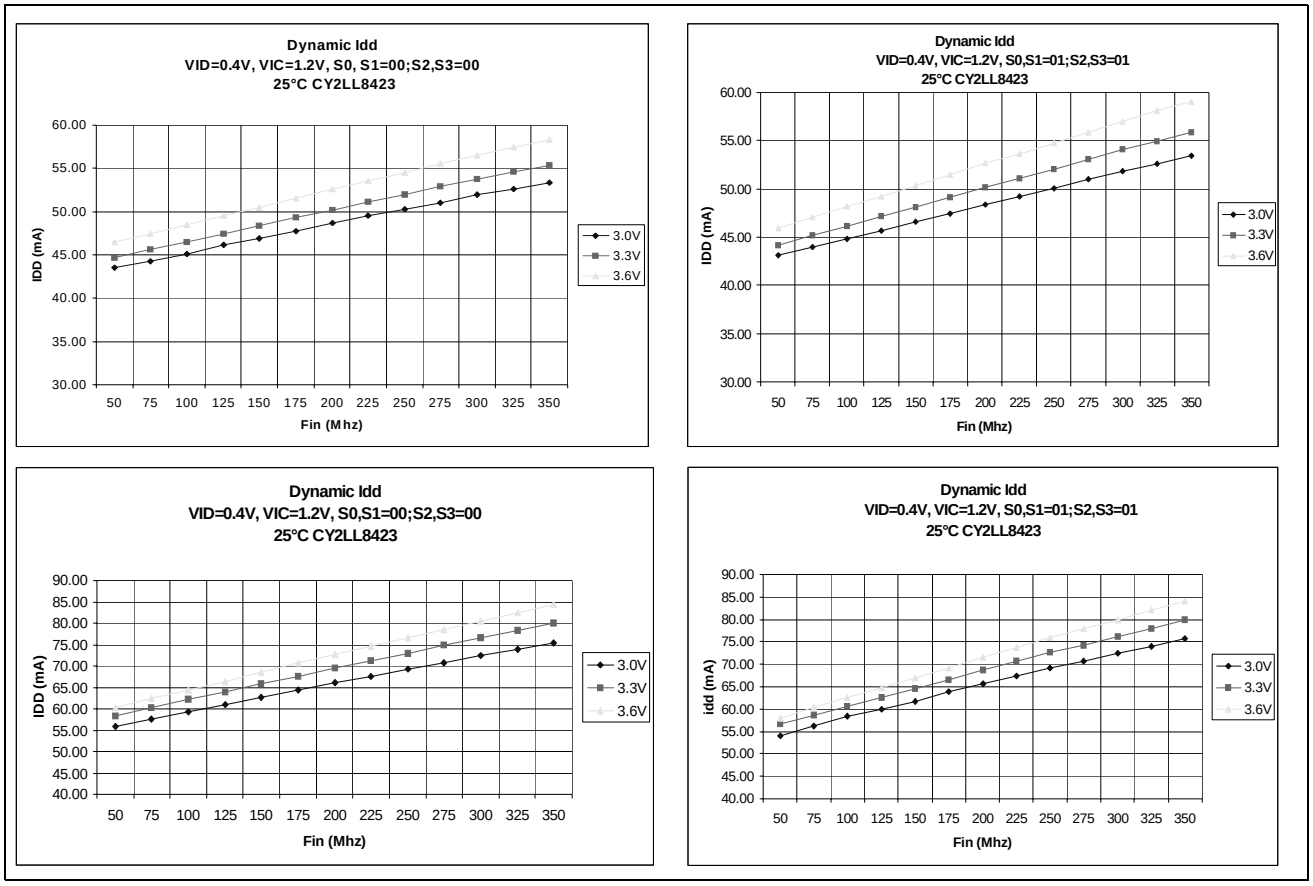


Figure 2. Dynamic IDD Diagrams

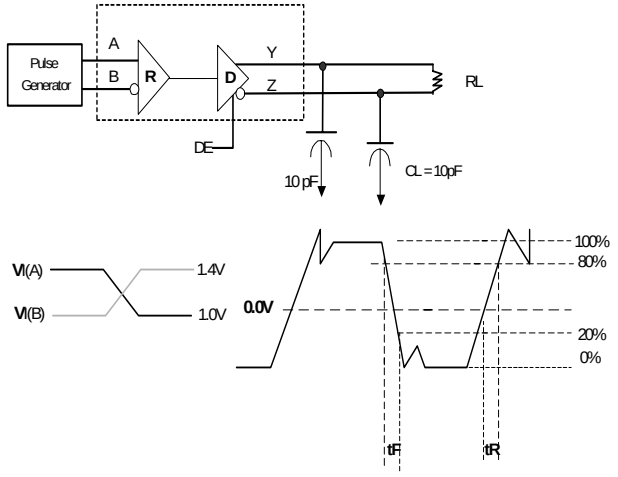


Figure 3. Test Circuit & Voltage Definitions for the Differential Output Signal[5,6,7]

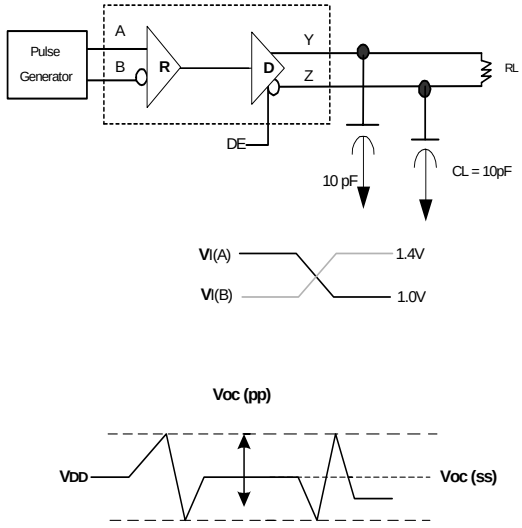


Figure 4. Test Circuit & Voltage Definitions for the Driver Common-Mode Output Voltage[5,6,7,8]

Notes:

5. All input pulses are supplied by a frequency generator with the following characteristics: t_R and $t_F \leq 1$ ns; Pulse rep rate = 50 Mpps; Pulse width = 10 ± 0.2 ns.
6. RL = 100 Ohm.
7. CL includes instrumentation and fixture capacitance within 6 mm of the DUT.
8. VOC measurement requires equipment with a 3-dB bandwith of at least 300 MHz.

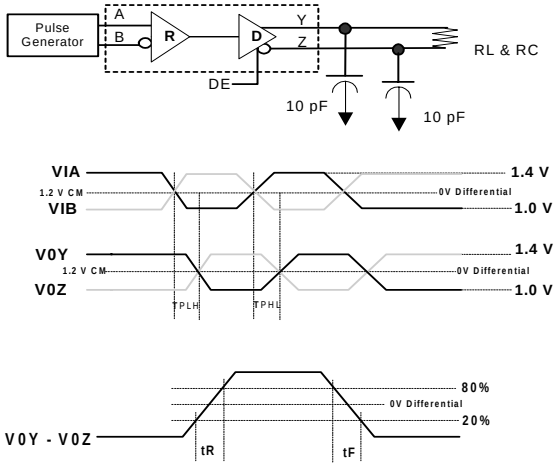


Figure 5. Differential Receiver to Driver Propagation Delay and Driver Transition Time[5,9,10]

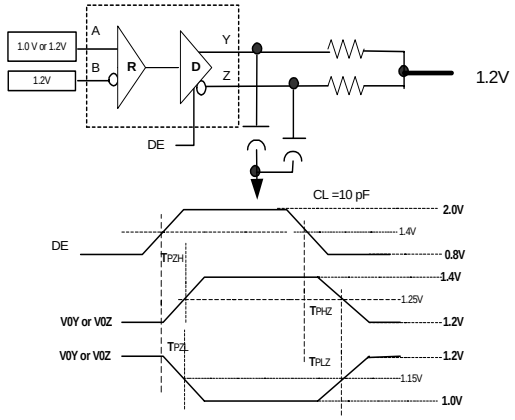


Figure 6. Test Circuit and Voltage Definitions for the Driver Common-Mode Output Voltage[5,9]

Application Engineering

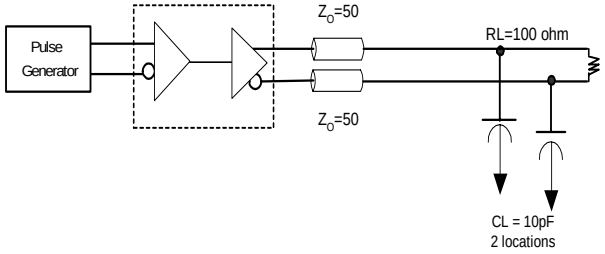


Figure 7. Termination Scheme for 100-Ohm External Termination

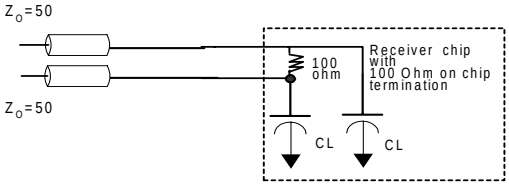


Figure 8. Termination Scheme for 100-Ohm Self Termination Interface Chip

Typical Characteristics @ V_{DD} = 3.3V, T_A = 25°C

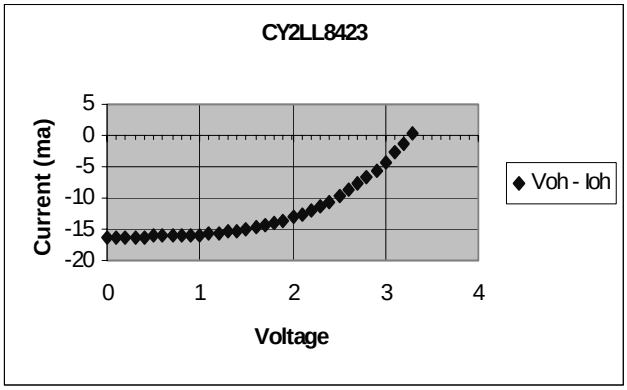


Figure 9. VOH vs IOH

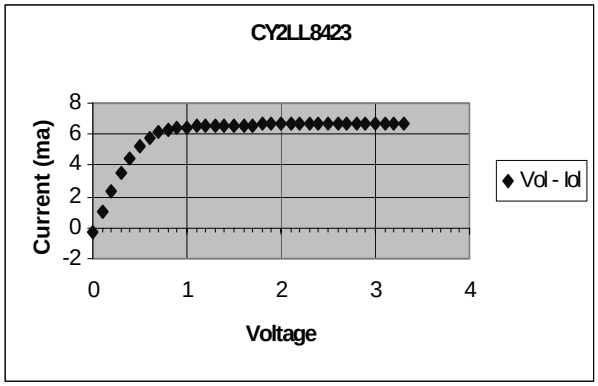


Figure 10. VOL vs IOL

Notes:
9. RL = 100 Ohm ±1%.
10. Point to Point: RL = 100 Ohm ±1% CL 3 pF.

Table 7. Technical Notes on STD Drive (LL842, A, and D) vs. High Drive (LL8423, B, and C

	A	B	C	D	Unit
VOX	1.2	1.2	1.2	1.2	V
DC Offset	1.0	1.0	1.0	1.0	V
VOD Min	0.25	0.5	0.25	0.125	V
VOD Max	0.45	0.9	0.45	0.225	V
T/Rise	1.4	1.4	0.6	0.6	ns
T/Fall	1.4	1.4	0.6	0.6	ns

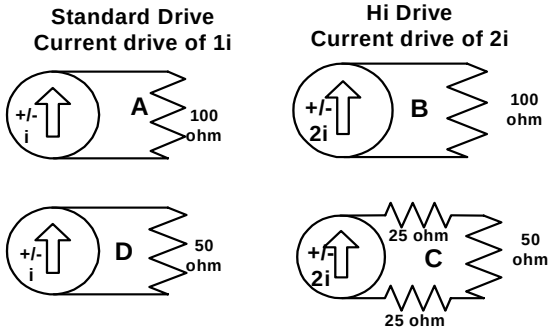


Figure 11.

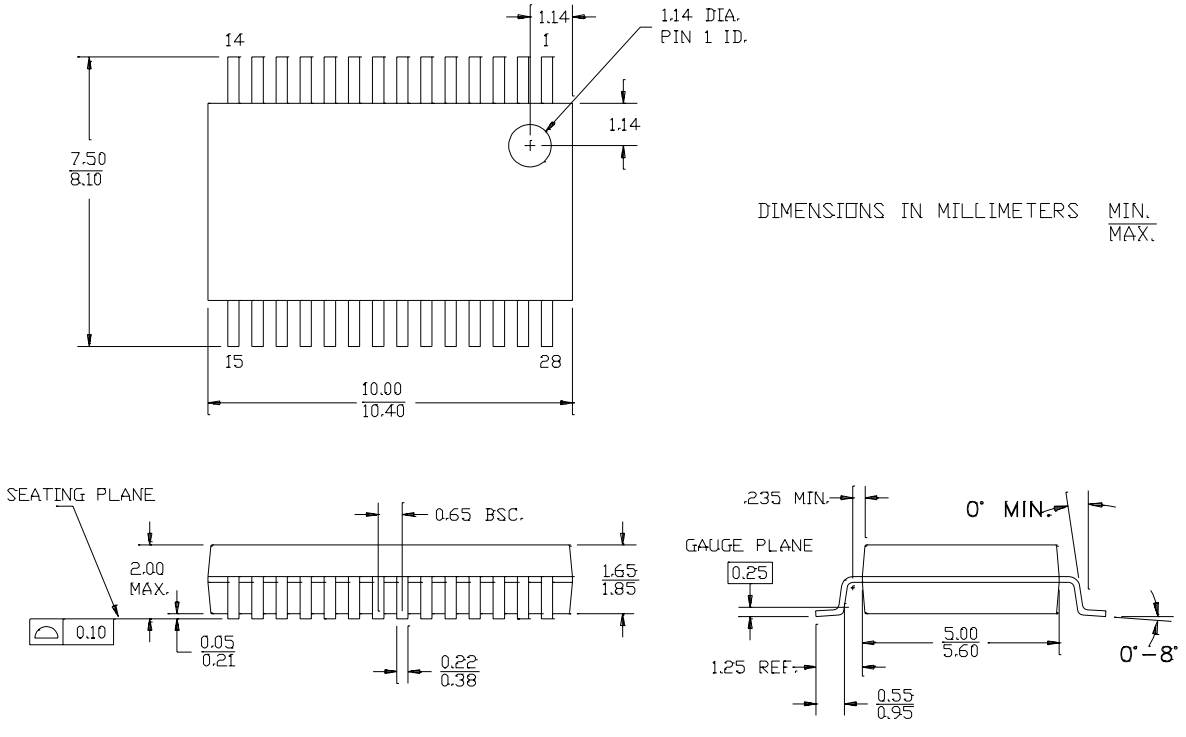
Ordering Information

Part Number	Package Type	Product Flow
CY2LL8423ZI	28-pin TSSOP	Industrial, –40° to 85°C
CY2LL8423ZIT	28-pin TSSOP – Tape and Reel	Industrial, –40° to 85°C
CY2LL8423ZC	28-pin TSSOP	Commercial, 0°C to 70°C
CY2LL8423ZCT	28-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY2LL8423OI	28-pin SSOP	Industrial, –40° to 85°C
CY2LL8423OIT	28-pin SSOP – Tape and Reel	Industrial, –40°C to 85°C
CY2LL8423OC	28-pin SSOP	Commercial, 0°C to 70°C
CY2LL8423OCT	28-pin SSOP – Tape and Reel	Commercial, 0°C to 70°C

Note:
11. See *Figure 11*.

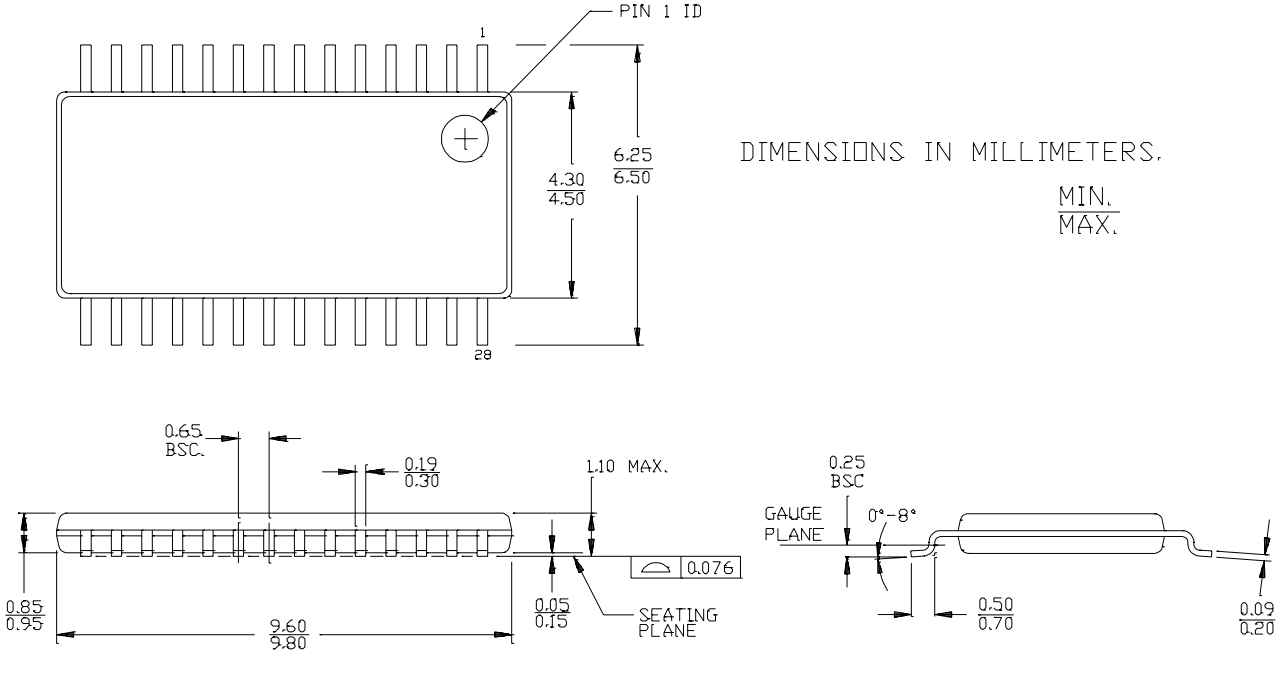
Package Drawings and Dimensions

28-lead (5.3 mm) Shrunk Small Outline Package O28



51-85079-*C

28-lead Thin Shrunk Small Outline Package (4.40-mm Body) Z29



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Document History Page

Document Title: CY2LL8423 ComLink™ Series High-drive Dual 2-Channel LVDS Repeater/Mux Document Number: 38-07065				
REV.	**ECN NO.**	**Issue Date**	**Orig. of Change**	**Description of Change**
**	116744	07/08/02	HWT	New Data Sheet
*A	122750	12/15/02	RBI	Added power-up requirements to operating conditions information
*B	124088	02/06/03	RGL	Changed the package drawing and dimension from Z28 to Z29