



CD3085

Fail-Safe, High-Speed (10Mbps), Slew-Rate-Limited RS-485/RS-422 Transceivers

Version: Rev 1.0.0 Date: 2025-10-23

Features ■■

- 1 transmitter and 1 receivers of the serial data
- Auto Shutdown function provide low power consumption
- Supply voltage range: $5.0V \pm 5\%$
- Operating temperature range: $-40 \sim +125^{\circ}\text{C}$
- ESD protection up to 2000V for transmitter
- Latch current, min – 300mA at normal
- Enhanced ESD Specifications:
 - ±15kV IEC61000-4-2 Air Discharge
 - ±8kV IEC61000-4-2 Contact Discharge

Application ■■

- Low-Power RS-485/RS-422 Transceivers
- Transceivers for EMI-Sensitive Applications
- Industrial-Control Local Area Networks

Description ■■

The CD3085A is interface transceiver of serial data under RS-485 standard with low power consumption.

The CD3085A is purposed for application in telecom systems under RS-485/RS-422 standards with low power dissipation, translators of the level, transceiving devices sensitive to electromagnetic radiation, industrial control systems.

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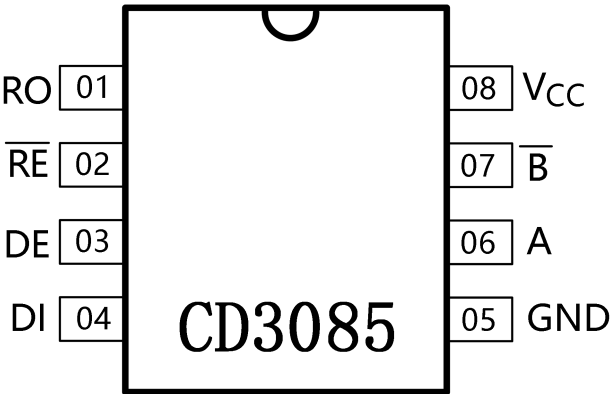
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Pin Configurations



Pin Number	Symbol	Pin Description
01	RO	TTL/CMOS Receiver data output
02	RE	Receiver Output Enable.
03	DE	Transmitter Output Enable.
04	DI	Transmitter input
05	GND	Common pin
06	A	Noninverting receiver/transmitter input/output
07	B	Inverting receiver/transmitter input/output
08	VCC	Power supply

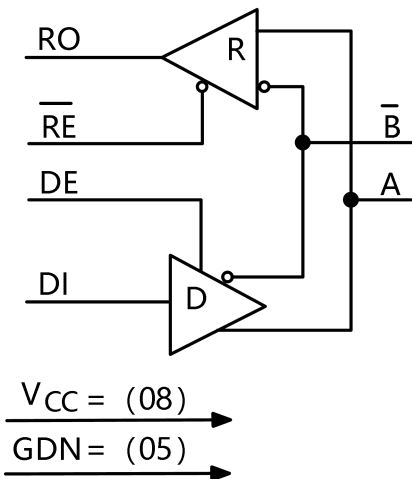


Figure 3. Block Diagram

Transmitter Truth Table

INPUTS			OUTPUTS	
RE	DE	DI	B	A
X	H	H	L	H
X	H	L	H	L
L	L	X	Z	Z
H	L	X	ZZ	

Note : H– high level, L– low level , X–don’ t care, Z– third state

Receiver Truth Table

INPUTS			OUTPUTS
RE	DE	A,B	RO
L	X	$\geq -0,05\text{ B}$	H
L	X	$\leq -0,2\text{ B}$	L
L	X	BH	H
H	H	X	Z
H	L	X	ZZ

Note : H – high level, L – low level , BH – inputs not used, X –don’ t care, Z – third state, ZZ – inputs and outputs are in the third state

Recommended Operating Condition

Symbol	Parameter	Limit		Unit
		min	max	
VCC	Supply voltage	4.75	5.25	V
VIL	Input low voltage DI, DE, PE pins	0	0.8	V
VIH	Input high voltage DI, DE, PE pins	2.0	VCC	V
VOD	Transmitter output voltage	-7.0	12.0	V
VIR	Receiver input voltage	-7.0	12.0	V
VOR	Receiver output voltage	0	VCC	V
VTH	Receiver differential threshold voltage	± 50	± 200	V
T	Ambient temperature	-40	125	°C

Absolute Maximum Ratings

Symbol	Parameter	Limit		Unit
		min	max	
VCC	Supply voltage	-	7.0	V
VIL	Input voltage on pins DI, DE,RE	-0.3	7.0	V
VOD	Transmitter output voltage	-13	13	V
VIR	Receiver input voltage	-13	13	V
VOR	Receiver output voltage	-0.3	VCC+0.3	V

Electrical Characteristics

(VCC = 5V±5%)

Symbol	Parameter	Mode	Limit		TA, °C	Unit
			Min	Max		
ICC	Idle mode supply current	VRE = 0B or VCC VDI = 0B or VCC VDE = VCC	-	800	25 ± 10	μA
				900	-40~125	
		VRE = 0 V VDI = 0 V or VCC VDE = 0	-	500	25 ± 10	
				600	-40~125	
ISHDN	Shutdown mode supply current	VDE = 0V VRE = VCC	-	9.0	25 ± 10	μA
				10	-40~125	
IILL	Input low leakage current on control pin	VDE = VDI = VRE = 0V	-	-0.2	25 ± 10	μA
				-2.0	-40~125	
IILH	Input high leakage current on control pin	VDE = VDI = VRE = VCC	-	0.2	25 ± 10	μA
				2.0	-40~125	
TSHDN	Shutdown time	-	50	600	25 ± 10	ns
Receiver						
VOLR	Output low voltage	VID = -200mV IOL = 4.0 mA	-	0.36	25 ± 10	V
				0.4	-40~125	
VOHR	Output high voltage	VID = -50 mV IOH = -4.0 mA	VCC-1.5	-	25 ± 10	V
					-40~125	
RI	Input resistance	- 7.0 V≤VIR≤12 V	96	-	25 ± 10	kΩ

						-40~125	
I _I	Input current	V _{IR} = 12 V	V _{DE} = 0 V V _{CC} = 0 or 5.25 V	-	114	25 ± 10	μA
		V _{IR} = -7.0 V		-66			
		V _{IR} = 12 V		125	-40~125		
		V _{IR} = -7.0 V		-75			
I _{OZLR}	Output low current for OFF-state	V _{OR} = 0.4 V	-	-0.5	25 ± 10	μA	
				-1.0	-40~125		
I _{OZHR}	Output high current for OFF-state	V _{OR} = 2.4 V	-	0.5	25 ± 10	μA	
				1.0	-40~125		
I _{OSHR}	Output high short circuit current	V _{OR} = VCC	8.0	87	25 ± 10	mA	
			7.0	95	-40~125		
I _{OSLR}	Output low short circuit current	V _{OR} = 0 V	-8.0	-87	25 ± 10	mA	
			-7.0	-95	-40~125		
V _{hR}	Hysteresis	-	-	50	25 ± 10	mV	
T _{PHLR} , T _{PLHR}	Receiver input to output switching delay	V _{ID} ≥2.0V T _{LH} = T _{HL} ≤15 ns	-	185	25 ± 10	ns	
				200	-40~125		
T _{SKD R}	Differential receiver skew	V _{ID} ≥2.0V T _{LH} = T _{HL} ≤15 ns	-	28	25 ± 10	ns	
				30	-40~125		
T _{PZHR} , T _{PZLR}	Receiver enable from OFF to output high (low)	C _L = 100 pF	-	45	25 ± 10	ns	
				50	-40~125		
T _{LR} (SHDN), T _{HR} (SHDN)	Receiver enable from shutdown to output high (low)	C _L = 100 pF	-	3150	25 ± 10	ns	
				3500	-40~125		
Transmitter							
V _{OD1}	Differential output voltage (no load)	-	5.0	-	25 ± 10 -40~125	V	
V _{OD2}	Differential output voltage (no load)	R _L = 50Ω(RS-422)	2.08	-	25 ± 10	V	
			2.00		-40~125		
		R _L = 27Ω(RS-485)	1.56	-	25 ± 10		
			1.50		-40~125		
ΔV _{OD}	Change in magnitude of differential output voltage for complementary output states	R _L = 50; 27Ω	-	0.18	25 ± 10	V	
				0.2	-40~125		
V _{OC}	Output bias voltage refer to	R _L = 50; 27Ω	-	2.9	25 ± 10	V	

	common pin			3.0	−40~125	
ΔV_{OC}	Change in magnitude of bias output voltage for complementary output states	$R_L = 50; 27\Omega$	-	0.18	25 ± 10	V
				0.20	−40~125	
I_{OSD}	Short circuit current	$-7.0V \leq V_{OD} \leq V_{CC}$	-	± 240	25 ± 10	
				± 250	−40~125	
		$0V \leq V_{OD} \leq 12V$		240	25 ± 10	
				250	−40~125	
		$0V \leq V_{OD} \leq V_{CC}$		± 26	25 ± 10	
				± 25	−40~125	
V_{hD}	Hysteresis	-	-	200	25 ± 10	
$T_{PHL D}, T_{PLH D}$	Transmitter input to output switching delay	$C_{L1} = C_{L2} = 100 \text{ pF}$ $R_{DIFF} = 54\Omega$	330	800	25 ± 10	
			250	1000	−40~125	
$T_{SKEW D}$	Transmitter output skew	$C_{L1} = C_{L2} = 100 \text{ pF}$ $R_{DIFF} = 54\Omega$		90	25 ± 10	
				100	−40~125	
$T_{PZH D}, T_{PZL D}$	Transmitter enable time from OFF to output high (low)	$C_L = 100 \text{ pF}$		2200	25 ± 10	
				2500	−40~125	
$T_{PHZ D}, T_{PLZ D}$	Transmitter disable time from output high (low) to OFF	$C_L = 15 \text{ pF}$		90	25 ± 10	
				100	−40~125	
T_{RD}, T_{FD}	Rise or fall time of differential output signal	$R_{DIFF} = 54\Omega$ $C_{L1} = C_{L2} = 100 \text{ pF}$	220	620	25 ± 10	
			200	750	−40~125	
$T_{LD (SHDN)}, T_{HD (SHDN)}$	Transmitter enable time from shutdown to output high (low)	$C_L = 15 \text{ pF}$		4000	25 ± 10	
				4500	−40~125	
ST	Data rate		600		25 ± 10	

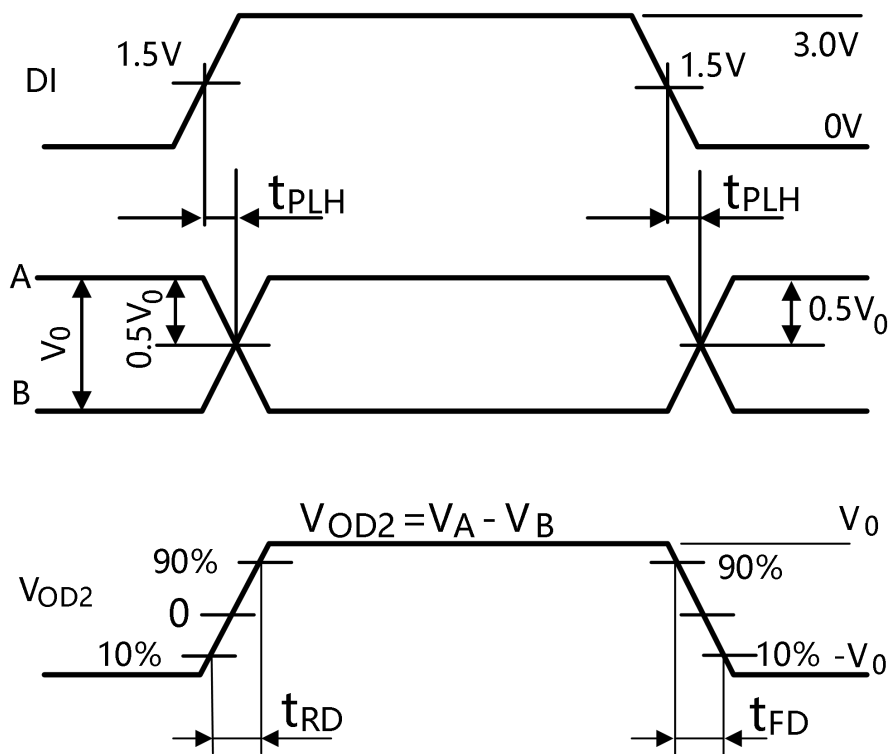
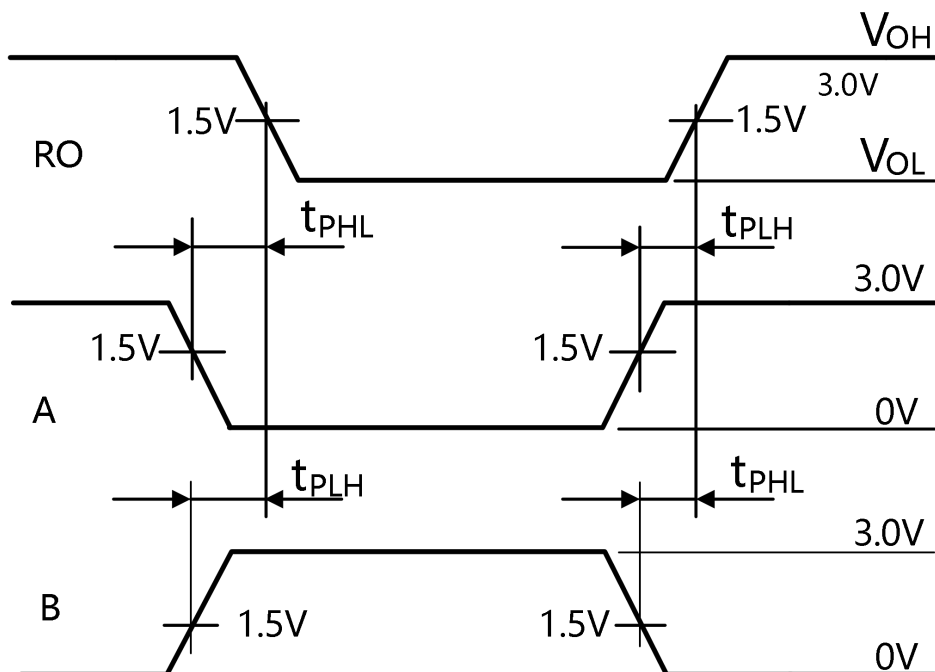


Figure 4. Transmitter output & input signals time diagram



During the input signal A is changing DC voltage 1.5 V is supplied to input B
During the input signal B is changing DC voltage 1.5 V is supplied to input A

Figure 5. Receiver output & input signals time diagram

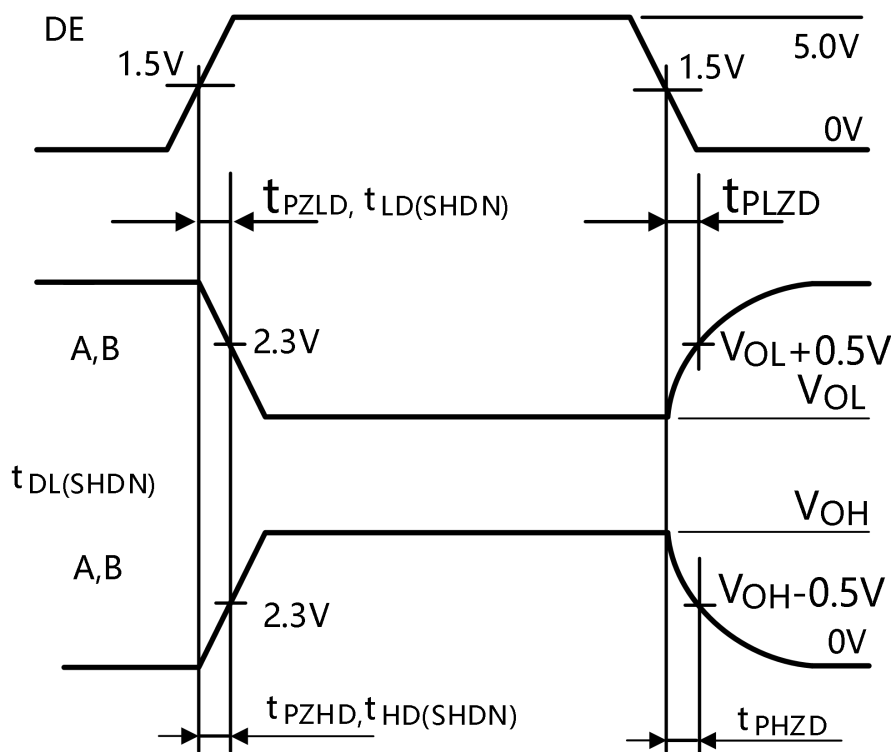


Figure 6. Transmitter output & input signals time diagram

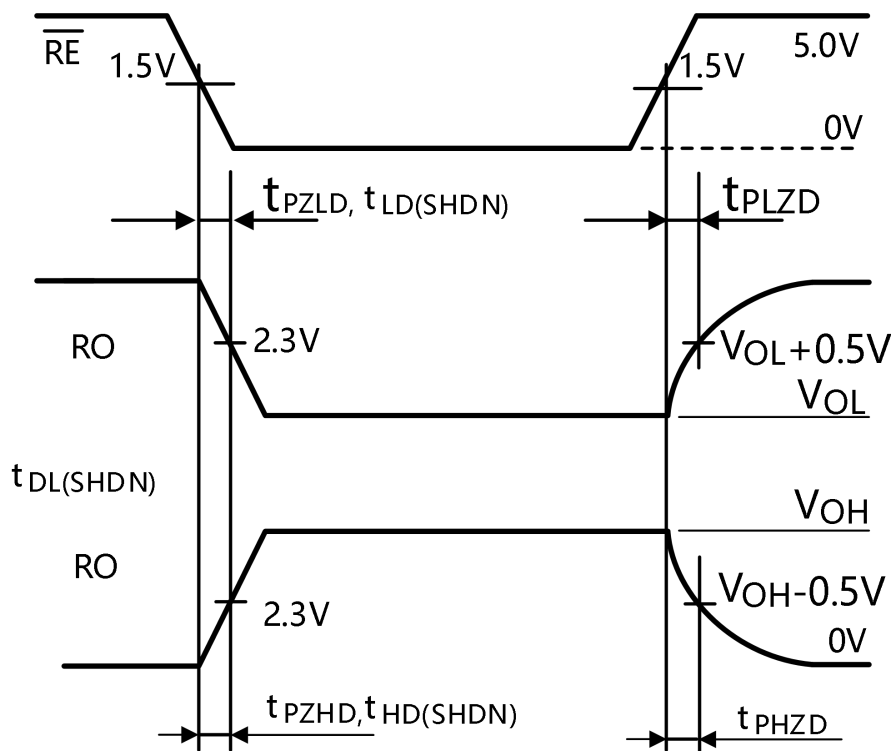
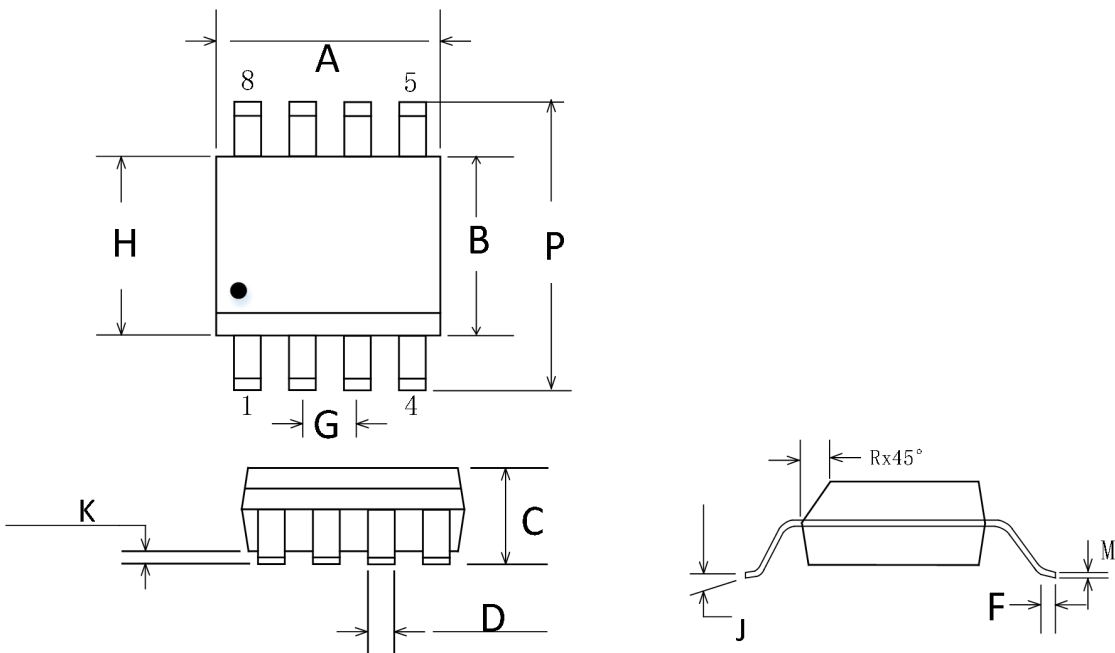


Figure 7. Receiver output & input signals time diagram

Package Outline Dimensions

SOP-8



- NOTES: 1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.

Symbol	Dimensions , mm	
	Min	Max
A	4.8	5
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

Package/Ordering Information

MODEL	TEMPERATURE	PACKAGE DESCRIPTION	PACKAGE OPTION
CD3085AS8	-40°C~125°C	SOIC-8(SOP8)	Tape and Reel, 2500
CD3085AS8-RL	-40°C~125°C	SOIC-8(SOP8)	Tape and Reel, 3000
CD3085AS8-REEL	-40°C~125°C	SOIC-8(SOP8)	Tape and Reel, 4000

Revision Log

Version	Revision date	Change content	Reason for Change	Modified by	Reviewed By	Note
V1.0	2025.10.23	Initial version	Regular update	WW	LYL	