

Features

- 1 transmitter and 1 receivers of the serial data of the standard RS-485
- 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 input and receiver output (TTL/CMOS levels) and up to 15000V for transmitter output and receiver input (RS-485 levels)
- Latch current, min – 300mA at normal climatic condition
- Enhanced ESD Specifications:
 - $\pm 15\text{kV}$ IEC61000-4-2 Air Discharge
 - $\pm 8\text{kV}$ IEC61000-4-2 Contact Discharge

General Description

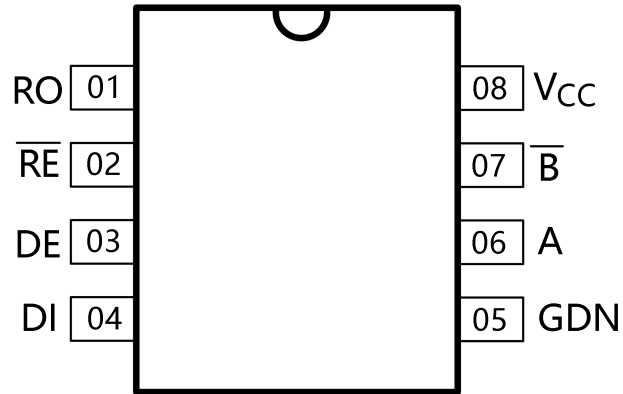
The CBM3085A is interface transceiver of serial data under RS-485 standard with low power consumption.

The CBM3085A 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.

CATALOG

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Pin Description



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

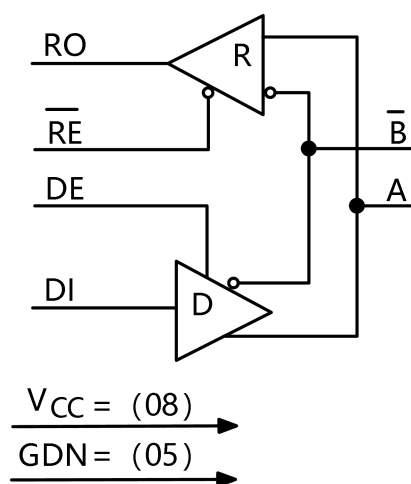


Figure 3. Block Diagram

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	$\geq -0,05 B$	H
L	X	$\leq -0,2 B$	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

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

*Stresses beyond those listed under “maximum ratings” may cause permanent damage to the device.

These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Electrical Parameters

($V_{CC} = 5V \pm 5\%$)

Symbol	Parameter	Mode	Limit		TA, °C	Unit
			Min	Max		
I _{CC}	Idle mode supply current	V _{RE} = 0B or V _{CC} V _{DI} = 0B or V _{CC} V _{DE} = V _{CC}	-	800	25 ± 10	μA
		V _{RE} = 0 V V _{DI} = 0 V or V _{CC} V _{DE} = 0	-	900	-40~125	
I _{SHDN}	Shutdown mode supply current	V _{DE} = 0V V _{RE} = V _{CC}	-	500	25 ± 10	μA
			-	600	-40~125	
I _{ILL}	Input low leakage current on control pin	V _{DE} = V _{DI} = V _{RE} = 0V	-	-0.2	25 ± 10	μA
				-2.0	-40~125	
I _{ILH}	Input high leakage current on control pin	V _{DE} = V _{DI} = V _{RE} = V _{CC}	-	0.2	25 ± 10	μA
				2.0	-40~125	
T _{SHDN}	Shutdown time	-	50	600	25 ± 10	ns
Receiver						
V _{OLR}	Output low voltage	V _{ID} = -200mV I _{OL} = 4.0 mA	-	0.36	25 ± 10	V
				0.4	-40~125	
V _{OHR}	Output high voltage	V _{ID} = -50 mV I _{OH} = -4.0 mA	V _{CC} - 1.5	-	25 ± 10	V
					-40~125	

R_i	Input resistance	$-7.0\text{ V} \leq V_{IR} \leq 12\text{ V}$	96	-	25 ± 10 $-40 \sim 125$	$\text{k}\Omega$	
I_i	Input current	$V_{IR} = 12\text{ V}$	-	-	114	μA	
		$V_{IR} = -7.0\text{ V}$			$V_{DE} = 0\text{ V}$ $V_{CC} = 0\text{ or } 5.25\text{ V}$		-66
		$V_{IR} = 12\text{ V}$			125		
		$V_{IR} = -7.0\text{ V}$			-75		
I_{OZLR}	Output low current for OFF-state	$V_{OR} = 0.4\text{ V}$	-	-	-0.5	25 ± 10	
					-1.0	$-40 \sim 125$	
I_{OZHR}	Output high current for OFF-state	$V_{OR} = 2.4\text{ V}$	-	-	0.5	25 ± 10	
					1.0	$-40 \sim 125$	
I_{OSHR}	Output high short circuit current	$V_{OR} = V_{CC}$	8.0	-	87	25 ± 10	
					7.0	95	$-40 \sim 125$
I_{OSLR}	Output low short circuit current	$V_{OR} = 0\text{ V}$	-8.0	-	-87	25 ± 10	
					-7.0	-95	$-40 \sim 125$
V_{hR}	Hysteresis	-	-	-	50	25 ± 10	
T_{PHLR}, T_{PLHR}	Receiver input to output switching delay	$ V_{ID} \geq 2.0\text{ V}$ $T_{LH} = T_{HL} \leq 15\text{ ns}$	-	-	185	25 ± 10	
					200	$-40 \sim 125$	
T_{SKDR}	Differential receiver skew	$ V_{ID} \geq 2.0\text{ V}$ $T_{LH} = T_{HL} \leq 15\text{ ns}$	-	-	28	25 ± 10	
					30	$-40 \sim 125$	
T_{PZHR}, T_{PZLR}	Receiver enable from OFF to output high (low)	$C_L = 100\text{ pF}$	-	-	45	25 ± 10	
					50	$-40 \sim 125$	

$T_{LR(SHDN)}, T_{HR(SHDN)}$	Receiver enable from shutdown to output high (low)	$C_L = 100 \text{ pF}$	-	3150	25 ± 10	ns
				3500	-40~125	
Transmitter						
V_{OD1}	Differential output voltage (no load)	-	5.0	-	25 ± 10	V
					-40~125	
V_{OD2}	Differential output voltage (no load)	$R_L = 50\Omega(\text{RS-422})$	2.08	-	25 ± 10	V
			2.00		-40~125	
		$R_L = 27\Omega(\text{RS-485})$	1.56	-	25 ± 10	
			1.50		-40~125	
ΔV_{OD}	Change in magnitude of differential output voltage for complementary output states	$R_L = 50; 27\Omega$	-	0.18	25 ± 10	V
				0.2	-40~125	
V_{OC}	Output bias voltage refer to common pin	$R_L = 50; 27\Omega$	-	2.9	25 ± 10	V
				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_{PHLD}, T_{PLHD}	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_{SKEWD}	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	
			500		-40~125	

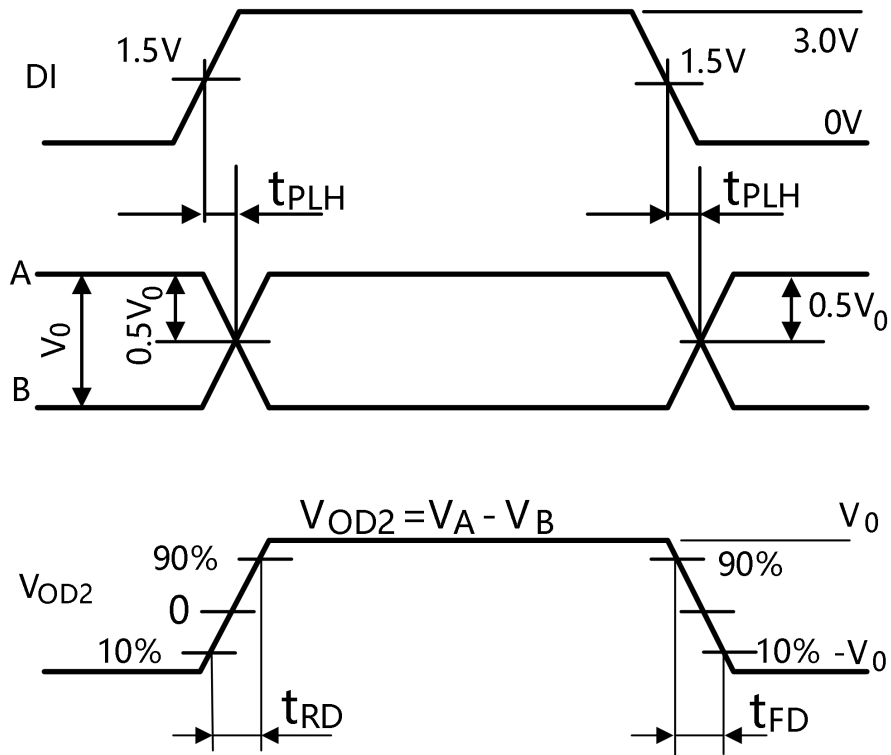
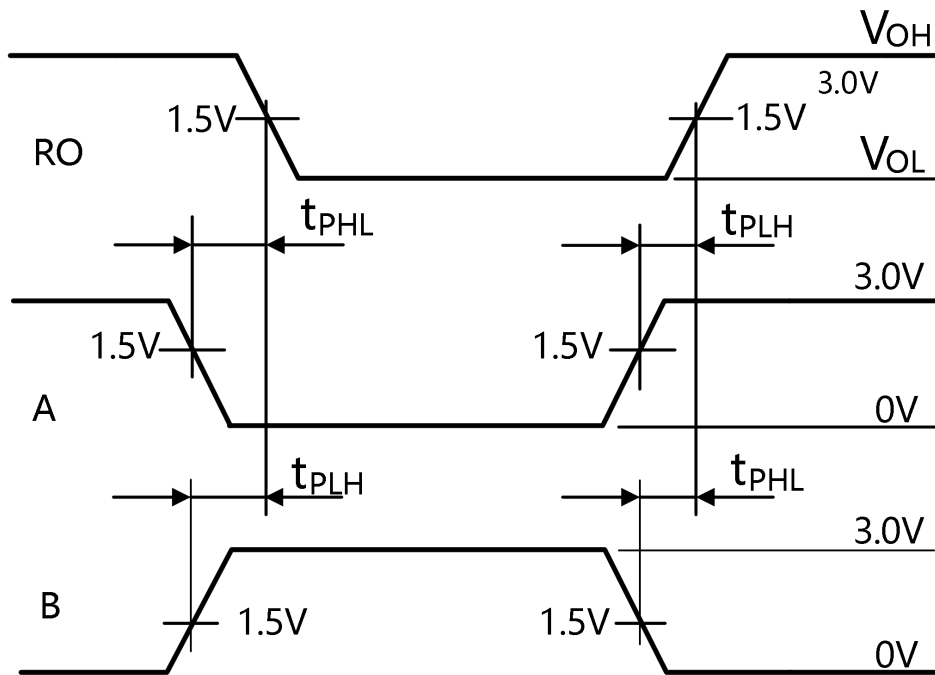


Figure 4. Transmitter output & input signals time diagram



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

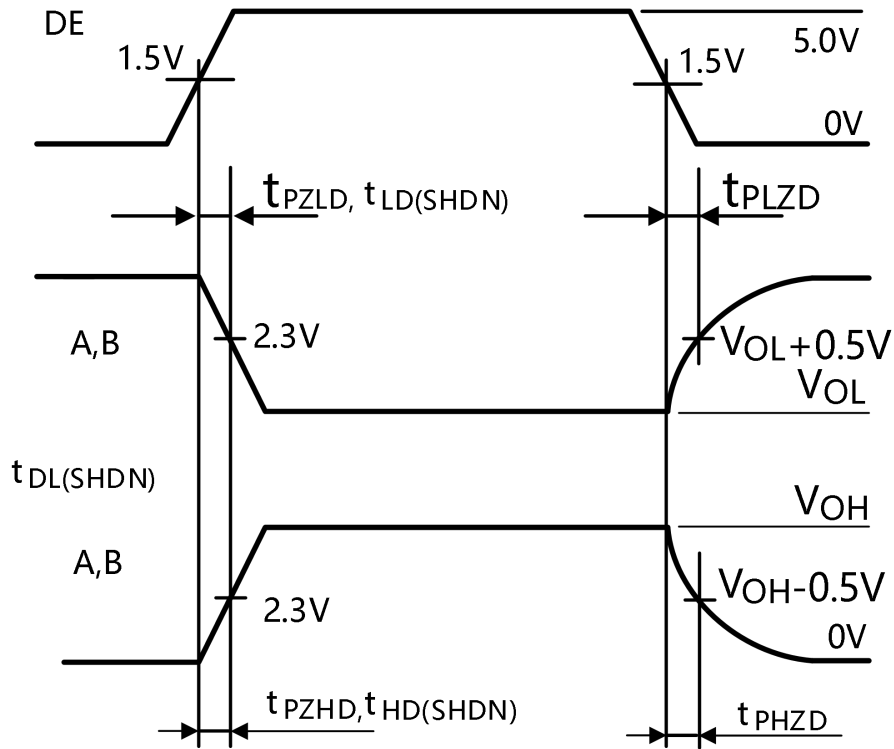


Figure 6. Transmitter output & input signals time diagram

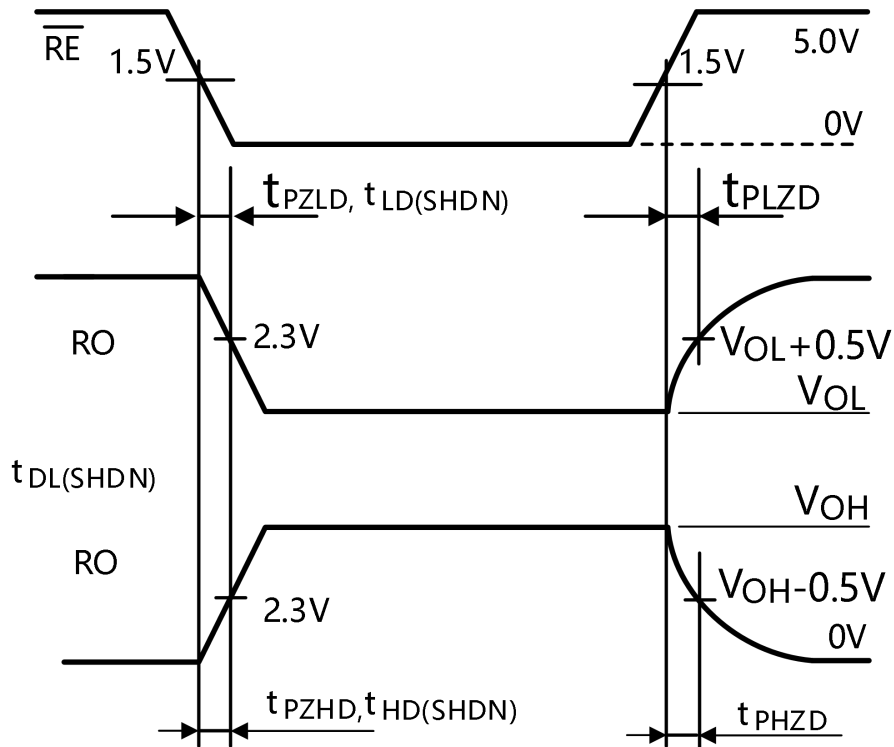
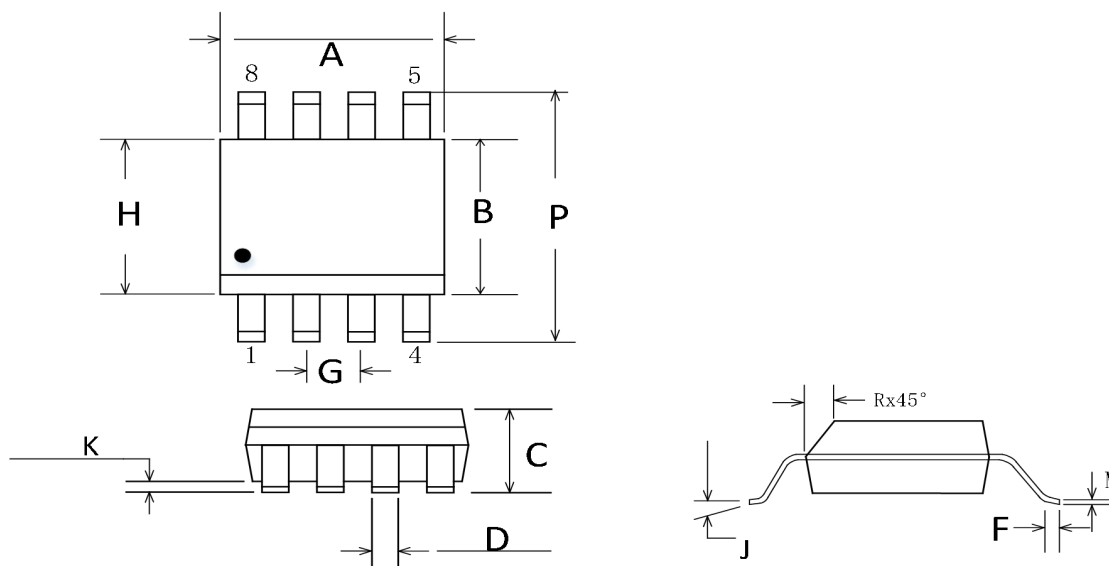


Figure 7. Receiver output & input signals time diagram

Package

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

PRODUCT TYPE	OPERATING TEMPERATURE	PACKAGE	PACKAGE MARKING	NUMBER OF PACKAGES
CBM3085AS8	-40°C~125°C	SOIC-8(SOP8)	CBM3085A	Tape and Reel, 2500
CBM3085AS8-RL	-40°C~125°C	SOIC-8(SOP8)	CBM3085A	Tape and Reel, 3000
CBM3085AS8-REEL	-40°C~125°C	SOIC-8(SOP8)	CBM3085A	Tape and Reel, 4000