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With fail-safe function (Fail-Safe), low power consumption, limited slew rate

RS-485 transceiver

product description

BL3085 is a 5V power supply, half-duplex RS-485 transceiver, the chip contains a driver and a receiver. The BL3085 uses a slew-rate-limited driver, which can significantly reduce EMI and reflections caused by improperly terminated cables, and achieve

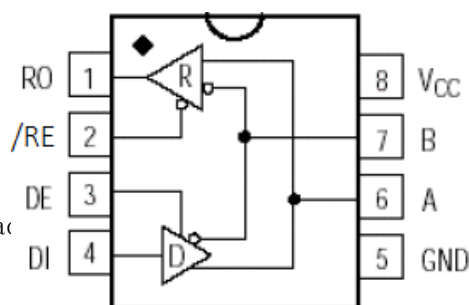
Error-free data transmission up to 500kbps. The BL3085 has a built-in fail-safe circuit to ensure that the output of the receiver is in a logic high state when the input of the receiver is open or shorted.

BL3085 receiver is 1/8 unit load, allowing up to 256 transceivers to be connected to the bus to realize half-duplex communication. BL3085 I/O pins have $\pm 15\text{kV}$ IEC 61000-4-2 contact discharge protection capability.

Product Features

- +5V working voltage
- Built-in fail-safe circuit
- Up to 500kbps transfer rate
- Bus allows up to 256 transceivers
- I/O pin ESD protection: $\pm 15\text{kV}$ IEC 61000-4-2, contact
- SOP8 package

Block Diagram



Application field

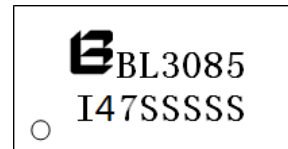
- smart meter
- Collection terminal
- industrial control
- security monitor

Note: The chip version " I47 " is determined by the first three digits in the second row of the chip silkscreen

Ordering information

型号	封装	丝印
BL3085(I47)	SOP8	BL3085 I47SSSSS

silk screen



Among them: "I47" is the chip version number

"SSSSS" represents the 4th to 8th digits of the card number

Pin definition

serial number	name	function
1	RO	receiver output
2	/RE	Receiver output enable. RO output is valid when /RE is low level; RO is high impedance state when /RE is high level
3	DE	Driver output enable. The driver output is valid when DE is high level, and the output is high impedance state when DE is low level
4	DI	drive input
5	GND	grounding
6	A	Receiver non-inverting input and driver non-inverting output
7	B	Receiver inverting input and driver inverting output
8	V _{CC}	power supply

Driver Truth Table

enter			output	
/RE	DE	DI	A	B
x	1	1	1	0

BL3085(I47)

x	1	0	0	1
0	0	x	High-Z	High-Z
1	0	x	Shutdown (High-Z)	

Receiver Truth Table

ente r			outp ut
/RE	DE	AB	RO
0	x	>-50mV	1
0	x	<-200mV	0
0	x	open / short	1
1	1	x	High-Z
1	0	x	Shutdown (High-Z)

Limit parameter

parameters	the symbol	limit value	unit
Operating Voltage	V_{CC}	+7	V
Control input voltage	/RE, DE	-0.3 to $V_{CC}+0.3$	V
Driver input voltage	DI	-0.3 to $V_{CC}+0.3$	V
Driver output voltage	A, B	± 13	V
Receiver input voltage	A, B	± 13	V
Receiver output voltage	RO	-0.3 to $V_{CC}+0.3$	V

temperature range

Specified service temperature	-40~+85 °C
Limit temperature	-55~+125 °C
storage temperature	-65~+150 °C

DC Electrical Characteristics

(VCC=+5V ± 5 % , TA = - 4 0 ° C ~ + 8 5 ° C , typical value at VCC = +5V , TA = 2 5 ° C) Note 1)

parameter	symbol	Test Conditions	minimum value	typical value	maximum value	unit
Operating Voltage	V _{CC}		4.5		5.5	V
driver						
Differential driver output (no load)	V _{OD1}	Figure 1			V _{CC}	V
Differential Driver Output	V _{OD2}	Figure 1 , R=27Ω	1.5			V
The magnitude of the differential output voltage Variation (Note 2)	ΔV _{OD}	Figure 1 , R=27Ω			0.2	V
Driver Common Mode Output Voltage	V _{OC}	Figure 1 , R=27Ω	1.0		3.0	V
Amplitude variation of common mode voltage (Note 2)	ΔV _{OC}	Figure 1 , R=27Ω			0.2	V
input high voltage	V _{IH}	DE,DI,RE	2.0			V
input low voltage	V _{IL}	DE,DI,RE			0.8	V
DI input hysteresis	V _{HYS}			100		mV
Input Current (A , B)	I _{IN4}	DE=GND V _{CC} =GND or 5.25V	V _{IN} =12V		125	μA
			V _{IN} =-7V	-75		
Driver short circuit output current	I _{OSD}	A Pin Short to B Pin	-100		100	mA
receiver						
Receiver Differential Threshold Voltage	V _{TH}	-7V ≤ V _{CM} ≤ 12V	-200	-125	-50	mV
Receiver Input Hysteresis	Δ V _{TH}			40		mV
Receiver output high voltage	V _{OH}	I _O =-8mA, V _{ID} =-50mV	4.0			V
Receiver output	V _{OL}	I _O =8mA,V _{ID} =-			0.4	V

low voltage		200mV					
Receiver Tri-State Output Current	QUR _				±1	μA	
Receiver input impedance	R IN	-7V ≤ VCM ≤ 12V _	96			KΩ	
Receiver output short circuit current	OSR _	0V ≤ V RO ≤ V CC	±7		±95	mA	
supply current							
supply current	I CC	No load , /RE=DI= GND or VCC	DE=V CC		350	600	μA
			DE=GND		370	600	μA
Standby Mode Supply Current	I SHDN	DE=GND, /RE= VCC , DI=V CC or GND				10	μA

Note 1 : All currents into the device are positive and all currents out of the device are negative; all voltages are to ground unless otherwise specified. Note 2 : When DI input changes state, ΔV_{OD} and ΔV_{OC} V_{OD-} and V_{OC} amount of change.

transmission characteristics

(VCC=+5V±5%, TA=-40℃ ~ +85℃ , the typical value is VCC=+5V, TA = 25℃)

parameter	symbol	condition	minimum value	typical value	maximum value	unit
Driver input to output delay	wxya_	Figures 3 and 5, $R_{DIFF}=54\Omega$ $C_{L1}=C_{L2}=100pF$		300	800	ns
	t _{DPLH}			300	800	
Driver output delay difference $ T_{DPLH} - T_{DPLH} $	t _{DSKEW}	Figures 3 and 5, $R_{DIFF}=54\Omega$ $C_{L1}=C_{L2}=100pF$			100	ns
Driver Rise or Fall Time	t _{DR} , t _{DF}	Figures 3 and 5, $R_{DIFF}=54\Omega$ $C_{L1}=C_{L2}=100pF$		420	900	ns
maximum rate	F _{MAX}		500			kbps
Driver Enable to Output High	wxya_	Figures 4 and 6, $C_L=100pF$ S2 Closed			300	ns
Driver Enable to Input low level	wxya_	Figures 4 and 6, $C_L=100pF$ S1 Closed			500	ns
drives the output low from the to off time	Im _w	Figures 4 and 6, $C_L=15pF$ S1 Closed			900	ns
drives the output high from the to off time	wxya_	Figures 4 and 6, $C_L=15pF$ S2 Closed			800	ns
Receiver input and output delay	t _{RPLH} t _{RPHL}	7 and 9, _ ; rise and fall time of VID ≤ 15ns		150	300	ns
T _{RPLH} - T _{RPHL} Difference between receiver input and output delay	t _{RSKD}	7 and 9, _ ; rise and fall time of VID ≤ 15ns		10		ns

Receiver Enable to Input out low	wxya ₋	Figures 2 and 8, C _{RL} =15pF S1 Closed		20	50	ns
Receiver Enable to Input high	wxya ₋	Figures 2 and 8, C _{RL} =15pF S2 Closed		20	50	ns
receiver outputs low from the to shutdown	Im _w	Figures 2 and 8, C _{RL} =15pF S1 Closed		30	60	ns
Receiver output high from to shutdown	wxya ₋	Figures 2 and 8, C _{RL} =15pF S2 Closed		30	60	ns
circuit off time	t _{SHDN}			500	1000	ns
Driver Enable from Standby to Output High	t _{DZH(SHDN)}	Figures 4 and 6, C _L =100pF S2 Closed			2500	ns

from standby to output low driver enable	$t_{DZL(SHDN)}$	Figures 4 and 6, $C_L = 100\text{pF}$ S1 Closed			2500	ns
Receiver Enable from Standby to Output High	$t_{RZH(SHDN)}$	Figures 2 and 8, $C_{RL} = 15\text{pF}$ S2 Closed			2500	ns
Receiver Enable from Standby to Output Low	$t_{RZL(SHDN)}$	Figures 2 and 8, $C_{RL} = 15\text{pF}$ S1 Closed			2500	ns

test circuit

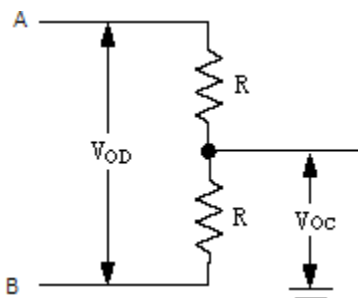


Figure 1: Driver DC Test Load

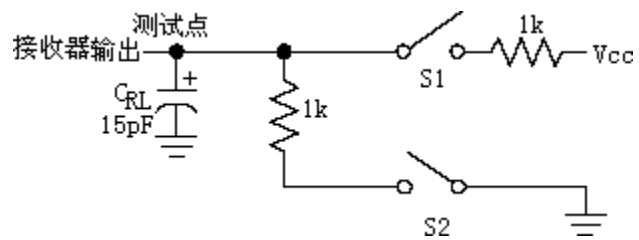


Figure 2: Receiver Enable/Disable Timing Testload

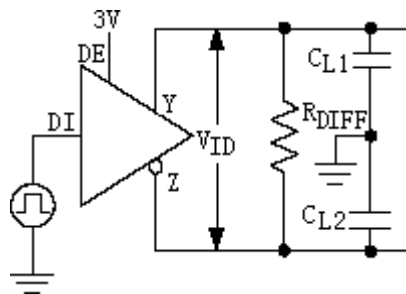


图 3: Driver Timing Test Circuit

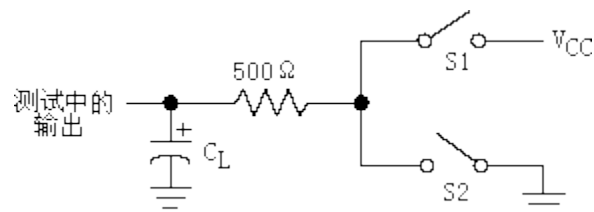


图 4: Driver Enable/Disable Timing Test Load

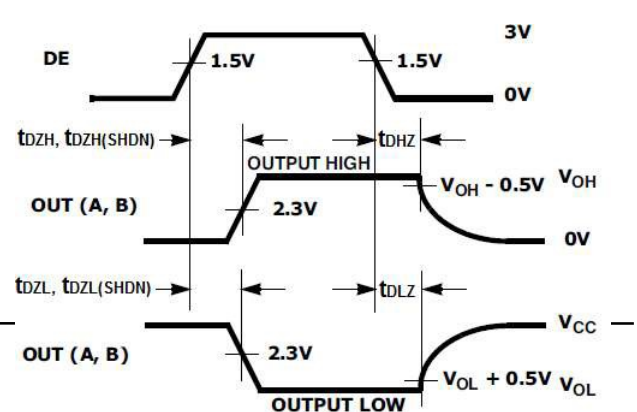
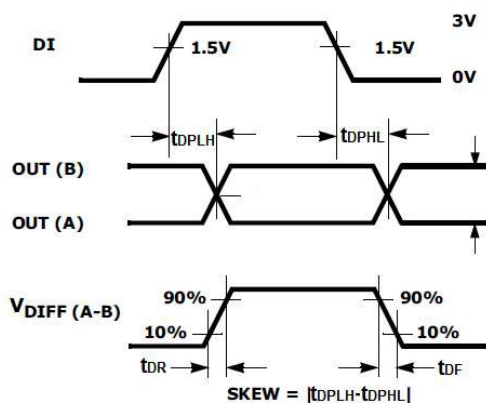


图 5: Driver Propagation Delays

图 6: Driver Enable and Disable Times

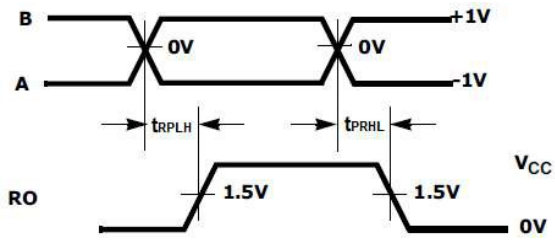


Figure 7 : Receiver Propagation Delays

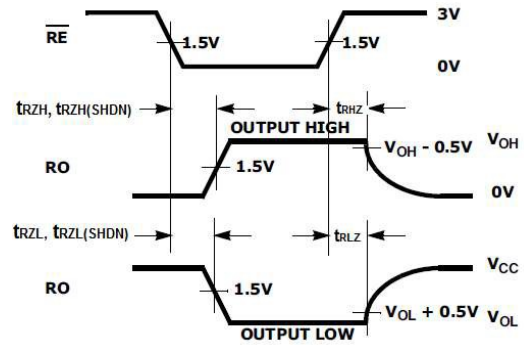


Figure 8 : Receiver Enable and Disable Times

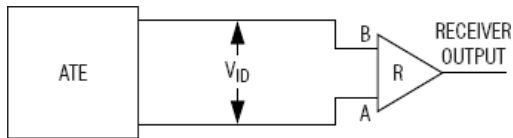


Figure 9 : Receiver Propagation Delay Test Circuit

Typical Application Diagram

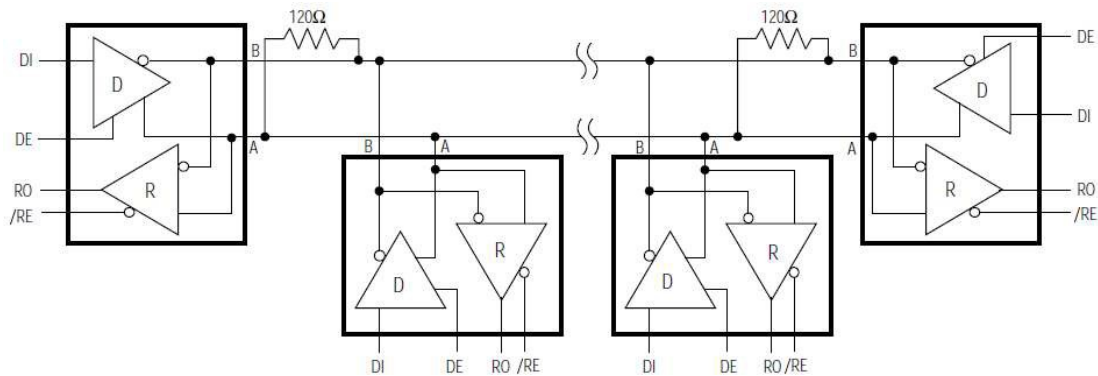
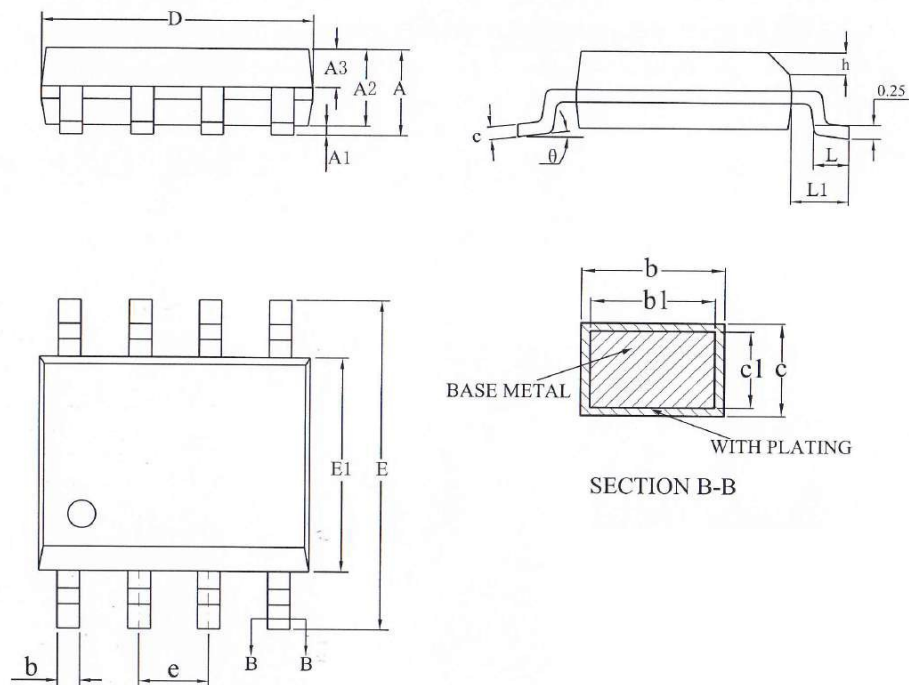


Figure 10 Typical half-duplex RS-485 network

Package size (SOP8)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.77
A1	0.08	0.18	0.28
A2	1.20	1.40	1.60
A3	0.55	0.65	0.75
b	0.39	—	0.48
b1	0.38	0.41	0.44
c	0.20	—	0.26
c1	0.19	0.20	0.21
D	4.70	4.90	5.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°