

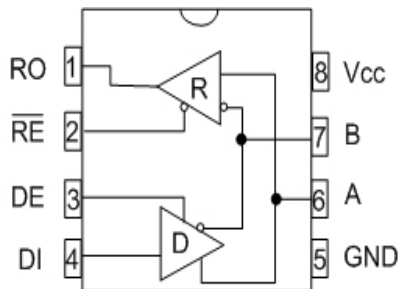


# SP483 / SP485

## Low Power Half-Duplex RS-485 Transceivers

### FEATURES

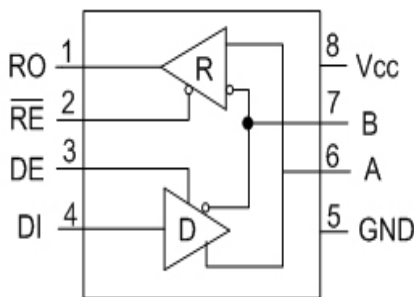
- +5V Only
- Low Power BiCMOS
- Driver / Receiver Enable
- Slew Rate Limited Driver for Low EMI (SP483)
- Low Power Shutdown mode (SP483)
- RS-485 and RS-422 Drivers/Receivers



SP483, SP485  
Pinout (Top View)

### DESCRIPTION

The **SP483** and **SP485** are a family of half-duplex transceivers that meet the specifications of RS-485 and RS-422. Their BiCMOS design allows low power operation without sacrificing performance. The **SP485** meets the requirements of RS-485 and RS-422 up to 5Mbps. Additionally, the **SP483** is equipped with a low power Shutdown mode. The **SP483** is internally slew rate limited to reduce EMI and can meet the requirements of RS-485 and RS-422 up to 250kbps.



SP483 and SP485

## ABSOLUTE MAXIMUM RATINGS

These are stress ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications below is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

V<sub>CC</sub>.....+12V

Input Voltages

Logic.....-0.3V to (V<sub>CC</sub> + 0.5V)

Drivers.....-0.3V to (V<sub>CC</sub> + 0.5V)

Receivers.....+/-15V

Output Voltages

Logic.....-0.3V to (V<sub>CC</sub> + 0.5V)

Drivers.....+/-15V

Receivers.....-0.3V to (V<sub>CC</sub> + 0.5V)

Storage Temperature.....-65°C to +150°C

Power Dissipation

8-pin NSOIC.....500mW

## ELECTRICAL CHARACTERISTICS

T<sub>MIN</sub> to T<sub>MAX</sub> and V<sub>CC</sub> = 5V +/-5% unless otherwise noted.

| PARAMETERS                                                                         | MIN. | TYP. | MAX.            | UNITS | CONDITIONS                                                                                            |
|------------------------------------------------------------------------------------|------|------|-----------------|-------|-------------------------------------------------------------------------------------------------------|
| <b>SP483/SP485 DRIVER</b>                                                          |      |      |                 |       |                                                                                                       |
| <b>DC Characteristics</b>                                                          |      |      |                 |       |                                                                                                       |
| Differential Output Voltage                                                        |      |      | V <sub>CC</sub> | Volts | Unloaded; R = ∞ ; see figure 1                                                                        |
| Differential Output Voltage                                                        | 2    |      | V <sub>CC</sub> | Volts | With Load; R = 50Ω (RS-422); see figure 1                                                             |
| Differential Output Voltage                                                        | 1.5  |      | V <sub>CC</sub> | Volts | With Load; R = 27Ω (RS-485); see figure 1                                                             |
| Change in Magnitude of Driver Differential Output Voltage for Complimentary states |      |      | 0.2             | Volts | R = 27Ω or R = 50Ω; see figure 1                                                                      |
| Driver Common Mode Output Voltage                                                  |      |      | 3               | Volts | R = 27Ω or R = 50Ω; see figure 1                                                                      |
| Input High Voltage                                                                 | 2.0  |      |                 | Volts | Applies to DE, DI, $\overline{RE}$                                                                    |
| Input Low Voltage                                                                  |      |      | 0.8             | Volts | Applies to DE, DI, $\overline{RE}$                                                                    |
| Input Current                                                                      |      |      | +/-10           | μA    | Applies to DE, DI, $\overline{RE}$                                                                    |
| Driver Short Circuit Current, V <sub>OUT</sub> = HIGH                              | 35   |      | 250             | mA    | -7V ≤ V <sub>O</sub> ≤ +12V                                                                           |
| Driver Short Circuit Current, V <sub>OUT</sub> = LOW                               | 35   |      | 250             | mA    | -7V ≤ V <sub>O</sub> ≤ +12V                                                                           |
| <b>SP485 DRIVER</b>                                                                |      |      |                 |       |                                                                                                       |
| <b>AC Characteristics</b>                                                          |      |      |                 |       |                                                                                                       |
| Maximum Data Rate                                                                  | 5    |      |                 | Mbps  | $\overline{RE}$ = 5V, DE = 5V                                                                         |
| Driver Input to Output, t <sub>PLH</sub>                                           |      | 30   | 60              | ns    | Figures 3 and 5, R <sub>DIFF</sub> = 54Ω, C <sub>L1</sub> = C <sub>L2</sub> = 100pF                   |
| Driver Input to Output, t <sub>PHL</sub>                                           |      | 30   | 60              | ns    | Figures 3 and 5, R <sub>DIFF</sub> = 54Ω, C <sub>L1</sub> = C <sub>L2</sub> = 100pF                   |
| Driver Skew                                                                        |      | 5    | 10              | ns    | Figures 3 and 5, t <sub>SKEW</sub> =  t <sub>DPHL</sub> - t <sub>DPLH</sub>                           |
| Driver Rise or Fall Time                                                           |      | 15   | 40              | ns    | From 10%-90%; R <sub>DIFF</sub> = 54Ω, C <sub>L1</sub> = C <sub>L2</sub> = 100pF; see figures 3 and 5 |

# ELECTRICAL CHARACTERISTICS

$T_{MIN}$  to  $T_{MAX}$  and  $V_{CC} = 5V \pm 5\%$  unless otherwise noted.

| PARAMETERS                                       | MIN. | TYP. | MAX. | UNITS      | CONDITIONS                                                                     |
|--------------------------------------------------|------|------|------|------------|--------------------------------------------------------------------------------|
| <b>SP485 DRIVER (continued)</b>                  |      |      |      |            |                                                                                |
| <b>AC Characteristics</b>                        |      |      |      |            |                                                                                |
| Driver Enable to Output High                     |      | 40   | 70   | ns         | $C_L = 100pF$ , see figures 4 and 6, $S_2$ closed                              |
| Driver Enable to Output Low                      |      | 40   | 70   | ns         | $C_L = 100pF$ , see figures 4 and 6, $S_1$ closed                              |
| Driver Disable Time from High                    |      | 40   | 70   | ns         | $C_L = 15pF$ , see figures 2 and 8, $S_2$ closed                               |
| Driver Disable Time from Low                     |      | 40   | 70   | ns         | $C_L = 15pF$ , see figures 2 and 8, $S_1$ closed                               |
| <b>SP483/SP485 RECEIVER</b>                      |      |      |      |            |                                                                                |
| <b>DC Characteristics</b>                        |      |      |      |            |                                                                                |
| Differential Input Threshold                     | -0.2 |      | +0.2 | Volts      | $-7V \leq V_{CM} \leq +12V$                                                    |
| Input Hysteresis                                 |      | 10   |      | mV         | $V_{CM} = 0V$                                                                  |
| Output Voltage High                              | 2.4  |      | 5    | Volts      | $I_O = -4mA$ , $V_{ID} = +200mV$                                               |
| Output Voltage Low                               | 0.0  |      | 0.4  | Volts      | $I_O = +4mA$ , $V_{ID} = -200mV$                                               |
| Three-State ( High Impedance) Output Current     |      |      | +/-1 | $\mu A$    | $0.4V \leq V_O \leq 2.4V$ ; $\overline{RE} = 5V$                               |
| Input Resistance                                 |      | 15   |      | k $\Omega$ | $-7V \leq V_{CM} \leq +12V$                                                    |
| Input Current (A, B); $V_{IN} = 12V$             |      |      | +1.0 | mA         | $DE = 0V$ , $V_{CC} = 0V$ or $5.25V$ , $V_{IN} = 12V$                          |
| Input Current (A, B); $V_{IN} = -7V$             |      |      | -0.8 | mA         | $DE = 0V$ , $V_{CC} = 0V$ or $5.25V$ , $V_{IN} = -7V$                          |
| Short-Circuit Current                            |      |      | 95   | mA         | $0V \leq V_{CM} \leq V_{CC}$                                                   |
| <b>SP485 RECEIVER</b>                            |      |      |      |            |                                                                                |
| <b>AC Characteristics</b>                        |      |      |      |            |                                                                                |
| Maximum Data Rate                                | 5    |      |      | Mbps       | $\overline{RE} = 0V$ , $DE = 0V$                                               |
| Receiver Input to Output                         | 60   | 90   | 200  | ns         | $t_{PLH}$ ; Figures 3 and 7, $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ |
| Receiver Input to Output                         | 60   | 90   | 200  | ns         | $t_{PHL}$ ; Figures 3 and 7, $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ |
| Differential Receiver Skew $ t_{PHL} - t_{PLH} $ |      | 13   |      | ns         | $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ , Figures 3 and 7            |
| Receiver Enable to Output Low                    |      | 20   | 50   | ns         | $C_{RL} = 15pF$ , Figures 2 and 8; $S_1$ Closed                                |
| Receiver Enable to Output High                   |      | 20   | 50   | ns         | $C_{RL} = 15pF$ , Figures 2 and 8; $S_2$ Closed                                |
| Receiver Disable from LOW                        |      | 20   | 50   | ns         | $C_{RL} = 15pF$ , Figures 2 and 8; $S_1$ Closed                                |
| Receiver Disable from High                       |      | 20   | 50   | ns         | $C_{RL} = 15pF$ , Figures 2 and 8; $S_2$ Closed                                |

## ELECTRICAL CHARACTERISTICS

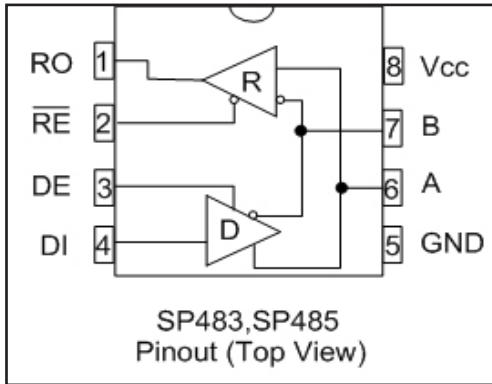
$T_{MIN}$  to  $T_{MAX}$  and  $V_{CC} = 5V \pm 5\%$  unless otherwise noted.

| PARAMETERS                                    | MIN.  | TYP. | MAX.  | UNITS       | CONDITIONS                                                        |
|-----------------------------------------------|-------|------|-------|-------------|-------------------------------------------------------------------|
| <b>POWER REQUIREMENTS</b>                     |       |      |       |             |                                                                   |
| Supply Voltage $V_{CC}$                       | +4.75 |      | +5.25 | Volts       |                                                                   |
| Supply Current                                |       |      |       |             |                                                                   |
| <b>SP485</b>                                  |       | 900  |       | $\mu A$     | No Load; $\overline{RE}$ , DI = 0V or $V_{CC}$ ;<br>DE = $V_{CC}$ |
|                                               |       | 900  |       | $\mu A$     | No Load; $\overline{RE} = 0V$ , DI = 0V or 5V;<br>DE = 0V         |
| <b>SP483</b>                                  |       | 600  |       | $\mu A$     | No Load; $\overline{RE}$ , DI = 0V or $V_{CC}$ ;<br>DE = $V_{CC}$ |
|                                               |       | 600  |       | $\mu A$     | No Load; $\overline{RE} = 0V$ , DI = 0V or 5V;<br>DE = 0V         |
| <b>SP483</b>                                  |       |      | 10    | $\mu A$     | Shutdown Mode; $\overline{DE} = 0V$ , RE = $V_{CC}$               |
| <b>ENVIRONMENTAL AND MECHANICAL</b>           |       |      |       |             |                                                                   |
| Operating Temperature                         |       |      |       |             |                                                                   |
| Commercial ( $_C$ )                           | 0     |      | 70    | $^{\circ}C$ |                                                                   |
| Industrial ( $_E$ )                           | -40   |      | +85   | $^{\circ}C$ |                                                                   |
| Storage Temperature                           | -65   |      | +150  | $^{\circ}C$ |                                                                   |
| Package: Plastic DIP ( $_P$ ), NSOIC ( $_N$ ) |       |      |       |             |                                                                   |

# ELECTRICAL CHARACTERISTICS

$T_{MIN}$  to  $T_{MAX}$  and  $V_{CC} = 5V \pm 5\%$  unless otherwise noted.

| PARAMETERS                                          | MIN. | TYP. | MAX. | UNITS | CONDITIONS                                                                                    |
|-----------------------------------------------------|------|------|------|-------|-----------------------------------------------------------------------------------------------|
| <b>SP483 DRIVER</b>                                 |      |      |      |       |                                                                                               |
| <b>AC Characteristics</b>                           |      |      |      |       |                                                                                               |
| Maximum Data Rate                                   | 250  |      |      | kbps  |                                                                                               |
| Driver Input to Output, $t_{PLH}$                   | 250  | 800  | 2000 | ns    | $t_{PLH}$ ; $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ , see figures 3 and 5           |
| Driver Input to Output, $t_{PHL}$                   | 250  | 800  | 2000 | ns    | $t_{PHL}$ ; $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ , see figures 3 and 5           |
| Driver Skew                                         |      | 100  | 800  | ns    | see figures 3 and 5,<br>$t_{SKEW} =  t_{DPLH} - t_{DPLH} $                                    |
| Driver Rise or Fall Time                            | 250  |      | 2000 | ns    | From 10%-90%; $R_{DIFF} = 54\Omega$<br>$C_{L1} = C_{L2} = 100pF$ ; see Figures 3 and 5        |
| Driver Enable to Output High                        | 250  |      | 2000 | ns    | $C_L = 100pF$ , see figures 4 and 6,<br>$S_2$ closed                                          |
| Driver Enable to Output Low                         | 250  |      | 2000 | ns    | $C_L = 100pF$ , see figures 4 and 6,<br>$S_1$ closed                                          |
| Driver Disable Time from High                       | 300  |      | 3000 | ns    | $C_L = 15pF$ , see figures 4 and 6,<br>$S_2$ closed                                           |
| Driver Disable Time from Low                        | 300  |      | 3000 | ns    | $C_L = 15pF$ , see figures 4 and 6,<br>$S_1$ closed                                           |
| <b>SP483 RECEIVER</b>                               |      |      |      |       |                                                                                               |
| <b>AC Characteristics</b>                           |      |      |      |       |                                                                                               |
| Maximum Data Rate                                   | 250  |      |      | kbps  |                                                                                               |
| Receiver Input to Output                            | 250  |      | 2000 | ns    | $t_{PLH}$ , $t_{PHL}$ ; Figures 3 and 7:<br>$R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ |
| Differential Receiver Skew<br>$ t_{PHL} - t_{PLH} $ |      | 100  |      | ns    | $R_{DIFF} = 54\Omega$ , $C_{L1} = C_{L2} = 100pF$ ,<br>see Figures 3 and 7                    |
| Receiver Enable to Output Low                       |      | 20   | 50   | ns    | $C_{RL} = 15pF$ , Figures 2 and 8;<br>$S_1$ Closed                                            |
| Receiver Enable to Output High                      |      | 20   | 50   | ns    | $C_{RL} = 15pF$ , Figures 2 and 8;<br>$S_2$ Closed                                            |
| Receiver Disable from LOW                           |      | 20   | 50   | ns    | $C_{RL} = 15pF$ , Figures 2 and 8;<br>$S_1$ Closed                                            |
| Receiver Disable from High                          |      | 20   | 50   | ns    | $C_{RL} = 15pF$ , Figures 2 and 8;<br>$S_2$ Closed                                            |
| <b>SP483</b>                                        |      |      |      |       |                                                                                               |
| <b>Shutdown Timing</b>                              |      |      |      |       |                                                                                               |
| Time to Shutdown                                    | 50   | 200  | 600  | ns    | $\overline{RE} = 5V$ , $DE = 0V$                                                              |
| Driver Enable from Shutdown to Output High          |      |      | 2000 | ns    | $C_L = 100pF$ ; See Figures 4 and 6;<br>$S_2$ Closed                                          |
| Driver Enable from Shutdown to Output Low           |      |      | 2000 | ns    | $C_L = 100pF$ ; See Figures 4 and 6;<br>$S_1$ Closed                                          |
| Receiver Enable from Shutdown to Output High        |      |      | 2500 | ns    | $C_L = 15pF$ ; See Figures 4 and 6;<br>$S_2$ Closed                                           |
| Receiver Enable from Shutdown to Output Low         |      |      | 2500 | ns    | $C_L = 15pF$ ; See Figures 4 and 6;<br>$S_1$ Closed                                           |



- Pin 1 - RO - Receiver Output
- Pin 2 -  $\overline{RE}$  - Receiver Output Enable Active LOW
- Pin 3 - DE - Driver Output Enable Active HIGH
- Pin 4 - DI - Driver Input
- Pin 5 - GND - Ground Connection
- Pin 6 - A - Driver Output / Receiver input Non-Inverting
- Pin 7 - B - Driver Output / Receiver Input Inverting
- Pin 8 - Vcc - Positive Supply  $4.75V \leq V_{CC} \leq 5.25V$

## TEST CIRCUITS

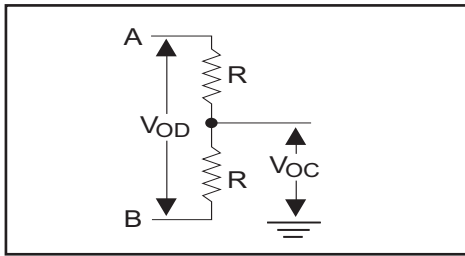


Figure 1. Driver DC Test Load Circuit

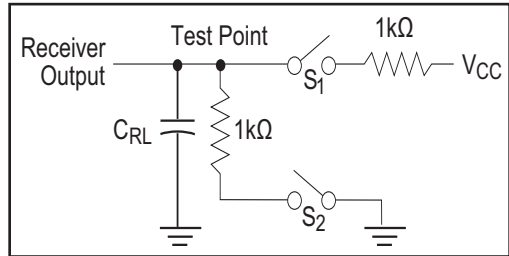


Figure 2. Receiver Timing Test Load Circuit

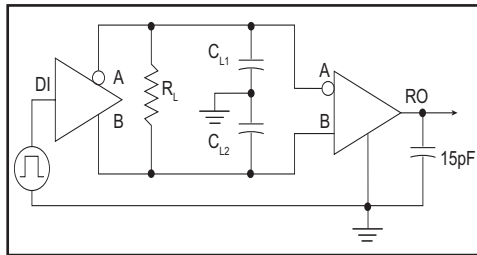


Figure 3. RS-485 Driver/Receiver Timing Test

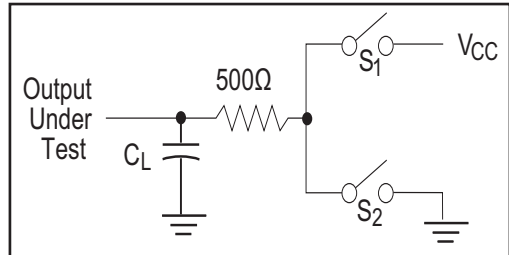


Figure 4. Driver Timing Test Load #2 Circuit

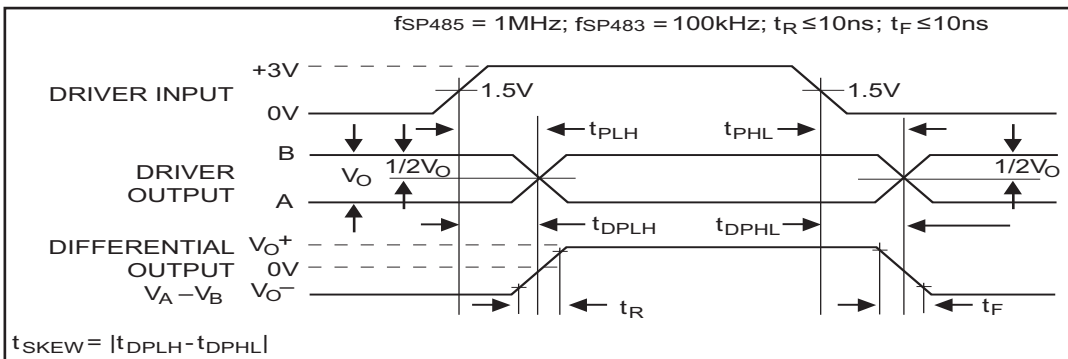


Figure 5. Driver Propagation Delays

## FUNCTION TRUTH TABLES

| INPUTS          |    |    | LINE<br>CONDITION | OUTPUTS |   |
|-----------------|----|----|-------------------|---------|---|
| $\overline{RE}$ | DE | DI |                   | A       | B |
| X               | 1  | 1  | No Fault          | 1       | 0 |
| X               | 1  | 0  | No Fault          | 0       | 1 |
| X               | 0  | X  | X                 | Z       | Z |
| X               | 1  | X  | Fault             | Z       | Z |

Table 1. Transmit Function Truth Table

| INPUTS          |    | A - B       | R |
|-----------------|----|-------------|---|
| $\overline{RE}$ | DE |             |   |
| 0               | 0  | +0.2V       | 1 |
| 0               | 0  | -0.2V       | 0 |
| 0               | 0  | Inputs Open | 1 |
| 1               | 0  | X           | Z |

Table 2. Receive Function Truth Table

## SWITCHING WAVEFORMS

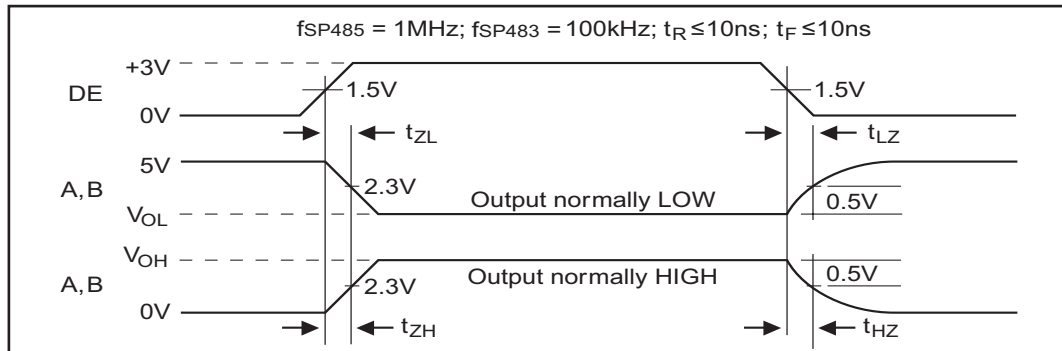


Figure 6. Driver Enable and Disable Times

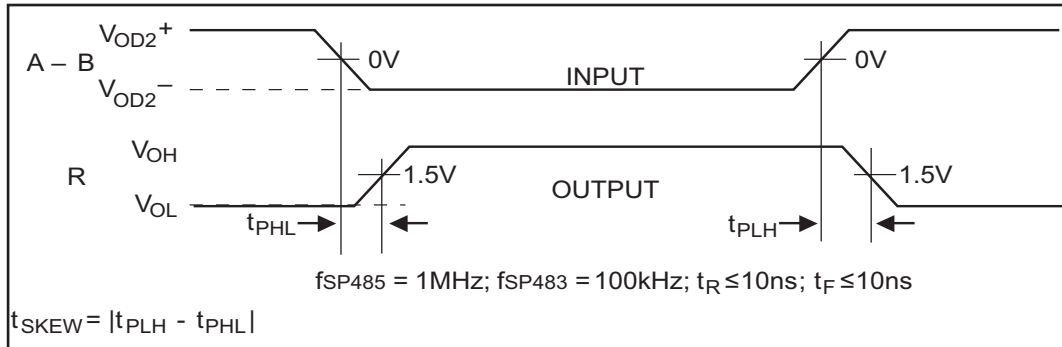


Figure 7. Receiver Propagation Delays

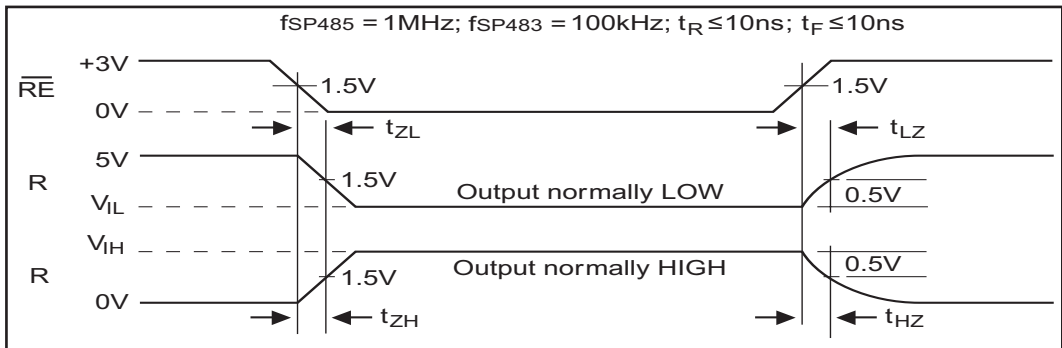


Figure 8. Receiver Enable and Disable Times

The **SP483** and **SP485** are half-duplex differential transceivers that meet the requirements of RS-485 and RS-422. Fabricated with an **Exar** proprietary BiCMOS process, this product requires a fraction of the power of older bipolar designs.

The RS-485 standard is ideal for multi-drop applications and for long-distance interfaces. RS-485 allows up to 32 drivers and 32 receivers to be connected to a data bus, making it an ideal choice for multi-drop applications. Since the cabling can be as long as 4,000 feet, RS-485 transceivers are equipped with a wide (-7V to +12V) common mode range to accommodate ground potential differences. Because RS-485 is a differential interface, data is virtually immune to noise in the transmission line.

## Drivers

### SP483 and SP485

The driver outputs of the **SP483** and **SP485** are differential outputs meeting the RS-485 and RS-422 standards. The typical voltage output swing with no load will be 0 Volts to +5 Volts. With worst case loading of 54 $\Omega$  across the differential outputs, the drivers can maintain greater than 1.5V voltage levels. The drivers of the **SP483** and **SP485** have an enable control line which is active HIGH. A logic HIGH on DE (pin 3) will enable the differential driver outputs. A logic LOW on the DE (pin 3) will tri-state the driver outputs.

The transmitters of the **SP485** will operate up to at least 5Mbps. The **SP483** has internally slew rate limited driver outputs to minimize EMI. The maximum data rate for the **SP483** driver is 250kbps.

## Receivers

### SP483 and SP485

The **SP483** and **SP485** receivers have differential inputs with an input sensitivity as low as  $\pm 200\text{mV}$ . Input impedance of the receivers is typically 15k $\Omega$  (12k $\Omega$  minimum). A wide common mode range of -7V to +12V allows for large ground potential differences between systems. The receivers of the **SP483** and **SP485** have a tri-state enable control pin. A logic LOW on RE (pin 2) will enable the receiver, a logic HIGH on RE (pin 2) will disable the receiver.

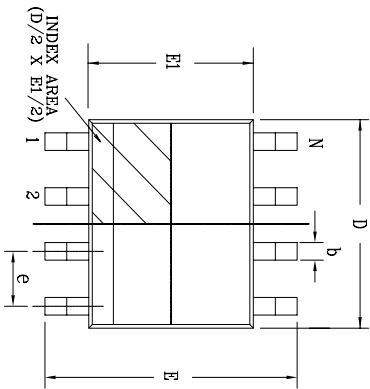
The receiver for the **SP485** will operate up to at least 10Mbps. The **SP483** receiver is rated for data rates up to 250kbps. The receiver for each of the three devices is equipped with the fail-safe feature. Fail-safe guarantees that the receiver output will be in a HIGH state when the input is left unconnected and floating.

## Shutdown Mode

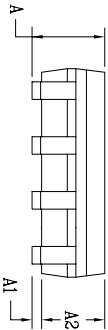
### SP483

The **SP483** is equipped with a Shutdown mode. To enable the shutdown state, both driver and receiver must be disabled simultaneously. A logic LOW on DE (pin 3) and a Logic HIGH on RE (pin 2) will put the **SP483** into Shutdown mode. In Shutdown, supply current will drop to typically 1 $\mu\text{A}$ .

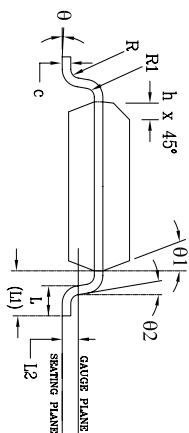
| REVISION HISTORY |                                      |          |       |
|------------------|--------------------------------------|----------|-------|
| REV.             | DESCRIPTION                          | DATE     | APP'D |
| A                | DRAWING ORIGINATOR                   | 08/16/05 | JL    |
| B                | DRAWING FORMAT MODIFICATION          | 07/19/06 | JL    |
| C                | CHANGE DRAWING LOGO ADN COMPANY NAME | 11/16/07 | JL    |



Top View



Side View



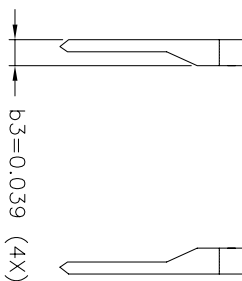
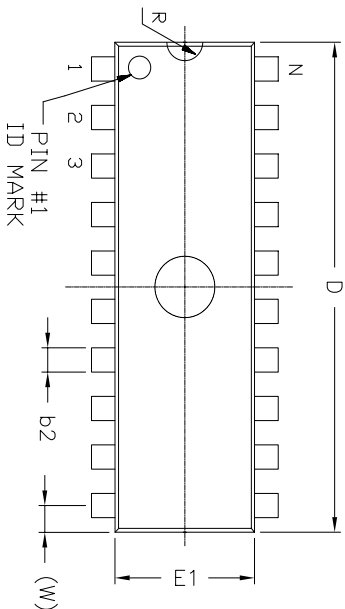
Front View

| 8 Pin SOICN JEDEC MS-012 Variation AA |                                    |     |      |       |                                        |       |     |  |  |
|---------------------------------------|------------------------------------|-----|------|-------|----------------------------------------|-------|-----|--|--|
| SYMBOLS                               | DIMENSIONS IN MM<br>(Control Unit) |     |      |       | DIMENSIONS IN INCH<br>(Reference Unit) |       |     |  |  |
|                                       | MIN                                | NOM | MAX  |       | MIN                                    | NOM   | MAX |  |  |
| A                                     | 1.35                               | —   | 1.75 | 0.053 | —                                      | 0.069 | —   |  |  |
| A1                                    | 0.10                               | —   | 0.25 | 0.004 | —                                      | 0.010 | —   |  |  |
| A2                                    | 1.25                               | —   | 1.65 | 0.049 | —                                      | 0.065 | —   |  |  |
| b                                     | 0.31                               | —   | 0.51 | 0.012 | —                                      | 0.020 | —   |  |  |
| c                                     | 0.17                               | —   | 0.25 | 0.007 | —                                      | 0.010 | —   |  |  |
| E                                     | 6.00 BSC                           |     |      |       | 0.236 BSC                              |       |     |  |  |
| E1                                    | 3.90 BSC                           |     |      |       | 0.154 BSC                              |       |     |  |  |
| e                                     | 1.27 BSC                           |     |      |       | 0.050 BSC                              |       |     |  |  |
| h                                     | 0.25                               | —   | 0.50 | 0.010 | —                                      | 0.020 | —   |  |  |
| L                                     | 0.40                               | —   | 1.27 | 0.016 | —                                      | 0.050 | —   |  |  |
| L1                                    | 1.04 REF                           |     |      |       | 0.041 REF                              |       |     |  |  |
| L2                                    | 0.25 BSC                           |     |      |       | 0.010 BSC                              |       |     |  |  |
| R                                     | 0.07                               | —   | —    | 0.003 | —                                      | —     | —   |  |  |
| R1                                    | 0.07                               | —   | —    | 0.003 | —                                      | —     | —   |  |  |
| 0                                     | 0°                                 | —   | 8°   | 0°    | —                                      | 8°    | —   |  |  |
| 01                                    | 5°                                 | —   | 15°  | 5°    | —                                      | 15°   | —   |  |  |
| 02                                    | 0°                                 | —   | —    | 0°    | —                                      | —     | —   |  |  |
| D                                     | 4.90 BSC                           |     |      |       | 0.193 BSC                              |       |     |  |  |
| N                                     | 8                                  |     |      |       | 8                                      |       |     |  |  |

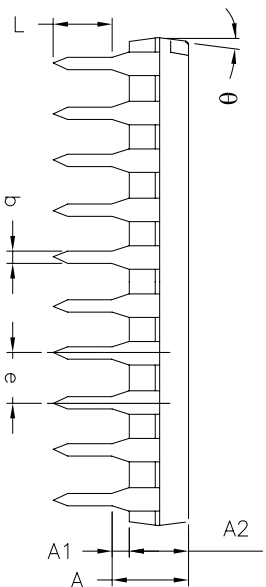
|                                                                                     |                |                             |               |
|-------------------------------------------------------------------------------------|----------------|-----------------------------|---------------|
|  |                | <b>EXAR CORPORATION</b>     |               |
|                                                                                     |                | 8 PIN SOICN PACKAGE OUTLINE |               |
| Packaging Approval:                                                                 | Drawing No:    | 8-PIN SOICN                 |               |
| By: JL                                                                              | Date: 11/16/07 | Revision: C                 | Sheet: 1 OF 1 |

| REVISION HISTORY |                                      |          |       |  |
|------------------|--------------------------------------|----------|-------|--|
| REV.             | DESCRIPTION                          | DATE     | APP'D |  |
| A                | DRAWING ORIGINATOR                   | 04/26/06 | JL    |  |
| B                | CHANGE DRAWING LOGO AND COMPANY NAME | 11/28/07 | JL    |  |

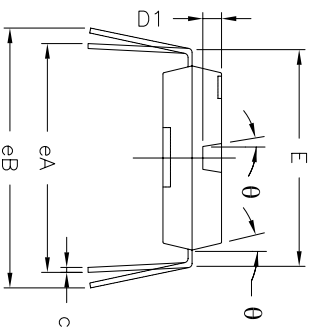
REMARKS:  
FOR 8LD AND 16LD  
ALL END LEADS (4X)  
ARE HALF LEAD TYPES



Top View



Side View



Front View

| 8 Pin PDIP JEDEC MS-001 Variation BA |                                      |       |       |      |                                      |       |     |     |  |
|--------------------------------------|--------------------------------------|-------|-------|------|--------------------------------------|-------|-----|-----|--|
| SYMBOLS                              | DIMENSIONS IN INCH<br>(Control Unit) |       |       |      | DIMENSIONS IN MM<br>(Reference Unit) |       |     |     |  |
|                                      | MIN                                  | NOM   | MAX   | MIN  | NOM                                  | MAX   | MIN | MAX |  |
| A                                    | —                                    | —     | 0.210 | —    | —                                    | 5.33  |     |     |  |
| A1                                   | 0.015                                | —     | —     | 0.38 | —                                    | —     |     |     |  |
| A2                                   | 0.115                                | 0.130 | 0.195 | 2.92 | 3.30                                 | 4.95  |     |     |  |
| b                                    | 0.014                                | 0.018 | 0.022 | 0.36 | 0.46                                 | 0.56  |     |     |  |
| b2                                   | 0.045                                | 0.060 | 0.070 | 1.14 | 1.52                                 | 1.78  |     |     |  |
| c                                    | 0.008                                | 0.010 | 0.014 | 0.20 | 0.25                                 | 0.36  |     |     |  |
| D1                                   | 0.030                                | —     | 0.060 | 0.76 | —                                    | 1.52  |     |     |  |
| E                                    | 0.300                                | 0.310 | 0.325 | 7.62 | 7.87                                 | 8.26  |     |     |  |
| E1                                   | 0.240                                | 0.250 | 0.280 | 6.10 | 6.35                                 | 7.11  |     |     |  |
| e                                    | 0.100 BSC                            |       |       |      | 2.54 BSC                             |       |     |     |  |
| eA                                   | 0.300 BSC                            |       |       |      | 7.62 BSC                             |       |     |     |  |
| eB                                   | —                                    | —     | 0.430 | —    | —                                    | 10.92 |     |     |  |
| L                                    | 0.115                                | 0.130 | 0.150 | 2.92 | 3.30                                 | 3.81  |     |     |  |
| W                                    | 0.075 REF                            |       |       |      | 1.91 REF                             |       |     |     |  |
| R                                    | 0.030 BSC                            |       |       |      | 0.76 BSC                             |       |     |     |  |
| theta                                | 4°                                   | 7°    | 10°   | 4°   | 7°                                   | 10°   |     |     |  |
| D                                    | 0.355                                | 0.365 | 0.400 | 9.02 | 9.27                                 | 10.16 |     |     |  |
| N                                    | 8                                    |       |       |      | 8                                    |       |     |     |  |

|                                                                                     |                |                            |          |      |  |
|-------------------------------------------------------------------------------------|----------------|----------------------------|----------|------|--|
|  |                | EXAR CORPORATION           |          |      |  |
|                                                                                     |                | 8 PIN PDIP PACKAGE OUTLINE |          |      |  |
| Packaging Approval:                                                                 | Drawing No:    | 8-PIN PDIP                 |          |      |  |
| By: JL                                                                              | Date: 11/28/07 | Revision: B                | Sheet: 1 | OF 1 |  |

## ORDERING INFORMATION

| Model              | Temperature Range    | Package Types |
|--------------------|----------------------|---------------|
| SP483CN-L .....    | 0°C to +70°C .....   | 8-pin NSOIC   |
| SP483CN-L/TR ..... | 0°C to +70°C .....   | 8-pin NSOIC   |
| SP483CS-L .....    | 0°C to +70°C .....   | 8-pin PDIP    |
| SP483EN-L .....    | -40°C to +85°C ..... | 8-pin NSOIC   |
| SP483EN-L/TR ..... | -40°C to +85°C ..... | 8-pin NSOIC   |
| SP483ES-L .....    | -40°C to +85°C ..... | 8-pin PDIP    |
| SP485CN-L .....    | 0°C to +70°C .....   | 8-pin NSOIC   |
| SP485CN-L/TR ..... | 0°C to +70°C .....   | 8-pin NSOIC   |
| SP485CS-L .....    | 0°C to +70°C .....   | 8-pin PDIP    |
| SP485EN-L .....    | -40°C to +85°C ..... | 8-pin NSOIC   |
| SP485EN-L/TR ..... | -40°C to +85°C ..... | 8-pin NSOIC   |
| SP485ES-L .....    | -40°C to +85°C ..... | 8-pin PDIP    |

Note: /TR = Tape and Reel

## REVISION HISTORY

| DATE     | REVISION | DESCRIPTION                                                                                                                                                                                                                                                                                                          |
|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 07/28/04 | --       | Legacy Sipex Datasheet                                                                                                                                                                                                                                                                                               |
| 07/14/10 | 1.0.0    | Convert to Exar Format. Update ordering information as a result of discontinued Lead type package options per PDN 081126-01. Remove all options and reference to SP481; Part is EOL. Remove "GND" entry from Minimum column of SP483/485 driver DC Characteristic paramter "Differential output voltage - Unloaded". |

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