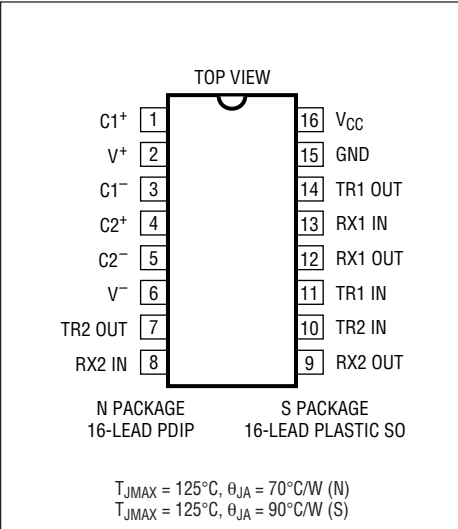


## ABSOLUTE MAXIMUM RATINGS

|                                      |                          |
|--------------------------------------|--------------------------|
| Supply Voltage ( $V_{CC}$ )          | 6V                       |
| Input Voltage                        |                          |
| Driver                               | -0.3V to $V_{CC} + 0.3V$ |
| Receiver                             | -25V to 25V              |
| Digital Input                        | -0.3V to $V_{CC} + 0.3V$ |
| Output Voltage                       |                          |
| Driver                               | -25V to 25V              |
| Receiver                             | -0.3V to $V_{CC} + 0.3V$ |
| Short-Circuit Duration               |                          |
| $V^+$                                | 30 sec                   |
| $V^-$                                | 30 sec                   |
| Driver Output                        | Indefinite               |
| Receiver Output                      | Indefinite               |
| Operating Temperature Range          |                          |
| LTC1383C                             | 0°C to 70°C              |
| LTC1383I                             | -40°C to 85°C            |
| Storage Temperature Range            | -65°C to 150°C           |
| Lead Temperature (Soldering, 10 sec) | 300°C                    |

## PACKAGE/ORDER INFORMATION

|                                                                                    |                                                  |
|------------------------------------------------------------------------------------|--------------------------------------------------|
|  | ORDER PART NUMBER                                |
|                                                                                    | LTC1383CN<br>LTC1383CS<br>LTC1383IN<br>LTC1383IS |

Consult LTC Marketing for parts specified with wider operating temperature ranges.

## DC ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at  $T_A = 25^\circ\text{C}$ .  $V_{CC} = 5V$ ,  $C1 = C2 = C3 = C4 = 0.1\mu\text{F}$ , unless noted.

| PARAMETER                     | CONDITIONS                                                | MIN    | TYP  | MAX | UNITS         |
|-------------------------------|-----------------------------------------------------------|--------|------|-----|---------------|
| <b>Any Driver</b>             |                                                           |        |      |     |               |
| Output Voltage Swing          | 3k to GND                                                 | ● 5.0  | 7.0  |     | V             |
|                               | Positive                                                  | ● -5.0 | -6.5 |     | V             |
| Logic Input Voltage Level     | Input Low Level ( $V_{OUT} = \text{High}$ )               | ●      | 1.4  | 0.8 | V             |
|                               | Input High Level ( $V_{OUT} = \text{Low}$ )               | ● 2.0  | 1.4  |     | V             |
| Logic Input Current           | $V_{IN} = V_{CC}$                                         | ●      |      | 5   | $\mu\text{A}$ |
|                               | $V_{IN} = 0V$                                             | ●      | -20  | -40 | $\mu\text{A}$ |
| Output Short-Circuit Current  | $V_{OUT} = 0V$                                            |        | ±9   | ±12 | mA            |
| <b>Any Receiver</b>           |                                                           |        |      |     |               |
| Input Voltage Thresholds      | Input Low Threshold                                       | ● 0.8  | 1.3  |     | V             |
|                               | Input High Threshold                                      | ●      | 1.7  | 2.4 | V             |
| Hysteresis                    |                                                           | ● 0.1  | 0.4  | 1   | V             |
| Input Resistance              | $-10V \leq V_{IN} \leq 10V$                               |        | 3    | 5   | k $\Omega$    |
| Output Voltage                | Output Low, $I_{OUT} = -1.6\text{mA}$ ( $V_{CC} = 5V$ )   | ●      | 0.2  | 0.4 | V             |
|                               | Output High, $I_{OUT} = 160\mu\text{A}$ ( $V_{CC} = 5V$ ) | ● 3.0  | 3.2  |     | V             |
| Output Short-Circuit Current  | Sinking Current, $V_{OUT} = V_{CC}$                       |        | -15  | -40 | mA            |
|                               | Sourcing Current $V_{OUT} = 0V$                           |        | 10   | 20  | mA            |
| <b>Power Supply Generator</b> |                                                           |        |      |     |               |
| $V^+$ Output Voltage          | $I_{OUT} = 0\text{mA}$                                    |        | 8.0  |     | V             |
|                               | $I_{OUT} = 8\text{mA}$                                    |        | 7.5  |     | V             |
| $V^-$ Output Voltage          | $I_{OUT} = 0\text{mA}$                                    |        | -8.0 |     | V             |
|                               | $I_{OUT} = -8\text{mA}$                                   |        | -7.0 |     | V             |

## DC ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at  $T_A = 25^\circ\text{C}$ .  $V_{CC} = 5\text{V}$ ,  $C_1 = C_2 = C_3 = C_4 = 0.1\mu\text{F}$ , unless noted.

| PARAMETER                    | CONDITIONS                                                  | MIN | TYP  | MAX | UNITS |
|------------------------------|-------------------------------------------------------------|-----|------|-----|-------|
| <b>Power Supply</b>          |                                                             |     |      |     |       |
| $V_{CC}$ Supply Current      | No Load (Note 2), $0^\circ\text{C}$ to $70^\circ\text{C}$   | ●   | 0.22 | 0.5 | mA    |
|                              | No Load (Note 2), $-40^\circ\text{C}$ to $85^\circ\text{C}$ | ●   | 0.35 | 1.0 | mA    |
| Digital Input Threshold Low  |                                                             | ●   | 1.4  | 0.8 | V     |
| Digital Input Threshold High |                                                             | ●   | 2.0  | 1.4 | V     |

## AC CHARACTERISTICS

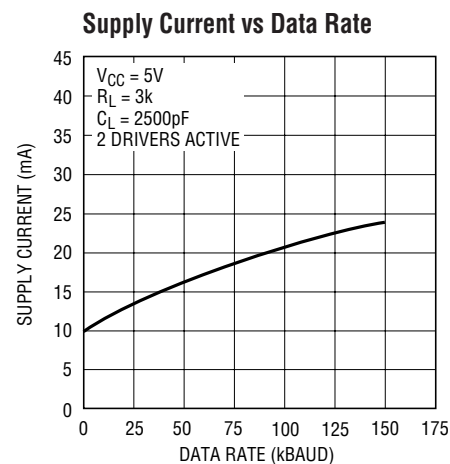
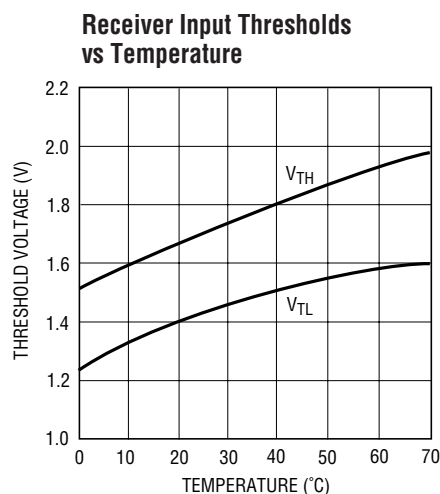
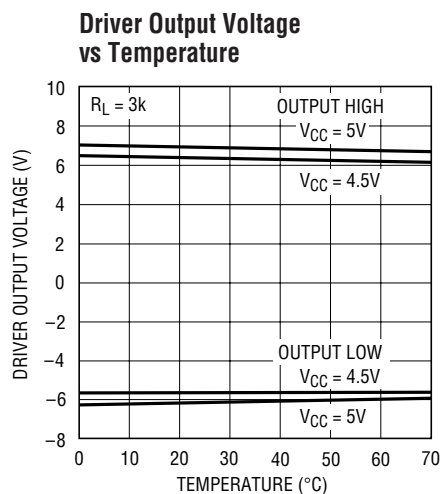
The ● denotes specifications which apply over the full operating temperature range, otherwise specifications are at  $T_A = 25^\circ\text{C}$ .  $V_{CC} = 5\text{V}$ ,  $C_1 = C_2 = C_3 = C_4 = 0.1\mu\text{F}$ , unless noted.

| PARAMETER                                    | CONDITIONS                                | MIN | TYP | MAX | UNITS                  |
|----------------------------------------------|-------------------------------------------|-----|-----|-----|------------------------|
| Slew Rate                                    | $R_L = 3\text{k}$ , $C_L = 51\text{pF}$   |     | 8   | 30  | $\text{V}/\mu\text{s}$ |
|                                              | $R_L = 3\text{k}$ , $C_L = 2500\text{pF}$ | 3   | 5   |     | $\text{V}/\mu\text{s}$ |
| Driver Propagation Delay<br>(TTL to RS232)   | $t_{\text{HLD}}$ (Figure 1)               | ●   | 2   | 3.5 | $\mu\text{s}$          |
|                                              | $t_{\text{LHD}}$ (Figure 1)               | ●   | 2   | 3.5 | $\mu\text{s}$          |
| Receiver Propagation Delay<br>(RS232 to TTL) | $t_{\text{HLR}}$ (Figure 2)               | ●   | 0.3 | 0.8 | $\mu\text{s}$          |
|                                              | $t_{\text{LHR}}$ (Figure 2)               | ●   | 0.3 | 0.8 | $\mu\text{s}$          |

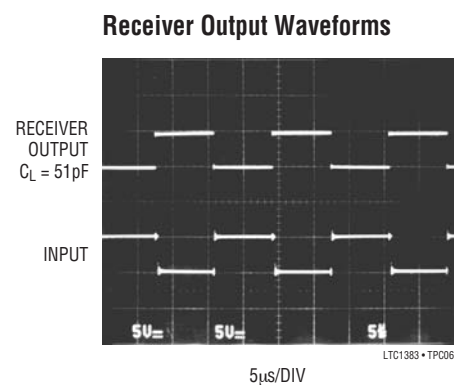
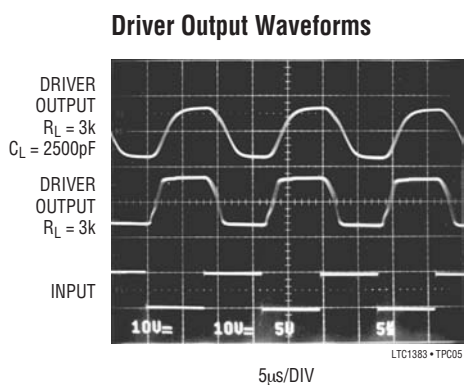
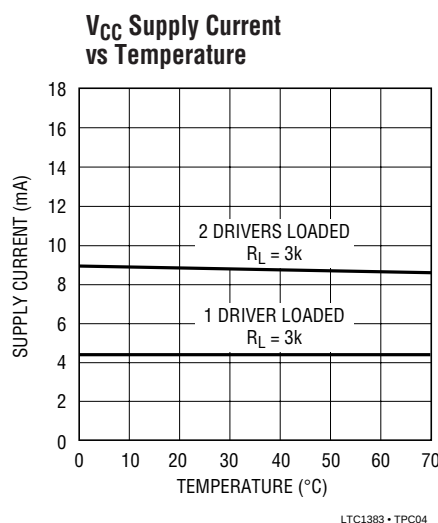
**Note 1:** Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

**Note 2:** Supply current is measured with driver and receiver outputs unloaded.

## TYPICAL PERFORMANCE CHARACTERISTICS



## TYPICAL PERFORMANCE CHARACTERISTICS



## PIN FUNCTIONS

**V<sub>CC</sub>:** 5V Input Supply Pin. This pin should be decoupled with a 0.1µF ceramic capacitor.

**GND:** Ground Pin.

**V<sup>+</sup>:** Positive Supply Output (RS232 Drivers).  $V^+ \approx 2V_{CC} - 2V$ . This pin requires an external capacitor  $C = 0.1\mu F$  for charge storage. The capacitor may be tied to ground or  $V_{CC}$ . With multiple devices, the  $V^+$  and  $V^-$  pins may share a common capacitor. For large numbers of devices, increasing the size of the shared common storage capacitors is recommended to reduce ripple.

**V<sup>-</sup>:** Negative Supply Output (RS232 Drivers).  $V^- \approx -(2V_{CC} - 2V)$ . This pin requires an external capacitor  $C = 0.1\mu F$  for charge storage.

**C1<sup>+</sup>, C1<sup>-</sup>, C2<sup>+</sup>, C2<sup>-</sup>:** Commutating Capacitor Inputs. These pins require two external capacitors  $C = 0.1\mu F$ : one from C1<sup>+</sup> to C1<sup>-</sup> and another from C2<sup>+</sup> to C2<sup>-</sup>. To maintain

charge pump efficiency, the capacitor's effective series resistance should be less than 2Ω.

**TR IN:** RS232 Driver Input Pins. Inputs are TTL/CMOS compatible. The inputs of unused drivers can be left unconnected since 300k input pull-up resistors to  $V_{CC}$  are included on chip.

**TR OUT:** Driver Outputs at RS232 Voltage Levels. The driver outputs are protected against ESD to ±10kV for human body model discharges.

**RX IN:** Receiver Inputs. These pins can be forced to ±25V without damage. The receiver inputs are protected against ESD to ±10kV for human body model discharges. Each receiver provides 0.4V of hysteresis for noise immunity.

**RX OUT:** Receiver Outputs with TTL/CMOS Voltage Levels.

## SWITCHING TIME WAVEFORMS

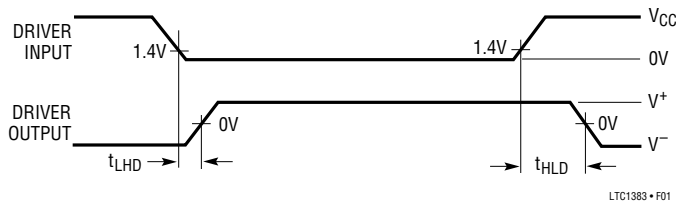


Figure 1. Driver Propagation Delay Timing

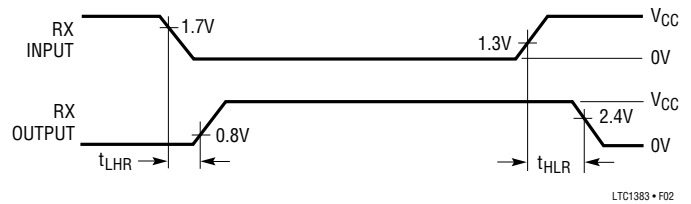
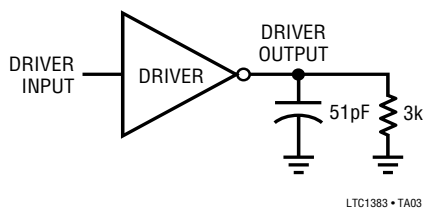


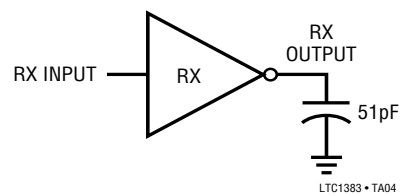
Figure 2. Receiver Propagation Delay Timing

## TEST CIRCUITS

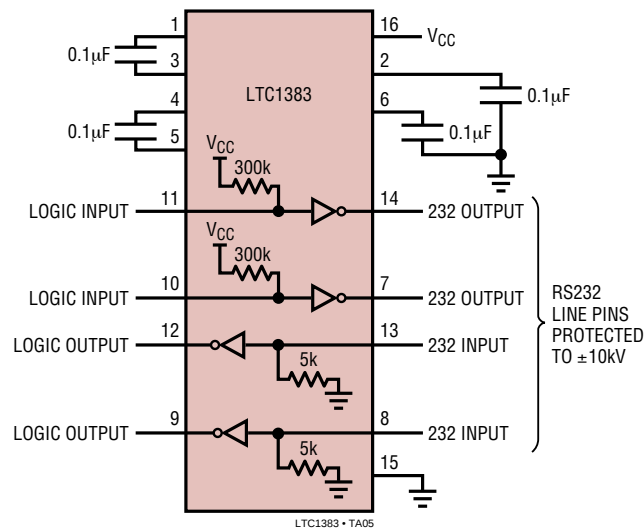
Driver Timing Test Load



Receiver Timing Test Load

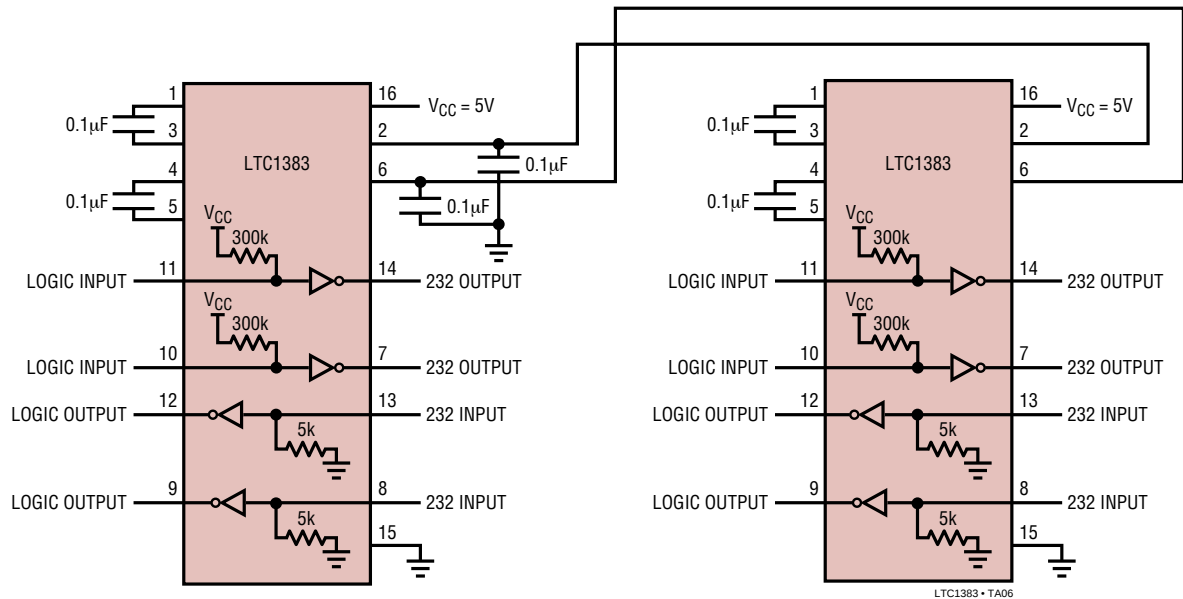


ESD Test Circuit



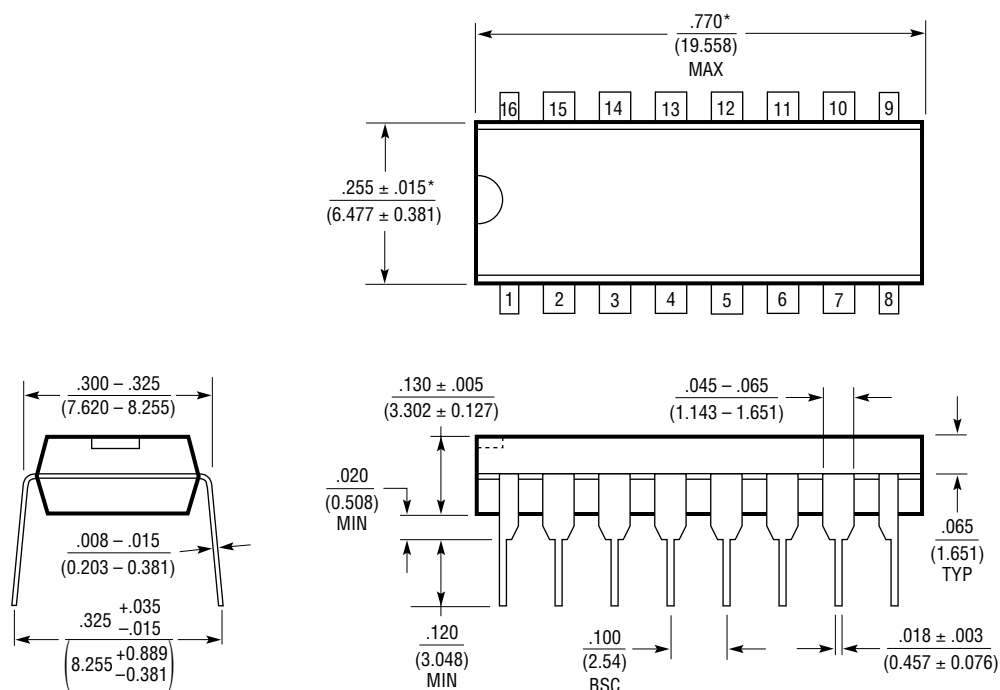
TYPICAL APPLICATIONS

Paralleling Power Supply Generator  
with Common Storage Capacitors



## PACKAGE DESCRIPTION

### N Package 16-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



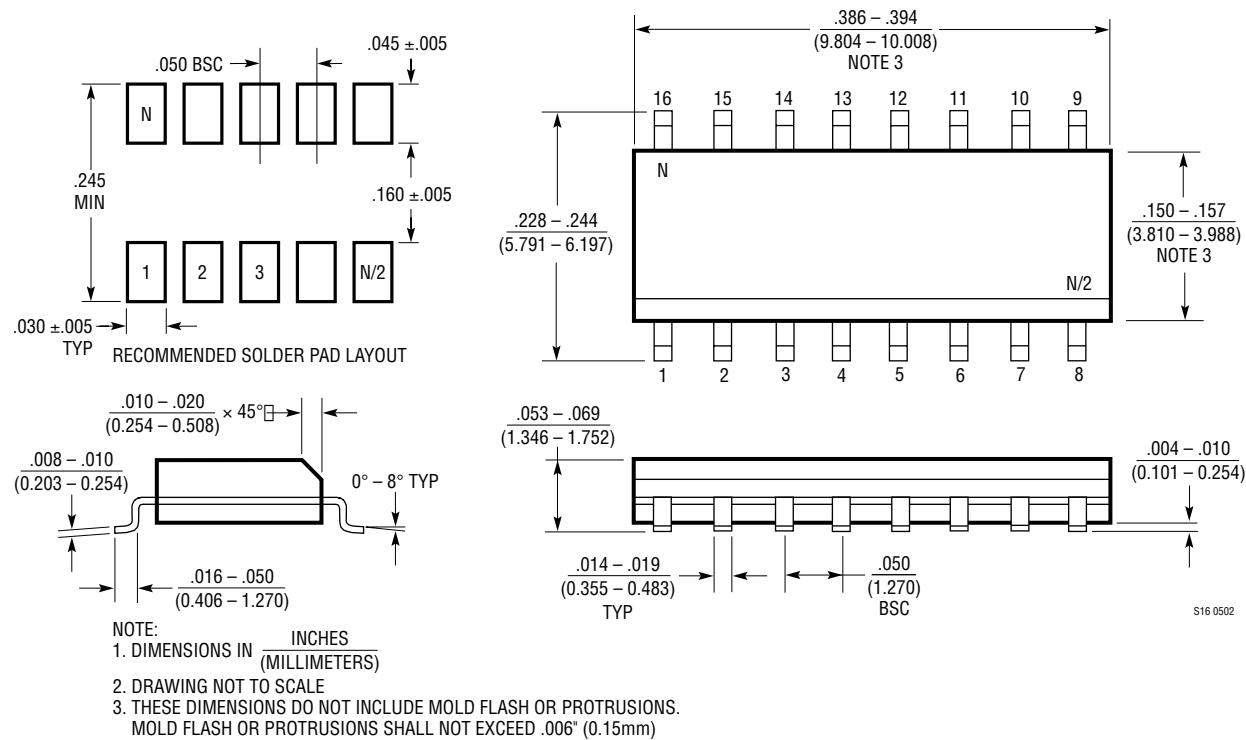
NOTE:  
1. DIMENSIONS ARE  $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

\*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.  
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

N16 1002

PACKAGE DESCRIPTION

S Package  
16-Lead Plastic Small Outline (Narrow .150 Inch)  
(Reference LTC DWG # 05-08-1610)



RELATED PARTS

| PART NUMBER   | DESCRIPTION                                  | COMMENTS                                                   |
|---------------|----------------------------------------------|------------------------------------------------------------|
| LT1780/LT1781 | 5V, 2 Driver, 2 Receiver RS232 Transceivers  | $\pm 15$ kV ESD per IEC 1000-4                             |
| LTC1382       | 5V, 2 Driver, 2 Receiver RS232 Transceiver   | 220 $\mu$ A Supply Current, 0.2 $\mu$ A in Shutdown        |
| LTC1384       | 5V, 2 Driver, 2 Receiver RS232 Transceiver   | 220 $\mu$ A Supply Current, 2 Receivers Active in Shutdown |
| LTC1385       | 3.3V, 2 Driver, 2 Receiver RS562 Transceiver | 220 $\mu$ A Supply Current, 2 Receivers Active in Shutdown |
| LTC1386       | 3.3V, 2 Driver, 2 Receiver RS562 Transceiver | 220 $\mu$ A Supply Current, Narrow 16-pin SO               |