FEATURES

- **Operates from a Single 5V Supply**
- **Low Supply Current: I_{CC} = 220μA**
- **ESD Protection Over ±10kV**
- Available in 16-Pin SOIC Narrow Package
- Uses Small Capacitors: 0.1μF
- Operates to 120kBaud
- Output Overvoltage Does Not Force Current Back into Supplies
- RS232 I/O Lines Can Be Forced to ±25V Without Damage
- Pin Compatible with LT1181A and MAX232A

APPLICATIONS

- Notebook Computers
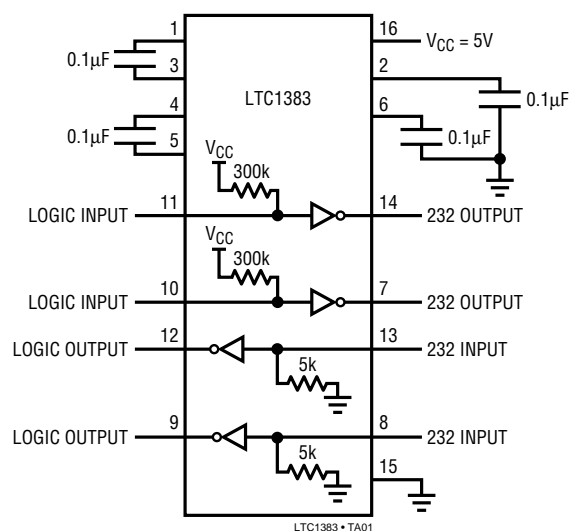- Palmtop Computers

DESCRIPTION

The LTC1383 is an ultra-low power 2-driver/2-receiver RS232 transceiver that operates from a single 5V supply. The charge pump requires only four space-saving 0.1μF capacitors. The supply current (I_{CC}) of the transceiver is only 220μA with driver outputs unloaded.

The LTC1383 is fully compliant with all data rate and overvoltage RS232 specifications. The transceiver can operate up to 120kbaud with a 2500pF, 3kΩ load. Both driver outputs and receiver inputs can be forced to ±25V without damage and can survive multiple ±10kV ESD strikes.
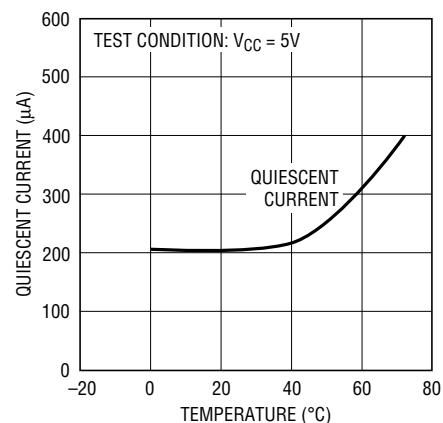
TYPICAL APPLICATION

LTC1383 • TA01

Quiescent Supply Current vs Temperature

LTC1383 • TA02

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 .... 0°C to 70°C
Storage Temperature Range .... -65°C to 150°C
Lead Temperature (Soldering, 10 sec)................ 300°C

PACKAGE/ORDER INFORMATION

TOP VIEW

C1⁺	1	16 V_{CC}
V⁺	2	15 GND
C1⁻	3	14 TR1 OUT
C2⁺	4	13 RX1 IN
C2⁻	5	12 RX1 OUT
V⁻	6	11 TR1 IN
TR2 OUT	7	10 TR2 IN
RX2 IN	8	9 RX2 OUT

N PACKAGE   S PACKAGE
16-LEAD PLASTIC DIP   16-LEAD NARROW
                                    PLASTIC SOIC

T_{JMAX} = 125°C, θ_{JA} = 65°C/W (N)
T_{JMAX} = 125°C, θ_{JA} = 95°C/W (S)

DC ELECTRICAL CHARACTERISTICS V_{CC} = 5V, C1 = C2 = C3 = C4 = 0.1µF, unless otherwise noted.

PARAMETER	CONDITIONS			MIN	TYP	MAX	UNITS
Any Driver							
Output Voltage Swing	3k to GND	Positive	●	5.0	7.0		V
		Negative	●	-5.0	-6.5		V
Logic Input Voltage Level	Input Low Level (V_{OUT} = High)		●		1.4	0.8	V
	Input High Level (V_{OUT} = Low)		●	2.0	1.4		V
Logic Input Current	$V_{IN} = V_{CC}$		●			5	µA
	$V_{IN} = 0V$		●		-20	-40	µA
Output Short-Circuit Current	$V_{OUT} = 0V$				±12		mA
Any Receiver							
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	7	kΩ
Output Voltage	Output Low, $I_{OUT} = -1.6mA$ ($V_{CC} = 5V$)		●		0.2	0.4	V
	Output High, $I_{OUT} = 160µA$ ($V_{CC} = 5V$)		●	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
Power Supply Generator							
V^+ Output Voltage	$I_{OUT} = 0mA$				8.0		V
	$I_{OUT} = 8mA$				7.5		V
V^- Output Voltage	$I_{OUT} = 0mA$				-8.0		V
	$I_{OUT} = -8mA$				-7.0		V

DC ELECTRICAL CHARACTERISTICS V_{CC} = 5V, C1 = C2 = C3 = C4 = 0.1μF, unless otherwise noted.

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Power Supply						
V_{CC} Supply Current	No Load (Note 2)	●		0.22	0.5	mA
Digital Input Threshold Low		●		1.4	0.8	V
Digital Input Threshold High		●	2.0	1.4		V

AC CHARACTERISTICS V_{CC} = 5V, C1 = C2 = C3 = C4 = 0.1μF, unless otherwise noted.

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

The ● denotes specifications which apply over the operating temperature range of 0°C ≤ T_A ≤ 70°C.
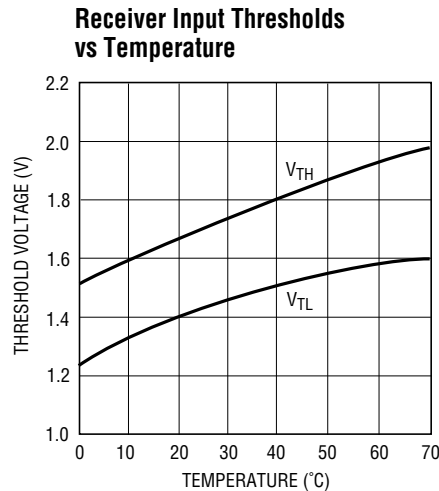
Note 1: Absolute maximum ratings are those values beyond which the life of the device may be impaired.

Note 2: Supply current is measured with driver and receiver outputs unloaded.
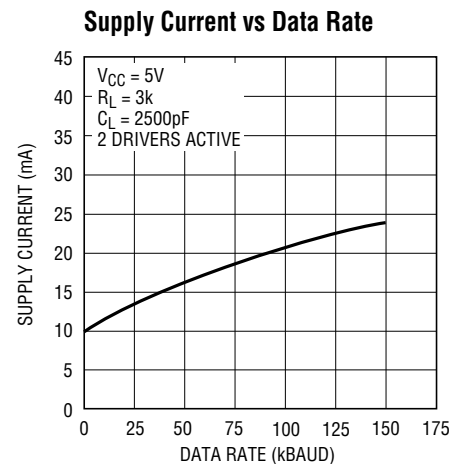
TYPICAL PERFORMANCE CHARACTERISTICS

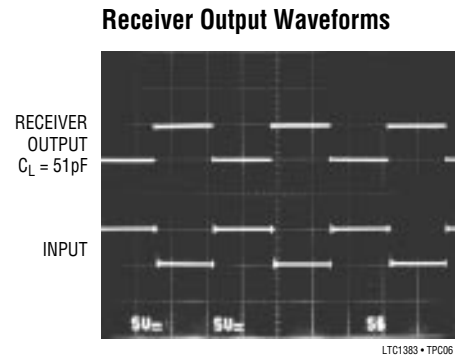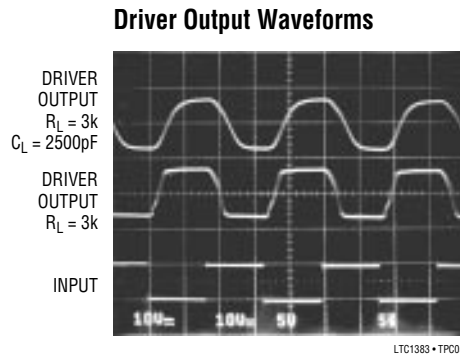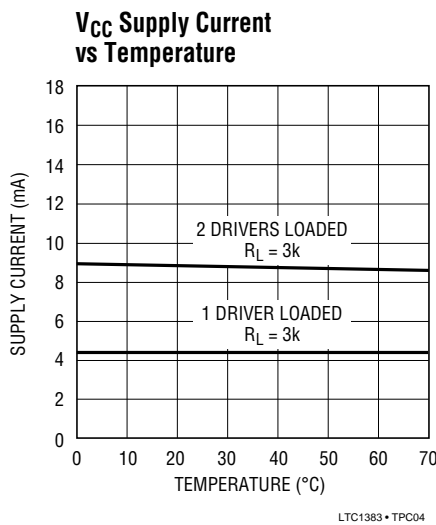**Driver Output Voltage vs Temperature**

LTC1383 • TPC01

Receiver Input Thresholds vs Temperature

LTC1383 • TPC02

Supply Current vs Data Rate

LTC1383 • TPC03

TYPICAL PERFORMANCE CHARACTERISTICS

V$_{CC}$ Supply Current vs Temperature

LTC1383 • TPC04

Driver Output Waveforms

LTC1383 • TPC05

Receiver Output Waveforms

LTC1383 • TPC06

PIN FUNCTIONS

V$_{CC}$: 5V Input Supply Pin. This pin should be decoupled with a 0.1µF ceramic capacitor.

GND: Ground Pin.

V$^+$: Positive Supply Output (RS232 Drivers). V$^+$ ≅ 2V$_{CC}$ – 2V. This pin requires an external capacitor C = 0.1µF 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$^-$: Negative Supply Output (RS232 Drivers). V$^-$ ≅ –(2V$_{CC}$ – 2V). This pin requires an external capacitor C = 0.1µF for charge storage.

C1$^+$, C1$^-$, C2$^+$, C2$^-$: Commutating Capacitor Inputs. These pins require two external capacitors C = 0.1µF: one from C1$^+$ to C1$^-$ and another from C2$^+$ to C2$^-$. 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.
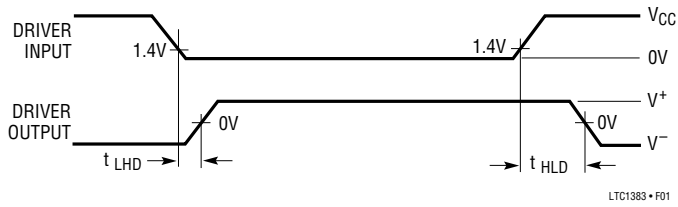
4

SWITCHING TIME WAVEFORMS

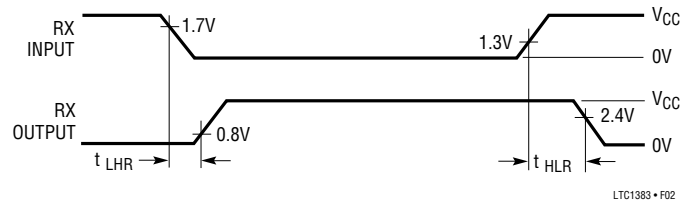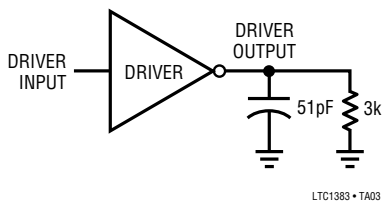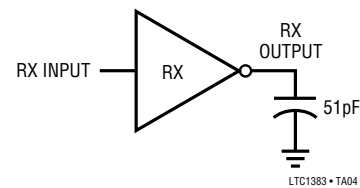Figure 1. Driver Propagation Delay Timing

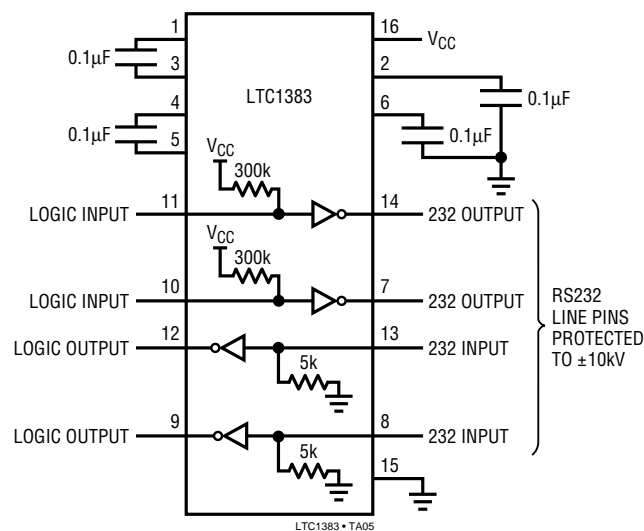Figure 2. Receiver Propagation Delay Timing

TEST CIRCUITS

Driver Timing Test Load

Receiver Timing Test Load
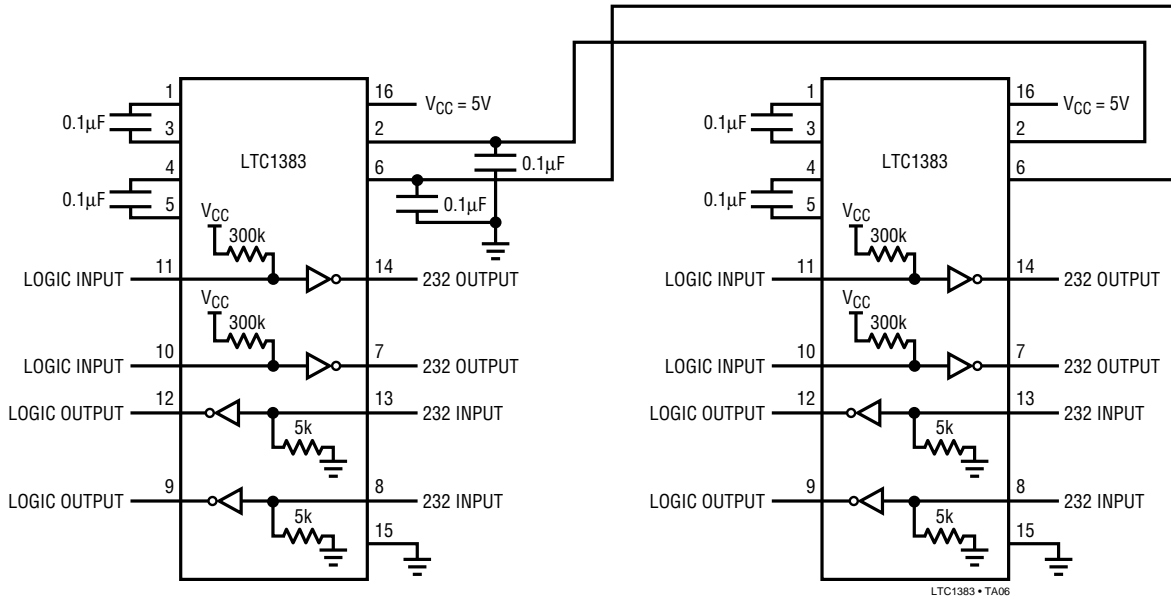

ESD Test Circuit
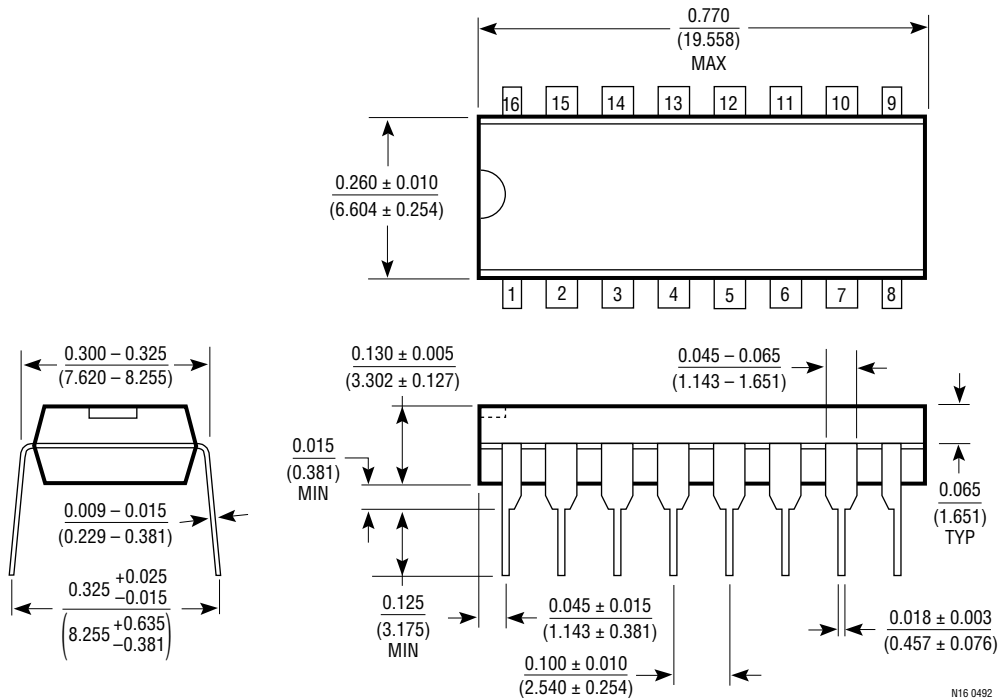
TYPICAL APPLICATIONS

**Paralleling Power Supply Generator
with Common Storage Capacitors**
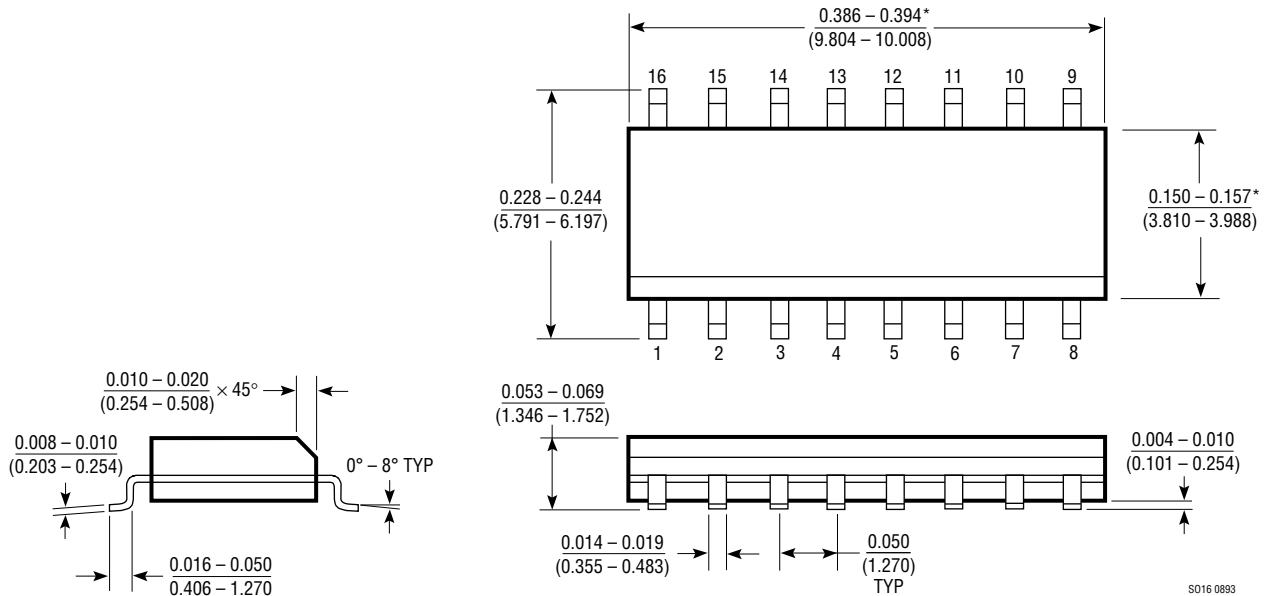

LTC1383 • TA06

PACKAGE DESCRIPTION

Dimensions in inches (millimeters) unless otherwise noted.

**N Package
16-Lead Plastic DIP**

N16 0492

PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise noted.

S Package
16-Lead Plastic SOIC

0.386 – 0.394*
(9.804 – 10.008)

16 15 14 13 12 11 10 9

0.228 – 0.244
(5.791 – 6.197)

0.150 – 0.157*
(3.810 – 3.988)

1 2 3 4 5 6 7 8

0.010 – 0.020
(0.254 – 0.508) × 45°

0.008 – 0.010
(0.203 – 0.254)

0° – 8° TYP

0.016 – 0.050
0.406 – 1.270

0.053 – 0.069
(1.346 – 1.752)

0.004 – 0.010
(0.101 – 0.254)

0.014 – 0.019
(0.355 – 0.483)

0.050
(1.270)
TYP

SO16 0893

*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.006 INCH (0.15mm).

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