

Low Power 5V RS232 Dual Driver/Receiver with 0.1 μ F Capacitors

FEATURES

- ESD Protection over $\pm 10\text{kV}$
- Uses Small Capacitors: 0.1 μF
- 120kbaud Operation for $R_L = 3\text{k}$, $C_L = 2500\text{pF}$
- 250kbaud Operation for $R_L = 3\text{k}$, $C_L = 1000\text{pF}$
- Outputs Withstand $\pm 30\text{V}$ Without Damage
- CMOS Comparable Low Power: 40mW
- Operates from a Single 5V Supply
- Rugged Bipolar Design
- Outputs Assume a High Impedance State When Off or Powered Down
- Meets All RS232 Specifications
- Available With or Without Shutdown
- Absolutely No Latch-up
- Available in SO Package

APPLICATIONS

- Portable Computers
- Battery-Powered Systems
- Power Supply Generator
- Terminals
- Modems

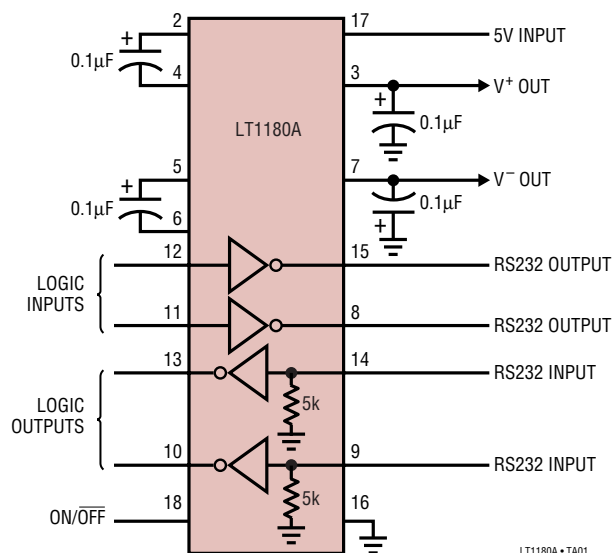
DESCRIPTION

The LT[®]1180A/LT1181A are dual RS232 driver/receiver pairs with integral charge pump to generate RS232 voltage levels from a single 5V supply. These circuits feature rugged bipolar design to provide operating fault tolerance and ESD protection unmatched by competing CMOS designs. Using only 0.1 μF external capacitors, these circuits consume only 40mW of power, and can operate to 120k baud even while driving heavy capacitive loads. New ESD structures on the chip allow the LT1180A/LT1181A to survive multiple $\pm 10\text{kV}$ strikes, eliminating the need for costly TransZorbs[®] on the RS232 line pins. The LT1180A/LT1181A are fully compliant with EIA RS232 standards. Driver outputs are protected from overload, and can be shorted to ground or up to $\pm 30\text{V}$ without damage. During shutdown or power-off conditions, driver and receiver outputs are in a high impedance state, allowing line sharing.

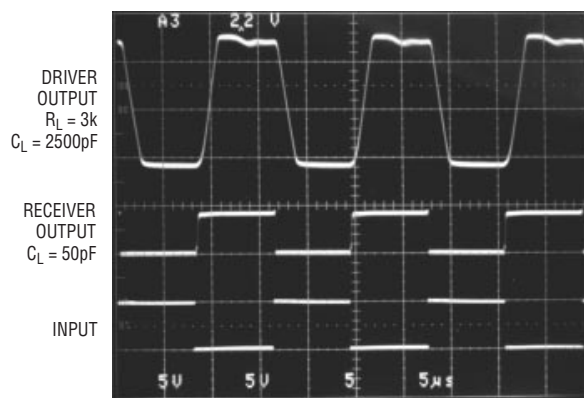
The LT1181A is available in 16-pin DIP and SO packages. The LT1180A is supplied in 18-pin DIP and SO packages for applications which require shutdown.

LT, LTC and LT are registered trademarks of Linear Technology Corporation.
TransZorb is a registered trademark of General Instruments, GSI

TYPICAL APPLICATION



Output Waveforms



LT1180A • TA02

LT1180A/LT1181A

ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage (V_{CC})	6V	Short-Circuit Duration	
V^+	13.2V	V^+	30 sec
V^-	-13.2V	V^-	30 sec
Input Voltage		Driver Output	Indefinite
Driver	V^- to V^+	Receiver Output	Indefinite
Receiver	-30V to 30V	Operating Temperature Range	
ON/OFF	-0.3V to 12V	LT1180AI/LT1181AI	-40°C to 85°C
Output Voltage		LT1180AC/LT1181AC	0°C to 70°C
Driver	$V^+ - 30V$ to $V^- + 30V$	Storage Temperature Range	-65°C to 150°C
Receiver	-0.3V to $V_{CC} + 0.3V$	Lead Temperature (Soldering, 10 sec)	300°C

PACKAGE/ORDER INFORMATION

TOP VIEW N PACKAGE 18-LEAD PDIP $T_{JMAX} = 125^\circ\text{C}$, $\theta_{JA} = 80^\circ\text{C/W}$, $\theta_{JC} = 36^\circ\text{C/W}$ (N) $T_{JMAX} = 125^\circ\text{C}$, $\theta_{JA} = 90^\circ\text{C/W}$, $\theta_{JC} = 26^\circ\text{C/W}$ (SW)	ORDER PART NUMBER LT1180ACN LT1180ACSW LT1180AIN LT1180AISW	TOP VIEW N PACKAGE 16-LEAD PDIP $T_{JMAX} = 125^\circ\text{C}$, $\theta_{JA} = 90^\circ\text{C/W}$, $\theta_{JC} = 46^\circ\text{C/W}$ (N) $T_{JMAX} = 125^\circ\text{C}$, $\theta_{JA} = 95^\circ\text{C/W}$, $\theta_{JC} = 27^\circ\text{C/W}$ (SW)	ORDER PART NUMBER LT1181ACN LT1181ACSW LT1181AIN LT1181AISW
J PACKAGE 18-LEAD CERDIP $T_{JMAX} = 150^\circ\text{C}$, $\theta_{JA} = 100^\circ\text{C/W}$, $\theta_{JC} = 40^\circ\text{C/W}$ (J) OBSELETE PACKAGE Consider N Package for Alternate Source	LT1180AMJ	J PACKAGE 16-LEAD CERDIP $T_{JMAX} = 150^\circ\text{C}$, $\theta_{JA} = 100^\circ\text{C/W}$, $\theta_{JC} = 40^\circ\text{C/W}$ (J) OBSELETE PACKAGE Consider N Package for Alternate Source	LT1181AMJ

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

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the operating temperature range ($0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ for commercial grade, and $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$ for industrial grade. (Note 2)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply Generator					
V^+ Output			7.9		V
V^- Output			-7.0		V
Supply Current (V_{CC})	(Note 3), $T_A = 25^\circ\text{C}$	●	9	13	mA
		●		16	mA
Supply Current When OFF (V_{CC})	Shutdown (Note 4) LT1180A Only	●	1	10	μA
Supply Rise Time	$C1 = C2 = C3 = C4 = 0.1\mu\text{F}$		0.2		ms
Shutdown to Turn-On	LT1180A Only		0.2		ms
ON/OFF Pin Thresholds	Input Low Level (Device Shutdown)	●	0.8	1.2	V
	Input High Level (Device Enabled)	●	1.6	2.4	V

11801afb

ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the operating temperature range ($0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$ for commercial grade, and $-40^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$ for industrial grade. (Note 2))

PARAMETER	CONDITIONS			MIN	TYP	MAX	UNITS
ON/OFF Pin Current	$0\text{V} \leq V_{\text{ON/OFF}} \leq 5\text{V}$	●		-15		80	μA
Oscillator Frequency					130		kHz
Driver							
Output Voltage Swing	Load = 3k to GND	Positive	●	5.0	7.5		V
		Negative	●		-6.3	-5.0	V
Logic Input Voltage Level	Input Low Level ($V_{\text{OUT}} = \text{High}$)		●		1.4	0.8	V
Input High Level ($V_{\text{OUT}} = \text{Low}$)			●	2.0	1.4		V
Logic Input Current	$0.8\text{V} \leq V_{\text{IN}} \leq 2.0\text{V}$	●			5	20	μA
Output Short-Circuit Current	$V_{\text{OUT}} = 0\text{V}$			± 9	17		mA
Output Leakage Current	Shutdown $V_{\text{OUT}} = \pm 30\text{V}$ (Note 4)	●			10	100	μA
Data Rate (Note 7)	$R_L = 3\text{k}, C_L = 2500\text{pF}$			120			kBaud
	$R_L = 3\text{k}, C_L = 1000\text{pF}$			250			kBaud
Slew Rate $R_L = 3\text{k}, C_L = 2500\text{pF}$	$R_L = 3\text{k}, C_L = 51\text{pF}$				15	30	V/ μs
				4	7		V/ μs
Propagation Delay	Output Transition t_{HL} High-to-Low (Note 5)				0.6	1.3	μs
	Output Transition t_{LH} Low-to-High				0.5	1.3	μs
Receiver							
Input Voltage Thresholds	Input Low Threshold ($V_{\text{OUT}} = \text{High}$)	C Grade	●	0.8	1.3		V
	Input High Threshold ($V_{\text{OUT}} = \text{Low}$)	C Grade	●		1.7	2.4	V
	Input LowI,	M Grade	●	0.2	1.3		V
	Input HighI,	M Grade	●		1.7	3.0	V
Hysteresis			●	0.1	0.4	1.0	V
Input Resistance	$V_{\text{IN}} = \pm 10\text{V}$			3	5	7	k Ω
Output Leakage Current	Shutdown (Note 4) $0 \leq V_{\text{OUT}} \leq V_{\text{CC}}$	●			1	10	μA
Output Voltage	Output Low, $I_{\text{OUT}} = -1.6\text{mA}$	●			0.2	0.4	V
	Output High, $I_{\text{OUT}} = 160\mu\text{A}$ ($V_{\text{CC}} = 5\text{V}$)	●		3.5	4.2		V
Output Short-Circuit Current	Sinking Current, $V_{\text{OUT}} = V_{\text{CC}}$				-20	-10	mA
	Sourcing Current, $V_{\text{OUT}} = 0\text{V}$			10	20		mA
Propagation Delay	Output Transition t_{HL} High-to-Low (Note 6)				250	600	ns
	Output Transition t_{LH} Low-to-High				350	600	ns

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

Note 2: Testing done at $V_{\text{CC}} = 5\text{V}$ and $V_{\text{ON/OFF}} = 3\text{V}$, unless otherwise specified.

Note 3: Supply current is measured as the average over several charge pump cycles. $C^+ = C^- = C1 = C2 = 0.1\mu\text{F}$. All outputs are open, with all driver inputs tied high.

Note 4: Supply current measurements in SHUTDOWN are performed with $V_{\text{ON/OFF}} \leq 0.1\text{V}$.

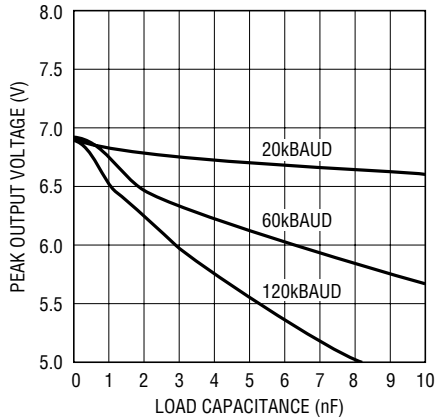
Note 5: For driver delay measurements, $R_L = 3\text{k}$ and $C_L = 51\text{pF}$. Trigger points are set between the driver's input logic threshold and the output transition to the zero crossing ($t_{\text{HL}} = 1.4\text{V}$ to 0V and $t_{\text{LH}} = 1.4\text{V}$ to 0V).

Note 6: For receiver delay measurements, $C_L = 51\text{pF}$. Trigger points are set between the receiver's input logic threshold and the output transition to standard TTL/CMOS logic threshold ($t_{\text{HL}} = 1.3\text{V}$ to 2.4V and $t_{\text{LH}} = 1.7\text{V}$ to 0.8V).

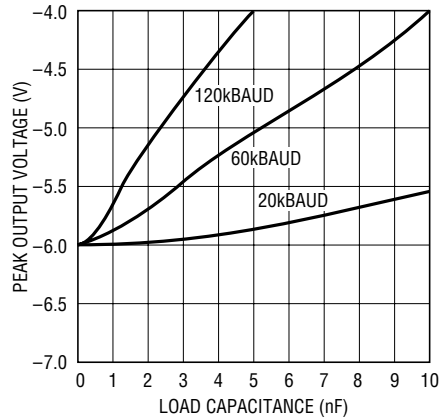
Note 7: Data rate operation guaranteed by slew rate, short-circuit current and propagation delay tests.

TYPICAL PERFORMANCE CHARACTERISTICS

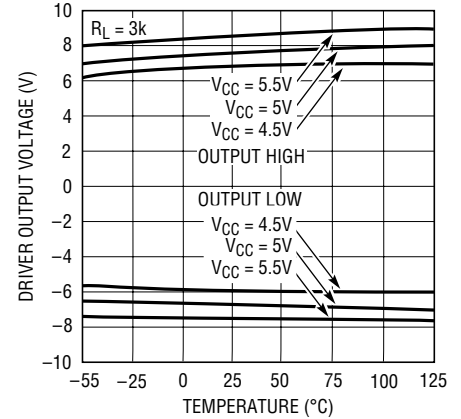
Driver Maximum Output Voltage vs Load Capacitance



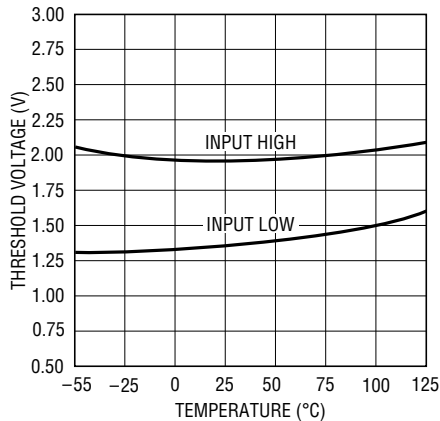
Driver Minimum Output Voltage vs Load Capacitance



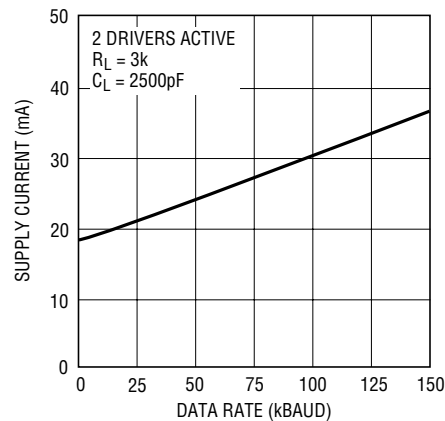
Driver Output Voltage



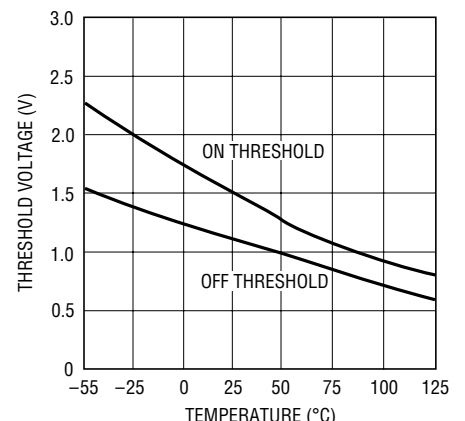
Receiver Input Thresholds



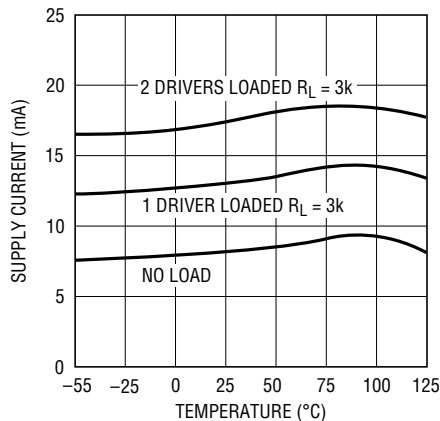
Supply Current vs Data Rate



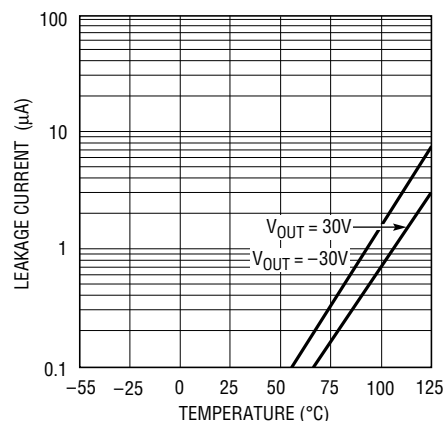
ON/OFF Thresholds



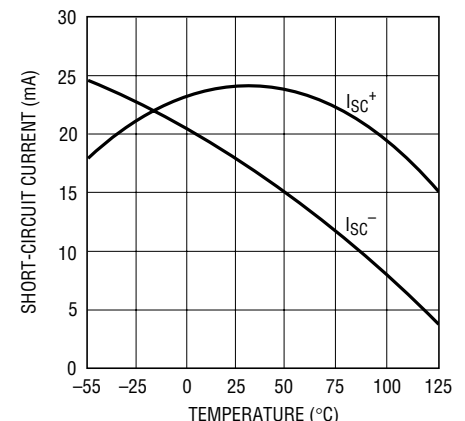
Supply Current



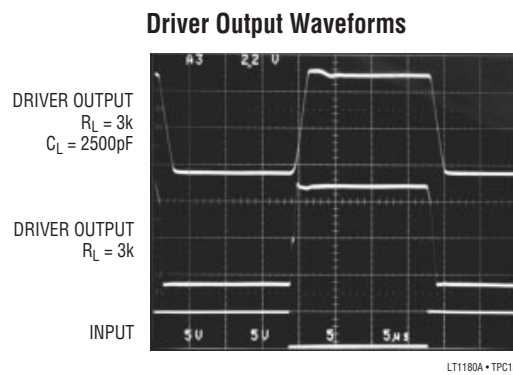
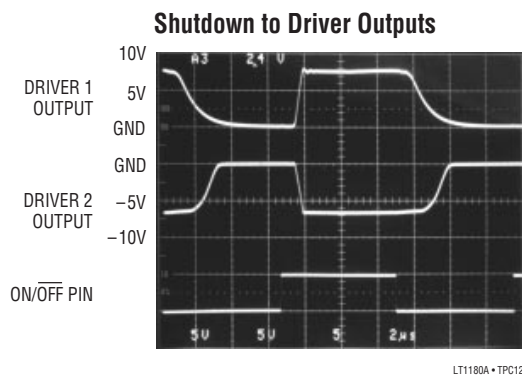
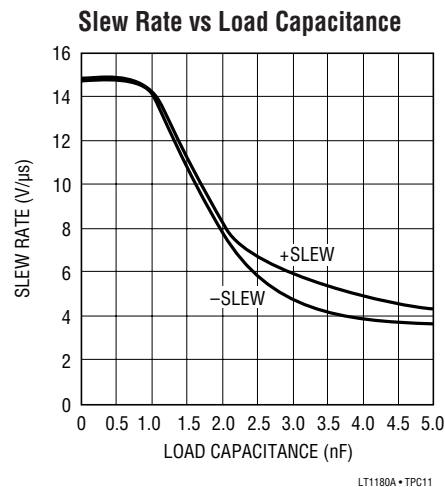
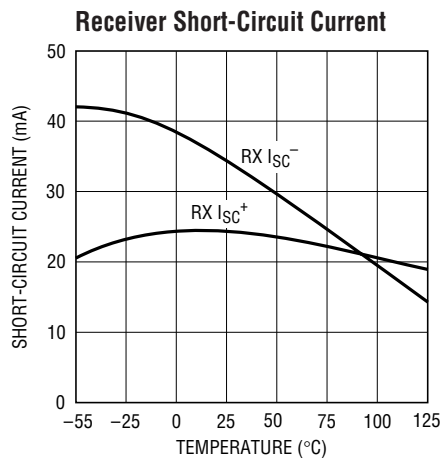
Driver Leakage in Shutdown



Driver Short-Circuit Current



TYPICAL PERFORMANCE CHARACTERISTICS



PIN FUNCTIONS

V_{CC}: 5V Input Supply Pin. This pin should be decoupled with a 0.1μF ceramic capacitor close to the package pin. Insufficient supply bypassing can result in low output drive levels and erratic charge pump operation.

GND: Ground Pin.

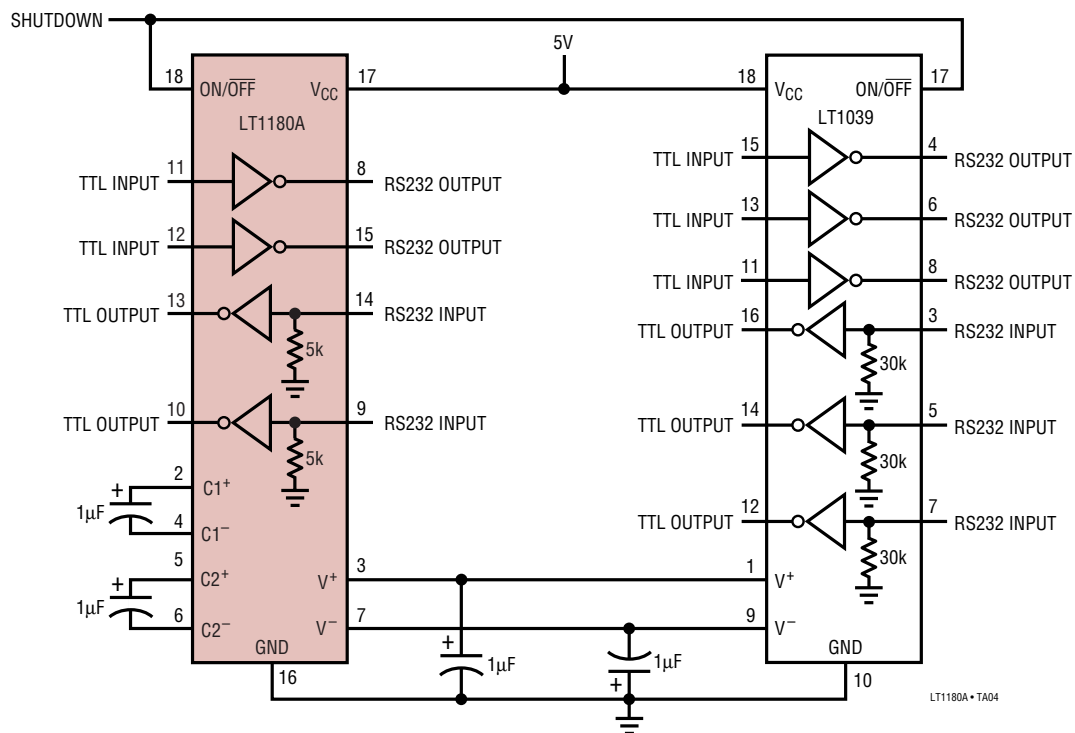
ON/OFF: A TTL/CMOS Compatible Operating Mode Control. A logic low puts the LT1180A in shutdown mode. Supply current drops to zero and both driver and receiver outputs assume a high impedance state. A logic high fully enables the device.

V⁺: Positive Supply Output (RS232 Drivers). $V^+ \approx 2V_{CC} - 1.5V$. This pin requires an external charge storage capacitor $C \geq 0.1\mu F$, tied to ground or V_{CC} . Larger value capacitors may be used to reduce supply ripple. With multiple transceivers, the V^+ and V^- pins may be paralleled into common capacitors.

V⁻: Negative Supply Output (RS232 Drivers). $V^- \approx -(2V_{CC} - 2.5V)$. This pin requires an external charge storage capacitor $C \geq 0.1\mu F$. Larger value capacitors may be used to reduce supply ripple. With multiple transceivers, the V^+ and V^- pins may be paralleled into common capacitors.

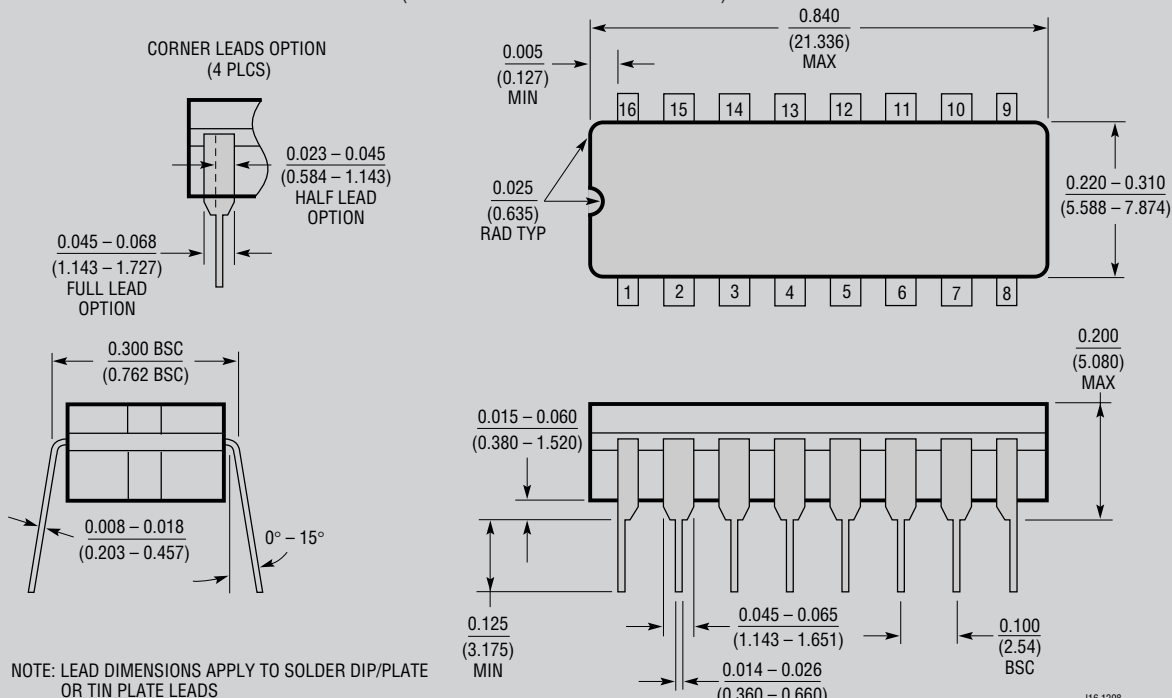
TYPICAL APPLICATION

Supporting an LT1039 (Triple Driver/Receiver)

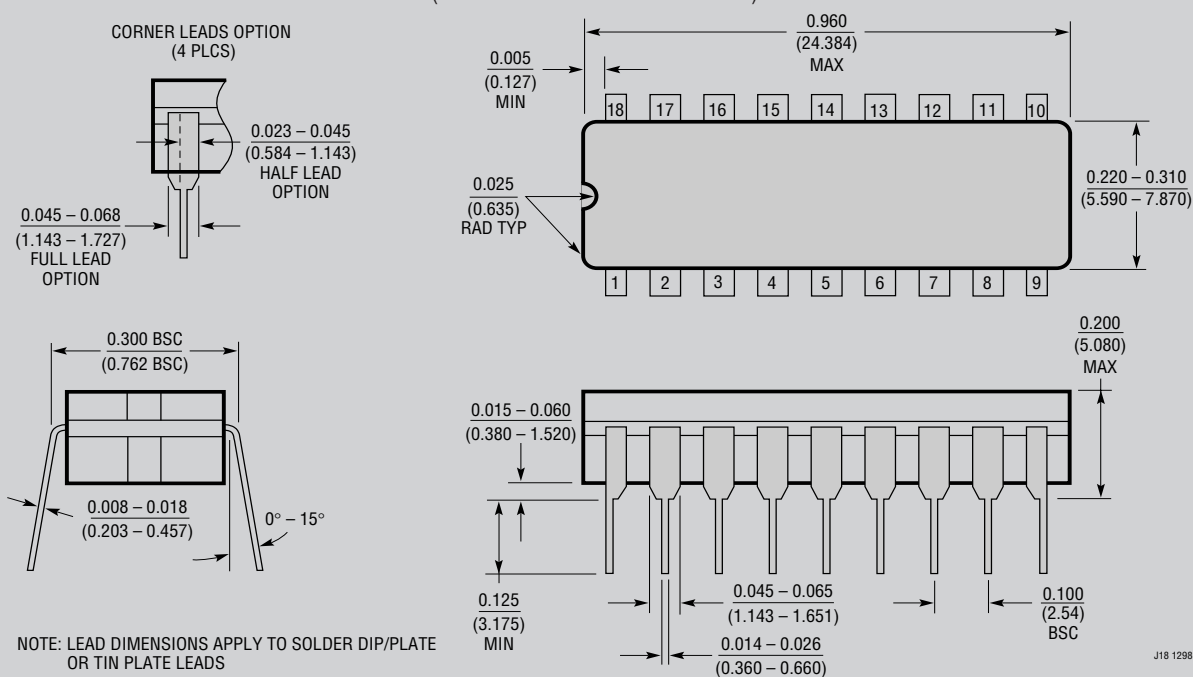


PACKAGE DESCRIPTION

J Package 16-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)



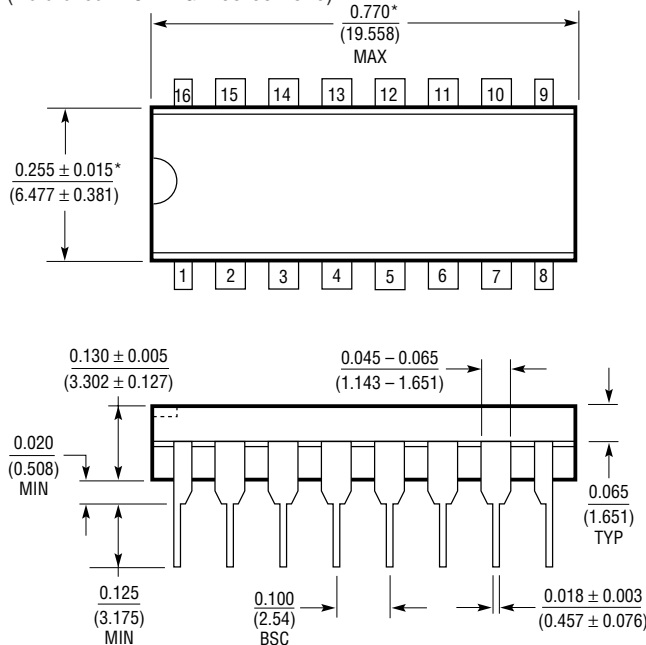
J Package 18-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)



OBSOLETE PACKAGES

PACKAGE DESCRIPTION

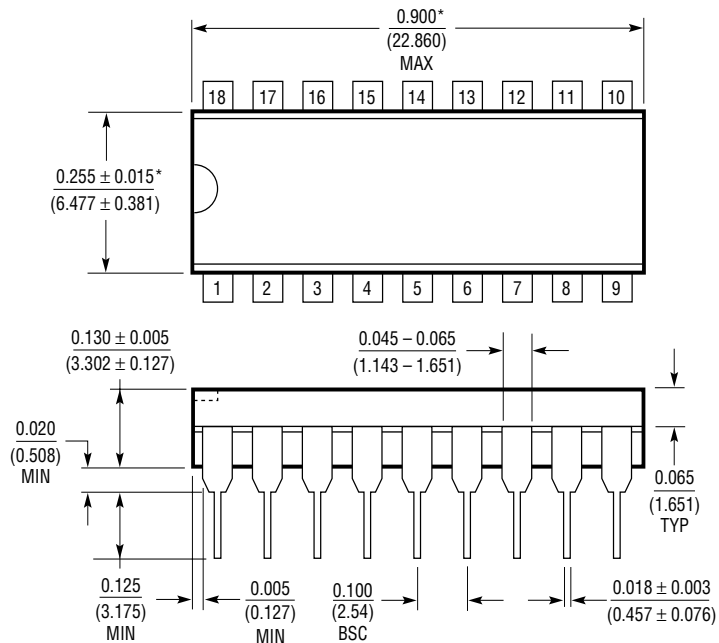
N Package 16-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.010 INCH (0.254mm)

N16 1098

N Package 18-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



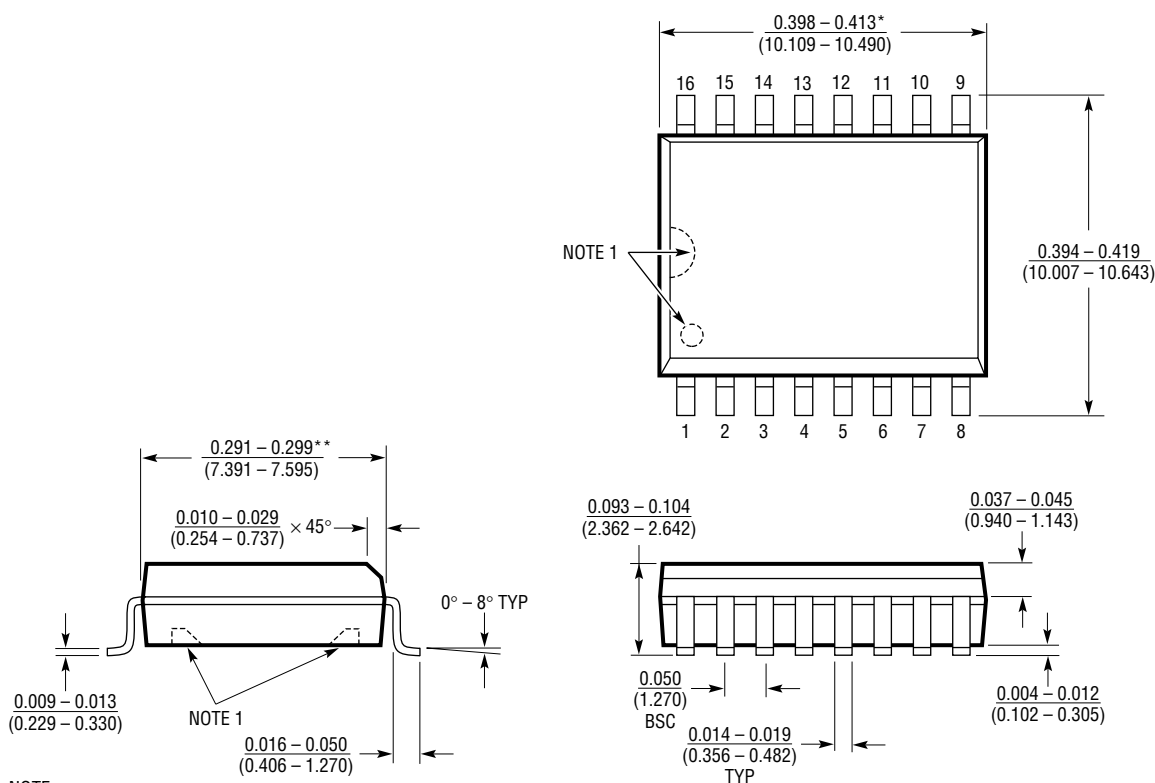
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.010 INCH (0.254mm)

N18 1098

11801afb

PACKAGE DESCRIPTION

SW Package
16-Lead Plastic Small Outline (Wide .300 Inch)
 (Reference LTC DWG # 05-08-1620)



NOTE:

- PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS. THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS

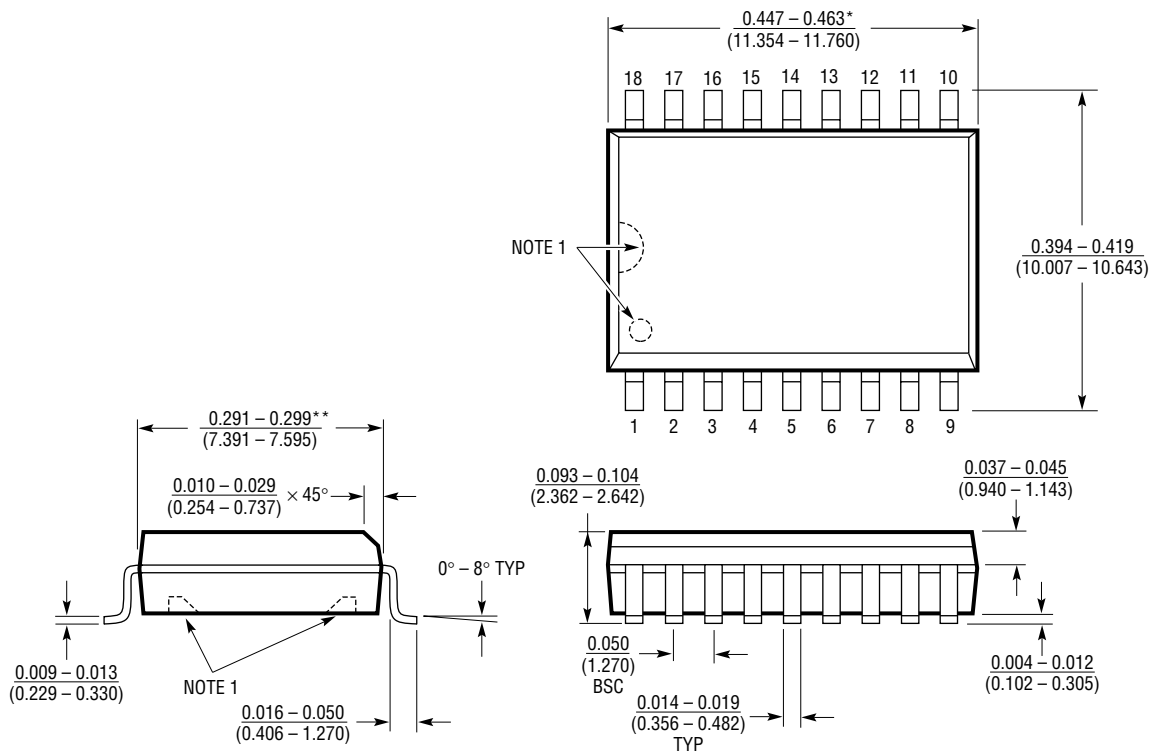
*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

S16 (WIDE) 1098

PACKAGE DESCRIPTION

SW Package
18-Lead Plastic Small Outline (Wide .300 Inch)
 (Reference LTC DWG # 05-08-1620)



NOTE:

1. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS. THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS

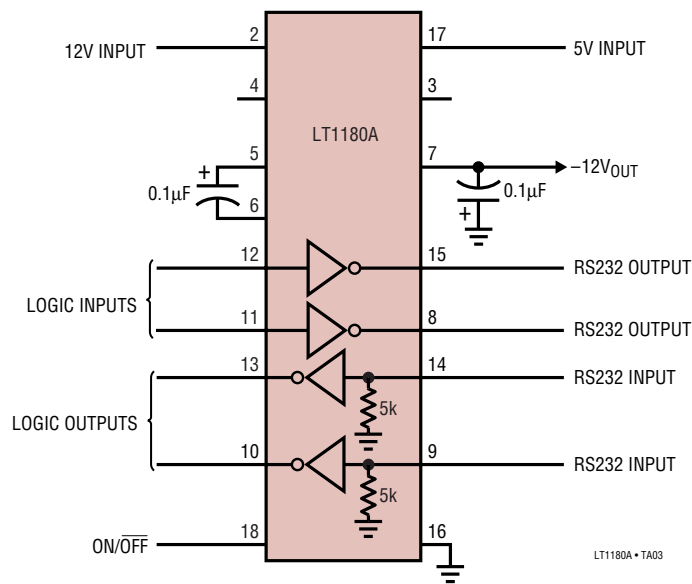
*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

S18 (WIDE) 1098

TYPICAL APPLICATION

Operation Using 5V and 12V Power Supplies



RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LT1280A/LT1281A	5V 2-Driver/2-Receiver RS232 Transceivers	Pin Compatible with LT1180A/LT1181A, I _{CC} = 10mA Max
LT1381	5V 2-Driver/2-Receiver RS232 Transceiver	Narrow 16-Pin SO Package
LT1780/LT1781	5V 2-Driver/2-Receiver RS232 Transceivers	IEC 1000-4-2 Level 4 Compliance

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9