

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) OBsolete 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) OBsolete 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

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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. $C^+ = C^- = C_1 = C_2 = 0.1\mu\text{F}$. All outputs are open, with all driver inputs tied high.

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

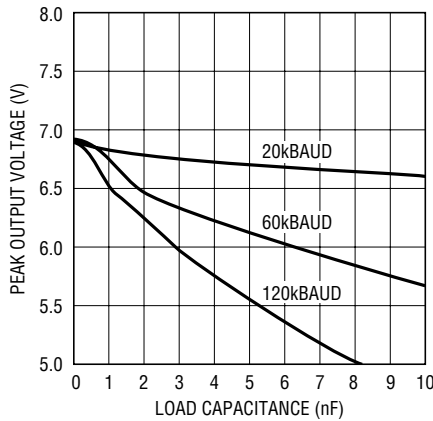
Note 5: For driver delay measurements, $R_L = 3\text{k}$ and $C_L = 51\text{pF}$. Trigger points are set between the driver's input logic threshold and the output transition to the zero crossing ($t_{\text{HL}} = 1.4\text{V}$ to 0V and $t_{\text{LH}} = 1.4\text{V}$ to 0V).

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).

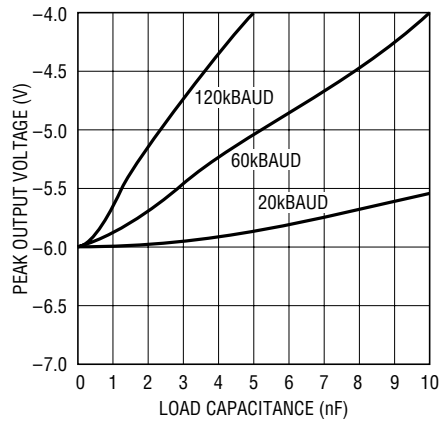
Note 7: Data rate operation guaranteed by slew rate, short-circuit current and propagation delay tests.

TYPICAL PERFORMANCE CHARACTERISTICS

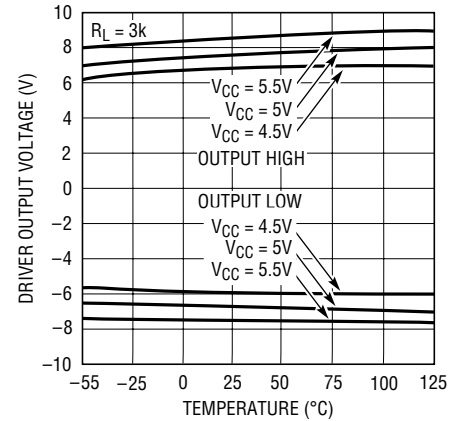
Driver Maximum Output Voltage vs Load Capacitance



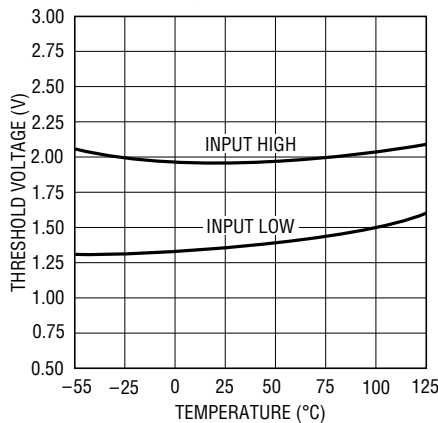
Driver Minimum Output Voltage vs Load Capacitance



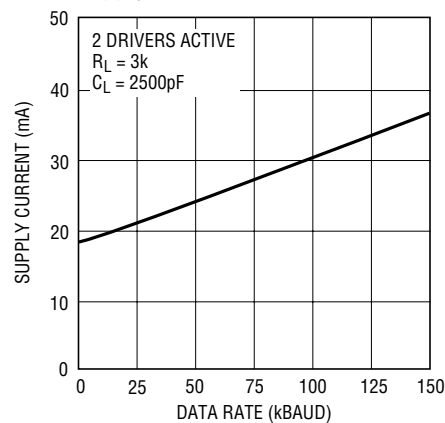
Driver Output Voltage



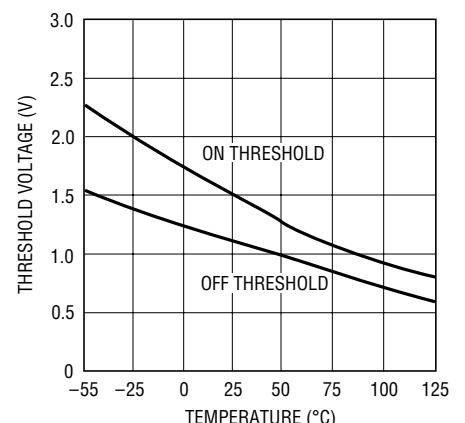
Receiver Input Thresholds



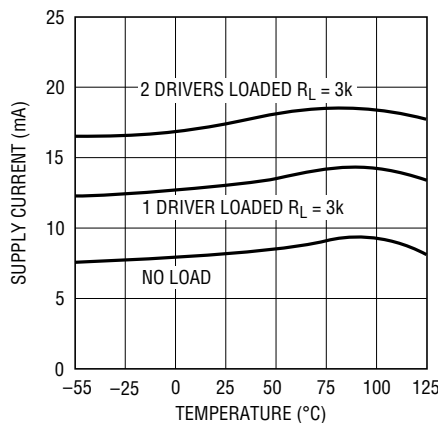
Supply Current vs Data Rate



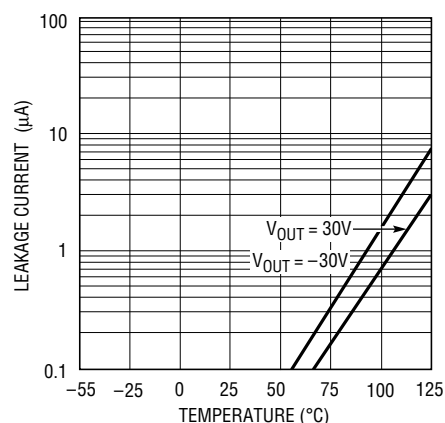
ON/OFF Thresholds



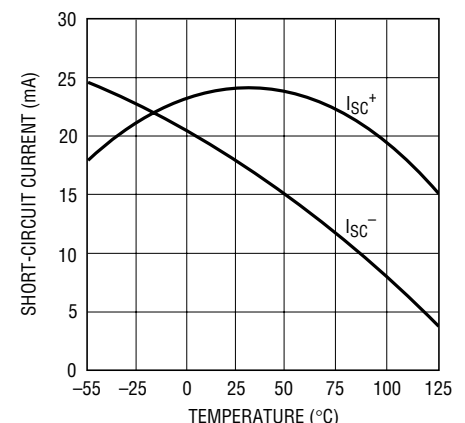
Supply Current



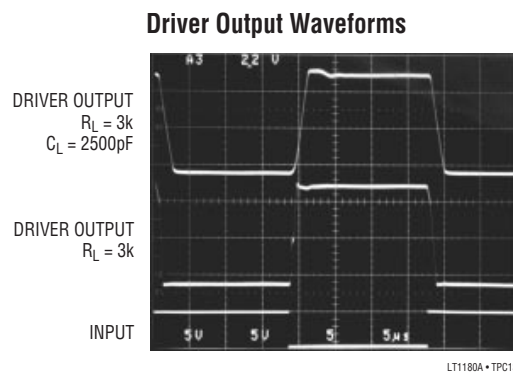
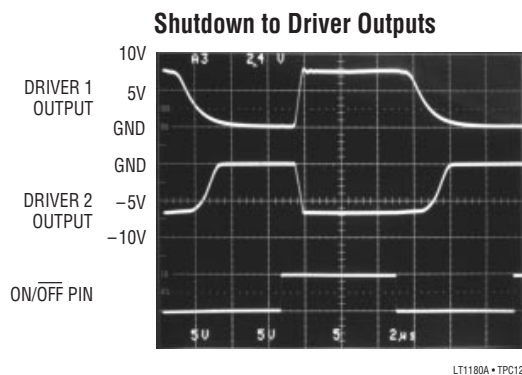
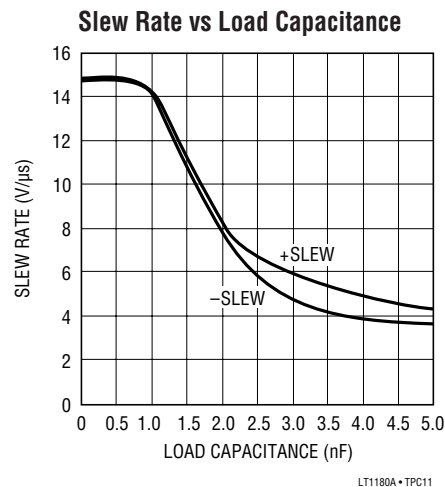
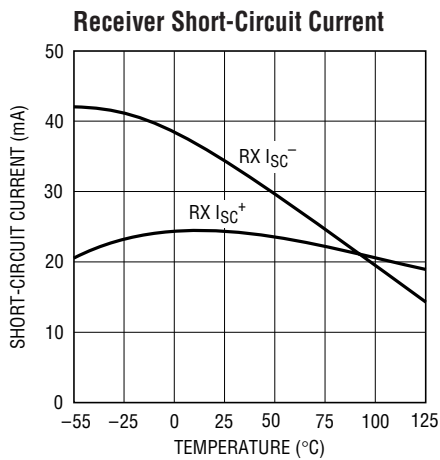
Driver Leakage in Shutdown



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.

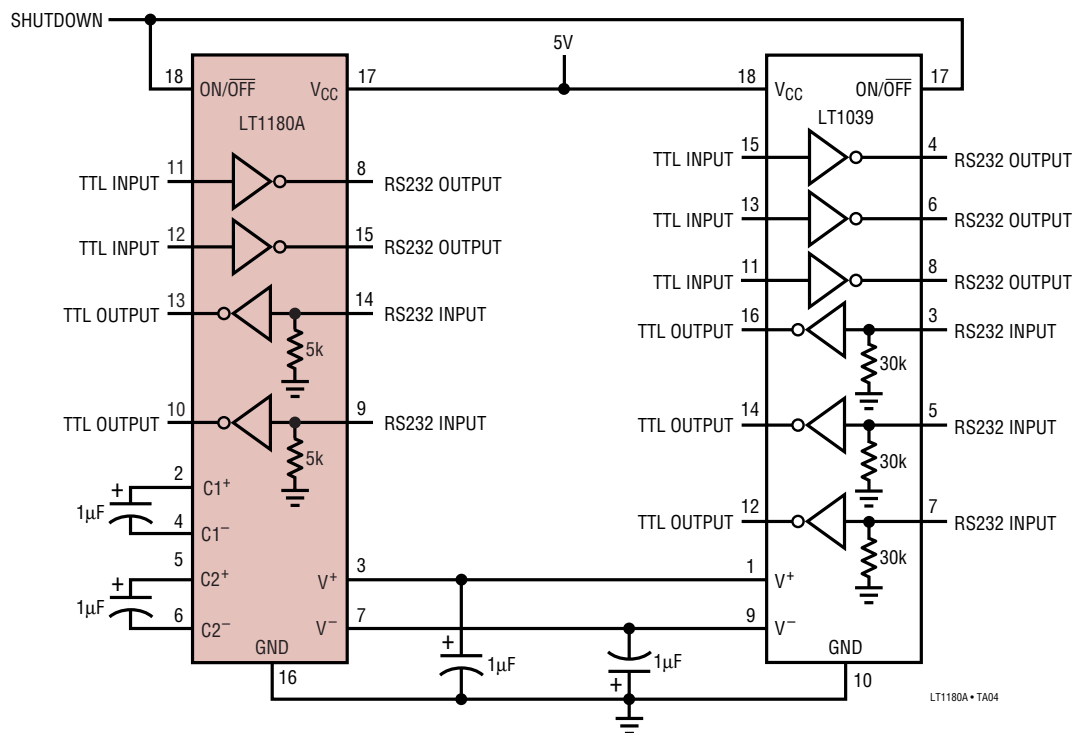
ON/OFF: A TTL/CMOS Compatible Operating Mode Control. A logic low puts the LT1180A in shutdown mode. Supply current drops to zero and both driver and receiver outputs assume a high impedance state. A logic high fully enables the device.

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

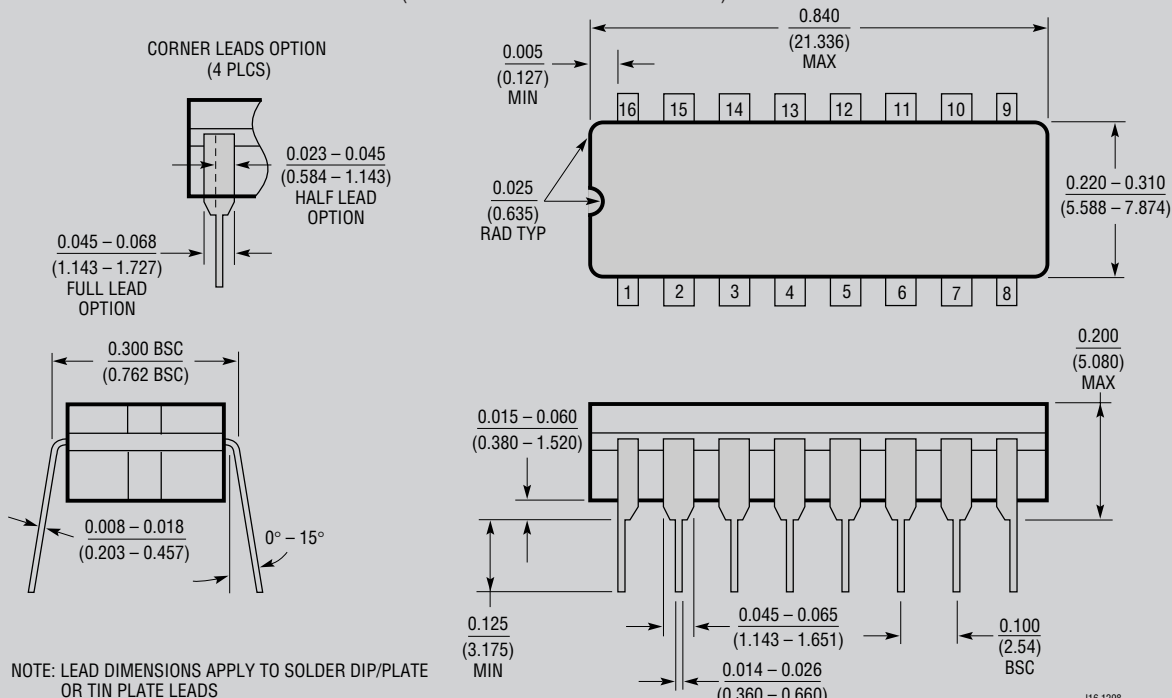
Supporting an LT1039 (Triple Driver/Receiver)



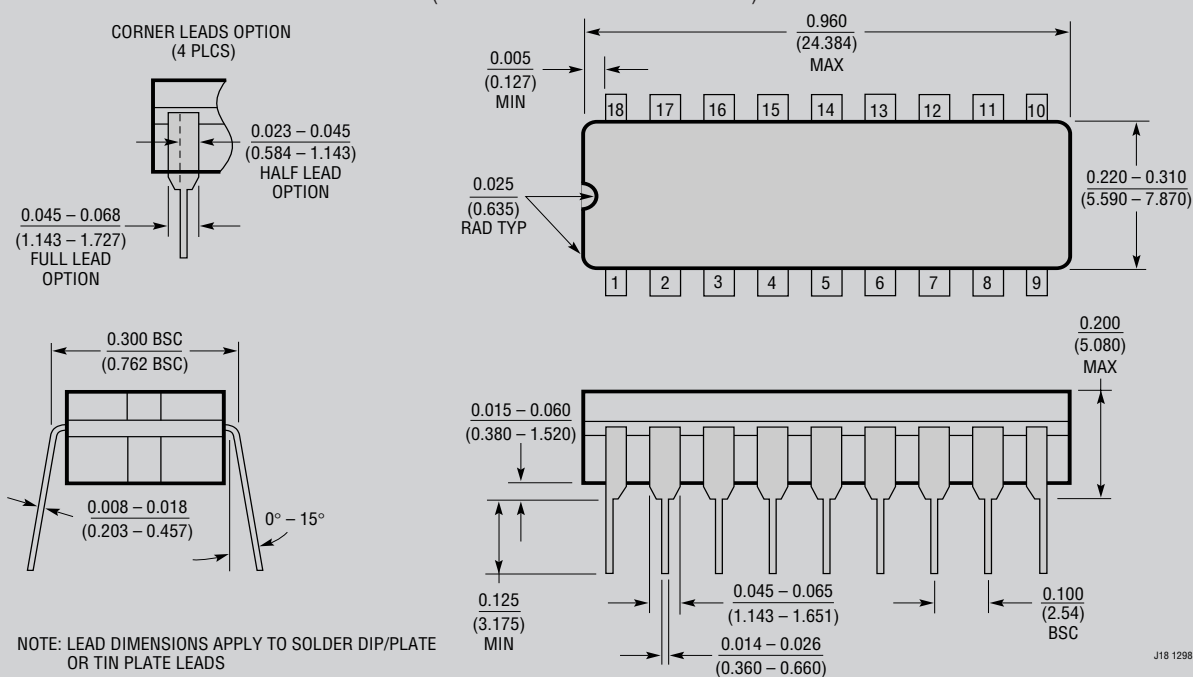
LT1180A • TA04

PACKAGE DESCRIPTION

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



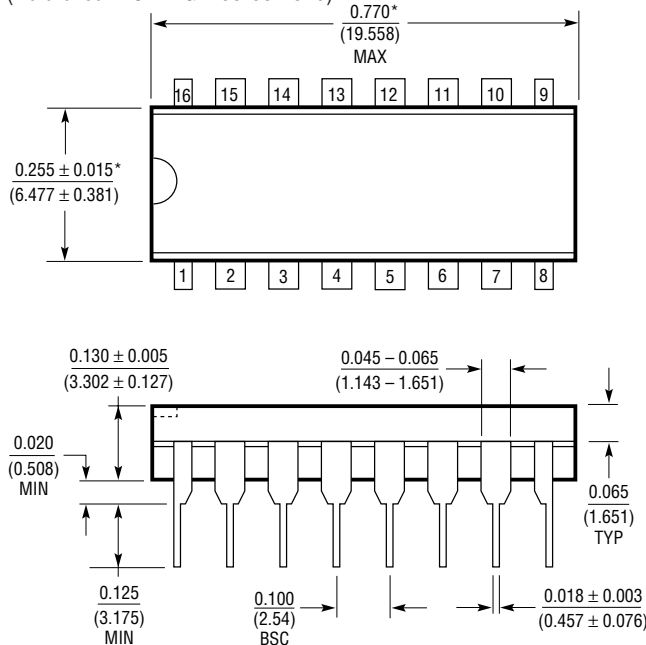
J Package 18-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)



OBSOLETE PACKAGES

PACKAGE DESCRIPTION

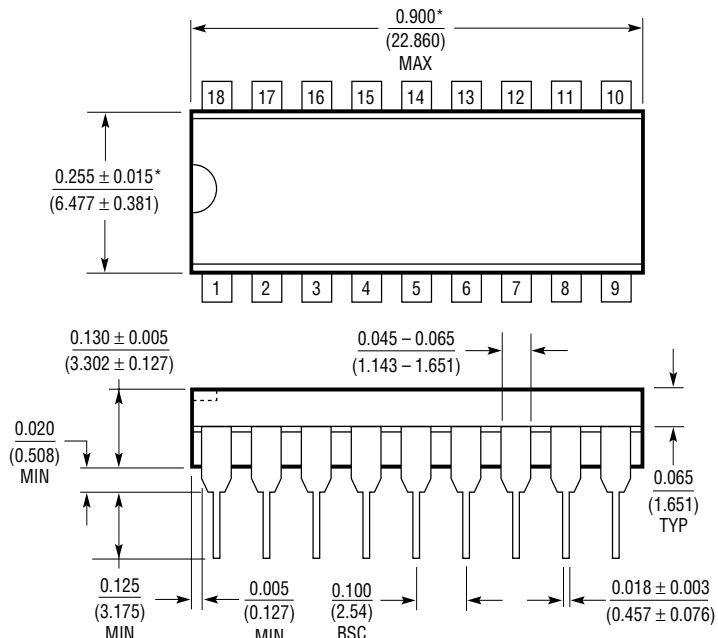
N Package 16-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



*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)



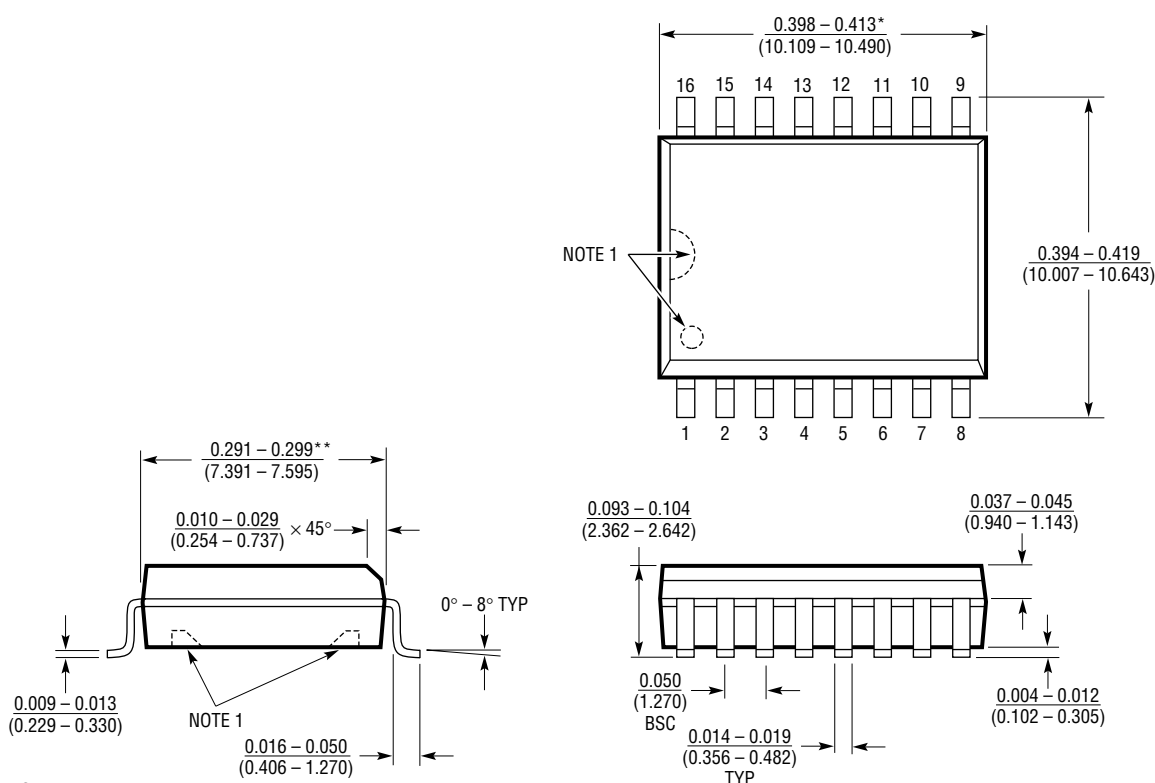
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.010 INCH (0.254mm)

N18 1098

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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

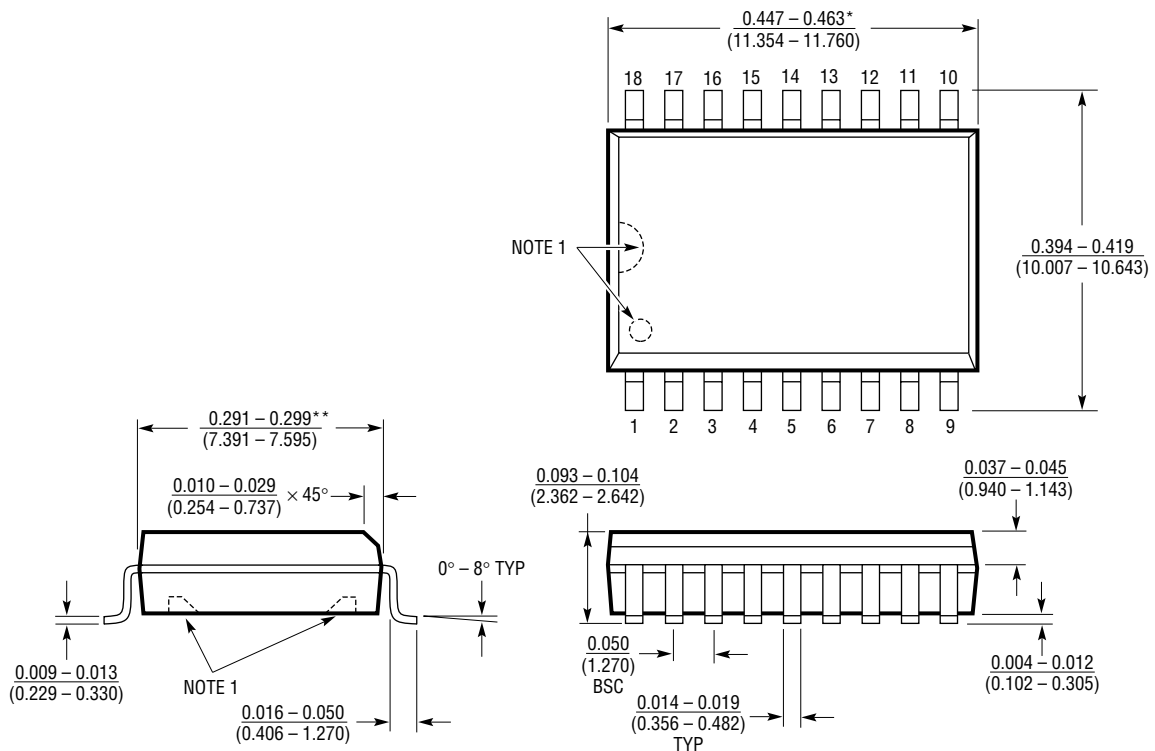
*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**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

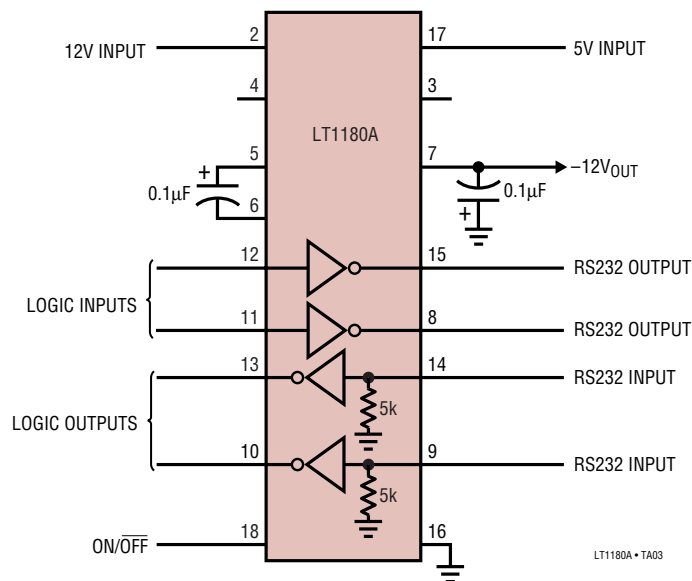
**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

S18 (WIDE) 1098

LT1180A/LT1181A

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