

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{CC})	6V
Input Voltage	
Driver	$-0.3V$ to $V_{CC} + 0.3V$
Receiver	$-25V$ to $25V$
On/Off Pin	$-0.3V$ 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	
Commercial (LTC1349C)	$0^{\circ}C$ to $70^{\circ}C$
Industrial (LTC1349I)	$-40^{\circ}C$ to $85^{\circ}C$
Storage Temperature Range	$-65^{\circ}C$ to $150^{\circ}C$
Lead Temperature (Soldering, 10 sec)	$300^{\circ}C$

PACKAGE/ORDER INFORMATION

TOP VIEW		ORDER PART NUMBER
V ⁺	1	28 V ⁻
V _{CC}	2	27 C2 ⁺
C1 ⁺	3	26 C2 ⁻
C1 ⁻	4	25 DR1 IN
DR1 OUT	5	24 RX1 OUT
RX1 IN	6	23 DR2 IN
DR2 OUT	7	22 RX2 OUT
RX2 IN	8	21 RX3 OUT
RX3 IN	9	20 RX4 OUT
RX4 IN	10	19 DR3 IN
DR3 OUT	11	18 RX5 OUT
RX5 IN	12	17 GND
ON/ $\overline{\text{OFF}}$	13	16 NC
NC	14	15 NC
G PACKAGE 28-LEAD SSOP		NW PACKAGE 28-LEAD PDIP
SW PACKAGE 28-LEAD PLASTIC SO		
$T_{J\text{MAX}} = 125^{\circ}\text{C}$, $\theta_{JA} = 96^{\circ}\text{C/W}$ (G)		
$T_{J\text{MAX}} = 125^{\circ}\text{C}$, $\theta_{JA} = 56^{\circ}\text{C/W}$ (NW)		
$T_{J\text{MAX}} = 125^{\circ}\text{C}$, $\theta_{JA} = 85^{\circ}\text{C/W}$ (SW)		
		LTC1349CG LTC1349CNW LTC1349CSW LTC1349IG LTC1349INW LTC1349ISW

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. $V_{CC} = 5V$, $C1 = C2 = C3 = C4 = 0.1\mu F$, unless noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Any Driver					
Output Voltage Swing	3k to GND	● 5.0 ● -5.0	7.0 -6.5		V V
Logic Input Voltage Level	Input Low Level ($V_{OUT} = \text{High}$) Input High Level ($V_{OUT} = \text{Low}$)	● 2.0 ●	1.4 1.4	0.8	V V
Logic Input Current	$V_{IN} = 5V$ $V_{IN} = 0V$	● ●		5 -5	μA μA
Output Short-Circuit Current	$V_{OUT} = 0V$	±9	±12		mA
Output Leakage Current	Shutdown, $V_{OUT} = \pm 20V$ (Note 3)	●	±10	±500	μA
Any Receiver					
Input Voltage Thresholds	Input Low Threshold Input High Threshold	● ●	0.8 1.3 1.7	2.4	V V
Hysteresis		●	0.1	0.4	1.0
Input Resistance	$-10V \leq V_{IN} \leq 10V$		3	5	7
Output Voltage	Output Low, $I_{OUT} = -1.6mA$ ($V_{CC} = 5V$) Output High, $I_{OUT} = 160\mu A$ ($V_{CC} = 5V$)	● ●	3.5	0.2 4.8	0.4
Output Short-Circuit Current	Sinking Current, $V_{OUT} = V_{CC}$		-15	-40	mA
Output Leakage Current	Shutdown, $0 \leq V_{OUT} \leq V_{CC}$ (Note 3)	●		1	10
Power Supply Generator					
V^+ Output Voltage	$I_{OUT} = 0mA$ $I_{OUT} = 12mA$		8.0 7.5		V V
V^- Output Voltage	$I_{OUT} = 0mA$ $I_{OUT} = -12mA$		-8.0 -7.0		V V
Supply Rise Time	Shutdown to Turn-On		0.2		ms

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DC ELECTRICAL CHARACTERISTICS

The ● denotes specifications which apply over the full operating temperature range. $V_{CC} = 5V$, $C1 = C2 = C3 = C4 = 0.1\mu F$, unless noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply					
V_{CC} Supply Current	No Load (All Drivers $V_{IN} = V_{CC}$)(Note 2), $0^{\circ}C \leq T_A \leq 70^{\circ}C$	●	0.3	0.8	mA
	No Load (All Drivers $V_{IN} = 0V$)(Note 2), $0^{\circ}C \leq T_A \leq 70^{\circ}C$	●	0.5	1.0	mA
	No Load (All Drivers $V_{IN} = V_{CC}$)(Note 2), $0^{\circ}C \leq T_A \leq 85^{\circ}C$	●	0.3	1.0	mA
	No Load (All Drivers $V_{IN} = V_{CC}$)(Note 2), $-40^{\circ}C \leq T_A \leq 0^{\circ}C$	●	0.3	1.5	mA
	No Load (All Drivers $V_{IN} = 0V$)(Note 2), $-40^{\circ}C \leq T_A \leq 85^{\circ}C$	●	0.5	1.5	mA
Supply Leakage Current (V_{CC})	Shutdown (Note 3)	●	35	50	μA
On/Off Threshold Low		●	1.4	0.8	V
On/Off Threshold High		●	2.0	1.4	V

AC CHARACTERISTICS

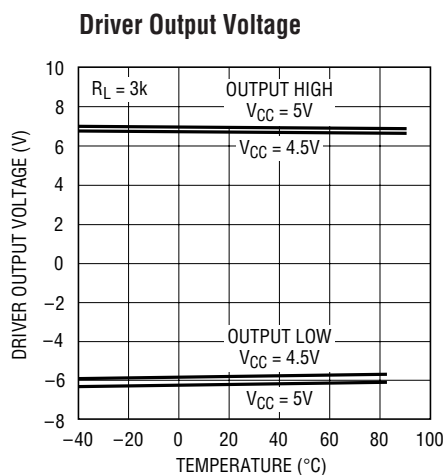
The ● denotes specifications which apply over the full operating temperature range. $V_{CC} = 5V$, $C1 = C2 = C3 = C4 = 0.1\mu F$, unless noted.

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 (TTL to RS232)	t_{HLD} (Figure 1)	●	2	3.5	μs
	t_{LHD} (Figure 1)	●	2	3.5	μs
Receiver Propagation Delay (RS232 to TTL)	t_{HLR} (Figure 2)	●	0.3	0.8	μs
	t_{LHR} (Figure 2)	●	0.2	0.8	μs

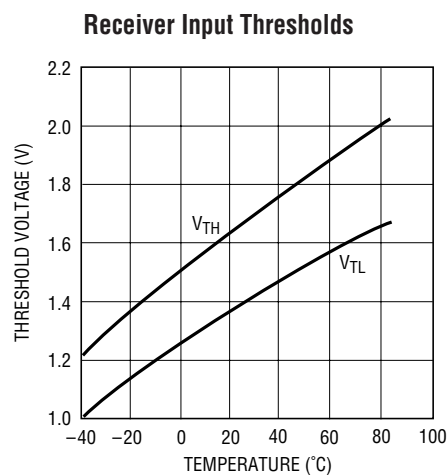
Note 1: Absolute Maximum Ratings are those values beyond which the life of the device may be impaired.

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

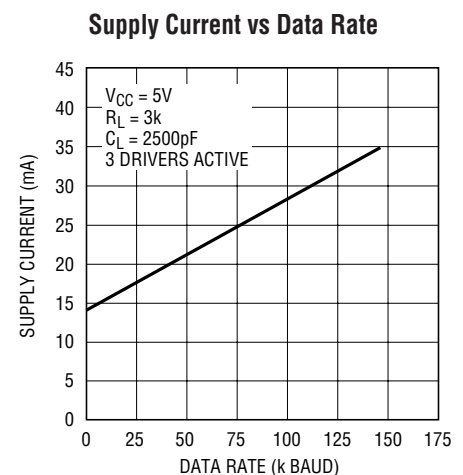
Note 3: Supply current and leakage current measurements in Shutdown are performed with $V_{ON/OFF} = 0V$.

TYPICAL PERFORMANCE CHARACTERISTICS

LTC1349 • TPC01

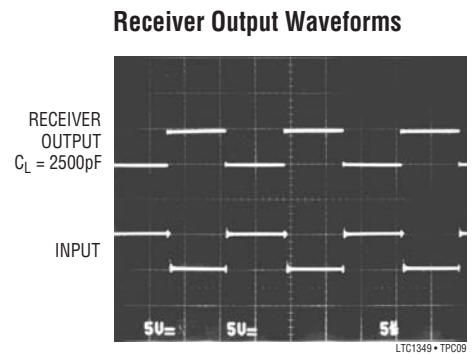
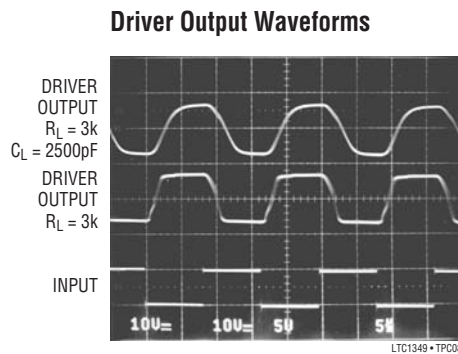
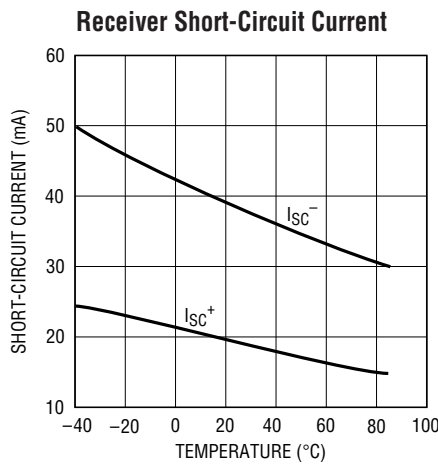
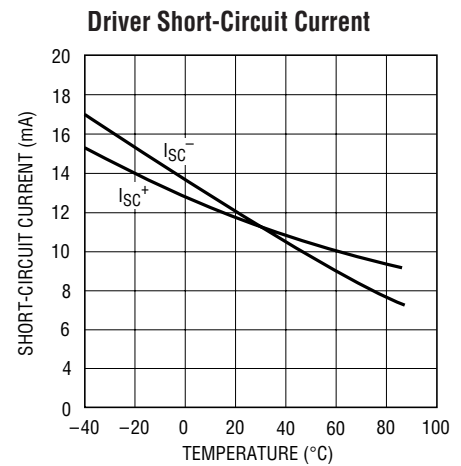
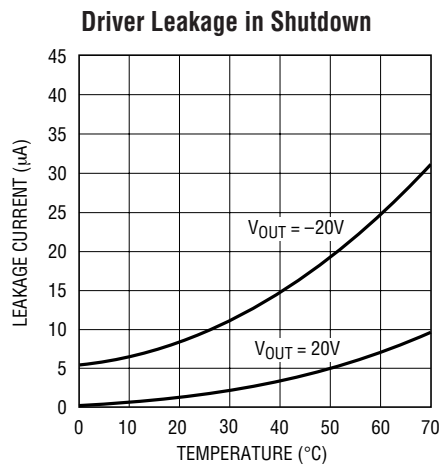
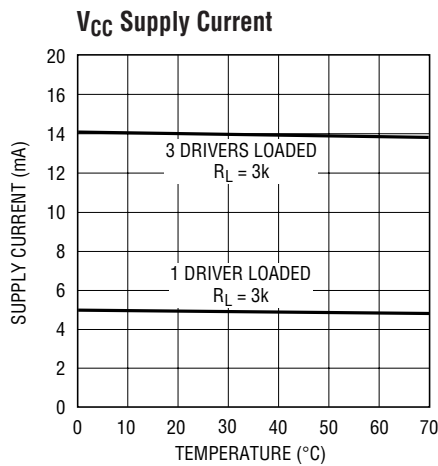


LTC1349 • TPC02



LTC1349 • TPC03

TYPICAL PERFORMANCE CHARACTERISTICS



PIN FUNCTIONS

V_{CC}: 5V Input Supply Pin. Supply current is typically 35µA in the Shutdown mode. This pin should be decoupled with a 0.1µF ceramic capacitor.

GND: Ground Pin.

ON/OFF: TTL/CMOS Compatible Shutdown Pin. A logic low puts the device in Shutdown mode, with receivers 4 and 5 kept alive and the supply current equal to 35µA. All driver outputs and other receiver outputs are in high impedance state. This pin can not float.

V⁺: Positive Supply Output (RS232 Drivers). $V^+ \approx 2V_{CC} - 1V$. This pin requires an external capacitor $C = 0.1\mu F$ for charge storage. The capacitor may be tied to ground or 5V.

With multiple devices, the V^+ and V^- pins may be paralleled into common capacitors. 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). $V^- \approx 2V_{CC} - 1.5V$. This pin requires an external capacitor $C = 0.1\mu F$ for charge storage.

C1⁺, C1⁻, C2⁺, C2⁻: Commutating Capacitor Inputs. These pins require two external capacitors $C = 0.1\mu F$: 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 20Ω.

PIN FUNCTIONS

DRIVER IN: RS232 Driver Input Pins. Inputs are TTL/CMOS compatible. Inputs should not be allowed to float. Tie unused inputs to V_{CC} .

DRIVER OUT: Driver Outputs at RS232 Voltage Levels. Outputs are in a high impedance state when in Shutdown mode or $V_{CC} = 0V$. The driver outputs are protected against ESD to $\pm 10kV$ for human body model discharges.

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

RX OUT: Receiver Outputs with TTL/CMOS Voltage Levels. Receiver 1, 2 and 3 outputs are in a high impedance state when in Shutdown mode to allow data line sharing. Receivers 4 and 5 are kept alive in Shutdown.

SWITCHING TIME WAVEFORMS

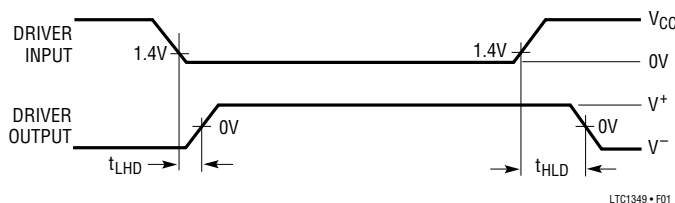


Figure 1. Driver Propagation Delay Timing

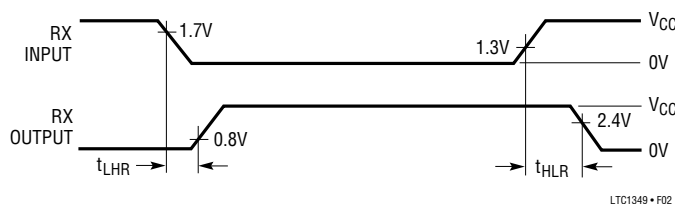
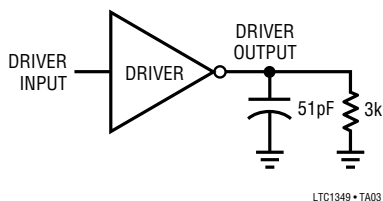


Figure 2. Receiver Propagation Delay Timing

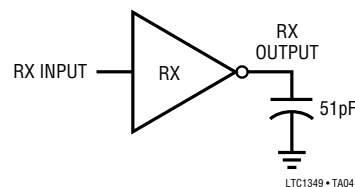
TEST CIRCUITS

Driver Timing Test Load



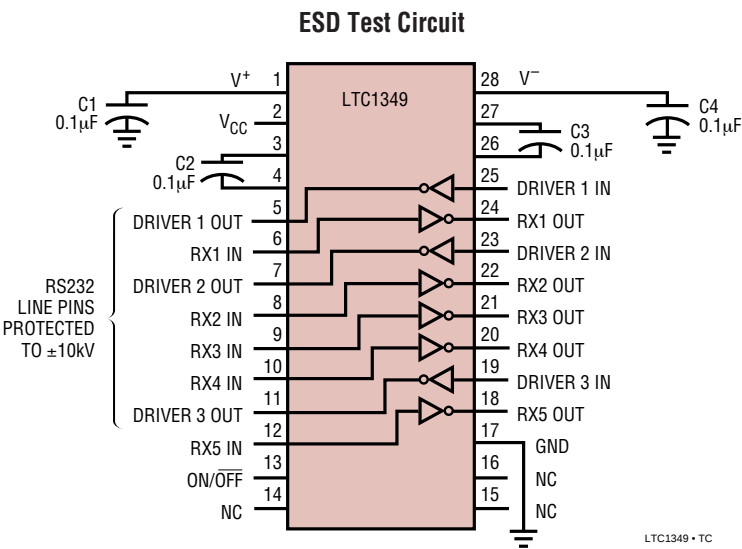
LTC1349 • TA03

Receiver Timing Test Load



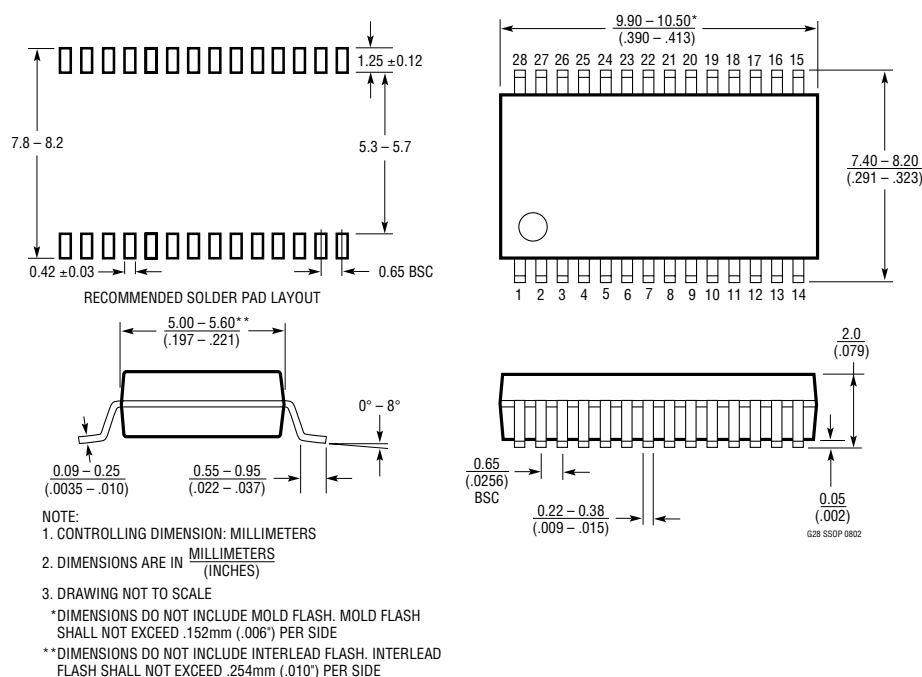
LTC1349 • TA04

TEST CIRCUITS

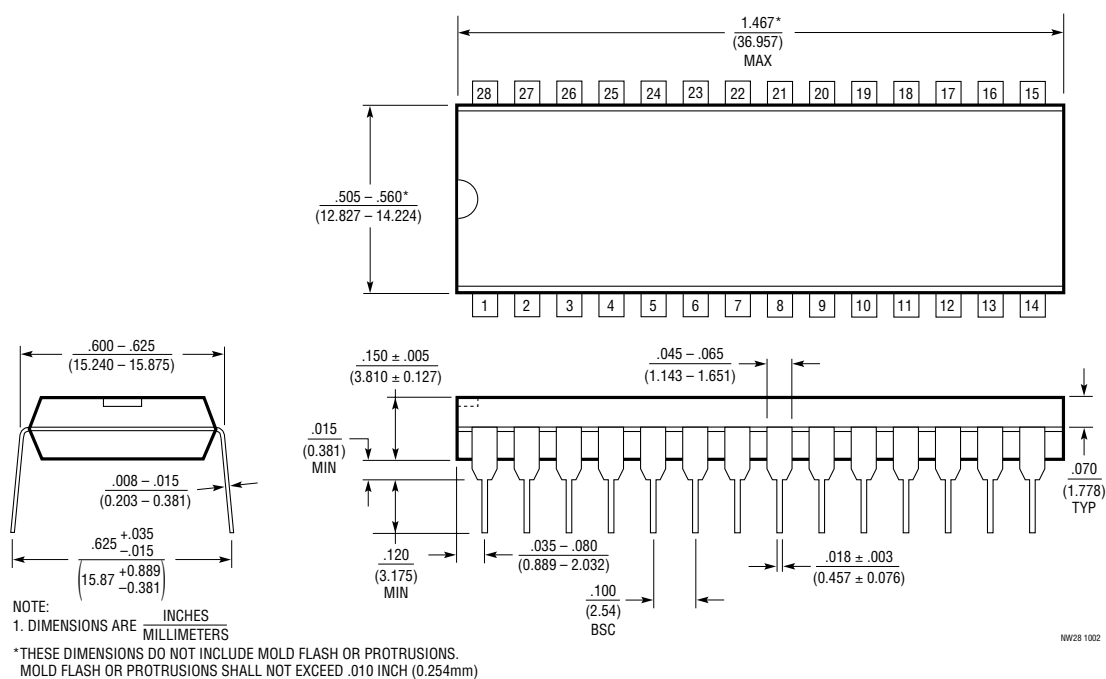


PACKAGE DESCRIPTION

G Package 28-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)



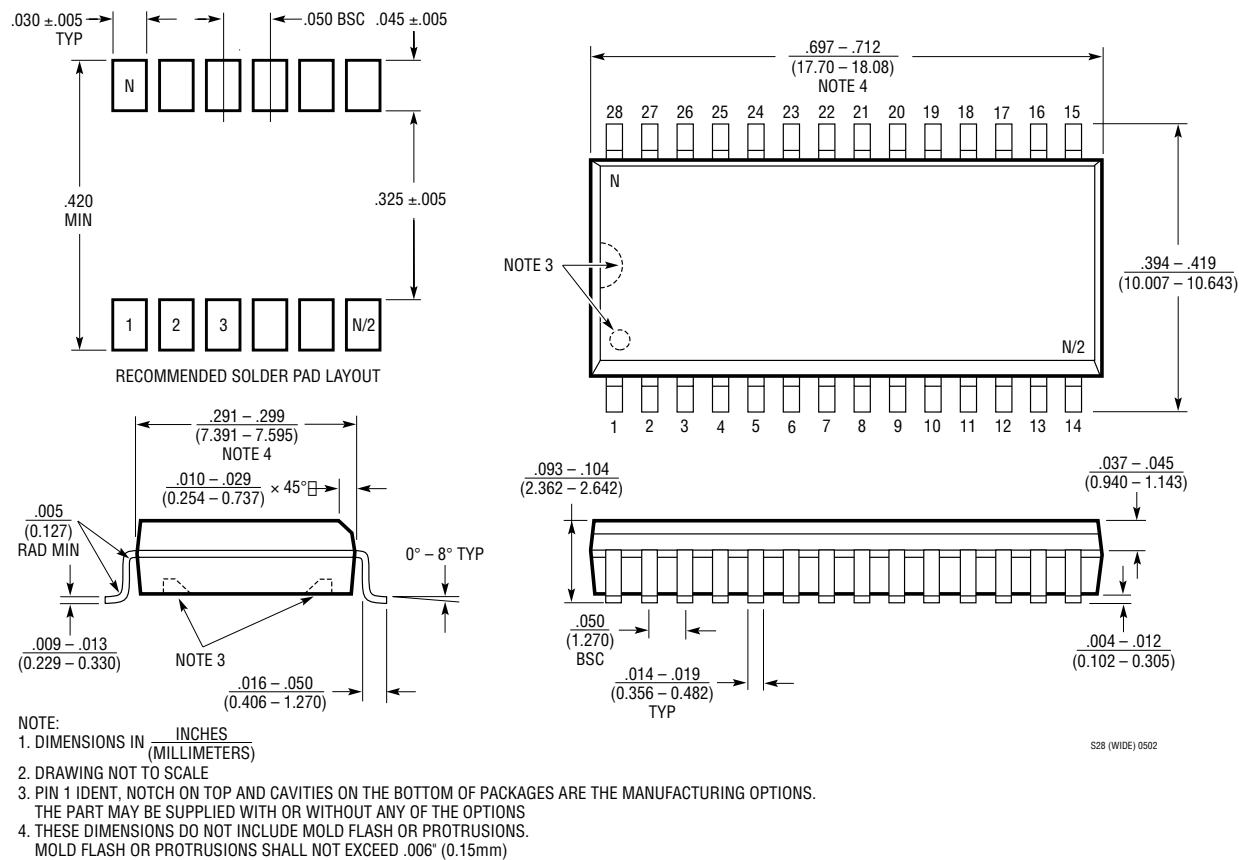
NW Package 28-Lead PDIP (Wide .600 Inch) (Reference LTC DWG # 05-08-1520)



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PACKAGE DESCRIPTION

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



RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LT [®] 1137A	5V, 3 Driver, 5 Receiver RS232 Transceiver	± 15 kV ESD per IEC 1000-4
LTC1327	3.3V, 3 Driver, 5 Receiver RS562 Transceiver	300 μ A Supply Current, 0.2 μ A in Shutdown
LTC1337	5V, 3 Driver, 5 Receiver RS232 Transceiver	300 μ A Supply Current, 1 μ A in Shutdown
LTC1348	3.3V to 5V, 3 Driver, 5 Receiver RS232 Transceiver	True RS232 on 3.3V, 5 Receivers Active in Shutdown