



- Low Supply Current **300 μ A**
- 0.2 μ A Supply Current in SHUTDOWN
- ESD Protection ± 10 kV
- Operates From a Single 3.3V Supply
- Uses Small Capacitors 0.1 μ F
- Operates To 120k Baud
- Three-State Outputs are High Impedance When Off
- Output Overvoltage Does Not Force Current Back Into Supplies
- EIA/TIA-562 I/O Lines Can Be Forced to ± 25 V Without Damage
- Flowthrough Architecture

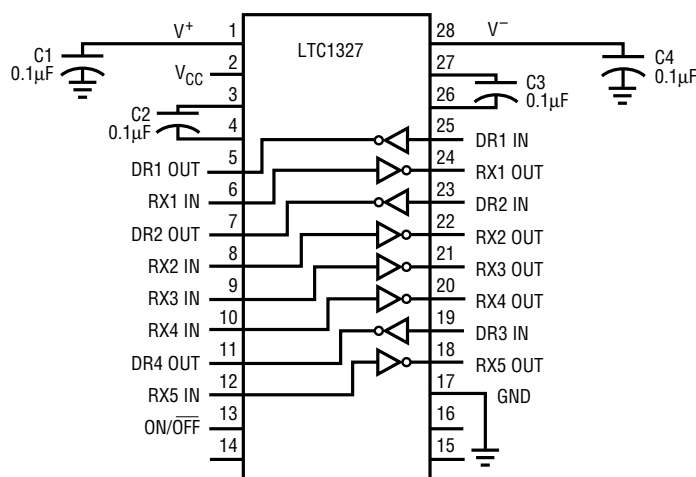
The LTC1327 is an advanced low power, three-driver/five-receiver EIA/TIA-562 transceiver. In the no load condition, the supply current is only **300µA**. The charge pump only requires four 0.1µF capacitors.

In SHUTDOWN mode, the supply current is further reduced to 0.2µA. All EIA/TIA-562 outputs assume a high impedance state in SHUTDOWN and with the power off.

The LTC1327 is fully compliant with all data rate and overvoltage EIA/TIA-562 specifications. The transceiver can operate up to 120k Baud with a 1000pF//3k Ω load. Both driver outputs and receiver inputs can be forced to $\pm 25V$ without damage, and can survive multiple $\pm 10kV$ ESD strikes.

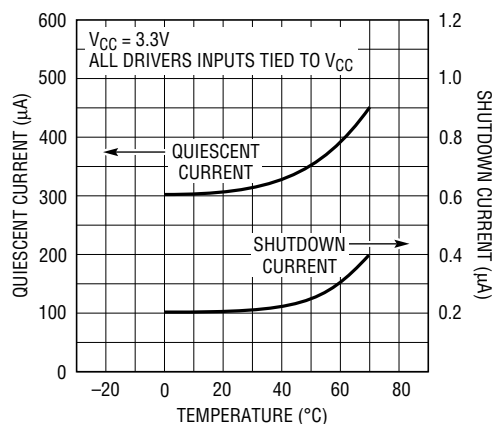
- Notebook Computers
- Palmtop Computers

3-Drivers/5-Receivers with SHUTDOWN



1327 TA01

Supply Current vs Temperature

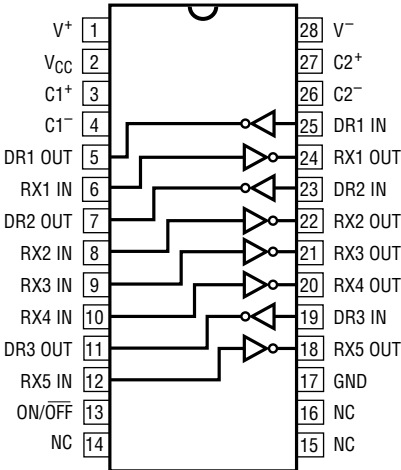


LTC1327 • TA02

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{CC})	5V
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 LTC1327C	$0^{\circ}C$ to $70^{\circ}C$
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
		
G PACKAGE 28-LEAD SSOP	N PACKAGE 28-LEAD PLASTIC DIP	LTC1327CG LTC1327CN LTC1327CS
S PACKAGE 28-LEAD PLASTIC SOL		
$T_{JMAX} = 125^{\circ}C, \theta_{JA} = 96^{\circ}C/W$ (G) $T_{JMAX} = 125^{\circ}C, \theta_{JA} = 56^{\circ}C/W$ (N) $T_{JMAX} = 125^{\circ}C, \theta_{JA} = 85^{\circ}C/W$ (S)		

Consult factory for Industrial and Military grade parts.

DC ELECTRICAL CHARACTERISTICS $V_{CC} = 3.3V$, C1 to C4 = 0.1 μF , unless otherwise noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Any Driver					
Output Voltage Swing	Positive Negative (3k to GND)	● ●	3.7 -3.7	4.5 -4.5	V V
Logic Input Voltage Level	Input Low Level ($V_{OUT} = \text{High}$) Input High Level ($V_{OUT} = \text{Low}$)	● ●	1.4 2	0.8 1.4	V V
Logic Input Current	$V_{IN} = 3.3$ $V_{IN} = 0$	● ●		5 -5	μA μA
Output Short-Circuit Current	$V_{OUT} = 0V$		± 7		mA
Output Leakage Current	SHUTDOWN (Note 3), $V_{OUT} = \pm 20V$		± 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
Input Resistance	$V_{IN} = \pm 10V$		3	5	7
Output Voltage	Output Low, $I_{OUT} = -1.6mA$ ($V_{CC} = 3.3V$) Output High, $I_{OUT} = 160\mu A$ ($V_{CC} = 3.3V$)	● ●	0.2 3	0.4 3.2	V V
Output Short-Circuit Current	Sinking Current, $V_{OUT} = V_{CC}$		-2	-10	mA
Output Leakage Current	SHUTDOWN (Note 3), $0 \leq V_{OUT} \leq V_{CC}$	●	1	10	μA

DC ELECTRICAL CHARACTERISTICS $V_{CC} = 3.3V$, C_1 to $C_4 = 0.1\mu F$, unless otherwise noted.

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Power Supply Generator						
V^+ Output Voltage	$I_{OUT} = 0mA$			5.7		V
	$I_{OUT} = 5mA$			5.5		V
V^- Output Voltage	$I_{OUT} = 0mA$			-5.3		V
	$I_{OUT} = -5mA$			-5.0		V
Supply Rise Time	SHUTDOWN to Turn-On			0.2		ms
Power Supply						
V_{CC} Supply Current	No Load (Note 2)	●		0.3	0.5	mA
Supply Leakage Current (V_{CC})	SHUTDOWN (Note 3)	●		0.2	10	μA
On/Off Threshold Low		●		1.4	0.8	V
On/Off Threshold High		●	2	1.4		V

AC CHARACTERISTICS

Slew Rate	$R_L = 3k$, $C_L = 51pF$			6	30	V/ μs
	$R_L = 3k$, $C_L = 1000pF$		3	5		V/ μs
Driver Propagation Delay (TTL to EIA/TIA-562)	t_{HLD}	●		2	3.5	μs
	t_{LHD}	●		2	3.5	μs
Receiver Propagation Delay (EIA/TIA-562 to TTL)	t_{HLR}	●		0.3	0.8	μs
	t_{LHR}	●		0.2	0.8	μs

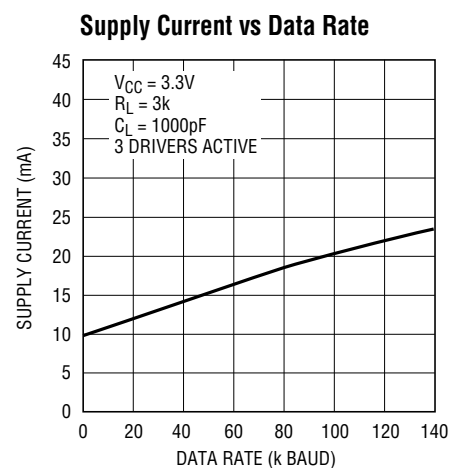
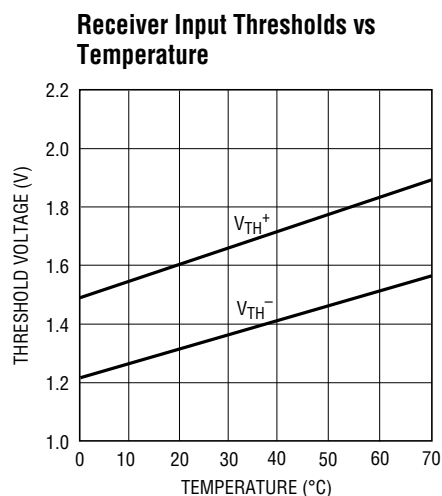
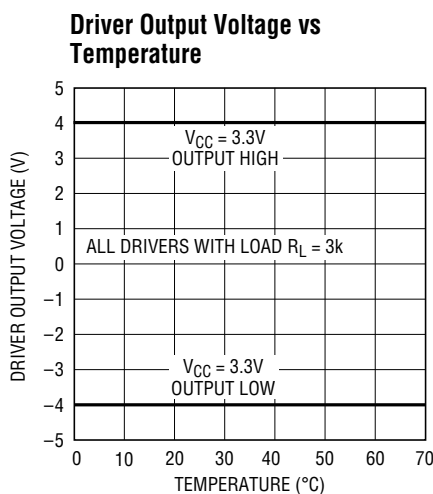
The ● denotes specifications which apply over the operating temperature ($0^\circ C \leq T_A \leq 70^\circ C$).

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 output unloaded and driver inputs tied high.

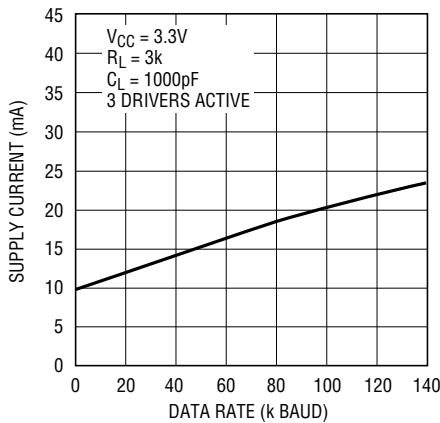
Note 3: Supply current measurement in SHUTDOWN mode is performed with $V_{ON/OFF} = 0V$.

TYPICAL PERFORMANCE CHARACTERISTICS

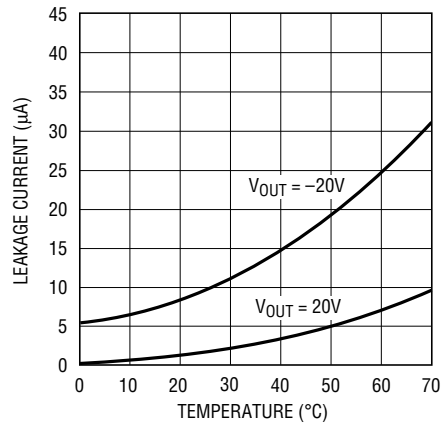


TYPICAL PERFORMANCE CHARACTERISTICS

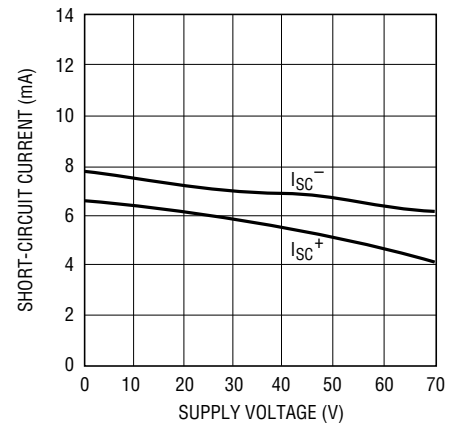
V_{CC} Supply Current vs Data Rate



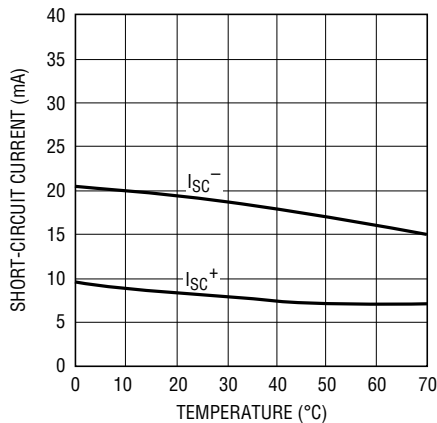
Driver Leakage in SHUTDOWN vs Temperature



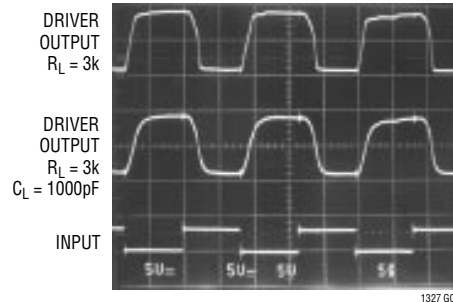
Driver Short-Circuit Current vs Supply Voltage



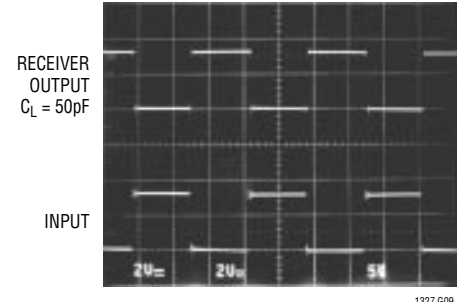
Receiver Short-Circuit Current vs Temperature



Driver Output Waveform



Receiver Output Waveform



PIN FUNCTIONS

V_{CC}: 3.3V Input Supply Pin. Supply current 0.2μA 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 which reduces the supply current to 0.2μA and places all drivers and receivers in high impedance state. This pin cannot float.

V⁺: Positive Supply Output (EIA/TIA-562 Drivers). $V^+ \cong 2V_{CC} - 1V$. This pin requires an external capacitor

$C = 0.1\mu F$ for charge storage. The capacitor may be tied to ground or 3.3V. 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 (EIA/TIA-562 Drivers). $V^- \cong -(2V_{CC} - 1.3)$. This pin requires an external capacitor $C = 0.1\mu F$ for a charge storage.

DR OUT: Driver Outputs at EIA/TIA-562 Voltage Levels. Outputs are in a high impedance state when in SHUT-

RX OUT: Receiver Outputs With TTL/CMOS Voltage Levels. Outputs are in a high impedance state when in SHUT-DOWN mode to allow data line sharing.

TEST CIRCUITS

Pin 1 to 14 connection diagram for the LTC1327. The diagram shows a 14-pin package with pins 1 through 14 on the left and pins 28 through 15 on the right. Pin 1 is V+, pin 28 is V-. Pins 2 and 3 are VCC, pins 27 and 26 are connected to a 0.1µF capacitor C3 to ground. Pins 4 and 5 are connected to a 0.1µF capacitor C4 to ground. Pins 6 through 14 are connected to pins 24 through 15 respectively. Pins 24 through 18 are labeled DR1 IN, RX1 OUT, DR2 IN, RX2 OUT, RX3 OUT, RX4 OUT, DR3 IN, and RX5 OUT. Pins 17 and 16 are GND, and pin 15 is connected to ground. A note on the left indicates that pins 6 through 14 are EIA/TIA 562 line pins protected to ±10kV.

DRIVER INPUT

DR

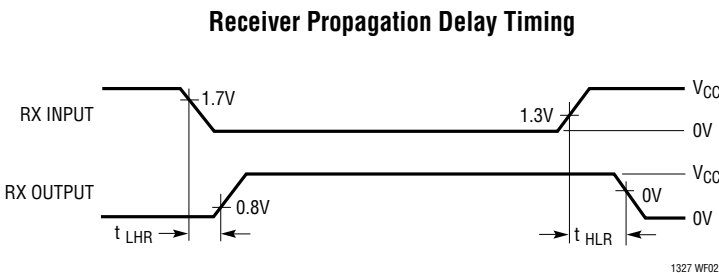
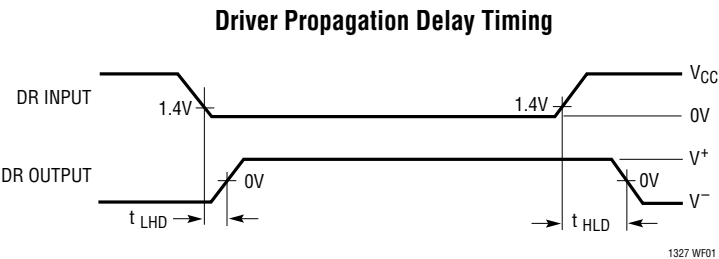
DRIVER OUTPUT

51pF

3k

1327 T02

SWITCHING TIME WAVEFORMS



APPLICATIONS INFORMATION

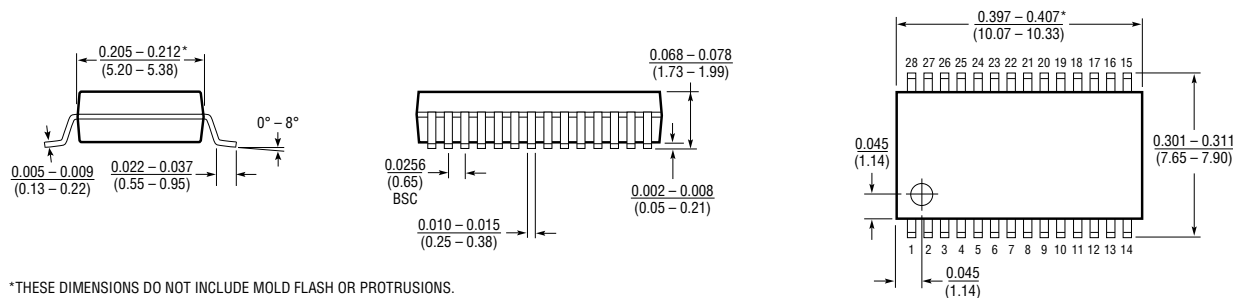
The LTC1327 is compatible with RS232 parts. This table shows some devices and the receiver input thresholds.

MANUFACTURER	PART NUMBER	COMPATIBLE	INPUT LOW THRESHOLD (V_{IL})			INPUT HIGH THRESHOLD (V_{IH})		
			MIN	TYP	MAX	MIN	TYP	MAX
Linear Technology	LT1080	√	0.8	1.3	–	–	1.7	2.4
	LT1137A	√	0.8	1.3	–	–	1.7	2.4
	LT1330	√	0.8	1.3	–	–	1.7	2.4
	LT1281	√	0.8	1.3	–	–	1.7	2.4
	All Others	√						
Texas Instruments	SN75189	√	0.65	1	1.25	0.9	1.3	1.6
	SN75189A	√	0.65	1	1.25	1.55	1.9	2.25
	MAX232	√	0.8	1.2	–	–	1.7	2.4
	SN75C185	√	0.65	1	1.25	1.6	2.1	2.55
Maxim	MAX232A	√	0.8	1.3	–	–	1.8	2.4
	MAX241	√	0.6	1.2	–	–	1.5	2.4
Sipex	SP232	√	0.8	1.2	–	–	1.7	2.4
	SP301	√	0.75	–	1.35	1.75	2.5	
Motorola	MC1489	√	0.75	–	1.25	1	–	1.5
	MC1489A	√	0.75	0.8	1.25	1.75	1.95	2.25
National	DS1489	√	0.75	1	1.25	1	1.25	1.5
	DS14C89A	√	0.5	–	1.9	1.3	–	2.7

PACKAGE DESCRIPTION

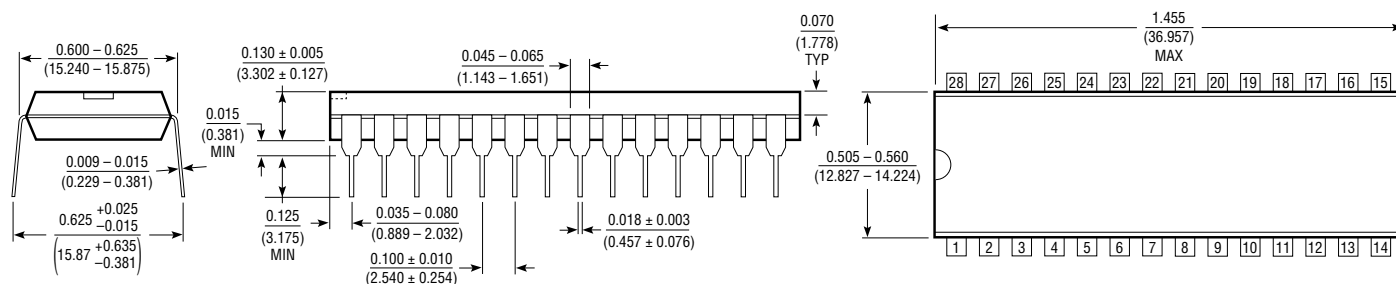
Dimensions in inches (millimeters) unless otherwise noted.

G Package 28-Lead SSOP

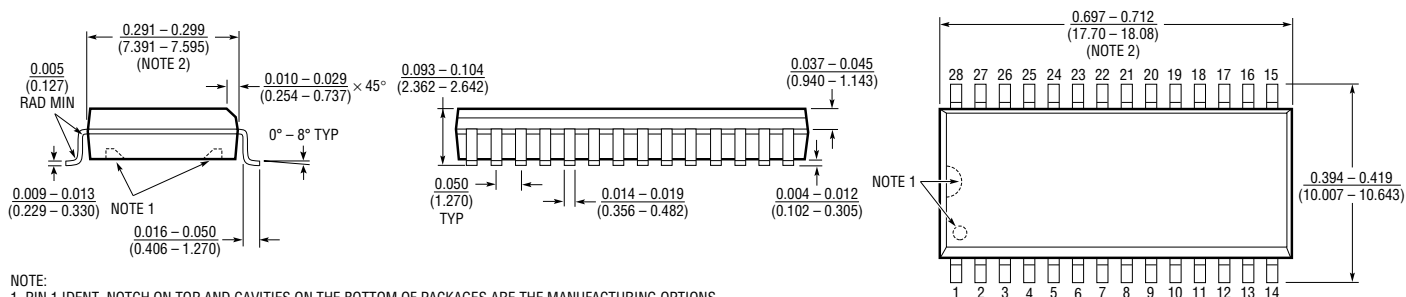


*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.006 INCH (0.15mm).

N Package 28-Lead Plastic DIP



S Package 28-Lead Plastic SOL



- 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.
 - 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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