



ULN2001LC

LINEAR INTEGRATED CIRCUIT

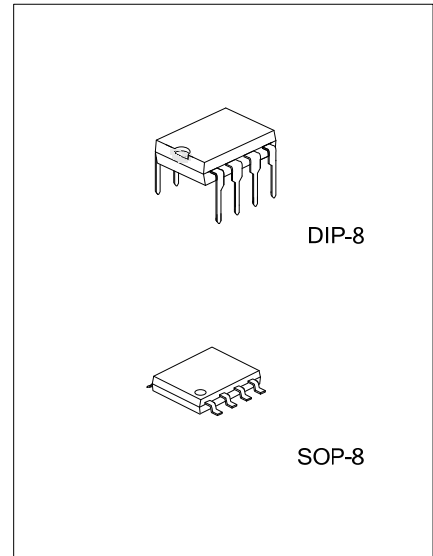
3CH DARLINGTON SINK DRIVER

DESCRIPTION

The UTC **ULN2001LC** is high-voltage, high-current darlington transistor arrays. Each consists of three NPN darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of a single darlington pair is 100mA. All units feature integral clamp diodes for switching inductive loads.

Applications include relay, hammer, lamp and display (LED) drivers.

The UTC **ULN2001LC** has a 2.7kΩ series base resistor for each darlington pair for operation directly with TTL or 5V CMOS devices.



FEATURES

- * Output Current (Single Output): 100mA max
- * High Sustaining Voltage Output: 50V min
- * Inputs Compatible with Various Types of Logic
- * Output Clamp Diodes
- * Relay-Driver Applications

ORDERING INFORMATION

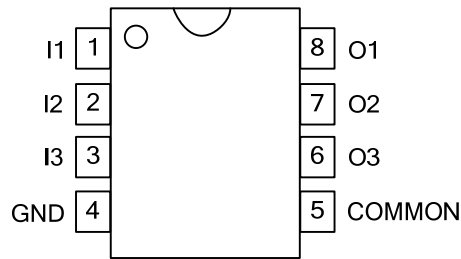
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULN2001LCL-D08-T	ULN2001LCG-D08-T	DIP-8	Tube
ULN2001LCL-S08-R	ULN2001LCG-S08-R	SOP-8	Tape Reel

<p>ULN2001LCG-D08-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D08: DIP-8, S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
---	---

MARKING

DIP-8	SOP-8
<p>8 7 6 5 → Date Code UTC □□□□ ULN2001LC □ □ □ → L: Lead Free □ □ → G: Halogen Free □ □ → Lot Code 1 2 3 4</p>	<p>8 7 6 5 → Date Code UTC □□□□ ULN2001LC □ □ □ → L: Lead Free □ □ → G: Halogen Free □ □ → Lot Code 1 2 3 4</p>

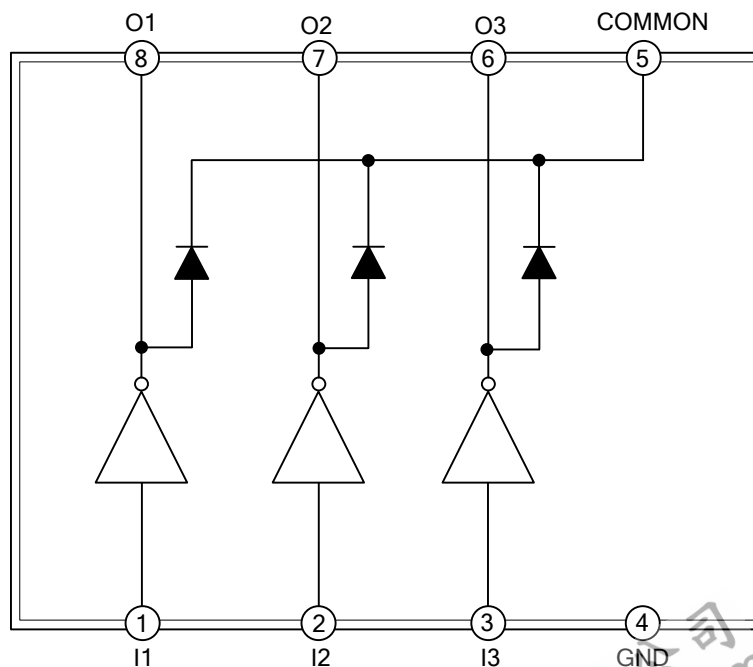
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	I1	1 Channel Input Pin
2	I2	2 Channel Input Pin
3	I3	3 Channel Input Pin
4	GND	Ground
5	COMMON	Clamp Diode
6	O3	3 Channel Output Pin
7	O2	2 Channel Output Pin
8	O1	1 Channel Output Pin

■ BLOCK DIAGRAM



ULN2001LC

INTEGRATED CIRCUIT

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	V _{CE}	50	V
Clamp Diode Reverse Voltage	V _{COM}	50	V
Input Voltage	V _I	30	V
Peak Collector Current	I _{CP}	100	mA
Output Clamp Current	I _{OK}	100	mA
Power Dissipation	DIP-8	P _D	0.750
	SOP-8		0.625
Junction Temperature	T _J	+125	°C
Storage Temperature	T _{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Sustaining Voltage	V _{CE(SUS)}		0		50	V
Output Current	I _{OUT}	T _A =+85°C			100	mA/ch
Input Voltage	V _{IN}		0		12	V
Input Voltage (Output On)	V _{IN(ON)}	I _{OUT} =100mA	2.8		12	V
Input Voltage (Output Off)	V _{IN(OFF)}		0		0.7	V
Clamp Diode Reverse Voltage	V _R				50	V
Clamp Diode Forward Current	I _F				70	mA

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-8	θ _{JA}	133
	SOP-8		160

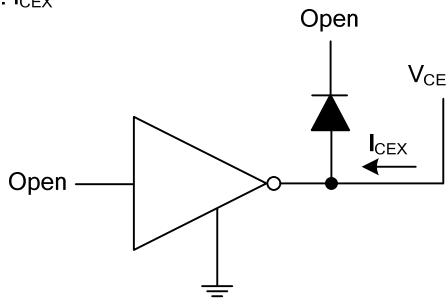
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CIRCUIT	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage (Output On)	V _{I(ON)}	2	V _{CE} =1.5V	I _C =20mA	1.9	2.3	V
				I _C =50mA	2.0	2.4	V
				I _C =80mA	2.0	2.4	V
				I _C =100mA	2.1	2.5	V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	3	V _I =2.4V (I _I >250μA)	I _C =20mA	0.83		V
				I _C =50mA	0.92		V
				I _C =80mA	0.99		V
				I _C =100mA	1.10		V
Input Current	I _I	2	I _C =60mA	V _I =12V	6.3		mA
				V _I =6V	2.8		mA
				V _I =4.5V	1.97		mA
				V _I =2.4V	0.83		mA
Clamp Diode Forward Voltage	V _F	5	I _F =70mA		1.1	1.4	V
Output Leakage Current	I _{CES}	1	V _{CE} =50V, I _I =0			50	μA
Collector-Emitter Voltage	V _{CE}	1	V _{CE} =50V, I _I =0	50			V
Clamp Diode Reverse Voltage	V _R	4	V _R =50V	50			V
Clamp Diode Reverse Current	I _R	4	V _R =50V			50	μA
Propagation Delay Time, Low- to High	t _{PLH}	6	V _L =12V, R _L =120Ω		0.15	1	μs
Propagation Delay Time, High - to Low	t _{PHL}	6	V _L =12V, R _L =120Ω		0.15	1	μs

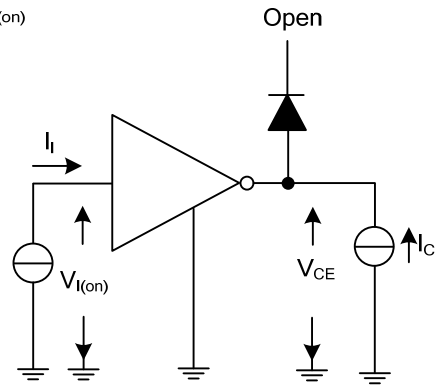


TEST CIRCUIT

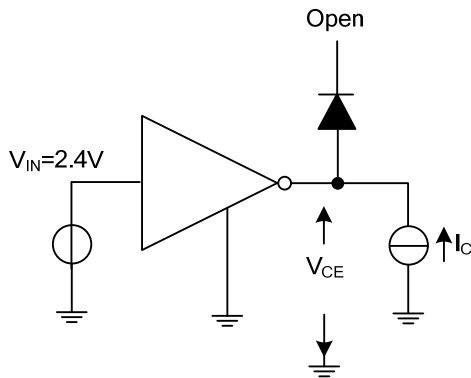
1. I_{CEX}



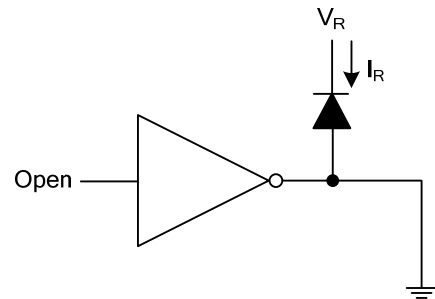
2. I_I & $V_{I(on)}$



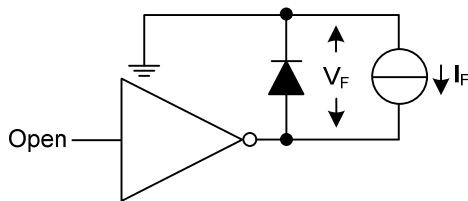
3. $V_{CE(sat)}$



4. I_R

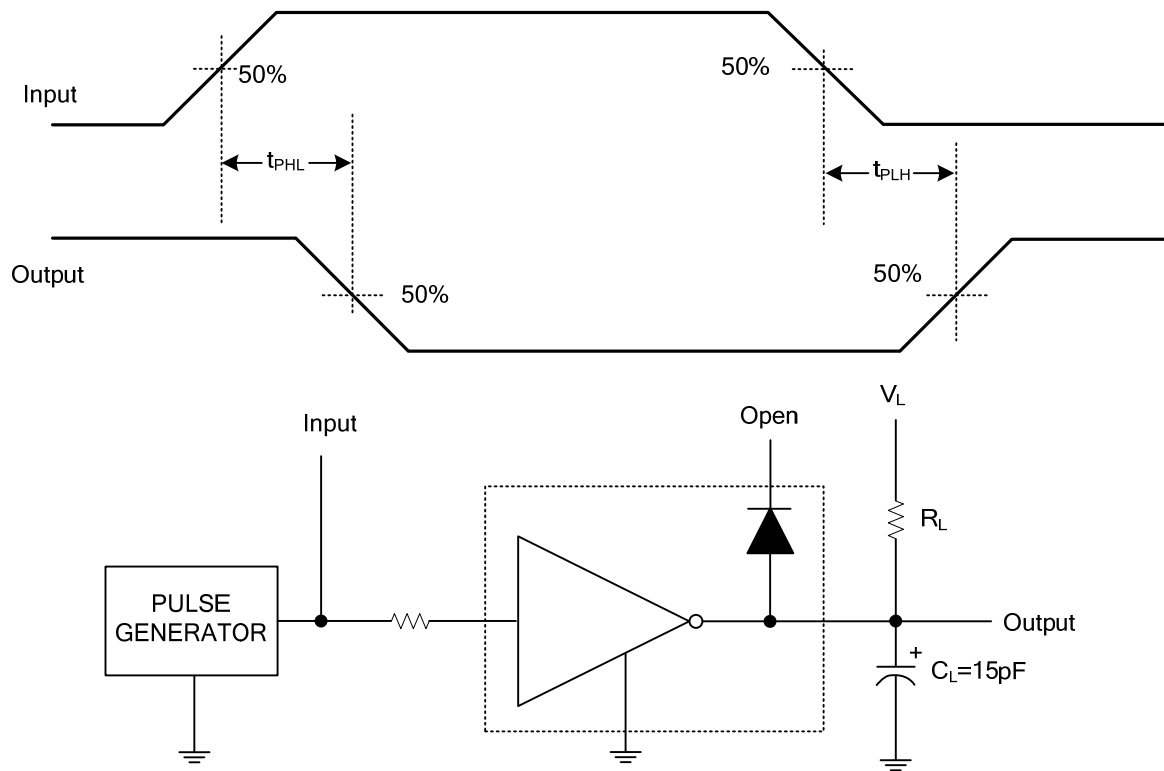


5. V_F

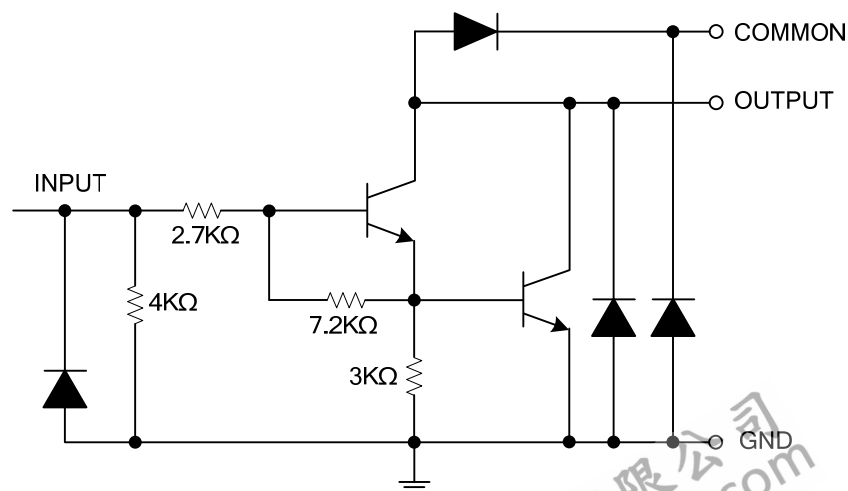


TEST CIRCUIT (Cont.)

6. Propagation Delay-Time Waveforms



TYPICAL APPLICATION CIRCUIT



UTC ULN2001 Drive Circuit

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.