

CLL Series

Photo-IC Sensors

Digital Output



March, 2003

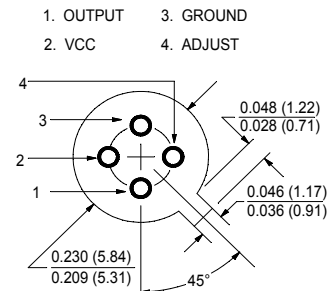
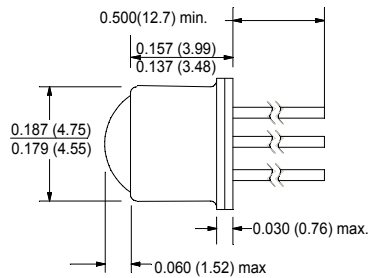


features

- Output stages:
 - a. Buffer or inverter
 - b. Open collector or internal 10KΩ pull-up
- Supply voltage 4.5V to 18V
- 7:1 user sensitivity adjustment on CLL130-CLL133 and CLL130W-CLL133W series
- Acceptance angle:
 - a. $\pm 15^\circ$ high dome lens can
 - b. $\pm 35^\circ$ flat window lens can
- Operates to 125°C
- RoHS compliant

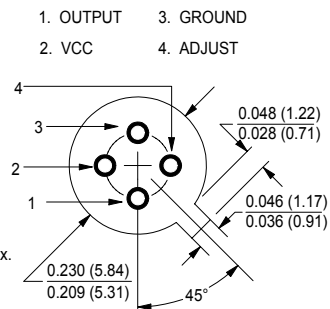
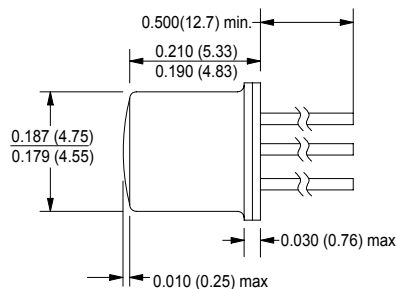
description

The CLL series are monolithic integrated circuits incorporating a photodiode, linear amplifier, Schmitt trigger for hysteresis and pulse shaping, and digital output with either 10KΩ pull-up or open collector. The series includes TO-72 four lead packages (with user adjustable gain) and TO-18 three lead packages in both high dome and flat window configurations. Alternate pin-outs are available. Contact Clairex.



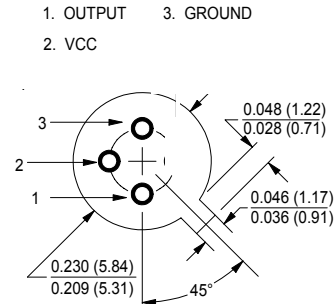
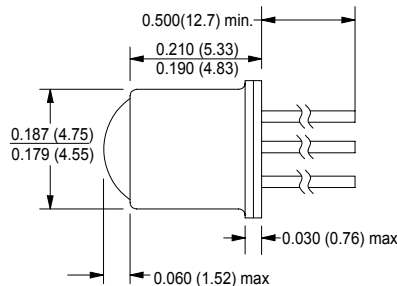
TO-72

CLL130
CLL131
CLL133



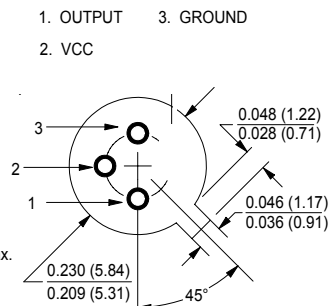
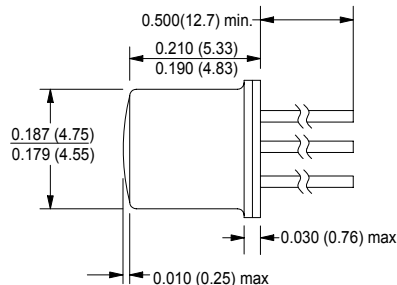
TO-72

CLL130W
CLL131W
CLL133W



TO-18

CLL134
CLL135
CLL136
CLL137



TO-18

CLL134W
CLL135W
CLL136W
CLL137W

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)

Revised 3/16/06

Clairex reserves the right to make changes at any time to improve design and to provide the best possible product.

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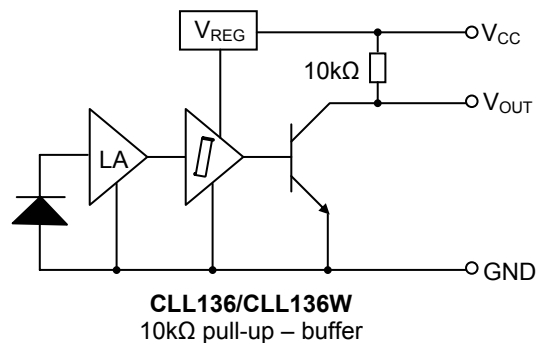
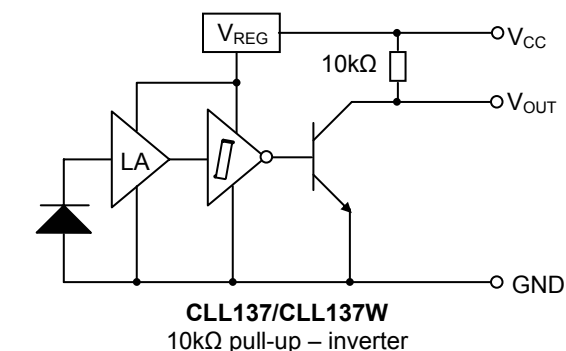
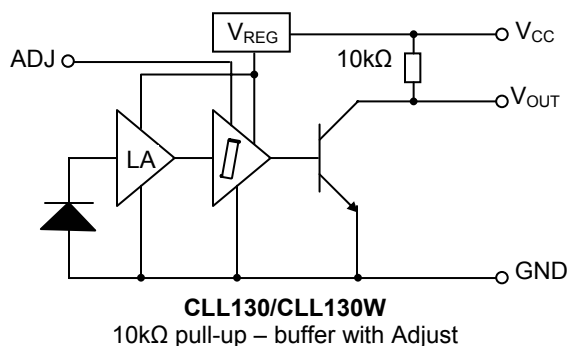
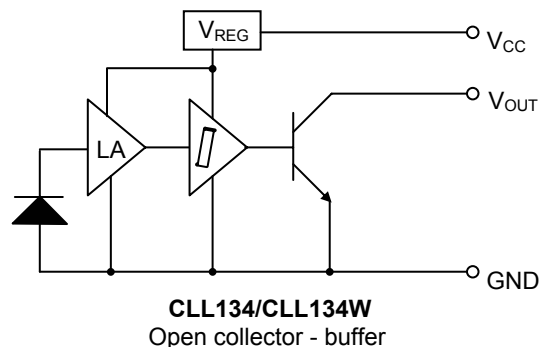
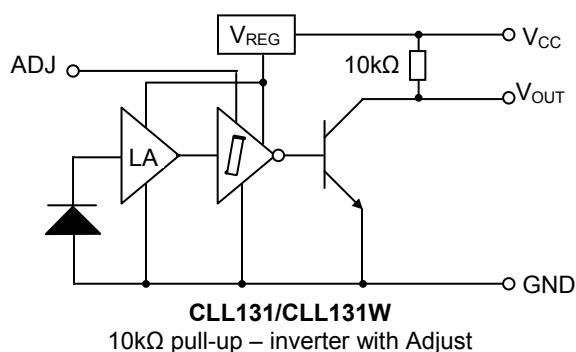
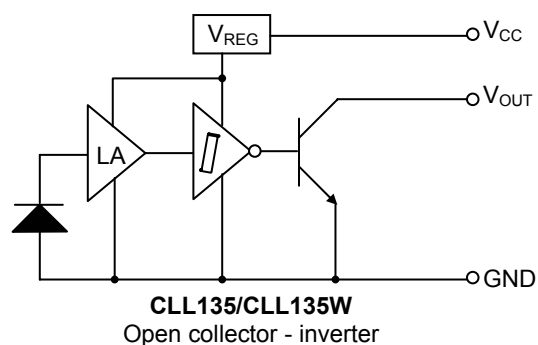
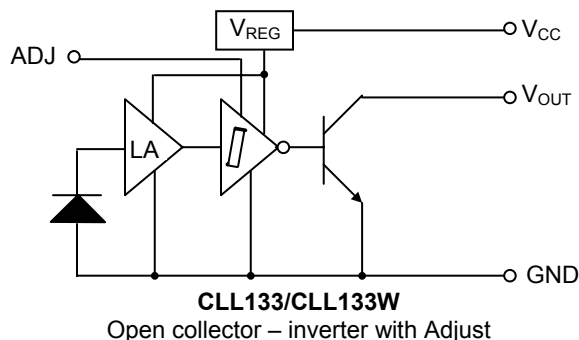
CLL Series

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Digital Output



Schematics



CLL Series

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Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise stated)

storage temperature	-65°C to +150°C
operating temperature	-65°C to +125°C
lead soldering temperature ⁽¹⁾	260°C
V_{CC} supply voltage	4.5V to 18V
V_{ADJ} (CLL130-CLL133 and CLL130W-CLL133W only)	3V
V_{OUT} (10k Ω pull-up series) ⁽²⁾	18V
V_{OUT} (open collector series) ⁽²⁾	30V
I_{SINK} ⁽³⁾	25mA
continuous power dissipation ⁽⁴⁾	250mW

NOTES:

1. 1/16" from the case for 5 seconds maximum.
2. This rating applies when the output is in the OFF state only.
3. This rating applies when the output is in the ON state only.
4. Derate linearly 2.0mW/°C from 25°C free air to $T_A = 125^\circ\text{C}$.
5. CLL130-CLL133 and CLL130W-CLL133W photo-IC sensors are tested with the ADJ lead open.
6. Light source is an AlGaAs IRED with peak wavelength at 850nm.

DEFINITIONS:

- $E_e (+)$ is the minimum irradiance required to cause the output to change state.
- Buffer: Output is HIGH when input irradiance is $>E_e (+)$.
- Inverter: Output is LOW when input irradiance is $>E_e (+)$.

electrical characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
parameter	symbol	min	typ	max	units	test conditions
Operating supply voltage	V_{CC}	4.5	-	18	V	
Positive going threshold irradiance ⁽⁶⁾	$E_e (+)$	0.005 0.025	- -	0.05 0.25	mW/cm ² mW/cm ²	4.5V $\leq V_{CC} \leq$ 18V, ADJ open, All non-suffix W parts. All suffix W parts.
Hysteresis ratio	$\frac{E_{eT} (+)}{E_{eT} (-)}$	1.1	-	1.8		operate point/release point
Supply current	I_{CC}	-	-	12	mA	4.5V $\leq V_{CC} \leq$ 18V, $E_e = 0$ or 0.5mW, ADJ open
Total acceptance angle	Θ_P	- -	30 70	- -	deg. deg.	All non-suffix W parts All suffix W parts

Gain threshold can be adjusted on the CLL130-CLL133 and CLL130W-CLL133W series by placing a resistor between the ADJ and GND leads in accordance with the following table. Decreasing the resistance causes the output to switch at a higher threshold level.

ADJ Resistor	Normalized Threshold
open	1.00
10k	2.00
4.7k	2.75
2.2k	3.75
1k	5.00
Connected to GND	7.25

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electrical characteristics (T _A = 25°C unless otherwise noted)						
parameter	symbol	min	typ	max	units	test conditions
CLL130/CLL130W and CLL136/CLL136W (buffer, 10kΩ pull-up)						
High state output voltage	V _{OH}	4.5	-	-	V	V _{CC} = 5.0V, E _e (+) ≥ 0.5mW/cm ²
Low state output voltage	V _{OL}	-	-	0.4	V	V _{CC} = 5.0V, E _e (+) = 0
Output rise and fall time	t _r , t _f	-	75	-	ns	V _{CC} = 5.0V, E _e = 0 or 0.5mW/cm ² , f = 10kHz, D.C. = 50%, R _L = 330Ω
Propagation delay	t _{PHL} , t _{PLH}	-	5	-	μs	
CLL131/CLL131W and CLL137/CLL137W (inverter, 10kΩ pull-up)						
High state output voltage	V _{OH}	4.5	-	-	V	V _{CC} = 5.0V, E _e (+) = 0
Low state output voltage	V _{OL}	-	-	0.4	V	V _{CC} = 5.0V, E _e (+) ≥ 0.5mW/cm ²
Output rise and fall time	t _r , t _f	-	75	-	ns	V _{CC} = 5.0V, E _e = 0 or 0.5mW/cm ² , f = 10kHz, D.C. = 50%, R _L = 330Ω
Propagation delay	t _{PHL} , t _{PLH}	-	5	-	μs	
CLL134/CLL134W (buffer, open collector)						
High state output current	I _{OH}	-	-	100	μA	V _{CC} = 5.0V, V _{OH} = 30V E _e (+) ≥ 0.5mW/cm ²
Low state output voltage	V _{OL}	-	-	0.4	V	V _{CC} = 5.0V, E _e (+) = 0 R _L = 330Ω
Output rise and fall time	t _r , t _f	-	75	-	ns	V _{CC} = 5.0V, E _e = 0 or 0.5mW/cm ² , f = 10kHz, D.C. = 50%, R _L = 330Ω
Propagation delay	t _{PHL} , t _{PLH}	-	5	-	μs	
CLL133/CLL133W and CLL135/CLL135W (inverter, open collector)						
High state output current	I _{OH}	-	-	100	μA	V _{CC} = 5.0V, V _{OH} = 30V E _e (+) = 0
Low state output voltage	V _{OL}	-	-	0.4	V	V _{CC} = 5.0V, R _L = 330Ω E _e (+) ≥ 0.5mW/cm ²
Output rise and fall time	t _r , t _f	-	75	-	ns	V _{CC} = 5.0V, E _e = 0 or 0.5mW/cm ² , f = 10kHz, D.C. = 50%, R _L = 330Ω
Propagation delay	t _{PHL} , t _{PLH}	-	5	-	μs	

NOTE: Due to the high sensitivity of the CLL series, when used in high speed switching applications, Clairex recommends installing a 0.1 μF capacitor between V_{CC} and GND.