

**Description**

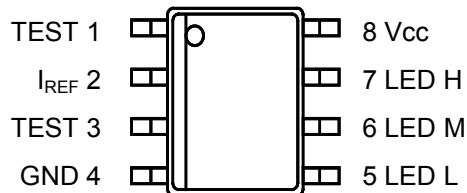
The A8130 is a 12V constant current LED driver, control up to three LEDs in series. The supply voltage of the A8130 ranges from 10V up to 14.4V or a maximum voltage of 21V for short time. Necessary for operation is only one external resistor, which defines the LED current in a range from 5mA up to 30mA. The A8130 can parallel using in several devices, uniformly distributed current is guaranteed by the current control also at a failure of a single LED.

The A8130 is available in 8Pin SOP package.

**Ordering Information**

SOP8	A8130M8 (Tube)
	A8130MR8 (T/R)

**Pin Assignment**



**Pin Description**

Pin #	Name	Description
1	TEST	No Connection
2	I <sub>REF</sub>	Reference Current
3	TEST	No Connection
4	GND	Ground
5	LEDL	LED Low
6	LEDM	LED Mid
7	LEDH	LED High
8	Vcc	Input Voltage

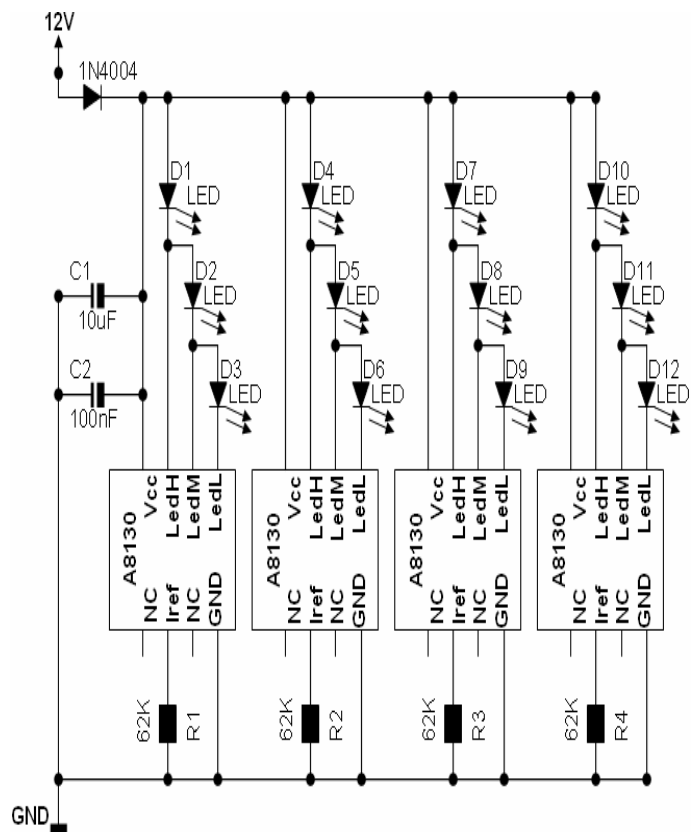
**Features**

- 12V Supply Voltage
- Drives Up to 3 LEDs in Series
- Programmable Current Sink for 5-30mA
- Minimize External Components required
- Bypass broken LEDs and Check LED Current
- A LED Break Does Not Lead to a Black-Out of a Complete Three-Fold LED String
- Compatible with all LED Colors (Red, Yellow, Green, Blue, White & UV)
- 8Pin SOP package

**Application**

- Third (High Mounted) Brake Lights
- LCD Backlight Unit
- Automotive Lighting
- Decoration Light Strings

**Typical Application**



4-Chain of 3 LEDs each driven in parallel

### Absolute Maximum Ratings

Vcc	-0.3 ~ +18.5V
Output Current	100mA
Operating Junction Temperature Range	-20 ~ +125 °C
Storage Temperature Range	-40 ~ +150 °C

### Electrical Characteristics

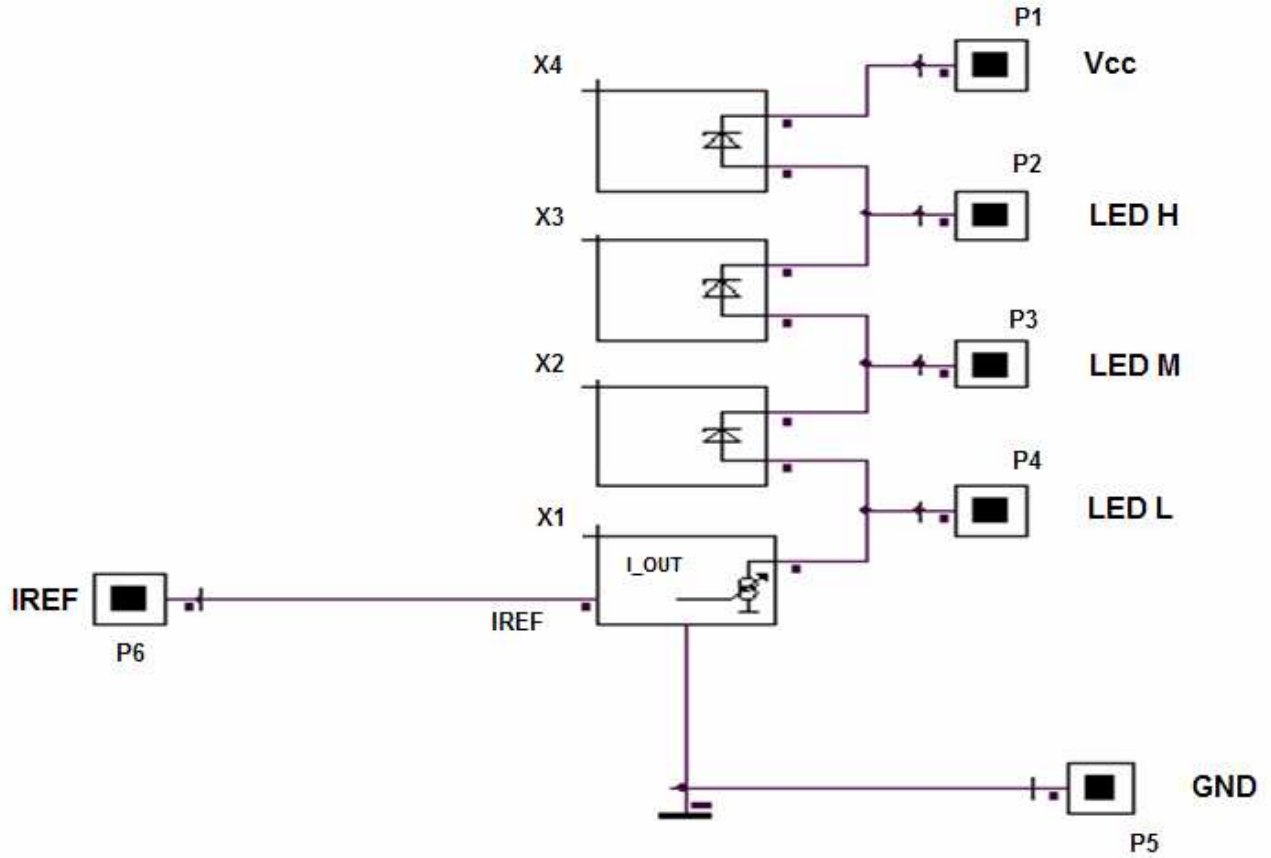
Vcc=12.4V, T<sub>A</sub>=22.5°C, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Supply Voltage		7.0		18.0	V
LED Current (I <sub>LEDL</sub> )	Note1	4.5		33	mA
V <sub>LEDH</sub> V <sub>LEDM</sub> V <sub>LEDL</sub>	Switch Off Current Flow Through LED			Vcc	V
Clamping Voltage V <sub>CC</sub> -V <sub>LEDH</sub> V <sub>LEDH</sub> -V <sub>LEDM</sub> V <sub>LEDM</sub> -V <sub>LEDL</sub>	Switch On Current Flow through Switch		2.6		V
Voltage at I <sub>REF</sub> Pin			4.4		V
Vcc Clamping Voltage		18.4			V
Current Through Vcc Clamping Diode				100	mA

Note1: LED Current as a function of the reference resistor

I <sub>LED</sub>	R <sub>REF</sub>
5 mA	329 kΩ
10 mA	182 kΩ
20 mA	94 kΩ
30 mA	62 kΩ

Block Diagram



## Detailed Information

### Normal Operation

Normally, if LEDs are driven in series, a failure in one LED will lead to the malfunction of the whole chain.

### Bypass Function

The A8130 supervises the current through the LED chain and bypasses all defective LEDs, keeping the remaining LEDs functional. If A8130 detects an anomaly in the current through the LED chain, the A8130 tries to re-establish the current flow by bypassing different LEDs and combinations of LEDs. The maximum test time is 1.4ms.

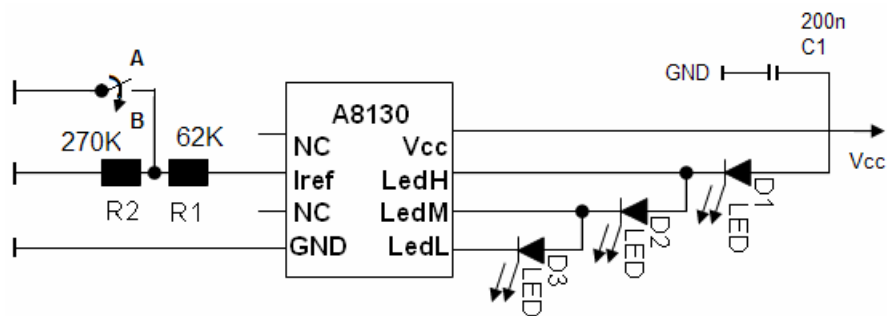
### Constant Current

The A8130 provides a constant current sink, keeping the LED current independent of  $V_{CC}$  and the number of LEDs in a string.

### Operation with PWM Control

As a Zero LED current state may interfere the break detection sequence, it should be avoided to switch the LED completely on and off to control brightness by a PWM signal.

It is possible to switch between minimum and maximum current by switching the reference current  $I_{REF}$  with a PWM signal, see below Fig. A:  $R_{REF}=332K$ , then  $I_{LED}=5mA$ , B:  $R_{REF}=62K$ , then  $I_{LED}=30mA$ .



## Thermal Design

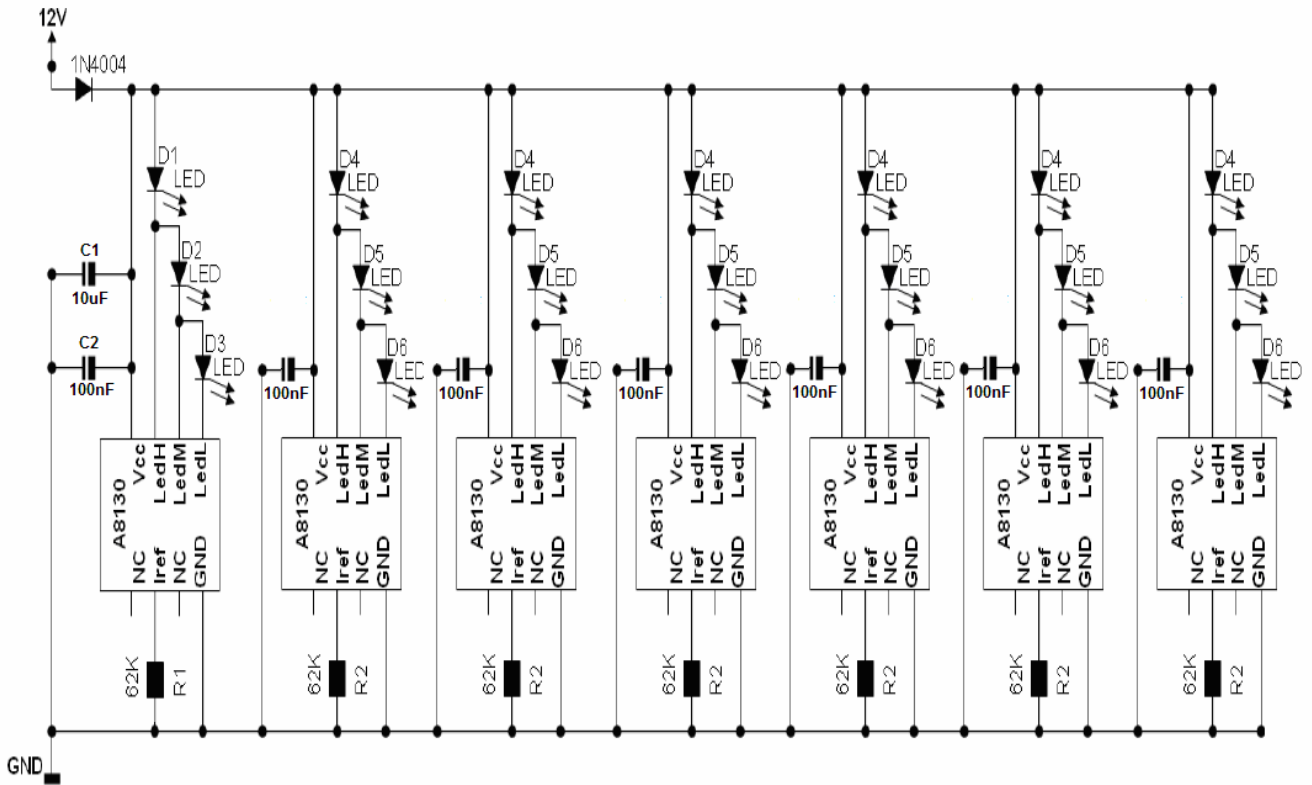
Worst case condition for the power are when all LEDs are broken, so the full voltage drop along the A8130.

Roughly the power can be calculated as the product of supply voltage and LED current, neglecting the current consumption by the A8130 itself.

$T_A$	$P_{MAX}$
25°C	550 mW
50°C	420 mW
75°C	280 mW
100°C	140 mW

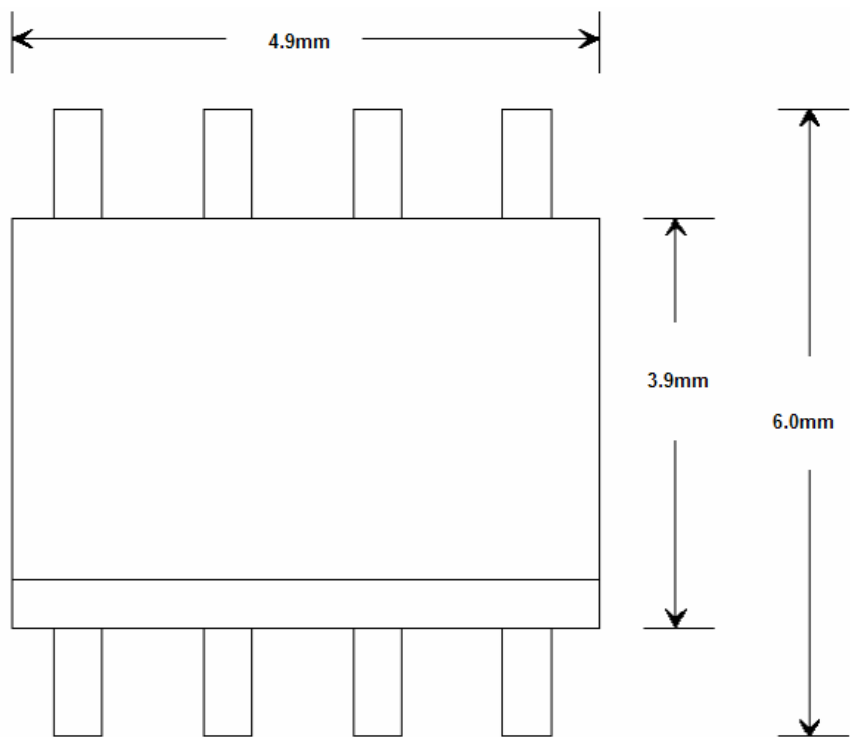
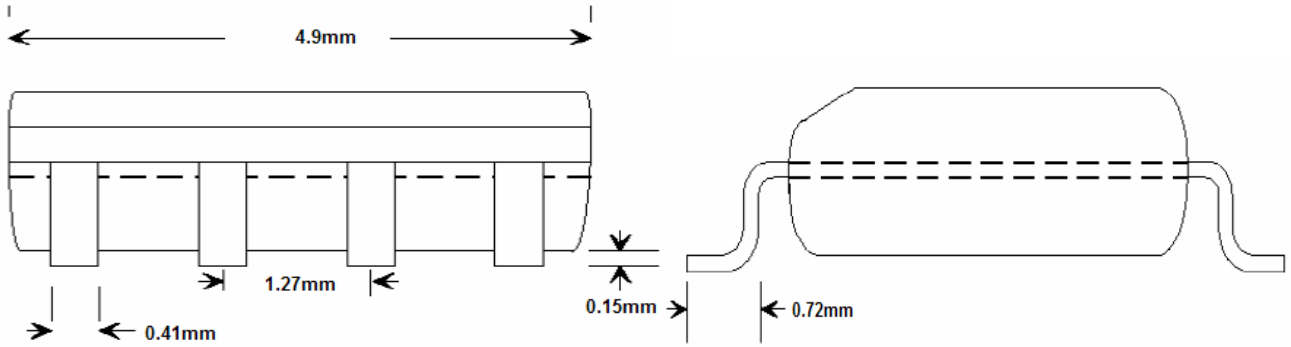
**Application Example**

21LEDs for 7" LED Backlight Unit Solution:



**Packaging Information**

Dimension in SOP8 Package (Unit: mm)



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