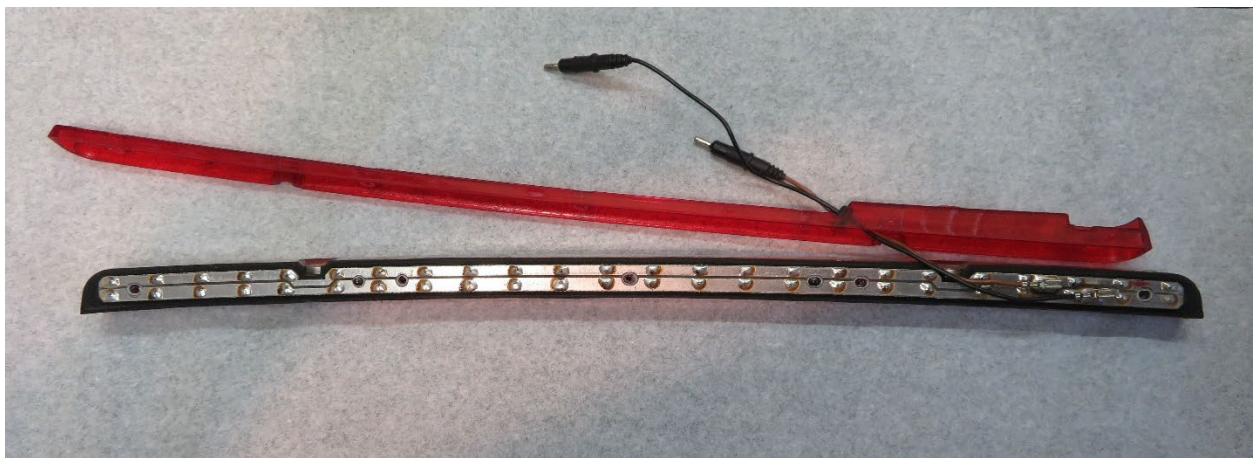


**Description**  
of the  
**Modification from bulbs into LED**  
of the  
**Top brake light**  
Of a  
**Porsche 993 Carrera 4S year 1996**



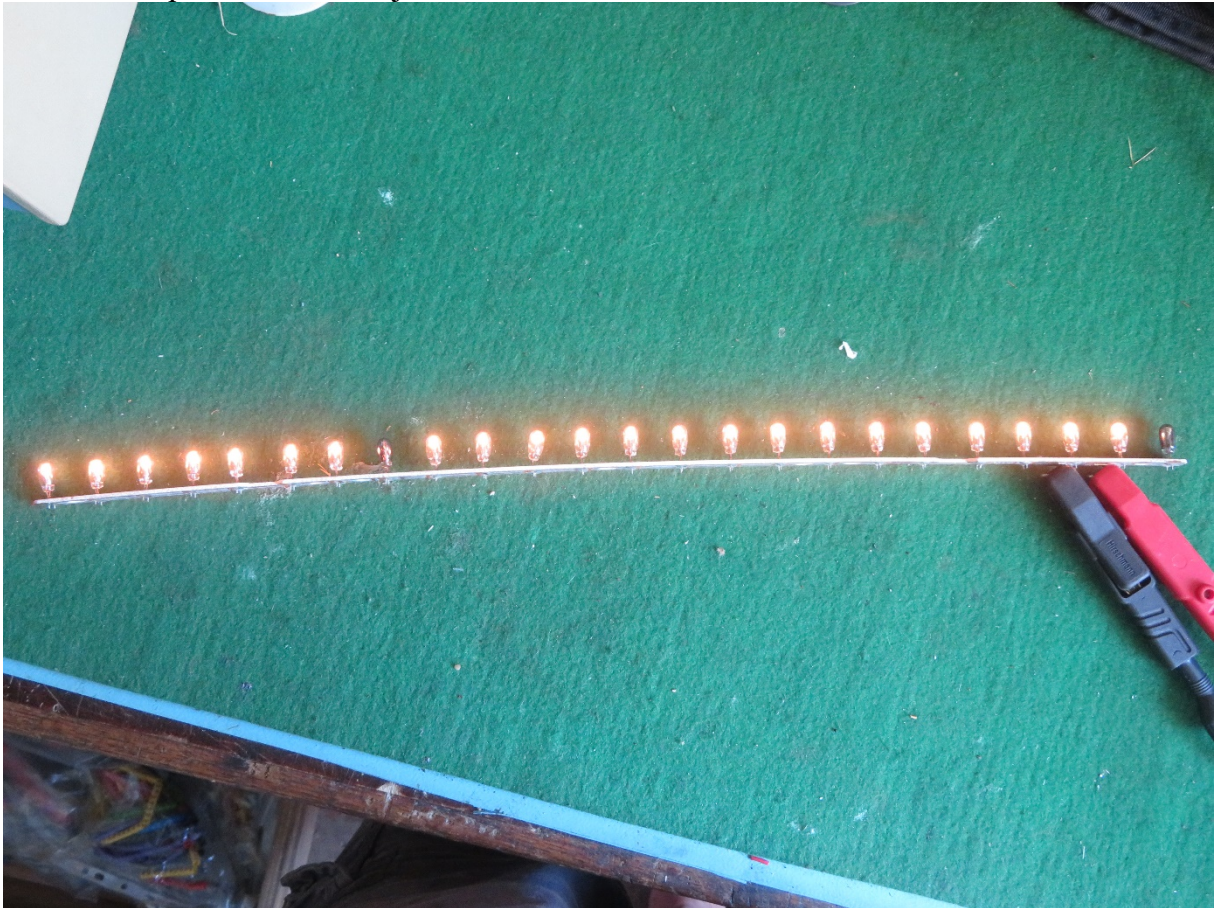
## 1. Introduction

This article describes the modification of the top brake light from bulbs into LED's

I cannot be held responsible for any shortcomings or errors in this article  
For improvements email me [info@hd-electronics.nl](mailto:info@hd-electronics.nl)  
Boekelo, The Netherlands  
August 2024,  
Hans Daman

## 2. Description of the problem

Two of the bulbs were broken. As I expected that in the near future more bulbs would fail I decided to replace the bulbs by LED's





### 3. LED's

I selected this LED



Data Sheet

## ASMT-UWB1-Nxxxx

### OneWhite Surface-Mount PLCC-2 LED Indicator



#### Description

This family of SMT LEDs is packaged in the industry standard PLCC-2 package. These SMT LEDs have high reliability performance and are designed to work under a wide range of environmental conditions. This high-reliability feature makes them ideally suited to be used as signs in various application conditions.

To facilitate easy pick and place assembly, the LEDs are packed in EIA-compliant tape and reel. Every reel will be shipped in single intensity and color bin.

These LEDs are compatible with reflow soldering process.

The wide viewing angle at 120° makes these LEDs ideally suited for panel, push button, office equipment, industrial equipment, and home appliances. The flat top emitting surface makes it easy for these LEDs to mate with light pipes. With the built-in reflector pushing up the intensity of the light output, these LEDs are also suitable to be used as LED pixels in electronic signs.

#### Features

- High reliability package with silicone encapsulation
- Compatible with reflow soldering process
- High optical efficiency with 100 lm/W
- Available in 8-mm carrier tape with reel diameter 180 mm
- JEDEC MSL 3 product
- ESD threshold of 1000V (HBM model) per JEDEC

#### Applications

- Home appliances
- Amusement machine backlighting
- Industrial lighting
- Light strips
- General signage backlighting
- Sign and display

| Color | Part Number     | CCT (K)     | Luminous Intensity (mcd) <sup>a, b</sup> |      |      | Test Current (mA) | Chip  |
|-------|-----------------|-------------|--|------|------|-------------------|-------|
|       |                 |             | Min.                                     | Typ. | Max. |                   |       |
| White | ASMT-UWB1-NX302 | 4500 ~ 8000 | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX312 | 2700 ~ 4000 | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3A2 | 8000        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3B2 | 6500        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3C2 | 5700        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3D2 | 5000        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3E2 | 4500        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3F2 | 4000        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3G2 | 3500        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3H2 | 3000        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX3J2 | 2700        | 1800                                     | 2300 | 3550 | 20                | InGaN |
| White | ASMT-UWB1-NX7B2 | 6500        | 2240                                     | —    | 4500 | 20                | InGaN |
| White | ASMT-UWB1-NX7D2 | 5000        | 2240                                     | —    | 4500 | 20                | InGaN |
| White | ASMT-UWB1-NX7C2 | 5700        | 2240                                     | —    | 4500 | 20                | InGaN |
| White | ASMT-UWB1-NX7A2 | 8000        | 2400                                     | —    | 4500 | 20                | InGaN |

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

| Parameters                        | Rating          |
|-----------------------------------|-----------------|
| DC Forward Current <sup>a</sup>   | 30 mA           |
| Peak Forward Current <sup>b</sup> | 100 mA          |
| Power Dissipation                 | 108 mW          |
| Junction Temperature              | 110°C           |
| Operating Temperature             | -40°C to +100°C |
| Storage Temperature               | -40°C to +100°C |

a. Derate linearly as shown in derating curve.

b. Duty factor = 10%, frequency = 1 kHz.

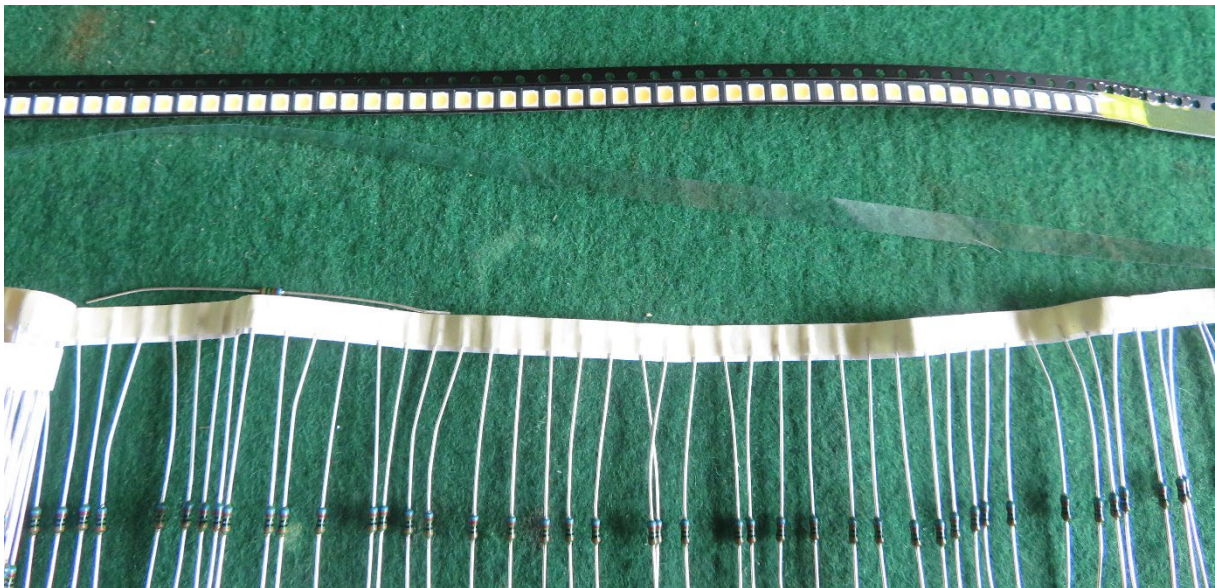
I did some tests and at 20 milli amps the light intensity of the LED's is similar to that of the bulbs

The forward voltage at 20 milli amps is approx 2,6 Volts.

The series resistor at 14,4 Volt should be  $(14,4 - 2,6)/0,02=590$  Ohm. As I had a lot of 620 Ohm resistors I used them resulting in a current of 19 milli amps.

### 4. Assembly

LED's and resistors





Preparation of the resistors



Ready for placement





Placed



All working!



Ready for assembling

