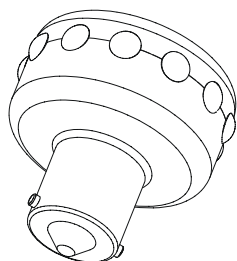


FIREFLY LED bulb

White navigation and anchor light

Nov 2005



General Description

FIREFLY LED bulb was developed as a replacement for classic incandescent bulb where the key factor is economic use of electric energy. Primary goal was to replace the 12V or 24V classic bulb in navigation and anchor lights that are used on boats without electrical generator, where there are constraints on energy consumption. Besides small consumption several other demands had to be met - high visibility (at least 2 nautical miles for boats up to 12m and 4 nautical miles for boats above 12m), changes of supply voltage (12V battery voltage varies between 10V and 14V, 24V battery voltage varies between 20V and 28V), as well as safety and reliability of LED bulb operation.

FIREFLY LED bulb uses ultra-bright white LED diodes (LED - Light Emitting Diode) as a light source. Its built-in electronic regulator ensures constant brightness independent of supply voltage. Supply voltage range extends from 9V to 30V DC and covers complete voltage range of a 12V / 24V battery, from completely discharged to fully charged. Built-in regulator ensures the same brightness regardless of the supply voltage and therefore permanent high visibility and added security during sailing or docked.

With typical consumption of 1.1W (boats up to 12m) or 2W (boats above 12m) it is at least 10x more efficient as 10W / 21W incandescent bulb that is normally used for this purpose. This means at least 10x longer battery operation before discharge.

For example: If a 12V / 45Ah battery supplies only navigation light, it will be able to power a 12V / 10W incandescent bulb for about 54 hours, where the bulb's brightness will noticeably decrease in the last few hours. On contrary, it could power

FIREFLY LED bulb for about 600 hours. LED bulb's brightness will remain the same at all times. Luminous intensity of each of the 12 LED diodes is up to 1800mCd (boats up to 12m) or 4000mCd (boats above 12m), which makes the bulb visible for at least 2 and 4 nautical miles respectively. Horizontal beam angle is 360° and vertical 120°, so the light is directed efficiently and does not escape in vertical directions, where there is no need for it to be seen.

Life expectancy of LED diodes is 100 000 working hours, which means at least 10 years of non-stop operation. With average use of 60 nights per year this means life expectancy of over 130 years. LED bulb is shockproof since LED diodes do not implement any moving parts (like fragile filament) and included electronic circuit is appropriately sealed and protected.

Operating temperature range extends from -40°C to +80°C, over which the consumption varies for about 5% in comparison to consumption at room temperature.

FIREFLY LED bulb is also waterproof and with proper protection of terminals can operate completely submerged in water.

Features

- low power consumption 1.1W or 2W - at least 10 x less than comparable 10W or 21W incandescent bulb
- constant power consumption and brightness over a large range of supply voltage and temperature
- directed light beam
- high visibility - 1.1W - over 2 nautical miles, 2W - over 4 nautical miles
- high life expectancy - at least 10 years of non-stop operation
- high temperature range and thermal stability (-40°C to +80°C)
- shockproof - no fragile filament
- waterproof - proper protections of terminals makes completely submerged operation possible
- replacement for classical incandescent bulb
- compatible with most navigation lights with lampbase BA15S, BA15D or BA15Y

Applications

- as navigation or anchor light
- as an indicator where economical use of electrical energy is crucial

Technical specifications for 1.1W bulb

Power supply range	9V to 30V DC ⁽¹⁾
Max. power consumption	1.3W ⁽²⁾
Typical power consumption for Vcc = 9V - 30V	1.1W
Operating temperature range	-40°C to +80°C
Horizontal beam angle	360°
Vertical beam angle	120° ⁽³⁾
Number and luminous intensity of LEDs, color	12x max. 1800mcd, white

Technical specifications for 2W bulb

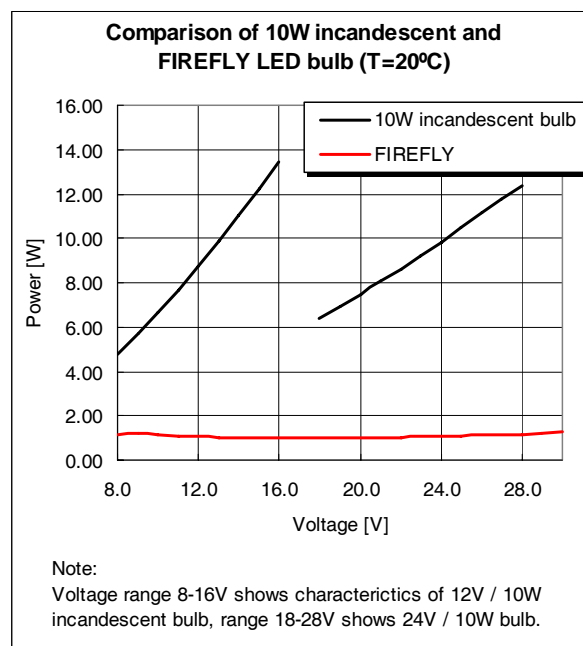
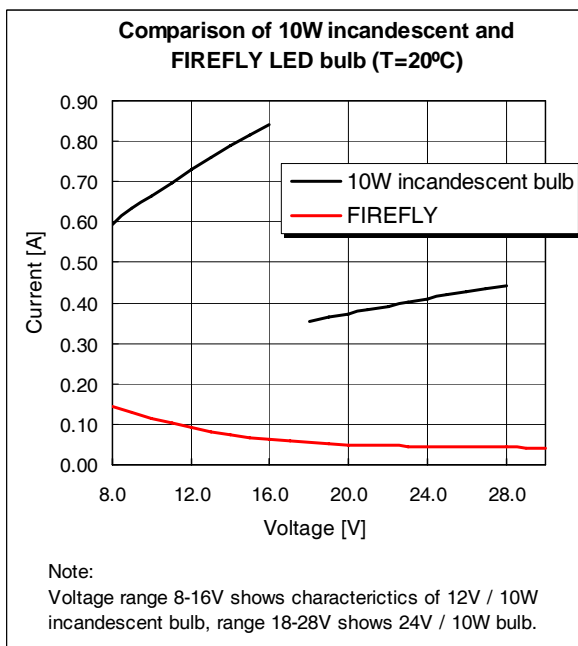
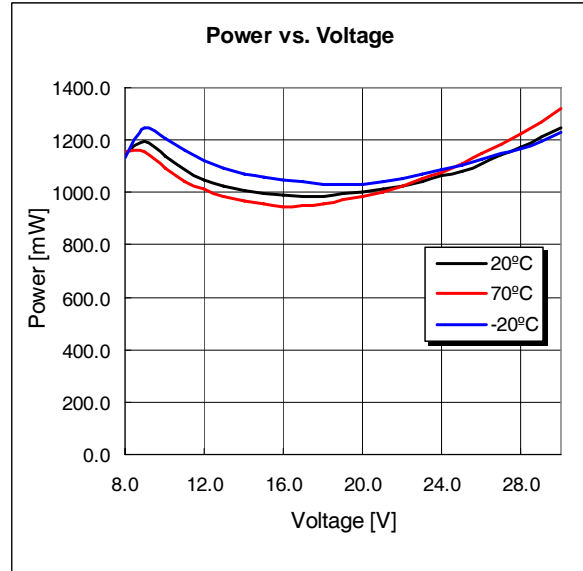
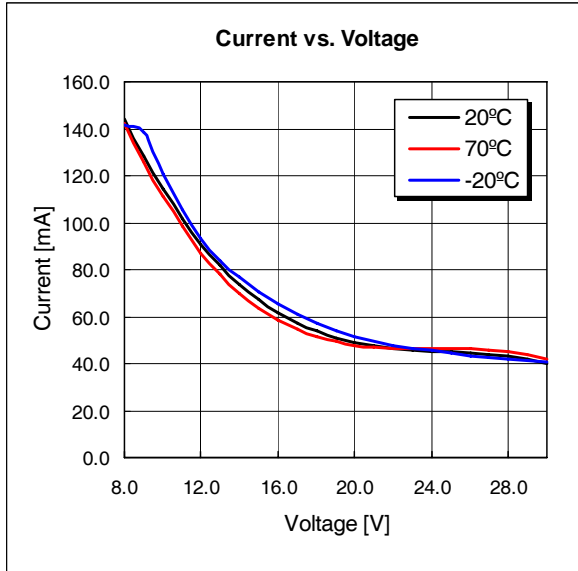
Power supply range	9V do 30V DC ⁽¹⁾
Max. power consumption	2.4W
Typical power consumption for Vcc = 9V - 30V	2W
Operating temperature range	-40°C to +80°C
Horizontal beam angle	360°
Vertical beam angle	120°
Number and luminous intensity of LEDs, color	12x max. 4000mcd, white

Note 1 - Not intended for use with AC power supplies. AC voltage is harmful to the product and may cause permanent damage.
Polarity of DC terminals is not important.

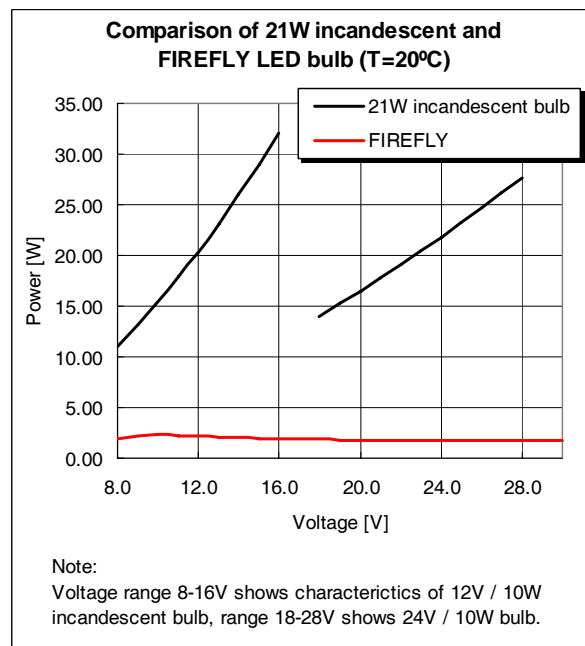
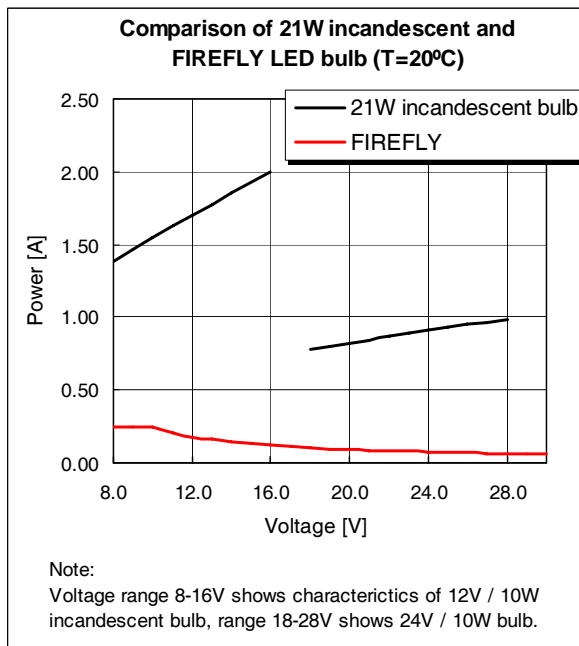
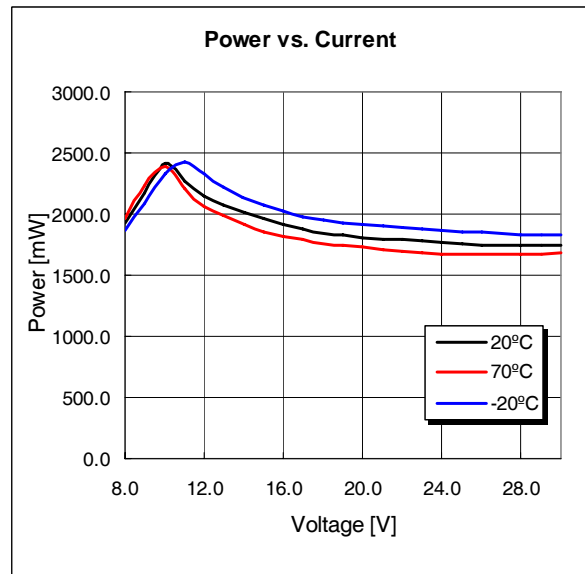
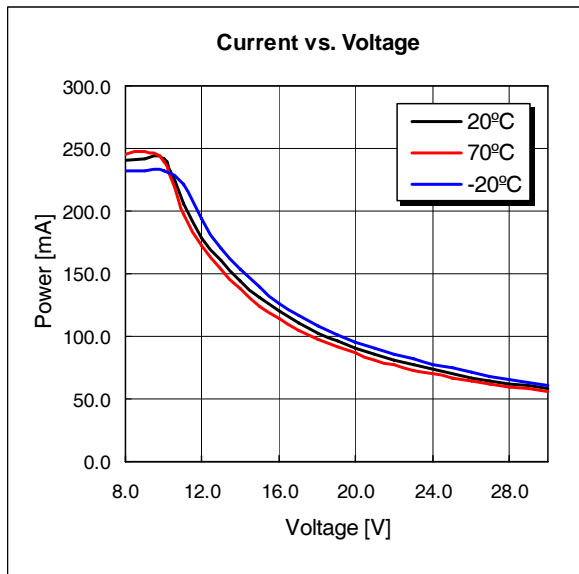
Note 2 - See power characteristics.

Note 3 - See physical dimensions section.

Electrical characteristics for 1.1W FIREFLY LED bulb

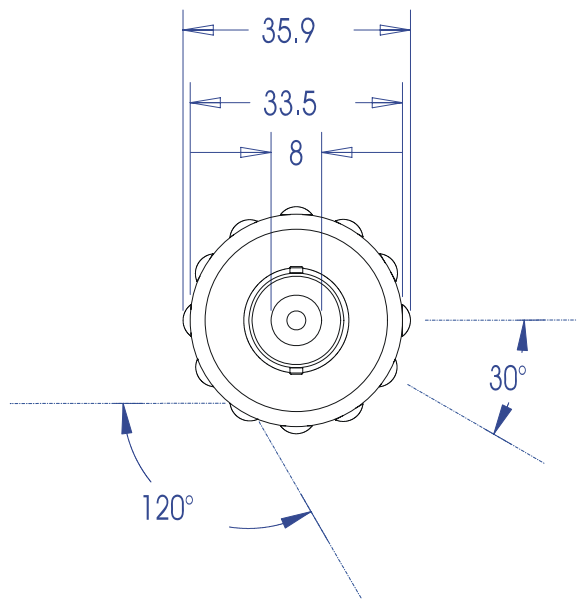
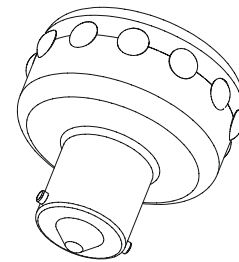
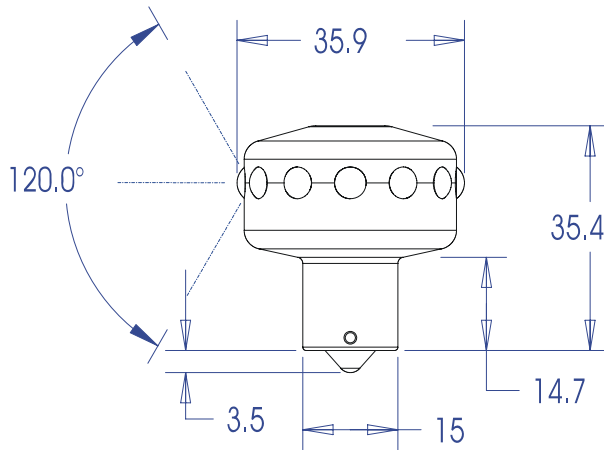


Electrical characteristics for 2W FIREFLY LED bulb



Physical Dimensions - lampbase BA15S

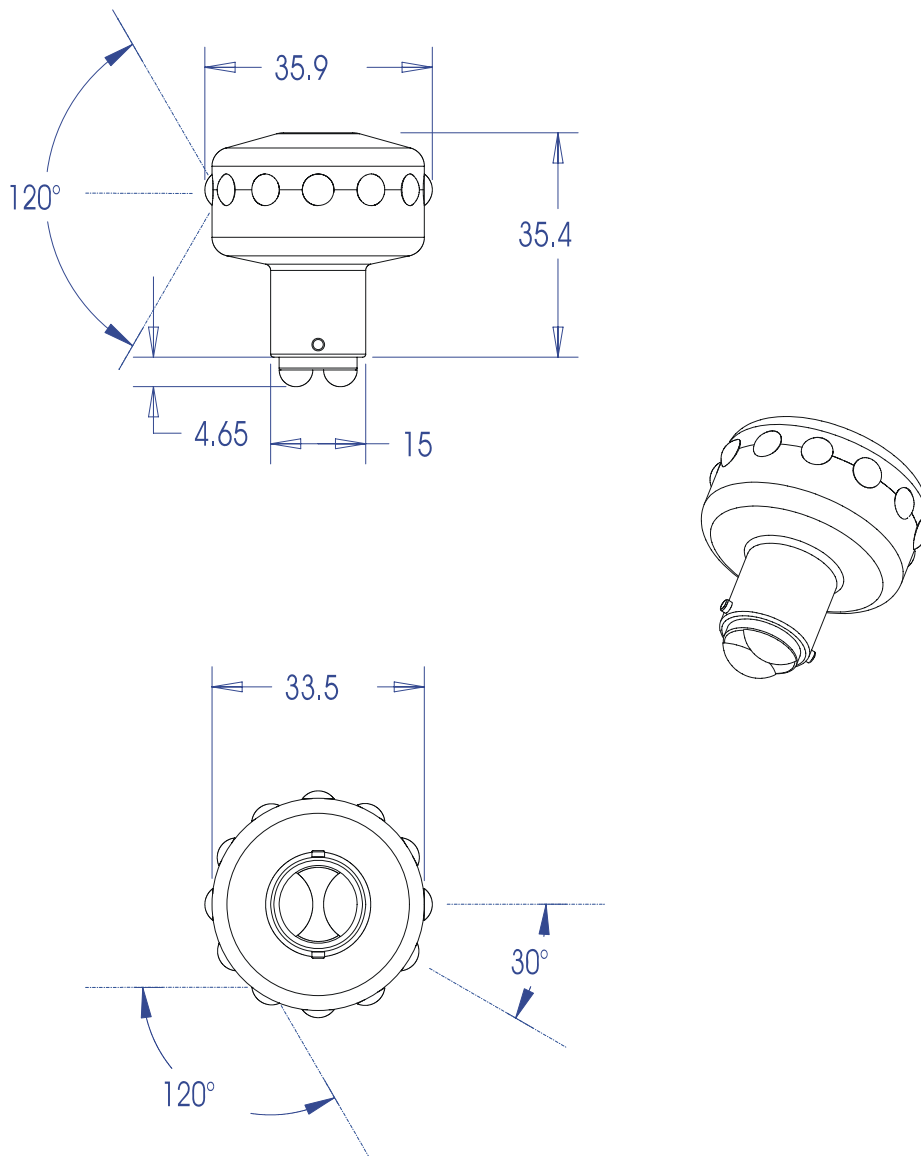
Bulb with lampbase BA15S (single contact).



Note - Horizontal and vertical beam angles are also shown.

Physical Dimensions - lampbase BA15D / BA15Y

Bulb with lampbase BA15D (double contact).



Note - Horizontal and vertical beam angles are also shown.

Lampbase BA15Y differs from BA15D only in the position of one of the locking contacts on the side of the lampbase - it is positioned a bit higher.