

# Custom Alphalight™

## Tailored for your specific application

- ◆ **The Right Performance:** Lasts the life of the application
- ◆ **The Right Light:** Covers the full visible and infrared spectrums
- ◆ **The Right Size:** Ultra compact for modern design applications



ALPHALIGHT™ is a better, brighter, more uniform “Light”. Its unmatched high performance is especially well suited for many applications that involve the most discerning of man’s finely tuned senses: **Vision**. ALPHALIGHT™ is offered in a variety of standard product formats. Applications are also fulfilled by custom or semicustom iterations as well.

- ◆ **SEMICUSTOM ALPHALIGHT™:** Each of the standard product ALPHALIGHT™ formats can be adapted to meet specific requirements without the full expenditure of a custom product design and development.
- ◆ **FULLY CUSTOM ALPHALIGHT™:** Teledyne can design a fully optimized ALPHALIGHT™ specifically tailored for a specific application. Designs include those for EL or CCFL replacement redesigns, as well as other state-of-the-art high-performance formats including :
  - **BACKLIGHTS:** For use with transmissive LCDs or reflective LCOS displays with relay optics.

### MULTIPLICITY OF ADAPTATIONS...

Teledyne ALPHALIGHT™ technology can be provided in configurations that can fulfill a wide variety of lighting applications ranging from the illumination of non-emissive displays; to uniform CCD-based machine vision lighting; to biomedical diagnostic, germicidal and therapeutical equipment; to safety, emergency or utility lighting applications.

- ◆ Specialized wavelengths or combinations of wavelengths can be provided including specified flux outputs, wavelengths, multiple color effects, NVIS-compatible lighting (MIL-L-85762/MIL-S-22885), and Infrared (880nm/940nm) devices. Color Field Sequential Lighting (CFSL) is a particular specialty of Teledyne.
- ◆ The patented ALPHALIGHT™ technology uses precision Total Internal Reflection (TIR) optical films in its aperture, as well as the company’s LUMAGUIDE™ hollow or solid-body waveguide technology combined with diffusely reflecting (approaching 99.5%) surfaces to achieve a new level in lambertian light source uniformity and performance.

- ◆ ALPHALIGHT™ technology lends itself to a wide variety of mechanical formats and electrical configurations:
  - Rugged, solid-state LEDs are low drive current controlled devices, with current applied either PWM or DC. Products can be integrated with current limiting, voltage compensation or other circuitry.
  - Non-light emitting areas are minimized, especially at the aperture borders, to provide miniaturized, compact designs for every ALPHALIGHT™ implementation. Products are made from durable material with thermal management considerations as applicable. ALPHALIGHT™ can be designed to meet almost any physical requirement.

| Part Number  | Description  |
|--------------|--|
| AL1010M-01XS | 1.0" (25.4mm) Diagonal Aperture Monochrome Super Bright LED Backlight  |
| AL1010M-1WX  | 1.0" (25.4mm) Diagonal Aperture White Super Bright LED Backlight       |
| AL1414M-1XS  | 1.4" (35.56mm) Diagonal Aperture Monochrome Super Bright LED Backlight |
| UB1010M      | 1.0" (25.4mm) Diagonal Aperture Monochrome Ultra Bright LED Backlight  |

Teledyne’s ALPHALIGHT™ product is fully patent protected (U.S. Patents #5,440,197, #5,684,354, #5,892,325, #6,043,591 domestically as well as foreign additional patents pending) for this specific application. For more information, please visit our website at [www.teledynelighting.com](http://www.teledynelighting.com)

# Alphalight™ Selection Guide



| Monochrome Product | Hue (λD nm) | Brightness (fL) Constant Current | Fwd VDC | Max. Power (mW) |
|--------------------|-------------|----------------------------------|---------|-----------------|
| AL0252M -1R        | 615         | 7900                             | 2.0-3.0 | 90              |
| -1G                | 525         | 8800                             | 3.5-4.0 | 120             |
| -1B                | 470         | 1800                             | 3.6-4.0 | 120             |
| AL0505M-1W         | White       | 3800                             | 3.6-4.0 | 120             |
| -1R                | 615         | 5300                             | 2.0-3.0 | 90              |
| -1G                | 525         | 5200                             | 3.5-4.0 | 120             |
| -1B                | 470         | 900                              | 3.6-4.0 | 120             |
| AL0505M-2W         | White       | 6700                             | 3.6-4.0 | 240             |
| -2R                | 615         | 7900                             | 2.0-3.0 | 180             |
| -2G                | 525         | 9600                             | 3.5-4.0 | 240             |
| -2B                | 470         | 1500                             | 3.6-4.0 | 240             |
| AL0707M-1W         | White       | 3800                             | 3.6-4.0 | 720             |
| -1R                | 615         | 6800                             | 2.0-3.0 | 540             |
| -1G                | 525         | 5500                             | 3.5-4.0 | 720             |
| -1B                | 470         | 1000                             | 3.6-4.0 | 720             |
| AL1010M-1W         | White       | 4400                             | 3.6-4.0 | 960             |
| -1R                | 615         | 5700                             | 2.0-3.0 | 720             |
| -1G                | 525         | 4800                             | 3.5-4.0 | 960             |
| -1B                | 470         | 1100                             | 3.6-4.0 | 960             |
| SB1010M-1W         | White       | 5600                             | 3.6-4.0 | 1902            |
| -1R                | 615         | 7200                             | 2.0-3.0 | 1440            |
| -2G                | 525         | 6400                             | 3.5-4.0 | 1920            |
| -1B                | 470         | 1300                             | 3.6-4.0 | 1920            |
| UB1010M-1R         | 615         | 100,000                          | 2.0-3.0 | 1350            |
| -1G                | 525         | 225,000                          | 3.5-4.0 | 1400            |
| -1B                | 470         | 50,000                           | 3.6-4.0 | 1400            |
| AL1414M-1W         | White       | 3400                             | 3.6-4.0 | 1440            |
| -1R                | 615         | 4600                             | 2.0-3.0 | 1080            |
| -1G                | 525         | 4800                             | 3.5-4.0 | 1440            |
| -1B                | 470         | 900                              | 3.6-4.0 | 1080            |

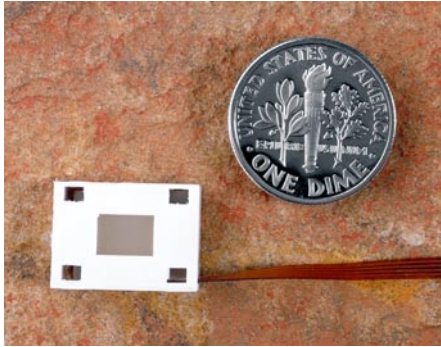
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| Monochrome Product | Hue (λD nm)                            | Brightness (fL) Constant Current | Fwd VDC                       | Max. Power (mW) |
|--------------------|--|----------------------------------|-------------------------------|-----------------|
| SB1414M-1W         | White                                  | 4000                             | 3.6-4.0                       | 2160            |
| -1R                | 615                                    | 6600                             | 2.0-3.0                       | 1620            |
| -2G                | 525                                    | 5200                             | 3.5-4.0                       | 2160            |
| -1B                | 470                                    | 1000                             | 3.6-4.0                       | 2160            |
| AL2020M-1W         | White                                  | 3000                             | 3.6-4.0                       | 1920            |
| AL2525M-1W         | White                                  | 2000                             | 3.6-4.0                       | 4800            |
| AL4040M-1W         | White                                  | 800                              | 3.6-4.0                       | 2880            |
| AL5858M-1W         | White                                  | 800                              | 3.6-4.0                       | 3360            |
| AL0252C            | Red (630)<br>Green (525)<br>Blue (470) | 12800                            | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 330             |
| AL0505-1C          | Red (630)<br>Green (525)<br>Blue (470) | 9600                             | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 330             |
| AL0707C            | Red (630)<br>Green (525)<br>Blue (470) | 5800                             | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 1230            |
| SB0707C            | Red (630)<br>Green (525)<br>Blue (470) | 8300                             | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 2460            |
| AL1010C            | Red (630)<br>Green (525)<br>Blue (470) | 8000                             | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 1680            |
| AL1414C            | Red (630)<br>Green (525)<br>Blue (470) | 6600                             | 1.9-2.4<br>3.5-4.0<br>3.6-4.0 | 2460            |

**Notes:**

- 1.0 Measurement uncertainty of luminous intensity is ±10%
- 2.0 Maximum rating at 10% duty cycle
- 3.0 Equal energy White ratio (%) equals: Red=30%; Green=62%; Blue=8%
- 4.0 Chromaticity (measurement uncertainty of colors is ±0.02):
  - 4.1 Red: x = 0.67 to 0.43, y = .27 to .33
  - 4.2 Green: x = 0.14 to 0.28, y = .64 to .73
  - 4.3 Blue: x = 0.11 to 0.15, y = .04 to .10
  - 4.4 White: x = 0.31 to 0.35, y = .31 to .35

# .25" (7.47mm) Monochrome & RGB Illuminators



| Parameter                | Characteristics (dimensions in mm)<br>AL0252M & C |
|--------------------------|---|
| Aperture Size (±.25)     | 6.10 x 4.32                                       |
| Aperture (Diagonal)      | 7.47  |
| Body Dimensions          | 15.42 x 11.30                                     |
| Height                   | 5.08  |
| Weight with Wire (grams) | 2 ± .5 grams                                      |
| Angular Radiation        | ±23° FWHM   |
| Operating Temperature    | -20° to +85°C                                     |

ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and Spatial Light Modulator (SLM) display performance with reduced power consumption.

The AL0252 series of ALPHALIGHT™ LED Illuminators provide exceptional high performance diffuse lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

### Design Implementation Advantages

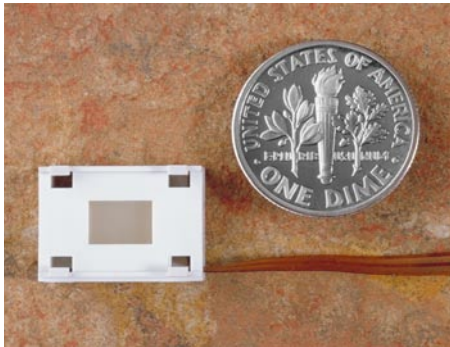
- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

| Parameters<br>(Steady State DC)<br>Ta = 25°C, If = 20 mA | AL0252M-1W                 | AL0252M-1R                 | AL0252M-1G                 | AL0252M-1B                 | AL0252C  |
|--|----------------------------|----------------------------|----------------------------|----------------------------|--|
| Luminance (fL) (±10%)                                    | ≥ 2000                     | ≥ 7900                     | ≥ 8800                     | ≥ 1800                     | ≥ 12800 (EEW: x=.33, y=.33)  |
| Color (±0.02)  | x = .31-.35<br>y = .31-.35 | x = .67-.43<br>y = .27-.33 | x = .14-.28<br>y = .64-.73 | x = .11-.15<br>y = .04-.10 | RED: x = .67-.73, y = .27-.33<br>GREEN: x = .14-.28, y = .67-.74<br>BLUE: x = .11-.15, y = .04-.10 |
| Uniformity (Full Aperture)                               | ≤ 1.4:1                    | ≤ 1.4:1                    | ≤ 1.4:1                    | ≤ 1.4:1                    | ≤ 1.4:1  |
| Power (mW) (Steady State)                                | 120                        | 90                         | 120                        | 120                        | 330  |
| Drive (VDC)  | 3.6-4.0                    | 2.0-3.0                    | 3.5-4.0                    | 3.6-4.0                    | RED = 1.9-2.4, GREEN = 3.5-4.0,<br>BLUE = 3.6-5.0  |
| Projected Life (Hours)*                                  | ≥ 10K                      | ≥ 10K                      | ≥ 10K                      | ≥ 10K                      | ≥ 10K  |

\*Additional derating required for elevated temperatures

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# .50" (10.7mm) Monochrome & RGB Illuminators



| Parameter                | Characteristics (dimensions in mm)<br>AL0505M & C (±.25) |
|--------------------------|--|
| Aperture Size            | 8.4 x 6.5  |
| Aperture (Diagonal)      | 10.7   |
| Body Dimensions          | 18.4 x 14.1  |
| Height                   | 5.46   |
| Weight with Wire (grams) | 4 ± .5 grams   |
| Angular Radiation        | ±23° FWHM  |
| Operating Temperature    | -20° to +85°C  |

ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and Spatial Light Modulator (SLM) display performance with reduced power consumption.

The AL0505 series of ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

| Parameters<br>(Steady State DC)<br>Ta = 25°C, If = 20 mA | AL0505M                    |        |                            |        |                            |        |                            |        | AL0505C  |
|--|----------------------------|--------|----------------------------|--------|----------------------------|--------|----------------------------|--------|--|
|  | -1R                        | -2R    | -1G                        | -2G    | -1B                        | -2B    | -1W                        | -2W    | -1   |
| Luminance (fL) (±10%)                                    | ≥ 5300                     | ≥ 7900 | ≥ 5200                     | ≥ 9600 | ≥ 900                      | ≥ 1500 | ≥ 3800                     | ≥ 6700 | ≥ 9600   |
| Color (±0.02)  | x = .67-.43<br>y = .27-.33 |        | x = .14-.28<br>y = .64-.73 |        | x = .11-.15<br>y = .04-.10 |        | x = .31-.35<br>y = .31-.35 |        | RED: x = .67-.43, y = .27-.33<br>GREEN: x=.14-.28, y = .64-.73<br>BLUE: x = .11-.15, y = .04-.10 |
| Uniformity (Full Aperture)                               | ≤ 1.4:1                    |        |                            |        |                            |        |                            |        |  |
| Power (mW) (Steady State)                                | 90                         | 180    | 120                        | 240    | 120                        | 240    | 120                        | 240    | 330  |
| Drive (VDC)  | 2.0-3.0                    |        | 3.5-4.0                    |        | 3.6-4.0                    |        | 3.6-4.0                    |        | RED=2.0-3.0, GREEN=3.5-4.0;<br>BLUE = 3.6-5.0  |
| Projected Life (Hours)*                                  | ≥ 10K                      |        |                            |        |                            |        |                            |        |  |

\*Additional derating required for elevated temperatures

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# .7" (19.41mm) Monochrome & RGB Illuminators



| Parameter                    | Characteristics (dimensions in mm)<br>AL0707M |
|------------------------------|---|
| Aperture Size (±.25)         | 15.49 x 11.68                                 |
| Aperture (Diagonal)          | 19.41   |
| Body Dimensions              | 25.15 x 18.03                                 |
| Height: -1 Part Number       | 6.73  |
| Weight with 12" Wire (grams) | 6 ± 2 grams                                   |
| Angular Radiation            | ±23° FWHM                                     |
| Operating Temperature        | -20° to +85°C                                 |

ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and Spatial Light Modulator (SLM) display performance with reduced power consumption.

AL0707M-X ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

### Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

| Parameters<br>(Steady State DC)<br>Ta = 25°C, If = 20 mA | AL0707M                    |                            |                            |                            | AL0707C  | SB0707C |
|--|----------------------------|----------------------------|----------------------------|----------------------------|--|---------|
|  | -1R                        | -1G                        | -1B                        | -1W                        | -1   | -2      |
| Luminance (fL) (±10%)                                    | ≥ 6800                     | ≥ 5500                     | ≥ 1000                     | ≥ 3800                     | ≥ 5800   | ≥ 8300  |
| Color (±0.02)  | x = .67-.43<br>y = .27-.33 | x = .14-.28<br>y = .64-.73 | x = .11-.15<br>y = .04-.10 | x = .31-.35<br>y = .31-.35 | RED: x = .67-.43, y = .27-.33<br>GREEN: x = .14-.28, y = .64-.73<br>BLUE: x=.11-.15, y=.04-.10 |         |
| Uniformity (Full Aperture)                               | ≤ 1.4:1                    |                            |                            |                            |  |         |
| Power (mW) (Steady State)                                | 540                        | 720                        | 720                        | 720                        | 1175   | 2460    |
| Drive (VDC)  | 2.0-3.0                    | 3.5-4.0                    | 3.6-4.0                    | 3.6-4.0                    | RED = 2.0-3.0, GREEN = 3.5-4.0,<br>BLUE = 3.6-5.   |         |
| Projected Life (Hours)*                                  | ≥ 10K                      | ≥ 10K                      | ≥ 10K                      | ≥ 10K                      | ≥ 10K  | ≥ 10K   |

\*Additional derating required for elevated temperatures

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# 1.0" (27.18mm) Monochrome & RGB Illuminators



| Parameter             | Characteristics (dimensions in mm) |               |               |
|-----------------------|------------------------------------|---------------|---------------|
|                       | AL1010M                            | SB1010M       | AL1010C       |
| Aperture Size (±.25)  | 21.59 x 16.51                      | 21.59 x 16.51 | 21.59 x 16.51 |
| Aperture (Diagonal)   | 27.18                              | 27.18         | 27.18         |
| Body Dimensions       | 31.24 x 22.78                      | 31.24 x 22.78 | 31.24 x 22.78 |
| Height                | 6.75                               | 12.5          | 19.0          |
| Weight with 12" Wire  | 8 ± 2 grams                        | 11 ± 2 grams  | 8 ± 2 grams   |
| Angular Radiation     | 23° FWHM                           | 23° FWHM      | 23° FWHM      |
| Operating Temperature | -20° to +85°C                      | -40° to +85°C | -40° to +85°C |

ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and Spatial Light Modulator (SLM) display performance with reduced power consumption.

AL1010M-X ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

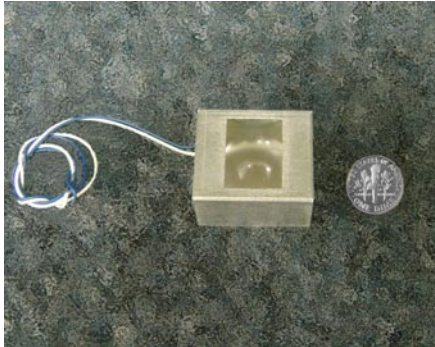
- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

|                            | AL1010M   |        |         |        | AL1010M |        |         |  | AL1010C                                  |
|----------------------------|---|--------|---------|--------|---------|--------|---------|--|--|
|                            | -1R   | -1G    | -1B     | -1W    | -R      | -G     | -B      | -W   | -1                                       |
| Luminance (fL) (±10%)      | ≥ 5700  | ≥ 4800 | ≥ 1100  | ≥ 4400 | ≥ 7200  | ≥ 6400 | ≥ 1300  | ≥ 5600   | ≥ 8000                                   |
| Color (±0.02)              | RED: x = .67-.43, y = .27-.33, GREEN: x = .14-.28, y = .64-.73, BLUE: x = .11-.15, y = .04-.10, WHITE: x = .31-.35, y = .31-.35 |        |         |        |         |        |         | RED: x=.67-.43, y=.27-.33, GREEN: x=.14-.28, y=.64-.73, BLUE: x=.11-.15, y=.04-.10 |  |
| Uniformity (Full Aperture) | ≤ 1.4:1   |        |         |        |         |        |         |  |  |
| Power (mW) (Steady State)  | 720   | 960    | 960     | 960    | 1440    | 1920   | 1920    | 1920   | 1680                                     |
| Drive (VDC)                | 2.0-3.0   |        | 3.5-4.0 |        | 3.6-4.0 |        | 3.6-4.0 |  | RED=2.0-3.0, GREEN=3.5-4.0, BLUE=3.6-4.0 |
| Projected Life (Hours)*    | ≥ 10K   |        |         |        |         |        |         |  |  |

\*Additional derating required for elevated temperatures

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# 1.0" (25mm) Monochrome Color Ultra-Bright



| Parameter                    | Characteristics (dimensions in mm) |               |               |
|------------------------------|------------------------------------|---------------|---------------|
|                              | UB1010M-1R                         | UB1010M-1G    | UB1010M-1B    |
| Aperture Size ( $\pm 0.25$ ) | 20.00 x 15.00                      | 20.00 x 15.00 | 20.00 x 15.00 |
| Aperture (Diagonal)          | 25.00                              | 25.00         | 25.00         |
| Body Dimensions              | 32.00 x 27.00                      | 32.00 x 27.00 | 32.00 x 27.00 |
| Height                       | 20.00                              | 20.00         | 20.00         |
| Weight w/12" Wire (grams)    | 14                                 | 14            | 14            |
| Angular Radiation            | $\pm 1^\circ$                      | $\pm 1^\circ$ | $\pm 1^\circ$ |
| Operating Temperature        | -55° to +70°C                      | -55° to +70°C | -55° to +70°C |

Teledyne's Ultra-Bright Collimated LED Illuminators (UCLI) employ large power chip LEDs (typically 1 mm x 1 mm) together with proprietary optical lensing to produce extremely bright and uniform illuminators for applications such as reflective and transmissive LCDs, light mediated biomedical procedures, automotive and general illumination accent lighting. High optical efficiencies on the order of 85% are obtained with uniformities typically of  $\pm 3\%$ .

Ultra-Bright Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's energy efficient lighting products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

| Parameters (Steady State DC)<br>Ta = 25°C | UB1010M-1R | UB1010M-1G | UB1010M-1B |
|---|------------|------------|------------|
| Luminance (fL) ( $\pm 10\%$ )             | 100,000    | 225,000    | 50,000     |
| Hue ( $\lambda$ nm)                       | 630        | 520        | 475        |
| Uniformity (Full Aperture)                | 1.2:1      | 1.2:1      | 1.2:1      |
| Power (mW)                                | 1350       | 1400       | 1400       |
| Drive (VDC) ( $\pm 0.3$ )                 | 2.0-3.0    | 3.5-4.0    | 3.6-4.0    |
| Drive Current (max) mA*                   | 450        | 350        | 350        |
| Projected Life (Hours)**                  | $\geq 50K$ | $\geq 10K$ | $\geq 10K$ |

\* Requires additional heat-sinking

\*\*Additional derating required for elevated temperatures

Teledyne's Ultra-Bright Collimated LED Illuminators are fully patent protected under patent #5,577,493 with other patents pending. For more information, please visit our website at [www.teledynelighting.com](http://www.teledynelighting.com)

# 1.4" (36.35mm) Monochrome & RGB Illuminators



| Parameter             | Characteristics (dimensions in mm) |               |               |
|-----------------------|------------------------------------|---------------|---------------|
|                       | AL1414M                            | SB1414M       | AL1414C       |
| Aperture Size (±.25)  | 28.45 x 22.61                      | 28.45 x 22.61 | 28.45 x 22.61 |
| Aperture (Diagonal)   | 36.35                              | 36.35         | 36.35         |
| Body Dimensions       | 38.35 x 29.21                      | 38.35 x 29.21 | 38.35 x 29.21 |
| Height                | 6.75                               | 12.7          | 6.75          |
| Weight with 12" Wire  | 11 ± 2 grams                       | 13 ± 2 grams  | 13 ± 2 grams  |
| Angular Radiation     | 23° FWHM                           | 23° FWHM      | 23° FWHM      |
| Operating Temperature | -40° to +85°C                      | -40° to +85°C | -40° to +85°C |

ALPHALIGHT™ Monochrome Color LED Illuminators are ideal for color field sequential lighting (CFSL™) of non-emissive displays. Bright and highly uniform light in each primary color or poly mounted color is achieved through unique solid state design and Non-Imaging, Total Internal Reflection (TIR) optics. High optical efficiencies significantly optimize LCD and Spatial Light Modulator (SLM) display performance with reduced power consumption.

Full Color ALPHALIGHT™ LED Illuminators provide exceptional high performance lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

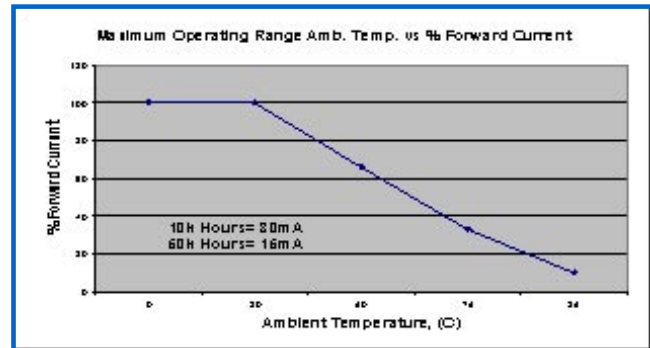
- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

|                            | AL1414M   |        |         |        | SB1414M |        |         |   | AL1414C                                  |
|----------------------------|---|--------|---------|--------|---------|--------|---------|---|--|
|                            | -1R   | -1G    | -1B     | -1W    | -R      | -G     | -B      | -W  | -1                                       |
| Luminance (fL) (±10%)      | ≥ 4600  | ≥ 4800 | ≥ 900   | ≥ 3400 | ≥ 6600  | ≥ 5200 | ≥ 1000  | ≥ 4000  | ≥ 6600                                   |
| Color (±0.02)              | RED: x = .67-.43, y = .27-.33, GREEN: x = .14-28, y = .64-.73, BLUE: x = .11-.15, y = .04-10, WHITE: x = .31-.35, y = .31-.35 |        |         |        |         |        |         | RED: x=.67-.43, y=.27-.33, GREEN: x=.14-28, y=.64-.73, BLUE: x=.11-.15, y=.04-.10 |  |
| Uniformity (Full Aperture) | ≤ 1.4:1   |        |         |        |         |        |         |   |  |
| Power (mW) (Steady State)  | 1080  | 1440   | 1440    | 1440   | 1620    | 2160   | 2160    | 2160  | 2460                                     |
| Drive (VDC)                | 2.0-3.0   |        | 3.5-4.0 |        | 3.6-4.0 |        | 3.6-4.0 |   | RED=2.0-3.0, GREEN=3.5-4.0, BLUE=3.6-4.0 |
| Projected Life (Hours)*    | ≥ 10K   |        |         |        |         |        |         |   |  |

\*Additional derating required for elevated temperatures

Teledyne's ALPHALIGHT™ product is fully patent protected (U.S. Patents #5,440,197, #5,684,354, #5,892,325, #6,043,591 domestically as well as foreign additional patents pending) for this specific application. For more information, please visit our website at [www.teledynelighting.com](http://www.teledynelighting.com)

# 2.0" (50.8mm) White LED Illuminator



ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and small aperture signage display performance with reduced power consumption.

The ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

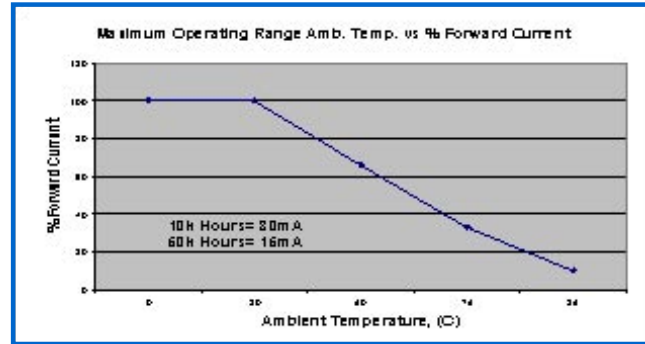
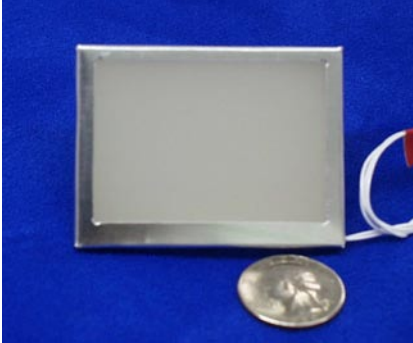
| Parameter             | Characteristics (dimensions in mm) |
|-----------------------|------------------------------------|
| Aperture Size (±.25)  | 39.00 x 31.00                      |
| Aperture (Diagonal)   | 50.8                               |
| Body Dimensions       | 47.00 x 39.40                      |
| Height                | 6.9                                |
| Weight (grams)        | 14 ± 2 grams                       |
| Angular Radiation     | ±23° FWHM                          |
| Operating Temperature | -40° to +85°C                      |

| Parameters (Steady State DC)<br>Ta = 25°C, If = 30 mA | Characteristics          |
|---|--------------------------|
| Luminance (fL) (±10%)                                 | ≥ 3000                   |
| Color (±0.02)   | x = .31-.35, y = .31-.35 |
| Uniformity (Full Aperture)                            | 1.4:1                    |
| Power (mW)  | 1920                     |
| Drive (VDC) (±0.2)                                    | 3.6-4.0                  |
| Projected Life (Hours)*                               | ≥ 10K                    |

\*Additional derating required for elevated temperatures

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# 2.5" (65mm) White LED Illuminator



ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and small aperture signage display performance with reduced power consumption.

The ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

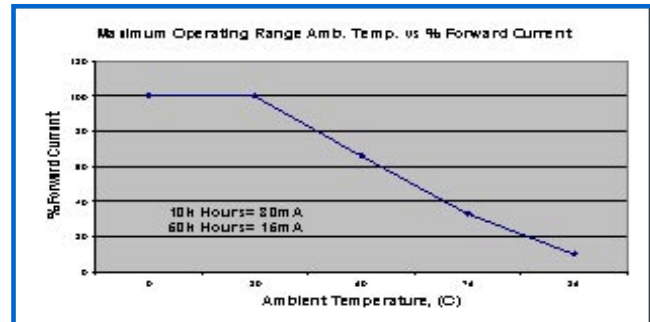
| Parameter             | Characteristics (dimensions in mm) |               |
|-----------------------|------------------------------------|---------------|
|                       | Single Side                        | Double Side   |
| Aperture Size (±.25)  | 52.50 x 39.00                      | 52.50 x 39.00 |
| Aperture (Diagonal)   | 65.00                              | 65.00         |
| Body Dimensions       | 60.00 x 50.00                      | 60.00 x 50.00 |
| Height                | 5.00                               | 5.00          |
| Weight (grams)        | 17.00                              | 18.50         |
| Angular Radiation     | ±23° FWHM                          | ±23° FWHM     |
| Operating Temperature | -40° to +85°C                      | -40° to +85°C |

| Parameters (Steady State DC)<br>Ta = 25°C, If = 30 mA | Characteristics          |
|---|--------------------------|
| Luminance (fL) (±10%)                                 | ≥ 2000                   |
| Color (±0.02)   | x = .31-.35, y = .31-.35 |
| Uniformity (Full Aperture)                            | 1.4:1                    |
| Power (mW)  | 4800                     |
| Drive (VDC) (±0.2)                                    | 3.6-4.0                  |
| Projected Life (Hours)*                               | ≥ 10K                    |

\*Additional derating required for elevated temperatures

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# 4.0" (100mm) White LED Illuminator



ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and small aperture signage display performance with reduced power consumption.

The ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

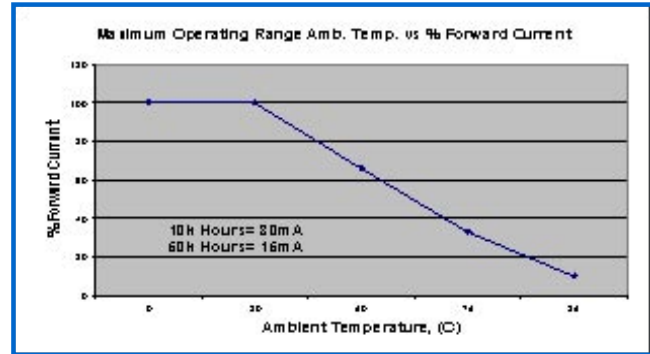
| Parameter             | Characteristics (dimensions in mm) |
|-----------------------|------------------------------------|
| Aperture Size (±.25)  | 81.25 x 61.25                      |
| Aperture (Diagonal)   | 100                                |
| Body Dimensions       | 84.75 x 72.25                      |
| Height                | 5.00                               |
| Weight (grams)        | 34.00                              |
| Angular Radiation     | ±23° FWHM                          |
| Operating Temperature | -40° to +85°C                      |

| Parameters (Steady State DC)<br>Ta = 25°C, If = 30 mA | Characteristics          |
|---|--------------------------|
| Luminance (fL) (±10%)                                 | ≥ 800                    |
| Color (±0.02)   | x = .31-.35, y = .31-.35 |
| Uniformity (Full Aperture)                            | 1.4:1                    |
| Power (mW)  | 2800                     |
| Drive (VDC) (±0.2)                                    | 3.6-4.0                  |
| Projected Life (Hours)*                               | ≥ 10K                    |

\*Additional derating required for elevated temperatures

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# 5.8" (151.6mm) White LED Illuminator



ALPHALIGHT™ LED Illuminators are available in standard and custom formats. They are ideal for lighting non-emissive displays. Bright and highly uniform light is achieved through unique solid state design using Teledyne's patented and proprietary technology. High optical efficiencies significantly optimize LCD and small aperture signage display performance with reduced power consumption.

The ALPHALIGHT™ LED Illuminators provide exceptional high performance uniform lighting. Products are available in monochrome, full color or specialized versions such as IR and NVIS. ALPHALIGHT™ Illuminators operate over a wide temperature range, are relatively immune to vibration and mechanical shock, making them an ideal choice for today's portable products.

## Design Implementation Advantages

- Compact, rugged, lightweight product
- Fast response < 100 ns on/off address
- Long life
- Low voltage/power efficient operation
- 15,000:1 dynamic full range dimming
- High optical efficiency
- Eliminates DC-AC inverter/power supply
- No warm-up and no over voltage start
- High reliability

| Parameter             | Characteristics (dimensions in mm) |
|-----------------------|------------------------------------|
| Aperture Size (±.25)  | 129.5 x 78.7                       |
| Aperture (Diagonal)   | 151.6                              |
| Body Dimensions       | 140.0 x 89.0                       |
| Height                | 7.6                                |
| Weight (grams)        | 105                                |
| Angular Radiation     | ±23° FWHM                          |
| Operating Temperature | -40° to +85°C                      |

| Parameters (Steady State DC)<br>Ta = 25°C, If = 30 mA | Characteristics          |
|---|--------------------------|
| Luminance (fL) (±10%)                                 | ≥ 800                    |
| Color (±0.02)   | x = .31-.35, y = .31-.35 |
| Uniformity (Full Aperture)                            | 1.4:1                    |
| Power (mW)*   | 3360                     |
| Drive (VDC) (±0.2)                                    | 3.6-4.0                  |
| Projected Life (Hours)**                              | ≥ 10K                    |

\*Thermal coupling backside of Illuminator required for operating power levels above 7.5 W  
 \*\*Additional derating required for elevated temperatures

Teledyne's ALPHALIGHT™ product is fully patent protected (U.S. Patents #5,440,197, #5,684,354, #5,892,325, #6,043,591 domestically as well as foreign additional patents pending) for this specific application. For more information, please visit our website at [www.teledynelighting.com](http://www.teledynelighting.com)