

lighting



CAPABILITIES



ARROW ELECTRONICS LIGHTING

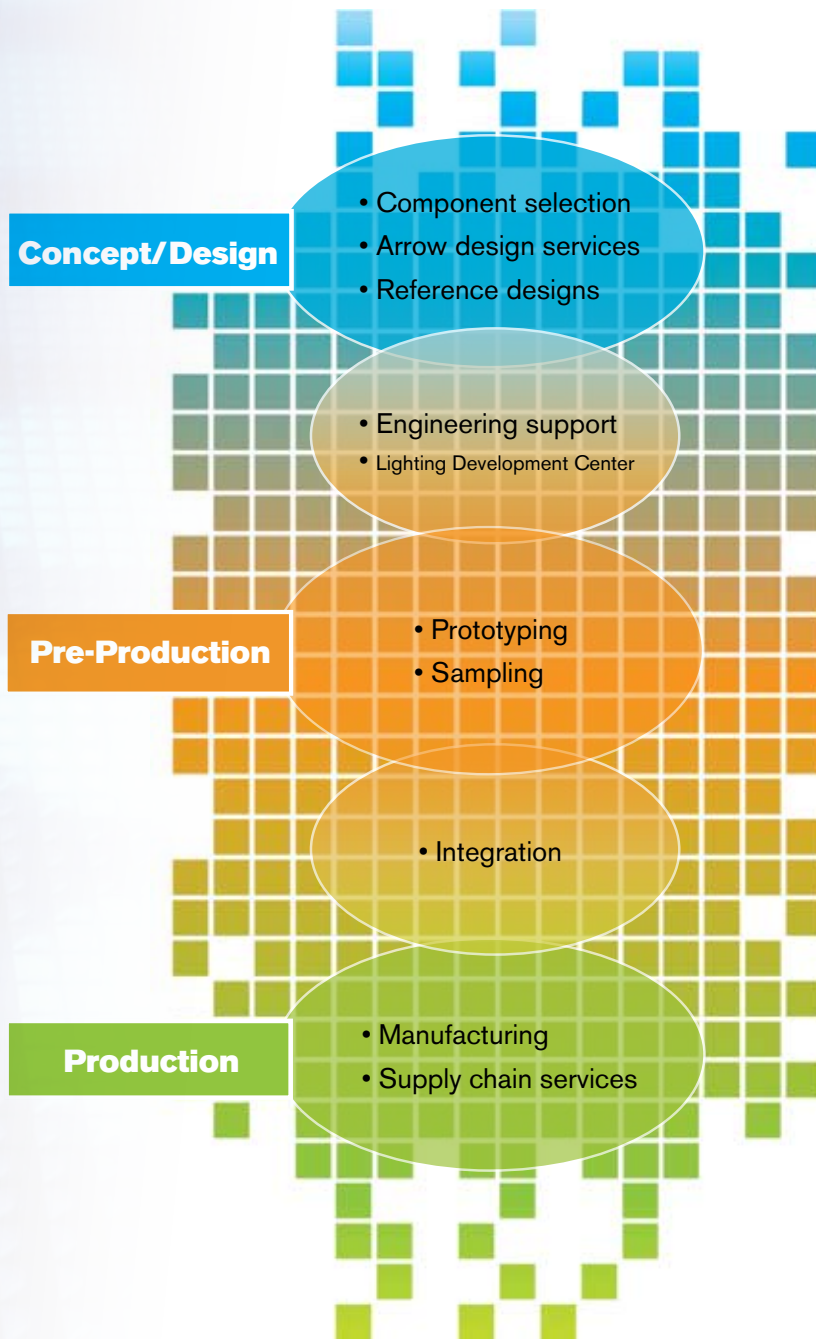
Arrow Lighting is dedicated to providing efficient and reliable LED system alternatives to traditional lighting. As a world-class global electronics distributor, Arrow Electronics offers a vast selection of products, services, and complete solutions to support your solid-state lighting needs from concept development to production.

Vast Lighting Line Card and Unrivaled Support

Our deep and broad line card features components and complete solutions from leading lighting manufacturers, and our renowned services, including comprehensive design, lighting engineering support, and systems integration capabilities, are backed by Arrow's distinguished technical know-how. Arrow Lighting can meet or exceed all your lighting needs and accelerate your journey to market whether you need support for general lighting, portable, transportation, signage, or backlighting design.



CONCEPT-TO-PRODUCTION SUPPORT



MAKING THE WORLD GREENER WITH COMPLETE LED SOLUTIONS

LEDs are considered efficient, but to be truly so, you need a complete, energy-efficient solution. Arrow's broad line card of manufacturers offers a full selection of components, integrated devices, and design kits to make a complete solution that helps maximize the efficiency of LEDs. Arrow Lighting can pull the right parts together for the optimal result. We can solve even the most challenging lighting scenarios and help you protect the environment at the same time.



Breadth of technologies for your next solution:

- LEDs
- LED drivers (chip sets and modules)
- Optics
- Thermal management solutions (heat sinks, metal-clad PCBs, and fans)
- Light engine modules
- Controls
- Passive components
- Connectors



THE RIGHT TEAM— BUILDING RELATIONSHIPS TO BUILD SOLUTIONS

Arrow Lighting is comprised of experienced lighting specialists and trained lighting applications engineers who are among the industry's most knowledgeable experts and provide unbiased guidance on your specific applications. They are backed by our local field applications engineers (FAEs), who typically have a minimum of 10 years of design experience. Getting our lighting professionals and FAEs engaged early in your design provides insight into which products, solutions, and services are ideal for your specific needs at each point in the design cycle.

ARROW'S ENGINEERING SERVICES SET US—AND YOU—APART

A comprehensive, innovative, and solution-focused approach sets Arrow's engineering services apart. Some of the ways we'll help move your lighting design from concept to production faster:

- **arrowdevtools.com™:** This intuitive online development tool selection and purchasing process gives you fast access to a broad range of development tools
- **TestdriveSM Tool Evaluation Program:** Try tools before you buy them—free of charge for 21 days
- **Arrow Consulting Engineering Services (ACES):** Access pre-screened, qualified, and certified third-party lighting design and integration service companies
- **Engineering Solutions Center:** Your FAE can access expertise for any application; our FAEs are fortified by an Arrow team of specialists in lighting, as well as specialists in several other end markets, and by our supplier network





ARROW LIGHTING DEVELOPMENT CENTER— SOPHISTICATED SUPPORT AND SOLUTIONS

The Arrow Lighting Development Center provides proof-of-concept retrofits, product evaluation from driver, optic, and thermal perspectives, and helpful demonstrations. The center also offers value-add LED solution sampling and prototyping, test and measurement, and access to state-of-the-art equipment and design tools to assist with your solid-state lighting design needs and minimize application development cycles.

Circuit-Board-Mounted LEDs

Samples of LEDs mounted on circuit boards are available to speed your proof of concept and design decisions. Whether you require standard, in-stock boards, or need to meet specific configurations, we can get you to prototype and production quickly. Arrow can guide you from concept through production to satisfy your requirements.

WORLD-CLASS SUPPLY CHAIN AND VALUE-ADD SERVICES

Arrow's renowned supply chain and value-add services offer flexibility and responsiveness for your product demand, and deliver the value you've come to expect from a world-class distributor. Our staff, facilities, and infrastructure are ready to meet your needs at every point. Just a few of the services offered by Arrow:

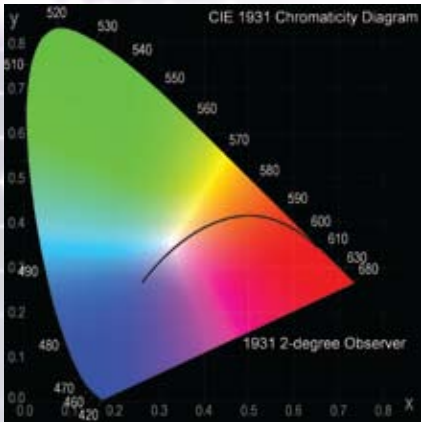
- *Vendor managed inventory*
- *In-plant stores*
- *Consignment programs*
- *Supply chain integration*
- *Breaking Tape & Reel capabilities*
- *Advanced Manufacturing Support Services (AMSS)*
- *Global design and manufacturing support*
- *Value-add binning*



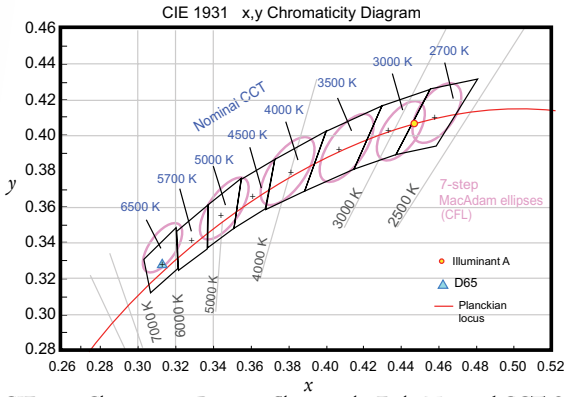
BINNING FOR COST-EFFECTIVE, OPTIMAL RESULTS

Arrow Lighting works closely with you to ensure optimal results on any binning requirement for consistent light output and color. Specific bin selection of LEDs may be necessary to optimize your lighting design for certain applications. In other cases, tight binning may not be required, or a system can be engineered with design methods to avoid or limit bin sorting and accept full distribution.

Arrow's expertise in working with manufacturers' binning variables, in conjunction with our large supply of inventory, enables us to assist with product selection and deliver consistent results. We offer tight binning for applications requiring closely matched LEDs, and we know how to eliminate bin sorting to save you time and money. By working with Arrow lighting specialists from the beginning of the design process, we can formulate designs that minimize binning requirements for your application and reduce component costs and lead times while still meeting your lighting needs.



CIE 1931 Chromatic Chart



CIE 1931 Chromaticity Diagram Showing the Eight Nominal CCT Quadrangles

LED manufacturers use some or all of the following parameters to define their unique bin selections for LEDs:

- *Luminous intensity - measured in candelas*
- *Luminous flux - measured in lumens*
- *Voltage - measured in volts*
- *Color chromaticity - plotted as x and y coordinates, dominant wavelength, or color temperature (white only)*

MARKET SPECIALIZATION

Arrow Lighting continuously researches new markets with potential for growth in order to discover opportunities to expand your business. We forge key partnerships with new and existing manufacturers to deliver complete solutions, expanding well beyond traditional component support. Along with our focus on five lighting markets, our specialization in solid-state lighting crosses over to the medical, aerospace and defense, and alternative energy markets.

Features and Benefits of LEDs:

- *Vast range of styling options*
- *Less maintenance required*
- *Lower total cost of ownership*
- *Can produce any color in the spectrum*
- *Small size*
- *High reliability and long lifetime*
- *Ability to operate in hot and cold temperatures*
- *Resistant to shock and vibration*
- *Aesthetically pleasing*
- *Capable of flashing without reduced life span*
- *Dimmability*
- *Environmentally friendly; lead- and mercury-free*



GENERAL LIGHTING

LEDs bring extraordinary flexibility to indoor and outdoor lighting designs and because of this, the possibilities for general lighting are almost boundless. You can use LEDs to create mood, interest, and drama for architectural, commercial, and other general lighting applications through dimming options and the broad range of colors available—warm white, cool white, and every color in the spectrum.

In addition, the small form factor and high brightness of LEDs make them an ideal solution for applications where space is limited or changing a traditional light source is cost prohibitive, which often are the case for commercial and architectural applications. LEDs offer true saturated colors and a wide temperature range, and dimming extends LED component life without changing color temperature. Long life and low maintenance requirements lower total cost of ownership. They're easily integrated with control systems, and can be designed to operate off any voltage input. Low energy consumption and the lack of harmful content contribute to the greening of your general lighting designs.

Applications:

- *Linear lighting*
- *Spot lighting*
- *Bulb retrofits*
- *Street and area lighting*
- *Downlighting*
- *Task lighting*
- *Color mixing*
- *High bay/low bay lighting*
- *Decorative lighting*
- *Wall washing*
- *Exit*
- *Cove lighting*
- *Emergency*
- *Wall pack*
- *Under cabinet*



PORTABLE

Advantages of LEDs over traditional light sources make for excellent opportunities in portable lighting. The extreme durability and high efficiency of LEDs spell higher reliability, and their compact nature means portable lights can be small and light weight yet effective. The illumination pattern of LEDs is much more uniform than that of a traditional bulb. And, another major customer “care about”—the extremely long lifetimes of LEDs lower lifetime costs significantly.

Applications:

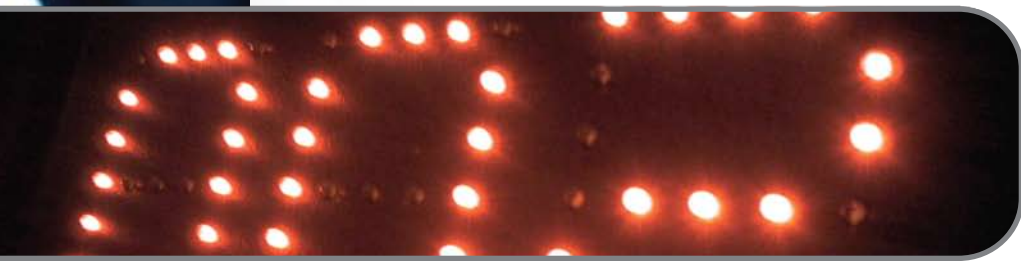
- *Consumer flashlights*
- *Tactical flashlights*
- *Bicycle headlights and tail lights*
- *Medical headlamps*
- *Work lamps*
- *Military*
- *Other application-specific portable lights*

TRANSPORTATION

This market includes the full spectrum of transportation applications. Lighting for transportation is a necessity that provides many opportunities to improve safety standards and aesthetic appeal. LEDs in transportation applications are designed to reduce energy consumption, extend lifetimes to lower replacement costs, and provide more natural lighting than conventional fluorescent tubing for passenger comfort. Numerous interior and exterior applications can benefit from LEDs, and the prospects are continuing to expand.

Applications:

- *Automotive exterior and interior*
- *Emergency vehicle*
- *Motorcycle*
- *Accent lighting*
- *Truck/bus*
- *Airplane*
- *Reading*
- *Marker/signal*
- *Other (RVs, yachts, etc.)*



SIGNAGE

LEDs are gaining ground in this territory once dominated by neon and other light sources. Readability at distances, effective luminance, appropriate viewing angle and set back, and shading are all factors that can be controlled by using LEDs. Their dimmable and programmable nature make them a natural fit for signage applications. LEDs are solid-state devices with low power consumption. There are millions of color options available using RGB emitters.

Applications:

- *Channel letter*
- *Variable-message signs*
- *Scoreboards*
- *Electronic billboards*
- *Full-color video displays*
- *Backlighting signage*
- *Traffic indication*
- *Traffic lights*

BACKLIGHTING

Backlighting applications provide an enormous opportunity to replace existing cold-cathode fluorescent lamp (CCFL) technology with LEDs. The advantages of using LED backlighting have already been observed in the LCDs of cell phones, and their use is increasing in televisions, monitors, and notebook computers. LEDs provide more saturated colors, have longer life, consume less power, and come in smaller sizes than their CCFL counterparts. They're also immune to vibration and offer precise control over intensity.

Applications:

- *Medical*
- *Aerospace and defense*
- *LCD TVs/monitors*
- *Notebook computers*
- *Handheld devices/PDAs*
- *Digital cameras and camcorders*
- *Keypads*
- *Full-color displays*
- *Projection*

DISPLAY SOLUTIONS

Arrow OEM Computing Solutions delivers some of the world's best panel-display solutions at competitive prices for both active and passive matrixes. Affordable integrated touch screens and LED backlights, enhanced brightness, and improved sunlight readability are just a few of the benefits. Arrow has the expertise to tie your entire lighting solution together.

RESEARCH, DESIGN, AND BUY LIGHTING.ARROW.COM



Visit lighting.arrow.com for:

- *The Arrow LED Selector Tool and its detailed LED parametric search*
- *Technical papers and reference designs*
- *Events and trainings*
- *New products*
- *Full solutions*
- *Part search capabilities*
- *Design tools*

Arrow's dedicated lighting website offers information organized according to the way you most often do business—first research, then design, and finally buy.



ARROW LIGHTING. COMPLETE LIGHTING SOLUTIONS.

Arrow Lighting's vast selection of products from the world's leading lighting manufacturers, unmatched lighting engineering support, and renowned supply chain management capabilities support you at each step of your design cycle, from concept to production, maximizing efficiencies and streamlining your journey to market.

To best address your needs, our representatives are located in a city near you. Call **1-888-9LIGHT1** to speak with your local Arrow Lighting representative, or visit **lighting.arrow.com** to view our line card and experience our world-class website.



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