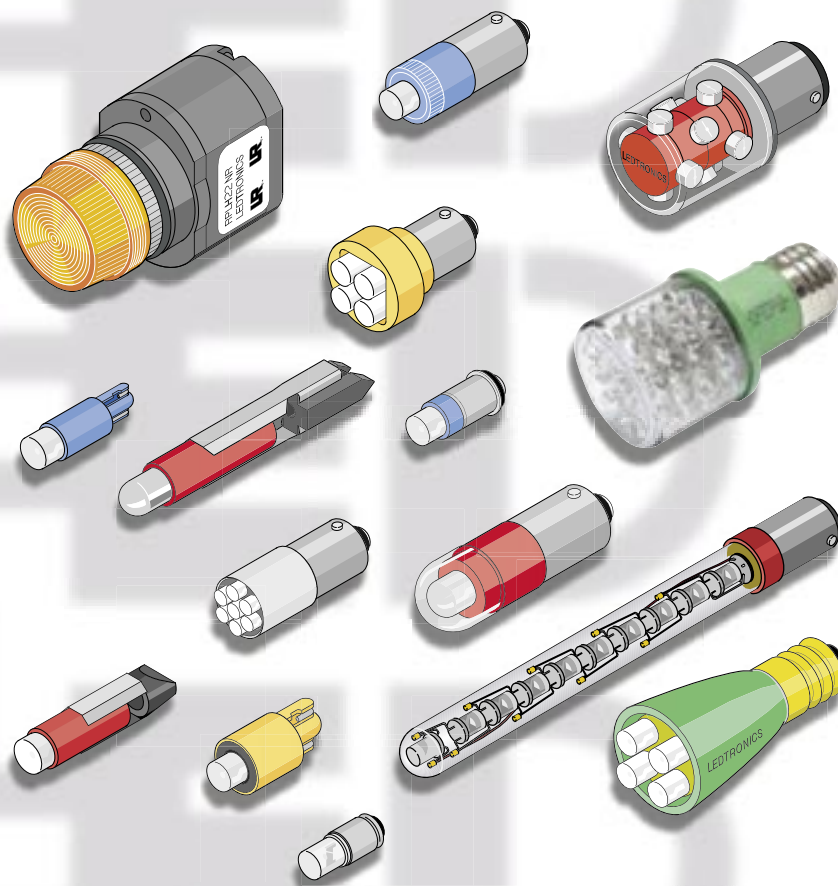


standard catalog

LEDtronics Standard Products



LED[®]
LEDTRONICS, INC.[®]
THE FUTURE OF LIGHT

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Website: www.ledtronics.com

Once limited to simple status indicators, Light Emitting Diodes (LEDs) now play prominent roles in back lighting, panel indication, decorative illumination, emergency lighting, animated signage, etc.... The emergence of LEDs as a viable alternative to incandescent lighting can be attributed to new manufacturing technologies, packaging innovations and an increasing number of colors. These factors along with the growing awareness of the advantages of LEDs (e.g., a life span measured in years not hours, vivid sunlight-visible colors and low power requirements) have engineers, product designers, purchasing agents and component vendors viewing LEDs in a whole new light.

For many applications LED lamps are superior to incandescent lighting. So why is it that in tens of millions of switches, indicators, control panels, signs, annunciators, displays, decor lights and dozens of other applications, design engineers still specify incandescent technology? It might be that they're just a few years behind what's really happening in LED illumination.

Although advances made in LED technology in the past few years have dramatically broadened the applications for these rugged little light sources, it wasn't that long ago that red was the only "daylight-visible" colored LED. And that wasn't the only thing limiting their use!

Unlike incandescent bulbs that give off the full spectrum of light in a spherical pattern, LEDs emit a focused beam of a single wavelength (color) in only one direction, in a variety of angles. For many applications, such as indicators or switch illuminators, this is not a problem, but it took the development of multi-chip arrays and high-flux LED chips to begin to achieve the effect of an incandescent filament.

Major advancements in LED technology have taken place in recent years such as development of new "doping" technologies that increase LED light output by as much as 20 times over earlier generations, and allow the production of daylight-visible LEDs in virtually any color of the spectrum. In addition to red, yellow, and amber/orange, LEDs are now available in many colors from leaf green to ultra blue. Even white light, long thought to be an impossibility, is now available in three different shades as a light-emitting diode.

The efficiency of LEDs is most apparent in applications requiring color. Light from a typical incandescent bulb must be filtered so that only light from a particular part of the spectrum (e.g., red, amber or green, etc...) for example—is visible. While LEDs deliver 100 percent of their energy as colored light, incandescent bulbs waste 90 percent or more of their energy in light blocked by the colored lens or filter. Incandescent bulbs also waste 80 percent to 90 percent of their energy on heat generation to reach the temperature for which (Kelvin scale) they are designed.

The point is that what was once a fairly marginal light source isn't marginal any more. In many applications, LEDs exceed the energy available from incandescent bulbs and offer significant additional benefits making LED clusters and lamps as friendly to the environment as they are to the operating budget.

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Cross Reference: Incandescent to LED

<u>Series</u>	<u>Page</u>	<u>Replaces Incandescents *</u>
5SBF200, 5SB206	14	(24V) 24PSB; (28V) 28PSB; (120V) 120PSB
BBL504	15	S14, (25mm Edison Screw Base)
BBL508	15	S19, (25mm Edison Screw Base)
BF304	11	(6V) 6MB, 44, 47, 755; (24V) 24MB; (120VAC) 120MB, NE51H
BF3126, BF3127	12	(6V) 6MB, 44, 47, 755; (12/14V) 12MB, 756; (24V) 24MB;
		(28V) 313, 757, 1819, 1829; (120VAC) 120MB, NE51H
BF321	10	(5/6V) 6MB, 44, 47, 755; (12/14V) 12MB, 756; (24V) 24MB;
		(28V) 313, 757, 1819, 1829; (120VAC) 120MB, NE51H
BSD-1118	15	1835
BSD-1279	15	1819
EXL-R-011A	17	15T6
EXL-R-021A	17	20T6 1/2 DC
EXL-R-031A	17	20T6 1/2 IF
F206	7	(5V) 328, 345, 350 (28V) 330, 382, 394
FF200	7	(12/14V) 330, 382, 394; (24) 330, 382, 394; (28) 327, 376, 387
GF200	8	(28V) 334, 388
RPLB-020x	10	(28V) 313, 757, 1819, 1829
RPLH16	18	ET16 or Equivalent
RPLH22	18	N/A
RPLH30	18	N/A
SLF464	13	S6
SL467	13	S6
STL602	16	BA15d
STL604	16	BA15d
UTL-1819	15	1819
UTL-1835	15	1835
UTL24X	14	T2-#2 Teleslide Incandescent Lamps #24X, #24E
WF150	6	(28V) 17, 85
WF200	6	(12/14V) 56, 79, 84, 86; (24V) 18, 37, 73, 74; (28V) 17, 85
WF206	6	(28V) 17, 85
WF321	9	(12/14V) 124, 194, 658, 2080, 936; (28V) 656, 657, 400, 464, 655

* Replacement subject to application specific criteria

What lamp is being replaced?	Part number, size, wattage, intensity, etc.
Base Size?	T1½, T1¾, T3¼, S6, 15mm etc.
Base Style?	Bayonet, candelabra screw, Edison screw, etc.
Operating Voltage and Polarity?	120Vac, 24Vdc, 12Vdc, center contact positive etc.
Viewing Distance?	How far is the operator / technician from the indicator; 5 to 10 feet, 20 to 50 feet, 100 to 200 feet, 500 to 1000 feet, etc.
Viewing Angle?	From what angle must the lamp be visible. 
Lens Type?	Diffused, clear, fluted, etc.
LED Color?	Red, Green, Yellow, Blue, Orange, White.
Ambient Lighting?	Office, factory, warehouse, direct sunlight, indirect sunlight.
Regulatory Requirements or Specifications?	SAE, ITE, Mil-Spec, IES, NEMA, UL, etc.
Is There an External Resistor Used in Series with the Lamp?	If yes, Ohms _____, Watts _____
Potential Quantity and Target Price?	How many pieces are required within a given time frame and what is the estimated budgetary funding allowable for this item or project.

Application notes Rev 1-2006



Based LED Questionnaire

Date _____

About you

The following information assists LEDtronics in determining the most appropriate LED product SAMPLE. Fax to (310) 534-1424 for fast response.

Name: _____ Phone: (____) _____

Company: _____ Fax: (____) _____

Address: _____ M/S: _____

City: _____ State: _____ Zip: _____

E-Mail: _____ Company Website: www. _____

About your company

What does your company manufacture _____

Is your company Govt/Military Govt Contractor OEM Distributor Utility MRO

Requirement is for R&D Replacement New Application Other _____

Total annual quantity _____

Target price _____ Time frame Immediate 3 months 6 months

For internal use only


SIC code: _____

Originator: _____


Rep: _____

Current Customer Yes No


About your application


 Incandescent/LED No. _____ mAmps _____ Design Volts _____ MSCD _____


Base size T1 T2 T1^{3/4} T3^{1/4} S6 15mm Other _____

 Base type Flange Bayonet Wedge Bi-pin Screw Groove Other _____

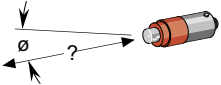
Operating voltage (max) 5V 12V 24V 28V 120VAC Other _____

 Center contact
Voltage (type) AC DC Bipolar Polarity of center contact + -

 Lens color Red Orange Amber Yellow White Green Blue Other _____


 Lens type Clear Diffused Lens size 16mm 22mm 30mm Other _____

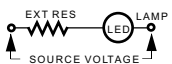
Lens shape Circular Square Rectangular
 Jelly-jar Other _____

 Ambient lighting conditions Indirect sunlight Direct sun Office Lowlight Darkroom

Maximum viewing distance desired 1 ft 5 ft 10 ft 20 ft 50 ft Other _____

Maximum viewing angle desired Straight on 30° 60° 90° Other _____

 Distance between top of lamp and lens/filter 1/8" 1/4" 1/2" Other _____

 Is an external resistor in series with the lamp Yes No If yes, Ohms _____ Watts _____

What is the source voltage? (If higher than the operating voltage of the lamp) _____

Would like updated literature Yes No More info on: Based Panel PCB Discrete Other _____

Applicable statutory and regulatory requirements Yes No Doc. No. _____

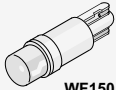
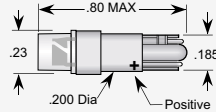
Additional Notes/Sketches



T1½, T1¾ Midget Wedge Based LED Bulbs

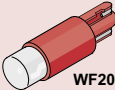
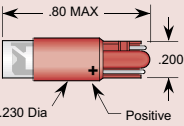

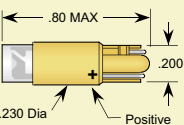

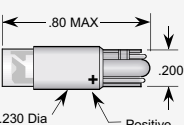

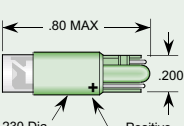
T1½ (4.5mm) Midget Wedge Based LED Bulbs

Sunlight Visible, Wide-Angle Beam Width


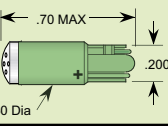
Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
Cool White InGaN  WF150 	17, 85	WF150-0CW-028V	28V	15	120°	V = DC only

T1¾ (5mm) Midget Wedge Based LED Bulbs

Sunlight Visible, Wide-Angle Beam Width

Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAlAs  WF200 	56,79,84,86	WF200-0UR-014V	12/14V	20	120°	V = DC only
	17, 85 18,37,73,74	WF200-0UR-028V	24V/28V	15		
595nm Super Yellow InGaAlP  WF200 	17, 85 18,37,73,74	WF200-0UY-028V	24V/28V	15	120°	V = DC only
8000K Cool White InGaN  WF200 	56,79,84,86	WF200-0CW-014V	12/14V	15	120°	V = DC only
	17, 85 18,37,73,74	WF200-0CW-028V	24V/28V	15		
525nm Aqua Green InGaN  WF200 	17, 85 18,37,73,74	WF200-0AG-028V	24V/28V	15	120°	V = DC only

6-Chip, High-Efficiency, Standard Intensity, Wide-Angle Beam Width

Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
565nm Hi-Efficiency Green GaP/GaP  W206 	17, 85	W206CG6-0004	28V	12-14	160°	V = DC only

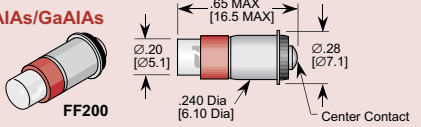

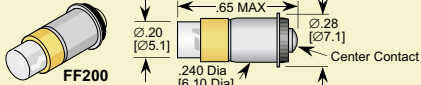
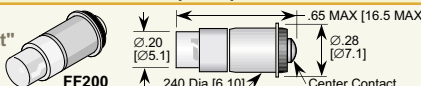
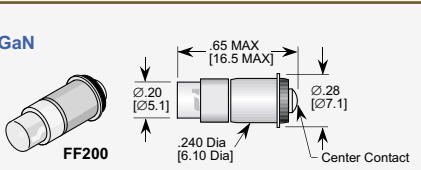
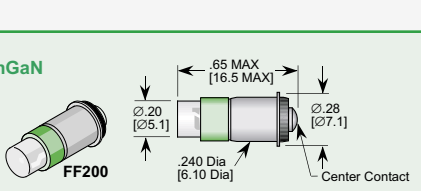
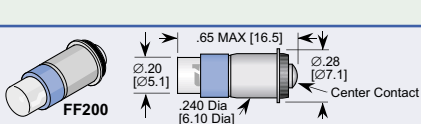
All dimensions in inches. For millimeters multiply by 25.4

Log # WF200 Rev 1-2006

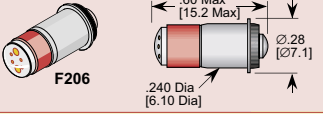
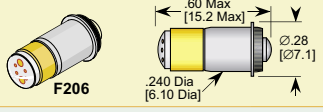
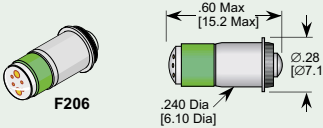


T1³/₄ (5mm) Midget Flange Based LED Bulbs

Single-Chip LED, Sunlight Visible, Wide-Angle Beam Width


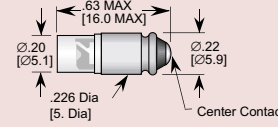

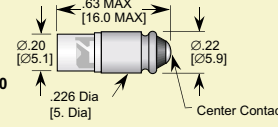

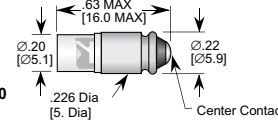

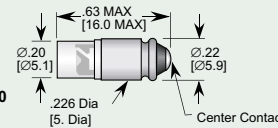
Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAlAs 	328,345,350	FF200-0UR-014B	12/14V	20	120°	B = BiPolar
	330,382,394	FF200-0UR-024B	24V	15		
	327,376,387	FF200-0UR-028B	28V	15		
620nm Super Orange InGaAlP 	327,376,387	FF200-0UO-028B	28V	15	120°	B = BiPolar
595nm Super Yellow InGaAlP 	328,345,350	FF200-0UY-014B	12/14V	20	120°	B = BiPolar
	327,376,387	FF200-0UY-028B	28V	15		
3000K "Incandescent" White InGaN 	327,376,387	FF200-2IW-028B	28V	15	120°	B = BiPolar
8000K Cool White InGaN 	328,345,350	FF200-0CW-014B	12/14V	15	120°	B = BiPolar A = AC Only
	330,382,394	FF200-0CW-024B	24V	15		
	327,376,387	FF200-0CW-028B	28V	15		
		FF200-0CW-120A	120VAC	6		
525nm Aqua Green InGaN 	328,345,350	FF200-0AG-014B	12/14V	15	120°	B = BiPolar A = AC Only
	330,382,394	FF200-0AG-024B	24V	15		
	327,376,387	FF200-0AG-028B	28V	15		
		FF200-0AG-120A	120VAC	6		
470nm Super Blue InGaN 	328,345,350	FF200-0PB-014B	12/14V	15	120°	B = BiPolar
	327,376,387	FF200-0PB-028B	28V	15		

6-Chip LED, High-Efficiency, Standard Intensity, Wide-Angle Beam Width

Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Center Contact Polarity
			Voltage V typ	Current mA typ		
635nm Hi-Efficiency Red GaAsP/GaAlP 	330,382,394	F206CR6-0027	28V	12-14	160°	Positive (+)
	330,382,394	F206CR6-0007	28V	12-14		Bipolar (+/-)
585nm Hi-Efficiency Yellow GaAsP/GaP 	327,376,387	F206CY6-0007	28V	12-14	160°	Negative (-)
565nm Hi-Efficiency Green GaP/GaP 	328,345,350	F206CG6-0009	5V	36-42	160°	Positive (+)
	330,382,394	F206CG6-0003	28V	12-14		Bipolar (+/-)
	330,382,394	F206CG6-0001	28V	12-14		Negative (-)
	330,382,394	F206CG6-0002	28V	12-14		Positive (+)
		F206CG6-0006	120VAC	6-8		AC Voltage

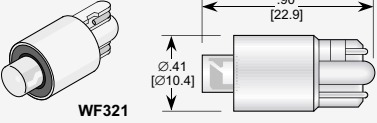
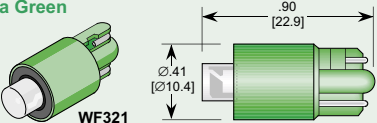
All dimensions in inches. For millimeters multiply by 25.4

Single-LED, Sunlight Visible, Wide-Angle Beam Width

Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAlAs  GF200 	334,388	GF200-0UR-028B	28V	15	120°	B = BiPolar DC
595nm Super Yellow InGaIP  GF200 	334,388	GF200-0UY-028B	28V	15	120°	B = BiPolar DC
8000K Cool White InGaN  GF200 	334,388	GF200-0CW-028B	28V	15	120°	B = BiPolar DC
525nm Aqua Green InGaN  GF200 	334,388	GF200-0AG-028B	28V	15	120°	B = BiPolar DC

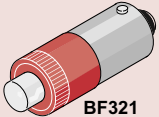
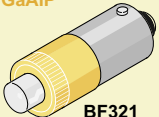
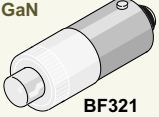
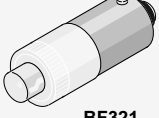
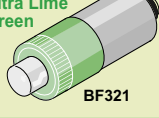
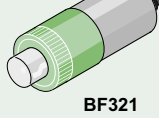
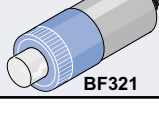
All dimensions in inches. [mm]

Single-LED, Sunlight Visible, Wide-Angle Beam Width

Miniature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
8000K Cool White InGaN  <p>WF321</p>	124,194,658,2080,936	WF321-0CW-014B	12/14V	15	120°	B = Bipolar DC,
	656,657,400,464,655	WF321-0CW-028B	28V	15		
525nm Aqua Green InGaN  <p>WF321</p>	656,657,400,464,655	WF321-0AG-028B	28V	15	120°	B = Bipolar DC,

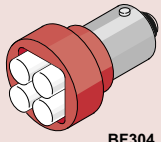
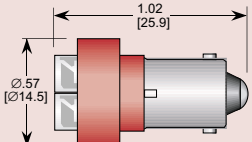
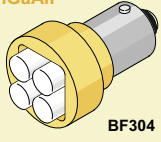
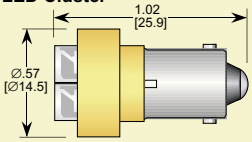
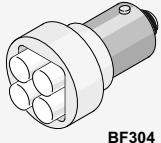
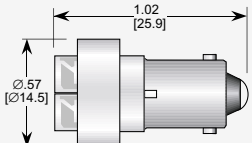
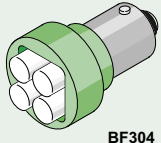
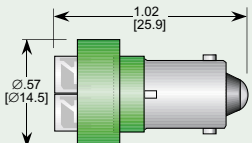
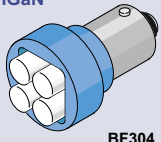
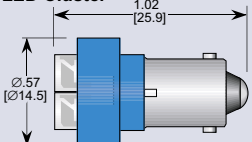
All dimensions in inches. [mm]

Single-LED, Sunlight Visible, Wide-Angle Beam Width

Miniature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAs  BF321	6MB, 44, 47, 755	BF321-0UR-006B	6V	20	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF321-0UR-014B	12/14V	20		
	24MB	BF321-0UR-024B	24V	20		
	313,757,1819,1829	BF321-0UR-028B	28V	20		
	120MB, NE51H	BF321-0UR-120A	120VAC	10		
		BF321-0UR-130B	130V	8		
595nm Super Yellow InGaAlP  BF321	6MB, 44, 47, 755	BF321-0UY-006B	6V	20	120°	B = Bipolar DC, A = AC only
	24MB	BF321-0UY-024B	24V	20		
	313,757,1819,1829	BF321-0UY-028B	28V	20		
	120MB, NE51H	BF321-0UY-120A	120VAC	10		
		BF321-0UY-130B	130V	8		
3000K Incandescent White InGaN  BF321	6MB, 44, 47, 755	BF321-0IW-006B	6V	15	120°	B = Bipolar DC, A = AC only
	24MB	BF321-0IW-024B	24V	15		
	313,757,1819,1829	BF321-0IW-028B	28V	15		
	120MB, NE51H	BF321-0IW-120A	120VAC	10		
		BF321-0IW-130B	130V	8		
8000K Cool White InGaN  BF321	6MB, 44, 47, 755	BF321-0CW-006B	6V	15	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF321-0CW-014B	12/14V	15		
	24MB	BF321-0CW-024B	24V	15		
	313,757,1819,1829	BF321-0CW-028B	28V	15		
	120MB, NE51H	BF321-0CW-120A	120VAC	10		
		BF321-0CW-130B	130V	8		
570nm Ultra Lime Green InGaAlP  BF321	6MB, 44, 47, 755	BF321-0UG-006B	6V	20	120°	B = Bipolar DC, A = AC only
	120MB, NE51H	BF321-0UG-120A	120VAC	10		
525nm Aqua Green InGaN  BF321	6MB, 44, 47, 755	BF321-0AG-006B	6V	15	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF321-0AG-014B	12/14V	15		
	24MB	BF321-0AG-024B	24V	15		
	313,757,1819,1829	BF321-0AG-028B	28V	15		
	120MB, NE51H	BF321-0AG-120A	120VAC	10		
		BF321-0AG-130B	130V	8		
470nm Super Blue InGaN  BF321	6MB, 44, 47, 755	BF321-0PB-006B	6V	15	120°	B = Bipolar DC, A = AC only
	24MB	BF321-0PB-024B	24V	15		
	313,757,1819,1829	BF321-0PB-028B	28V	15		
	120MB, NE51H	BF321-0PB-120A	120VAC	10		

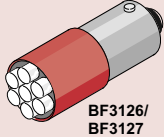
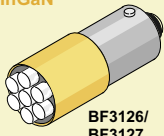
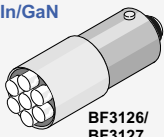

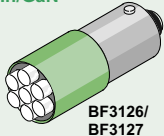
All dimensions in inches. [mm]

4-LED Cluster, Sunlight Visible, Wide-Angle Beam Width

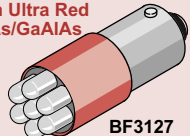
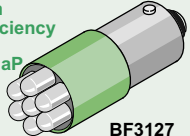
Miniature Packages		Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
				Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAs  BF304	T3¼ (9mm) Miniature Bayonet LED Cluster 	6MB, 44, 47, 755	BF304-0UR-006B	6V	80	120°	B = Bipolar DC, A = AC only
		24MB	BF304-0UR-024B	24V	20		
		120MB, NE51H	BF304-0UR-120A	120VAC	10		
			BF304-0UR-130B	130V	8		
595nm Super Yellow InGaAlP  BF304	T3¼ (9mm) Miniature Bayonet LED Cluster 	6MB, 44, 47, 755	BF304-0UY-006B	6V	80	120°	B = Bipolar DC, A = AC only
		24MB	BF304-0UY-024B	24V	20		
		120MB, NE51H	BF304-0UY-120A	120VAC	10		
8000K Cool White InGaN  BF304	T3¼ (9mm) Miniature Bayonet LED Cluster 	6MB, 44, 47, 755	BF304-0CW-006B	6V	15	120°	B = Bipolar DC, A = AC only
		12MB, 756	BF304-0CW-014B	12/14V	15		
		24MB	BF304-0CW-024B	24V	15		
		120MB, NE51H	BF304-0CW-120A	120VAC	10		
			BF304-0CW-130B	130V	8		
525nm Aqua Green InGaN  BF304	T3¼ (9mm) Miniature Bayonet LED Cluster 	6MB, 44, 47, 755	BF304-0AG-006B	6V	60	120°	B = Bipolar DC, A = AC only
		24MB	BF304-0AG-024B	24V	15		
		120MB, NE51H	BF304-0AG-120A	120VAC	10		
			BF304-0AG-130B	130V	8		
525nm Super Blue InGaN  BF304	T3¼ (9mm) Miniature Bayonet LED Cluster 	24MB	BF304-0PB-024B	24V	15	120°	B = Bipolar DC

All dimensions in inches. [mm]

6- or 7-LED Cluster, Wide-Angle Beam Width, Sunlight Visible

Miniature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAs  BF3126/ BF3127	6MB, 44, 47, 755	BF3126-0UR-006B	6V	120	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF3126-0UR-014B	12/14V	40		
	24MB	BF3127-0UR-024B	24V	20		
	313,757,1819,1829	BF3127-0UR-028B	28V	20		
	120MB, NE51H	BF3127-0UR-120A	120VAC	10		
		BF3127-0UR-130B	130V	8		
595nm Super Yellow InGaN  BF3126/ BF3127	6MB, 44, 47, 755	BF3126-0UY-006B	6V	120	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF3126-0UY-014B	12/14V	40		
	24MB	BF3127-0UY-024B	24V	20		
	313,757,1819,1829	BF3127-0UY-028B	28V	20		
	120MB, NE51H	BF3127-0UY-120A	120VAC	10		
		BF3127-0UY-130B	130V	8		
8000K Cool White In/GaN  BF3126/ BF3127	6MB, 44, 47, 755	BF3126-0CW-006B	6V	90	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF3126-0CW-014B	12/14V	30		
	24MB	BF3126-0CW-024B	24V	15		
	313,757,1819,1829	BF3127-0CW-028B	28V	15		
	120MB, NE51H	BF3127-0CW-120A	120VAC	10		
		BF3127-0CW-130B	130V	8		
570nm Lime Green InGaAlP  BF3127	120MB, NE51H	BF3127-0UG-120A	120VAC	10	120°	A = AC only
525nm Aqua Green In/GaN  BF3126/ BF3127	6MB, 44, 47, 755	BF3126-0AG-006B	6V	90	120°	B = Bipolar DC, A = AC only
	12MB, 756	BF3126-0AG-014B	12/14V	30		
	24MB	BF3126-0AG-024B	24V	15		
	313,757,1819,1829	BF3127-0AG-028B	28V	15		
	120MB, NE51H	BF3127-0AG-120A	120VAC	10		
		BF3127-0AG-130B	130V	8		

7-LED Cluster, Medium-Angle Beam Width, High-Efficiency, Standard Intensity

Medium-Angle Beam Width: T3¼ (9mm) Miniature Bayonet LED Cluster	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAs  BF3127	24MB	B3127CR6-0015	24V	25	50°	Bipolar DC
	313,757,1819,1829	B3127CR6-0016	28V	25		Bipolar DC
	120MB, NE51H	B3127CR6-0001	120VAC	8		AC
		B3127CR6-0004	130V	10		Bipolar DC
565nm Hi-Efficiency Green GaP/GaP  BF3127	313,757,1819,1829	B3127CG6-0001	28V	26	50°	Bipolar DC
	120MB, NE51H	B3127CG6-0005	120VAC	8		AC

All dimensions in inches. [mm]

Log # BF3126_3127 Rev 01-2006

Single-LED, Wide-Angle Beam Width

Miniature Packages	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
		Voltage V typ	Current mA typ		
<p>SLF461</p>	660nm Ultra Red GaAlAs/GaAlAs	SLF461-0UR-120A	120VAC	10	120° A = AC only
	8000K Cool White InGaN	SLF461-0CW-120A	120VAC	10	

4-LEDs, Wide-Angle Beam Width

Miniature Packages	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
		Voltage V typ	Current mA typ		
<p>SLF464</p>	660nm Ultra Red GaAlAs/GaAlAs	SLF464-0UR-024B	24VDC	20	120° B = Bipolar DC, A = AC only
		SLF464-0UR-120A	120VAC	10	
		SLF464-0UR-130B	130VDC	8	
	8000K Cool White InGaN	SLF464-0CW-024B	24VDC	15	120° B = Bipolar DC, A = AC only
		SLF464-0CW-120A	120VAC	10	
		SLF464-0CW-130B	130VDC	8	
	525nm Low Cost Aqua Green InGaN	SLF464-0AG-024B	24VDC	15	120° B = Bipolar DC, A = AC only
		SLF464-0AG-120A	120VAC	10	
		SLF464-0AG-130B	130VDC	8	

7-LEDs, Wide-Angle Beam Width

Miniature Packages	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
		Voltage V typ	Current mA typ		
<p>SLF467</p>	660nm Ultra Red GaAlAs/GaAlAs	SLF467-0UR-120A	120VAC	10	120° B = Bipolar DC, A = AC only
		SLF467-0UR-130B	130VDC	8	
	8000K Cool White InGaN	SLF467-0CW-120A	120VAC	10	120° B = Bipolar DC, A = AC only
		SLF467-0CW-130B	130VDC	8	
	570nm Super Lime Green InGaAlP	SLF467-0UG-120A	120VAC	10	120° A = AC only
	525nm Aqua Green InGaN	SLF464-0AG-120A	120VAC	10	120° A = AC only

7-LEDs, Narrow-Angle Beam Width

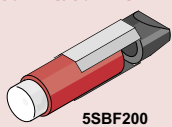
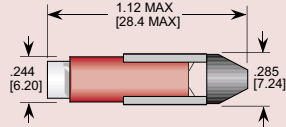
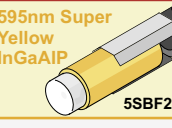
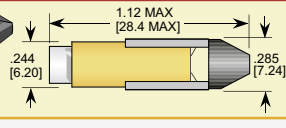
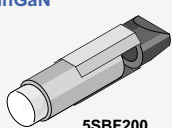
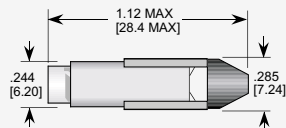

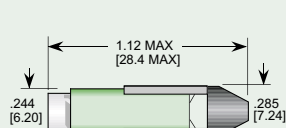
Miniature Packages	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
		Voltage V typ	Current mA typ		
<p>SL467</p>	660nm Ultra Red GaAlAs/GaAlAs	SL467CR6-0007	120VAC	8	15° A = AC only
	565nm High Efficiency Green GaP/GaP	SL467CG6-0004	120VAC	8	

All dimensions in inches [mm]

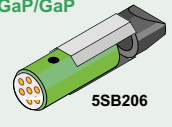
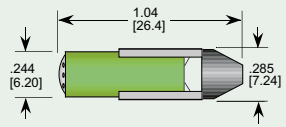


Telephone Slide Based LED Lamps

T2 ANSI #5 Telephone Slide Based LEDs Single-Chip Sunlight Visible

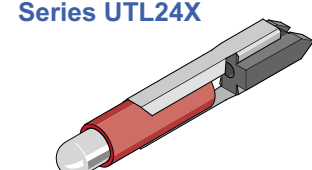
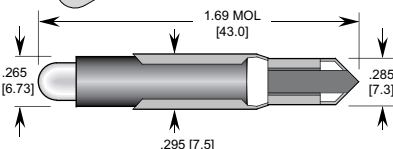
Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
660nm Ultra Red GaAlAs/GaAlAs  5SBF200 	24 PSB 28 PSB	5SBF200-OUR-028B	24V/28V	15	120°	B = BiPolar DC A = AC only
	120 PSB	5SBF200-OUR-120A	120VAC	10		
595nm Super Yellow InGaAlP  5SBF200 	24 PSB 28 PSB	5SBF200-UUY-028B	24V/28V	15	120°	B = BiPolar DC
	120 PSB	5SBF200-UUY-120A	120VAC	10		
8000K Cool White InGaN  5SBF200 	24 PSB 28 PSB	5SBF200-OCW-028B	24V/28V	15	120°	B = BiPolar DC A = AC only
	120 PSB	5SBF200-OCW-120A	120VAC	10		
525nm Aqua Green InGaN  5SBF200 	24 PSB 28 PSB	5SBF200-OAG-028B	24V/28V	15	120°	B = BiPolar DC A = AC only
	120 PSB	5SBF200-OAG-120A	120VAC	10		

6-Chip High-Efficiency Standard Intensity

Subminiature Packages	Replaces Incandescent	Part Number	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
			Voltage V typ	Current mA typ		
555nm High Efficiency Green GaP/GaP  5SB206 	24 PSB	5SB206CG6-0003	120VAC	6 - 8	160°	A = AC only

All dimensions in inches. [mm]

T2 #2 Telephone Slide UtilityLED™ Lamps for #24X, #24E Single-Chip, Super Bright

Series UTL24X	Part Number	Color	Circuit Rating Volts	Circuit Voltage		External Series Resistor Ohms	Incandescent Lamp Number	Incandescent Lamp Voltage Rating
				Min	Max			
 	UTL24X-OUR	● RED	24VDC	22	28	110	24E / 24X	28V
	UTL24X-UUY	● YELLOW						
	UTL24X-0IW	○ INCAND WHITE						
	UTL24X-0CW	○ COOL WHITE						
	UTL24X-0AG	● GREEN						
	UTL24X-1UR	● RED	48VDC	44	56	900	24E / 24X	28V
	UTL24X-1UY	● YELLOW	67VAC	55	76	1500		
	UTL24X-1IW	○ INCAND WHITE	115VAC	95	130	2800		
	UTL24X-1CW	○ COOL WHITE	125VDC	110	140	3300		
	UTL24X-1CW	○ COOL WHITE	230VAC	220	280	6300		
UTL24X-1AG	● GREEN	250VDC	220	280	7200			

All dimensions in inches. [mm]

Log #5SBF200 Rev 1-2006

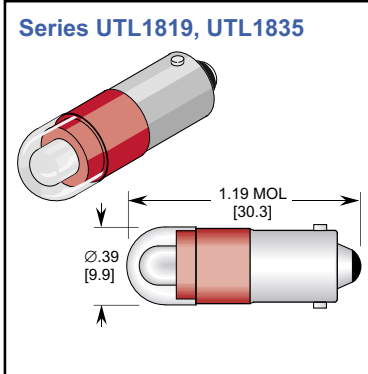


T3¼ (9mm) Miniature Bayonet UtilityLED™ Lamps

Features

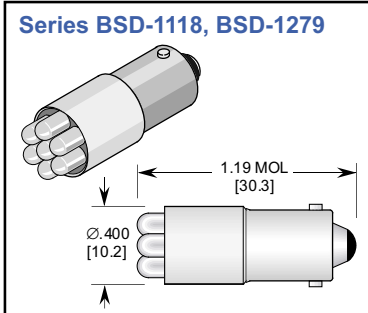
- T3¼ (9mm) Replaces Incandescent Lamps #1819, #1835
- Long Life 100,000+ hrs (10+ Years)
- Solid-State, High Shock/Vibration Resistant
- Maintenance Free, Easy Installation
- All DC Lamps Are Bipolar
- Major Power Savings
- Major Reduction in Heat Generation
- Built-in, Current-Limiting Resistor Including External Resistor
- 3-Year Lamp Warranty
- Low Power Consumption, High Intensity

Lens Capped, Single-LED, Sunlight Visible, Super-Intensity



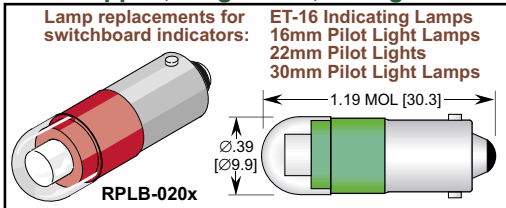
Part Number	Color	Circuit Rating Volts	Circuit Voltage		External Series Resistor Ohms	Incandescent Lamp Number	Incandescent Lamp Voltage Rating
			Min	Max			
UTL1819-0CW	○ COOL WHITE	24VDC	22	28	10	1819	28V
UTL1835-0CW	○ COOL WHITE	48VDC	44	56	200	1835	55V
UTL1835-0UR	● RED						
CONSULT FACTORY			70VAC	55	76	750	CONSULT FACTORY
UTL1835-1UR	● RED	125VDC	110	140	2000	1835	55V
UTL1835-1UY	● YELLOW	120VAC	95	130	1900		
UTL1835-1IW	○ INCANDESCENT WHITE	130VAC	105	140	2300		
UTL1835-1CW	○ COOL WHITE	240VAC	195	260	4800		
UTL1835-1AG	● GREEN	250VDC	220	280	5100		

7-LED Cluster, High-Efficiency, Standard Intensity



Part Number	Color	Circuit Rating Volts	Circuit Voltage		External Series Resistor Ohms	Incandescent Lamp Number	Incandescent Lamp Voltage Rating
			Min	Max			
BSD-1118-001	● ULTRA RED	125VDC	110	140	2000	1835	55V
BSD-1118-002	● RED	120VAC	95	130	1900		
BSD-1118-004	● YELLOW	130VAC	105	140	2300		
BSD-1118-026	○ PALE WHITE	240VAC	195	260	4800		
BSD-1118-006	● GREEN	250VDC	220	280	5100		
BSD-1279-002	● HI-EFFICIENCY RED	24VDC	22	28	10	1819	28V
BSD-1279-004	● HI-EFFICIENCY YELLOW						
BSD-1279-006	● HI-EFFICIENCY GREEN						

Lens Capped, Single-LED, Sunlight Visible, Wide-Angle Beam Width

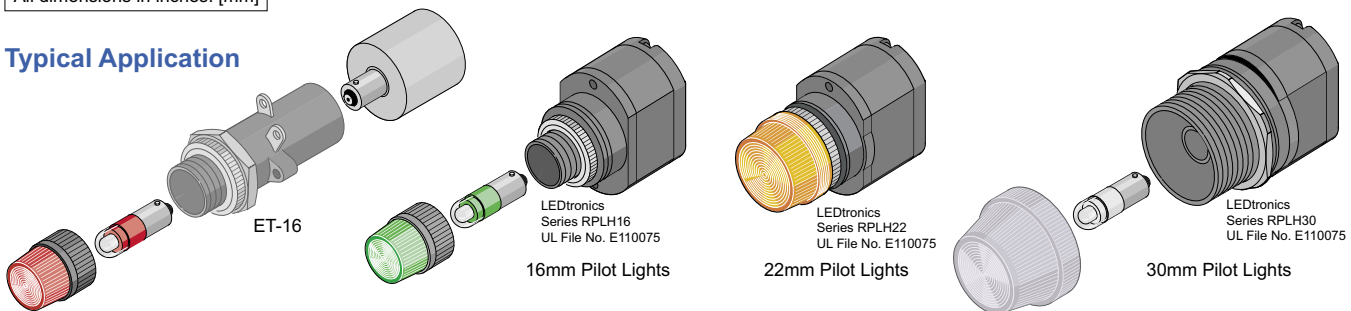


Lamp replacements for switchboard indicators:
 ET-16 Indicating Lamps
 16mm Pilot Light Lamps
 22mm Pilot Lights
 30mm Pilot Light Lamps

Replaces Incandescent	Part Number	Color	λp (nm) Color Temp (Kelvin)	Electrical-Optical Characteristics (Ta = 25°C)		Angle of Illumination	Polarity
				Voltage V typ	Current mA typ		
313, 757, 1819, 1829	RPLB-0201-28V	● ULTRA RED	660nm	28V	20	120°	Bipolar DC
	RPLB-0209-28V	○ COOL WHITE	8000K		15		
	RPLB-0206-28V	● AQUA GREEN	520nm		15		
	RPLB-0208-28V	● ULTRA BLUE	470nm		15		

All dimensions in inches. [mm]

Typical Application





Beacons, Machine Status Indicator LED Lights

BeaconLED®, 25mm Edison Screw Based LED Lamps

Series BBL504
25mm Medium Screw Edison Base
(4 Tier Beacon)

Part Number	LED Color	Input Voltage	Current I _f (mA) typ	Intensity per LED I _v (mcd) typ	λ _p (nm)	Power (Watts)
BBL504-01-02	RED ●	120VAC	15	3000	633	1.8
BBL504-03-02	GREEN ●	120VAC	12	10,200	525	1.44
BBL504-04-02	YELLOW ●	120VAC	15	3075	595	1.8
BBL504-05-02	BLUE ●	120VAC	12	2775	470	1.44
BBL504-06-02	WHITE ○	120VAC	12	5850	8000K*	1.44

Series BBL508
25mm Medium Screw Edison Base
(8 Tier Beacon)

Part Number	LED Color	Input Voltage	Current I _f (mA) typ	Intensity per LED I _v (mcd) typ	λ _p (nm)	Power (Watts)
BBL508-01-02	RED ●	120VAC	30	3000	633	3.6
BBL508-06-02	WHITE ○	120VAC	24	5850	8000K*	2.88

Dimensions: in inches [mm]

*Color Temperature (Kelvin)

StackLED®, 9mm DC Bayonet Based LED Status Indicator Lamps

Series STL602
(15mm DC Bayonet Base)

Part Number	LED Color Code*	Volts**	Current (mA)	Total mcd	Use on†
STL602-01-01	RED ●	24V BP	60	1475	Siemens Square D Company/ Telemecanique Inc. (XVAL series)
STL602-02-01	AMBER ●	24V BP	60	850	
STL602-04-01	YELLOW ●	24V BP	60	1400	
STL602-03-01	GREEN ●	24V BP	45	4800	
STL602-05-01	BLUE ●	24V BP	45	1525	
STL602-06-01	WHITE ○	24V BP	45	1920	
STL602-01-02	RED ●	120VAC	20	1475	Joslyn Clark (SL System) Tork Klockner Moeller Werma
STL602-03-02	GREEN ●	120VAC	15	4800	
STL602-06-02	WHITE ○	120VAC	15	1920	

* Color codes listed reflect the status indicator lens colors.
† Part numbers listed are recommended retrofits to a specific manufacturer's stack holder model and are designed specifically to operate in those models

Dimensions: in inches [mm]

Series STL604
(15mm DC Bayonet Base)

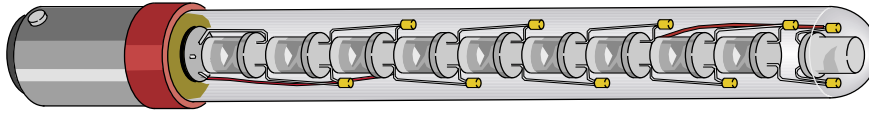
Part Number	LED Color Code*	Volts**	Current (mA)	Total mcd	Use on†
STL604-06-02	WHITE ○	120VAC	30	3840	Federal Signal (Litestak-LSB & LSL) Edwards (Adaptalight 101)

* Color codes listed reflect the status indicator lens colors.
† Part numbers listed are recommended retrofits to a specific manufacturer's stack holder model and are designed specifically to operate in those models

Log # STL602 Rev 1-2006



Series EXL-x-021
(15mm DC Bayonet Base)



Features

- Maintenance Free
- Long life / 100,000+ hours
- Solid state, high shock / vibration resistant
- Easy installation – No adapters or wiring required

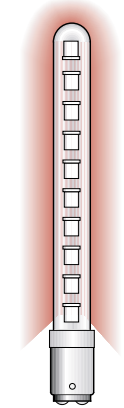
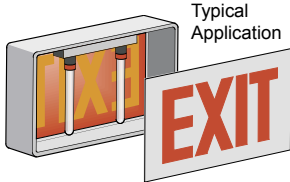
- Five-year lamp warranty
- Major cost savings
- Complies with UL924 standards

Applications

- Compatible with most standard EXIT signs
- Suitable for use in single- / double-sided EXIT signs

Benefits

- Units provide lighting which meets UL924 requirements
- Advanced circuitry allows for long life and high intensity
- Lenses are impact resistant and configured for optimal light transmission
 - Made from flame retardant polycarbonate resin
- Units are interchangeable with incandescents
- Reduces power consumption up to 80%
- High reliability/quality of kit
- Easy to install -- minimum installation time

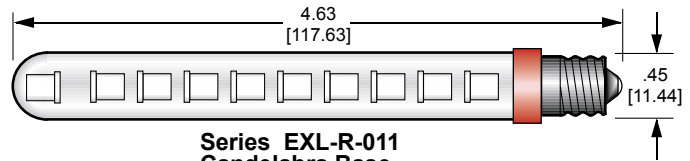
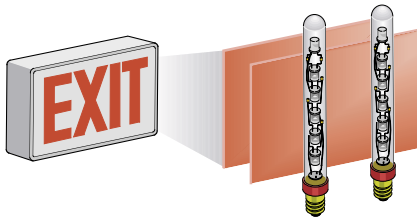


Illumination Pattern

Series EXL-R-011	Kit Number	Color Code	Volts	Replaces Incandescent	Energy Used (Watts)
Series EXL 2-Bulb / Diffuser Kit (T6-Candelabra Base)	EXL-R-011A	RED ●	120VAC*	15T6	2.20

*Also available in other voltages

Each Kit contains
2 LED Lamps
and 2 Diffusers

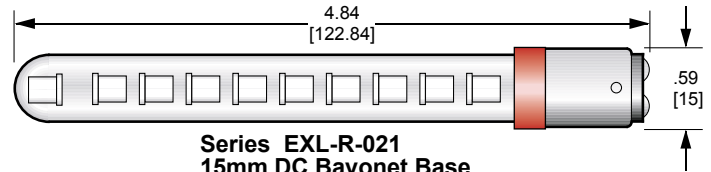
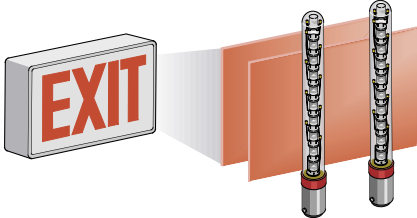


Series EXL-R-011
Candelabra Base

Series EXL-R-021	Kit Number	Color Code	Volts	Replaces Incandescent	Energy Used (Watts)
Series EXL 2-Bulb / Diffuser Kit (15mm DC Bayonet Base)	EXL-R-021A	RED ●	120VAC*	20T6 1/2 DC	2.20

*Also available in other voltages

Each Kit contains
2 LED Lamps
and 2 Diffusers

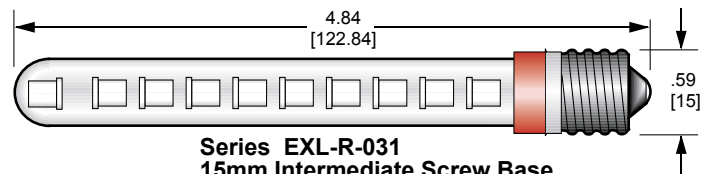
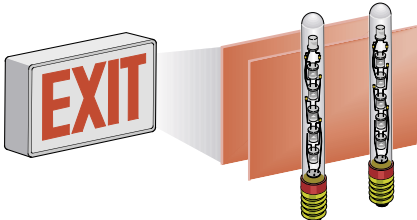


Series EXL-R-021
15mm DC Bayonet Base

Series EXL-R-031	Kit Number	Color Code	Volts	Replaces Incandescent	Energy Used (Watts)
Series EXL 2-Bulb / Diffuser Kit (15mm Intermediate Screw Base)	EXL-R-031A	RED ●	120VAC*	20T6 1/2 IF	2.20

*Also available in other voltages

Each Kit contains
2 LED Lamps
and 2 Diffusers



Series EXL-R-031
15mm Intermediate Screw Base

Miniature Packages	Part Number	Input Voltage	Lens (included with package)	LED Lamp 1-LED (included with package)	Color	illumination Pattern and Measurements
	RPLH16-01-01-02	48VDC	RPLL16-CRF	RPLB-0201-28V	Red	
	RPLH16-01-02-02	48VDC	RPLL16-CAF	RPLB-0203-28V	Orange	
	RPLH16-01-04-02	48VDC	RPLL16-CGF	RPLB-0206-28V	Green	
	RPLH16-01-05-02	48VDC	RPLL16-CBF	RPLB-0208-28V	Blue	
	RPLH16-01-06-02	48VDC	RPLL16-TWF	RPLB-0209-28V	White	
	RPLH16-02-01-02	130VDC	RPLL16-CRF	RPLB-0201-28V	Red	
	RPLH16-02-02-02	130VDC	RPLL16-CAF	RPLB-0203-28V	Orange	
	RPLH16-02-04-02	130VDC	RPLL16-CGF	RPLB-0206-28V	Green	
	RPLH16-02-05-02	130VDC	RPLL16-CBF	RPLB-0208-28V	Blue	
RPLH16-02-06-02	130VDC	RPLL16-TWF	RPLB-0209-28V	White		
	RPLH22-02-01-02	130VDC	RPLL22-CRF	RPLB-0201-28V	Red	
	RPLH22-02-02-02	130VDC	RPLL22-CAF	RPLB-0203-28V	Orange	
	RPLH22-02-04-02	130VDC	RPLL22-CGF	RPLB-0206-28V	Green	
	RPLH22-02-06-02	130VDC	RPLL22-TWF	RPLB-0209-28V	White	
	RPLH30-02-01-02	130VDC	RPLL30-CRF	RPLB-0201-28V	Red	
	RPLH30-02-02-02	130VDC	RPLL30-CAF	RPLB-0201-28V	Orange	
	RPLH30-02-04-02	130VDC	RPLL30-CGF	RPLB-0206-28V	Green	
	RPLH30-02-06-02	130VDC	RPLL30-TWF	RPLB-0209-28V	White	

All dimensions in inches. [mm]

Log #RPLH Rev 1-2006



LED Color Chart

LEDtronics Code	LED Chip Code	Peak Wave-length (nm)*	Dominant Wave-length (nm)	X Coordinate (typ)	Y Coordinate (typ)	Color Name	Nominal Fwd Voltage (V _f @ 20mA)	Intensity (mcd) 5mm LEDs (For Reference)	Radiant Power mW / sr	Viewing Angle	LED Dye Material	
941	IR	IR941	940	N/A		Infrared	1.3	N/A	16mW@20mA	22°-30°	GaAlAs/GaAs	
881	IR	IR881	885	N/A		Infrared	1.6	N/A	31mW@20mA	12°-20°	GaAlAs/GaAs	
851	IR	IR851	843	N/A		Infrared	1.7	N/A	86mW@20mA	12°-20°	GaAlAs/GaAs	
0UR		R3KF/R6	654	641	0.72	0.28	Ultra Red	1.9	1000mcd@20mA	13mW@20mA	22°-30°	GaAlAs/GaAlAs
00R		R3/R4/R5	640	625	0.70	0.30	High Eff. Red	2.0	220mcd@20mA	1.8mW@20mA	12°-20°	GaAsP/GaP
0ER		E3K	634	624	0.70	0.29	Super Red	2.2	8000mcd@20mA	45mW@20mA	12°-20°	InGaAlP
0UO		O3KF	616	610	0.66	0.33	Super Orange	2.0	2000mcd@20mA	7mW@20mA	22°-30°	InGaAlP
0O0		O4/O5	609	604	0.64	0.35	Orange	2.1	220mcd@20mA	0.7mW@20mA	12°-20°	GaAsP/GaP
0UY		Y3KF	598	593	0.60	0.40	Super Yellow	2.0	5000mcd@20mA	10mW@20mA	12°-20°	InGaAlP
0PY		Y3KH	592	589	0.57	0.42	Super Pure Yellow	2.3	4000mcd @ 20mA	8mW@20mA	22°-30°	InGaAlP
00Y		Y3/Y4/Y5	582	584	0.54	0.45	Yellow	2.1	170mcd @ 20mA	0.3mW@20mA	12°-20°	GaAsP/GaP
0IW			3000K	N/A	0.44	0.41	Warm White	3.3	5500mcd @ 20mA	17mW@20mA	12°-20°	InGaN
XPW			6000K	N/A	0.31	0.34	Pale White	3.3	5500mcd @ 20mA	17mW@20mA	40°-50°	InGaN
0WW			8000K	N/A	0.26	0.25	Cool White	3.3	5800mcd @ 20mA	23mW@20mA	12°-20°	InGaN
0CW			8000K	N/A	0.28	0.27	Cool White	3.4	8400mcd @ 20mA	33mW@20mA	12°-20°	InGaN
XCW			8000K	N/A	0.28	0.28	Cool White	3.3	16000mcd @ 20mA	60mW@20mA	12°-20°	InGaN
0UG		G1K	575	573	0.47	0.53	Super Lime Green	2.0	1800mcd @ 20mA	3mW@20mA	12°-20°	InGaAlP
00G		G3/G4/G5	563	569	0.44	0.55	High Eff. Green	2.3	210mcd @ 20mA	0.03mW@20mA	12°-20°	GaP/GaP
UPG		PG350	564	564	0.41	0.59	Super Pure Green	2.1	400mcd@20mA	0.6mW@20mA	40°-50°	InGaAlP
0PG		PG5	557	560	0.37	0.61	Pure Green	2.1	140mcd@20mA	0.2mW@20mA	12°-20°	GaP/GaP
0AG		AG10K	522	528	0.18	0.71	Aqua Green	3.5	15,000mcd@20mA	30mW@20mA	12°-20°	InGaN
0BG		BG7K	501	502	0.08	0.52	Blue Green	3.4	4300mcd@20mA	16mW@20mA	40°-50°	InGaN
0PB		PB3KB	455	460	0.14	0.04	Super Blue	3.2	3000mcd@20mA	61mW@20mA	12°-20°	InGaN
00B		UB500	425	447	0.15	0.05	Ultra Blue	4.0	250mcd@20mA	5mW@20mA	12°-20°	SiC/GaN
405	UV	UV405	402	420	0.17	0.006	Ultraviolet	3.8	39mcd@20mA	53mW@20mA	12°-20°	SiC/GaN
395	UV	UV395	397	419	0.17	0.006	Ultraviolet	3.7	35mcd@20mA	39mW@20mA	12°-20°	SiC/GaN
750	UV	UV750	378	N/A	0.35	0.32	Ultraviolet	3.3	150mcd@20mA	18mW@20mA	10°	GaN

* Color temperature in degrees Kelvin

Chart is provided for an understanding of color relationships. Printed materials cannot reproduce the color intensity of visible light emitting diodes. What is shown only depicts rough categories and not precise statements of color.

Log # 038 Rev 01 -2006 ISO 9001 4,10-657A



TURN LIGHTING ON ITS HEAD!

THINK MINIATURE BASED LEDs



> Right-Angled S6 Candelabra Screw Based LED Lamps



> Miniature Based LED Lamps BF321 Bayonet Based LED Lamps



> 9mm Screw Based and Bayonet Based LED Lamps



> R12-Styled Elevator Lantern LED Lamps Series BL630 and BXL630



> Single- and Double-Contact Bayonet Based LED Lamps



> Dome Bayonet Based and Flat Top Telephone Slide LED Lamps

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