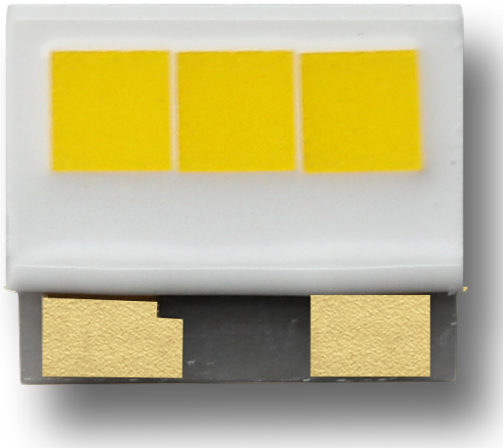


Bridgelux® Autoflux™ Series 1x3 Top Contact

Product Data Sheet DS140

Introduction

Autoflux™ Series

The Bridgelux Autoflux™ Series product offers superior lumen output, reliability, industry-leading optical and thermal performance. With top contact products, top electrical contacts and bottom thermal pads are designed to simplify lighting system integration and lower system costs. This is also achieved through a unique system and method of dispensing phosphor. The 1x3 product is hot color targeted to ensure that it falls within specified color bins at typical application conditions.

Bridgelux Autoflux Series has passed the Automotive Electronics Council AEC-Q101-Rev-D1 reliability tests.

Features

- Robust package on ceramic substrate
- High flux output
- Industry-leading thermal performance
- 8kV ESD protection
- Excellent corrosion resistance

Benefits

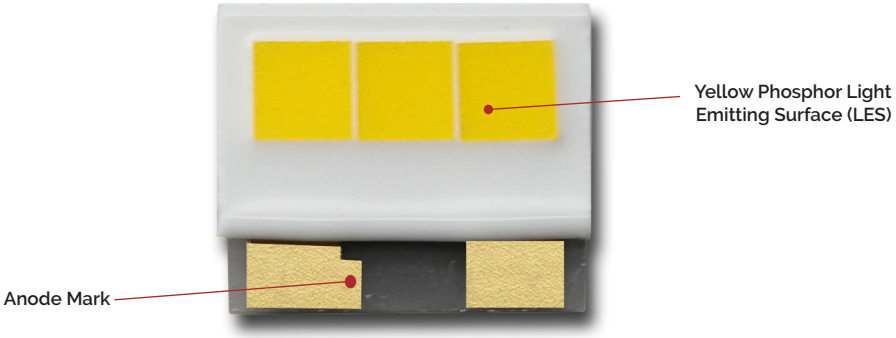
- Simplified thermal management reduces system cost
- High flux output from small footprint reduces cost and improves design flexibility
- Higher drive current capability for increased flux output

Pb free RoHS

Contents

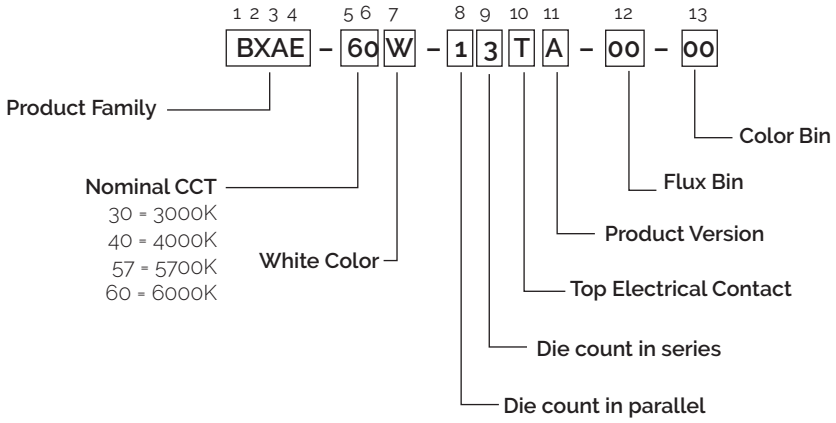
Product Feature Map

Bridgelux Autoflux™ Series 1x3 products are robust and compact in size. These LEDs are optimized for performance and reliability, and are manufactured using high quality materials to ensure superior optical and thermal performance. This construction addresses the stringent reliability requirements of the automotive lighting industry.



Product Nomenclature

The part number designation for Bridgelux Autoflux™ Series LED is as follows:



Product Test Conditions

Bridgelux Autoflux™ Series 1x3 are pulse tested with a 10ms monopulse (MP) of 1000mA . Luminous flux is binned at T_j=T_c=25˚C, and color is hot targeted at T_j=T_c=85˚C.

Product Selection Guide

The following product configurations are available:

Table 1: Optical Characteristics, Pulsed Measurement Data at 1000mA, 10ms MP (T_j=T_c=85°C) [8]

Part Number [1]	CRI [4, 6,7]	Typical Flux [6] (lm)	Correlated Color Temperature[5,6,7] (K)			Typical Total Included Angle[2] $\theta_{0.90v}$ (°)	Typical Viewing Angle[3] $\theta_{1/2}$ (°)
			Minimum	Typical	Maximum		
BXAE-30W-13TA-00-00	60	640	2800	3000	3200	140	120
BXAE-40W-13TA-00-00	60	722	3710	4000	4255	140	120
BXAE-57W-13TA-00-00	60	870	5350	5700	6100	140	120
BXAE-60W-13TA-00-00	70	805	5850	6220	6680	140	120

Table 2: Electrical Characteristics, Pulsed Measurement Data at 1000mA, 10ms MP (T_j=T_c=85°C) [8]

Part Number [1]	Nominal Drive Current (mA)	Forward Voltage (V) [6,7]			Typical Coefficient of Forward Voltage $\Delta V_f/\Delta T$ (mV/°C)	Typical Thermal Resistance Junction to Case R_{j-c} (°C/W)
		Minimum	Typical	Maximum		
BXAE-30W-13TA-00-00	1000	8.6	9.4	9.8	-5.5	2.0
BXAE-40W-13TA-00-00	1000	8.6	9.4	9.8	-5.5	2.0
BXAE-57W-13TA-00-00	1000	8.6	9.4	9.8	-5.5	2.0
BXAE-60W-13TA-00-00	1000	8.6	9.4	9.8	-5.5	2.0

Notes for Tables 1 & 2:

1. The last 5 characters (including hyphens '-') refer to flux bins, and color bin options, respectively. "00-00" denotes the full distribution of flux, and the full color bin in CIE 1931 color space. See Tables 4-7 and Figures 1-4 for color bin options.
2. Total angle at which 90% of total luminous flux is captured.
3. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.
4. Listed CRI values are minimum and include test tolerance.
5. Product CCT is hot targeted at T_j = T_c = 85°C.
6. Bridgelux maintains a ±7.5% tolerance on luminous flux measurements, ±0.1V tolerance on forward voltage measurements, and ±2 tolerance on CRI measurements for the Autoflux 1x3 products. The CRI and Voltage minimum and maximum values at the nominal drive current are guaranteed by 100% test.
7. Products tested under pulsed condition (10ms pulse width) at nominal drive current.
8. Typical performance is tested based on operation under monopulsed with Bridgelux Autoflux Series product mounted onto a heat sink with thermal interface material and the case temperature maintained at T_c=85°C. Based on the Bridgelux test setup, values may vary depending on the thermal design of the lighting system and/or the exposed environment to which the product is subjected.

Product Bin Definitions

Table 3 lists the standard photometric luminous flux bins for Bridgelux Autoflux Series 1x3. Although several bins are listed, product availability in a particular bin varies by production run and by product performance.

Table 3: Luminous Flux Bin Definitions at 1000mA, 10ms MP (T_J=T_c=85˚C)

Bin Code	Minimum	Maximum	Unit	Condition
3A	560	620	lm	I_F=1000mA
3B	620	680		
3C	680	740		
3D	740	800		
3E	800	850		
3F	850	900		
3G	900	950		
3H	950	1000		
3J	1000	1050		
3K	1050	1100		

Note for Table 3:

1. Bridgelux maintains a tolerance of ± 7.5% on luminous flux measurements.

Product Bin Definitions

Table 4: Color code definitions for Bridgelux Autoflux Series 1x3 at 1000mA, 10ms MP (T_j=T_c=85˚C, 3000K)

Bin Code	X	Y
Q3	0.4223	0.3990
	0.4299	0.4165
	0.4431	0.4213
	0.4345	0.4033
Q4	0.4147	0.3814
	0.4223	0.3990
	0.4345	0.4033
	0.4260	0.3854
R3	0.4345	0.4033
	0.4431	0.4213
	0.4562	0.4260
	0.4468	0.4077
R4	0.4260	0.3854
	0.4345	0.4033
	0.4468	0.4077
	0.4373	0.3893

Table 5: Color code definitions for Bridgelux Autoflux Series 1x3 at 1000mA, 10ms MP (T_j=T_c=85˚C, 4000K)

Bin Code	X	Y
L3	0.3695	0.3695
	0.3736	0.3874
	0.3853	0.3949
	0.3808	0.3770
L4	0.3808	0.3770
	0.3695	0.3695
	0.3671	0.3580
	0.3775	0.3640
M3	0.3853	0.3949
	0.4005	0.4040
	0.3942	0.3848
	0.3808	0.3770
M4	0.3808	0.3770
	0.3775	0.3640
	0.3899	0.3718
	0.3942	0.3848

Table 6: Color code definitions for Bridgelux Autoflux Series 1x3 at 1000mA, 10ms MP (T_j=T_c=85˚C, 5700K)

Bin Code	X	Y
E3	0.3203	0.3301
	0.3190	0.3458
	0.3277	0.3537
	0.3281	0.3372
E4	0.3285	0.3218
	0.3215	0.3152
	0.3203	0.3301
	0.3281	0.3372
F3	0.3281	0.3372
	0.3277	0.3537
	0.3364	0.3614
	0.336	0.3443
F4	0.3356	0.3281
	0.3285	0.3218
	0.3281	0.3372
	0.3360	0.3443

Table 7: Color code definitions for Bridgelux Autoflux Series 1x3 at 1000mA, 10ms MP (T_j=T_c=85˚C, 6000K)

Bin Code	X	Y
D0	0.3127	0.3093
	0.3100	0.3259
	0.3100	0.3287
	0.3172	0.3353
	0.3194	0.3159
	0.3127	0.3093
DE	0.3194	0.3159
	0.3172	0.3353
	0.3246	0.3424
	0.3255	0.3222
	0.3194	0.3156

Notes for Tables 4-7:

1. Color binning at T_j=T_c=85˚C
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates in the CIE 1931 color space.

Product Bin Definitions

Figure 1: CIE. 1931 Chromaticity Diagram 3000K (Color Bin Structure, hot color targeted at T_j=T_c=85°C)

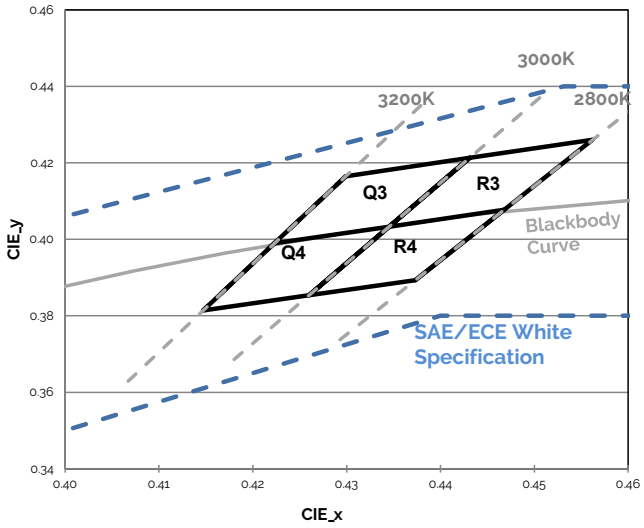


Figure 2: CIE. 1931 Chromaticity Diagram 4000K (Color Bin Structure, hot color targeted at T_j=T_c=85°C)

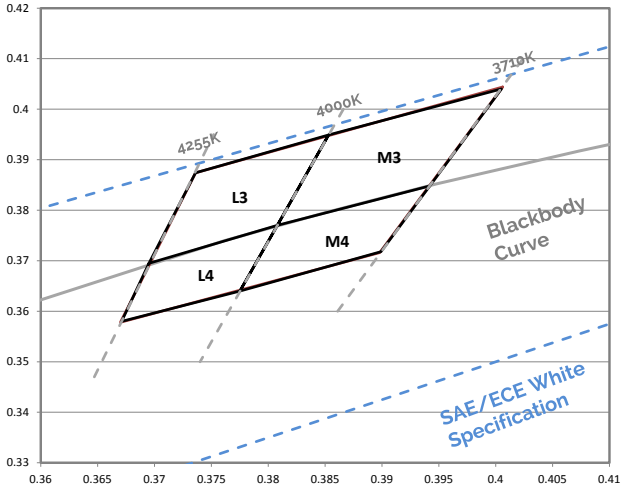


Figure 3: CIE. 1931 Chromaticity Diagram 5700K (Color Bin Structure, hot color targeted at T_j=T_c=85°C)

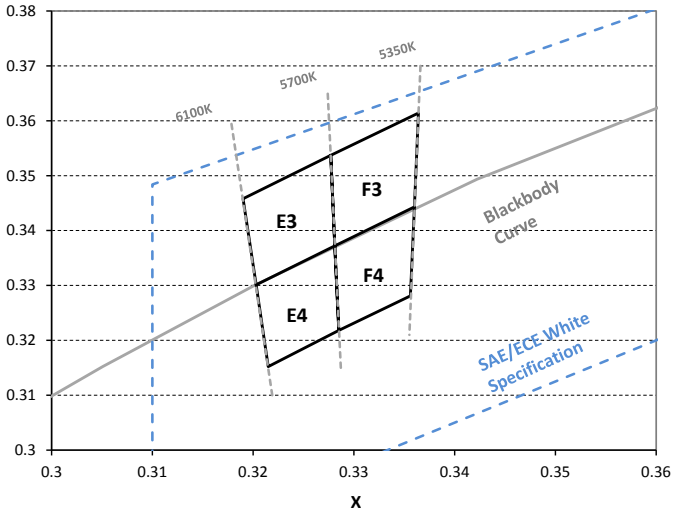
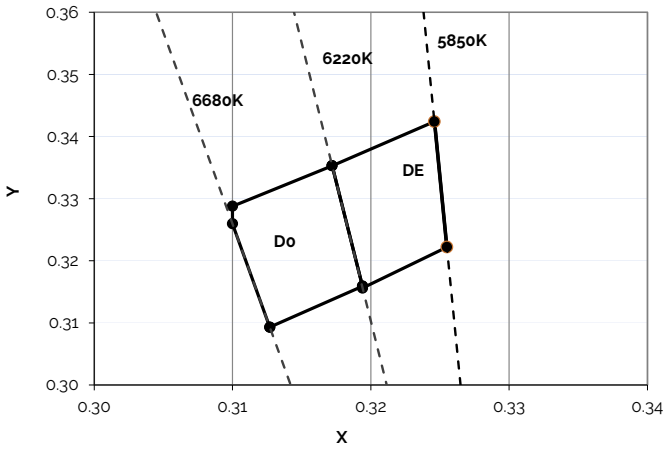


Figure 4: CIE. 1931 Chromaticity Diagram 6000K (Color Bin Structure, hot color targeted at T_j=T_c=85°C)



Absolute Maximum Ratings

Table 8: Maximum Ratings

Parameter	Maximum Rating
DC Forward Current	1200mA
Junction Temperature	150˚C
Operating Case Temperature @ 1000mA	-40˚C to 105˚C
Storage Temperature Range	-40˚C to 105˚C
Soldering Temperature	260˚C
ESD Withstand Voltage	8kV HBM, 800V MM
Reverse Voltage	Not designed to be driven in reverse bias

Notes for Table 8:

1. Proper current derating must be observed to maintain junction temperature below the maximum, so that the LED is maintained below the maximum rated operating case temperature
2. Bridgelux Autoflux LEDs driven at or above the maximum rated operating case temperature may result in shorter lifetime

Performance Curves

Figure 5: Drive Current vs. Voltage (T_j=T_c=85°C)

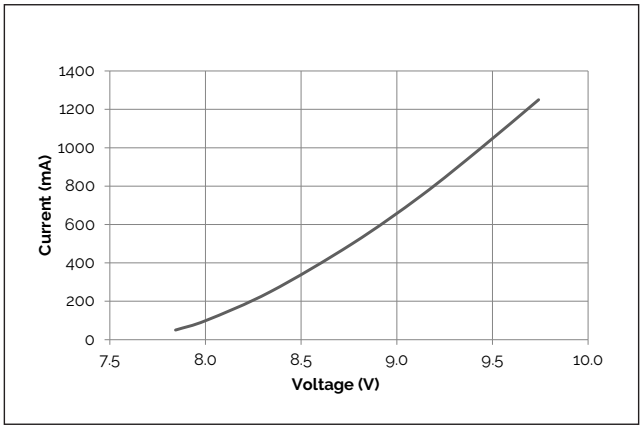


Figure 6: Typical Relative Luminous Flux vs. Drive Current (T_j=T_c=85°C)[1]

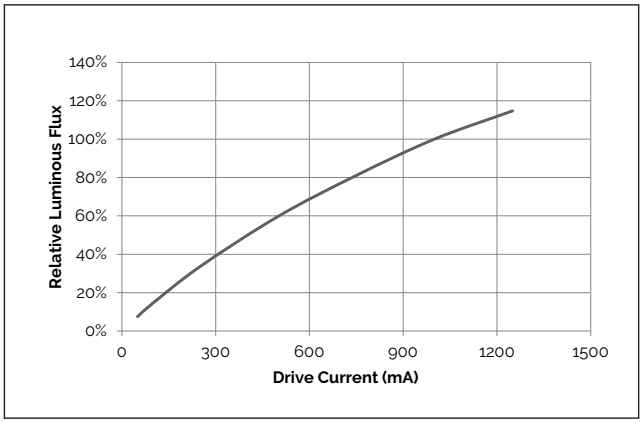


Figure 7: Typical Relative Flux vs. Case Temperature[2]

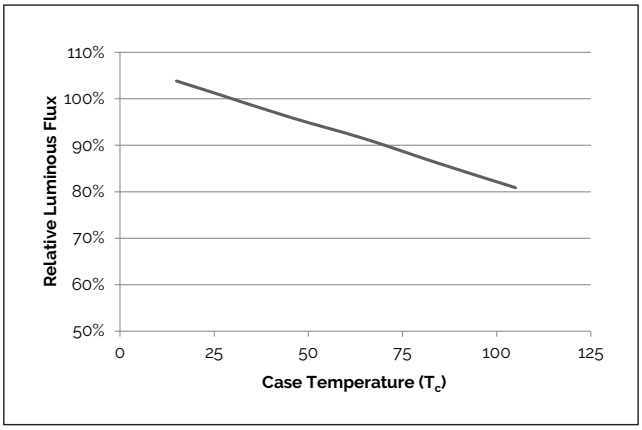


Figure 8: Maximum Forward Current vs. Case Temperature

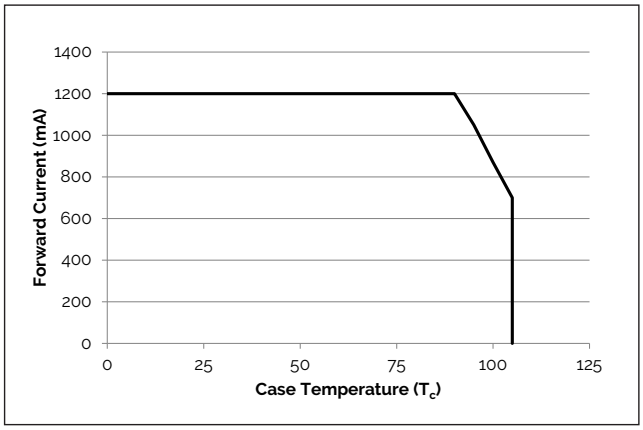


Figure 9: Typical ccx Shift vs. Case Temperature for 3000K[2]

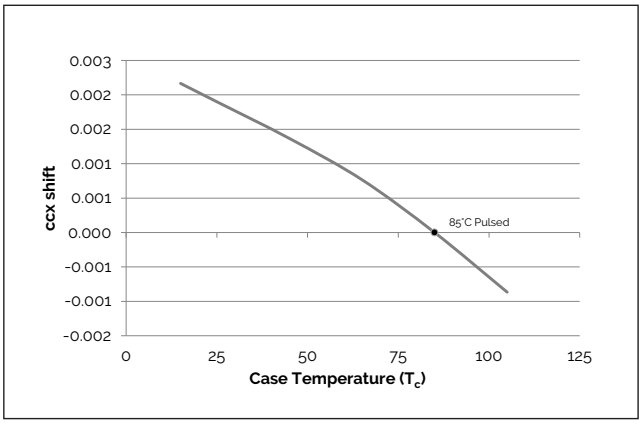
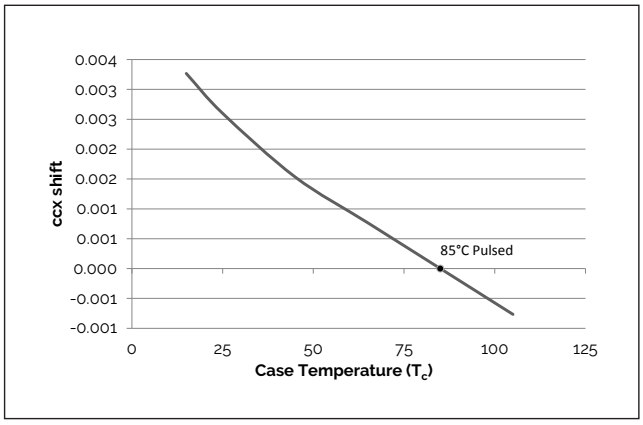


Figure 10: Typical ccx Shift vs. Case Temperature for 4000K[2]



Notes for Figures 5-10:

1. Bridgelux does not recommend driving high power LEDs at low currents. Doing so may produce unpredictable results.
2. Products tested under pulsed condition (10ms pulse width) at nominal test current where T_j (junction temperature) = T_c (case temperature) = 85°C.

Performance Curves

Figure 11: Typical ccx Shift vs. Case Temperature for 5700K[1]

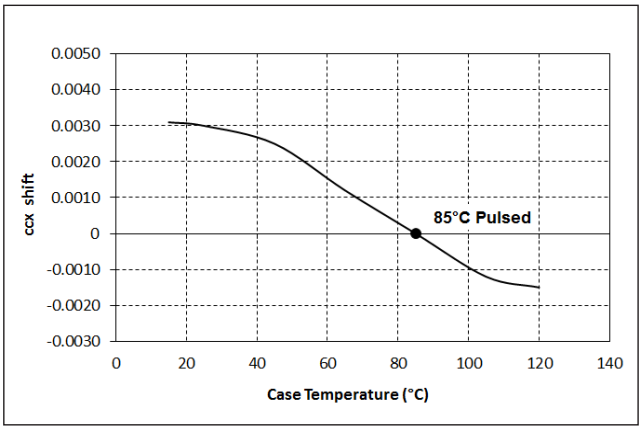


Figure 12: Typical ccx Shift vs. Case Temperature for 6000K

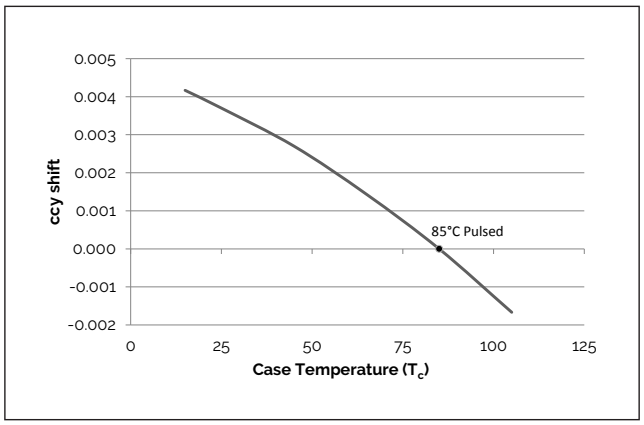


Figure 13: Typical ccy Shift vs. Case Temperature for 3000K

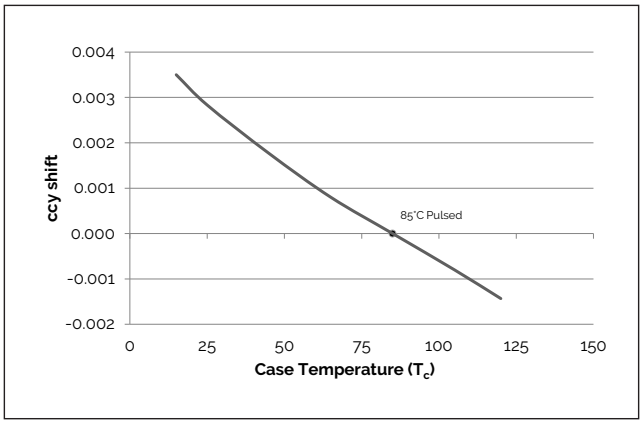


Figure 14: Typical ccy Shift vs. Case Temperature 4000K

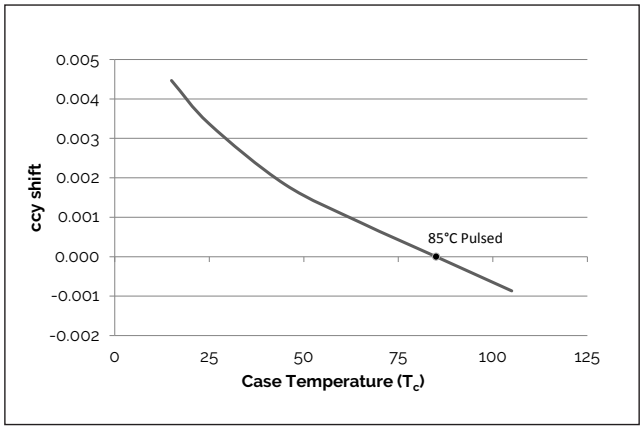


Figure 15: Typical ccy Shift vs. Case Temperature for 5700K

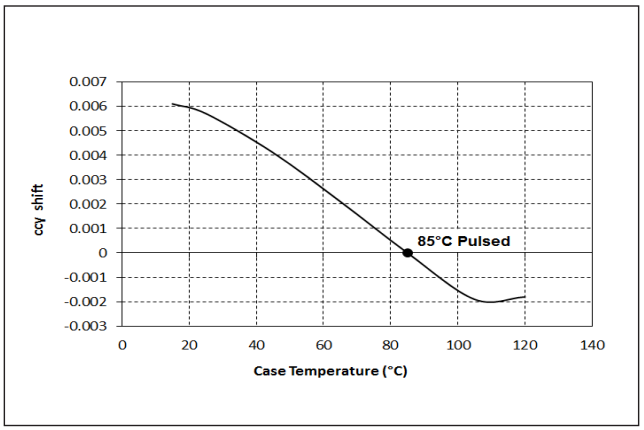
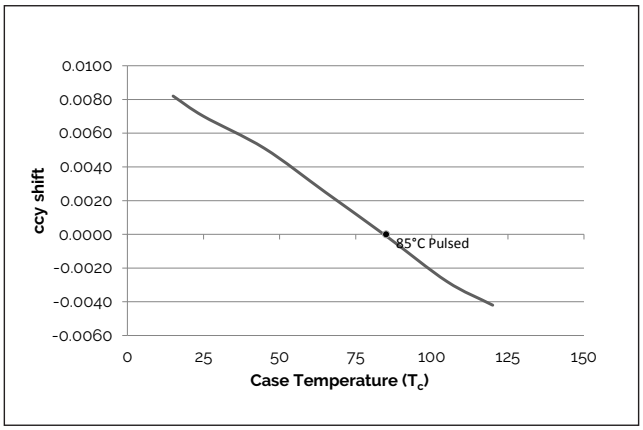


Figure 16: Typical ccy Shift vs. Case Temperature for 6000K



Note for Figure 11-16:

1. Products tested under pulsed condition (10ms pulse width) at nominal test current where T_j (junction temperature) = T_c (case temperature) = 85°C.

Performance Curves

Figure 17: Autoflux Series 1x3 Typical Forward Voltage Shift vs. Case Temperature

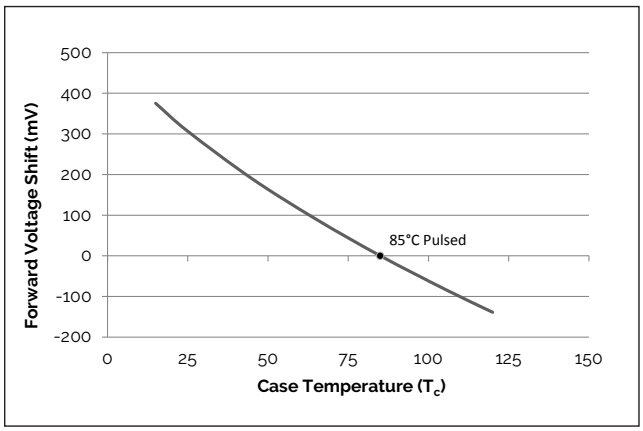


Figure 18: Typical Color Spectrum (3000K, 4000K)

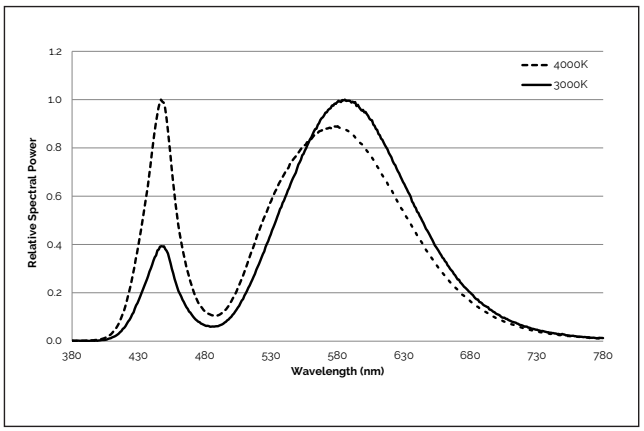


Figure 19: Typical Normalized Power vs. 5700K Wavelength

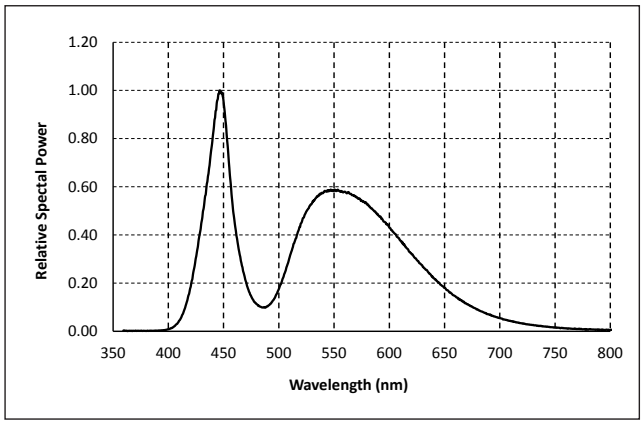


Figure 20: Typical Normalized Power vs. 6000K Wavelength

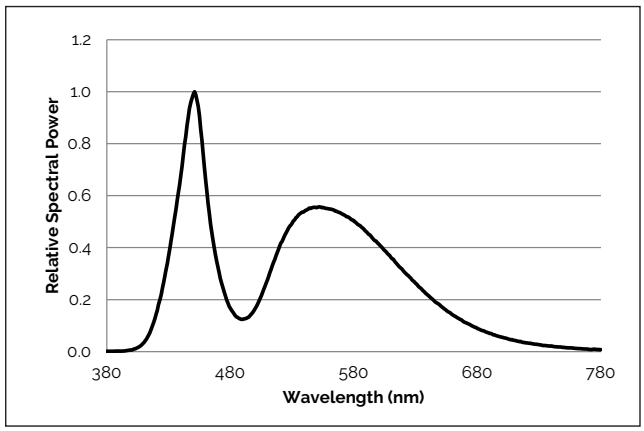


Figure 21: Typical Spatial Radiation Pattern

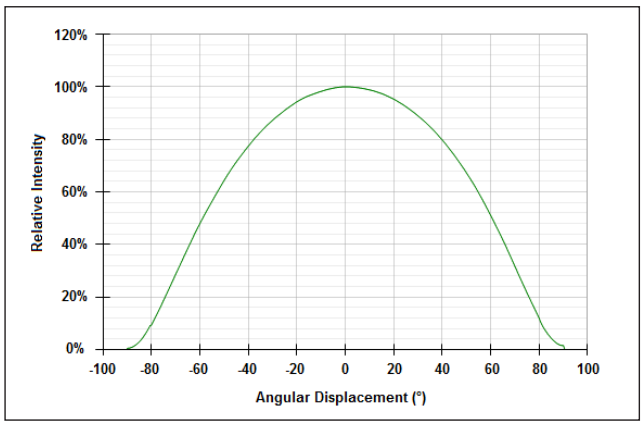
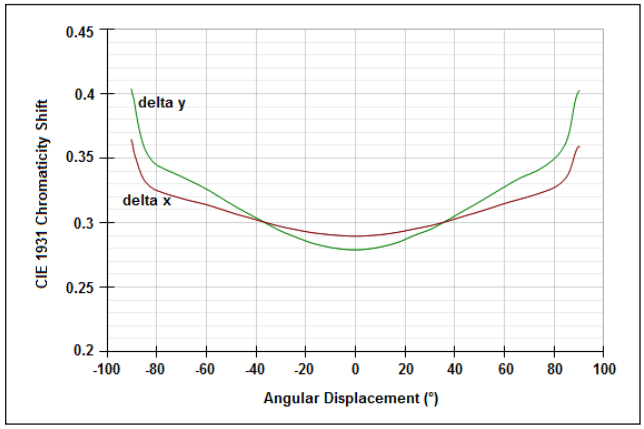


Figure 22: Typical Color Shift Over Angle



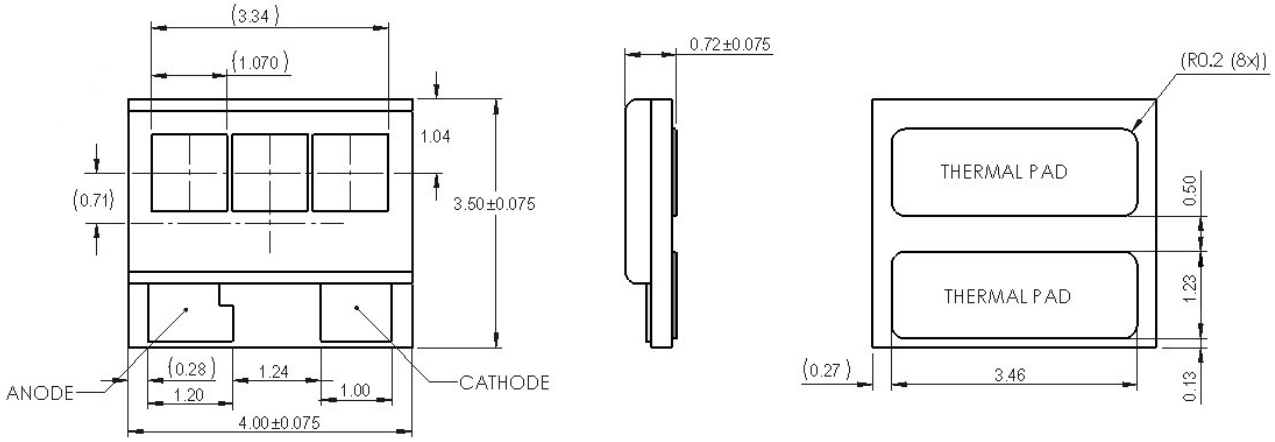
Reliability

Table 9: Reliability Test Items and Conditions

Test	Reference Standard	Test Conditions	Test Duration	Units Failed/Tested
High Temperature High Humidity Operation Life	JESD22-A101	T_c=85˚C, RH=85%, I_f = 1.0A	1000 hours	0/30
High Temperature High Humidity Power Cycle	JESD22-A101	T_c=85˚C, RH=85%, I_f = 1.0A, pulsed current, t_{on} = t_{off} = 5 min *	1000 hours	0/30
High Temperature Operation Life , T_c=85˚C	JESD22-A108	T_c=85˚C I_f=1.0A	3000 hours	0/30
High Temperature Operation Life, T_c=105˚C	JESD22-A108	T_c=105˚C I_f=1.0A	3000 hours	0/30
High Temperature Operation Life, T_c=125˚C	JESD22-A108	T_c=125˚C I_f=1.0A	1000 hours	0/30
Room Temperature Operation Life	JESD22-A108	I_f = 1.2A, $T_{ambient}$ = 25˚C,T_c= 25˚C	1000 hours	0/30
Low Temperature Operating Life	JESD22-A108	$T_{ambient}$ = -40˚C, I_f = 1.2A	1000 hours	0/30
Thermal Shock	JESD22-A106	-40˚C/125˚C, air to air , ≥ 3 min dwell, ≤ 10s transfer	500 cycles	0/30
Temperature Cycle	JESD22-A104	-40˚C/125˚C, ≥ 15 min dwell, ≥ 5 min transfer	500 cycles	0/30
Power Temperature Cycle	JESD22-A105	-40˚C / +105˚C, I_f = 1A, pulsed current, t_{on} = t_{off} = 2 min 10 min dwell, 20 min transfer	500 cycles	0/30
ESD Human Body Model	JESD22-A114	2KV, 1.5K ohm, 100PF, 3 pulses, alternately positive or negative; 2KV, 4KV, 8KV	5 each at each voltage	0/15
ESD Machine Model	JESD22-A115	200V, 400V, 800V	5 each at each voltage	0/15
Mechanical Shock	JESD22-B104-C 2004	Acceleration: 1500g, 0.5ms; Direction: XYZ; Time: five shock pulses /direction	5 each	0/15
Vibration	JEDEC JESD22-B103B 2002(R 2010)	Frequency range: 20Hz to 2000Hz; Cross-over frequency: 80Hz, Displacement: 1.5mm; Acceleration: 20g; Time: 4 cycles each in X, Y, and Z direction; 4 minutes / cycle	5 each	0/15
Mixed Flowing Gas	IEC 60068-2-43:2003	H_2S--10ppm; Temperature of chamber: 25C; Humidity of chamber: 75%; 21 days	15 each	0/15

Mechanical Dimensions

Figure 23: Drawing for Autoflux Series 1x3 LED

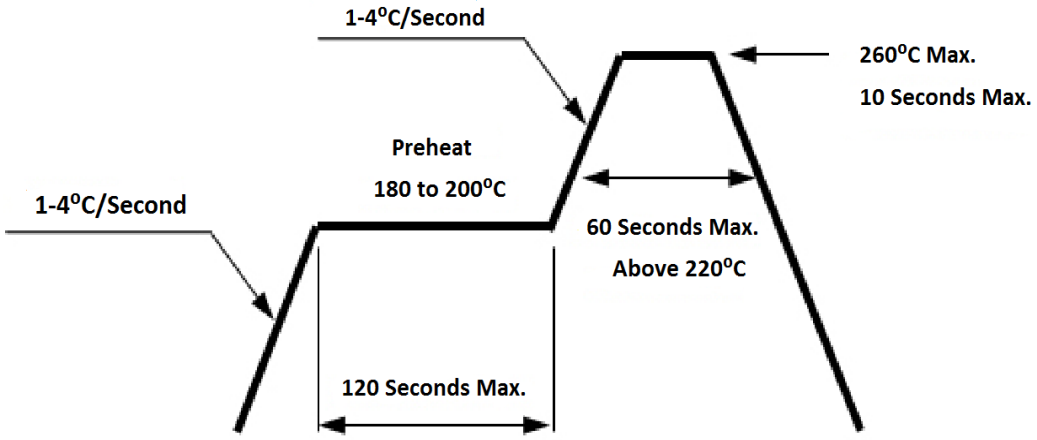


Notes for Figure 23:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are ± 0.10mm.

Reflow Characteristics

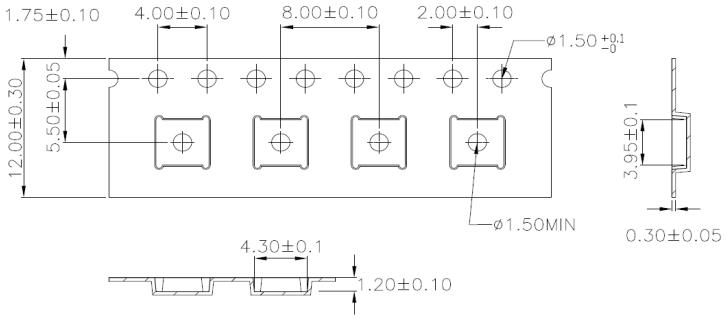
Figure 24: Reflow Profile



Profile Feature	Lead Free Assembly
Preheat: Temperature Range	180˚C – 200˚C
Preheat: Time (Maximum)	120 seconds
Peak Temperature	260˚C
Soldering Time (Maximum)	10 seconds
Allowable Reflow Cycles	2

Packaging

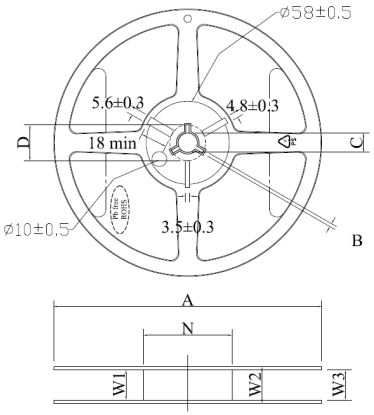
Figure 25: Autoflux Series Packaging Tape Drawing



Note for Figure 25:

1. Drawings are not to scale. Drawing dimensions are in millimeters.

Figure 26: Autoflux Series Packaging Reel Drawing



A	N	W1	W2	W3	D	B	C
178±1.0	60.5±0.5	13.3±0.5	15.85±1.0	12.4<W3<15	21.5±0.6	2.5±0.3	13.5±0.5

Note for Figure 26:

1. Drawings are not to scale. Drawing dimensions are in millimeters.

Design Resources

Please contact your Bridgelux sales representative for assistance. Visit www.bridgelux.com/contact

Precautions

CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in Bridgelux Autoflux lighting manufacturing and assembly can cause damage to the product. Please consult Bridgelux Application Notes for additional information.

CAUTION: EYE SAFETY

This Autoflux 1x3 LED package emits visible light, that, under certain circumstances, could be harmful to the eye. Proper safeguards must be used.

CAUTION: RISK OF BURN

Do not touch the Bridgelux Autoflux 1x3 product during operation. Allow the emitter to cool for a sufficient period of time before handling. The Autoflux 1x3 product may reach elevated temperatures such that could burn skin when touched.

CAUTION

CONTACT WITH LIGHT EMITTING SURFACE (LES)

Avoid any contact with the LES. Do not touch the LES of the emitter or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the emitter

Optics and reflectors must not be mounted in contact with the LES (yellow phosphor resin area).

Disclaimers

MINOR PRODUCT CHANGE POLICY

The rigorous qualification testing on products offered by Bridgelux provides performance assurance. Slight cosmetic changes that do not affect form, fit, or function may occur as Bridgelux continues product optimization.

STANDARD TEST CONDITIONS

Unless otherwise stated, Bridgelux Autoflux 1x3 Top Contact product testing is performed at the nominal drive current.

About Bridgelux: Bridging Light and Life™

At Bridgelux, we help companies, industries and people experience the power and possibility of light. Since 2002, we've designed LED solutions that are high performing, energy efficient, cost effective and easy to integrate. Our focus is on light's impact on human behavior, delivering products that create better environments, experiences and returns—both experiential and financial. And our patented technology drives new platforms for commercial and industrial luminaires.

For more information about the company, please visit
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