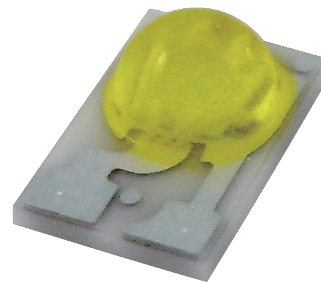


Federal 3045 Series Datasheet



Features :

- High lumen performance
- Promising lumen maintenance characteristics
- High efficiency package
- Level 1 on JEDEC moisture sensitivity analysis
- 350mA – 700mA drive current
- RoHS compliant

Typical Applications

- | | | |
|-----------------------------|-----------------------|--------------------------|
| ■ Reading lights | ■ Decoration lights | ■ Contour lights |
| ■ Up-lights and Down-lights | ■ Beacon lights | ■ Garden lighting |
| ■ General lighting | ■ Portable flashlight | ■ Architectural lighting |
| ■ Ceiling lights | ■ LCD Backlights | |

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Lighting Design Manufacturing Service

General Information

Introduction

Federal is a surface mount, compact, high brightness LED that is built for various illumination needs. A single Cool White Federal can deliver typical luminous flux of 100 lm while driving at 350mA suitable for any kind of lighting sources, including general illumination, flashlights, streetlights, spotlights, signal lights, industrial and commercial lightings. The small physical dimension can free customers from any constraints or limitations in these fields of applications. Furthermore, the reflow-solderable nature of Federal provides an easy path towards the optimum thermal management to achieve a promising reliability. In conclusion, Federal offers you an extraordinary LED experience.

Product Nomenclature

The following table describes the available color, power, and lens type. For more flux and forward voltage information, please consult the Bin Group document.

E F E W - 1 A E 1

X1 X2 X3 X4 X5 X6 X7

X1 LED Item		X2 Module		X3 Emitting Color		X4 Power		X5 Lens Item	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
EF	Edixeon®Federal	E	Emitter	W	Cool White	1	350mA	A	4.5mmx3mm
		S	Star	H	Neutral White	3	700mA		
				X	Warm White				
				R	Red				
				A	Amber				
				T	True Green				
				B	Blue				
				D	Dental Blue				
				C	Royal Blue				
				E	Deep Red				
				F	Cherry Red				
				I	IR 850nm				
				J	Cyan				
				N	IR 940nm				
				V	Ultraviolet				
X6 Housing Item		X7 Serial No.							

Figure 1. Federal Nomenclature

Mechanical Dimensions

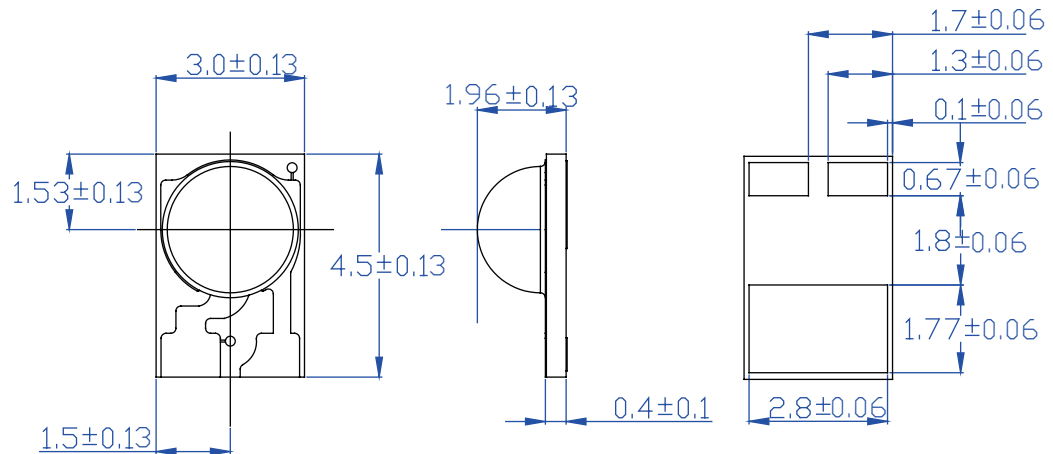
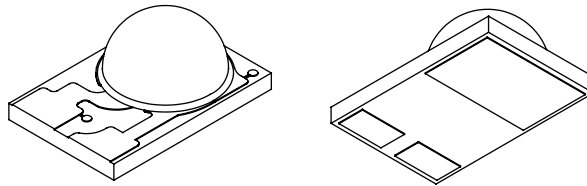


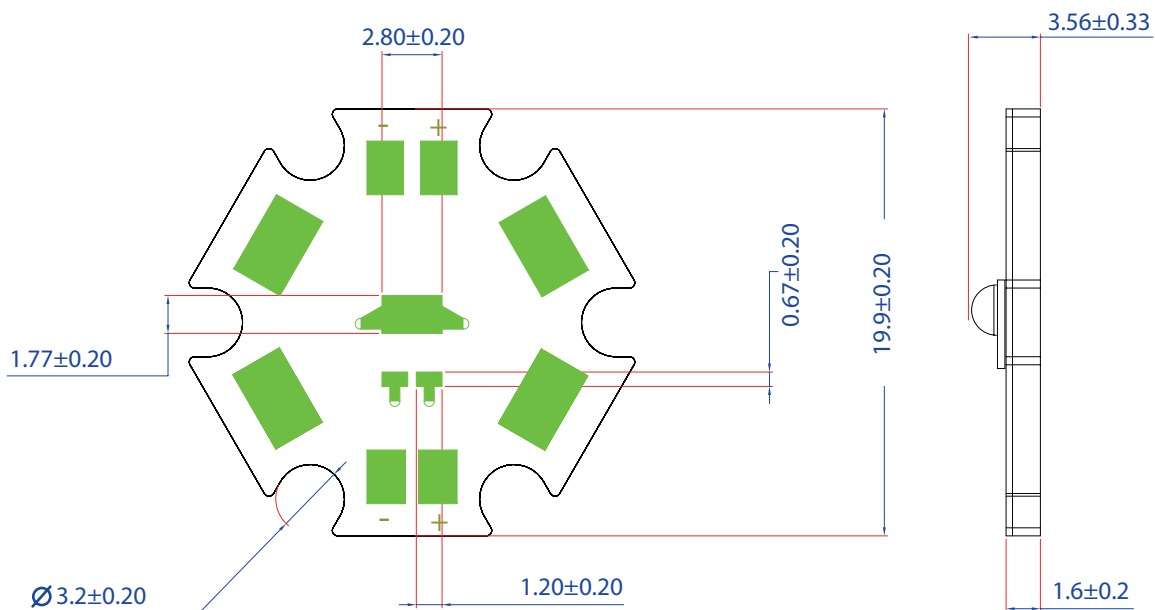
Figure 2. Federal series Dimension

Notes:

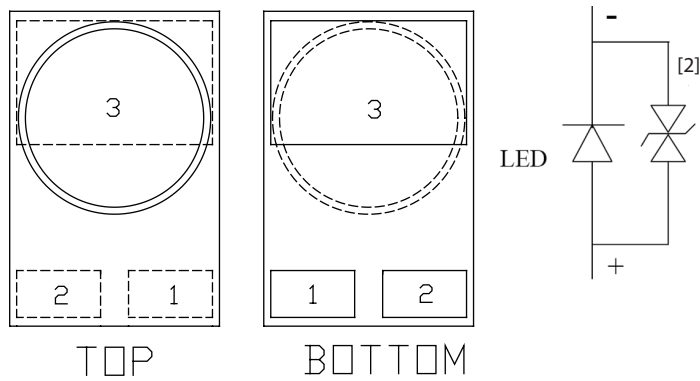
1. All dimensions are measured in mm.
2. Drawings are not to scale.



Star PCB Type Dimension



Mechanical Dimensions



Notes:

1. The thermal pad is electrically isolated from anode and cathode.
2. EFEI-1AE1 & EFEN-1AE1 Without Zener.

PAD	FUNCTION
1	ANODE
2	CATHODE
3	THERMAL

Figure 3. Pad Configuration

PAD	FUNCTION EFEI-1AE1 EFEN-1AE1
1	CATHODE
2	ANODE
3	THERMAL

Figure 4. Pad Configuration for EFEI-1AE1, EFEN-1AE1

Absolute Maximum Ratings

The following tables describe flux of Federal series under various current and different color.

Table 1 . Federal series absolute maximum ratings

Parameter	Symbol	Rating	Units
DC Forward Current ^[1]	I_F	350 / 700	mA
Peak Pulsed Current; ($t_p \leq 100\mu s$, Duty cycle=0.25)	I_{pulse}	1000	mA
Transient Surge Voltage		8	V
Reverse Voltage ^[2]	V_R	Note 2	V
LED Junction Temperature ^[3]	T_J	150 / 125 ^[4]	°C
Operating Temperature		-40 ~ +80	°C
Storage Temperature		-40 ~ +120	°C
ESD Sensitivity		8,000	V
Allowable Reflow Cycles		3	cycles
Soldering Temperature		260	°C

Notes:

1. Maximum forward current for 1W and 3W are 350mA and 700mA respectively.
2. LEDs are not designed to drive in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum.
4. The maximum junction temperature for Red, Amber, Deep Red and Cherry Red is 125°C.

Luminous Flux Characteristics

Table 2 . Luminous flux characteristics at $I_f=350\text{mA}$ and $P_{ad}=25^\circ\text{C}$

Power Consumption	Part Name	Color	Min Luminous Flux@350mA		Units
			Group	Flux(lm)	
1W	EFEW-1AE1	Cool White	T2	70	lm
			T3	80	
			U1	86.5	
			U2	90	
			U3	100	
	EFEH-1AE1	Neutral White	S2	58.8	lm
			T1	66.5	
			T2	70	
			T3	80	
			U1	86.5	
	EFEX-1AE1	Warm White	S1	51.2	lm
			S2	58.8	
			T1	66.5	
			T2	70	
	EFER-1AE1	Red	Q	30.3	lm
			R	39.4	
			S	51.2	
	EFEA-1AE1	Amber	Q	30.3	lm
			R	39.4	
			S	51.2	
	EFET-1AE1	True Green	S	51.2	lm
			T	66.5	
			U	86.5	
	EFEB-1AE1	Blue	L	10.6	lm
			M	13.8	
			N	17.9	
	EFED-1AE1	Dental Blue	J	256.3	mW
	EFEC-1AE1	Royal Blue	J	256.3	mW
			K	384.4	
	EFEJ-1AE1	Cyan	R	39.4	lm
			S	51.2	
	EFEE-1AE1	Deep Red	G	113.9	mW
			H	170.9	
	EFEF-1AE1	Cherry Red	F	75.9	mW
			G	113.9	
	EFEV-1AE1	Ultraviolet	G	113.9	mW
			H	170.9	
			J	256.3	
	EFEI-1AE1	IR 850nm	H	170.9	mW
	EFEN-1AE1	IR 940nm	J	256.3	
			G	113.9	mW

Table 3 . Luminous flux characteristics at $I_f=700\text{mA}$ and $\text{Pad}=25^\circ\text{C}$

Power Consumption	Part Name	Color	Min Luminous Flux(lm)	
			Group	700mA
3W	EFEW-3AE1	Cool White	V2	129.4
			W1	146.2
			W2	168.1
	EFEH-3AE1	Neutral White	U3	100
			V1	112.5
			V2	129.4
	EFEX-3AE1	Warm White	U1	86.5
			U2	90
			U3	100
	EFER-3AE1	Red	T	66.5
			U	86.5
	EFET-3AE1	True Green	U	86.5
			V	112.5
	EFEB-3AE1	Blue	P	23.3
			Q	30.3
	EFEA-3AE1	Amber	T	66.5
			U	86.5

Note:

The luminous flux performance is guaranteed within published operating conditions. Edison maintains a tolerance of $\pm 10\%$ on flux measurements.

Characteristics

Optical Characteristics

Table 4 . Optical characteristics at $I_f=350\text{mA}$ and $T_j=25^\circ\text{C}$

Power Consumption	Part Name	Color	CCT / wavelength			Viewing Angle (Degree)
			Min.	Typ.	Max.	
1W	EFEW-1AE1	Cool White	5,000	--	10,000	120
	EFEH-1AE1	Neutral White	3,800	--	50,00	120
	EFEX-1AE1	Warm White	2,670	--	3,800	120
	EFER-1AE1	Red	620	--	630	120
	EFEA-1AE1	Amber	585	--	595	120
	EFET-1AE1	True Green	515	--	535	120
	EFEB-1AE1	Blue	455	--	475	120
	EFED-1AE1	Dental Blue ^[1]	450	--	470	120
	EFEC-1AE1	Royal Blue ^[1]	440	--	460	120
	EFEJ-1AE1	Cyan	490	--	510	120
	EFEE-1AE1	Deep Red ^[1]	650	--	670	120
	EFEF-1AE1	Cherry Red ^[1]	730	--	750	120
	EFEV-1AE1	Ultraviolet ^[1]	390	--	410	120
	EFEI-1AE1	IR 850nm ^[1]	840	--	860	120
	EFEN-1AE1	IR 940nm ^[1]	930	--	950	120

Notes:

1. Wavelengths are stated as peak wavelength.

1. Wavelengths are stated as peak wavelength.
2. Edison maintains a tolerance of $\pm 0.5\text{nm}$ for dominant wavelength, $\pm 2\text{nm}$ for peak wavelength and $\pm 5\%$ on CCT measurement.

Electrical Characteristics

Table 5 . Electrical characteristics at T_j=25°C

Power Consumption	Part Name	Color	V _F (V)			Forward Current (mA)	Thermal Resistance (°C/W)
			Min.	Typ.	Max.		
1W	EFEW-1AE1	White	2.8	--	4.0	350	10
	EFEH-1AE1	Neutral White	2.8	--	4.0	350	10
	EFEY-1AE1	Warm White	2.8	--	4.0	350	10
	EFER-1AE1	Red	2.0	--	3.0	350	10
	EFEA-1AE1	Amber	2.0	--	3.0	350	10
	EFET-1AE1	True Green	3.0	--	4.0	350	10
	EFEY-1AE1	Blue	2.8	--	4.0	350	10
	EFED-1AE1	Dental Blue	2.8	--	4.0	350	10
	EFEY-1AE1	Royal Blue	2.8	--	4.0	350	10
	EFEJ-1AE1	Cyan	2.8	--	4.0	350	10
	EFEY-1AE1	Deep Red	2.0	--	3.0	350	10
	EFEY-1AE1	Cherry Red	2.0	--	3.0	350	10
	EFEV-1AE1	Ultraviolet	3.0	--	4.0	350	10
	EFEI-1AE1	IR 850nm	1.5	--	2.5	700	10
	EFEY-1AE1	IR 940nm	1.5	--	2.5	700	10
3W	EFEW-3AE1	White	3.4	--	4.4	700	8
	EFEH-3AE1	Neutral White	3.4	--	4.4	700	8
	EFEY-3AE1	Warm White	3.4	--	4.4	700	8
	EFER-3AE1	Red	2.2	--	3.2	700	8
	EFET-3AE1	True Green	3.6	--	4.6	700	8
	EFEY-3AE1	Blue	3.4	--	4.4	700	8
	EFEA-3AE1	Amber	2.3	--	3.3	700	8

Note:
Edison maintains a tolerance of 0.06V on forward voltage measurement.

JEDEC Moisture Sensitivity

Table 6 . JEDEC Moisture Sensitivity

Level	Floor Life		Soak Requirements	
	Time	Conditions	Standard	
			Time (hours)	Conditions
1	unlimited	≤30°C / 85% RH	168+5/-0	85°C / 85% RH

Characteristic Curve

Spectrum

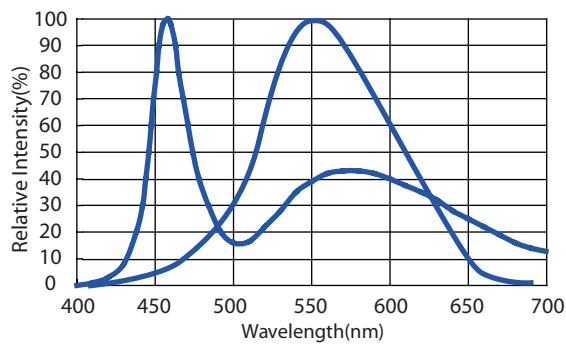


Figure 5. Color Spectrum for Cool White at $T_j=25^\circ\text{C}$

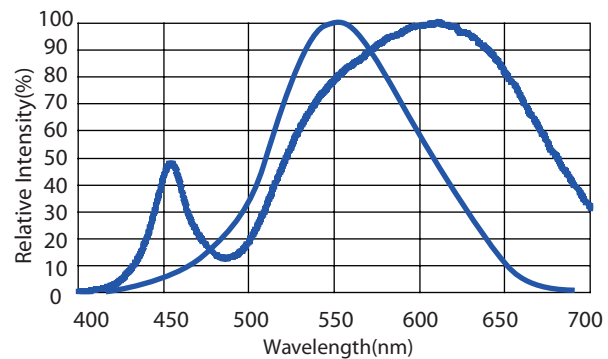


Figure 6. Color Spectrum for Warm White at $T_j=25^\circ\text{C}$.

Radiation Diagram

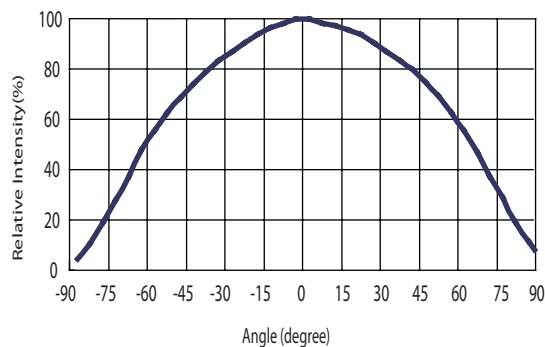


Figure 7. Emission Angle

Luminous Flux & Junction Temperature

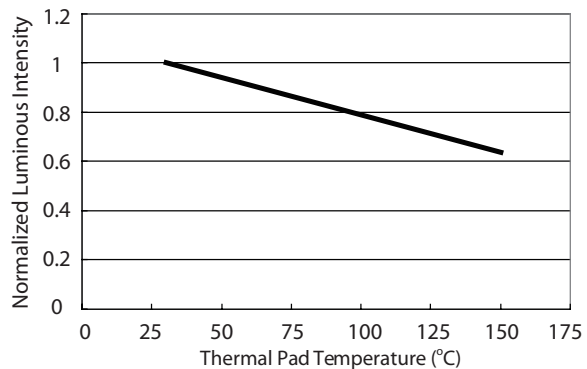


Figure 8. Relative luminous flux vs. thermal pad temperature for Cool White.

Luminous Flux & Junction Temperature

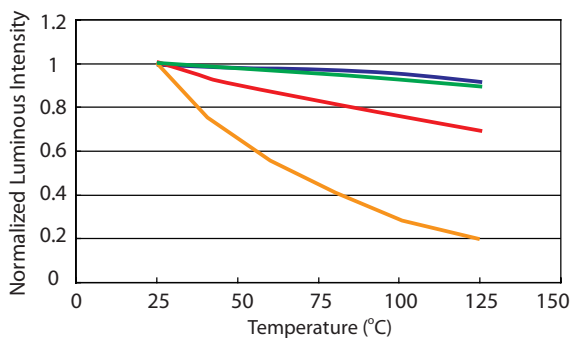


Figure 9. Relative luminous flux vs. junction temperature for True Green, Blue, Red and Amber.

CCT & Junction Temperature

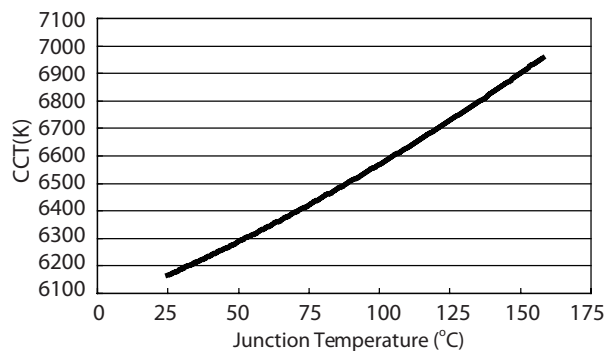


Figure 10. Typical CCT vs. junction temperature for Cool White.

Forward Voltage & Forward Current

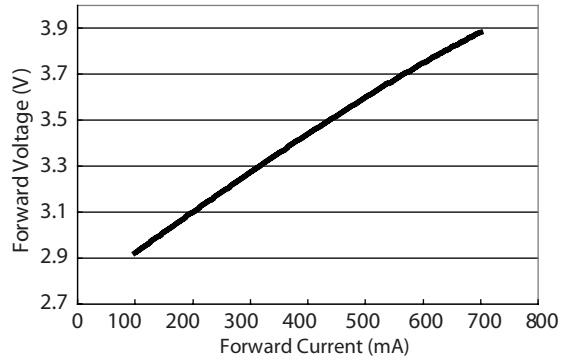


Figure 11. Forward voltage vs. forward current for White, Blue, Dental Blue and Royal Blue ,at $T_j = 25^\circ\text{C}$.

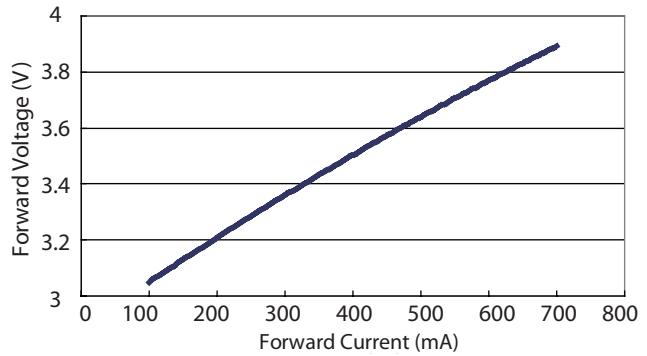


Figure 12. Forward voltage vs. forward current for True Green and Cyan ,at $T_j = 25^\circ\text{C}$.

Luminous Flux & Forward Current

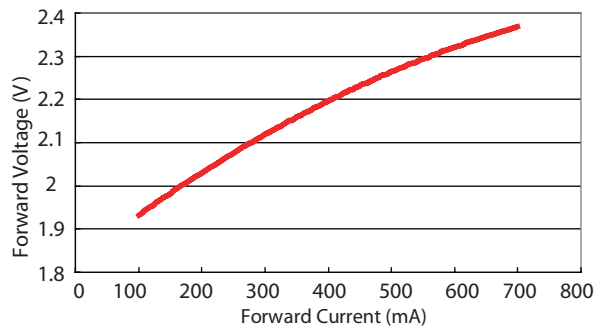


Figure 13. Forward voltage vs. forward current for Red and Amber ,at $T_j = 25^\circ\text{C}$.

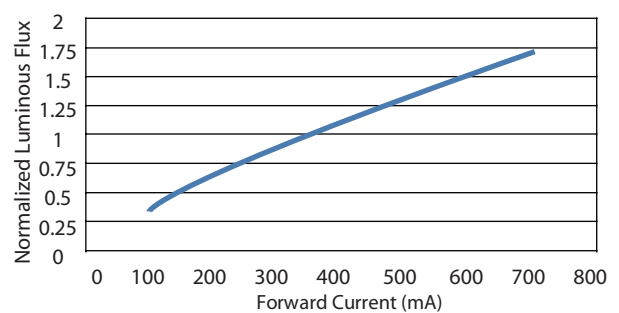


Figure 14. Relative luminous flux vs. forward current for Cool White, True Green, Blue, Cyan, Dental Blue and Royal Blue ,at $T_j = 25^\circ\text{C}$.

CCT/Wavelength & Forward Current

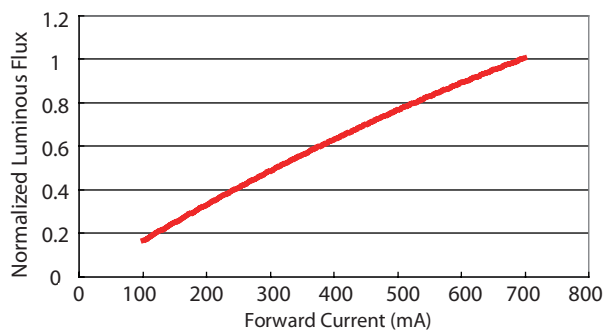


Figure 15. Relative luminous flux vs. forward current for Red and Amber ,at $T_j = 25^\circ\text{C}$.

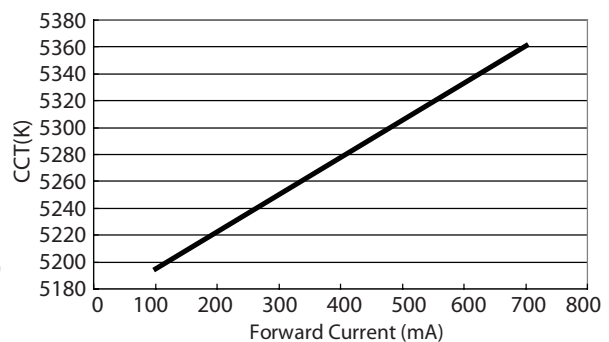


Figure 16. CCT vs. forward current for Cool White ,at $T_j = 25^\circ\text{C}$.

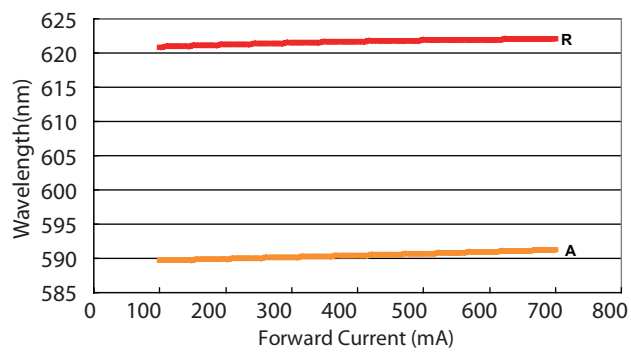


Figure 17. Wavelength length vs. forward current for Red and Amber, at $T_j = 25^\circ\text{C}$.

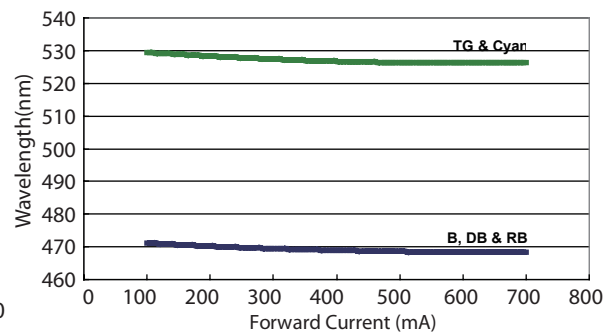


Figure 18. Wavelength length vs. forward current for True Green, Blue, Cyan, Royal Blue and Dental Blue, at $T_j = 25^\circ\text{C}$.

Revision History

Table 7. Revision history of Federal series datasheet

Version	Description	Release Date
1	1. Establish a datasheet	2008/12/02
2	1. Update the data of Absolute Maximum Ratings	2009/11/04
3	1. Update the data of Lumen	2010/03/03
4	1. Layout update	2011/03/07
5	1. Modify Amber points Bin changed to Z1: 591 ~ 593 and Z2593 ~ 595 - P.12, the P22	2011/03/22
6	1. Update the data of Luminous Flux Characteristics	2011/05/20
7	1. Update the layout of datasheet 2. Update the luminous flux with bin group 3. update the mechanical dimensions 4. up date the pad configuration for EFEL-1AE1 and EFEN-1AE1 5.Update the flux and electrical characteristics 6. Update the reel of product packaging	2011/09/01
8	1. update component image	2012/05/17
9	1. Add the Star PCB Type Dimension 2. Modify the figure of Luminous Flux & Junction Temperature	2012/06/15

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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