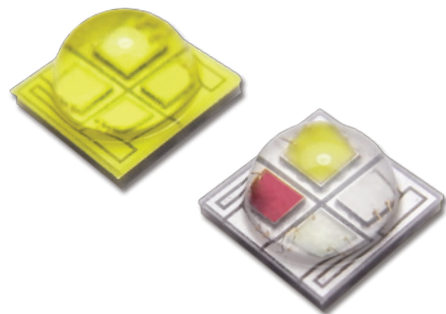


Federal 5050 Series Datasheet



Features :

- High lumen/flux performance
- Promising lumen maintenance characteristics
- High efficiency package
- Level 1 on JEDEC moisture sensitivity analysis
- Max pulse current: 1000mA
- RoHS compliant

Typical Applications :

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

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General Information

Introduction

Federal 5050 Series is a smaller and brighter multi-chip LED which provides multi-color packaging flexibility. Federal is a surface mount, compact, high brightness LED that is suitable for various illumination needs such as general illumination, ashlights, streetlights, spot lights as well as industrial and commercial lightings. The multi-color LEDs (RGBW/ RGBA) are especially suitable for stage lights, and with its smallest dimensions in the world, enables a higher flexibility for optical design. All the Edison products are carefully tested in order to achieve reliability and optimal performance, for giving 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.

Table 1 . Federal 5050 Nomenclature

EF X1	E X2	X X3	-	1 X4	C X5	E X6	1 X7		
X1 LED Item		X2 Module		X3 Emitting Color		X4 Current		X5 Dimension	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
EF	Edixeon® Federal	E	Emitter	4W	Cool White x4	1	350mA	C	5.0x5.0mm
		S	4 Single Star	4H	Neutral White x4				
		L	4 Series Star	4X	Warm White x4				
		P	2 Parallel 2 Series Star	RTBW	Red, Green, Blue, Cool White				
				RTBA	Red, Green, Blue, Amber				
				RTBH	Red, Green, Blue, Neutral white				
				RTTB	Red, Green x2, Blue				
				RTBX	Red, Green, Blue, Warm White				
X6 Housing Item		X7 Serial Number							
Code	Type	Code	Type						
E	E-type	-	-						

Mechanical Dimensions

Component Dimension

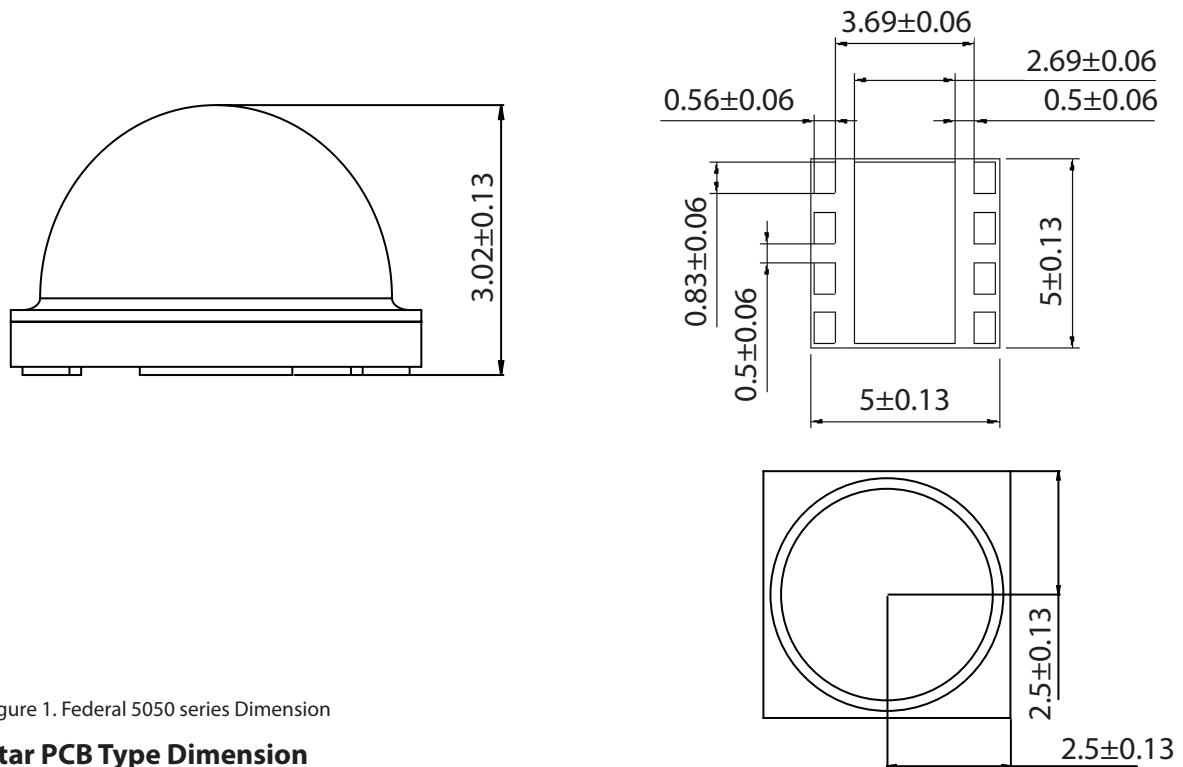


Figure 1. Federal 5050 series Dimension

Star PCB Type Dimension

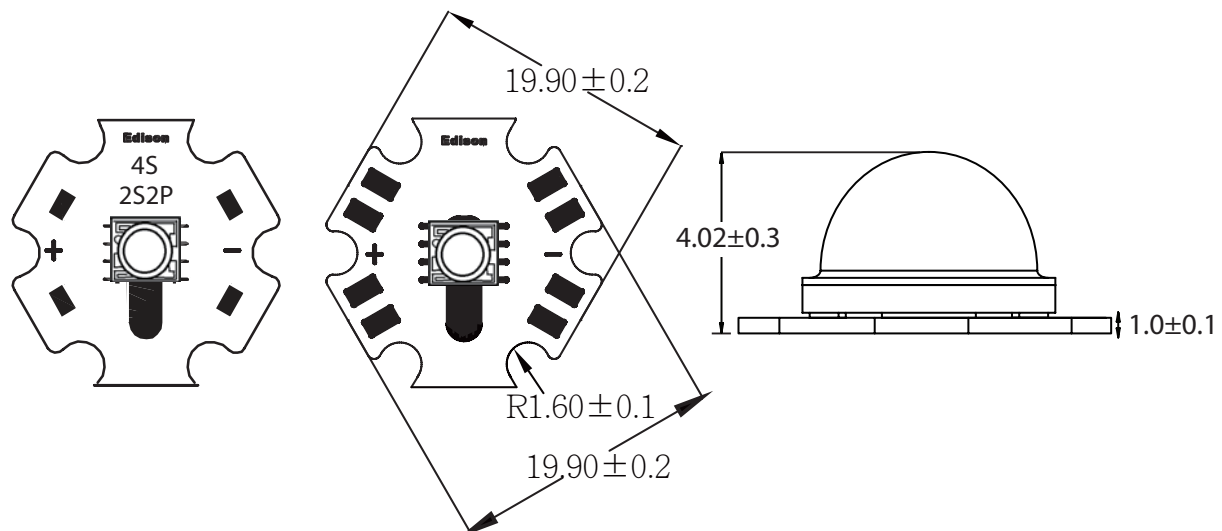


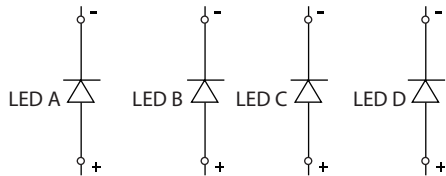
Figure 2. Federal 5050 Series Star PCB type Dimension

Notes:

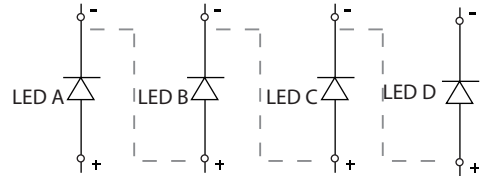
1. All dimensions are measured in mm.
2. Drawings are not to scale.

Circuit and applications

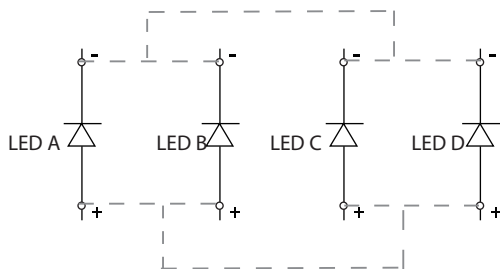
1. Separate operation (EFS4x-1CEX)



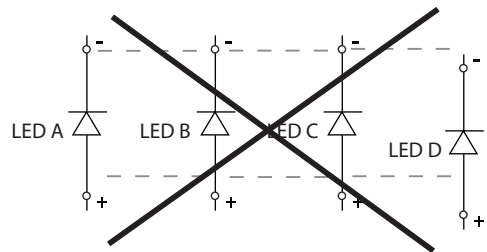
2. Four S (EFL4x-1CEX)



3. Two S and Two (EFP4x-1CEX)



4. Not Available



Note:

1. The circuit design depends on your PCB design.

PCB Layout

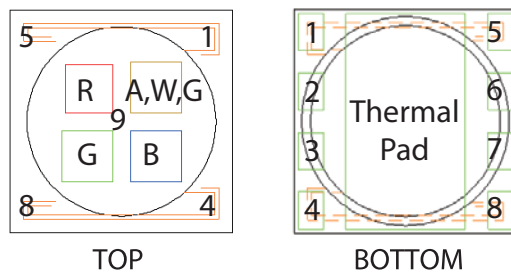


Figure 3. Federal 5050 series circuit and pcb layout

Note:

The thermal pad is electrically isolated from anode and cathode.

Solder Pad

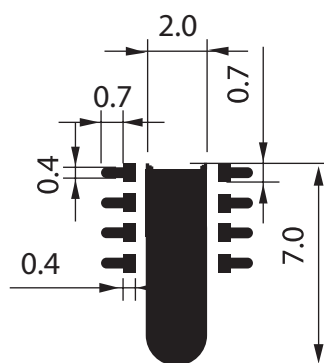


Table 2. Pad Configuration

Color	FUNCTION	
	Anode	Cathode
Red	6	2
Green	7	3
Blue	8	4
Amber White Green	5	1

Absolute Maximum Ratings

The following tables describe flux of Federal 5050 series under various current and different color.

Table 3. Federal 5050 series absolute maximum ratings

Parameter	Symbol	Value	Units
DC Forward Current ^[1]	I_F	350 / 700	mA
Peak Pulsed Current; (tp≤100μs, Duty cycle=0.25)	I_{pulse}	1,000	mA
Transient Surge Voltage		8	V
Reverse Voltage ^[2]	V_R	Note 2	V
LED Junction Temperature ^[3]	T_J	125 / 150 ^[4]	°C
Operating Temperature		-40 ~ +80	°C
Storage Temperature		-40 ~ +120	°C
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 is 125°C.

Luminous Flux Characteristic

The following tables describe flux of Federal 5050 series under various current and different color.

Table 4. Luminous Flux Characteristics, $I_f=350\text{mA}$, and Thermal Pad= 25°C

Power Consumption	Part Name	Color	Min Luminous Flux(lm)		
			Group	350mA	700mA
4W	EFE4W-1CE7	Cool White	G1	370	640
			G2	425	735
			H1	480	830
4W	EFE4H-1CE7	Neutral White	F2	330	570
			G1	370	640
4W	EFE4X-1CE7	Warm White	F1	290	501
			F2	330	570

Power Consumption	Part Name	Color	Min Luminous Flux(lm)	
			350mA	700mA
1W / per chip	EFERTBW-1CE1 EFERTBA-1CE1 EFERTTB-1CE1 EFERTBH-1CE1 EFERTBX-1CE1	Red	39.4	74.9
		Green	70	112
		Blue	13.8	23.9
		Amber	39.4	74.9
		Cool White	90	155.7
		Neutral White	80	138.4
		Warm White	66.5	115.1

Notes:

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

Characteristics

Table 5. Electrical and optical characteristics, $I_F=350\text{mA}$ and Thermal Pad= 25°C

Part Name	Color	CCT/ Wavelength Range		Viewing Angle (Degree)	V_F (V)		Thermal Resistance ($^\circ\text{C/W}$)
		Min.	Max.		Min.	Max.	
EFE4W-1CE7	Cool White	5,000K	10,000K	130	2.8	4.0	2.5
EFE4H-1CE7	Neutral White	3,800K	5,000K				
EFE4X-1CE7	Warm White	2,670K	3,800K				
EFERTBW-1CE1 EFERTBA-1CE1 EFERTTB-1CE1 EFERTBH-1CE1 EFERTBX-1CE1	Red	620nm	630nm	120	1.7	2.7	2.5
	Green	520nm	535nm	125	3.0	4.0	2.5
	Blue	450nm	470 nm	120	2.8	4.0	2.5
	Amber	585nm	595nm	120	1.7	2.7	2.5
	Cool White	5,000K	10,000K	130	2.8	4.0	2.5
	Neutral White	3,800K	5,000K	130	2.8	4.0	2.5
	Warm White	2,670K	3,800K	130	2.8	4.0	2.5

1. Edison maintains a tolerance of $\pm 0.5\text{nm}$ for dominant wavelength and $\pm 5\%$ on CCT measurement

Characteristic Curve

Spectrum

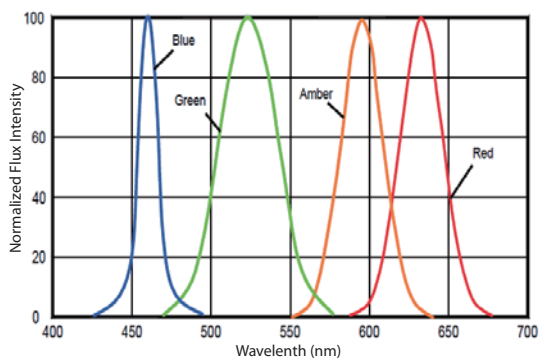


Figure 4 Color Spectrum for EFERTBA-1CE1 at $T_j=25^\circ\text{C}$

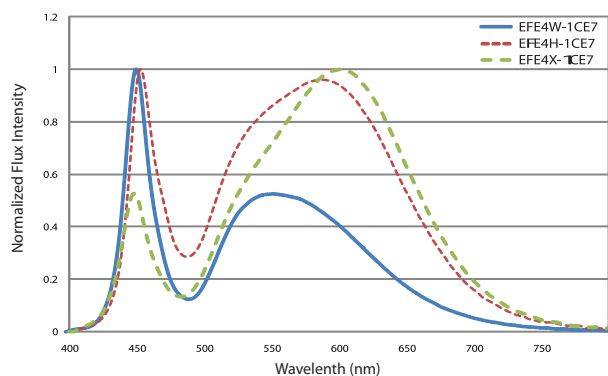


Figure 5. Color spectrum for cool white, neutral white and warm white at $T_j=25^\circ\text{C}$

Radiation Diagram

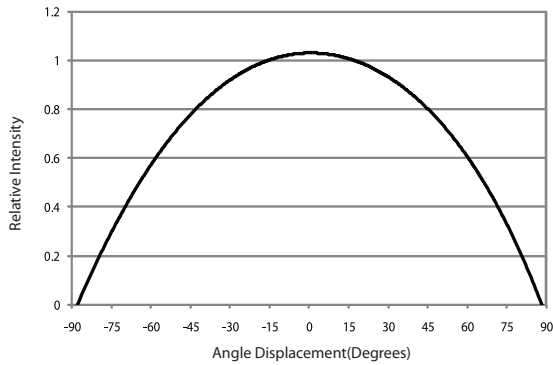


Figure 6. Radiation diagram for EFE4W-1CE7

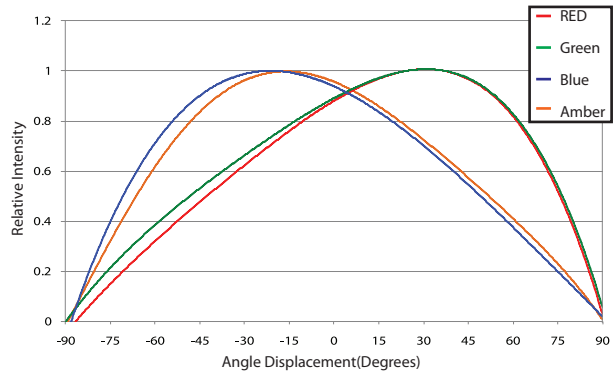


Figure 7. Radiation diagram for EFERTBA-1CE1

Forward Voltage & Forward Current

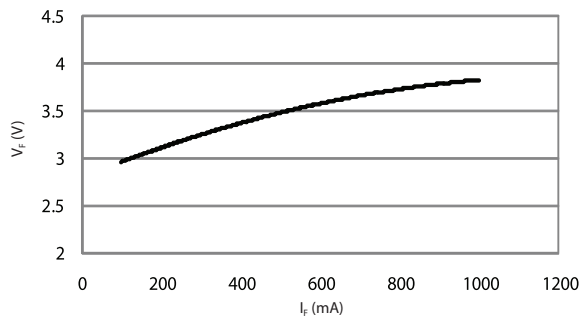


Figure 8. Forward voltage vs. forward current for White series

Luminous Flux & Forward Current

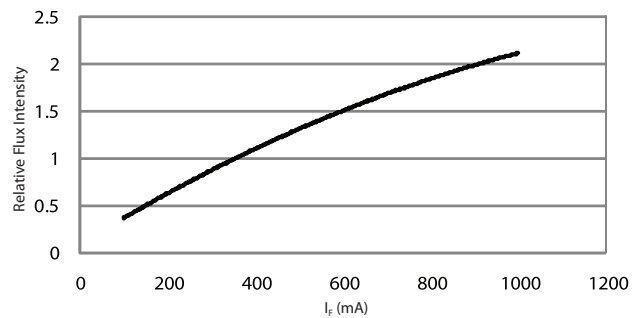


Figure 9. Relative luminous flux vs. forward current for White series

Luminous Flux & Junction Temperature

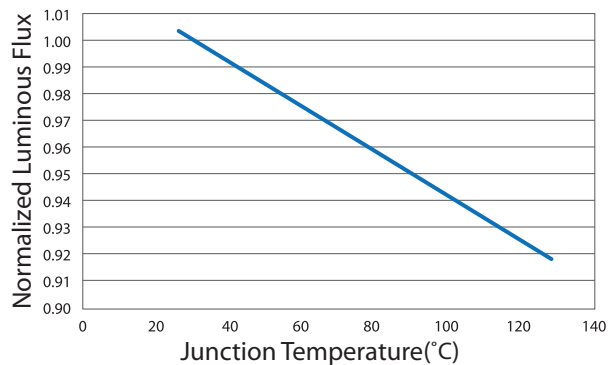


Figure 10. Relative luminous flux vs. thermal pad temperature for White series.

Forward Voltage & Forward Current

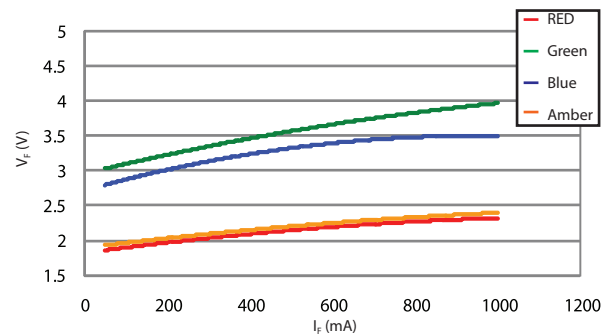


Figure 11. Forward voltage vs. forward current for Federal 5050 series

Luminous Flux & Forward Current

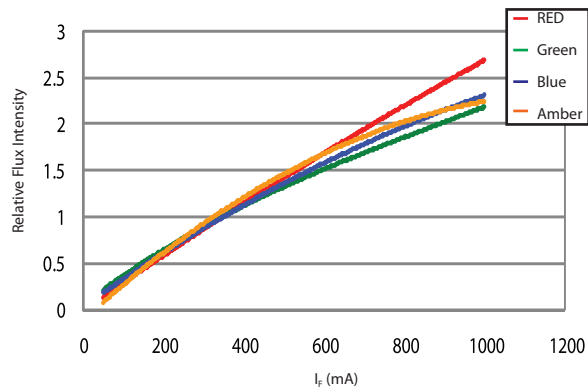


Figure 12. Relative luminous flux vs. forward current for Federal 5050 series

Luminous Flux & Junction Temperature

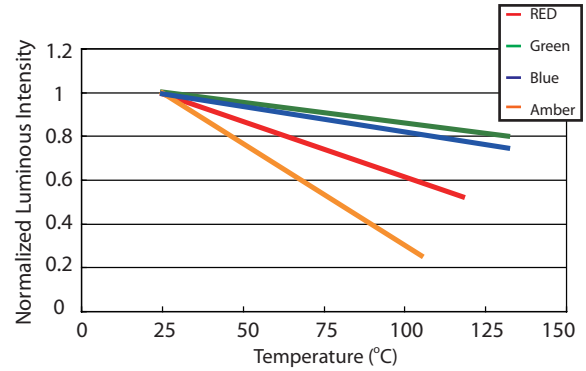
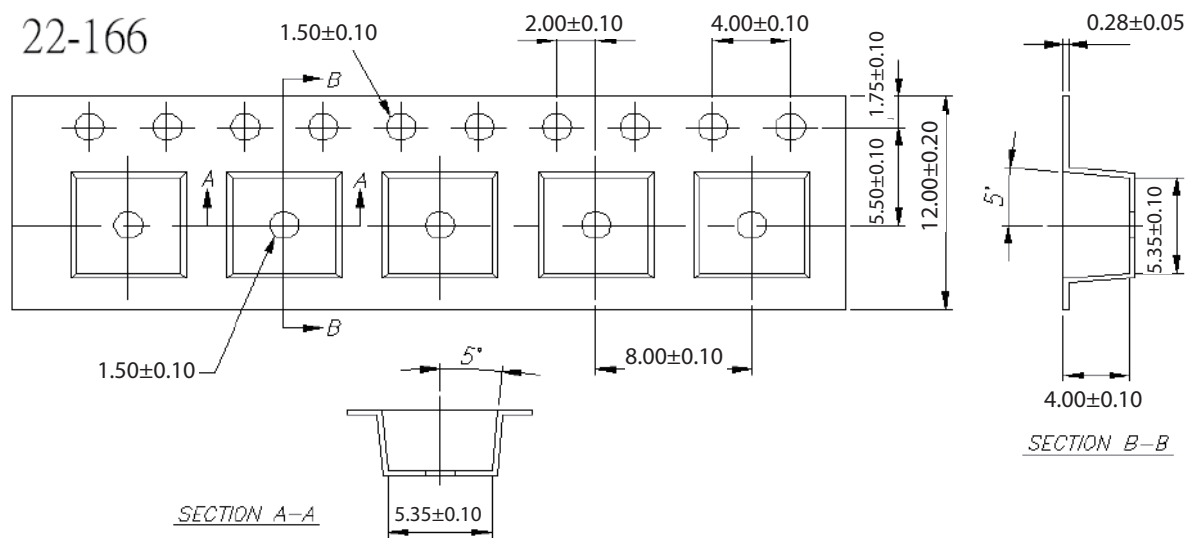
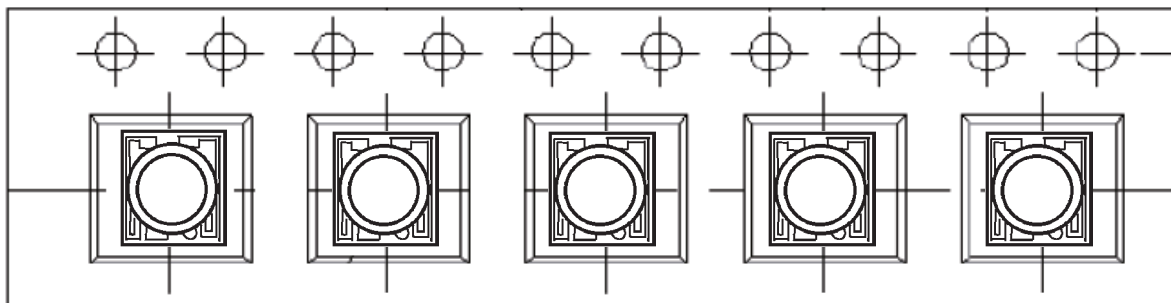


Figure 13. Relative luminous flux vs. thermal pad temperature for True Green, Blue, Red and Amber.

Product Packaging Information



CATHODE SIDE



ANODE SIDE

Figure 17. Federal 5050 single color Reel Dimensions.

Table 6. Federal 5050 single color quantity and dimension of product package

Item	Quantity	Total	Dimensions(mm)
Reel	500pcs	500pcs	R-178
Box	4 Reels	2,000pcs	240*235*67
Carton	5 boxes	10,000pcs	353*354*256

Starting with 50pcs empty,and 50pcs empty at the last

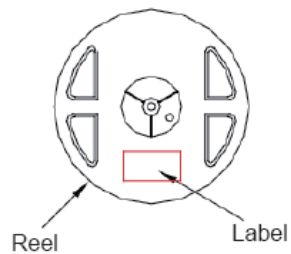


Figure 18. Taping reel dimensions

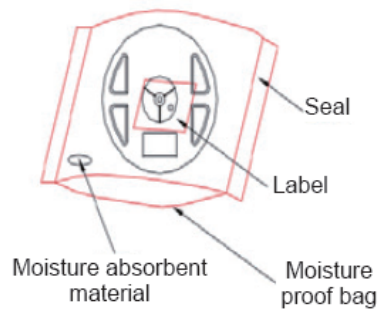


Figure 19. Federal 5050 Package

Revision History

Table 7. Revision history of Federal 5050 series datasheet

Version	Description	Release Date
1	1.Establish a datasheet	2011/09/29
2	1.Update information	2012/01/10
3	1.Add new part numbers 2.Add new Star item	2012/03/02

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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