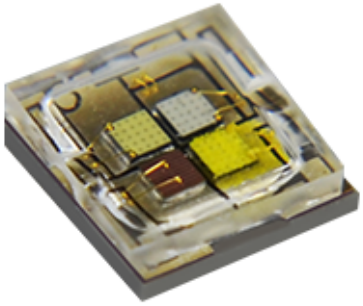
Federal Series

5050 Glass 15W RTBW

Stage Lighting

Datasheet



Features :

- Available in red, green, blue and white in a single package
- Maximum drive current per LED die : R:1000mA ; T/B/W(CW): 1200mA
- Individually addressable LEDs
- Electrically neutral thermal path
- Thermal Resistance (Rth)=0.7°C/W
- RoHS compliant
- Flat package with cover glass on top.

Typical Applications :

- Stage lighting
- Color-changing lighting
- Mood lighting
- Architectural lighting
- Entertainment lighting
- Indoor directional 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 stage lighting, color-changing lighting, mood lighting, architectural lighting, as well as entertainment lighting and indoor directional lightings. The multi-color LEDs (RTBW) 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.

Ordering Code Format

2	F	M 0	1 5	M 2	x x	F 0 3	x x x
X1	X2	X3	X4	X5	X6	X7	X8

X1		X2		X3		X4		X5	
Type		Component		Series		Wattage		Color	
2	Emitter	F	Federal	M0	5050	15	15W	M2	RTBW

X6		X7		X8	
Internal code		PCB Board		Serial Number	
-	-	F03	5050	-	-

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Absolute Maximum Ratings

Parameter	Symbol	Value	Units
DC Forward Current[1]	I_F	R:1000 T/B/W(CW): 1200	mA
Reverse Voltage[2]	V_R	Note 2	V
LED Junction Temperature[3]	T_J	125	°C
Operating Temperature	-	-40 ~ +85	°C
Storage Temperature	-	-40 ~ +125	°C
Soldering Temperature	-	260	°C

Notes:
1. LEDs are not designed to drive in reverse bias.
2. Proper current derating must be observed to maintain junction temperature below the maximum.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle	$2\Theta_{1/2}$	115	Degree
Forward voltage@350mA	V_F	R:1.5~2.5 T: 2.7~3.7 B/W(CW): 2.5~3.5	V
Thermal resistance	-	0.7	°C/W
CCT/Wavelength	-	R : 620 - 630 T : 520 - 530 B : 450 - 460 W(CW): 5,000-7,000	K/nm
CRI (Ra)	-	CRI70	-
JEDEC Moisture Sensitivity	-	Level 1 **Floor Life** Conditions: ≤30°C / 85% RH **Soak Requirements(Standard)** Time (hours): 168+5/-0 Conditions: 85°C / 85% RH	-

Notes:
1. Edison maintains a tolerance of ±1nm for dominant wavelength.
2. Viewing angle is measured with accuracy of ±10%.
3. Color rendering index CRI Tolerance : ±2

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Luminous Flux Characteristic

Luminous Flux Characteristics, I_F=350mA and Tj =25˚C

Emitter Type	Color	Ra	WD	Luminous Flux @350mA (lm)	Luminous Flux @700mA (lm)	Luminous Flux @1,000mA (lm)	Luminous Flux @1,200mA (lm)	Order Code
RTBW	Cool White	70	-	95~125	190~230	250~295	295~340	2FM015M206F03S02
	True Green	-	520-530	105~125	165~195	205~230	230~260	
	Blue	-	450-460	15~23	27~37	37~47	44~55	
	Red	-	620-630	35~50	70~95	100~125	-	

Note:
The luminous flux performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of ±10% on flux measurements.

Wavelength Bin Structure

Color	Group	Min. Wd (nm)	Max. Wd (nm)
Red	X	620	630
True Green	W	520	525
	X	525	530
Blue	U	450	455
	V	455	460

Note:
Dominant wavelength measurement allowance: ±1nm.

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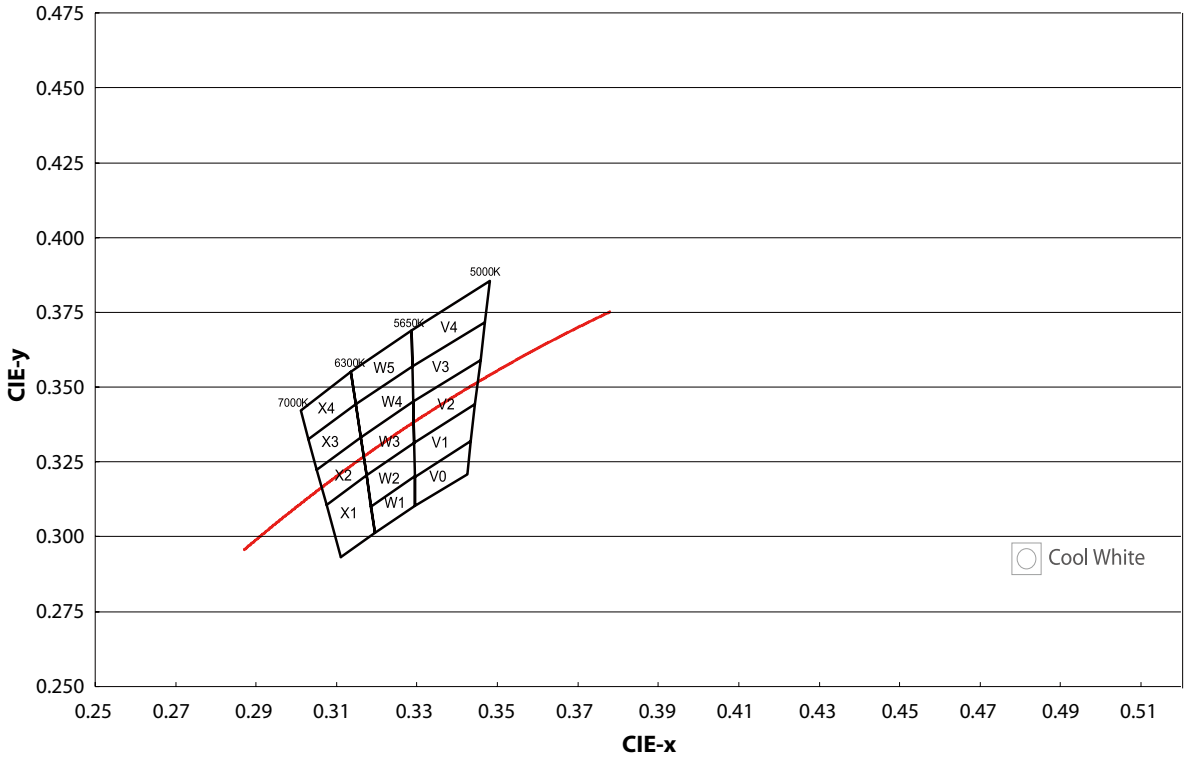
Color BIN code



X1		X2		X3		X4	
X	Y	X	Y	X	Y	X	Y
0.3076	0.3108	0.3076	0.3108	0.3052	0.3224	0.3031	0.3327
0.3174	0.3204	0.3052	0.3224	0.3031	0.3327	0.3011	0.3422
0.3196	0.3013	0.3160	0.3332	0.3148	0.3444	0.3136	0.3550
0.3112	0.2932	0.3175	0.3204	0.3160	0.3332	0.3148	0.3444

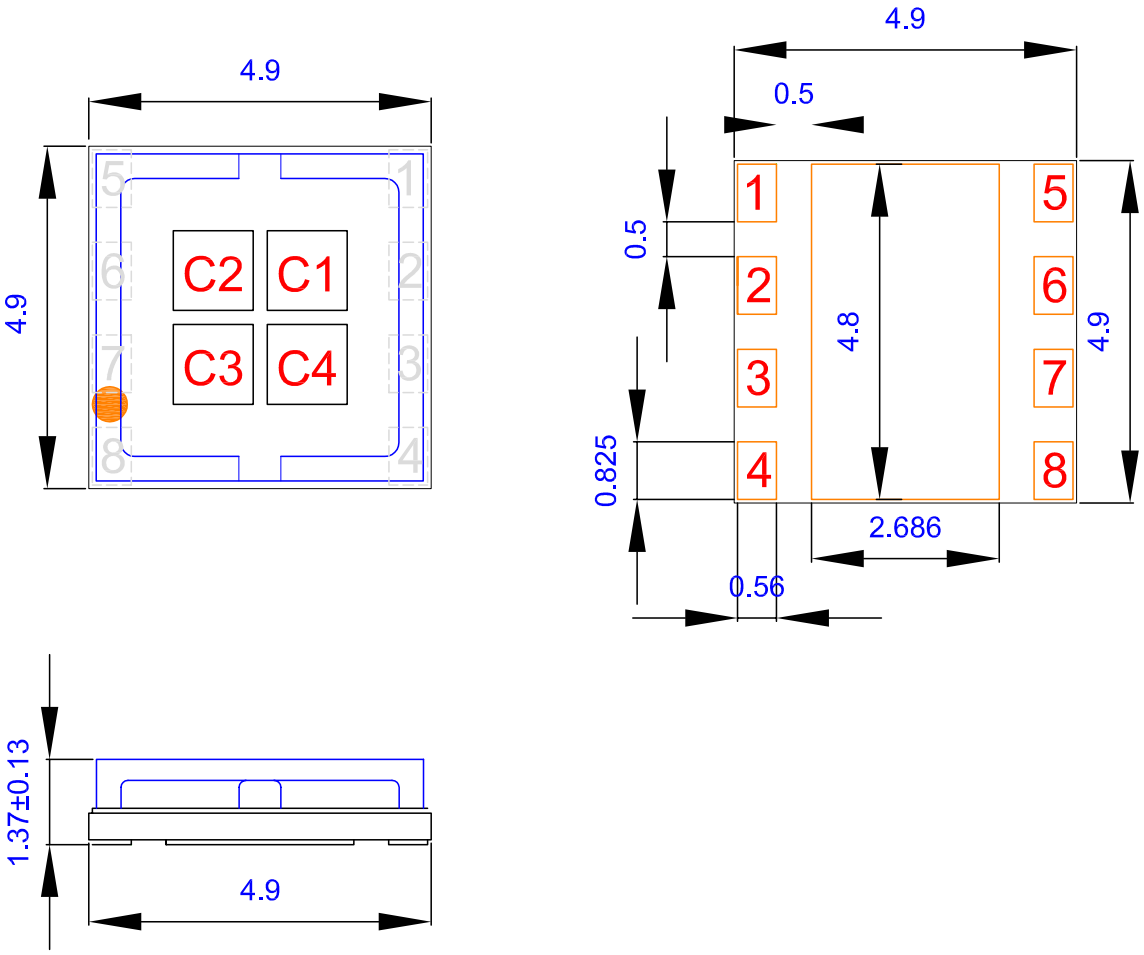
W1		W2		W3		W4		W5	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3294	0.3202	0.3292	0.3313	0.3290	0.3451	0.3290	0.3451	0.3148	0.3444
0.3295	0.3105	0.3294	0.3202	0.3292	0.3313	0.3160	0.3332	0.3136	0.3550
0.3196	0.3013	0.3186	0.3102	0.3175	0.3204	0.3148	0.3444	0.3286	0.3690
0.3186	0.3102	0.3175	0.3204	0.3160	0.3332	0.3288	0.3569	0.3288	0.3569

V0		V1		V2		V3		V4	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3434	0.3320	0.3292	0.3313	0.3292	0.3313	0.3290	0.3451	0.3288	0.3569
0.3425	0.3208	0.3444	0.3442	0.3290	0.3451	0.3288	0.3569	0.3286	0.3690
0.3295	0.3105	0.3434	0.3320	0.3458	0.3592	0.3469	0.3717	0.3481	0.3856
0.3294	0.3200	0.3294	0.3200	0.3444	0.3442	0.3458	0.3592	0.3469	0.3717

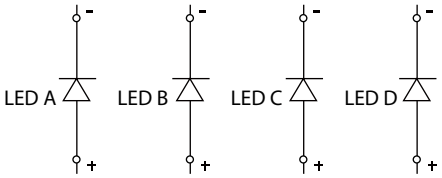
Note:
CIE_x/y tolerance: ±0.005.

Mechanical Dimensions

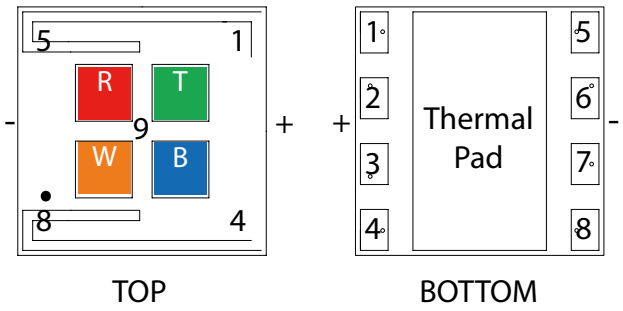
Emitter Type Dimension



Circuit



PCB Layout



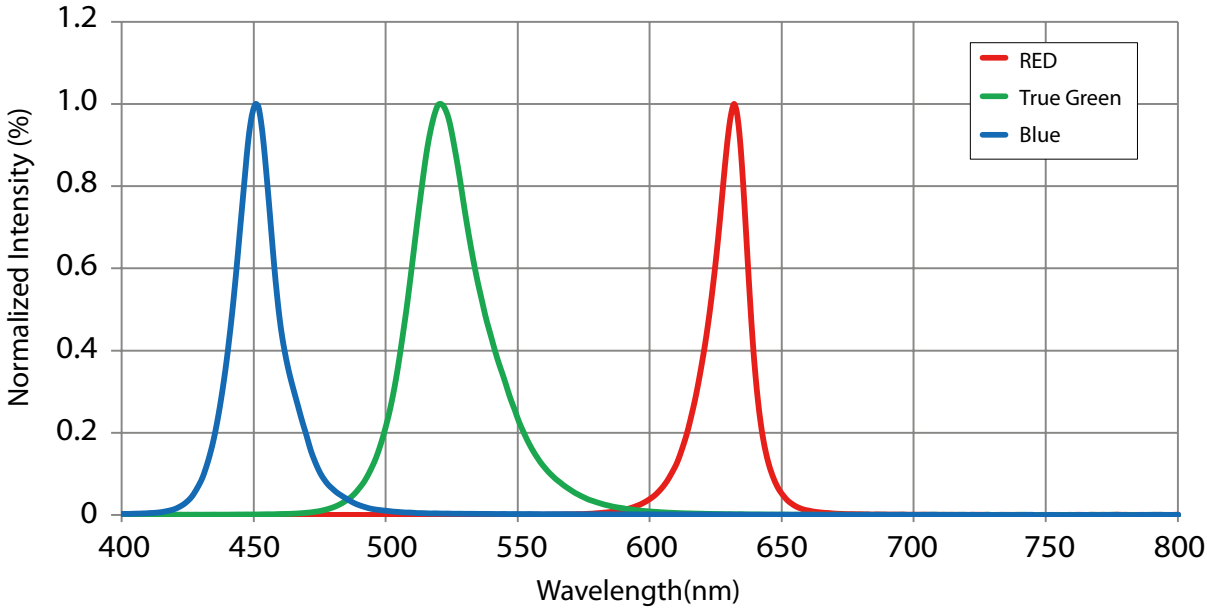
Pad Configuration

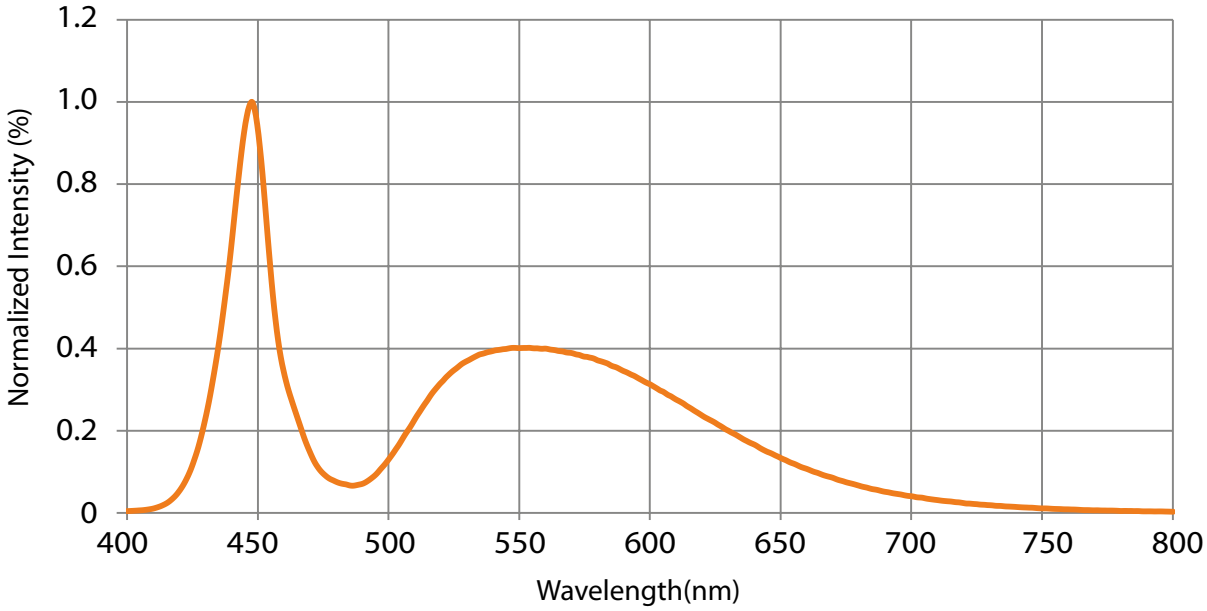
Color	FUNCTION	
	Anode	Cathode
True Green	1	5
Red	2	6
CW	3	7
Blue	4	8

Note:
The thermal pad is electrically isolated from anode and cathode.

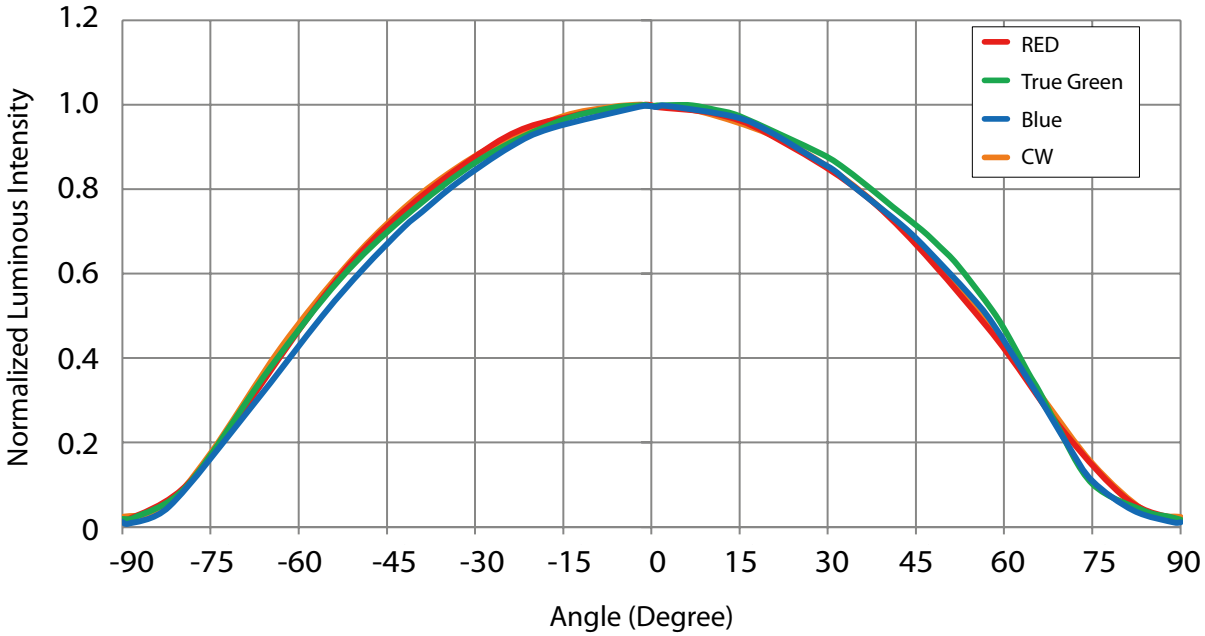
Characteristic curve

Color Spectrum

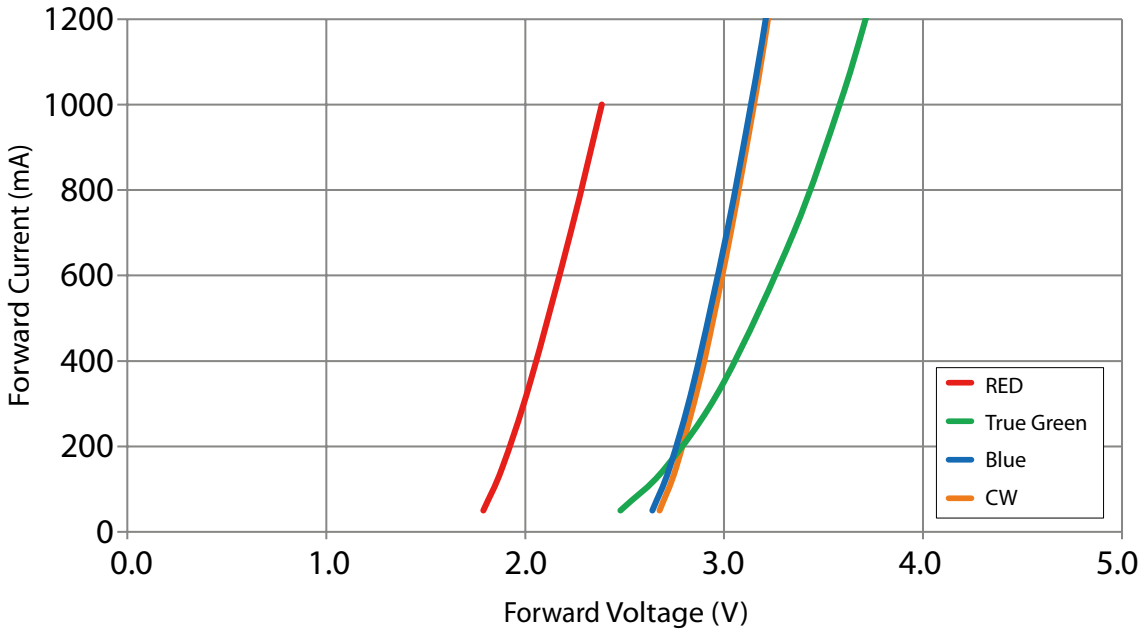




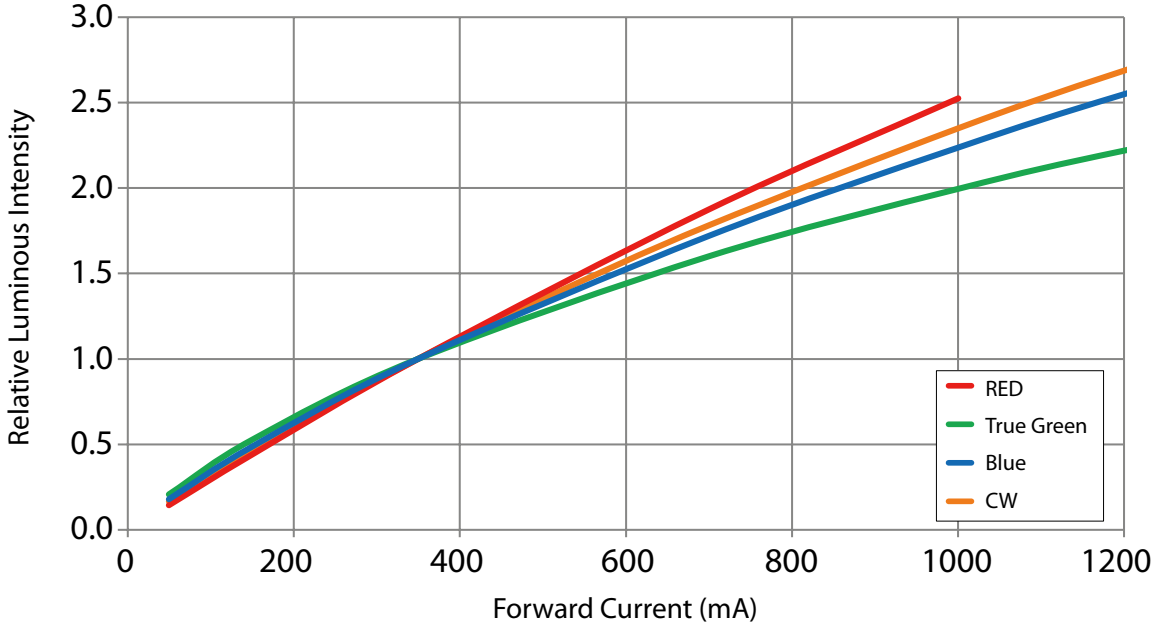
Beam Pattern



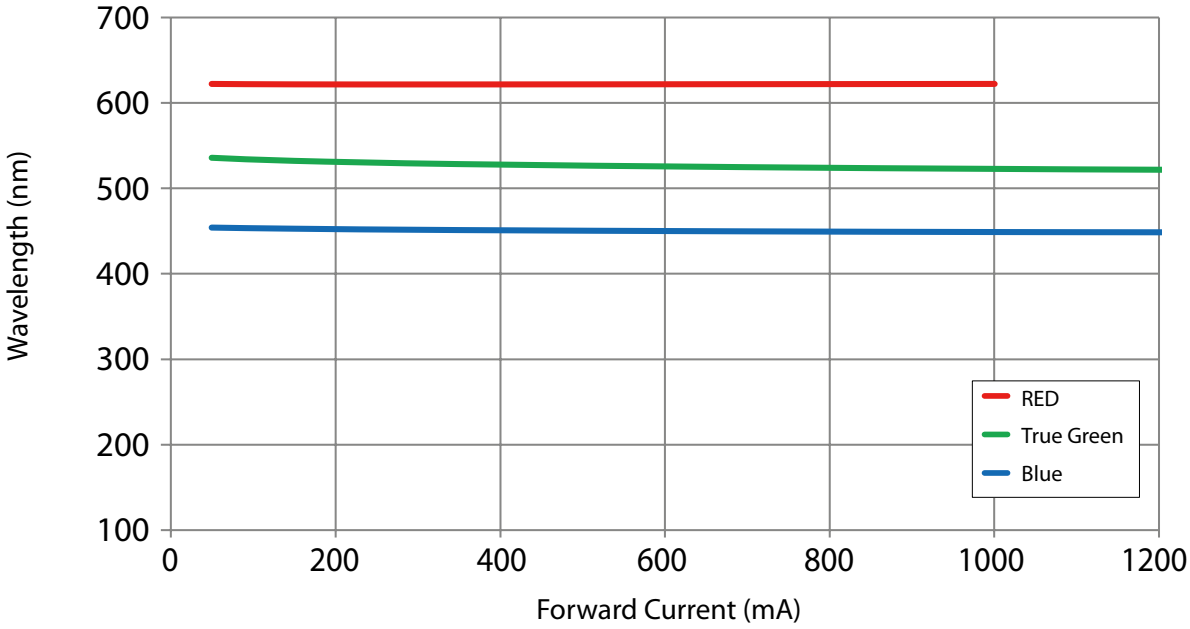
Forward Currentvs. Forward Voltage IF = f (VF); $T_{ambient}$ = 25°C



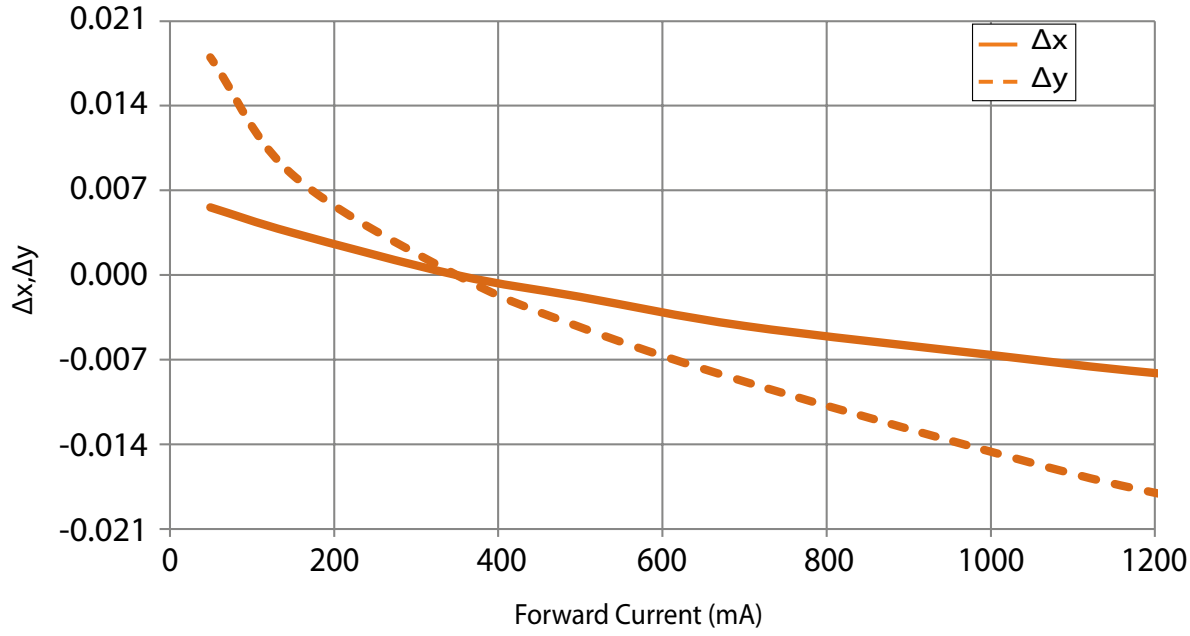
Relative Luminous Intensity vs. Forward Current IV/IV (350mA) = f(IF) ; $T_{ambient}$ = 25°C



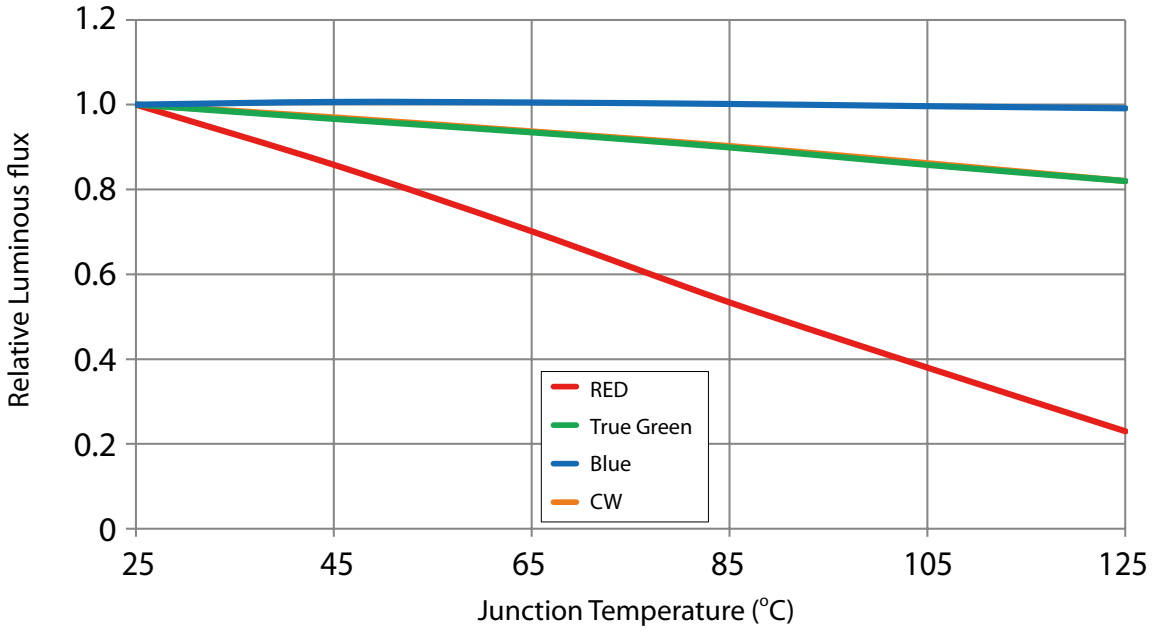
Wavelength vs. Forward Current $T_{ambient}$ = 25 °C



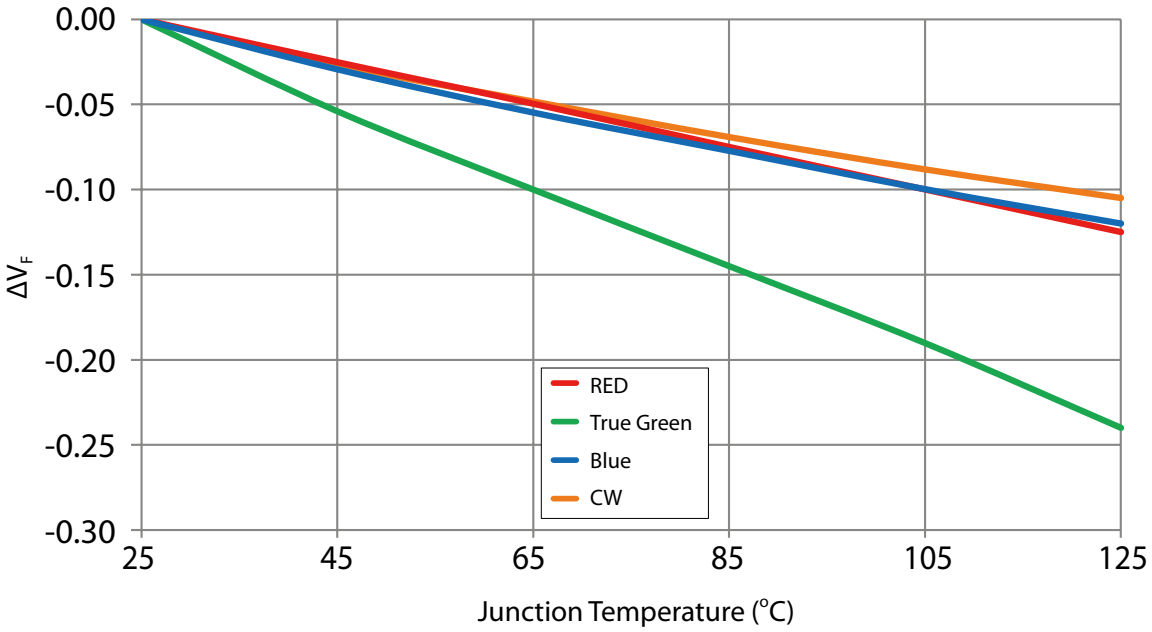
Δx,Δy vs. Forward Current ΔCx, ΔCy = f(IF); $T_{ambient}$ = 25 °C



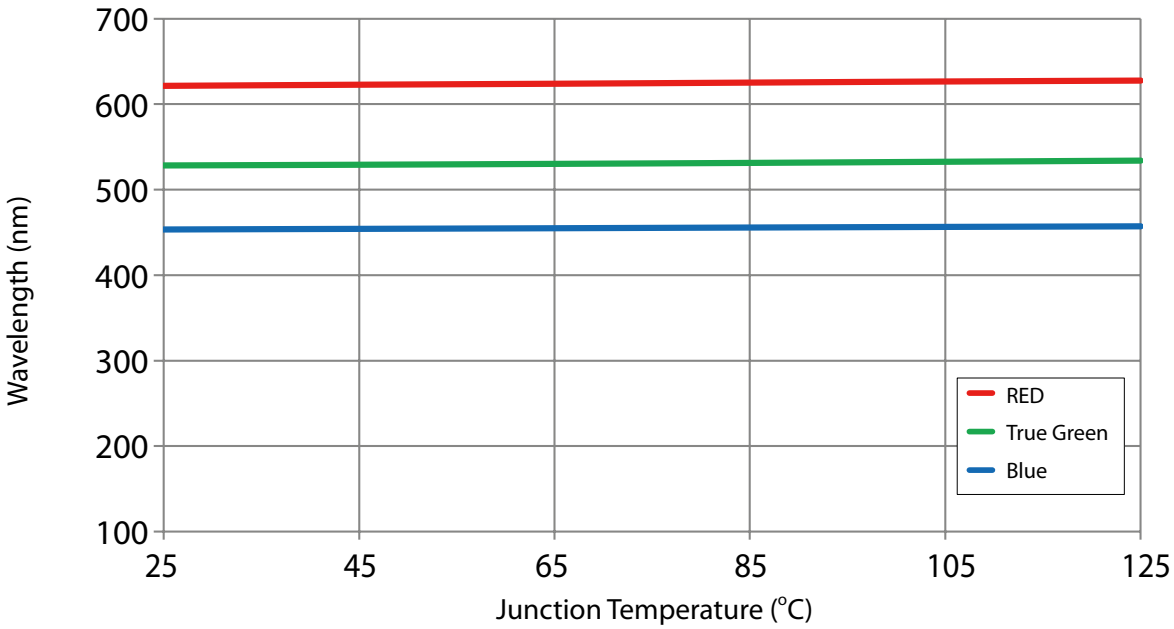
Relative Luminous Flux vs. Junction Temperature IV/IV(25°C) = f(Tj); IF = 350mA



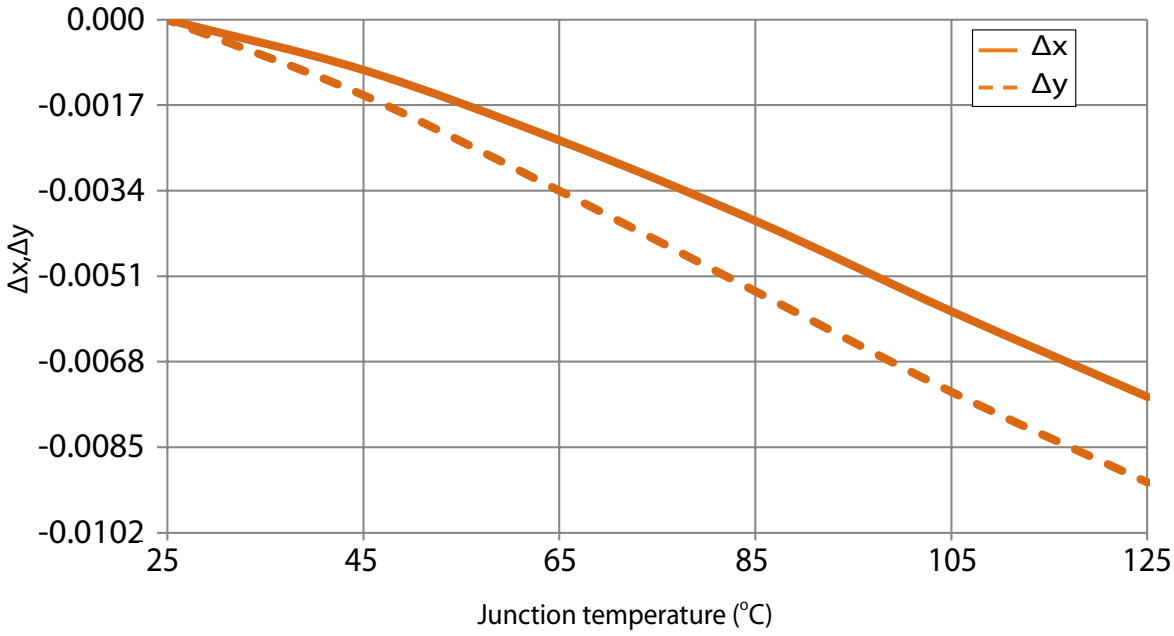
ΔV_F vs. Junction Temperature ΔVF=VF-VF(25°C)= f(Tj) ; IF=350mA



Wavelength vs. Junction Temperature IF = 350mA

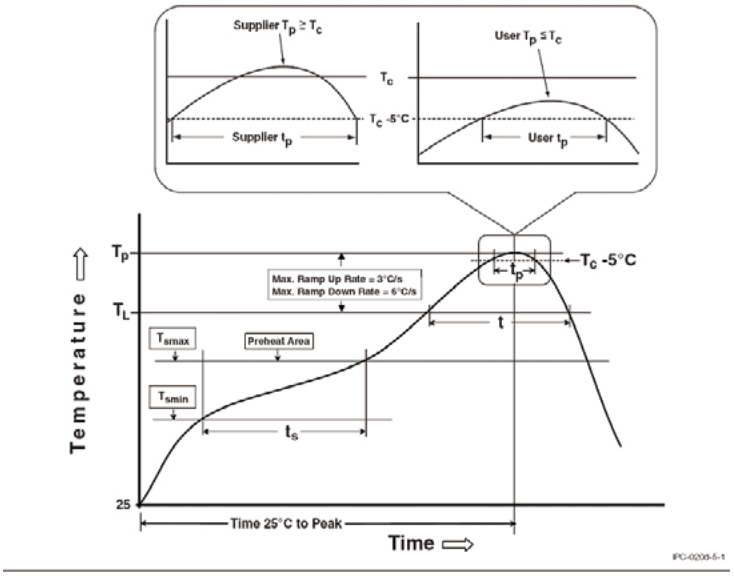


Δx,Δy vs. Junction Temperature ΔCx, ΔCy = f(IF); IF = 350mA



Reflow Profile

The following reflow profile is from IPC/JEDEC J-STD-020D which provided here for reference.



Reflow Profiles

Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	 150 °C 200 °C 60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	217 °C 60-150 seconds
Peak package body temperature (Tp)*	255 °C ~260 °C *
Classification temperature (Tc)	260 °C
Time (tp)** within 5 °C of the specified classification temperature (Tc)	30** seconds
Average ramp-down rate (Tp to Tsmax)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Notes:
1. * Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
2. ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

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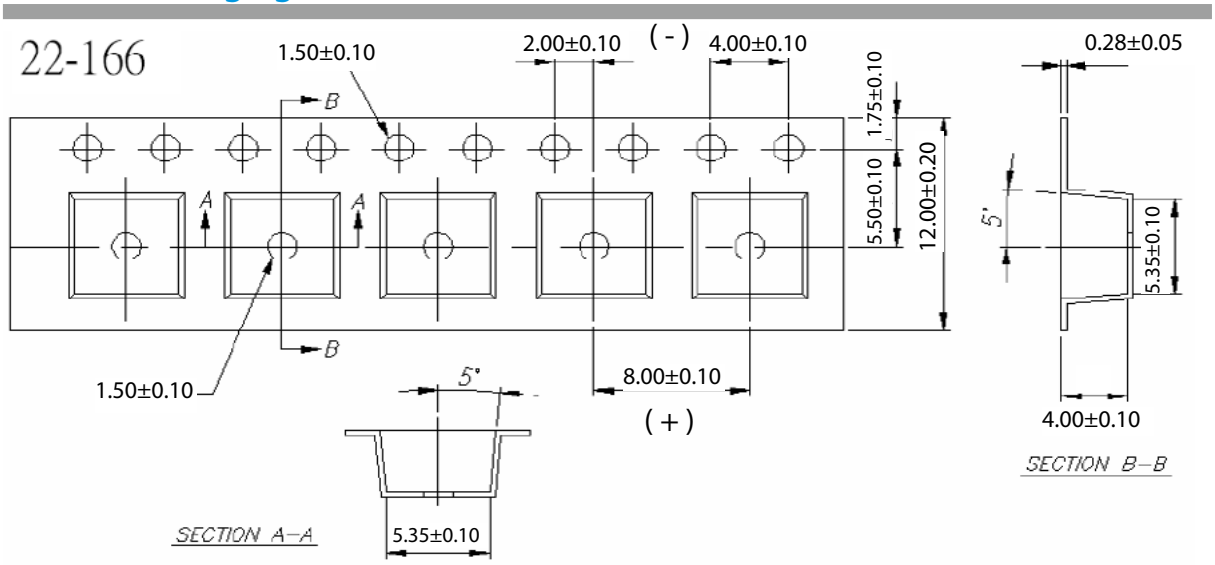
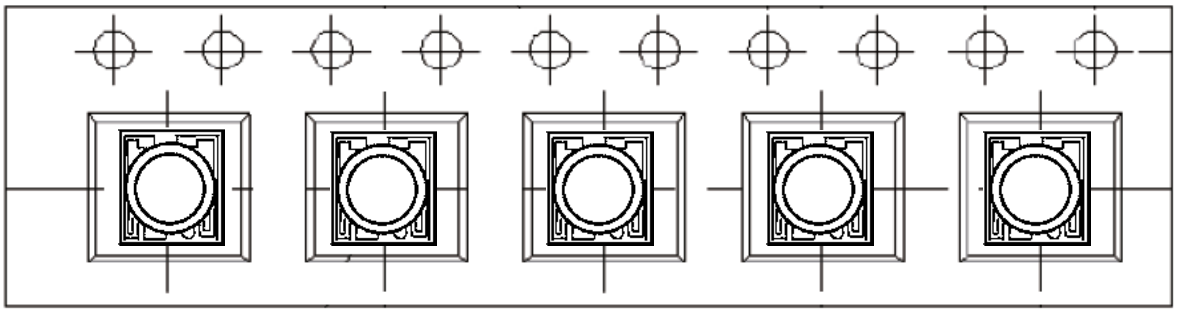
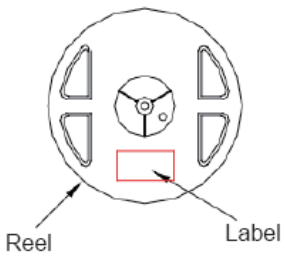
Product Packaging Information



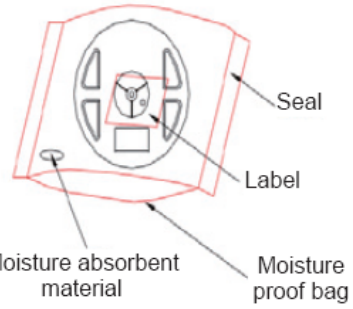
ANODE SIDE



CATHODE SIDE



Taping reel dimensions



Federal 5050 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			

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Revision History

Versions	Description	Release Date
0.1	Preliminary	2019/10/25
0.2	Revise Color Bin Code	2019/11/01

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

www.edison-opto.com

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