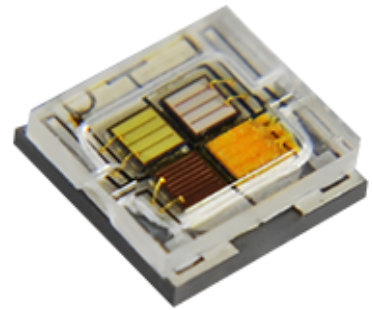


Federal Series

5050 Glass 20W RTBX

Stage Lighting

Datasheet

Decorative
LightngMood
LightingStage
Lighting

Features :

- Available in red, green, blue and white in a single package
- Maximum drive current per LED die : 1.5A
- Individually addressable LEDs
- Electrically neutral thermal path
- Thermal Resistance (R_{th})=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 (RGBX) 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
X1
F
X2
M 0
X3
2 0
X4
M 7
X5
x x
X6
F 0 3
X7
x x x
X8

X1		X2		X3		X4		X5	
Type		Component		Series		Wattage		Color	
2	Emitter	F	Federal	M0	5050	20	20W	M7	RTBX

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

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
DC Forward Current ^[1]	I_F	1500	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/X(WW): 2.5~3.5	V
Thermal resistance	-	0.7	°C/W
CCT/Wavelength	-	R: 620 - 625 T: 520 - 530 B: 450 - 460 X(WW): 2,670-3,070	K/nm
CRI (Ra)	-	CR180	-
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

Luminous Flux Characteristic

Luminous Flux Characteristics, $I_f=1000\text{mA}$ and $T_j=25^\circ\text{C}$

Emitter Type	Color	Ra	WD	Luminous Flux @350mA (lm)	Luminous Flux @700mA (lm)	Luminous Flux @1,000mA (lm)	Luminous Flux @1,500mA (lm)	Order Code
RTBX	Warm White	80	-	80~95	145~165	195~220	225~250	2FM020M767F03S02
	True Green	-	520-530	110~130	170~200	210~240	270~300	
	Blue	-	450-460	15~23	27~37	38~48	50~65	
	Red	-	620-630	35~50	65~85	95~115	135~160	

Note:

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

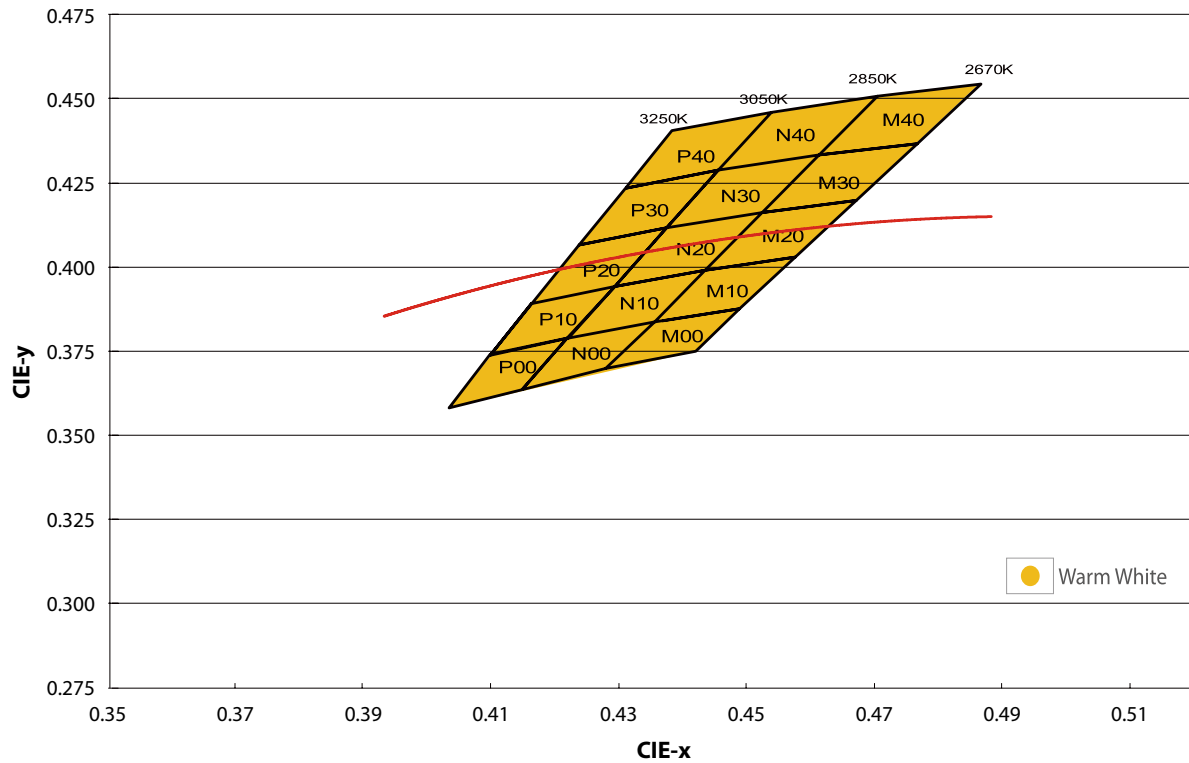
Wavelength Bin Structure

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: $\pm 1\text{nm}$.

Color BIN code



P00		P10		P20		P30		P40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4220	0.3790	0.4294	0.3943	0.4240	0.4065	0.4312	0.4234	0.4385	0.4404
0.4150	0.3635	0.4221	0.3790	0.4376	0.4116	0.4456	0.4287	0.4538	0.4460
0.4035	0.3580	0.4100	0.3738	0.4294	0.3943	0.4376	0.4116	0.4456	0.4287
0.4100	0.3740	0.4165	0.3890	0.4165	0.3890	0.4240	0.4065	0.4312	0.4234

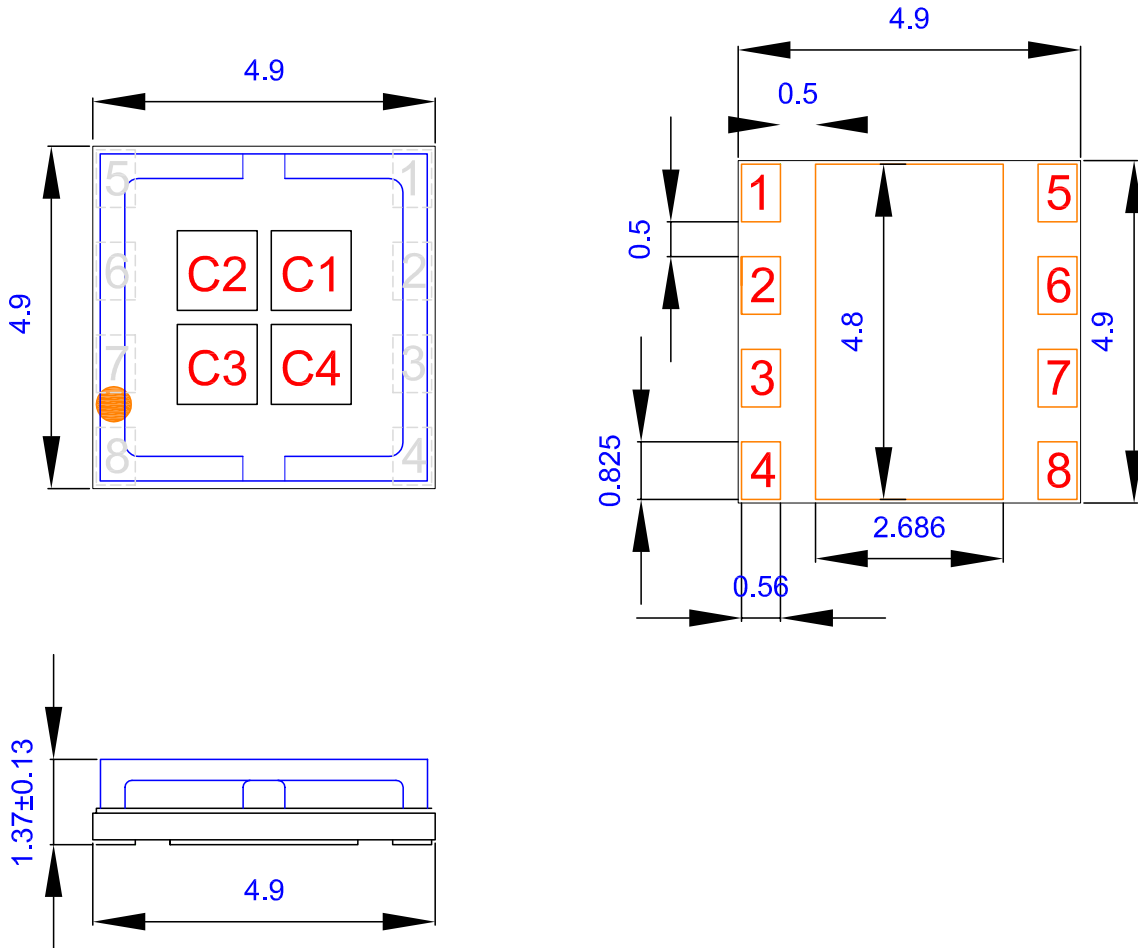
N00		N10		N20		N30		N40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4356	0.3837	0.4294	0.3943	0.4376	0.4116	0.4614	0.4333	0.4538	0.4460
0.4280	0.3700	0.4436	0.3991	0.4294	0.3943	0.4525	0.4162	0.4705	0.4508
0.4150	0.3635	0.4356	0.3837	0.4436	0.3991	0.4376	0.4116	0.4614	0.4333
0.4220	0.3790	0.4221	0.3790	0.4525	0.4162	0.4456	0.4287	0.4456	0.4287

M00		M10		M20		M30		M40	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4490	0.3875	0.4436	0.3991	0.4525	0.4162	0.4614	0.4333	0.4705	0.4508
0.4420	0.3750	0.4577	0.4029	0.4671	0.4196	0.4767	0.4366	0.4866	0.4542
0.4280	0.3700	0.4490	0.3875	0.4577	0.4029	0.4671	0.4196	0.4767	0.4366
0.4356	0.3837	0.4356	0.3837	0.4456	0.4287	0.4525	0.4162	0.4614	0.4333

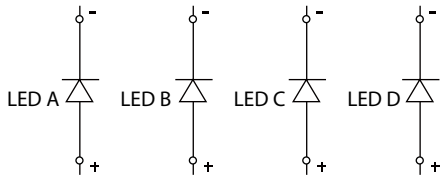
Note:
CIE_x/y tolerance: ± 0.005 .

Mechanical Dimensions

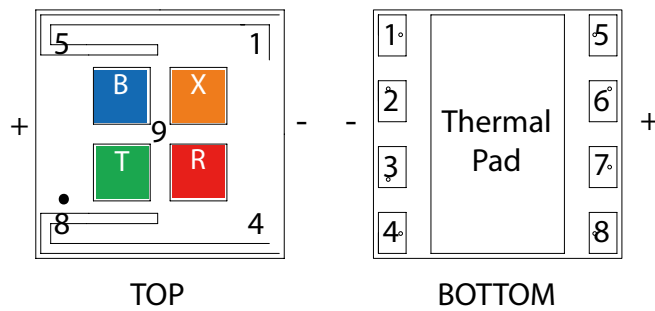
Emitter Type Dimension



Circuit



PCB Layout



Pad Configuration

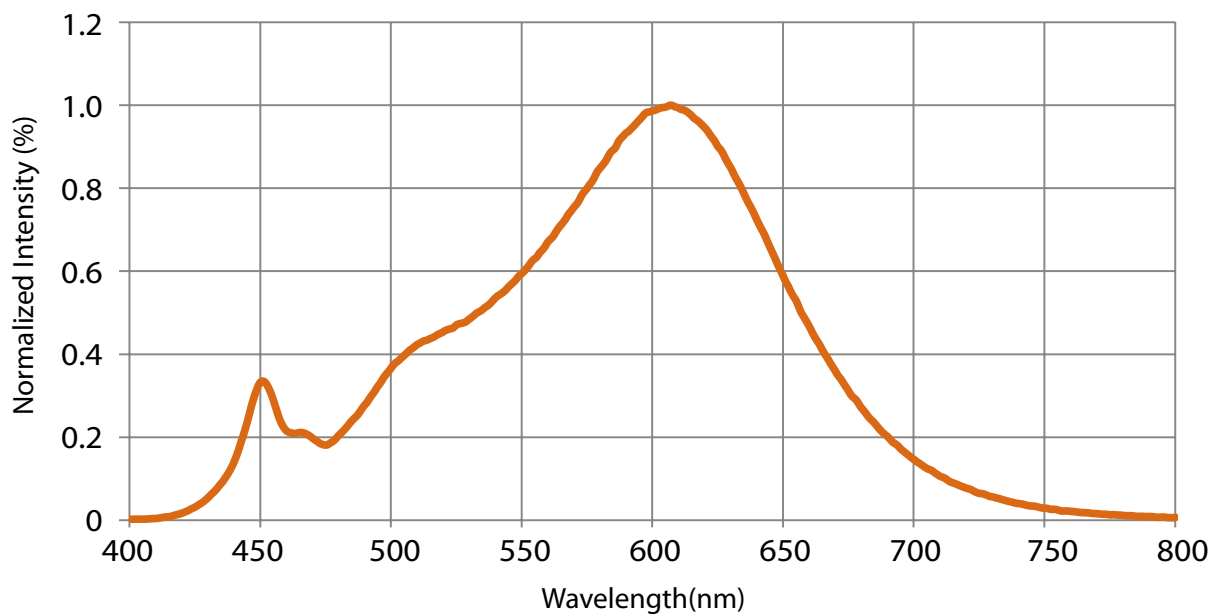
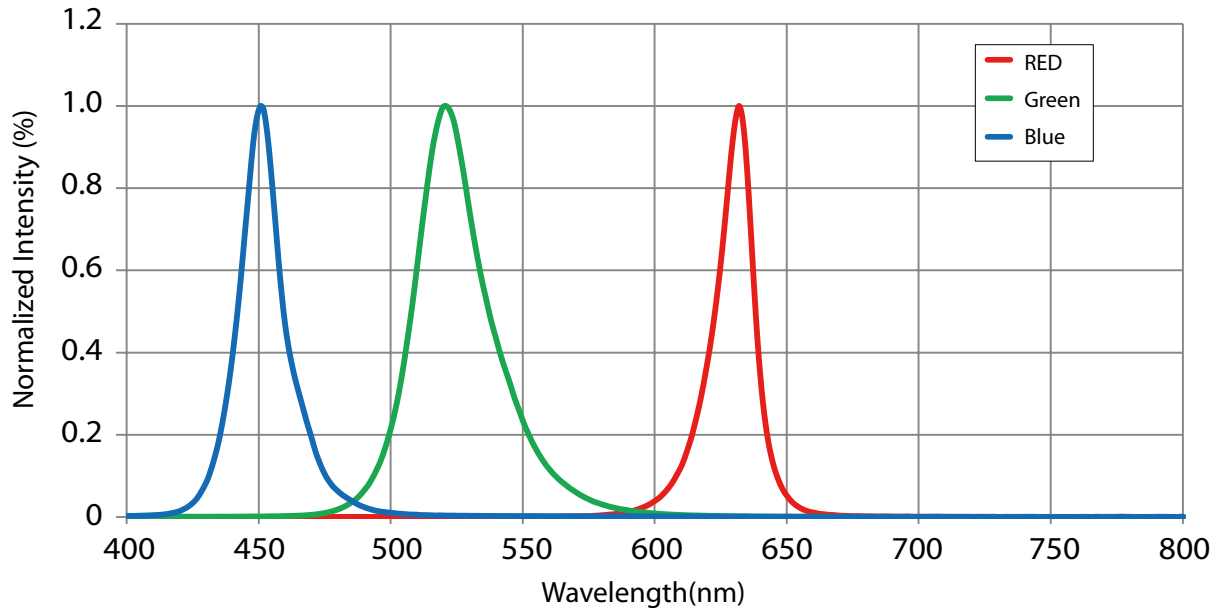
Color	FUNCTION	
	Anode	Cathode
WW	1	5
Blue	2	6
Green	3	7
Red	4	8

Note:

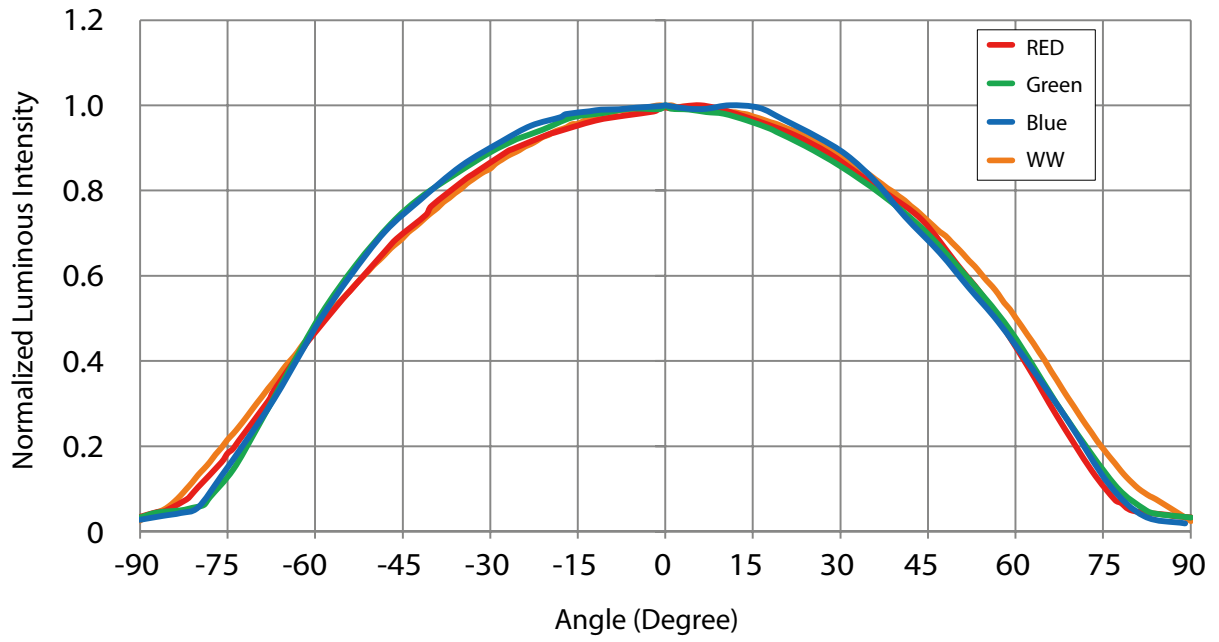
The thermal pad is electrically isolated from anode and cathode.

Characteristic curve

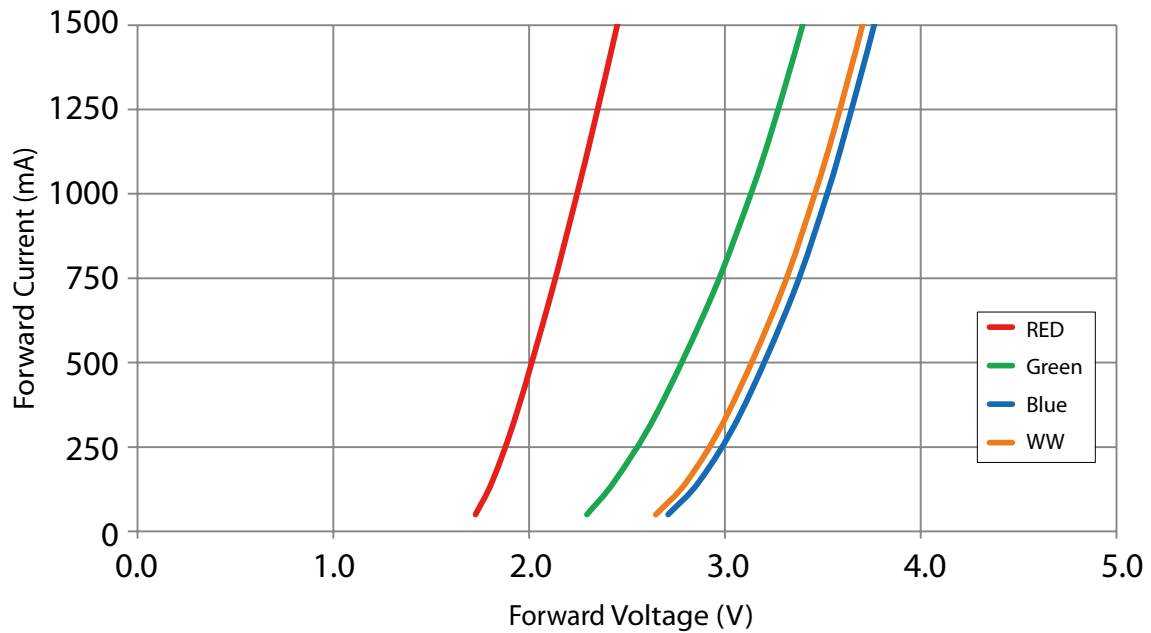
Color Spectrum



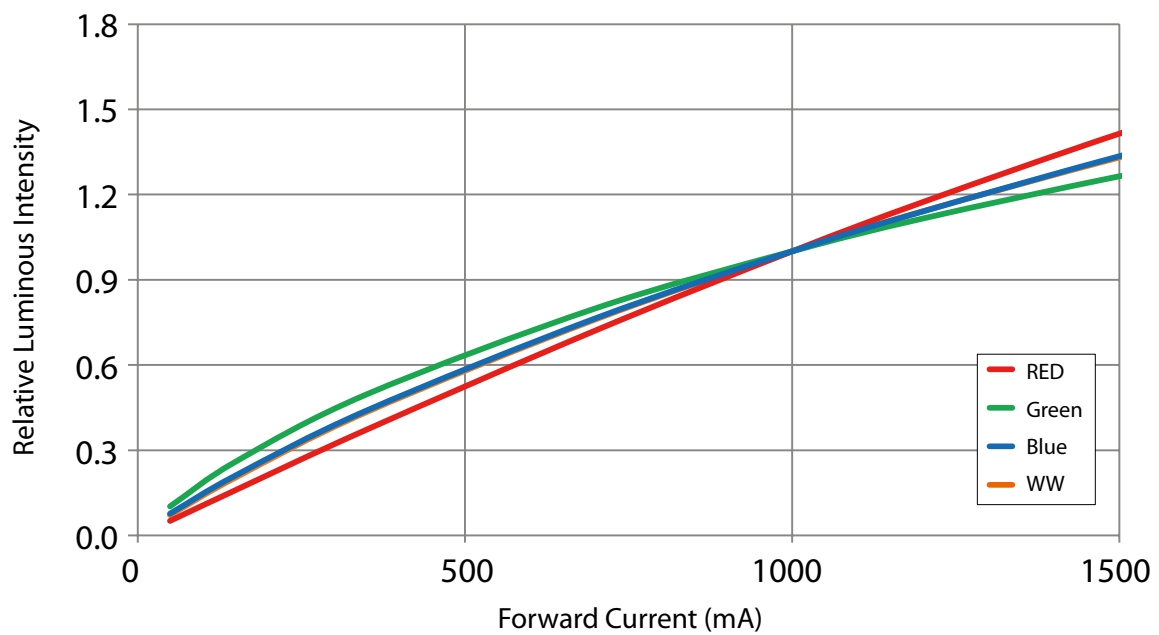
Beam Pattern



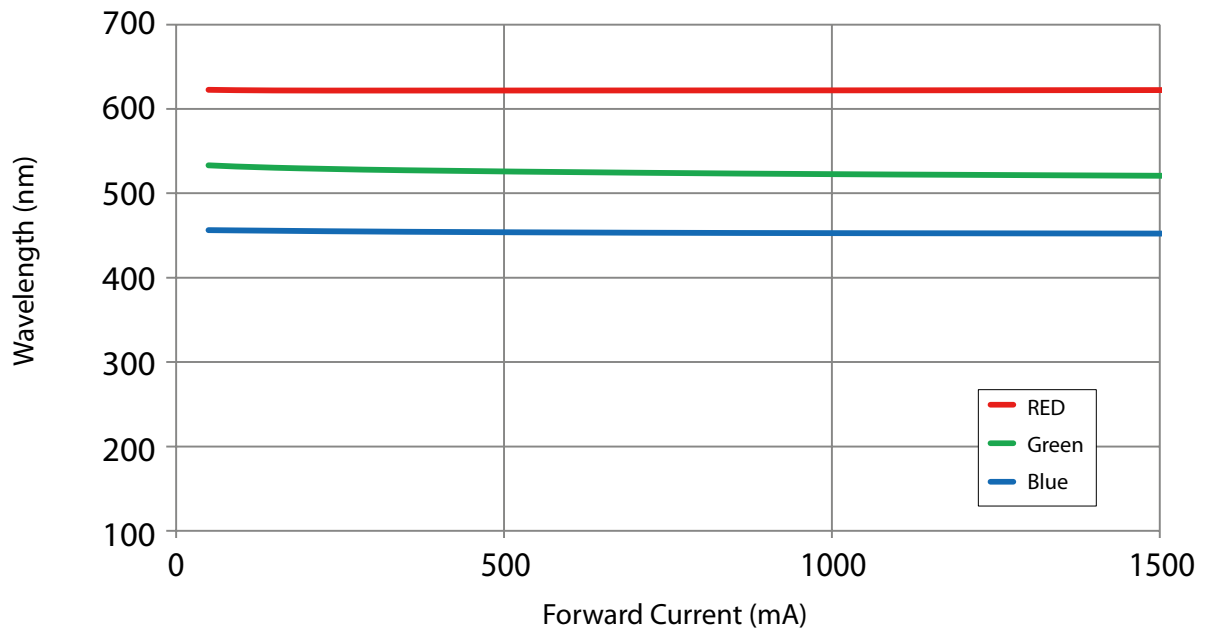
Forward Current vs. Forward Voltage $I_F = f(V_F); T_{\text{ambient}} = 25^\circ\text{C}$



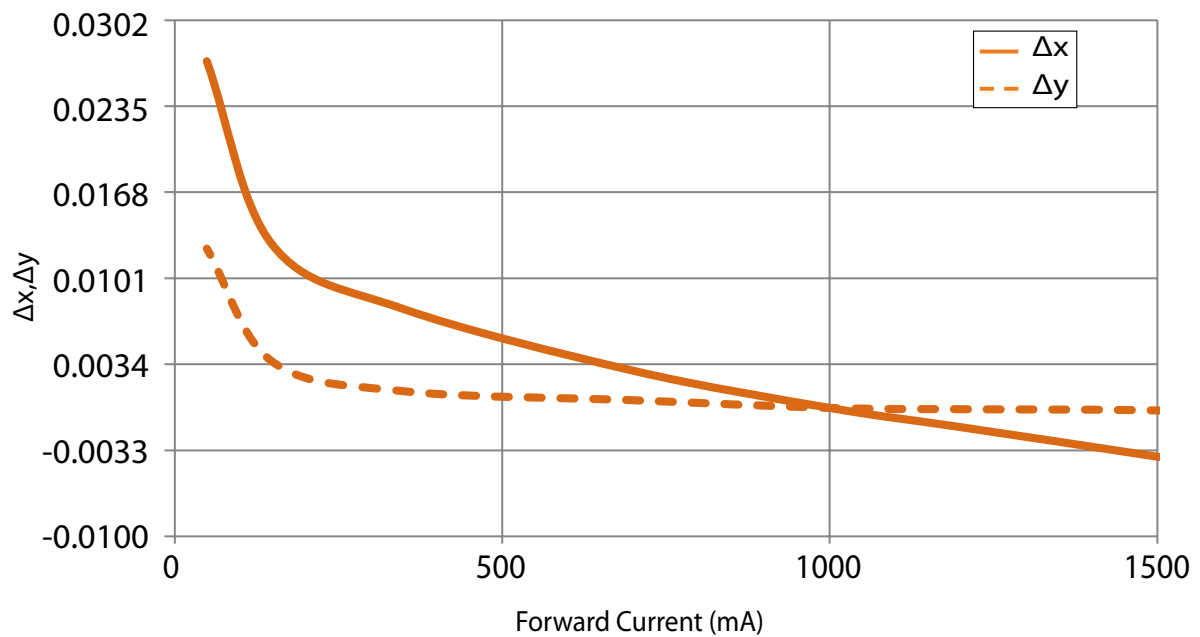
Relative Luminous Intensity vs. Forward Current $I_V/I_V(1000\text{mA}) = f(I_F); T_{\text{ambient}} = 25^\circ\text{C}$



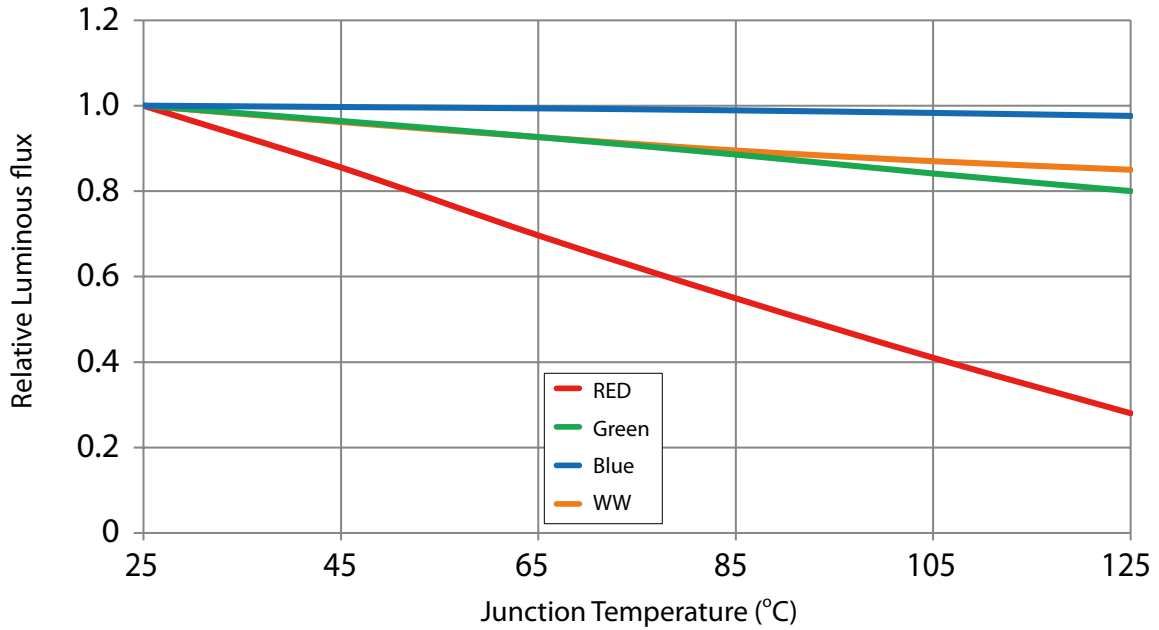
Wavelength vs. Forward Current $T_{\text{ambient}} = 25\text{ }^{\circ}\text{C}$



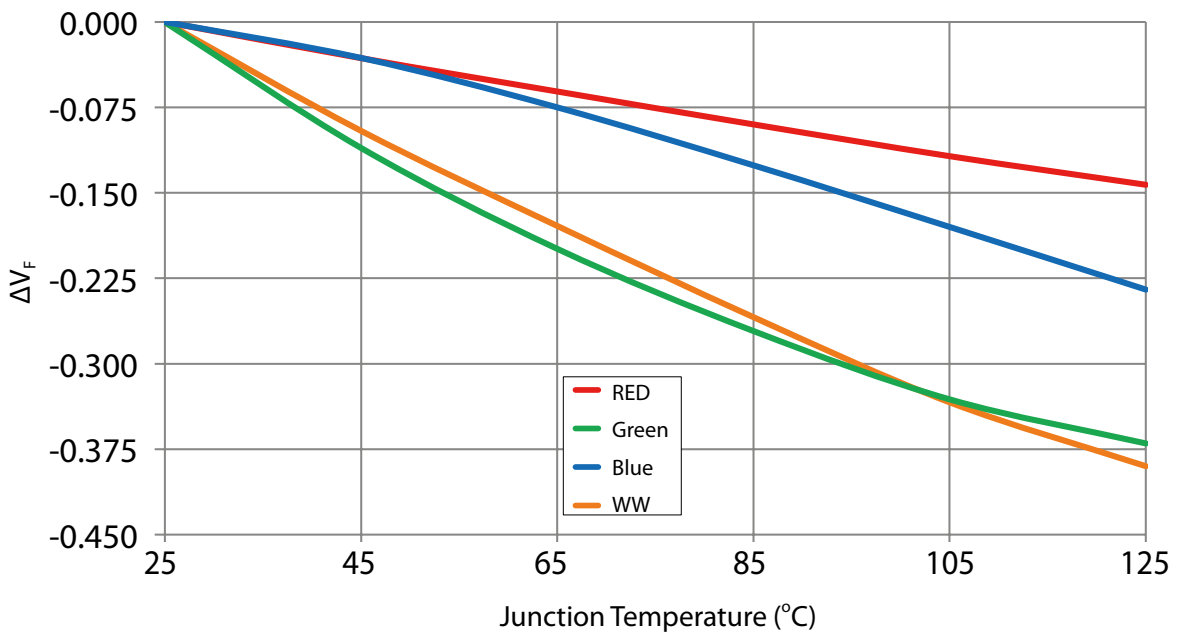
$\Delta x, \Delta y$ vs. Forward Current $\Delta Cx, \Delta Cy = f(IF); T_{\text{ambient}} = 25\text{ }^{\circ}\text{C}$



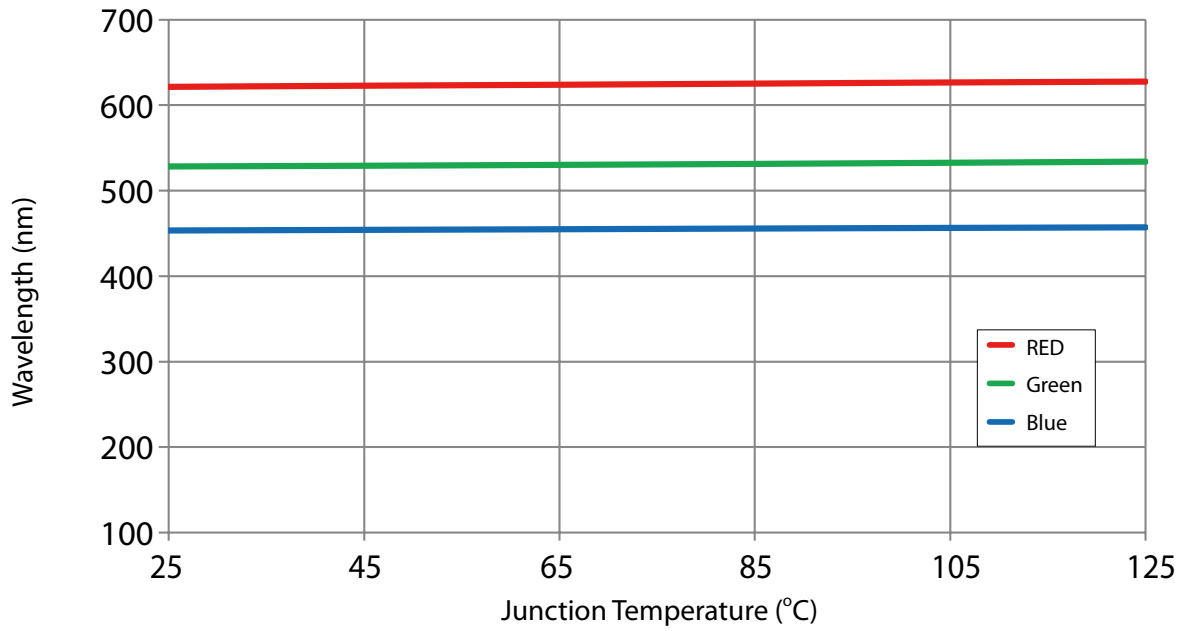
Relative Luminous Flux vs. Junction Temperature $I_V/I_V(25^\circ\text{C}) = f(T_j)$; $I_F = 1000\text{mA}$



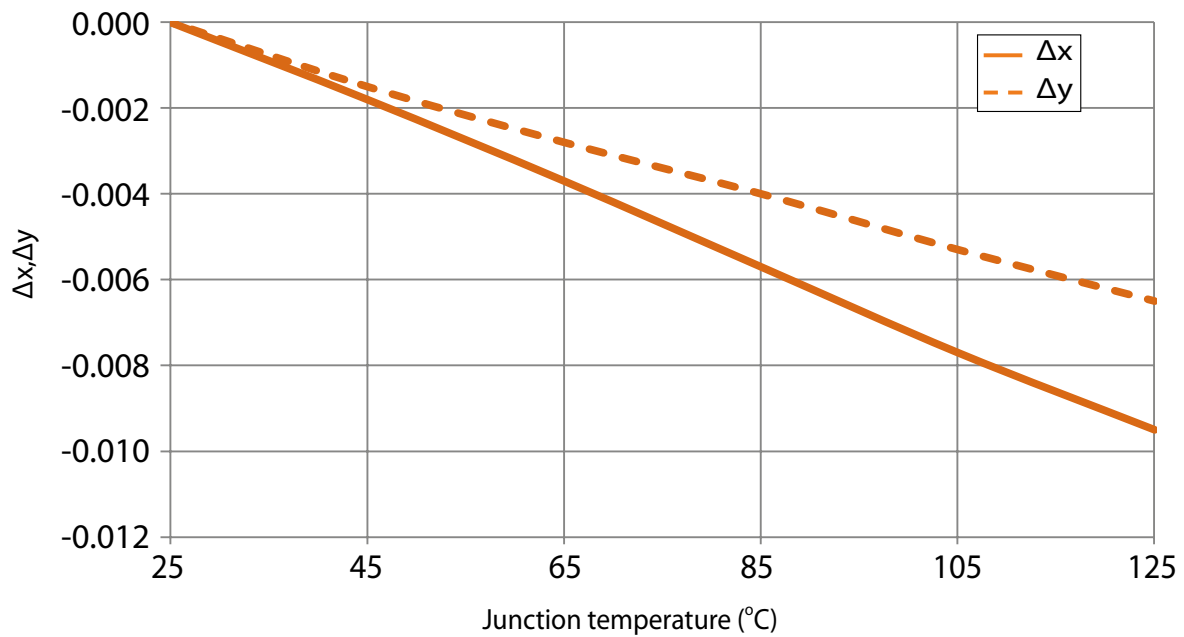
ΔV_F vs. Junction Temperature $\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$; $I_F = 1000\text{mA}$



Wavelength vs. Junction Temperature IF = 1000mA

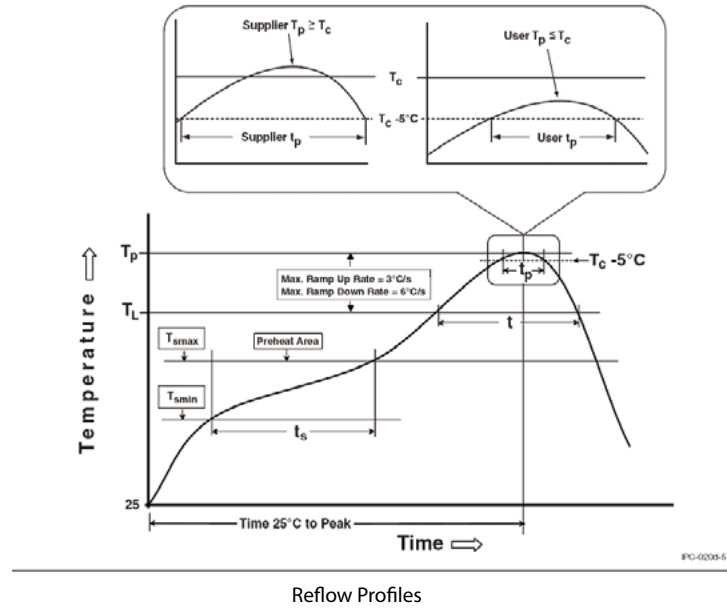


$\Delta x, \Delta y$ vs. Junction Temperature $\Delta C_x, \Delta C_y = f(IF)$; IF = 1000mA



Reflow Profile

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



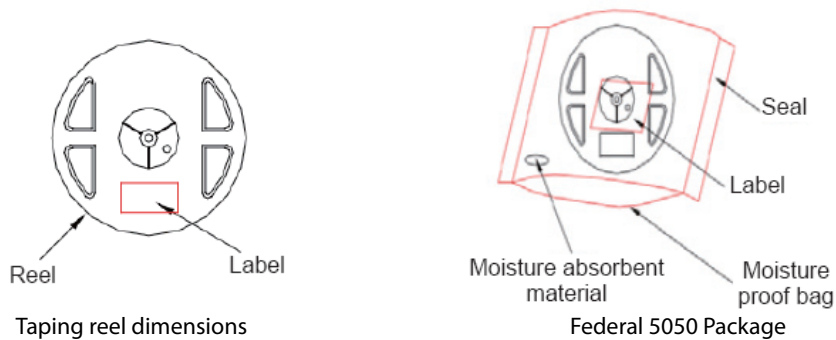
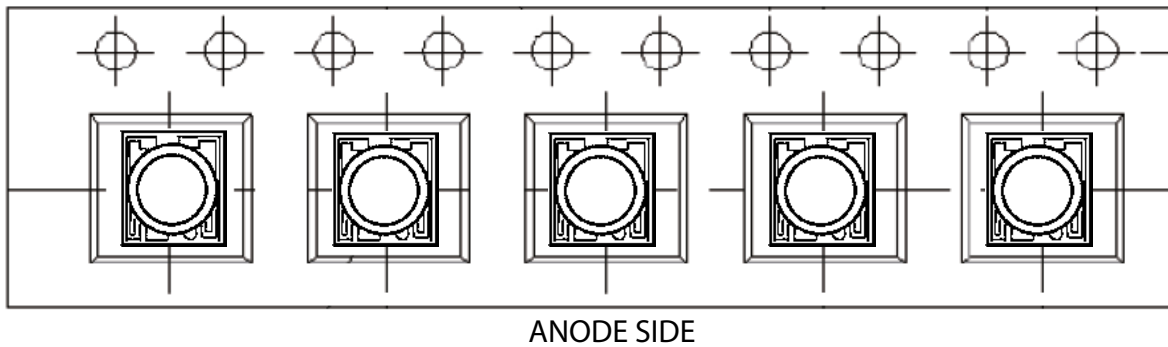
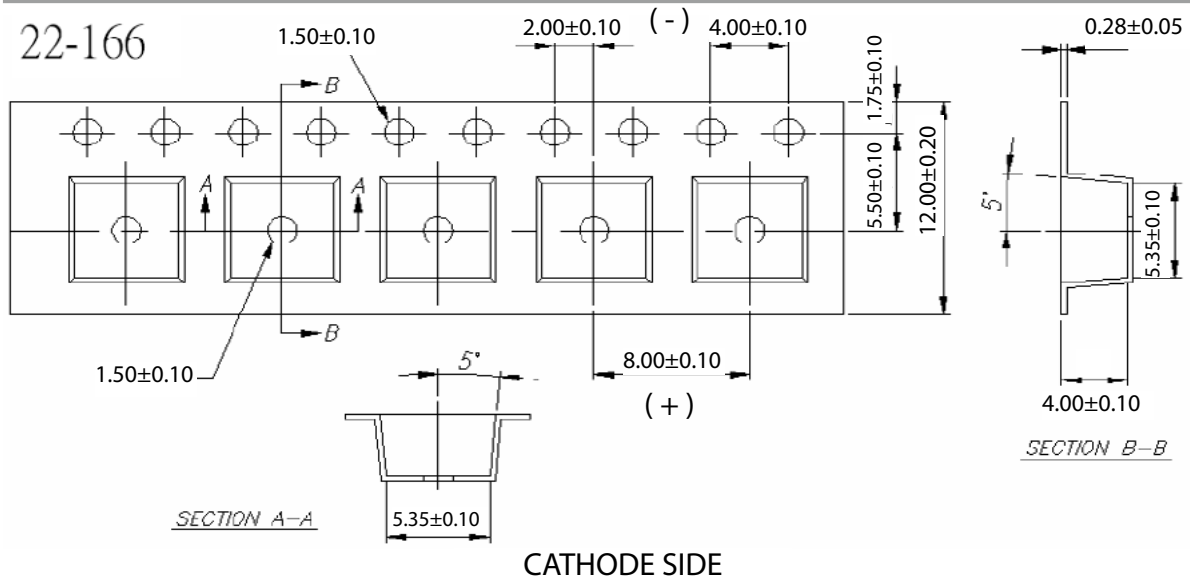
Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak Temperature min (T Amin)	150 °C
Temperature max (T smax)	200 °C
Time (T Amin to T smax) (ts)	60-120 seconds
Average ramp-up rate (T Amin to Tp)	3 °C/second max.
Liquidous temperature (TL)	217 °C
Time at liquidous (tL)	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 T smax)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Notes:

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

Product Packaging Information



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

Revision History

Versions	Description	Release Date
0.1	Preliminary	2019/10/23

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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