

EdiPower® II HM Series Datasheet



Features :

- LED light engine
- High power operation
- Instant on
- Long lifetime

Table of Contents

General Information	3
Absolute Maximum Ratings	5
Characteristics	5
Luminous Flux Characteristic	6
Chromaticity coordinates($T_j=25^{\circ}\text{C}$).....	9
Mechanical Dimensions.....	10
Characteristic Curve	13
Product Packaging Information.....	25
Revision History	26
About Edison Opto	26

General Information

Introduction

EdiPower® II HM series can provide different operating powers and different colors. They serve as optical engine and can be utilized in general lighting and special lighting applications, such as MR16 and projectors. Furthermore, the high CRI options allow the customers to optimize the effect in various fields such as interior architecture.

Ordering Code Format

<u>2</u> X1	<u>P</u> X2	<u>HM</u> X3	<u>xx</u> X4	<u>xW</u> X5	<u>xx</u> X6	<u>P 1 x</u> X7	<u>xxx</u> X8		
X1	X2		X3		X4		X5		
Type	Component		Series		Wattage		Color		
2	L1	P	EdiPower	HM	HM Series	05 09 16 30 40	5W 9W 16W 30W 40W	CW NW WW	Cool White Neutral White Warm White
X6		X7		X8					
Internal code		PCB Board		Serial Number					
-	-	P12	13x13	-	-				
		P13	19x19						
		P16	28x28						



Average Lumen Maintenance Characteristics

Lumen maintenance for light sources or luminaires is defined in terms of the change in light output of a light source over operational life, relative to initially measured light output. Edison Opto projects that EdiPower II HM Series products will deliver, on average, greater than 70% lumen maintenance (L70) after 50,000 hours of operation at the rated forward test current. This performance is based on constant current operation with case temperature maintained at or below 85°C.

These projections are based on a combination of package test data, semiconductor chip reliability data, a fundamental understanding of package related degradation mechanisms, and performance observed from products installed in the field using Edison Opto die technology. Observation of design limits in this datasheet is required in order to achieve this projected lumen maintenance.



Limited Warranty for Edison Opto EdiPower II HM Series

This limited warranty is provided by Edison Opto to the original purchaser of the LED lighting product that is identified on our invoice reflecting its original purchase (the "Product"). We warrant that the Product, under normal operation ($T_p < 80^\circ\text{C}$ $T_j < 150^\circ\text{C}$ and the operation current is lower than maximum forward current which is described in the datasheet), will be free of defects in material and workmanship for a period of **FIVE (5) YEARS** from the date of original purchase.

Note:

1. This limited warranty cannot be transferred to subsequent purchasers of the Product; even Product is resold in new condition and in its original packaging.
2. The determination of whether the Product is defective shall be made by Edison Opto in our sole discretion with consideration given to the overall performance of the Product.

Absolute Maximum Ratings

Absolute maximum ratings ($T_J=25^{\circ}\text{C}$)

Parameter	Symbol	Value	Units
DC Forward Current ¹	I_F	2PHM05xWxxP12xxx : 120 2PHM09xWxxP12xxx : 240 2PHM16xWxxP13xxx : 360 2PHM30xWxxP13xxx : 720 2PHM40xWxxP16xxx : 1080	mA
Max Forward Current	I_F	2PHM05xWxxP12xxx : 240 2PHM09xWxxP12xxx : 480 2PHM16xWxxP13xxx : 720 2PHM30xWxxP13xxx : 1440 2PHM40xWxxP16xxx : 2160	mA
Reverse Voltage ²	V_R	Note 2	V
LED junction Temperature ³	T_J	150	$^{\circ}\text{C}$
Operating Temperature	-	-40 ~ +110	$^{\circ}\text{C}$
Storage Temperature	-	-40 ~ +120	$^{\circ}\text{C}$
ESD Sensitivity (HBM)	V_B	2,000	V
Isolation Voltage	-	1,000	V
Thermal Measurement Point (T_p)	-	<80	$^{\circ}\text{C}$

Notes:

- DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
- LEDs are not designed to be driven in reverse bias.
- Proper current derating must be observed to maintain junction temperature below the maximum at all time.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle (Typ.)	$2\theta_{1/2}$	105~120	Degree
Forward voltage	V_F	36~38.4	V
CCT	-	CW : 5000-10000 NW : 3800-5000 WW : 2670-3800	K
Thermal resistance (Typ.)	$R\theta_{J-B}$	2PHM05xWxxP12xxx : 3.7 2PHM09xWxxP12xxx : 2.1 2PHM16xWxxP13xxx : 1.4 2PHM30xWxxP13xxx : 0.8 2PHM40xWxxP16xxx : 0.6	$^{\circ}\text{C}/\text{W}$
$\Delta V_f/\Delta T$ (Typ.)	-	2PHM05xWxxP12xxx : -12 to -20 2PHM09xWxxP12xxx : -10 to -18 2PHM16xWxxP13xxx : -8 to -14 2PHM30xWxxP13xxx : -6 to -12 2PHM40xWxxP16xxx : -4 to -10	mV/ $^{\circ}\text{C}$
CRI	-	80	-

Notes:

- $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is half of the axial luminous intensity.
- CCT is measured with an accuracy of $\pm 5\%$.
- Wavelength is measured with an accuracy of $\pm 0.5\text{nm}$.
- Color rendering index CRI Tolerance : ± 2

Luminous Flux Characteristic

Luminous Flux Characteristics $T_j=25^{\circ}\text{C}$

Wattage (W)	Color	Typ. Luminous Flux(lm) $T_p=60^{\circ}\text{C}$	Typ. Luminous Flux(lm) $T_j=25^{\circ}\text{C}$	Typ. Forward Voltage V_f (V)	Forward Current (mA)	Order Code		
5-10W	2700K	430	475	37.2	120	2PHM05WW27P12001		
		730	810	40.3	240			
	3000K	440	490	37.2	120		2PHM05NW27P12001	
		760	840	40.3	240			
	3500K	460	510	37.2	120			2PHM05CW27P12001
		790	880	40.3	240			
	4000K	470	520	37.2	120	2PHM09WW27P12001		
		810	900	40.3	240			
	5000K	470	525	37.2	120		2PHM09NW27P12001	
		820	910	40.3	240			
	5700K	480	530	37.2	120			2PHM09CW27P12001
		820	915	40.3	240			
6500K	490	540	37.2	120	2PHM05WW27P12001			
	830	920	40.3	240				
9-20W	2700K	830	920	37.2		240	2PHM09NW27P12001	
		1440	1600	40.3		480		
	3000K	855	950	37.2		240		2PHM09CW27P12001
		1485	1650	40.3		480		
	3500K	880	980	37.2	240	2PHM09WW27P12001		
		1530	1700	40.3	480			
	4000K	920	1020	37.2	240		2PHM05WW27P12001	
		1590	1770	40.3	480			
	5000K	920	1025	37.2	240			2PHM05NW27P12001
		1600	1780	40.3	480			
	5700K	930	1030	37.2	240	2PHM05CW27P12001		
		1610	1790	40.3	480			
6500K	950	1050	37.2	240	2PHM05WW27P12001			
	1630	1810	40.3	480				

Wattage (W)	Color	Typ. Luminous Flux(lm) T _p =60°C	Typ. Luminous Flux(lm) T _j =25°C	Typ. Forward Voltage V _F (V)	Forward Current (mA)	Order Code
16-24W	2700K	1350	1500	37.2	360	2PHM16WW27P13001
		2300	2560	40.3	720	
	3000K	1390	1540	37.2	360	
		2370	2630	40.3	720	
	3500K	1440	1600	37.2	360	2PHM16NW27P13001
		2560	2730	40.3	720	
	4000K	1490	1655	37.2	360	
		2550	2830	40.3	720	
	5000K	1490	1660	37.2	360	2PHM16CW27P13001
		2560	2845	40.3	720	
	5700K	1500	1670	37.2	360	
		2570	2860	40.3	720	
6500K	1530	1700	37.2	360		
	2620	2910	40.3	720		
30-60W	2700K	2560	2840	37.2	720	2PHM30WW27P13001
		4290	4770	40.3	1440	
	3000K	2640	2930	37.2	720	
		4430	4920	40.3	1440	
	3500K	2730	3030	37.2	720	2PHM30NW27P13001
		4570	5075	40.3	1440	
	4000K	2840	3150	37.2	720	
		4720	5240	40.3	1440	
	5000K	2840	3160	37.2	720	2PHM30CW27P13001
		4725	5250	40.3	1440	
	5700K	2850	3170	37.2	720	
		4730	5260	40.3	1440	
6500K	2925	3250	37.2	720		
	4770	5300	40.3	1440		

Wattage (W)	Color	Typ. Luminous Flux(lm) T _p =60°C	Typ. Luminous Flux(lm) T _j =25°C	Typ. Forward Voltage V _F (V)	Forward Current (mA)	Order Code		
40W	2700K	4185	4650	37.2	1080	2PHM40WW27P16001		
		6975	7750	40.3	2160			
	3000K	4320	4800	37.2	1080		2PHM40NW27P16001	
		7200	8000	40.3	2160			
	3500K	4410	4900	37.2	1080			2PHM40CW27P16001
		7350	8170	40.3	2160			
	4000K	4500	5000	37.2	1080	2PHM40CW27P16001		
		7470	8300	40.3	2160			
	5000K	4590	5100	37.2	1080		2PHM40CW27P16001	
		7650	8500	40.3	2160			
	5700K	4680	5200	37.2	1080			2PHM40CW27P16001
		7785	8650	40.3	2160			
6500K	4770	5300	37.2	1080	2PHM40CW27P16001			
	7830	8700	40.3	2160				

Notes:

1. Forward Voltage has $\pm 3.6V$ tolerance.
2. The emphasised value with bold font showed at forward current means the DC forward current value.

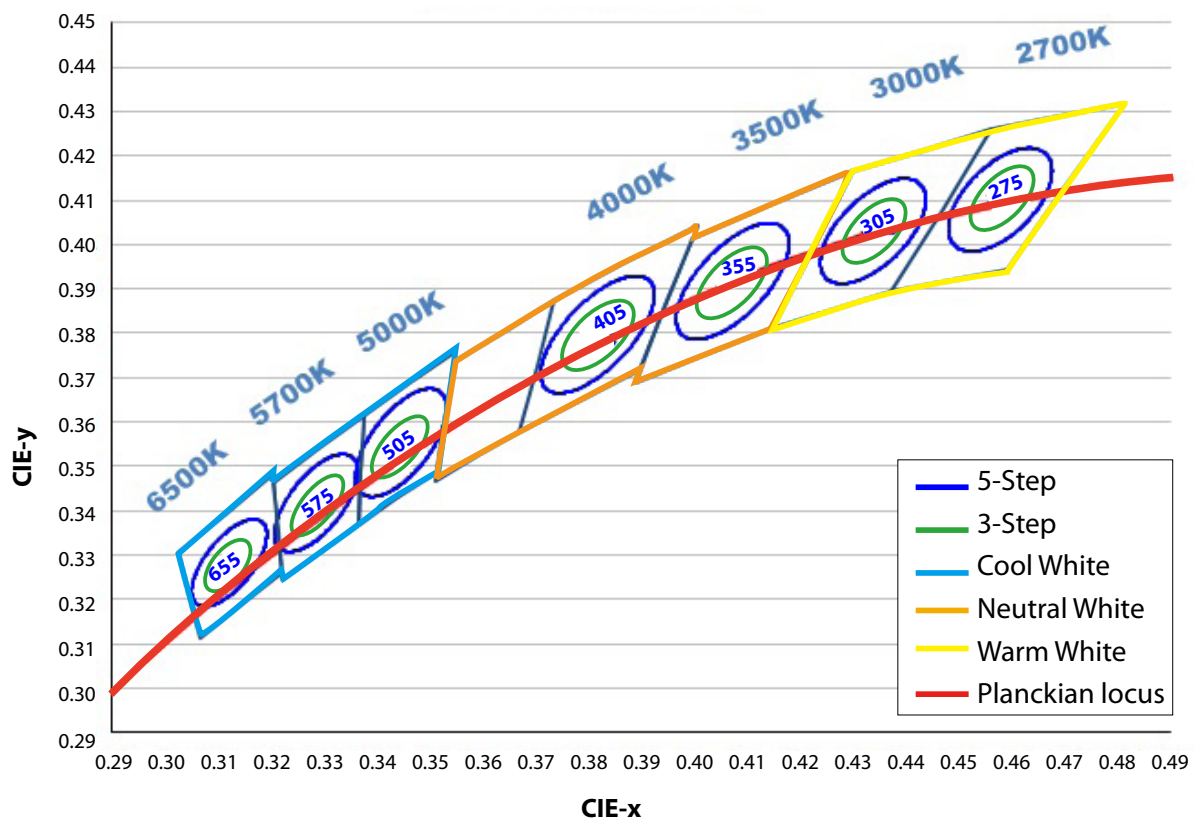
Chromaticity coordinates($T_j=25^{\circ}\text{C}$)

Color region stay within Macadam "3-Step/5-step" ellipse from the chromaticity center.

The chromaticity center refers to ANSI C78.377:2008.

Please refer to ANSI C78.377 for the chromaticity center.

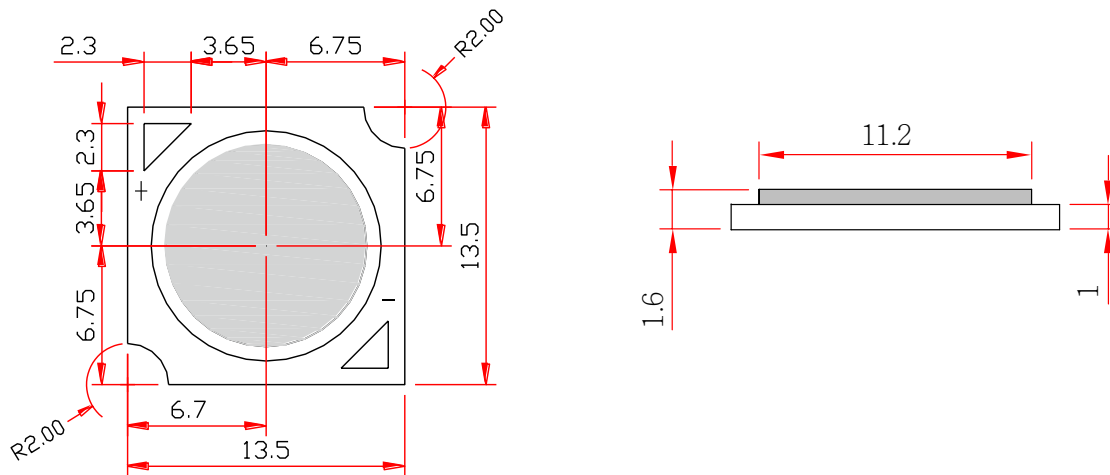
θ is the angle between the major axis of the ellipse and the x-axis, and a and b are the major and minor semi-axes of an ellipse. (Ref. IEC 60081:1997 AnnexD)



CCT	Steps	Cx	Cy	a	b	theta
2700K	5	0.4578	0.4101	0.01350	0.00700	53.7
3000K	5	0.4338	0.4030	0.01390	0.00680	53.22
3500K	5	0.4073	0.3917	0.01545	0.00690	54
4000K	5	0.3818	0.3797	0.01565	0.00670	53.72
5000K	5	0.3447	0.3553	0.01370	0.00590	59.62
5700K	5	0.3287	0.3417	0.01243	0.00533	59.09
6500K	5	0.3123	0.3282	0.01115	0.00475	58.57

Mechanical Dimensions

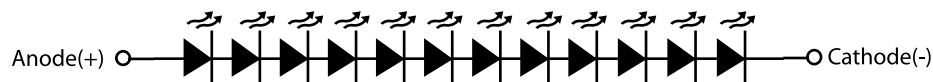
5W/ 9W Emitter Dimensions



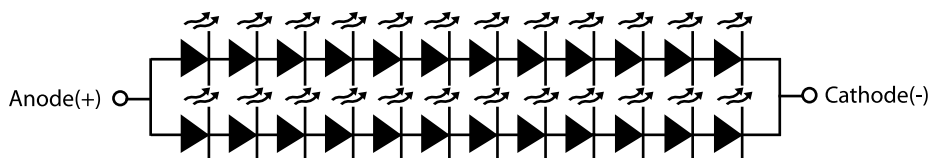
Notes :

1. Unit : mm
2. Tolerance : ± 0.2 mm
3. Drawings are not to scale
4. T_p : Thermal measurement point

5W/ 9W Emitter Circuit Layout

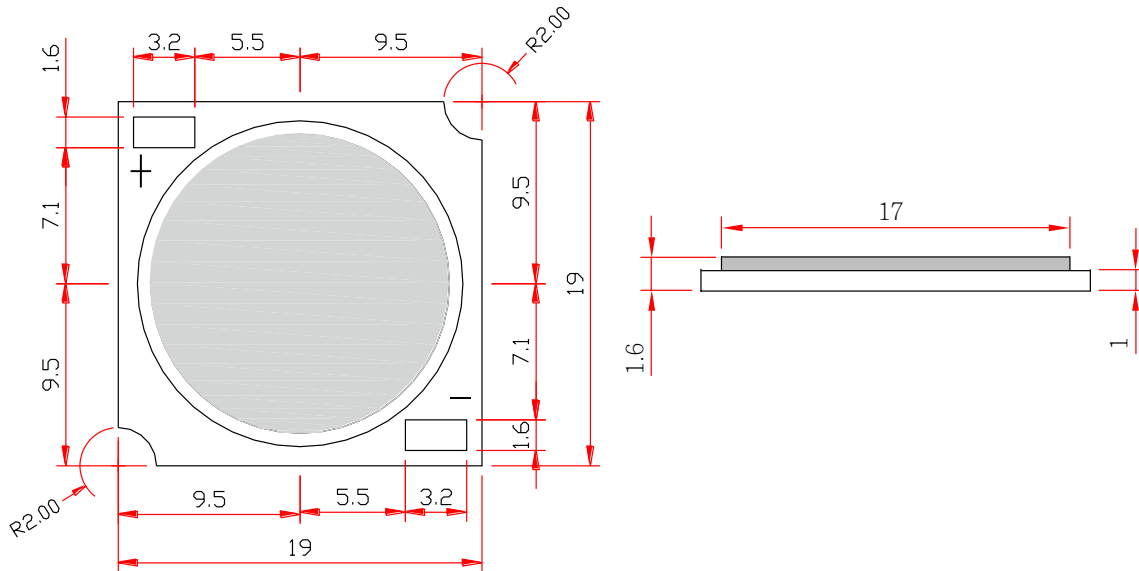


5W EdiPower® II HM Series Circuit Layout



9W EdiPower® II HM Series Circuit Layout

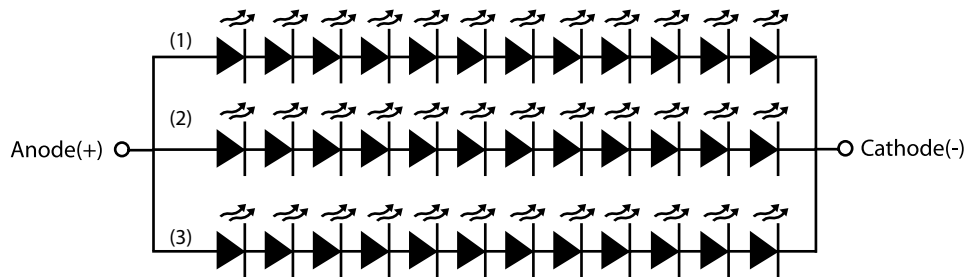
16W/ 30W Emitter Dimensions



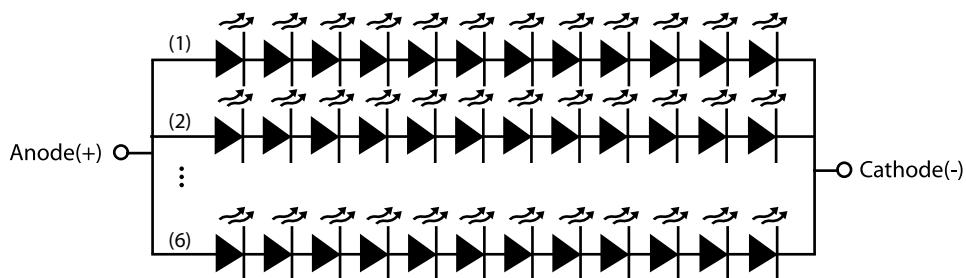
Notes :

1. Unit : mm
2. Tolerance : ± 0.2 mm
3. Drawings are not to scale
4. T_p : Thermal measurement point

16W/ 30W Emitter Circuit Layout



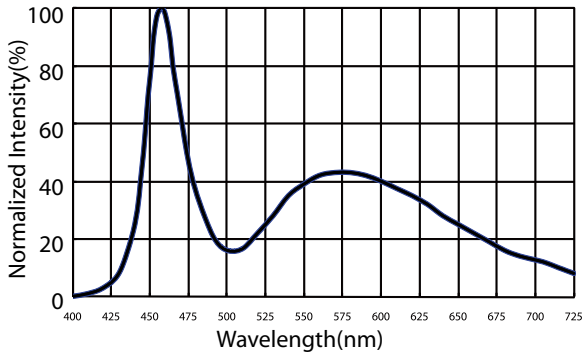
16W EdiPower® II HM Series Circuit Layout



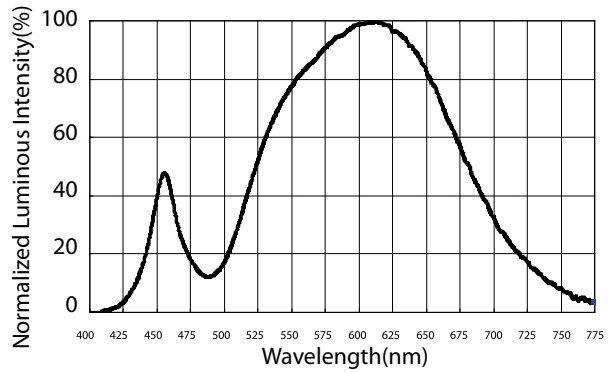
30W EdiPower® II HM Series Circuit Layout

Characteristic Curve

Spectrum

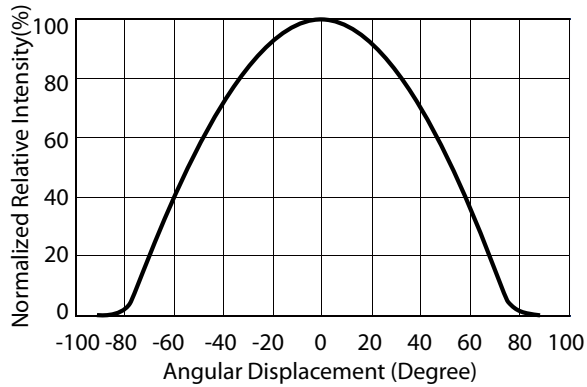


Color spectrum for EdiPower® II HM Cool White



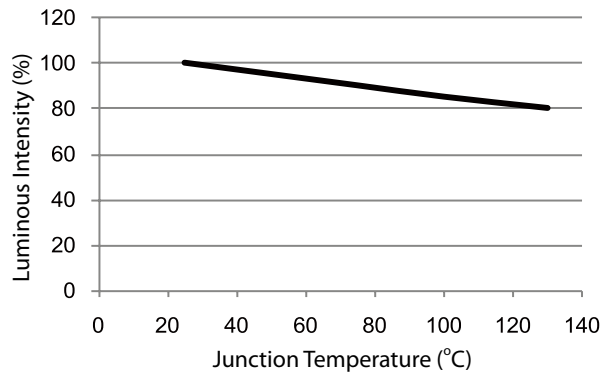
Color spectrum for EdiPower® II HM Warm White and Neutral White

Radiation Diagram

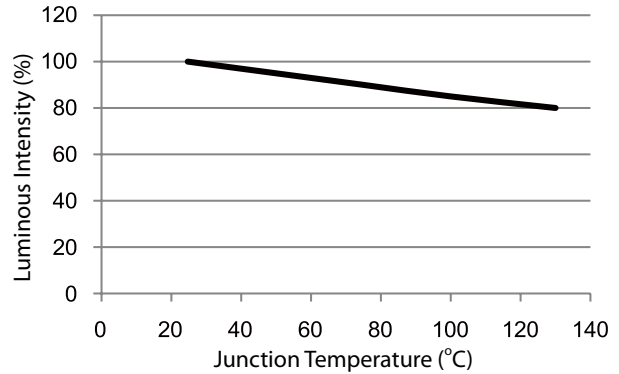


Lambertian at $T_j=25^{\circ}\text{C}$ for EdiPower II HM series

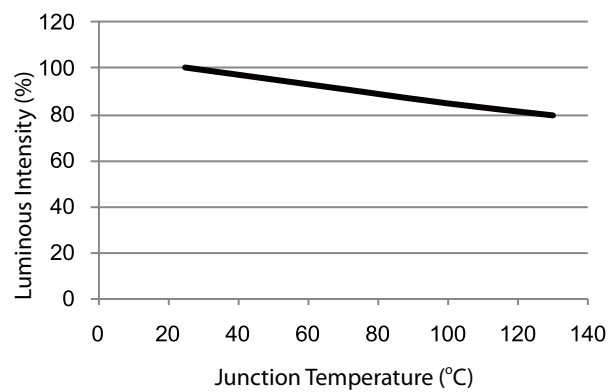
Luminous Flux vs. Junction Temperature



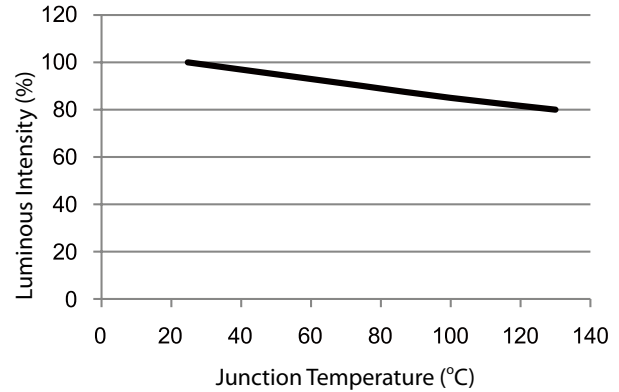
Luminous flux vs. junction temperature for 2PHM05xWxxP12001



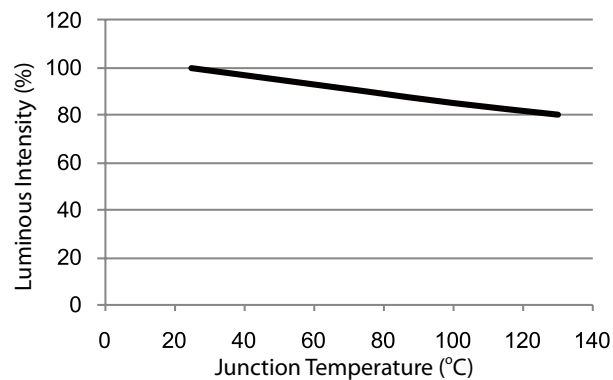
Luminous flux vs. junction temperature for 2PHM09xWxxP12001



Luminous flux vs. junction temperature for 2PHM16xWxxP13001

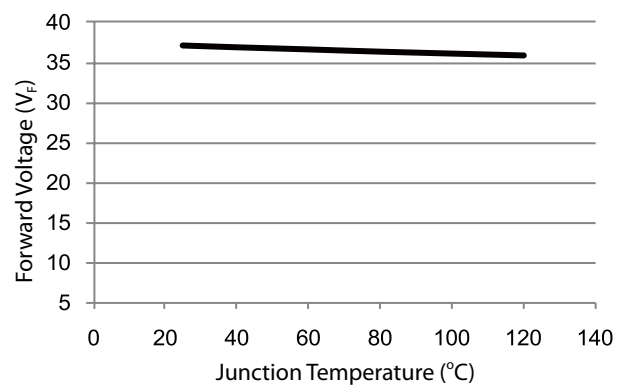


Luminous flux vs. junction temperature for 2PHM30xWxxP13001



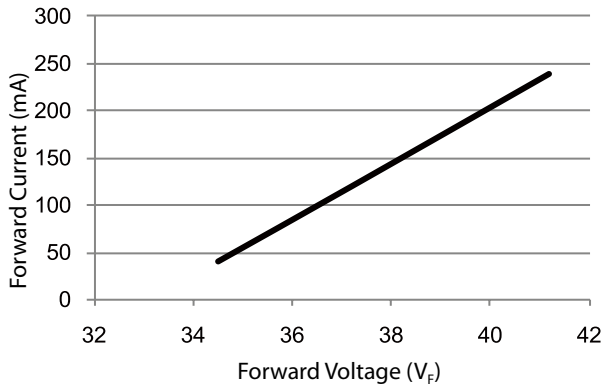
Luminous flux vs. junction temperature for 2PHM40xWxxP16001

Forward Voltage vs. Junction Temperature

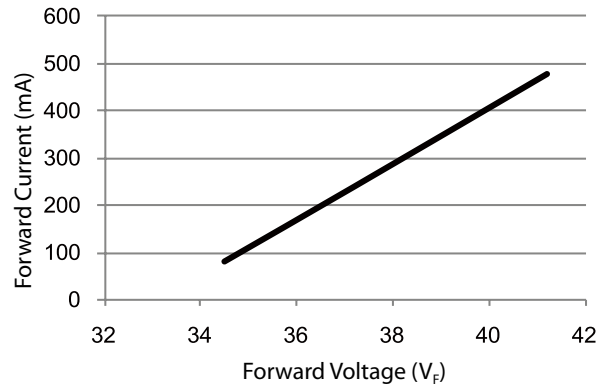


Forward voltage vs. junction temperature for 2PHM05xWxxP12001, 2PHM09xWxxP12001, 2PHM16xWxxP13001, 2PHM30xWxxP13001, 2PHM40xWxxP16001

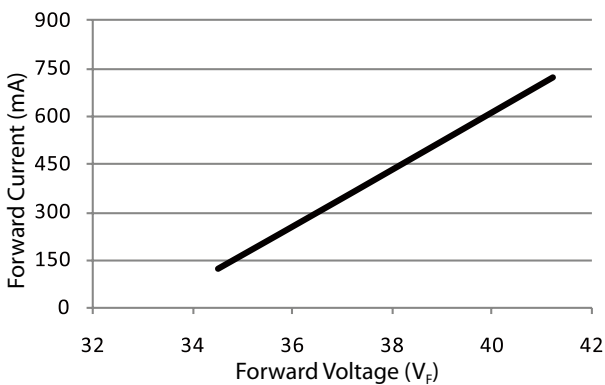
Forward Current vs. Forward Voltage



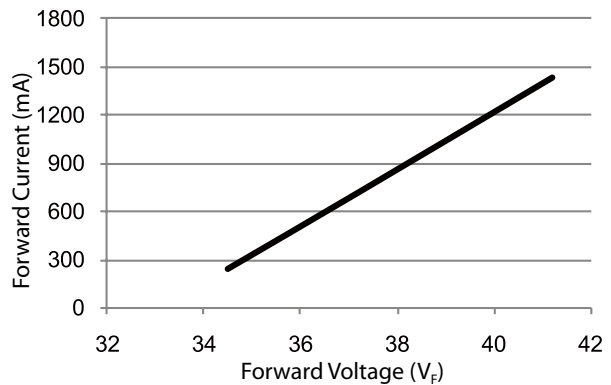
Forward current vs. Forward voltage for 2PHM05xWxxP12001



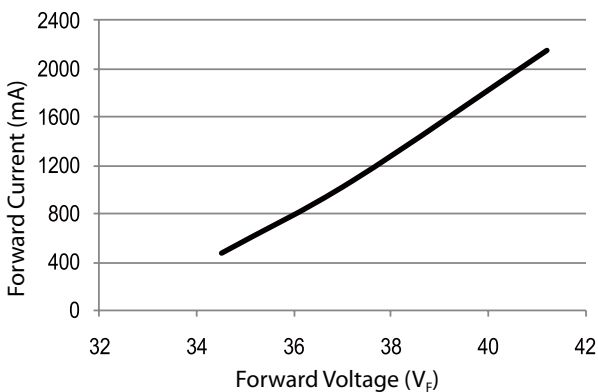
Forward current vs. Forward voltage for 2PHM09xWxxP12001



Forward current vs. Forward voltage for 2PHM16xWxxP13001

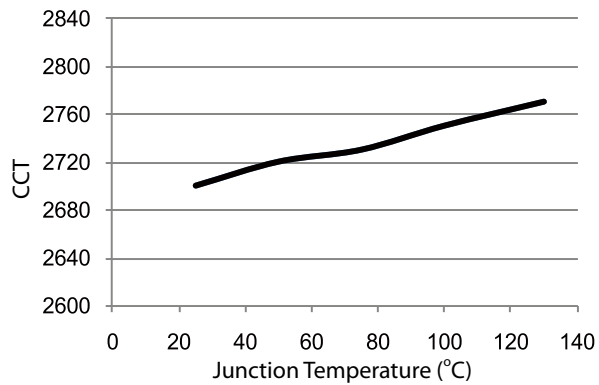


Forward current vs. Forward voltage for 2PHM30xWxxP13001

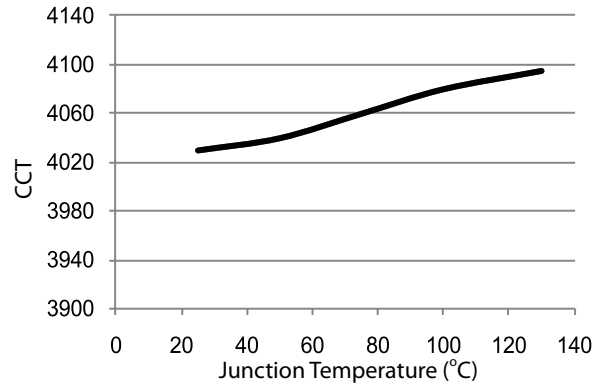


Forward current vs. Forward voltage for 2PHM40xWxxP16001

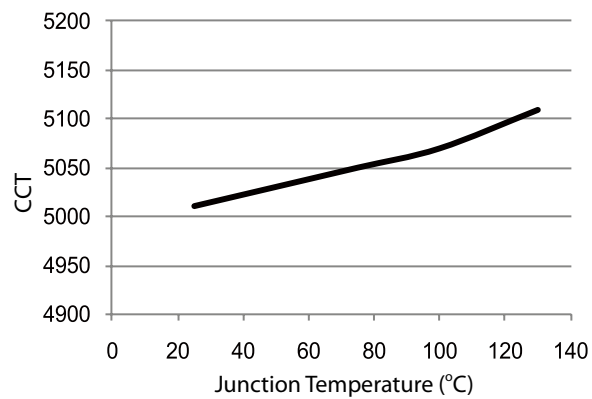
CCT vs. Junction Temperature



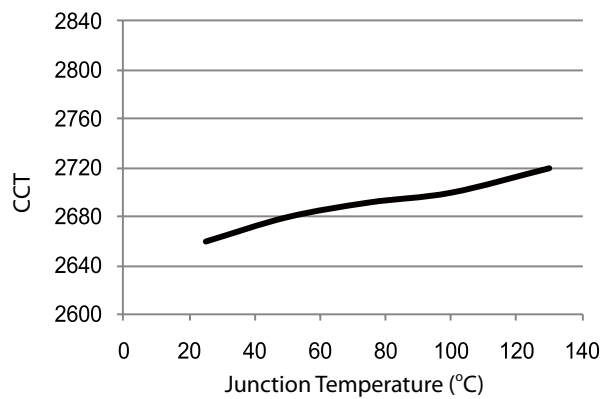
CCT vs. junction temperature for 2PHM05WWxxP12001



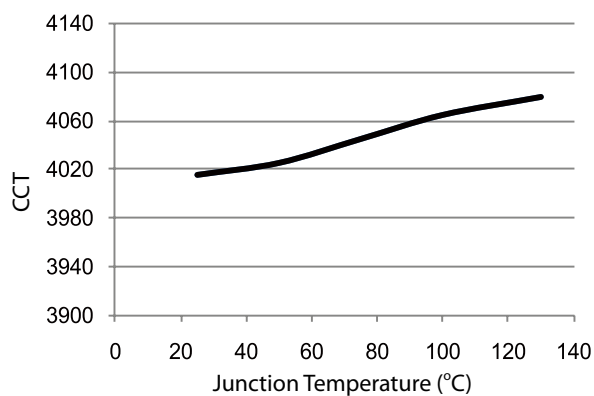
CCT vs. junction temperature for 2PHM05NWxxP12001



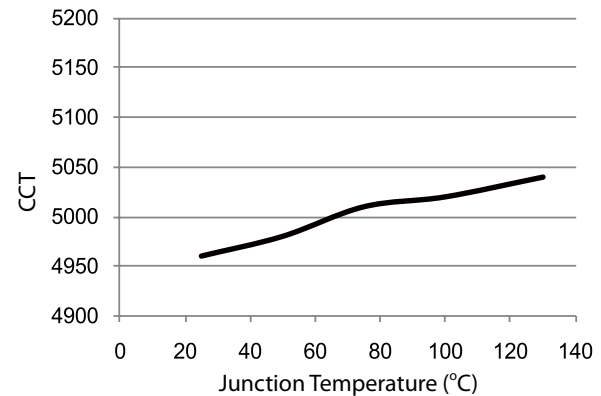
CCT vs. junction temperature for 2PHM05CWxxP12001



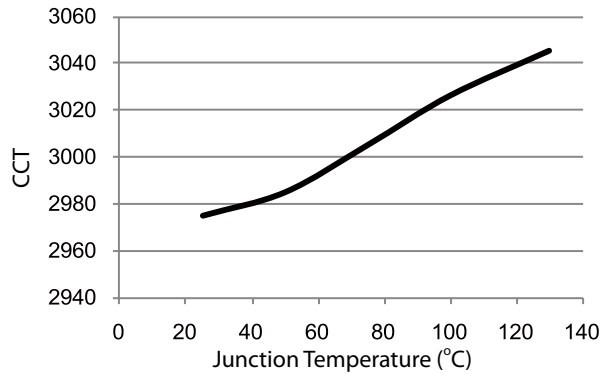
CCT vs. junction temperature for 2PHM09WWxxP12001



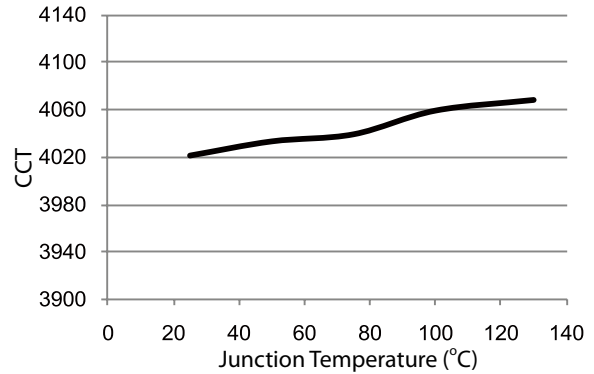
CCT vs. junction temperature for 2PHM09NWxxP12001



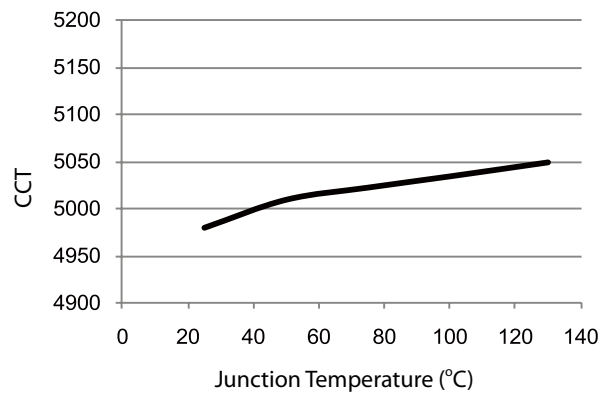
CCT vs. junction temperature for 2PHM09CWxxP12001



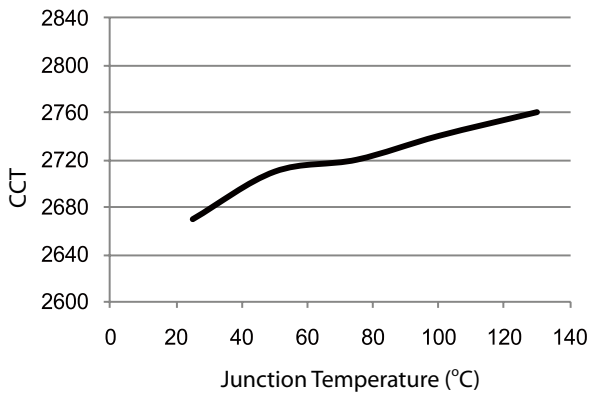
CCT vs. junction temperature for 2PHM16WWxxP13001



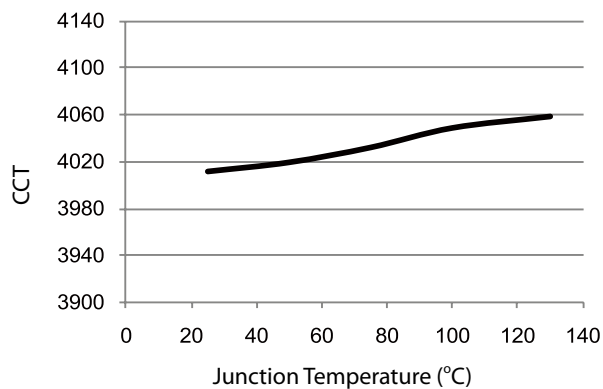
CCT vs. junction temperature for 2PHM16NWxxP13001



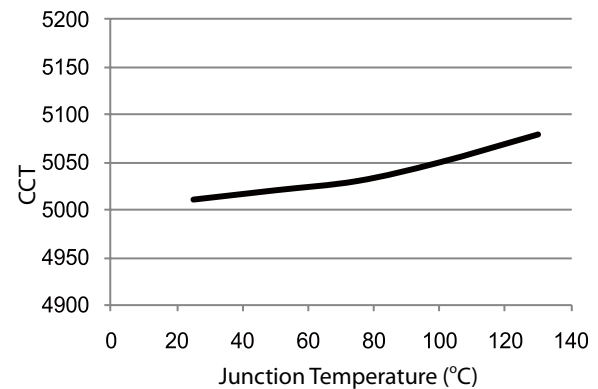
CCT vs. junction temperature for 2PHM16CWxxP13001



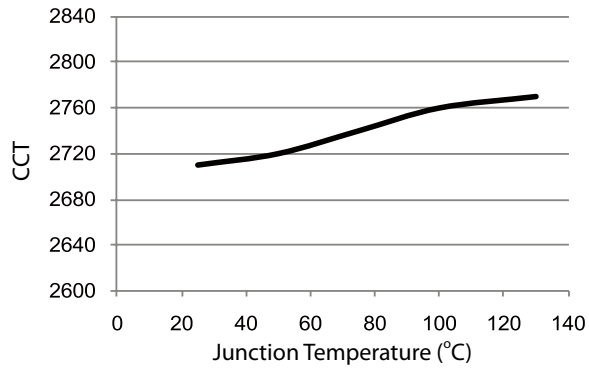
CCT vs. junction temperature for 2PHM30WWxxP13001



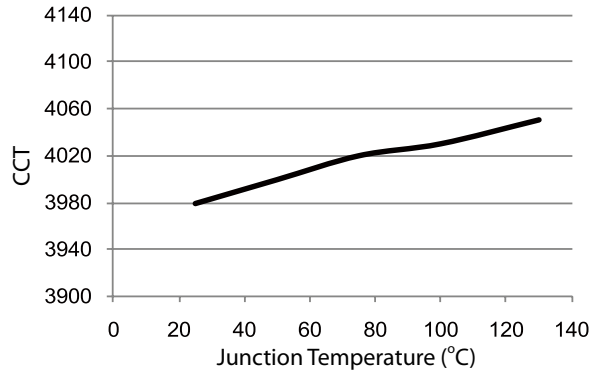
CCT vs. junction temperature for 2PHM30NWxxP13001



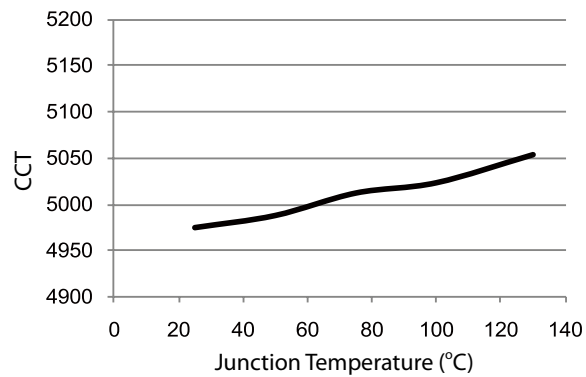
CCT vs. junction temperature for 2PHM30CWxxP13001



CCT vs. junction temperature for 2PHM40WWxxP16001

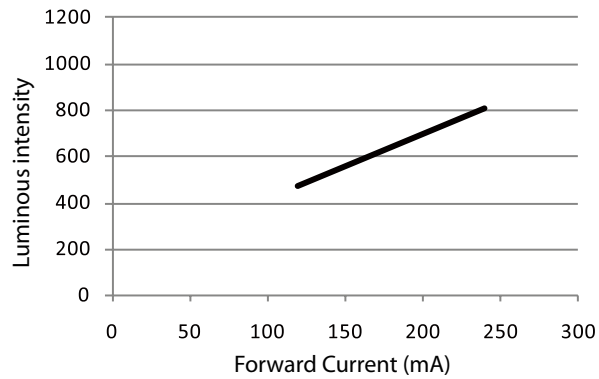


CCT vs. junction temperature for 2PHM40NWxxP16001 (4000K)

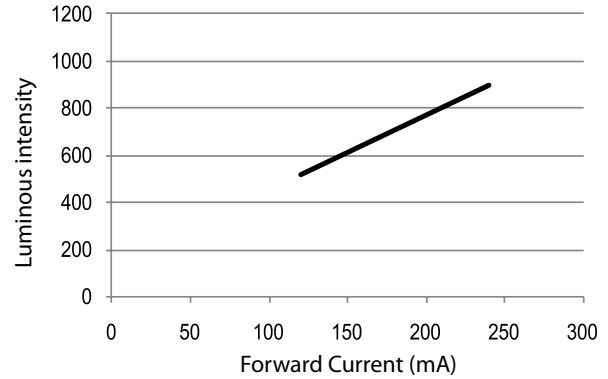


CCT vs. junction temperature for 2PHM40CWxxP16001 (5000K)

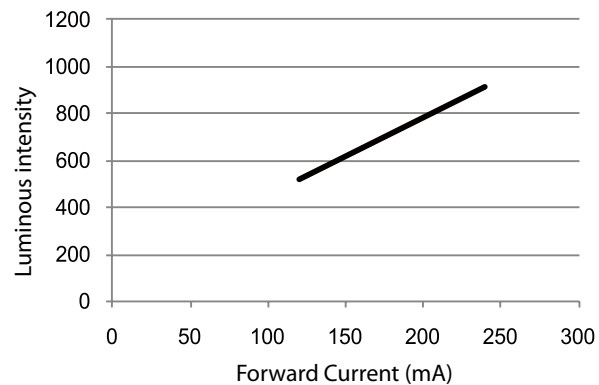
Luminous intensity vs. Forward current



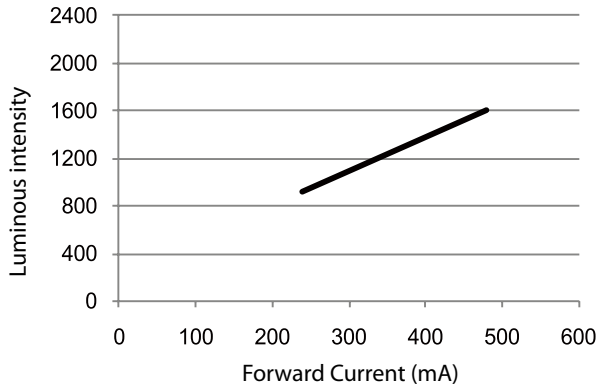
Luminous intensity vs. Forward current for 2PHM05WWxxP12001



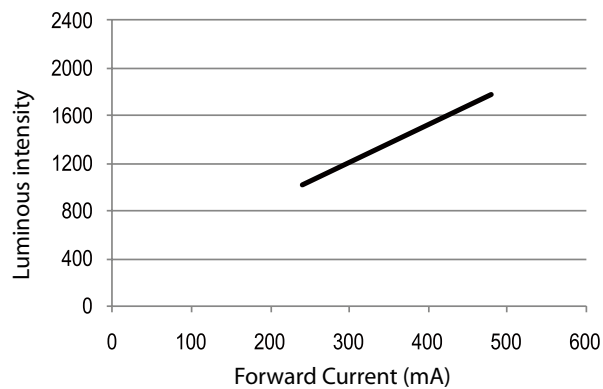
Luminous intensity vs. Forward current for 2PHM05NWxxP12001



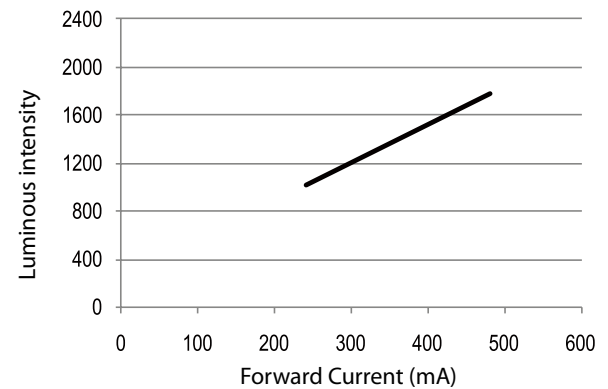
Luminous intensity vs. Forward current for 2PHM05CWxxP12001



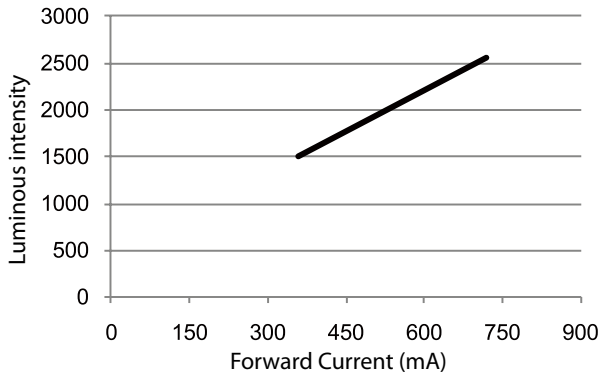
Luminous intensity vs. Forward current for 2PHM09WWxxP12001



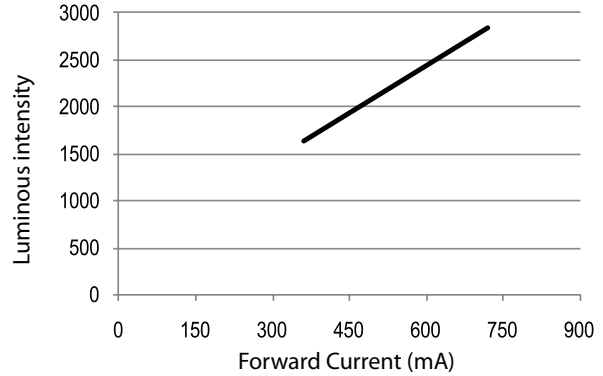
Luminous intensity vs. Forward current for 2PHM09NWxxP12001



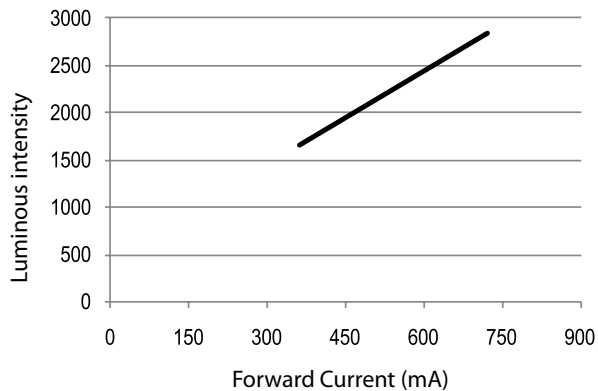
Luminous intensity vs. Forward current for 2PHM09CWxxP12001



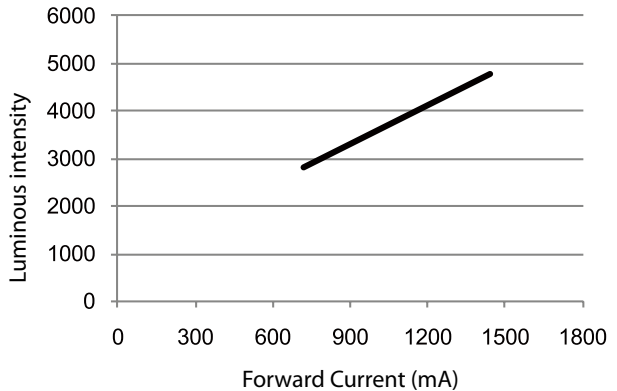
Luminous intensity vs. Forward current for 2PHM16WWxxP13001



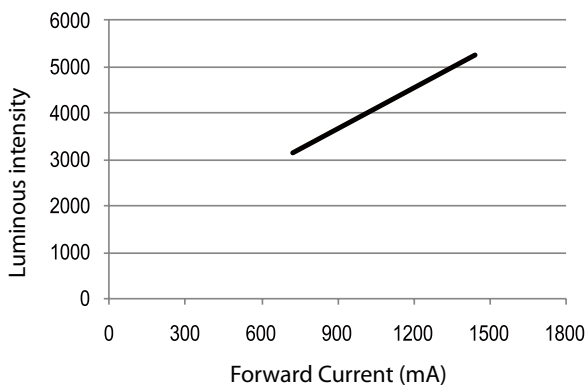
Luminous intensity vs. Forward current for 2PHM16NWxxP13001



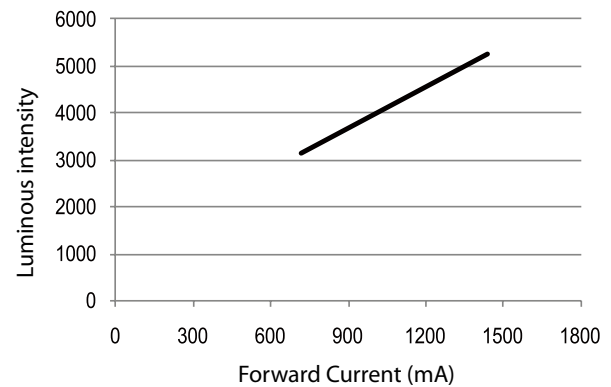
Luminous intensity vs. Forward current for 2PHM16CWxxP13001



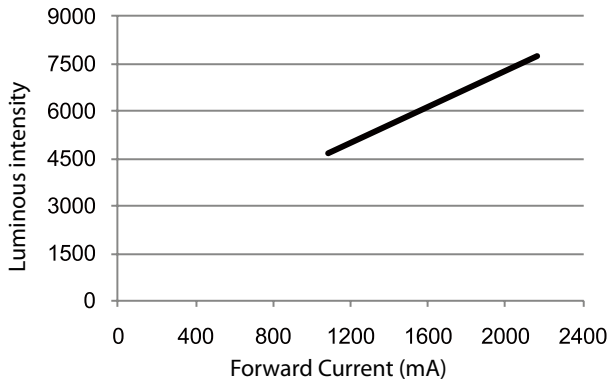
Luminous intensity vs. Forward current for 2PHM30WWxxP13001



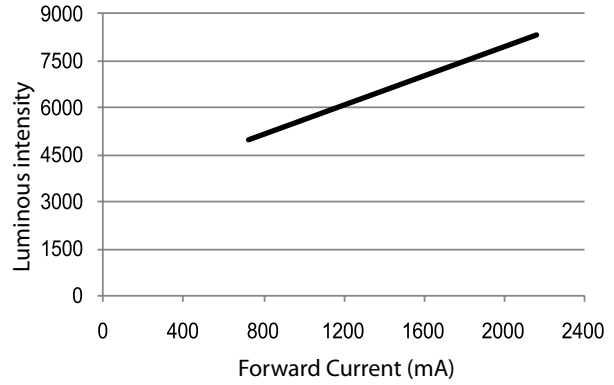
Luminous intensity vs. Forward current for 2PHM30NWxxP13001



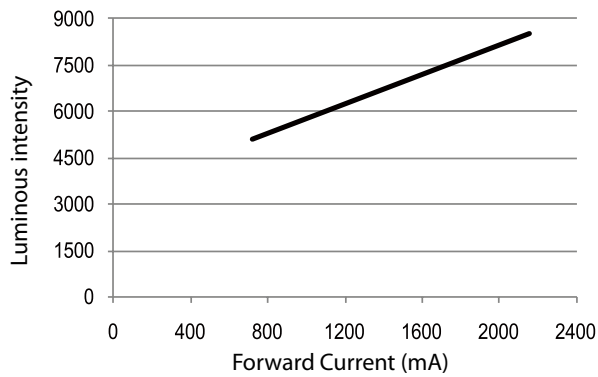
Luminous intensity vs. Forward current for 2PHM30CWxxP13001



Luminous intensity vs. Forward current for 2PHM40WWxxP16001

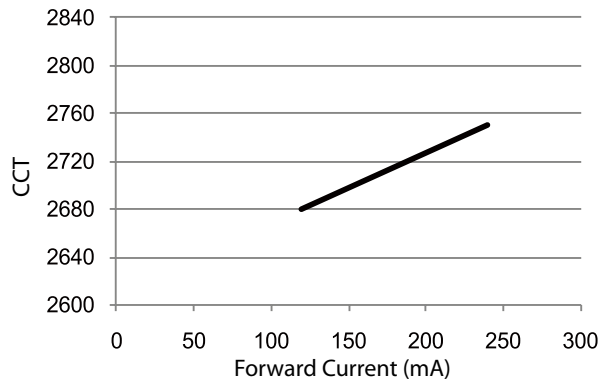


Luminous intensity vs. Forward current for 2PHM40NWxxP16001

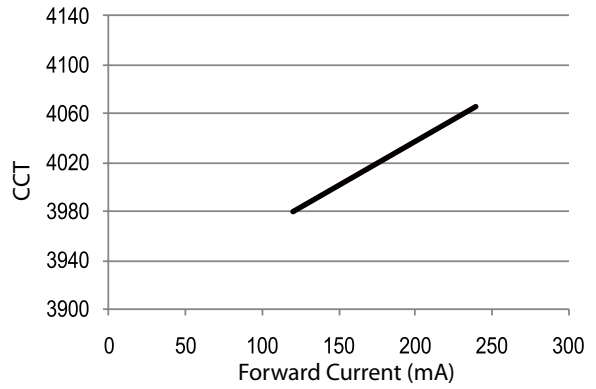


Luminous intensity vs. Forward current for 2PHM40CWxxP16001

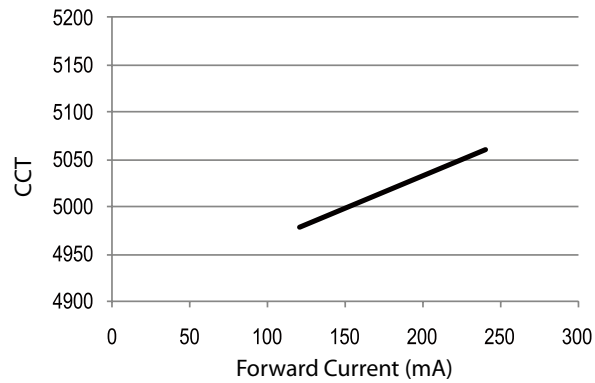
CCT vs. Forward current



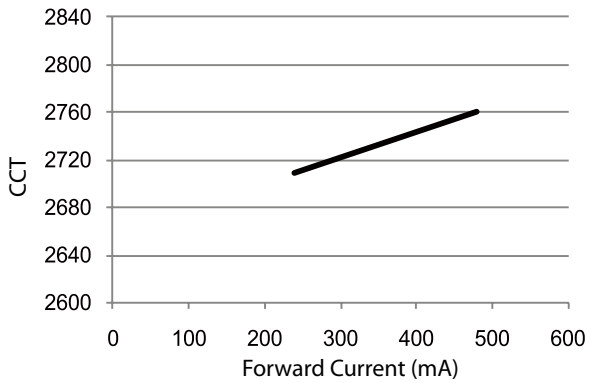
CCT vs. Forward current for 2PHM05CWxxP12001



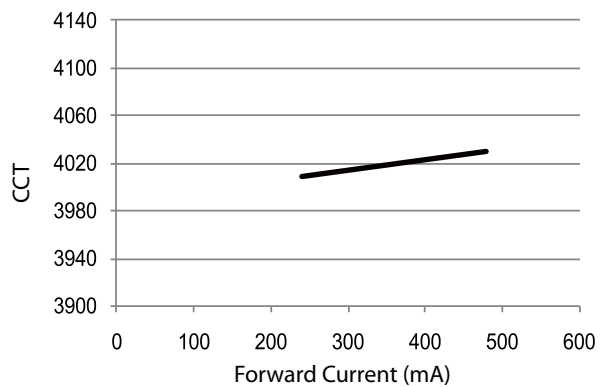
CCT vs. Forward current for 2PHM05NWxxP12001



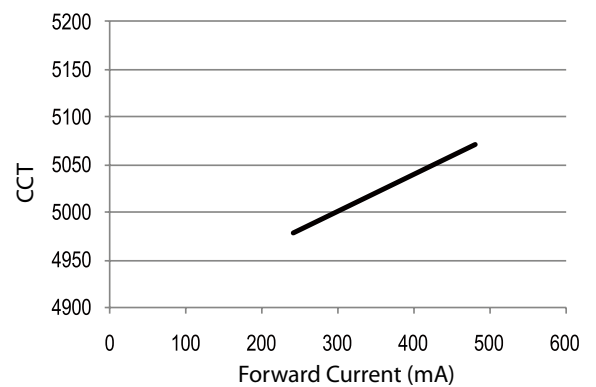
CCT vs. Forward current for 2PHM05WWxxP12001



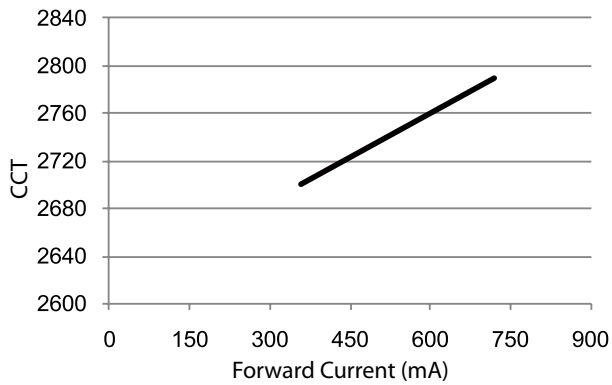
CCT vs. Forward current for 2PHM09CWxxP12001



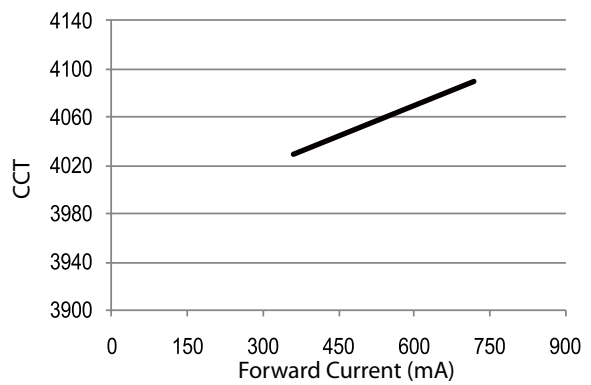
CCT vs. Forward current for 2PHM09NWxxP12001



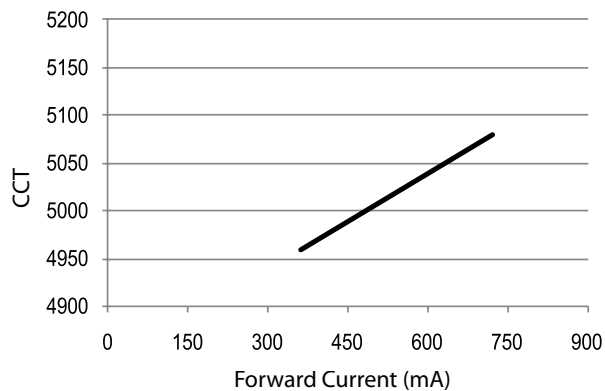
CCT vs. Forward current for 2PHM09WWxxP12001



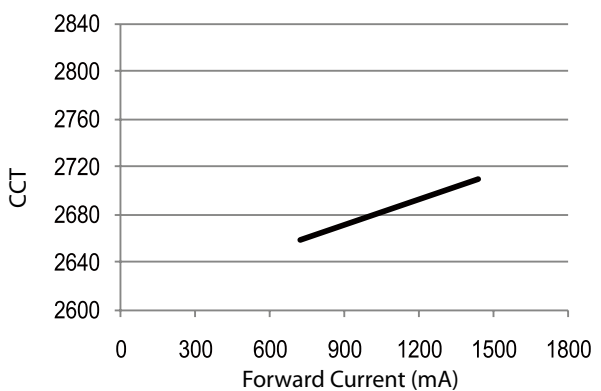
CCT vs. Forward current for 2PHM16CWxxP13001



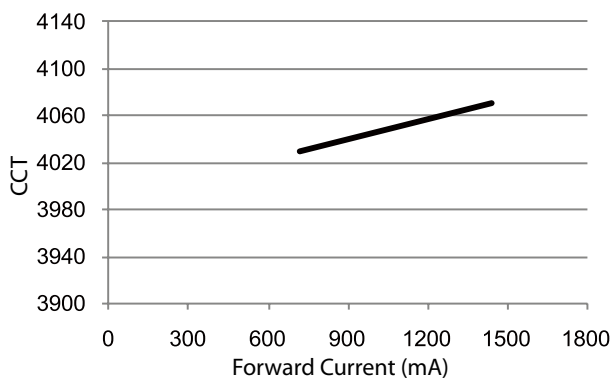
CCT vs. Forward current for 2PHM16NWxxP13001



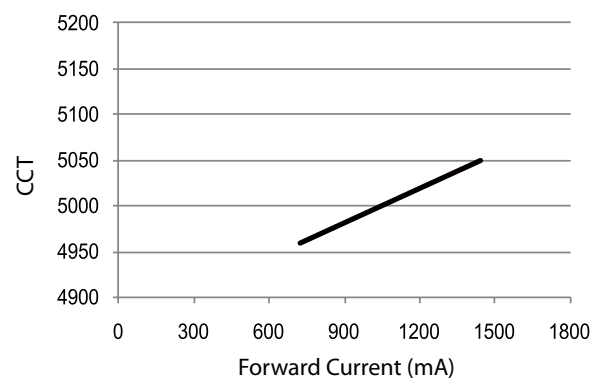
CCT vs. Forward current for 2PHM16WWxxP13001



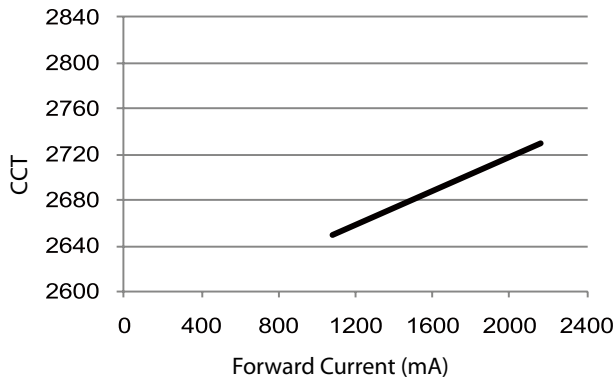
CCT vs. Forward current for 2PHM30CWxxP13001



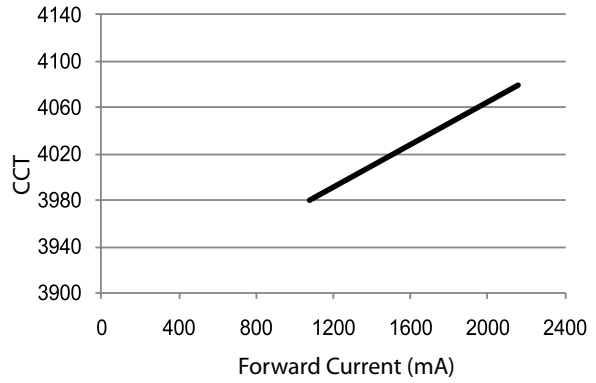
CCT vs. Forward current for 2PHM30NWxxP13001



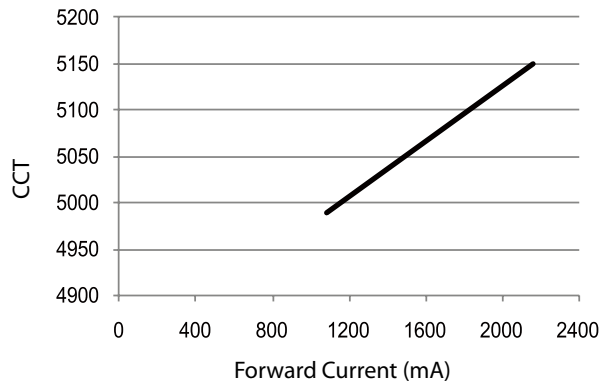
CCT vs. Forward current for 2PHM30WWxxP13001



CCT vs. Forward current for 2PHM40CWxxP16001



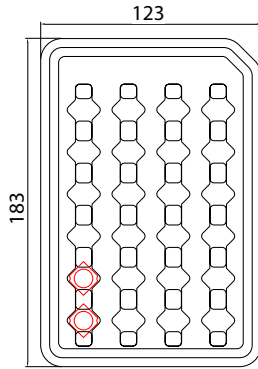
CCT vs. Forward current for 2PHM40NWxxP16001



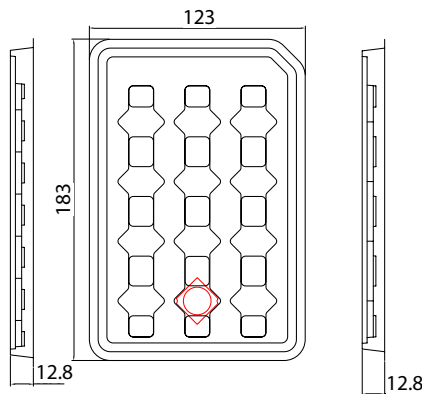
CCT vs. Forward current for 2PHM40WWxxP16001

Product Packaging Information

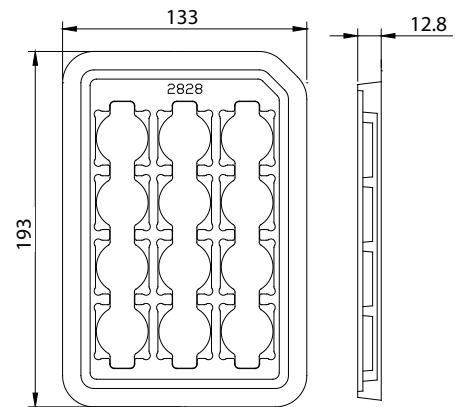
Tray Packing for 5/ 9 W



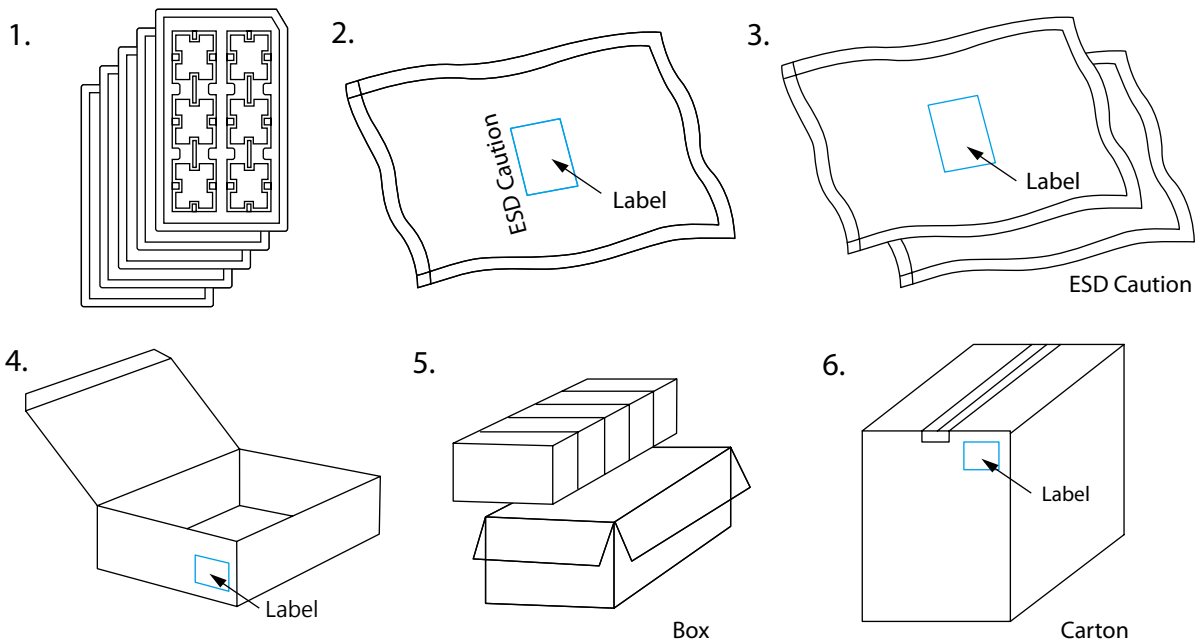
Tray Packing for 16/ 30W



Tray Packing for 40W



Tray package dimension.



Packaging steps for HM Series

Notes:

1. All dimensions are in mm.
2. There are 5W/9W 24pcs or 16W/30W/40W 12pcs emitters in a full tray.
3. There are 5 trays in a bag.
4. There are 5 bags in a boxes.
5. There are 5 boxes in a carton.
6. A bag contains one humidity indicator card and drying agent.

Revision History

Versions	Description	Release Date
1	Establish order code information	2013/01/24
2	1. Add 5W and 16W information 2. Add characteristic curve	2013/05/20
3	Update the Characteristic Curve	2013/06/24
4	1. Add the Characteristic curve & Tray Packing 2. Update the luminous flux characteristic 3. Add Average Lumen Maintenance Characteristics 4. Update Mechanical Dimensions 5. Add the Chromaticity coordinates	2013/10/02
5	1. Delete Bin Range of Chromaticity Coordinates 2. Update Luminous Flux Characteristic 3. Add the Limited Warranty	2013/10/08

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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