Edipower II Series

Application Guide

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Here are a bunch of passionate people who work and live to contribute to a better tomorrow.

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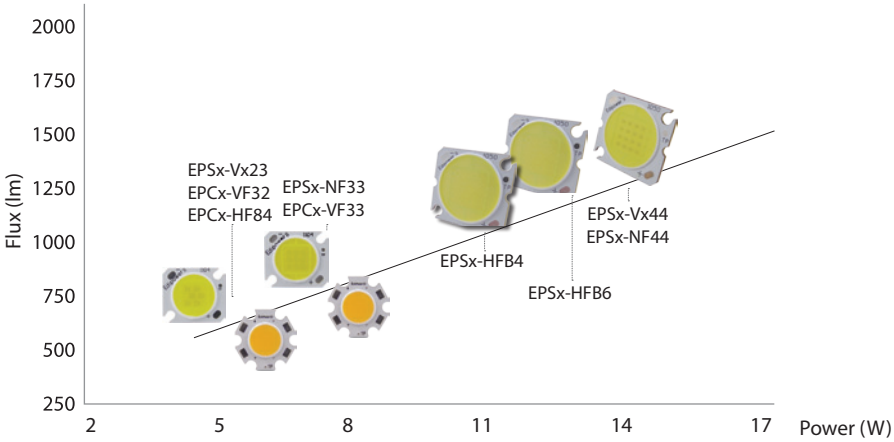
I. Product Introduction

EdiPower® II series provides different color correlate temperatures and flux choices from 4W to 120W, which may be applied from LED Engine design and application into MR-16 or High/Low Bay Fixtures.

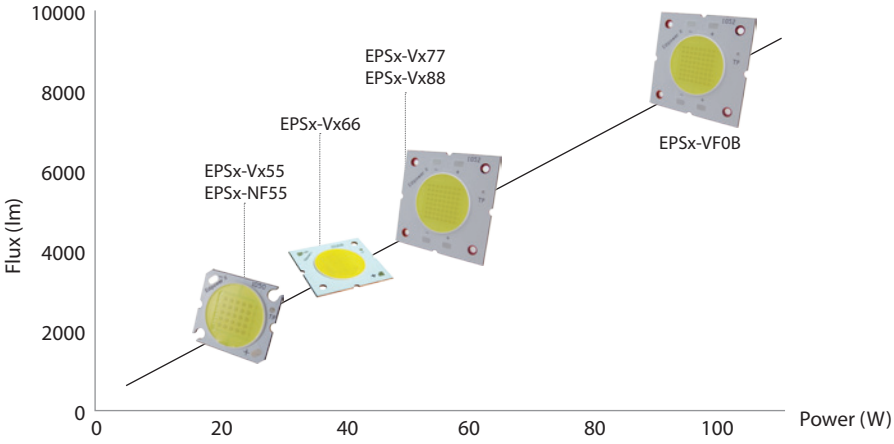
Features:

- High Power Operation
- Instant -On
- Long Lifetime

EdiPower® II Series (5~20W)



EdiPower® II Series (20~100W)



EdiPower® II Environmental Compliance

EdiPower® II series are compliant to the Restriction of Hazardous Substances Directive or RoHS. The restricted materials including lead, mercury cadmium hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used in EdiPower II to provide an environmentally friendly product to the customers.

II. Nomenclature, Bin Group and CCT Ranks

Nomenclature

EP	S	x	-	x	x	x	x
X1	X2	X3		X4	X5	X6	X7

X1 LED Item		X2 Emitter Type		X3 Color		X4-X5 Serial Number	
Code	Type	Code	Type	Code	Type	Code	Type
EP	EdiPower®	S	Square	W	Cool White	--	Serial Number
		C	Star	H	Neutral White		
				X	Warm White		
				R	Red		
				T	Green		
				B	Blue		

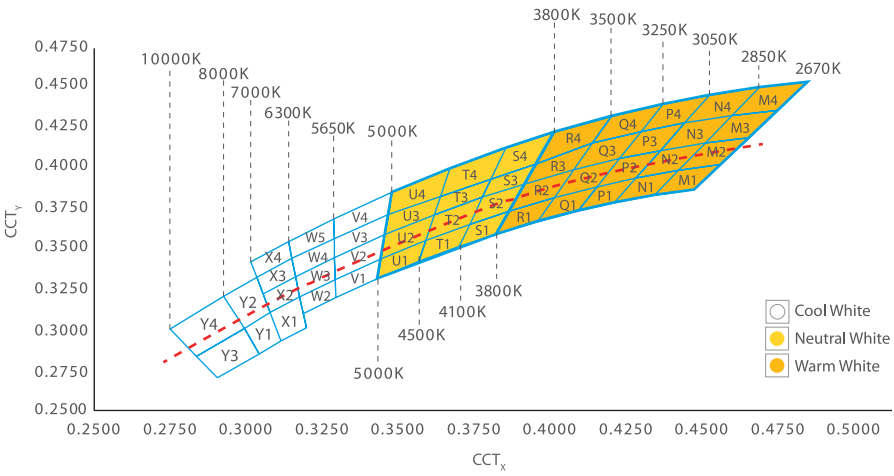
X6 Circuit Series		X7 Circuit Parallel	
Code	Type	Code	Type
1-9	1-9 series	1-9	1- 9 parallel
0	10 series	0	10 parallel
A	11 series	A	11 parallel
B	12 series	B	12 parallel

Bin group

Group	Min.	Max.
A1	10	50
A2	50	90
A3	90	100
B0	100	130
C1	130	150
C2	150	170
D0	170	220
E1	220	255
E2	255	290
F1	290	330
F2	330	370
G1	370	425
G2	425	480
H1	480	555
H2	555	630
J1	630	725
J2	725	820
K1	820	940
K2	940	1060

Group	Min.	Max.
L1	1060	1220
L2	1220	1380
M1	1380	1585
M2	1585	1790
N1	1790	2060
N2	2060	2330
P1	2330	2680
P2	2680	3030
Q1	3030	3485
Q2	3485	3940
R1	3940	4530
R2	4530	5120
S1	5120	5885
S2	5885	6650
T1	6650	7650
T2	7650	8650
U	8650	11250
V	11250	14620
M	14620	19000
X	19000	24710

CCT Ranks - Edison Opto Standard Ranks



Notes
1. The red line represents the blackbody locus on CIE 1931 graph.
2. Edison maintains a tolerance of ±0.005 on x, y color coordinates.

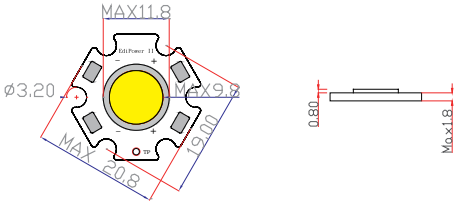
Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y
	0.4436	0.3991		0.4293	0.3942		0.4293	0.3942		0.4164	0.3890
M1	0.4576	0.4028	N1	0.4436	0.3991	P1	0.4221	0.3789	Q1	0.4021	0.3821
2,700K	0.4489	0.3875	2,900K	0.4355	0.3837	3,150K	0.4100	0.3738	3,300K	0.4100	0.3738
	0.4355	0.3837		0.4221	0.3789		0.4164	0.3890		0.3965	0.3672
	0.4525	0.4162		0.4375	0.4116		0.4239	0.4064		0.4085	0.3995
M2	0.4671	0.4196	N2	0.4293	0.3942	P2	0.4375	0.4116	Q2	0.4239	0.4064
2,700K	0.4576	0.4028	2,900K	0.4436	0.3991	3,150K	0.4293	0.3942	3,300K	0.4164	0.3890
	0.4436	0.3991		0.4525	0.4162		0.4164	0.3890		0.4021	0.3821
	0.4614	0.4333		0.4614	0.4333		0.4311	0.4233		0.4085	0.3995
M3	0.4767	0.4366	N3	0.4525	0.4162	P3	0.4456	0.4286	Q3	0.4147	0.4161
2,700K	0.4671	0.4196	2,900K	0.4375	0.4116	3,150K	0.4375	0.4116	3,300K	0.4311	0.4233
	0.4525	0.4162		0.4456	0.4286		0.4239	0.4064		0.4239	0.4064
	0.4705	0.4508		0.4538	0.4459		0.4384	0.4404		0.4384	0.4404
M4	0.4866	0.4541	N4	0.4705	0.4508	P4	0.4538	0.4459	Q4	0.4311	0.4233
2,700K	0.4767	0.4366	2,900K	0.4614	0.4333	3,150K	0.4456	0.4286	3,300K	0.4147	0.4161
	0.4614	0.4333		0.4456	0.4286		0.4311	0.4233		0.4209	0.4326

Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y	Group/ CCT (Typ.)	X	Y
	0.3870	0.3739		0.3594	0.3556		0.3292	0.3313		0.3075	0.3107
R1	0.4021	0.3821	T1	0.3570	0.3425	V1	0.3444	0.3442	X1	0.3174	0.3204
3,650K	0.3965	0.3672	4,300K	0.3705	0.3519	5,300K	0.3433	0.3320	6,650K	0.3196	0.3013
	0.3826	0.3595		0.3740	0.3658		0.3293	0.3200		0.3111	0.2931
	0.3923	0.3909		0.3622	0.3716		0.3292	0.3313		0.3075	0.3107
R2	0.3870	0.3739	T2	0.3782	0.3824	V2	0.3290	0.3450	X2	0.3051	0.3223
3,650K	0.4021	0.3821	4,300K	0.3740	0.3658	5,300K	0.3457	0.3591	6,650K	0.3160	0.3332
	0.40859	0.3995		0.3594	0.3556		0.3444	0.3442		0.3174	0.3204
	0.40859	0.3995		0.3642	0.3828		0.3290	0.3450		0.3051	0.3223
R3	0.39237	0.3909	T3	0.3811	0.3937	V3	0.3288	0.3569	X3	0.3030	0.3327
3,650K	0.39628	0.4035	4,300K	0.3782	0.3824	5,300K	0.3469	0.3717	6,650K	0.3147	0.3444
	0.41478	0.4161		0.3622	0.3716		0.3457	0.3591		0.3160	0.3332
	0.40227	0.4227		0.3672	0.4002		0.3288	0.3569		0.3030	0.3327
R4	0.42094	0.4326	T4	0.3859	0.4129	V4	0.3286	0.3689	X4	0.3010	0.3422
3,650K	0.41478	0.4161	4,300K	0.3811	0.3937	5,300K	0.3481	0.3856	6,650K	0.3136	0.3549
	0.39628	0.4035		0.3642	0.3828		0.3469	0.3717		0.3147	0.3444
	0.3470	0.3658		0.3444	0.3442		0.3292	0.3313		0.3040	0.2850
S1	0.3870	0.3738	U1	0.3433	0.3320	W2	0.3293	0.3202	Y1	0.2990	0.3010
3,900K	0.3825	0.3595	4,750K	0.3570	0.3425	6,000K	0.3186	0.3102	7,500K	0.3075	0.3107
	0.3705	0.3519		0.3594	0.3556		0.3174	0.3204		0.3111	0.2931
	0.3782	0.3824		0.3622	0.3716		0.3290	0.3450		0.2990	0.3010
S2	0.3923	0.3909	U2	0.3594	0.3556	W3	0.3292	0.3313	Y2	0.2920	0.3210
3,900K	0.3870	0.3738	4,750K	0.3444	0.3442	6,000K	0.3174	0.3204	7,500K	0.3030	0.3327
	0.3740	0.3658		0.3457	0.3591		0.3160	0.3332		0.3075	0.3107
	0.3782	0.3824		0.3642	0.3828		0.3290	0.3450		0.3040	0.2850
S3	0.3811	0.3937	U3	0.3622	0.3716	W4	0.3160	0.3332	Y3	0.2899	0.2703
3,900K	0.3962	0.4035	4,750K	0.3457	0.3591	6,000K	0.3147	0.3444	9,000K	0.2829	0.2837
	0.3923	0.3909		0.3469	0.3717		0.3288	0.3569		0.2990	0.3010
	0.3859	0.4129		0.3642	0.3828		0.3147	0.3444		0.2920	0.3210
S4	0.4022	0.4227	U4	0.3672	0.4002	W5	0.3136	0.3549	Y4	0.2742	0.3006
3,900K	0.3962	0.4035	4,750K	0.3481	0.3856	6,000K	0.3186	0.3689	9,000K	0.2829	0.2837
	0.3811	0.3937		0.3469	0.3717		0.3288	0.3569		0.2990	0.3010

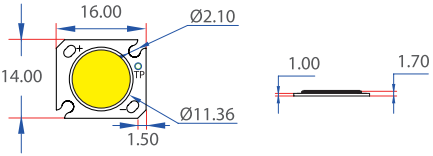
III. Product Dimensions

Unit: mm

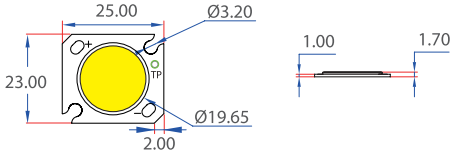
Star type: EPCX-xFxx



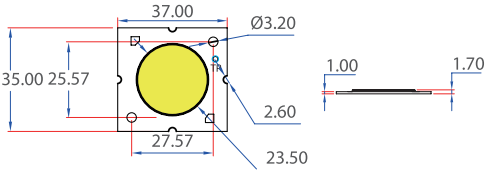
1416 type: EPSx-Vx23 / EPSx-Vx32 / EPSx-NF33



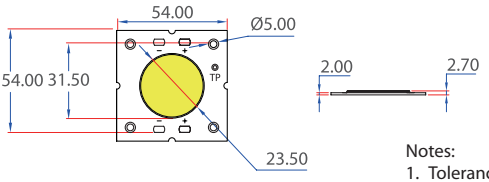
2325 type: EPSx-Vx44/ EPSx-Vx55/ EPSx-HFBx / EPSx-NF44/ EPSx-NF55/ EPSx-x155



3537 type: EPSx-Vx66/ EPSx-Vx77



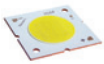
5454 type: EPSx-Vx88 / EPSx-VF0B



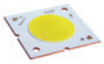
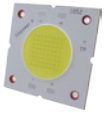
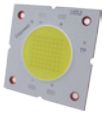
Notes:
1. Tolerance: ±0.2mm
2. 3Drawings are not to scale
3. TP: Thermal measurement point.

IV. Specifications

EdiPower® II Series

Power	Picture	Part No.	CCT(K)	I_F (mA)	Flux(lm) T_j=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)	Ra
4W-6W		EPSW-VF23	5000-10000	700	450	405	6.4	70
				1000	590	540	6.7	
		EPSH-VF23	3800-5000	700	385	345	6.4	75
				1000	505	450	6.7	
		EPSX-VE23	2670-3800	700	330	295	6.4	80
				1000	460	415	6.7	
10W-15W		EPSW-VF44	5000-10000	700	935	840	12.0	70
				1000	1320	1190	12.5	
				1200	1540	1385	12.8	
		EPSH-VF44	3800-5000	700	825	740	12.0	75
				1000	1100	990	12.5	
				1200	1310	1155	12.8	
		EPSX-VE44	2670-3800	700	660	590	12.0	80
				1000	935	840	12.5	
				1200	1075	965	12.8	
16W-24W		EPSW-VF55	5000-10000	1000	1595	1430	15.5	70
				1200	1835	1650	16.0	
				1500	2255	2030	16.5	
		EPSH-VF55	3800-5000	1000	1320	1155	15.5	75
				1200	1560	1410	16.0	
				1500	1925	1735	16.5	
		EPSX-VE55	2670-3800	1000	1100	990	15.5	80
				1200	1380	1155	16.0	
				1500	1595	1430	16.5	
25W-40W		EPSW-VF66	5000-10000	1400	2510	2255	19.0	70
				1800	3170	2855	19.5	
				2000	3575	3220	20.0	
		EPSH-VF66	3800-5000	1400	2105	1890	19.0	75
				1800	2695	2425	19.5	
				2000	3000	2725	20.0	
		EPSX-VE66	2670-3800	1400	1815	1630	19.0	80
				1800	2260	2035	19.5	
				2000	2530	2275	20.0	

Notes:
1. LED is a dynamic, creative and evolving technology, please refer to the datasheet for final specifications.
2. Other colors available upon request.

Power	Picture	Part No.	CCT(K)	I_F (mA)	Flux(lm) T_J=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)	Ra
40W-50W		EPSW-VF77	5000-10000	1500	3035	2570	21.2	70
				2000	4070	3660	22.0	
				2200	4510	4050	22.6	
		EPSH-VF77	3800-5000	1500	2575	2310	21.2	75
				2000	3455	3100	22.0	
				2200	3830	3445	22.6	
		EPSX-VE77	2670-3800	1500	2120	1900	21.2	80
				2000	2845	2560	22.0	
				2200	3155	2835	22.6	
50W-60W		EPSW-VF88	5000-10000	1500	3500	3200	24.8	70
				2000	4500	4100	25.4	
				2400	5100	4600	26.0	
		EPSH-VF88	3800-5000	1500	3150	2850	24.8	75
				2000	4100	3700	25.4	
				2400	4700	4200	26.0	
		EPSX-VF88	2670-3800	1500	2400	2150	24.8	80
				2000	3260	2950	25.4	
				2400	3850	3480	26.0	
100W-120W		EPSW-VF0B	5000-10000	2600	6300	5800	31.0	70
				3000	7500	6750	31.5	
				3600	9100	8200	32.0	
		EPSH-VF0B	3800-5000	2600	5600	5150	31.0	75
				3000	6800	6120	31.5	
				3600	8200	7400	32.0	
		EPSX-VF0B	2670-3800	2600	4800	4420	31.0	80
				3000	5800	5220	31.5	
				3600	7000	6500	32.0	

Notes:
1. LED is a dynamic, creative and evolving technology, please refer to the datasheet for final specifications.
2. Other colors available upon request.

EdiPower® II Series Absolute Maximum Ratings

Item	Symbol	Parameter	Unit
Foward Direct Current(1)	I_F	Please refer to the indicated current on the specifiation	mA
Reverse Voltage	V_R	(2)	V
LED Junction Temperature(3)	T_J	<150	°C
Operating Temperature		-40~+110	°C
Storage Temperature		-40~+120	°C
Thermal Measurement Point(4)	TP	<80	°C
ESD Sensitivity	V_B	2,000	V
Isolation Voltage		1,000	V

Notes:
1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
4. TP: Thermal measurement point on board.
5. Suitable drivers are recommended at page 39 to provide the optimized operate condition.

EdiPower® II-LD Series

Power	Picture	Part No.	CCT(K)	I_F (mA)	Flux(lm) T_J=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)	Ra
6W-10W		EPSW-NF33	5000-10000	700	570	520	9.3	70
				100	810	745	9.6	
		EPSH-NF33	3800-5000	700	510	465	9.3	75
				1000	720	660	9.6	
		EPSX-NF33	2670-3800	700	440	400	9.3	80
				1000	630	580	9.6	
10W-15W		EPSW-NF44	5000-10000	700	785	720	12.0	70
				1000	1120	1030	12.5	
				1200	1220	1120	12.8	
		EPSH-NF44	3800-5000	700	700	640	12.0	75
				1000	960	880	12.5	
				1200	1040	960	12.8	
		EPSX-NF44	2670-3800	700	670	620	12.0	80
				1000	920	850	12.5	
				1200	1000	920	12.8	
16W-24W		EPSW-NF55	5000-10000	1000	1330	1220	15.5	70
				1200	1790	1650	16.0	
				1500	1950	1790	16.5	
		EPSH-NF55	3800-5000	1000	1190	1090	15.5	75
				1200	1435	1320	16.0	
				1500	1700	1560	16.5	
		EPSX-NF55	2670-3800	1000	1030	945	15.5	80
				1200	1470	1350	16.0	
				1500	1600	1470	16.5	

Notes:
1. LED is a dynamic, creative and evolving technology, please refer to the datasheet for final specifications.
2. Other colors available upon request.

EdiPower® II-LD Absolute Maximum Ratings

Item	Symbol	EPSx-NF33	EPSx-NF44	EPSx-NF55	Unit
Foward Direct Current[1]	I_F	700-1000	700-1200	1000-1500	mA
Max. Forward Current	$I_{F\,max}$	1200	1800	2000	mA
Peak Pulse Current (tp≤100μs, duty cycle=0.25)	I_{Pulse}	1500	2000	2500	mA
Reverse Voltage	V_R		[2]		V
LED Junction Temperature[3]	T_J		<150		℃
Operating Temperature			-40~+110		℃
Storage Temperature			-40~+120		℃
Thermal Measurement Point[4]	TP		<80		℃
ESD Sensitivity	V_B		2000		V

Notes:
1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
4. TP: Thermal measurement point on board.
5. Suitable drivers are recommended at page 39 to provide the optimized operate condition.

Edipower II HV Series

Power	Picture	Part No.	CCT(K)	I_F (mA)	Flux(lm) T_J=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)	Ra
9W		EPSW-HFB4	5000-10000	180	750	680	37.5	70
				250	970	873	38.7	
		EPSX-HFB4	2670-3800	180	690	630	37.5	80
				250	900	810	38.7	
13W		EPSW-HFB6	5000-10000	250	1020	925	37.3	70
				350	1380	1250	38.5	
		EPSX-HFB6	2670-3800	250	670	880	37.3	80
				350	1250	1100	38.5	

Edipower II HV Absolute Maximum Ratings

Item	Symbol	EPSx-HFB4	EPSx-HFB6	Unit
Foward Direct Current(1)	I_F	180-250	250-350	mA
Max. Forward Current	$I_{F\,max}$	250	350	mA
Peak Pulse Current (tp≤100μs, duty cycle=0.25)	I_{Pulse}	300	400	mA
Reverse Voltage	V_R	(2)		V
LED Junction Temperature(3)	T_J	<125		°C
Operating Temperature		-40~+110		°C
Storage Temperature		-40~+120		°C
Thermal Measurement Point(4)	TP	<75		°C
ESD Sensitivity	V_B	2000		V

Notes:
1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
4. TP: Thermal measurement point on board.
5. Suitable drivers are recommended at page 39 to provide the optimized operate condition.

Edipower™ II ★ STAR Series

Power	Picture	Part No.	CCT(K)	I_F (mA)	Flux(lm) T_J=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)	Ra
4W-6W		EPCX-VF32	2670-3800	700	435	400	9.6	80
6W-10W		EPCX-VE33	2670-3800	1000	610	560	9.8	80
6W		EPCX-HF84	2670-3800	250	575	530	26.5	80

Edipower™ II ★ Absolute Maximum Ratings

Item	Symbol	EPCX-VF32	EPCX-VE33	EPCX-HF84	Unit
Foward Direct Current(1)	I_F	700	1000	250	mA
Max. Forward Current	$I_{F\,max}$	1400	2000	300	mA
Peak Pulse Current (tp≤100μs, duty cycle=0.25)	I_{Pulse}	1500	2000	300	mA
Reverse Voltage	V_R		(注 2)		V
LED Junction Temperature(3)	T_J	<125	<150	<125	°C
Operating Temperature			-40~+110		°C
Storage Temperature			-40~+120		°C
Thermal Measurement Point(4)	TP	<75	<80	<75	°C
ESD Sensitivity	V_B		2000		V
Isolation Voltage			1000		V

Notes:
1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
4. TP: Thermal measurement point on board.
5. Suitable drivers are recommended at page 39 to provide the optimized operate condition.

EdiPower® II Single Color Series

Power	Picture	Part No.	Color	Wavelength (nm)	I_F (mA)	Flux(lm) T_J=25°C	Flux (lm) TP=60°C	V_F(V) (Typ.)
Single Color		EPSR-V155	Red	620-630	1000	345	310	10.6
					1200	420	380	11.0
					1500	515	464	11.4
		EPST-F155	True Green	515-535	1000	825	743	16.5
					1200	955	860	17.1
					1500	1145	1030	17.5
		EPSB-V155	Blue	455-475	1000	240	216	15.5
					1200	300	271	16.0
					1500	350	315	16.5

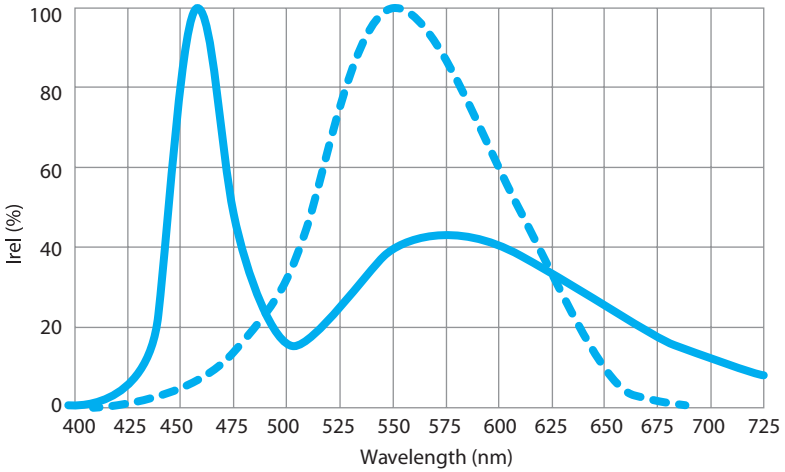
EdiPower® II Absolute Maximum Ratings

Item	Symbol	Parameter	Unit
Foward Direct Current[1]	I_F	1,000~1,500	mA
Reverse Voltage	V_R	[2]	V
LED Junction Temperature[3]	T_J	<150	°C
Operating Temperature		-40~+110	°C
Storage Temperature		-40~+120	°C
Thermal Measurement Point[4]	TP	<80	°C
ESD Sensitivity	V_B	2,000	V
Isolation Voltage		1,000	V

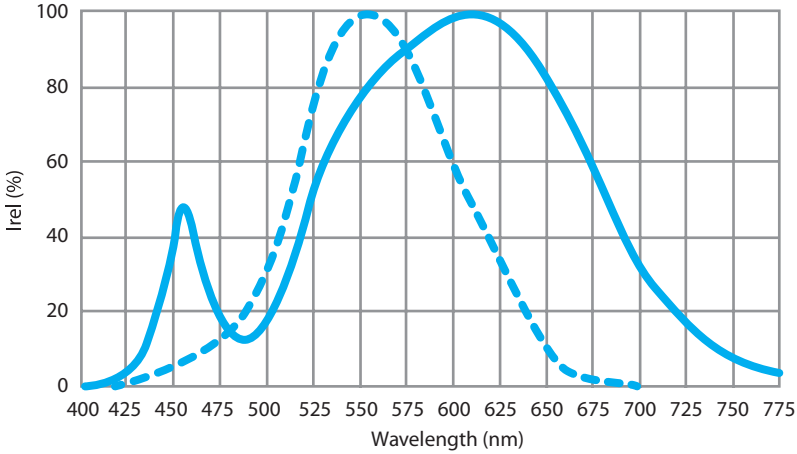
Notes:
1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
4. TP: Thermal measurement point on board.
5. Suitable drivers are recommended at page 39 to provide the optimized operate condition.

V. Color Spectrum and Radiation Pattern

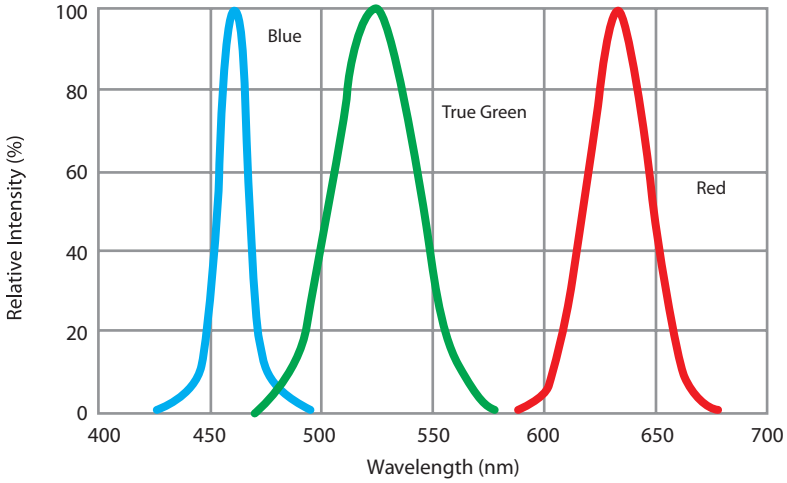
Color Spectrum for EdiPower® II Series cool white



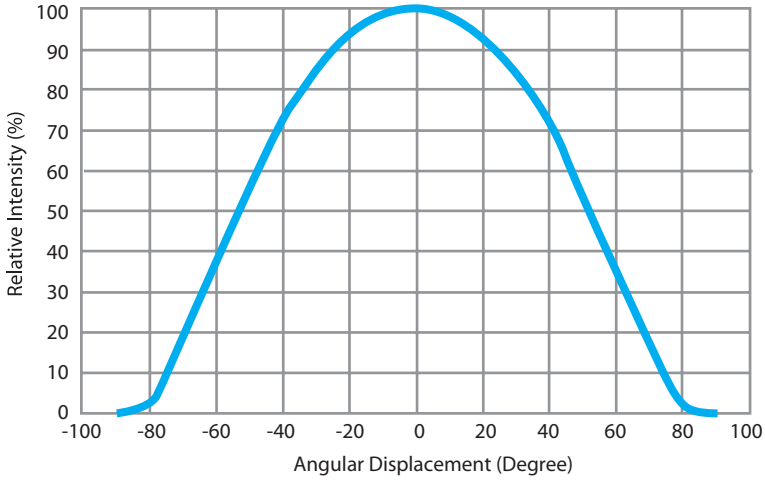
Color Spectrum for EdiPower® II Series warm white



Color Spectrum for EdiPower® II Single color Series



Lambertian Radiation Pattern at T_J=25°C for EdiPower® II series.



Note:
For more optical and eletric performance curves, please refer to the datasheets.

VI. Reliability Items and Failure Measure

The following table describes operating life, mechanical, and environmental tests performed on EdiPower ®II series package at T_J=25°C

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life	25°C, I_F=$I_{F\ max}$ (1)	1000 hours	(2)
Temperature Cycle	-40°C/100°C Dwell: 30 mins Transfer: <5 mins	100 cycles	(2)
High Temperature Storage Life	85°C	1000 hours	(2)
Low Temperature Storage Life	-40°C	1000 hours	(2)
Thermal Shock	-40°C/125°C Dwell: 5 mins Transfer <10 secx	100 cycles	No catastrophic
Natural Drop	On Concrete from 1.2 m, 3X	--	No catastrophic
Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate 20G about 1 min, 1.5mm, 3X/ axies	--	No catastrophic
Solder Heat Resistance (SHR)	360 ±5°C	10 secs	No catastrophic

Notes:
1. Depending on the maximum derating curve.
2. Failure Criteria:
   - Electrical failures: VF shift ≥10%
   - Light Output Degradation: % IV shift ≥ 30% @1,000hrs or 500 cycle
   - Visual failures: Broken or damaged package, Solderability < 95% wetting, dimension out of tolerance

Failure Types

Catastrophic failures are failures that result in the LED emitting no light or very little light at normal current levels (e.g. 700 mA). Catastrophic failures are not expected for EdiPower II emitters that are handled and operated within the limits specified in EdiPower II documentation. Please refer to Absolute Maximum Ratings for more information on design limits.

Parametric failures are failures that cause key characteristics to shift outside of acceptable bounds. The most common parametric failure, for a high-power LED, is permanent light output degradation over operating life. Most other light sources experience catastrophic failure at the end of their useful life, providing a clear indication that the light source must be replaced. For instance, the filament of an incandescent light bulb breaks and

the bulb ceases to create light. In contrast, high-power LEDs generally do not experience catastrophic failure but simply become too dim to be useful in the intended application. Further discussion of this matter can be found in the Long-Term Lumen Maintenance Testing section of this document.

Another parametric failure common to white LEDs is a large and permanent shift in the exact color of white light output, called the white point or color point. A shift in white point may not be detectable in one LED by itself, but would be obvious in a side-by-side comparison of multiple LEDs. Since each lighting installation commonly uses many high-power LEDs, white point stability is a point of concern for lighting designers. Typically, white high-power LEDs, created by combining blue LEDs with yellow (and sometimes red) phosphor, will shift towards blue over operational life. This shift can be accelerated by high temperatures and high drive currents.

VII. Package, Transportation and Conservation

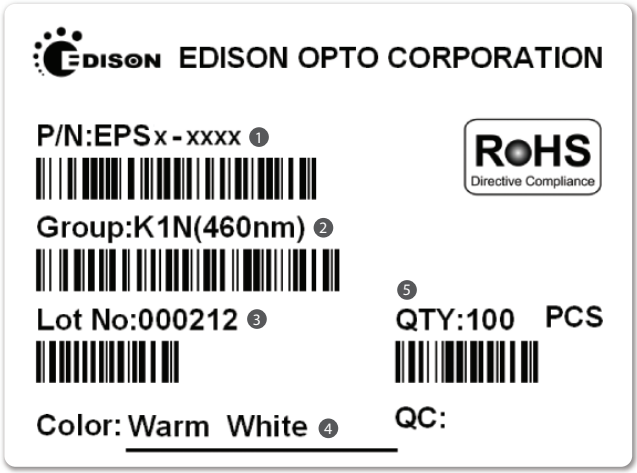
Package and Tags

When receive a package, please check the items as below:

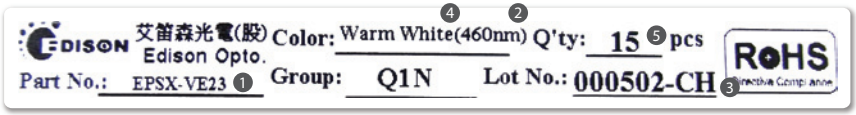
1. Confirm the all the packages are intact. The anti-static bags have no damages or punctures.
2. Confirm the information written on the tag is corresponded to the order.
3. Check the quantity is corresponded to the information on the tag.

If there are any inconsistencies, please contact Edison Opto.

Tag on Cartons

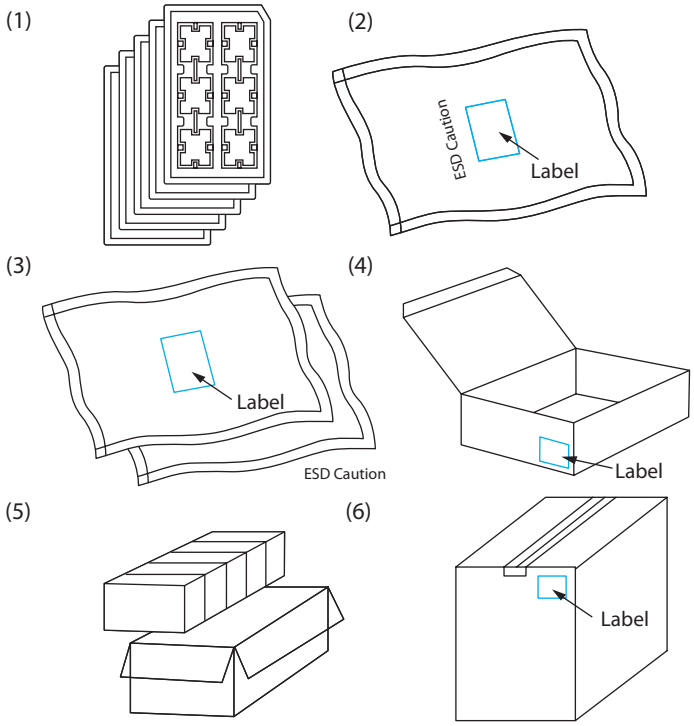


Tag and Trays



Notes:

❶ Part numer
❷ Bin group (blue light wavelength)
❸ Lot. Number
❹ Color
❺ Total quantity



Notes :
1. 5 trays and 1 desiccant in each anti-static bag.
2. 2 anti-static bags in each Box.
3. 5 boxes in each carton.

Open, Conservation and Re-use

- Do not put any extra force on the package to avoid the damage or any broken possibility on the components.
- When opening the anti-static bag, beware of the carelessness of cutting the tray plates.
- When operating EdiPower® II components, please refer the “Handling Guide”. Limit the air expose time for the components.
- Conserve the rest of EdiPower® II components into the tray plate and seal them in the anti-static bag with a desiccant. Do not use a tape or a staple to seal the bag.
- Control the environment temperature at 25±5°C and humidity at 60%RH.
- When operate with a re-open EdiPower® II component, it is strongly recommend to proceed a drying process with a oven at first. Dry condition recommend: 120-150°C for 1 hour. Do not put the tray into the oven.

VIII. Handling with a EdiPower® II Series

Notification on Anti-static

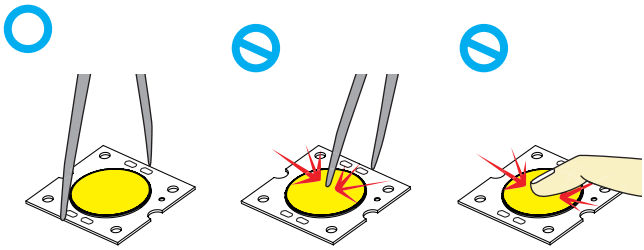
LED device are combine by many accurate parts which belong to static sensitive device. A human body may aware of the discharge voltage about 2-3KV, which is much larger than an electronic device may bear. Therefore, to keep the LED operation environment away from static and lower the exits static become an important issue in a LED manufacture

1. Anti-Static Steps - All the staffs who has the possibility to contact with the LED components should follow the instructions to eliminate the static:
   - Put on the hand or finger gloves before touch a LED device. (Do not use a nylon or rubber Glove)
   - Do not do any actions that may generate the static in the protection area. Such as wipe hands or foot, put on/off the clothes.
   - Avoid any movement that may cause static damages. When remove a component from the package, please be slow and gentle.
   - Do not touch the metal part of a LED component.

2. Environmental anti-static protection
   - Use an anti-static floor and make earth. Materials such as plastic or rubber contain carbon or conductive polyester is recommended.
   - LEDs should be operated on the desk which is laid by the static discharge material.
   - Protection area with a temperature at 22±5°C and a relative humidity at 70±10%RH are recommended.
   - Layout an appropriate earth system. All the equipments should earth isolated into the ground or pillar.
   - All soldering and testing equipments should also provide earth ability.
   - Prevent the accumulation and the fractions between stuffs.

3. Anti-Static steps for package, transportation and storage.
   - Package: All the bags must have the ability of anti-static. Do not use any nylon bag, normal plastic bag or polyester bag for package. Do not open the bag if a LED is not ready to be handling. Open the bag at the protection area and put in a conductive case.
   - Transportation: The cart should install the conductive wheels. Avoid the mechanical vibration and impacts.
   - Storage: Be attention of the temperature and the relative humidity under the suggest condition.

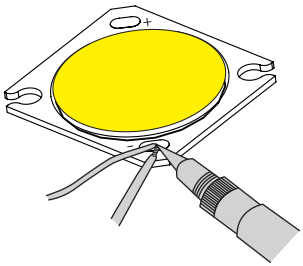
Handling with a EdiPower® II Component



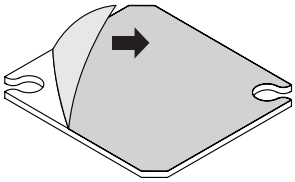
- Proper handling of the EdiPower® II using tweezers or gloved fingers.
- Do not touch the emitting region.
- Use only the IPA and swab to clean the flux/dust of the EdiPower® II surface. Other organic solvent may cause the failure

Notification of Installation.

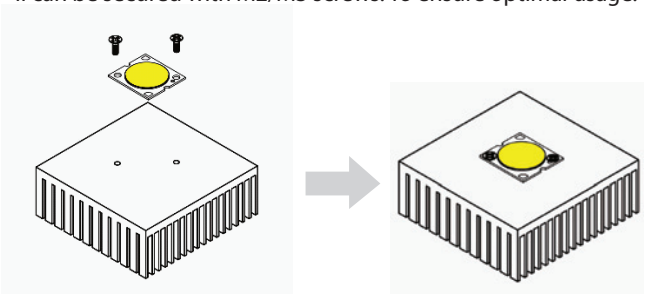
1. Soldering pads are present for direct electrical wiring. Manual soldering at 360±5°C, <5 secs are recommended.(No need with IR reflow process)



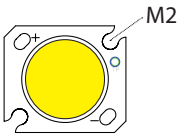
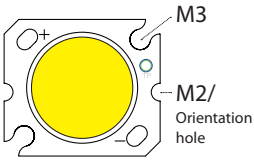
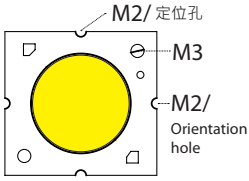
2. Please peel off the protective film

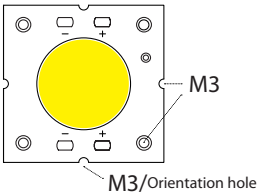
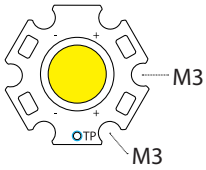


3. EdiPower® II can be secured with M2/M3 screws. To ensure optimal usage.



4. Choose the optimal screws

Shape	Part No.	Screw hole Distances (from center to center)
	EPSx-Vx23 EPSx-Vx32 EPSx-Vx33	M2: 15.48mm
	EPSx-Vx44 EPSx-Vx55 EPSx-HFBx	M2: 25.05mm M3: 25.9mm
	EPSx-Vx77	M2 (Vertical): 35mm M2 (Horizontal): 37mm M3: 37.7mm

Shape	Part No.	Screw hole Distances (from center to center)
	EPSx-Vx88 EPSx-VF0B	M3 (side): 54mm M3 (corner): 57.42mm
	EPCX-xFxx	M3:19mm

Recommendations:

Flat screws or countersunk screws are recommended.

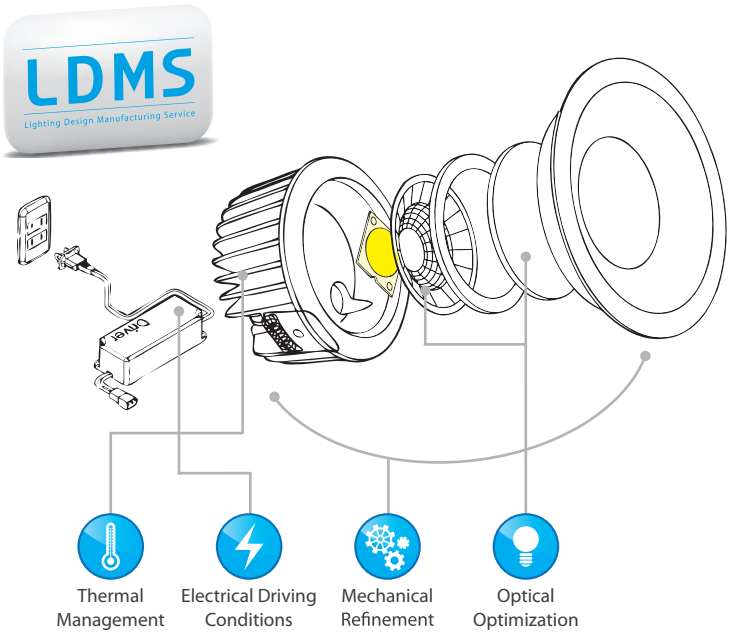
Avoid the screw head touching the pad to prevent from the electric leakage.

5. Screw Torque Specification

Size	Tightening Torque (N·m)
M2	0.25~1
M3	1~1.25

IX. Lighting Design Manufacture Service (LDMS)

The LDMS is a unique idea which we provide our service program to meet our customers' needs. LDMS integrates the four essential technologies in LED Lighting applications, including thermal management, electrical driving condition, mechanical refinement and optical optimization. From level 1(Emitter) to level 6 (Solution), we provide our customers the best service and satisfactions.



Edison Opto R&D team has developed a complete TEMO auxiliary system for EdiPower® II series products. You may easily find your needs from the following sections.

Our team is dedicated to working with you and offering our pre/after sales support. For more information, please contact LED.Detective@edison-opto.com.tw

X. Applications

EdiPower® II Series products are able to apply in various lighting fixtures and places. Through the professional TEMO team support by Edison Opto, we provide you all the EdiPower®II series product solutions for your requirements at different stage of light business.

Module Applications

EDIS C Module

MR16 Module

Solid-State Lighting Applications

4"/ 6" /8" Downlights

9W A19 Bulb

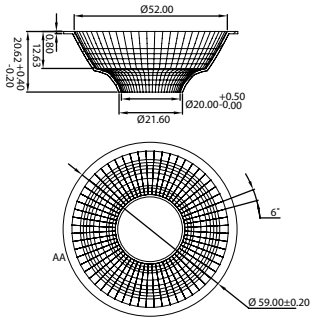
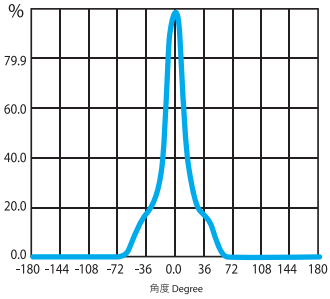
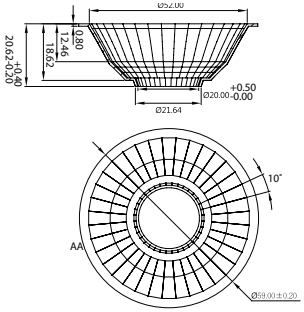
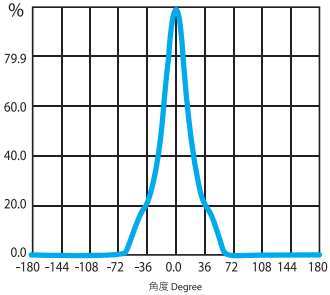
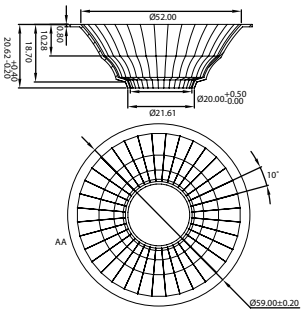
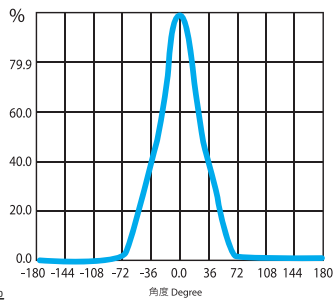
High/ Low Bay

Environmental Applications

XI. Optical Support

Edison Opto provides a series of reflectors which are suitable for EdiPower® II series products. We also offer the professional optical design service to customize your special light patterns needs.

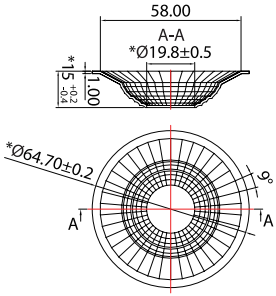
EPSx-Vx44, EPSx-Vx55, EPSx-x155, EPSx-HFBx.

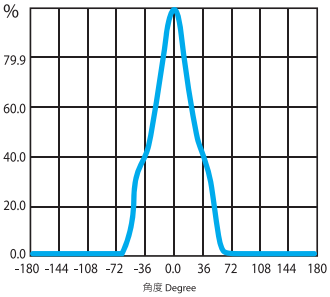
Picture	Dimension	Light Pattern
25° Beam angle(2θ1/2)  EPOR-BE25-052020 PCB Size 23x25mm		
35° Beam angle(2θ1/2)  EPOR-BE35-052020 PCB Size 23x25mm		
50° Beam angle(2θ1/2)  EPOR-BE50-052020 PCB Size 23x25mm		

60°
Beam angle(2θ1/2)

4inch DownLight Reflector 60 deg

PCB Size
23x25mm

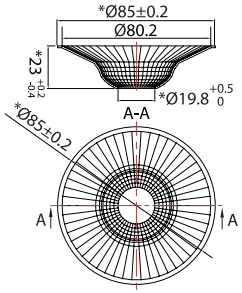


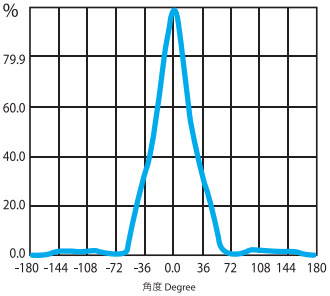


60°
Beam angle(2θ1/2)

6inch DownLight Reflector 60 deg

PCB Size
23x25mm

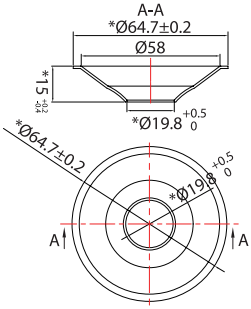


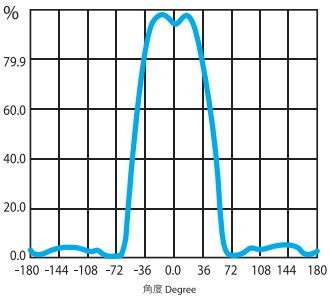


100°
Beam angle(2θ1/2)

4inch DownLight Reflector 100 deg

PCB Size
23x25mm

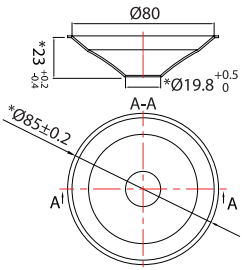


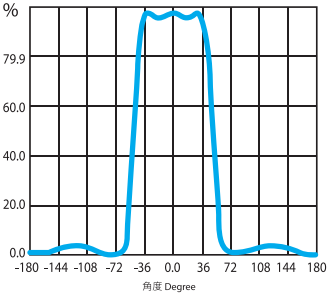


100°
Beam angle(2θ1/2)

6inch DownLight Reflector 100 deg

PCB Size
23x25mm



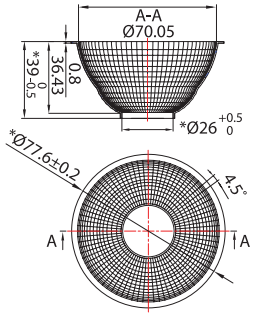


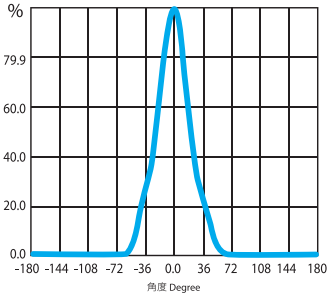
EPSx-Vx66, EPSx-Vx77.

40°
Beam angle(2θ1/2)

EPOR-CF40-070039

PCB Size
35x37mm

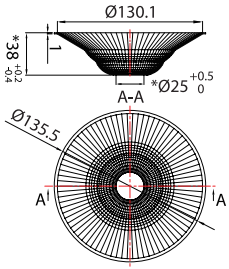


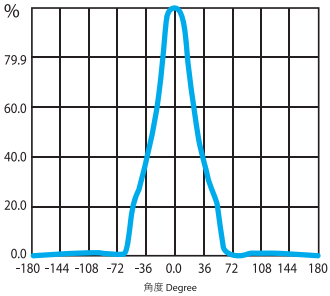


60°
Beam angle(2θ1/2)

8inch DownLight Reflector 60 deg

PCB Size
35x37mm

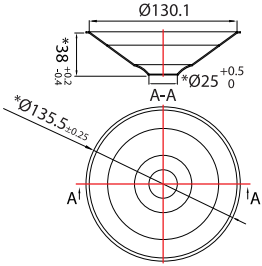


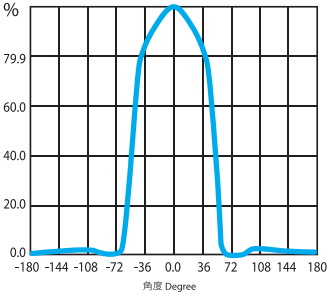


100°
Beam angle(2θ1/2)

8inch DownLight Reflector 100 deg

PCB Size
35x37mm





Notes:

1. The luminous flux performance is guaranteed within published operating conditions. Edison maintains a tolerance of ±10% on flux measurements.
2. Wavelengths are stated as peak wavelength.
3. Edison maintains a tolerance of ±0.5nm for dominant wavelength, ±2nm for peak wavelength and ±5% on CCT measurement.

XII. Thermal Management

About 80% of input power of a LED transform into heat. A high temperature operation condition always easily causes the LEDs to decrease of flux and the life decay of LED dies. The highest operation temperature of a component is able to be found in its datasheet which is indicated as T_J.

The power dissipation ability, the ambient temperature between the LED junction, environment, thermal path and its thermal resistance are the mean parameters which affect the performance of a LED device. Therefore, the limitation of the junction temperature has become an important issue when designing a LED product.

For LEDs, choose an appropriate operation environment and conduct the heat to the air after light on LEDs may maintain the better performance and lifetime. Four major thermal path are as follow:

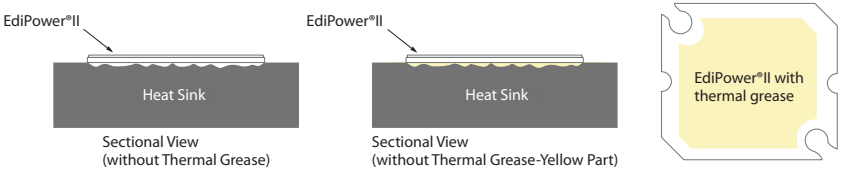
(1) From heat source (component) to heat sink. (By conduction)

(2) Conduction from within the heat sink to its surface. (By conduction)

(3) Transfer from the surface to the surrounding air. (By convection)

(4) Emit heat from the heat sink surface. (By Radiation)

Path(1): The contact surface of the component and heat sink are not perfectly flat, they are not able to meet each other completely. Air between these two materials will result high thermal resistance and reduce the effect of heat transfer. To enhance the ability of thermal conduction, one common method is applying thermal grease between the two interfaces and use the screws to enforce the adhesion between two surface.



Recommended thermal Grease Parameters

Characteristics	Value	Unit
Thermal Conductivity (K)	>3.0	W/m · K
Thickness	≤0.1	mm

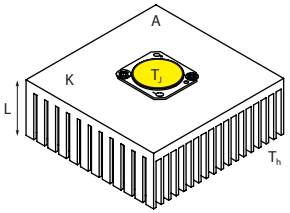
Path(2): Temperature gradient depends on time of a heat sink. The total heat flux(Q) is consist:

(1) The temperature difference from the heat source(T_J) and heat sink(T_h)

(2) Conductivity of the heat sink (K).

(3) Total surface area of the heat sink (A)

(4) The linear path distance of the heat transfer (L).



This is represented by the Fourier's Law as follow

$$Q = K \times A \times \frac{(T_J - T_h)}{L}$$

When design LEDs, there is always a limitation of the junction temperature. By choose higher thermal conductivity, increase the surface area of the heat sink (add the number of fins) or shorten the distance of the linear path of heat, may improve the heat flux per unit time. Among all materials, metals have the best choice between its high thermal conductivity and the price.

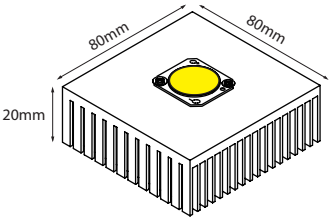
List of thermal conductivity for some usual materials

Material Code	K(W/m · K)
Copper	391
C1100	384
Aluminum	230
Aluminum 5000 series	225
ADC-12	96.2
Magnesium	156
Air	0.024

Sample Heat sink Design

The following table describes recommended heat sink design guideline. The result may vary under different designs.

Wattage	Total Surface Area (cm^2)	Fin Design	
		Thickness	Pitch
6W	150~250		
15W	900~1000		
24W	2000~2200	>3mm	>6mm
50W	7000~7300		
120W	15200~15800		



10W Heat Sink Sample

Path (3) Heat Dissipation includes Convection and Radiation. Those two transfer type are proportional to the surface area of the heat sink. By add the number of fin may increase the total surface area. In a restricted volume, the number of fin cannot be added with any limitation. Too much fins may cause inhabitation of convection. There are many other novels thermal management methods such as by install a fan to reach obliged convection. However, this design involves the issue such as noise or circuit design. It will not be overtalk in this document.

Path (4): Compare with an unfinished heat sink, the one that covered by high emissivity material, such as ceramic powder or deep color paint, usually has better radiation ability. Both anodizing and etching are also effective to increase the thermal dissipation.

Key Points for thermal management:

- The contact surface flatness and smoothness of the component and heat sink.
- The total surface area of heat sink.
- The choice of heat sink material.
- Optimization of the number of fins. (Aerodynamic optimization)

XIII. Drivers

EdiPower® II series products are designed to be driven by common operation condition which customers are able to acquire the drivers by different specifications from a driver vendor easily. Edison Opto also provides a complete driver solution for our client to collocate their demand.

EdiPower® II Series: EPSx-xx23/ EPxx-xx33/EPxx-VF32

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	effic-iency	IP	°C(min./max.)	L×W×H(mm)
BPHE005C701	100~240	3-7	700	4.9	70%	67	-20 /+60	66.5×35×23.5
LA1012-12-C1000	90~264	3-12	1000	12	75%	66	-40 /+50	85×35×24
EGL700mA/17W	220~240	2-27	700	17	-	-	-20/+45	113x44x28
EGL1050mA/17W	220~240	2-16	1050	17	-	-	-20/+40	113x44x28

EdiPower® II Series: EPSx-Vx44/EPSx-NF44

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	effic-iency	IP	°C(min./max.)	L×W×H(mm)
LPC-20-700	90~264	9-30	700	21	83%	67	-30 /+70	118×35×26
LP1017	90~264	12-24	700	17	82%	66	-30 /+50	200×25×22
LP1025	90~264	12-24	1040	25	82%	66	-30 /+50	80×78×26
LPC-30-1050	90~264	9-30	1050	31.5	85%	67	-30 /+75	148×40×30
LP1020	90~264	9-17	1250	21	82%	66	-30 /+50	95×40×25
PLN-30-15	90~295	10.5-15	0-2000	30	83.5%	64	-30 /+50	145×47×30

EdiPower® II Series: EPSx-Vx55/EPSx-NF55/EPSx-x155

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	effic-iency	IP	°C(min./max.)	L×W×H(mm)
LP1025	90~264	12-24	1040	25	82%	66	-30 /+50	80×78×26
LPC-30-1050	90~264	9-30	1050	31.5	85%	67	-30 /+75	148×40×30
LP1020	90~264	9-17	1250	21	82%	66	-30 /+50	95×40×25
PLN-30-20	90~295	14-20	0-1500	30	84%	64	-30 /+50	145×47×30
LP1060	90~264	13-24	1300-2500	60	82%	66	-30 /+50	95×40×25

EdiPower® II Series: EPSx-Vx77

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	effic-iency	IP	°C(min./max.)	L×W×H(mm)
LP1060	90~264	13-24	1300-2500	60	82%	66	-30 /+50	95×40×25
CLG-60-24	90~295	16.8-24	0-2500	60	89%	67	-30 /+70	195.6×61.5×38.8
PLN-60-24	90~295	16.8-24	0-2500	60	87%	64	-30 /+50	181×61.5×35

EdiPower® II Series: EPSx-HFB4/ EPCX-HF84

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	effic-iency	IP	°C(min./max.)	L×W×H(mm)
LA1012-48-C0250	90~264	12~48	250	12	75	66	-40 /+50	85×35×24

EdiPower® II Series: EPSx-HFB6

Part No.	AC V_{input}	DC V_{output}	I_{output} (mA)	W_{max}	效率	IP	°C(min./max.)	L×W×H(mm)
LPC-20-350	90~264	9~48	350	16.8	83	67	-30/+70	118×35×26

Note:

EdiPower® II series products are not designed for hot plug in.

XIV. EdiPower Module Series

A. EDIS C Module

EDIS C Light Module uses EdiPower II 15W~24W high brightness LEDs. With specially designed holder and lens, each EDIS C Module can be assembled into a heat sink and a lighting fixture, suitable in application such downlights, truck lights, spot lights ….etc.

Features:

- Thin holder and lens design
- high power operation.
- Light weight and easy assembly process.
- Design-in for quick expansion.

Nomenclature

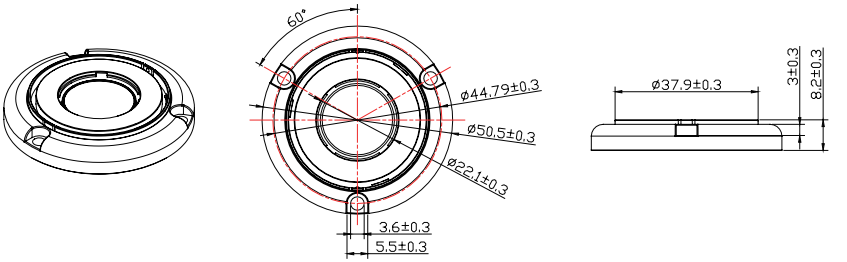
The following table describes the available colors, beam angles, and lens types. For more information on luminous flux and forward voltage, please refer to the Multi-chip Bin Group document.

C	L	X	-	C	0 0
X1	X2	X3		X4	X5

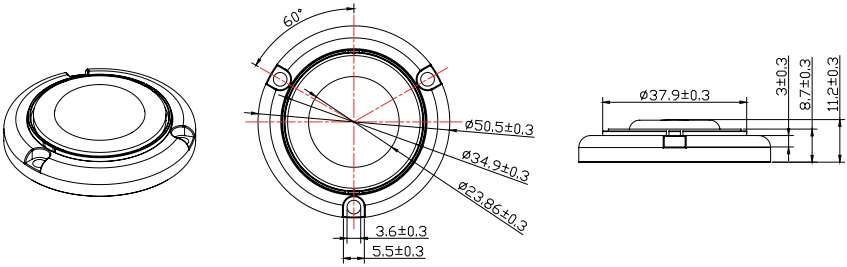
X1 Module		X2 Optical Type		X3 Emitting Color		X4 Emitting Type 1		X5 Beam Angle	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
C	Circle	R	Reflector	W	Warm White	A	VF44	No Optics	NO
		L	Lens	H	Neutral White	B	VF55	00	100°
		M	No Optics	X	Cool White	C	VE44	45	45°
						D	VE55		

Dimensions

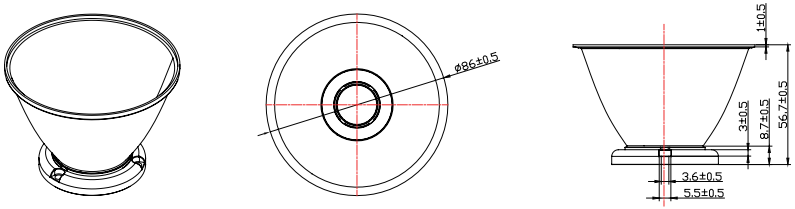
CMx-xxx



CLx-xxx



CRx-xxx



Notes:

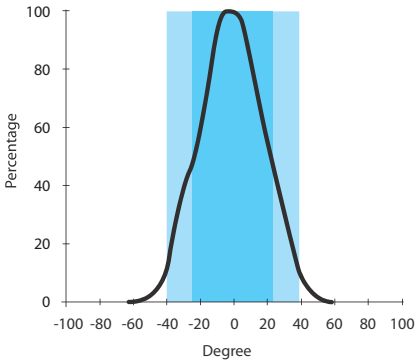
1. Units: mm
2. Tolerance: ±0.2mm
3. Drawings are not to scale.

Specification

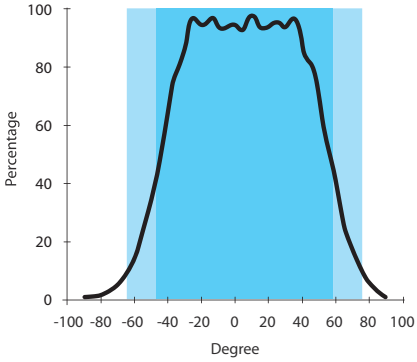
Item	Part No.	CCT (K)	V_F(V) (Typ.)	Test Current (mA)	Flux (lm) T_j=25°C	Flux (lm) TP=60C	Ra
15W	CMW-Axx	5000-7000	12.8	1200	1400	1260	70
	CMH-Axx	3800-4500			1190	1050	75
	CMX-Cxx	2670-3200			980	880	80
24W	CMW-Bxx	5000-7000	16.5	1500	2050	1845	70
	CMH-Bxx	3800-4500			1750	1575	75
	CMX-Dxx	2670-3200			1450	1300	80

Optical Characteristic

Reflector View Angle
Beam Angle 45˚
Field Angle 80˚



Lens View Angle
Beam Angle 100˚
Field Angle 140˚



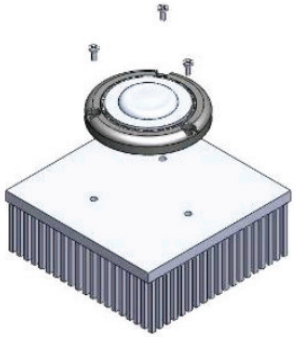
Thermal Management and its Assembling

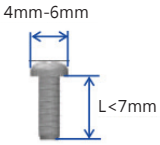
1. For heat sink design instruction, please refer to chapter XII.

2. Assembling:

Thermal grease is required to fill in between the streetlight module and the heat sink. The suggested thermal grease conductivity should be greater than 3W/m · K.

Recommend use the M3 screw.



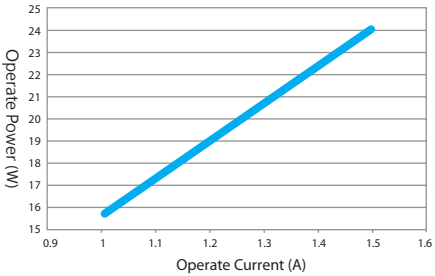


Driver Recommendations

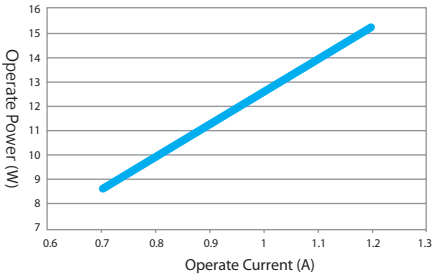
Model	Power	Specification
CMx-Axx CMx-Cxx	8~15W	DC Output Voltage: 10~16V Output Current: 0.7~1.2A
CMx-Bxx CMx-Dxx	16~24W	DC Output Voltage: 14~20V Output Current: 1~1.5A

Reference typical operate power

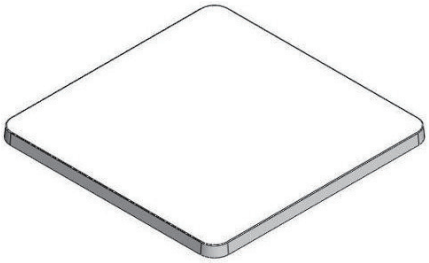
CMx-Axx /CMx-Cxx

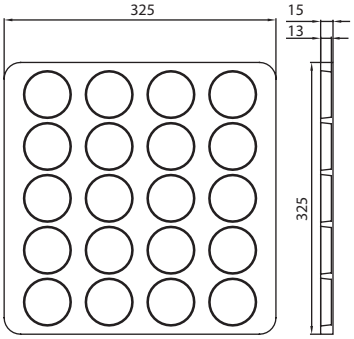


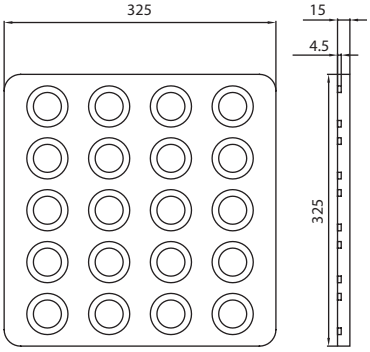
CMx-Bxx / CMx-Dxx



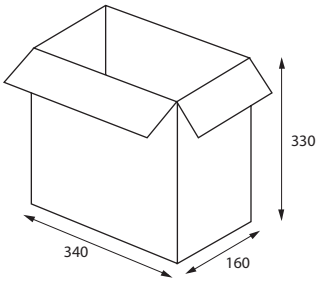
Packaging Information



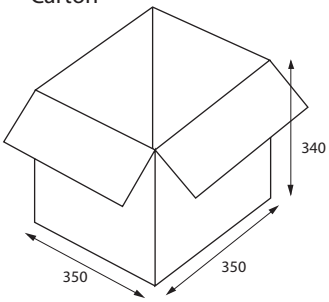




Box



Carton



Notes :
1. Unit: mm
2. 20 pieces of EDIS C Modules are included in 1 Tray.
3. 10 trays in each Box.
4. 2 boxes in each carton.

B. MR 16 Module

MR16 Module uses EdiPower® II to ensure best quality. Through the professional assistance of Edison R&D team, your products will be able to reach the best optical and thermal performance.

There are different viewing angles available in MR16 module in order to satisfy different illumination needs, you could even build your own electronic circuits inside and easily make this module fully assembled by yourself.

Features:

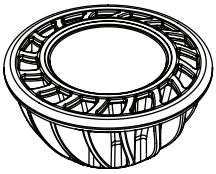
- Optimized optical and thermal design.
- Customized electronic circuit available.
- Easy-assembly.

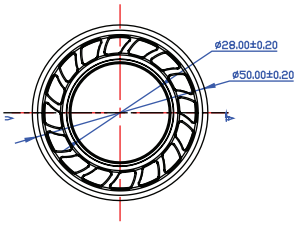
Nomenclature

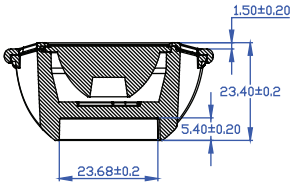
P M	V	X	-	2 5	A
X1	X2	X3		X4	X5

X1 Module Type		X2 Heat Sink Type		X3 Emitting Color		X4 Beam Angle		X5 Serial Number	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
PM	EdiPower® II Module	V	MR16	W	Cool White	25	25°±5°	--	Serial Number
				X	Warm White	38	38°±5°		

Dimensions







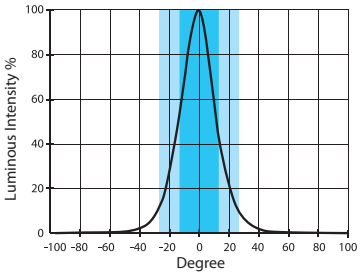
Notes:
1. Units: mm
2. Tolerance: ±0.2mm
3. Drawings are not to scale.

Specification

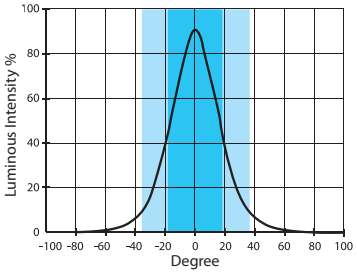
Item	Part No.	CCT (K)	V_F(V) (Typ.)	Test Current (mA)	Flux (lm) T_J=25°C	Ra
6W	PMVW-25A	5000-7000	9.3	700	425	65
	PMVX-25A	2670-3200			325	80
	PMVW-38A	5000-7000			425	65
	PMVX-38A	2670-3200			325	80

Optical Characteristic

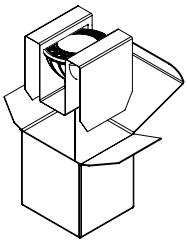
Lens View Angle
Beam Angle 27°
Field Angle 55°



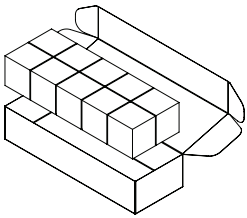
Lens View Angle
Beam Angle 36°
Field Angle 73°



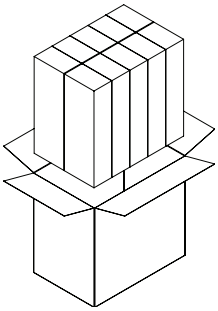
Packaging Information



1 pc/ Pack
Pack: 60x55x65mm



10 Packs/ Box
Box: 330x120x70mm



10 Boxes/ Carton
Carton: 368x248x350mm

XV. Common Problems and Analysis

Problem: The component does no t light on completely when turn on.

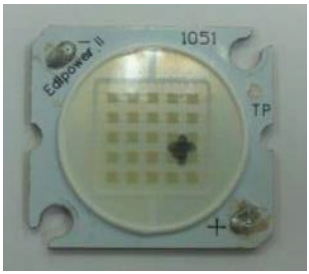
Description: When turn on, only 4 pieces of 25 LED dies has normal operation.

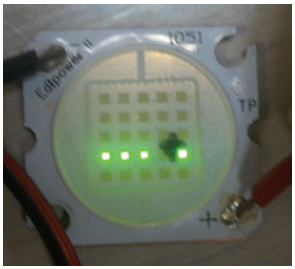
Failure analysis:

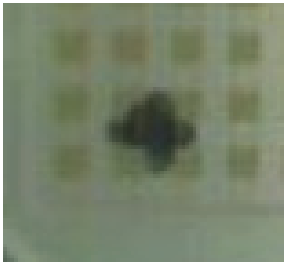
EdiPower® II series products are high power LED components. Any unstable operation current to increase the partial thermal resistance may cause the raise of temperature. Or, gaps between EdiPower® II and heat sink introduce the accumulation of heat on the component, is also a mean reason why LED dies surfer from too much heat and become failure.

Improvement Strategy recommended

1. Avoid any gap between component and heat sink when installed with thermal grease or thermal pad.
2. Use thermal couple when proceed a temperature examination. Thermal couple has less difference between the real temperature than a IR thermal detector. Misevaluation may accelerate the damage of LED dies.
3. Use a surge test apparatus and design a stable input current to avoid the over maximum pulse current.







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