产品规格书
Specification

客户名称/Client Name：	
客户品号/Client P/N：	
产品型号/Product P/N：	**LKL-D14BL5023R01**
送样日期/Sending Date：	

客户审核/Client Approval		同一方审核/LKL Approval		
核准/Approval	审查/Audit	核准/Approval	审查/Audit	制作/Confirm
			鲁立松	林观宏
□ 接受/Qualified □ 不接受/Disqualified		日期/Date:		

Note：This specification shall come into effect upon signatures by both parties.

1. Product Introduction

LKL Opto. has introduced a variety of AC modules which are designed to be driven AC Line voltage. Compared with the traditional LED, LKL Opto. 's AC modules don't need to connect external AC Switch Power or driver. So that it can help to reduce the cost of circuit and the size of luminaries. And users have more flexibility when designing the luminaries. In addition to it make the luminaries manufacturing and assembling work more efficiency and simple.

The AC Switch Power or driver found in most general lighting luminaries can limit the overall life of the products. But with LKL Opto. 's AC modules the life of the general lighting luminaries more closely be estimated from the LED itself. And the module have a high power factor which can contribute to a higher energy savings in the end applications.

LKL Opto. will be a good partner or the best choice when designing your new creative luminaries with their high qualities AC modules which be designed and made carefully ,tested strictly .

1.1 Product Features

- Connects Directly to AC Line Voltage
- High Power Efficiency & Factor
- Long Life Time
- Simple BOM
- Rosh Compliant
- Line Voltage Regulation
- Easy assembly
- Lead Free Product

1.2 Product Applications

2. Electrical & Optical Characteristics(Ta=25℃) Table 2-1

ITEM	SYMBOL	UNIT	TYPICAL Value
Input Voltage	Vin	V	230
Input Current	IF	mA	228.5
Operating Frequency	F	Hz	50/60
Input Power	P	W	52.36
Power Factor	PF	%	0.996
Total Harmonic Distortion	THD	%	8.6
Dimming Type	■NA □ TRIAC □ PWM □ 0-10V □ DALI □ DMX □ Smart □ Other		
Surge Capacity *	Vs	KV	2KV
Electric Strength(AC)	Ve	KV	1.5
Operating/Case Temperature	Ta/Tc	℃	25/85
LED Parameters	3030		
Luminous Flux	Φv	Lm	6556.5
Luminous Efficiency	ηv	Lm/w	125.2
Color Temperature	CCT	K	6351
Color Rendering Index	Ra/CRI	%	73.0/62.2
Light Distribution	-	-	
Viewing Angle	2θ 1/2	Deg.	-

Note:

1) Operating Voltage doesn't indicate the maximum voltage which customers use but means tolerable voltage according to each country's voltage variation rate. It is recommended that the solder pad temperature should be below 85℃.
2) Color bins are defined at transient operation.
3) The tolerance of measurement at our tester is Φv+/-10% and Ra+/-2.
4) Tolerance of ±5% on Power dissipation.
5) Φv is the total luminous flux output measured with an integrated sphere.
6) Surge Capacity in accordance with IEC61000-4-5.
7) The Variants Modules Parameters please reference table2-2.
8)Add 10kv spd

Table2-2 Variants Modules

Model Number	CCT	CRI	VAC	POWER	LIUMEN	Lm/W

2.1 Other Parameters(Ta=25℃) Table 2-3

ITEM	Description
PCB Material	**Aluminum Substrate**
PCB dimensions	239mm×47mm×1.6mm
Certification	■ NA □ CCC □ CE □ UL □ FCC □ENERGY STAR □ Other
MBTF/Life Time @ Tc=85℃	**>20000** Hours

2.2 Absolute Maximum Ratings(Ta=25℃) Table 2-4

ITEM	SYMBOL	UNIT	Value
Power Dissipation	Pd	W	52.5
AC Current(RMS)	IF	mA	240
AC Voltage(RMS)	Vin	V	200~240
LED Junction Temperature	Tj-LED	℃	110
IC Junction Temperature	Tj-IC	℃	150
Top of the IC temperature IC	Tp	℃	100
LED Thermal Resistance （Junction / Soldering point）	Rthj-s	℃/W	20
IC Thermal Resistance （Junction / Soldering point）	Rthj-s	℃/W	40
Operating Temperature	To	℃	-20~+85
Storage Temperature	Ts	℃	-40~+100
ESD Sensitivity(HBM)	Vesd	KV	±2
Soldering Temperature(Reflow)	Tsld	℃	-
Soldering Temperature(Hand)	Tsld	℃	350 3S

3. Optical properties

3.1 Chromaticity Bins

LKL complies with the ANSI C78.377A standard for its chromaticity bin structure. For each ANSI quadrangle for the CCT range of 2700K to 6500K, LKL provides 5 Bins and 3 Bins.

Figure 3-1 Chromaticity Bin

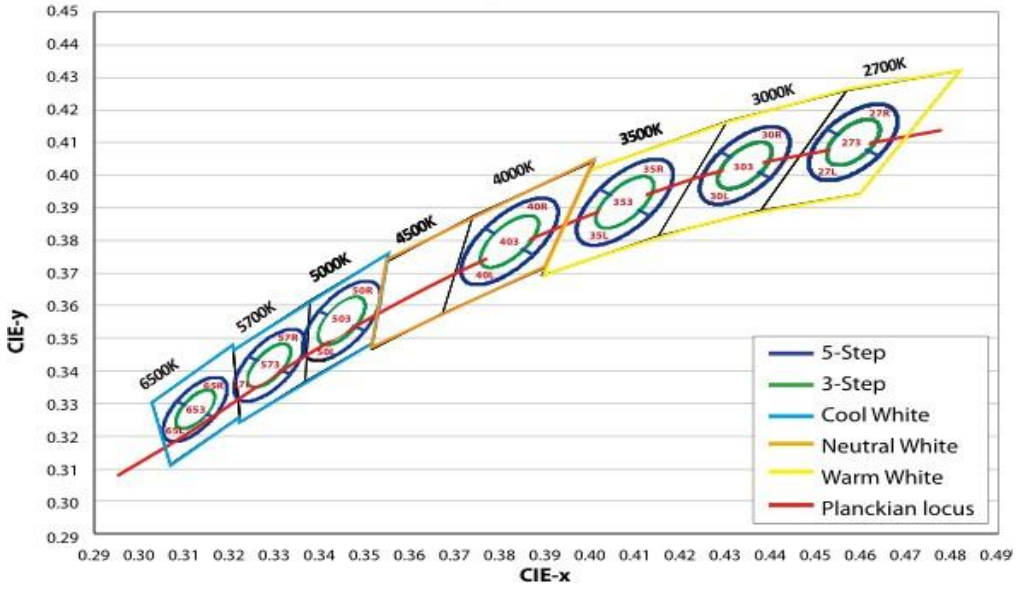


Table 3-1 5 step Bins

CCT	Steps	Cx	Cy	a	b	theta
2700K	5	0.4578	0.4101	0.01350	0.00700	53.70
3000K	5	0.4338	0.403	0.01390	0.00680	53.22
3500K	5	0.4073	0.3917	0.01545	0.00690	54.00
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
6000K	5	0.3123	0.3282	0.01115	0.00475	58.57

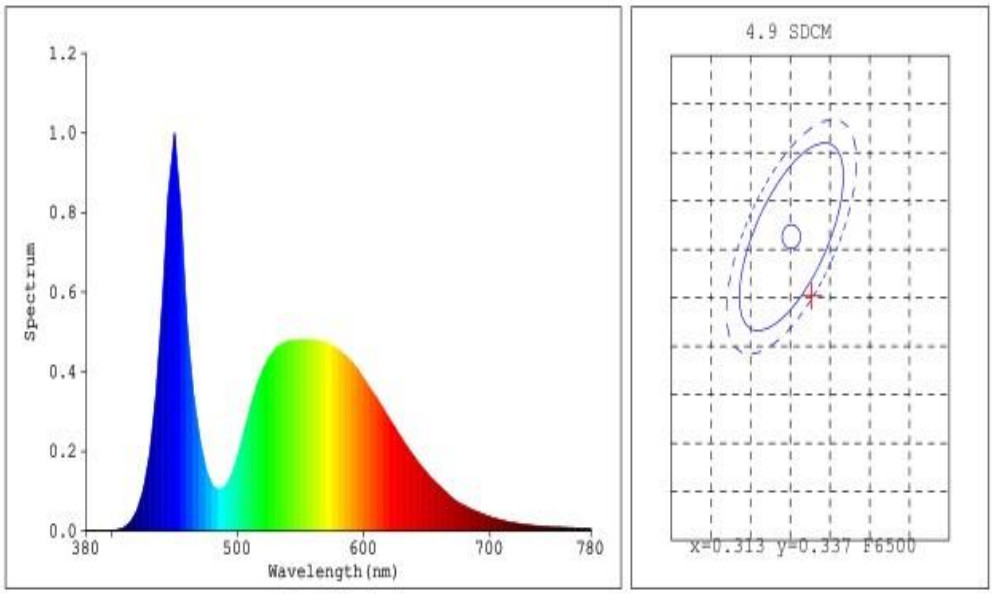
Table 3-2 3 step Bins

CCT	Steps	Cx	Cy	a	b	theta
2700K	3	0.4578	0.4101	0.00810	0.00420	53.70
3000K	3	0.4338	0.403	0.00834	0.00408	53.22
3500K	3	0.4073	0.3917	0.00927	0.00414	54.00
4000K	3	0.3818	0.3797	0.00939	0.00402	53.72
5000K	3	0.3447	0.3553	0.00822	0.00354	59.62
5700K	3	0.3287	0.3417	0.00746	0.00320	59.09
6000K	3	0.3123	0.3282	0.00669	0.00285	58.57

3.2 Integrating sphere testing Reports

Figure 3-2 Integrating Sphere Testing Reports

Light Source Test Report



Color Parameters:

Chromaticity Coordinate:x=0.3152 y=0.3321

Chromaticity Coordinate:u'=0.1984 v'=0.4703(duv=3.54e-03)

Tc=6351K Dominant WL:Ld=490.8nm Purity=6.2% Centroid WL:542.0nm

Ratio:R=13.5% G=82.9% B=3.7% Peak WL:Lp=450.0nm HWL:21.9nm

Render Index:Ra=73.0 CRI=62.2

R1 =71	R2 =76	R3 =79	R4 =74	R5 =72	R6 =68	R7 =82	
R8 =61	R9 =-28	R10=43	R11=72	R12=41	R13=71	R14=88	R15=66

Photo Parameters:

Flux: 6556.5 lm Fe: 20.173 W Efficacy:125.2 lm/W

Electrical Parameters:

Luminaire: U=229.9V I=0.2285A P=52.36W PF=0.9966

Instrument Status:

Scan Range:380.0nm-780.0nm Interval:5.0nm[0] Ip=37002(G=3,D=52)

REF=10122(R=2) %=0.968% PMT: 24.9 centigrade [150.0]

3.3 Typical Electrical & Optical Curves

Figure 3-3 Relative Power vs. Voltage, T_a =25℃

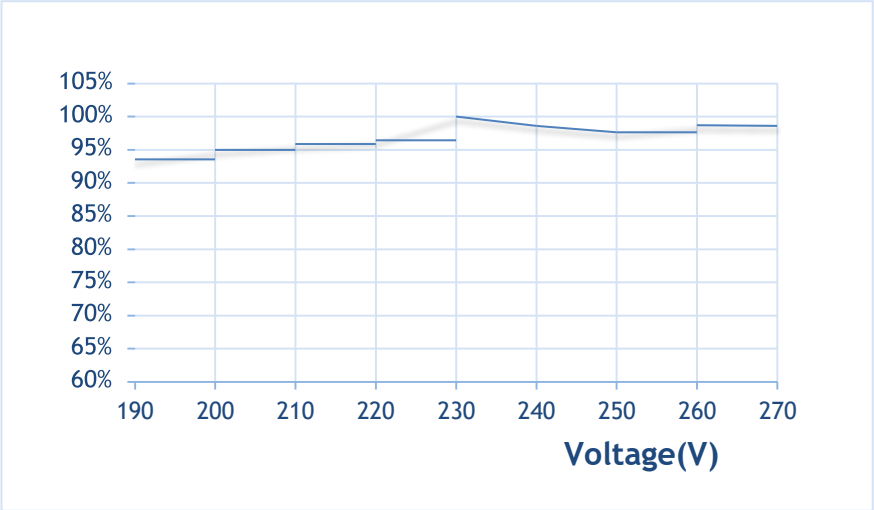


Figure 3-4 Relative Luminous Flux vs. Voltage, T_a =25℃

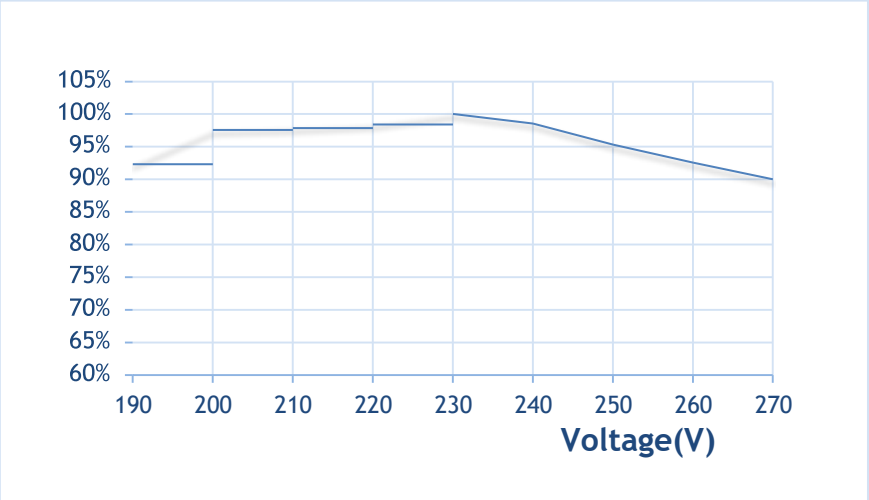
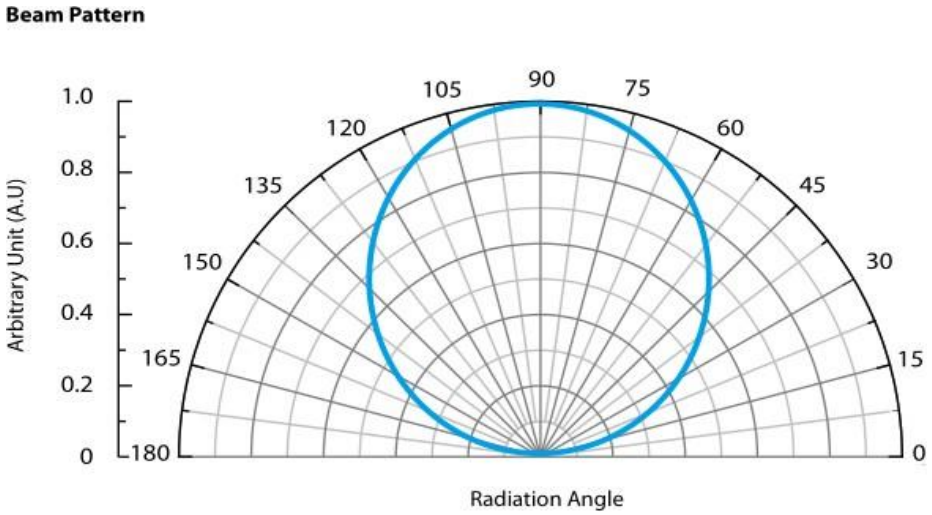
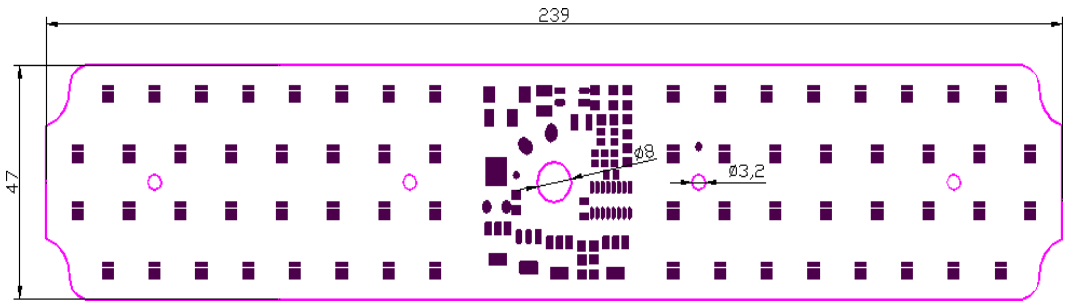


Figure 3-6 Radiant Pattern, T_a =25℃



4. Mechanical Dimensions

Figure 4-1 Dimensions



Notes:

1) All dimensions are in millimeters.(Tolerance:±0.2mm）
2)Scale: None

5. Part Number Identification

<table>
<tr><th colspan="14">DOB 模组编码</th></tr>
<tr><th>X1</th><th>X2-X5</th><th>X6</th><th>X7-X8</th><th>X9-X10</th><th colspan="2">X11-X12</th><th>X13X14</th><th>X15X16</th><th>X17</th><th>X18</th><th>X19</th><th colspan="2">X20 X21X22</th></tr>
<tr><td>①</td><td>②</td><td>③</td><td>④</td><td>⑤</td><td colspan="2">⑥ ⑦</td><td>⑧</td><td>⑨</td><td>⑩</td><td>⑪</td><td>⑫</td><td colspan="2">⑬</td></tr>
<tr><td rowspan="2">Product Code</td><td>Client Code</td><td rowspan="2">IC Code</td><td rowspan="2">Power Code</td><td rowspan="2">Voltage Code</td><td colspan="2">Serial Num.</td><td rowspan="2">LED Code</td><td rowspan="2">CCT Code</td><td rowspan="2">SDCM</td><td rowspan="2">CRI Code</td><td rowspan="2">Luminance</td><td>Year</td><td>Month</td><td>Serial Num.</td></tr>
<tr><td>Module Code</td><td>Case Code</td><td>Serial Num.</td><td colspan="3">Serial Num.</td></tr>
</table>

1) product code: C=Client Module D=Self Module
2) Client Code & Module Code: if ①=C then 4 digit for client code else for self module code
3)IC Code: one character for IC

Power Code										
01—99W	100W	120W	150W	200W	250W	300W	350W	400W	450W	500W
01-99	A0	B0	C0	D0	E0	F0	G0	H0	J0	K0

4)Power Code：

5)Voltage Code:11=110V,12=120V,22=220V,23=230V

6)CCT Code

CCT Code（K）												
1800 - 2000	2000 - 2200	2200 - 2400	2500 - 2700	2700 - 2900	3000 - 3200	3200 - 3400	3500 - 3700	4000 - 4300	4500 - 4800	5000 - 5500	5800 - 6300	6000 - 6500	6500 - 7000
18	20	22	25	27	30	32	35	40	45	50	58	60	65

6. Packaging

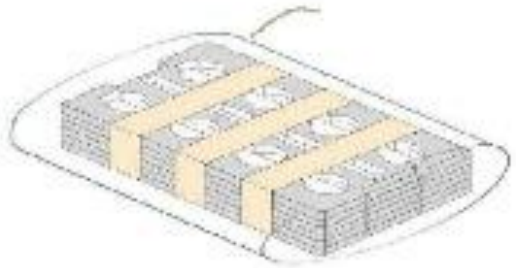
LKL Opto. LED modules products, packed in plastic Tray, according to different size, XX PCs each plastic Tray, as shown in the following. products without plastic box packed in bubble bags, in order to prevent the outside pressure, choose different bubble bag, according to the product size in each pack of XX products, packaged product will be stored in the form of carton and sealed, as shown in the following.

1) xx PCS LED module per Tray

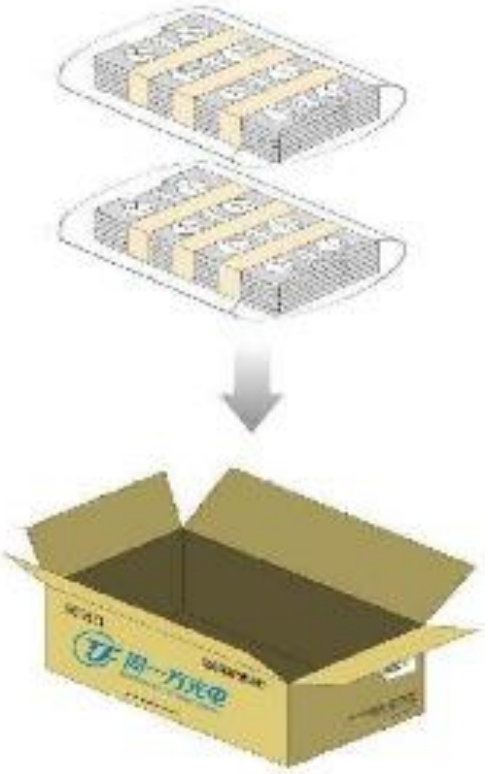
2)Tray stack and taping, XX LED module trays and additional 1 dummy trays each up of box. Add silica gel (1 each) on top of the tray

3) Sealing packing

Dielectric sealing pack (x00mm x x00mm)



4) Box information & packing



XXX PCS modules per BOX

7. Precaution For Use

7.1 Thermal Management

Table 7-1 LED and IC Thermal Parameters Example

PART	Maximum Junction Temperature [℃]	Rθj-s [℃/W]
LED	115	**15**
IC	130	**20**

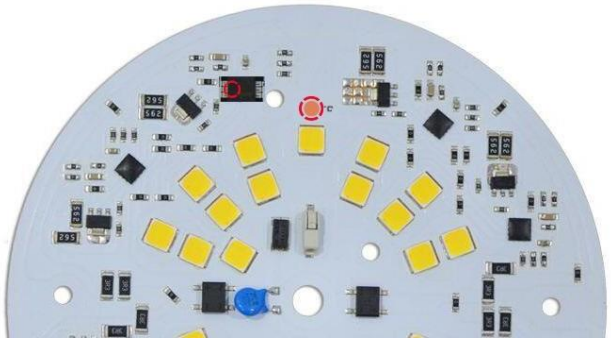


Figure 7-1

Note：

1) LKL Opto. DOB Module is Recommended to keep the junction temperature under maximum junction temperature spec.(Table 2-4).

LED lead temperature and IC top case temperature measured with thermocouple. LED and IC unction temperatures can be calculated using the formulas as follow.

$$Ts\_max=Tj\_max-R\theta j\text{-}s * Pd$$

For Example:

If LED lead temperature and IC top case temperature are 90℃ then the LED junction temperature

Tj=Ts_max+Rθj-s*Pd=90℃ + 12 ℃/W* 1 W = 102 ℃

and the IC junction temperature

Tj=Ts_max+Rθj-s*Pd=90 ℃ + 15℃/W*2 W= 120 ℃

7.2 Silicone Resin of DOB (AC-COB) Handing

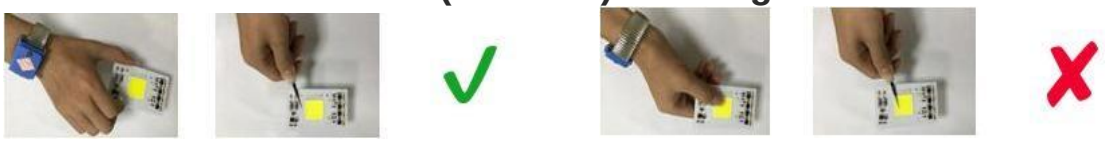


Figure 7-2

1) Please do not touch the silicone resin area with sharp things .

2)Finger prints on silicone resin area may affect performance .

3) Please do not cover the silicone resin area with any other resins such as epoxy,urethane,etc.

4) Please prevent any dust accumulation on the surface of the silicone resin area.

7.3 Precaution

1) Please note, LKL Opto. DOB products work under high voltage, therefore caution should be taken when working near the products.
2) Make sure proper discharge prior to starting work.
3) DO NOT touch any of the circuit board, components or terminals with body or metal while circuit is active.
4) Please do not add or change wires while circuit is active.
5) Long time exposure to sunlight or UV can cause the lens to discolor.
6) Please do not use adhesives to attach the LED that out gas organic vapor.
7) Please do not use together with the materials containing Sulfur.
8) Please do not assemble in conditions of high moisture and/or oxidizing gas such as Cl2, H_2S, NH_3, SO_2, NO_x, etc.
9) Please do not make any modification on module.
10) Please be cautious when soldering to board so as not to create a short between different trace patterns.
11) Do not impact or place pressure on this product because even a small amount of pressure can damage the product. The product should also not be placed in dust-laden air, high temperatures, high humidity or direct sunlight since the device is sensitive to these conditions
12) When storing devices for a long period of time before usage, please following these guidelines:
    - The devices should be stored in the anti-static bag and kept with bag seal closed well.
    - If the anti-static bag has been opened, re-seal preventing air and moisture from being present in the bag.
13) LED and IC are sensitive to Electro-Static Discharge (ESD). The LKL Opto. product should also not be installed in end equipment without ESD protection.
14) LED and IC are also sensitive to Electrical Over-Stress (EOS) that is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. To minimize the damage from an EOS - event LKL Opto. recommends utilizing a surge protection circuit, an appropriately rated over voltage and over current protection device.