www.opledtw.com

Opto Plus LED Corp.
Case Mold Type LED Display
OPD-DR54RGB-W

EDIT HISTORY

Version A: May. 23, 2023

Preliminary Spec.

Prepared by	Checked by	Approved by

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

INTERNAL FEATURES

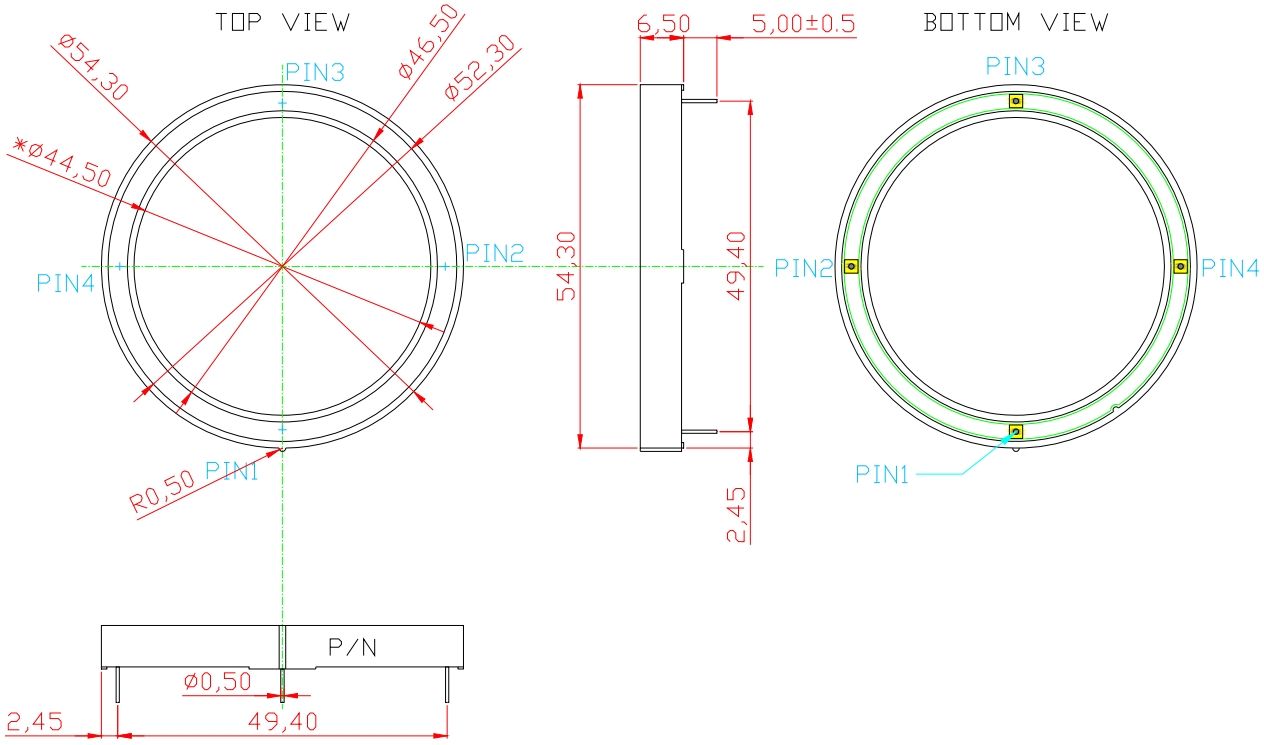
1. One Circle Two Color.
2. Ø 54.3mm Case Mold Type LED Display
3. Ø 44.5mm Hollow Circle.
4. PIN 1 Description : Data-In terminal.
5. PIN 2 Description : Supply voltage terminal.
6. PIN 3 Description : Ground terminal.
7. PIN 4 Description : Data-Out terminal.
8. 256-step gray-scale output to allow 16,777,216 color display.
9. Built-in oscillator 20M.
10. Operating temperature: -25℃ to +85℃
11. Operating temperature: -25℃ to +85℃

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of the devices at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

Opto Plus LED Corp.
Case Mold Type LED Display
OPD-DR54RGB-W

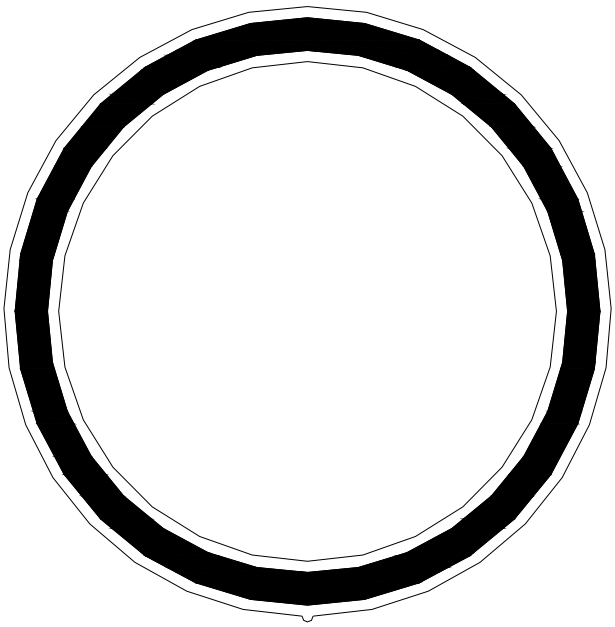
MECHANICAL DIMENSIONS

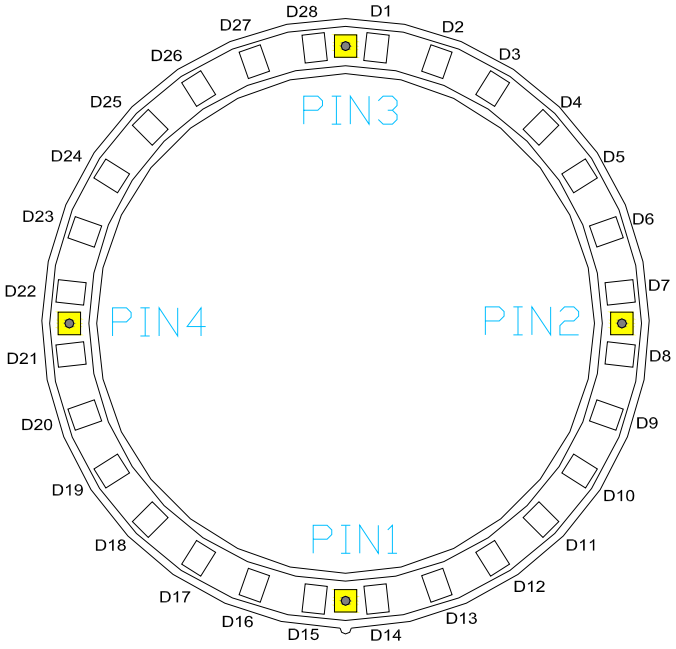


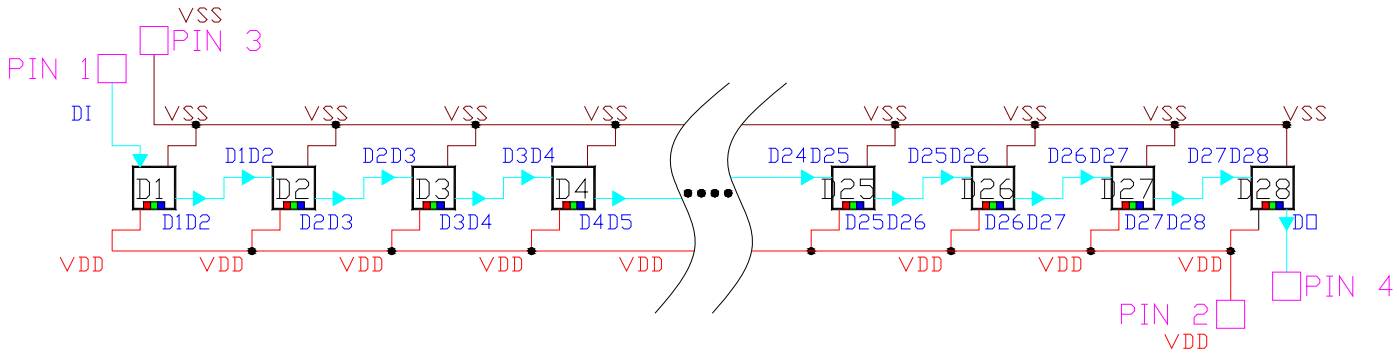
NOTES: All dimensions are in millimeters. Tolerances are± 0.25 mm unless otherwise noted.

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

TYPICAL INTERNAL EQUIVALENT CIRCUIT







Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

● RGB: FULL COLOR (AlInGaP/InGaP)

ABSOLUTE MAXIMUM RATING AT Ta=25º (Per SMD Chip)

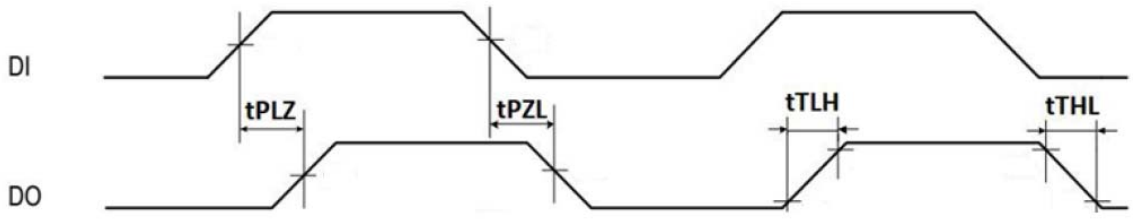
Parameter	Symbol	Maximum Rating	Unit
Supply Voltage	VDD	6.5	V
Power Dissipation	PD	<400	mW
Maximum Output Current	ILEDOUT	5	mA
Operating temperature	T_{OP}	-40 to + 85	°C
Storage temperature	T_{ST}	-40 to + 100	°C
Welding temperature	T_M	300(85)	°C

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

ELECTRICAL - OPTICAL CHARACTERISTICS AT TA=25℃ (PER SMD CHIP)

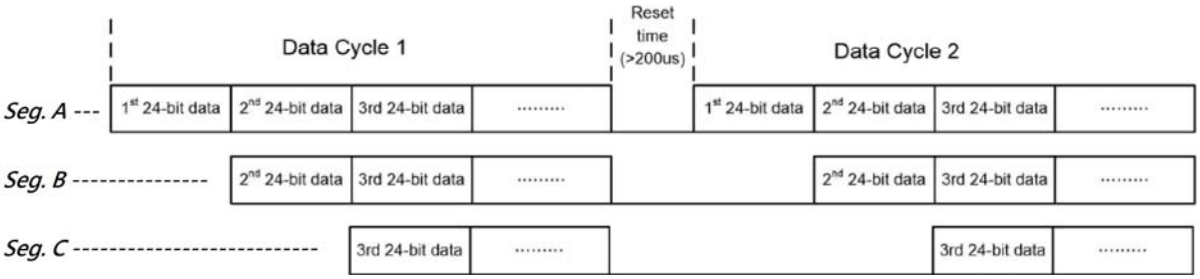
Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Supply Voltage	VDD	4.5	5	5.5	V	
Operation Current	I_{DD}			2	mA	R、G、B no load
Input High "H" of DI	V_{IH}	2.7		VDD	V	
Input Low "L" of DI	V_{IL}	0		1.0	V	
Pull Down Resistance	R_{PD}		500K		Ω	DI, DO
Output High "H" of DO	V_{OH}	4.5			V	I_{OH}=4mA
Output Low "L" of DO	V_{OL}			0.4	V	I_{OL}=4mA
R, G, B Sink Current	I_{sink}	4.75	5	5.25	mA	Vo=VDD-3.0V @VDD=5V
Input leakage	I_{leak}			1	uA	DI=VDD
R , G , B off leakage current	I_{off}			1	uA	PWM=0(off), @R, G, B =5V

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Propagation delay time	tPLZ			300	ns	DI → DO, CL=15pF, RL=10KΩ
	tPZL			300	ns	
Rising time	tTZH			200	ns	R、G、B=20mA, CL=30pF
Falling time	tTHZ			200	ns	
Data rate	F_{data}		800		Khz	



Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

Data Transfer Protocol

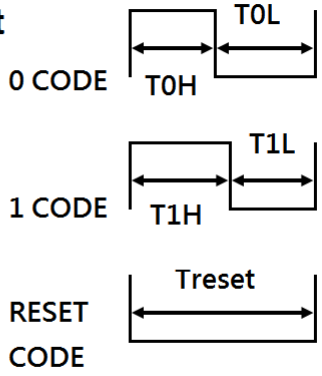


The single wire data transfer protocol supports 24-bit data for each LED RGB display data refresh. The IC receives 24-bit data and passes the remaining data to next LED. The 24-bit data consist of green, red and blue data, each with 8-bit width, and are transferred with MSB first.

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4	R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

The transferred data are recognized based on the pulse widths received by the IC. A low bit 0 is represented by a 0.3us high pulse followed by a 0.9us low pulse. A high bit 1 is represented by a 0.9us high pulse followed by a 0.3us low pulse. A low pulse ≧ 200us is used to issue a reset command to the IC to start a new cycle of serial commands.

Sequence Chart



(T0H:0.3us+0.15us,T0L:0.9us+0.15us)
(T1H:0.9us+0.15us,T1L:0.3us+0.15us)

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

Sample CODE

```
// Please write using Arduino IDE.
// Make sure that the Adafruit_NeoPixel library has been installed.

#include <Adafruit_NeoPixel.h>
#define LED_PIN     6   // Which pin on the Arduino is connected to the NeoPixels?
#define LED_COUNT  28   // How many NeoPixels are attached to the Arduino?
    // Declare our NeoPixel strip object:
    Adafruit_NeoPixel strip(LED_COUNT, LED_PIN, NEO_GRB + NEO_KHZ800);

void setup() {
    strip.begin();// INITIALIZE NeoPixel strip object (REQUIRED)
    strip.show();
    strip.setBrightness(255);// Set BRIGHTNESS to about 5/5 (max = 255)

  }

void loop() {
    strip.setBrightness(255);// Set BRIGHTNESS to about 5/5 (max = 255)
    strip.setPixelColor(0, 255, 255, 255); // D1 //Turn on White.
    strip.setPixelColor(1, 255, 255, 255); // D2 //Turn on White.
    strip.setPixelColor(2, 255, 255, 255); // D3 //Turn on White.
    strip.setPixelColor(3, 255, 255, 255); // D4 //Turn on White.
    strip.setPixelColor(4, 255, 255, 255); // D5 //Turn on White.
    strip.setPixelColor(5, 255, 255, 255); // D6 //Turn on White.
    strip.show();
    delay(250);
    strip.setBrightness(102);// Set BRIGHTNESS to about 2/5 (max = 255)
    strip.setPixelColor(21, 255, 127, 0); // D22 //Turn on Yellow.
    strip.setPixelColor(22, 255, 127, 0); // D23 //Turn on Yellow.
    strip.setPixelColor(23, 255, 127, 0); // D24 //Turn on Yellow.
    strip.setPixelColor(24, 255, 127, 0); // D25 //Turn on Yellow.
    strip.setPixelColor(25, 255, 127, 0); // D26 //Turn on Yellow.
    strip.setPixelColor(26, 255, 127, 0); // D27 //Turn on Yellow.
    strip.setPixelColor(27, 255, 127, 0); // D28 //Turn on Yellow.
    strip.show();
    delay(250);

    strip.setBrightness(0);// Set BRIGHTNESS to about 0/5 (min = 0)
    strip.show();
    delay(250);
   }
```

● LUMINOUS INTENSITY (IV) BIN :

BIN	**N**	**O**	**P**
(Red) @5mA	40-65 mcd	66-95 mcd	96-120 mcd

BIN	**Q**	**R**	**S**
(Green) @5mA	60-100 mcd	101-140 mcd	141-180 mcd

BIN	**K**	**L**	**M**
(Blue) @5mA	15-30 mcd	31-45 mcd	46-60 mcd

Note: It maintains a tolerance of ±10% on Luminous Intensity.

● WAVELENGTH(ƛD) BIN :

BIN	**7**	**8**	**9**
(Red) @5mA	618-619 nm	620-623 mcd	624-625 nm

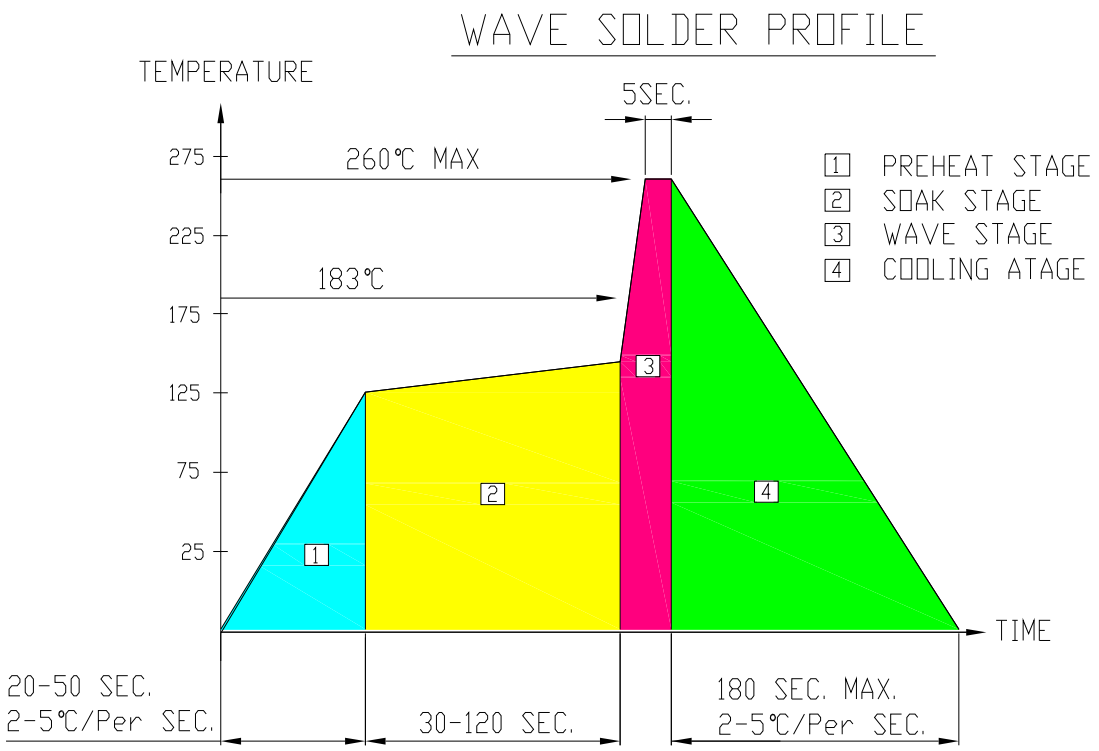
BIN	**4**	**5**	**6**
(Green) @5mA	518-523 nm	524-529 mcd	530-535 nm

BIN	**1**	**2**	**3**
(Blue) @5mA	460 – 464 nm	465-469 nm	470 – 474 nm

Note: It maintains a tolerance of ±0.5nm on Wavelength BIN.

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

RECOMMEND SOLDERING PROFILE



Note:

- Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C
- Peak wave soldering temperature between 245°C ~ 225°C for 3 sec (5 sec max)
- No more than one wave soldering pass

SOLDERING IRON

Basic spec is ≦4 sec when 260°C. If temperature is higher, time should be shorter (+10°C→1 sec). Power dissipation of Iron should be smaller than 15W, and temperature should be controllable. Surface temperature of the device should be under 230°C.

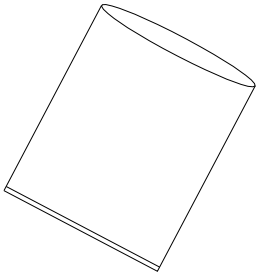
REWORK

Customer must finish rework within ≦3 sec under 350℃.
The head of soldering iron cannot touch copper foil.

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566

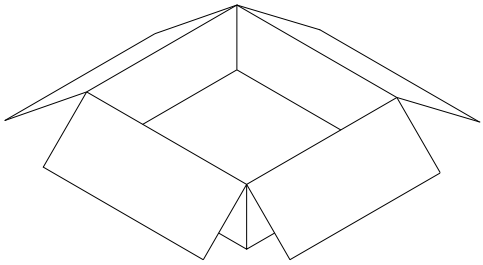
PACKAGE DIMENSIONS

30 PCS / 1 ESD TRAY.
180 PCS / 6 ESD TRAY / TOP & BOTTOM 1 Corrugates Paper / 1 PINK ESD BAG.



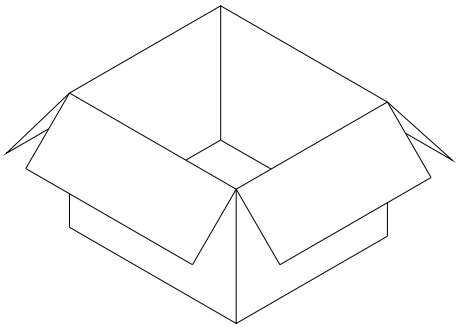
BAG SIZE :450X410X560

180 PCS / 1 Inner Carton.



INNER BOX SIZE : 394 x 370 x 138 mm

360 PCS / 2 Inner Carton / 1 Outer Carton.



OUTER BOX SIZE : 430 x 390 x 300 mm

Note:

LED DISPLAY STANDARD STORAGED CONDITION
Product in the original packaging material state is the recommended storage conditions.

TERATURE CONDITION	HUMIDITY CONDITION
5°C ~ 30°C	Below 60%RH

If the storage conditions do not meet specification standards, the component pins may become oxidized requiring re-plating and re-sorting before use. Suggest customers consume LEDs as soon as possible, and avoid long-term storage of large inventories.

Opto Plus LED Corp. 7F-3, No.496 , Bannan Road, Jhonghe Dist., New Taipei City 235, Taiwan (R.O.C)
Website: www.opledtw.com E-mail: sales@opledtw.com Tel: 886-2-2222-5698 Fax: 886-2-2222-2566