



**Opto Plus LED Corp.**  
**0.40" SMD Type LED Display**  
**OPS-AD4020LR | OPS-AD4021LR**

● **EDIT HISTORY**

Version A: Jan. 06, 2021

Preliminary Spec.

Version B: Jun. 21, 2022

1. Modify electrical optical characteristic.
2. Modify curve graph.



# Opto Plus LED Corp.

## 0.40" SMD Type LED Display

### OPS-AD4020LR | OPS-AD4021LR

#### ● FEATURES

- 0.4 inch (10.16 mm) digit height.
- SMD type.
- Low current operation.
- RoHS Compliant, Pb Free.

#### ● DESCRIPTION

The device are 0.4 inch (10.16 mm) height Dual digit 7-segment displays.

The device is Opto Plus LED Corp standard LED Display.

This device utilizes Super Red LED chip which are made from AlGaInP on a Transparent GaAs, substrate.

The device has face and segment option, please refer to **PRODUCT APPEARANCE**.

#### ● DEVICE

PART NO.	DESCRIPTION
OPS-AD4020LR-GW	Common Anode   Gray face   White segment
OPS-AD4021LR-GW	Common Cathode   Gray face   White segment
OPS-AD4020LR-BW	Common Anode   Black face   White segment
OPS-AD4021LR-BW	Common Cathode   Black face   White segment

**RoHS Compliance**



**Pb Free.**



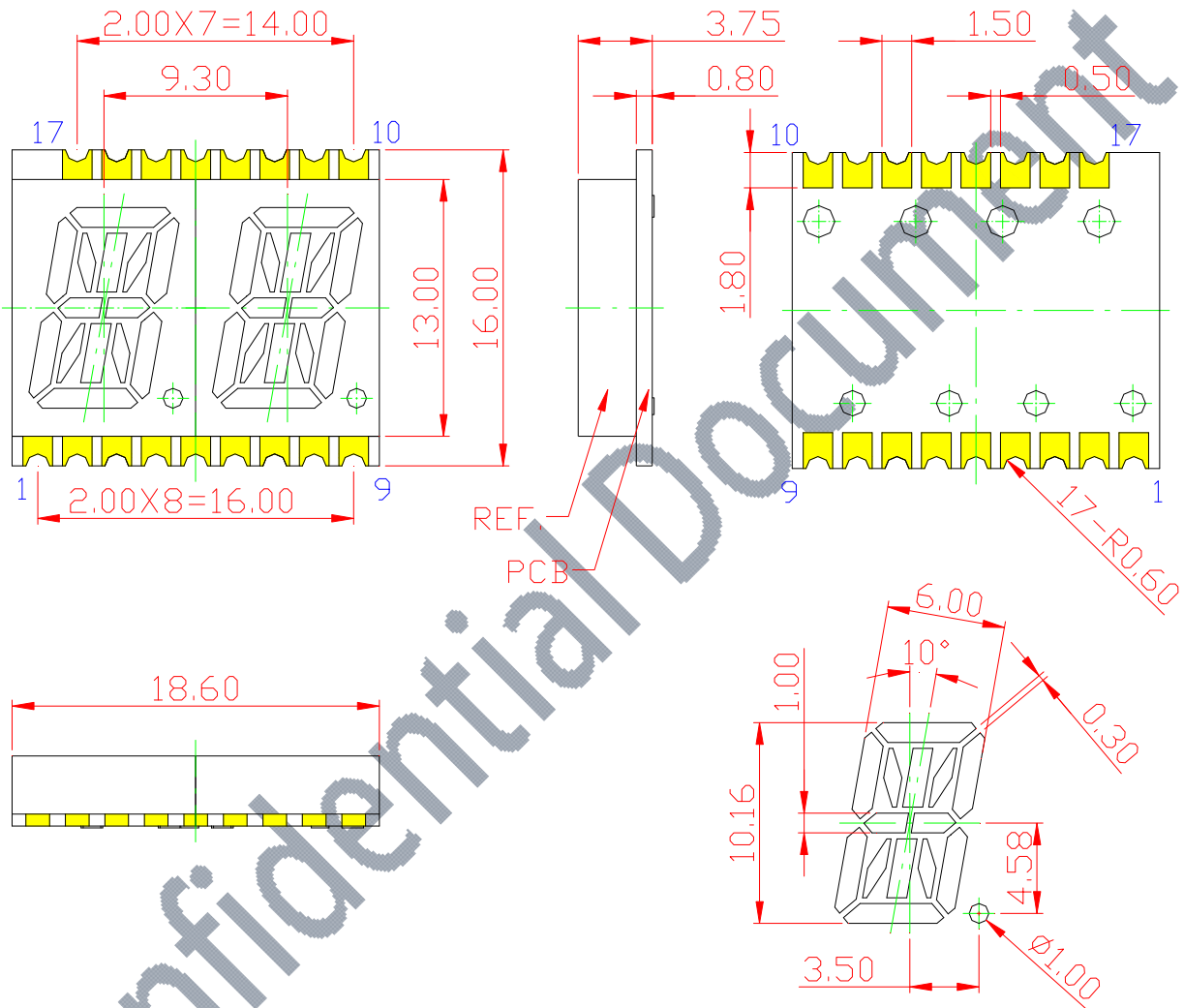


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## 0.40" SMD Type LED Display

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#### ● MECHANICAL DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerances are  $\pm 0.25$  mm unless otherwise noted.

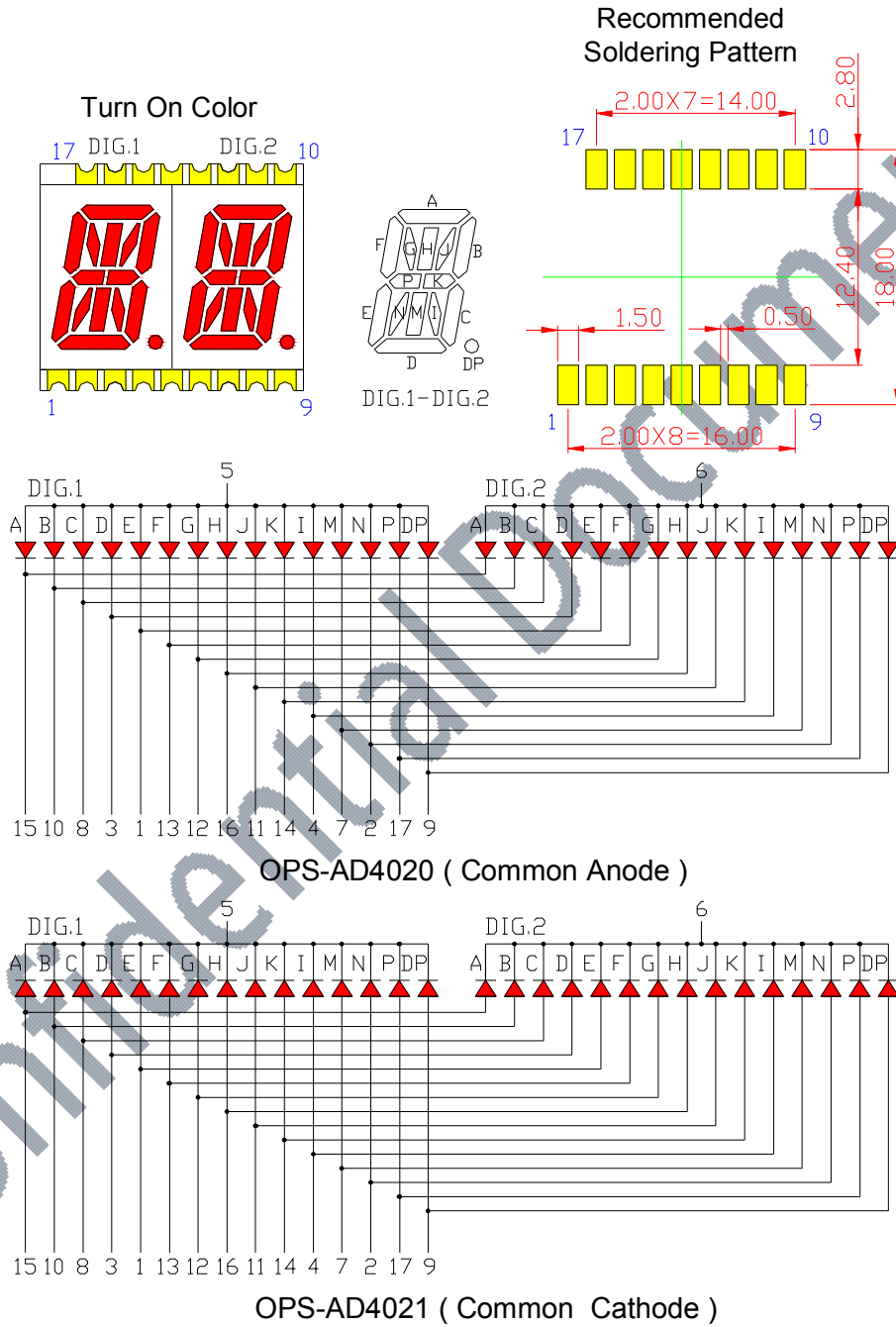


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#### ● TYPICAL INTERNAL EQUIVALENT CIRCUIT



※EMITTED COLOR : SUPER RED

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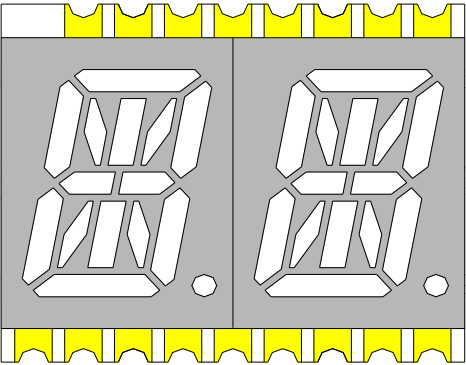
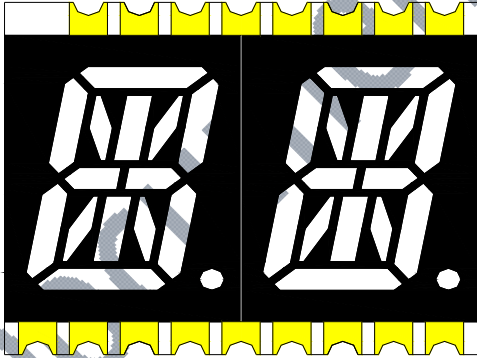
Disclaimer:  
 Subject to change without notice



## Opto Plus LED Corp. 0.40'' SMD Type LED Display OPS-AD4020LR | OPS-AD4021LR

### ● PRODUCT APPEARANCE

The most common reflector color and segment color are show in below diagram.

-GW	-BW
	
※ REFLECTOR COLOR: Gray ※ SEGMENT COLOR: White	※ REFLECTOR COLOR: Black ※ SEGMENT COLOR: White

Opto Plus can customize reflector and segment colors by customer's request. If you have these request please visit [www.opledtw.com](http://www.opledtw.com) or contact [sales@opledtw.com](mailto:sales@opledtw.com) for more **Standard Product Customization** information.

Part NO. related to reflector and segment colors show as table below.

PART NO.	DESCRIPTION
OPS-AD4020LR-GW	Common Anode   Gray face   White segment
OPS-AD4021LR-GW	Common Cathode   Gray face   White segment
OPS-AD4020LR-BW	Common Anode   Black face   White segment
OPS-AD4021LR-BW	Common Cathode   Black face   White segment



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● **LR: SUPER RED (AlGaInP/GaAs)**

ABSOLUTE MAXIMUM RATING AT Ta=25°C

Parameter	Symbol	Maximum Rating	Unit
Power dissipation	$P_{AD}$	48	mW
Continuous forward current	$I_{AF}$	20	mA
Peak current (duty cycle 1/10, 1kHz)	$I_{PF}$	40	mA
Reverse voltage	$V_R$	5	V
Operating temperature	$T_{OPR}$	-40 to +85	°C
Storage temperature	$T_{STG}$	-40 to +85	°C

ELECTRICAL - OPTICAL CHARACTERISTICS AT Ta=25°C

Characteristic	Symbol	Condition	Min.	Type.	Max.	Unit
Forward Voltage, (Per Dice)	$V_F$	$I_F = 20\text{mA}$	-	2.1	2.4	V
Reverse Current, (Per Dice)	$I_R$	$V_R = 5\text{V}$	-	-	10	$\mu\text{A}$
Peak Wavelength	$\lambda_P$	$I_F = 20\text{mA}$	-	650	-	nm
Dominant Wavelength	$\lambda_D$	$I_F = 20\text{mA}$	635	-	648	nm
Luminous Intensity	$I_V$	$I_F = 20\text{mA}$	0.7	-	7.0	mcd
Spectral Line Half-Bandwidth	$\Delta\lambda$	$I_F = 20\text{mA}$	-	20	-	nm



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- LR: BIN GRADE (Unit : mcd) 20mA

Super Red	<b>F</b>	<b>G</b>	<b>H</b>
	0.7 – 2.8	2.9 – 5.0	5.1 – 7.0

- LR: HUE GRADE ( $\lambda_D$  : nm)

<b>1</b>	<b>2</b>	<b>3</b>
635.0 – 639.0	639.1 – 643.0	643.1 – 648.0

- AVAILABLE BIN / HUE TABLE

F1	F2	F3
G1	G2	G3
H1	H2	H3



# Opto Plus LED Corp.

## 0.40" SMD Type LED Display

### OPS-AD4020LR | OPS-AD4021LR

#### ● LR: SUPER RED (AlGaInP/GaAs) CURVE

### Typical Electro-optical Characteristic Curves (25 °C Free Air Temperature Unless Otherwise Specified)

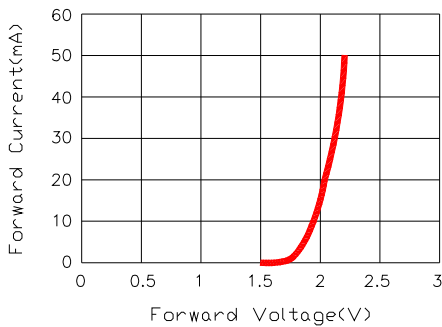


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE

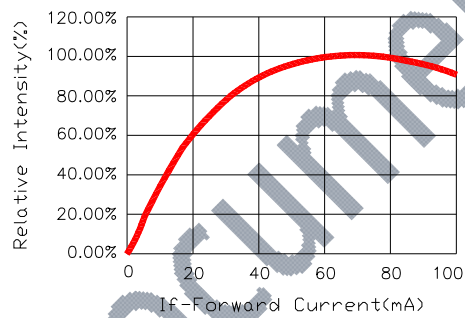


Fig.2 RELATIVE INTENSITY VS. FORWARD CURRENT

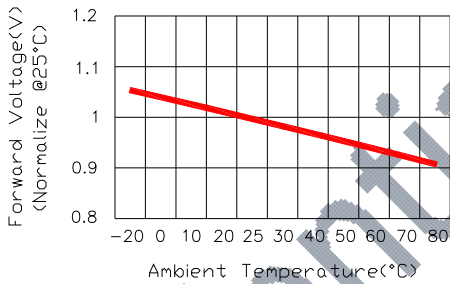


Fig.3 FORWARD VOLTAGE VS. TEMPERATURE

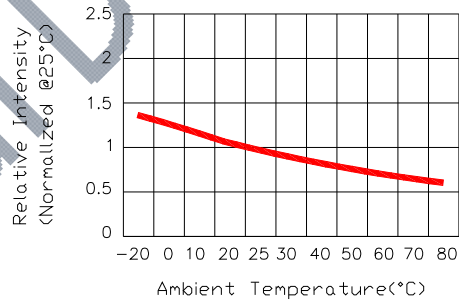


Fig.4 RELATIVE INTENSITY VS. TEMPERATURE

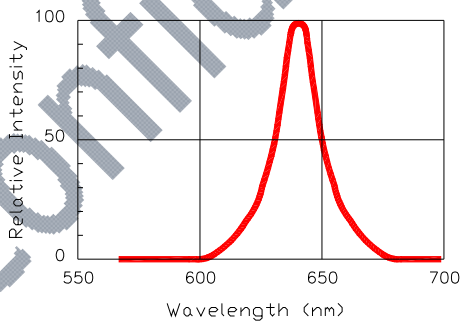


Fig.5 RELATIVE INTENSITY VS. WAVELENGTH

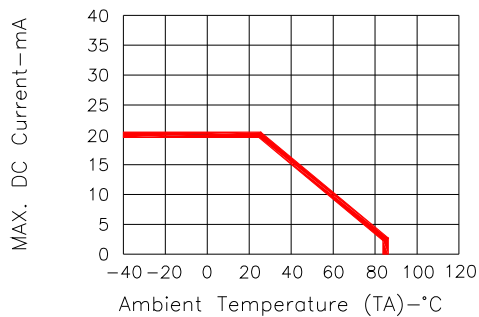


Fig.6 MAX. ALLOWABLE DC CURRENT VS. AMBIENT TEMPERATURE





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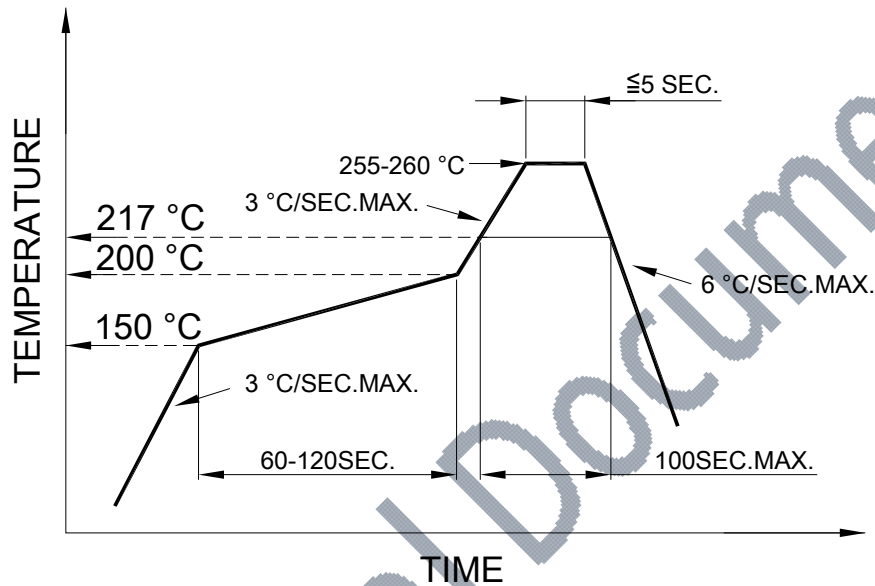
## 0.40" SMD Type LED Display

### OPS-AD4020LR | OPS-AD4021LR

#### ● SMT REFLOW SOLDERING INSTRUCTIONS

SMT Soldering Profile

Pb free reflow soldering Profile



- We recommend the reflow temperature 245°C (+/- 5°C).  
The maximum soldering temperature should be limited to 260°C.
- Number of reflow process shall be 2 times or less.

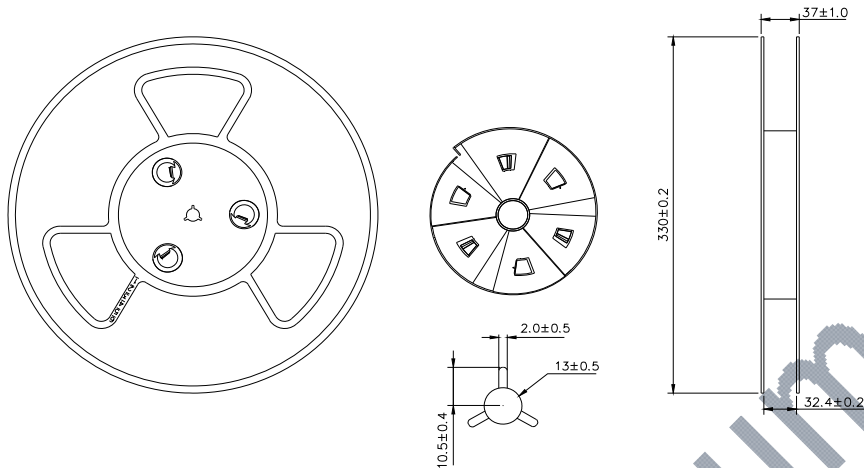
#### ● SOLDERING IRON

Basic spec is  $\leq 4$  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.

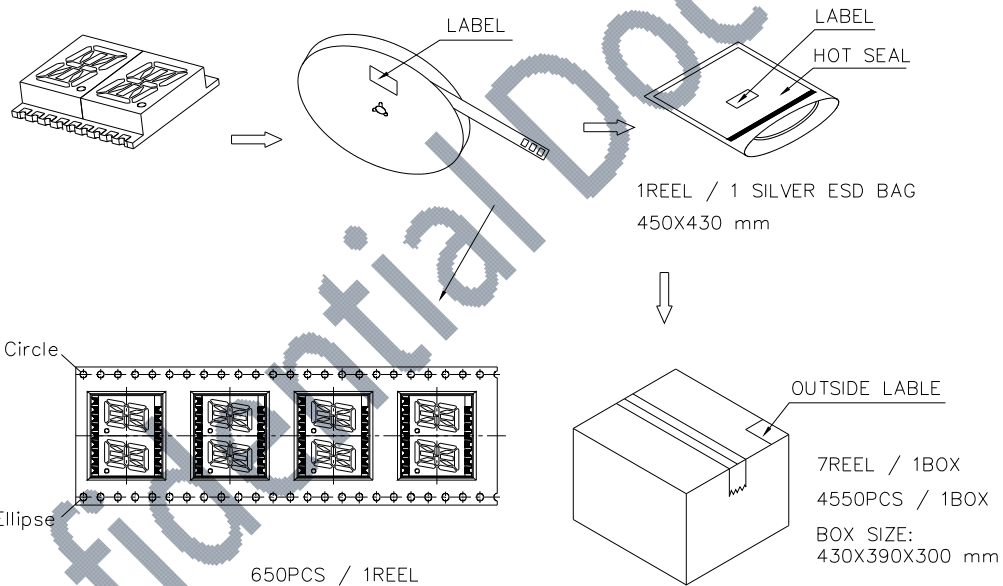
#### ● REWORK

- Customer must finish rework within 3 sec. under 350°C.
- The head of soldering iron cannot touch copper foil.

### ● REEL DIMENSIONS



### ● PACKING & LABEL SPECIFICATIONS



### ● STORAGE CONDITION

In factory original sealed bag package

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

After opened and not in factory original sealed bag package

TEMPERATURE CONDITION	HUMIDITY CONDITION	STORAGE TIME
5°C ~ 30°C	Below 60%RH	Within 4 weeks (MSL as level 2a)