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Opto Plus LED Corp.
0.40" SMD Type LED Display
OPS-AQ4022SPG | OPS-AQ4023SPG

● **EDIT HISTORY**

Version A: Feb. 03, 2025

Preliminary Spec.



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● **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 Quadruple digit alphanumeric display.
 The device is Opto Plus LED Corp standard LED Display.
 This device utilizes Pure Green LED chip which are made from InGaN on a Transparent GaN, substrate.
 The device has face and segment option, please refer to **PRODUCT APPEARANCE**.

● **DEVICE**

PART NO.	DESCRIPTION
OPS-AQ4022SPG-GW	Common Anode Gray face White segment
OPS-AQ4023SPG-GW	Common Cathode Gray face White segment
OPS-AQ4022SPG-BW	Common Anode Black face White segment
OPS-AQ4023SPG-BW	Common Cathode Black face White segment

RoHS Compliance



Pb Free.



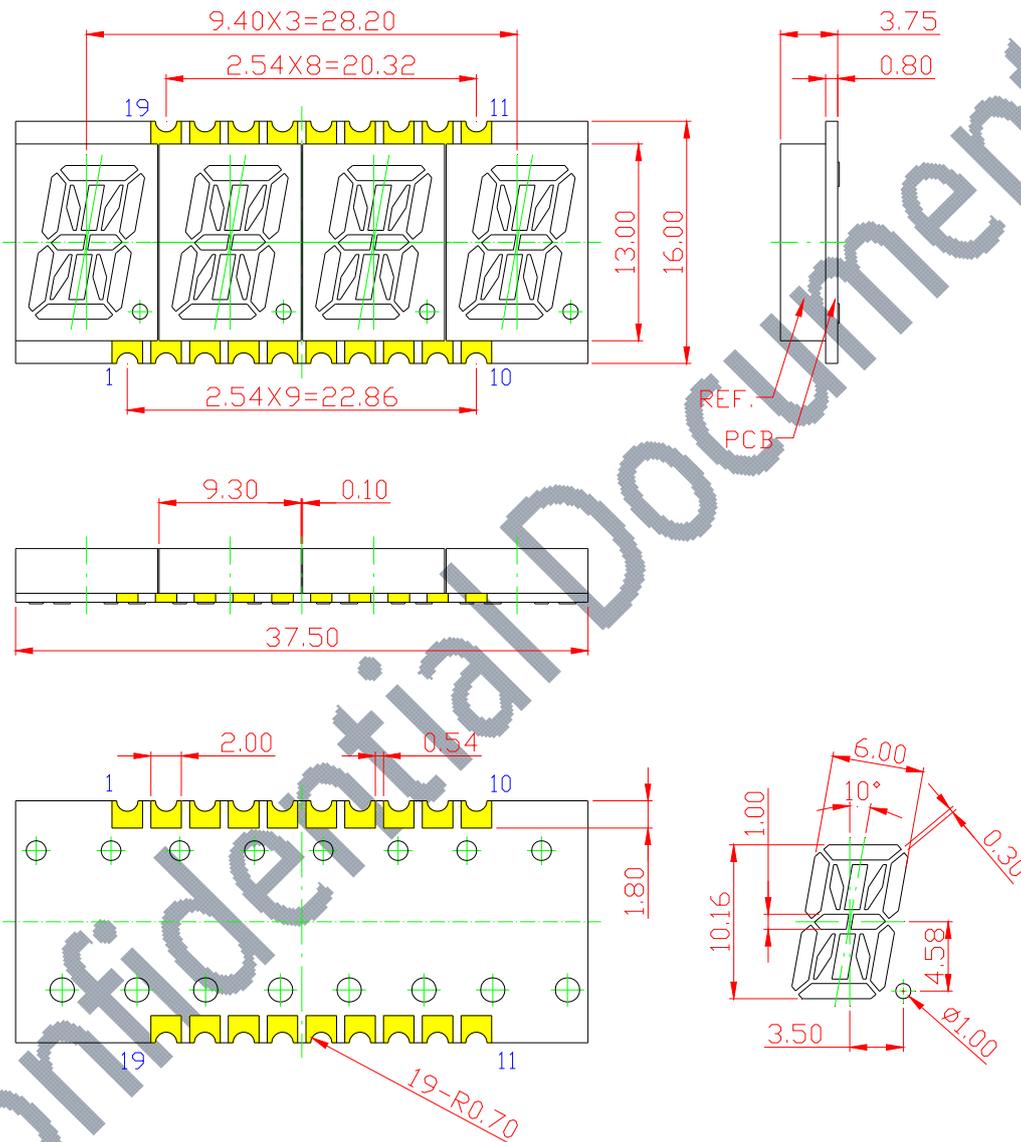


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● MECHANICAL DIMENSIONS



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



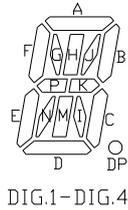
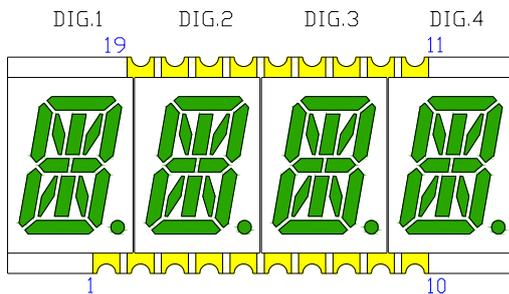
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0.40'' SMD Type LED Display

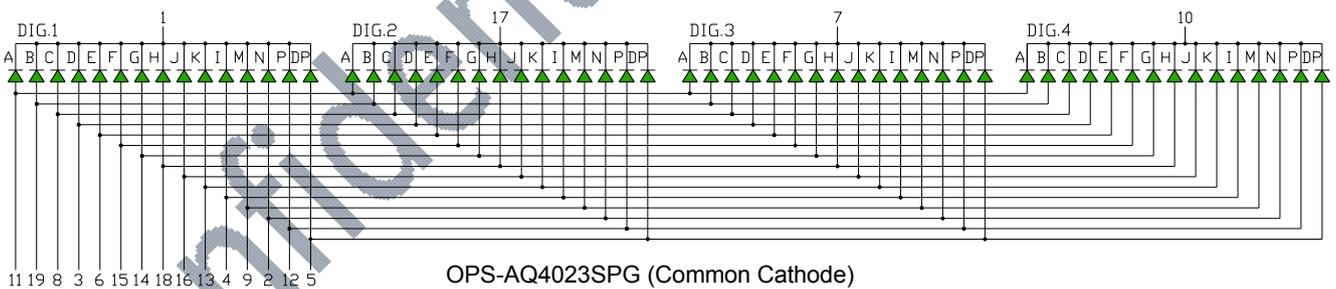
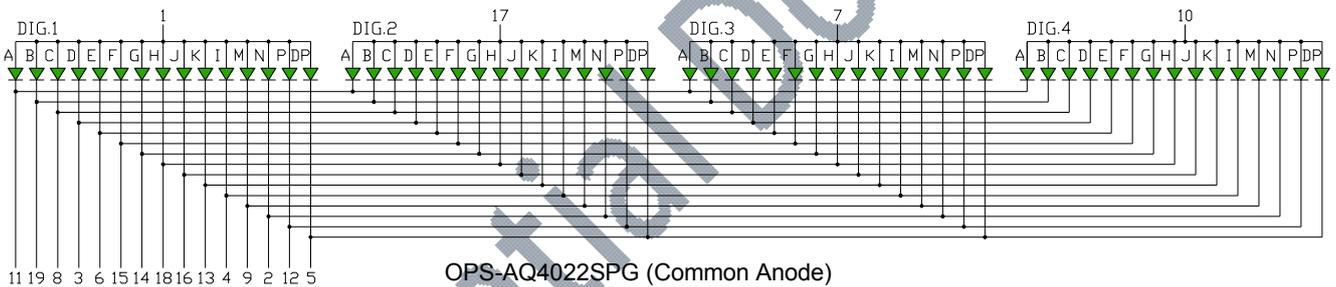
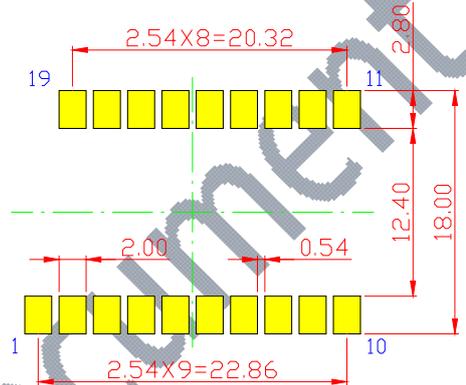
OPS-AQ4022SPG | OPS-AQ4023SPG

● TYPICAL INTERNAL EQUIVALENT CIRCUIT

Turn On Color



Recommended Soldering Pattern



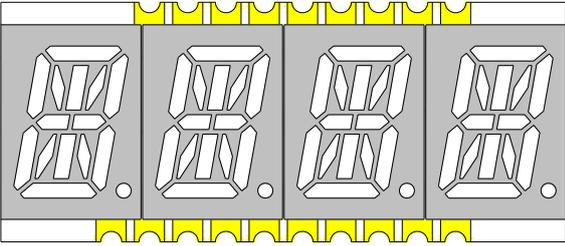
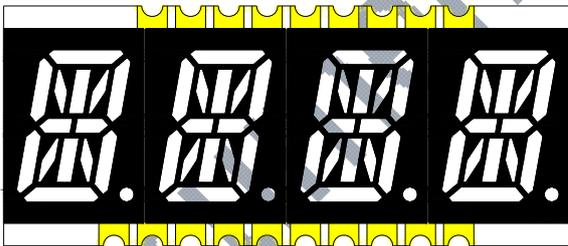
※EMITTED COLOR : PURE GREEN



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● **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 or contact 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-AQ4022SPG-GW	Common Anode Gray face White segment
OPS-AQ4023SPG-GW	Common Cathode Gray face White segment
OPS-AQ4022SPG-BW	Common Anode Black face White segment
OPS-AQ4023SPG-BW	Common Cathode Black face White segment



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● **SPG: PURE GREEN (InGaN/GaN)**

ABSOLUTE MAXIMUM RATING AT Ta=25°C

Parameter	Symbol	Maximum Rating	Unit
Power dissipation	P_{AD}	90	mW
Continuous forward current	I_{AF}	30	mA
Peak current (duty cycle 1/10, 1kHz)	I_{PF}	60	mA
Reverse voltage	V_R	5	V
Operating temperature	T_{OPR}	-40 to +105	°C
Storage temperature	T_{STG}	-40 to +105	°C

ELECTRICAL - OPTICAL CHARACTERISTICS AT Ta=25°C

Characteristic	Symbol	Condition	Min.	Type.	Max.	Unit
Forward Voltage, (Per Dice)	V_F	$I_F = 20\text{mA}$	-	3.0	3.4	V
Reverse Current, (Per Dice)	I_R	$V_R = 5\text{V}$	-	-	10	μA
Dominant Wavelength	λ_D	$I_F = 20\text{mA}$	515	-	530	nm
Luminous Intensity	I_v	$I_F = 20\text{mA}$	30	90	150	mcd
Spectral Line Half-Bandwidth	$\Delta\lambda$	$I_F = 20\text{mA}$	-	20	-	nm



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

Pure Green	O	P	Q
	30.0 – 70.0	70.1 – 110.0	110.1 – 150.0

- SPG: HUE GRADE (λ D : nm)

1	2	3
515.0 – 520.0	520.1 – 525.0	525.1 – 530.0

- AVAILABLE BIN / HUE TABLE

O1	O2	O3
P1	P2	P3
Q1	Q2	Q3



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● SPG: PURE GREEN (InGaN/GaN) CURVE

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

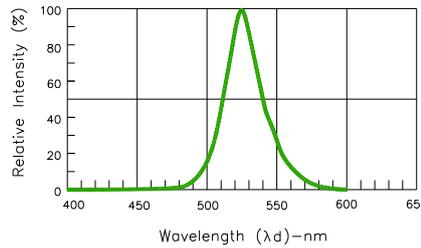


Fig. 1- Relative Intensity VS. Wavelength

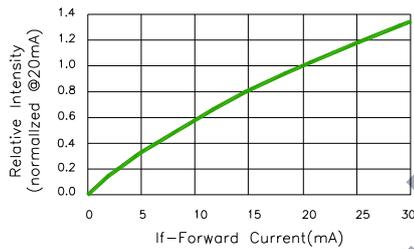


Fig.2-Relative Luminous Intensity vs. Forward Current

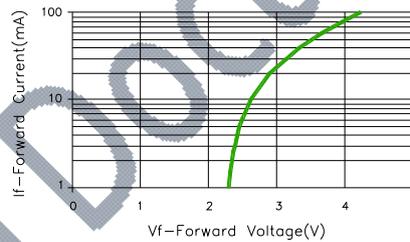


Fig.3-Forward Current vs. Forward Voltage

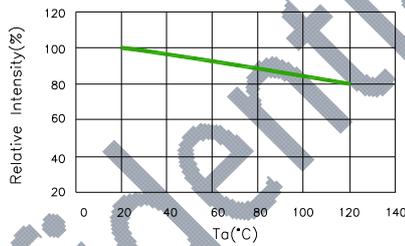


Fig.4-Relative Intensity(@20mA)VS. Ambient Temperature

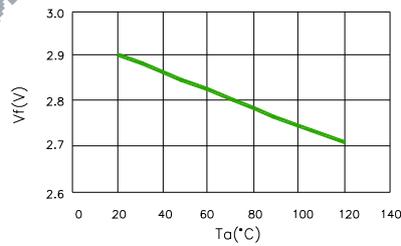


Fig.5-Forward Voltage(@20mA)VS. Ambient Temperature



Fig.6-Dominant Wavelength(@20mA)
VS. Ambient Temperature

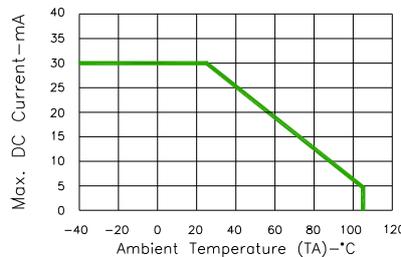


Fig.7-Max. Allowable DC Current
VS. Ambient Temperature



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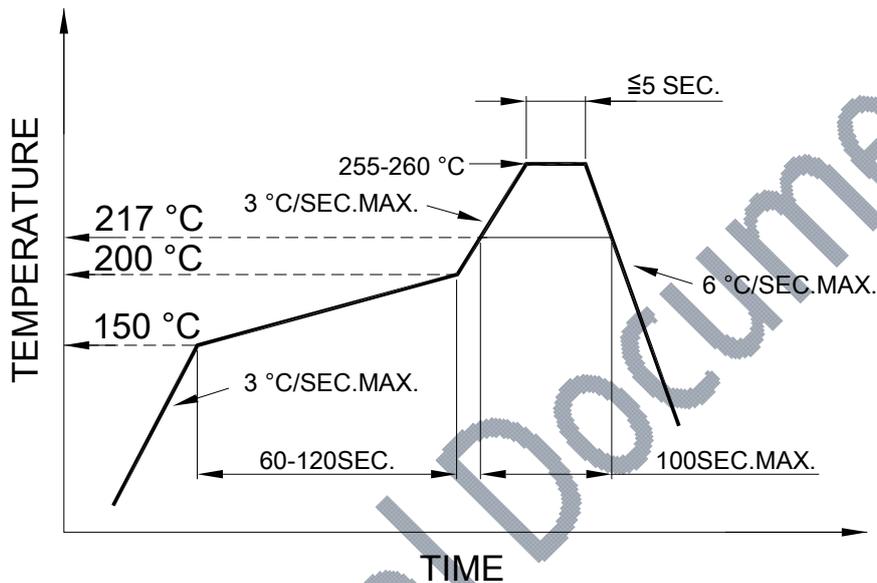
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● SMT REFLOW SOLDERING INSTRUCTIONS

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 ≤ 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.

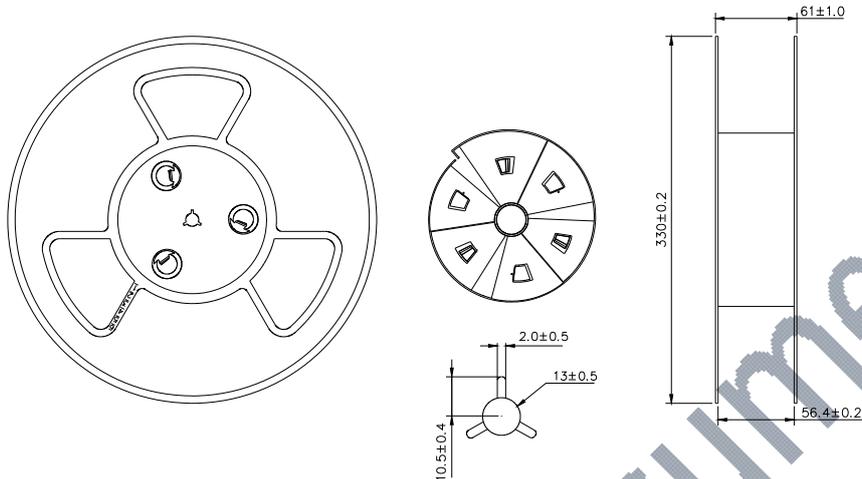


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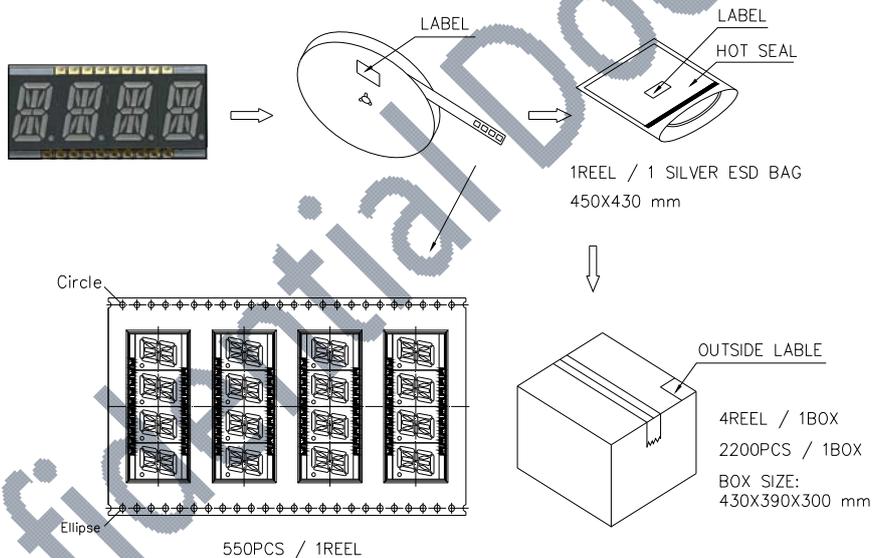
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● REEL DIMENSIONS



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