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Opto Plus LED Corp.
8X8 Dot-Matrix SMD Type LED Display
OPS-M288AAF6

● **EDIT HISTORY**

Version A: MAR. 12, 2025

Preliminary Spec.

Confidential Document



Opto Plus LED Corp. 8X8 Dot-Matrix SMD Type LED Display OPS-M288AAF6

● FEATURES

- Stackable vertically and horizontally.
- 8X8 array with X-Y select.
- SMD type.
- Wide viewing angle.
- RoHS Compliant, Pb Free.

● DESCRIPTION

The device are 0.76 inch (19.40 mm) height 8X8 dot matrix display,

Built-in programmable LEDs.

This device are 256-step gray-scale output to allow 16,777,216 color display,

Built-in oscillator 20M.

The device is Opto Plus LED Corp standard LED Display.

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

● DEVICE

PART NO.		DESCRIPTION
	OPS-M288AAF6-GW	Single data line Gray face White segment
	OPS-M288AAF6-BW	Single data line Black face White segment

RoHS Compliance



Pb Free.



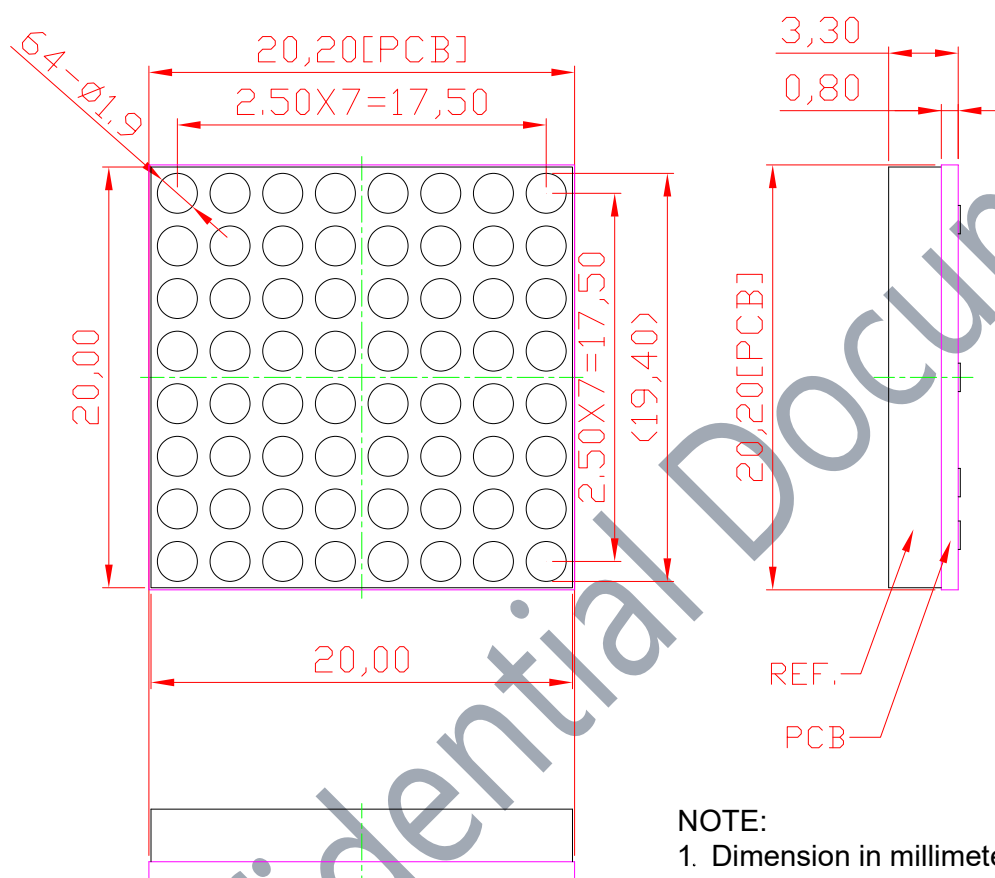


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● MECHANICAL DIMENSIONS



NOTE:

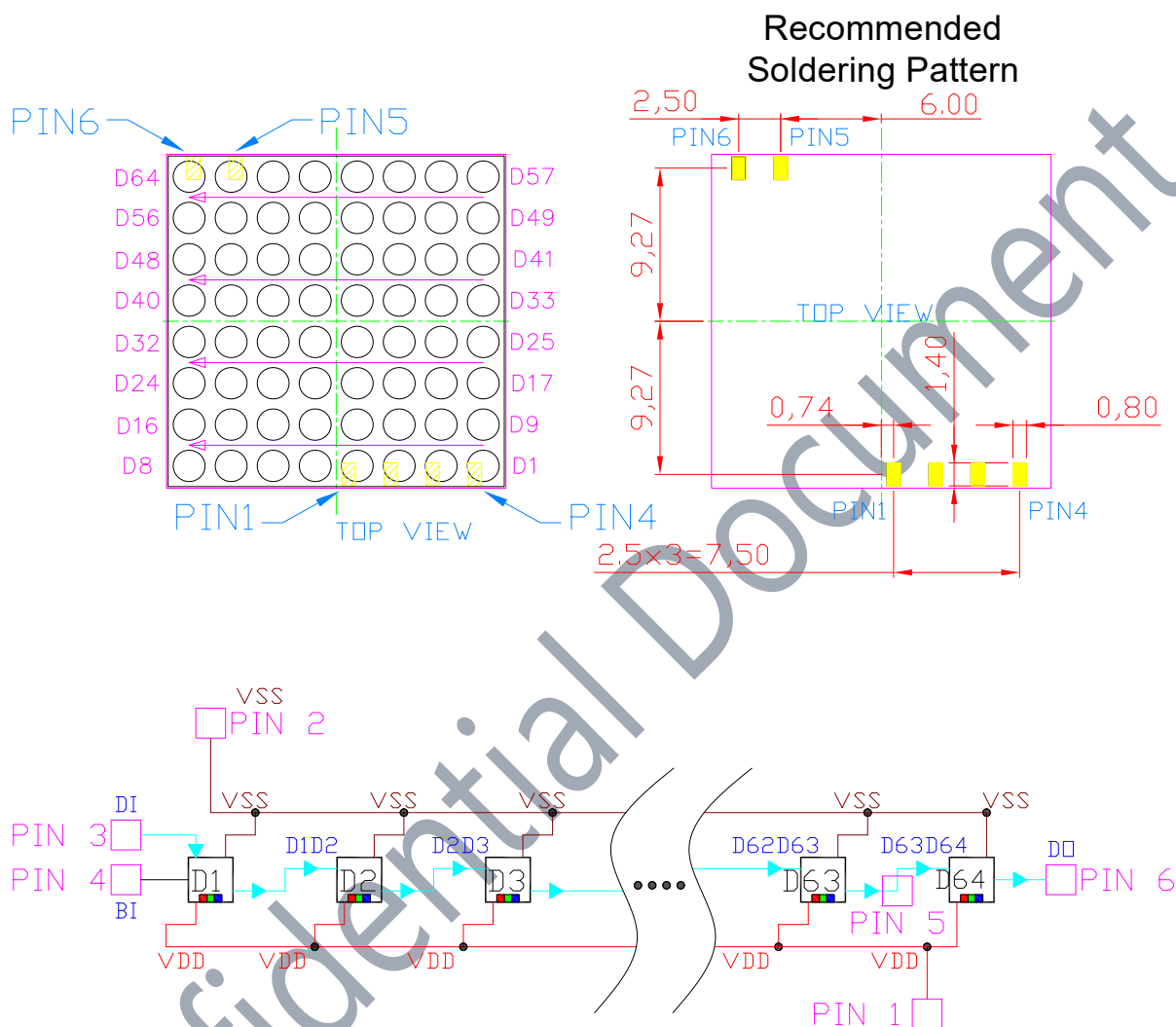
1. Dimension in millimeters (inches),
And tolerances are ± 0.25 mm (0.1") specified
2. Bending $\angle$ Length : 2 %

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● TYPICAL INTERNAL EQUIVALENT CIRCUIT



PIN 1 : Power Supply.

PIN 2 : Ground.

PIN 3 : Control Data Signal Input.

PIN 4 : Backup Data Signal Input. (Single Signal Wiring Diagram : BI is connected to GND.)

PIN 5 : Backup Data Signal Input From D64.

PIN 6 : Control Data Signal Output.

※ SUPPORT BI BACKUP [PIN 4] INPUT DATA LINE

TO PREVENT DATA INPUT FAILURE FROM MALFUNCTION DI.



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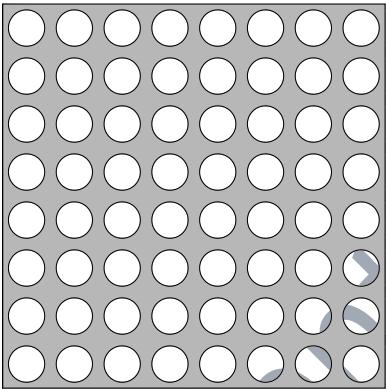
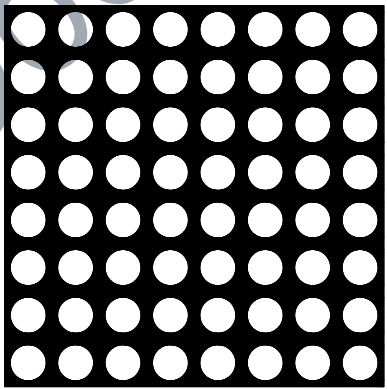
OPS-M288AAF6

※EMITTED COLOR : RED & GREEN & BLUE

IN THE PRACTICAL APPLICATION CIRCUIT, THE SIGNAL INPUT AND OUTPUT PINS OF THE IC SIGNAL INPUT AND OUTPUT PINS SHOULD BE CONNECTED TO THE SIGNAL INPUT AND OUTPUT TERMINALS. IN ADDITION, IN ORDER TO MAKE THE IC CHIP IS MORE STABLE, EVEN THE CAPACITANCE BETWEEN DISPLAY IS ESSENTIAL BACK; APPLICATION: DISPLAY TRANSMISSION DISTANCE IS SHORT, SUGGESTED IN SIGNAL IN TIME THE CLOCK LINE INPUT AND OUTPUT END OF EACH CONNECTED IN SERIES PROTECTION RESISTOR (ABOUT 470 OHMS). APPLICATION: FOR MODULE OR GENERAL SPECIAL-SHAPED PRODUCTS, DISPLAY TRANSMISSION DISTANCE IS LONG, BECAUSE OF DIFFERENT WIRE AND TRANSMISSION DISTANCE, IN THE SIGNAL IN TIME CLOCK AT BOTH ENDS OF THE LINE ON GROUNDING PROTECTION RESISTANCE WILL BE SLIGHTLY DIFFERENT; TO THE ACTUAL USE OF FIXED;

● 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
OPD-M288AAF6-GW	Single data line Top Mount Gray face White segment
OPD-M288AAF6-BW	Single data line Top Mount Black face White segment



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● F6: FULL COLOR (AlInGaP/InGaP)

ABSOLUTE MAXIMUM RATING AT Ta=25°

Parameter	Symbol	Maximum Rating	Unit
Supply Voltage	VDD	6.5	V
Power Dissipation	PD	<400	mW
Maximum Output Current	I _{LEDOUT}	5	mA
Operating temperature	T _{OP}	-25 to + 85	°C
Storage temperature	T _{ST}	-40 to + 100	°C
Welding temperature	T _M	300(<8sec.)	°C

ELECTRICAL - OPTICAL CHARACTERISTICS AT Ta=25°C (Each. Segment)

Characteristic	Symbol	Condition	Min.	Type.	Max.	Unit
Dominant Wavelength (Red) (Each. Segment)	λ_D	I _{SINK} =5mA	-	622	-	nm
Dominant Wavelength (Green) (Each. Segment)	λ_D	I _{SINK} =5mA	-	525	-	nm
Dominant Wavelength (Blue) (Each. Segment)	λ_D	I _{SINK} =5mA	-	466	-	nm
Luminous Intensity (Red) (Each. Segment)	I _V	I _{SINK} =5mA	-	30	-	mcd
Luminous Intensity (Green) (Each. Segment)	I _V	I _{SINK} =5mA	-	68	-	mcd
Luminous Intensity (Blue) (Each. Segment)	I _V	I _{SINK} =5mA	-	20	-	mcd
Spectrum Radiation Bandwidth (Red) (Each. Segment)	$\Delta\lambda$	I _{SINK} =5mA	-	16	-	nm
Spectrum Radiation Bandwidth (Green) (Each. Segment)	$\Delta\lambda$	I _{SINK} =5mA	-	28	-	nm
Spectrum Radiation Bandwidth (Blue) (Each. Segment)	$\Delta\lambda$	I _{SINK} =5mA	-	18	-	nm



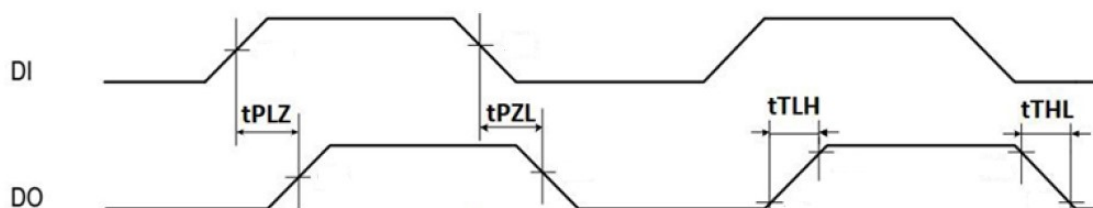
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ELECTRICAL - OPTICAL CHARACTERISTICS AT TA=25°C (DRIVER IC.)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note.
Supply Voltage	VDD	3.3	5.0	5.5	V	
Operation Current (With IC)	IDD-1		1		mA	R/G/B Without load @VDD=5V
Operation Current (With IC)	IDD-2		0.6		mA	R/G/B Without load @VDD=3.3V
Sleep Mode Current	Isleep		5		uA	
Input High "H" of DI, BI	VIH	0.7*VDD		VDD+0.4	V	
Input Low "L" of DI, BI	VIL	-0.4		0.2*VDD	V	
Output High "H" of DO	VOH	4.5			V	IOH=3mA
Output Low "L" of DO	VOL			0.4	V	IOL=3mA
R/G/B Sink Current	ISink-1	2.9	3.0	3.1	mA	Max. 3mA option
R/G/B Sink Current	ISink-2	4.8	5.0	5.2	mA	Max. 5mA option
R/G/B Current Gain	Glevel-1		3/17		mA/level	Max. 3mA option
R/G/B Current Gain	Glevel-2		5/17		mA/level	Max. 5mA option
DI / BI Input Leakage	Ileak			1	uA	VDI=VBI=VDD =5V
R/G/B off Leakage Current	Ioff			1	uA	VR/G/B=5V, PWM off
Propagation delay time	tPLZ			80	ns	DI → DO, load=30pF
	tPZL			80	ns	
Rising time	tTHL		15		ns	
Falling time	tTLH		15		ns	
Rising time	tR		50		ns	ISK(R/G/B) =3/5mA, load=30pF
Falling time	tF		50		ns	
Data rate	Fdata		800		KHz	



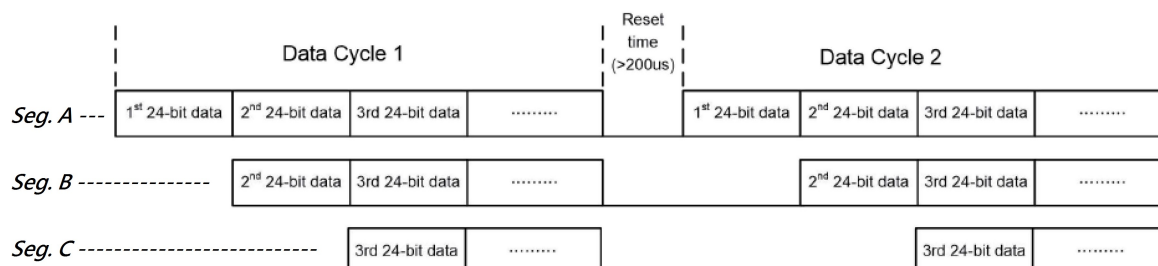


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Data Transfer Protocol



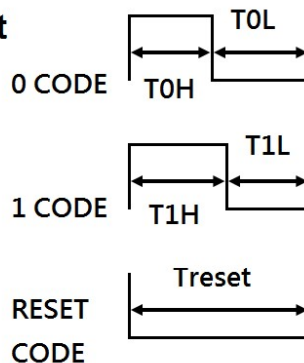
The single wire data transfer protocol supports 24-bit data for each LED RGB display data refresh.

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.

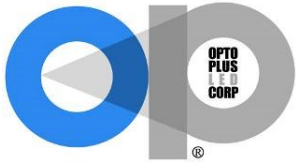


The transferred data are recognized based on the pulse widths received by the IC. A low bit 0 is represented by a 0.3us high pulse followed by a 0.9us low pulse. A high bit 1 is represented by a 0.9us high pulse followed by a 0.3us low pulse. A low pulse $\geq 200\mu s$ is used to issue a reset command 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)



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Sample CODE

```
// Please write using Arduino IDE.

// Make sure that the Adafruit_NeoPixel library has been installed.

#include <Adafruit_NeoPixel.h>
#define LED_PIN    4    // Signal pin for the LED Display.
#define LED_COUNT  64   // Number of LEDs in the LED Display.
Adafruit_NeoPixel strip(LED_COUNT, LED_PIN, NEO_GRB + NEO_KHZ800);
// Function used to create colorful effects
void setup() {
    strip.begin();
    strip.show();
    strip.setBrightness(127); //Set brightness to approximately 1/2 (maximum value = 255)
}
void loop() {
    strip.setPixelColor(0, 255, 0, 0); // Turn on D1-Red
    strip.setPixelColor(1, 255, 0, 0); // Turn on D3-Red
    strip.setPixelColor(8,  0, 0, 0); // Turn off
    strip.setPixelColor(9,  0, 0, 0); // Turn off
    strip.show(); // Update to display
    delay(500); // delay 0.5 seconds.
    strip.setPixelColor(0, 0, 0, 0); // Turn off
    strip.setPixelColor(1, 0, 0, 0); // Turn off
    strip.setPixelColor(8, 0, 255, 0); // Turn on D9-Green
    strip.setPixelColor(9, 0, 255, 0); // Turn on D10-Green
    strip.show(); // Update to display
    delay(500); // delay 0.5 seconds.
}
```

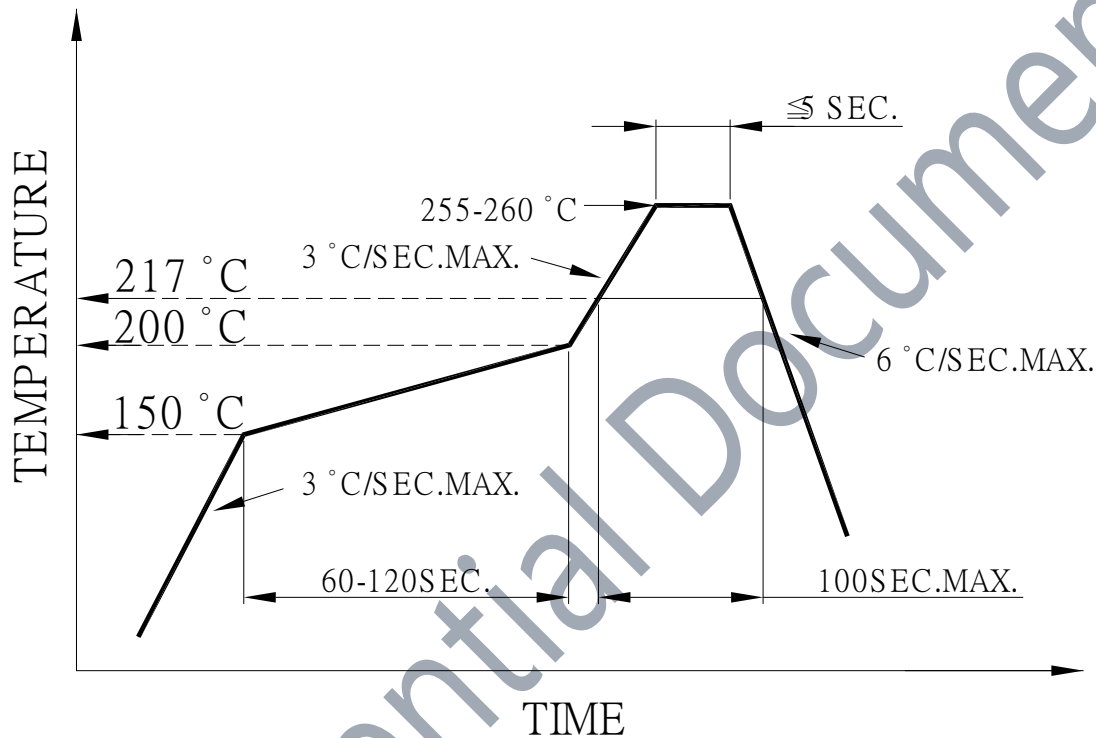


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● SMT REFLOW SOLDERING INSTRUCTIONS

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.

● SOLDERING IRON

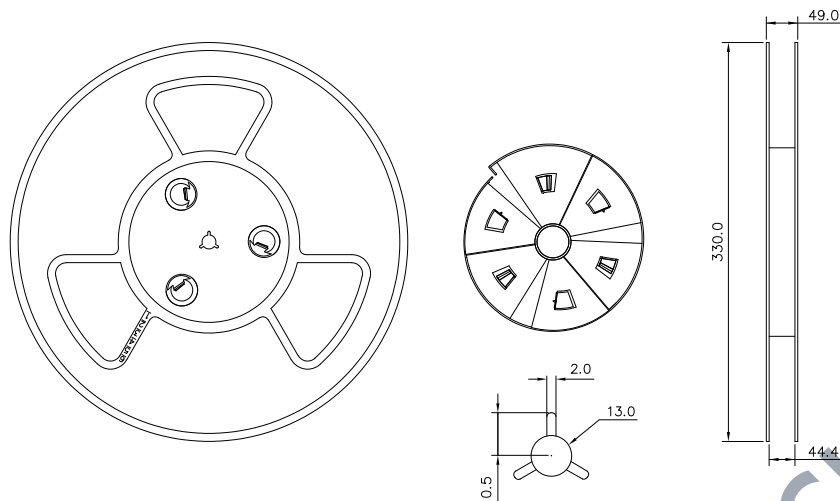
Basic spec is ≤ 4 sec when 260°C. If temperature is higher, time should be shorter (+10°C→1 sec). Power dissipation of Iron should be smaller Than 15W, and temperature should be controllable. Surface temperature Of the device should be under 230°C.

● REWORK

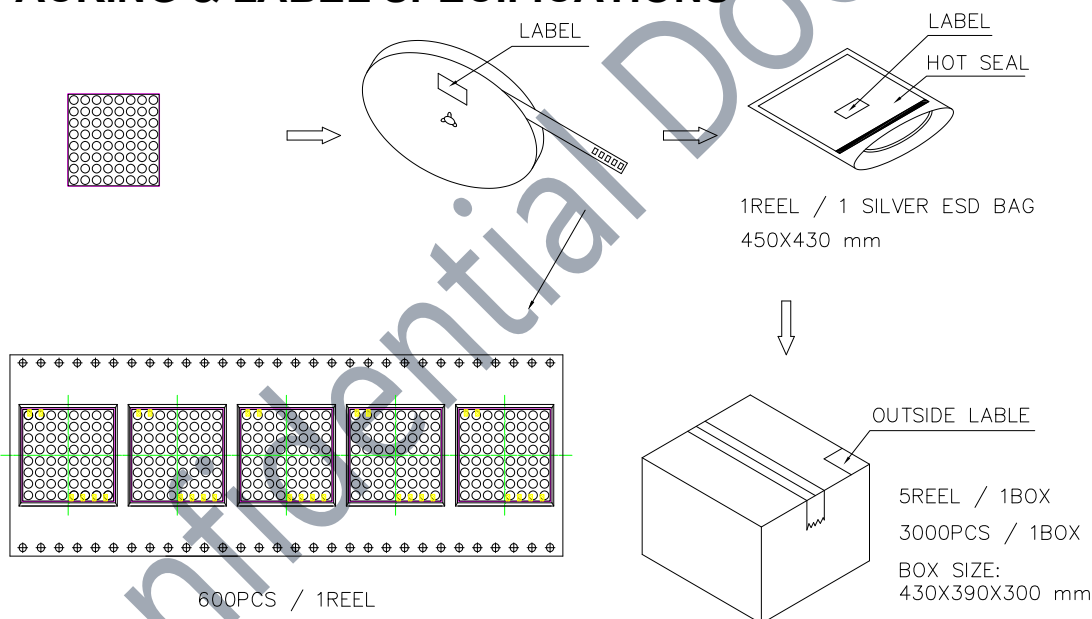
Customer must finish rework within 3 sec. under 350°C.

The head of soldering iron cannot touch copper foil.

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)