BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED !

ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

PRODUCT DATASHEET

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

- ► PLCC Side View SMD
- ► 4516SV 1.7t Series
- ► Red (633nm) / Green (527nm) / Blue (457nm)

Release Date: 16 October 2023 Version: A1.0

N0M65S94ZSV

4516SV 1.7t Series

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RoHS Compliant

AUTOMOTIVE AEC-Q102

FEATURES (Red/Green/Blue*):

- **Package:** PLCC6 RGB Side View SMD Package
- **Forward Current:** 20/20/20mA
- **Forward Voltage (typ.):** 2.1/3.1/2.9V
- **Luminous Flux (typ.):** 480/1760/300mcd@20mA
- **Colour:** Red/Green/Blue
- **Dominant Wavelength (typ.):** 633/527/457nm
- **Viewing Angle:** 120/120/120°
- **Materials:**
  - Resin: Silicon (White Diffused)
- **Operating Temperature:** -40~+105°C
- **Storage Temperature:** -40~+105°C
- **ESD:** 2000 (HBM)
- **Grouping Parameters:**
  - Forward voltage
  - Luminous intensity
  - Dominant wavelength
- **Soldering Methods:** Reflow soldering
- **MSL Level:** 2a according to JEDEC
- **Packing:** 12mm tape with max.2000pcs/reel, ø180mm (7'')

APPLICATIONS:

- Automotive
- 3C Application
- Decoration Lighting
- Flat Backlight for LCD

CHARACTERISTICS:

Absolute Maximum Characteristics (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Forward Current	I_F	30/30/30*	mA
Pulse Forward Current (duty 1/10; width 0.1ms)	I_{MAX}	100	mA
Reverse Voltage	V_R	5	V
Reverse Current @5V	I_R	10	μA
Electrostatic Discharge (HBM)	ESD	2000	V
Junction Temperature	T_j	125	°C
Thermal Resistance Junction to Solder Point	R_{THJ-S}	65/110/100	°C/W
Soldering Temperature	T_{sol}	260	°C
Operating Temperature	T_{OPR}	-40~+105	°C
Storage Temperature	T_{STG}	-40~+105	°C

1. * In the order of Red/Green/Blue.

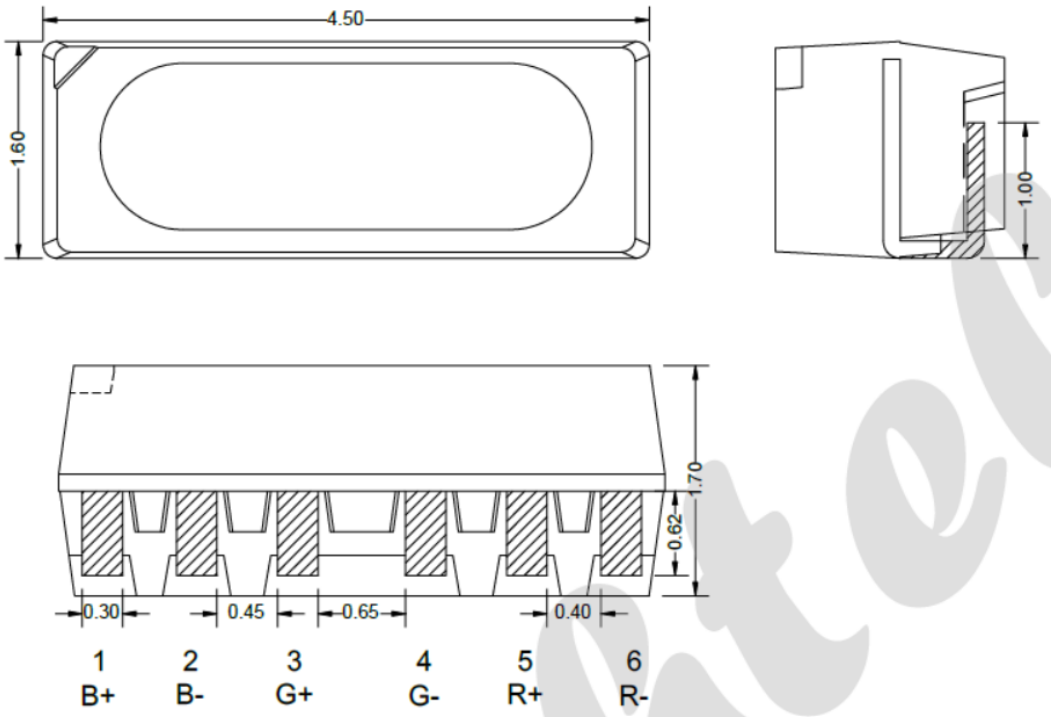
Electrical & Optical Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Red - Forward Voltage	V_F	1.8	---	2.4	V	I_F=20mA
Red - Luminous Intensity	I_V	380	480	600	mcd	I_F=20mA
Red - Wavelength	W_P	630	---	636	nm	I_F=20mA
Green - Forward Voltage	V_F	2.8	---	3.4	V	I_F=20mA
Green - Luminous Intensity	I_V	1400	1760	2200	mcd	I_F=20mA
Green - Wavelength	W_P	524	---	529	nm	I_F=20mA
Blue - Forward Voltage	V_F	2.6	---	3.2	V	I_F=20mA
Blue - Luminous Intensity	I_V	240	300	380	mcd	I_F=20mA
Blue - Wavelength	W_P	455	---	460	nm	I_F=20mA
Viewing Angle	$2\theta_{1/2}$	---	120	---	deg	I_F=20mA

1. Luminous intensity (IV) ±10%, Forward Voltage (VF) ±0.1V, Viewing angle(2θ1/2) ±5%, Wavelength (λ) ±1nm.
2. We will amend the bin code to maintain bins centralization, and we provide the luminous intensity 1.25double per bin and the dominant wavelength is per 5/5/5nm of the R/G/B per bins.

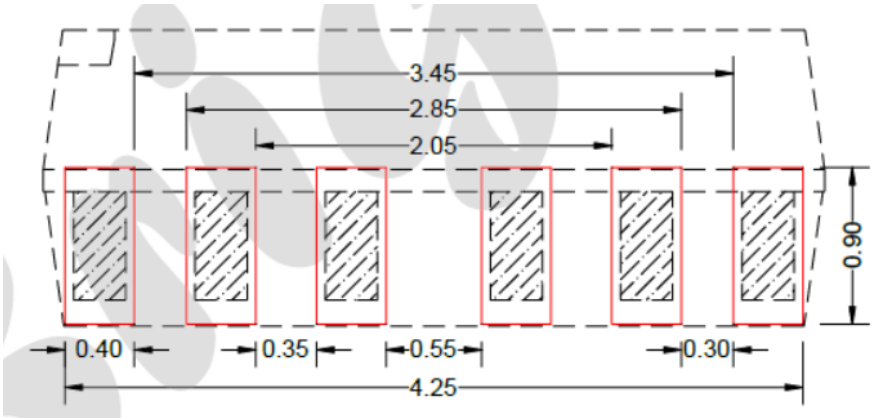
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).
2. Tolerance ±0.1mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



Recommended PCB Solder Pad

1. Dimensions are in millimetre (mm).
2. Tolerance ±0.1mm with angle tolerance ±0.5°.

BINNING GROUPS:

Forward Voltage Classifications (I_F = 20mA):

Code		Min.	Max.	Unit
R	A	1.8	2.4	V
G	B	2.8	3.4	
B	C	2.6	3.2	

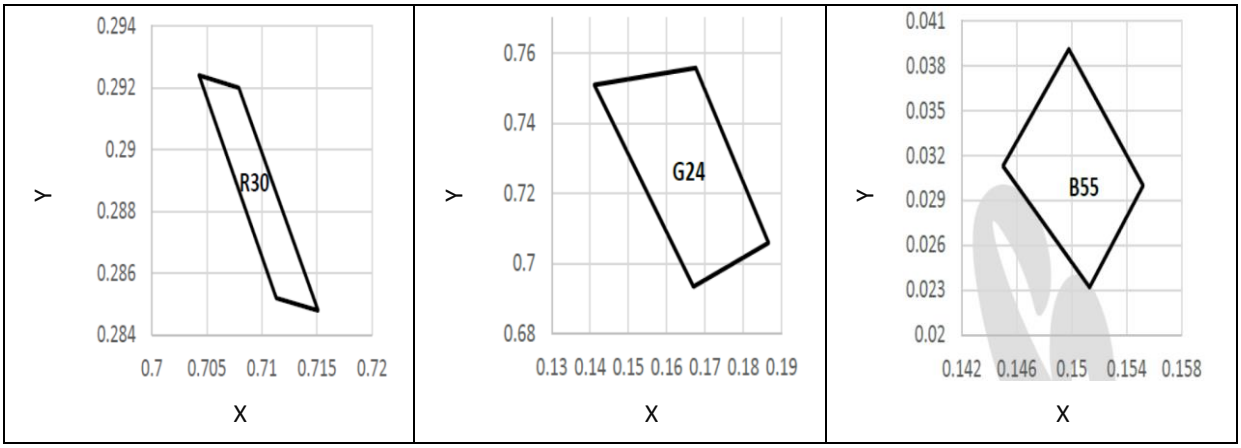
Luminous Intensity Classifications (I_F = 20mA):

Code		Min.	Max.	Unit
R	1	380	480	mcd
	2	480	600	
G	1	1400	1760	mcd
	2	1760	2200	
B	1	240	300	mcd
	2	300	380	

Dominant Wavelength Classifications (I_F = 20mA):

Code		Min.	Max.	Unit
R	A	630	636	nm
G	B	524	529	nm
B	C	455	460	nm

CIE CHROMATICITY DIAGRAM:

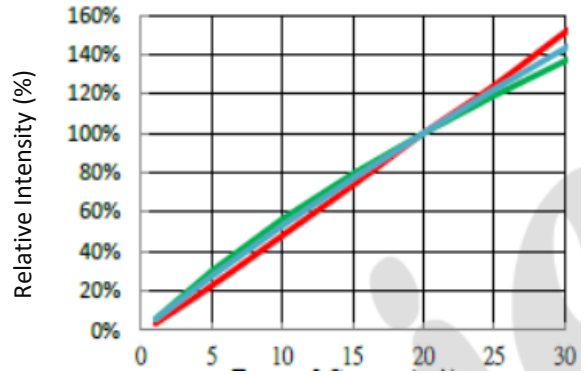


Chromaticity Coordinates Classifications (I_F = 20mA):

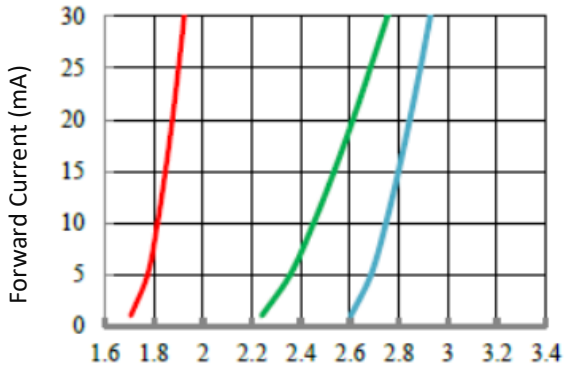
	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
R30	0.7043	0.2924	0.7079	0.2920	0.7151	0.2848	0.7113	0.2852
G24	0.1676	0.7558	0.1411	0.7510	0.1670	0.6934	0.1866	0.7059
B55	0.1450	0.0313	0.1513	0.0232	0.1552	0.0300	0.1498	0.0391

ELECTRO-OPTICAL CHARACTERISTICS:

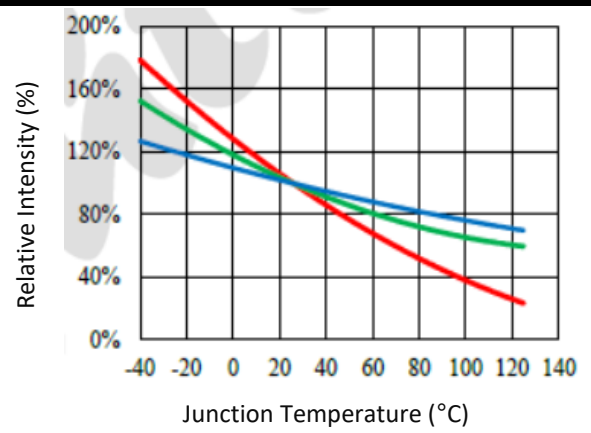
Relative Intensity v.s. Forward Current



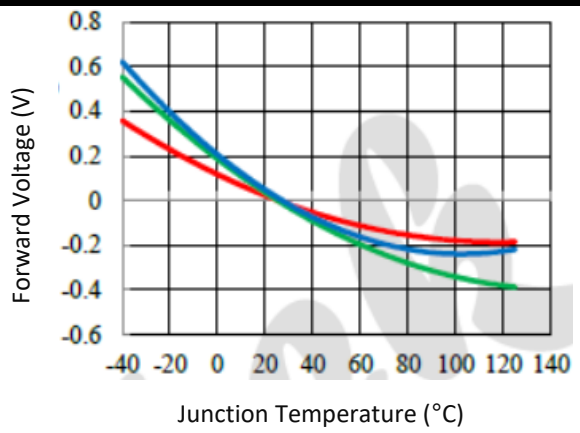
Forward Current v.s. Forward Voltage



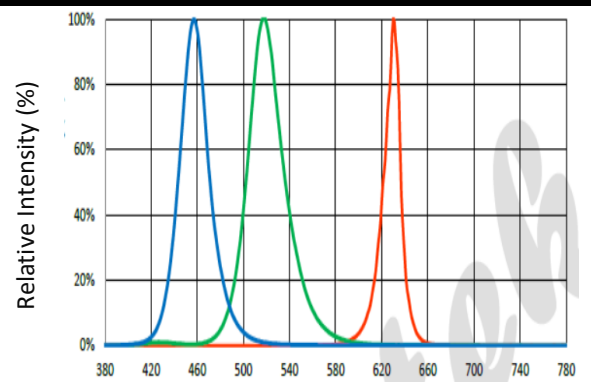
Relative Intensity v.s. Jnction Temperature



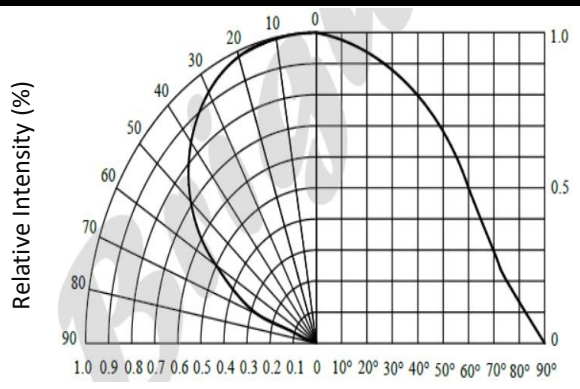
Forward Voltage v.s. Junction Temperature



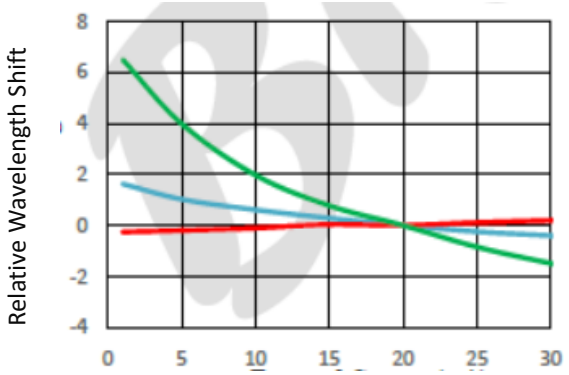
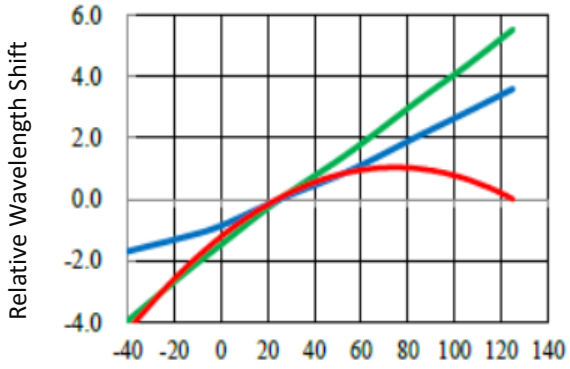
Relative Spectral Distribution



Directive Radiation

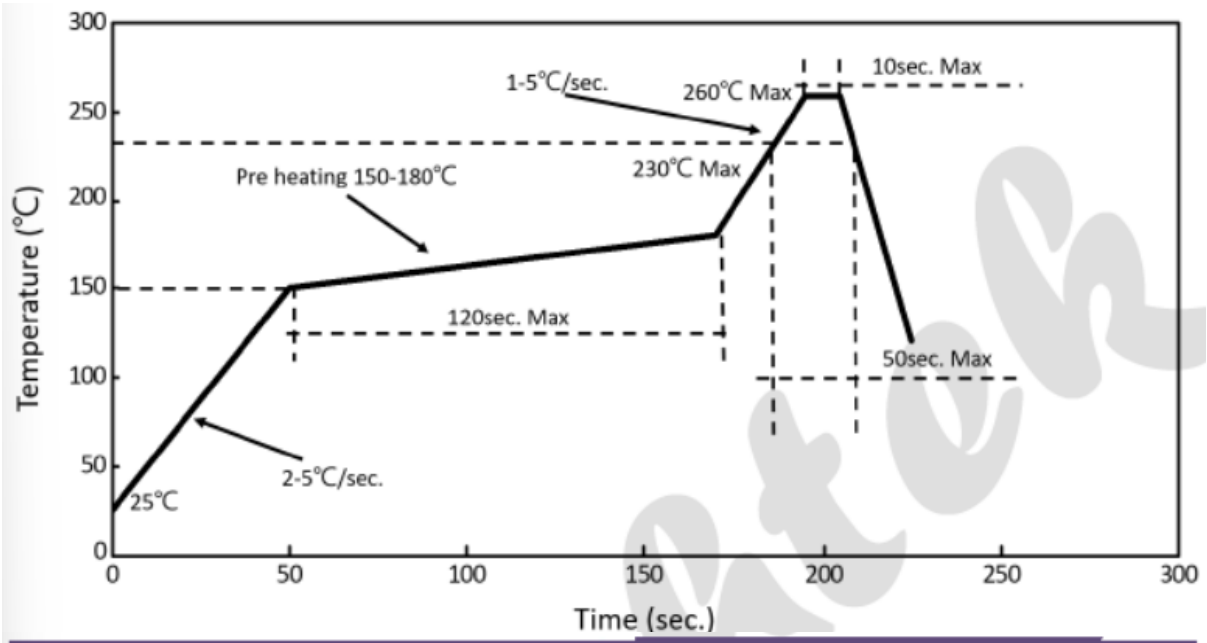


ELECTRO-OPTICAL CHARACTERISTICS:

Colours Shifting v.s. Forward Current	Colour Shifting v.s. Junction Temperature
	

RECOMMENDED SOLDERING PROFILE:

Lead-free Solder:



Characteristics	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Min.	Recommendation	Max.	
Ramp-up rate to preheat (25°C to 150°C)	-	-	2	3	K/s
Time tS (TS min to TS max)	tS	60	100	120	s
Ramp-up rate to peak (TS max to TP)	-	-	2	3	K/s
Liquidus temperature	TL	-	217	-	°C
Time above liquidus temperature	tL	-	80	100	s
Peak temperature	TP	-	245	260	°C
Time within 5 °C of the specified peak temperature TP - 5 K	tP	-	-	10	s
Ramp-down Rate (TP to 100 °C)	-	-	3	4	K/s
Time 25 °C to TP	-	-	-	480	s

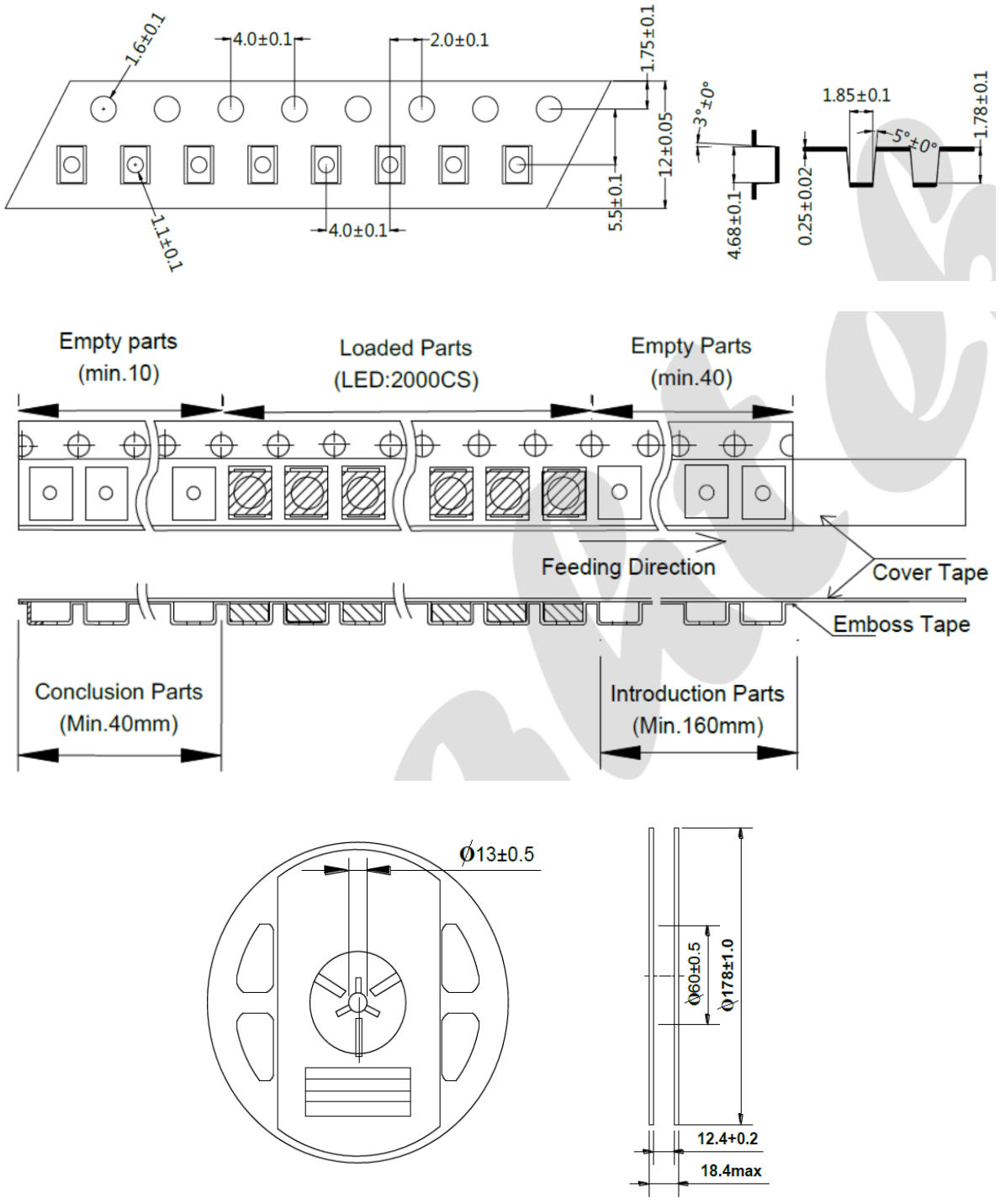
Note:

1. Maximum reflow soldering: 3 times.
2. Recommended reflow temperature is 240°C; the maximum soldering temperature should be limited to 260°C.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

PACKING SPECIFICATION:

Reel Dimension:

Max.2000pcs/reel



PRECAUTIONS OF USE:

Storage:

It is recommended to store the products in the following conditions:

- Humidity: 60% R.H. Max.
- Temperature: 5°C~30°C (41°F ~86°F).

Shelf life in sealed bag: 12 months at 5°C~30°C and <60% R.H.

Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp-proof box with descanting agent <10% R.H. and apply baking before use.

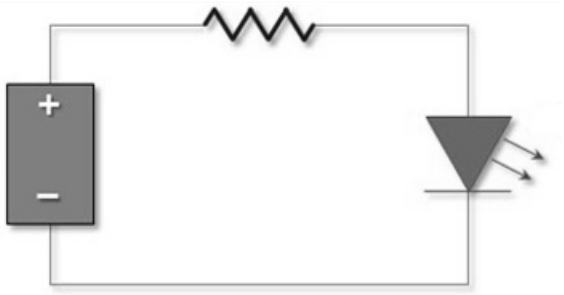
Baking:

It is recommended to bake the LED before soldering if the pack has been unsealed for longer than 24hrs. The suggested baking conditions are as followings:

- 60±3°C x 6hrs and <5%RH, taped / reel package.

It's normal to see slight color fading of carrier (light yellow) after baking in process.

Testing Circuit:



Must apply resistor(s) for protection (over current proof).

Cleaning:

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED carrier / package. Avoid putting any stress force directly on to the LED lens.

ESD (Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing the LED all time. All devices, equipment, machinery, work tables, and storage racks must be properly grounded.

In the events of manual working in process, make sure the devices are well protected from ESD at any time.

REVISION RECORD:

Version	Date	Summary of Revision
A1.0	16/10/2023	Datasheet set-up.