
SPECIFICATION

ITEM	FULL COLOR SIDE VIEW LED
MODEL	SFAF3L
CUSTOMER	

Customer

Approved by	Approved by	Approved by
/	/	/

Supplier

Drawn by	Checked by	Approved by
/	/	/



SEOUL SEMICONDUCTOR CO., LTD.

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1. Features

- Package: SMT Solderability
- Dimension : 7.0 × 2.0 × 1.9 (mm)
- Low Thermal Resistance
- RoHS Compliant, Lead Free
- 6-Pin (R, G, B separate) type
- InGaAlP(Red) / InGaN(Green) / InGaN(Blue)
- SFAF3L is Very Useful Side View LED in Back Light Unit Application
- Long Life Time (MTTF*1 : > 15,000HR @ Ta=25℃, If=20(R), 40(G), 20(B) mA)

2. Applications

- Flat Backlighting (LCD, Display)
- Monitor, PDA, CNS, Notebook
- Coupling into Light Guide Panel
- Illuminations

*1 MTTF = Mean Time To Failure. Failure means that Luminous intensity degrades to 50% of initial value.

3. Absolute Maximum Ratings

 $(T_a = 25^\circ\text{C})$

Parameter	Symbol	Value			Unit
		RED	GREEN	BLUE	
Power Dissipation	P_d^{*1}	72	204	102	mW
Forward Current	I_F	30	60	30	mA
Peak Forward Current	I_{FM}^{*2}	100	180	100	mA
Reverse Voltage	V_R	5			V
Operating Temperature	T_{opr}	-40 ~ +85			$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +100			$^\circ\text{C}$

*1 Care is to be taken that Power Dissipation does not exceed the Absolute Maximum Rating of the product. The value for one LED device.(Single color)

*2 I_{FM} conditions : Pulse width $T_w \leq 0.1\text{ms}$, Duty ratio $\leq 1/10$

4. Electro-Optical Characteristics

 $(T_a = 25^\circ\text{C})$

Item	Symbol	Condition	Min	Typ	Max	Unit	
Forward Voltage	RED	V_F	$I_F = 20\text{ mA}$	1.8	-	2.4	V
	GREEN		$I_F = 40\text{ mA}$	2.8	-	3.6	
	BLUE		$I_F = 20\text{ mA}$	2.8	-	3.4	
Reverse Current	I_R	$V_R = 5\text{ V}$	50			μA	
Luminous Intensity ^{*1}	RED	I_V	$I_F = 20\text{ mA}$	500	-	700	mcd
	GREEN		$I_F = 40\text{ mA}$	2050	-	2500	
	BLUE		$I_F = 20\text{ mA}$	170	-	230	
Viewing Angle ^{*2}	$2\theta_{1/2}$	$I_F = 60\text{ mA}$	120			$^\circ$	
Dominant Wavelength	RED	λ_d	$I_F = 20\text{ mA}$	620	-	625	nm
	GREEN		$I_F = 40\text{ mA}$	525	-	535	
	BLUE		$I_F = 20\text{ mA}$	455	-	460	
Thermal Resistance ^{*3}	RED	$R_{th\ j-a}$	$I_F = 20\text{ mA}$	-	330	-	$^\circ\text{C/W}$
	GREEN		$I_F = 40\text{ mA}$	-	310	-	
	BLUE		$I_F = 20\text{ mA}$	-	310	-	

*1 The luminous intensity I_V is measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package. Luminous Intensity Measurement allowance is $\pm 10\%$.

*2 $\theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.

*3 Thermal resistance from LED junction to the specific environment

Note : All measurements were made under the standardized environment of Seoul Semiconductor.

5. Rank of SFAF3L

▣ Luminous Intensity [Iv]

IV Rank Name	RED		IV Rank Name	GREEN		IV Rank Name	BLUE	
	MIN	MAX		MIN	MAX		MIN	MAX
RN	500	550	GN	2050	2200	BN	170	200
RO	550	600	GO	2200	2350	BO	200	230
RP	600	650	GP	2350	2500			
RQ	650	700						

Mix Rank Name	R	G	B
N1	N	N	N
N2	N	N	O
N3	N	O	N
N4	N	O	O
N5	N	P	N
N6	N	P	O
O1	O	N	N
O2	O	N	O
O3	O	O	N
O4	O	O	O
O5	O	P	N
O6	O	P	O

Mix Rank Name	R	G	B
P1	P	N	N
P2	P	N	O
P3	P	O	N
P4	P	O	O
P5	P	P	N
P6	P	P	O
Q1	Q	N	N
Q2	Q	N	O
Q3	Q	O	N
Q4	Q	O	O
Q5	Q	P	N
Q6	Q	P	O

▣ Dominant Wavelength [λ_d]

DW Rank Name	RED		DW Rank Name	GREEN		DW Rank Name	BLUE	
	MIN	MAX		MIN	MAX		MIN	MAX
RA	620.0	622.5	GA	525.3	527.5	BA	455.0	460.0
RB	622.5	625.0	GB	527.5	530.0			
			GC	530.0	532.5			
			GD	532.5	535.0			

Mix Rank Name	R	G	B
DW1	A	A	A
DW2	A	B	A
DW3	A	C	A
DW4	A	D	A

Mix Rank Name	R	G	B
DW5	B	A	A
DW6	B	B	A
DW7	B	C	A
DW8	B	D	A

▣ Forward Voltage

DW Rank Name	RED		GREEN		BLUE	
	MIN	MAX	MIN	MAX	MIN	MAX
Z	1.8	2.4	2.8	3.6	2.8	3.4

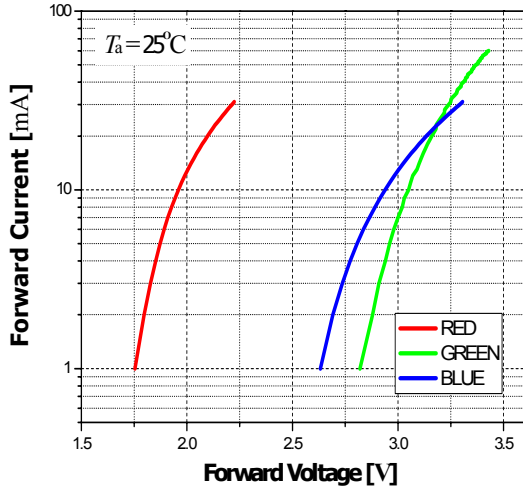
6. Rank Name Table

X_1	X_2	X_3
Max Vf	Mix λ d	Mix Iv

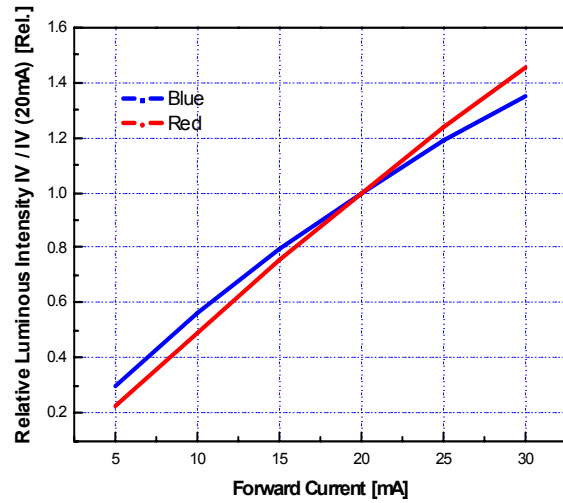
Label Name	Code Name	Label Name	Code Name	Label Name	Code Name	Label Name	Code Name
1	ZDW1N1	49	ZDW3N1	97	ZDW5N1	145	ZDW7N1
2	ZDW1N2	50	ZDW3N2	98	ZDW5N2	146	ZDW7N2
3	ZDW1N3	51	ZDW3N3	99	ZDW5N3	147	ZDW7N3
4	ZDW1N4	52	ZDW3N4	100	ZDW5N4	148	ZDW7N4
5	ZDW1N5	53	ZDW3N5	101	ZDW5N5	149	ZDW7N5
6	ZDW1N6	54	ZDW3N6	102	ZDW5N6	150	ZDW7N6
7	ZDW1O1	55	ZDW3O1	103	ZDW5O1	151	ZDW7O1
8	ZDW1O2	56	ZDW3O2	104	ZDW5O2	152	ZDW7O2
9	ZDW1O3	57	ZDW3O3	105	ZDW5O3	153	ZDW7O3
10	ZDW1O4	58	ZDW3O4	106	ZDW5O4	154	ZDW7O4
11	ZDW1O5	59	ZDW3O5	107	ZDW5O5	155	ZDW7O5
12	ZDW1O6	60	ZDW3O6	108	ZDW5O6	156	ZDW7O6
13	ZDW1P1	61	ZDW3P1	109	ZDW5P1	157	ZDW7P1
14	ZDW1P2	62	ZDW3P2	110	ZDW5P2	158	ZDW7P2
15	ZDW1P3	63	ZDW3P3	111	ZDW5P3	159	ZDW7P3
16	ZDW1P4	64	ZDW3P4	112	ZDW5P4	160	ZDW7P4
17	ZDW1P5	65	ZDW3P5	113	ZDW5P5	161	ZDW7P5
18	ZDW1P6	66	ZDW3P6	114	ZDW5P6	162	ZDW7P6
19	ZDW1Q1	67	ZDW3Q1	115	ZDW5Q1	163	ZDW7Q1
20	ZDW1Q2	68	ZDW3Q2	116	ZDW5Q2	164	ZDW7Q2
21	ZDW1Q3	69	ZDW3Q3	117	ZDW5Q3	165	ZDW7Q3
22	ZDW1Q4	70	ZDW3Q4	118	ZDW5Q4	166	ZDW7Q4
23	ZDW1Q5	71	ZDW3Q5	119	ZDW5Q5	167	ZDW7Q5
24	ZDW1Q6	72	ZDW3Q6	120	ZDW5Q6	168	ZDW7Q6
25	ZDW2N1	73	ZDW4N1	121	ZDW6N1	169	ZDW8N1
26	ZDW2N2	74	ZDW4N2	122	ZDW6N2	170	ZDW8N2
27	ZDW2N3	75	ZDW4N3	123	ZDW6N3	171	ZDW8N3
28	ZDW2N4	76	ZDW4N4	124	ZDW6N4	172	ZDW8N4
29	ZDW2N5	77	ZDW4N5	125	ZDW6N5	173	ZDW8N5
30	ZDW2N6	78	ZDW4N6	126	ZDW6N6	174	ZDW8N6
31	ZDW2O1	79	ZDW4O1	127	ZDW6O1	175	ZDW8O1
32	ZDW2O2	80	ZDW4O2	128	ZDW6O2	176	ZDW8O2
33	ZDW2O3	81	ZDW4O3	129	ZDW6O3	177	ZDW8O3
34	ZDW2O4	82	ZDW4O4	130	ZDW6O4	178	ZDW8O4
35	ZDW2O5	83	ZDW4O5	131	ZDW6O5	179	ZDW8O5
36	ZDW2O6	84	ZDW4O6	132	ZDW6O6	180	ZDW8O6
37	ZDW2P1	85	ZDW4P1	133	ZDW6P1	181	ZDW8P1
38	ZDW2P2	86	ZDW4P2	134	ZDW6P2	182	ZDW8P2
39	ZDW2P3	87	ZDW4P3	135	ZDW6P3	183	ZDW8P3
40	ZDW2P4	88	ZDW4P4	136	ZDW6P4	184	ZDW8P4
41	ZDW2P5	89	ZDW4P5	137	ZDW6P5	185	ZDW8P5
42	ZDW2P6	90	ZDW4P6	138	ZDW6P6	186	ZDW8P6
43	ZDW2Q1	91	ZDW4Q1	139	ZDW6Q1	187	ZDW8Q1
44	ZDW2Q2	92	ZDW4Q2	140	ZDW6Q2	188	ZDW8Q2
45	ZDW2Q3	93	ZDW4Q3	141	ZDW6Q3	189	ZDW8Q3
46	ZDW2Q4	94	ZDW4Q4	142	ZDW6Q4	190	ZDW8Q4
47	ZDW2Q5	95	ZDW4Q5	143	ZDW6Q5	191	ZDW8Q5
48	ZDW2Q6	96	ZDW4Q6	144	ZDW6Q6	192	ZDW8Q6

7. Characteristic Diagram

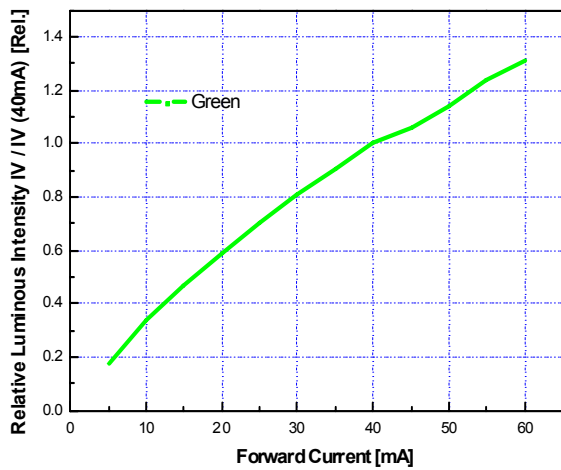
Forward Current vs. Forward Voltage



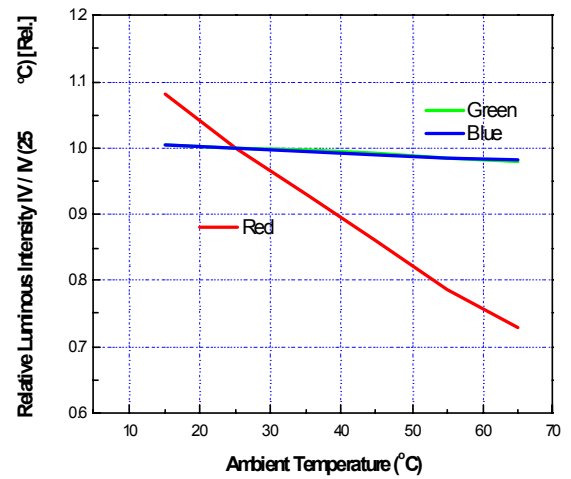
Intensity vs. Forward Current [Red, Blue]



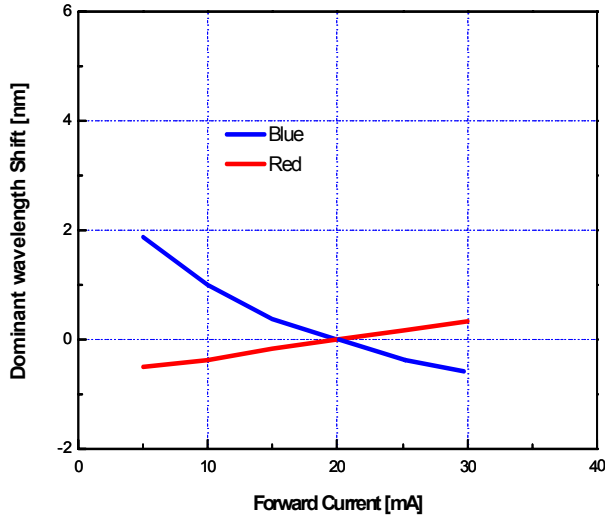
Intensity vs. Forward Current [Green]



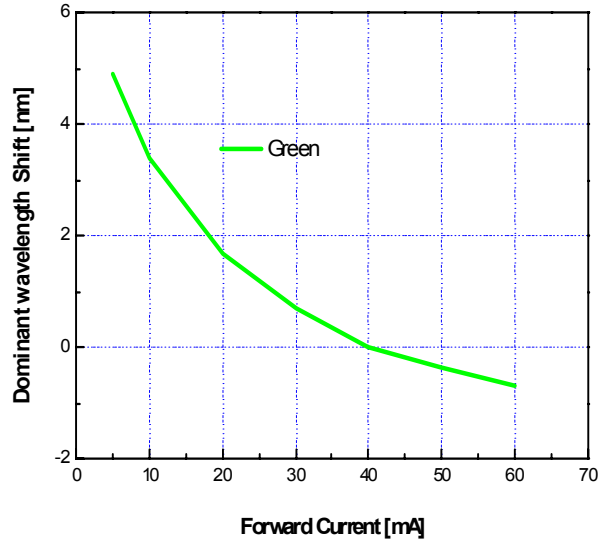
Intensity vs. Ambient Temperature



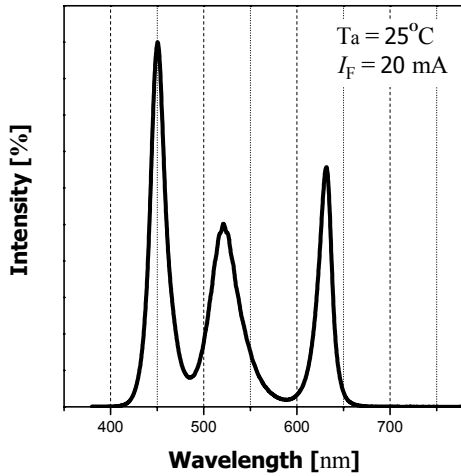
Wavelength vs. Forward Current [Red, Blue]



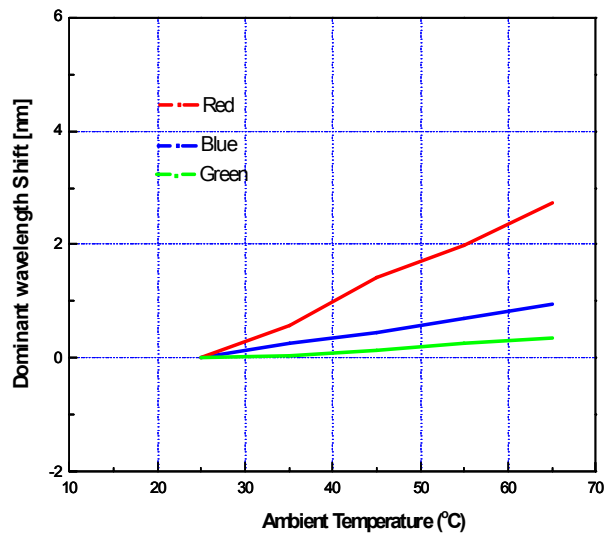
Wavelength vs. Forward Current [Green]



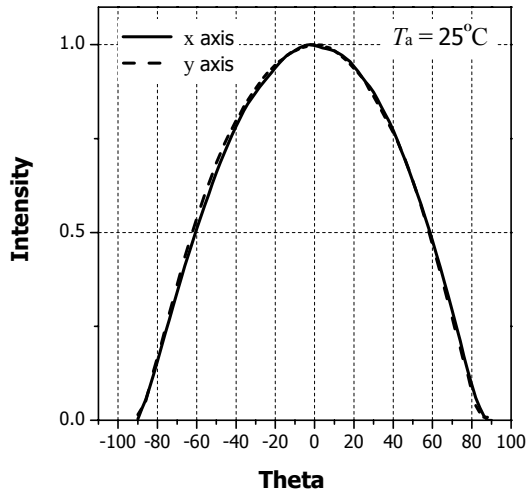
Spectrum



Dominant Wavelength vs. Ambient Temperature



Radiation Diagram



8. Reliability

(1) TEST ITEMS AND RESULTS

TEST ITEM	Test conditions	Note	Number of Damaged	Reference
Life Test	$T_a = 25^\circ\text{C}$; $I_F = 20 \text{ mA /chip}$	1000 hr	0/20	EIAJ ED-4701 100 101
High Humidity Heat Life Test	$T_a = 60^\circ\text{C}$; $RH = 90\%$, $I_F = 20 \text{ mA /chip}$	1000 hr	0/20	EIAJ ED-4701 100 102
Thermal Shock	$-30^\circ\text{C} \sim 85^\circ\text{C}$ (30 min) (30 min)	20 cycle	0/50	EIAJ ED-4701 300 307
High Temperature Life Test	$T_a = 85^\circ\text{C}$; $I_F = 15 \text{ mA /chip}$	1000 hr	0/20	-
Low Temperature Life Test	$T_a = -40^\circ\text{C}$; $I_F = 20 \text{ mA /chip}$	1000 hr	0/20	-
High Temperature Storage	$T_a = 100^\circ\text{C}$	1000 hr	0/50	EIAJ ED-4701 200 201
Low Temperature Storage	$T_a = -40^\circ\text{C}$	1000 hr	0/50	EIAJ ED-4701 200 202
Humidity Heat Storage	$T_a = 60^\circ\text{C}$; $RH = 90\%$	1000 hr	0/20	
ESD	Human Body Mode : 1 kV	1 time	0/50	MIL-STD 888E

(2) CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Condition	Criteria for Judgment	
			Min.	Max.
Forward Voltage	V_F	$I_F = 20 \text{ mA/chip}$	-	U.S.L \times 1.2
Reverse Current	I_R	$V_R = 5 \text{ V}$	-	U.S.L \times 2.0
Luminous Intensity	I_V	$I_F = 20 \text{ mA/chip}$	L.S.L \times 0.7	-

U.S.L. : Upper Standard Level, L.S.L. : Lower Standard Level

9. Precautions

(1) Storage conditions

- Keep the product in a dry box or a desiccator with a desiccant in order to prevent moisture absorption.
 - a. Keep it at a temperature in the range from 5°C to 30°C and at a humidity of less than 60% RH.
- In case of being stored for more than 3 months, the product should be sealed with Nitrogen gas.

(2) After opening the package

- When soldering, this could result in a decrease of the photoelectric effect or light intensity.
 - a. Soldering should be done right after mounting the product.
 - b. Keep the temperature in the range from 5°C to 40°C and the humidity at less than 30%.
- Soldering should be done within 7 days after opening the desiccant package.

If the product has been exposed for more than 7 days after opening the package or the indicating color of the desiccator changes, the product must be baked at a temperature between 60°C and 65°C for 10 to 12 hours.

- An unused and unsealed product should be repacked in a desiccant package and kept sealed in a dry atmosphere.

(3) Precautions for use

- Any external mechanical force or excessive vibration should not be applied to the product during cooling after soldering, and it is preferable to avoid rapid cooling.
- The product should not be mounted on a distorted part of PCB.
- Gloves or wrist bands for ESD(Electric Static Discharge) should be wore in order to prevent ESD and surge damage, and all devices and equipments must be grounded to the earth.

(4) Miscellaneous

- Radiation resistance is not considered.
- When cleaning the product, any kind of fluid such as water, oil and organic solvent must not be used and IPA(Isopropyl Alcohol) must be used.
- When using the product, operating current should be settled in consideration of the maximum ambient temperature.
- Its appearance or specification for improvement is subject to change without notice.

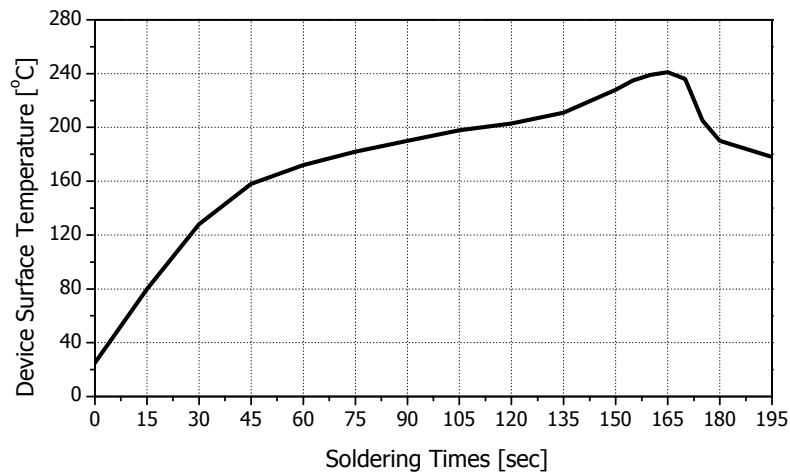
10. Soldering Profile

The LED can be soldered in place using the reflow soldering method.

(1) Lead solder

Preliminary heating to be at maximum 210°C for maximum 2 minutes.

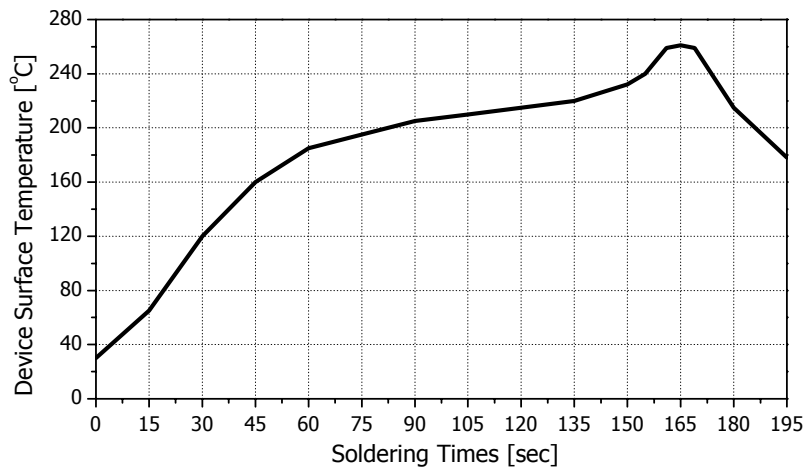
Soldering heat to be at maximum 240°C for maximum 10 seconds.



(2) Lead-free solder

Preliminary heating to be at maximum 220°C for maximum 2 minutes.

Soldering heat to be at maximum 260°C for maximum 10 seconds.

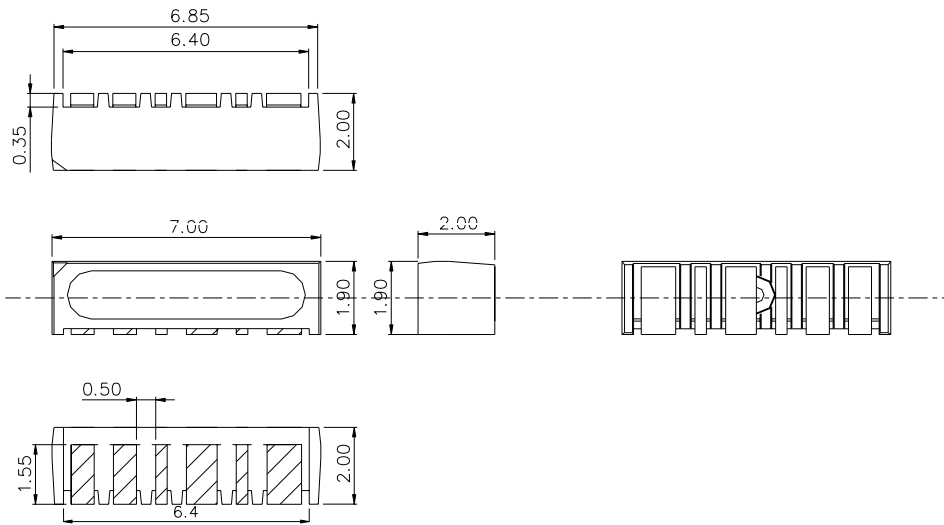


(3) Hand Soldering conditions

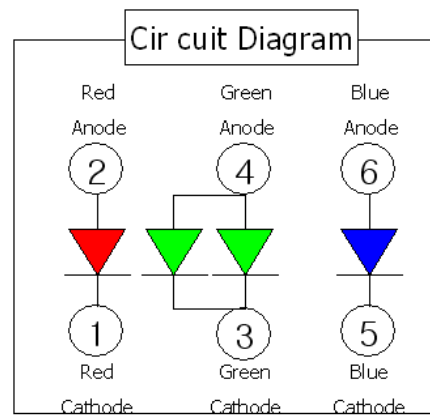
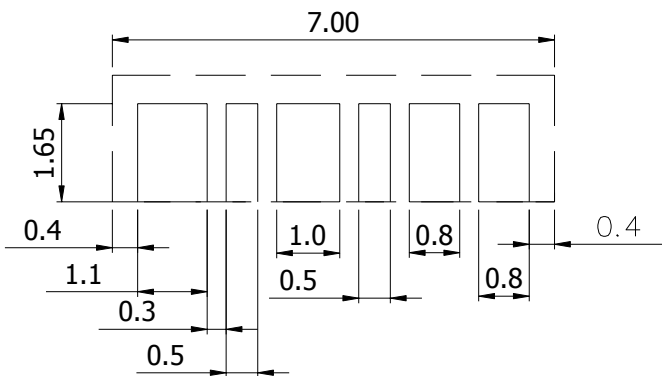
Not more than 5 seconds @MAX 300°C, under Soldering iron.

11. Outline Dimension

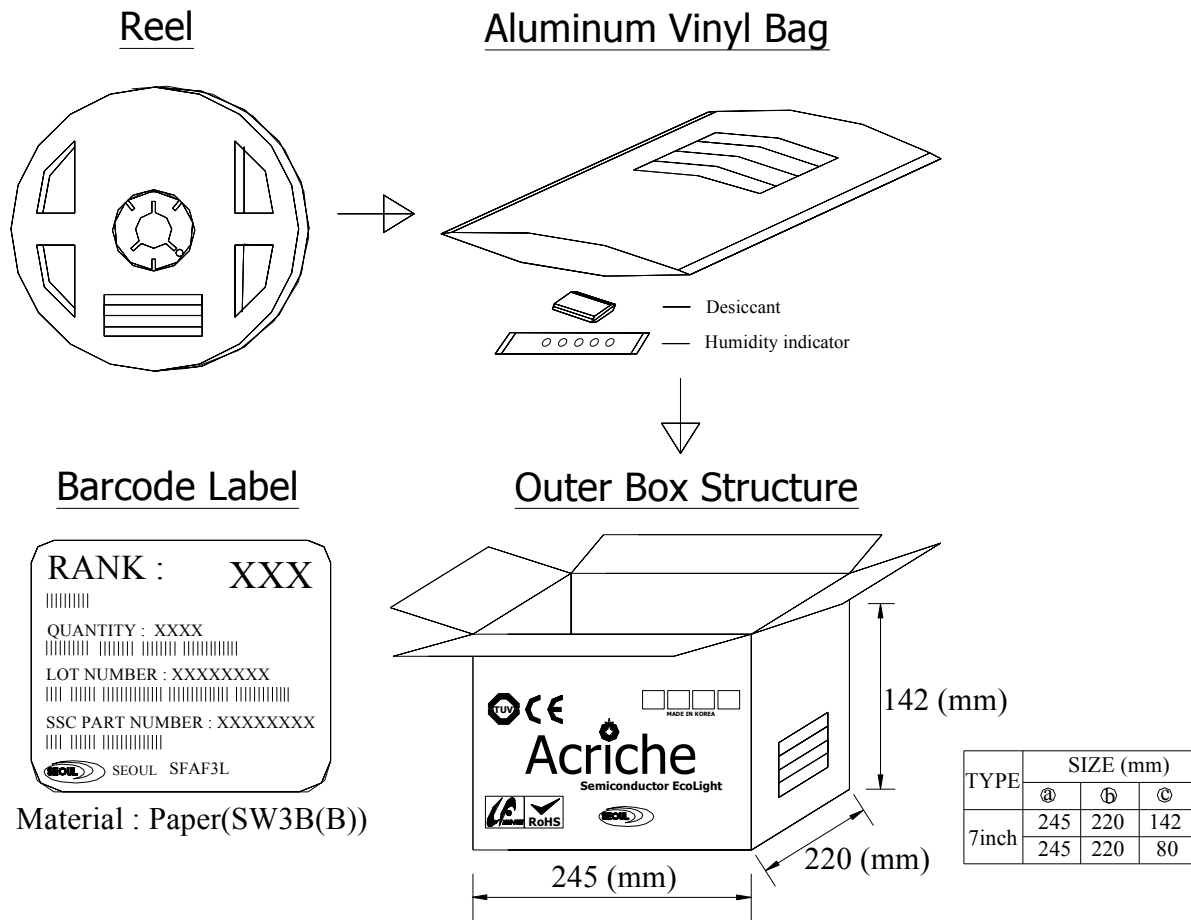
(Tolerance : ± 0.2 , Unit : mm)



Recommended solder pad



13. Reel Packing Structure



● **Lot Number**

The lot number is composed of the following characters;

SFAF3L ○□□◎◎ ◇◇◇

Symbol	Meaning	Example
○	Year	8 for 2008, 9 for 2009
□□	Month	01 for Jan., 02 for Feb., 12 for Dec.
◎◎	Day	01, 02, 03, 04, 05, 27, 28, 29, 30, 31
◇◇◇	Number	001, 002, 003, 004, 005, 006, 007

13. History

Rev. No.	Contents	Date
1.00	- The institution of New Spec.	2008.06.03

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