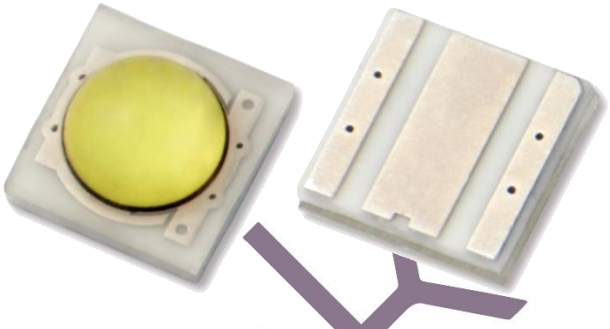
3535DP White LEDs

F-H Type



- Outline : 3.5*3.5*2.0mm
- High efficiency
- Good thermal dissipation & optical uniformity

Table of Contents :

Features

- Binning based on ANSI C78.377
- RoHS and REACH-compliant
- MSL2 qualified according to J-STD 020
- ESD 2KV (HBM : MIL-STD-883 Class 2)

Applications

- Portable lighting
- Outdoor lighting
- Indoor lighting
- Commercial lighting
- Industrial lighting
- Decorative lighting
- Automobile lighting
- Street and tunnel lighting

■ Product Code

V – F – DP35 – A – W3FF – H – 0 – 3 – Z – 4

V – F – DP35 – A – W3FF – H – 0 – 2 – Z – 4

V – F – DP35 – A – W5FF – H – 0 – K – Z – 4

V – F – DP35 – A – W5FF – H – C – 2 – Z – 4

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	②	③	④	⑤
Process type	**Category**	**Specification**	**Lens code**	**Dice wavelength & Luminous rank**
V: Eutectic process	F: Flip Chip LED	DP35: Ceramic 3535	A: 120°	W3XX: Cool White W5XX: Warm White

⑥	⑦	⑧	⑨	⑩
Support code	**Zener & High CRI**	**Cap color code**	**Module & Lens code**	**Current code**
H: HTCC	0: None Zener CRI>70 C: None Zener CRI>80	2: Series No. 3: Series No. K: 4000K	Z: Molding	4: 350mA

■ Product list

Color & CRI	Luminous Flux (lm) @350mA			Typical CCT (K)	Forward Voltage (V) @350mA		Viewing Angle	Part Number
	Group	Min.	Max.		Min.	Max.		
Cool White >70	B35	120	130	5710-6530	2.8	3.4	120°	VFDP35AW3FFH03Z4
	B36	130	140					
	B37	140	150					
	B38	150	160					
Cool White >70	B35	120	130	4745-5310	2.8	3.4	120°	VFDP35AW3FFH02Z4
	B36	130	140					
	B37	140	150					
	B38	150	160					
Neutral White >70	B34	110	120	3710-4260	2.8	3.4	120°	VFDP35AW5FFH0KZ4
	B35	120	130					
	B36	130	140					
	B37	140	150					
Warm White >80	B32	90	100	2725-3045	2.8	3.4	120°	VFDP35AW5FFHC2Z4
	B33	100	110					
	B34	110	120					
	B35	120	130					

Notes:

1. Forward voltage (V_F) ±0.05V ; Luminous flux (Φ_V) ±7% ; CRI ±2 Viewing angle($2\theta_{1/2}$) ±10°
2. IS standard testing.

■ Maximum Rating (Ta : 25℃)

Characteristics	Symbol	Min.	Typical	Max.	Unit
DC Forward Current[1]	I_F		350	1000	mA
Pulse Forward Current[2]	I_{PF}			1500	mA
Reverse Voltage	V_R			-5	V
Reverse Current (5V)	I_R			10	μA
Junction Temperature[3]	T_j			150	℃
Thermal Resistance Junction / Solder Point	R_{th}		10		℃/W
Storage Temperature Range	T_{stg}	-40	–	100	℃
Soldering Temperature	T_{sol}			250	℃

Notes:

1. For other ambient, limited setting of current will depend on de-rating curves.
2. D=0.01s duty 1/10.
3. When drive on maximum current , Tj must be kept below 150℃

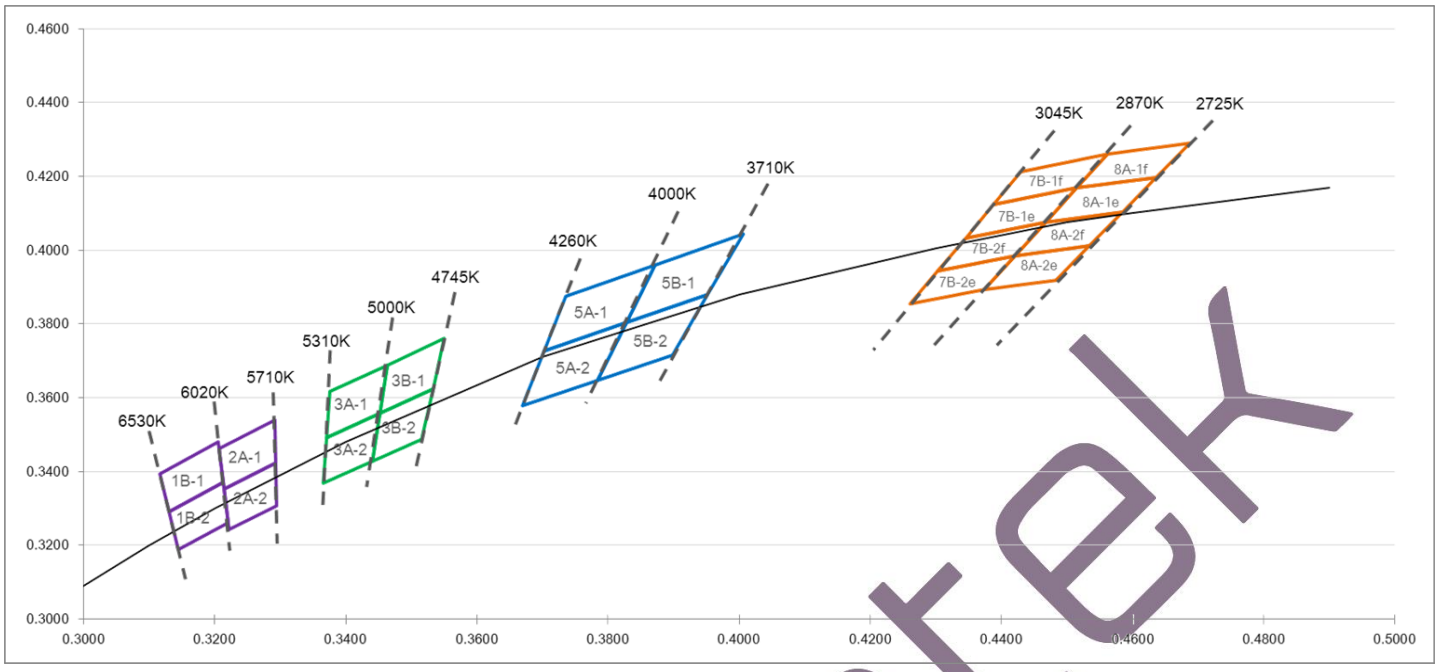
■ Intensity Binning

Bin code (350mA)	Min. Φ_v (Lm)	Max. Φ_v (Lm)
B32	90	100
B33	100	110
B34	110	120
B35	120	130
B36	130	140
B37	140	150
B38	150	160

■ Forward Voltage Binning

Bin code (350mA)	Min. V_F (V)	Max. V_F (V)
V2830	2.8	3.0
V3032	3.0	3.2
V3234	3.2	3.4

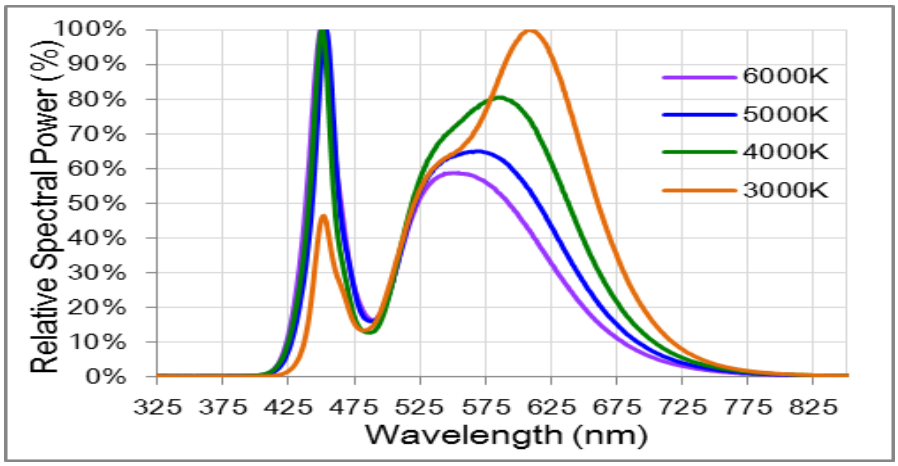
■ Color coordinate binning



BIN	CIE X	CIE Y	BIN	CIE X	CIE Y	BIN	CIE X	CIE Y	BIN	CIE X	CIE Y
1B-1	0.3205	0.3481	1B-2	0.3213	0.3371	2A-1	0.3292	0.3539	2A-2	0.3293	0.3423
	0.3117	0.3393		0.3131	0.3290		0.3207	0.3462		0.3215	0.3353
	0.3131	0.3290		0.3145	0.3187		0.3215	0.3353		0.3222	0.3243
	0.3213	0.3371		0.3221	0.3261		0.3293	0.3423		0.3294	0.3306
3A-1	0.3463	0.3688	3A-2	0.3452	0.3558	3B-1	0.3452	0.3558	3B-2	0.3441	0.3428
	0.3376	0.3616		0.3371	0.3492		0.3463	0.3688		0.3452	0.3558
	0.3371	0.3492		0.3366	0.3369		0.3550	0.3760		0.3533	0.3624
	0.3452	0.3558		0.3441	0.3428		0.3533	0.3624		0.3515	0.3487
5A-1	0.3871	0.3959	5A-2	0.3828	0.3803	5B-1	0.4006	0.4044	5B-2	0.3952	0.3880
	0.3736	0.3874		0.3703	0.3726		0.3871	0.3959		0.3828	0.3803
	0.3703	0.3726		0.3670	0.3578		0.3828	0.3803		0.3784	0.3647
	0.3828	0.3803		0.3784	0.3647		0.3952	0.3880		0.3898	0.3716
7B-1e	0.4515	0.4168	7B-1f	0.4562	0.4260	7B-2e	0.4420	0.3985	7B-2f	0.4467	0.4076
	0.4467	0.4076		0.4515	0.4168		0.4373	0.3893		0.4420	0.3985
	0.4345	0.4033		0.4388	0.4123		0.4260	0.3854		0.4303	0.3944
	0.4388	0.4123		0.4430	0.4213		0.4303	0.3944		0.4345	0.4033
8A-1e	0.4636	0.4197	8A-1f	0.4687	0.4289	8A-2e	0.4534	0.4011	8A-2f	0.4585	0.4104
	0.4585	0.4104		0.4636	0.4197		0.4483	0.3918		0.4534	0.4011
	0.4467	0.4076		0.4515	0.4168		0.4373	0.3893		0.4420	0.3985
	0.4515	0.4168		0.4562	0.426		0.442	0.3985		0.4467	0.4076

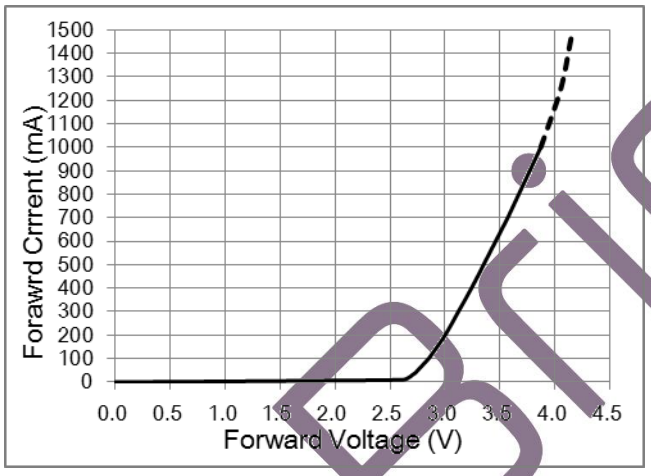
Notes : Chromaticity (CIEx, CIEy) ±0.007

■ Relative spectral power distribution

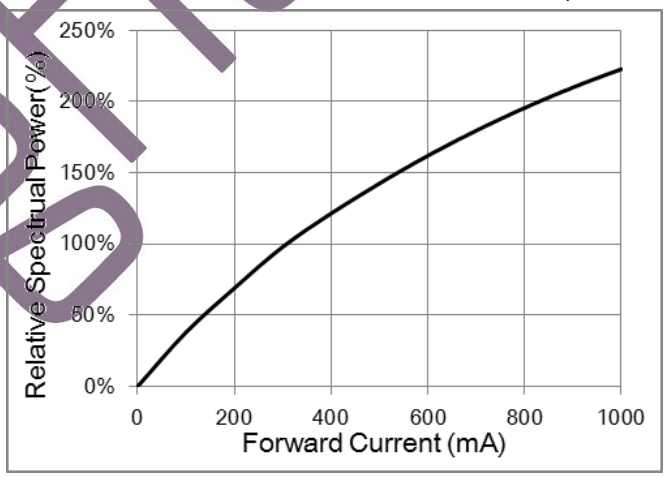


■ Electronic-Optical Characteristics

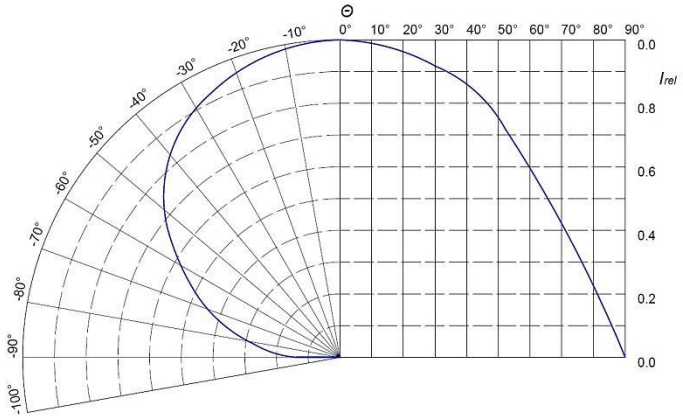
Forward Current vs. Forward Voltage (Ta=25℃)



Relative luminous Flux vs. Forward Current (T_a=25℃)

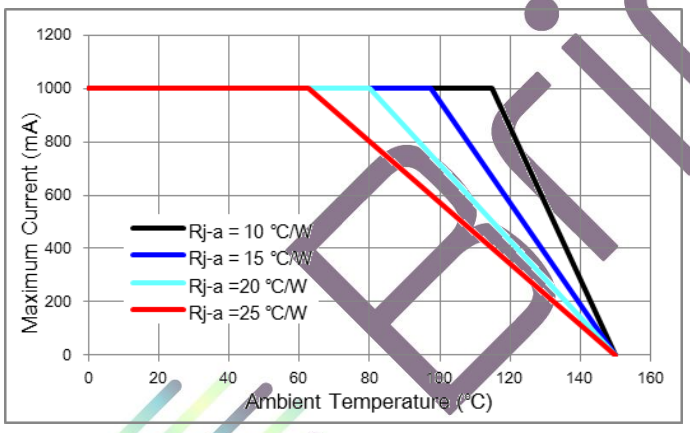


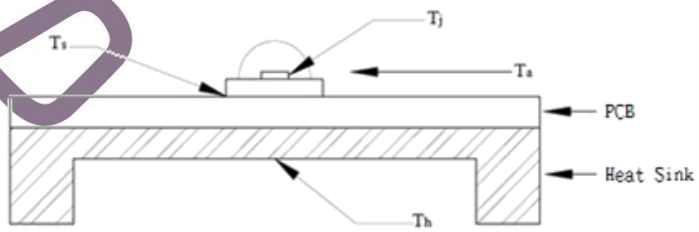
■ Typical Spatial Distribution



■ Thermal Design for De-rating

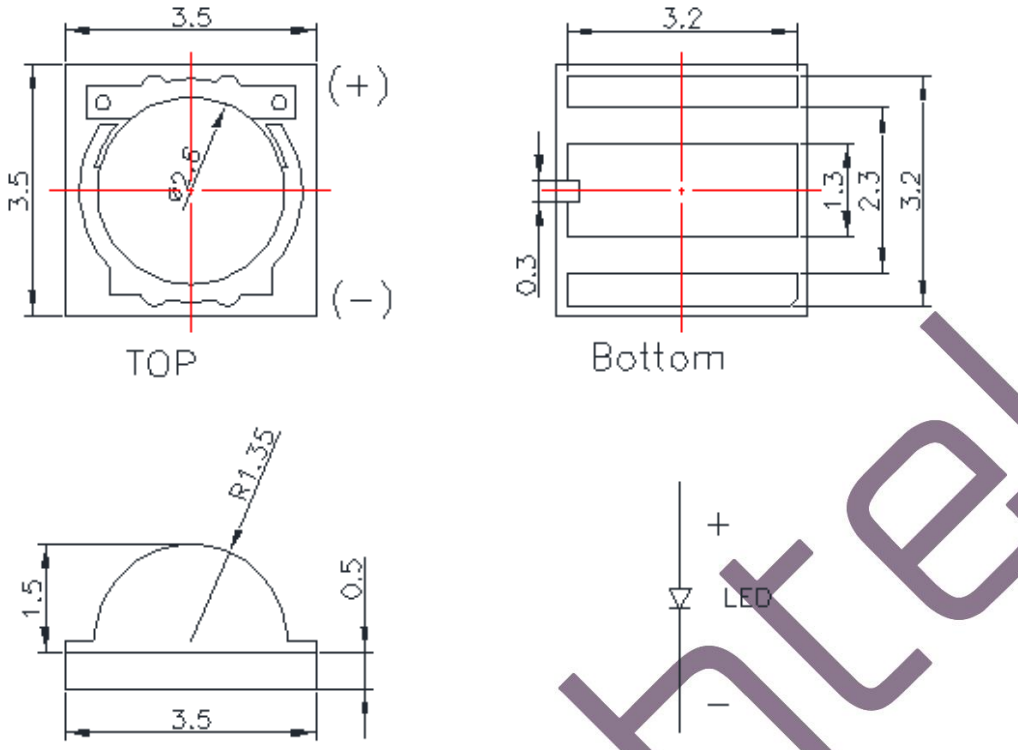
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.





Tj : LED junction Temp.
Ts : Solder Point Temp.
Th : Heat Sink Temp.
Ta : Ambient Temp.
Rj-a : Thermal Resistance from Tj to Ta

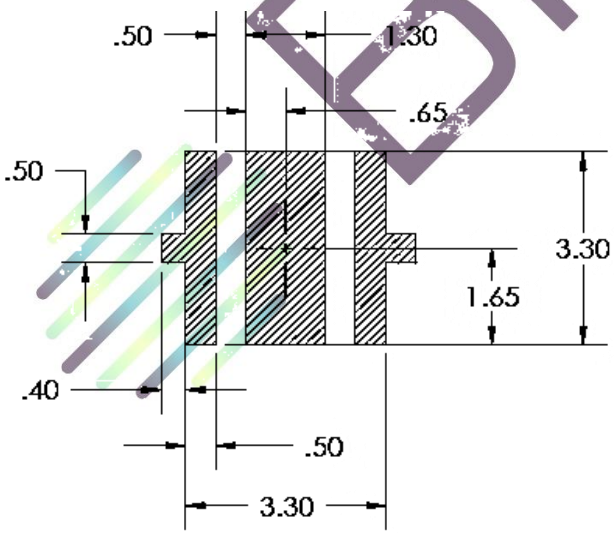
■ Dimensions



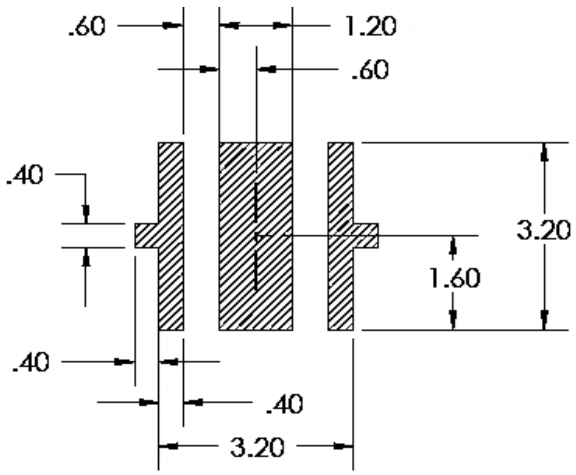
§ All dimensions are in millimeters.

§ Tolerance is ±0.13mm unless other specified.

■ Suggest Stencil Pattern (Recommendations for reference)



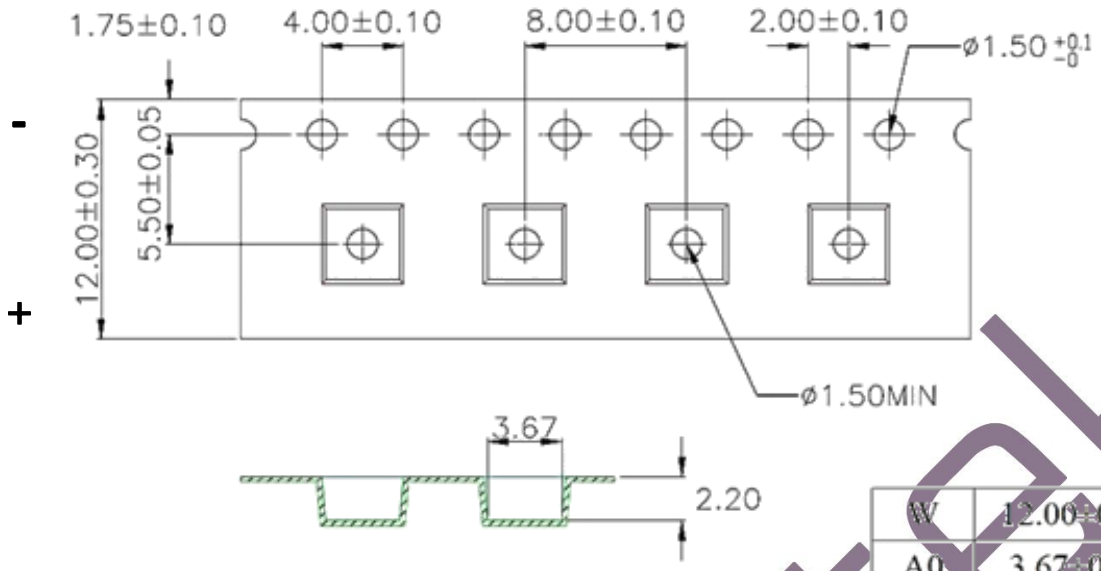
RECOMMENDED PCB SOLDER PAD



RECOMMENDED STENCIL PATTERN
(HATCHED AREA IS OPENING)

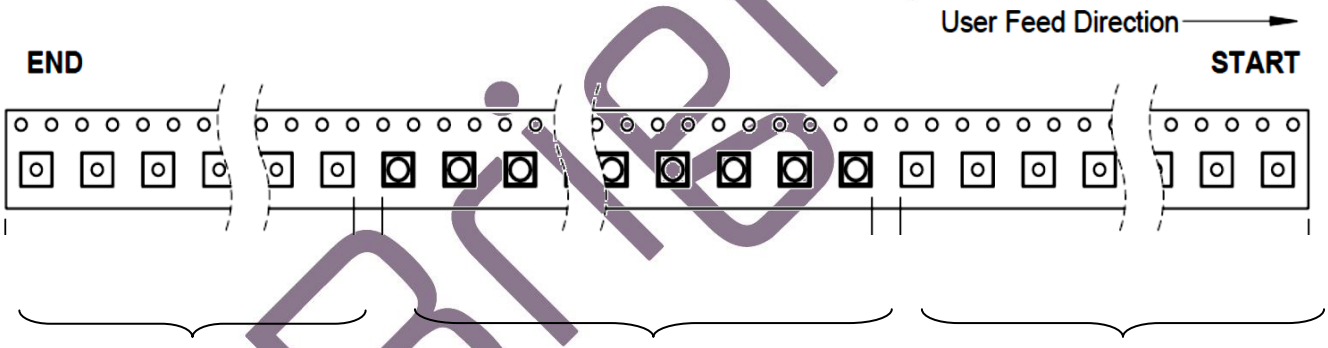
§ Suggest stencil t =0.12 mm

■ Packing



W	12.00±0.30
A0	3.67±0.10
B0	3.60±0.10
K0	2.20±0.10

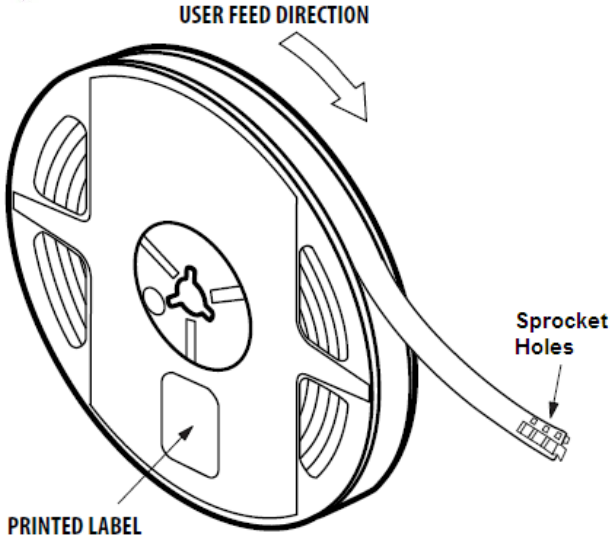
1. 10 sprocket hole pitch cumulative tolerance ±0.20.
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness : 0.30±0.05mm.

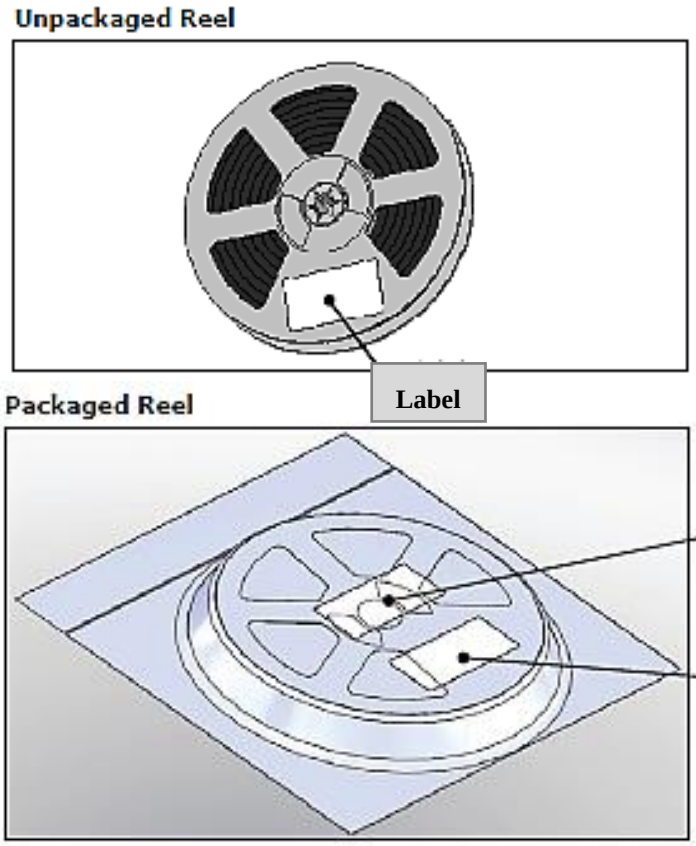


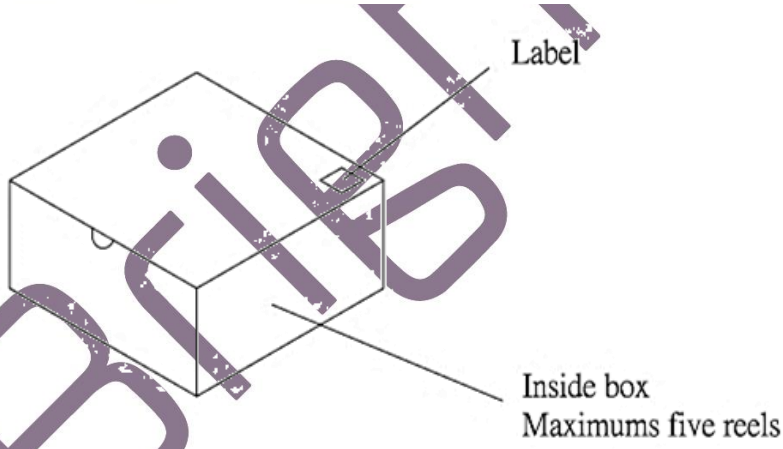
Trailer 160mm (min) of empty pockets sealed

Loaded Pockets (1000 pcs)

Leader 400mm (min) of empty pockets sealed







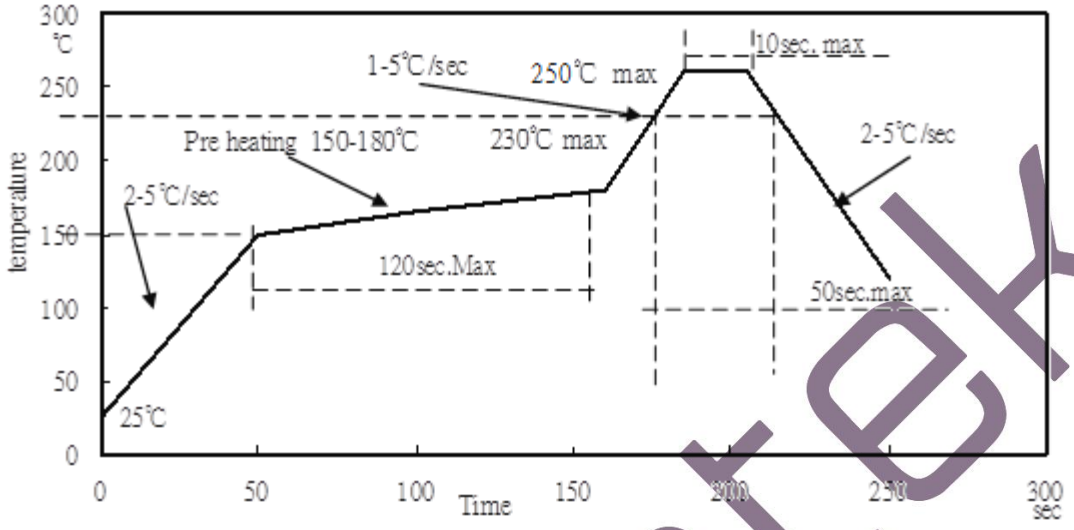
Notes:

1. Each reel (minimum number of pieces is 100 and maximum is 1000 for 120 degree product) is packed in a moisture-proof bag along with a packs of desiccant and a humidity indicator card.
2. A maximum of 5 moisture-proof bags are packed in an inner box (size: 260mm x 230mm x 100mm ±5mm).
3. A maximum of 4 inner boxes are put in an outer box (size: 480mm x 275mm x 215mm ±5mm).
4. Part No., Lot No., quantity should be indicated on the label of the moisture-proof bag and the cardboard box.

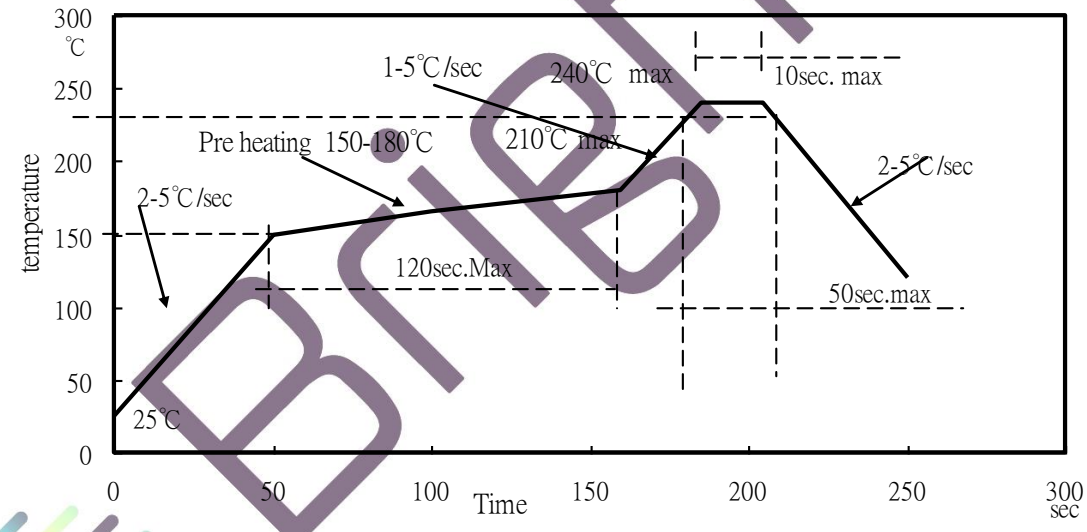
■ Reflow Profile

IR Reflow Soldering Profile

Lead Free solder



Lead solder



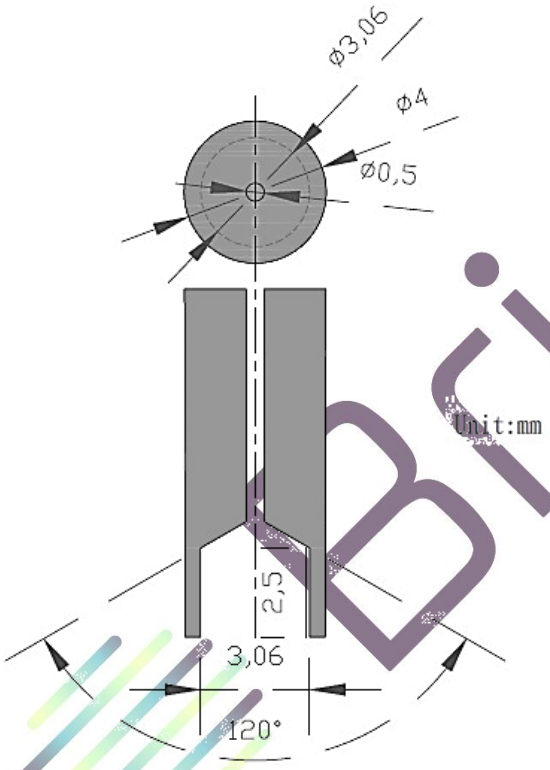
Notes:

1. The recommended reflow temperature is 240℃(±5℃). The maximum soldering temperature should be limited to 250℃.
2. Do not stress the silicone resin while it is exposed to high temperature.
3. The reflow process should not exceed 3 times.

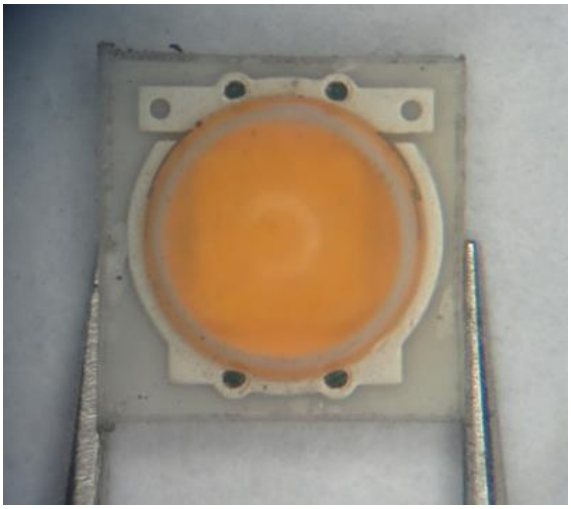
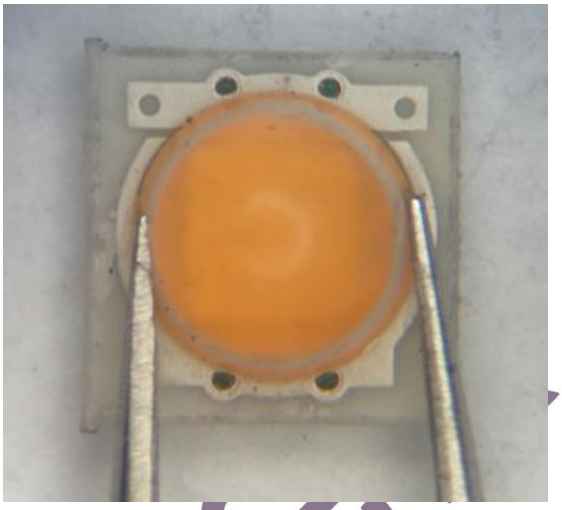
■ Precautions

1. Recommendation for using LEDs
   1.1 The lens of LEDs should not be exposed to dust or debris. Excessive dust and debris may cause a drastic decrease in the luminosity.
   1.2 Avoid mechanical stress on LED lens.
   1.3 Do not touch the LED lens surface. It would affect the optical performance of the LED due to the LED lens' damage.
   1.4 Pick & place tools are recommended for the remove of LEDs from the factory tape & reel packaging

2. Pick & place nozzle
   The pickup tool was recommended and shown as below



3. Lens handling
   Please follow the guideline to pick LEDs.
   3.1 Use tweezers to pick LEDs.
   3.2 Do not touch the lens by using tweezers.
   3.3 Do not touch lens with fingers.
   3.4 Do not apply more than 4N (400gw) directly onto the lens.

Correct (√)	Wrong (X)
	

4. Lens cleaning

In the case which a small amount of dirt and dust particles remain on the lens surface, a suitable cleaning solution can be applied.

4.1 Try a gentle wiping with dust-free cloth.

4.2 If needed, use dust-free cloth and isopropyl alcohol to gently clean the dirt from the lens surface.

4.3 Do not use other solvents as they may directly react with the LED assembly.

4.4 Do not use ultrasonic cleaning which will damage the LEDs.

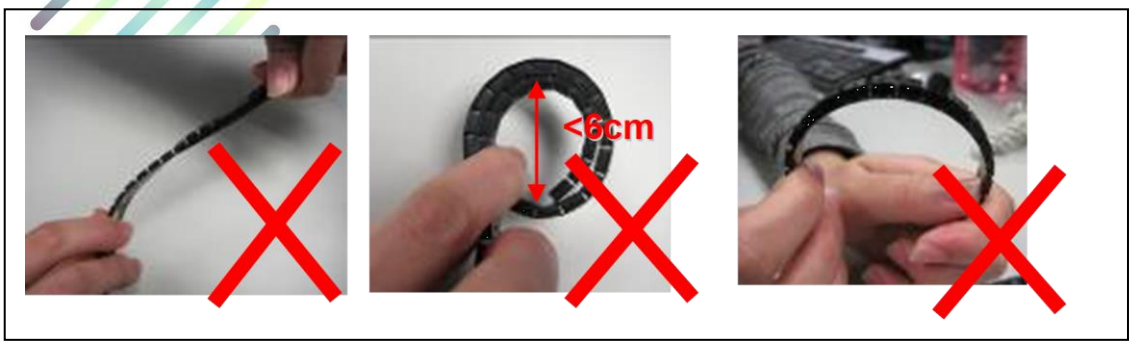
5. Carrier tape handling

The following items are recommended when handling the carrier tape of LEDs.

5.1 Do not twist the carrier tape.

5.2 The inward bending diameter should not be smaller than 6cm for each carrier tape.

5.3 Do not bend the tape outward.



6. Storage

6.1 The moisture-proof bag is sealed：

The LEDs should be stored at 30°C or less and 90%RH or less. And the LEDs are limited to use within one year, while the LEDs is packed in moisture-proof package with the desiccants inside.

6.2 The moisture-proof bag is opened：

The LEDs should be stored at 30°C or less and 60%RH or less. Moreover, the LEDs are limited to solder process within 168hrs. If the humidity indicator card shows the pink color in 10% even higher or exceed the storage limiting time since opened, that we recommended to baking LEDs at 60°C at least 24hrs. To seal the remainder LEDs return to the moisture-proof bag, it's recommended to be with workable desiccants.

■ Test Items and Results of Reliability

Test Item	Test Conditions	Duration/ Cycle	Number of Damage	Reference
Thermal Shock	–40℃ 30min ↑↓5min 125℃ 30min	100 cycles	0/22	AEC-Q101
High Temperature Storage	T_a=100℃	1000 hrs	0/22	EIAJ ED-4701 200 201
Humidity Heat Storage	T_a=85℃ RH=85%	1000 hrs	0/22	EIAJ ED-4701 100 103
Low Temperature Storage	T_a=-40℃	1000 hrs	0/22	EIAJ ED-4701 200 202
Life Test	T_a=25℃ If=350mA	1000 hrs	0/22	
High Humidity Heat Operation	85℃ RH=85% If=350mA	1000 hrs	0/22	
High Temperature Operation	T_a=85℃ If=350mA	1000 hrs	0/22	
ESD(HBM)	2KV at 1.5kΩ;100pf	3 Times	0/22	MIL-STD-883

Failure Criteria				
Item	Symbol	Condition	Criteria for Judgment	
			Min	Max
Forward Voltage	V_F	If=350mA	-	USL[1]×1.1
Reverse Current	I_R	V_R =5V	-	100μA
Luminous Intensity	I_v	If=350mA	LSL[2]×0.7	-

Notes:

1. USL: Upper specification level
2. LSL: Lower specification level