



YL-AC7870-13LxENHLxx
3W AC LED
Technical Datasheet
Version: 1.3

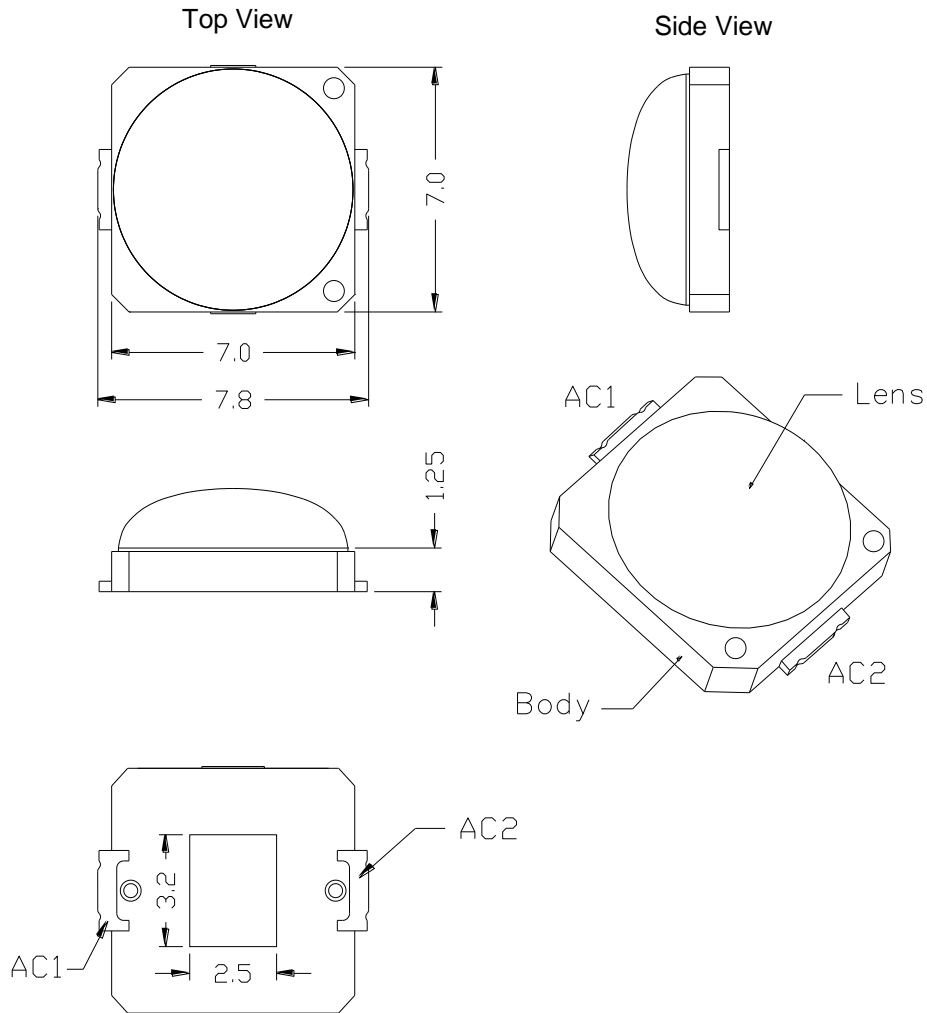
Features

- High Color rendering index
- High flux per LED
- Good color uniformity
- Industry best moisture sensitivity level - JEDEC Level 1
- RoHS compliant
- More energy efficient than incandescent and most halogen lamps
- Instant light (less than 100ns)
- No UV

Typical Applications

- G9
- Candle Light

Emitter Mechanical Dimensions



Notes:

1. Electrical insulation between the case and the board is required. Do not electrically connect either the AC1 or AC2 to the slug.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. Unless otherwise indicated, tolerances are $\pm 0.10\text{mm}$.
5. Please do not bend the leads of the LED, otherwise it will damage the LED.
6. **Please do not use a force of over 3kgf impact or pressure on the LED, otherwise it will cause a catastrophic failure.**

*The appearance and specifications of the product may be modified for improvement without notice.

Flux Characteristics at 30mA-rms, T_J = 25°C

Radiation Pattern	Color	Part Number Emitter	Luminous Flux Φ _v (lm)		CRI Minimum
			Minimum	Typical	
Lambertian	White	YL-AC7870-13LWENHL65	170	190	80
	Warm White	YL-AC7870-13LVENHL27	170	183	80

- YesLED maintains a tolerance of ± 7% on flux and power measurements.
- YesLED maintains a tolerance of ± 2 on CRI measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Optical Characteristics at 30mA-rms, T_J = 95°C

Color	Color Temperature CCT			Total included Angle (degrees) θ _{0.90V}	Viewing Angle (degrees) 2 θ _{1/2}	Thermal Resistance Junction to Slug (°C/W)
	Min.	Typ.	Max.			
White	6130 K	6500 K	6890 K	160	140	8
Warm White	2630 K	2700 K	2820 K	160	140	8

- YesLED maintains a tolerance of ± 5% for CCT measurements.

Electrical Characteristics at 30mA-rms, T_J = 25°C

Color	Forward Voltage V _F (V)		
	Min.	Typ.	Max.
White	85	93	100
Warm White	85	93	100

- YesLED maintains a tolerance of ± 1V for Voltage measurements.

Absolute Maximum Ratings

Parameter	White/Warm White
DC Forward Current (mA)	30
Peak Pulsed Forward Current (mA)	60 (less than 1/10 duty cycle@1KHz)
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	> ±1000V
LED Junction Temperature	≤115°C
Operating Board Temperature at Maximum DC Forward Current	85°C
Storage Temperature	-40°C - 85°C
Soldering Temperature	JEDEC 020c 260°C
Allowable Reflow Cycles	1

Photometric Luminous Flux Bin Structure

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)	Available Color Bins
White	7	170	180	All
	8	180	190	[1]
	9	190	200	[1]
	A	200	210	[1]
	B	210	220	[1]
Warm White	7	170	180	All
	8	180	190	[1]
	9	190	200	[1]
	A	200	210	[1]

- YesLED maintains a tolerance of $\pm 7\%$ on flux and power measurements.
- The flux bin of the product may be modified for improvement without notice.
- ^[1] The rest of color bins are not 100% ready for order currently. Please ask for quote and order possibility.

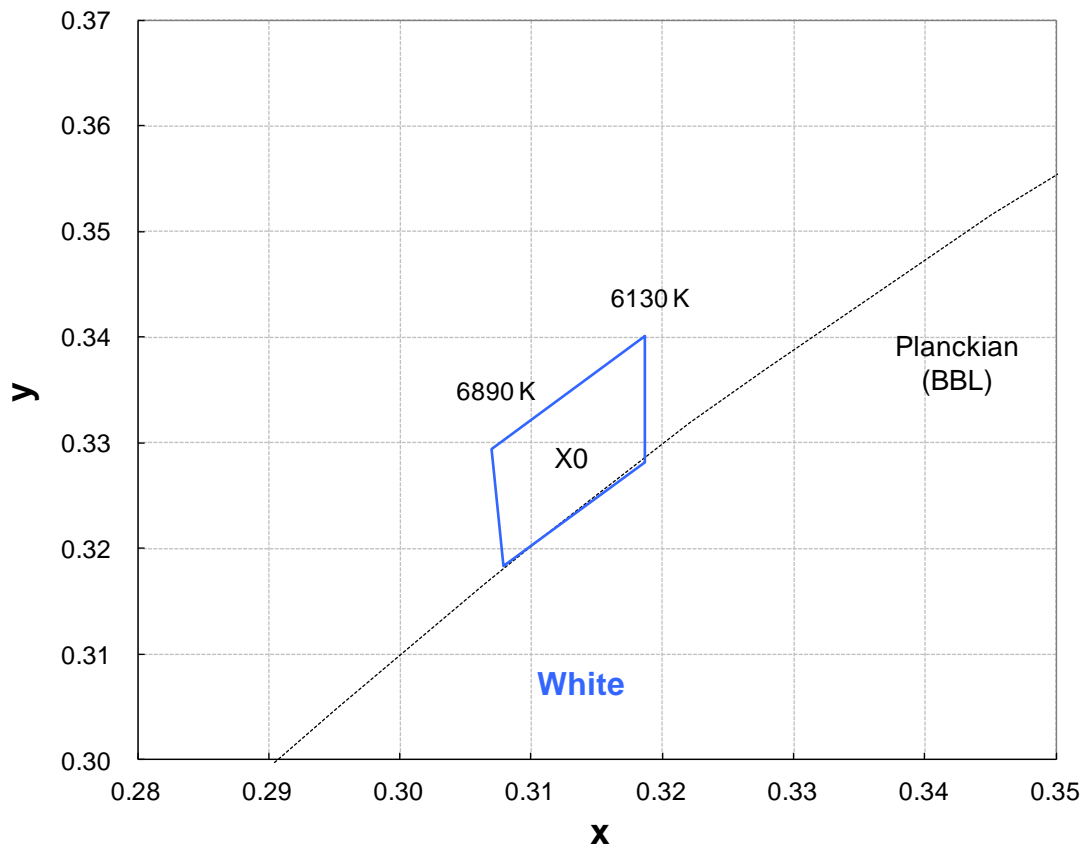
Voltage Bin Structure

Color	Bin Code	Minimum Voltage[RMS]	Maximum Voltage[RMS]
White	1	85	93
	2	93	100
Warm White	1	85	93
	2	93	100

- YesLED maintains a tolerance of $\pm 1V$ for Voltage measurements.

Color Bins

White Binning Structure Graphical Representation at 30mA-rms, $T_J = 95^\circ\text{C}$

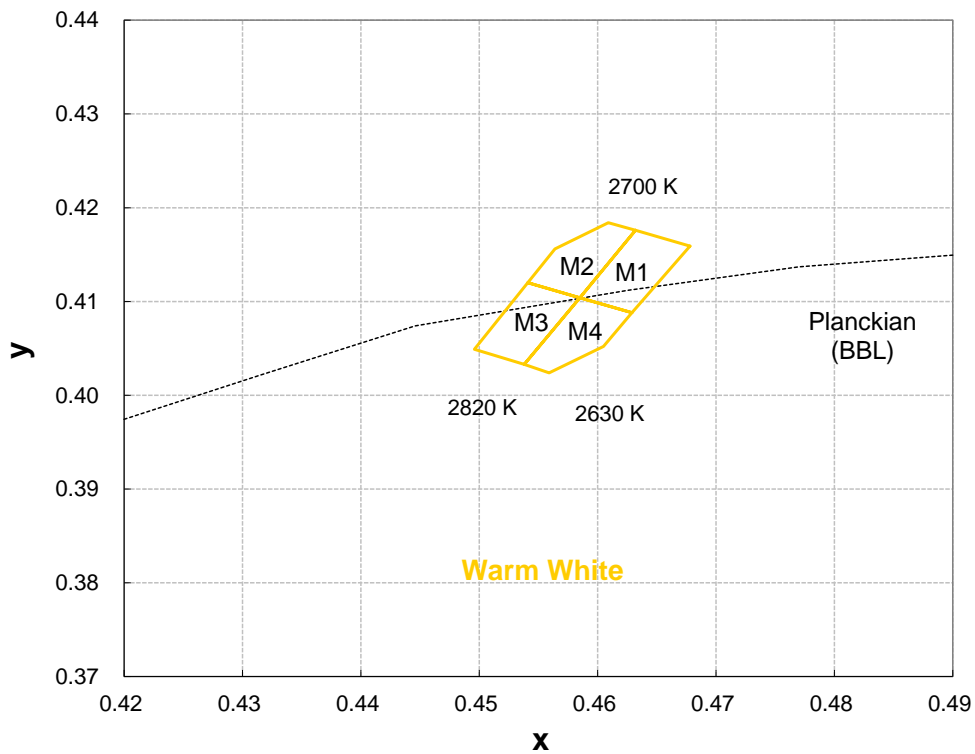


Bin Code	x	y	Typ. CCT (K)
X0	0.319	0.340	6500
	0.307	0.329	
	0.308	0.318	
	0.319	0.328	

- Color range stay within MacAdam “4-step” ellipse from the chromaticity center.
- Tolerance on each color bin (x , y) is ± 0.005

Color Bins

Warm White Binning Structure Graphical Representation at 30mA-rms, $T_J = 95^\circ\text{C}$



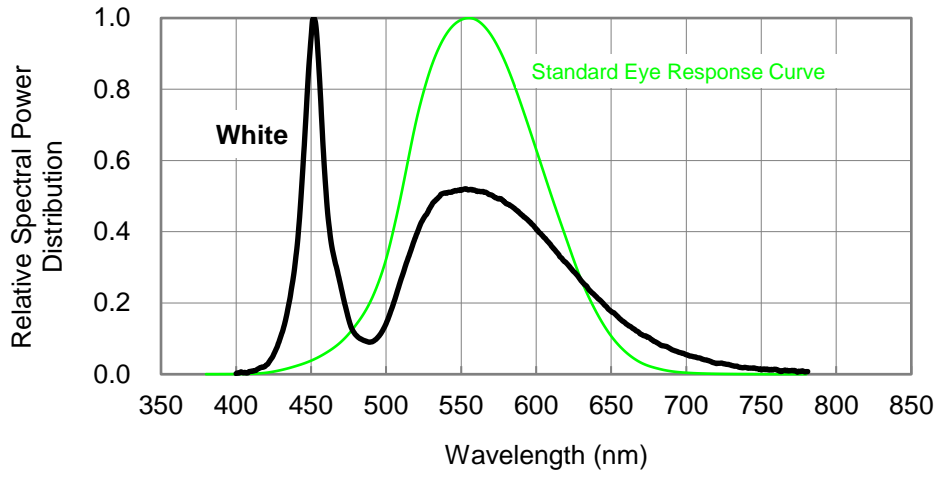
Warm White Bin Structure

Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
M1	0.4678	0.4159	2665	M3	0.4585	0.4104	2760
	0.4632	0.4176			0.4541	0.4120	
	0.4585	0.4104			0.4496	0.4049	
	0.4629	0.4088			0.4538	0.4033	
	0.4678	0.4159			0.4585	0.4104	
M4	0.4629	0.4088	2665	M2	0.4632	0.4176	2760
	0.4585	0.4104			0.4609	0.4184	
	0.4538	0.4033			0.4564	0.4156	
	0.4559	0.4024			0.4541	0.4120	
	0.4605	0.4052			0.4585	0.4104	
	0.4629	0.4088			0.4632	0.4176	

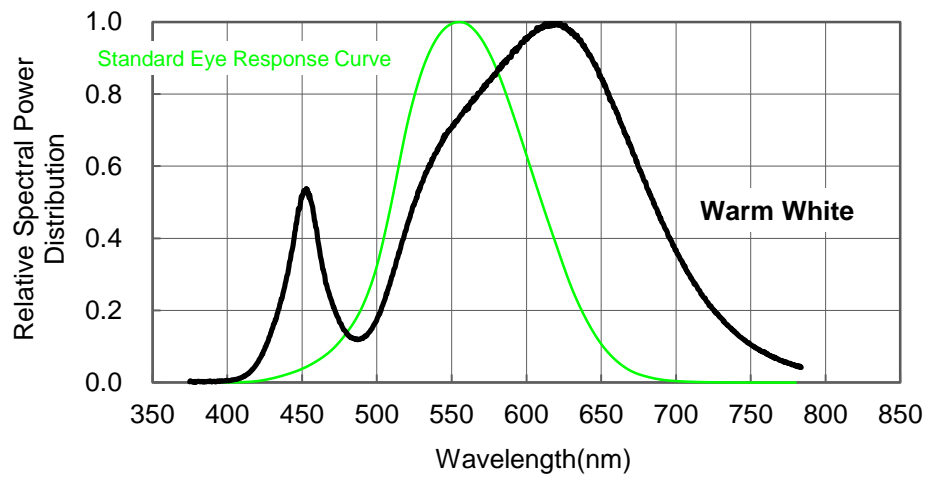
- Color range stay within MacAdam "4-step" ellipse from the chromaticity center.
- Tolerance on each color bin (x , y) is ± 0.005

Color Spectrum, $T_J = 25^\circ\text{C}$

1. White

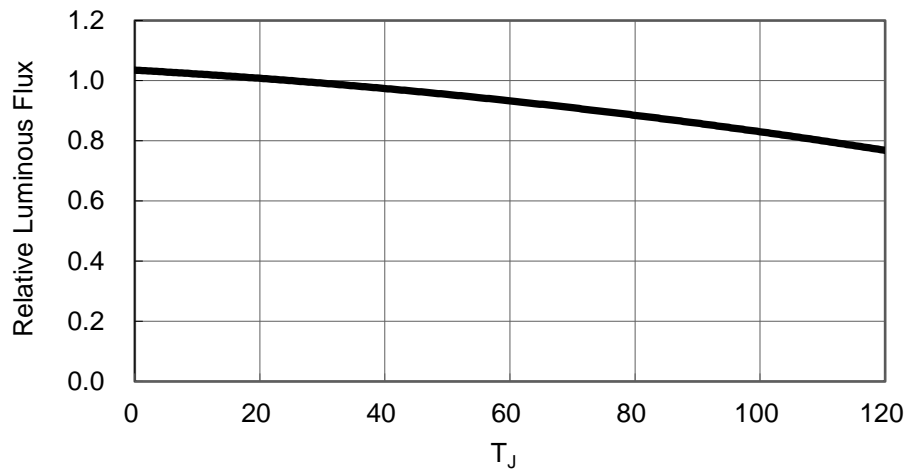


2. Warm White

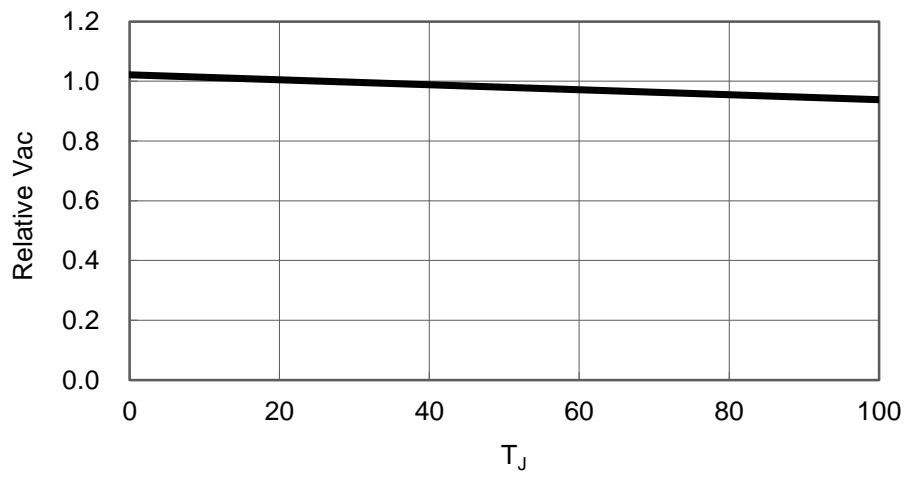


Color Spectrum, $T_J = 25^\circ\text{C}$

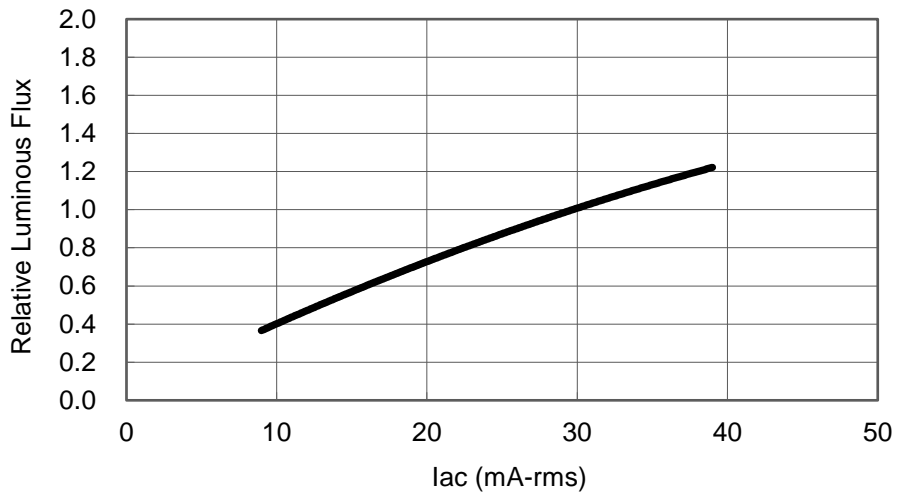
T_J VS Relative Luminous Flux



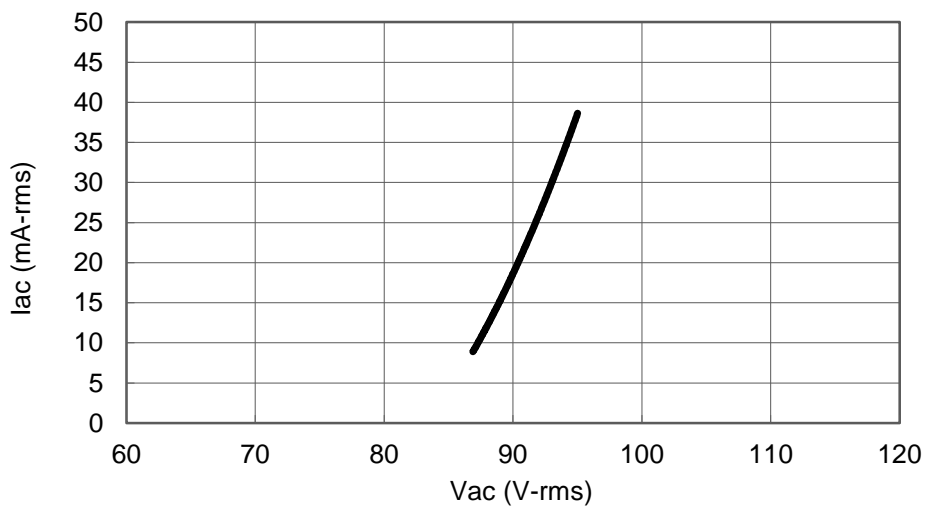
T_J VS Relative Vac



Iac VS Relative Luminous Flux



Iac VS Vac



Moisture Sensitivity Level - JEDEC Level 1

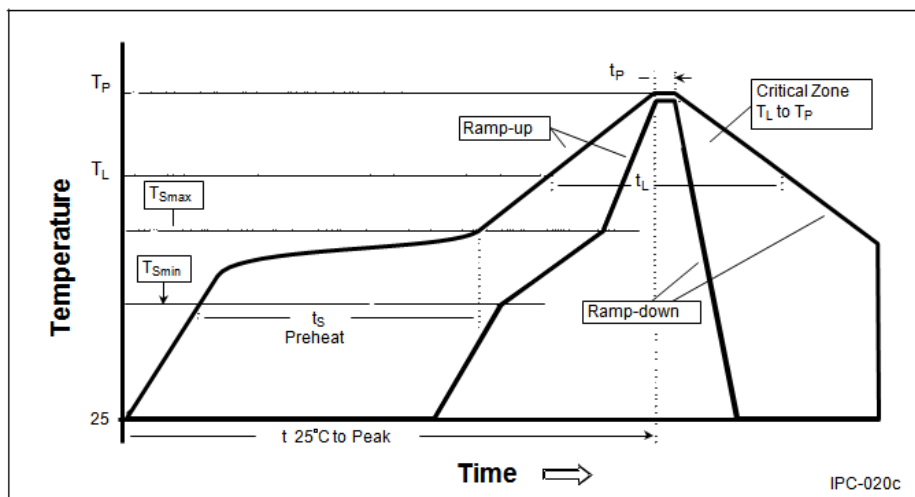
Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≤30°C / 85% RH	168 +5/-0	85°C / 85% RH	NA	NA

- The standard soak time includes a default value of 24 hours for semiconductor manufacture's exposure time (MET) between bake and bag and includes the maximum time allowed out of the bag at the distributor's facility.
- Table below presents the moisture sensitivity level definitions per IPC/JEDEC's J-STD-020C.

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≤30°C / 85% RH	168 +5/-0	85°C / 85% RH	NA	NA
2	1 year	≤30°C / 60% RH	168 +5/-0	85°C / 60% RH	NA	NA
2a	4 weeks	≤30°C / 60% RH	696 +5/-0	30°C / 60% RH	120 +1/-0	60°C / 60% RH
3	168 hours	≤30°C / 60% RH	192 +5/-0	30°C / 60% RH	40 +1/-0	60°C / 60% RH
4	72 hours	≤30°C / 60% RH	96 +2/-0	30°C / 60% RH	20 +0.5/-0	60°C / 60% RH
5	48 hours	≤30°C / 60% RH	72 +2/-0	30°C / 60% RH	15 +0.5/-0	60°C / 60% RH
5a	24 hours	≤30°C / 60% RH	48 +2/-0	30°C / 60% RH	10 +0.5/-0	60°C / 60% RH
6	Time on Label (TOL)	≤30°C / 60% RH	Time on Label (TOL)	30°C / 60% RH	NA	NA

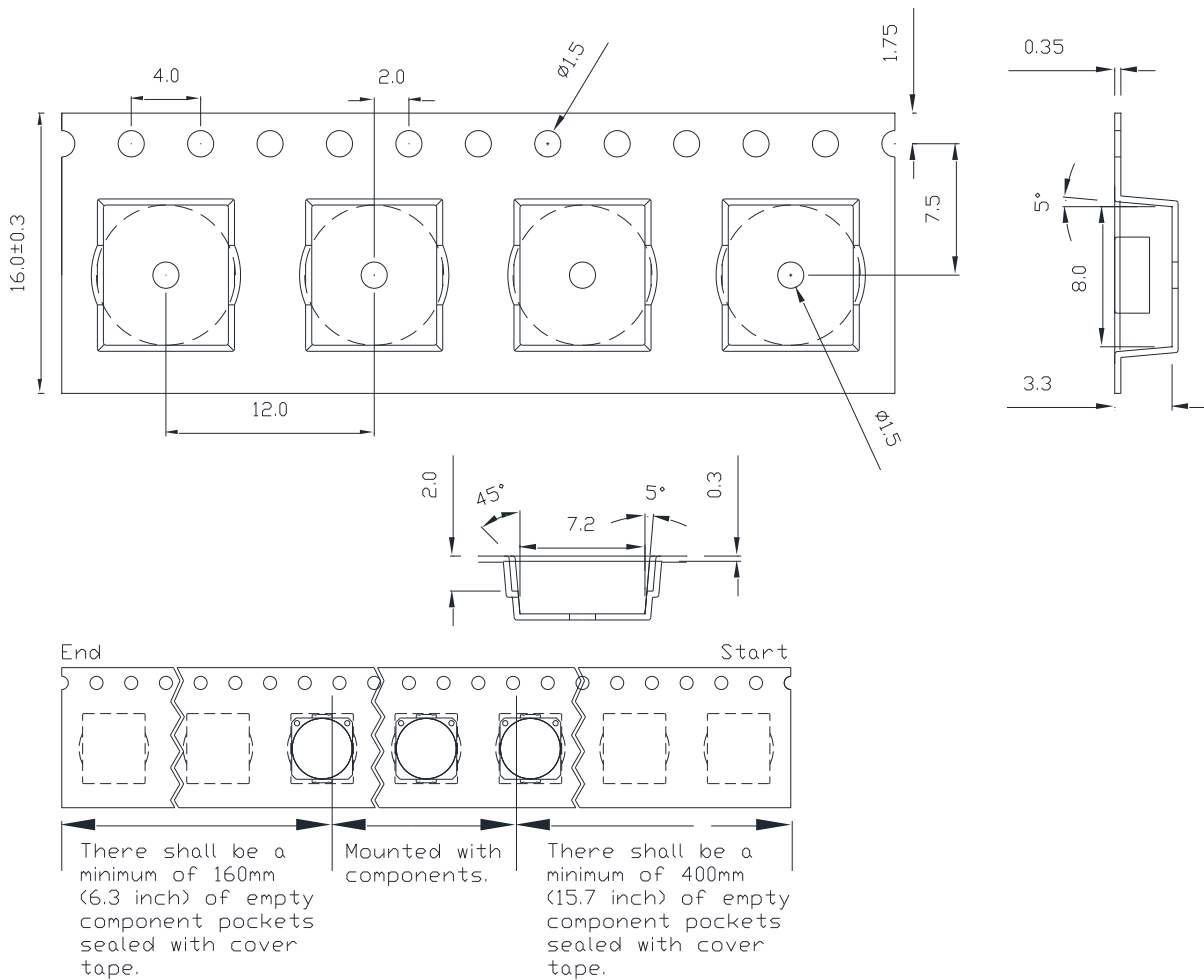
Reflow Soldering Condition

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max.	3°C / second max.
Preheat <ul style="list-style-type: none"> - Temperature Min (T_{Smin}) - Temperature Max (T_{Smax}) - Time (t_{Smin} to t_{Smax}) 	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: <ul style="list-style-type: none"> - Temperature (T_L) - Time (t_L) 	183°C 60-150 seconds	217°C 60-150 seconds
Peak/Classification Temperature (T_P)	240°C	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



- We recommend using the M705-S101-S4 solder paste from SMIC (Senju Metal Industry Co., Ltd.) for lead-free soldering.
- Do not use solder pastes with post reflow flux residue > 47%. (58Bi-42Sn eutectic alloy, etc) This kind of solder pastes may cause a reliability problem to LED.
- All temperatures refer to topside of the package, measured on the package body surface.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- Reflow soldering should not be done more than one times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.

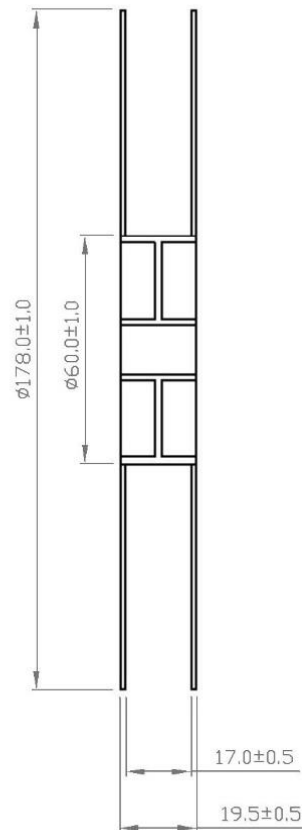
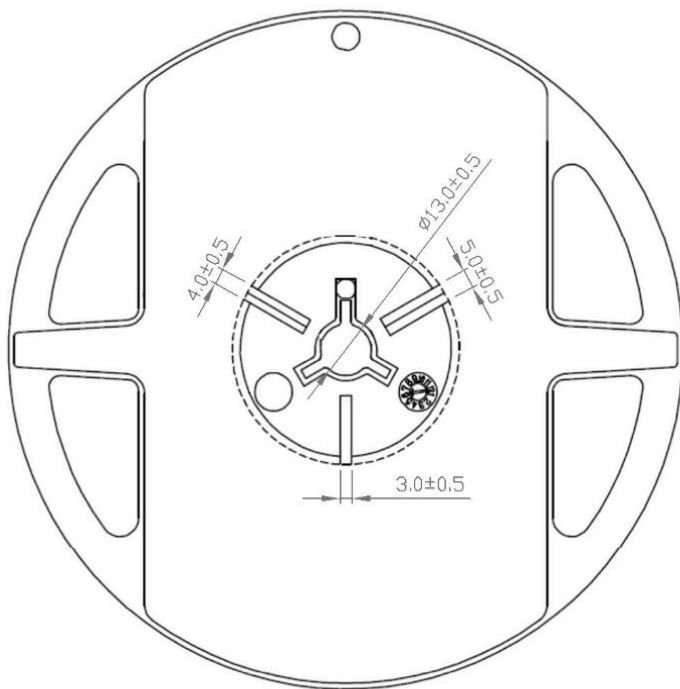
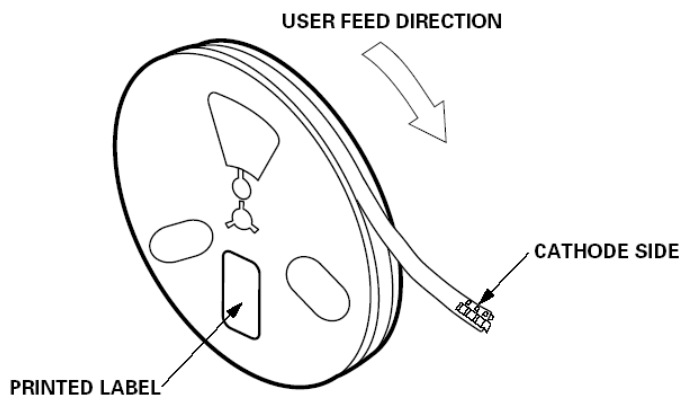
Emitter Reel Packaging



Notes:

1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.10 mm.

Emitter Reel Packaging



Notes:

1. Empty component pockets sealed with top cover tape.
2. 250, 500 and 1000 pieces per reel.
3. Drawing not to scale.
4. All dimensions are in millimeters.

Precaution for Use

- Storage
Please do not open the moisture barrier bag (MBB) more than one week. This may cause the leads of LED discoloration. We recommend storing YesLED's LEDs in a dry box after opening the MBB. The recommended storage conditions are temperature 5 to 30°C and humidity less than 40% RH. It is also recommended to return the LEDs to the MBB and to reseal the MBB.
- The slug is not electrically neutral. Therefore, we recommend to isolate the heat sink.
- **We recommend using the M705-S101-S4 solder paste from SMIC (Senju Metal Industry Co., Ltd.) for lead-free soldering.**
- **Do not use solder pastes with post reflow flux residue >47%. (58Bi-42Sn eutectic alloy, etc) This kind of solder pastes may cause a reliability problem to LED.**
- Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temperature after soldering.
- Please avoid rapid cooling after soldering.
- Components should not be mounted on warped direction of PCB.
- **Repairing should not be done after the LEDs have been soldered.**
- This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When cleaning is required, isopropyl alcohol should be used.
- When the LEDs are illuminating, operating current should be decided after considering the package maximum temperature.
- The appearance, specifications and flux bin of the product may be modified for improvement without notice. Please refer to the below website for the latest datasheets.

Handling of Silicone Lens LEDs

Notes for handling of silicone lens LEDs

- Please do not use a force of over 3kgf impact or pressure on the LED, otherwise it will cause a catastrophic failure.
- The LEDs should only be picked up by making contact with the sides of the LED body.
- Avoid touching the silicone especially by sharp tools such as Tweezers.
- Avoid leaving fingerprints on the silicone.
- Please store the LEDs away from dusty areas or seal the product against dust.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the silicone must be prevented.
- Please do not mold over the silicone with another resin. (epoxy, urethane, etc)