



YJ-BC-RGBWW-7070M-G03

Surface Mount Device



Applications

- High-end architectural lighting
- Photographic/broadcast lighting
- Photoelectric device and relevant research

Features

- Industrial high CRI performance of white light
- Full-color gamut of red, green and blue
- 6.9mm × 6.9mm package
- TLCI & TM-30 specified (white light)
- SimpleBinning solution (white light)

[About Yujileads[®]](#)

Rev Version: 2.3

P3190003.00

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Notification

The Yujileds® 7070M LED is designed in a specific structure hence it demands specific SMT materials and reflow processes, we kindly remind you to pay extra attention to the part [Solder and reflow instruction \(Page 20 – 22\)](#) before the use.

General description

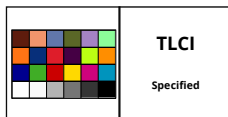
Yujileds® Multichromatic series 7070M LED is an innovative mid-power LED. It integrates five different color channels in a compact package. With Yujileds® advanced phosphors technology, the white light channels achieve industrial highest CRI performance and consistency, and the color channels reach saturated and stable monochromatic. The compact package and high output make the LED suitable for a wide variety of applications demanding higher color quality and homogeneous lighting distribution, and it also simplify the optical design.

The Multichromatic series 7070M LED also supports the unique service/certification by Yujileds® as described below.



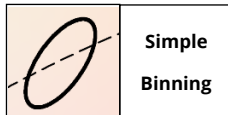
TM-30-18 specification

The most advanced colorimetric for color rendition, widely recognized as the successor of CRI.



TLCI specification

Based on the Macbeth ColorChecker, for evaluating the colorimetric quality of the broadcast lighting.

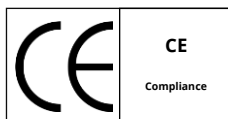


SimpleBinning specification

Simplify the chromaticity binning with TrueChroma data support to provide the most economical, simple, and practical solution to customers.



RoHS 2011/65/EU compliance



CE compliance



REACH compliance (Phosphor)

Ordering information

PART NUMBER	PRODUCT CODE	CCT	CHROMATICITY BINS	VOLTAGE RANGE
YJ-BC-RGBWW-7070M-G03-2765	P3190003.26	2700K-6500K	27M / 65M	0.2V

Characteristics

Electrical-optical characteristics ($T_A = 25^\circ\text{C}$, 150mA)

COLOR	PARAMETER	SYMBOL	VALUE			UNIT
			MIN.	TYP.	MAX.	
Red	Forward voltage	V_F	1.9	-	2.5	V
	Luminous flux	Φ	24	26	28	lm
	Dominant wavelength ⁽¹⁾	λ	619	622	625	nm
	View angle	$2\theta_{1/2}$	-	120	-	Deg
	Reverse current	I_r	-	-	5	μA
	Thermal resistance ⁽²⁾	$R_{\theta\text{JS}}$	-	10.19	-	$^\circ\text{C/W}$
Green	Forward voltage	V_F	2.8	-	3.4	V
	Luminous flux	Φ	42	46	50	lm
	Dominant wavelength ⁽¹⁾	λ	520	522.5	525	nm
	View angle	$2\theta_{1/2}$	-	120	-	Deg
	Reverse current	I_r	-	-	5	μA
	Thermal resistance ⁽²⁾	$R_{\theta\text{JS}}$	-	13.81	-	$^\circ\text{C/W}$
Blue	Forward voltage	V_F	3.0	-	3.4	V
	Luminous flux	Φ	9	10.5	12	lm
	Dominant wavelength ⁽¹⁾	λ	457.5	-	460	nm
	View angle	$2\theta_{1/2}$	-	120	-	Deg
	Reverse current	I_r	-	-	5	μA
	Thermal resistance ⁽²⁾	$R_{\theta\text{JS}}$	-	11.88	-	$^\circ\text{C/W}$
2700K	Forward voltage	V_F	3.0	-	3.4	V
	Luminous flux	Φ	41	-	46	lm
	Correlated color temperature ⁽¹⁾	CCT	2600	2700	2800	K
	Color rendering index	Ra	95	-	-	-
	TCS R9 (CRI red)	R9	-	90	-	-
	Fidelity index ⁽³⁾	Rf	-	94	-	-
	Gamut index ⁽³⁾	Rg	-	101	-	-
	TLCI 2012 ⁽⁴⁾	-	-	97	-	-
	View angle	$2\theta_{1/2}$	-	120	-	Deg
	Reverse current	I_r	-	-	5	μA
Thermal resistance ⁽²⁾	$R_{\theta\text{JS}}$	-	13.67	-	$^\circ\text{C/W}$	

Characteristics

Electrical-optical characteristics ($T_A = 25^\circ\text{C}$, 150mA) (continued)

COLOR	PARAMETER	SYMBOL	VALUE			UNIT
			MIN.	TYP.	MAX.	
6500K	Forward voltage	V_F	3.0	-	3.4	V
	Luminous flux	Φ	51	-	56	lm
	Correlated color temperature⁽¹⁾	CCT	6150	6500	6850	K
	Color rendering index	Ra	94	96	-	-
	TCS R9 (CRI red)	R9	-	90	-	-
	Fidelity index⁽³⁾	Rf	-	94	-	-
	Gamut index⁽³⁾	Rg	-	101	-	-
	TLCI 2012⁽⁴⁾	-	-	97	-	-
	View angle	$2\theta_{1/2}$	-	120	-	Deg
	Reverse current	I_r	-	-	5	μA
	Thermal resistance⁽²⁾	$R_{\theta JS}$	-	13.05	-	$^\circ\text{C/W}$

(1). Yujileds® promises the chromaticity coordinate tolerance of ± 0.0015 (CIE 1931 x,y) based on Yuji standard equipment shall prevail.

(2). The data of thermal resistance is only for reference.

(3). Defined by the IES TM-30-18 method, this data is for trial.

(4). Defined by the EBU, TLCI is the abbreviation of Television Lighting Consistency Index, this data is for trial.

Characteristics

Absolute maximum ratings ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	RED	GREEN	BLUE	2700K	6500K	UNIT
Power Consumption (Simultaneous)	P_D	360	576	576	576	576	mW
DC Forward Current (pulsed)⁽¹⁾	$I_{FP}^{(2)}$	360	360	360	360	360	mA
DC Forward Current	I_F	180	180	180	180	180	mA
Reverse Voltage	V_R	5	5	5	5	5	V
Solder Point Temperature⁽³⁾	T_s			85			$^\circ\text{C}$
Operating Temperature	T_{opr}			-25 ~ +85			$^\circ\text{C}$
Storage Temperature	T_{stg}			-35 ~ +85			$^\circ\text{C}$
Soldering Temperature	T_{sol}			180 ± 5			$^\circ\text{C}$
Reflow Cycles Allowed	-			2			-

(1). Pulse width $\leq 0.1\text{ms}$, duty $\leq 1/10$.

(2). Theoretical data.

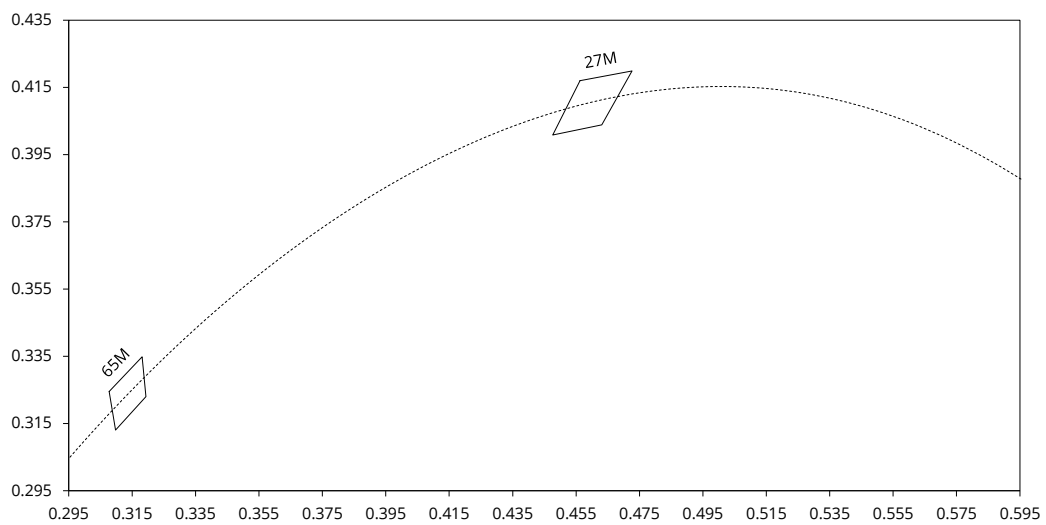
(3). See page [Package material and dimension](#).

Chromaticity group and diagram

Chromaticity bins & coordinates

CCT	BIN	CIE 1931 COORDINATES							
		X0	Y0	X1	Y1	X2	Y2	X3	Y3
2700K	27M	0.4562	0.4170	0.4477	0.4009	0.4631	0.4039	0.4727	0.4199
6500K	65M	0.3078	0.3245	0.3098	0.3131	0.3193	0.3230	0.3181	0.3349

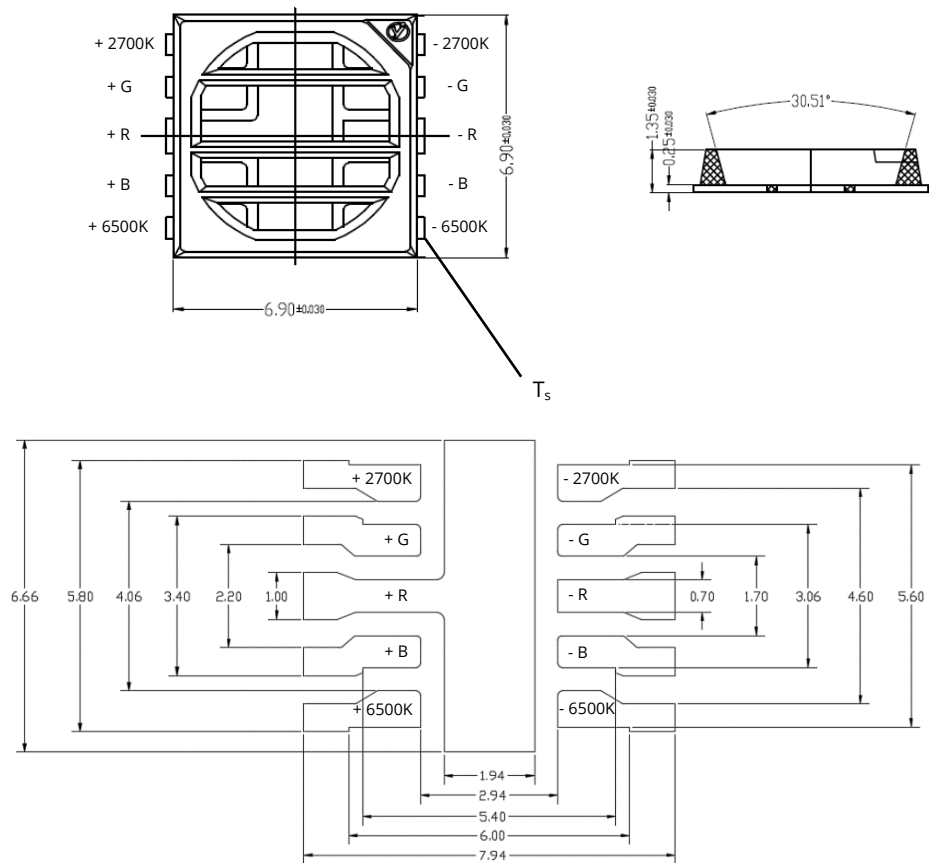
CIE 1931 diagram



Package dimension

Package layout

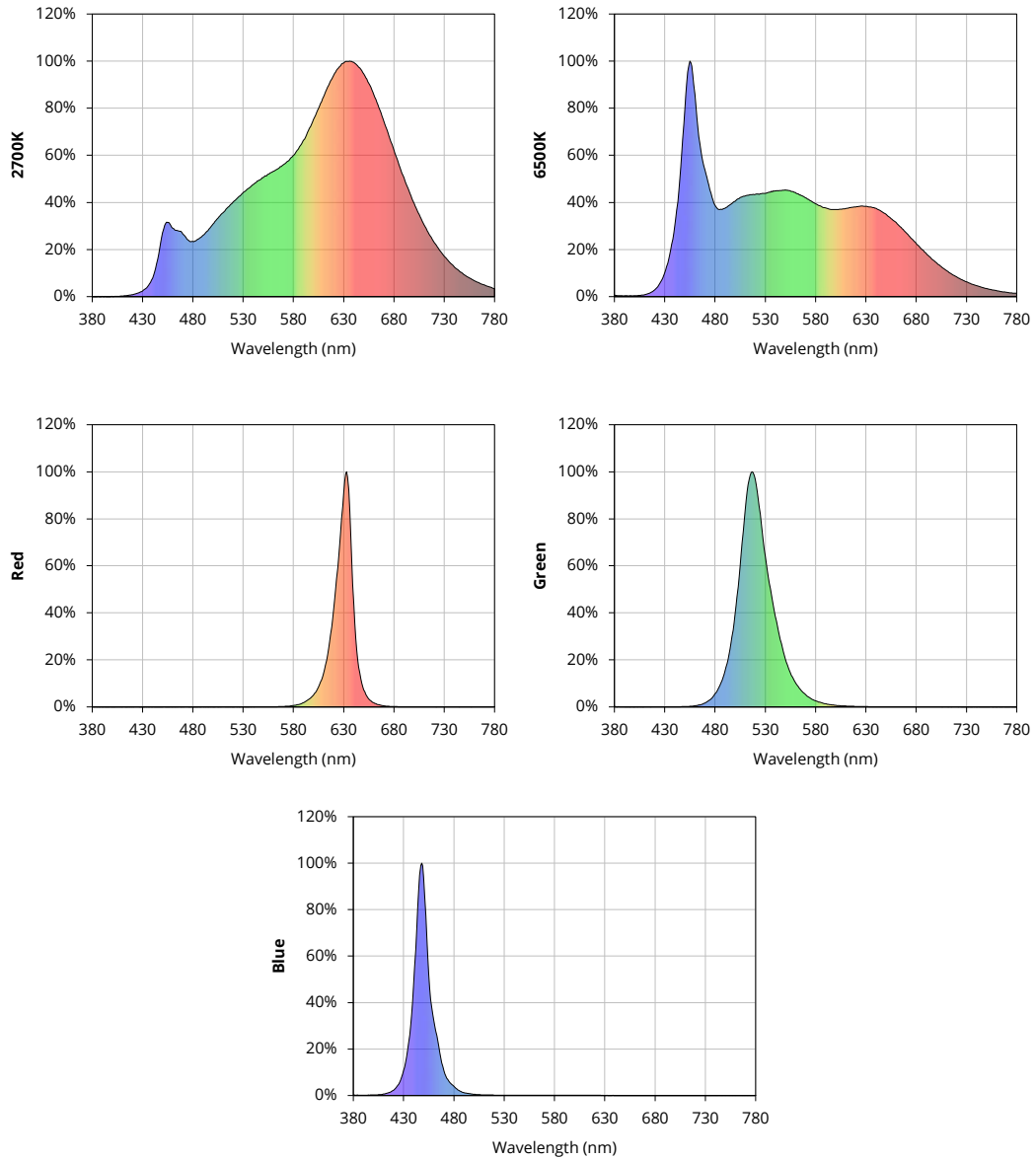
All dimensions in mm, tolerance unless mentioned is ± 0.1 mm.



Characteristic graph

Typical spectral power distribution ($T_A = 25^\circ\text{C}$, $I_F = 150\text{mA}$) (normalized)

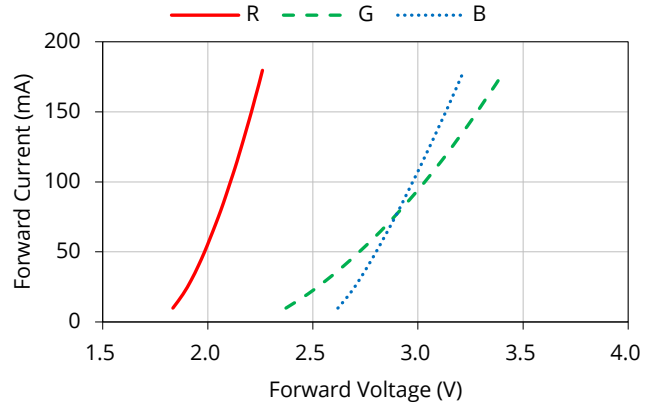
All characteristic curves are for reference only and not guaranteed.



Characteristic graph

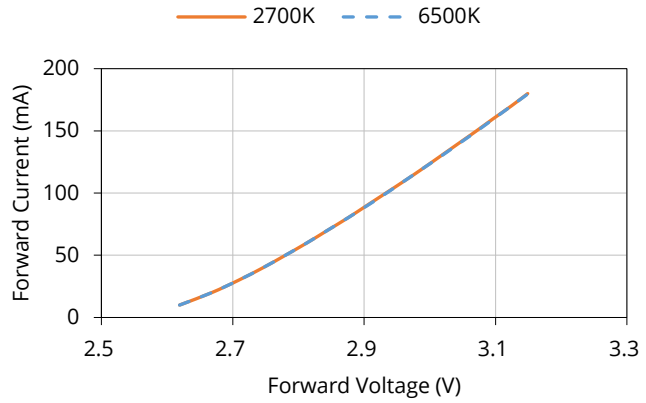
Forward current

All characteristic curves are for reference only and not guaranteed.



Vs. forward voltage

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



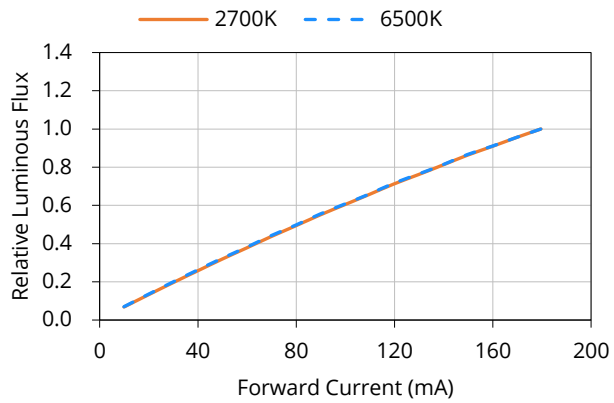
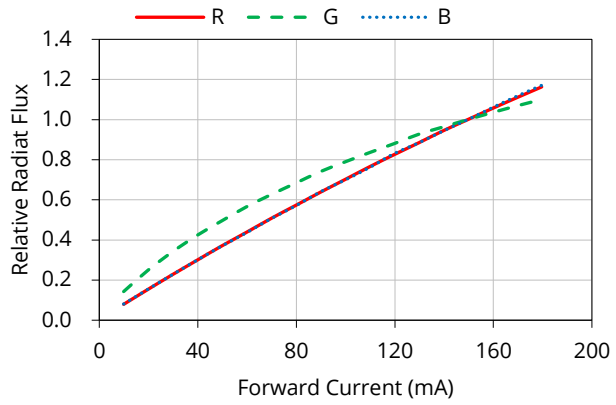
Characteristic graph

Forward current (continued)

All characteristic curves are for reference only and not guaranteed.

Vs. relative radiant flux /
luminous flux

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



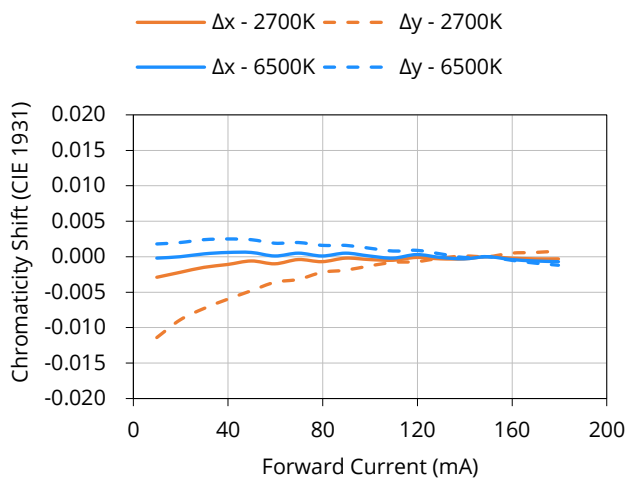
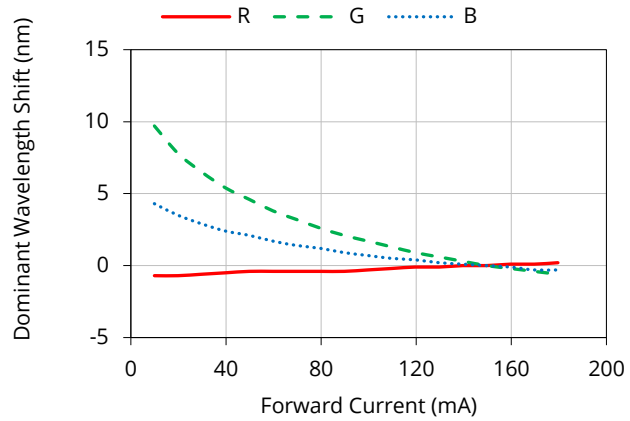
Characteristic graph

Forward current (continued)

All characteristic curves are for reference only and not guaranteed.

Vs. relative dominant
wavelength shift / chromaticity
shift

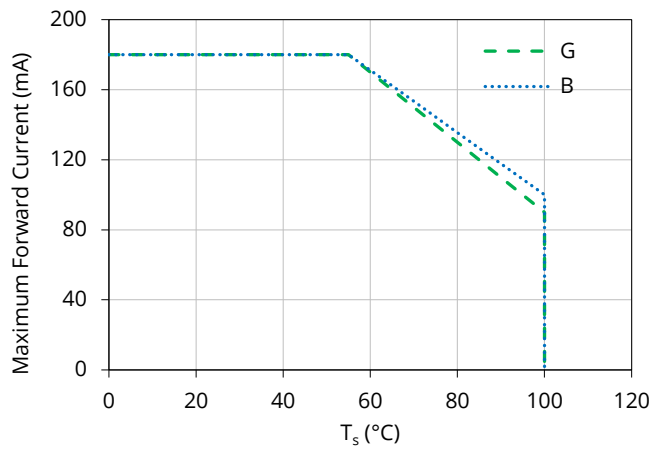
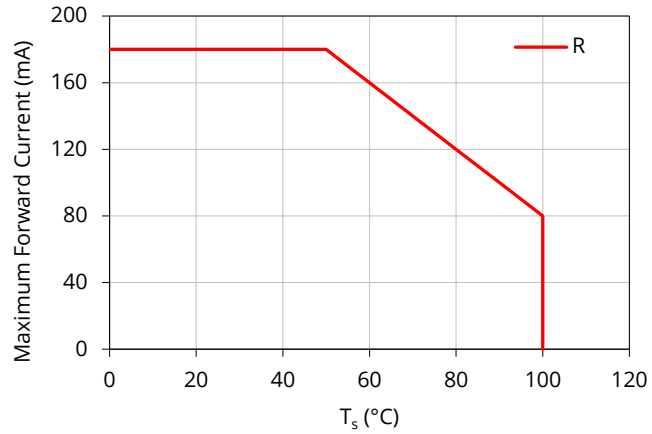
($T_A = 25^\circ\text{C}$)



Characteristic graph

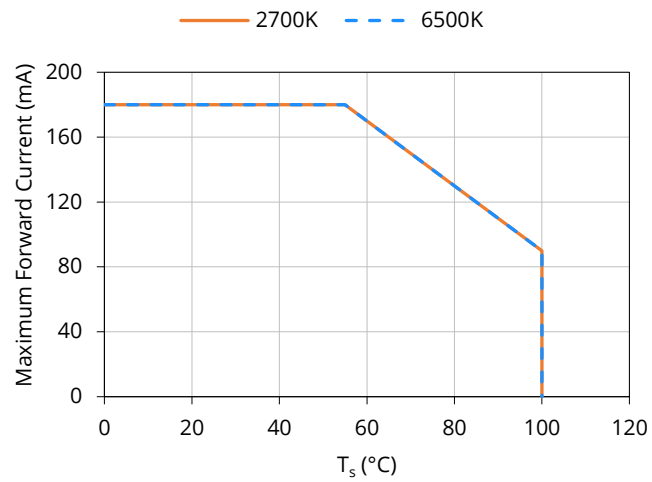
Forward current (continued)

All characteristic curves are for reference only and not guaranteed.



Derating based on solder point

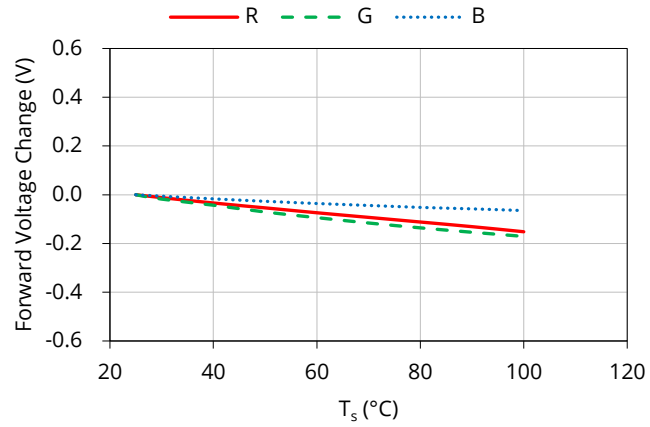
Note: De-rating curves are meant for recommendation only and are not meant to provide guarantees of product stability and longevity.



Characteristic graph

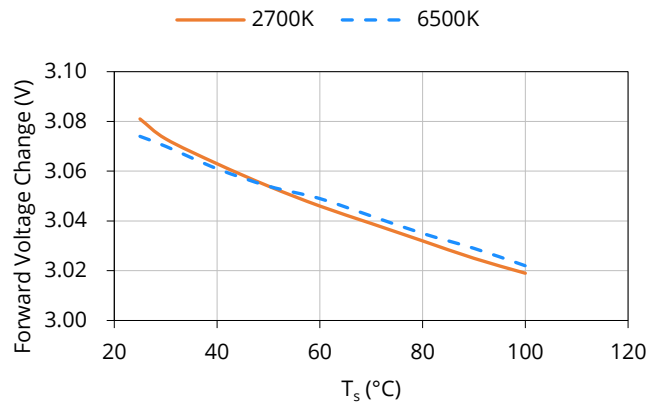
Solder point temperature (T_s)

All characteristic curves are for reference only and not guaranteed.



Vs. forward voltage

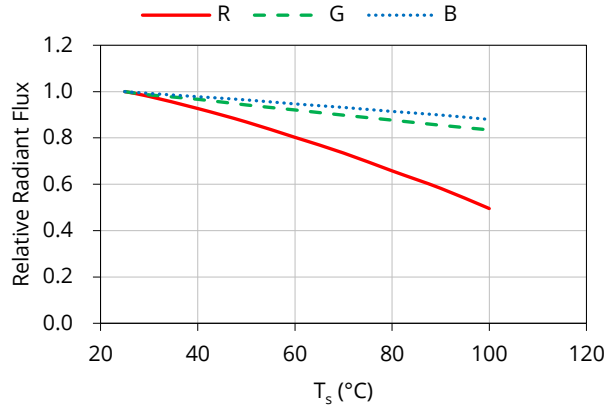
($I_F = 150\text{mA}$)



Characteristic graph

Solder point temperature (T_s) (continued)

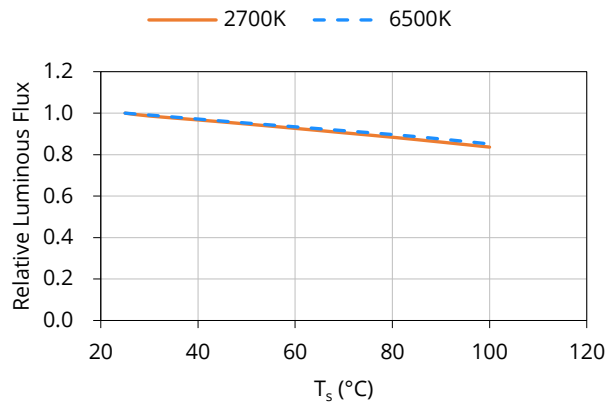
All characteristic curves are for reference only and not guaranteed.



Vs. relative radiant flux /

luminous flux

($I_F = 150\text{mA}$)



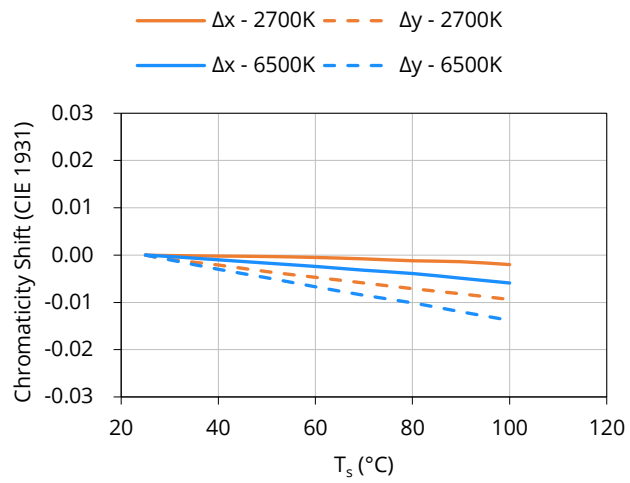
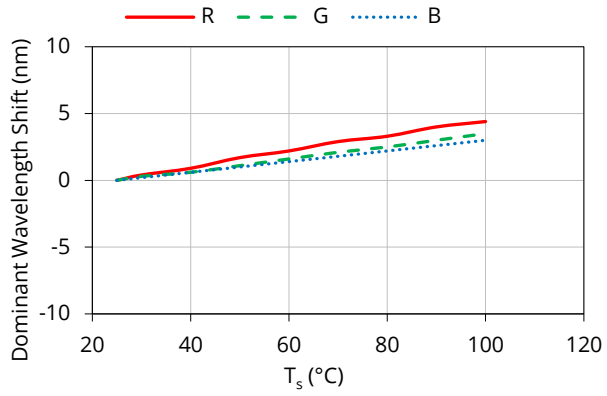
Characteristic graph

Solder point temperature (T_s) (continued)

All characteristic curves are for reference only and not guaranteed.

Vs. relative dominant
wavelength shift / chromaticity
shift

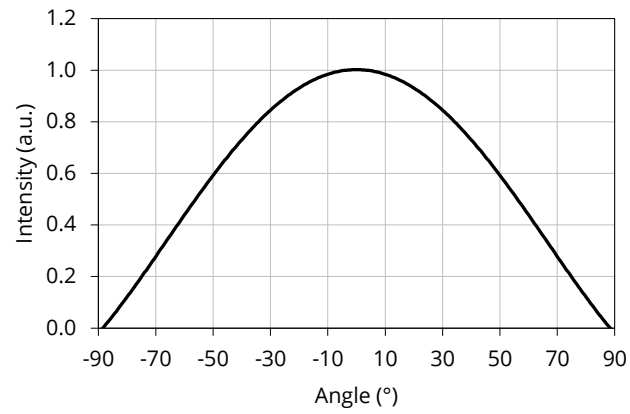
($I_F = 150\text{mA}$)



Characteristic graph

Spatial distribution ($T_A = 25^\circ\text{C}$, $I_F = 150\text{mA}$)

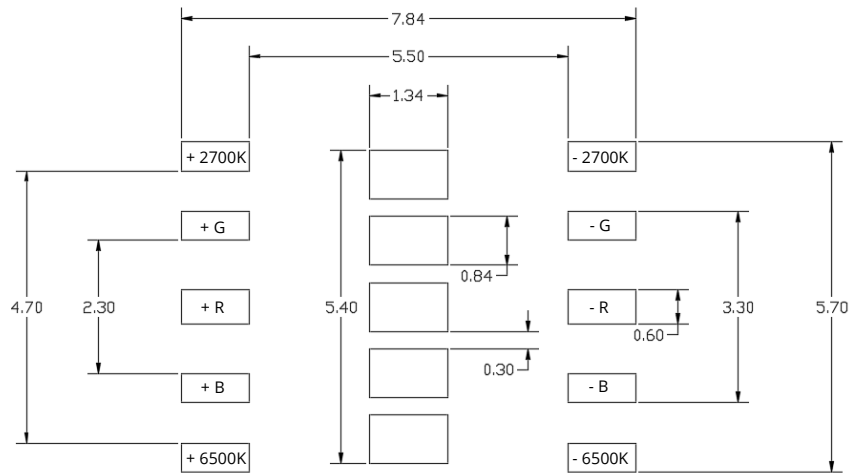
All characteristic curves are for reference only and not guaranteed.



Solder and reflow instruction

Steel stencil

Thickness 0.1mm-0.12mm, reducing the stencil by 10%-30% could help with improving the solder balls effectively. All dimensions in mm, tolerance unless mentioned is ± 0.1 mm. ([Download the CAD file](#))



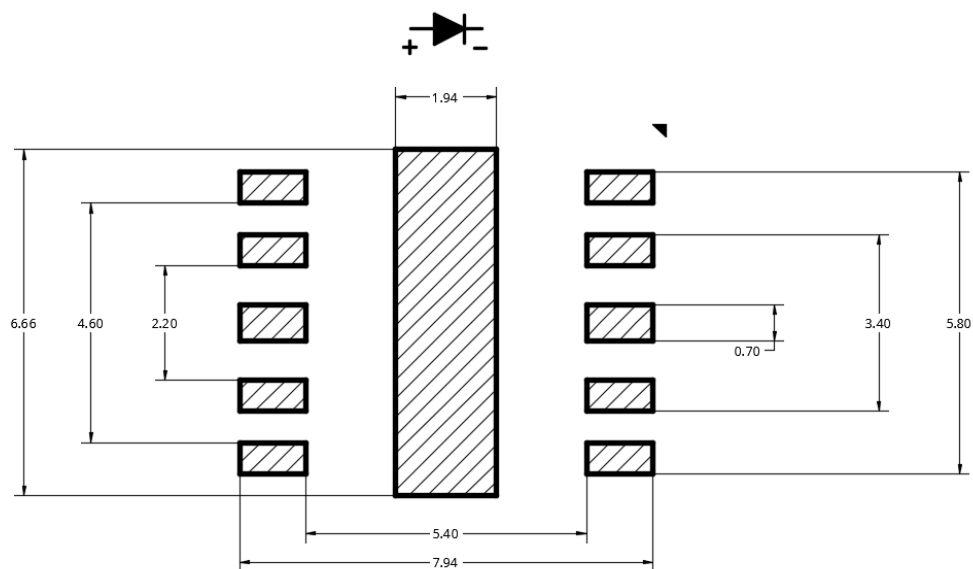
Recommended solder paste

Indium 5.7LT-1 ([Download the datasheet](#))



Recommended solder pad layout

All dimensions in mm, tolerance unless mentioned is ± 0.1 mm.

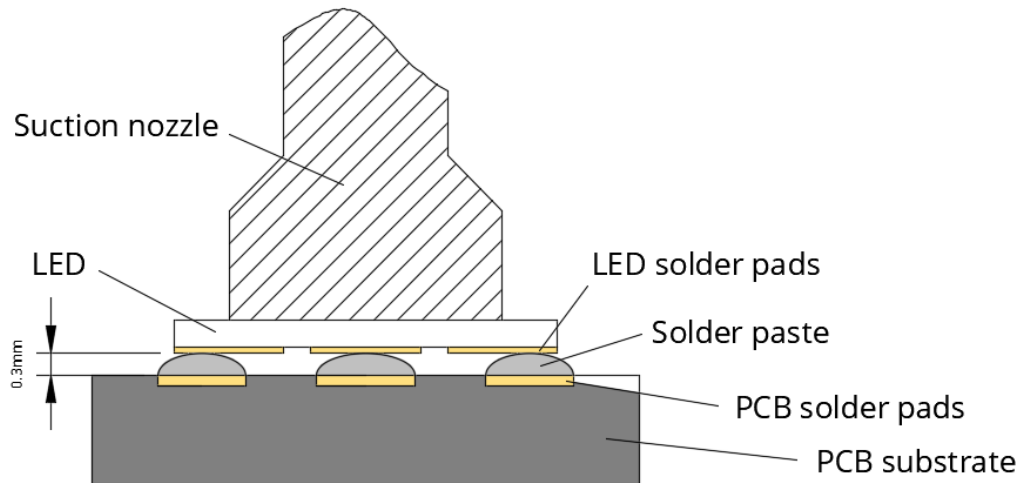


Recommended PCB process

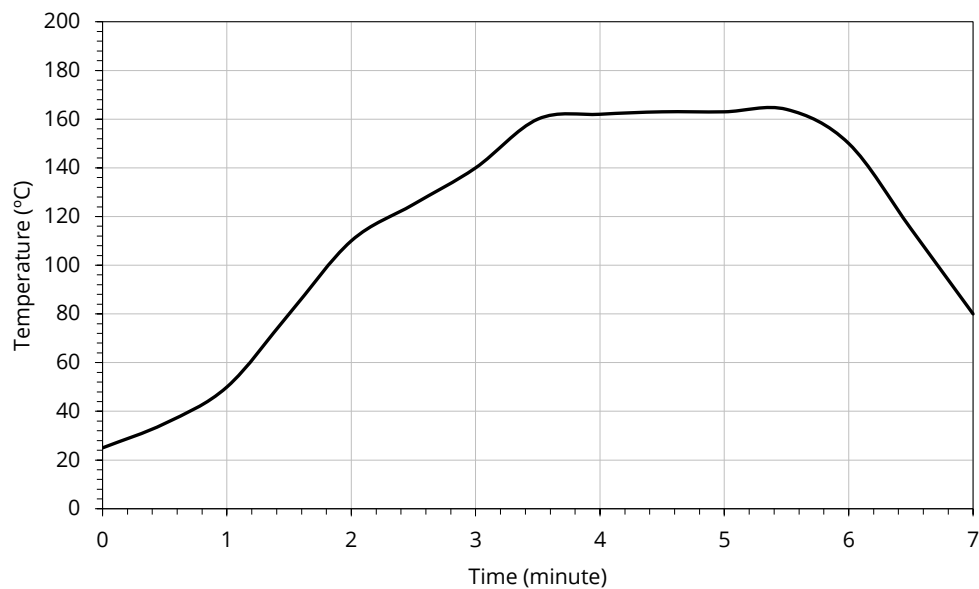
ENIG or OSP is recommended, HASL should NOT be applied.

Solder pressure

The distance between the LED solder pads and PCB solder pads is 0.3mm, this is to avoid high pressure of the suction nozzle to generate solder balls.



Soldering ramp-up time (Pb-FREE).



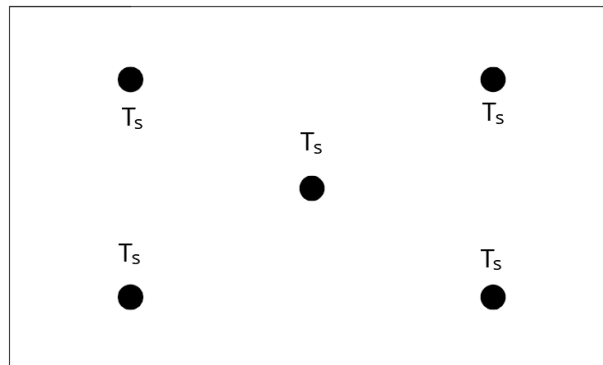
Based on Indalloy®282 solder paste.

- Heating phase.
Temperature increase speed 0.5 – 1.0°C/second.

- Liquid phase.
Peak temperature is 25 - 45°C higher than the melting point of the solder alloy. The reflow temperature should NOT be above 185°C.
- Cooling phase.
Temperature decrease speed 2 - 6°C/second.

Evaluation of eligible soldering process

- Evaluate the actual temperature referring to the profile in the Indium 5.7LT-1 datasheet, the temperature should never be over 185°C.
- Pick at least five T_s points (depends on the PCB size) to evaluate the temperature.



- The ideal solder effect (after removing the LED on the PCB, irreversible¹ evaluation).
- Thrust evaluation (irreversible). The eligible thrusts for 7070 and other common components:
 - 7070 LED: >8kg
 - 0805 resistor: >5kg
 - 1206 resistor: >5kg
 - 2010 resistor: >5kg
 - SOP-8 component: >5kg



1. Irreversible means the tested sample should not be used after the evaluation.

SMT instruction

Problems caused by improper selection of collet

Choosing the right collet is important in ensuring product quality after SMT. LEDs are different from other electronic components, as they are not only concerned with electrical output but also optical output. This characteristic makes LEDs more fragile in the process of SMT. If the collet's lowering height is not well set, it will bring damage to the gold wire at the time of collet's pick-and-place process which can cause the LED to not illuminate, flicker or contribute to other quality problems, some of which may not be immediately detectable.

Collet selection

During SMT, please choose the appropriate collet in order to avoid damage the gold wire inside the LED or insufficient suction. Setting the height of the collet is crucial in order to avoid damage to the top view SMD. If the collet setting is set to too low of an altitude, the collet will press down on the SMD, causing damage or breakage to the encapsulant and cause distortion or breakage of the gold wire.

Other notes of caution

- No pressure should be exerted to the epoxy shell of the SMD under high temperature.
- Do not scratch or wipe the lens since the lens and gold wire inside are rather fragile and cross out easy to break.
- LED should be used as soon as possible when being taken out of the original package, and should be stored in anti-moisture and anti-ESD package.
- This usage and handling instructions are for reference only.

About Yujileds



Our story - Start from the superior stable red LED phosphor.

We started to make LED phosphor materials in 2006. White LEDs were still in very early stage, the industry focused on improving device brightness and efficiency via yellow phosphor very much. No one cared about the light quality. Based on this situation, we took a different approach and focused on red phosphor technology, which is the most important phosphor recipe for high CRI and/or low CCT LEDs, and it made Yuji become a JV partner with Mitsubishi Chemical from 2012.

Today, we are well known for our comprehensive research and full line-up production of LED phosphor from ultra-violet to near-infrared, and we are proud to commit to providing superior stable and efficient phosphors to the worldwide markets.

Our technology - Focus on LED spectrum innovation.

The industrial structure of both phosphor and LED gives us a unique view to develop our spectrum recipes. Compared to the general LED manufacturers, we have comprehensive information in evaluating the feasibility for both technical and commercial aspects. LED spectrum technology is not only about the quality of white LEDs, but also for different applications which have specialized requirements in lighting.

Yuji is one of the few companies that provide the service of designing or customizing a specific spectrum for clients, our confidence comes from the years of accumulation in focusing on the spectrum technologies and the control of LED phosphor and LED die supply-chain with thousands of successful cases in the past years. Innovating LED technologies and giving them commercial values are our eternal driving forces.

Our product - Yujileds®, stands for high-performance LED.

The trademark of Yujileds® is the identification of the LED products developed and manufactured by Yuji. We put our understanding of the LED technologies and the standard of our quality control into every LED we make. Regardless of any product series, we pay attention to expressing the high-performance feature and achieving the product value for clients and never compromise in pursuing the true performance.

Furthermore, we also care about every detail of any documentation we prepare for the product because we

understand the importance to transmit accurate information to clients. It is even more critical for clients to obtain the truth to decide the solution, rather than just a nominal high-performance.

Our client - Outstanding game players in different fields.

Clients are our proudest achievements, now over 200 of our clients are the best game players in their fields in more than 33 countries. We regard the clients' successes as our biggest accomplishments and appreciate their contribution in different fields, clients use our LEDs not just for simple lighting, but to design the lighting for plants, cameras, sensors, health, circadian rhythm, animals, and other industries that we have never imagined that our technologies can be utilized, that makes our work so meaningful.

Our service - Professional supporting team.

There is a group of people in Yuji passionate about creating maximum value for our clients. We have accumulated experience in different projects. Currently, the company gathers more than 30 experts from various fields of semiconductor, chemistry, optics, photoelectricity, circuitry, materials and color science.

Our sales team is well trained in deep LED technologies and has skilled global communication experience. Not just for sales, our team is more like a specialized consultancy to help every client succeed in different projects, and we do not only provide professional business service, but also support in the supply chain, logistics, marketing and technical discussions.

Contact us - We look forward to providing our efficient service for you.

LED website: www.yujiintl.com

Find Yujileds® high-performance LEDs, read our insights into a variety of advanced technologies and applications.

Contact: info@yujigroup.com

LED lighting website: www.yujilighting.com

Find our state-of-art LED lamps and luminaires designed for improving the lighting experience with the vision of illuminating the future.

Contact: lighting@yujigroup.com

Online shop: store.yujiintl.com

Shop your favorite Yuji Lighting product with rapid and professional service.

Contact: webstore@yujigroup.com