

CUSTOMER :

No. : CLD – 0000

EDIT : 0 (1/11)

DATE : 2008/02/01

SPECIFICATIONS FOR APPROVAL

PRODUCT : Top view Multi-color SMD LED

MODEL NAME : ADLTC-3528-G200-L1

(CUSTOMER P/N :)

APPROVAL			REVISION
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REMARK			

DGND.	CHKD.	APPD.

ADIVA TECHNOLOGY INC.

CONTENTS

1. Features	-----	3 / 11
2. Outline dimensions	-----	3 / 11
3. Applications	-----	4 / 11
4. Absolute Maximum Ratings	-----	4 / 11
5. Electro-Optical characteristics	-----	4 / 11
6. Rank Sorting Method	-----	5 / 11
7. Typical Characteristic Curves	-----	6 / 11
8. Reliability Test Items and Conditions	-----	7 / 11
9. Package	-----	8 / 11
10. Cautions on use	-----	9 / 11
11. Others	-----	9~10 / 11
12. Appendix	-----	11 / 11

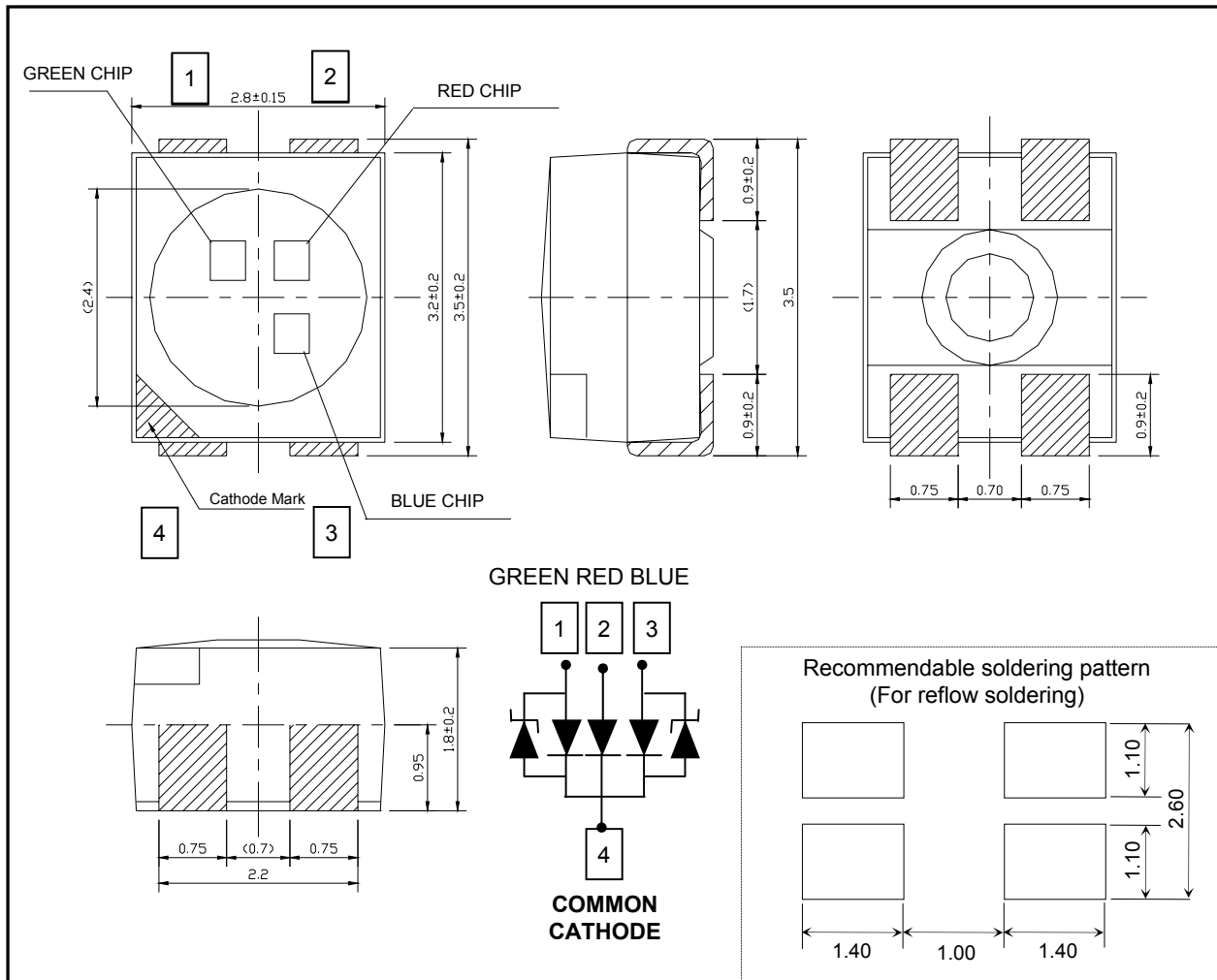
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					ADLTC-3528-C200-L1

1. Features

- Lighting Color : Red, Green, Blue
- Lead Frame type PKG : 3.5×2.8×1.8 mm(L×W×H)
- Viewing angle : extremely wide(120°)
- Compatible to Pb-free IR reflow soldering
- ESD-withstand voltage : up to 2kV acc. to JESD22-A 114-B
- Taping : 8 mm conductive black carrier tape & antistatic clear cover tape.
2000pcs/reel, Φ180 mm wheel

2. Outline Dimensions

(Unit : mm)



◆Tolerances Unless Dimension ±0.2mm

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3. Applications

- Indicator
- Interior and Exterior Illumination, Automotive Lighting
- Backlighting
- Mobile Phone Camera Flash

4. Absolute Maximum Ratings

(Ta=25℃)

Items	Symbols	Rating			Unit
		Red	Green	Blue	
Forward Current *2)	I _F	30	30	30	mA
Pulse Forward Current *1), *2)	I _{FP}	100	100	100	mA
Reverse Current *2)	I _R	5	-	-	V
Power Dissipation *2)	P _d	72	108	108	mW
Operating Temperature	T _{opr}	-30 ~ +85			℃
Storage Temperature	T _{stg}	-40 ~ +100			℃

*1) Pulse Width ≤ 10msec, Duty ≤ 10%

Note) These values are based on 1-die performance

*2) The values are based on 1-die performance

5. Electro - Optical Characteristics

(Ta=25℃)

Item	Symbol	Condition	Color	Characteristics			Unit
				Min	Typ	Max	
Forward Voltage	V _F	I _F =20mA	R	1.9	2.0	2.4	V
			G	3.0	3.3	3.6	
			B	3.0	3.3	3.6	
Reverse Current	I _R	VR=5V	R	-	-	100	uA
Luminous Intensity	I _v	I _F =20mA	R	450	650	1050	mcd
			G	700	1000	1600	
			B	150	250	450	
Dominant Wavelength	λ _d	I _F =20mA	R	610	620	630	nm
			G	510	520	530	
			B	455	460	465	
Spectral half width	Δλ	I _F =20mA	R	-	20	-	nm
			G	-	35	-	
			B	-	25	-	
Viewing Angle	2Θ _{1/2}	I _F =20mA	R/G/B	-	120	-	deg

※ These values measured by Optical Spectrum Analyzer of Adiva Technology Inc. and tolerances are followings as below

- Luminous Intensity (I_v) : ±20%, Forward Voltage (V_F) : ±0.1V, Dominant Wavelength (λ_d) : ±2nm

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6. Rank Sorting Method

- This product shall be classified by following table

Rank of Luminous Intensity

Rank	RED	GREEN	BLUE
A	450 ~ 650	700 ~ 1000	150 ~ 250
B	650 ~ 850	1000 ~ 1300	250 ~ 350
C	850 ~ 1050	1300 ~ 1600	350 ~ 450

※ Luminous intensity is tested at a current pulse duration of 25ms and accuracy of $\pm 20\%$.

Rank of Dominant Wavelength

Rank	RED	GREEN	BLUE
A	610 ~ 620	510 ~ 520	455 ~ 460
	620 ~ 630	520 ~ 530	460 ~ 465

※ Dominant wavelength is measured with an accuracy of $\pm 2\text{nm}$.

Rank of Forward Voltage

Rank	RED	GREEN	BLUE
1	1.9 ~ 2.1	3.0 ~ 3.2	3.0 ~ 3.2
2	2.1 ~ 2.3	3.2 ~ 3.4	3.2 ~ 3.4
3	2.3 ~ 2.5	3.4 ~ 3.6	3.4 ~ 3.6

※ Voltages are tested at a current pulse duration of 1ms and an accuracy of $\pm 0.1\text{V}$.

※ Rank name method: Please refer to the following example

Rank Name : ABC-A-123

IV rank	WD rank = A	VF rank
▪Red Iv = A		▪Red Iv = 1
▪Green Iv = B		▪Green Iv = 2
▪Blue Iv = C		▪Blue Iv = 3

* Voltages are tested at a current pulse duration of 1 ms and an accuracy of $\pm 5.0\%$.

* This categories are established for classification of products.

* VF, Iv, Wd values are based on 1-die performance.

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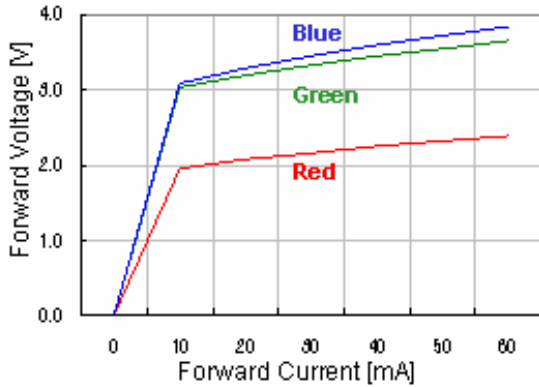
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7. Typical Characteristic Curves

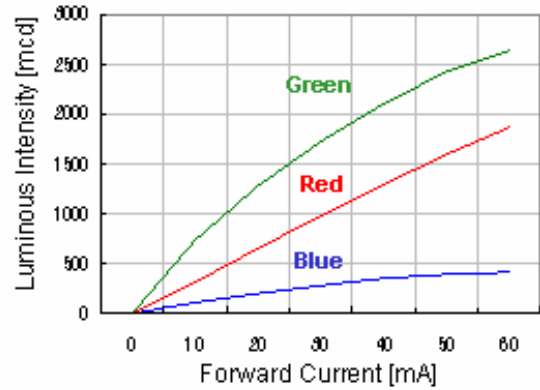
■ Forward Voltage vs. Forward Current

Ta=25°C



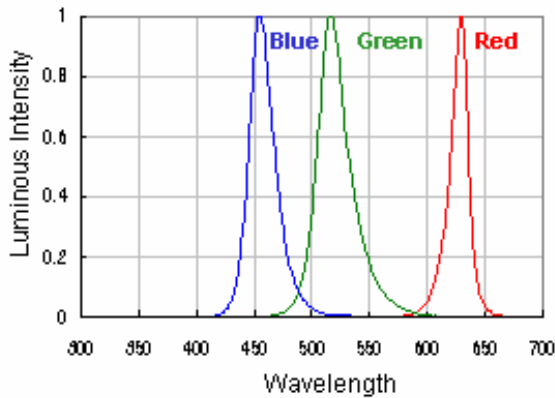
■ Forward Current vs. Luminous Intensity

Ta=25°C

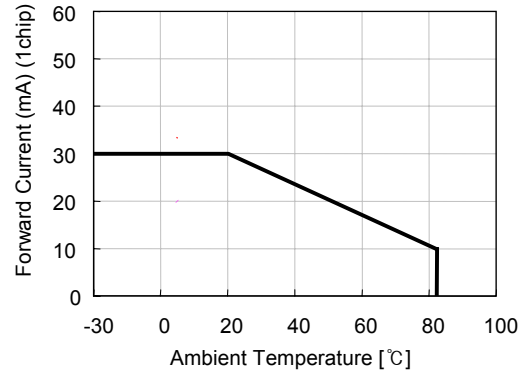


■ Spectrum

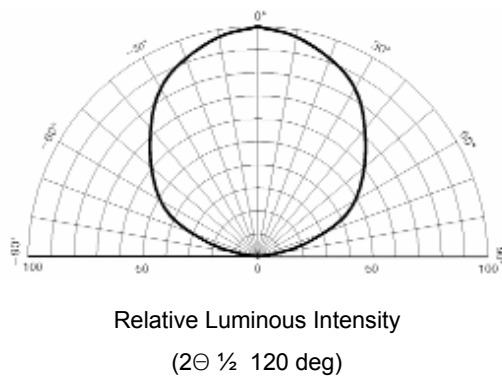
Ta=25°C



■ Max. Permissible Forward Current



■ Radiation Characteristics



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8. Reliability Test Items and Conditions

8-1. The Reliability criteria of SMD LED

Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V _F	I _F = 20mA	-	U.S.L.× 1.2
Luminous Intensity	I _v	I _F = 20mA	L.S.L × 0.5	-

*U.S.L : Upper Spec Limit, *L.S.L : Lower Spec Limit

8-2. Results of Reliability Test

No	Item	Test Condition	Test Hours/ Cycles	Sample No	Ac/Re
1	Steady State Operating Life	Ta=25℃, I _F =20mA / 1 die	500hr	11 pcs	0 / 1
2	High Temp. Humidity Life	Ta=60℃, RH=90%, I _F =15[mA] / 1die	500hr	11 pcs	0 / 1
3	Steady State Operating Life of High Temperature	Ta=85℃, I _F =10mA / 1die	500hr	11 pcs	0 / 1
4	Steady State Operating Life of Low Temperature	Ta= -30℃, I _F =20mA / 1die	500hr	11 pcs	0 / 1
5	High Temp. Storage	Ta=100℃	500hr	11 pcs	0 / 1
6	Low Temp. Storage	Ta= -40℃	500hr	11 pcs	0 / 1
7	High Temperature High Humidity Storage	Ta=85℃,RH=85%	500hr	11 pcs	0 / 1
8	Temperature Cycle	-40℃(30min) ~ 25℃(5min) ~ 100℃(30min) ~ 25℃(5min)	100cycle	11 pcs	0 / 1
9	Thermal Shock	100℃(15min) ~ -40℃(15min)	50cycle	11 pcs	0 / 1
10	Resistance to Soldering (IR Reflow)	Tsld=260℃, 10sec (Pre treatment 30℃,70%,168hr)	2times	11 pcs	0 / 1
11	Moisture Resistance Cycle	25℃~65℃~-10℃ (90%HR,24Hr/1Cycle)	10Cycle	11 pcs	0 / 1

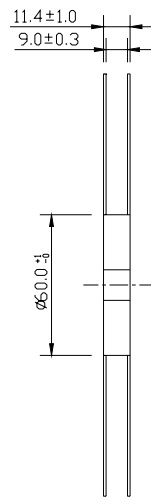
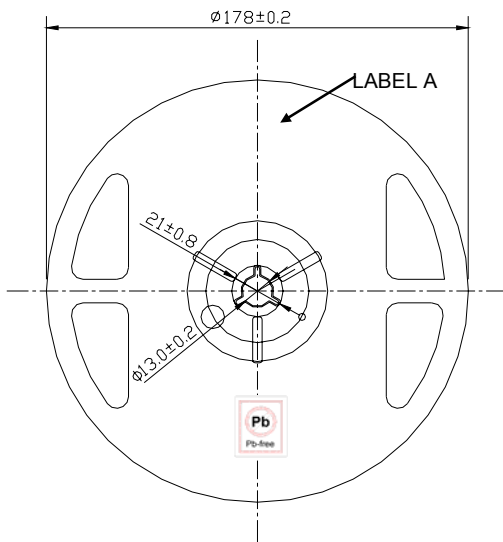
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9. Package

9-1. Taping Outline Dimension

Dimension of Reel

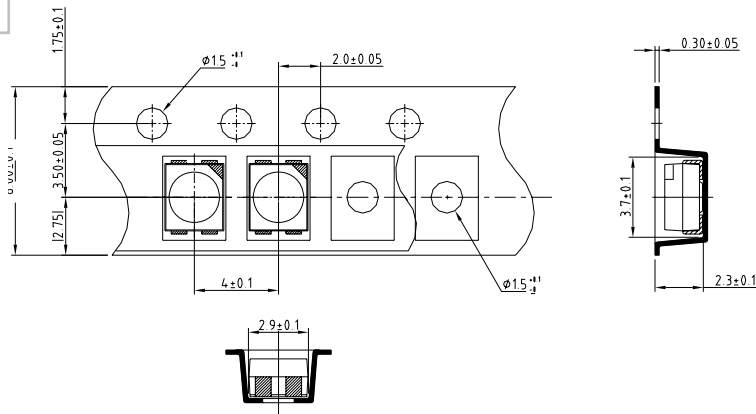
(Unit : mm)



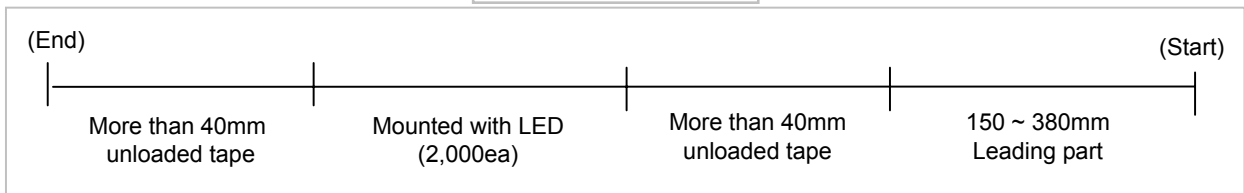
◆ Packing Materials :

- Reel : Conductive PS (Black)
- Emboss Tape : Conductive PS (Black)
- Cover Tape : Conductive PET Base

Dimension of Tape



Arrangement of Tape



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10. Cautions on use

10-1. Over-current-proof

Customer must apply resistors for protection, others slight voltage shift will cause big current change (Burn out will happen).

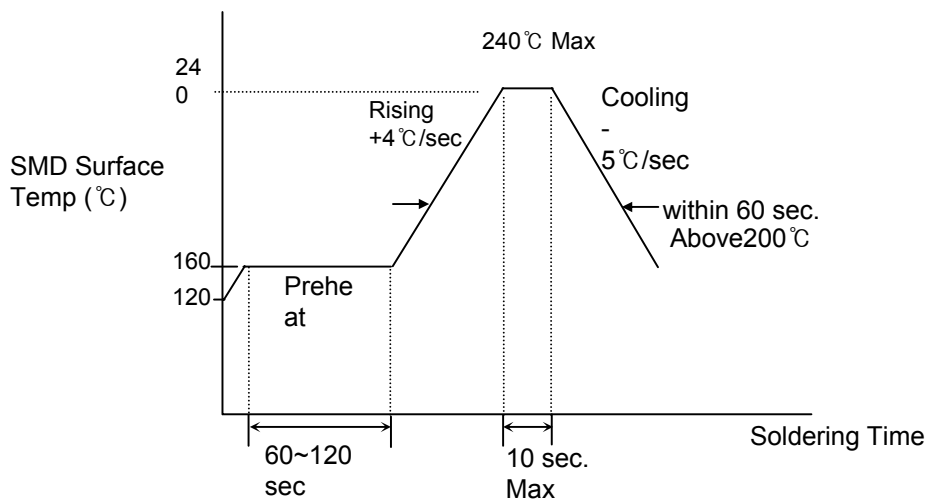
10-2. For the Storage

- Proper temperature and RH conditions for storage are : 5 °C ~35 °C , RH 60%.
- Do not open moisture-proof bag before the products are ready to use.
- Store products in a moisture-proof bag with a desiccant(Silica gel) after open.
- These products should be used within 168 hours after opening the bag based upon storage condition.
- These products must be baked to remove moisture before using them if the Silica gel loses its blue color. Conditions for baking are 60±5°C , 20% (RH) and 24 hours maximum. (For reeled status without bag)
- Considering the tape life, we suggest our customers to use our products within a year(from production date)

10-3. *Adiva Tech* will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit if use to exceed the absolute maximum ratings, or not keep the matters that demand special attention.

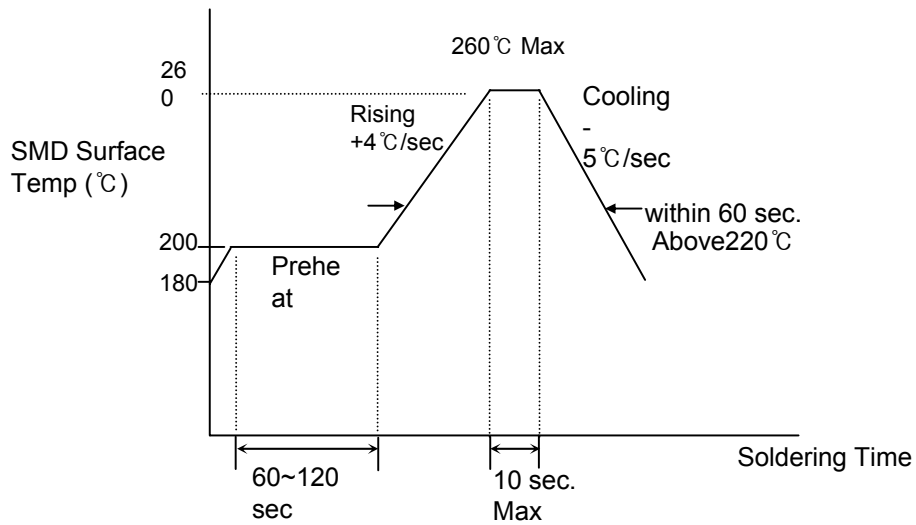
11. Others

11-1. Lead Solder



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11-2. Lead-Free Solder

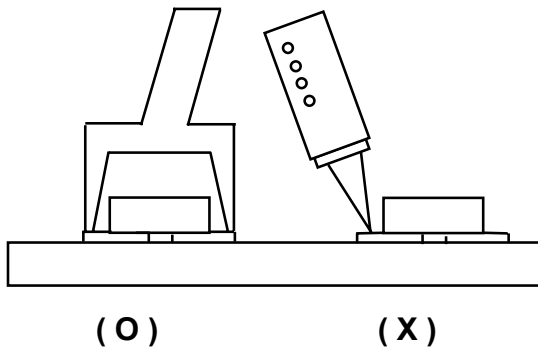


11-3. Soldering Iron

Basic spec is $\leq 3\text{sec}$ when 345°C . If temperature is higher, time shorter ($+10^\circ\text{C} \rightarrow -1\text{sec}$). Power dissipation of Iron should be smaller than 15W, and temperature should be controllable. Surface temperature of the device should be under 230°C .

11-4. Rework

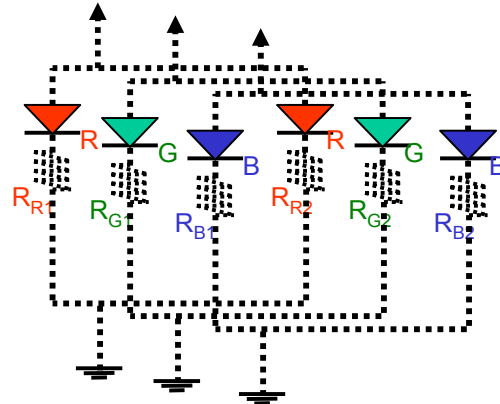
- 1) Customer must finish rework within 5sec under 245°C .
- 2) The head of Iron can not touch copper foil.
- 3) Twin-head type is preferred.



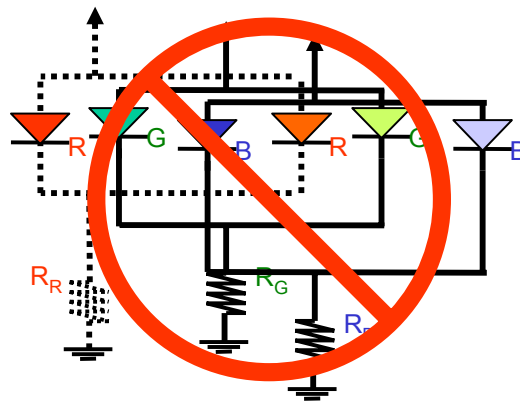
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※. Appendix

Caution using Multi-color LED on PCB



[Pic.1 : Recommended Circuit]
(Separate resistor per each LED and each color)



[Pic.2 : Abnormal Circuit]
(Easy to occur brightness / color problem)

► **Caution on designing PCB & Circuit**

Using more than 2 pcs of 3 in 1 LED per a phone, It is strongly recommend to **use separate resistor per each LED and each color.** (Pic. 1)

(For example, condition using 2 pcs in 1 PCB, Please do notice that it is needed total 6 ea of separate resistor, if one resistor is connected to more than 2 pcs of LED (Pic.2), it can cause serious problem on brightness or color)

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