S P E C I F I C A T I O N S

SMD TYPE TOP VIEW RGB COLOR LED

MODEL : AT541M3SE3

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1. General Description

(1) Features

- Package size - 5.4(L) × 5.0(W) × 1.6(T) mm
- Wide Beam angle ($2\theta_{1/2}$=120deg)
- RoHS Compliant

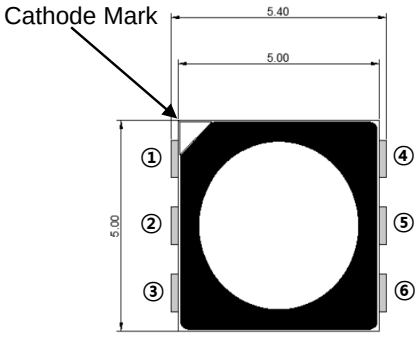
(2) Applications

- Backlighting (LCD, switchs, keys, displays)
- Coupling into light guides
- Optical indicator
- General lighting

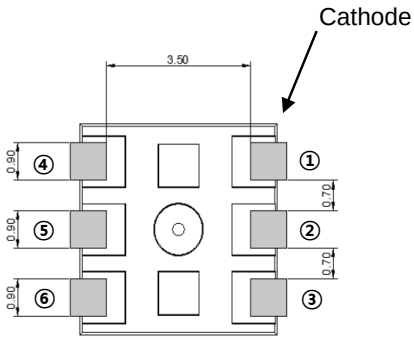
(3) Outline Dimensions

[Tolerance : ±0.2, unit : mm]

[Top View]

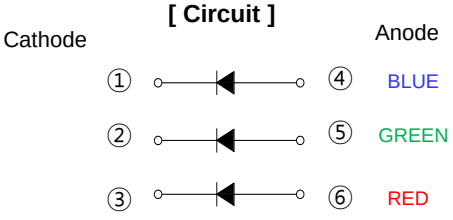


[Bottom View]



[Side View]

[Circuit]



2. Specifications

(1) Absolute Maximum Ratings

(T_a=25℃)

Parameter	Symbol	Absolute Maximum Rating			Unit	Remark
		Red	Green	Blue		
Power Dissipation	P_D	48	64	64	mW	
Forward Current	I_F	20	20	20	mA	per chip
Peak Pulse Current(1)	I_{FP}	40	40	40	mA	per chip
Reverse Voltage	V_R		5		V	I_R=10㎂
Storage Temperature	T_{STG}		-40 to +100		℃	

* Note : (1) Duty ratio = 1/10, pulse with = 10msec

(2) Initial Electrical/Optical Characteristics

(T_a=25℃)

Parameter	Symbol	Condition	Color	Min.	Typ.	Max.	Unit
Forward Voltage(1)	V_F	I_F = 20mA	Red	2.0	-	2.4	V
			Green	2.9	-	3.2	
			Blue	2.9	-	3.2	
Luminous Intensity(2)	I_V	I_F = 20mA	Red	1,000	1,150	1,300	mcd
			Green	1,900	2,100	2,500	
			Blue	500	550	600	
Dominant Wavelength(3)	λ_D	I_F = 20mA	Red	620	-	625	nm
			Green	520	-	525	
			Blue	465	-	470	
Beam Angle(4)	$2\theta_{½}$	I_F = 20mA	Red	-	120	-	deg
			Green				
			Blue				

* Notes : (1) Forward voltage measurement allowance is ± 0.1V.
(2) Luminous intensity measurement allowance is ± 10%, Measuring equipment
(3) Dominant wavelength measurement allowance is ± 1nm, Measuring equipment
(4) $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
Based on the measuring instruments of Dongbu LED

3. Rank

(1) Characteristics Rank

■ Luminous Intensity Rank

(T_a=25℃)

Rank	Chip Count	Condition	Color	Min.	Typ.	Max.	Unit
A	3chip	I_F = 20mA / Chip	Red	1,000	1,150	1,300	mcd
			Green	1,900	2,100	2,500	
			Blue	500	550	600	

■ Dominant Wavelength Rank

(T_a=25℃)

Rank	Condition	Color	Min.	Typ.	Max.	Unit
M10	I_F = 20mA / Chip	Red	620	-	625	nm
		Green	520	-	525	
		Blue	465	-	470	

■ Forward Voltage Rank

(T_a=25℃)

Rank	Chip Count	Condition	Color	Min.	Typ.	Max.	Unit
AAA	3chip	I_F = 20mA / Chip	Red	2.0	-	2.4	V
			Green	2.9	-	3.2	
			Blue	2.9	-	3.2	

■ Rank Code

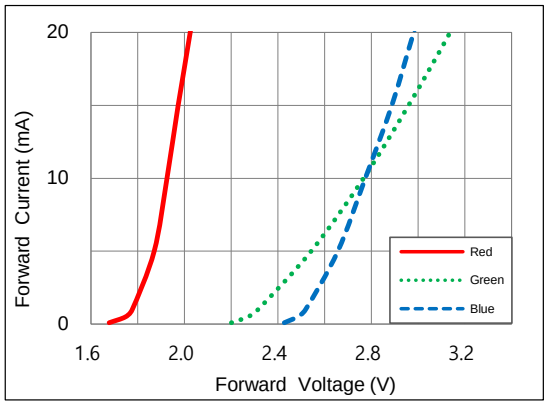
The rank inscription is composed of the follow method.

Ex)	A	A	A
	①	②	③

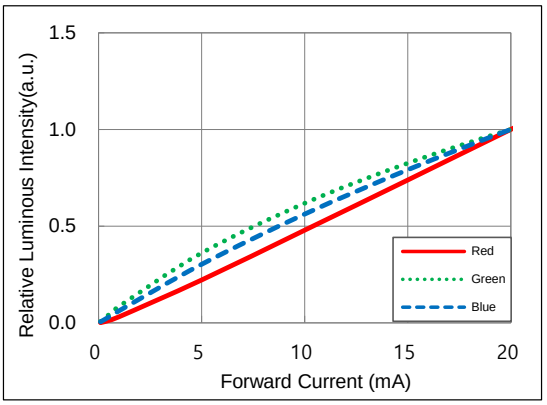
→

①	I_V Rank
②	Color Rank
③	V_F Rank

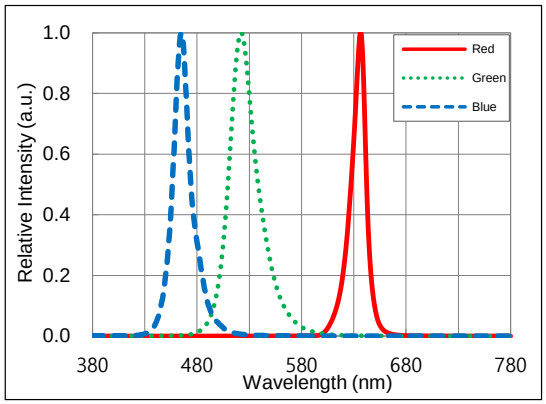
4. Characteristics Diagrams



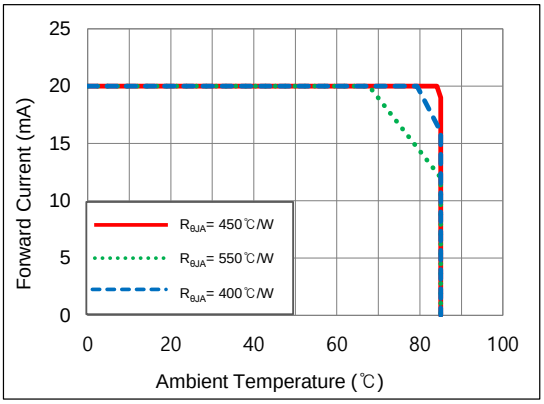
Forward Voltage vs Forward Current, T_a=25℃



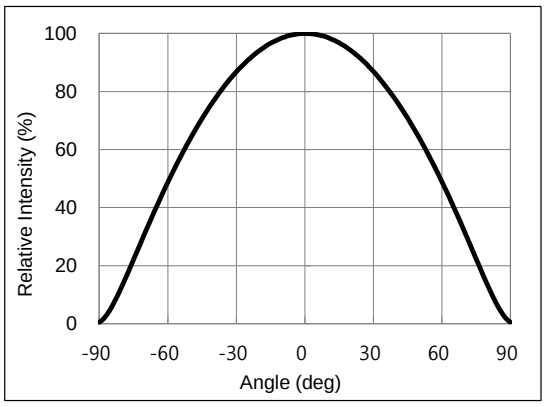
Forward Current vs Relative Luminous Intensity, T_a=25℃



Spectrum, T_a=25℃, I_F=20mA



Derating Curve



Beam Angle, T_a=25℃, I_F=20mA

* Note : The graph of characteristics is the sampling data for the reference.

5. Soldering Conditions

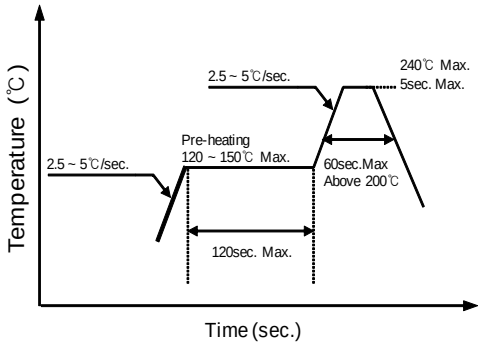
(1) Recommended Soldering Conditions

Reflow Soldering			Hand Soldering	
Conditions	Lead Solder	Lead-Free Solder		
Pre-Heating	120 ~ 150℃	180 ~ 200℃	Temperature	300℃ Max.
Pre-Heat Time	120sec. Max.	120sec. Max.	Soldering time	3 sec. Max. (one time only)
Peak Temperature	240℃ Max.	260℃ Max.		
Soldering Time	5sec. Max.	5sec. Max.		

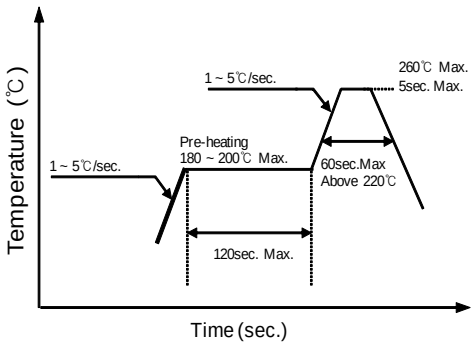
* After reflow soldering, rapid cooling should be avoid.

(2) Recommended Reflow Soldering Profile

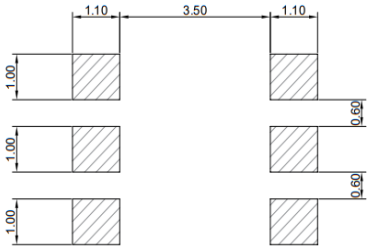
■ Lead Solder



■ Lead Free Solder



(3) Recommended Soldering Pad Pattern



(Unit : mm)

(4) Soldering Cautions

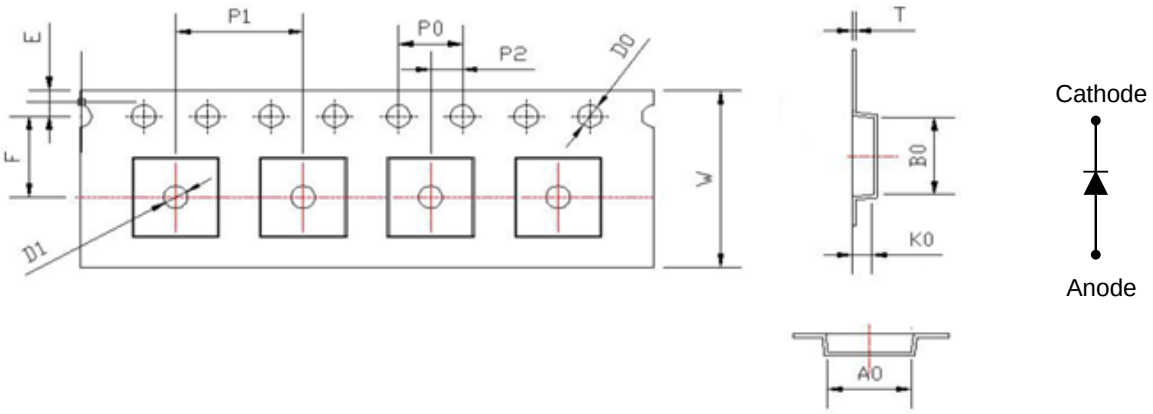
-. Reflow soldering should not be done more than two times.
-. When soldering, do not put stress on the LEDs during heating.
-. After soldering, do not wrap the circuit board.
-. The LEDs can be soldered on place using the reflow soldering method.
-. Occasionally there is a brightness decrease cause by the influence of heat or ambient atmosphere during air reflow. It is recommend that the user use the nitrogen reflow method.
-. After complete soldering, the product should be handled after cooling. (required to be handled under 60℃)

6. Packing

(1) Carrier Tape & Carrier Reel Dimensions

■ Carrier Tape

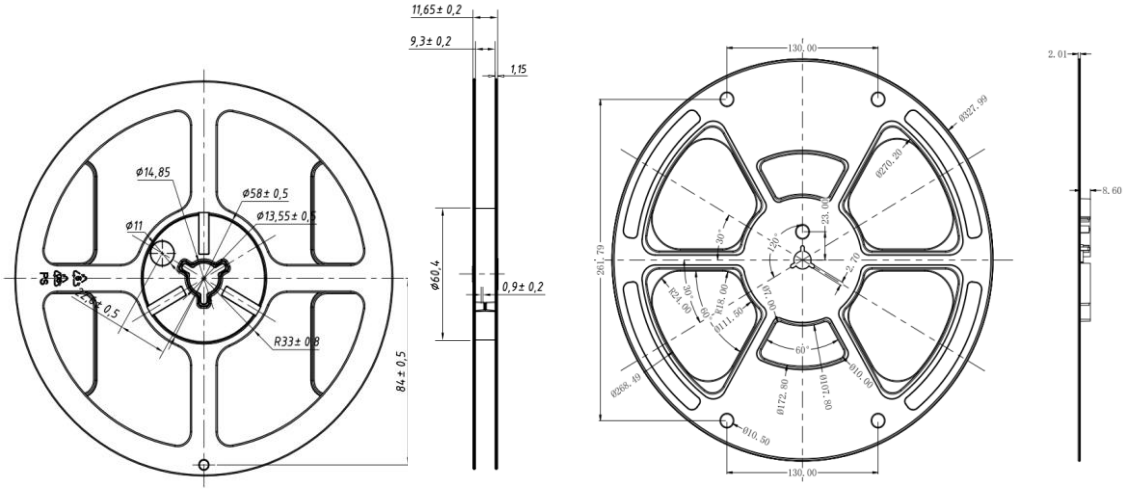
(Unit : mm)



Symbol	A0	B0	K0	P0	P1	P2
Spec	5.35±0.10	5.75±0.10	1.85±0.10	4.00±0.10	8.00±0.10	2.00±0.10
Symbol	W	T	E	F	D0	D1
Spec	12.00±0.20	0.20±0.10	1.75±0.10	5.50±0.10	1.55±0.10	1.55±0.10

■ Carrier Reel

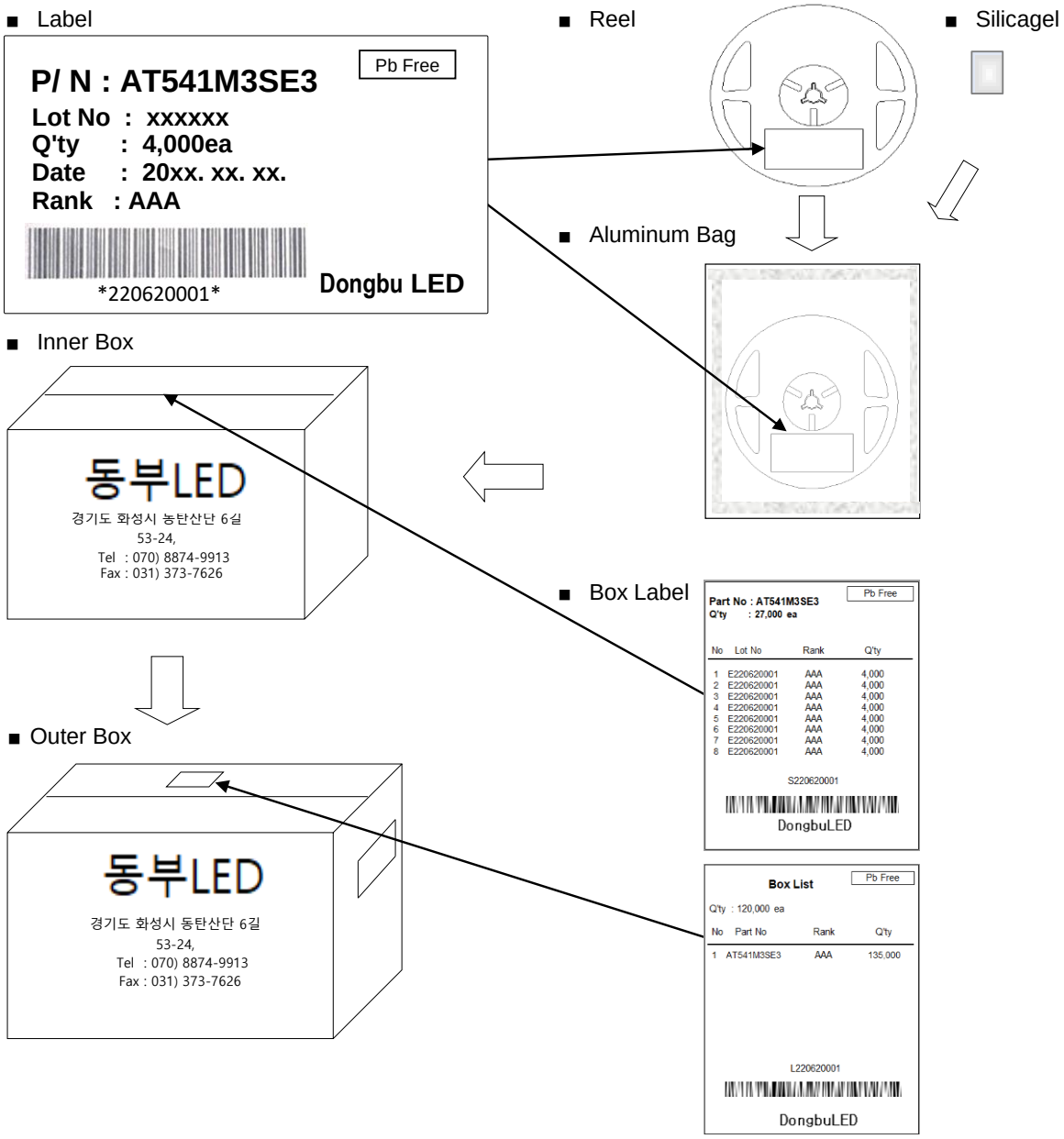
(Unit : mm)



< 7" Reel > < 13" Reel >

1) Quantity : Taping of 1 reel will be from min 1,000pcs to 4,000pcs in unit of a number in the thousands.
2) Adhesion strength of cover tape is 0.1 ~ 0.7N(20gf ~60gf) when the cover tape is turned off from the carrier tape.

(2) Packing and Packaging



Box Type	Inner Box	Outer Box
Max. Packing Q'ty(pcs)	24,000	120,000

1) The carrier tape winded on the reel are placed into an ESD protected pack with a silicagel and sealed by the thermal pressure sealer. Then this sealed pack is packaged in a cardboard box.

7. Precaution

(1) Static Electricity

These LEDs are highly susceptible to static electricity or surge voltage. So a wrist strap or an anti-electrostatic glove necessarily be used when handling the LEDs.

Do not use the equipment that surge voltage is came into existence.

All devices and equipment that measure or mount the LEDs must be properly grounded.

After being assembled LEDs, it should be ascertained a electrical characteristic whether that are damaged by static electricity or not.

(2) Packing

The moisture that is absorbed into the LED products may cause a badness and damage to the optical characteristics of the LEDs. Therefore the moisture barrier aluminum bag is used to keep moisture in the packing. And a silicagel is inserted into a moisture barrier aluminum bag that sealed by the thermal pressure sealer.

(3) Cleaning

Ethanol can be used for LED cleaning. The maximum exposure time with ethanol is 1 minute for cleaning.

Do not use ultrasonic for cleaning the LEDs or other solvents, If ultrasonic cleaning is absolutely necessary, a pre-test should be done before cleaning to see if the LED is damaged.

(4) Storage

In order to avoid the absorption of moisture, it is recommended to store LEDs in the moisture barrier aluminun bag is not opened.

Storage condition before opening the packing :

Temperature : below 30℃

Humidity : 90%RH max

The LEDs should be used within a year.

Storage condition after opening the packing :

Temperature : below 30℃

Humidity : 60%RH max

The products have to be used within one year from the date marked on label which is attached to reel or aluminium bag. After opening the packing, the LEDs should be used within 168 hours(7days). If unused LEDs remain, they should be stored in the place kept away moisture.

If the LEDs have exceeded the above storage time, it should be used after to bake using the following conditions.

Baking condition : 60±5℃, 10 ~ 24 hours

A slight amount of sulfur, chlorine or VOC from the surrounding environment may cause discoloration of the LEDs.

(5) Pick and Place

It should be avoided to rub or scratch the surface of resin by any hard material. It is possible that the LEDs are damaged to the optical characteristics.

(6) Heat

The LEDs are products that are generated heat. It must be considered the heat generation of the LEDs when it is designed the PCB. After considering the ambient temperature and the heat generation of LEDs, the operating current should be decided .

(7) Others

If the forward or reverse voltage which exceeds the absolute maximum rating is applied to the LEDs, that will cause the damage to the LEDs. It is possible that the damaged LEDs do not light on at the current.

Be careful not to look the LEDs that the output power is strongly increased in the face. It is possible that eyesight has been getting weaker.

Light emitting part should not be exposed by physical contact. It can be the reason of material desquamation and progressive disconnection.

This LED is made for in-door use only. If the user wants the LED for out-door use, it is necessary to take some additional treatment on the product after surface mounting technology(SMT).

This specification could be changed without a notice to the customer because of the inside circumstance of the company.