

Features

- 0402 0.4mm SMD LED
- High Brightness
- AllInGaP / InGaN Technology
- Small package
- High reliability
- Clear Lens

Applications

- Consumer Electronics
- Wearables
- Automobile After Market
- Industrial Equipment

Description

The IN-S42BT series is a popular low profile 0402 package with versatile design capabilities. It is a PCB type molding style LED which can be used in various applications.

Recommended Solder Pattern

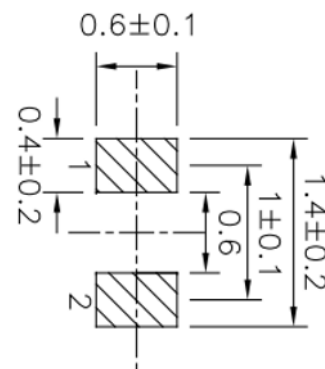
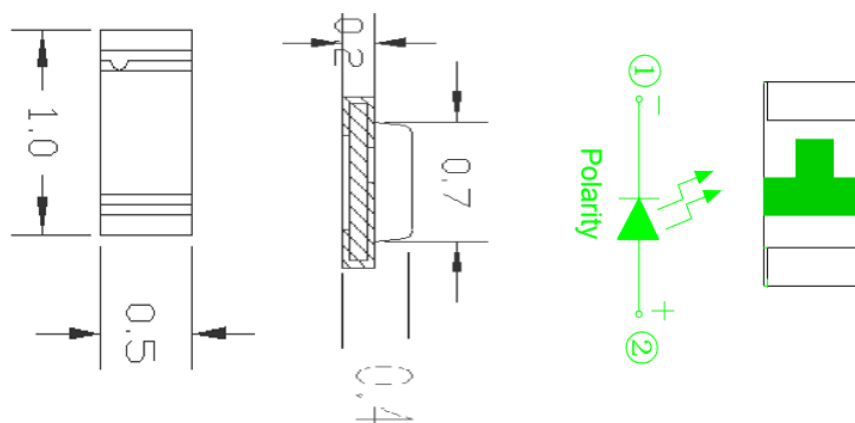


Figure 1. IN-S42BT Solder Pattern

Package Dimensions in mm



Notes.

1. All dimensions are in millimeters.
2. Tolerance is ± 0.10 mm unless otherwise noted

Figure 2. IN-S42BT Package Dimensions

Absolute Maximum Rating at 25°C (Note 1)

Product	Emission Color	P _d (mW)	I _F (mA)	I _{FP} * (mA)	V _R (V)	T _{OP} (°C)	T _{ST} (°C)
IN-S42BTR	Red	60	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5YG	Yellow Green	60	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5Y	Yellow	60	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5A	Amber	60	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5B	Blue	90	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5G	Green	90	25	100	5	-30°C~+85°C	-40°C~+90°C
IN-S42BT5UW	White	90	25	100	5	-30°C~+85°C	-40°C~+90°C

Notes

1. Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width

ESD Precaution

ATTENTION: Electrostatic Discharge (ESD) protection



The symbol above denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are STATIC SENSITIVE devices. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

Please be advised that normal static precautions should be taken in the handling and assembly of this device to prevent damage or degradation which may be induced by electrostatic discharge (ESD).

Electrical Characteristics $T_A = 25^\circ\text{C}$ (Note 1)

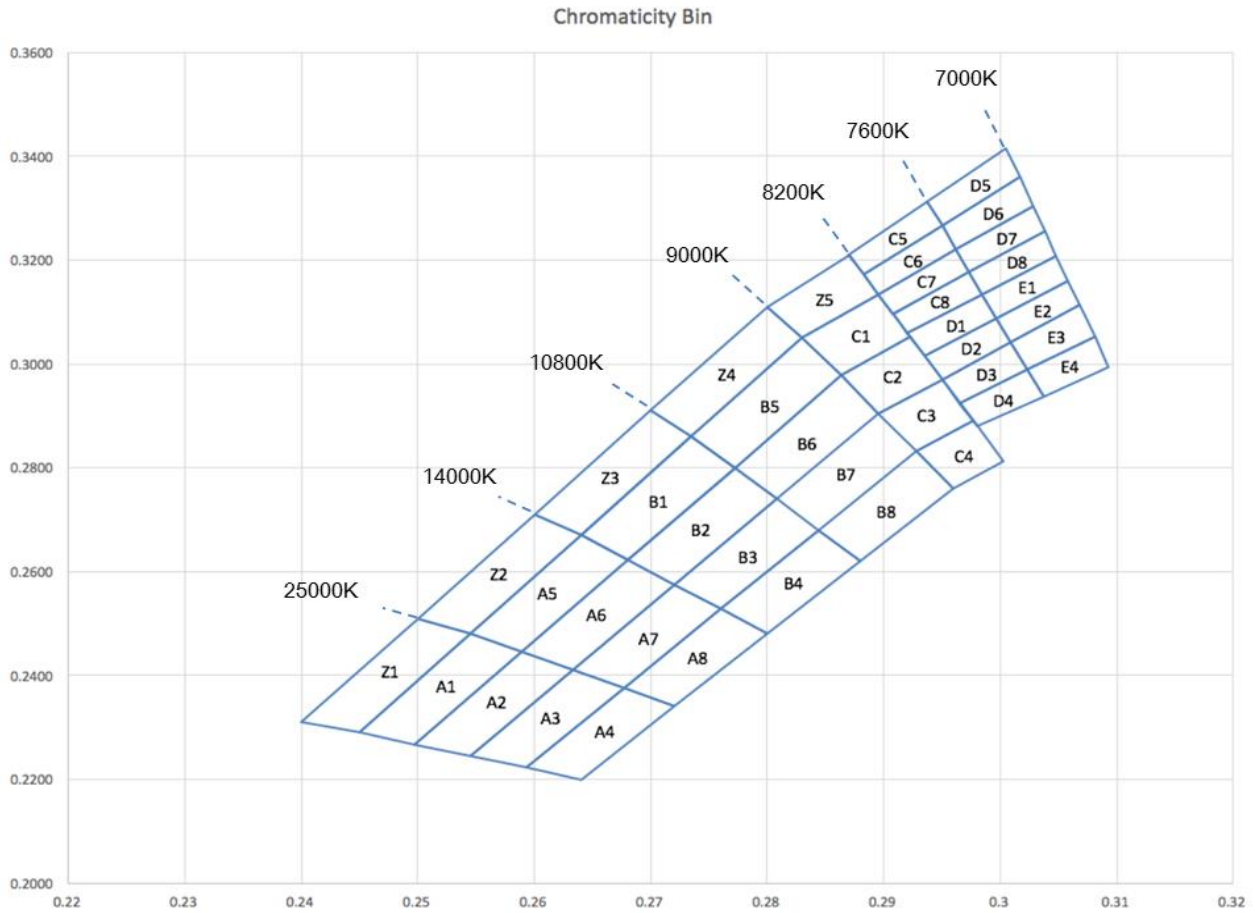
Product	Emission Color	$I_F(\text{mA})$	$V_F(\text{V})$		$\lambda (\text{nm})$			Viewing Angle	$I_v(\text{mcd})$
			typ.	max	λ_D	λ_P	$\Delta\lambda$	$2\theta_{1/2}$	typ.
IN-S42BTR	Red	20	2.1	2.4	622	625	20	120	100
IN-S42BT5YG	Yellow Green	5	2.0	2.2	571	574	15	120	11.5
IN-S42BT5Y	Yellow	5	2.0	2.2	585	592	15	120	23
IN-S42BT5A	Amber	5	2.0	2.2	605	603	15	120	30
IN-S42BT5B	Blue	5	2.9	3.1	467	467	30	120	30
IN-S42BT5G	Green	5	2.7	3.0	525	524	35	120	300
IN-S42BT5UW	White	5	3.2	3.6	X=0.29 Y=0.29	-	-	120	285

Notes

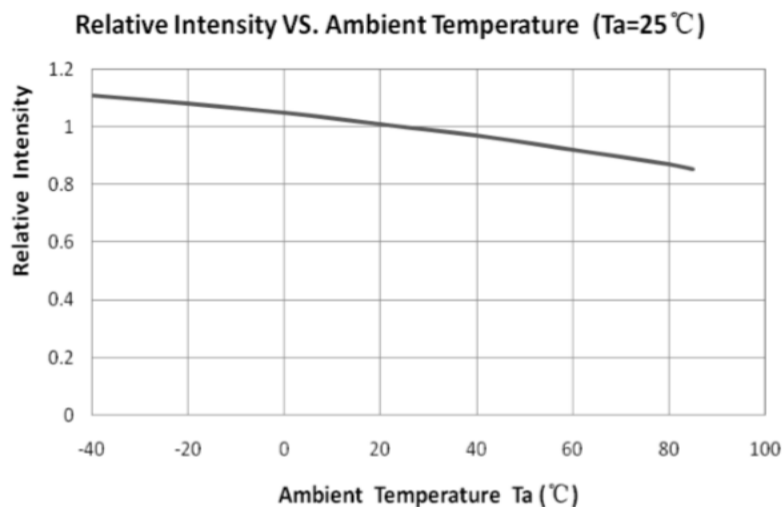
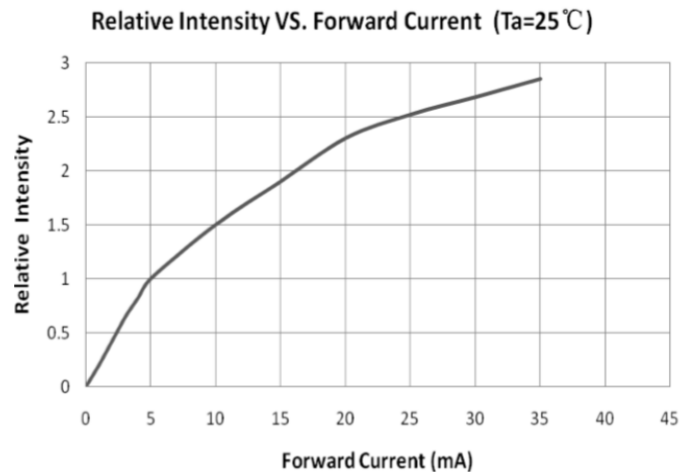
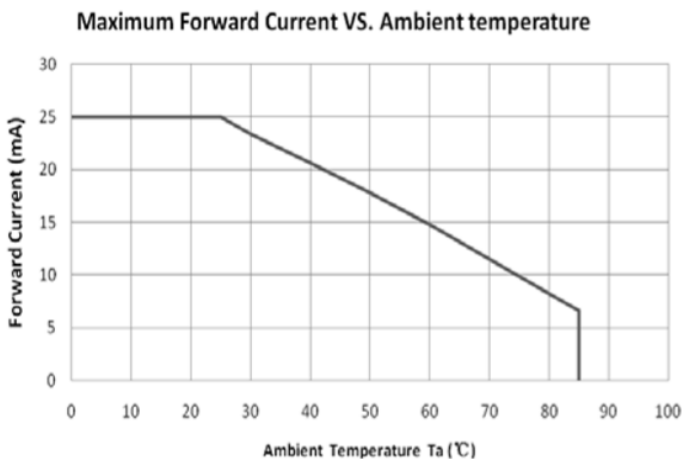
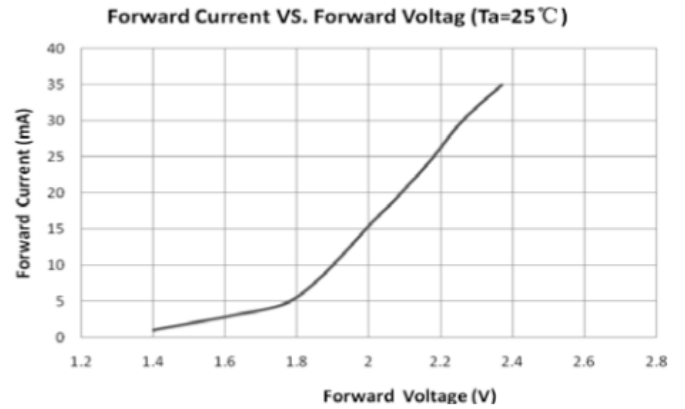
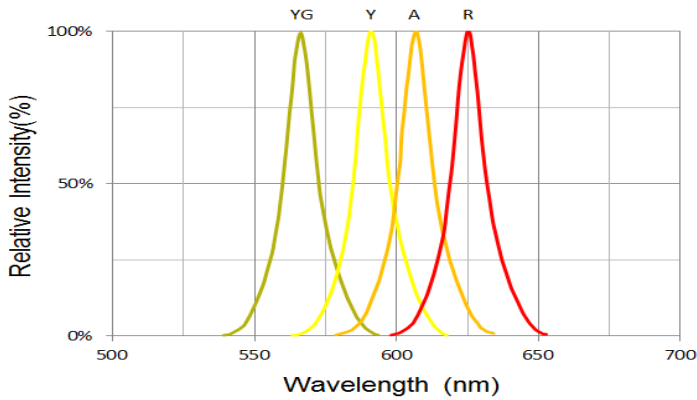
1. Performance guaranteed only under conditions listed in above tables.

Chromaticity Bin (for White only)

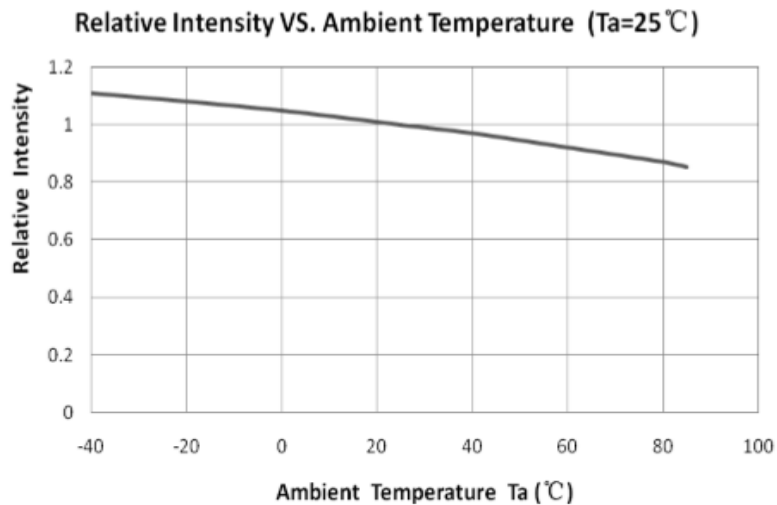
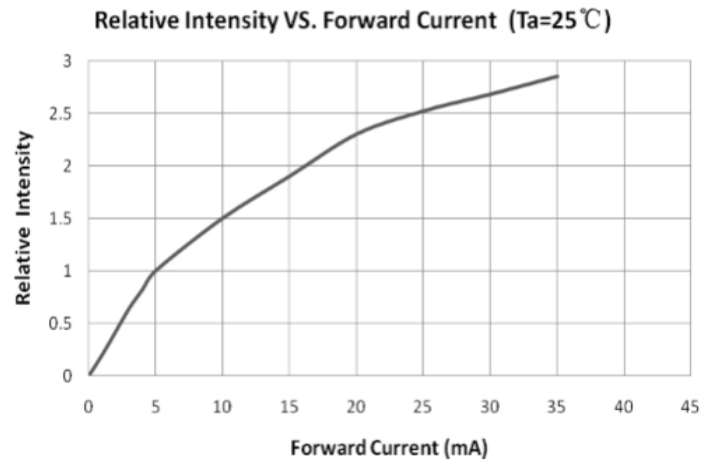
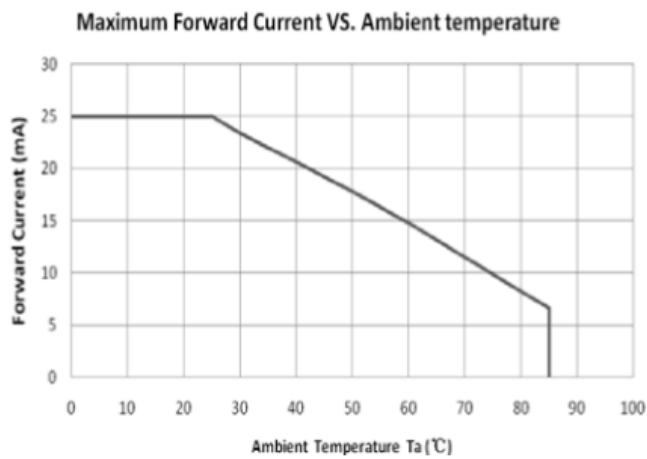
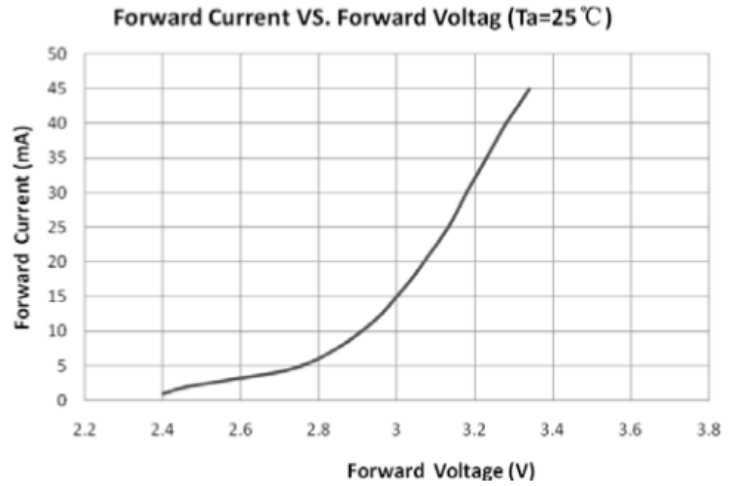
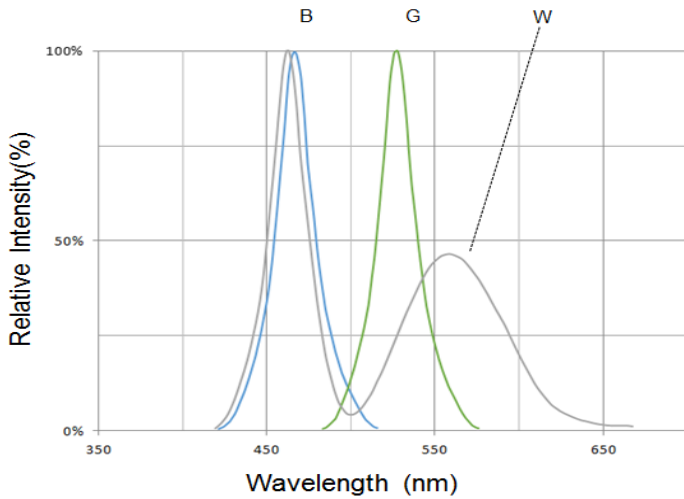
Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y
A5	0.2545	0.2480	B1	0.2640	0.2670	C1	0.2830	0.3050	D1	0.2920	0.3060
	0.2589	0.2445		0.2680	0.2623		0.2863	0.2978		0.2935	0.3015
	0.2680	0.2623		0.2772	0.2800		0.2923	0.3052		0.2997	0.3088
	0.2640	0.2670		0.2735	0.2860		0.2895	0.3134		0.2984	0.3133
A6	0.2589	0.2445	B2	0.2720	0.2575	C2	0.2863	0.2978	D2	0.2935	0.3015
	0.2633	0.2410		0.2680	0.2623		0.2895	0.2905		0.2950	0.2970
	0.2720	0.2575		0.2772	0.2800		0.2950	0.2970		0.3009	0.3042
	0.2680	0.2623		0.2808	0.2740		0.2923	0.3052		0.2997	0.3088
A7	0.2677	0.2375	B3	0.2720	0.2575	C3	0.2895	0.2905	D3	0.2950	0.2970
	0.2633	0.2410		0.2760	0.2528		0.2928	0.2833		0.2965	0.2925
	0.2720	0.2575		0.2844	0.2680		0.2977	0.2891		0.3023	0.2990
	0.2760	0.2528		0.2808	0.2740		0.2950	0.2970		0.3009	0.3042
A8	0.2720	0.2340	B4	0.2760	0.2528	C4	0.2928	0.2833	D4	0.2965	0.2925
	0.2677	0.2375		0.2844	0.2680		0.2977	0.2891		0.2980	0.2880
	0.2760	0.2528		0.2880	0.2620		0.3003	0.2812		0.3037	0.2937
	0.2800	0.2480		0.2800	0.2480		0.2960	0.2760		0.3023	0.2990
E1	0.2984	0.3133	B5	0.2735	0.2860	C5	0.2883	0.3172	D5	0.2937	0.3312
	0.2997	0.3088		0.2772	0.2800		0.2870	0.3210		0.2950	0.3266
	0.3058	0.3160		0.2863	0.2978		0.2937	0.3312		0.3017	0.3360
	0.3048	0.3207		0.2830	0.3050		0.2950	0.3266		0.3005	0.3415
E2	0.2997	0.3088	B6	0.2772	0.2800	C6	0.2883	0.3172	D6	0.2950	0.3266
	0.3009	0.3042		0.2808	0.2740		0.2950	0.3266		0.2962	0.3220
	0.3068	0.3113		0.2895	0.2905		0.2962	0.3220		0.3028	0.3304
	0.3058	0.3160		0.2863	0.2978		0.2895	0.3134		0.3017	0.3360
E3	0.3009	0.3042	B7	0.2808	0.2740	C7	0.2895	0.3134	D7	0.2962	0.3220
	0.3023	0.2990		0.2844	0.2680		0.2908	0.3097		0.2973	0.3177
	0.3081	0.3053		0.2928	0.2833		0.2973	0.3177		0.3038	0.3256
	0.3068	0.3113		0.2895	0.2905		0.2962	0.3220		0.3028	0.3304
E4	0.3023	0.2990	B8	0.2844	0.2680	C8	0.2908	0.3097	D8	0.2973	0.3177
	0.3037	0.2937		0.2928	0.2833		0.2920	0.3060		0.2984	0.3133
	0.3093	0.2993		0.2960	0.2760		0.2984	0.3133		0.3048	0.3207
	0.3081	0.3053		0.2880	0.2620		0.2973	0.3177		0.3038	0.3256
Z2	0.2500	0.2510	Z3	0.2600	0.2710	Z4	0.2700	0.2910	Z5	0.2800	0.3110
	0.2600	0.2710		0.2700	0.2910		0.2800	0.3110		0.2871	0.3210
	0.2640	0.2670		0.2735	0.2860		0.2830	0.3050		0.2895	0.3134
	0.2545	0.2480		0.2640	0.2670		0.2735	0.2860		0.2830	0.3050
A1	0.2497	0.2267	A2	0.2497	0.2267	A3	0.2593	0.2223	A4	0.2640	0.2200
	0.2450	0.2290		0.2589	0.2445		0.2677	0.2375		0.2593	0.2223
	0.2545	0.2480		0.2633	0.2410		0.2633	0.2410		0.2677	0.2375
	0.2589	0.2445		0.2545	0.2245		0.2545	0.2245		0.2720	0.2340
Z1	0.2400	0.2310									
	0.2500	0.2510									
	0.2545	0.2480									
	0.2450	0.2291									



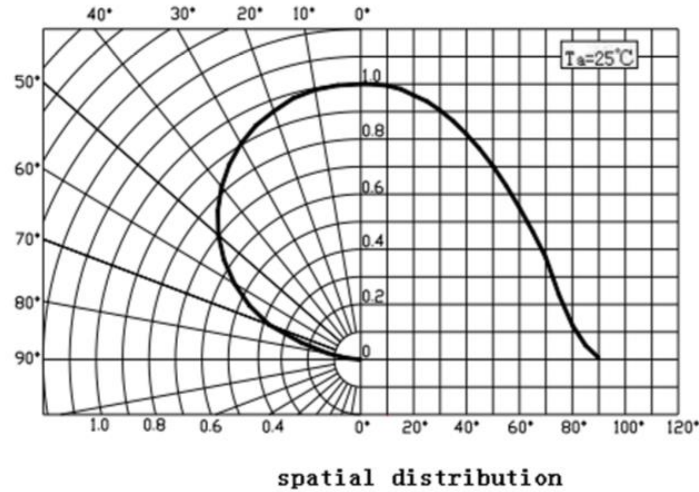
Typical Characteristic Curves – YG, Y, A, R



Typical Characteristic Curves – B, G, W

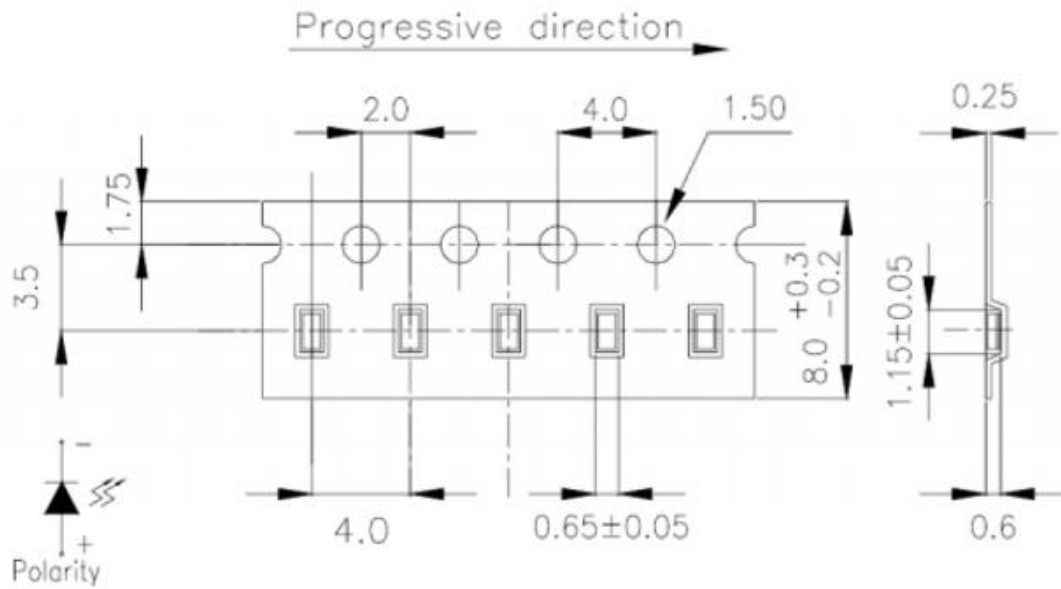
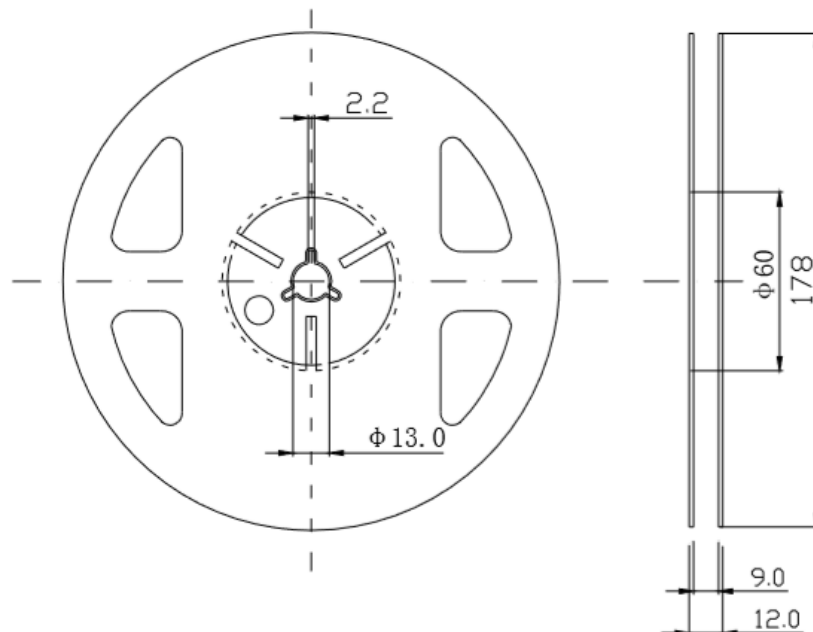


Typical Characteristic Curves – Radiation Pattern

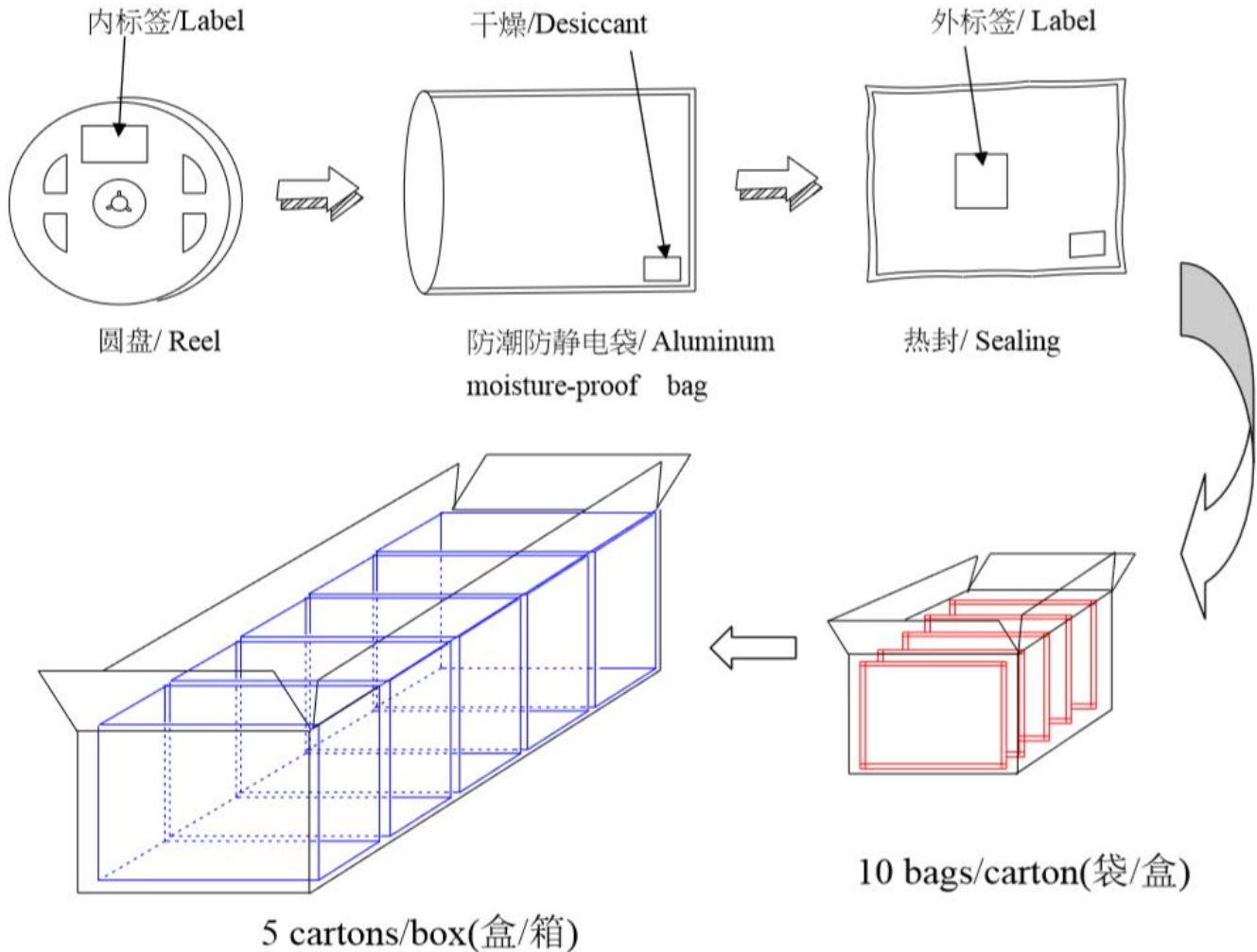


Ordering Information

Product	Emission Color	Technology	Test Current I_F (mA)	Luminous Intensity I_V (mcd) (Typ.)	Forward Voltage V_F (V) (Typ.)	Orderable Part Number
IN-S42BTR	Red	AllnGaP	20	100	2.1	IN-S42BTR
IN-S42BT5YG	Yellow Green	AllnGaP	5	11.5	2.0	IN-S42BT5YG
IN-S42BT5Y	Yellow	AllnGaP	5	23	2.0	IN-S42BT5Y
IN-S42BT5A	Amber	AllnGaP	5	30	2.0	IN-S42BT5A
IN-S42BT5B	Blue	InGaN	5	30	2.9	IN-S42BT5B
IN-S42BT5G	Green	InGaN	5	300	2.7	IN-S42BT5G
IN-S42BT5UW	White	InGaN	5	285	3.2	IN-S42BT5UW

Packaging Information: 3000pcs Per Reel
Tape Dimension

Reel Dimension


Packing Dimension

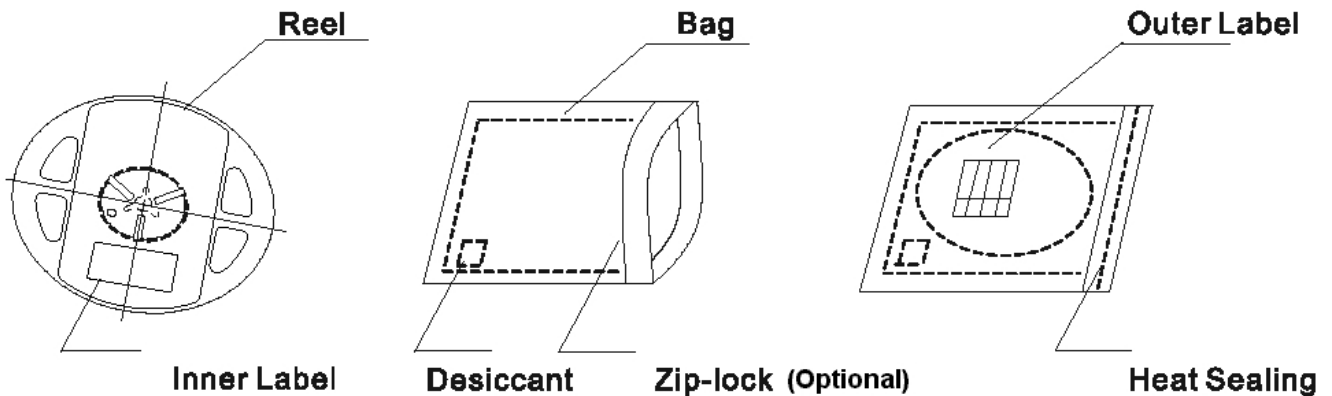


Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

Upon request, a humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

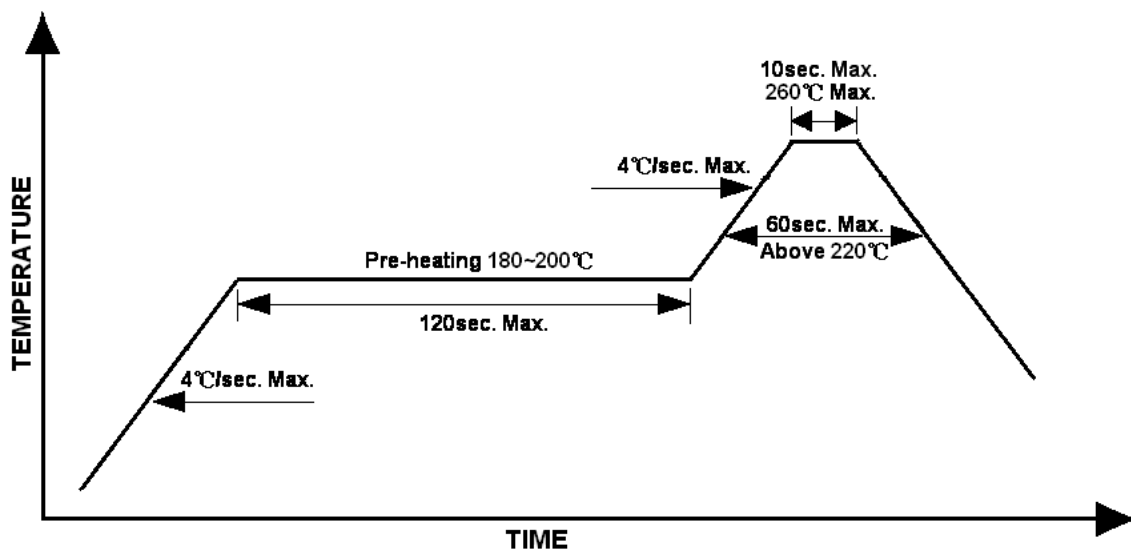
The packaging sequence is as follows:



Reflow Soldering

- Recommended tin glue specifications: melting temperature in the range of 178~192 °C
- The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

Lead-free Solder Profile



Precautions

- Avoid exposure to moisture at all times during transportation or storage.
- Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
- It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage.
- Avoid operation beyond the limits as specified by the absolute maximum ratings.
- Avoid direct contact with the surface through which the LED emits light.
- If possible, assemble the unit in a clean room or dust-free environment.

Reworking

- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

Cleaning

Following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultra sonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

Cautions of Pick and Place

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electro-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.

Reliability

Item	Frequency/ lots/ samples/ failures	Standards Reference	Conditions
Precondition	For all reliability monitoring tests according to JEDEC Level 2	J-STD-020	1.) Baking at 85°C for 24hrs 2.) Moisture storage at 85°C/ 60% R.H. for 168hrs
Solderability	1Q/ 1/ 22/ 0	JESD22-B102-B And CNS-5068	Accelerated aging 155°C/ 24hrs Tinning speed: 2.5+0.5cm/s Tinning: A: 215°C/ 3+1s or B: 260°C/ 10+1s
Resistance to soldering heat		CNS-5067	Dipping soldering terminal only Soldering bath temperature A: 260+/-5°C; 10+/-1s B: 350+/-10°C; 3+/-0.5s
Operating life test	1Q/ 1/ 40/ 0	CNS-11829	1.) Precondition: 85°C baking for 24hrs 85°C/ 60%R.H. for 168hrs 2.) Tamb25°C; IF=20mA; duration 1000hrs
High humidity, high temperature bias	1Q/ 1/ 45/ 0	JESD-A101-B	Tamb: 85°C Humidity: 85% R.H., IF=5mA Duration: 1000hrs
High temperature bias	1Q/ 1/ 20	IN specs.	Tamb: 55°C IF=20mA Duration: 1000hrs
Pulse life test	1Q/ 1/ 40/ 0		Tamb25°C, If=20mA,, Ip=100mA, Duty cycle=0.125 (tp=125 μs, T=1sec) Duration 500hrs)
Temperature cycle	1Q/ 1/ 76/ 0	JESD-A104-A IEC 68-2-14, Nb	A cycle: -40 degree C 15min; +85 degree C 15min Thermal steady within 5 min.. 300 cycles 2 chamber/ Air-to-air type
High humidity storage test	1Q/ 1/ 40/ 0	CNS-6117	60+3°C 90+5/-10% R.H. for 500hrs
High temperature storage test	1Q/ 1/ 40/ 0	CNS-554	100+10°C for 500hrs
Low temperature storage test	1Q/ 1/ 40/ 0	CNS-6118	-40+5°C for 500hrs

Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial Release		1.0	10-04-2018

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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