

EL Multi Color CH2525E-RGBW0401H-AM

Preliminary



Features

- Package: Red, Green, Blue and White color LEDs on Ceramic Package
- Emitted Color: Red 627nm; Green 530nm; Blue 456nm
- Typ Luminous Intensity: Red 1050mcd; Green 2900mcd; Blue 550mcd; White 3300mcd @ 40mA
- Viewing angle: Red, Green, Blue and White 130°,
- ESD: up to 8KV
- MSL: 2
- Qualifications : According to AEC-Q102
- Compliance with RoHS & REACH
- Compliance Halogen Free. (Br<900ppm, Cl<900ppm, Br+Cl<1500ppm)
- Sulfur robustness

Applications

- Automotive Interior Lighting , Dashboard, Reading lamp, Audio and Car infotainmentetc
- Color change Application for Automotive Ambient Lighting.

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1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current	R,G,B,W	I_F	10	40	80	mA	---
Luminous Intensity [1][3]	Red	Φ_v	710	1050	1400	mcd	$I_F=40\text{mA}$
	Green		2240	2900	3550		
	Blue		450	550	900		
	White		2240	3300	4500		
Forward Voltage[4][6]	Red	V_F	1.75	2.25	2.50	V	$I_F=40\text{mA}$
	Green		2.75	3.10	3.50		
	Blue		2.75	3.05	3.50		
	White		2.75	3.10	3.50		
Viewing Angle	Red	ψ	---	130	---	deg	$I_F=40\text{mA}$
	Green		---	130	---		
	Blue		---	130	---		
	White		---	130	---		
Peak Wavelength	Red	λ_p	---	639	---	nm	$I_F=40\text{mA}$
	Green		---	521	---		
	Blue		---	455	---		
Dominant Wavelength	Red	λ_d	624	627	633	nm	$I_F=40\text{mA}$
	Green		520	530	535		
	Blue		451	456	459		
Thermal Resistance (Junction to Solder)	Red	$R_{th\ JS\ real}$	---	33	40	K/W	$I_F=40\text{mA}$
		$R_{th\ JS\ el}$	---	25	27		
	Green	$R_{th\ JS\ real}$	---	46	75		
		$R_{th\ JS\ el}$	---	35	66		
	Blue	$R_{th\ JS\ real}$	---	28	41		
		$R_{th\ JS\ el}$	---	22	30		
	Cool White	$R_{th\ JS\ real}$	---	30	41		
		$R_{th\ JS\ el}$	---	22	30		

Notes:

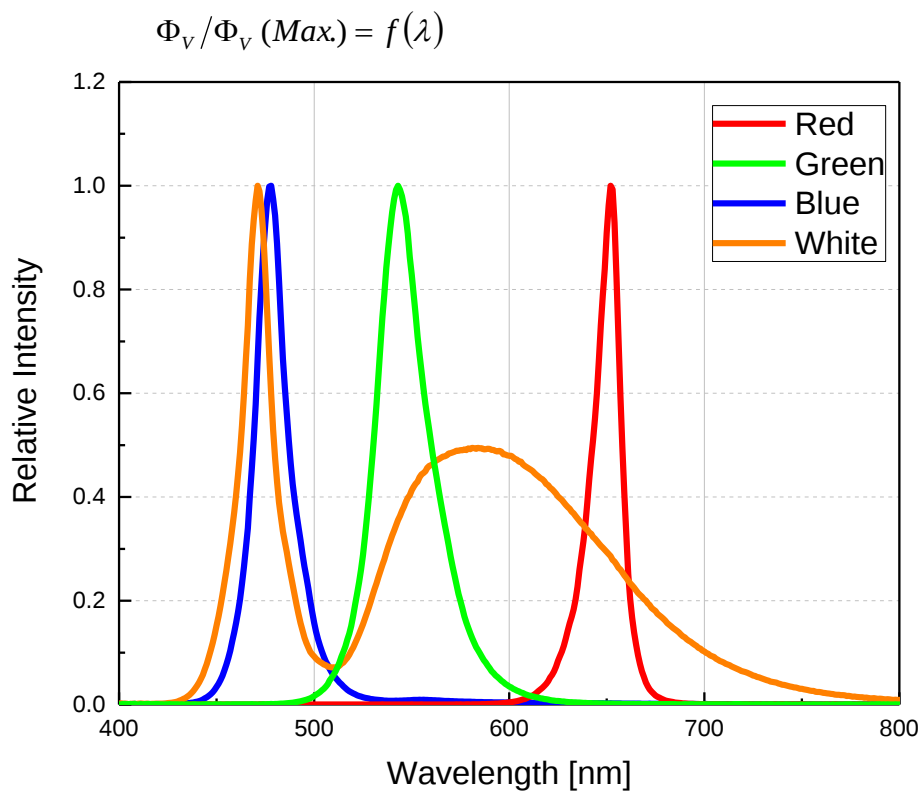
1. Luminous intensity measurement tolerance: $\pm 8\%$.
2. Luminous flux measurement tolerance: $\pm 8\%$.
3. The data of luminous intensity and luminous flux measured at thermal pad=25°C.
4. Forward voltage measurement tolerance: $\pm 0.05\text{V}$.
5. Typical luminous flux or light output performance is operated within the condition guided by this datasheet.
6. The V_f range shown in the table above indicates 99% output.

2. Absolute Maximum Ratings

Parameter	Symbol	Ratings				Unit
		Red	Green	Blue	White	
Reverse Voltage	V_R	Not designed for reverse operation				V
Forward Current	I_F	80				mA
Power Dissipation	P_d	200	280	280	280	mW
Junction Temperature	T_J	125				°C
Operating Temperature	T_{opr}	-40 ~ +110				°C
Storage Temperature	T_{stg}	-40 ~ +110				°C
ESD Sensitivity (R=1.5kΩ, C= 100pF)	ESD_{HBM}	8				kV
Soldering Temperature	T_{Sol}	260°C for 30sec				°C

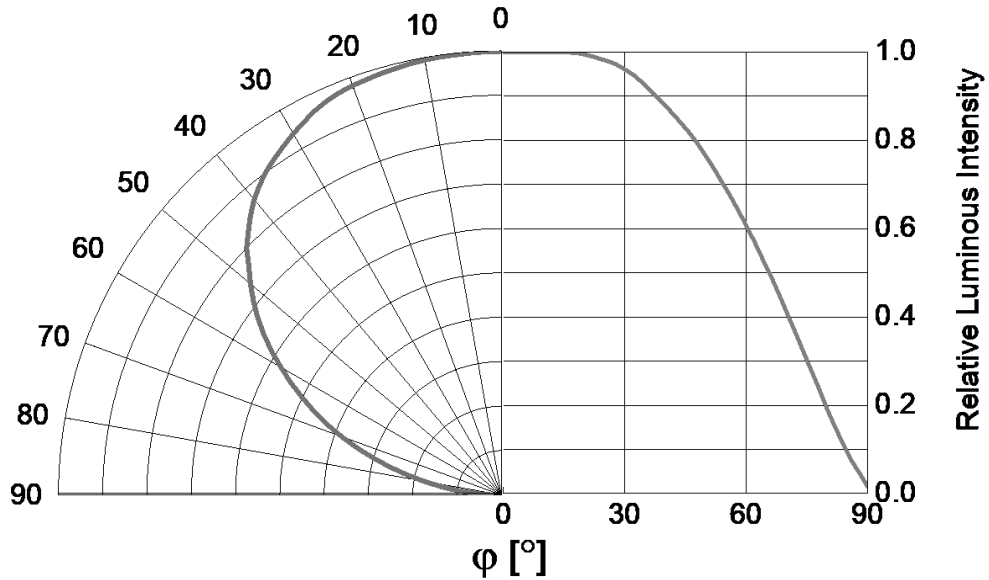
3. Characteristics Graph

Wavelength Characteristics Relative Spectral Distribution @ Solder Pad Temperature = 25°C



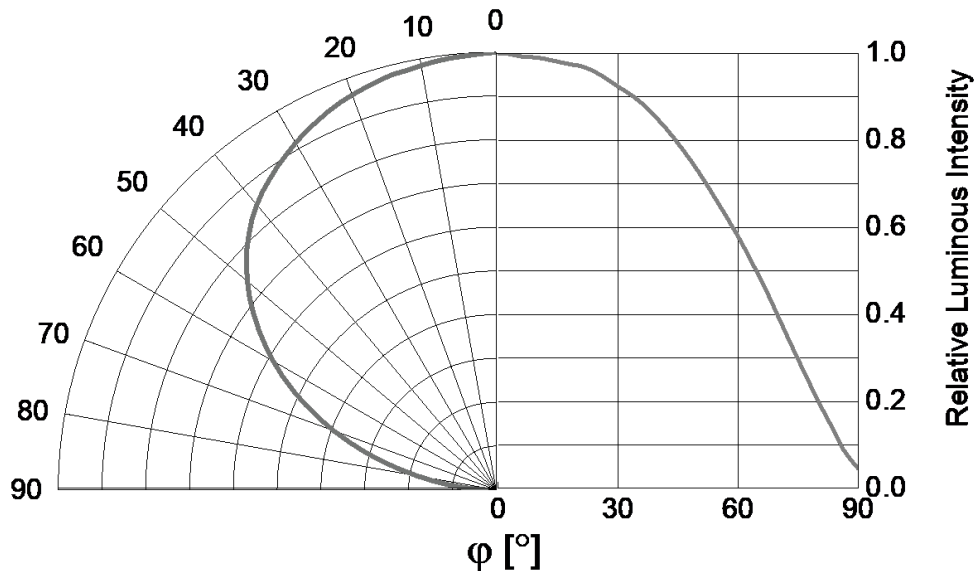
Typical Diagram Characteristics of Radiation (Red)

$$\Phi_v / \Phi_v(0^\circ) = f(\varphi)$$



Typical Diagram Characteristics of Radiation (Green)

$$\Phi_v / \Phi_v(0^\circ) = f(\varphi)$$

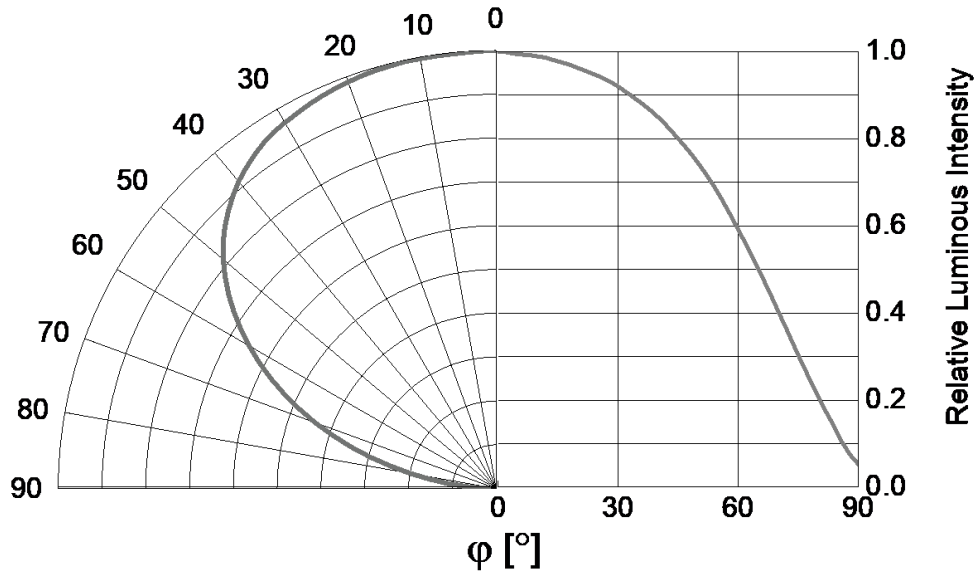


Notes:

1. φ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is $\pm 5^\circ$.

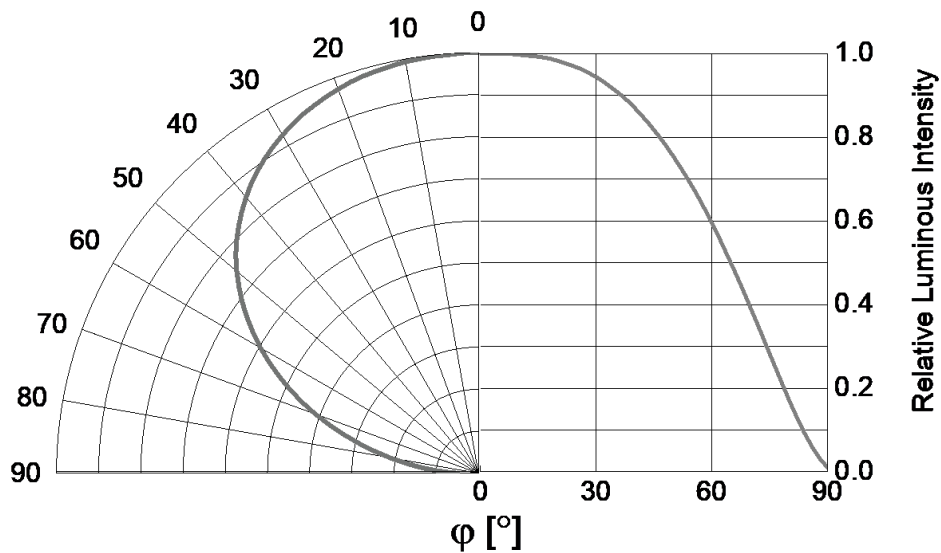
Typical Diagram Characteristics of Radiation (Blue)

$$\Phi_V / \Phi_V(0^\circ) = f(\varphi)$$



Typical Diagram Characteristics of Radiation (White)

$$\Phi_V / \Phi_V(0^\circ) = f(\varphi)$$

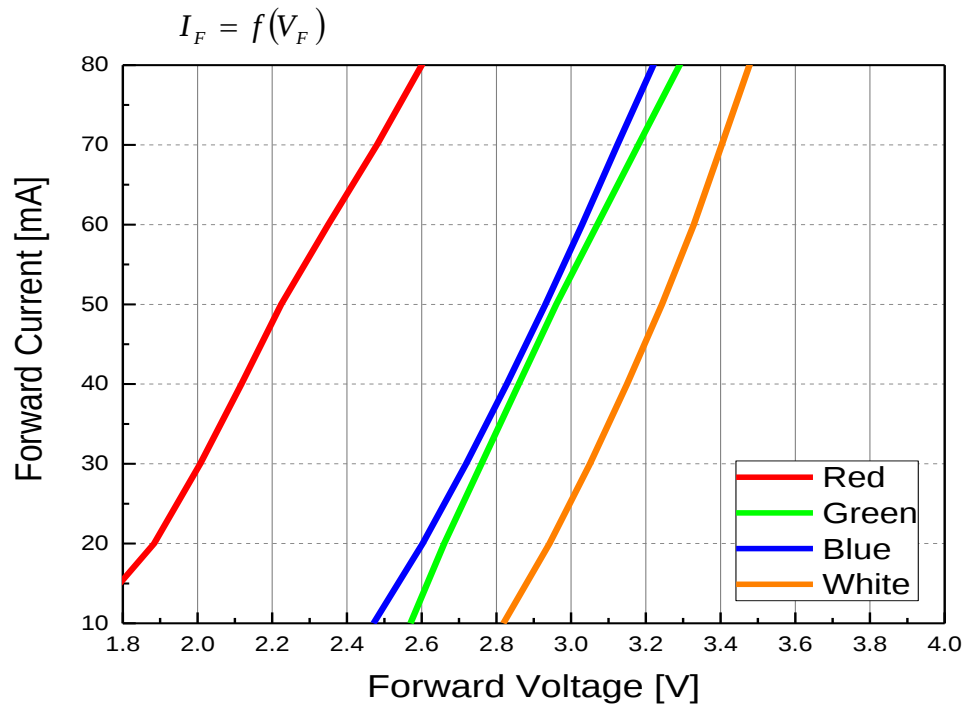


Notes:

1. φ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is $\pm 5^\circ$.

Forward Current vs. Forward Voltage

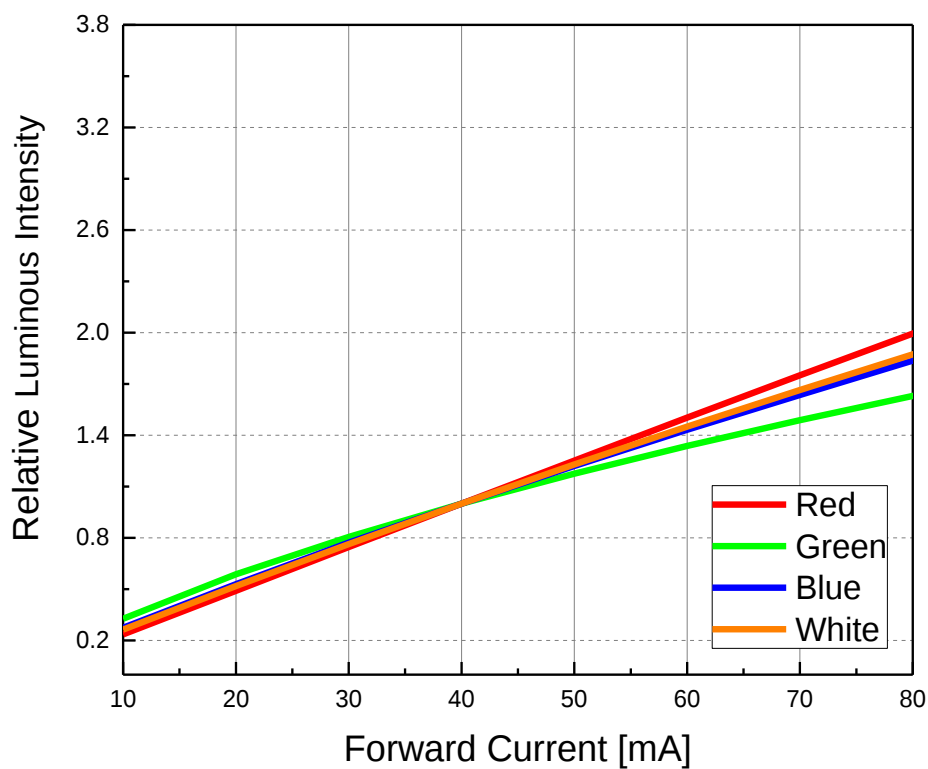
@ Ts = 25°C



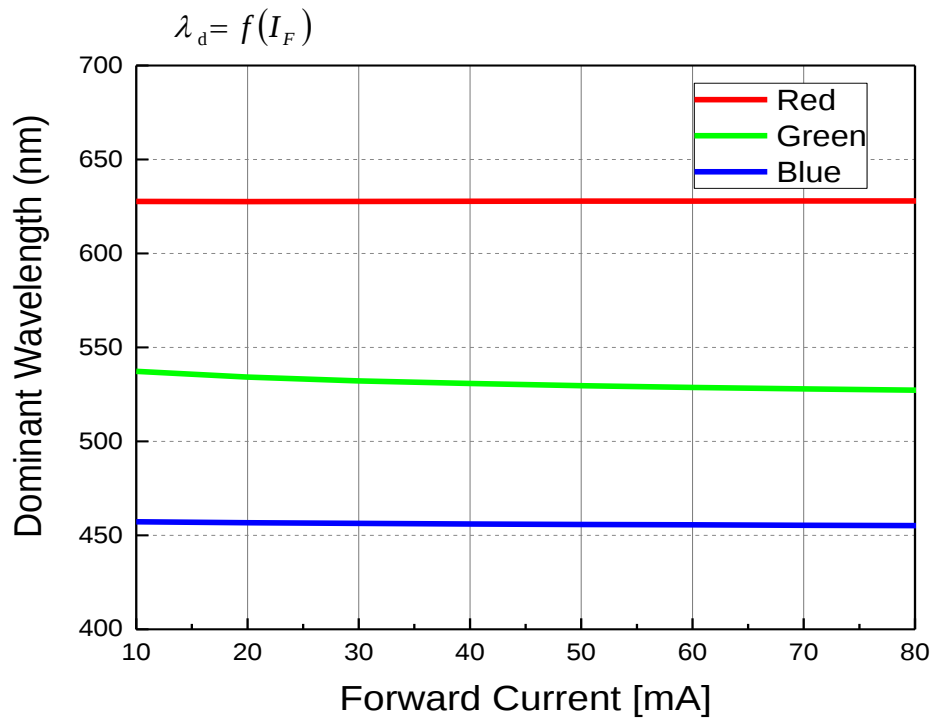
Relative Luminous Intensity vs. Forward Current

@ Ts = 25°C

$$\Phi_V / \Phi_V(40mA) = f(I_F)$$

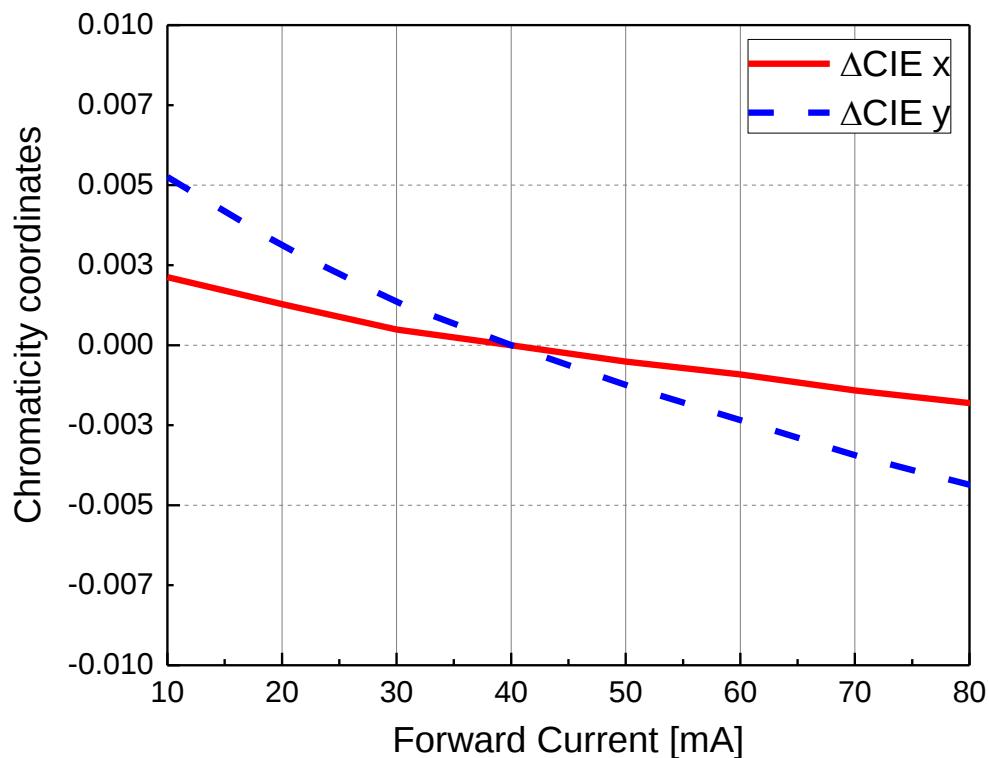


Wavelength Characteristics vs. Forward Current @ Ts = 25°C

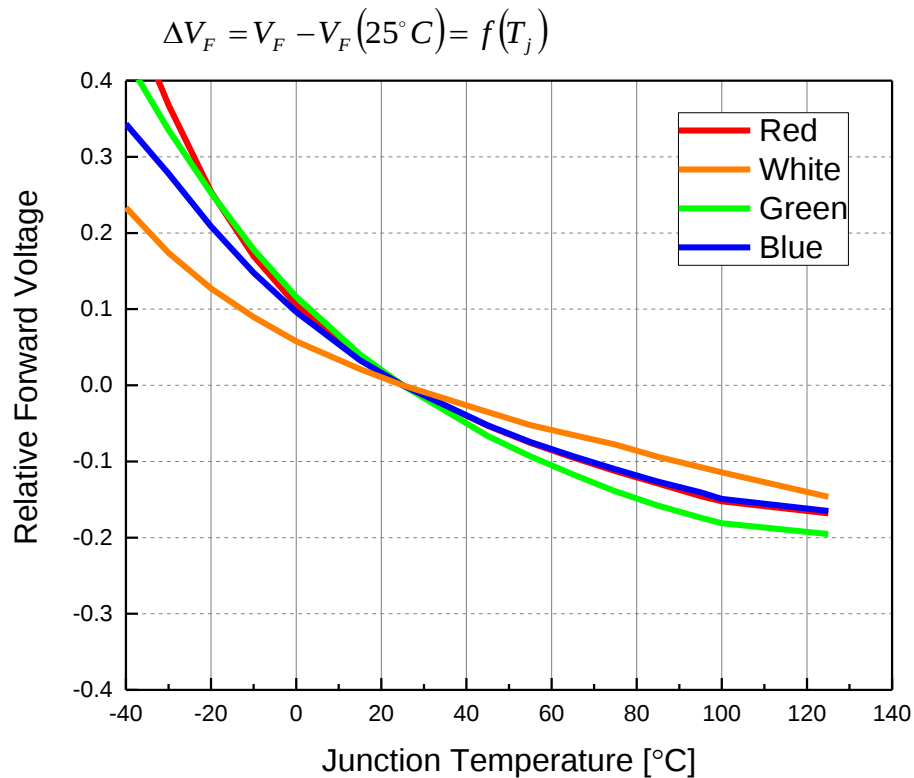


Chromaticity Coordinates vs. Forward Current @ Ts = 25°C (White)

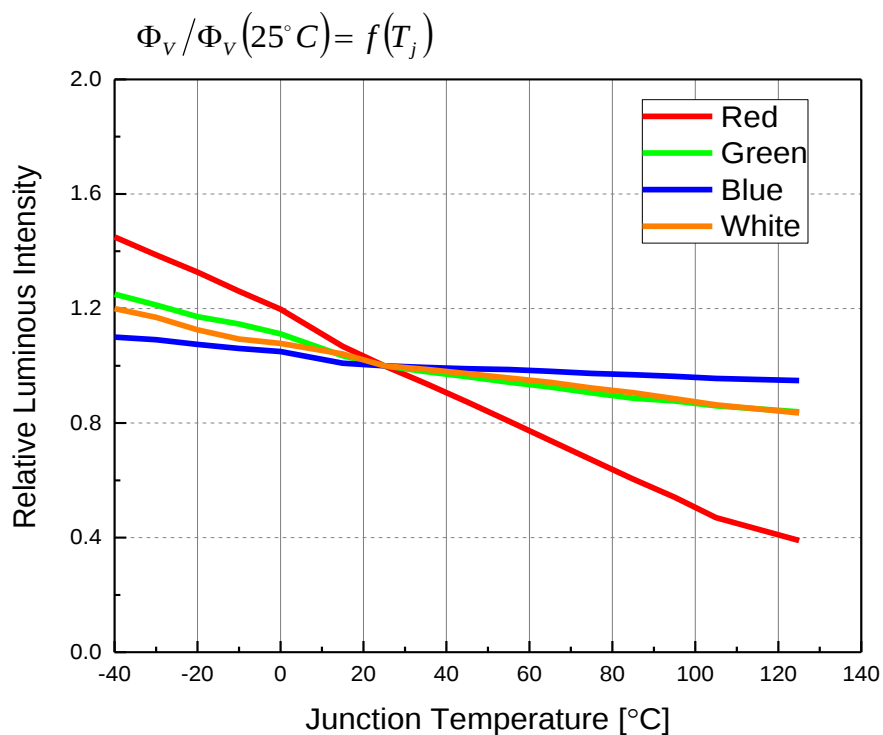
$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



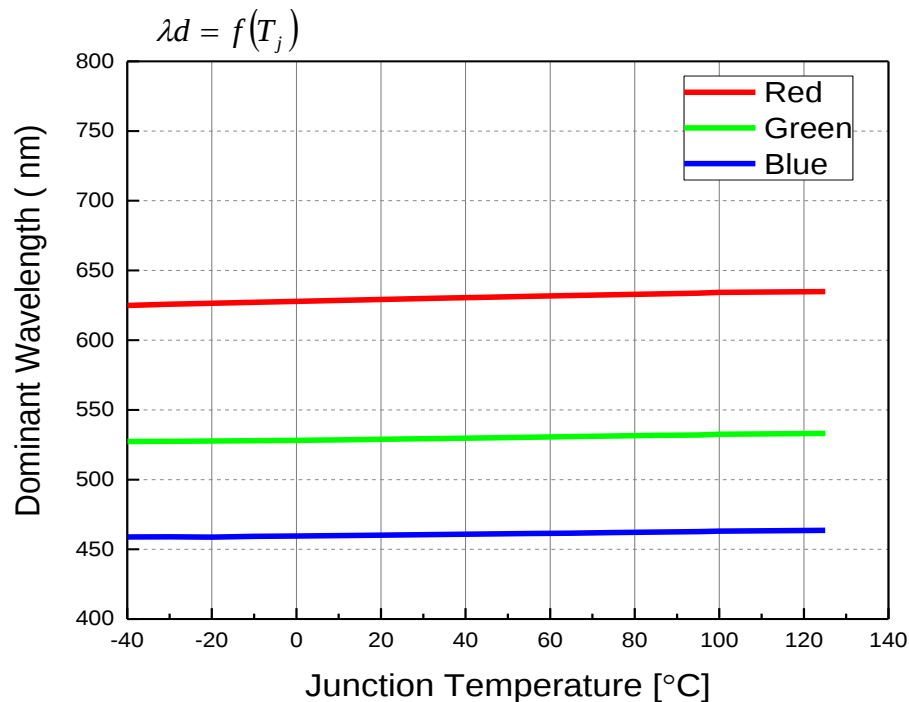
Relative Forward Voltage vs. Junction Temperature @Forward Current = 40mA



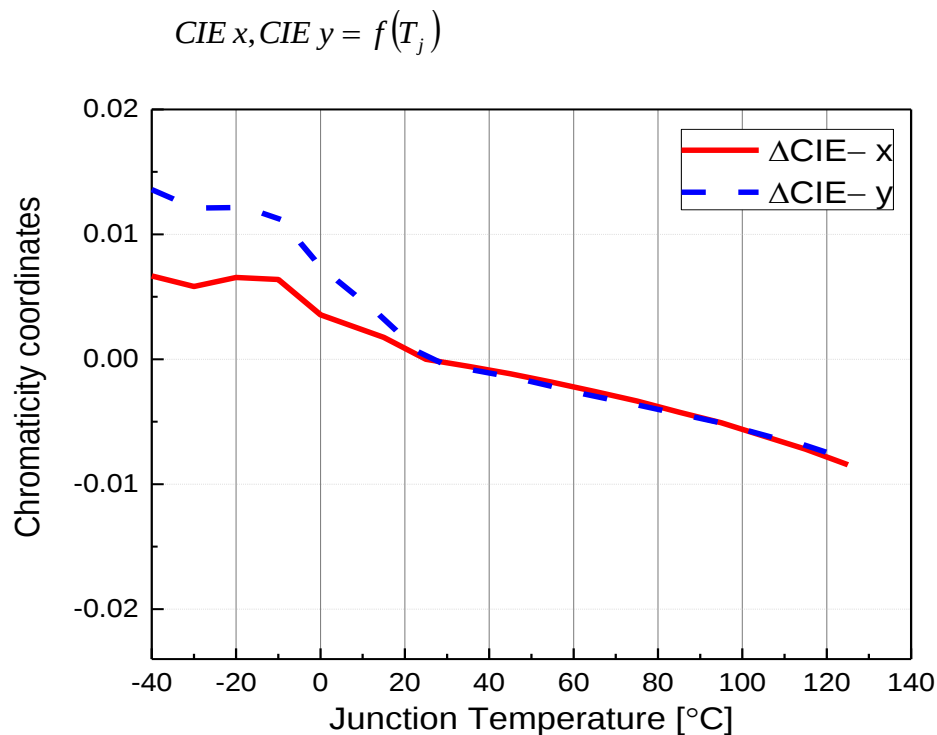
Relative Luminous Flux vs. Junction Temperature @Forward Current = 40mA



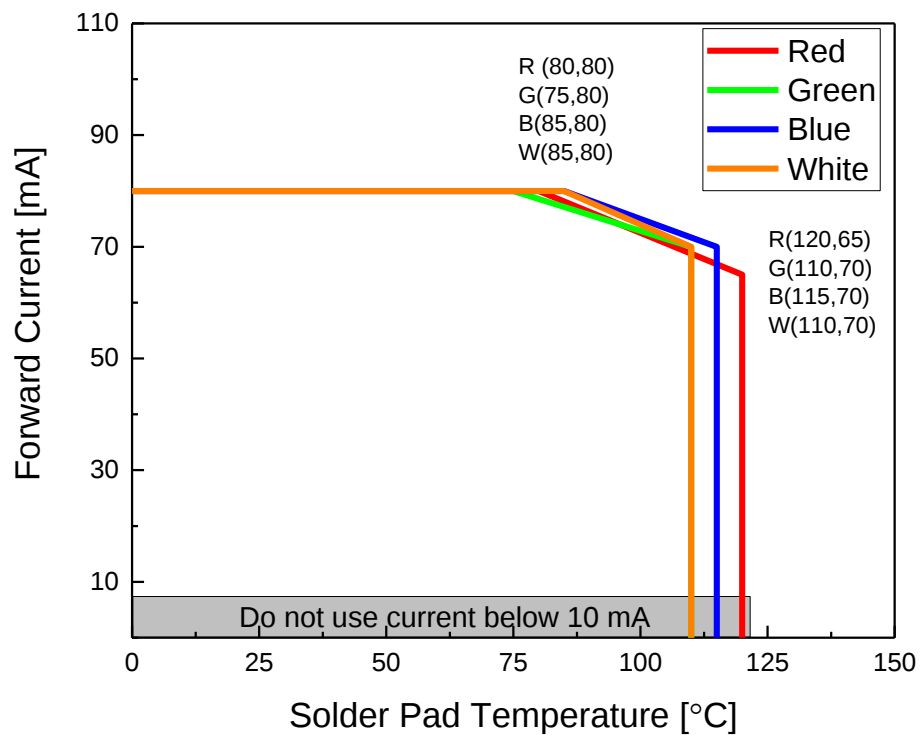
Wavelength Characteristics vs. Junction Temperature @Forward Current = 40mA



Chromaticity Coordinates Shift CIE X/Y vs. Junction Temperature @Forward Current = 40mA (White)



Forward Current Derating Curve



4. Binning Information

Luminous Intensity Bins

Color	Group Bin	Minimum Luminous Intensity [mcd]	Maximum Luminous Intensity [mcd]
	L1	11.2	14
	L2	14	18
	M1	18	22.4
	M2	22.4	28
	N1	28	35.5
	N2	35.5	45
	P1	45	56
	P2	56	71
	Q1	71	90
	Q2	90	112
	R1	112	140
	R2	140	180
	S1	180	224
	S2	224	280
	T1	280	355
	T2	355	450
Blue	U1	450	560
	U2	560	710
Red / Blue	V1	710	900
Red	V2	900	1120
	AA	1120	1400
	AB	1400	1800
	BA	1800	2240
Green/White	BB	2240	2800
	CA	2800	3550
White	CB	3550	4500
	DA	4500	5600
	DB	5600	7100
	EA	7100	9000
	EB	9000	11200
	FA	11200	14000
	FA	11200	14000
	FB	14000	18000
	GA	18000	22400

Notes:

1. Luminous intensity measurement tolerance: 8%.

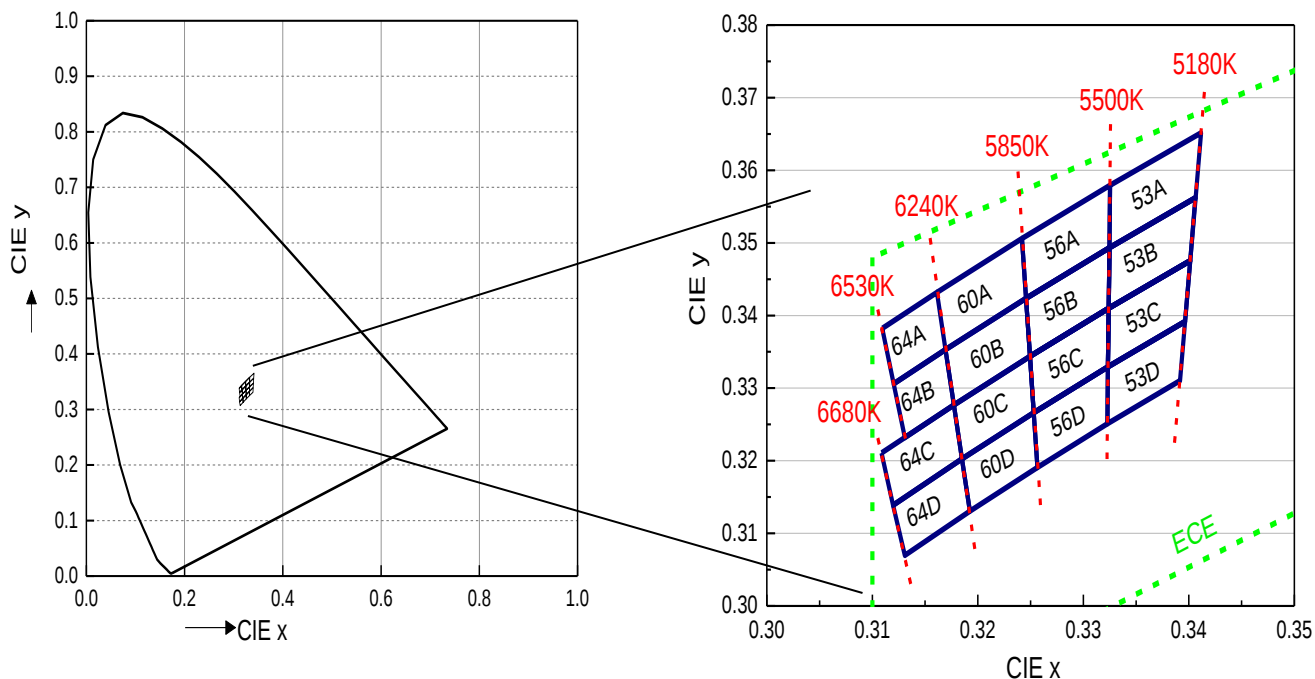
Wavelength Bin Structure

Color Bin Structure Bin	Minimum Dominant Wavelength [nm]	Maximum Dominant Wavelength [nm]
5155	451	455
5559	455	459
5963	459	463
6367	463	467
6771	467	471
7175	471	475
1015	510	515
1520	515	520
2025	520	525
2530	525	530
3035	530	535
5861	558	561
6164	561	564
6467	564	567
6770	567	570
7073	570	573
7376	573	576
7679	576	579
7982	579	582
8285	582	585
8588	585	588
8891	588	591
9194	591	594
9497	594	597
9700	597	600
0003	600	603
0306	603	606
0609	606	609
0912	609	612
1215	612	615
1518	615	618
1821	618	621
2124	621	624
2427	624	627
2730	627	630
3033	630	633
3336	633	636
3639	636	639

Notes:

1. Dominant wavelength measurement tolerance: $\pm 1\text{nm}$.

Color Bin Structure ECE Bin Structure



Cool White Bin Coordinates

Bin	CIE x	CIE y
64A	0.3109	0.3382
	0.3161	0.3432
	0.3169	0.3353
	0.3120	0.3306
Reference Range: 6240~6530K		

Bin	CIE x	CIE y
64B	0.3120	0.3306
	0.3169	0.3353
	0.3177	0.3277
	0.3131	0.3232
Reference Range: 6240~6530K		

Bin	CIE x	CIE y
64C	0.3109	0.3211
	0.3177	0.3277
	0.3185	0.3203
	0.3120	0.3139
Reference Range: 6240~6680K		

Bin	CIE x	CIE y
64D	0.3120	0.3139
	0.3185	0.3203
	0.3192	0.3131
	0.3131	0.3070
Reference Range: 6240~6680K		

Cool White Bin Coordinates

Bin	CIE x	CIE y
60A	0.3161	0.3432
	0.3242	0.3506
	0.3246	0.3424
	0.3169	0.3353
Reference Range: 5850~6240K		

Bin	CIE x	CIE y
60B	0.3169	0.3353
	0.3246	0.3424
	0.3249	0.3344
	0.3177	0.3277
Reference Range: 5850~6240K		

Bin	CIE x	CIE y
60C	0.3177	0.3277
	0.3249	0.3344
	0.3253	0.3266
	0.3185	0.3203
Reference Range: 5850~6240K		

Bin	CIE x	CIE y
60D	0.3185	0.3203
	0.3253	0.3266
	0.3256	0.3191
	0.3192	0.3131
Reference Range: 5850~6240K		

Bin	CIE x	CIE y
56A	0.3242	0.3506
	0.3325	0.3579
	0.3325	0.3493
	0.3246	0.3424
Reference Range: 5500~5850K		

Bin	CIE x	CIE y
56B	0.3246	0.3424
	0.3325	0.3493
	0.3324	0.3410
	0.3249	0.3344
Reference Range: 5500~5850K		

Bin	CIE x	CIE y
56C	0.3249	0.3344
	0.3324	0.3410
	0.3323	0.3329
	0.3253	0.3266
Reference Range: 5500~5850K		

Bin	CIE x	CIE y
56D	0.3253	0.3266
	0.3323	0.3329
	0.3323	0.3251
	0.3256	0.3191
Reference Range: 5500~5850K		

Bin	CIE x	CIE y
53A	0.3325	0.3579
	0.3412	0.3652
	0.3406	0.3562
	0.3325	0.3493
Reference Range: 5180~5500K		

Bin	CIE x	CIE y
53B	0.3325	0.3493
	0.3406	0.3562
	0.3401	0.3476
	0.3324	0.3410
Reference Range: 5180~5500K		

Bin	CIE x	CIE y
53C	0.3324	0.3410
	0.3401	0.3476
	0.3396	0.3392
	0.3323	0.3329
Reference Range: 5180~5500K		

Bin	CIE x	CIE y
53D	0.3323	0.3329
	0.3396	0.3392
	0.3392	0.3310
	0.3323	0.3251
Reference Range: 5180~5500K		

Forward Voltage Bins

Bin	Minimum Forward Voltage [V]	Maximum Forward Voltage [V]
1012	1.00	1.25
1215	1.25	1.75
1517	1.50	1.75
1720	1.75	2.00
2022	2.00	2.25
2225	2.25	2.50
2527	2.50	2.75
2730	2.75	3.00
3032	3.00	3.25
3235	3.25	3.50
3537	3.50	3.75
3740	3.75	4.00
4042	4.00	4.25
4245	4.25	4.50
4547	4.50	4.75
4750	4.75	5.00
5052	5.00	5.25
5255	5.25	5.50
5557	5.50	5.75
5760	5.75	6.00
6062	6.00	6.25
6265	6.25	6.50
6567	6.50	6.75
6770	6.75	7.00

Notes:

1. Forward voltage measurement tolerance: $\pm 0.05V$.
2. Forward voltage bins are defined at $I_F = 40mA$ operation.

5. Part Number

CH2525E-RGBW0401H-AM

Part number is designated with below details.

CH2525E = product family name.

RGBW = color ^[1]

040 = test current [mA]

1 = Metallic Plating Type (0=Ag ; 1=Au ; 2=MLP)

H = Brightness Level (H=High ; M=Medium ; L=Low)

AM = Automotive Application

Note

^[1] Color:

Symbol	Description
C	Cool White
N	Neutral White
W	Warm White
PA	Phosphor Converted Amber
PR	Phosphor Converted Red
UB	Blue
IB	Ice Blue
SB	Sky Blue
UP	Purple
UG	Green
UY	Yellow
UA	Amber
UR	Red
SR	Super Red
RGB	RGB – Color
RGBW	RGBW – Color

6. Ordering Information

CH2525E-RGBW0401H- **ABC-DE**-AM

Part Number of the EL Multi Color	Order Code
CH2525E-RGBW0401H-AM	CH2525E-RGBW0401H- ELW-DE -AM

Order code contains information with below details:

ABC = Please refer to the chart to the right.

D = Standard packing quantity

E = Packing method (T for tape & reel)

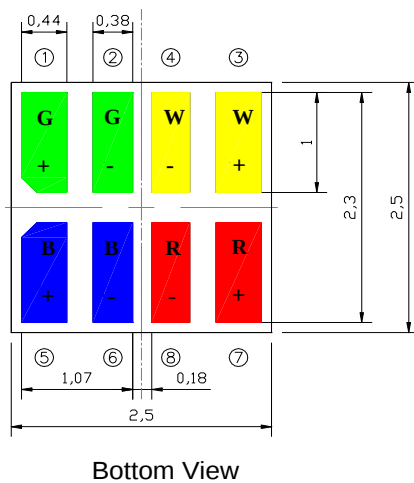
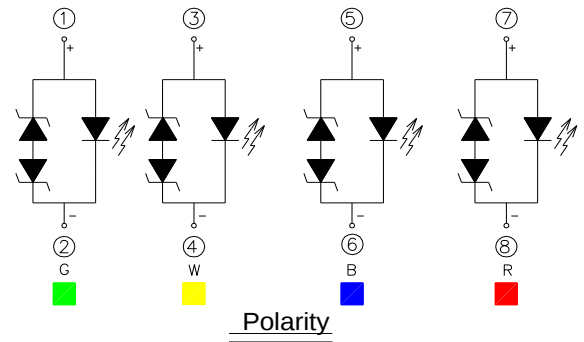
AM = Automotive Application Note

Note

^[1] Group Bin chart

Group Bin	Dominant Wavelength (nm)		Φ_v	V_F
ELW	Red	624 ~ 633	V1AA	1725
	Green	520 ~ 535	BBCA	2735
	Blue	451 ~ 459	U1V1	2735
	White	64D53A	BBCB	2735

7. Mechanical Dimension

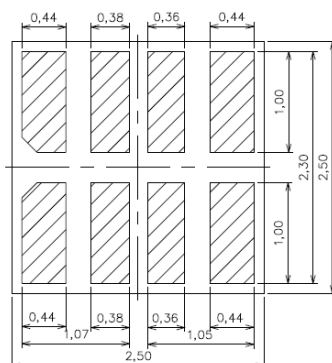


Item	Description
Package Materials	Ceramics
Encapsulating Resin Materials	Silicone Resin
Electrodes Materials	Ag-plated copper alloy
Weight	0.0145g

Notes:

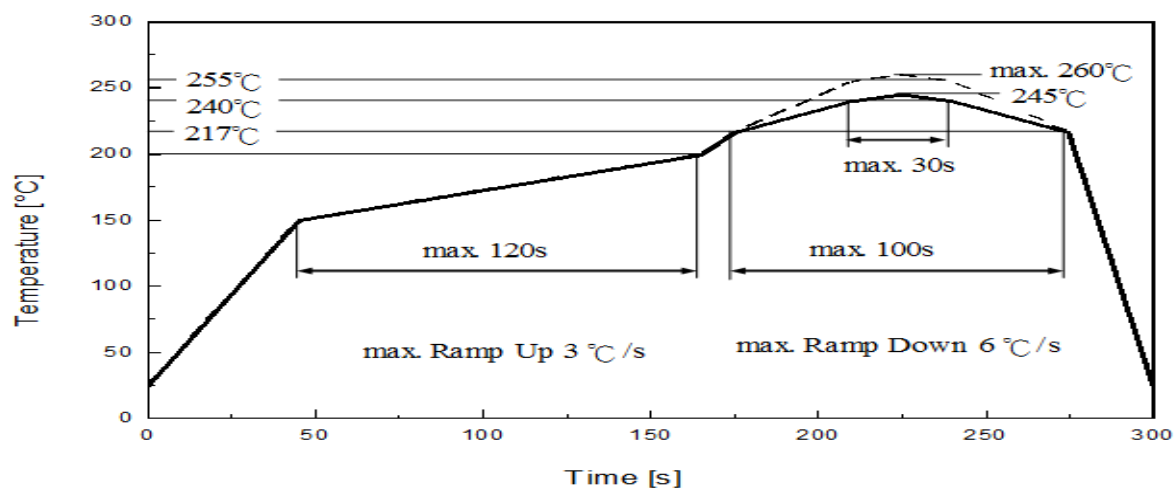
1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.1\text{mm}$.

8. Recommend Soldering Pad



9. Reflow Soldering Profile

Soldering Condition (Reference: IPC/JEDEC J-STD-020D)



Profile Feature	Pb-Free Assembly	Unit Einheit
	Recommendation	
Ramp-up rate to preheat 25 °C to 150 °C	3	°C /sec
Time of soaking zone 150 °C to 200 °C	120	sec
Ramp-up rate to peak	3	°C /sec
Liquidus temperature	217	°C
Time above liquidus temperature	100	sec
Peak temperature (max.)	260	°C
Time within 5°C of the specified peak temperature	30	Csec
Ramp-down Rate (max.)	6	°C /sec

10. Packaging Information

• Product Labeling



·CPN : Customer's Product Number

·P/N : Everlight Part Number

·QTY : Packing Quantity

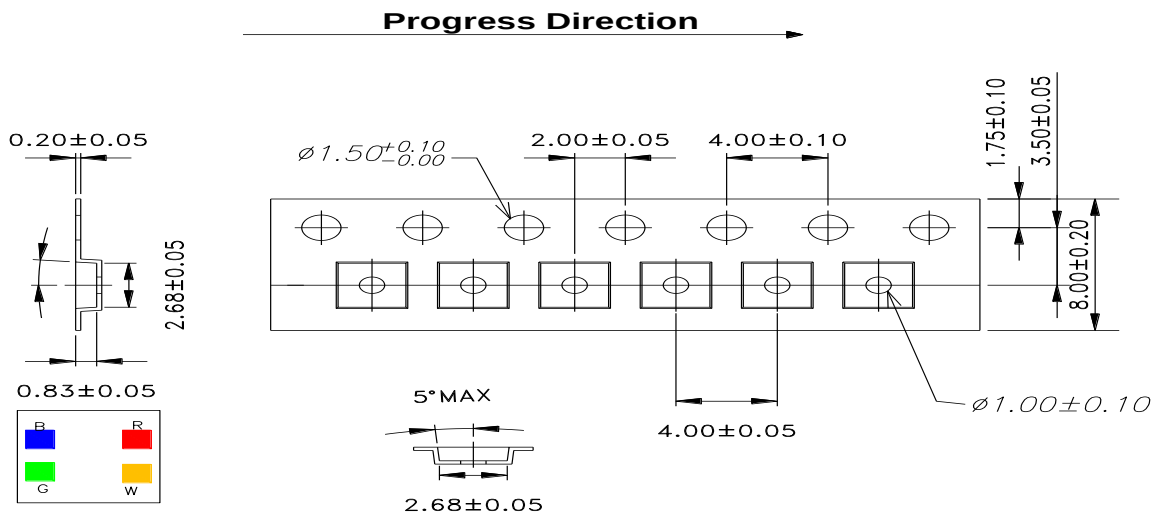
·CAT : Luminous Flux (Brightness) Bin

·HUE : Color Bin

·REF : Forward Voltage Bin

·LOT No : Lot Number

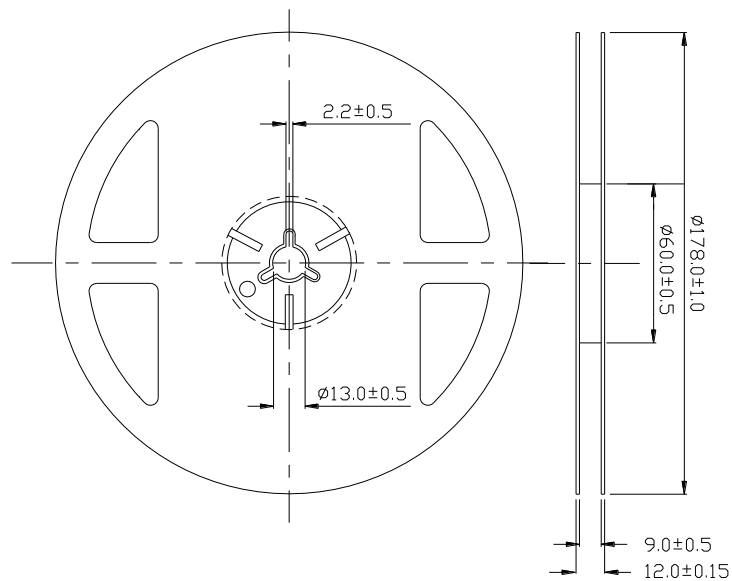
• Packing: Loaded Quantity 500 pcs Per Reel



Notes:

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are ±0.2mm.

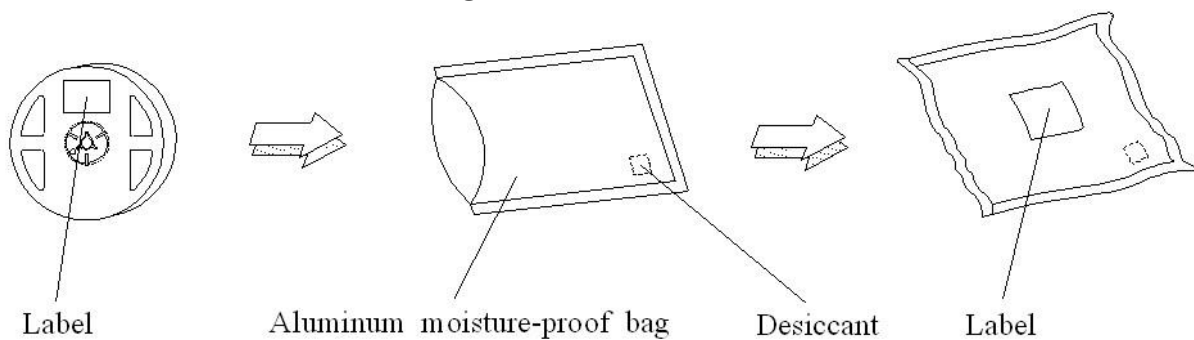
● Reel Dimensions



Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.2\text{mm}$.

● Moisture Resistant Packing Process



Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.2\text{mm}$.

11. Precaution for Use

1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (burn out will happen).

2. Assemblies

Do not stack assemblies containing LEDs to prevent damage to the optical surface of LEDs. Forces applied to the optical surface may result in the surface being damaged.

3. Soldering Condition

3.1 When soldering, do not put stress on the LEDs during heating.

3.2 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.