

DATASHEET

EVERLIGHT AUTOMOTIVE

EL Mini Top View LED 1608-C70200H-2T-AM(BYD)



Features

- Package : PLCC 2 package
- Color : Cool White
- Typ. Luminance Intensity : 2240 mcd @ 20mA
- Viewing angle : 120°
- ESD : 8 kV
- MSL : 3
- Typ.color coordinates : (0.3,0.28)
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

Applications

- Automotive Interior Lighting.
- Switches.
- Light guide design.

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1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current		I_F	3	20	30	mA	---
Luminous Intensity		I_V	1800	2240	2800	mcd	$I_F=20\text{ mA}$
Forward Voltage		V_F	2.75	3.1	3.75	V	$I_F=20\text{ mA}$
Viewing Angle		ϕ	---	120	---	deg	$I_F=20\text{ mA}$
Color		CIE x	---	0.3	---		$I_F=20\text{ mA}$
Color		CIE y	---	0.28	---	---	$I_F=20\text{ mA}$
Thermal Resistance (Junction to Solder)	Real	$R_{th\text{ JS real}}$	---	---	160	K/W	$I_F=20\text{ mA}$
	Electrical	$R_{th\text{ JS el}}$	---	---	120		

Notes:

1. Luminous Flux measurement tolerance: $\pm 8\%$.
2. The data of Luminous Flux measured at thermal pad= 25°C
3. Forward voltage measurement tolerance: $\pm 0.05\text{V}$
4. Tolerance of Chromaticity Coordinates x,y : ± 0.005

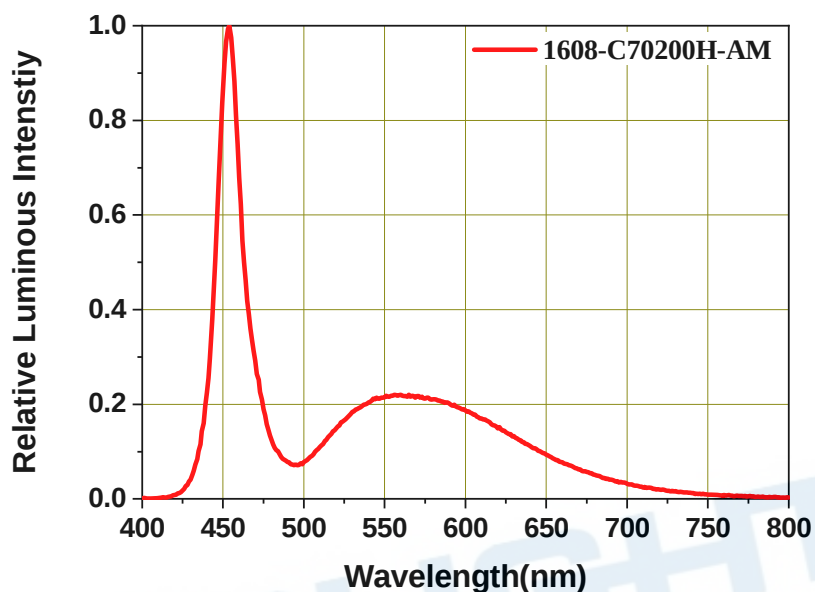
2. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Dissipation	P_d	112.5	mW
Forward Current	I_F	30	mA
Surge Current ($t \leq 10 \mu s$; $D=0.005$; $T_s=25^\circ C$)	I_{FM}	60	mA
Reverse Voltage	V_R	Not designed for reverse operation	V
Junction Temperature	T_J	125	$^\circ C$
Operating Temperature	T_{opr}	-40 ~ +110	$^\circ C$
Storage Temperature	T_{stg}	-40 ~ +110	$^\circ C$
ESD Sensitivity ($R=1.5k\Omega$, $C=100pF$)	ESD_{HBM}	8	kV
Soldering Temperature	Reflow	260 $^\circ C$ for 30sec	$^\circ C$

3. Characteristics Graph

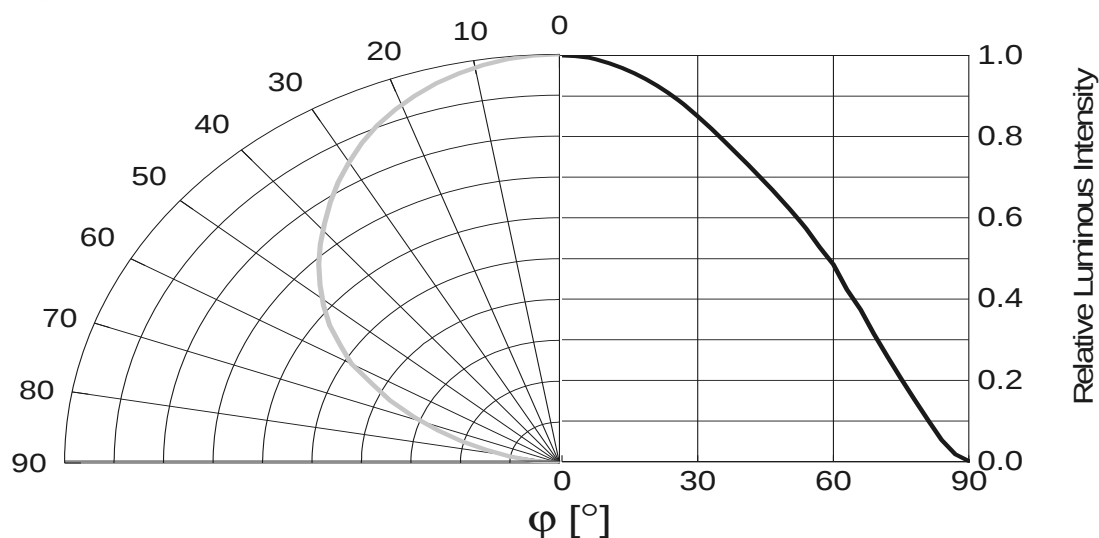
Wavelength Characteristics Relative Spectral Distribution @ Ts = 25°C, If=20mA

$$\Phi_V / \Phi_V (Max.) = f(\lambda)$$



Typical Diagram Characteristics of Radiation

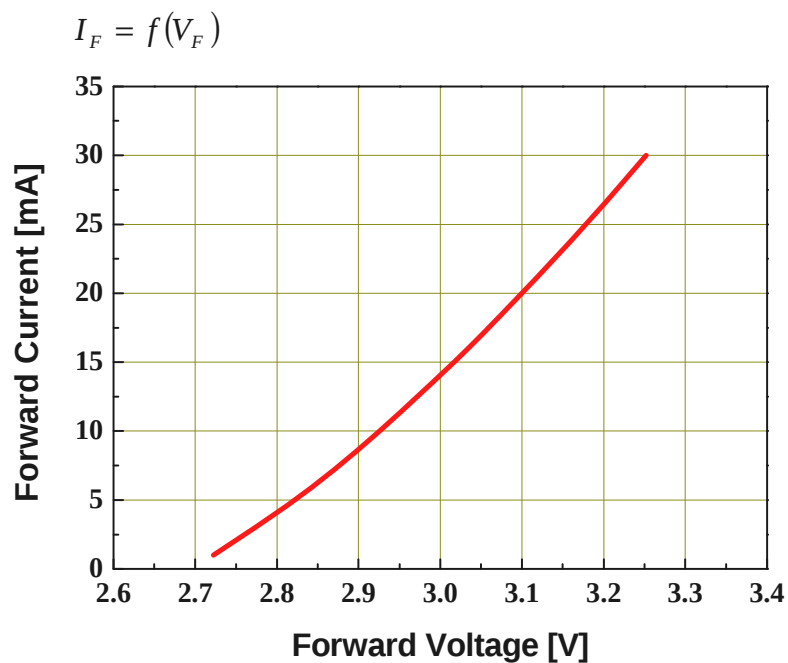
$$\Phi_V / \Phi_V (0^\circ) = f(\varphi)$$



Notes:

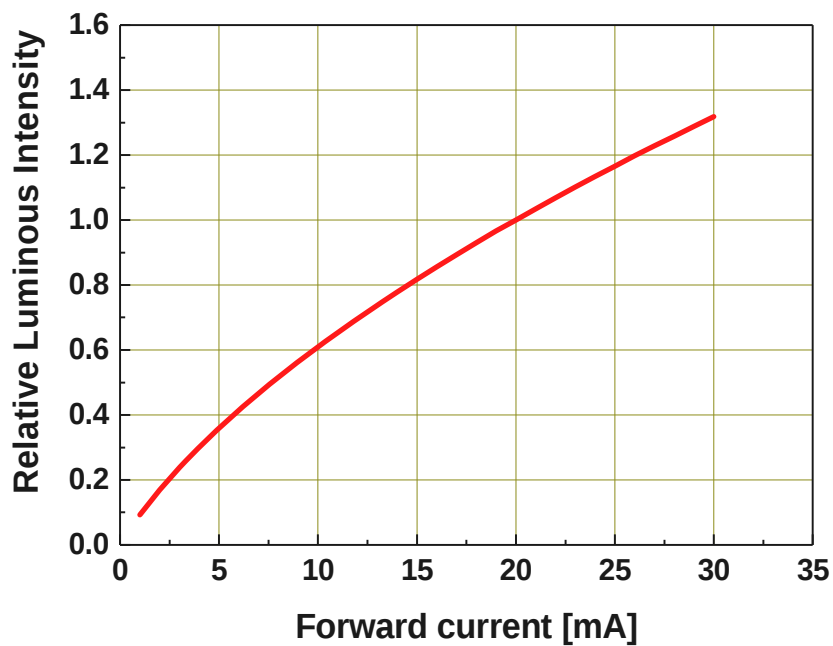
1. φ is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is $\pm 5^\circ$.

Forward Current vs. Forward Voltage @ Ts = 25°C



Relative Luminous Intensity vs. Forward Current @ Ts = 25°C

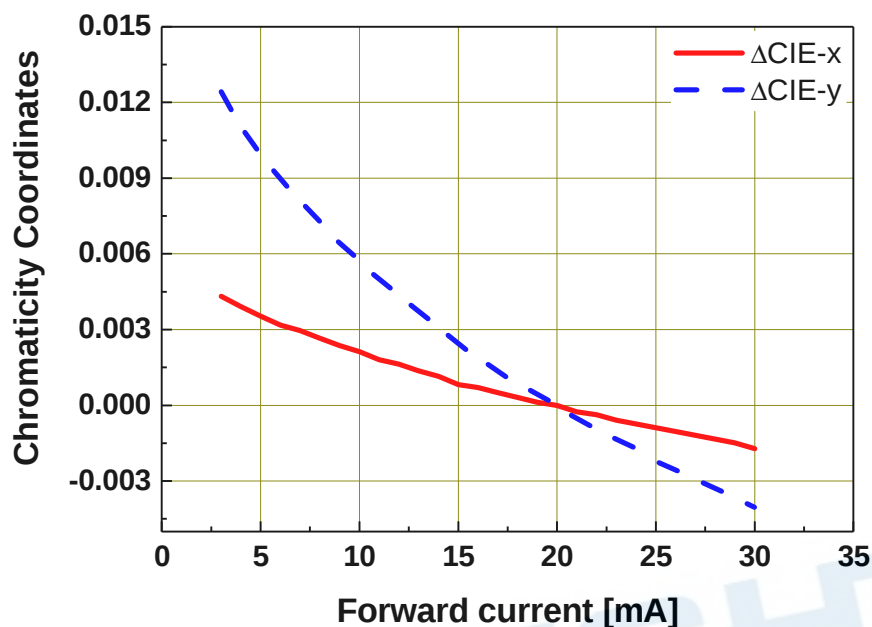
$$\Phi_V / \Phi_V(20\text{mA}) = f(I_F)$$



Chromaticity Coordinates Shift vs. Forward Current

@ $T_s = 25^\circ\text{C}$

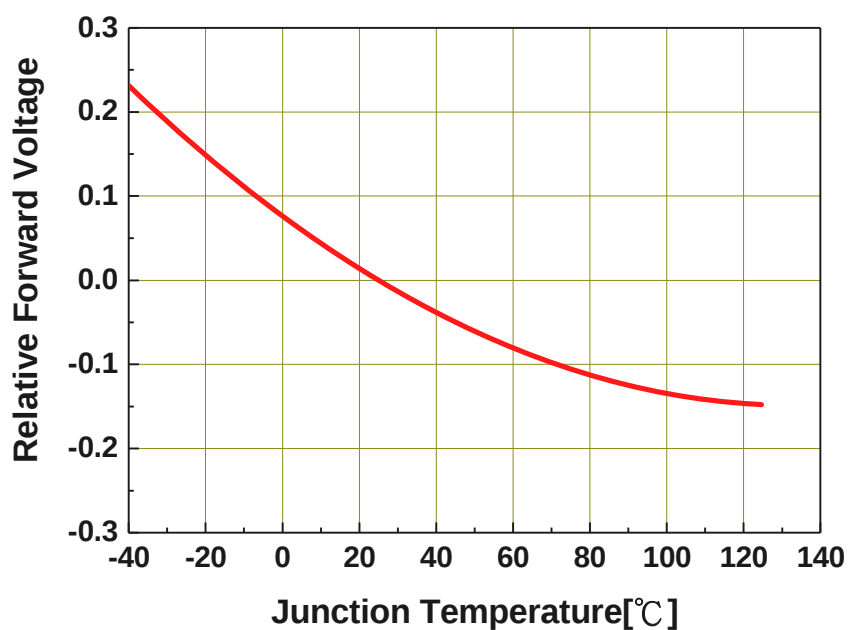
$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



Relative Forward Voltage vs. Junction Temperature

@ $I_F = 20\text{mA}$

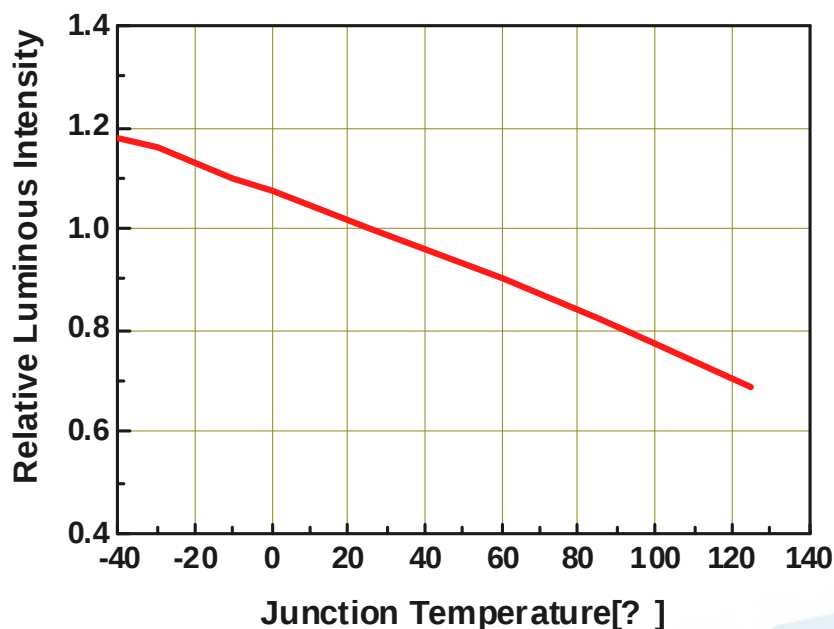
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$$



Relative Luminous Intensity vs. Junction Temperature

@ $I_F=20\text{mA}$

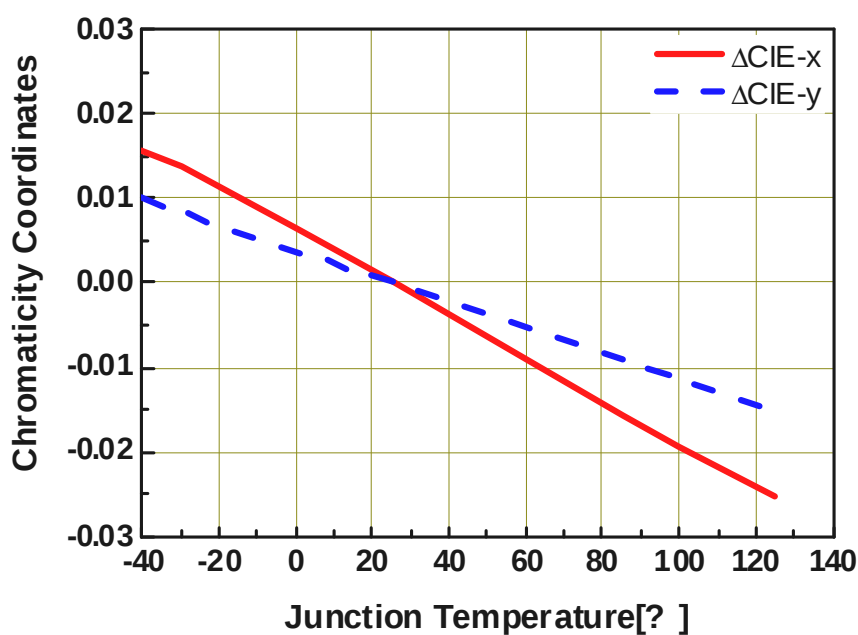
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j)$$



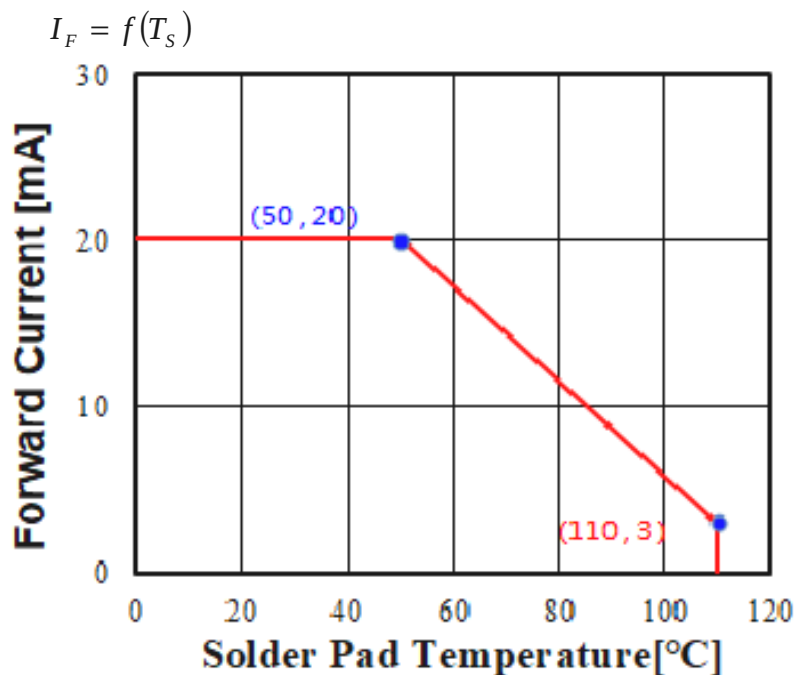
Chromaticity Coordinates Shift vs. Junction Temperature

@ $I_F=20\text{mA}$

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

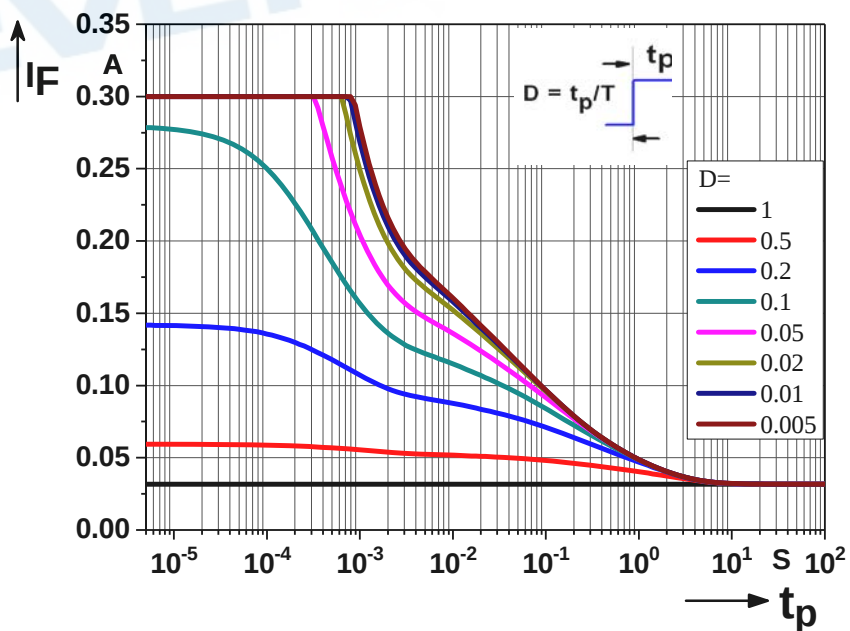


Forward Current Derating Curve



Permissible Pulse Handling Capability

D=Duty cycle, $T_S = 25^\circ\text{C}$



4. Binning Information

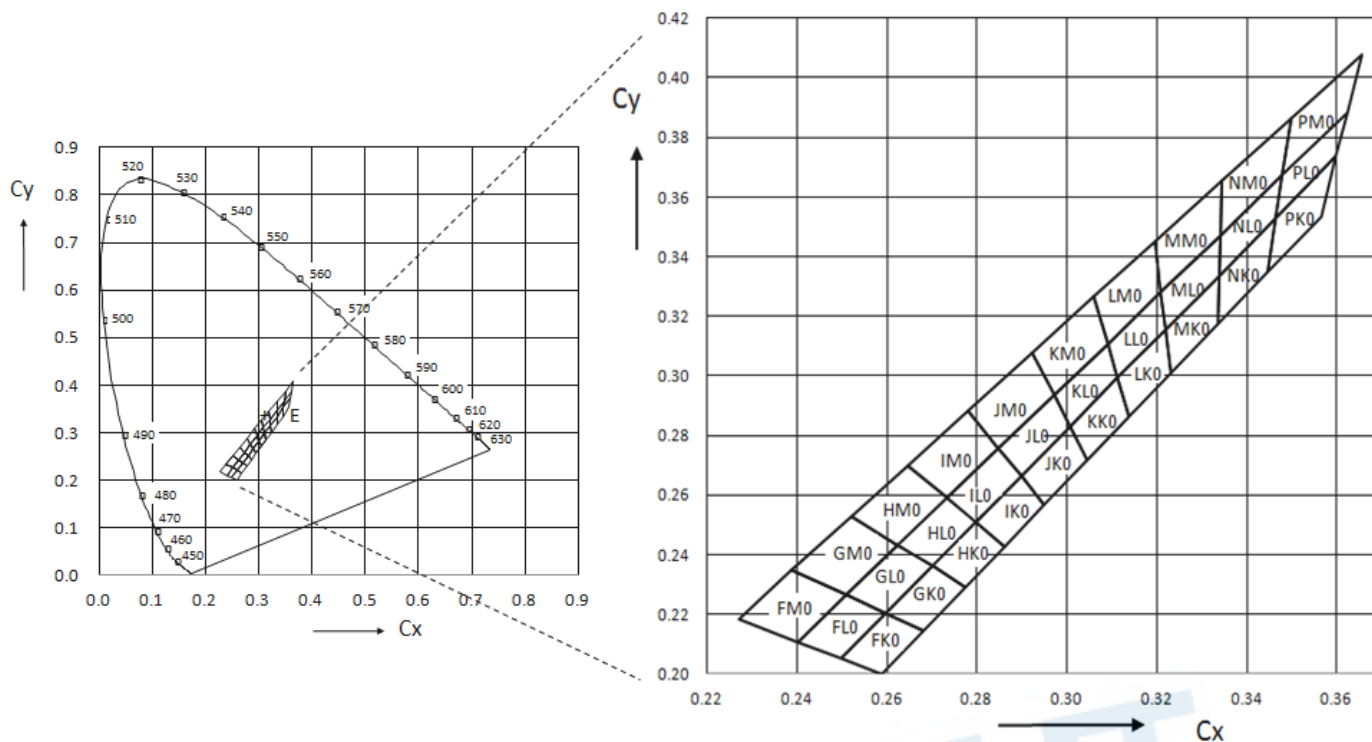
Luminous Intensity Bins

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
U1	450	560
U2	560	710
V1	710	900
V2	900	1120
AA	1120	1400
AB	1400	1800
BA	1800	2240
BB	2240	2800
CA	2800	3550
CB	3550	4500
DA	4500	5600
DB	5600	7100
EA	7100	9000
EB	9000	11200
FA	11200	14000
FB	14000	18000
GA	18000	22400

Notes:

1. Luminous flux measurement tolerance: $\pm 8\%$.
2. Highlighted Black Box is possible output bins.

Standard White Color Bin Structure



Cool White Color Bin Coordinates

Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
FK0	0.2589	0.2000	NK0	0.3339	0.3336
	0.2498	0.2053		0.3335	0.3172
	0.2597	0.2204		0.3447	0.3347
	0.2682	0.2146		0.3465	0.3530
GK0	0.2682	0.2146	PK0	0.3465	0.3530
	0.2597	0.2204		0.3447	0.3347
	0.2700	0.2361		0.3567	0.3535
	0.2775	0.2292		0.3599	0.3735
HK0	0.2775	0.2292	FL0	0.2498	0.2053
	0.2700	0.2361		0.2402	0.2108
	0.2797	0.2509		0.2509	0.2264
	0.2861	0.2427		0.2597	0.2204
IK0	0.2861	0.2427	GL0	0.2597	0.2204
	0.2797	0.2509		0.2509	0.2264
	0.2898	0.2664		0.2624	0.2431
	0.2950	0.2568		0.2700	0.2361
JK0	0.2950	0.2568	HL0	0.2700	0.2361
	0.2898	0.2664		0.2624	0.2431
	0.3007	0.2830		0.2733	0.2590
	0.3045	0.2717		0.2797	0.2509
KK0	0.3045	0.2717	ILO	0.2797	0.2509
	0.3007	0.2830		0.2733	0.2590
	0.3113	0.2992		0.2848	0.2757
	0.3138	0.2862		0.2898	0.2664
LK0	0.3138	0.2862	JL0	0.2898	0.2664
	0.3113	0.2992		0.2848	0.2757
	0.3219	0.3154		0.2971	0.2935
	0.3231	0.3008		0.3007	0.2830
MK0	0.3339	0.3336	KL0	0.3007	0.2830
	0.3219	0.3154		0.2971	0.2935
	0.3231	0.3008		0.3090	0.3108
	0.3335	0.3172		0.3113	0.2992

Cool White Color Bin Coordinates

Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
LL0	0.3113	0.2992	IM0	0.2733	0.2590
	0.3090	0.3108		0.2646	0.2700
	0.3209	0.3281		0.2780	0.2883
	0.3219	0.3154		0.2848	0.2757
ML0	0.3341	0.3472	JM0	0.2848	0.2757
	0.3209	0.3281		0.2780	0.2883
	0.3219	0.3154		0.2922	0.3077
	0.3339	0.3336		0.2971	0.2935
NL0	0.3341	0.3472	KM0	0.2971	0.2935
	0.3339	0.3336		0.2922	0.3077
	0.3465	0.3530		0.3060	0.3266
	0.3479	0.3673		0.3090	0.3108
PL0	0.3479	0.3673	LM0	0.3090	0.3108
	0.3465	0.3530		0.3060	0.3266
	0.3599	0.3735		0.3196	0.3451
	0.3623	0.3882		0.3209	0.3281
FM0	0.2388	0.2348	MM0	0.3345	0.3654
	0.2269	0.2185		0.3196	0.3451
	0.2402	0.2108		0.3209	0.3281
	0.2509	0.2264		0.3341	0.3472
GM0	0.2509	0.2264	NM0	0.3345	0.3654
	0.2388	0.2348		0.3341	0.3472
	0.2520	0.2527		0.3479	0.3673
	0.2624	0.2431		0.3498	0.3863
HM0	0.2624	0.2431	PM0	0.3498	0.3863
	0.2520	0.2527		0.3479	0.3673
	0.2646	0.2700		0.3623	0.3882
	0.2733	0.2590		0.3655	0.4079

Forward Voltage Bins

Bin code	Min Forward Voltage [V]	Max Forward Voltage [V]
1012	1.00	1.25
1215	1.25	1.50
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 $I_F = 20mA$ operation.

5. Part Number

1608-C70200H-AM

Part number is designated with below details.

1608 = Product family name.

C = Color ^[1]

7 = CRI (0=N/A; >70%=7; >80%=8; >90%=9)

020 = Test current [mA]

0 = Lead Frame 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
UYG	Brilliant Yellow Green
UPG	Pale Green
UA	Amber
UR	Red
SR	Super Red
RGB	RGB-Color
PYG	Phosphor Converted Yellow Green

6. Ordering Information

1608- C70200H-**ABCDEFGHJKLMNO-PQ-AM**

Part Number of the 1608	Order Code
1608-C70200H-AM	1608-C70200H-ABCDEFGHJKLMNO-PQ-AM

Order code contains information with below details :

ABCDEF = min/max wavelength or CCT

GHJK = min./max. luminous flux in [lm] or luminous intensity in [mcd]

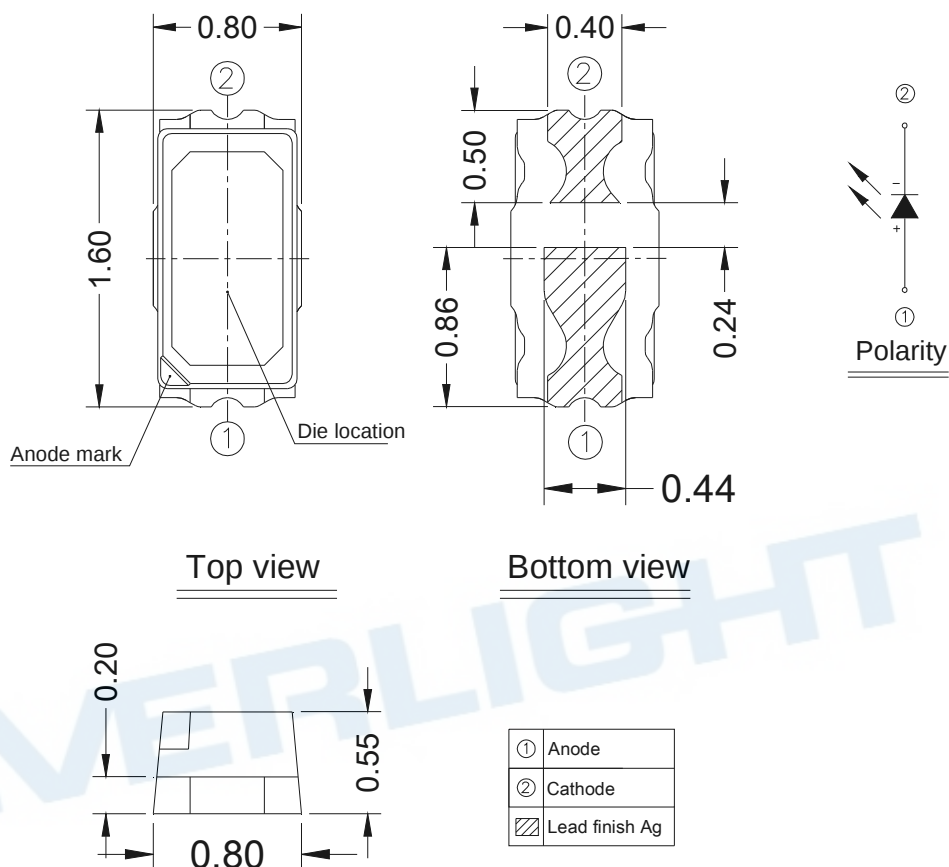
LMNO = min./max. forward voltage

PQ = internal code

AM = Automotive Application

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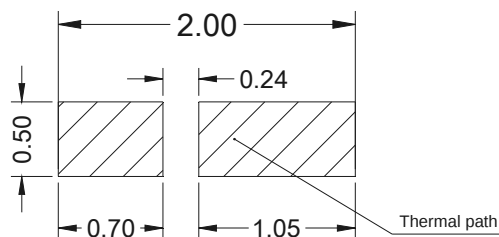
7. Mechanical Dimension



Notes:

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

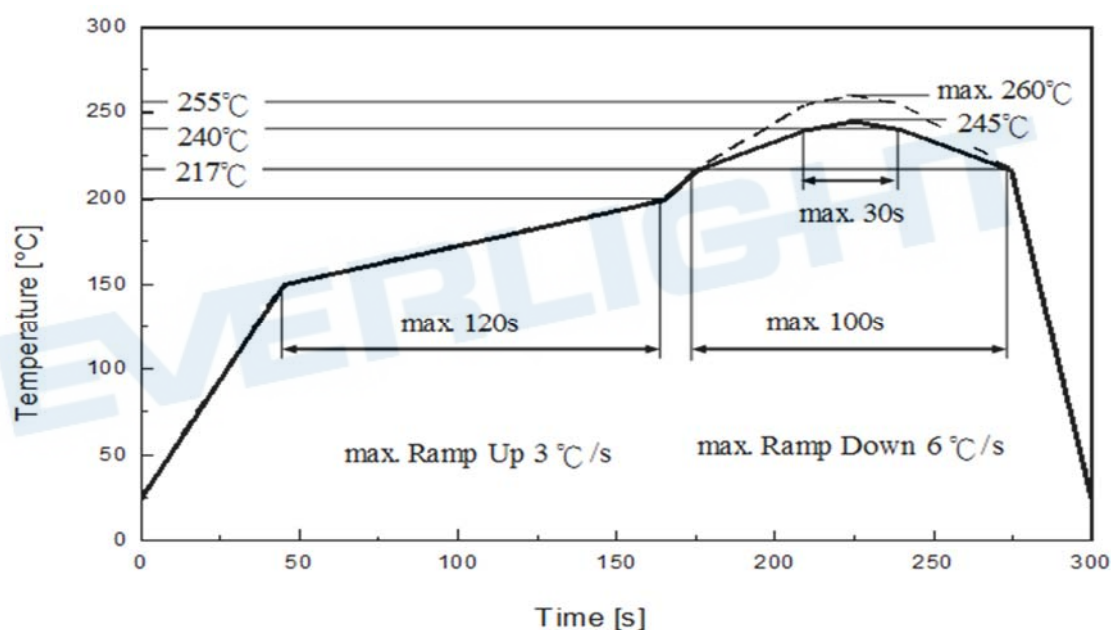
8. Recommended Soldering Pad



Soldering Pad

9. Reflow Soldering Profile

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



Profile Feature	Pb-Free Assembly	Unit
	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	sec
Ramp-down Rate (max.)	6	°C /sec

10. Packaging Information

• Product Labeling



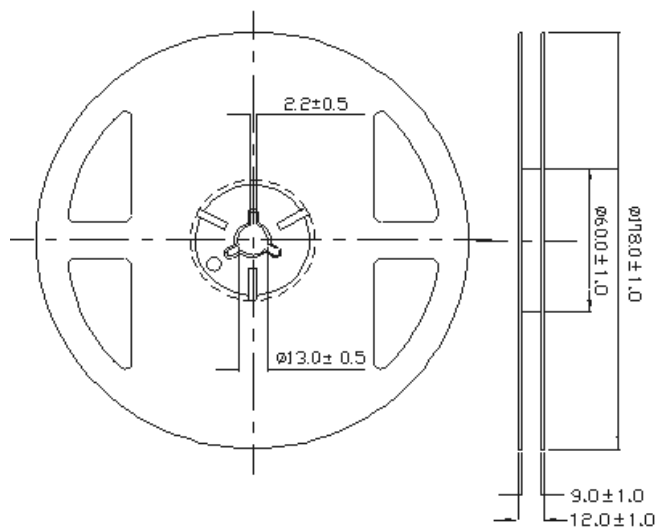
- CPN : Customer's Product Number
- P/N : Everlight Part Number
- QTY : Packing Quantity
- CAT : Luminous Flux (Brightness) Bin
- HUE : Color Bin
- REF : Forward Voltage Bin
- LOT No : Lot Number

• Packing: Loaded Quantity 2000 pcs Per Reel

Notes:

1. Dimensions are in millimeters.

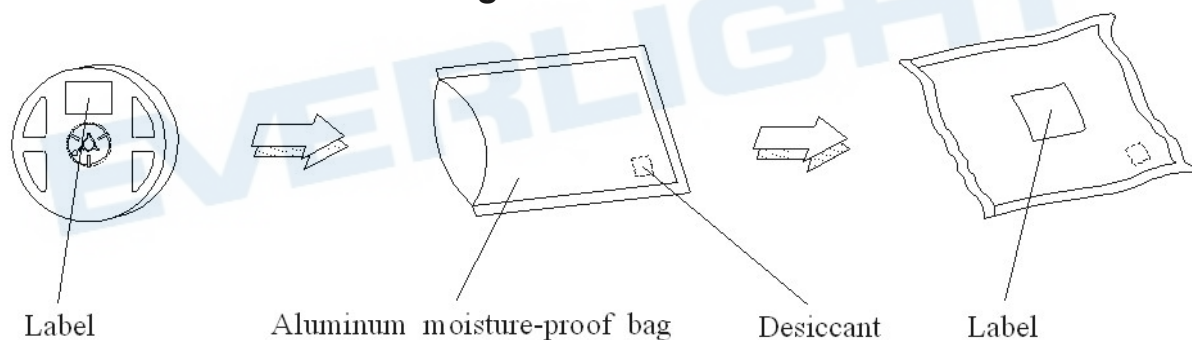
• Reel Dimensions



Notes:

1. Dimensions are in millimeters.

• Moisture Resistant Packing Process



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.

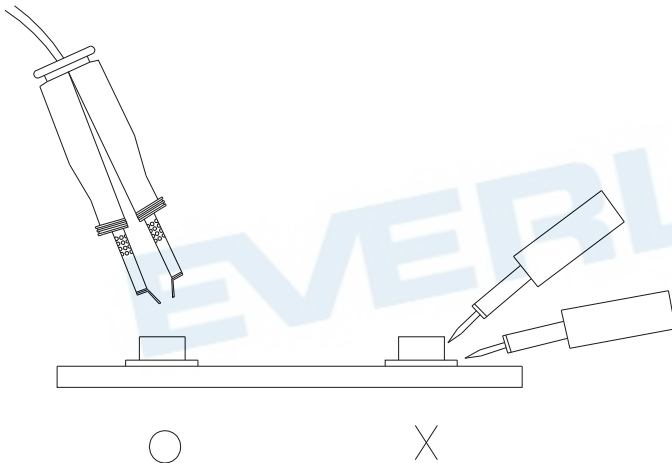
3.2 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350℃ 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.



Revision History

Current version: 22.May.2020

Issue No: DSE-0023565

Version: 1

Created by: Rudy Lin

Rev.	Subjects (major change in previous version)	Modified date
1	Standard data sheet	2020/05/22

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