

EL 3535E CH3535E-C03501L-AM



Features

- Package : SMD ceramic package
- Typical color temperature : 5850 K
- Typical luminous flux : 140 lm @ 350mA
- Viewing angle : 120°
- ESD : up to 8KV
- MSL : 2
- Qualifications : According to AEC-Q102
- The product itself will remain within RoHS compliant version.
- Compliance with EU REACH
- Compliance Halogen Free. (Br<900ppm,Cl<900ppm,Br+Cl<1500ppm)
- Sulfur robustness

Applications

- Automotive exterior lighting
- Daytime running light (DRL)

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1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current		I_F	50	350	700	mA	---
Luminous Flux ^{[1][2]}		I_v	120	140	160	lm	$I_F=350\text{mA}$
Forward Voltage ^{[3][4]}		V_F	3.0	3.1	4.0	V	$I_F=350\text{mA}$
Viewing Angle		ϕ	---	120	---	deg	$I_F=350\text{mA}$
Color Temperature		CCT	5180	5850	6680	K	$I_F=350\text{mA}$
Thermal Resistance (Junction to Solder)	Real	$R_{th JS real}$	---	6.0	8.0	K/W	$I_F=350\text{mA}$
	Electrical	$R_{th JS el}$	---	4.0	5.6		

Notes:

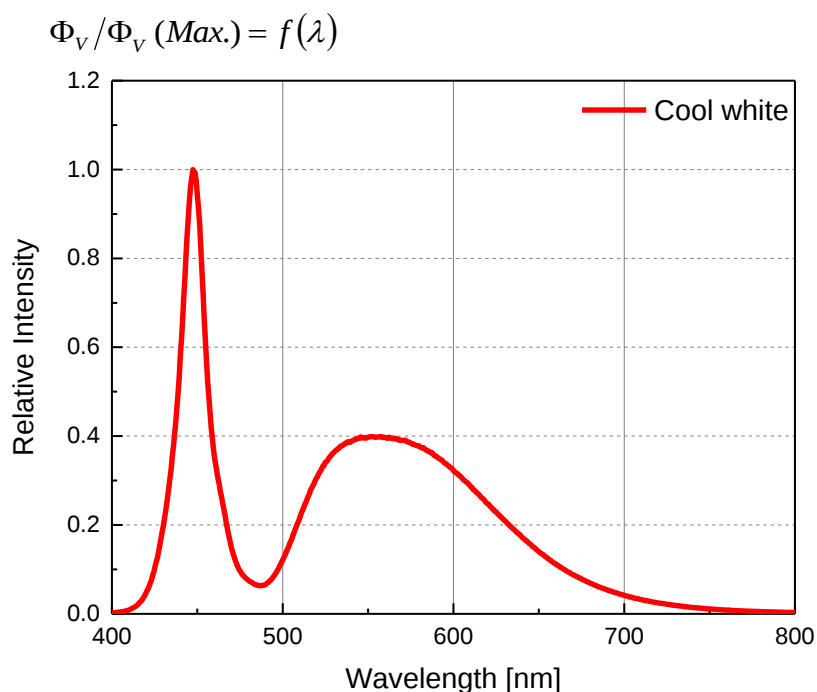
1. Luminous flux measurement tolerance: $\pm 8\%$.
2. The data of luminous flux measured at thermal pad=25°C.
3. Forward voltage measurement tolerance: $\pm 0.05\text{V}$.
4. The V_F range shown in the table above indicates 99% output.

2. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Dissipation	P_d	2800	mW
Forward Current	I_F	700	mA
Surge Current ($t \leq 10 \mu s$; $D=0.005$; $T_s=25^\circ C$)	I_{FM}	2500	mA
Reverse Voltage	V_R	Not designed for reverse operation	V
Junction Temperature	T_J	150	$^\circ C$
Operating Temperature	T_{opr}	-40 ~ +125	$^\circ C$
Storage Temperature	T_{stg}	-40 ~ +125	$^\circ C$
ESD Sensitivity ($R=1.5k\Omega$, $C=100pF$)	ESD_{HBM}	8	kV
Soldering Temperature	Reflow	260 $^\circ C$ for 30sec	$^\circ C$

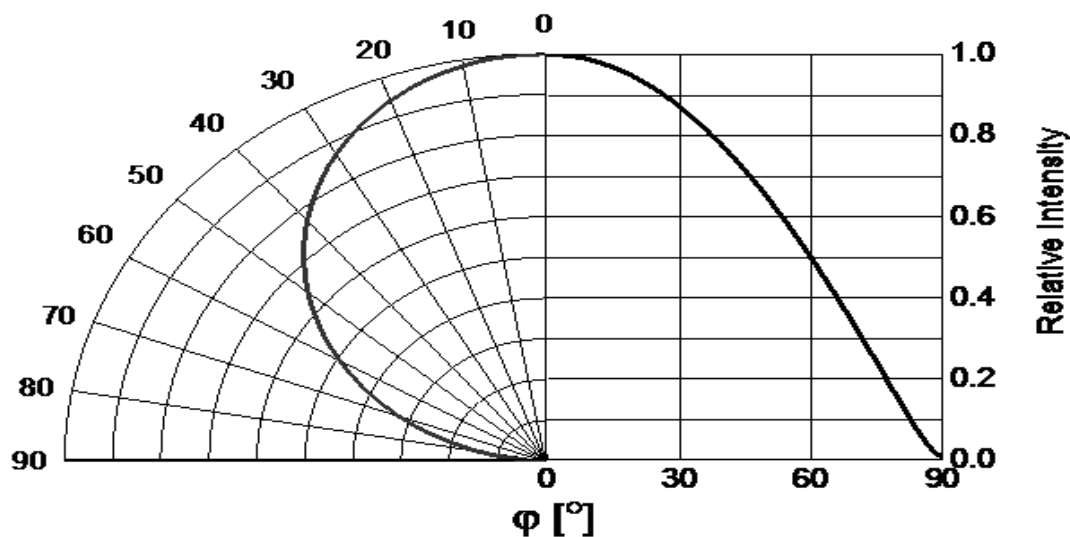
3. Characteristics Graph

Wavelength Characteristics Relative Spectral Distribution
@ Ts = 25°C, If=350mA



Typical Diagram Characteristics of Radiation

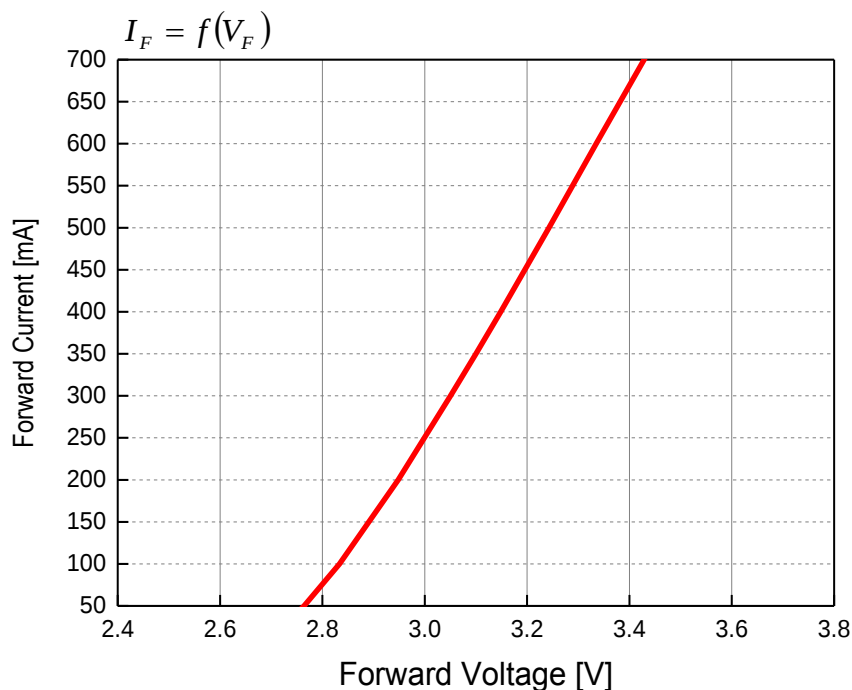
$\Phi_V / \Phi_V (0^\circ) = f(\varphi)$



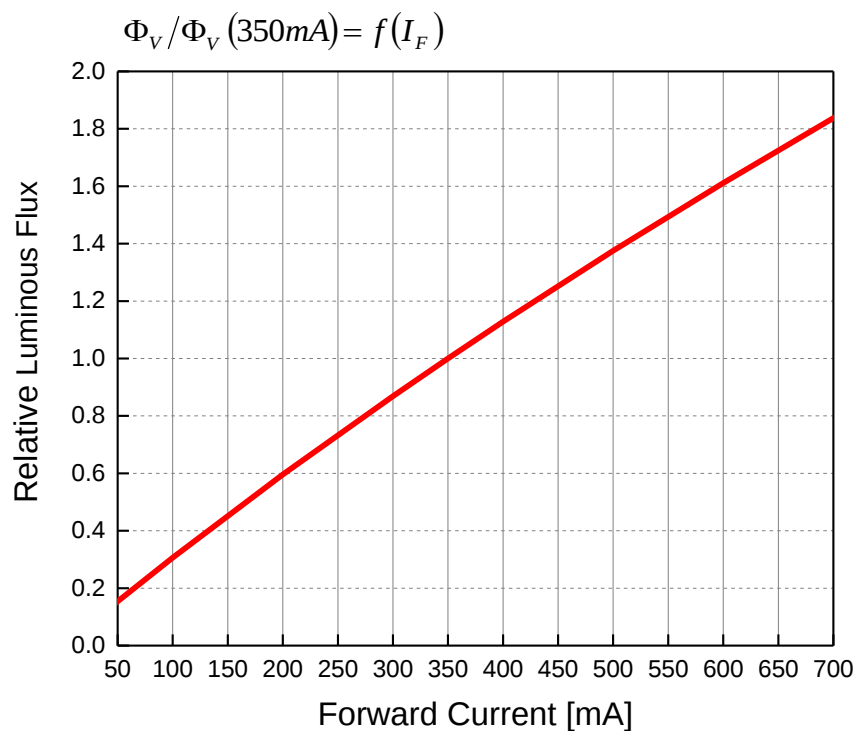
Notes:

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 ± 5

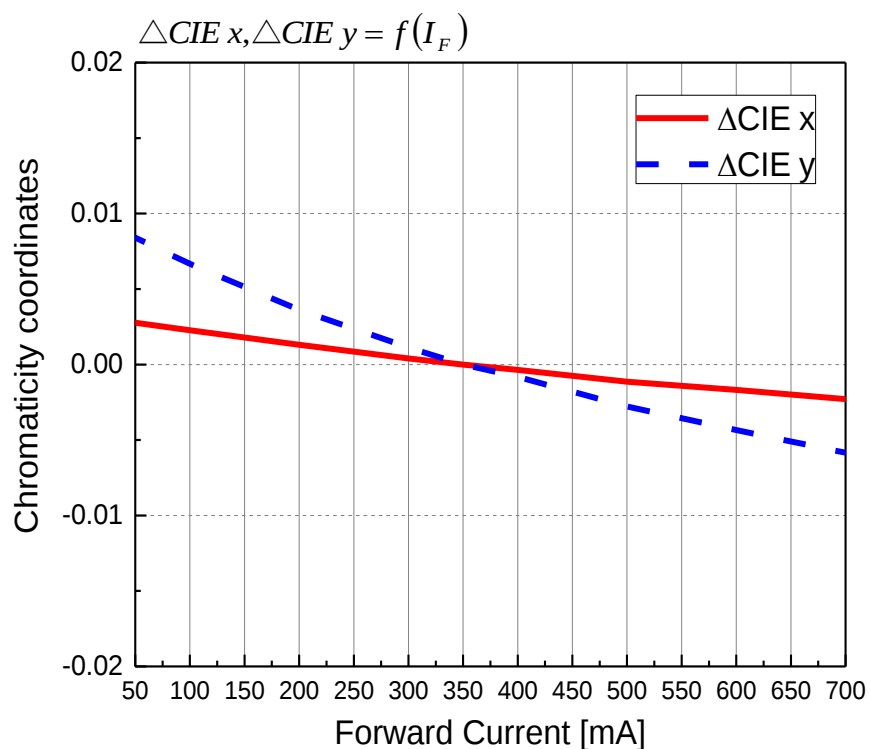
Forward Current vs. Forward Voltage
@ Ts = 25°C



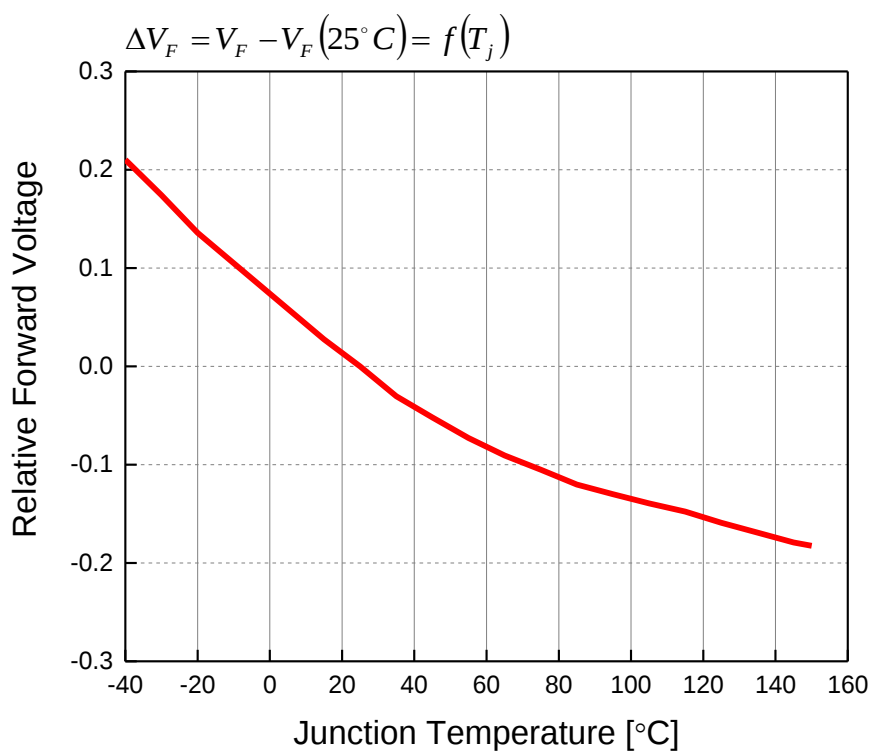
Relative Luminous Flux vs. Forward Current
@ Ts = 25°C



Chromaticity Coordinates Shift vs. Forward Current @ $T_s = 25^\circ\text{C}$

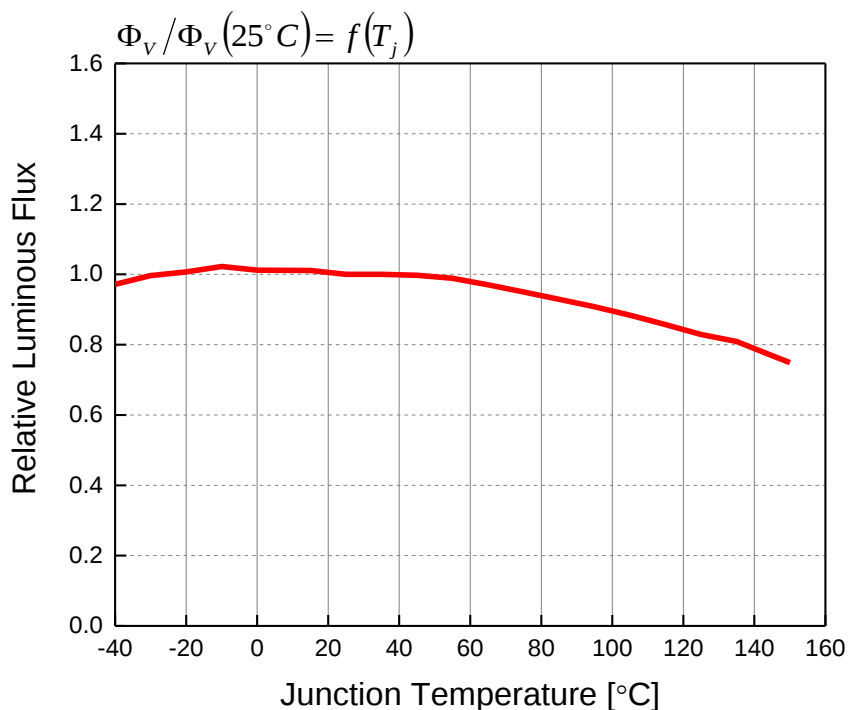


Relative Forward Voltage vs. Junction Temperature @ $I_F = 350\text{mA}$



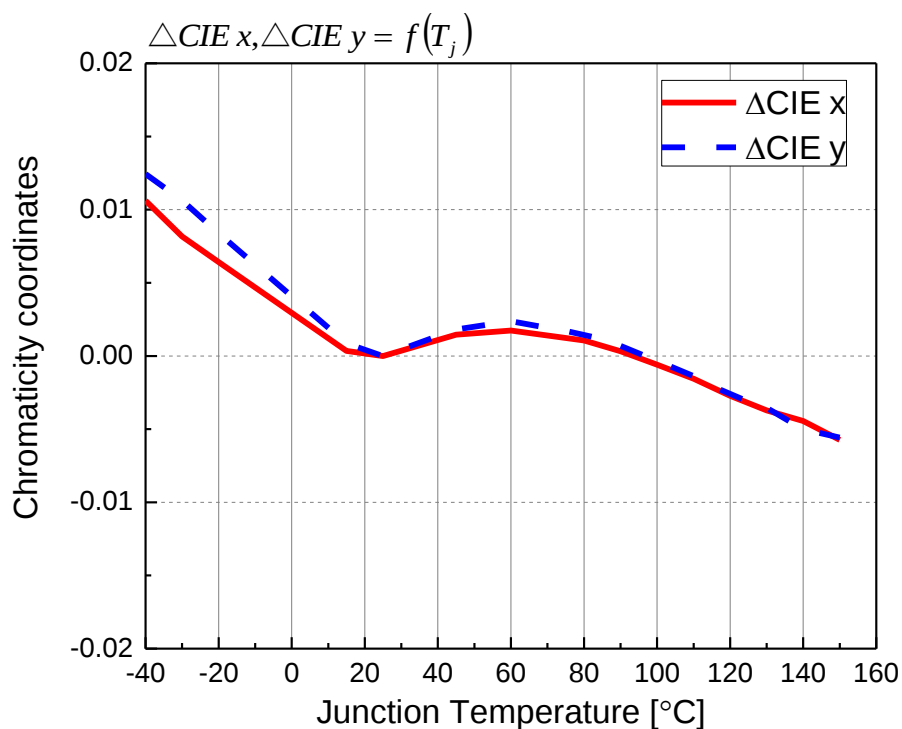
Relative Luminous Flux vs. Junction Temperature

@ $I_F=350\text{mA}$

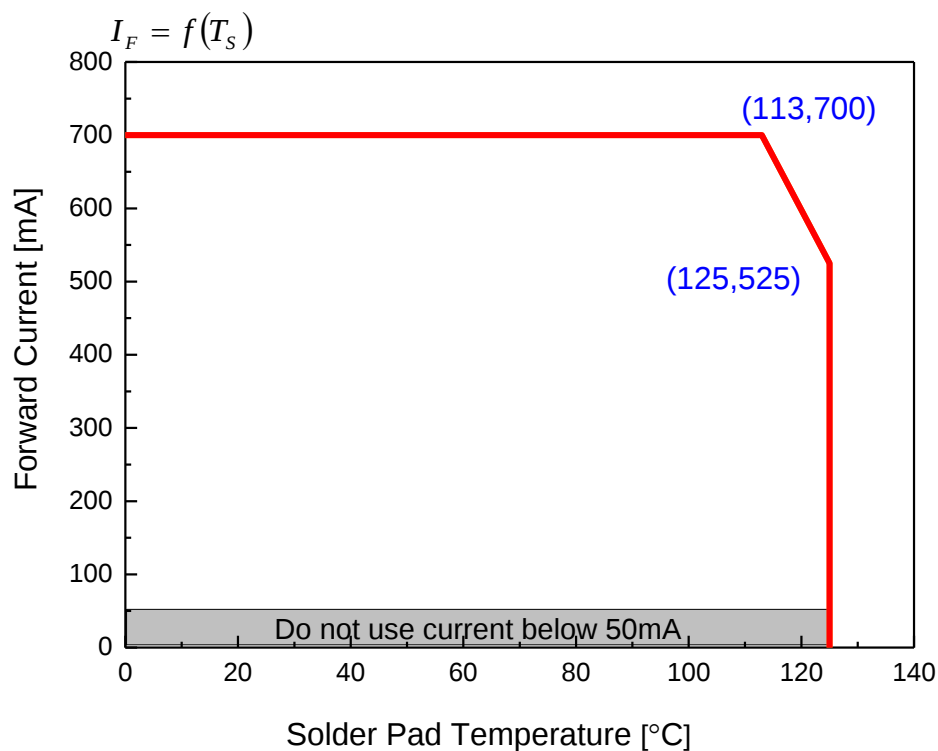


Chromaticity Coordinates Shift vs. Junction Temperature

@ $I_F=350\text{mA}$

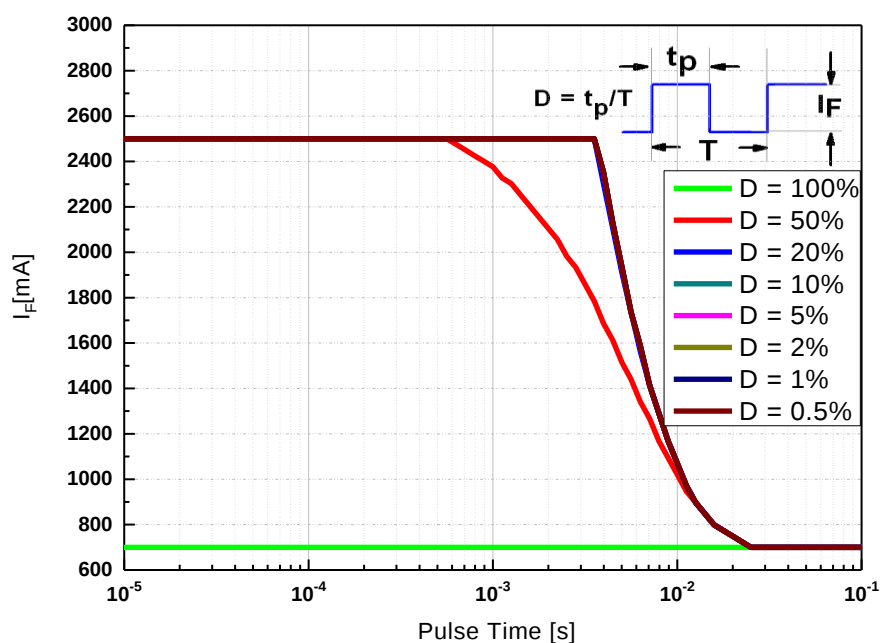


Forward Current Derating Curve



Permissible Pulse Handling Capability

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



4. Binning Information

Luminous Flux Bins

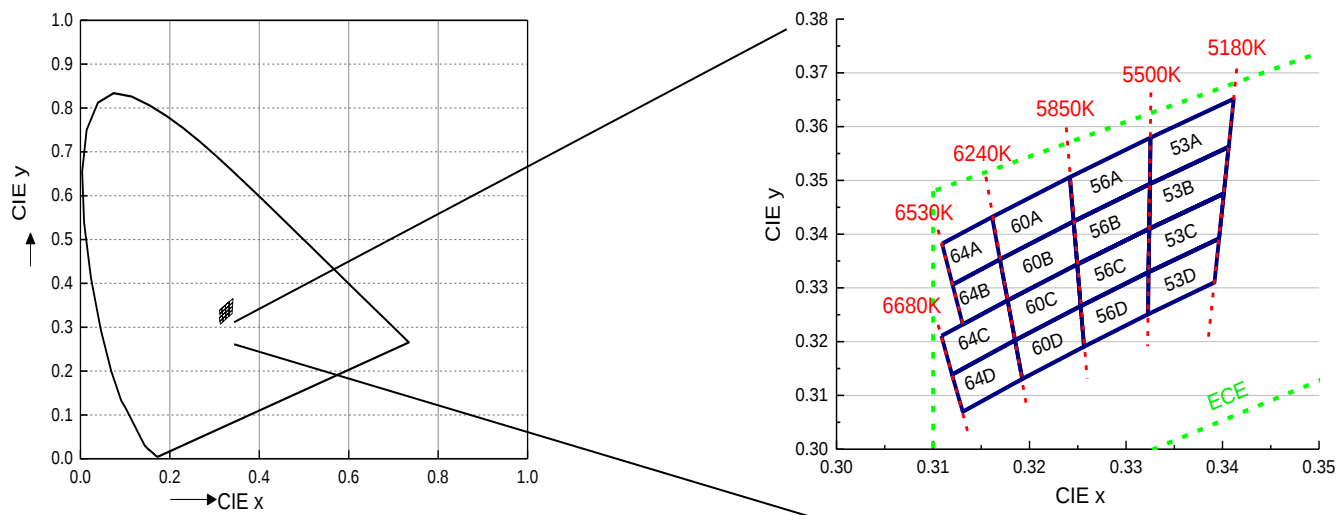
Group	Bin	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
E	1	4	5
	2	5	6
	3	6	8
	4	8	10
	5	10	13
	6	13	17
	7	17	20
	8	20	23
	9	23	27
F	1	27	33
	2	33	39
	3	39	45
	4	45	52
	5	52	60
	6	60	70
	7	70	80
	8	80	90
	9	90	100

Group	Bin	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
J	1	100	110
	2	110	120
	3	120	130
	4	130	140
	5	140	150
	6	150	160
	7	160	180
	8	180	200
	9	200	225
K	1	225	250
	2	250	275
	3	275	300
	4	300	325
	5	325	350
	6	350	375
	7	375	400
	8	400	425
	9	425	450

Notes:

1. Luminous flux measurement tolerance: $\pm 8\%$.

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		

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		

Cool White Bin Coordinates

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		

Notes: 1.Color coordinates measurement allowance: ± 0.005

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 $I_F = 350mA$ operation.

5. Part Number

CH3535E-C03501L-AM

Part number is designated with below details.

CH3535E = Product family name.

C = Color [1]

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

350 = Test current [mA]

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

L = 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
RGBY	RGBY – Color

6. Ordering Information

CH3535E-C03501L-ABCDEFGHIJKLMNO-PQ-AM

Part Number of the EL 3535E	Order Code
CH3535E-C03501L-AM	CH3535E-C03501L-ABCDEFGHIJKLMNO-PQ-AM

Order code contains information with below details :

ABCDEF = min/max wavelength or CCT

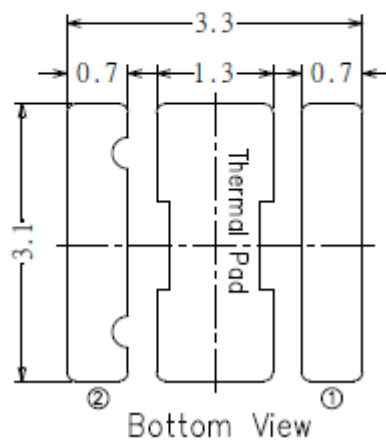
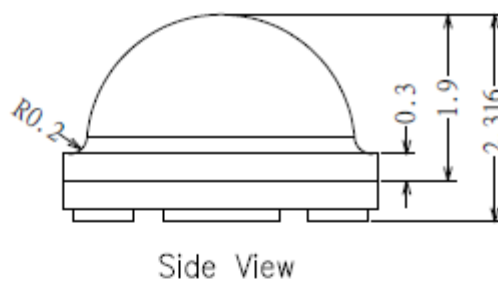
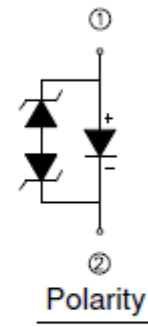
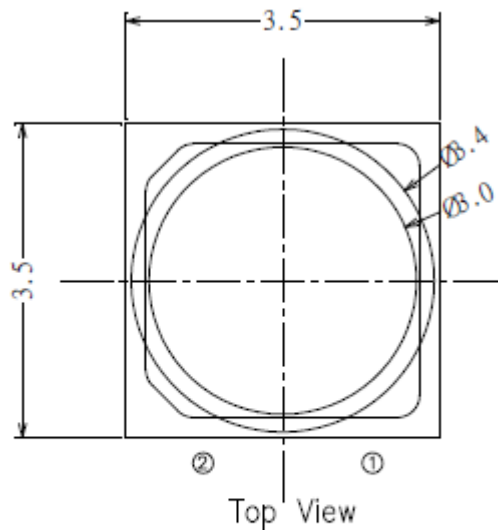
GHJK = min./max. luminous flux in [lm] or luminous intensity in [mcd]

LMNO = min./max. forward voltage

PQ =Internal code

AM = Automotive Application

7. Mechanical Dimension

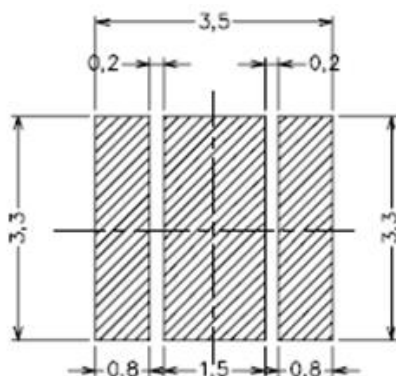


①	Anode
②	Cathode

Notes:

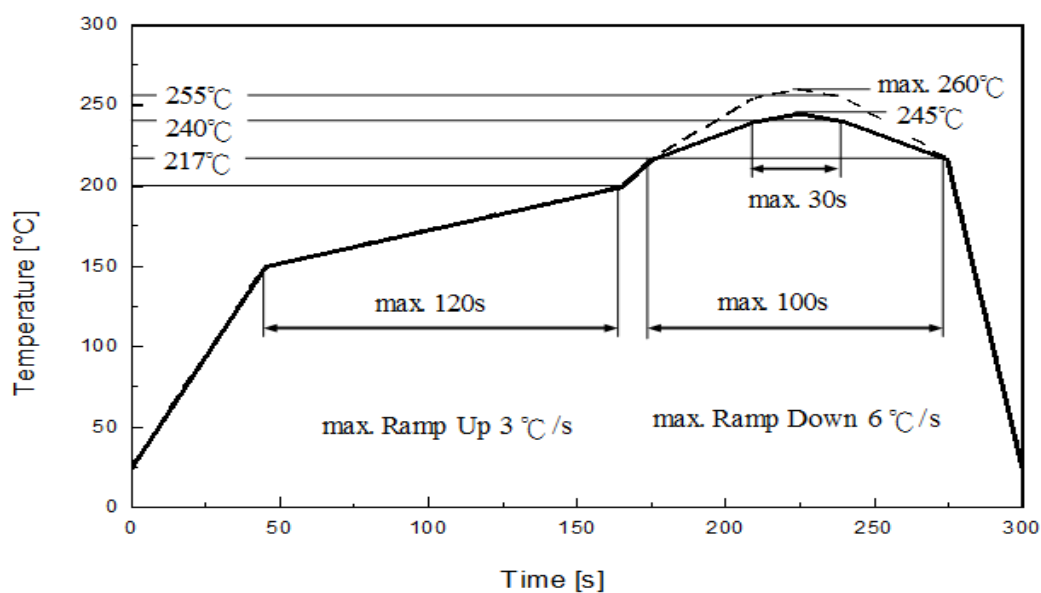
1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.1\text{mm}$.

8. Recommended 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	sec
Ramp-down Rate (max.)	6	°C /sec

10. Packaging Information

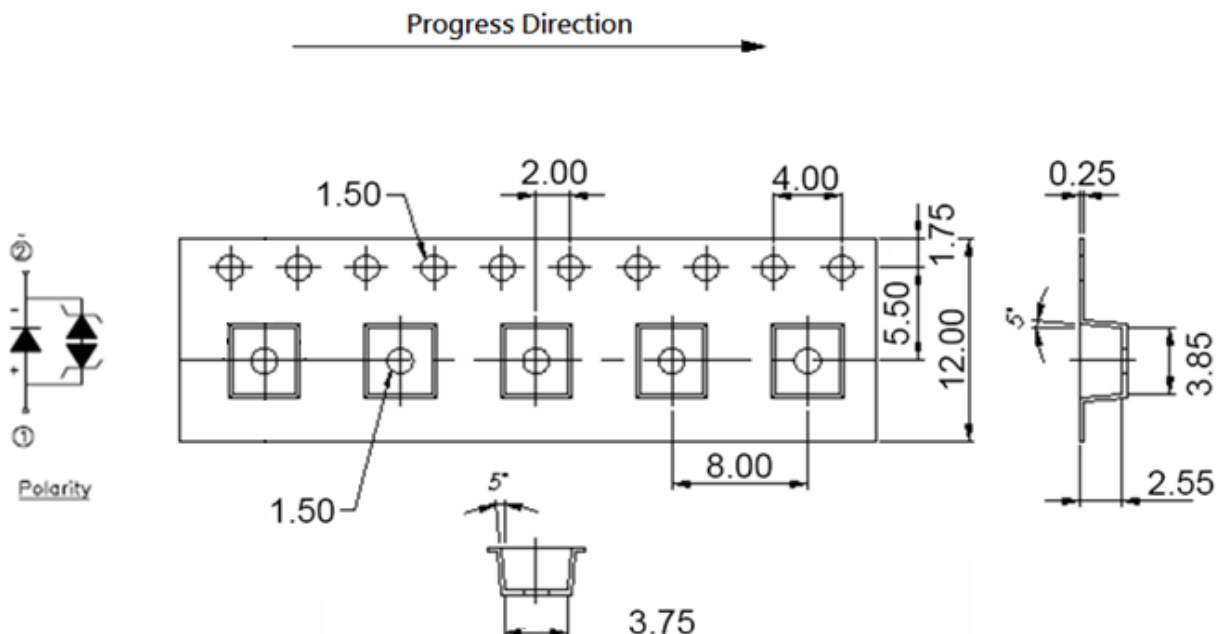
• Product Labeling



- 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

• Carrier Tape Dimensions as the following

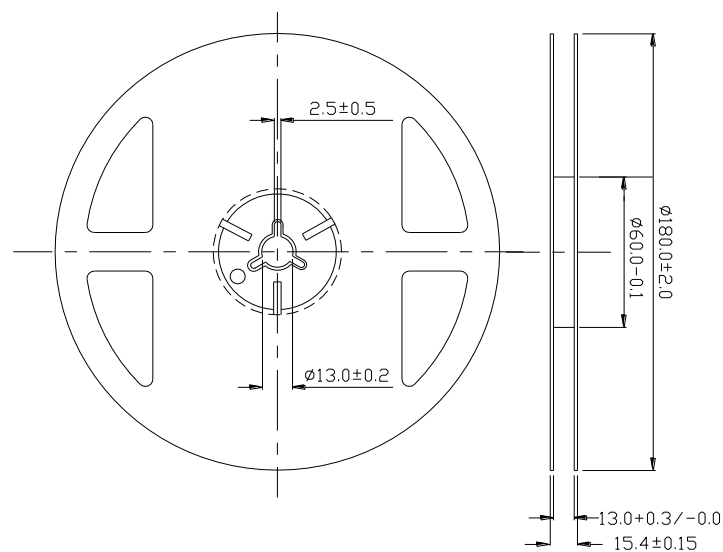
Packing: Loaded Quantity 400 pcs per reel.



Notes:

1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are $\pm 0.2\text{mm}$.

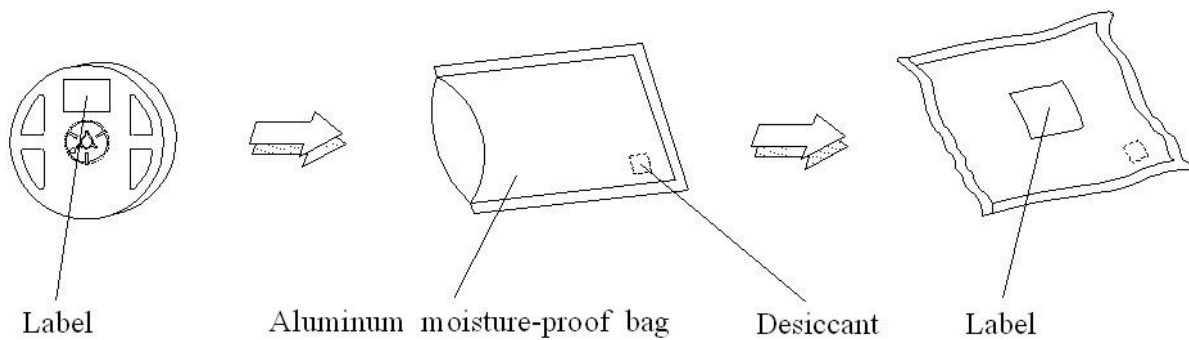
● Reel Dimensions



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°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.

Revision History

Current version: Apr.17.2019

Issue No: DHE-0003353

Version: 6

Created by: Sam Lu

Rev.	Subjects (major change in previous version)	Modified date
1	Standard data sheet	2017/02/20
2	Change VF bin format	2017/12/04
3	Modify CIE picture	2017/12/20
4	Modify Applications	2018/01/08
5	Add Halogen Free in cover page	2018/11/20
6	Add Rth max	2019/04/17