

EL TOP VIEW LED 62-117D-G81000H-AM



Features

- Package : PLCC 2 package
- Color : General White
- Typ. Luminance Flux : 40 lm @ 100mA
- Viewing angle : 120°
- ESD : 8KV
- MSL : 2
- Typ.color coordinates : (0.37,0.37)
- Qualified AEC-Q101
- 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
- Reading light

Contents

1. Characteristics	3
2. Absolute Maximum Ratings	4
3. Characteristics Graph	5
4. Binning Information	10
5. Part Number.....	20
6. Ordering Information	21
7. Mechanical Dimension.....	22
8. Recommended Soldering Pad.....	23
9. Reflow Soldering Profile.....	23
10. Packaging Information.....	24
11. Precaution for Use	26

1. Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current		I_F	20	100	150	mA	---
Luminous Flux		Φ_v	35	40	55	lm	$I_F=100\text{mA}$
Forward Voltage		V_F	2.5	3.0	3.5	V	$I_F=100\text{mA}$
Viewing Angle		ϕ	---	120	---	deg	$I_F=100\text{mA}$
Color		CIE x	---	0.37	---		$I_F=100\text{mA}$
Color		CIE y	---	0.37	---	---	$I_F=100\text{mA}$
Thermal Resistance (Junction to Solder)	Real	$R_{th JS real}$	---	---	30	K/W	$I_F=100\text{mA}$
	Electrical	$R_{th JS el}$	---	---	20		

Notes:

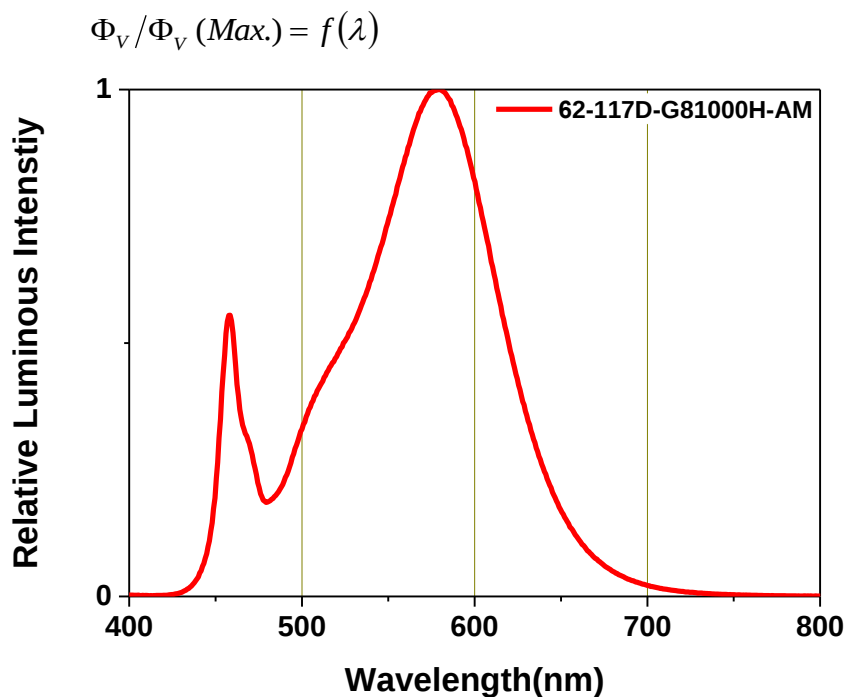
1. Luminous Flux measurement tolerance: $\pm 8\%$.
2. The data of Luminous Flux measured at thermal pad=25°C
3. Forward voltage measurement tolerance: $\pm 0.05\text{V}$
4. The V_F range shown in the table above indicates 99% output.
5. Tolerance of Chromaticity Coordinates x,y : ± 0.005

2. Absolute Maximum Ratings

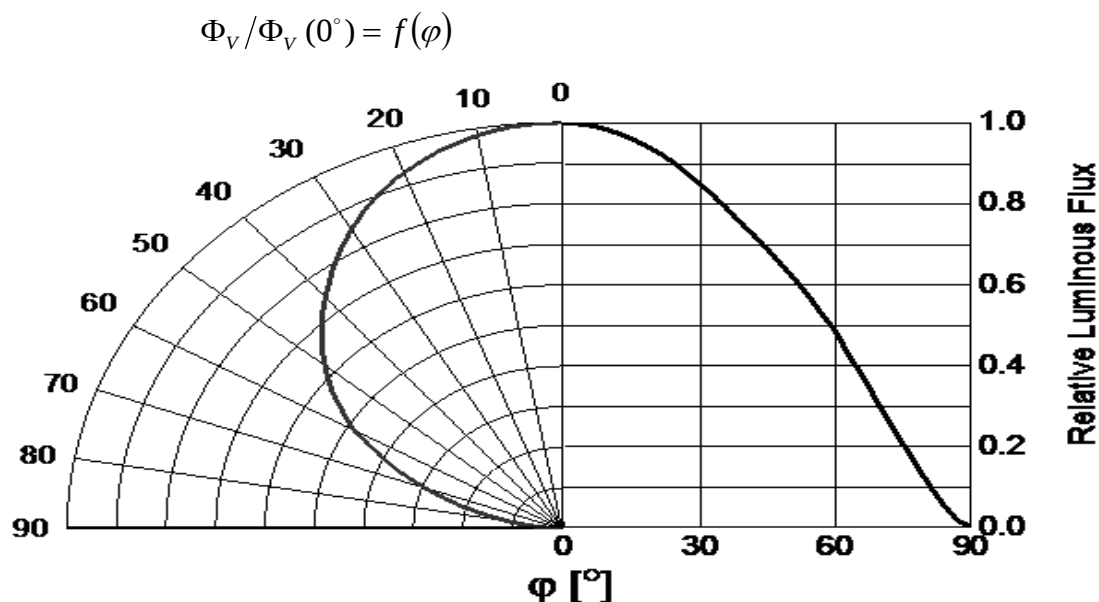
Parameter	Symbol	Ratings	Unit
Power Dissipation	P_d	525	mW
Forward Current	I_F	150	mA
Surge Current ($t \leq 10 \mu s$; $D=0.005$; $T_s=25^\circ C$)	I_{FM}	300	mA
Reverse Voltage	V_R	Not designed for reverse operation	V
Junction Temperature	T_J	125	$^\circ C$
Operating Temperature	T_{opr}	-40 ~ +110	$^\circ C$
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
 @ $T_s = 25^\circ\text{C}$, $I_F = 100\text{mA}$



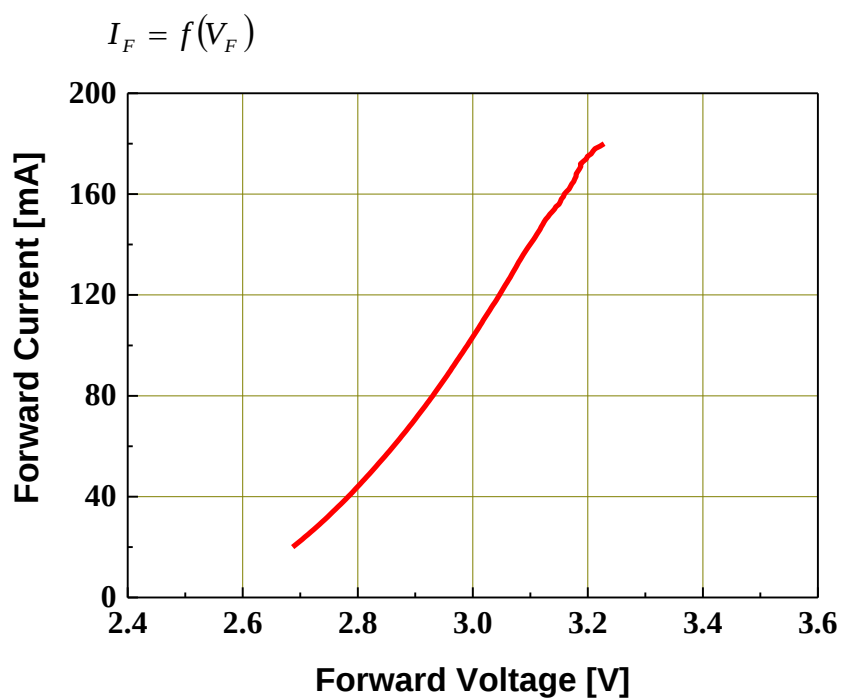
Typical Diagram Characteristics of Radiation



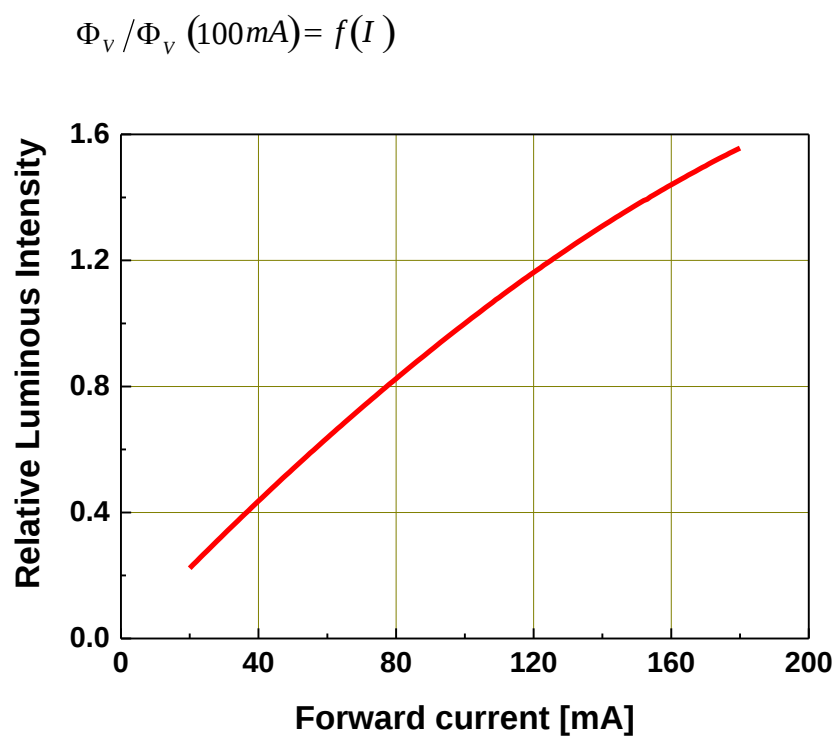
Notes:

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



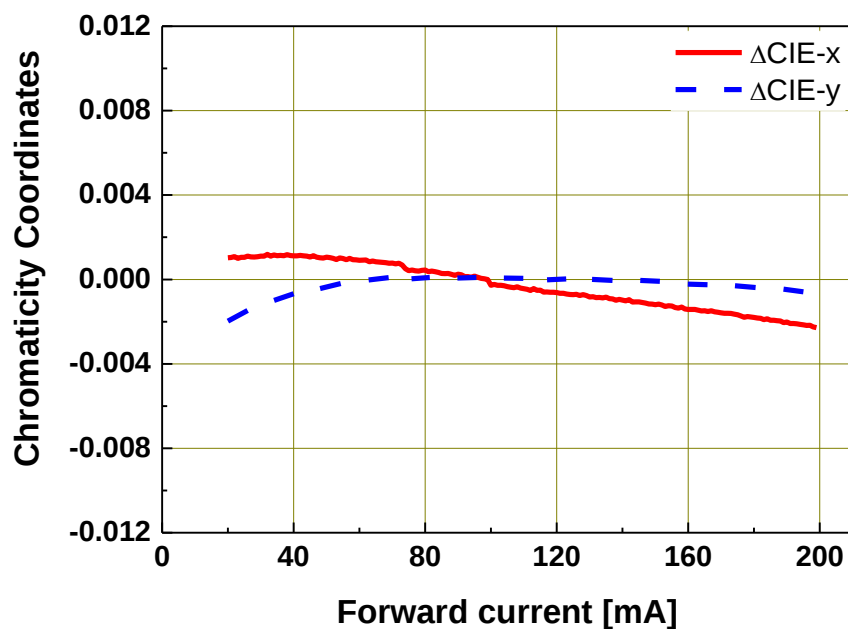
Relative Luminous Flux vs. Forward Current
@ Ts = 25°C



Chromaticity Coordinates Shift vs. Forward Current

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

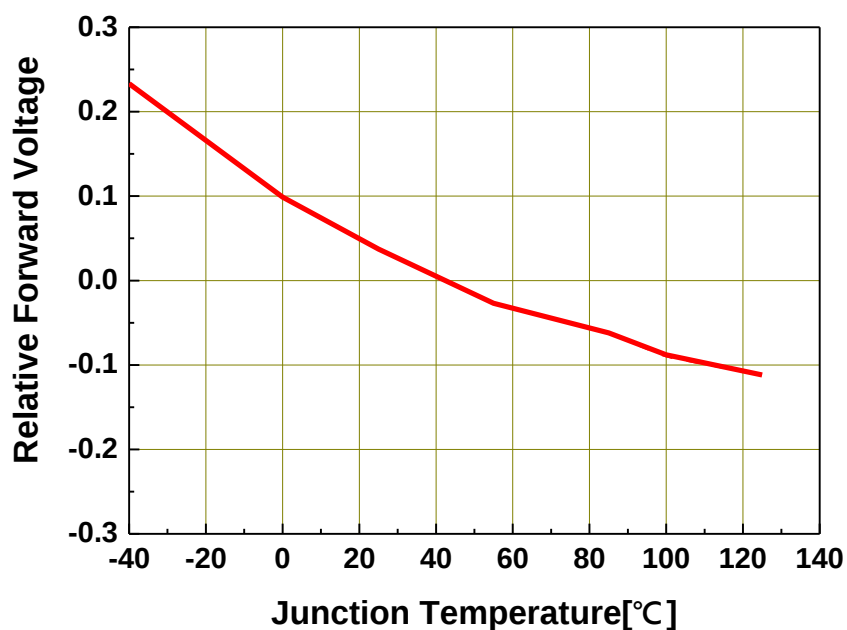
$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



Relative Forward Voltage vs. Junction Temperature

@ $I_F = 100\text{mA}$

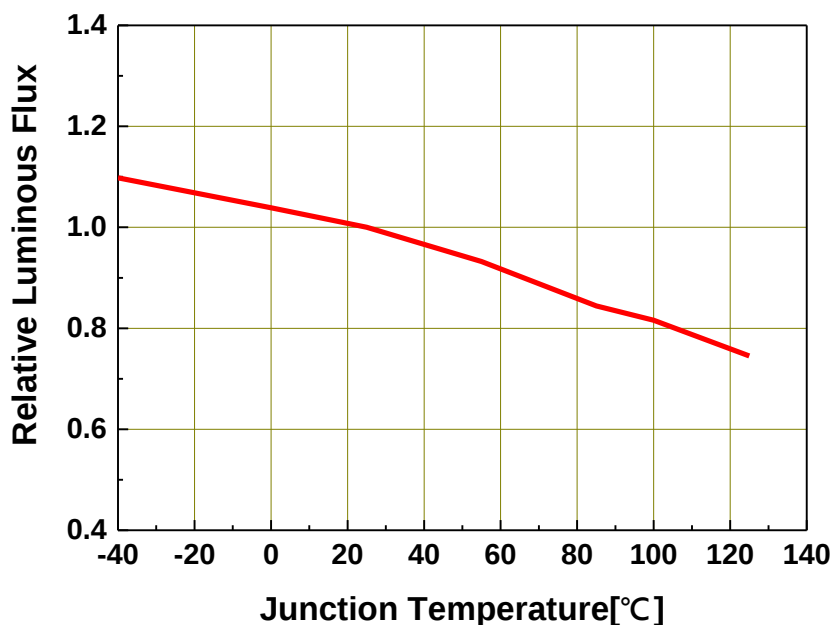
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$$



Relative Luminous Flux vs. Junction Temperature

@ $I_F=100\text{mA}$

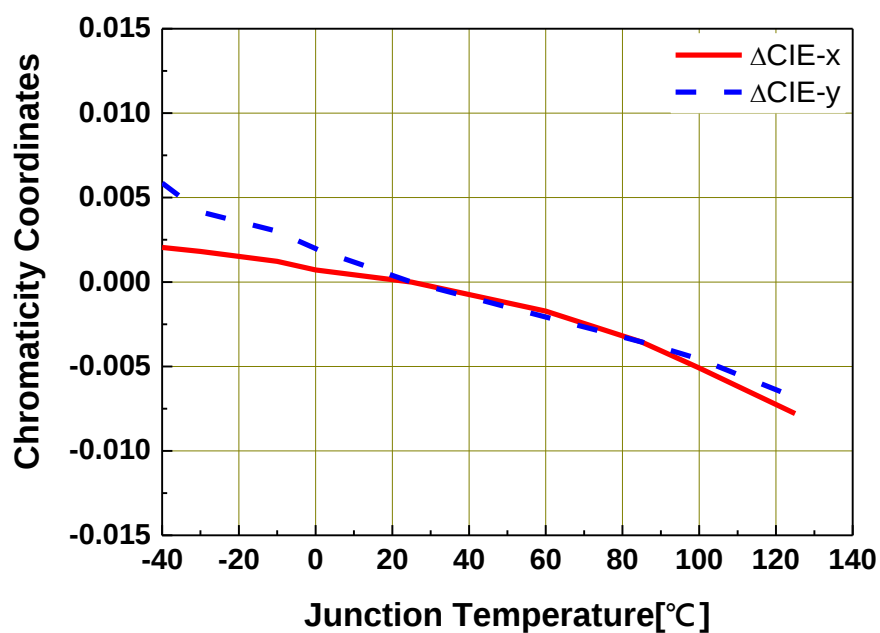
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j)$$



Chromaticity Coordinates Shift vs. Junction Temperature

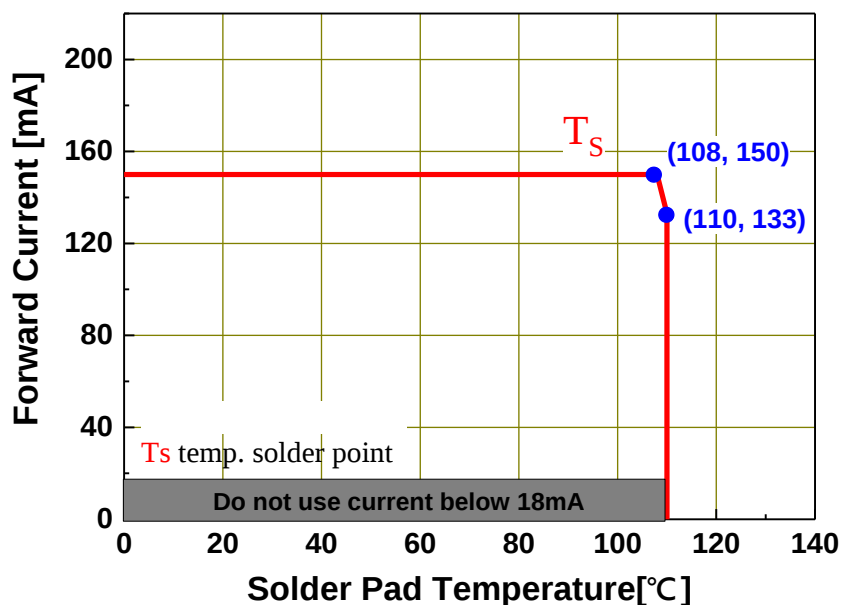
@ $I_F=100\text{mA}$

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



Forward Current Derating Curve

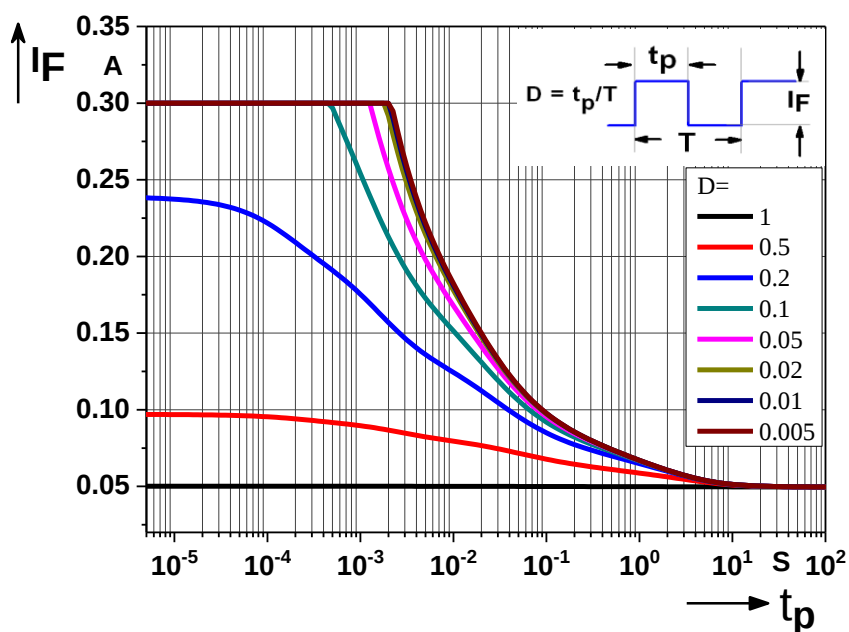
$$I_F = f(T_S)$$



Permissible Pulse Handling Capability

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

$$I_F = f(t_p); D = \text{Duty cycle}; T_A = 25^\circ\text{C}$$



4. Binning Information

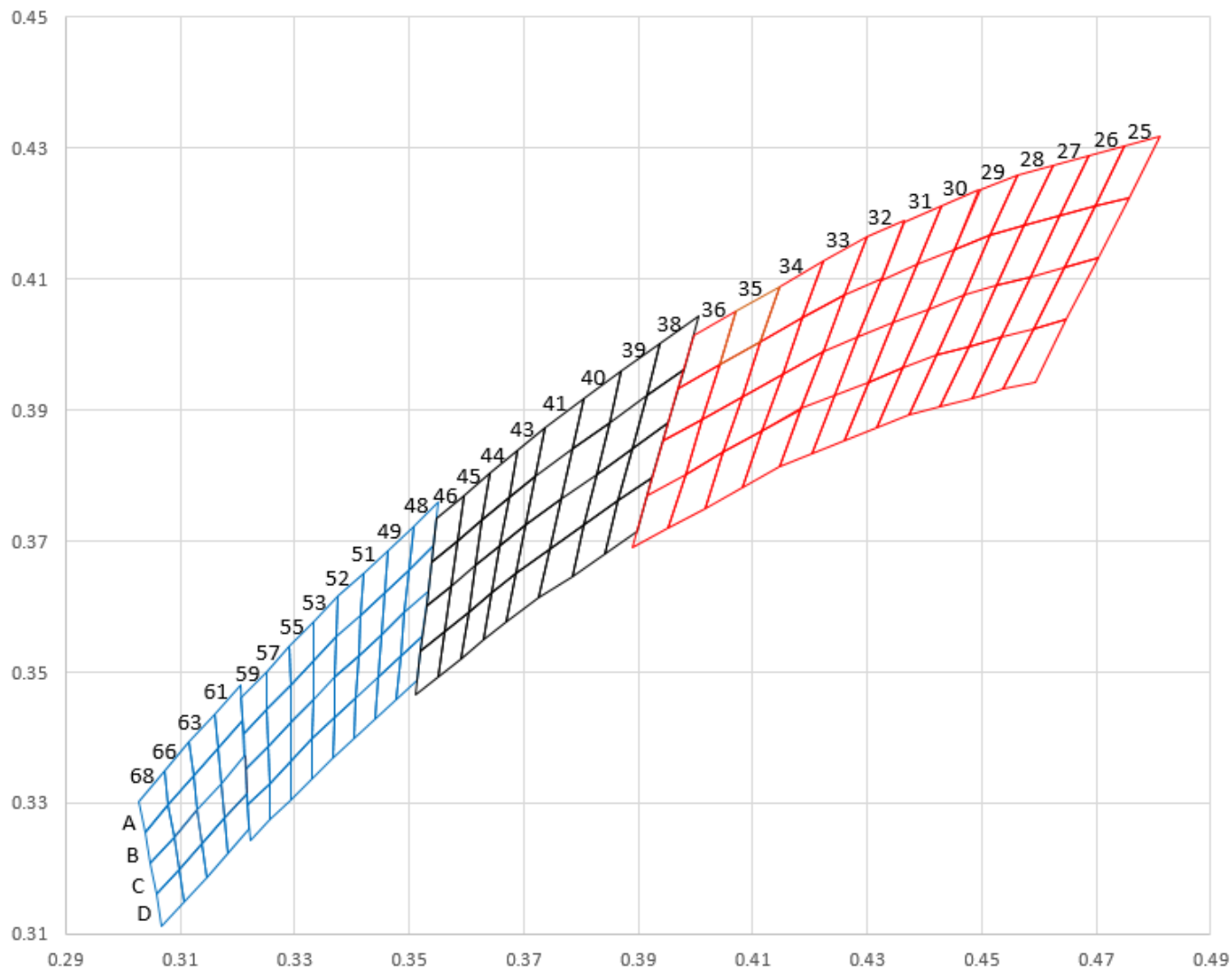
Luminous Flux Bins

Group Bin	Minimum Luminous Flux (lm)	Maximum Luminous Flux (lm)	Minimum Luminous Intensity (mcd)	Maximum Luminous Intensity (mcd)
Z1	1	3	330	990
Z3	3	5	990	1650
Z5	5	7	1650	2310
Z7	7	9	2310	2970
Z9	9	12	2970	3960
A2	12	15	3960	4950
A5	15	18	4950	5940
A8	18	21	5940	6930
B1	21	24	6930	7920
B4	24	27	7920	8910
B7	27	30	8910	9900
C0	30	35	9900	11550
C5	35	40	11550	13200
D0	40	45	13200	14850
D5	45	50	14850	16500
E0	50	55	16500	18150
E5	55	60	18150	19800

Notes:

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

Color Bin Structure



Color Bin Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
2700K	25A	0.475	0.4304	25B	0.4697	0.4211
		0.4697	0.4211		0.4644	0.4118
		0.4758	0.4225		0.4703	0.4132
		0.481	0.4319		0.4758	0.4225
	25C	0.4644	0.4118	25D	0.4591	0.4025
		0.4591	0.4025		0.4538	0.3932
		0.4648	0.4038		0.4593	0.3944
		0.4703	0.4132		0.4648	0.4038

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
2700K	26A	0.4687	0.4289	26B	0.4636	0.4197
		0.4636	0.4197		0.4585	0.4104
		0.4697	0.4211		0.4644	0.4118
		0.475	0.4304		0.4697	0.4211
	26C	0.4585	0.4104	26D	0.4534	0.4012
		0.4534	0.4012		0.4483	0.3919
		0.4591	0.4025		0.4538	0.3932
		0.4644	0.4118		0.4591	0.4025
2700K	27A	0.4625	0.4275	27B	0.4575	0.4182
		0.4575	0.4182		0.4526	0.409
		0.4636	0.4197		0.4585	0.4104
		0.4687	0.4289		0.4636	0.4197
	27C	0.4526	0.409	27D	0.4477	0.3998
		0.4477	0.3998		0.4428	0.3906
		0.4534	0.4012		0.4483	0.3919
		0.4585	0.4104		0.4534	0.4012
	28A	0.4562	0.426	28B	0.4515	0.4168
		0.4515	0.4168		0.4468	0.4077
		0.4575	0.4182		0.4526	0.409
		0.4625	0.4275		0.4575	0.4182
	28C	0.4468	0.4077	28D	0.442	0.3985
		0.442	0.3985		0.4373	0.3893
		0.4477	0.3998		0.4428	0.3906
		0.4526	0.409		0.4477	0.3998
3000K	29A	0.4496	0.4236	29B	0.4451	0.4145
		0.4451	0.4145		0.4406	0.4055
		0.4514	0.4168		0.4468	0.4077
		0.4562	0.426		0.4515	0.4168
	29C	0.4406	0.4055	29D	0.4361	0.3964
		0.4361	0.3964		0.4316	0.3873
		0.442	0.3985		0.4373	0.3893
		0.4468	0.4077		0.442	0.3985
	30A	0.443	0.4212	30B	0.4387	0.4122
		0.4387	0.4122		0.4345	0.4033
		0.4451	0.4145		0.4406	0.4055
		0.4496	0.4236		0.4451	0.4145

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
3000K	30C	0.4345	0.4033	30D	0.4302	0.3943
		0.4302	0.3943		0.4259	0.3853
		0.4361	0.3964		0.4316	0.3873
		0.4406	0.4055		0.4361	0.3964
3000K	31A	0.4364	0.4188	31B	0.4324	0.41
		0.4324	0.4099		0.4284	0.4011
		0.4387	0.4122		0.4345	0.4033
		0.443	0.4212		0.4387	0.4122
	31C	0.4284	0.4011	31D	0.4302	0.3943
		0.4243	0.3922		0.4259	0.3853
		0.4302	0.3943		0.4203	0.3834
		0.4345	0.4033		0.4243	0.3922
	32A	0.4299	0.4165	32B	0.4261	0.4077
		0.4261	0.4077		0.4223	0.399
		0.4324	0.41		0.4284	0.4011
		0.4365	0.4189		0.4324	0.41
	32C	0.4223	0.399	32D	0.4243	0.3922
		0.4185	0.3902		0.4203	0.3834
		0.4243	0.3922		0.4147	0.3814
		0.4284	0.4011		0.4185	0.3902
3500K	33A	0.4223	0.4127	33B	0.4187	0.4041
		0.4187	0.4041		0.4152	0.3955
		0.4261	0.4077		0.4223	0.399
		0.4299	0.4165		0.4261	0.4077
	33C	0.4152	0.3955	33D	0.4117	0.3869
		0.4117	0.3869		0.4082	0.3783
		0.4185	0.3902		0.4147	0.3814
		0.4223	0.399		0.4185	0.3902
	34A	0.4146	0.4089	34B	0.4114	0.4005
		0.4114	0.4005		0.4082	0.392
		0.4187	0.4041		0.4152	0.3955
		0.4223	0.4127		0.4187	0.4041
	34C	0.4082	0.392	34D	0.4049	0.3836
		0.4049	0.3836		0.4017	0.3751
		0.4117	0.3869		0.4082	0.3783
		0.4152	0.3955		0.4117	0.3869

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
3500K	35A	0.4071	0.4052	35B	0.4042	0.3969
		0.4042	0.3969		0.4012	0.3886
		0.4114	0.4005		0.4082	0.392
		0.4146	0.4089		0.4114	0.4005
	35C	0.4012	0.3886	35D	0.3983	0.3803
		0.3983	0.3803		0.3953	0.3721
		0.4049	0.3836		0.4017	0.3751
		0.4082	0.392		0.4049	0.3836
	36A	0.3996	0.4015	36B	0.3969	0.3934
		0.3969	0.3934		0.3943	0.3853
		0.4042	0.3969		0.4012	0.3886
		0.4071	0.4052		0.4042	0.3969
	36C	0.3943	0.3853	36D	0.3916	0.3771
		0.3916	0.3771		0.3889	0.369
		0.3983	0.3803		0.3953	0.3721
		0.4012	0.3886		0.3983	0.3803
4000K	38A	0.3939	0.4002	38B	0.3914	0.3922
		0.3914	0.3922		0.389	0.3842
		0.3979	0.3962		0.3952	0.388
		0.4006	0.4044		0.3979	0.3962
	38C	0.389	0.3842	38D	0.3865	0.3762
		0.3865	0.3762		0.3841	0.3682
		0.3925	0.3798		0.3898	0.3716
		0.3952	0.388		0.3925	0.3798
	39A	0.3871	0.3959	39B	0.3849	0.3881
		0.3849	0.3881		0.3828	0.3803
		0.3914	0.3922		0.389	0.3842
		0.3939	0.4002		0.3914	0.3922
	39C	0.3828	0.3803	39D	0.3806	0.3725
		0.3806	0.3725		0.3784	0.3647
		0.3865	0.3762		0.3841	0.3682
		0.389	0.3842		0.3865	0.3762
4000K	40A	0.3804	0.3917	40B	0.3784	0.3841
		0.3784	0.3841		0.3765	0.3765
		0.3849	0.3881		0.3828	0.3803
		0.3871	0.3959		0.3849	0.3881

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
4000K	40C	0.3765	0.3765	40D	0.3746	0.3689
		0.3746	0.3689		0.3727	0.3613
		0.3806	0.3725		0.3784	0.3647
		0.3828	0.3803		0.3806	0.3725
	41A	0.3736	0.3874	41B	0.3720	0.3800
		0.3720	0.3800		0.3703	0.3726
		0.3784	0.3841		0.3765	0.3765
		0.3804	0.3917		0.3784	0.3841
	41C	0.3703	0.3726	41D	0.3687	0.3652
		0.3687	0.3652		0.3670	0.3578
		0.3746	0.3689		0.3727	0.3613
		0.3765	0.3765		0.3746	0.3689
4500K	43A	0.3689	0.3839	43B	0.3674	0.3767
		0.3674	0.3767		0.3659	0.3694
		0.3720	0.3800		0.3703	0.3726
		0.3736	0.3874		0.3720	0.3800
	43C	0.3659	0.3694	43D	0.3645	0.3622
		0.3645	0.3622		0.3630	0.3550
		0.3687	0.3652		0.3670	0.3578
		0.3703	0.3726		0.3687	0.3652
	44A	0.3641	0.3804	44B	0.3628	0.3733
		0.3628	0.3733		0.3616	0.3663
		0.3674	0.3767		0.3659	0.3694
		0.3689	0.3839		0.3674	0.3767
	44C	0.3616	0.3663	44D	0.3603	0.3592
		0.3603	0.3592		0.3590	0.3521
		0.3645	0.3622		0.3630	0.3550
		0.3659	0.3694		0.3645	0.3622
4500K	45A	0.3595	0.3770	45B	0.3584	0.3701
		0.3584	0.3701		0.3573	0.3632
		0.3628	0.3733		0.3616	0.3663
		0.3641	0.3804		0.3628	0.3733
	45C	0.3573	0.3632	45D	0.3562	0.3562
		0.3562	0.3562		0.3551	0.3493
		0.3603	0.3592		0.3590	0.3521
		0.3616	0.3663		0.3603	0.3592

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
4500K	46A	0.3548	0.3736	46B	0.3539	0.3668
		0.3539	0.3668		0.3530	0.3601
		0.3584	0.3701		0.3573	0.3632
		0.3595	0.3770		0.3584	0.3701
	46C	0.3530	0.3601	46D	0.3520	0.3533
		0.3520	0.3533		0.3511	0.3465
		0.3562	0.3562		0.3551	0.3493
		0.3573	0.3632		0.3562	0.3562
5000K	48A	0.3507	0.3724	48B	0.3500	0.3657
		0.3500	0.3657		0.3492	0.3591
		0.3542	0.3692		0.3533	0.3624
		0.3551	0.3760		0.3542	0.3692
	48C	0.3492	0.3591	48D	0.3485	0.3524
		0.3485	0.3524		0.3477	0.3458
		0.3523	0.3555		0.3514	0.3487
		0.3533	0.3624		0.3523	0.3555
	49A	0.3463	0.3687	49B	0.3457	0.3622
		0.3457	0.3622		0.3452	0.3558
		0.3500	0.3657		0.3492	0.3591
		0.3507	0.3724		0.3500	0.3657
	49C	0.3452	0.3558	49D	0.3446	0.3493
		0.3446	0.3493		0.3440	0.3428
		0.3485	0.3524		0.3477	0.3458
		0.3492	0.3591		0.3485	0.3524
5000K	51A	0.3420	0.3652	51B	0.3415	0.3588
		0.3415	0.3588		0.3411	0.3525
		0.3457	0.3622		0.3452	0.3558
		0.3463	0.3687		0.3457	0.3622
	51C	0.3411	0.3525	51D	0.3407	0.3462
		0.3407	0.3462		0.3403	0.3399
		0.3446	0.3493		0.3440	0.3428
		0.3452	0.3558		0.3446	0.3493
	52A	0.3376	0.3616	52B	0.3374	0.3554
		0.3374	0.3554		0.3371	0.3493
		0.3415	0.3588		0.3411	0.3525
		0.3420	0.3652		0.3415	0.3588

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
5000K	52C	0.3371	0.3493	52D	0.3369	0.3431
		0.3369	0.3431		0.3366	0.3369
		0.3407	0.3462		0.3403	0.3399
		0.3411	0.3525		0.3407	0.3462
5700K	53A	0.3334	0.3578	53B	0.3333	0.3518
		0.3333	0.3518		0.3332	0.3458
		0.3374	0.3554		0.3371	0.3493
		0.3376	0.3616		0.3374	0.3554
	53C	0.3332	0.3458	53D	0.3331	0.3398
		0.3331	0.3398		0.3330	0.3338
		0.3369	0.3431		0.3366	0.3369
		0.3371	0.3493		0.3369	0.3431
	55A	0.3292	0.3539	55B	0.3293	0.3481
		0.3293	0.3481		0.3293	0.3423
		0.3333	0.3518		0.3332	0.3458
		0.3334	0.3578		0.3333	0.3518
	55C	0.3293	0.3423	55D	0.3294	0.3364
		0.3294	0.3364		0.3294	0.3306
		0.3331	0.3398		0.3330	0.3338
		0.3332	0.3458		0.3331	0.3398
5700K	57A	0.3250	0.3501	57B	0.3252	0.3444
		0.3252	0.3444		0.3254	0.3388
		0.3293	0.3481		0.3293	0.3423
		0.3292	0.3539		0.3293	0.3481
	57C	0.3254	0.3388	57D	0.3256	0.3331
		0.3256	0.3331		0.3258	0.3275
		0.3294	0.3364		0.3294	0.3306
		0.3293	0.3423		0.3294	0.3364
	59A	0.3207	0.3462	59B	0.3211	0.3407
		0.3211	0.3407		0.3215	0.3353
		0.3252	0.3444		0.3254	0.3388
		0.3250	0.3501		0.3252	0.3444
	59C	0.3215	0.3353	59D	0.3218	0.3298
		0.3218	0.3298		0.3222	0.3243
		0.3256	0.3331		0.3258	0.3275
		0.3254	0.3388		0.3256	0.3331

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
6500K	61A	0.3160	0.3437	61B	0.3166	0.3384
		0.3166	0.3384		0.3172	0.3331
		0.3209	0.3426		0.3213	0.3371
		0.3205	0.3481		0.3209	0.3426
	61C	0.3172	0.3331	61D	0.3178	0.3277
		0.3178	0.3277		0.3184	0.3224
		0.3217	0.3316		0.3221	0.3261
		0.3213	0.3371		0.3217	0.3316
	63A	0.3115	0.3393	63B	0.3123	0.3342
		0.3123	0.3342		0.3131	0.3290
		0.3166	0.3384		0.3172	0.3331
		0.3160	0.3437		0.3166	0.3384
	63C	0.3131	0.3290	63D	0.3138	0.3239
		0.3138	0.3239		0.3146	0.3187
		0.3178	0.3277		0.3184	0.3224
		0.3172	0.3331		0.3178	0.3277
6500K	66A	0.3072	0.3349	66B	0.3080	0.3299
		0.3080	0.3299		0.3089	0.3249
		0.3123	0.3342		0.3131	0.3290
		0.3115	0.3393		0.3123	0.3342
	66C	0.3089	0.3249	66D	0.3098	0.3200
		0.3098	0.3200		0.3107	0.3150
		0.3138	0.3239		0.3146	0.3187
		0.3131	0.3290		0.3138	0.3239
	68A	0.3028	0.3304	68B	0.3038	0.3256
		0.3038	0.3256		0.3048	0.3209
		0.3080	0.3299		0.3089	0.3249
		0.3072	0.3349		0.3080	0.3299
	68C	0.3048	0.3209	68D	0.3058	0.3161
		0.3058	0.3161		0.3068	0.3113
		0.3098	0.3200		0.3107	0.3150
		0.3089	0.3249		0.3098	0.3200

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 $I_F = 100mA$ operation.

5. Part Number

67-117D-G81000H-AM

Part number is designated with below details.

67-117D = Product family name.

G = Color ^[1]

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

100 = Test current [mA]

0 = Lead Frame Type (0=Ag ; 1=Au ; 2=MLP)

H = Chip Code

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
G	General White

6. Ordering Information

67-117D-G81000H-**ABCDEFGHJKLMNO-PQ-AM**

Part Number of the 67-117D	Order Code
67-117D-G81000H-AM	67-117D-G81000H-ABCDEFGHJKLMNO-PQ-AM

Order code contains information with below details :

ABCDEF = min/max wavelength or CCT

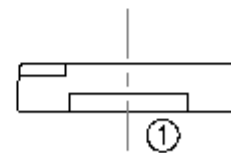
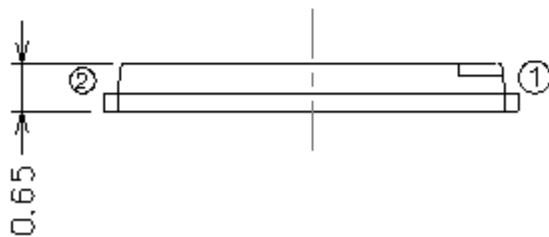
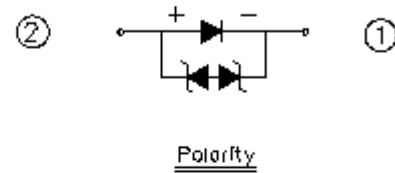
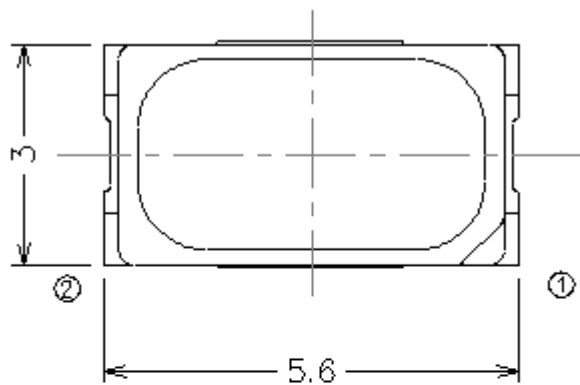
GHJK = min./max. luminous flux in [lm] or luminous intensity in [mcd]

LMNO = min./max. forward voltage

PQ = internal code

AM = Automotive Application

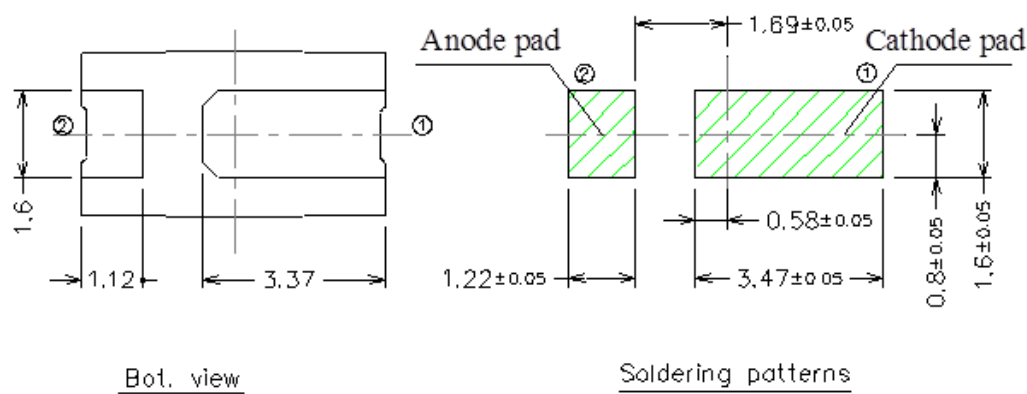
7. Mechanical Dimension



Notes:

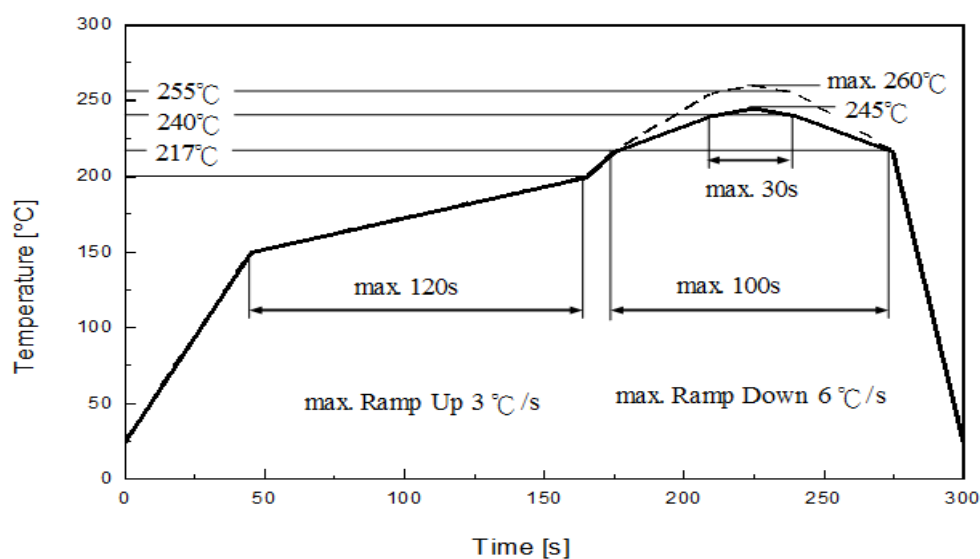
1. Dimensions are in millimeters.
2. Tolerances unless mentioned are $\pm 0.1\text{mm}$.

8. Recommended Soldering Pad



9. Reflow Soldering Profile

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



Profile Feature	Pb-Free Assembly	Unit
	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

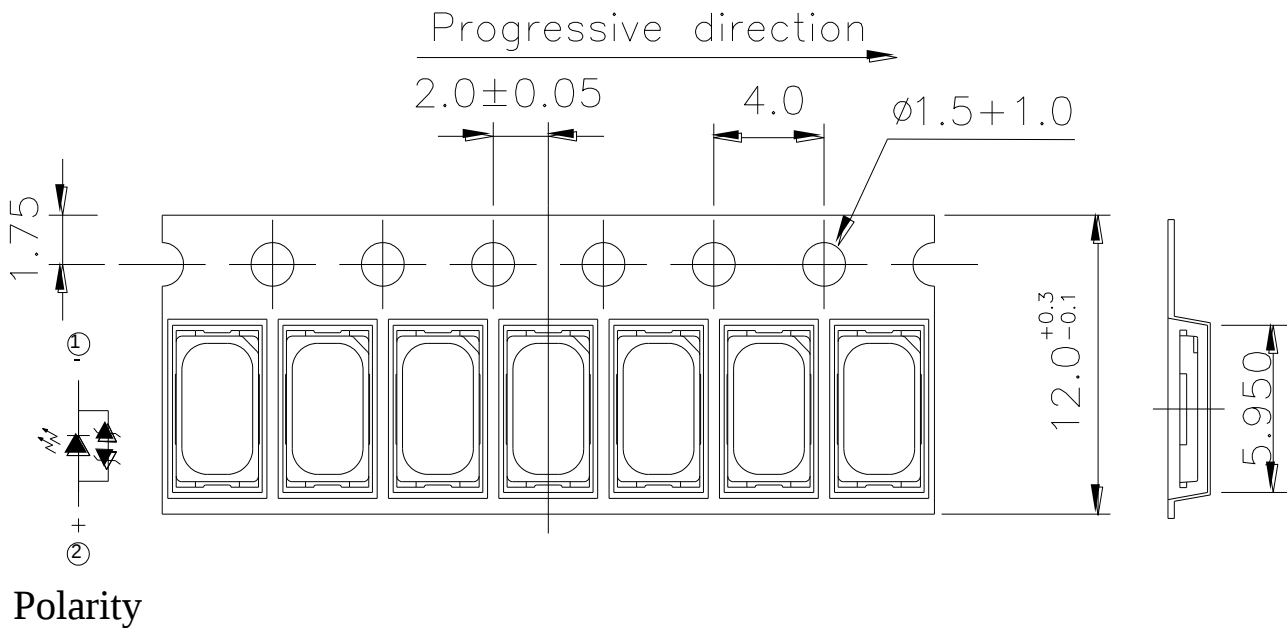
10. Packaging Information

• 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

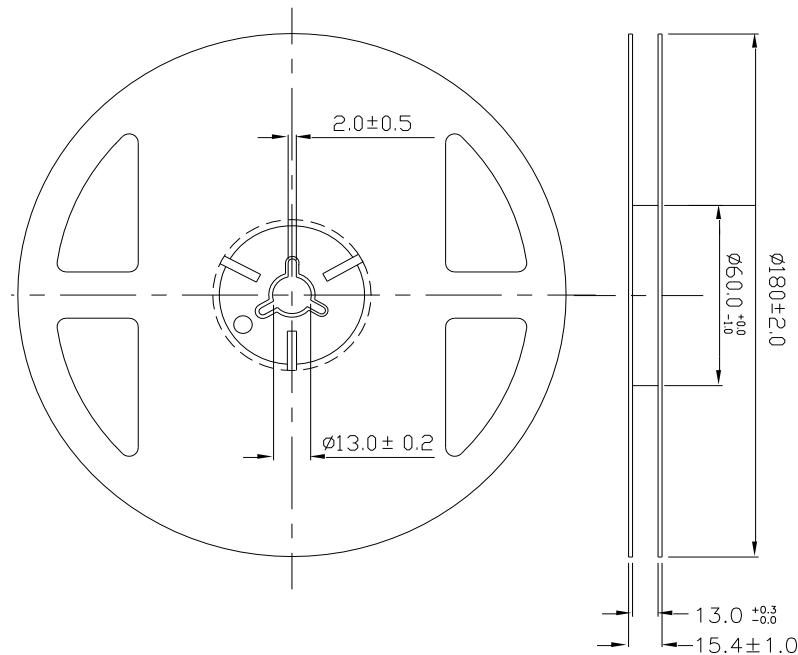
• Packing: Loaded Quantity 2000 pcs Per Reel



Notes:

1. Dimensions are in millimeters.

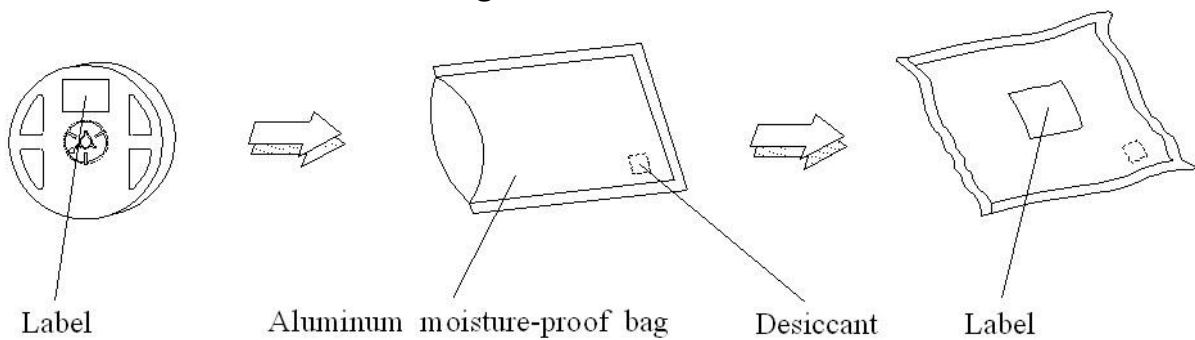
- **Reel Dimensions**



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°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.

