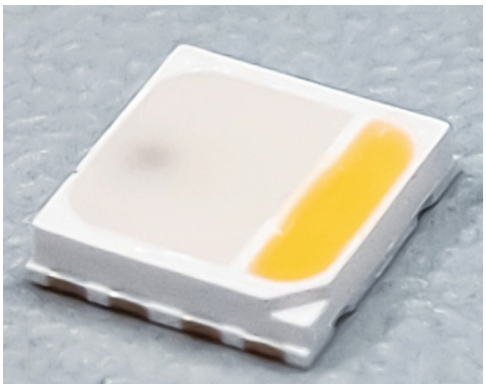
CLQ6B-TKW: PLCC8 4-in-1 RGBW SMD LEDs



PRODUCT DESCRIPTION

These SMD LEDs are packaged in an industry standard PLCC8 package. These high performance 4 color SMT LEDs are designed to work in a wide range of applications. A wide viewing angle and high brightness make these LEDs suitable for signage applications.

FEATURES

- Size (mm): 5.0 x 5.2 x 1.1
- Dominant Wavelength/CCT
  Red (619 - 624nm)
  Green (520 - 535nm)
  Blue (460 - 475nm)
  White(3000K/4000K/5000K/5700K)
- Lead - Free
- RoHS Compliant

APPLICATIONS

- Architecture Lighting
- Decorative Lighting
- Amusement

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / www.cree-led.com

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Items	Symbol	Absolute Maximum Rating				Unit
		R	G	B	W	
Forward Current Note 1	I_F	200	180	180	200	mA
Peak Forward Current Note 2	I_{FP}	500	400	400	500	mA
Reverse Voltage	V_R	5	5	5	5	V
Power Dissipation	P_D	520	684	684	720	mW
Operation Temperature	T_{opr}	-40 ~ +85				°C
Storage Temperature	T_{stg}	-40 ~ +100				°C
Junction Temperature	T_J	110	110	110	110	°C
Junction/ambient	R_{THJA}	60	110	70	80	°C/W
Junction/solder point	R_{THJS}	20	70	40	40	°C/W
Electrostatic Discharge Classification(MIL-STD-883E)	ESD	1000 V				

Note:

1. Single color light
2. Pulse width ≤0.1 msec, duty ≤1/10.

TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS (T_A = 25°C)

Characteristics	Condition	Symbol	Values				Unit
			R	G	B	W	
Dominant Wavelength	I_F = 100 mA(R) I_F = 100 mA(G) I_F = 100 mA(B) I_F = 100 mA(W)	λ_{DOM}	619~624	520~535	460~475	NA	nm
Spectral bandwidth at 50% I_{REL} max	I_F = 100 mA(R) I_F = 100 mA(G) I_F = 100 mA(B) I_F = 100 mA(W)	Δ λ	24	38	28	NA	nm
Forward Voltage	I_F = 100 mA(R) I_F = 100 mA(G) I_F = 100 mA(B) I_F = 100 mA(W)	$V_{F(avg)}$	2.1	3.0	3.1	2.9	V
		$V_{F(max)}$	2.5	3.7	3.5	3.5	V
Luminous Intensity	I_F = 100 mA(R) I_F = 100 mA(G) I_F = 100 mA(B) I_F = 100 mA(W)	$I_{V(min)}$	3000	7030	1824	10100	mcd
		$I_{V(avg)}$	4700	12000	3400	15000	mcd
Luminous Flux(Reference)	I_F = 100 mA(R) I_F = 100 mA(G) I_F = 100 mA(B) I_F = 100 mA(W)	$\Phi_{V(avg)}$	14.5	32.5	9.5	43	lm
Reverse Current (max)	V_R = 5 V	I_R	100	100	100	100	μA

* Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT

Red (100 mA)			Green (100 mA)			Blue (100 mA)			White (100 mA)		
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
1L	3000	4180	1R	7030	10100	1H	1824	2560	1T	10100	14400
1M	3590	5020	1S	8200	12000	1J	2130	3000	1U	12000	16800
1N	4180	5860	1T	10100	14400	1K	2560	3590	1V	14400	20160
						1L	3000	4180			

* Tolerance of measurement of luminous intensity is ±10%

COLOR BIN LIMIT

Red (100 mA)			Green (100 mA)			Blue (100 mA)		
Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)
RB	619	624	G7	520	525	B3	460	465
			G23	522.5	527.5	B23	462.5	467.5
			G8	525	530	B4	465	470
			G45	527.5	532.5	B45	467.5	472.5
			G9	530	535	B5	470	475

* Tolerance of measurement of dominant wavelength is ±1 nm.

CRI BIN LIMIT

White (100 mA)		
Bin Code	CRI Min.	CRI Max.
D	75	80
H	80	85
J	85	90

* Tolerance of measurement of CRI is ±2.

COLOR BIN LIMIT

White (100 mA)

- Tolerance of measurement of the color coordinates is ±0.01.

Bin Code	Sub-bins	x	y
XA	A11	0.3146	0.3172
		0.3201	0.3222
		0.3211	0.3106
		0.3161	0.3059
	A12	0.3130	0.3284
		0.3190	0.3339
		0.3201	0.3222
		0.3146	0.3172
	A13	0.3190	0.3339
		0.3251	0.3394
		0.3256	0.3273
		0.3201	0.3222
	A14	0.3201	0.3222
		0.3256	0.3273
		0.3261	0.3152
		0.3211	0.3106
	A21	0.3115	0.3397
		0.3180	0.3456
		0.3190	0.3339
		0.3130	0.3284
	A22	0.3099	0.3509
		0.3170	0.3572
		0.3180	0.3456
		0.3115	0.3397
	A23	0.3170	0.3572
		0.3240	0.3636
		0.3245	0.3515
		0.3180	0.3456
	A24	0.3180	0.3456
		0.3245	0.3515
		0.3251	0.3394
		0.3190	0.3339

Bin Code	Sub-bins	x	y
XA	A31	0.3245	0.3515
		0.3311	0.3574
		0.3311	0.3449
		0.3251	0.3394
	A32	0.3240	0.3636
		0.3311	0.3699
		0.3311	0.3574
		0.3245	0.3515
	A33	0.3311	0.3699
		0.3381	0.3762
		0.3376	0.3633
		0.3311	0.3574
	A34	0.3311	0.3574
		0.3376	0.3633
		0.3371	0.3504
		0.3311	0.3449
	A41	0.3256	0.3273
		0.3311	0.3324
		0.3311	0.3199
		0.3261	0.3152
	A42	0.3251	0.3394
		0.3311	0.3449
		0.3311	0.3324
		0.3256	0.3273
	A43	0.3311	0.3449
		0.3371	0.3504
		0.3366	0.3374
		0.3311	0.3324
	A44	0.3311	0.3324
		0.3366	0.3374
		0.3361	0.3245
		0.3311	0.3199

Bin Code	Sub-bins	x	y
XD	D11	0.3371	0.3504
		0.3433	0.3546
		0.3423	0.3413
		0.3366	0.3374
	D12	0.3376	0.3633
		0.3443	0.3678
		0.3433	0.3546
		0.3371	0.3504
	D13	0.3443	0.3678
		0.3509	0.3724
		0.3494	0.3588
		0.3433	0.3546
	D14	0.3433	0.3546
		0.3494	0.3588
		0.3479	0.3453
		0.3423	0.3413
	D21	0.3381	0.3762
		0.3453	0.3811
		0.3443	0.3678
		0.3376	0.3633
	D22	0.3386	0.3891
		0.3463	0.3944
		0.3453	0.3811
		0.3381	0.3762
	D23	0.3463	0.3944
		0.3541	0.3996
		0.3525	0.3860
		0.3453	0.3811
	D24	0.3453	0.3811
		0.3525	0.3860
		0.3509	0.3724
		0.3443	0.3678

Bin Code	Sub-bins	x	y
XD	D31	0.3525	0.3860
		0.3596	0.3908
		0.3576	0.3769
		0.3509	0.3724
	D32	0.3541	0.3996
		0.3616	0.4047
		0.3596	0.3908
		0.3525	0.3860
	D33	0.3616	0.4047
		0.3693	0.4099
		0.3668	0.3957
		0.3596	0.3908
	D34	0.3596	0.3908
		0.3668	0.3957
		0.3643	0.3815
		0.3576	0.3769
	D41	0.3494	0.3588
		0.3556	0.3631
		0.3536	0.3492
		0.3479	0.3453
	D42	0.3509	0.3724
		0.3576	0.3769
		0.3556	0.3631
		0.3494	0.3588
	D43	0.3576	0.3769
		0.3643	0.3815
		0.3618	0.3673
		0.3556	0.3631
	D44	0.3556	0.3631
		0.3618	0.3673
		0.3592	0.3531
		0.3536	0.3492

COLOR BIN LIMIT

White (100 mA)

- Tolerance of measurement of the color coordinates is ±0.01.

Bin Code	Sub-bins	x	y
SB	4C3	0.3663	0.3758
		0.3680	0.3833
		0.3736	0.3874
		0.3719	0.3797
	4C4	0.3646	0.368
		0.3663	0.3758
		0.3719	0.3797
		0.3702	0.3722
	4D3	0.3630	0.3611
		0.3646	0.368
		0.3702	0.3722
		0.3686	0.3649
	4D4	0.3614	0.3539
		0.3630	0.3611
		0.3686	0.3649
		0.3670	0.3578
	4T4	0.3680	0.3833
		0.3698	0.3915
		0.3754	0.3954
		0.3736	0.3874
	5S1	0.3736	0.3874
		0.3754	0.3954
		0.3820	0.3997
		0.3802	0.3916
	5S4	0.3802	0.3916
		0.3820	0.3997
		0.3894	0.4044
		0.3871	0.3959
	5T1	0.3871	0.3959
		0.3894	0.4044
		0.3962	0.4086
		0.3937	0.4001
	5T4	0.3937	0.4001
		0.3962	0.4086
		0.4035	0.4133
		0.4006	0.4044

Bin Code	Sub-bins	x	y
SB	5A1	0.3670	0.3578
		0.3686	0.3649
		0.3744	0.3685
		0.3726	0.3612
	5A2	0.3686	0.3649
		0.3702	0.3722
		0.3763	0.3760
		0.3744	0.3685
	5A3	0.3744	0.3685
		0.3763	0.3760
		0.3825	0.3798
		0.3804	0.3721
	5A4	0.3726	0.3612
		0.3744	0.3685
		0.3804	0.3721
		0.3783	0.3646
	5B1	0.3702	0.3722
		0.3719	0.3797
		0.3782	0.3837
		0.3763	0.3760
	5B2	0.3719	0.3797
		0.3736	0.3874
		0.3802	0.3916
		0.3782	0.3837
	5B3	0.3782	0.3837
		0.3802	0.3916
		0.3869	0.3958
		0.3847	0.3877
	5B4	0.3763	0.3760
		0.3782	0.3837
		0.3847	0.3877
		0.3825	0.3798

Bin Code	Sub-bins	x	y
SB	5C1	0.3825	0.3798
		0.3847	0.3877
		0.3912	0.3917
		0.3887	0.3836
	5C2	0.3847	0.3877
		0.3869	0.3958
		0.3937	0.4001
		0.3912	0.3917
	5C3	0.3912	0.3917
		0.3937	0.4001
		0.4006	0.4044
		0.3978	0.3958
	5C4	0.3887	0.3836
		0.3912	0.3917
		0.3978	0.3958
		0.3950	0.3875
	5D1	0.3783	0.3646
		0.3804	0.3721
		0.3863	0.3758
		0.3840	0.3681
	5D2	0.3804	0.3721
		0.3825	0.3798
		0.3887	0.3836
		0.3863	0.3758
	5D3	0.3863	0.3758
		0.3887	0.3836
		0.3950	0.3875
		0.3924	0.3794
	5D4	0.3840	0.3681
		0.3863	0.3758
		0.3924	0.3794
		0.3898	0.3716

COLOR BIN LIMIT

White (100 mA)

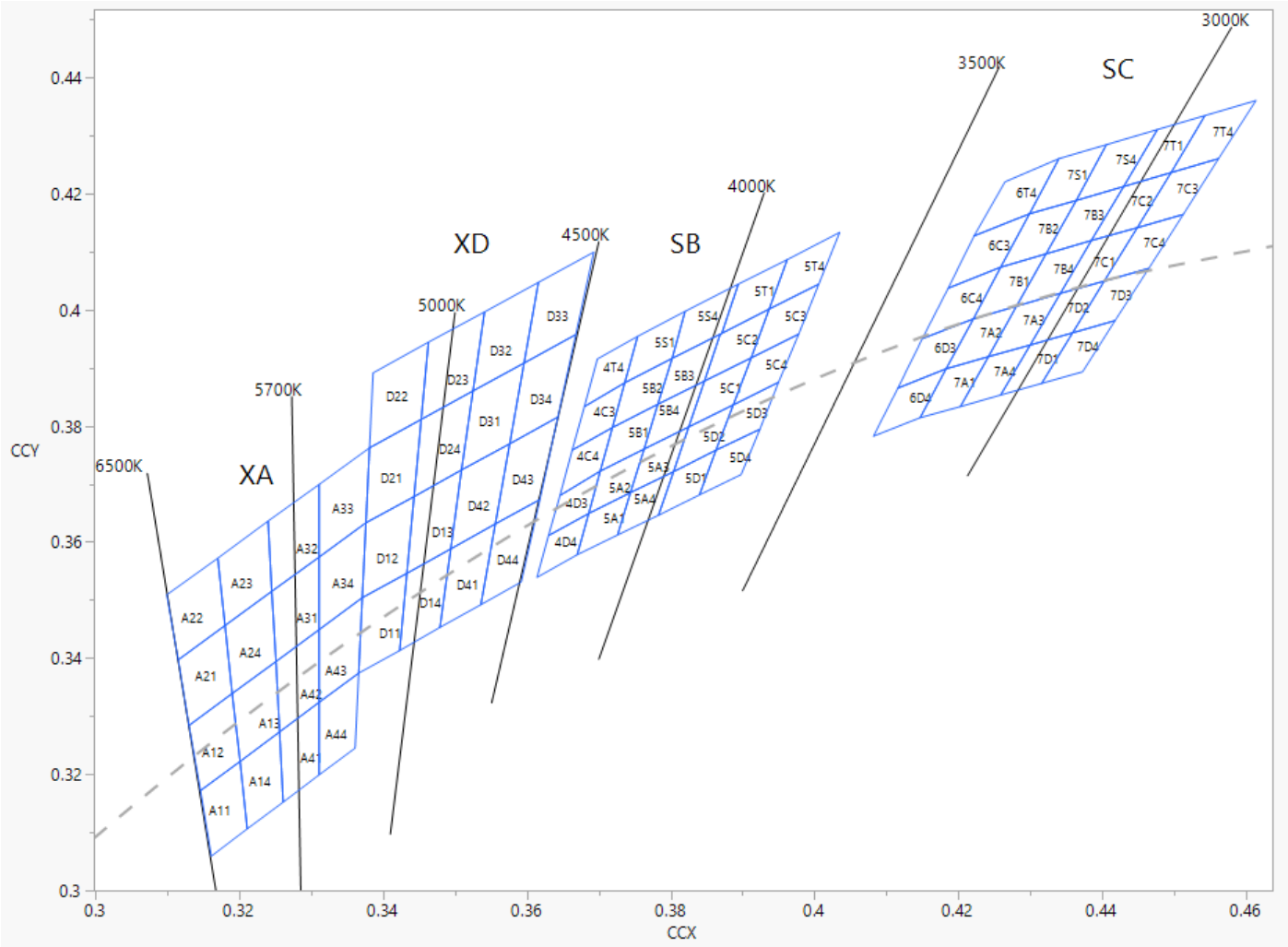
- Tolerance of measurement of the color coordinates is ±0.01.

Bin Code	Sub-bins	x	y
SC	6C3	0.4186	0.4037
		0.4222	0.4127
		0.4299	0.4165
		0.4259	0.4073
	6C4	0.4150	0.3950
		0.4186	0.4037
		0.4259	0.4073
		0.4221	0.3984
	6D3	0.4116	0.3865
		0.4150	0.3950
		0.4221	0.3984
		0.4183	0.3898
	6D4	0.4082	0.3782
		0.4116	0.3865
		0.4183	0.3898
		0.4147	0.3814
	6T4	0.4222	0.4127
		0.4265	0.4220
		0.4340	0.4260
		0.4299	0.4165
	7S1	0.4299	0.4165
		0.4340	0.4260
		0.4406	0.4284
		0.4364	0.4188
	7S4	0.4364	0.4188
		0.4406	0.4284
		0.4477	0.4310
		0.4430	0.4212
	7T1	0.4430	0.4212
		0.4477	0.4310
		0.4543	0.4334
		0.4496	0.4236
	7T4	0.4496	0.4236
		0.4543	0.4334
		0.4614	0.4360
		0.4562	0.4260

Bin Code	Sub-bins	x	y
SC	7A1	0.4147	0.3814
		0.4183	0.3898
		0.4242	0.3919
		0.4203	0.3833
	7A2	0.4183	0.3898
		0.4221	0.3984
		0.4281	0.4006
		0.4242	0.3919
	7A3	0.4242	0.3919
		0.4281	0.4006
		0.4342	0.4028
		0.4300	0.3939
	7A4	0.4203	0.3833
		0.4242	0.3919
		0.4300	0.3939
		0.4259	0.3853
	7B1	0.4221	0.3984
		0.4259	0.4073
		0.4322	0.4096
		0.4281	0.4006
	7B2	0.4259	0.4073
		0.4299	0.4165
		0.4364	0.4188
		0.4322	0.4096
	7B3	0.4322	0.4096
		0.4364	0.4188
		0.4430	0.4212
		0.4385	0.4119
	7B4	0.4281	0.4006
		0.4322	0.4096
		0.4385	0.4119
		0.4342	0.4028

Bin Code	Sub-bins	x	y
SC	7C1	0.4342	0.4028
		0.4385	0.4119
		0.4449	0.4141
		0.4403	0.4049
	7C2	0.4385	0.4119
		0.4430	0.4212
		0.4496	0.4236
		0.4449	0.4141
	7C3	0.4449	0.4141
		0.4496	0.4236
		0.4562	0.4260
		0.4513	0.4164
	7C4	0.4403	0.4049
		0.4449	0.4141
		0.4513	0.4164
		0.4465	0.4071
	7D1	0.4259	0.3853
		0.4300	0.3939
		0.4359	0.3960
		0.4316	0.3873
	7D2	0.4300	0.3939
		0.4342	0.4028
		0.4403	0.4049
		0.4359	0.3960
	7D3	0.4359	0.3960
		0.4403	0.4049
		0.4465	0.4071
		0.4418	0.3981
	7D4	0.4316	0.3873
		0.4359	0.3960
		0.4418	0.3981
		0.4373	0.3893

CIE CHROMATICITY DIAGRAM



ORDER CODE TABLE

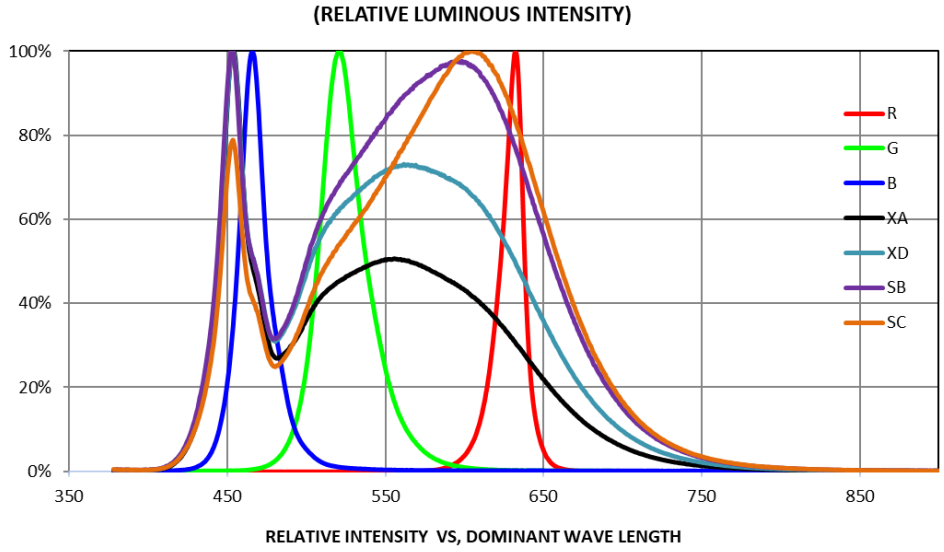
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max. (nm)	
CLQ6B-TKW-S1L1R1H1TBB7935AA3	Red	Any 1 Intensity bin from 1L(3000) - 1N(5860)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 1R(7030) - 1T(14400)		Any 1 hue bin from G7(520) - G9(535)				Reel
	Blue	Any 1 Intensity bin from 1H(1824) - 1L(4180)		Any 1 hue bin from B3(460) - B5(475)				Reel
	White	Any 1 Intensity bin from 1T(10100) - 1V(20160)		XA				Reel
CLQ6B-TKW-S1L1R1H1TBB7935BB3	Red	Any 1 Intensity bin from 1L(3000) - 1N(5860)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 1R(7030) - 1T(14400)		Any 1 hue bin from G7(520) - G9(535)				Reel
	Blue	Any 1 Intensity bin from 1H(1824) - 1L(4180)		Any 1 hue bin from B3(460) - B5(475)				Reel
	White	Any 1 Intensity bin from 1T(10100) - 1V(20160)		SB				Reel
CLQ6B-TKW-S1L1R1H1TBB7935CC3	Red	Any 1 Intensity bin from 1L(3000) -1N(5860)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 1R(7030)-1T(14400)		Any 1 hue bin from G7(520) - G9(535)				Reel
	Blue	Any 1 Intensity bin from 1H(1824) -1L(4180)		Any 1 hue bin from B3(460) - B5(475)				Reel
	White	Any 1 Intensity bin from 1T(10100) - 1V(20160)		SC				Reel
CLQ6B-TKW-S1L1R1H1TBB7935DD3	Red	Any 1 Intensity bin from 1L(3000) - 1N(5860)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 1R(7030) - 1T(14400)		Any 1 hue bin from G7(520) - G9(535)				Reel
	Blue	Any 1 Intensity bin from 1H(1824) - 1L(4180)		Any 1 hue bin from B3(460) - B5(475)				Reel
	White	Any 1 Intensity bin from 1T(10100) - 1V(20160)		XD				Reel

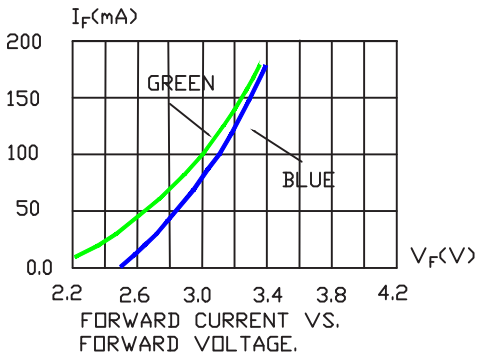
Notes:

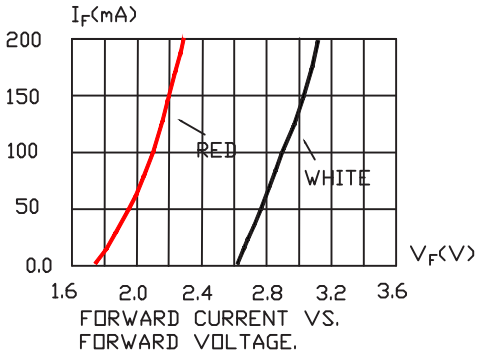
- The above kit numbers represent the order codes which include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each reel. Single intensity-bin code and single color-bin code will be orderable in certain quantities. For example, any 1 intensity bin from 1R - 1T means only 1 intensity bin(1R or 1S or 1T) will be shipped by Cree LED. For example, any 1 color bin from G7 - G9 means only 1 color bin (G7 or G23 or G8 or G45 or G9) will be shipped by Cree LED.
- Please refer to the HB LED Lamp Reliability Test Standards document for reliability test conditions.
- Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.

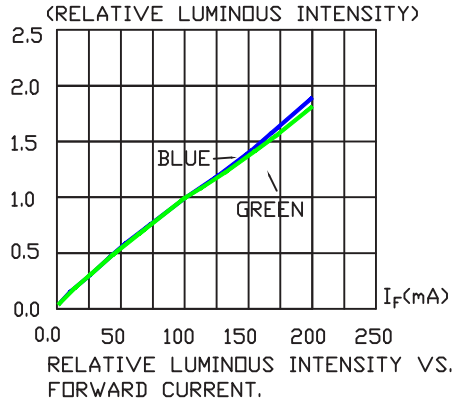
GRAPHS

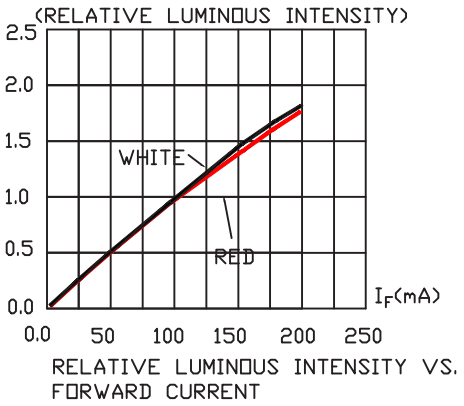
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.





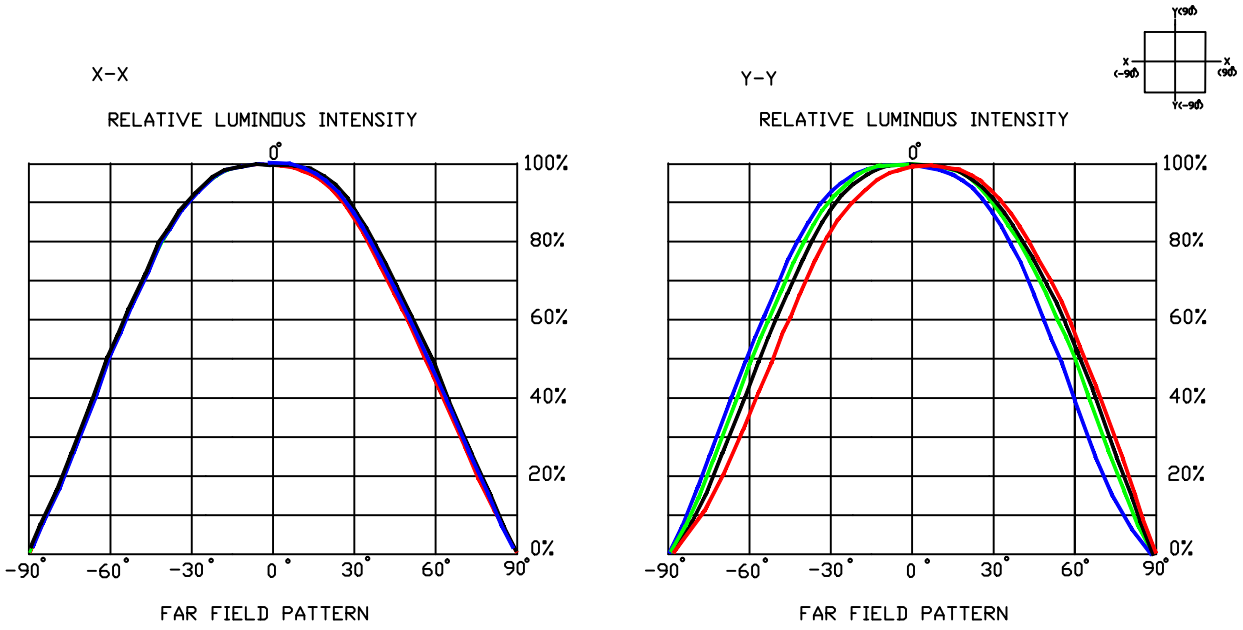


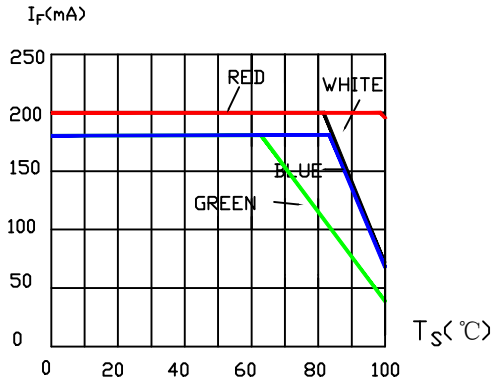




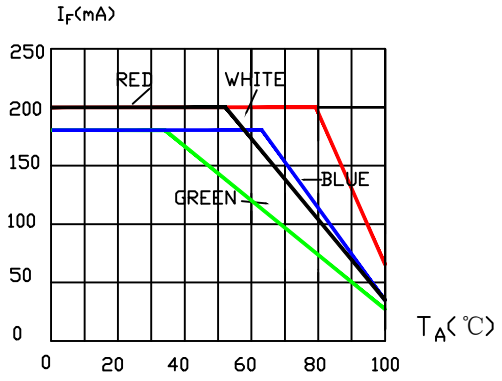
GRAPHS

The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.





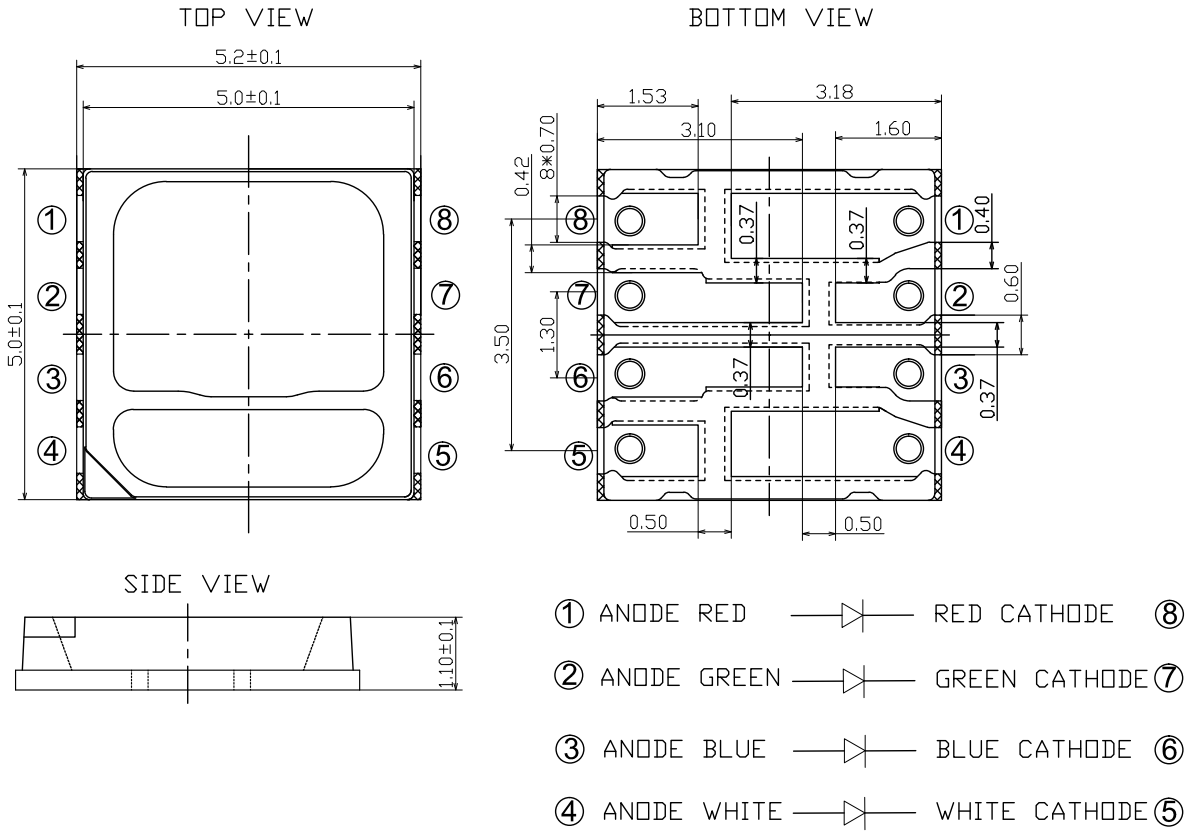
MAXIMUM FORWARD DC CURRENT
VS, SOLDER POINT TEMPERATURE.



MAXIMUM FORWARD DC CURRENT
VS, AMBIENT TEMPERATURE.

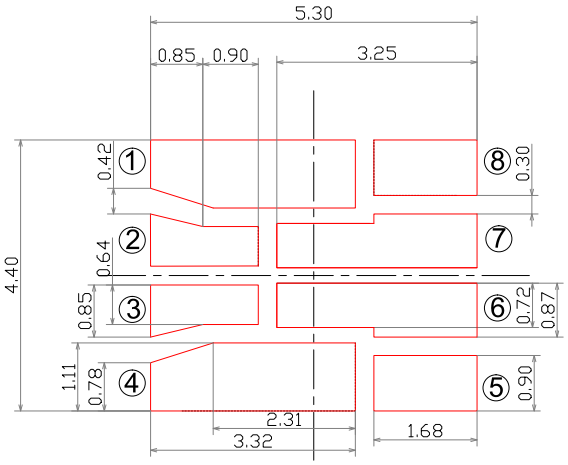
MECHANICAL DIMENSIONS

All dimensions are in mm. Tolerance of measurement of the dimension is ±0.1.



RECOMMENDED SOLDER PAD DIMENSIONS

All dimensions are in mm. Tolerance of measurement of the dimension is ±0.1.



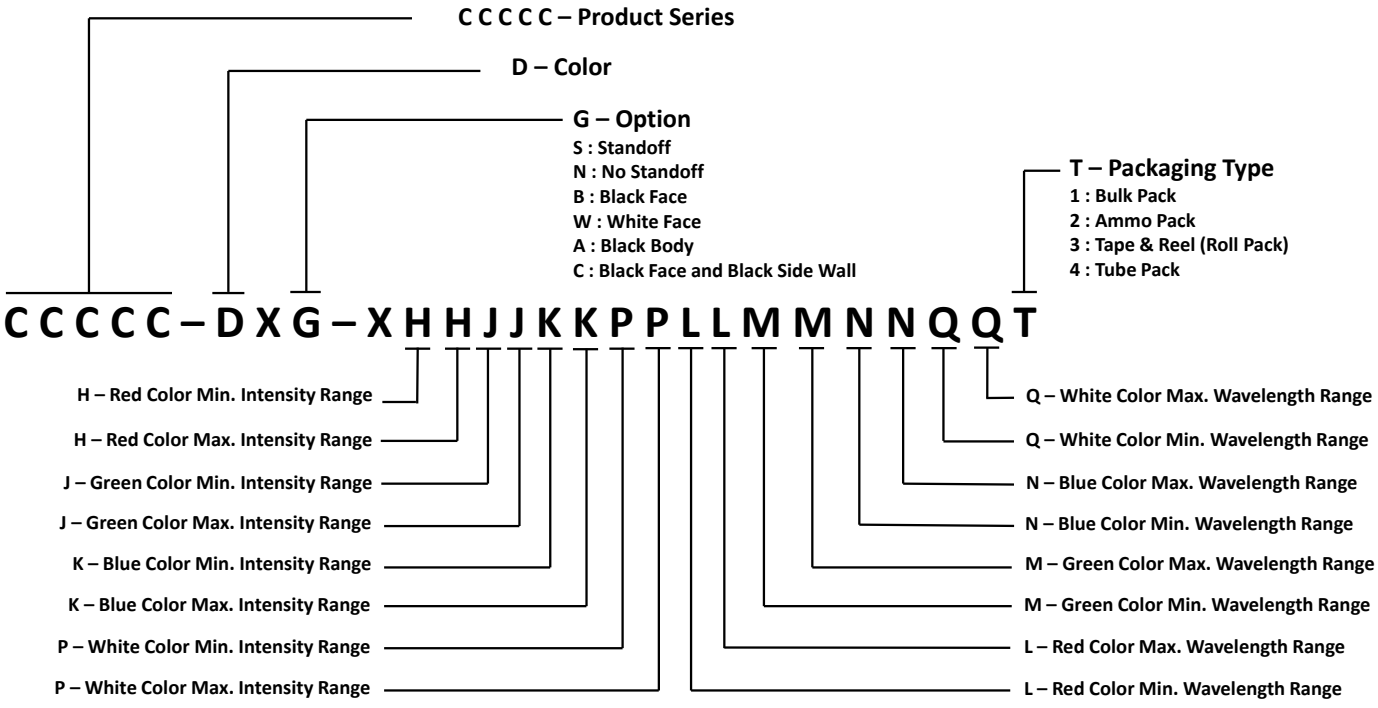
Assembly Notes

- Modification of an SMD LED is not recommended after soldering. If modification cannot be avoided, the modifications must be pre-qualified to avoid damaging the SMD LED.
- Reflow soldering should not be done more than two times (according to model's MSL requirements).
- No stress should be exerted on the package during soldering.
- The package may be affected by environments & assemblies which contain corrosive substance. Please avoid conditions which may cause the LEDs to corrode tarnish or discolor.
- The PCB should not be wrapped after soldering to allow natural cooling down to 40°C.

KIT NUMBER SYSTEM

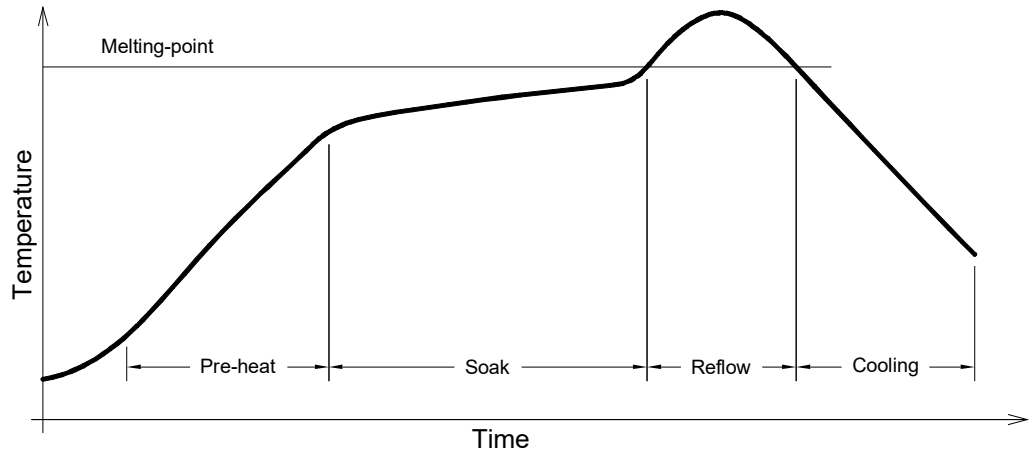
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness. Sorted LEDs are packaged for shipping in various convenient options.

Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:



REFLOW SOLDERING

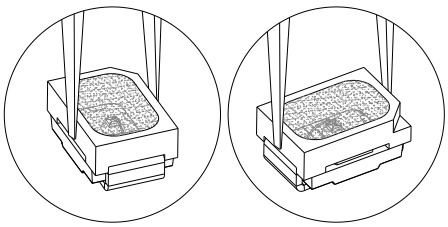
- The CLQ6B-TKW is rated as a MSL 5a product.
- The recommended floor life out of bag is 24hrs.
- The temperature profile is as below.



Use only with CLQ6B-TKW

Solder
Average ramp-up rate = 4 ºC/second max.
Soak temperature = 150ºC-200ºC
Soak time = 120 seconds max.
Duration above 217 ºC = 60 seconds max.
Peak temperature = 250ºC max
Time within 5 ºC of peak temperature = 10 seconds max.
Ramp-down rate = 6 ºC/second max.

- The packaging sizes of these SMD products are very small and the resin is still soft after solidification. Users are required to handle with care. Never touch the resin surface of SMD products.
- To avoid damaging the product's surface and interior device, it is recommended to choose a special nozzle to pick up the SMD products during the process of SMT production. If handling is necessary, take special care when picking up these products. The following method is necessary:
- Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.



PACKAGING

- The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags.
- Cardboard boxes will be used to protect the LEDs from mechanical shock during transportation.
- The boxes are not water resistant, and they must be kept away from water and moisture.
- The reel pack is applied in SMD LED.
- Max 4000 pcs per reel.