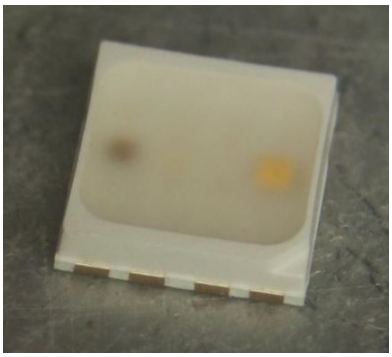
CLQ6A-TKW: PLCC8 4 in 1 SMD LED



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.

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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)
- Luminous Intensity (mcd)
  Red (3000 - 5860)
  Green (7030 - 14400)
  Blue (1824 - 4180)
  White (5860 - 12000)
- Moisture Sensitivity Level: 5a
- Lead-Free
- RoHS Compliant

APPLICATIONS

- Architecture Lighting
- Decorative Lighting
- Amusement

Cree LED / 4400 Silicon Drive / Durham, NC 27703 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	1000V				

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
		$V_{F(max)}$	2.6	3.8	3.8	3.6	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	5860	mcd
		$I_{V(avg)}$	4500	10400	3000	8200	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	30	8.2	25	lm
Reverse Current (max)	V_R = 5 V	I_R	10	10	10	10	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	1Q	5860	8200
1M	3590	5020	1S	8200	12000	1J	2130	3000	1R	7030	10100
1N	4180	5860	1T	10100	14400	1K	2560	3590	1S	8200	12000
						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.
Z	60	65
A	65	70
C	70	75
D	75	80
H	80	85
J	85	90

* Tolerance of measurement of CRI is ±2.

PERFORMANCE GROUPS - CHROMATICITY

Region	x	y	Region	x	y	Region	x	y	Region	x	y
A11	0.3146	0.3172	A12	0.3130	0.3284	A13	0.3190	0.3339	A14	0.3201	0.3222
	0.3201	0.3222		0.3190	0.3339		0.3251	0.3394		0.3256	0.3273
	0.3211	0.3106		0.3201	0.3222		0.3256	0.3273		0.3261	0.3152
	0.3161	0.3059		0.3146	0.3172		0.3201	0.3222		0.3211	0.3106
A21	0.3115	0.3397	A22	0.3099	0.3509	A23	0.3170	0.3572	A24	0.3180	0.3456
	0.3180	0.3456		0.3170	0.3572		0.3240	0.3636		0.3245	0.3515
	0.3190	0.3339		0.3180	0.3456		0.3245	0.3515		0.3251	0.3394
	0.3130	0.3284		0.3115	0.3397		0.3180	0.3456		0.3190	0.3339
A31	0.3245	0.3515	A32	0.3240	0.3636	A33	0.3311	0.3699	A34	0.3311	0.3574
	0.3311	0.3574		0.3311	0.3699		0.3381	0.3762		0.3376	0.3633
	0.3311	0.3449		0.3311	0.3574		0.3376	0.3633		0.3371	0.3504
	0.3251	0.3394		0.3245	0.3515		0.3311	0.3574		0.3311	0.3449
A41	0.3256	0.3273	A42	0.3251	0.3394	A43	0.3311	0.3449	A44	0.3311	0.3324
	0.3311	0.3324		0.3311	0.3449		0.3371	0.3504		0.3366	0.3374
	0.3311	0.3199		0.3311	0.3324		0.3366	0.3374		0.3361	0.3245
	0.3261	0.3152		0.3256	0.3273		0.3311	0.3324		0.3311	0.3199
4C3	0.3663	0.3758	4C4	0.3646	0.3680	4D3	0.3630	0.3611	4D4	0.3614	0.3539
	0.3680	0.3833		0.3663	0.3758		0.3646	0.3680		0.3630	0.3611
	0.3736	0.3874		0.3719	0.3797		0.3702	0.3722		0.3686	0.3649
	0.3719	0.3797		0.3702	0.3722		0.3686	0.3649		0.3670	0.3578
4T4	0.3680	0.3833	5S1	0.3736	0.3874	5S4	0.3802	0.3916	5T1	0.3871	0.3959
	0.3698	0.3915		0.3754	0.3954		0.3820	0.3997		0.3894	0.4044
	0.3754	0.3954		0.3820	0.3997		0.3894	0.4044		0.3962	0.4086
	0.3736	0.3874		0.3802	0.3916		0.3871	0.3959		0.3937	0.4001
5T4	0.3937	0.4001	5A1	0.3670	0.3578	5A2	0.3686	0.3649	5A3	0.3744	0.3685
	0.3962	0.4086		0.3686	0.3649		0.3702	0.3722		0.3763	0.3760
	0.4035	0.4133		0.3744	0.3685		0.3763	0.3760		0.3825	0.3798
	0.4006	0.4044		0.3726	0.3612		0.3744	0.3685		0.3804	0.3721
5A4	0.3726	0.3612	5B1	0.3702	0.3722	5B2	0.3719	0.3797	5B3	0.3782	0.3837
	0.3744	0.3685		0.3719	0.3797		0.3736	0.3874		0.3802	0.3916
	0.3804	0.3721		0.3782	0.3837		0.3802	0.3916		0.3869	0.3958
	0.3783	0.3646		0.3763	0.3760		0.3782	0.3837		0.3847	0.3877

PERFORMANCE GROUPS - CHROMATICITY (CONTINUED)

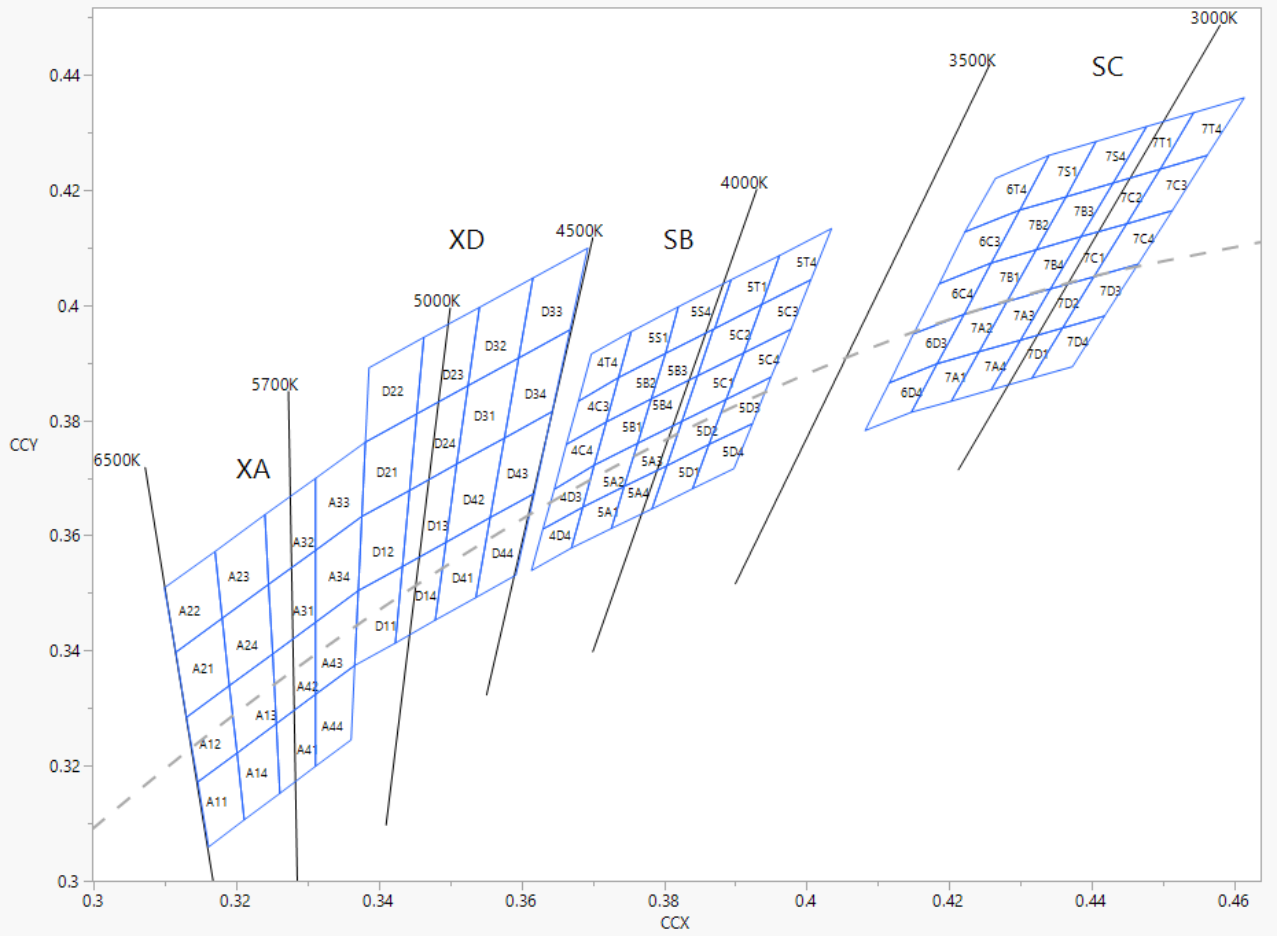
Region	x	y	Region	x	y	Region	x	y	Region	x	y
5B4	0.3763	0.3760	5C1	0.3825	0.3798	5C2	0.3847	0.3877	5C3	0.3912	0.3917
	0.3782	0.3837		0.3847	0.3877		0.3869	0.3958		0.3937	0.4001
	0.3847	0.3877		0.3912	0.3917		0.3937	0.4001		0.4006	0.4044
	0.3825	0.3798		0.3887	0.3836		0.3912	0.3917		0.3978	0.3958
5C4	0.3887	0.3836	5D1	0.3783	0.3646	5D2	0.3804	0.3721	5D3	0.3863	0.3758
	0.3912	0.3917		0.3804	0.3721		0.3825	0.3798		0.3887	0.3836
	0.3978	0.3958		0.3863	0.3758		0.3887	0.3836		0.3950	0.3875
	0.3950	0.3875		0.3840	0.3681		0.3863	0.3758		0.3924	0.3794
5D4	0.3840	0.3681	6C3	0.4186	0.4037	6C4	0.4150	0.3950	6D3	0.4116	0.3865
	0.3863	0.3758		0.4222	0.4127		0.4186	0.4037		0.4150	0.3950
	0.3924	0.3794		0.4299	0.4165		0.4259	0.4073		0.4221	0.3984
	0.3898	0.3716		0.4259	0.4073		0.4221	0.3984		0.4183	0.3898
6D4	0.4082	0.3782	6T4	0.4222	0.4127	7S1	0.4299	0.4165	7S4	0.4364	0.4188
	0.4116	0.3865		0.4265	0.4220		0.4340	0.4260		0.4406	0.4284
	0.4183	0.3898		0.4340	0.4260		0.4406	0.4284		0.4477	0.4310
	0.4147	0.3814		0.4299	0.4165		0.4364	0.4188		0.4430	0.4212
7T1	0.4430	0.4212	7T4	0.4496	0.4236	7A1	0.4147	0.3814	7A2	0.4183	0.3898
	0.4477	0.4310		0.4543	0.4334		0.4183	0.3898		0.4221	0.3984
	0.4543	0.4334		0.4614	0.4360		0.4242	0.3919		0.4281	0.4006
	0.4496	0.4236		0.4562	0.4260		0.4203	0.3833		0.4242	0.3919
7A3	0.4242	0.3919	7A4	0.4203	0.3833	7B1	0.4221	0.3984	7B2	0.4259	0.4073
	0.4281	0.4006		0.4242	0.3919		0.4259	0.4073		0.4299	0.4165
	0.4342	0.4028		0.4300	0.3939		0.4322	0.4096		0.4364	0.4188
	0.4300	0.3939		0.4259	0.3853		0.4281	0.4006		0.4322	0.4096
7B3	0.4322	0.4096	7B4	0.4281	0.4006	7C1	0.4342	0.4028	7C2	0.4385	0.4119
	0.4364	0.4188		0.4322	0.4096		0.4385	0.4119		0.4430	0.4212
	0.4430	0.4212		0.4385	0.4119		0.4449	0.4141		0.4496	0.4236
	0.4385	0.4119		0.4342	0.4028		0.4403	0.4049		0.4449	0.4141
7C3	0.4449	0.4141	7C4	0.4403	0.4049	7D1	0.4259	0.3853	7D2	0.4300	0.3939
	0.4496	0.4236		0.4449	0.4141		0.4300	0.3939		0.4342	0.4028
	0.4562	0.4260		0.4513	0.4164		0.4359	0.3960		0.4403	0.4049
	0.4513	0.4164		0.4465	0.4071		0.4316	0.3873		0.4359	0.3960

PERFORMANCE GROUPS - CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
7D3	0.4359	0.3960	7D4	0.4316	0.3873	D11	0.3371	0.3504	D12	0.3376	0.3633
	0.4403	0.4049		0.4359	0.3960		0.3433	0.3546		0.3443	0.3678
	0.4465	0.4071		0.4418	0.3981		0.3423	0.3413		0.3433	0.3546
	0.4418	0.3981		0.4373	0.3893		0.3366	0.3374		0.3371	0.3504
D13	0.3443	0.3678	D14	0.3433	0.3546	D21	0.3381	0.3762	D22	0.3386	0.3891
	0.3509	0.3724		0.3494	0.3588		0.3453	0.3811		0.3463	0.3944
	0.3494	0.3588		0.3479	0.3453		0.3443	0.3678		0.3453	0.3811
	0.3433	0.3546		0.3423	0.3413		0.3376	0.3633		0.3381	0.3762
D23	0.3463	0.3944	D24	0.3453	0.3811	D31	0.3525	0.3860	D32	0.3541	0.3996
	0.3541	0.3996		0.3525	0.3860		0.3596	0.3908		0.3616	0.4047
	0.3525	0.3860		0.3509	0.3724		0.3576	0.3769		0.3596	0.3908
	0.3453	0.3811		0.3443	0.3678		0.3509	0.3724		0.3525	0.3860
D33	0.3616	0.4047	D34	0.3596	0.3908	D41	0.3494	0.3588	D42	0.3509	0.3724
	0.3693	0.4099		0.3668	0.3957		0.3556	0.3631		0.3576	0.3769
	0.3668	0.3957		0.3643	0.3815		0.3536	0.3492		0.3556	0.3631
	0.3596	0.3908		0.3576	0.3769		0.3479	0.3453		0.3494	0.3588
D43	0.3576	0.3769	D44	0.3556	0.3631						
	0.3643	0.3815		0.3618	0.3673						
	0.3618	0.3673		0.3592	0.3531						
	0.3556	0.3631		0.3536	0.3492						

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

CIE CHROMATICITY DIAGRAM



ORDER CODE TABLE

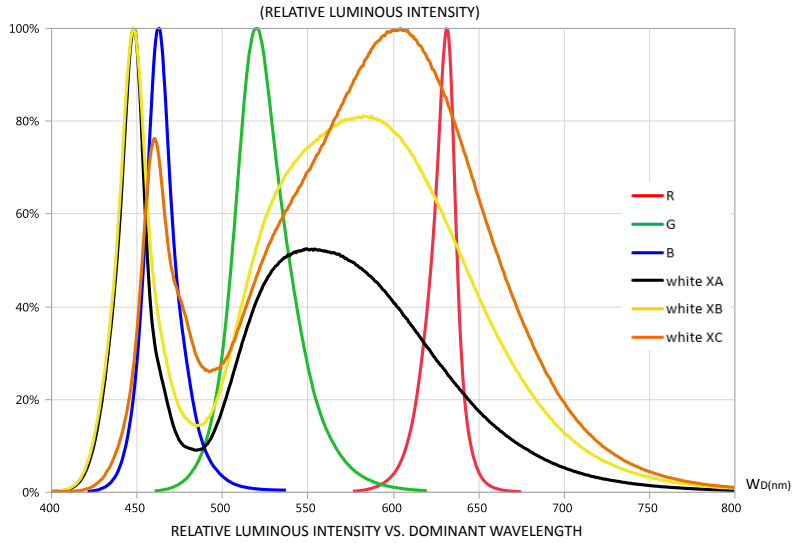
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max. (nm)	
CLQ6A-TKW-S1L1R1H1QBB7935AA3	Red	Any 1 Intensity bin from 1L(3000) - 1N(5860)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 1R(7030) - 1T(14400)		Any 1 hue bin from 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 1Q(5860) - 1S(12000)		XA				Reel
CLQ6A-TKW-S1L1R1H1QBB7935BB3	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 1Q(5860) - 1S(12000)		SB				Reel
CLQ6A-TKW-S1L1R1H1QBB7935CC3	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 1Q(5860) - 1S(12000)		SC				Reel
CLQ6A-TKW-S1L1R1H1QBB7935DD3	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 1Q(5860) - 1S(12000)		XD				Reel

Notes:

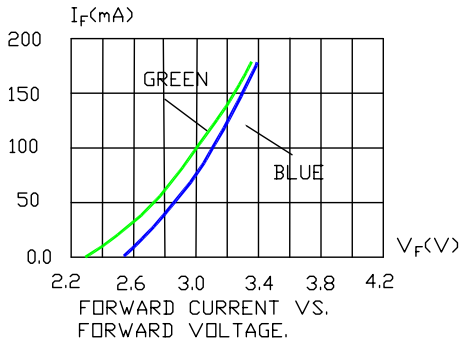
- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- Please refer to the HB LED Lamp Reliability 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

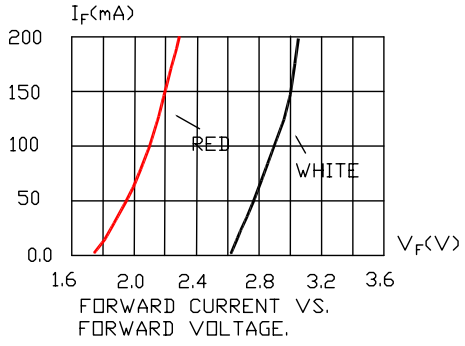
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



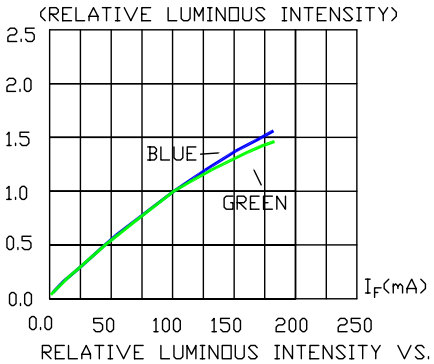
RELATIVE LUMINOUS INTENSITY VS. DOMINANT WAVELENGTH



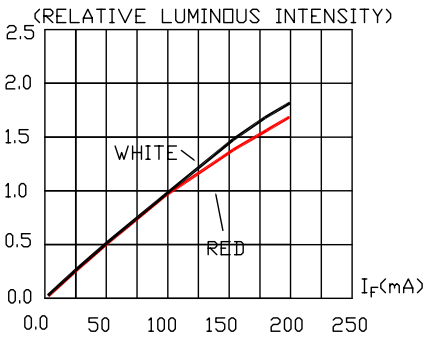
FORWARD CURRENT VS. FORWARD VOLTAGE.



FORWARD CURRENT VS. FORWARD VOLTAGE.



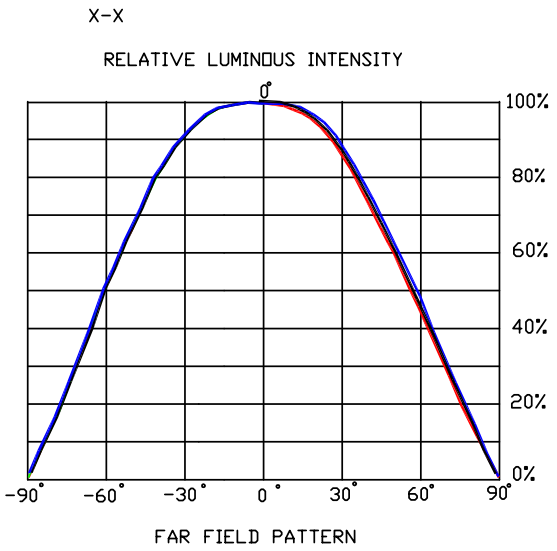
RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.

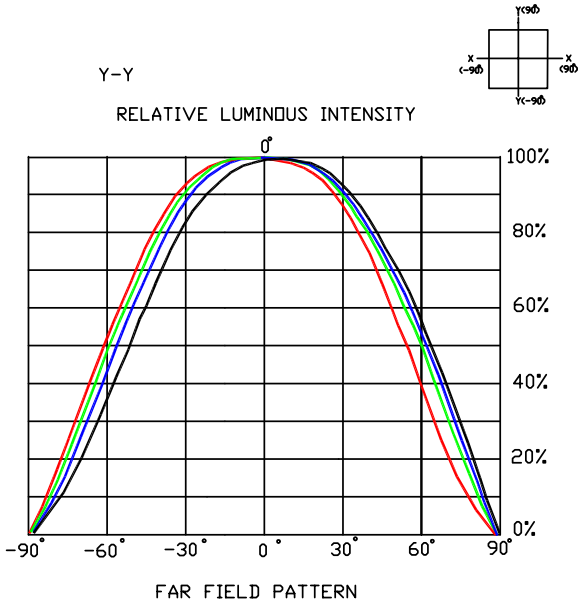


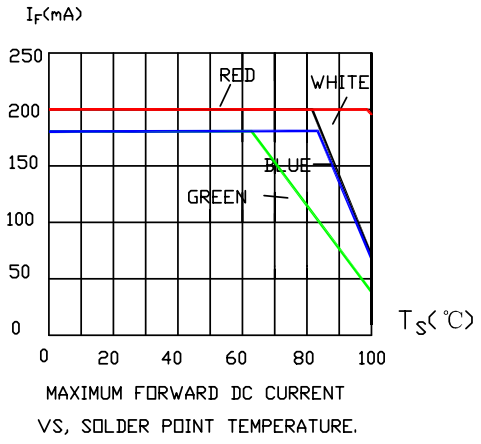
RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

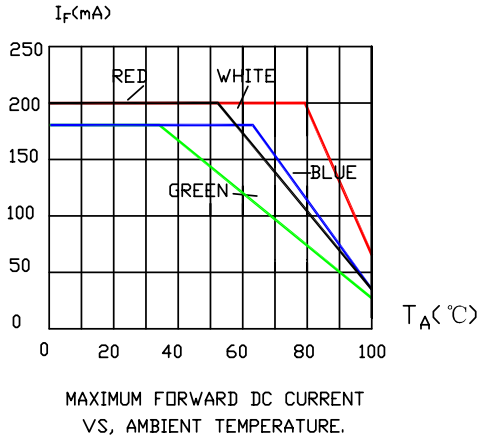
GRAPHS

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.







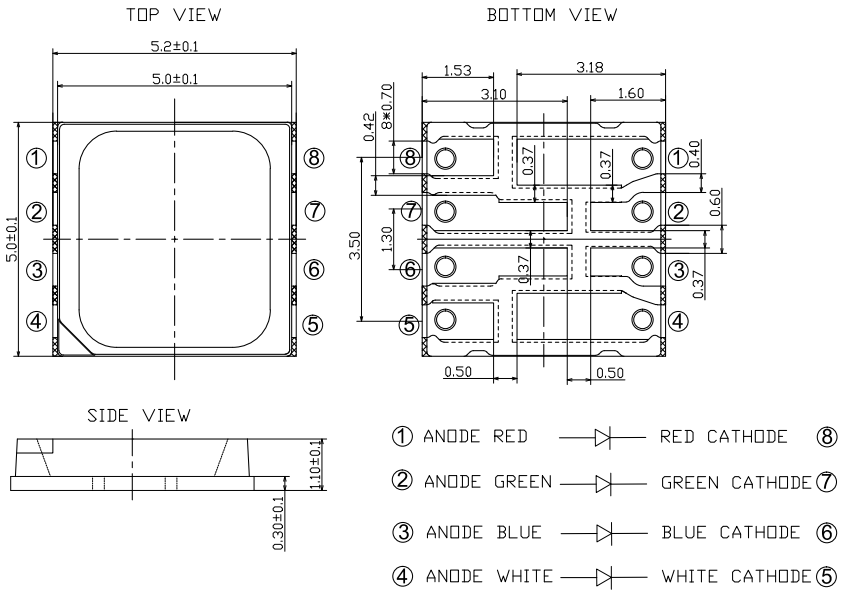


The graph shows the maximum allowable DC current for a LED die of each color.

MECHANICAL DIMENSIONS

All dimensions are in mm.

Tolerance of measurement of the dimension is ±0.1.



NOTES

RoHS Compliance

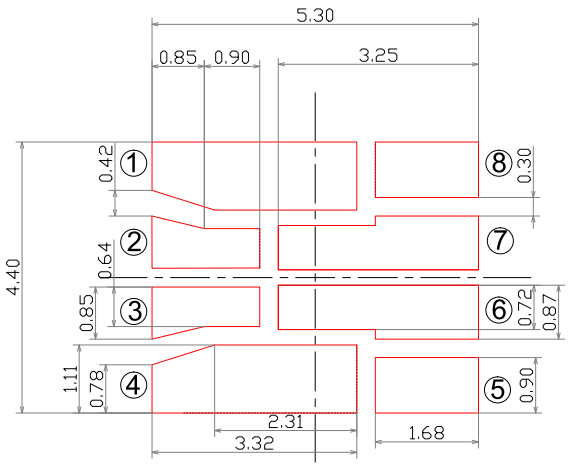
The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree LED representative or from the Product Ecology section of the Cree LED website.

Vision Advisory

WARNING: Do not look at an exposed lamp in operation. Eye injury can result.

Solder Pad recommend:

All dimensions are in mm.



• Tolerance of measurement of the dimension is ±0.1.

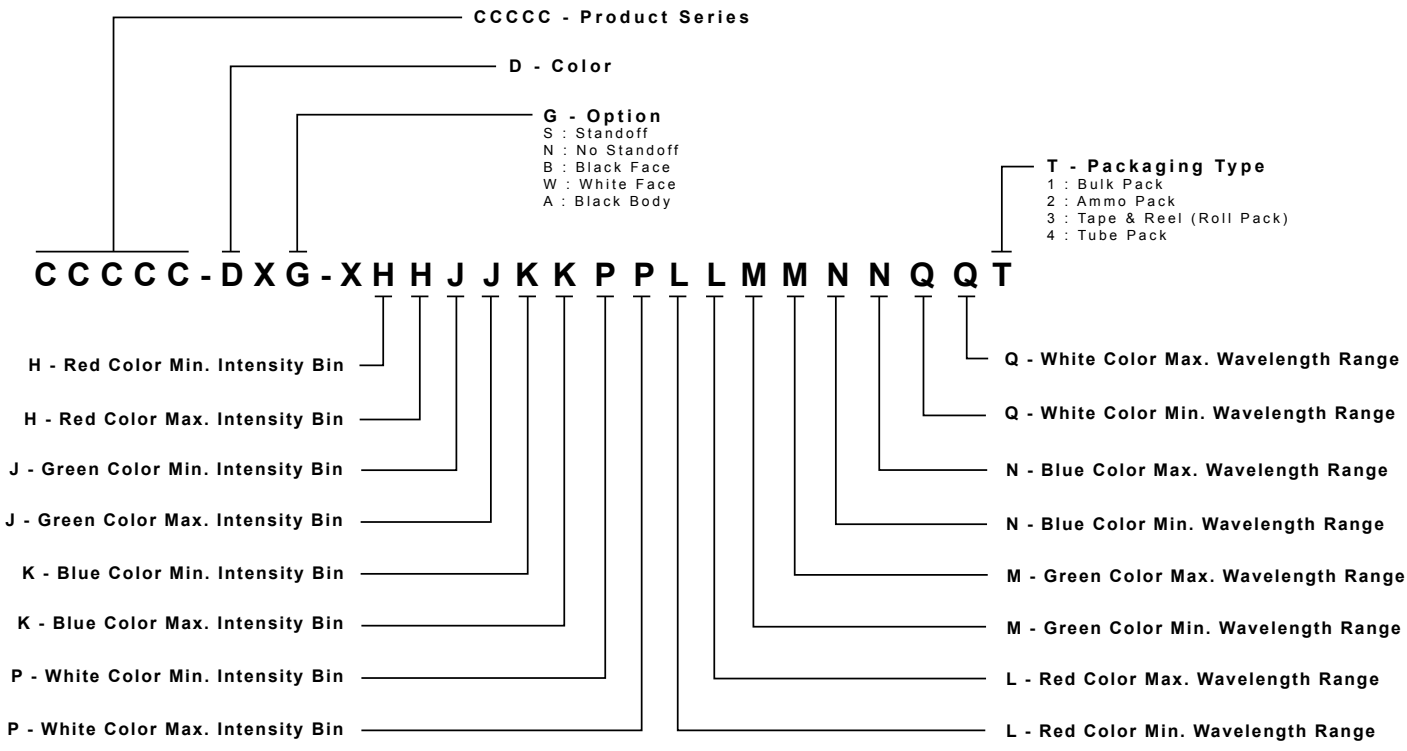
Assembly notes:

- 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°.

KIT NUMBER SYSTEM

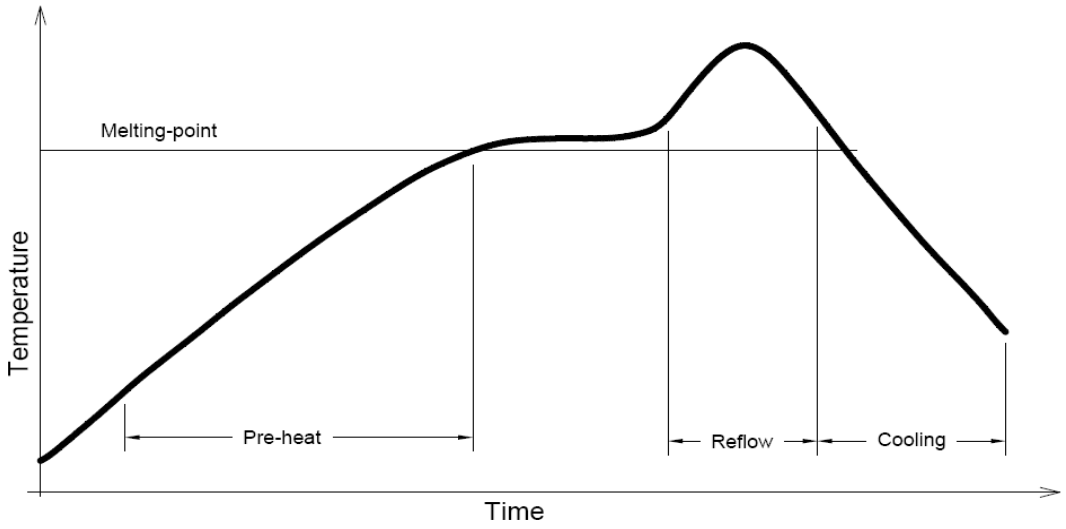
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness.

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



REFLOW SOLDERING

- The CLQ6A-TKW is rated as a MSL 5a product.
- The recommended floor life out of bag is 24hrs.
- The temperature profile is as below.

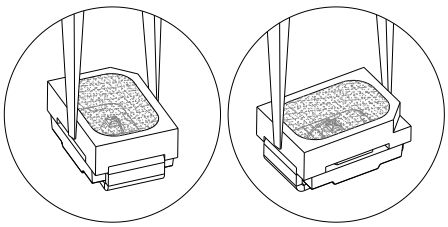


Use only with CLQ6A-TKW

Solder
Average ramp-up rate = 4°C/s max
Preheat temperature = 150°C ~200°C
Preheat time = 120s max
Ramp-down rate = 6°C/s max
Peak temperature = 250°C max
Time within 5°C of actual Peak Temperature = 10s max
Duration above 217°C is 60s max

NOTES

- 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:



PACKAGING

- The boxes are not water resistant and they must be kept away from water and moisture.
- 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 shocks during transportation.
- The reel pack is applied in SMD LED.
- Max 4000 pcs per reel.