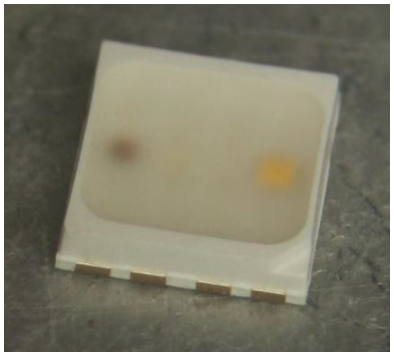
CLD-CT1387.013

Cree® PLCC8 4 in 1 SMD LED CLQ6A-TKW



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)
- 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

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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
		$V_{F(max)}$	2.6	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

Note: Continuous reverse voltage can cause LED damage.

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INTENSITY BIN LIMIT(RED I_F =100mA,GREEN I_F =100mA,BLUE I_F =100mA,WHITE I_F =100mA)

Red

Bin Code	Min.(mcd)	Max.(mcd)
1L	3000	4180
1M	3590	5020
1N	4180	5860

Green

Bin Code	Min.(mcd)	Max.(mcd)
1R	7030	10100
1S	8200	12000
1T	10100	14400

Blue

Bin Code	Min.(mcd)	Max.(mcd)
1H	1824	2560
1J	2130	3000
1K	2560	3590
1L	3000	4180

White

Bin Code	Min.(mcd)	Max.(mcd)
1Q	5860	8200
1R	7030	10100
1S	8200	12000

Tolerance of measurement of luminous intensity is ±10%.

COLOR BIN LIMIT (RED I_F =100mA,GREEN I_F =100mA,BLUE I_F =100mA,WHITE I_F =100mA)

Red

Bin Code	Min.(nm)	Max.(nm)
RB	619	624

Green

Bin Code	Min.(nm)	Max.(nm)
G7	520	525
G23	522.5	527.5
G8	525	530
G45	527.5	532.5
G9	530	535

Blue

Bin Code	Min.(nm)	Max.(nm)
B3	460	465
B23	462.5	467.5
B4	465	470
B45	467.5	472.5
B5	470	475

Tolerance of measurement of dominant wavelength is ±1 nm.

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CRI BIN LIMIT (RED I_F =100mA,GREEN I_F =100mA,BLUE I_F =100mA,WHITE I_F =100mA)

Bin Code	CRI Min.	CRI Max.
A	65	70
C	70	75
D	75	80
H	80	85
J	85	90

Tolerance of measurement of CRI is ±2.

COLOR BIN LIMIT (RED I_F =100mA,GREEN I_F =100mA,BLUE I_F =100mA,WHITE I_F =100mA)

White

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
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

Bin Code	Sub-bins	x	y
SB	5T4	0.3937	0.4001
		0.3962	0.4086
		0.4035	0.4133
		0.4006	0.4044
	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

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

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Bin Code	Sub-bins	x	y
SB	5B4	0.3763	0.3760
		0.3782	0.3837
		0.3847	0.3877
		0.3825	0.3798
	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

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

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

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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

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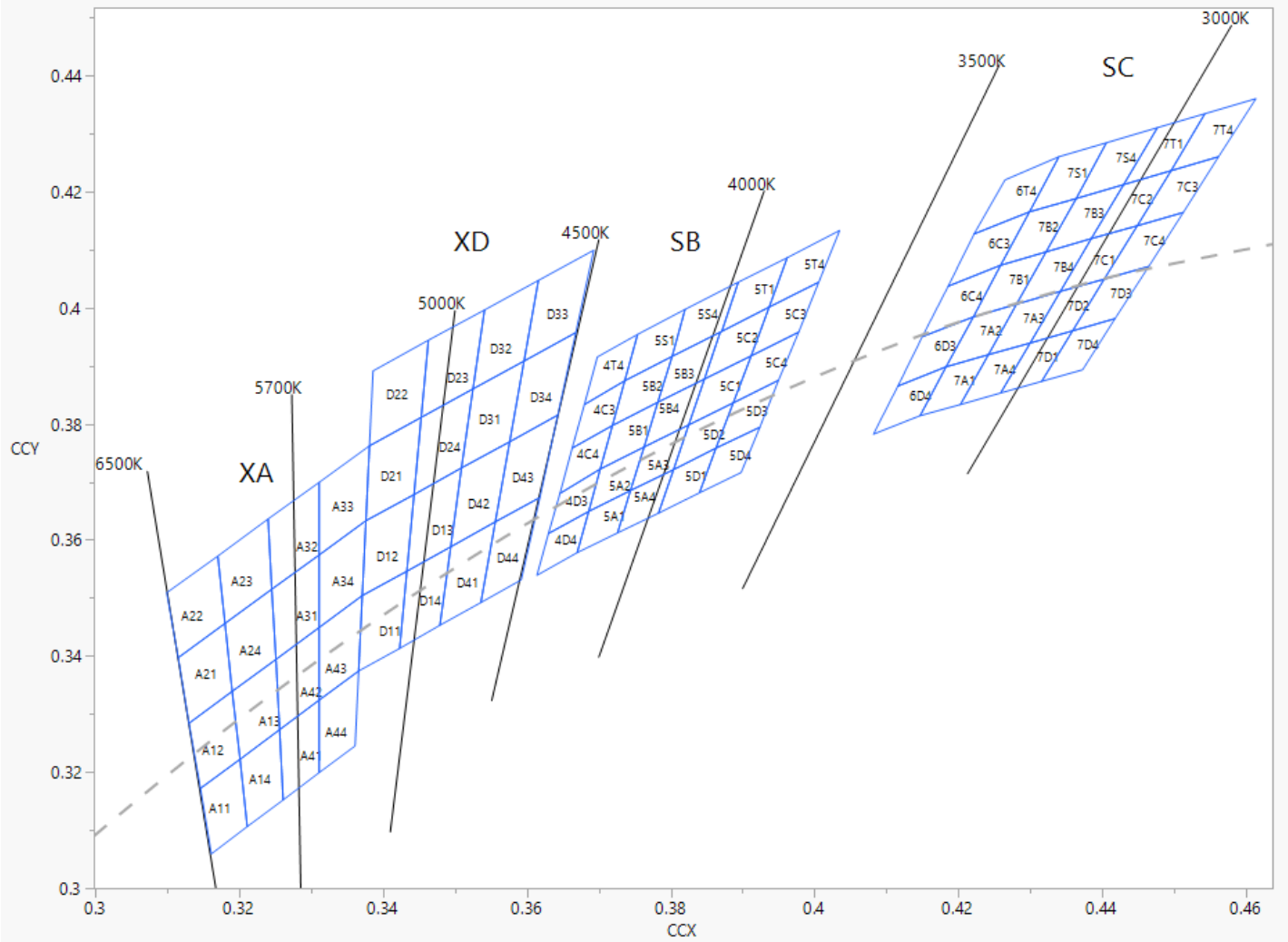
CIE CHROMATICITY DIAGRAM



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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:
1. 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. 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.
2. Please refer to the "Cree LED Lamp Reliability Test Standards" document #1 for reliability test conditions.
3. Please refer to the "Cree LED Lamp Soldering & Handling" document #2 for information about how to use this LED product safely.

#1: Refer to http://www.cree.com/led-components/media/documents/LED_Lamp_Reliability_Test_Standard.pdf

#2: Refer to http://www.cree.com/led-components/media/documents/sh-HB.pdf

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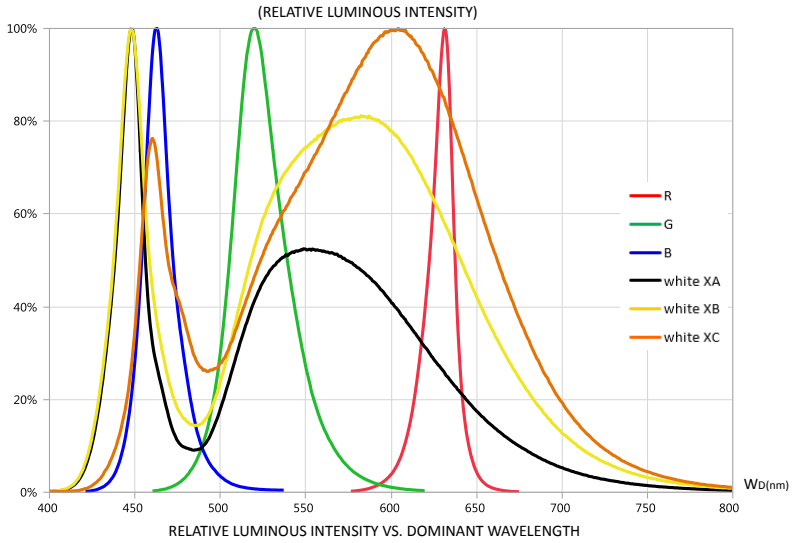
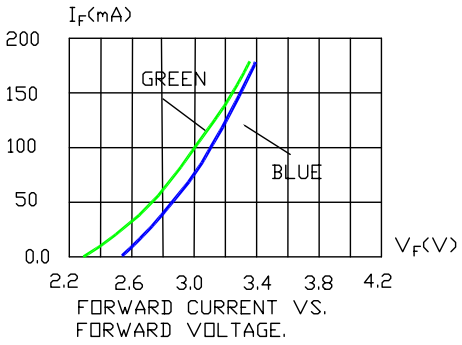
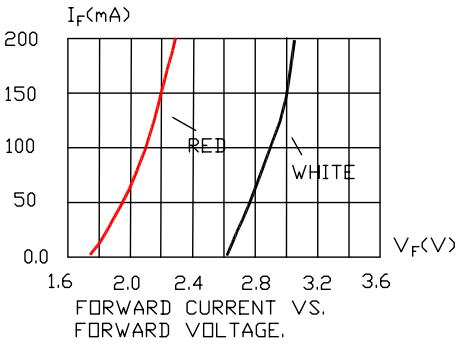
GRAPHS



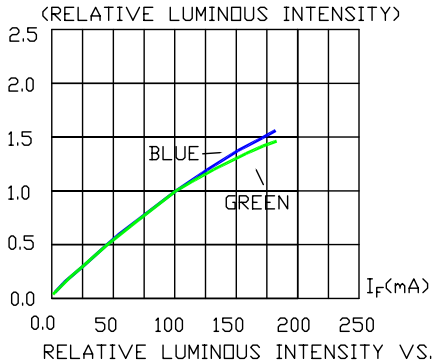
RELATIVE LUMINOUS INTENSITY VS. DOMINANT WAVELENGTH



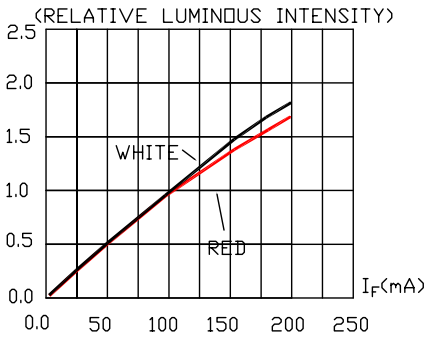
FORWARD CURRENT VS. FORWARD VOLTAGE.



FORWARD CURRENT VS. FORWARD VOLTAGE.



RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.



RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

The above data 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.

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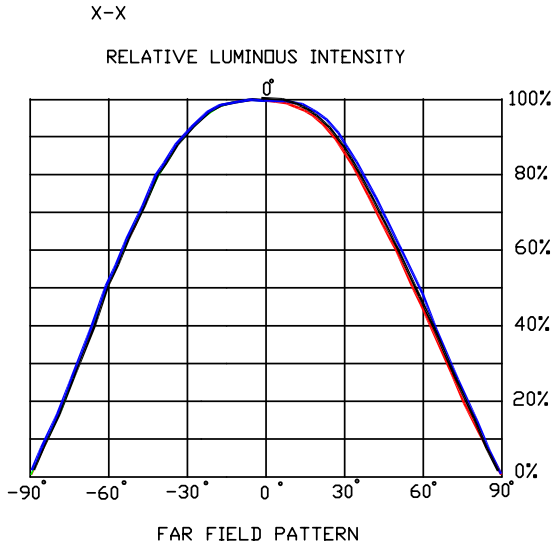
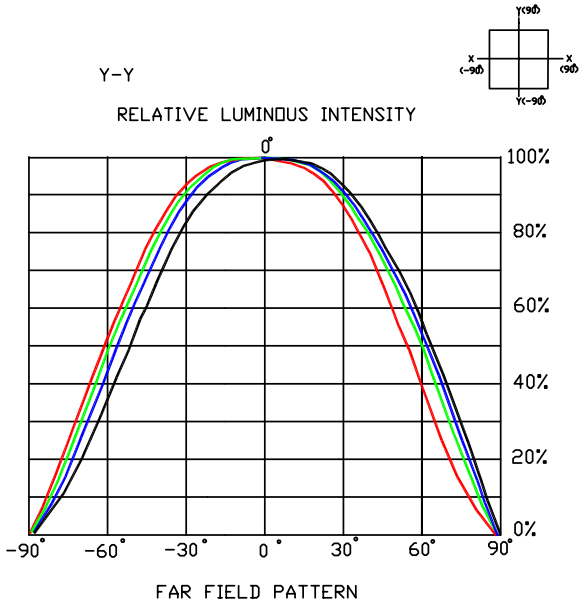
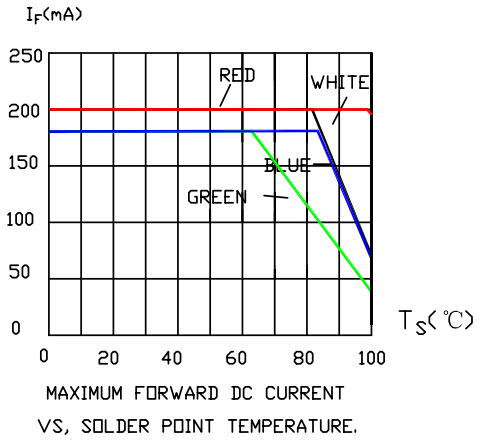
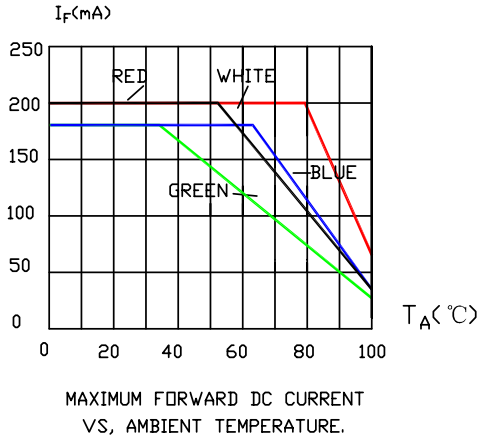
GRAPHS









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

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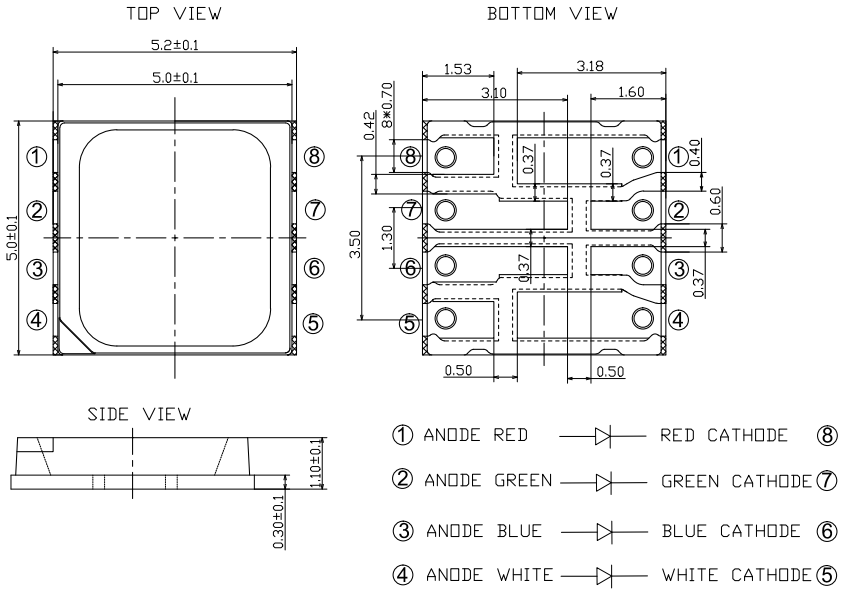
MECHANICAL DIMENSIONS

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 by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863/EU.

RoHS Declarations for this product can be obtained from your Cree representative or from the Product Ecology section of the Cree website.

Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

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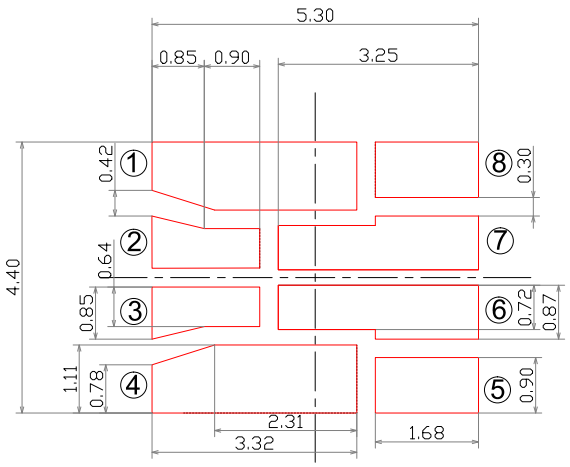
Solder Pad recommend:

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°.

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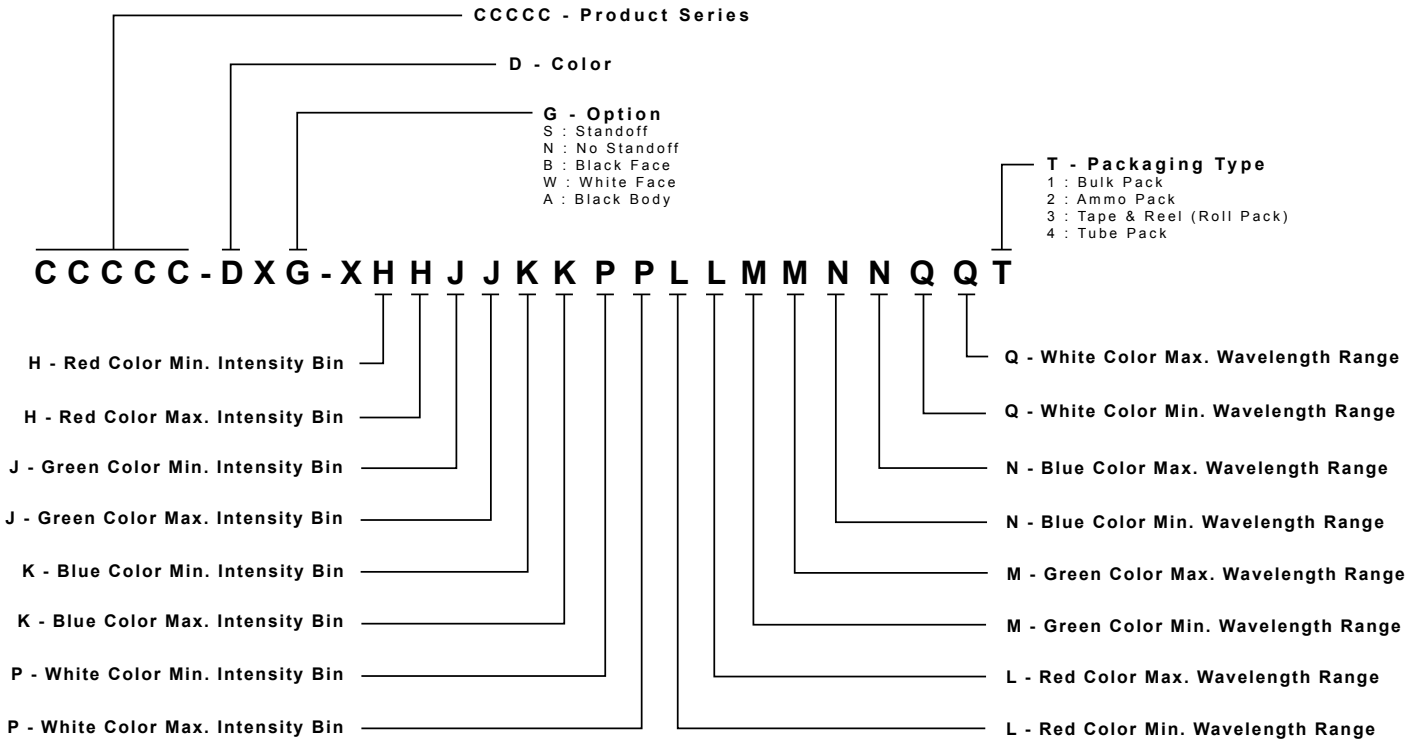
KIT NUMBER SYSTEM

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. Please refer to the "Cree LED Lamp Packaging Standard" document for more information about shipping and packaging options.

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



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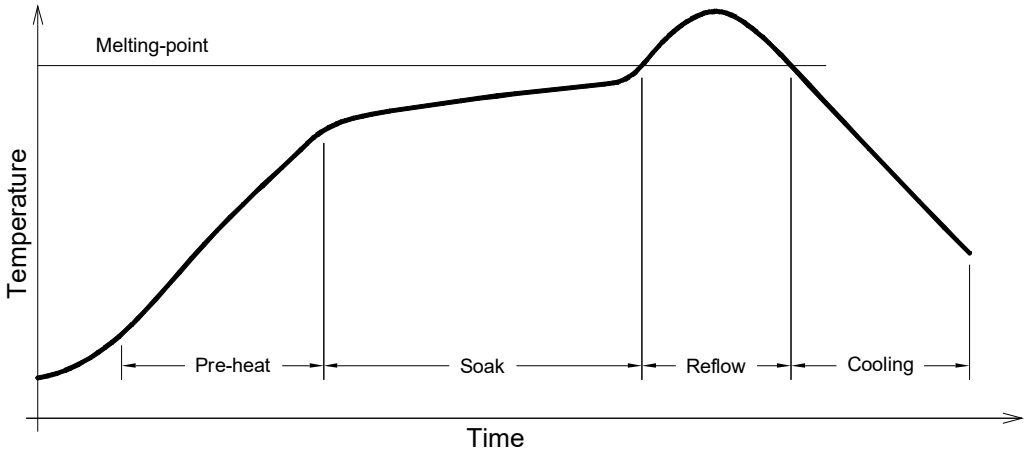
REFLOW SOLDERING

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

Refer to "http://www.cree.com/led-components/media/documents/sh-HB.pdf" for soldering & handling details.

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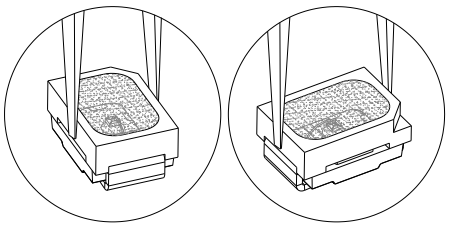
NOTES

- 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:



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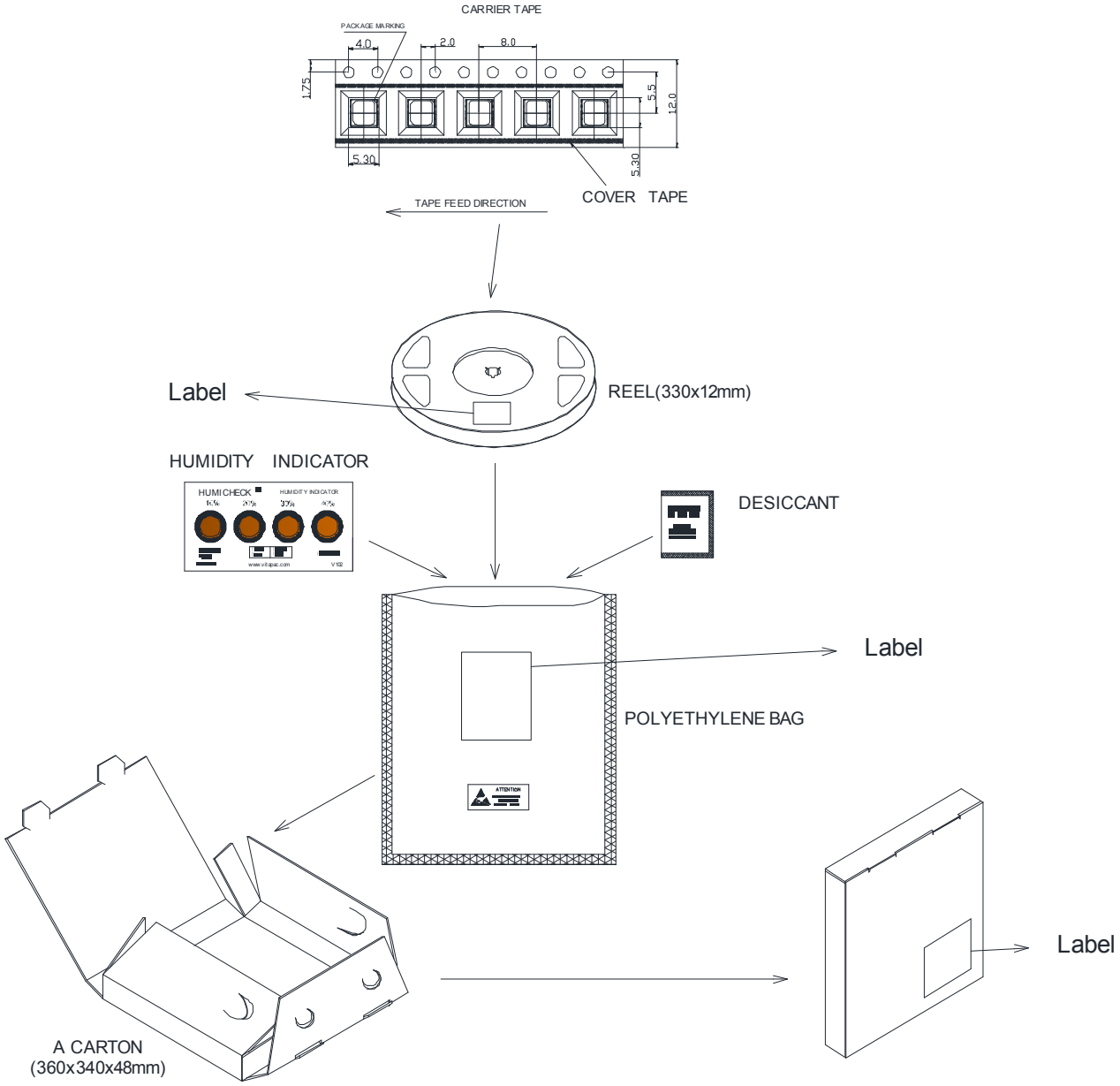
PACKAGING

- 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.



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