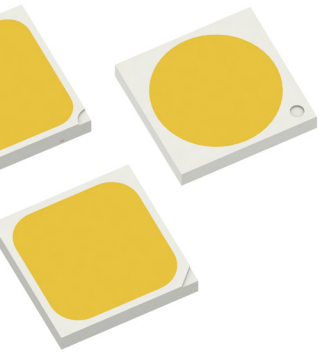
LUMILEDS

ILLUMINATION

LUXEON 5050

High efficacy and superior robustness in a high power package, enabling cost-effective system design



LUXEON 5050 is a high power package that provides high luminance from a super robust package to enable cost effective and reliable fixture designs. LUXEON 5050 uses an industry standard 5050 surface mount package with a fairly small Light Emitting Surface (LES). LUXEON 5050 product family includes LUXEON 5050 Round LES, LUXEON 5050 Square LES, LUXEON 5050 HE, and LUXEON 5050 HE Plus, four product lines. LUXEON 5050 comes in 70CRI, 80CRI and 90CRI with a wide range of CCTs, and offers hot-color targeting to ensure that the LEDs are within color target at application conditions of 85°C. Futhermore, with the latest NightScape Technology, LUXEON 5050 enabled revolutionary environmental friendly outdoor solutions with blue content below 2%.

Now With NightScape Technology

NightScape Technology enables white light with blue light content that is less than 2%.

FEATURES AND BENEFITS

- Superior lm/W enables outstanding efficacy in end application
- Extremely reliable package design affirms long lifetime in harsh environments [1]
- Robust coating design for enhanced sulfur protection capability (LUXEON 5050 Square LES) [1]
- Two voltage configurations are compatible with low cost high efficacy drivers
- Low R_{th} enables effective thermal dissipation design for higher efficiency
- Hot-color targeting ensures color is within ANSI bin at 85°C
- 3-step and 5-step MacAdam ellipse binning structure ensures excellent color uniformity

PRIMARY APPLICATIONS

- Street Lights
- High Bay
- Low Bay
- Flood Lights
- Wall Pack
- Landscape Lighting
- Downlights

1. Refer to reliability datasheet for more details.

No. E507562

Table of Contents

General Product Information

Product Test Conditions

LUXEON 5050 LEDs are tested with a 20ms monopulse specified below at a junction temperature, T_j, of 25°C. Forward voltage and luminous flux are binned at a T_j of 25°C, while color is hot-targeted at a T_j of 85°C.

160mA – LUXEON 5050 Round LES/LUXEON 5050 HE – 24V and LUXEON 5050 Square LES – 30V
640mA – LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus – 6V
800mA – LUXEON 5050 (Square LES) – 6V

Part Number Nomenclature

Part numbers for LUXEON 5050 follow the convention below:

L 1 5 0 – **A A A A** 5 0 **B B C C C C C**

Where:

A A A A – designates nominal CCT and CRI (2780=2700K, 80CRI; 3090 =3000K, 90CRI, etc., and NSC1 = Nightscape)

B B – designates voltage (06=6V, 24=24V, 30=30V)

C C C C C – designates options for product specification (00000= 5050 Round LES base part, 000S0= 5050 Square LES base part, 000H0=5050 HE base part, 00TH0=5050 HE base part with ESD Sensitivity of Class 3B, 00HH0=5050 HE Plus base part. Besides, there would be custom part numbers that are derived from base part number for kitting purpose etc., and those would take the last five digits to differentiate from base part number)

Therefore, the following part number is used for a custom part number that derived from LUXEON 5050 Round LES, 4000K 70CRI, 24V:

L 1 5 0 – **4 0 7 0** 5 0 **2 4 L K H G 0**

Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON 5050 is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU including amendments 2015/863/EU & 2017/2102/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Performance Characteristics

Product Selection Guide

Table 1a. Product performance of LUXEON 5050 at rated current, T_j=25°C.

PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	LUMINOUS FLUX [2, 3] (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		TYPICAL		
			RATED CURRENT [4]			SAME DRIVING CURRENT [5]		
LUXEON 5050 Round LES 24V	2200K	70	515	587	150	350	169	L150-2270502400000
	2700K	70	535	640	164	382	184	L150-2770502400000
	3000K	70	553	667	171	398	192	L150-3070502400000
	3500K	70	600	686	176	410	197	L150-3570502400000
	4000K	70	580	693	178	414	199	L150-4070502400000
	5000K	70	580	693	178	414	199	L150-5070502400000
	5700K	70	570	683	175	408	196	L150-5770502400000
	6500K	70	570	677	173	404	195	L150-6570502400000
	2200K	80	440	510	131	305	147	L150-2280502400000
	2700K	80	500	593	152	354	171	L150-2780502400000
	3000K	80	516	615	158	367	177	L150-3080502400000
	3500K	80	527	620	159	370	178	L150-3580502400000
	4000K	80	539	645	165	385	185	L150-4080502400000
	5000K	80	539	645	165	385	185	L150-5080502400000
	5700K	80	539	644	165	385	185	L150-5780502400000
	6500K	80	539	628	161	375	181	L150-6580502400000
	2700K	90	414	475	122	284	137	L150-2790502400000
	3000K	90	428	490	126	293	141	L150-3090502400000
	3500K	90	445	510	131	305	147	L150-3590502400000
	4000K	90	456	530	136	316	152	L150-4090502400000
	5000K	90	456	530	136	316	152	L150-5090502400000
	5700K	90	456	530	136	316	152	L150-5790502400000
LUXEON 5050 Round LES 6V	2200K	70	515	587	150	350	169	L150-2270500600000
	2700K	70	535	640	164	382	184	L150-2770500600000
	3000K	70	553	667	171	398	192	L150-3070500600000
	3500K	70	600	686	176	410	197	L150-3570500600000
	4000K	70	580	693	178	414	199	L150-4070500600000
	5000K	70	580	693	178	414	199	L150-5070500600000
	5700K	70	570	683	175	408	196	L150-5770500600000
	6500K	70	570	677	173	404	195	L150-6570500600000
	2200K	80	440	510	131	305	147	L150-2280500600000
	2700K	80	500	593	152	354	171	L150-2780500600000
	3000K	80	516	615	158	367	177	L150-3080500600000
	3500K	80	527	620	159	370	178	L150-3580500600000
	4000K	80	539	645	165	385	185	L150-4080500600000
	5000K	80	539	645	165	385	185	L150-5080500600000
	5700K	80	539	644	165	385	185	L150-5780500600000
	6500K	80	539	628	161	375	181	L150-6580500600000
	2700K	90	414	475	122	284	137	L150-2790500600000
	3000K	90	428	490	126	293	141	L150-3090500600000
	3500K	90	445	510	131	305	147	L150-3590500600000
	4000K	90	456	530	136	316	152	L150-4090500600000
	5000K	90	456	530	136	316	152	L150-5090500600000
	5700K	90	456	530	136	316	152	L150-5790500600000

Table 1a continued on next page:

1. Correlated color temperature is hot targeted at T_j=85°C.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at T_j=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus: 6V - 640mA, 24V - 160mA. Rated current ofLUXEON 5050 Square LES: 6V - 800mA, 30V - 160mA.
5. Parts can also be compared at same driving current regardless of their rated current. And in Table 1a., such driving current is: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus/LUXEON 5050 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, T_j=25°C, Continued.

PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	LUMINOUS FLUX [2, 3] (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		TYPICAL		
			RATED CURRENT [4]			SAME DRIVING CURRENT [5]		
LUXEON 5050 Square LES 30V	1850K [6]	50	645	693	142	414	159	L150-NSC15030000S0
	1800K	70	556	598	123	358	137	L150-18705030000S0
	2200K	70	621	717	147	429	165	L150-22705030000S0
	2700K	70	693	792	162	474	182	L150-27705030000S0
	3000K	70	720	813	167	486	187	L150-30705030000S0
	3500K	70	729	838	172	501	193	L150-35705030000S0
	4000K	70	743	850	174	508	195	L150-40705030000S0
	5000K	70	743	850	174	508	195	L150-50705030000S0
	5700K	70	738	840	172	502	193	L150-57705030000S0
	6500K	70	720	825	169	493	190	L150-65705030000S0
	2200K	80	586	630	130	377	145	L150-22805030000S0
	2700K	80	650	695	143	416	160	L150-27805030000S0
	3000K	80	665	730	150	437	168	L150-30805030000S0
	3500K	80	679	735	151	440	169	L150-35805030000S0
	4000K	80	700	768	158	459	177	L150-40805030000S0
	5000K	80	702	768	158	459	177	L150-50805030000S0
	5700K	80	700	768	158	459	177	L150-57805030000S0
	6500K	80	688	740	152	443	171	L150-65805030000S0
	2700K	90	558	600	123	359	138	L150-27905030000S0
	3000K	90	586	630	130	377	145	L150-30905030000S0
	3500K	90	600	640	132	383	148	L150-35905030000S0
	4000K	90	609	655	135	392	151	L150-40905030000S0
	5000K	90	618	665	137	398	153	L150-50905030000S0
	5700K	90	605	650	134	389	150	L150-57905030000S0
LUXEON 5050 Square LES 6V	1850K [6]	50	645	693	142	337	165	L150-NSC15006000S0
	1800K	70	556	598	123	291	142	L150-18705006000S0
	2200K	70	621	717	147	349	170	L150-22705006000S0
	2700K	70	693	792	162	386	188	L150-27705006000S0
	3000K	70	720	813	167	396	193	L150-30705006000S0
	3500K	70	729	838	172	408	199	L150-35705006000S0
	4000K	70	743	850	174	414	202	L150-40705006000S0
	5000K	70	743	850	174	414	202	L150-50705006000S0
	5700K	70	738	840	172	409	199	L150-57705006000S0
	6500K	70	720	825	169	402	196	L150-65705006000S0
	2200K	80	586	630	130	307	150	L150-22805006000S0
	2700K	80	650	695	143	338	166	L150-27805006000S0
	3000K	80	665	730	150	355	174	L150-30805006000S0
	3500K	80	679	735	151	358	175	L150-35805006000S0
	4000K	80	700	768	158	374	183	L150-40805006000S0
	5000K	80	702	768	158	374	183	L150-50805006000S0
	5700K	80	700	768	158	374	183	L150-57805006000S0
	6500K	80	688	740	152	360	176	L150-65805006000S0
	2700K	90	558	600	123	292	143	L150-27905006000S0
	3000K	90	586	630	130	307	150	L150-30905006000S0
	3500K	90	600	640	132	312	152	L150-35905006000S0
	4000K	90	609	655	135	319	156	L150-40905006000S0
	5000K	90	618	665	137	324	158	L150-50905006000S0
	5700K	90	605	650	134	316	155	L150-57905006000S0

Table 1a continued on next page:

1. Correlated color temperature is hot targeted at T_j=85°C.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at T_j=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
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4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus: 6V - 640mA, 24V - 160mA. Rated current ofLUXEON 5050 Square LES: 6V - 800mA, 30V - 160mA.
5. Parts can also be compared at same driving current regardless of their rated current. And in Table 1a., such driving current is: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus/LUXEON 5050 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, T_j=25°C, Continued.

PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	LUMINOUS FLUX [2, 3] (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		TYPICAL		
			RATED CURRENT [4]			SAME DRIVING CURRENT [5]		
LUXEON 5050 HE 24V	1800K	70	455	498	129	296	143	L150-18705024000H0
	2200K	70	544	608	157	361	174	L150-22705024000H0
	2700K	70	602	675	174	401	194	L150-27705024000H0
	3000K	70	623	694	179	412	199	L150-30705024000H0
	3500K	70	632	707	183	420	203	L150-35705024000H0
	4000K	70	651	725	187	431	208	L150-40705024000H0
	5000K	70	651	724	187	430	208	L150-50705024000H0
	5700K	70	640	713	184	423	205	L150-57705024000H0
	6500K	70	637	711	184	422	204	L150-65705024000H0
	2200K	80	474	520	134	309	149	L150-22805024000H0
	2700K	80	539	598	154	355	172	L150-27805024000H0
	3000K	80	563	625	161	371	179	L150-30805024000H0
	3500K	80	586	650	168	386	186	L150-35805024000H0
	4000K	80	597	662	171	393	190	L150-40805024000H0
	5000K	80	597	660	170	392	189	L150-50805024000H0
	5700K	80	595	654	169	388	188	L150-57805024000H0
	6500K	80	586	652	168	387	187	L150-65805024000H0
	2700K	90	465	503	130	299	144	L150-27905024000H0
	3000K	90	485	525	136	312	151	L150-30905024000H0
	3500K	90	502	544	140	323	156	L150-35905024000H0
	4000K	90	512	558	144	331	160	L150-40905024000H0
	5000K	90	512	560	145	333	161	L150-50905024000H0
	5700K	90	512	560	145	333	161	L150-57905024000H0
	1800K	70	455	496	128	295	142	L150-1870502400TH0
	2200K	70	544	605	156	359	174	L150-2270502400TH0
	2700K	70	602	672	174	399	193	L150-2770502400TH0
	3000K	70	623	691	178	410	198	L150-3070502400TH0
	3500K	70	632	704	182	418	202	L150-3570502400TH0
	4000K	70	651	722	186	429	207	L150-4070502400TH0
	5000K	70	651	721	186	428	207	L150-5070502400TH0
	5700K	70	640	710	183	422	204	L150-5770502400TH0
	6500K	70	637	708	183	420	203	L150-6570502400TH0
	2200K	80	474	515	133	306	148	L150-2280502400TH0
	2700K	80	539	586	151	348	168	L150-2780502400TH0
	3000K	80	563	612	158	363	176	L150-3080502400TH0
	3500K	80	586	643	166	382	184	L150-3580502400TH0
	4000K	80	597	660	170	392	189	L150-4080502400TH0
	5000K	80	597	658	170	391	189	L150-5080502400TH0
	5700K	80	595	652	168	387	187	L150-5780502400TH0
	6500K	80	586	650	168	386	186	L150-6580502400TH0

Table 1a continued on next page:

1. Correlated color temperature is hot targeted at T_j=85°C.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at T_j=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus: 6V - 640mA, 24V - 160mA. Rated current ofLUXEON 5050 Square LES: 6V - 800mA, 30V - 160mA.
5. Parts can also be compared at same driving current regardless of their rated current. And in Table 1a., such driving current is: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus/LUXEON 5050 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, T_j=25°C, Continued.

PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	LUMINOUS FLUX [2, 3] (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		TYPICAL		
			RATED CURRENT [4]			SAME DRIVING CURRENT [5]		
LUXEON 5050 HE 6V	1800K	70	455	498	129	296	143	L150-18705006000H0
	2200K	70	544	608	157	361	174	L150-22705006000H0
	2700K	70	602	675	174	401	194	L150-27705006000H0
	3000K	70	623	694	179	412	199	L150-30705006000H0
	3500K	70	632	707	183	420	203	L150-35705006000H0
	4000K	70	651	725	187	431	208	L150-40705006000H0
	5000K	70	651	724	187	430	208	L150-50705006000H0
	5700K	70	640	713	184	423	205	L150-57705006000H0
	6500K	70	637	711	184	422	204	L150-65705006000H0
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	4000K	80	597	662	171	393	190	L150-40805006000H0
	5000K	80	597	660	170	392	189	L150-50805006000H0
	5700K	80	595	654	169	388	188	L150-57805006000H0
	6500K	80	586	652	168	387	187	L150-65805006000H0
	2700K	90	465	503	130	299	144	L150-27905006000H0
	3000K	90	485	525	136	312	151	L150-30905006000H0
	3500K	90	502	544	140	323	156	L150-35905006000H0
	4000K	90	512	558	144	331	160	L150-40905006000H0
	5000K	90	512	560	145	333	161	L150-50905006000H0
	5700K	90	512	560	145	333	161	L150-57905006000H0
	1800K	70	455	496	128	295	142	L150-1870500600TH0
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	4000K	70	651	722	186	429	207	L150-4070500600TH0
	5000K	70	651	721	186	428	207	L150-5070500600TH0
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	6500K	70	637	708	183	420	203	L150-6570500600TH0
	2200K	80	474	515	133	306	148	L150-2280500600TH0
	2700K	80	539	586	151	348	168	L150-2780500600TH0
	3000K	80	563	612	158	363	176	L150-3080500600TH0
	3500K	80	586	643	166	382	184	L150-3580500600TH0
	4000K	80	597	660	170	392	189	L150-4080500600TH0
	5000K	80	597	658	170	391	189	L150-5080500600TH0
	5700K	80	595	652	168	387	187	L150-5780500600TH0
	6500K	80	586	650	168	386	186	L150-6580500600TH0

Table 1a continued on next page:

1. Correlated color temperature is hot targeted at T_j=85°C.
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5. Parts can also be compared at same driving current regardless of their rated current. And in Table 1a., such driving current is: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus/LUXEON 5050 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, T_j=25°C, Continued.

PART	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	LUMINOUS FLUX [2, 3] (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		TYPICAL		
			RATED CURRENT [4]			SAME DRIVING CURRENT [5]		
LUXEON 5050 HE Plus - 6V	1800K	70	474	510	136	296	144	L150-1870500600HH0
	2200K	70	582	626	167	364	177	L150-2270500600HH0
	2700K	70	639	687	183	399	194	L150-2770500600HH0
	3000K	70	658	708	189	411	200	L150-3070500600HH0
	3500K	70	675	725	194	421	205	L150-3570500600HH0
	4000K	70	694	746	199	433	211	L150-4070500600HH0
	5000K	70	685	737	197	428	208	L150-5070500600HH0
	5700K	70	676	727	194	422	206	L150-5770500600HH0
	6500K	70	670	720	192	418	204	L150-6570500600HH0
	2200K	80	504	541	144	314	153	L150-2280500600HH0
	2700K	80	581	624	167	363	176	L150-2780500600HH0
	3000K	80	600	645	172	375	182	L150-3080500600HH0
	3500K	80	621	667	178	387	189	L150-3580500600HH0
	4000K	80	636	684	183	397	193	L150-4080500600HH0
	5000K	80	642	690	184	401	195	L150-5080500600HH0
	5700K	80	632	680	182	395	192	L150-5780500600HH0
	6500K	80	628	675	180	392	191	L150-6580500600HH0

Notes for Table 1a:
1. Correlated color temperature is hot targeted at T_j=85°C.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at T_j=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus: 6V - 640mA, 24V - 160mA. Rated current ofLUXEON 5050 Square LES: 6V - 800mA, 30V - 160mA.
5. Parts can also be compared at same driving current regardless of their rated current. And in Table 1a., such driving current is: LUXEON 5050 Round LES/LUXEON 5050 HE/LUXEON 5050 HE Plus/LUXEON 5050 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1b. Percent Blue for LUXEON 5050 with NightScape Technology at test current, T_j=25°C.

PART NUMBER	BLUE CONTENT [1]	
	TYPICAL	MAXIMUM
L150-NSC15030000S0	1%	2%
L150-NSC15006000S0	1%	2%

Notes for Table 1b:
1. Blue content is defined as the radiometric flux emitted between 400nm and 500nm divided by the total radiometric power.

Optical Characteristics

Table 2. Optical characteristics for LUXEON 5050 at test current, T_j=25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L150-xxxx50xx00xx0	138°	116°

Notes for Table 2:
1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 5050 at test current, T_j=25°C.

PART	FORWARD VOLTAGE [1] (V_f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
LUXEON 5050 Round LES - 24V	23.5	24.4	26.5	-12	2.4
LUXEON 5050 Round LES - 6V	5.8	6.1	6.6	-3	2.4
LUXEON 5050 Square LES - 30V	29.0	30.5	32.0	-15	1.4
LUXEON 5050 Square LES - 6V	5.8	6.1	6.6	-3	1.4
LUXEON 5050 HE - 24V	22.7	24.2	25.8	-12	2.2
LUXEON 5050 HE - 6V	5.6	6.05	6.4	-3	2.2
LUXEON 5050 HE Plus - 6V	5.6	5.85	6.1	-3	1.1

Notes for Table 3:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 5050.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	240mA for LUXEON 5050 Round LES - 24V 800mA for LUXEON 5050 Round LES - 6V 240mA for LUXEON 5050 Square LES - 30V 1000mA for LUXEON 5050 Square LES - 6V 240mA for LUXEON 5050 HE - 24V 800mA for LUXEON 5050 HE - 6V 1200mA for LUXEON 5050 HE Plus - 6V
Peak Pulsed Forward Current [1, 3]	300mA for LUXEON 5050 Round LES - 24V 1000mA for LUXEON 5050 Round LES - 6V 300mA for LUXEON 5050 Square LES - 30V 1250mA for LUXEON 5050 Square LES - 6V 300mA for LUXEON 5050 HE - 24V 1000mA for LUXEON 5050 HE - 6V 1500mA for LUXEON 5050 HE Plus - 6V
LED Junction Temperature [1] (DC & Pulse)	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B for L150-xxxx50xx00TH0 Class 2 for the rest
Operating Case Temperature [1]	-40°C to 105°C
LED Storage Temperature	-40°C to 105°C
Allowable Reflow Cycles	3
Reverse Voltage ($V_{reverse}$)	LUXEON LEDs are not designed to be driven in reverse bias

Notes for Table 4:
1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
   – The frequency of the ripple current is 100Hz or higher
   – The average current for each cycle does not exceed the maximum allowable DC forward current
   – The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current
3. At ≤50% duty cycle with pulse width of 5ms.

Characteristic Curves

Spectral Power Distribution Characteristics

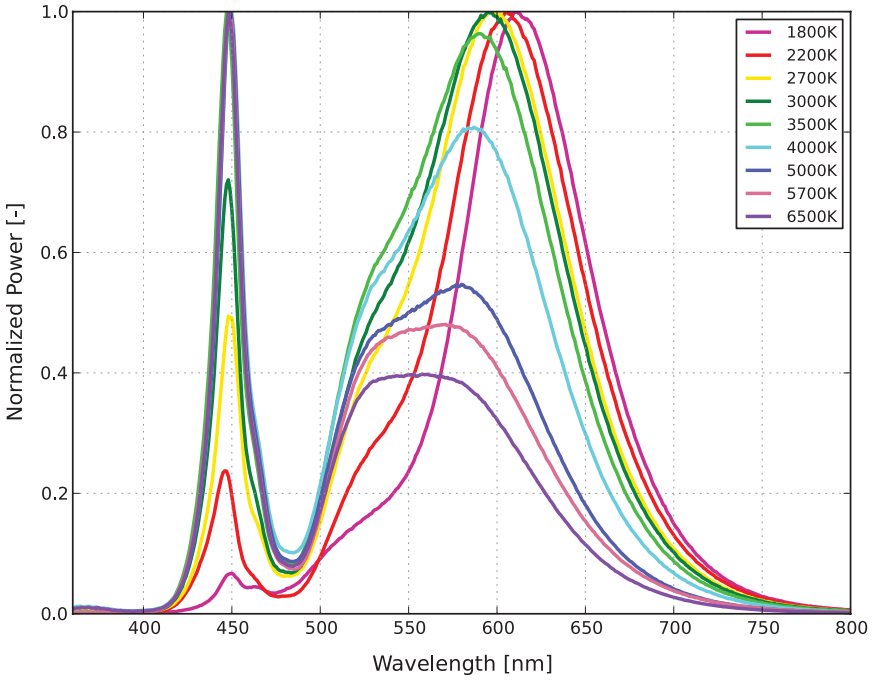

Figure 1a. Typical normalized power vs. wavelength for 70CRI LUXEON 5050 at test current, T_j=25°C.

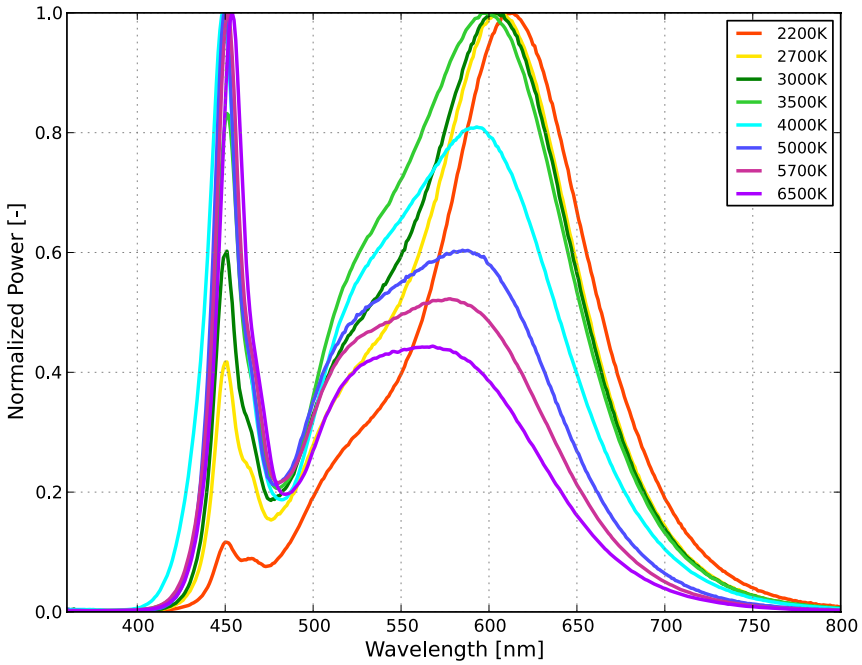

Figure 1b. Typical normalized power vs. wavelength for 80CRI LUXEON 5050 at test current, T_j=25°C.

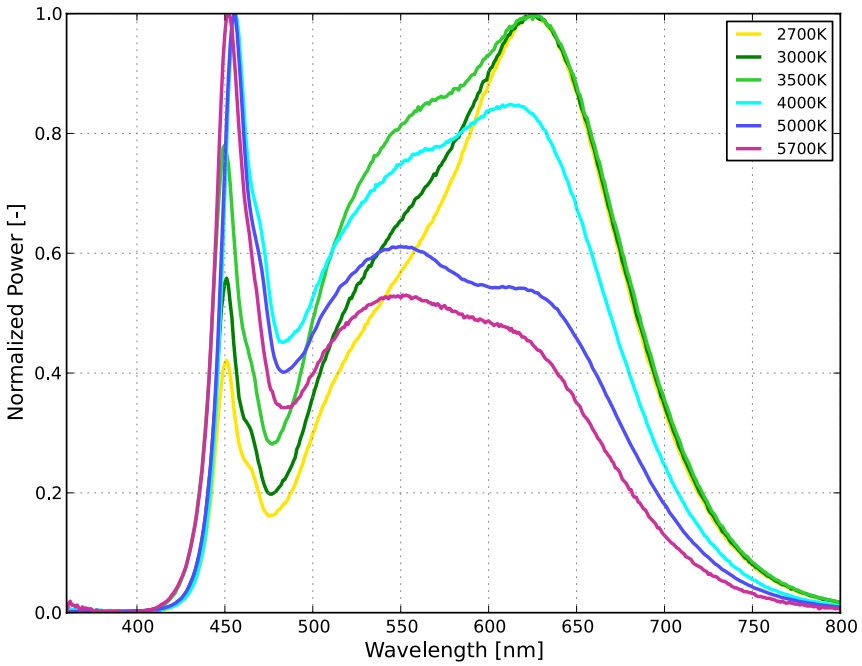

Figure 1c. Typical normalized power vs. wavelength for 90CRI LUXEON 5050 at test current, T_j=25°C.

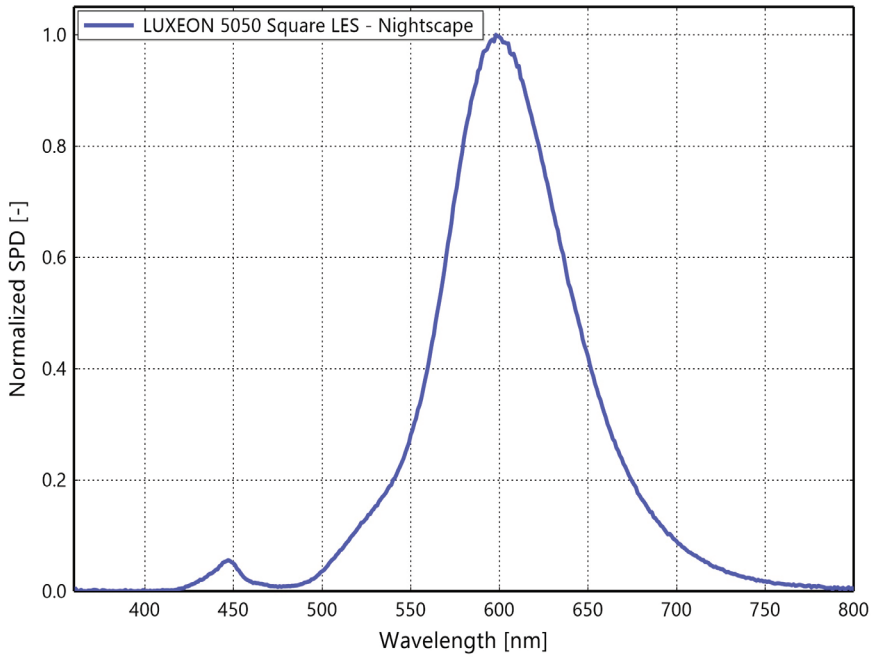

Figure 1d. Typical normalized power vs. wavelength for L150-NSC150xx000x0 at test current, T_j=25°C.

Light Output Characteristics

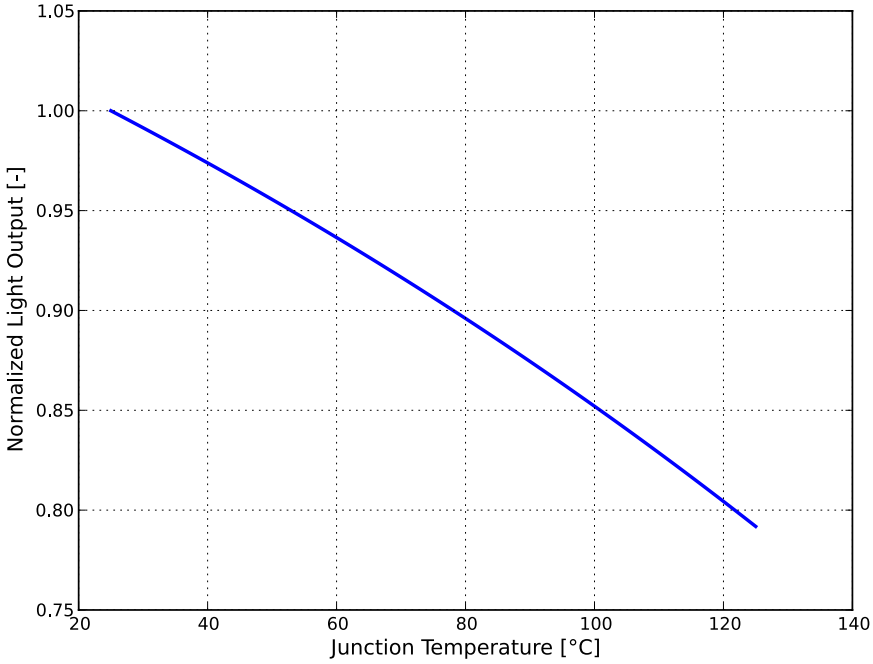

Figure 2. Typical normalized light output vs. junction temperature for all LUXEON 5050 at test current.

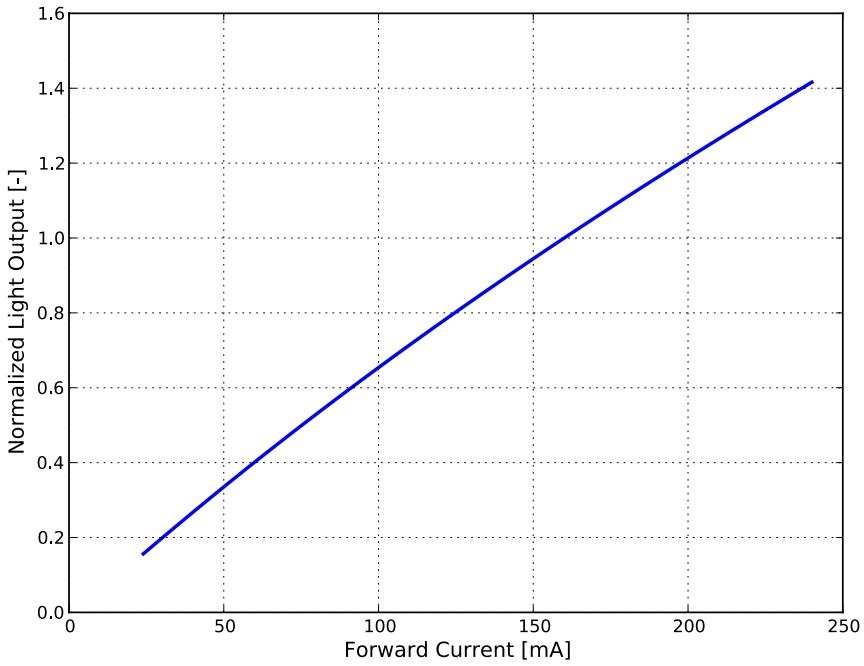

Figure 3a. Typical normalized light output vs. forward current for LUXEON 5050 Round LES - 24V, LUXEON 5050 HE - 24V and LUXEON 5050 Square LES - 30V, T_j=25°C.

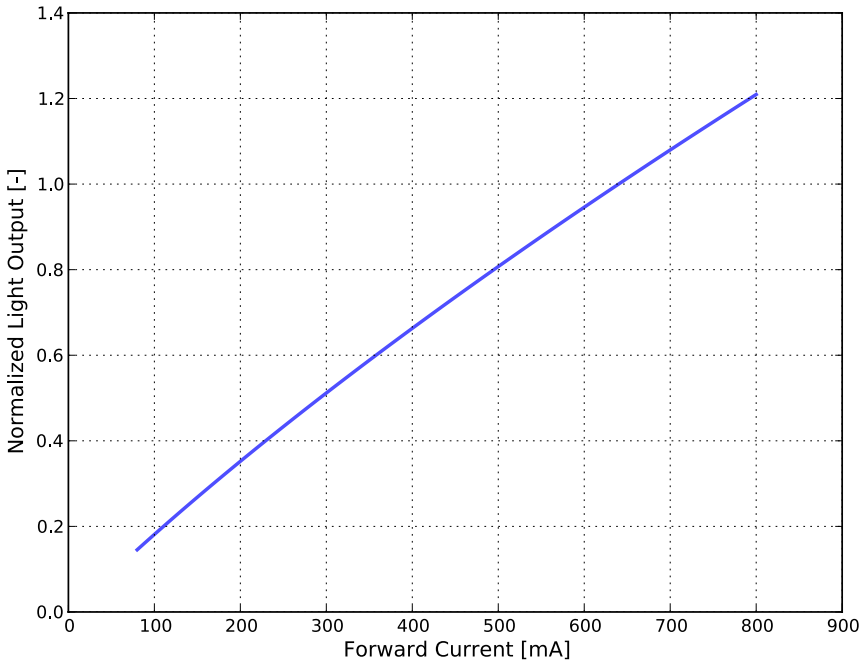

Figure 3b. Typical normalized light output vs. forward current for LUXEON 5050 Round LES - 6V, LUXEON 5050 HE - 6V and LUXEON 5050 HE Plus - 6V, T_j=25°C.

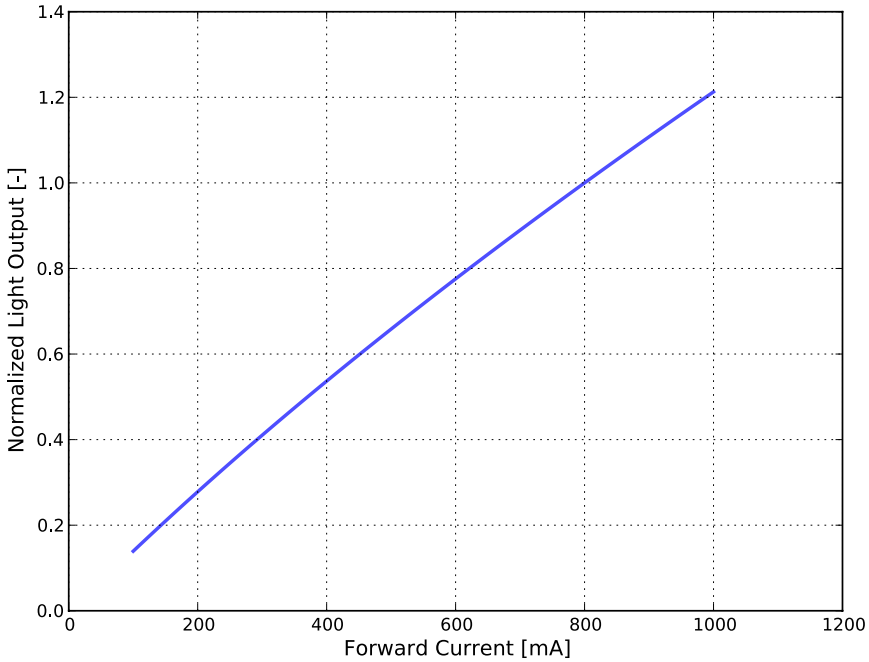

Figure 3c. Typical normalized light output vs. forward current for LUXEON 5050 Square LES - 6V, T_j=25°C.

Forward Current Characteristics

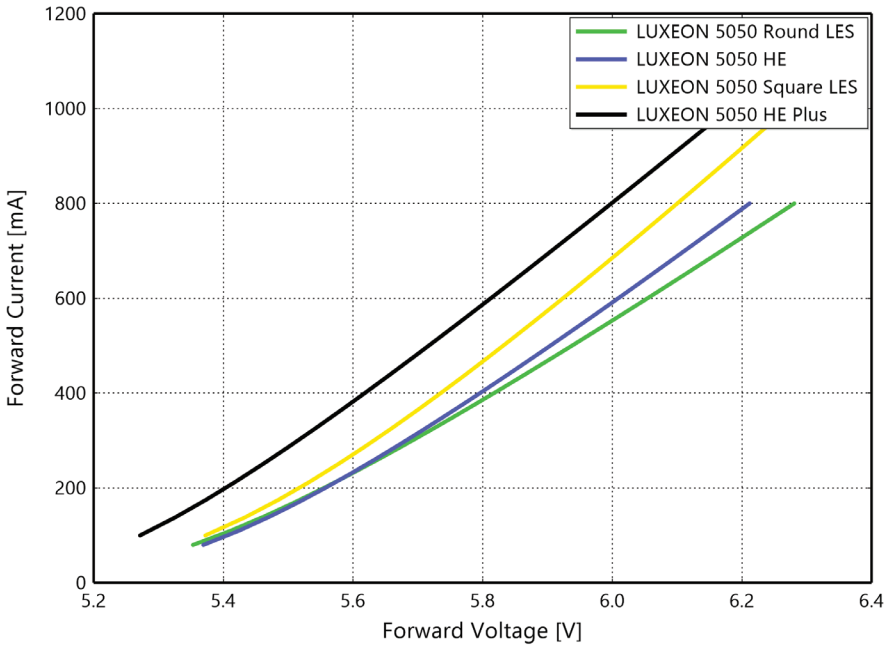

Figure 4a. Typical forward current vs. forward voltage for LUXEON 5050 Round LES - 6V, LUXEON 5050 HE - 6V, LUXEON 5050 Square LES - 6V and LUXEON 5050 HE Plus - 6V, T_j=25°C.

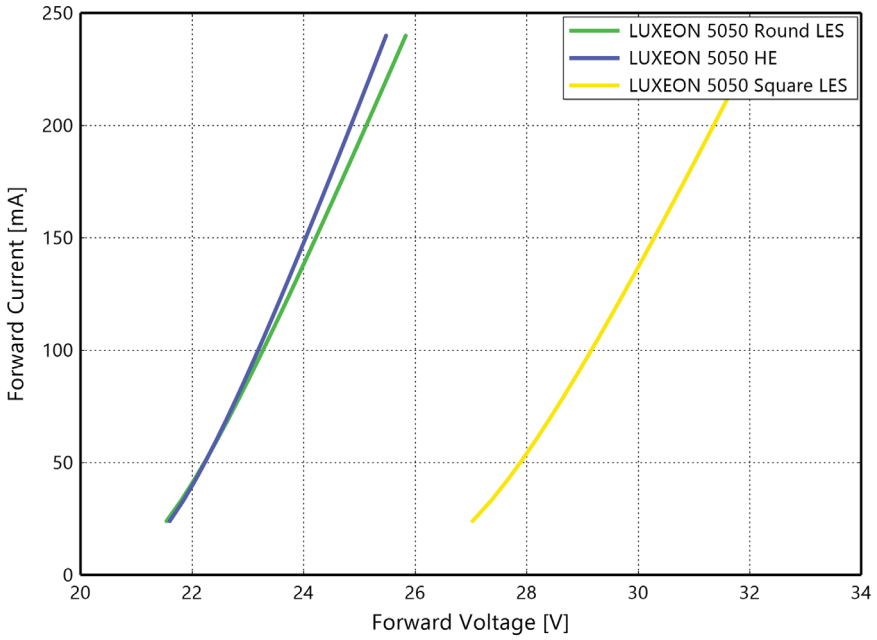

Figure 4b. Typical forward current vs. forward voltage for LUXEON 5050 Round LES - 24V, LUXEON 5050 HE - 24V, LUXEON 5050 Square LES - 30V, T_j=25°C.

Radiation Pattern Characteristics

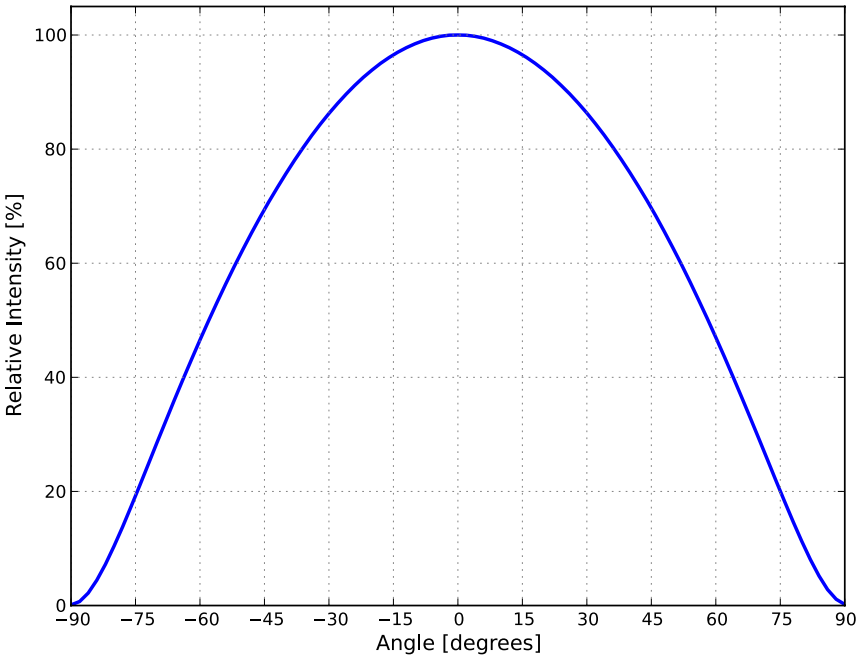

Figure 5. Typical radiation pattern for all LUXEON 5050s at test current, T_j=25°C.

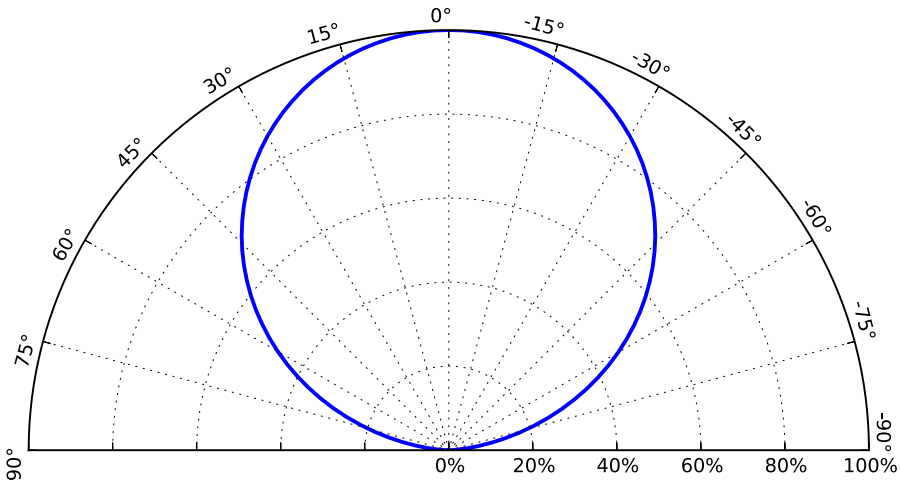

Figure 6. Typical polar radiation pattern for all LUXEON 5050s at test current, T_j=25°C.

Product Bin and Labeling Definitions

Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Lumileds bins LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON 5050 (Round LES) and LUXEON 5050 HE LEDs are labeled using a 4-digit alphanumeric CAT code following the format below:

A B C C

Where:

- **A** – designates luminous flux bin (example: L=600 to 650lm in LUXEON 5050 (Round LES) and M=675 to 700lm in LUXEON 5050 HE)
- **B** – designates color bin (example: 3=3 SDCM, 5=5 SDCM parts)
- **C C** – designates forward voltage bin (example: A1, A2, B1, B2)

Therefore, a LUXEON 5050 (Round LES) with a lumen range of 600 to 650 lm, color bin of 3 and forward voltage range of 23.5 to 24.2V has the following CAT code:

L 3 A 1

LUXEON 5050 (Square LES) LEDs are labeled using a 4-digit alphanumeric CAT code following the format below:

A B B C

Where:

- **A** – designates luminous flux bin (example: L=600 to 650lm, M=650 to 700lm)
- **B B** – designates color bin: (example: 83=2700K and 3 SDCM, 35=5000K and 5 SDCM)
- **C** – designates forward voltage bin (example: A, B, C, D)

Therefore, a LUXEON 5050 (Square LES) with a lumen range of 600 to 650 lm, color bin of 83 and forward voltage range of 29.0 to 30.0V has the following CAT code:

L 8 3 A

Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 5050 LEDs. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 5a. Luminous flux bin definitions for LUXEON 5050 Round LES and Square LES, T_j=25°C.

BIN	LUMINOUS FLUX [1] (lm)	
	MINIMUM	MAXIMUM
G	400	450
H	450	500
J	500	550
K	550	600
L	600	650
M	650	700
N	700	750
P	750	800
Q	800	850
R	850	900
S	900	950
T	950	1000

Notes for Table 5a:
1. Lumileds maintains a tolerance of ±7% on luminous flux measurements.

Table 5b. Luminous flux bin definitions for LUXEON 5050 HE and LUXEON 5050 HE Plus, T_j=25°C.

BIN	LUMINOUS FLUX [1] (lm)	
	MINIMUM	MAXIMUM
B	425	450
C	450	475
D	475	500
E	500	525
F	525	550
G	550	575
H	575	600
J	600	625
K	625	650
L	650	675
M	675	700
N	700	725
P	725	750
Q	750	775

Notes for Table 5b:
1. Lumileds maintains a tolerance of ±7% on luminous flux measurements.

Color Bin Definitions

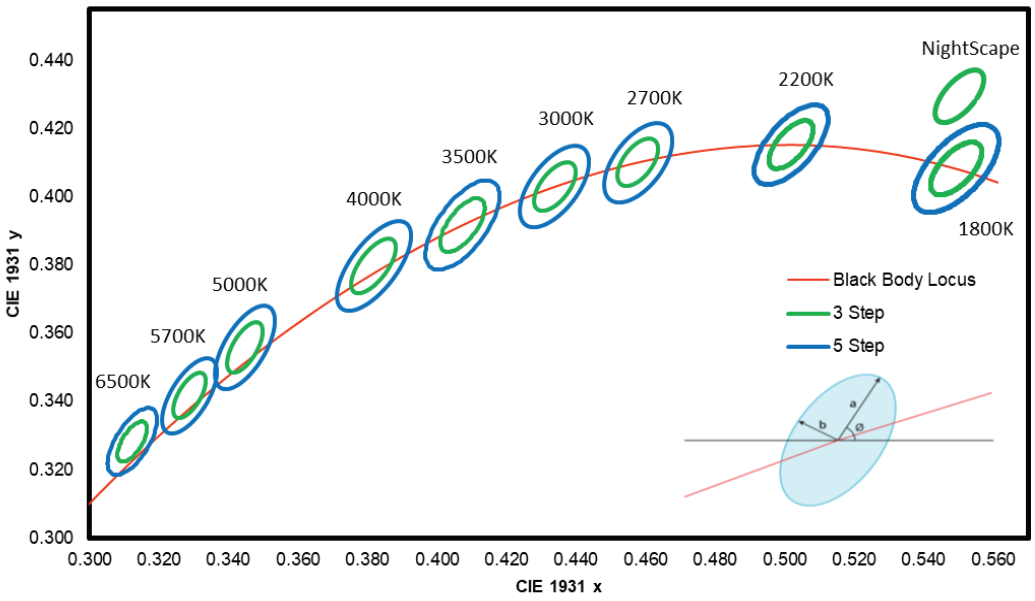

Figure 7. 3- and 5-step MacAdam ellipse illustration for hot-color targeting expected at 85°C.

Table 6. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 5050 at test current, hot-color targeted at T_j=85°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ	LUXEON 5050 ROUND LES, LUXEON 5050 HE AND 5050 HE PLUS COLOR BIN CODE	LUXEON 5050 SQUARE LES COLOR BIN CODE
1850K [2]	Single 3-step MacAdam ellipse	(0.5510, 0.4300)	0.0096	0.0046	49.27	-	N3
1800K	Single 3-step MacAdam ellipse	(0.5493, 0.4083)	0.00962	0.00462	47.34°	3	B3
2200K	Single 3-step MacAdam ellipse	(0.5018, 0.4153)	0.00863	0.00398	49.27°	3	A3
2700K	Single 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00810	0.00420	53.70°	3	83
3000K	Single 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00834	0.00408	53.22°	3	73
3500K	Single 3-step MacAdam ellipse	(0.4073, 0.3917)	0.00927	0.00414	54.00°	3	63
4000K	Single 3-step MacAdam ellipse	(0.3818, 0.3797)	0.00939	0.00402	53.72°	3	53
5000K	Single 3-step MacAdam ellipse	(0.3447, 0.3558)	0.00822	0.00354	59.62°	3	33
5700K	Single 3-step MacAdam ellipse	(0.3287, 0.3417)	0.00745	0.00320	59.09°	3	23
6500K	Single 3-step MacAdam ellipse	(0.3123, 0.3282)	0.00669	0.00285	58.57°	3	13
1800K	Single 5-step MacAdam ellipse	(0.5493, 0.4083)	0.00962	0.00462	47.34°	5	B5
2200K	Single 5-step MacAdam ellipse	(0.5018, 0.4153)	0.01438	0.00663	49.27°	5	A5
2700K	Single 5-step MacAdam ellipse	(0.4578, 0.4101)	0.01350	0.00700	53.70°	5	85
3000K	Single 5-step MacAdam ellipse	(0.4338, 0.4030)	0.01390	0.00680	53.22°	5	75
3500K	Single 5-step MacAdam ellipse	(0.4073, 0.3917)	0.01545	0.00690	54.00°	5	65
4000K	Single 5-step MacAdam ellipse	(0.3818, 0.3797)	0.01565	0.00670	53.72°	5	55
5000K	Single 5-step MacAdam ellipse	(0.3447, 0.3558)	0.01370	0.00590	59.62°	5	35
5700K	Single 5-step MacAdam ellipse	(0.3287, 0.3417)	0.01243	0.00533	59.09°	5	25
6500K	Single 5-step MacAdam ellipse	(0.3123, 0.3282)	0.01115	0.00475	58.57°	5	15

Notes for Table 6:
1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.
2. Also refered as LUXEON 5050 Square LES - Nightscape (L150-NSC150xx000S0).

Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 5050, T_j=25°C.

PART NUMBER	BIN	FORWARD VOLTAGE [1] (V_f)	
		MINIMUM	MAXIMUM
LUXEON 5050 Round LES - 24V	A1	23.5	24.2
	A2	24.2	25.0
	B1	25.0	25.8
	B2	25.8	26.5
LUXEON 5050 Round LES - 6V	A1	5.8	6.0
	A2	6.0	6.2
	B1	6.2	6.4
	B2	6.4	6.6
LUXEON 5050 Square LES - 30V	A	29.0	30.0
	B	30.0	31.0
	C	31.0	32.0
LUXEON 5050 Square LES - 6V	A	5.8	6.0
	B	6.0	6.2
	C	6.2	6.4
	D	6.4	6.6
LUXEON 5050 HE - 24V	A0	22.7	23.5
	A1	23.5	24.2
	A2	24.2	25.0
	B1	25.0	25.8
LUXEON 5050 HE - 6V and LUXEON 5050 HE Plus - 6V	A0	5.6	5.8
	A1	5.8	6.0
	A2	6.0	6.2
	B1	6.2	6.4

Notes for Table 7:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Mechanical Dimensions

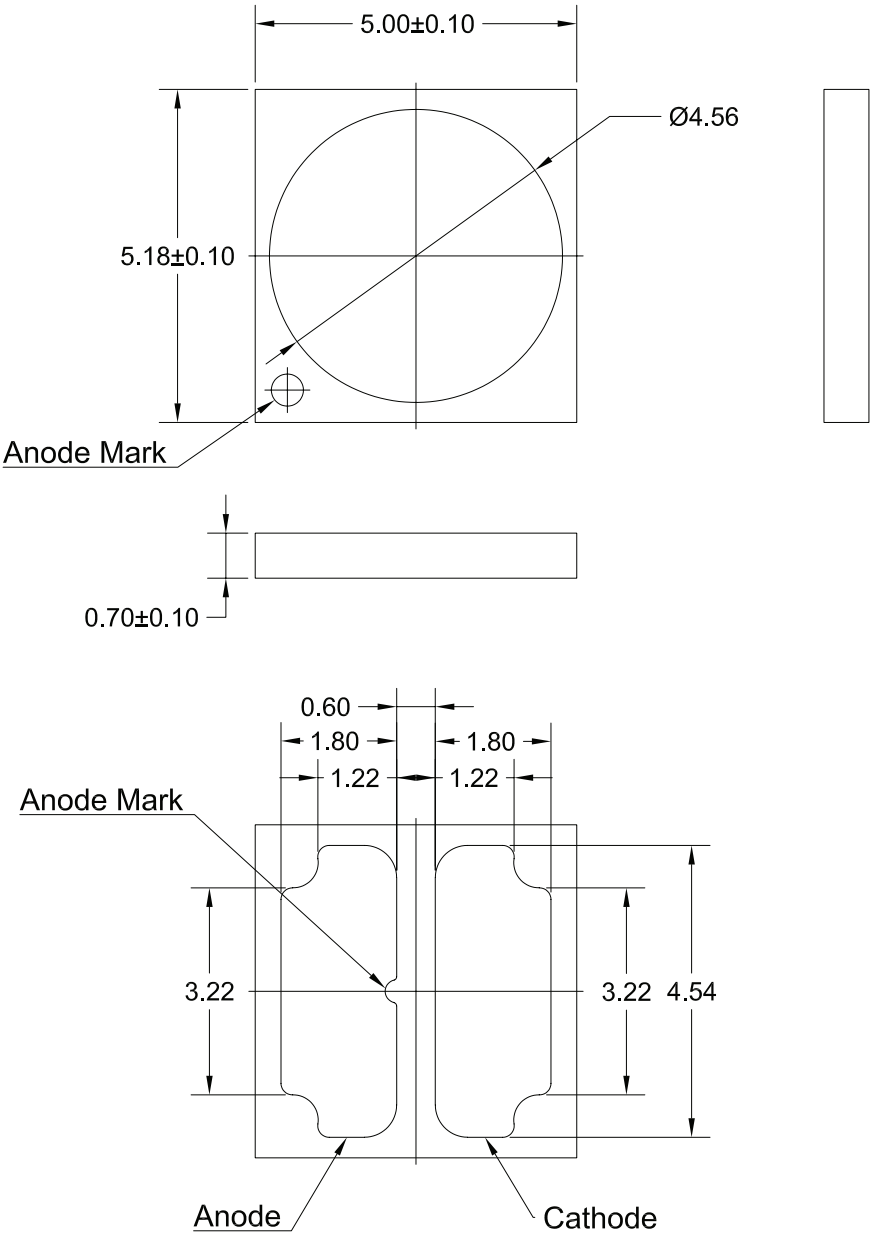

Figure 8a. Mechanical dimensions for LUXEON 5050 Round LES.

Notes for Figure 8a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

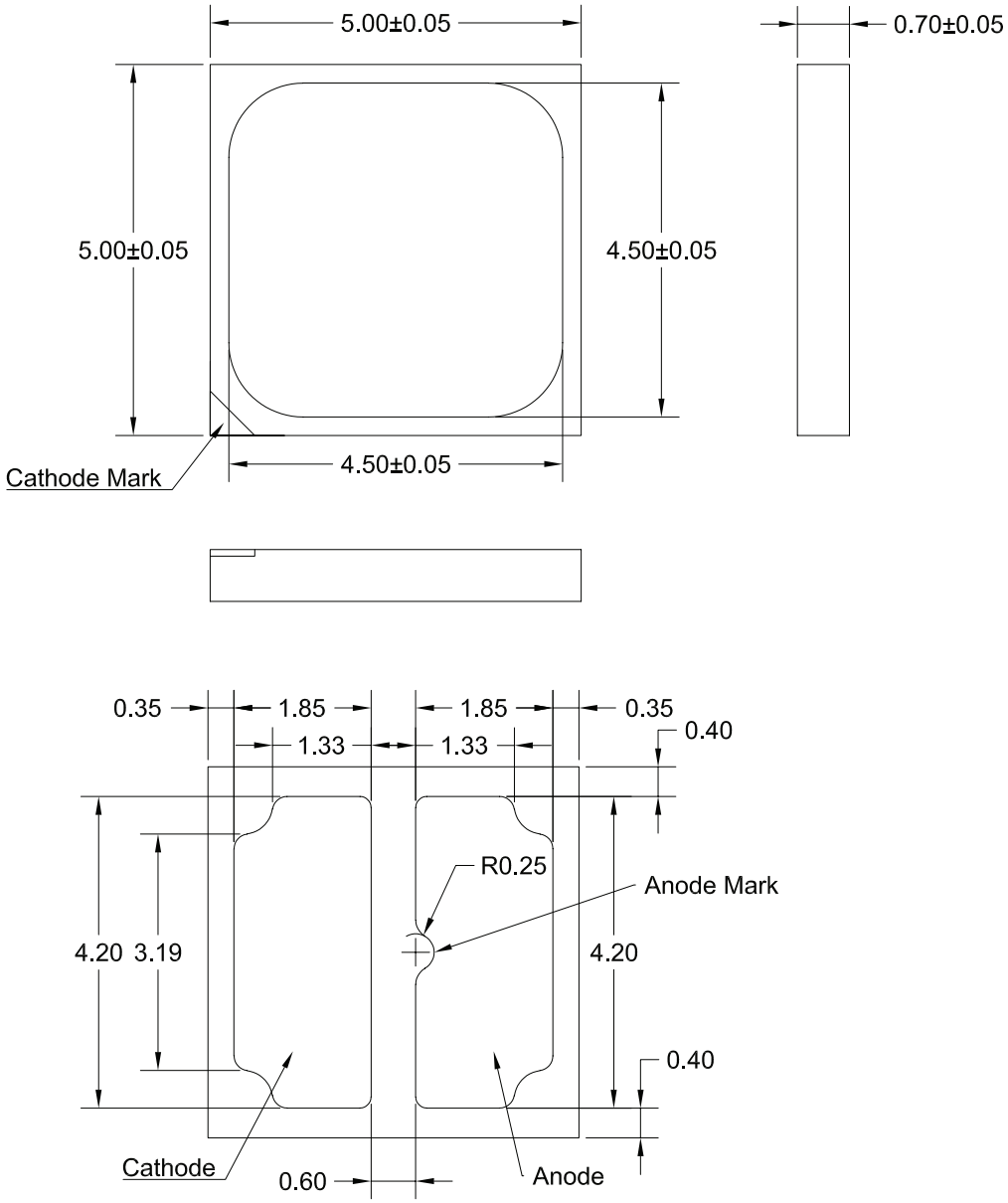

Figure 8b. Mechanical dimensions for LUXEON 5050 Square LES.

Notes for Figures 8b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

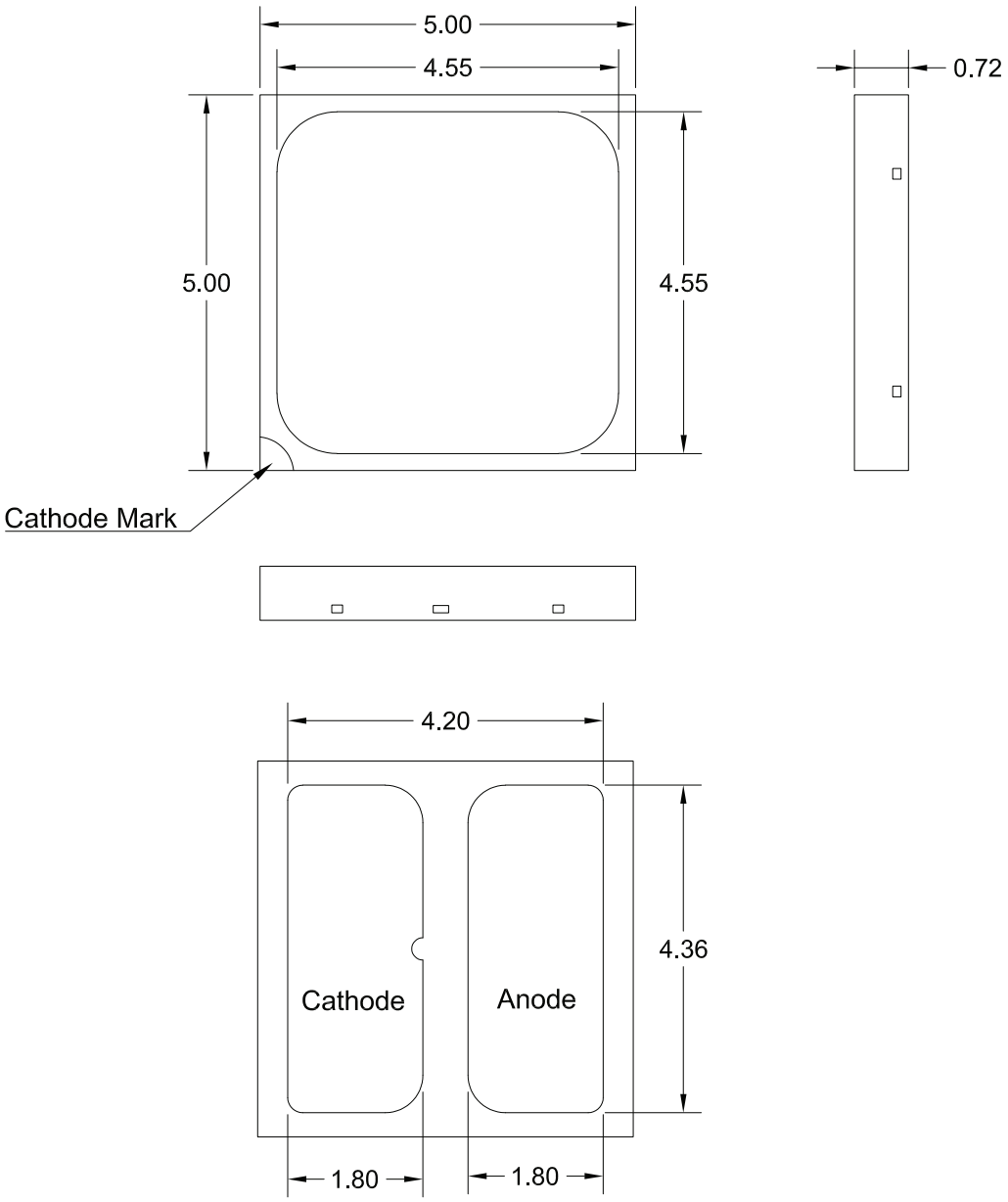

Figure 8c. Mechanical dimensions for LUXEON 5050 HE and LUXEON 5050 HE Plus.

Notes for Figure 8c:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reflow Soldering Guidelines

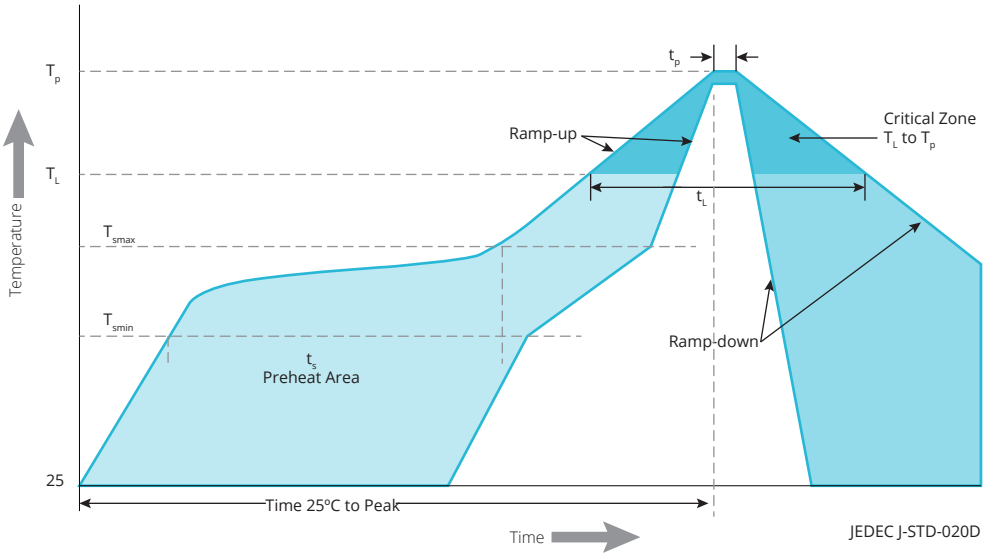

Figure 9. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 5050.

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Minimum Temperature (T_{smin})	150°C
Preheat Maximum Temperature (T_{smax})	200°C
Preheat Time (t_{smin} to t_{smax})	60 to 180 seconds
Ramp-Up Rate (T_L to T_p)	3°C / second maximum
Liquidous Temperature (T_L)	217°C
Time Maintained Above Temperature T_L (t_L)	60 to 150 seconds
Peak / Classification Temperature (T_p)	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	20 to 40 seconds
Ramp-Down Rate (T_p to T_L)	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON 5050.

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
3	168 Hours	≤30°C / 60% RH	192 Hours +5 / -0	30°C / 60% RH

Solder Pad Design

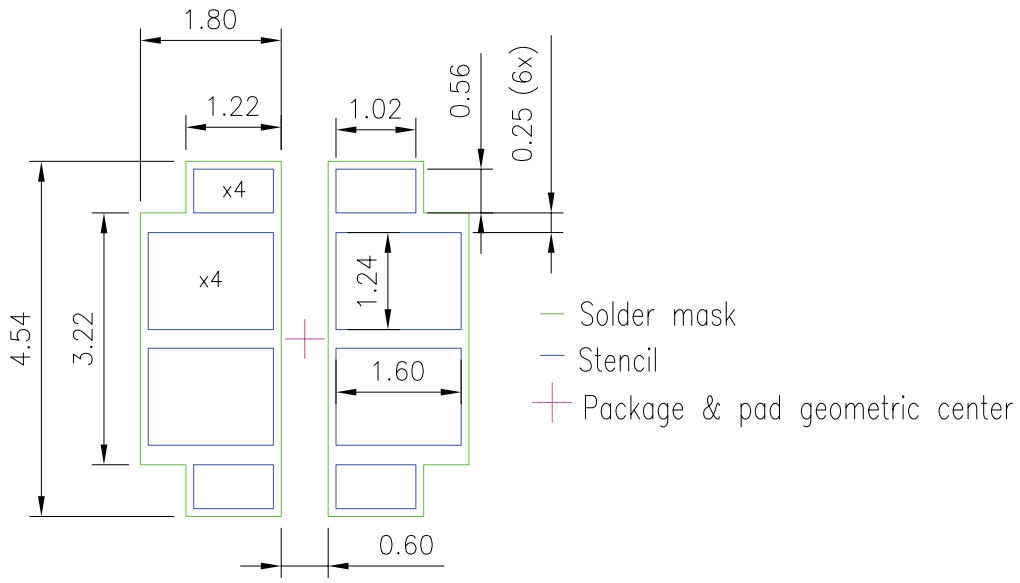

Figure 10. Optional PCB solder pad layout for LUXEON 5050 Round LES, LUXEON 5050 Square LES, LUXEON 5050 HE and LUXEON 5050 HE Plus.

Notes for Figure 10:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. For more details about recommended PCB layout design, please refer to application brief AB174.

Packaging Information

Pocket Tape Dimensions

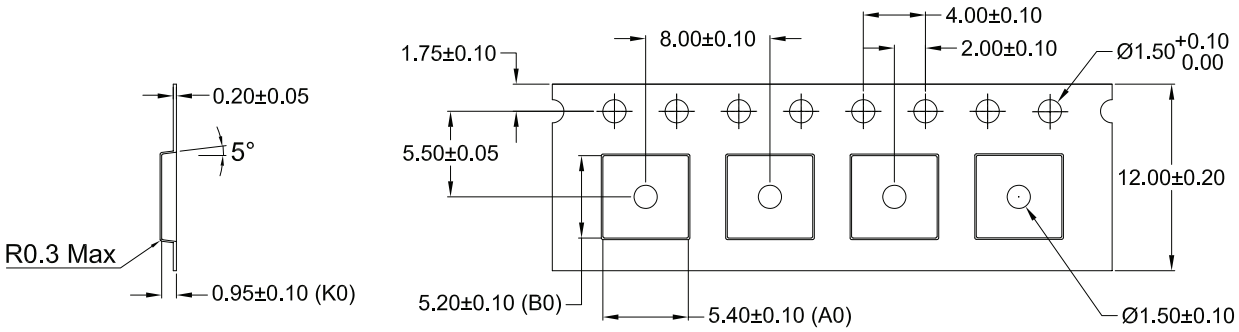

Figure 11. Pocket Tape dimensions for LUXEON 5050 Round LES, LUXEON 5050 Square LES, LUXEON 5050 HE and LUXEON 5050 HE Plus.

Notes for Figure 11:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reel Dimensions

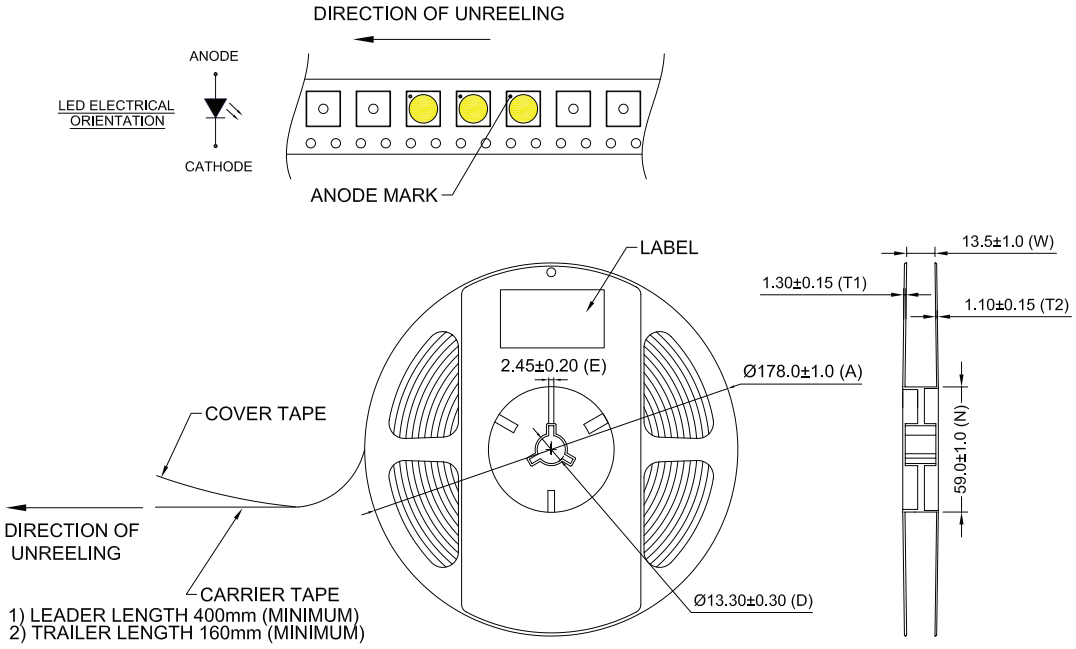

Figure 12a. Reel dimensions for LUXEON 5050 Round LES.

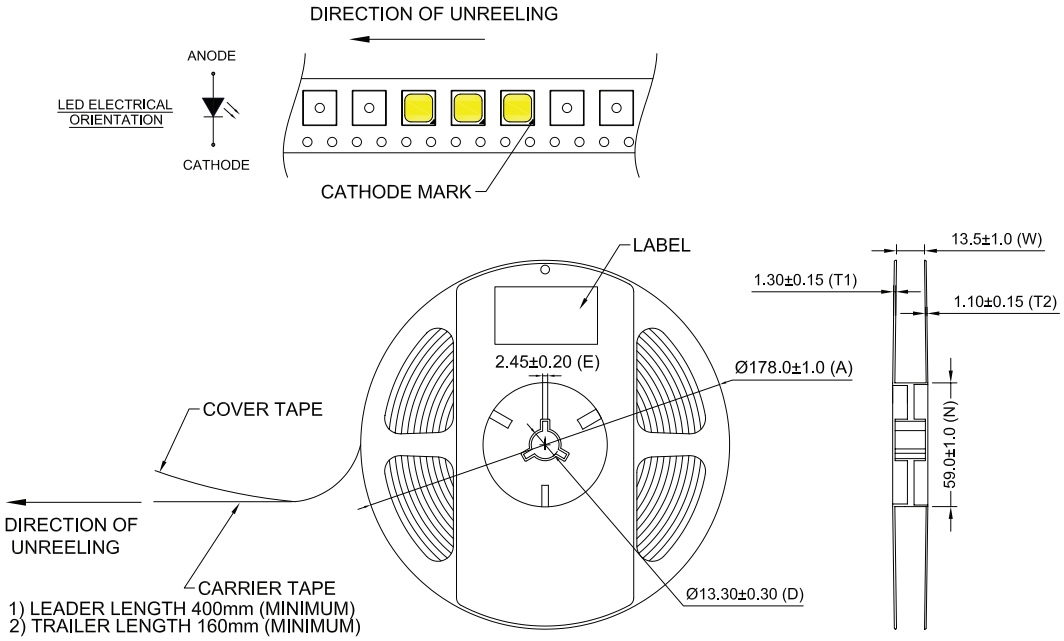

Figure 12b. Reel dimensions for LUXEON 5050 Square LES.

Notes for Figures 12a and 12b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

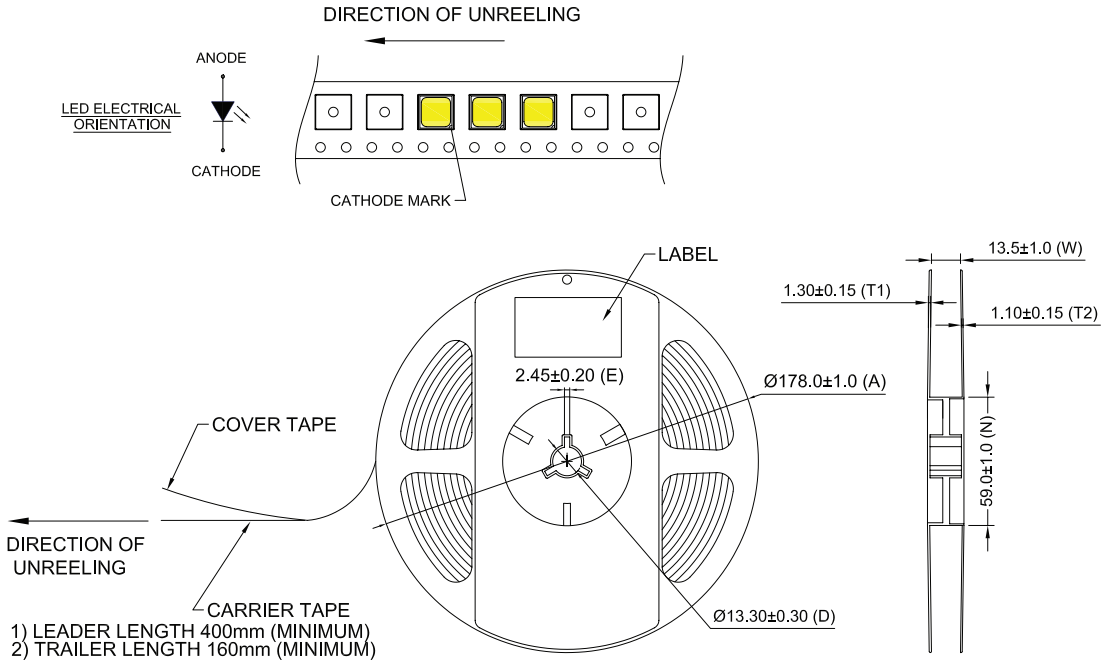

Figure 12c. Reel dimensions for LUXEON 5050 HE and LUXEON 5050 HE Plus.

Notes for Figure 12c:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.

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