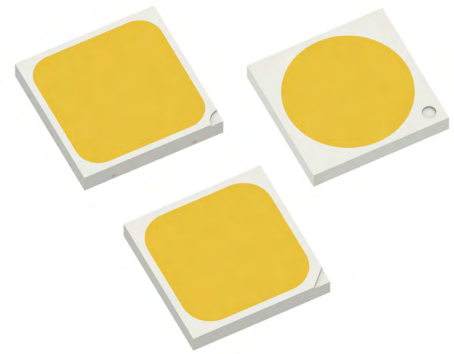


LUXEON 5050

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 and LUXEON 5050 HE, three 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. Furthermore, 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

1. Refer to reliability datasheet for more details.

PRIMARY APPLICATIONS

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

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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 – 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. 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, $T_j=25^\circ\text{C}$.

| 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 $T_j=85^\circ\text{C}$.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at $T_j=25^\circ\text{C}$. 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 $\pm 7\%$ on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE: 6V - 640mA, 24V - 160mA. Rated current of LUXEON 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 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 not 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: 6V - 640mA, 24V - 160mA. Rated current of LUXEON 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 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, $T_j=25^{\circ}\text{C}$, 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 | L150-18705024000TH0 |
| | 2200K | 70 | 544 | 605 | 156 | 359 | 174 | L150-22705024000TH0 |
| | 2700K | 70 | 602 | 672 | 174 | 399 | 193 | L150-27705024000TH0 |
| | 3000K | 70 | 623 | 691 | 178 | 410 | 198 | L150-30705024000TH0 |
| | 3500K | 70 | 632 | 704 | 182 | 418 | 202 | L150-35705024000TH0 |
| | 4000K | 70 | 651 | 722 | 186 | 429 | 207 | L150-40705024000TH0 |
| | 5000K | 70 | 651 | 721 | 186 | 428 | 207 | L150-50705024000TH0 |
| 5700K | 70 | 640 | 710 | 183 | 422 | 204 | L150-57705024000TH0 | |
| 6500K | 70 | 637 | 708 | 183 | 420 | 203 | L150-65705024000TH0 | |
| 2200K | 80 | 474 | 515 | 133 | 306 | 148 | L150-22805024000TH0 | |
| 2700K | 80 | 539 | 586 | 151 | 348 | 168 | L150-27805024000TH0 | |
| 3000K | 80 | 563 | 612 | 158 | 363 | 176 | L150-30805024000TH0 | |
| 3500K | 80 | 586 | 643 | 166 | 382 | 184 | L150-35805024000TH0 | |
| 4000K | 80 | 597 | 660 | 170 | 392 | 189 | L150-40805024000TH0 | |
| 5000K | 80 | 597 | 658 | 170 | 391 | 189 | L150-50805024000TH0 | |
| 5700K | 80 | 595 | 652 | 168 | 387 | 187 | L150-57805024000TH0 | |
| 6500K | 80 | 586 | 650 | 168 | 386 | 186 | L150-65805024000TH0 | |

Table 1a continued on next page:

1. Correlated color temperature is not targeted at $T_j=85^{\circ}\text{C}$.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at $T_j=25^{\circ}\text{C}$. 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 $\pm 7\%$ on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE: 6V - 640mA, 24V - 160mA. Rated current of LUXEON 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 Square LES: 6V - 360mA, 24V/30V - 90mA.
6. With Nightscape technology inside.

Table 1a. Product performance of LUXEON 5050 at rated current, $T_j=25^{\circ}\text{C}$, 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 |
| | 2200K | 80 | 474 | 520 | 134 | 309 | 149 | L150-22805006000H0 |
| | 2700K | 80 | 539 | 598 | 154 | 355 | 172 | L150-27805006000H0 |
| | 3000K | 80 | 563 | 625 | 161 | 371 | 179 | L150-30805006000H0 |
| | 3500K | 80 | 586 | 650 | 168 | 386 | 186 | L150-35805006000H0 |
| | 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 | L150-18705006000TH0 |
| | 2200K | 70 | 544 | 605 | 156 | 359 | 174 | L150-22705006000TH0 |
| | 2700K | 70 | 602 | 672 | 174 | 399 | 193 | L150-27705006000TH0 |
| | 3000K | 70 | 623 | 691 | 178 | 410 | 198 | L150-30705006000TH0 |
| | 3500K | 70 | 632 | 704 | 182 | 418 | 202 | L150-35705006000TH0 |
| | 4000K | 70 | 651 | 722 | 186 | 429 | 207 | L150-40705006000TH0 |
| | 5000K | 70 | 651 | 721 | 186 | 428 | 207 | L150-50705006000TH0 |
| 5700K | 70 | 640 | 710 | 183 | 422 | 204 | L150-57705006000TH0 | |
| 6500K | 70 | 637 | 708 | 183 | 420 | 203 | L150-65705006000TH0 | |
| 2200K | 80 | 474 | 515 | 133 | 306 | 148 | L150-22805006000TH0 | |
| 2700K | 80 | 539 | 586 | 151 | 348 | 168 | L150-27805006000TH0 | |
| 3000K | 80 | 563 | 612 | 158 | 363 | 176 | L150-30805006000TH0 | |
| 3500K | 80 | 586 | 643 | 166 | 382 | 184 | L150-35805006000TH0 | |
| 4000K | 80 | 597 | 660 | 170 | 392 | 189 | L150-40805006000TH0 | |
| 5000K | 80 | 597 | 658 | 170 | 391 | 189 | L150-50805006000TH0 | |
| 5700K | 80 | 595 | 652 | 168 | 387 | 187 | L150-57805006000TH0 | |
| 6500K | 80 | 586 | 650 | 168 | 386 | 186 | L150-65805006000TH0 | |

Notes for Table 1a:

1. Correlated color temperature is hot targeted at $T_j=85^{\circ}\text{C}$.
2. Luminous flux and CRI are based upon mounted package on highly reflective surface at $T_j=25^{\circ}\text{C}$. 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 $\pm 7\%$ on luminous flux measurements.
4. Parts are specified at rated current: LUXEON 5050 Round LES/LUXEON 5050 HE: 6V - 640mA, 24V - 160mA. Rated current of LUXEON 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 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, $T_j=25^{\circ}\text{C}$.

| 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, $T_j=25^{\circ}\text{C}$.

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

Notes for Table 2:

- Total angle at which 90% of total luminous flux is captured.
- 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, $T_j=25^{\circ}\text{C}$.

| PART NUMBER | 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 | | |
| L150-xxxx502400000 | 23.5 | 24.4 | 26.5 | -12 | 2.4 |
| L150-xxxx500600000 | 5.8 | 6.1 | 6.6 | -3 | 2.4 |
| L150-xxxx5030000S0 | 29.0 | 30.5 | 32.0 | -15 | 1.4 |
| L150-xxxx5006000S0 | 5.8 | 6.1 | 6.6 | -3 | 1.4 |
| L150-xxxx502400xH0 | 22.7 | 24.2 | 25.8 | -12 | 2.2 |
| L150-xxxx500600xH0 | 5.6 | 6.05 | 6.4 | -3 | 2.2 |

Notes for Table 3:

- Lumileds maintains a tolerance of $\pm 0.1\text{V}$ on forward voltage measurements.
- 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 L150-xxxx502400000 800mA for L150-xxxx500600000 240mA for L150-xxxx5030000S0 1000mA for L150-xxxx5006000S0 240mA for L150-xxxx502400xH0 800mA for L150-xxxx500600xH0 |
| Peak Pulsed Forward Current ^[1,3] | 300mA for L150-xxxx502400000 1000mA for L150-xxxx500600000 300mA for L150-xxxx5030000S0 1250mA for L150-xxxx5006000S0 300mA for L150-xxxx502400xH0 1000mA for L150-xxxx500600xH0 |
| LED Junction Temperature ^[1] (DC & Pulse) | 125°C |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012) | Class 2 for L150-xxxx50xx00000; L150-xxxx50xx000H0; L150-xxxx50xx000S0 Class 3B for L150-xxxx50xx00TH0 |
| 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:

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- 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
- At $\leq 50\%$ duty cycle with pulse width of 5ms.

Characteristic Curves

Spectral Power Distribution Characteristics

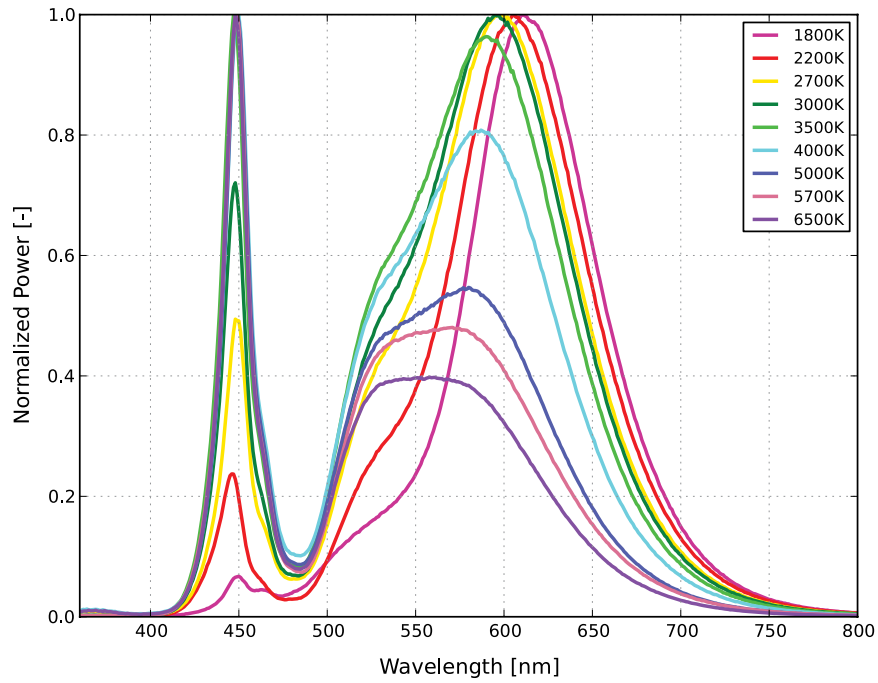


Figure 1a. Typical normalized power vs. wavelength for L150-xx7050xx00xx0 at test current, $T_j=25^\circ\text{C}$.

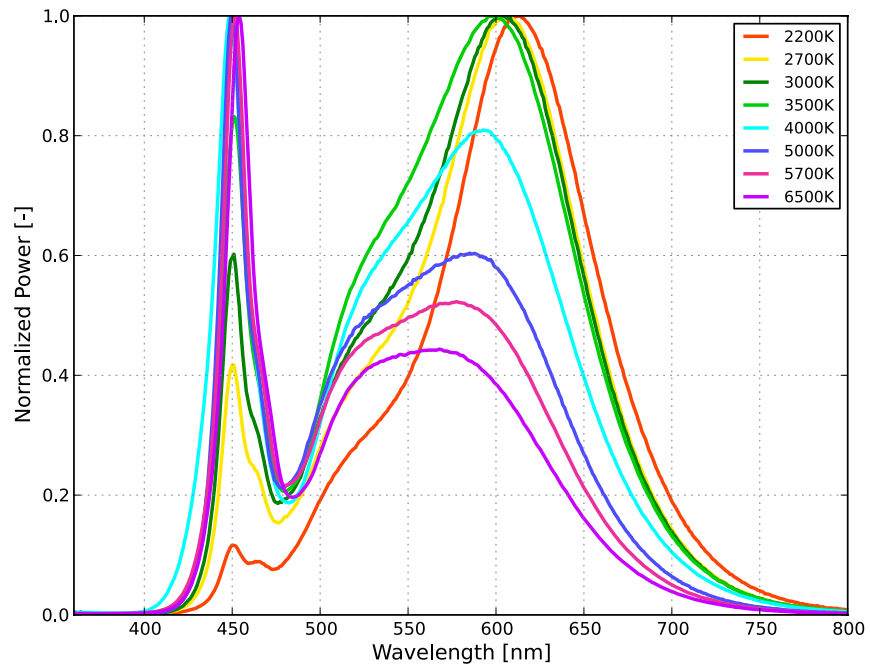


Figure 1b. Typical normalized power vs. wavelength for L150-xx8050xx00xx0 at test current, $T_j=25^\circ\text{C}$.

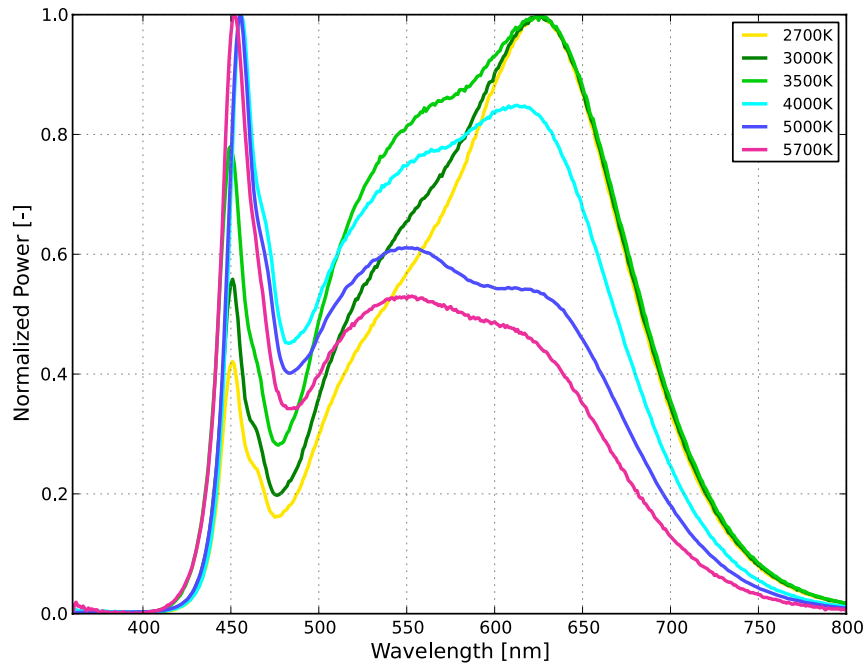


Figure 1c. Typical normalized power vs. wavelength for L150-xx9050xx00xx0 at test current, $T_j=25^\circ\text{C}$.

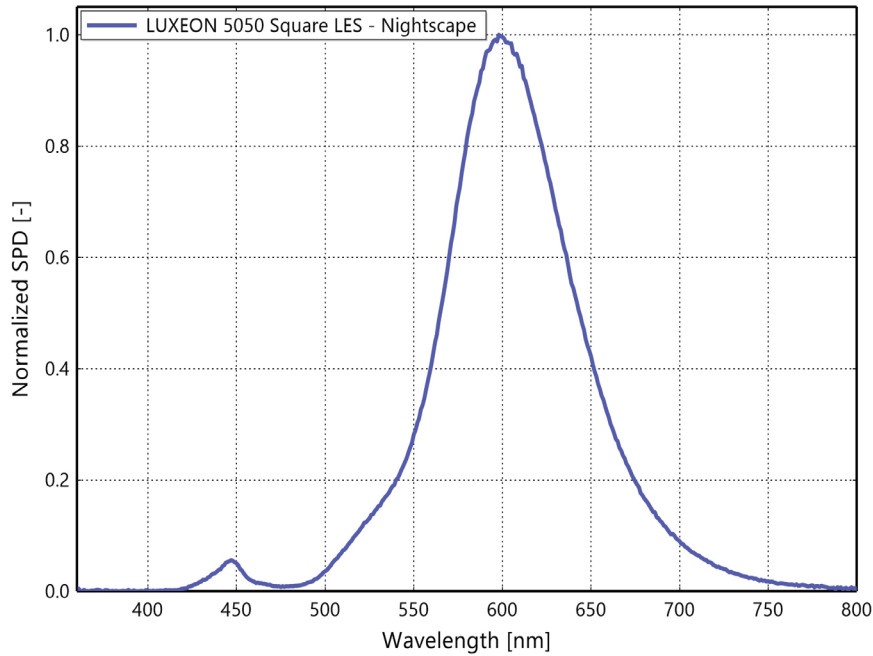


Figure 1d. Typical normalized power vs. wavelength for L150-NSC150xx000x0 at test current, $T_j=25^\circ\text{C}$.

Light Output Characteristics

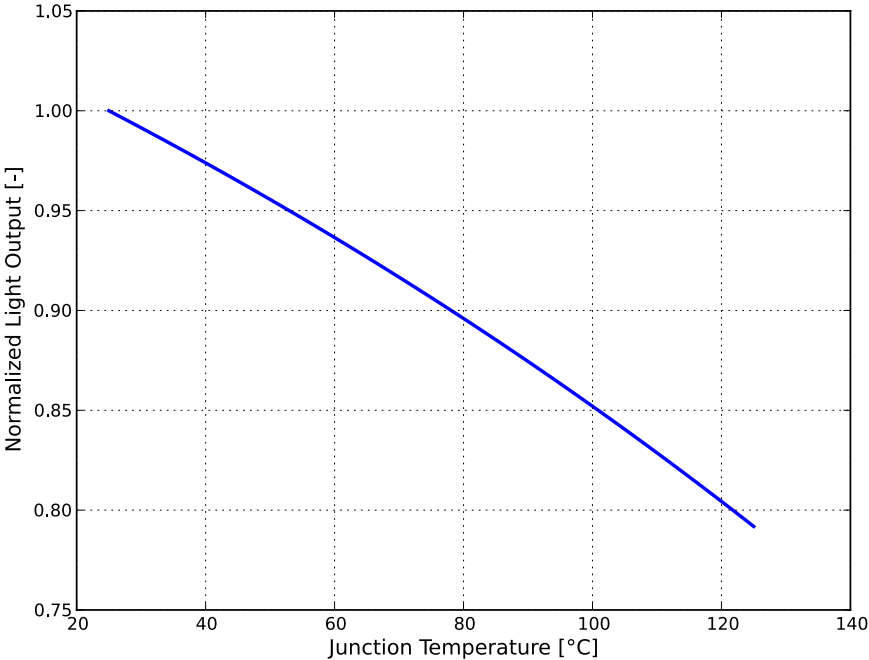


Figure 2. Typical normalized light output vs. junction temperature for L150-xxxx50xx00xx0 at specified test current.

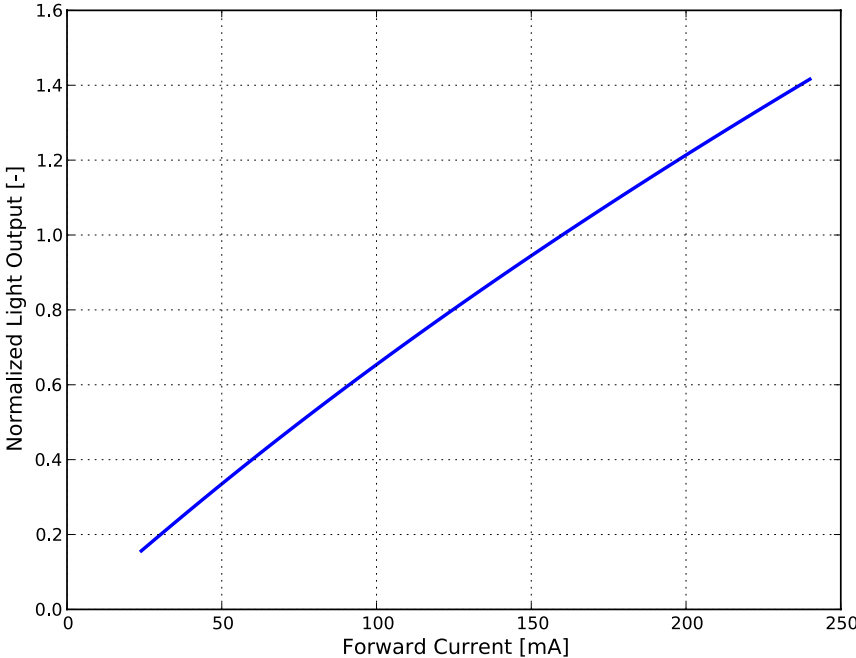


Figure 3a. Typical normalized light output vs. forward current for L150-xxxx502400000, L150-xxxx502400xH0 and L150-xxxx5030000S0, $T_j=25^{\circ}\text{C}$.

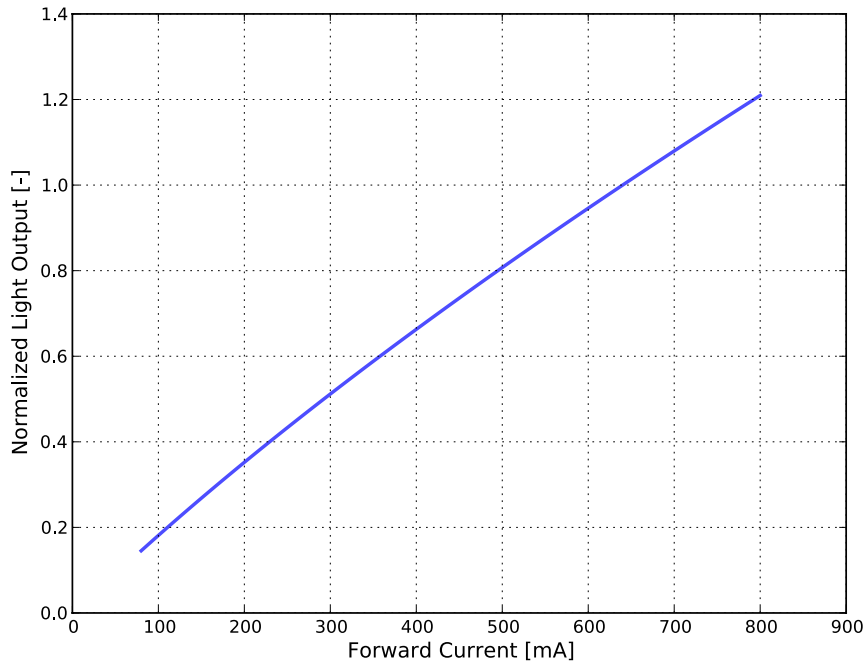


Figure 3b. Typical normalized light output vs. forward current for L150-xxxx500600000 and L150-xxxx500600xH0, $T_j=25^\circ\text{C}$.

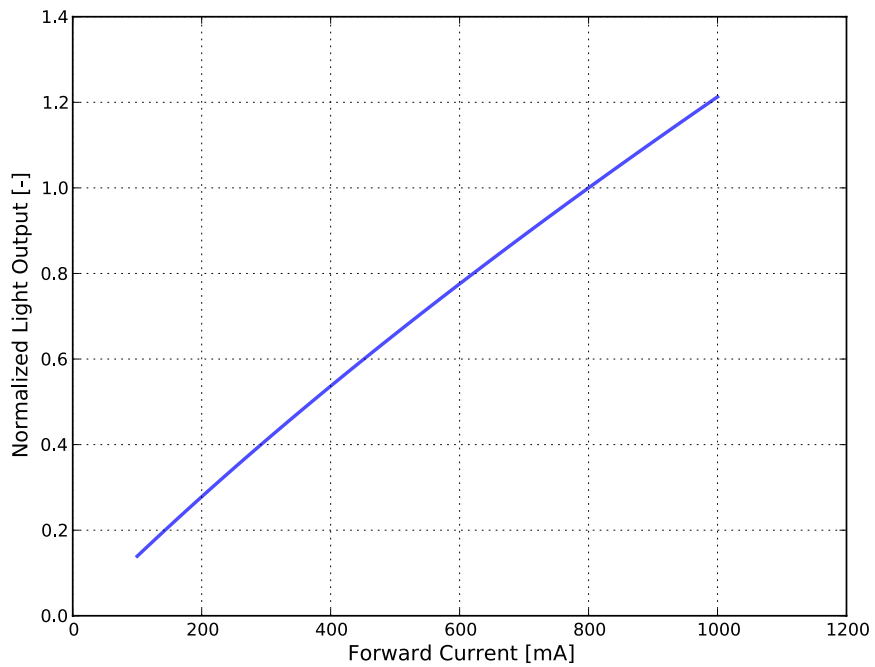


Figure 3c. Typical normalized light output vs. forward current for L150-xxxx50060000S0, $T_j=25^\circ\text{C}$.

Forward Current Characteristics

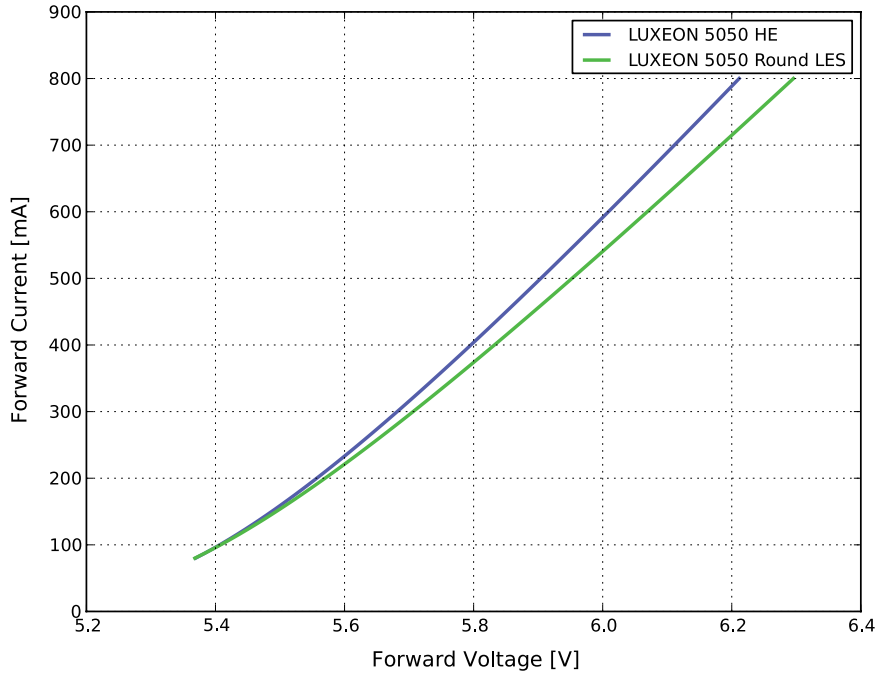


Figure 4a. Typical forward current vs. forward voltage for L150-xxxx500600000 and L150-xxxx500600xH0, $T_j=25^{\circ}\text{C}$.

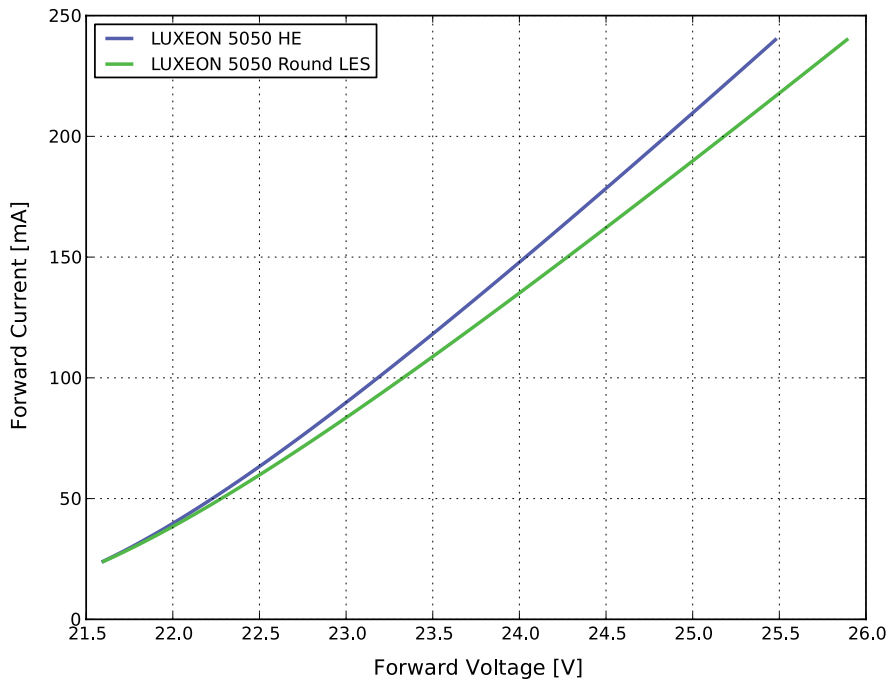


Figure 4b. Typical forward current vs. forward voltage for L150-xxxx502400000 and L150-xxxx502400xH0, $T_j=25^{\circ}\text{C}$.

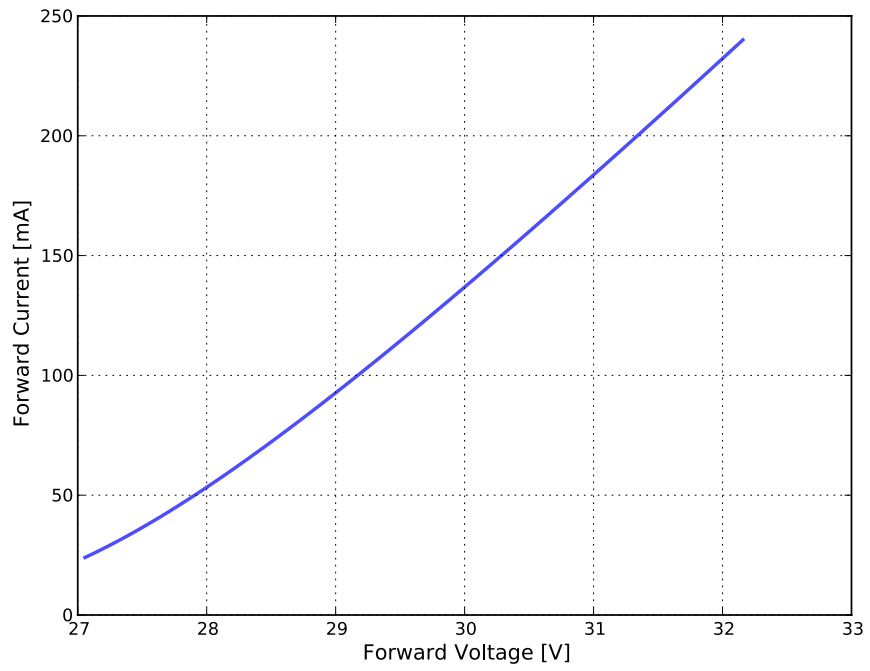


Figure 4c. Typical forward current vs. forward voltage for L150-xxxx5030000S0, $T_j=25^\circ\text{C}$.

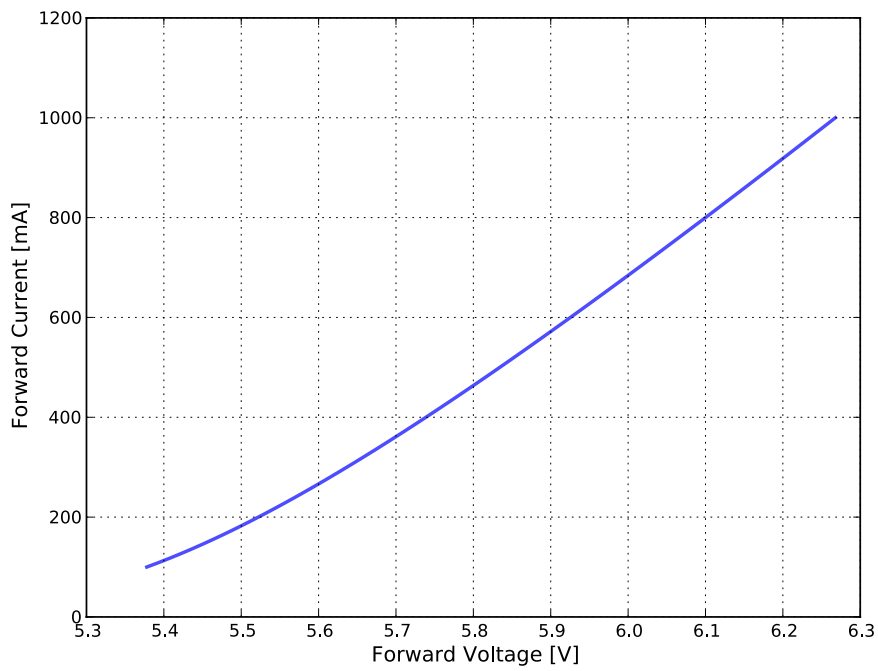


Figure 4d. Typical forward current vs. forward voltage for L150-xxxx5006000S0, $T_j=25^\circ\text{C}$.

Radiation Pattern Characteristics

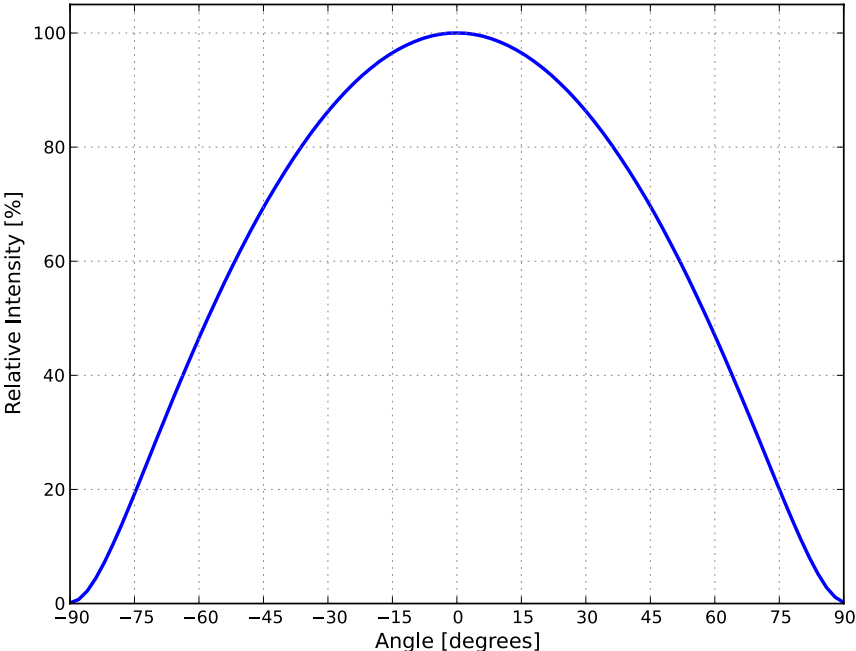


Figure 5. Typical radiation pattern for L150-xxxx50xx00xx0 at test current, $T_j=25^{\circ}\text{C}$.

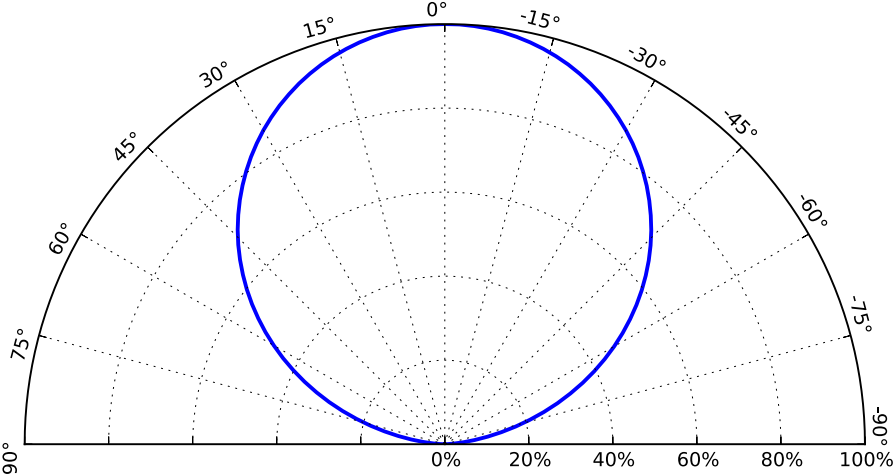


Figure 6. Typical polar radiation pattern for L150-xxxx50xx00xx0 at test current, $T_j=25^{\circ}\text{C}$.

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 650 lm, M=650 to 700 lm)
- 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, $T_j=25^\circ\text{C}$.

| 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 $\pm 7\%$ on luminous flux measurements.

Table 5b. Luminous flux bin definitions for LUXEON 5050 HE, $T_j=25^\circ\text{C}$.

| 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 $\pm 7\%$ on luminous flux measurements.

Color Bin Definitions

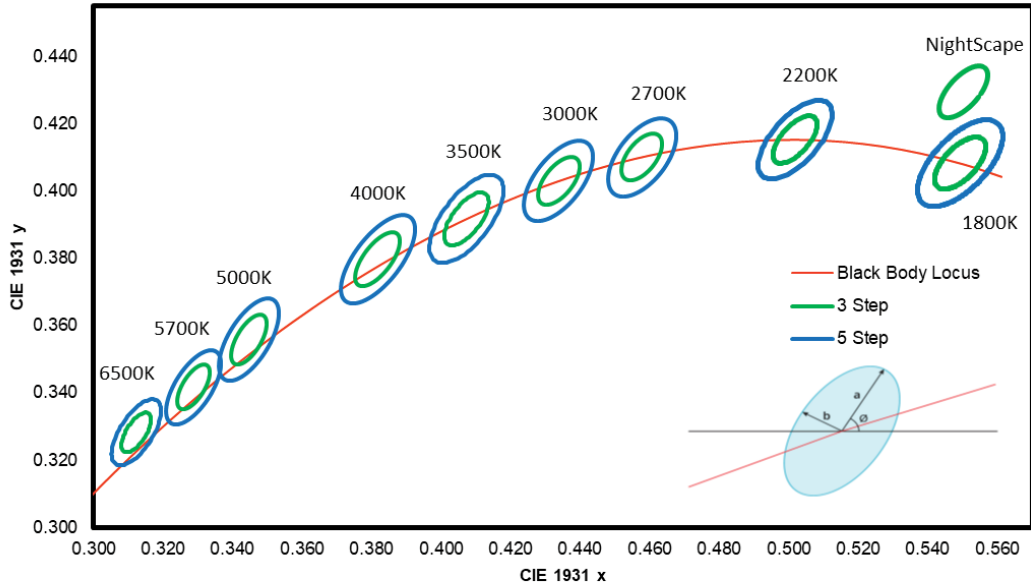


Figure 7. 3- and 5-step MacAdam ellipse illustration for hot-color targeting expected at 85°C.

Table 6. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 5050 at test current, hot-color targeted at $T_j=85^\circ\text{C}$.

| NOMINAL CCT | COLOR SPACE | CENTER POINT ⁽¹⁾ (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ | LUXEON 5050 ROUND LES AND LUXEON 5050 HE 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:

- Lumileds maintains a tolerance of ± 0.005 on x and y coordinates in the CIE 1931 color space.
- Also referred as LUXEON 5050 Square LES - Nightscape (L150-NSC150xx00050).

Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 5050, $T_j=25^{\circ}\text{C}$.

| PART NUMBER | BIN | FORWARD VOLTAGE ⁽¹⁾ (V _f) | |
|--------------------|-----|--|---------|
| | | MINIMUM | MAXIMUM |
| L150-xxxx502400000 | A1 | 23.5 | 24.2 |
| | A2 | 24.2 | 25.0 |
| | B1 | 25.0 | 25.8 |
| | B2 | 25.8 | 26.5 |
| L150-xxxx500600000 | A1 | 5.8 | 6.0 |
| | A2 | 6.0 | 6.2 |
| | B1 | 6.2 | 6.4 |
| | B2 | 6.4 | 6.6 |
| L150-xxxx5030000S0 | A | 29.0 | 30.0 |
| | B | 30.0 | 31.0 |
| | C | 31.0 | 32.0 |
| L150-xxxx5006000S0 | A | 5.8 | 6.0 |
| | B | 6.0 | 6.2 |
| | C | 6.2 | 6.4 |
| | D | 6.4 | 6.6 |
| L150-xxxx502400xH0 | A0 | 22.7 | 23.5 |
| | A1 | 23.5 | 24.2 |
| | A2 | 24.2 | 25.0 |
| | B1 | 25.0 | 25.8 |
| L150-xxxx500600xH0 | 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 $\pm 0.1\text{V}$ on forward voltage measurements.

Mechanical Dimensions

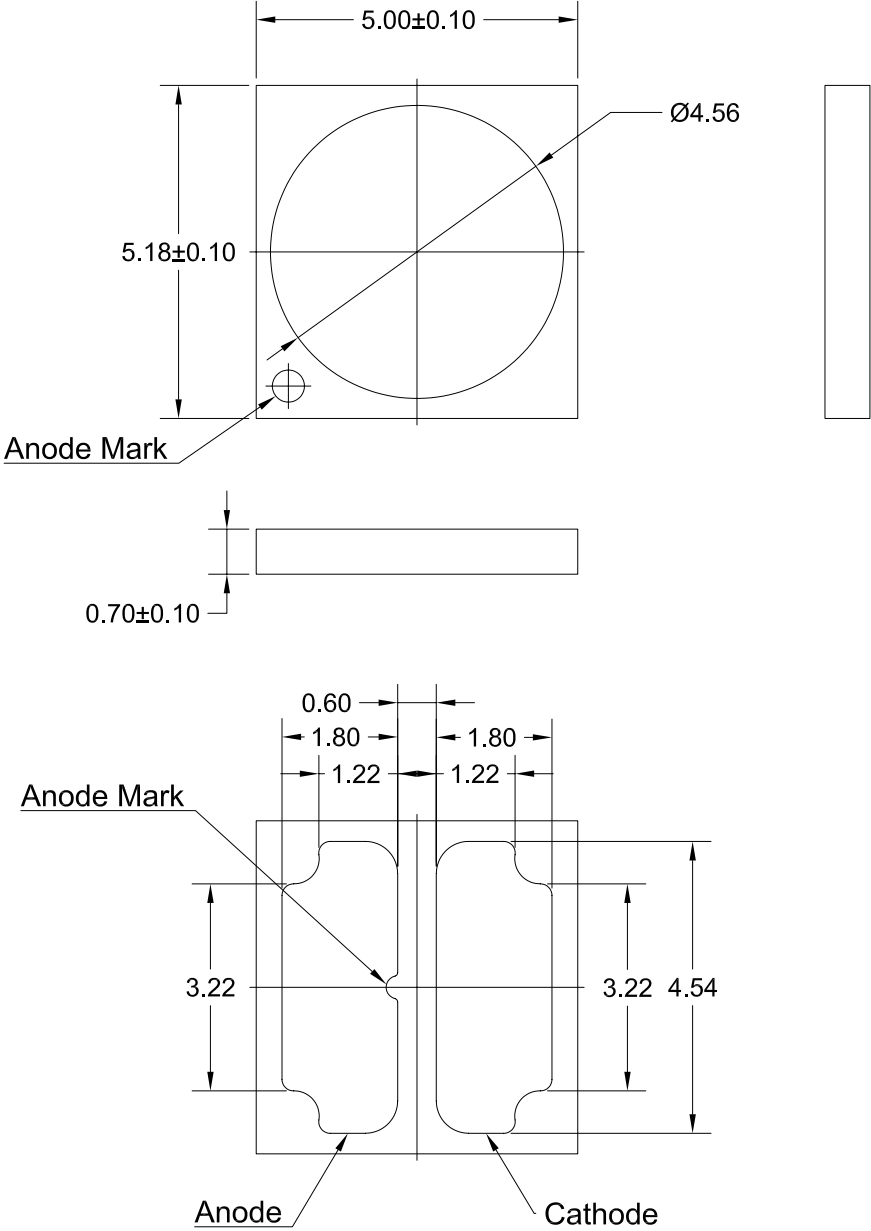


Figure 8a. Mechanical dimensions for LUXEON 5050 Round LES.

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

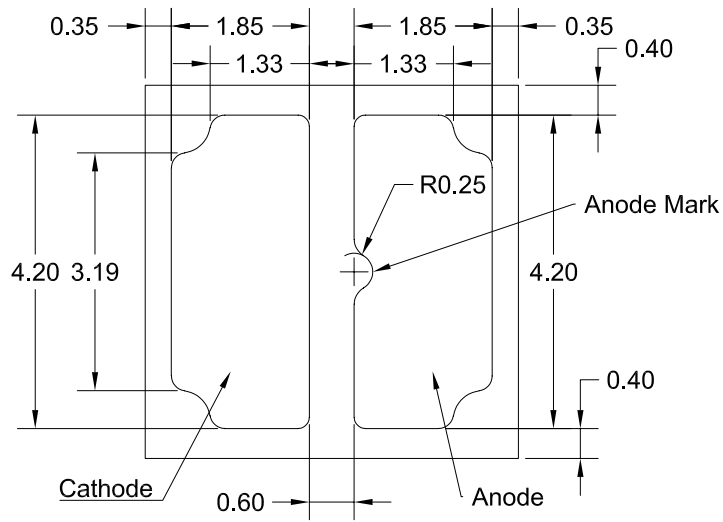
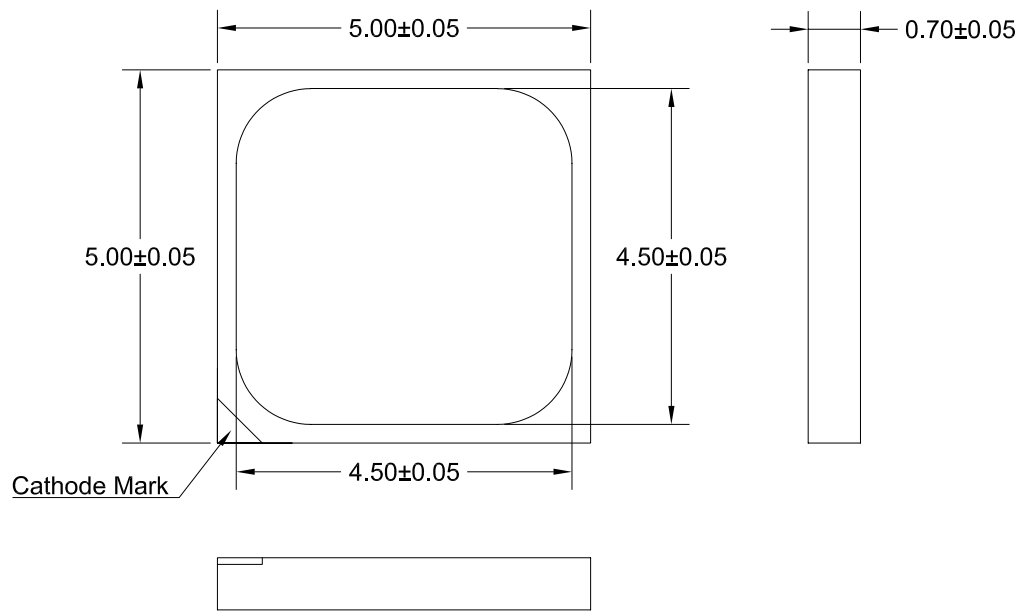


Figure 8b. Mechanical dimensions for LUXEON 5050 Square LES.

Notes for Figures 8b:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

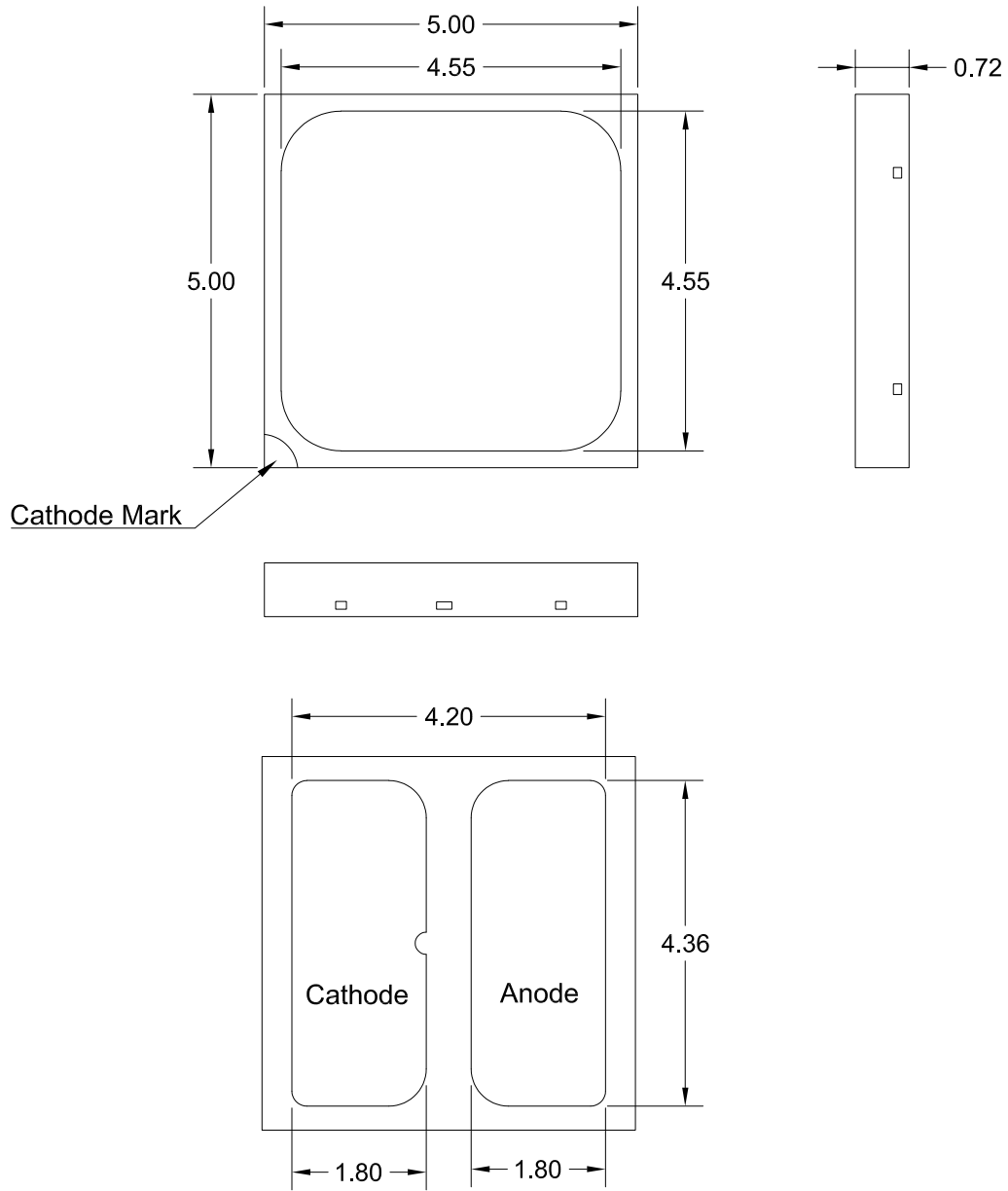


Figure 8c. Mechanical dimensions for LUXEON 5050 HE.

Notes for Figure 8c:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reflow Soldering Guidelines

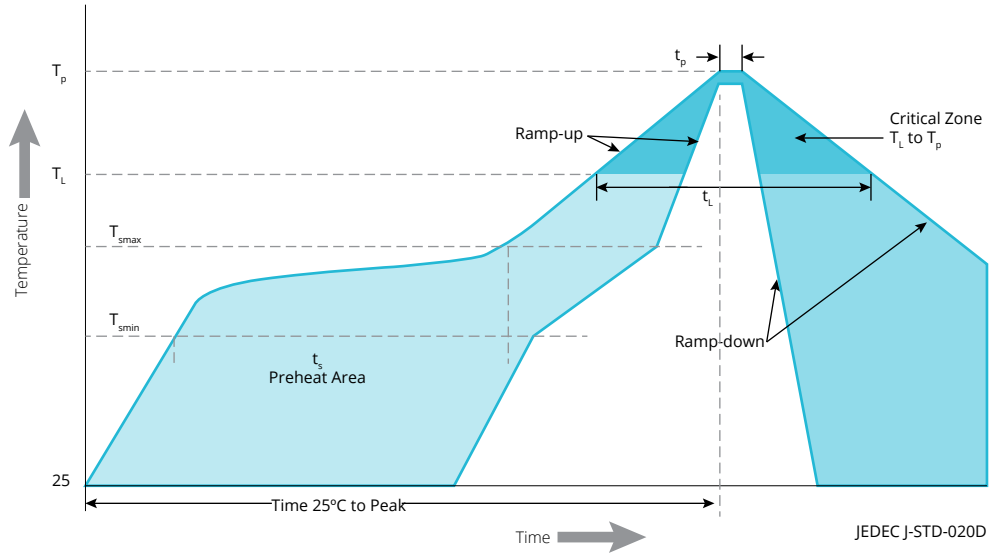


Figure 9. Visualization of the acceptable reflow temperature profile as specified in Table 8.

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_t) | 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

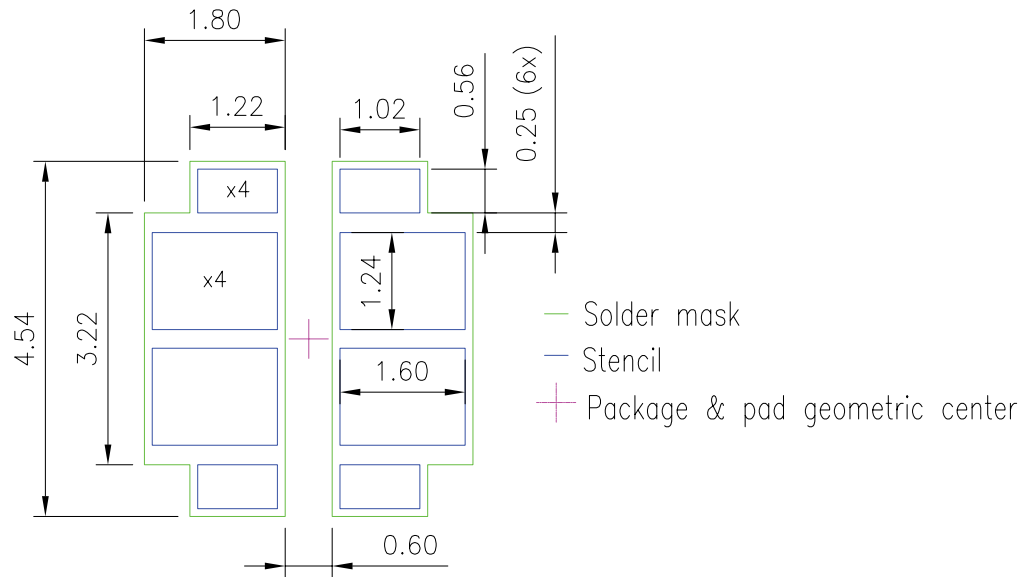


Figure 10. Recommended PCB solder pad layout for LUXEON 5050 Round LES, LUXEON 5050 Square LES and LUXEON 5050 HE.

Notes for Figure 10:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Refer to application brief [AB174](#) for additional details regarding recommended PCB layout design.

Packaging Information

Pocket Tape Dimensions

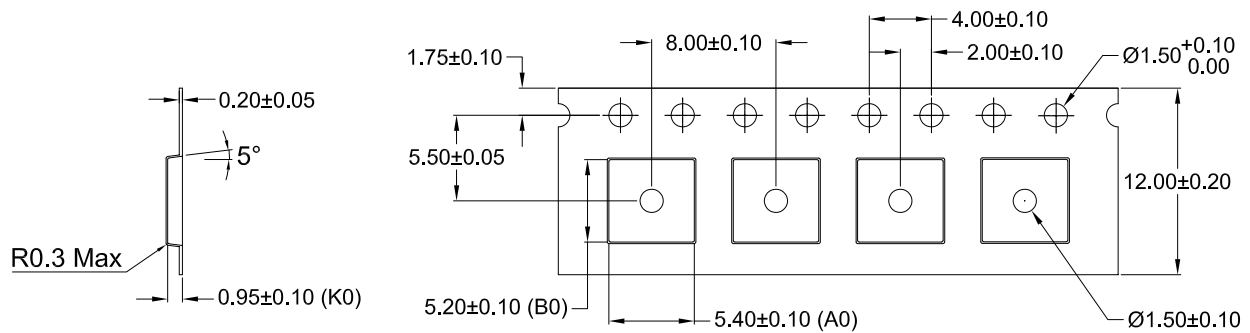


Figure 11. Pocket Tape dimensions for LUXEON 5050 Round LES, LUXEON 5050 Square LES and LUXEON 5050 HE.

Notes for Figure 11:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reel Dimensions

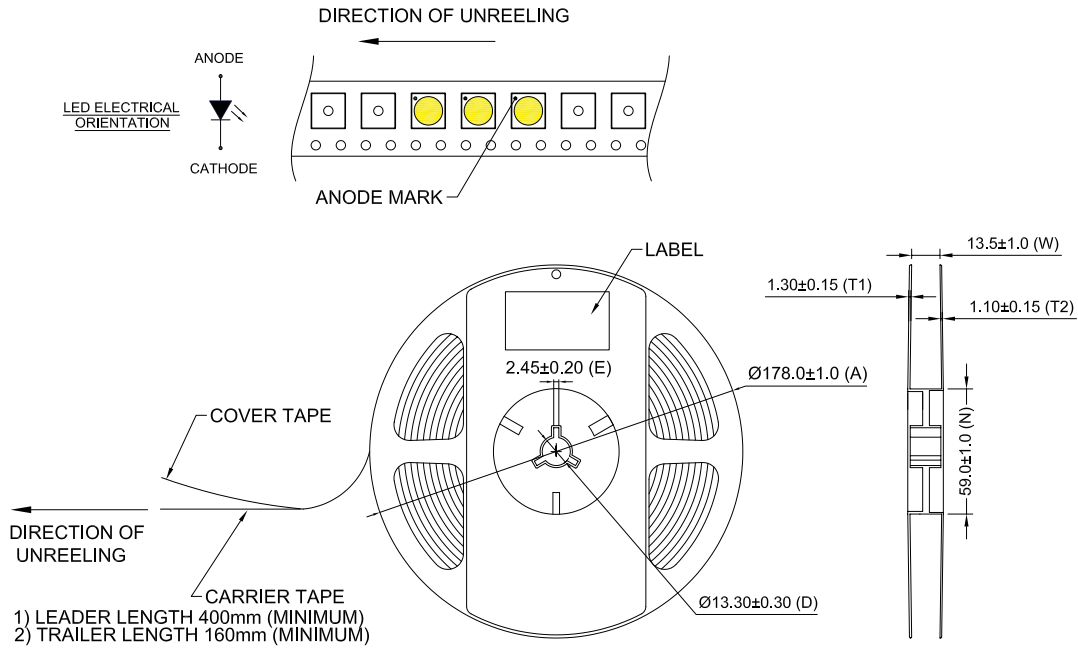


Figure 12a. Reel dimensions for LUXEON 5050 Round LES.

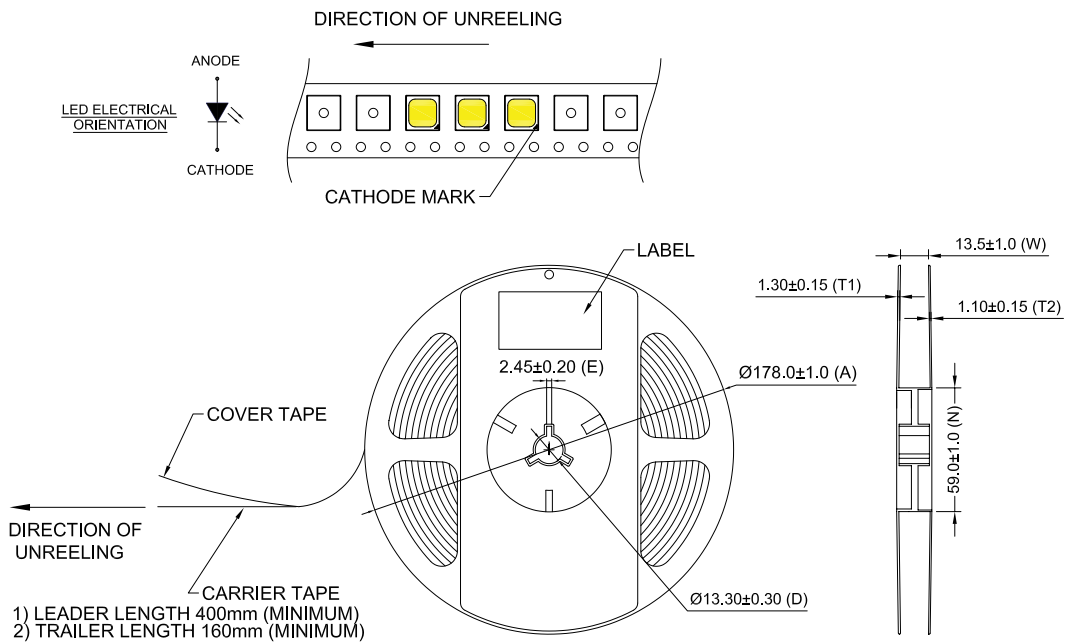


Figure 12b. Reel dimensions for LUXEON 5050 Square LES.

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

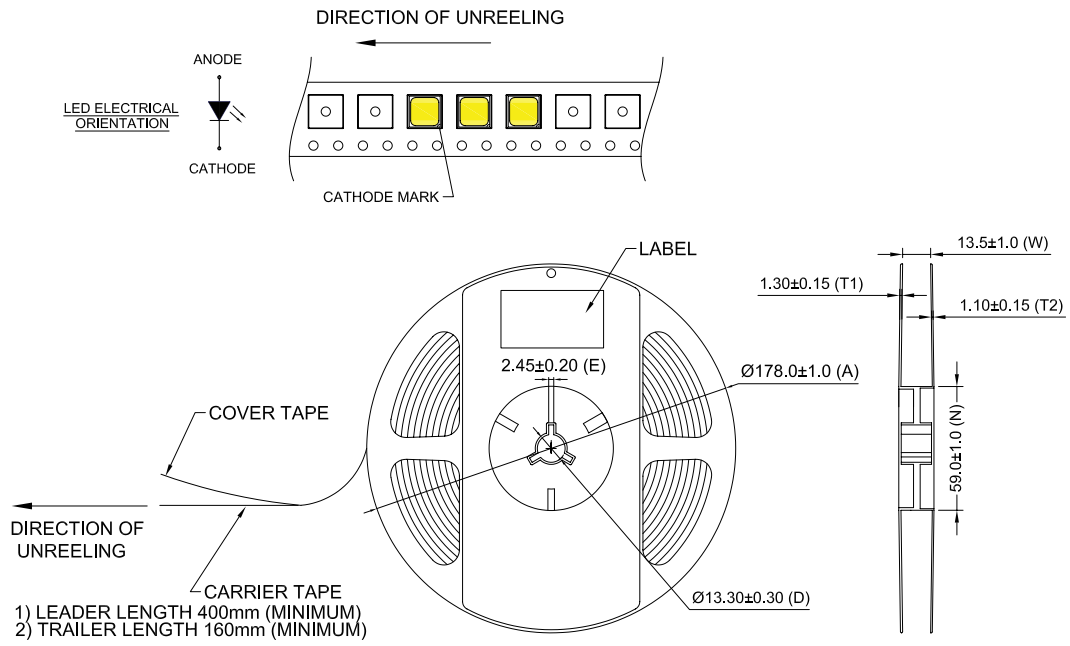


Figure 12c. Reel dimensions for LUXEON 5050 HE.

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.

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