

The background of the cover is a dark blue gradient with a complex network of glowing white and blue lines, resembling a circuit board or a data network. Several small, realistic images of electronic components are scattered throughout: a yellow LED package in the upper left, a white LED package in the upper right, a green LED package in the middle left, a green 8888 LED display in the middle right, and a small white LED package in the lower right. A large, stylized, wireframe graphic of a human head is positioned in the center, composed of blue and green lines. A bright green beam of light passes through the head. At the bottom, there are horizontal streaks of orange and yellow light, with a small image of a component on the left.

Kingbright

Optoelectronic Components
2022-2023



About KINGBRIGHT

An Innovative LED Solution Provider

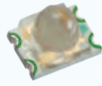
Kingbright is a Taiwanese LED solution provider built on over 40 years of expertise, innovation and collaboration.

We are deeply ingrained in the pursuit of excellence, manufacturing the most comprehensive, reliable and highest quality LEDs in both visible and invisible spectrums to meet various engineering needs in all industries for customers around the globe.

Our commitments to technological innovation and quality excellence ensure continuous improvement to products and customer satisfaction with the superior support of our sales offices and warehouses in the US, Europe and across Asia.



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SMD LED

SMD stands for Surface Mount Device, a special type of high intensity LED lights. With no wires, SMDs have tiny conductive contacts that provide seamless application and can be directly soldered onto circuit boards. Kingbright's vast selection of SMDs are available in variety of size, viewing angles, and color combinations. Our SMD LEDs are energy efficient and provide excellent intensity performance.



03/
Low Current LED

08/
Top-Emitting Chip
SMD LED



12/
Right Angle SMD LED

14/
Multi-Color SMD LED



20/
Top-Emitting
PLCC SMD LED

21/
Subminiature
SMD LED



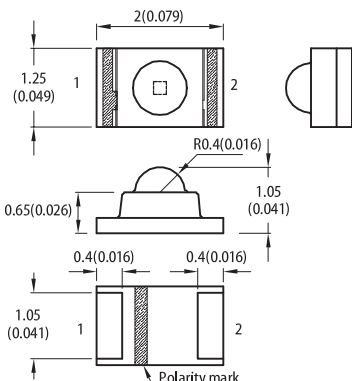
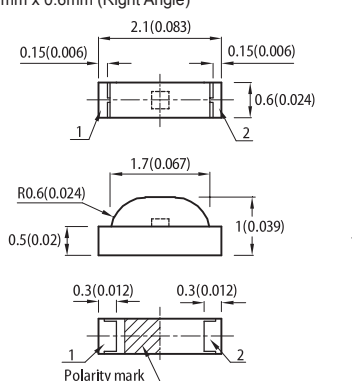
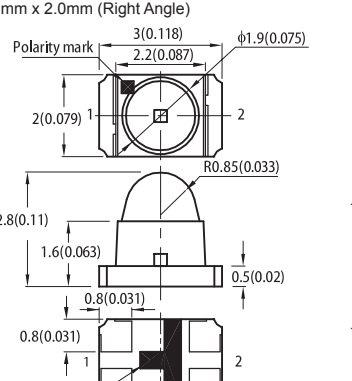
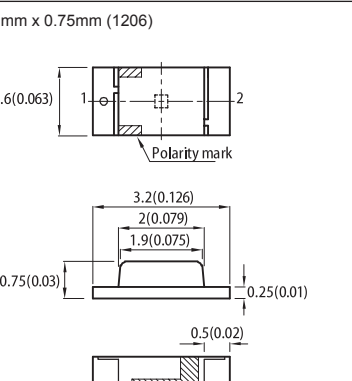
22/
Reverse Mount
SMD LED

LOW CURRENT LED

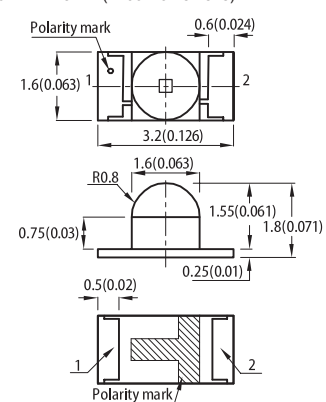
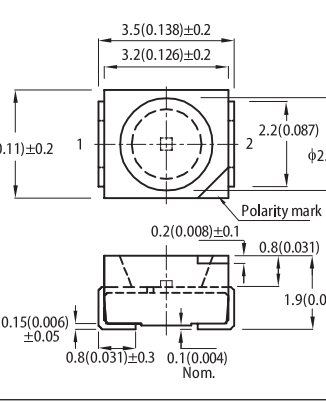
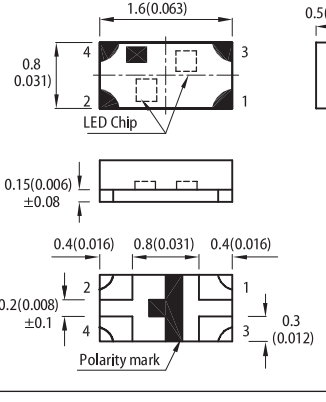
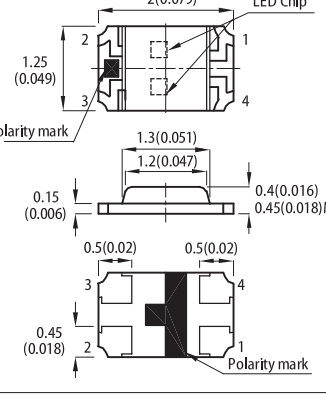
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle 2 θ /2	Dimensions
				Min.	Typ.		
APHHS1005LSECK/J3-PF	AlGaInP	625	Water Clear	15	35	120°	1.0mm x 0.5mm x 0.5mm (0402) APHHS1005LQBC/D-V APHHS1005LSECK/J3-PF APHHS1005LSECK/J4-PF Units: mm (inch) Tolerance: ± 0.1 (0.004)
APHHS1005LSECK/J4-PF	AlGaInP	605	Water Clear	20	40	120°	
APHHS1005LCGCK	AlGaInP	570	Water Clear	1.2	3.5	120°	
APHHS1005LQBC/D-V	InGaN	465	Water Clear	6	15	140°	
APT1608LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	120°	1.6mm x 0.8mm x 0.75mm (0603) APT1608LSECK/J4-PRV APT1608LSYCK/J3-PRV Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT1608LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	120°	
APT1608LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	120°	
APT1608LZGCK	InGaN	525	Water Clear	50	100	130°	
APT1608LVBC/D	InGaN	470	Water Clear	15	24	130°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens) APTD1608LSECK/J4-PF APTD1608LSYCK/J3-PF Units: mm (inch) Tolerance: ± 0.15 (0.006)
APTD1608LSURCK	AlGaInP	630	Water Clear	15	30	60°	
APTD1608LSECK/J3-PF	AlGaInP	625	Water Clear	50	120	60°	
APTD1608LSECK/J4-PF	AlGaInP	605	Water Clear	80	150	60°	
APTD1608LSYCK	AlGaInP	590	Water Clear	20	40	60°	
APTD1608LSYCK/J3-PF	AlGaInP	590	Water Clear	30	55	60°	
APTD1608LCGCK	AlGaInP	570	Water Clear	6	8	60°	
APTD1608LZGCK	InGaN	525	Water Clear	250	420	60°	
APTD1608LVBC/D	InGaN	470	Water Clear	30	65	40°	
APTD1608LQBC/D	InGaN	465	Water Clear	10	20	40°	2.0mm x 1.25mm x 0.75mm (0805) APT2012LSECK/J3-PRV Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT2012LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	140°	
APT2012LZGCK	InGaN	525	Water Clear	50	100	140°	
APT2012LVBC/D	InGaN	470	Water Clear	15	24	140°	

AP series custom-made is available upon request.

LOW CURRENT LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.		
APTD2012LSURCK	AlGaInP	630	Water Clear	20	50	40°	2.0mm x 1.25mm x 1.05mm (0805 Dome Lens)  Units: mm (inch) Tolerance: ± 0.15 (0.006)
APTD2012LSYCK	AlGaInP	590	Water Clear	30	90	40°	
APTD2012LCGCK	AlGaInP	570	Water Clear	20	40	40°	
APTD2012LZGCK	InGaIn	525	Water Clear	180	440	30°	
APTD2012LQBC/D	InGaIn	465	Water Clear	20	50	30°	
APA2107LZGCK	InGaIn	525	Water Clear	50	100	170°	2.1mm x 1.0mm x 0.6mm (Right Angle)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APA2107LVBC/D	InGaIn	470	Water Clear	10	20	170°	
APDA3020LSECK/J3-PF	AlGaInP	625	Water Clear	250	500	10°	3.0mm x 2.8mm x 2.0mm (Right Angle)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
APDA3020LZGCK	InGaIn	525	Water Clear	700	1500	10°	
APT3216LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	140°	3.2mm x 1.6mm x 0.75mm (1206)  Units: mm (inch) Tolerance: ± 0.2 (0.008)

LOW CURRENT LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.		
APTD3216LSURCK	AlGaInP	630	Water Clear	20	50	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
AA3528LSECKT/J3	AlGaInP	625	Water Clear	30	50	120°	3.5mm x 2.8mm x 1.9mm  Units: mm (inch) Tolerance: ± 0.25 (0.01)
APHB1608LZGKSURKC	InGaN	525	Water Clear	20	40	130°	1.6mm x 0.8mm x 0.5mm (0603 Bi-Color)  Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	630		2	8		
APHBM2012LSURKZGKC	AlGaInP	630	Water Clear	6	15	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
	InGaN	525		50	90		

AP series custom-made is available upon request.

LOW CURRENT LED

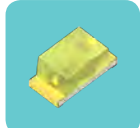
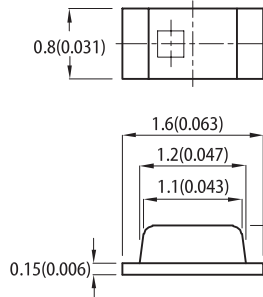
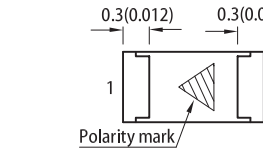
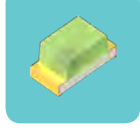
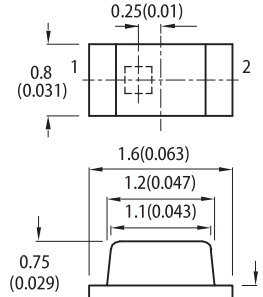
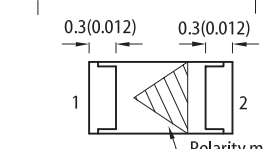
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.		
APBD3224LSURKCGKC	AlGaInP	630	Water Clear	10	30	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens) APBD3224L Red 1, Green 3 Blue 1, Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		10	30		
APBD3224LSURKZGKC	AlGaInP	630	Water Clear	10	30	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens) APBD3224L Red 1, Green 3 Blue 1, Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	InGaIn	525		120	250		
APBD3224LQBDCGKC	InGaIn	465	Water Clear	12	30	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens) APBD3224L Red 1, Green 3 Blue 1, Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		10	30		
APHF1608LSEEQBDZGKC	AlGaInP	621	Water Clear	4	15	140°	1.6mm x 0.8mm x 0.5mm (Full Color) APHF1608L Red 2, Blue 3, Green 4 Units: mm (inch) Tolerance: ± 0.15 (0.006)
	InGaIn	465		4	10		
	InGaIn	525		20	70		
APTF1616LSEEZGKBKC	AlGaInP	621	Water Clear	6	15	130°	1.6mm x 1.6mm x 0.7mm (Full Color) APTF1616L Blue 4, Green 3, Red 2 Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaIn	525		20	50		
	InGaIn	465		6	14		
APFA2507LQBDSSEZGKC	InGaIn	465	Water Clear	4	10	130°	2.5mm x 1.0mm x 0.7mm (Right Angle, Full Color) APFA2507L Blue 1, Red 2, Green 3, Green 4 Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	621		6	10		
	InGaIn	525		20	60		

LOW CURRENT LED

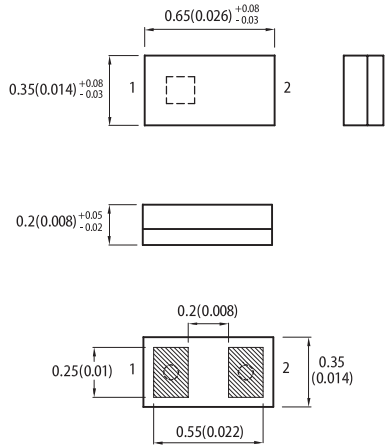
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				Min.	Typ.		
APFA3010LSEEZGKBKC	AlGaInP	621	Water Clear	6	15	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color) APFA3010L Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	525		20	60		
	InGaN	465		4	10		
APF3236LSEEZGKBKC	AlGaInP	621	Water Clear	6	15	150°	3.2mm x 3.6mm x 1.1mm (Full Color) APF3236L Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	525		20	60		
	InGaN	465		4	10		
AAA3528LSEEZGKBKS	AlGaInP	621	Water Clear	10	20	120°	3.5mm x 2.8mm x 1.9mm (Full Color) AAA3528L Units: mm (inch) Tolerance: ± 0.25 (0.01)
	InGaN	525		80	180		
	InGaN	465		12	30		
APG0603VBC-A1-5MAV	InGaN	468	Water Clear	*30	*60	140°	0.65mm x 0.35mm x 0.2mm (0201) APG0603-5MAV Units: mm (inch) Tolerance: ± 0.1 (0.004)

AP series custom-made is available upon request.

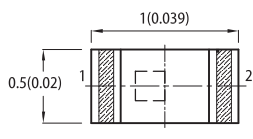
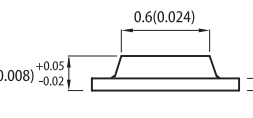
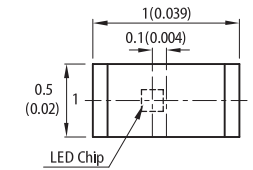
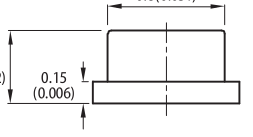
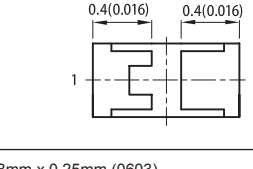
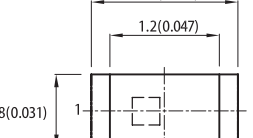
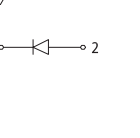
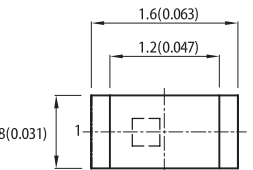
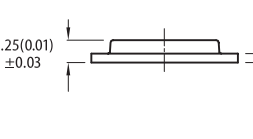
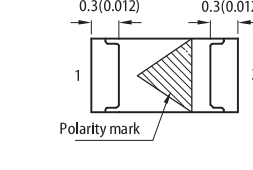
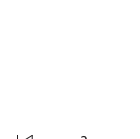
LOW CURRENT LED

Part Number	Material	Chromaticity Coordinates	Lens Type	Iv (mcd) @5mA		Viewing Angle 2θ1/2	Dimensions
				Min.	Max.		
APHM1608VRBXF/A-5MAV	InGaN	x=0.20 y=0.15	Yellow Fluorescent	80	180	160°	1.6mm x 0.8mm x 0.45mm (0603)  APHM1608-5MAV   1 0 2 Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT1608VRCXF/A-5MAV	InGaN	x=0.23 y=0.41	Green Fluorescent	80	350	160°	1.6mm x 0.8mm x 0.75mm (0603)  APT1608-5MAV   1 0 2 Units: mm (inch) Tolerance: ± 0.1 (0.004)

TOP-EMITTING CHIP SMD LED

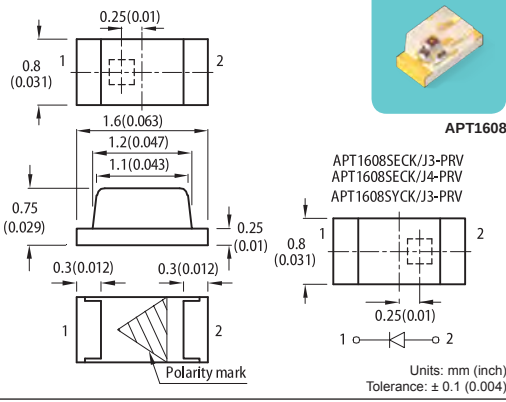
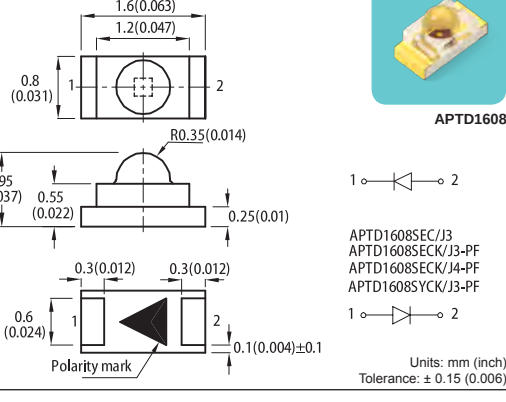
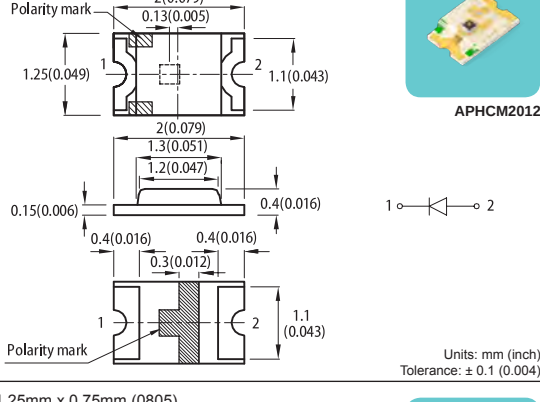
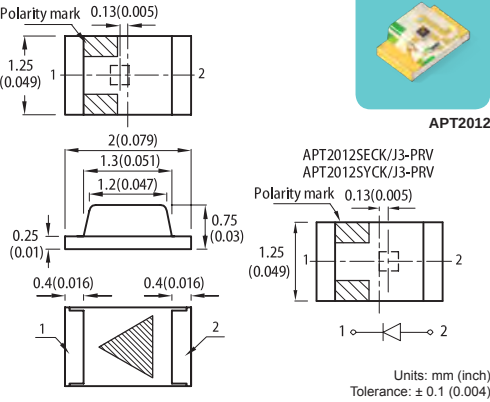
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				Min.	Typ.		
APG0603SURC-TT	AlGaInP	631	Water Clear	10	35	140°	0.65mm x 0.35mm x 0.2mm (0201)  APG0603  1 0 2 Units: mm (inch) Tolerance: ± 0.1 (0.004)
APG0603SEC-E-TT	AlGaInP	624	Water Clear	15	40	140°	
APG0603SEC-TT	AlGaInP	605	Water Clear	20	50	140°	
APG0603SYC-TT	AlGaInP	589	Water Clear	10	30	140°	
APG0603CGC-TT	AlGaInP	571	Water Clear	6	15	140°	

TOP-EMITTING CHIP SMD LED

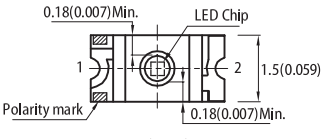
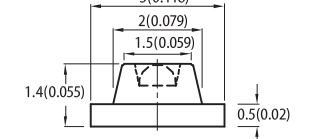
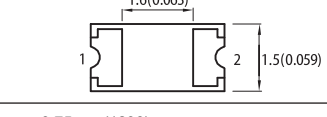
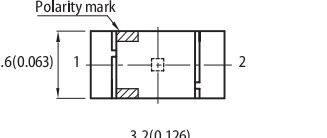
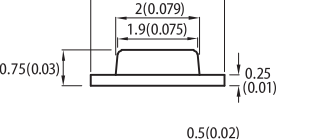
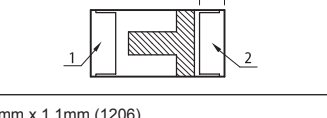
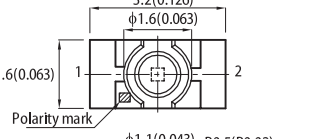
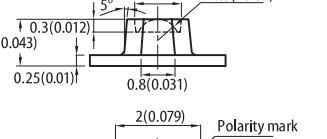
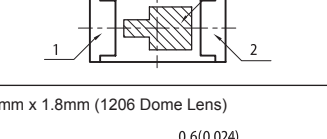
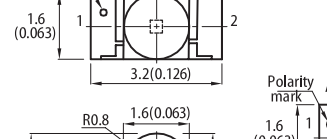
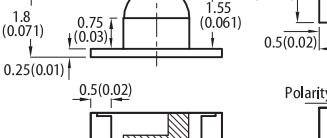
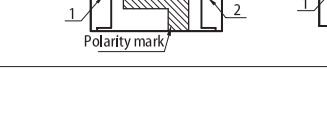
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APG1005SYC-T	AlGaInP	589	Water Clear	55	100	120°	1.0mm x 0.5mm x 0.2mm (0402)    APG1005
APG1005CGC-T	AlGaInP	571	Water Clear	12	35	120°	
APHHS1005SURCK	AlGaInP	630	Water Clear	40	70	120°	1.0mm x 0.5mm x 0.5mm (0402)    APHHS1005 APHHS1005ZGCK APHHS1005QBC/D    APHHS1005 Units: mm (inch) Tolerance: ± 0.1 (0.004)
APHHS1005SECK	AlGaInP	605	Water Clear	80	150	120°	
APHHS1005SYCK	AlGaInP	590	Water Clear	80	150	120°	
APHHS1005CGCK	AlGaInP	570	Water Clear	20	50	120°	
APHHS1005ZGCK	InGaN	525	Water Clear	400	550	140°	
APHHS1005QBC/D	InGaN	465	Water Clear	40	60	140°	
APG1608SURKC/T	AlGaInP	630	Water Clear	55	110	120°	1.6mm x 0.8mm x 0.25mm (0603)    APG1608 APG1608SEKC/T APG1608SYKC/T APG1608CGKC/T APG1608ZGCK APG1608QBC/D    APG1608 Units: mm (inch) Tolerance: ± 0.1 (0.004)
APG1608SEKC/T	AlGaInP	601	Water Clear	55	100	120°	
APG1608SYKC/T	AlGaInP	590	Water Clear	55	120	120°	
APG1608CGKC/T	AlGaInP	570	Water Clear	20	50	120°	
APG1608ZGCK	InGaN	525	Water Clear	300	400	130°	
APG1608QBC/D	InGaN	465	Water Clear	40	100	130°	

AP series custom-made is available upon request.

TOP-EMITTING CHIP SMD LED

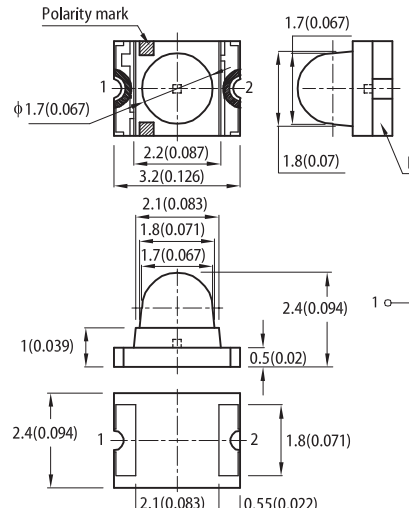
Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APT1608SURCK	AlGaInP	630	Water Clear	40	80	120°	1.6mm x 0.8mm x 0.75mm (0603)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT1608SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	120°	
APT1608SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	120°	
APT1608SECK	AlGaInP	605	Water Clear	80	180	120°	
APT1608SYCK	AlGaInP	590	Water Clear	80	150	120°	
APT1608SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	120°	
APT1608CGCK	AlGaInP	570	Water Clear	20	50	120°	
APT1608ZGCK	InGaN	525	Water Clear	300	550	130°	
APT1608VBC/D	InGaN	470	Water Clear	120	180	130°	
APT1608QBC/D	InGaN	465	Water Clear	40	100	130°	
APTD1608SURCK	AlGaInP	630	Water Clear	80	250	60°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens)  Units: mm (inch) Tolerance: ± 0.15 (0.006)
APTD1608SEC/J3	AlGaInP	625	Water Clear	500	900	60°	
APTD1608SECK/J3-PF	AlGaInP	625	Water Clear	500	900	60°	
APTD1608SECK/J4-PF	AlGaInP	605	Water Clear	1000	1600	60°	
APTD1608SECK	AlGaInP	605	Water Clear	200	500	60°	
APTD1608SYCK	AlGaInP	590	Water Clear	300	600	60°	
APTD1608SYCK/J3-PF	AlGaInP	590	Water Clear	500	850	60°	
APTD1608CGCK	AlGaInP	570	Water Clear	80	190	60°	
APTD1608ZGCK	InGaN	525	Water Clear	700	1200	60°	
APTD1608VBC/D	InGaN	470	Water Clear	200	350	40°	
APTD1608QBC/D	InGaN	465	Water Clear	80	200	40°	
APHCM2012SURCK-F01	AlGaInP	630	Water Clear	40	80	140°	2.0mm x 1.25mm x 0.4mm (0805)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APHCM2012SECK-F01	AlGaInP	605	Water Clear	80	180	140°	
APHCM2012SYCK-F01	AlGaInP	590	Water Clear	80	150	140°	
APHCM2012CGCK-F01	AlGaInP	570	Water Clear	20	50	140°	
APHCM2012QBC/D-F01	InGaN	465	Water Clear	40	100	140°	
APT2012SURCK	AlGaInP	630	Water Clear	40	80	140°	2.0mm x 1.25mm x 0.75mm (0805)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT2012SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	140°	
APT2012SECK	AlGaInP	605	Water Clear	80	180	140°	
APT2012SYCK	AlGaInP	590	Water Clear	80	150	140°	
APT2012SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	140°	
APT2012CGCK	AlGaInP	570	Water Clear	20	50	140°	
APT2012ZGCK	InGaN	525	Water Clear	300	550	140°	
APT2012VBC/D	InGaN	470	Water Clear	120	180	140°	
APT2012QBC/D	InGaN	465	Water Clear	40	100	140°	

TOP-EMITTING CHIP SMD LED

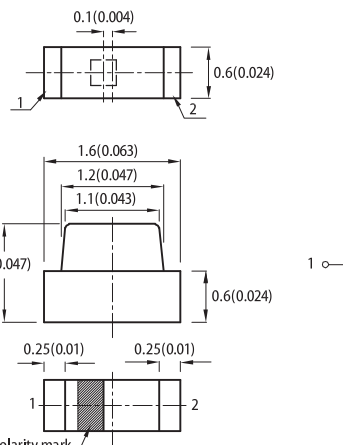
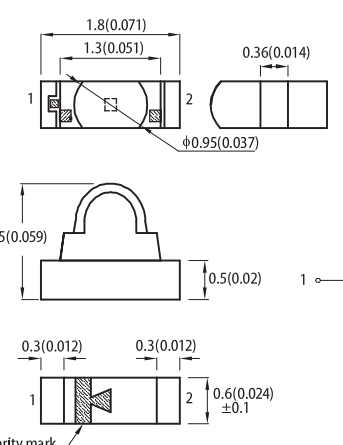
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APL3015SURCK-F01	AlGaInP	630	Water Clear	120	180	70°	3.0mm x 1.5mm x 1.4mm    Units: mm (inch) Tolerance: ± 0.2 (0.008)
APL3015SECK-F01	AlGaInP	605	Water Clear	120	350	70°	
APL3015SYCK-F01	AlGaInP	590	Water Clear	200	350	70°	
APL3015CGCK-F01	AlGaInP	570	Water Clear	55	120	70°	
APL3015ZGC-F01	InGaIn	525	Water Clear	1000	1500	50°	
APL3015QBC/D-F01	InGaIn	465	Water Clear	120	200	50°	
APT3216SURCK	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 1.6mm x 0.75mm (1206)    Units: mm (inch) Tolerance: ± 0.2 (0.008)
APT3216SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	140°	
APT3216SECK	AlGaInP	605	Water Clear	80	180	140°	
APT3216SYCK	AlGaInP	590	Water Clear	80	150	140°	
APT3216CGCK	AlGaInP	570	Water Clear	20	50	140°	
APT3216ZGC	InGaIn	525	Water Clear	300	600	150°	
APT3216QBC/D	InGaIn	465	Water Clear	40	100	150°	
APTL3216SURCK	AlGaInP	630	Water Clear	120	230	80°	3.2mm x 1.6mm x 1.1mm (1206)    Units: mm (inch) Tolerance: ± 0.1 (0.004)
APTL3216SECK	AlGaInP	605	Water Clear	200	350	80°	
APTL3216SYCK	AlGaInP	590	Water Clear	200	350	80°	
APTL3216CGCK	AlGaInP	570	Water Clear	55	100	80°	
APTL3216ZGC	InGaIn	525	Water Clear	700	1100	80°	
APTL3216QBC/D	InGaIn	465	Water Clear	120	250	80°	
APTD3216SRCPRV	GaAlAs	640	Water Clear	80	150	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)    Units: mm (inch) Tolerance: ± 0.2 (0.008)
APTD3216SURCK	AlGaInP	630	Water Clear	300	800	40°	
APTD3216SECK	AlGaInP	605	Water Clear	500	1000	40°	
APTD3216SYCK	AlGaInP	590	Water Clear	700	800	40°	
APTD3216CGCK	AlGaInP	570	Water Clear	120	300	40°	
APTD3216ZGCK	InGaIn	525	Water Clear	2700	4000	30°	
APTD3216QBC/D	InGaIn	465	Water Clear	300	700	30°	

AP series custom-made is available upon request.

TOP-EMITTING CHIP SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APD3224SURCK-F01	AlGaInP	630	Water Clear	700	1500	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APD3224SECK-F01	AlGaInP	605	Water Clear	1000	1600	20°	
APD3224SYCK-F01	AlGaInP	590	Water Clear	1000	1300	20°	
APD3224CGCK-F01	AlGaInP	570	Water Clear	500	900	20°	
APD3224ZGCK-F01	InGaN	525	Water Clear	3600	6800	20°	
APD3224QBC/D-F01	InGaN	465	Water Clear	500	900	20°	

RIGHT ANGLE SMD LED

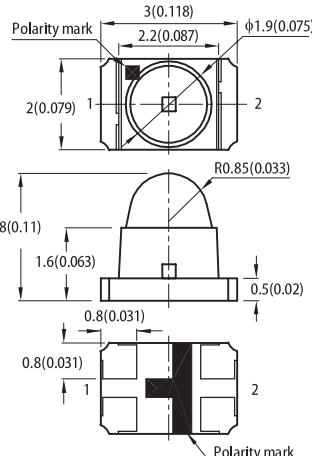
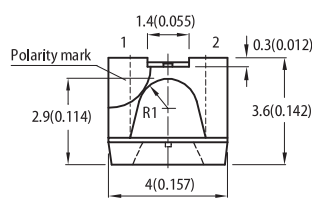
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APA1606SURCK	AlGaInP	630	Water Clear	40	80	110°	1.6mm x 1.2mm x 0.6mm (Right Angle)  Units: mm (inch) Tolerance: ± 0.1 (0.004)
APA1606SECK	AlGaInP	605	Water Clear	80	180	110°	
APA1606SYCK	AlGaInP	590	Water Clear	80	150	110°	
APA1606CGCK	AlGaInP	570	Water Clear	20	50	110°	
APA1606VBC/D	InGaN	470	Water Clear	120	200	110°	
APA1606QBC/D	InGaN	465	Water Clear	40	80	110°	
APDA1806SURCK	AlGaInP	630	Water Clear	500	1200	25°	1.8mm x 1.5mm x 0.6 mm (Right Angle)  Units: mm (inch) Tolerance: ± 0.15 (0.006)
APDA1806SECK/J3-PRV	AlGaInP	625	Water Clear	1300	2600	25°	
APDA1806SECK	AlGaInP	605	Water Clear	500	1100	25°	
APDA1806SYCK/J3-PRV	AlGaInP	590	Water Clear	700	1800	25°	
APDA1806SYCK	AlGaInP	590	Water Clear	500	1100	25°	
APDA1806CGCK	AlGaInP	570	Water Clear	120	400	25°	
APDA1806ZGCK	InGaN	525	Water Clear	1900	3200	25°	
APDA1806VBC/D	InGaN	470	Water Clear	400	800	25°	

RIGHT ANGLE SMD LED

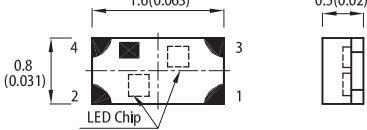
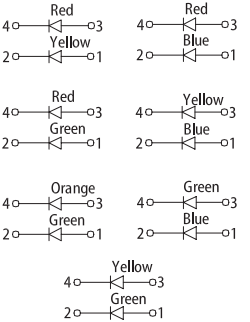
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ /2	Dimensions
				Min.	Typ.		
APA2107SURCK	AlGaInP	630	Water Clear	40	80	140°	2.1mm x 1.0mm x 0.6mm (Right Angle) Units: mm (inch) Tolerance: ± 0.1 (0.004)
APA2107SYCK	AlGaInP	590	Water Clear	80	150	140°	
APA2107CGCK	AlGaInP	570	Water Clear	20	50	140°	
AA2810ASURSK	AlGaInP	630	Water Clear	40	100	110°	2.8mm x 1.2mm x 0.8mm (Right Angle) Units: mm (inch) Tolerance: ± 0.1 (0.004)
AA2810ASESK/J3	AlGaInP	625	Water Clear	300	500	110°	
AA2810ASYSK	AlGaInP	590	Water Clear	120	200	110°	
AA2810ACGSK	AlGaInP	570	Water Clear	40	70	110°	
AA2810AVBS/D	InGaN	470	Water Clear	200	350	110°	
APA3010SURCK-GX	AlGaInP	630	Water Clear	40	80	120°	3.0mm x 2.0mm x 1.0mm (Right Angle) Units: mm (inch) Tolerance: ± 0.15 (0.006)
APA3010SECK-GX	AlGaInP	605	Water Clear	80	180	120°	
APA3010SYCK-GX	AlGaInP	590	Water Clear	80	150	120°	
APA3010CGCK-GX	AlGaInP	570	Water Clear	20	50	120°	
APA3010QBC/D-GX	InGaN	465	Water Clear	40	80	120°	

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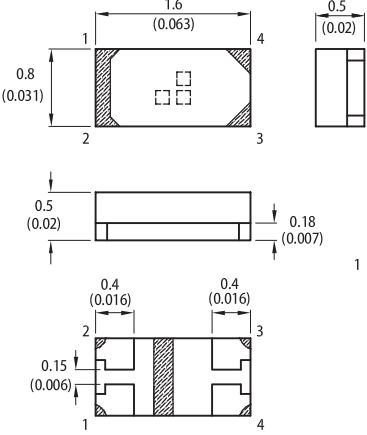
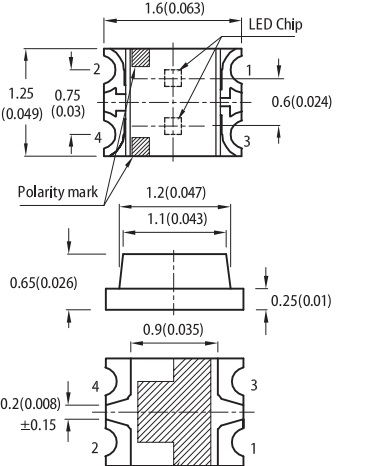
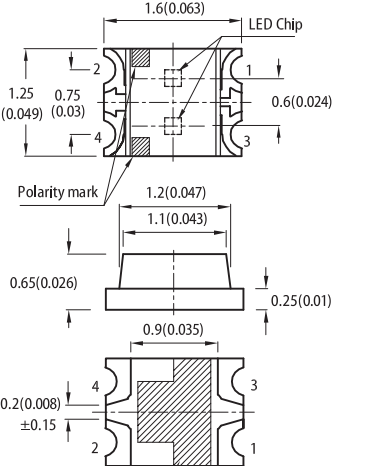
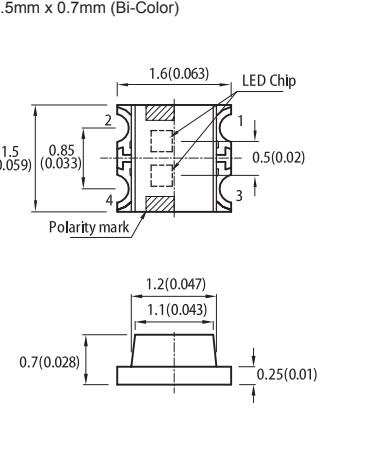
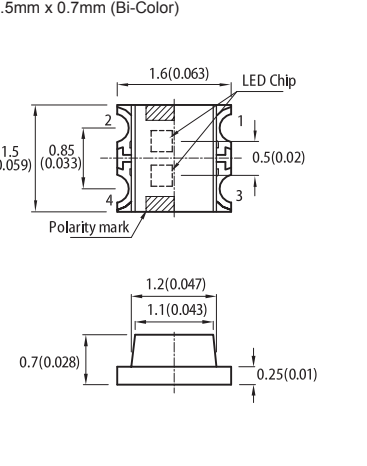
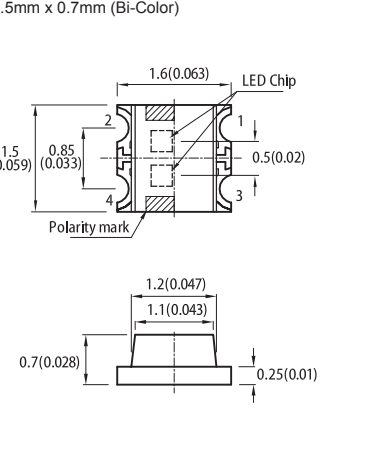
RIGHT ANGLE SMD LED

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APDA3020SECK/J3-PF	AlGaInP	625	Water Clear	2300	3800	10°	3.0mm x 2.8mm x 2.0mm (Right Angle, Dome Lens)  APDA3020VBC/D APDA3020SECK/J3-PF APDA3020SYCK/J3-PF Units: mm (inch) Tolerance: ± 0.2 (0.008)
APDA3020SYCK/J3-PF	AlGaInP	590	Water Clear	3600	7000	10°	
APDA3020VBC/D	InGaN	470	Water Clear	1300	2300	10°	
AA4040CGCK	AlGaInP	570	Water Clear	40	90	120°	4.0mm x 4.0mm x 3.6mm (Right Angle)  AA4040 Units: mm (inch) Tolerance: ± 0.25 (0.01)
AA4040QBS/D	InGaN	465	Water Clear	80	220	120°	

MULTI-COLOR SMD LED

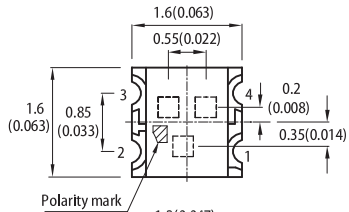
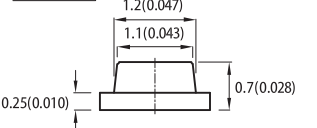
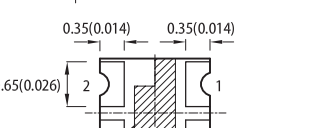
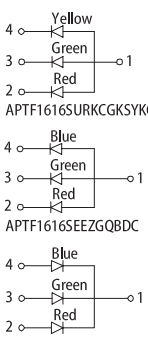
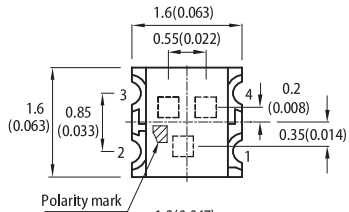
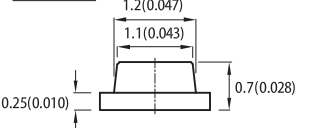
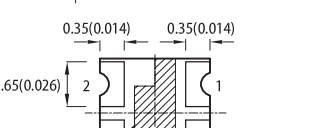
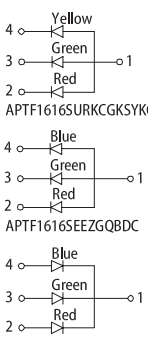
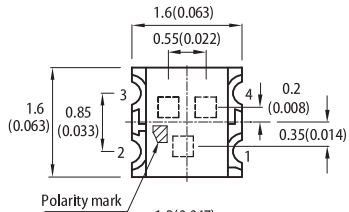
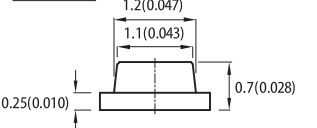
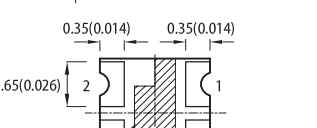
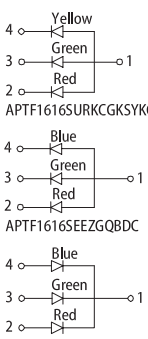
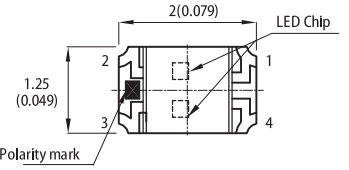
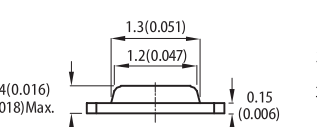
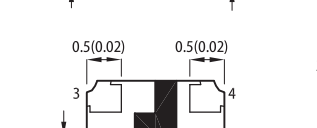
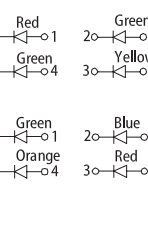
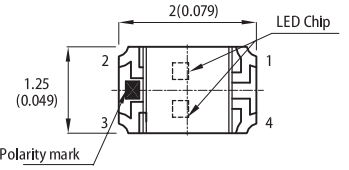
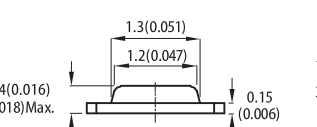
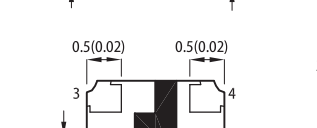
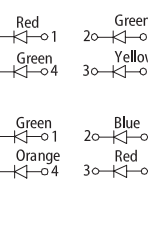
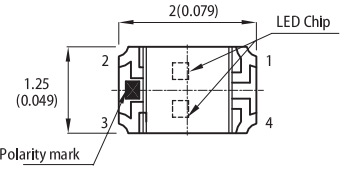
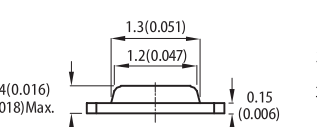
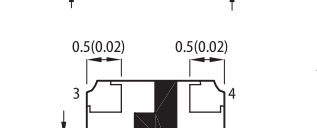
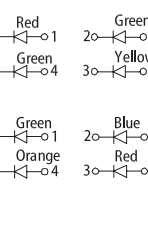
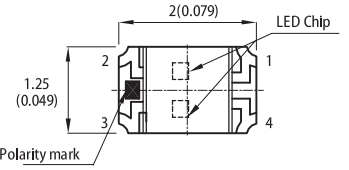
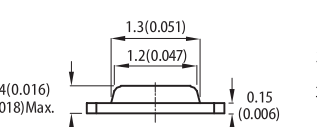
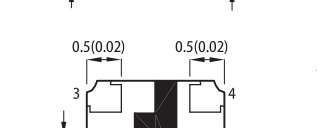
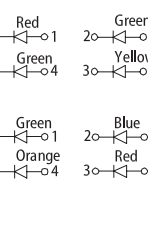
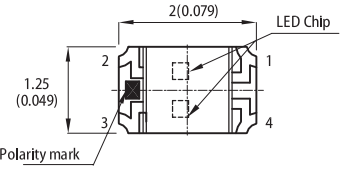
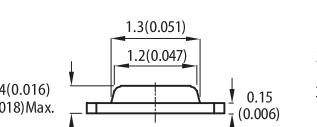
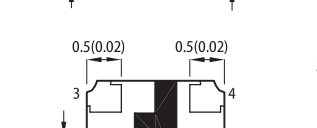
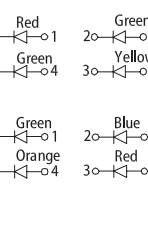
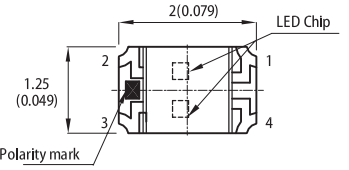
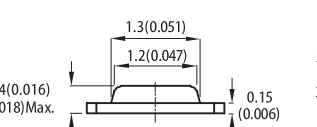
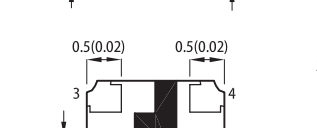
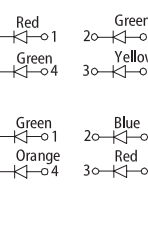
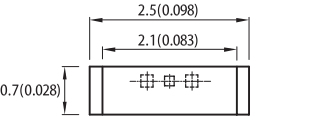
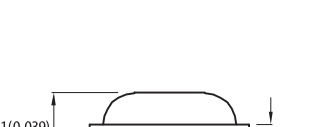
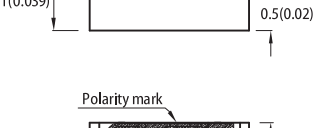
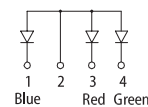
Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APHB1608SYKSURKC	AlGaInP	590	Water Clear	80	150	130°	1.6mm x 0.8mm x 0.5mm (0603 Bi-Color)   APHB1608  Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	630		40	90		
APHB1608CGKSURKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	630		40	90		
APHB1608CGKSEKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	605		80	200		
APHB1608CGKSYKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	590		80	150		
APHB1608ZGKSURKC	InGaN	525	Water Clear	200	350	130°	
	AlGaInP	630		40	90		
APHB1608ZGKSYKC	InGaN	525	Water Clear	200	400	130°	
	AlGaInP	590		80	150		
APHB1608QBDSURKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	630		40	90		
APHB1608QBDSYKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	590		80	150		
APHB1608QBDCGKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	570		20	50		

MULTI-COLOR SMD LED

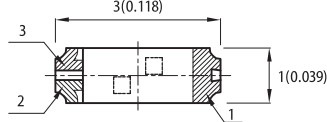
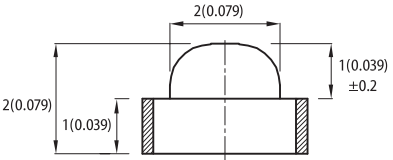
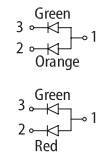
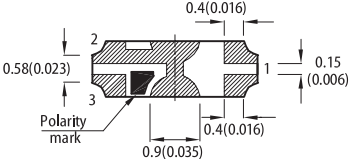
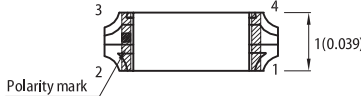
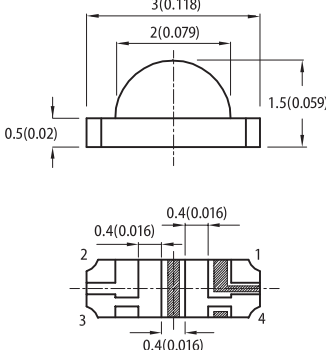
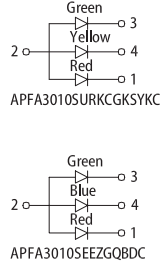
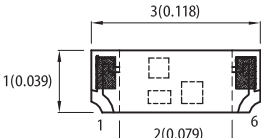
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				Min.	Typ.		
APHF1608SEEQBDZGKC	AlGaInP	621	Water Clear	40	120	140°	1.6mm x 0.8mm x 0.5mm (Full Color)  Units: mm (inch) Tolerance: ± 0.15 (0.006)
	InGaN	465		20	60		
	InGaN	525		200	480		
APT1612SURKCGKC-F01	AlGaInP	630	Water Clear	40	80	150°	1.6mm x 1.25mm x 0.65mm (Bi-Color)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	50		
APT1612SURQBDC-F01	AlGaInP	630	Water Clear	40	80	150°	1.6mm x 1.25mm x 0.65mm (Bi-Color)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	465		40	80		
APT1612SYKCGKC-F01	AlGaInP	590	Water Clear	80	120	150°	1.6mm x 1.5mm x 0.7mm (Bi-Color)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	50		
APT1615SURKCGKC-F01	AlGaInP	630	Water Clear	40	80	150°	1.6mm x 1.5mm x 0.7mm (Bi-Color)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	50		
APT1615SYKCGKC-F01	AlGaInP	590	Water Clear	80	120	150°	1.6mm x 1.5mm x 0.7mm (Bi-Color)  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	50		

AP series custom-made is available upon request.

MULTI-COLOR SMD LED

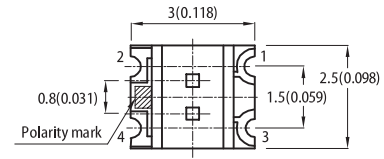
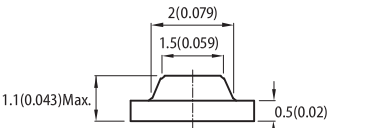
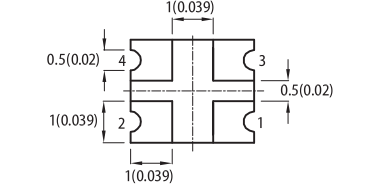
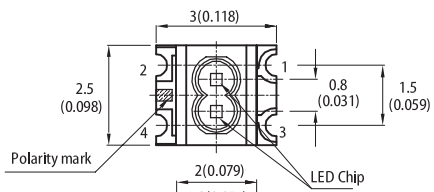
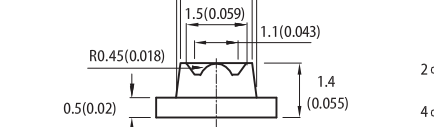
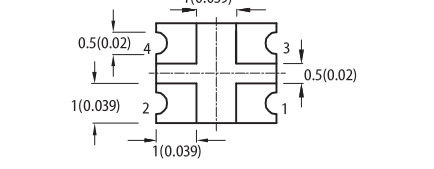
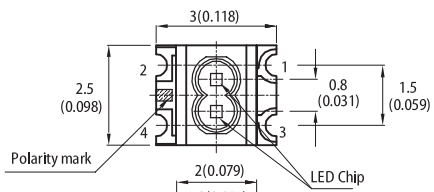
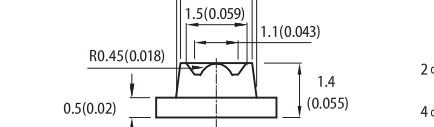
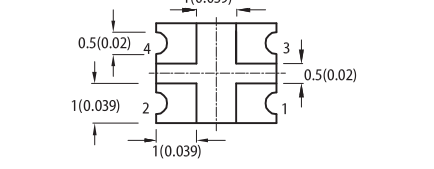
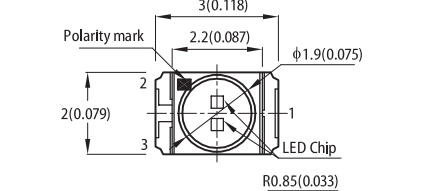
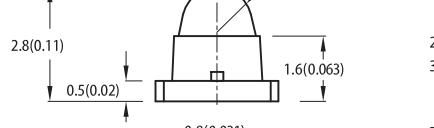
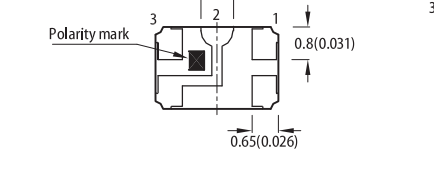
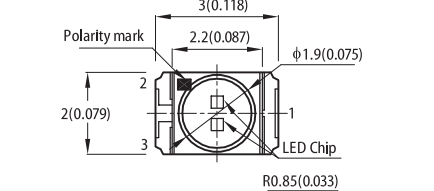
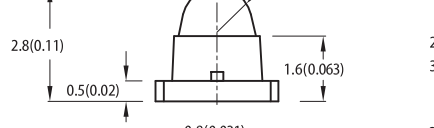
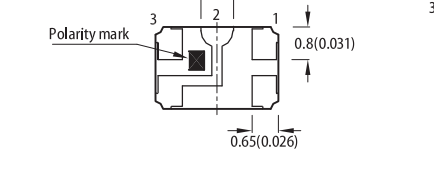
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				Min.	Typ.		
APTF1616SURKCGKSYKC	AlGaInP	630	Water Clear	40	80	130°	1.6mm x 1.6mm x 0.7mm (Full Color)     Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	50		
	AlGaInP	590		80	120		
APTF1616SEEZGQBDC	AlGaInP	621	Water Clear	55	110	130°	1.6mm x 1.6mm x 0.7mm (Full Color)     Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaIn	525		120	280		
	InGaIn	465		40	70		
APTF1616SEJ3ZGGVBDC	AlGaInP	625	Water Clear	200	360	130°	1.6mm x 1.6mm x 0.7mm (Full Color)     Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaIn	525		500	750		
	InGaIn	470		80	140		
APHBM2012SURKCGKC	AlGaInP	630	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		20	50		
APHBM2012SURKZGC	AlGaInP	630	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	InGaIn	525		200	300		
APHBM2012SURKZGKC	AlGaInP	630	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	InGaIn	525		200	280		
APHBM2012CGKSEKC	AlGaInP	570	Water Clear	20	50	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	605		80	180		
APHBM2012CGKSYKC	AlGaInP	570	Water Clear	20	50	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	590		80	120		
APHBM2012QBDSURKC	InGaIn	465	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	630		40	80		
APFA2507QBDSEEZGKC	InGaIn	465	Water Clear	40	65	130°	2.5mm x 1.0mm x 0.7mm (Right Angle, Full Color)     Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	621		80	110		
	InGaIn	525		300	500		

MULTI-COLOR SMD LED

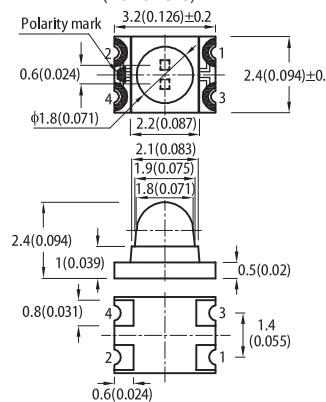
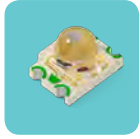
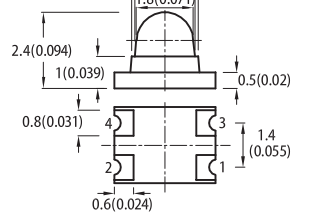
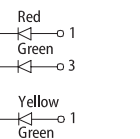
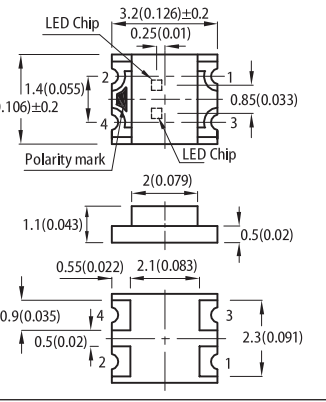
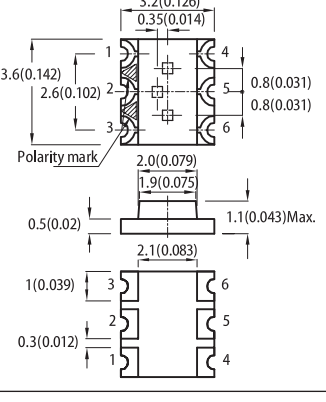
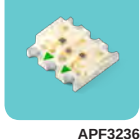
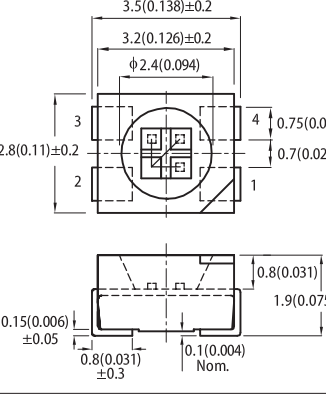
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APBA3010SEKCGKC-GX	AlGaInP	605	Water Clear	80	150	140°	3.0mm x 2.0mm x 1.0mm (Right Angle, Bi-Color)   APBA3010
	AlGaInP	570		40	70		
APBA3010SURKCGKC-GX	AlGaInP	630	Water Clear	40	80	140°	 
	AlGaInP	570		40	70		
APBA3010SYKCGKC-GX	AlGaInP	590	Water Clear	80	120	140°	 
	AlGaInP	570		40	70		
APFA3010SURKCGKSYKC	AlGaInP	630	Water Clear	55	80	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)   APFA3010
	AlGaInP	570		20	45		
	AlGaInP	590		120	180		
APFA3010SEEZGQBDC	AlGaInP	621	Water Clear	80	140	150°	 
	InGaN	525		300	500		
	InGaN	465		40	70		
APFA3011-AK13/F	InGaN	470	Water Clear	80	150	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)   APFA3011
	AlGaInP	625		200	410		
	InGaN	525		500	780		

AP series custom-made is available upon request.

MULTI-COLOR SMD LED

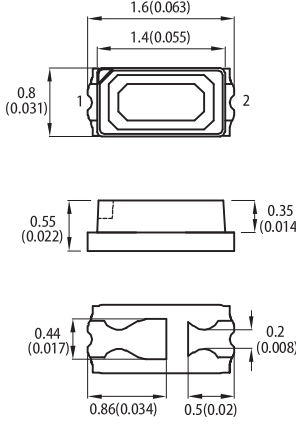
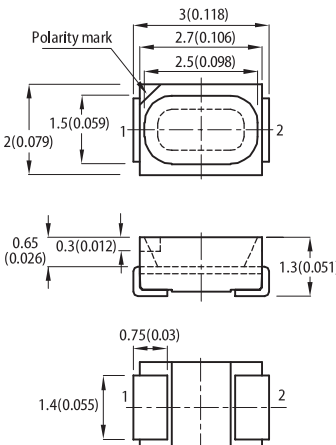
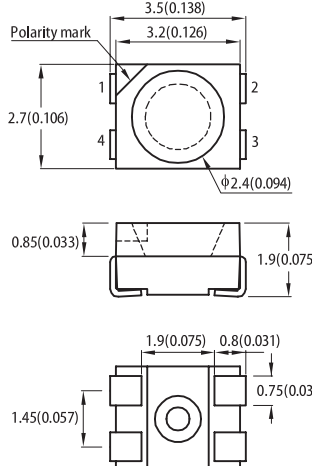
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APB3025SURKCGKC-F01	AlGaInP	630	Water Clear	40	70	160°	3.0mm x 2.5mm x 1.1mm (Bi-Color)    Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	60		
APBL3025SURKCGK-F01	AlGaInP	630	Water Clear	120	300	50°	3.0mm x 2.5mm x 1.4mm (Bi-Color)    Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		80	150		
APBL3025SURKZGKC	AlGaInP	630	Water Clear	120	300	50°	   Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	525		700	1800		
APBDA3020SURKCGKC-GX	AlGaInP	630	Water Clear	120	300	15°	3.0mm x 2.8mm x 2.0mm (Right Angle, Dome Lens)    Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		120	300		
APBDA3020CGKSYKC-GX	AlGaInP	570	Water Clear	120	280	15°	   Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	590		400	700		

MULTI-COLOR SMD LED

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APBD3224SURKCGKC-F01	AlGaInP	630	Water Clear	120	400	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)   APBD3224 Red 1 Green 3 Yellow 1 Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		80	280		
APBD3224SYKCGKC-F01	AlGaInP	590	Water Clear	400	800	20°	  APBD3224 Red 1 Green 3 Yellow 1 Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		80	280		
APB3227SURKCGKC	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 2.7mm x 1.1mm (Bi-Color)   APB3227 Red 1 Green 3 Units: mm (inch) Tolerance: ± 0.1 (0.004)
	AlGaInP	570		20	55		
APF3236SEEGQBDC	AlGaInP	621	Water Clear	80	140	150°	3.2mm x 3.6mm x 1.1mm (Full Color)   APF3236 Red 4 Green 5 Blue 6 Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	525		200	330		
	InGaN	465		40	70		
AAA3528SEEGKQBKS	AlGaInP	621	Water Clear	120	220	120°	3.5mm x 2.8mm x 1.9mm (Full Color)   AAA3528 Blue 4 Green 3 Red 1 Units: mm (inch) Tolerance: ± 0.25 (0.01)
	InGaN	525		400	500		
	InGaN	465		55	100		

AP series custom-made is available upon request.

TOP-EMITTING PLCC SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA*10mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AA1608SURSK	AlGaInP	630	Water Clear	40	160	120°	1.6mm x 0.8mm x 0.55mm (0603)  AA1608 Units: mm (inch) Tolerance: ± 0.15 (0.006)
AA1608SYSK	AlGaInP	590	Water Clear	55	240	120°	
AA1608CGSK	AlGaInP	570	Water Clear	12	75	120°	
AA1608VBS/A1-10MAV	InGaN	468	Water Clear	*50	*160	120°	
AA3021SURSK	AlGaInP	630	Water Clear	40	90	120°	3.0mm x 2.0mm x 1.3mm  AA3021 Units: mm (inch) Tolerance: ± 0.2 (0.008)
AA3021SYSK	AlGaInP	590	Water Clear	120	200	120°	
AA3021CGSK	AlGaInP	570	Water Clear	40	80	120°	
AA3021QBS/D	InGaN	465	Water Clear	80	120	120°	
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @50mA*30mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AA3527ASESK/J3-50MAV	AlGaInP	625	Water Clear	1000	1500	120°	3.5mm x 2.7mm x 1.9mm  AA3527A Units: mm (inch) Tolerance: ± 0.25 (0.01)
AA3527ASYSK/J3-50MAV	AlGaInP	590	Water Clear	1000	1500	120°	
AA3527AZGSK-30MAV	InGaN	525	Water Clear	*500	*700	120°	
AA3527AVBS/D-30MAV	InGaN	470	Water Clear	*300	*600	120°	

TOP-EMITTING PLCC SMD LED

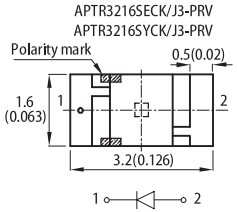
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ /2	Dimensions
				Min.	Typ.		
AA3528SURCK	AlGaInP	630	Water Clear	55	100	120°	3.5mm x 2.8mm x 1.9mm Units: mm (inch) Tolerance: ± 0.25 (0.01)
AA3528SYCK	AlGaInP	590	Water Clear	120	250	120°	
AA3528CGCK	AlGaInP	570	Water Clear	40	100	120°	
AA3528ZGCK	InGaN	525	Water Clear	500	1000	120°	
AA3528VBS/D	InGaN	470	Water Clear	300	450	120°	
AA3528QBS/D	InGaN	465	Water Clear	80	150	120°	

SUBMINIATURE SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ /2	Dimensions
				Min.	Typ.		
AM2520SURCK03	AlGaInP	630	Water Clear	700	1200	20°	Subminiature Solid State Lamps Gull Wing Lead Units: mm (inch) Tolerance: ± 0.25 (0.01)
AM2520SYCK03	AlGaInP	590	Water Clear	1600	2700	20°	
AM2520CGCK03	AlGaInP	570	Water Clear	500	1000	20°	
AM2520QBC/D03	InGaN	465	Water Clear	500	1300	20°	
AM2520SURCK09	AlGaInP	630	Water Clear	700	1200	20°	Subminiature Solid State Lamps Z-Bend Lead Units: mm (inch) Tolerance: ± 0.25 (0.01)
AM2520SECK09	AlGaInP	605	Water Clear	1900	3500	20°	
AM2520CGCK09	AlGaInP	570	Water Clear	500	1000	20°	
AM2520QBC/D09	InGaN	465	Water Clear	500	1300	20°	

AP series custom-made is available upon request.

REVERSE MOUNT SMD LED

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APTR3216SURCK	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 1.6mm x 1.05mm (1206 Reverse Mount)  APTR3216SECK/J3-PRV APTR3216SYCK/J3-PRV  Units: mm (inch) Tolerance: ± 0.2 (0.008)
APTR3216SECK	AlGaInP	605	Water Clear	80	180	140°	
APTR3216SYCK	AlGaInP	590	Water Clear	80	150	140°	
APTR3216SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	140°	
APTR3216CGCK	AlGaInP	570	Water Clear	20	50	140°	
APTR3216ZGCK	InGaN	525	Water Clear	300	550	140°	
APTR3216QBC/D	InGaN	465	Water Clear	40	100	140°	
APTL3216SURCK-01	AlGaInP	630	Water Clear	120	230	80°	
APTL3216SECK-01	AlGaInP	605	Water Clear	200	350	80°	
APTL3216SYCK01	AlGaInP	590	Water Clear	200	350	80°	
APTL3216CGCK-01	AlGaInP	570	Water Clear	55	100	80°	
APTL3216ZGCK-01	InGaN	525	Water Clear	700	1000	80°	
APTL3216QBC/D-01	InGaN	465	Water Clear	120	250	80°	3.2mm x 2.8mm x 1.9mm (Reverse Mount)  AA3528SECKT/J309 AA3528SYCKT09 AA3528ZGCKT09 AA3528QBS/D09 Units: mm (inch) Tolerance: ± 0.25 (0.01)
AA3528SURCKT09	AlGaInP	630	Water Clear	55	100	120°	
AA3528SECKT/J309	AlGaInP	625	Water Clear	300	450	120°	
AA3528SYCKT09	AlGaInP	590	Water Clear	120	250	120°	
AA3528ZGCKT09	InGaN	525	Water Clear	500	1000	120°	
AA3528QBS/D09	InGaN	465	Water Clear	80	150	120°	3.2mm x 2.8mm x 1.9mm (Reverse mount, Multi-Color)  AAA3528SURCKGKC09 AAA3528RBGS/08-09 Units: mm (inch) Tolerance: ± 0.2 (0.008)
AAA3528SURCKGKC09	AlGaInP	630	Water Clear	55	100	120°	
	AlGaInP	570		40	80		
AAA3528RBGS/08-09	AlGaInP	630	Water Clear	55	110	120°	
	InGaN	465		55	100		
	InGaN	525		400	500		

1.5W High Brightness LED

Ideal for decorative, interior lighting and backlighting, Kingbright's high brightness LEDs include built-in Zener diodes to enhance ESD tolerance and are used in a variety of applications. Each color can be driven individually to produce variety of colors to fulfill the specifications.



Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @150mA		Viewing Angle	Dimensions
				Min.	Typ.		
AAAF5051-05	InGaN	460	Water Clear	1600	2300	120°	5.0mm x 5.0mm x 1.3mm (Full Color) AAAF5051-05
	AlGaInP	624		1900	4000		
	InGaN	525		7000	9000		

Units: mm (inch)
Tolerance: ± 0.15 (0.006)

Through-Hole LED

Kingbright through-hole LEDs are available with a variety of sizes, shapes, viewing angles, color combinations, lens types and brightness. Our extensive selection fulfills virtually any need in through-hole LED applications.



25 /
Round LED

27 /
Rectangular LED



28 /
Cylindrical LED

28 /
Multi-Color LED



30 /
Low Current LED

31 /
Resistor LED



31 /
Light Bar

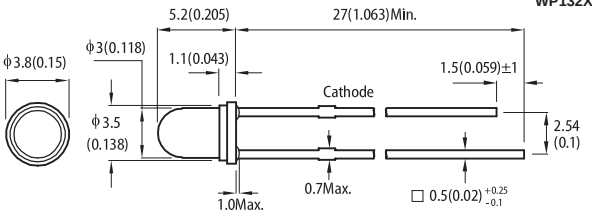
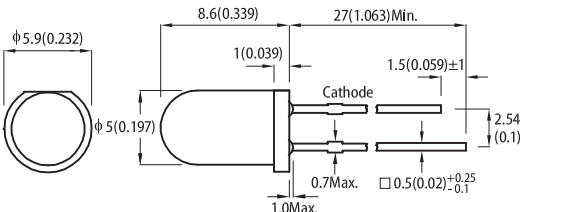
ROUND LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2θ1/2	Dimensions
				Min.	Typ.		
WP4060ID	GaAsP/GaP	617	Red Diffused	4	8	70°	1.8mm Round WP4060
WP4060YD	GaAsP/GaP	588	Yellow Diffused	4	8	70°	
WP4060GD	GaP	568	Green Diffused	6	12	70°	
WP710A10ID	GaAsP/GaP	617	Red Diffused	10	20	50°	T-1 (3mm) Round WP710A10
WP710A10IT	GaAsP/GaP	617	Red Transparent	12	30	30°	
WP710A10EC	GaAsP/GaP	617	Water Clear	12	30	30°	
WP710A10ND	GaAsP/GaP	602	Orange Diffused	10	20	50°	
WP710A10NC	GaAsP/GaP	602	Water Clear	12	30	30°	
WP710A10YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP710A10YT	GaAsP/GaP	588	Yellow Transparent	10	30	30°	
WP710A10YC	GaAsP/GaP	588	Water Clear	10	30	30°	
WP710A10GD	GaP	568	Green Diffused	10	25	50°	
WP710A10GT	GaP	568	Green Transparent	12	40	30°	
WP710A10GC	GaP	568	Water Clear	12	40	30°	
WP710A10SRC/D	GaAlAs	640	Water Clear	*120	*240	30°	
WP710A10SRD/D	GaAlAs	640	Red Diffused	*70	*140	50°	
WP710A10SRD/E	GaAlAs	640	Red Diffused	*80	*150	50°	
WP710A10SRD/F	GaAlAs	640	Red Diffused	*90	*160	50°	
WP710A10SRC/J4	AlGaInP	640	Water Clear	*1000	*1500	30°	
WP710A10SRD/J4	AlGaInP	640	Red Diffused	*200	*500	50°	
WP710A10SURCK	AlGaInP	630	Water Clear	*400	*900	30°	
WP710A10SURC/E	AlGaInP	630	Water Clear	*500	*1100	30°	
WP710A10SECK/J3	AlGaInP	625	Water Clear	*2300	*3600	30°	
WP710A10SECK/J4	AlGaInP	605	Water Clear	*3600	*6000	30°	
WP710A10SED	AlGaInP	605	Orange Diffused	*300	*650	50°	
WP710A10SECK	AlGaInP	605	Water Clear	*700	*1400	30°	
WP710A10SYD	AlGaInP	590	Yellow Diffused	*480	*900	50°	
WP710A10SYCK	AlGaInP	590	Water Clear	*700	*1500	30°	
WP710A10SYCK/J3	AlGaInP	590	Water Clear	*1900	*3000	30°	
WP710A10CGCK	AlGaInP	570	Water Clear	*200	*500	30°	
WP710A10SGD	GaP	568	Green Diffused	*18	*40	50°	
WP710A10SGC	GaP	568	Water Clear	*30	*60	30°	
WP710A10ZGCK	InGaN	525	Water Clear	*8000	*14000	30°	
WP710A10ZGC/G	InGaN	525	Water Clear	*10500	*16500	30°	
WP710A10VBC/D	InGaN	470	Water Clear	*2100	*3700	30°	
WP710A10QBC/D	InGaN	465	Water Clear	*900	*1600	30°	
WP3A10HD	GaP	635	Red Diffused	0.6	1.8	60°	T-1 (3mm) Round WP3A10
WP3A10ID	GaAsP/GaP	617	Red Diffused	6	15	60°	
WP3A10YD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP3A10GD	GaP	568	Green Diffused	12	25	60°	

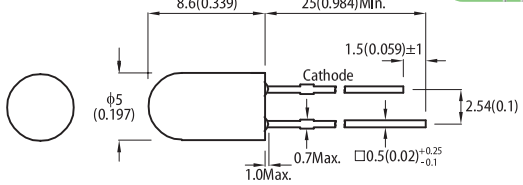
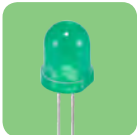
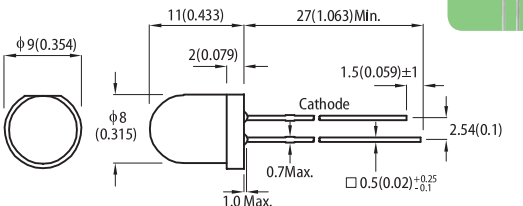
All dimensions are in millimeters (inches). Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

THROUGH-HOLE LED

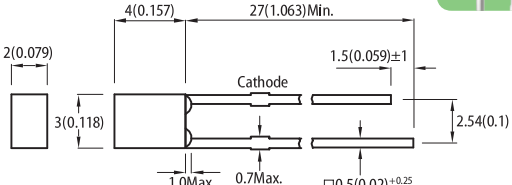
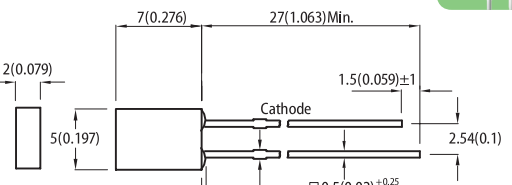
ROUND LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP132XID	GaAsP/GaP	617	Red Diffused	8	16	60°	T-1 (3mm) Round  
WP132XIT	GaAsP/GaP	617	Red Transparent	10	20	50°	
WP132XND	GaAsP/GaP	602	Orange Diffused	8	16	60°	
WP132XNT	GaAsP/GaP	602	Orange Transparent	10	20	50°	
WP132XYD	GaAsP/GaP	588	Yellow Diffused	6	15	60°	
WP132XGD	GaP	568	Green Diffused	15	25	60°	
WP132XGT	GaP	568	Green Transparent	20	40	50°	T-1 3/4 (5mm) Round  
WP7113ID	GaAsP/GaP	617	Red Diffused	18	40	30°	
WP7113IT	GaAsP/GaP	617	Red Transparent	40	100	20°	
WP7113EC	GaAsP/GaP	617	Water Clear	40	100	20°	
WP7113YD	GaAsP/GaP	588	Yellow Diffused	10	25	30°	
WP7113YT	GaAsP/GaP	588	Yellow Transparent	30	80	20°	
WP7113YC	GaAsP/GaP	588	Water Clear	30	80	20°	
WP7113GD	GaP	568	Green Diffused	15	30	30°	
WP7113GT	GaP	568	Green Transparent	25	80	20°	
WP7113GC	GaP	568	Water Clear	25	80	20°	
WP7113SRC/DU	GaAlAs	640	Water Clear	*300	*500	20°	
WP7113SRC/DV	GaAlAs	640	Water Clear	*400	*600	20°	
WP7113SRC/DW	GaAlAs	640	Water Clear	*500	*700	20°	
WP7113SRC/J4	AlGaInP	640	Water Clear	*3300	*5000	20°	
WP7113SRD/D	GaAlAs	640	Red Diffused	*120	*210	30°	
WP7113SRD/E	GaAlAs	640	Red Diffused	*180	*250	30°	
WP7113SRD/F	GaAlAs	640	Red Diffused	*200	*300	30°	
WP7113SRD/J4	AlGaInP	640	Red Diffused	*300	*600	30°	
WP7113SURCK	AlGaInP	630	Water Clear	*900	*1300	20°	
WP7113SURC/E	AlGaInP	630	Water Clear	*1100	*2100	20°	
WP7113SECK/J3	AlGaInP	625	Water Clear	*3600	*6000	20°	
WP7113SED	AlGaInP	605	Orange Diffused	*600	*1000	30°	
WP7113SECK	AlGaInP	605	Water Clear	*1300	*2100	20°	
WP7113SYD	AlGaInP	590	Yellow Diffused	*650	*1200	30°	
WP7113SYCK	AlGaInP	590	Water Clear	*1800	*3000	20°	
WP7113SYCK/J3	AlGaInP	590	Water Clear	*5000	*7800	20°	
WP7113CGCK	AlGaInP	570	Water Clear	*700	*1400	20°	
WP7113SGD	GaP	568	Green Diffused	*18	*40	30°	
WP7113SGC	GaP	568	Water Clear	*120	*240	20°	
WP7113ZGCK	InGaN	525	Water Clear	*14000	*26000	20°	
WP7113ZGC/G	InGaN	525	Water Clear	*18000	*30000	20°	
WP7113VBC/D	InGaN	470	Water Clear	*4300	*7000	20°	
WP7113QBC/D	InGaN	465	Water Clear	*3100	*4500	20°	

ROUND LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP1503ID	GaAsP/GaP	617	Red Diffused	12	40	30°	T-1 3/4 (5mm) Round  
WP1503GD	GaP	568	Green Diffused	15	30	30°	
WP1503SRD	GaAlAs	640	Red Diffused	*120	*260	30°	
WP1503SRC/J4	AlGaInP	640	Water Clear	*2500	*4300	20°	
WP1503SGC	GaP	568	Water Clear	*80	*200	20°	
WP793SRC/D	GaAlAs	640	Water Clear	*500	*800	15°	8mm Round  
WP793SRD/E	GaAlAs	640	Red Diffused	*140	*180	30°	
WP793SRD/J4	AlGaInP	640	Red Diffused	*300	*600	30°	
WP793ID	GaAsP/GaP	617	Red Diffused	*30	*60	30°	
WP793GD	GaP	568	Green Diffused	*30	*60	30°	

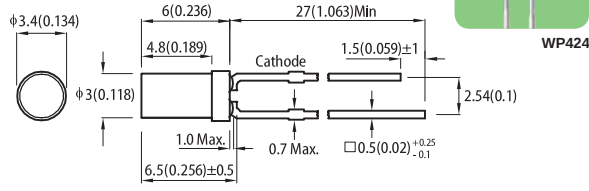
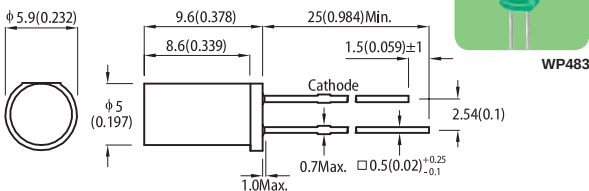
RECTANGULAR LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP914IDT	GaAsP/GaP	617	Red Diffused	1.2	4	140°	2mm x 3mm Rectangular  
WP914GDT	GaP	568	Green Diffused	3	6	140°	
WP113IDT	GaAsP/GaP	617	Red Diffused	2	4	140°	2mm x 5mm Rectangular  
WP113YDT	GaAsP/GaP	588	Yellow Diffused	1.2	4	140°	
WP113GDT	GaP	568	Green Diffused	1.2	5	140°	
WP113SRDT	GaAlAs	640	Red Diffused	*10	*20	140°	

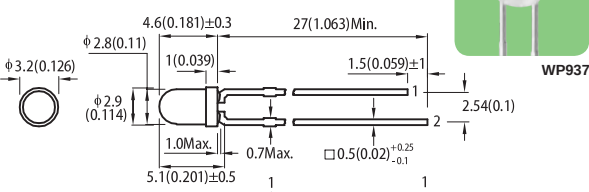
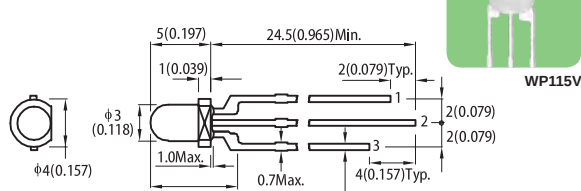
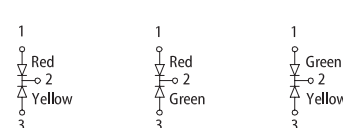
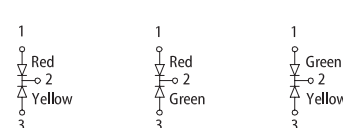
All dimensions are in millimeters (inches). Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

THROUGH-HOLE LED

CYLINDRICAL LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP424HDT	GaP	635	Red Diffused	0.2	0.6	140°	T-1 (3mm) Cylindrical 
WP424IDT	GaAsP/GaP	617	Red Diffused	1.2	4	140°	
WP424EDT	GaAsP/GaP	617	Orange Diffused	1.2	4	140°	
WP424YDT	GaAsP/GaP	588	Yellow Diffused	1.2	3	140°	
WP424GDT	GaP	568	Green Diffused	2	6	140°	
WP424SRDT	GaAlAs	640	Red Diffused	*12	*20	140°	
WP483IDT	GaAsP/GaP	617	Red Diffused	1.2	4	140°	T-1 3/4 (5mm) Cylindrical 
WP483YDT	GaAsP/GaP	588	Yellow Diffused	1.2	3	140°	
WP483GDT	GaP	568	Green Diffused	1.5	3	140°	

MULTI-COLOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP937EGW	GaAsP/GaP	617	White Diffused	4	10	60°	T-1 (3mm) Round 
	GaP	568		6	14		
WP937GYW	GaP	568	White Diffused	6	14	60°	
	GaAsP/GaP	588		4	8		
WP115VEYW	GaAsP/GaP	617	White Diffused	8	20	60°	T-1 (3mm) Round 
	GaAsP/GaP	588		10	24		
WP115VEGW	GaAsP/GaP	617	White Diffused	8	20	60°	
	GaP	568		10	30		
WP115VGYW	GaP	568	White Diffused	10	30	60°	
	GaAsP/GaP	588		10	24		

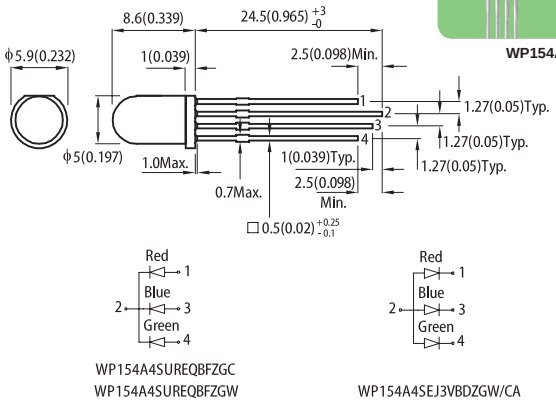
MULTI-COLOR LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP3VEGW	GaAsP/GaP	617	White Diffused	10	30	60°	T-1 (3mm) Round
	GaP	568		20	40		
WP3VGYW	GaP	568	White Diffused	15	40	60°	
	GaAsP/GaP	588		10	15		
WP7113SRSGW	GaAlAs	640	White Diffused	40	100	35°	T-1 3/4 (5mm) Round
	GaP	568		20	60		
WP57EGW	GaAsP/GaP	617	White Diffused	6	14	30°	T-1 3/4 (5mm) Round
	GaP	568		12	30		
WP57GYW	GaP	568	White Diffused	12	30	30°	
	GaAsP/GaP	588		4	10		
WP59EYW	GaAsP/GaP	617	White Diffused	20	40	30°	T-1 3/4 (5mm) Round
	GaAsP/GaP	588		20	40		
WP59SURCKGW	AlGaInP	630	White Diffused	200	400	30°	
	AlGaInP	570		80	180		
WP59EGC	GaAsP/GaP	617	Water Clear	50	100	20°	
	GaP	568		50	120		
WP59GYC	GaP	568	Water Clear	50	120	20°	
	GaAsP/GaP	588		40	80		

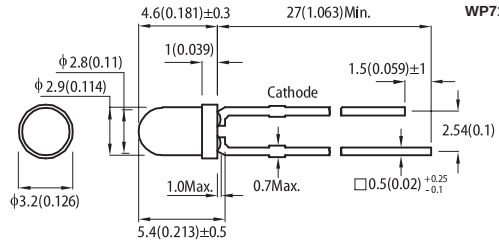
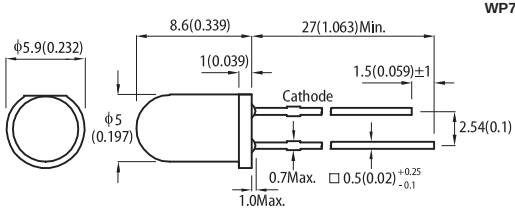
All dimensions are in millimeters (inches). Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

THROUGH-HOLE LED

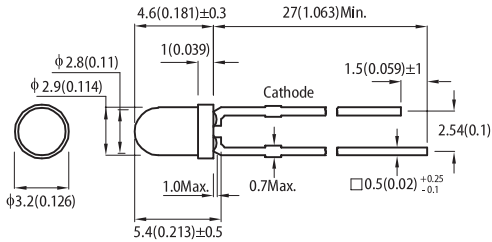
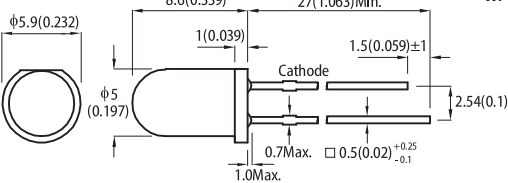
MULTI-COLOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @ 20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP154A4SUREQBFZGC	AlGaInP	630	Water Clear	200	400	50°	T-1 3/4 (5mm) Full color  
	InGaIn	465		400	900		
	InGaIn	525		1900	3600		
WP154A4SUREQBFZGW	AlGaInP	630	White Diffused	120	250	60°	
	InGaIn	465		300	500		
	InGaIn	525		600	1300		
WP154A4SEJ3VBDZGW/CA	AlGaInP	625	White Diffused	900	1500	60°	
	InGaIn	470		200	400		
	InGaIn	525		480	1100		

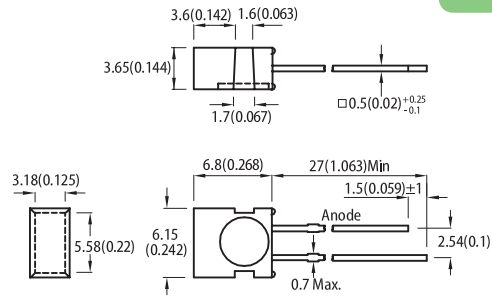
LOW CURRENT LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @ 2mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP710A10LSRD	GaAlAs	640	Red Diffused	2	6	50°	T-1 (3mm) Round  
WP710A10LID	GaAsP/GaP	617	Red Diffused	0.5	1.2	50°	
WP710A10LSYCK/J3	AlGaInP	590	Water Clear	120	200	30°	
WP710A10LYD	GaAsP/GaP	588	Yellow Diffused	0.8	3	50°	
WP710A10LGD	GaP	568	Green Diffused	1	3	50°	
WP710A10LZGCK	InGaIn	525	Water Clear	500	1100	30°	
WP710A10LVBC/D	InGaIn	470	Water Clear	180	450	30°	
WP7113LSRD	GaAlAs	640	Red Diffused	4	8	30°	T-1 3/4 (5mm) Round  
WP7113LSECK/J3	AlGaInP	625	Water Clear	180	550	20°	
WP7113LID	GaAsP/GaP	617	Red Diffused	0.7	2	30°	
WP7113LSYCK/J3	AlGaInP	590	Water Clear	320	800	20°	
WP7113LYD	GaAsP/GaP	588	Yellow Diffused	1	3	30°	
WP7113LGD	GaP	568	Green Diffused	1.2	3	30°	
WP7113LZGCK	InGaIn	525	Water Clear	1000	3000	20°	
WP7113LVBC/D	InGaIn	470	Water Clear	550	1600	20°	

RESISTOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) V=5V		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP710A10SRD5V	GaAlAs	640	Red Diffused	25	50	50°	T-1 (3mm) Round  
WP710A10ID5V	GaAsP/GaP	617	Red Diffused	6	14	50°	
WP710A10GD5V	GaP	568	Green Diffused	12	25	50°	
WP710A10SGD5V	GaP	568	Green Diffused	10	25	50°	
WP7113ID5V	GaAsP/GaP	617	Red Diffused	12	25	30°	T-1 3/4 (5mm) Round  
WP7113SGD5V	GaP	568	Green Diffused	15	25	30°	

LIGHT BAR

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP1043SURDTK	AlGaInP	630	Red Diffused	*30	*60	140°	3.65mm x 6.15mm  
WP1043SYDTK	AlGaInP	590	Yellow Diffused	*80	*150	140°	
WP1043GD	GaP	568	Green Diffused	2	6	140°	

All dimensions are in millimeters (inches). Tolerance is ± 0.25 mm (0.01") unless otherwise noted.

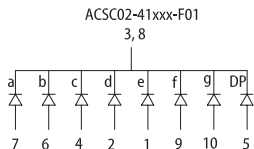
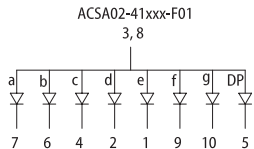
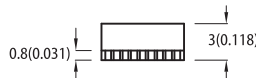
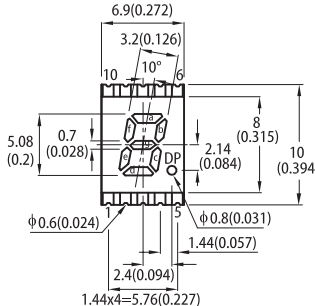
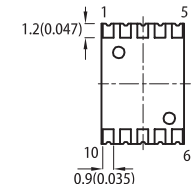
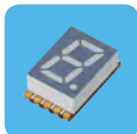
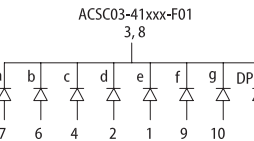
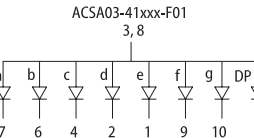
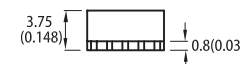
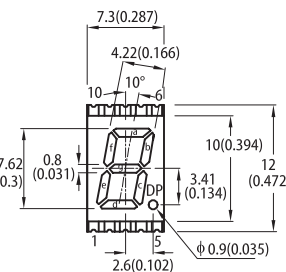
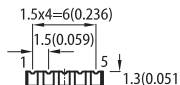
SMD Display

Kingbright's SMD LED display products are designed for applications that require character and text displays. Whether an ultra thin, 7-segment, or alphanumeric SMD display is required for healthcare, consumer electronics, industrial devices or handheld devices, our products will meet your needs.



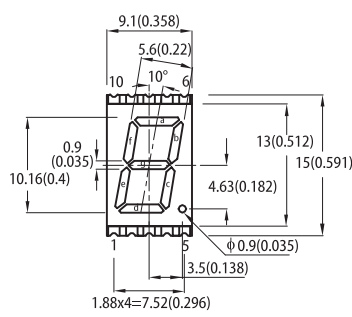
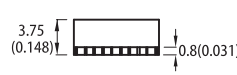
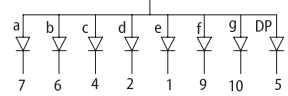
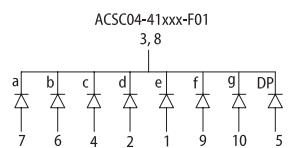
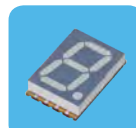
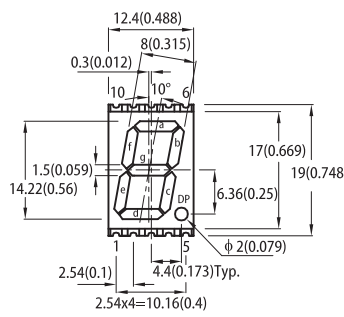
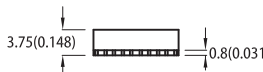
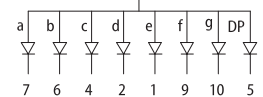
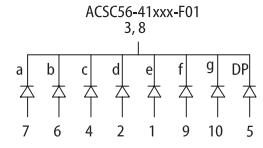
33 /
7-Segment SMD Display

7-SEGMENT SMD DISPLAY

Part Number		Material	λD (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA02-41SURKWA-F01	ACSC02-41SURKWA-F01	AlGaInP	630	3600	8100	0.2 inch (5.08mm), Gray Face, White Segment  ACSX02-41 
ACSA02-41CGKWA-F01	ACSC02-41CGKWA-F01	AlGaInP	570	2200	4300	
ACSA03-41SURKWA-F01	ACSC03-41SURKWA-F01	AlGaInP	630	3600	6400	0.3 inch (7.62mm), Gray Face, White Segment  ACSX03-41 
ACSA03-41SEKWA-F01	ACSC03-41SEKWA-F01	AlGaInP	605	5600	11000	
ACSA03-41SYKWA-F01	-	AlGaInP	590	5600	13000	
ACSA03-41CGKWA-F01	ACSC03-41CGKWA-F01	AlGaInP	570	1400	3100	

All dimensions are in millimeters (inches). Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

7-SEGMENT SMD DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA04-41SURKWA-F01	ACSC04-41SURKWA-F01	AlGaInP	630	9000	20000	0.4 inch (10.16mm), Gray Face, White Segment  ACSX04-41   ACSX04-41xxx-F01  ACSC04-41xxx-F01 
ACSA04-41SEKWA-F01	ACSC04-41SEKWA-F01	AlGaInP	605	9000	15000	
ACSA04-41SYKWA-F01	-	AlGaInP	590	9000	23000	
ACSA04-41CGKWA-F01	ACSC04-41CGKWA-F01	AlGaInP	570	2200	4100	
0.56 inch (14.22mm), Gray Face, White Segment						
ACSA56-41SURKWA-F01	ACSC56-41SURKWA-F01	AlGaInP	630	14000	29000	0.56 inch (14.22mm), Gray Face, White Segment  ACSX56-41   ACSX56-41xxx-F01  ACSC56-41xxx-F01 
ACSA56-41SEKWA-F01	ACSC56-41SEKWA-F01	AlGaInP	605	14000	23000	
ACSA56-41SYKWA-F01	ACSC56-41SYKWA-F01	AlGaInP	590	14000	29000	
ACSA56-41CGKWA-F01	ACSC56-41CGKWA-F01	AlGaInP	570	2200	4600	
ACSA56-41QBWA/D-F01	ACSC56-41QBWA/D-F01	InGaN	465	5600	15000	

Chameleon RGB+IC

Kingbright's RGB+IC integrates the control circuit and RGB chip for complete control of pixel points. With each color being controlled individually, our RGB+IC SMD LED can achieve 256-level grayscale, which is ideal for decorative and entertainment lighting applications, commercial and residential architectural lighting, or signage applications.



Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @ VDD = 5V, Gray Scale Level = 255		Viewing Angle	Dimensions
				Min.	Typ.		
AAAF5050-MC-K12	AlGaInP	625	Water Clear	200	360	120°	5.0mm x 5.0mm x 1.6mm (RGB+IC)
	InGaN	525		400	600		
	InGaN	465		80	150		

Units: mm (inch)
Tolerance: ± 0.2 (0.008)

PIN FUNCTION		
No.	Symbol	Function Description
1	VSS	Ground
2	NC	/
3	DI	Control data signal input
4	VDD	Power supply LED
5	VDD	Power supply LED
6	DO	Control data signal output

Circuit Board Indicator

Commonly used as panel or diagnostic indicators, Kingbright's circuit board indicators are perfect for any number of applications ranging from diagnostic, industrial equipment, and data storage applications. Each circuit board indicator comes in a variety of configurations and colors that meets the specifications of your application.



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Single-Level CBI



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Bi-Level CBI



39 /
Tri-Level CBI

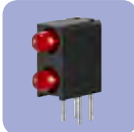
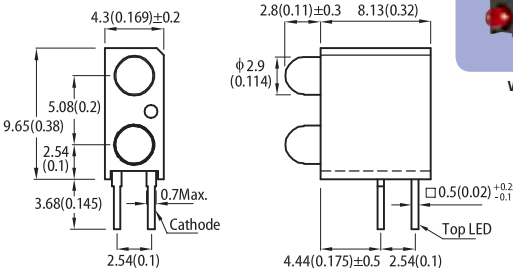
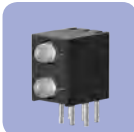
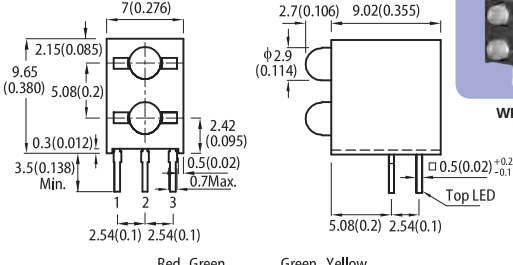


39 /
Quad-Level CBI

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.	2 θ 1/2	
WP934CB/ID	GaAsP/GaP	617	Red Diffused	10	20	50°	T-1 (3mm) Right Angle
WP934CB/YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934CB/GD	GaP	568	Green Diffused	10	25	50°	
WP934CB/SRD	GaAlAs	640	Red Diffused	*50	*100	50°	
WP934EW/ID	GaAsP/GaP	617	Red Diffused	10	20	50°	T-1 (3mm) Right Angle
WP934EW/YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934EW/GD	GaP	568	Green Diffused	10	25	50°	
WP934EW/SRD	GaAlAs	640	Red Diffused	*50	*100	50°	
WP130WDT/EGW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1 (3mm) Right Angle
	GaP	568		*12	*30		
WP130WDT/GYW	GaP	568	White Diffused	*18	*40	60°	
	GaAsP/GaP	588		*10	*20		
WP1384AD/ID	GaAsP/GaP	617	Red Diffused	8	16	60°	3.4mm Right Angle
WP1384AD/YD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP1384AD/GD	GaP	568	Green Diffused	10	20	60°	

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BI-LEVEL CBI

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP934MD/2ID	GaAsP/GaP	 617	Red Diffused	10	20	50°	T-1 (3mm) Bi-Level  WP934MD/2
WP934MD/2YD	GaAsP/GaP	 588	Yellow Diffused	8	15	50°	
WP934MD/2GD	GaP	 568	Green Diffused	10	25	50°	
WP934MD/2SRD	GaAlAs	 640	Red Diffused	*50	*100	50°	
WP130WCP/2EGW	GaAsP/GaP	 617	White Diffused	*10	*24	60°	T-1(3mm) Bi-Level  WP130WCP/2
	GaP	 568		*12	*30		
WP130WCP/2GYW	GaP	 568	White Diffused	*18	*40	60°	
	GaAsP/GaP	 588		*10	*20		

TRI-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP934SA/3ID	GaAsP/GaP	617	Red Diffused	10	20	50°	T-1 (3mm) Tri-Level WP934SA/3
WP934SA/3YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934SA/3GD	GaP	568	Green Diffused	10	25	50°	

QUAD-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP934SB/4ID	GaAsP/GaP	617	Red Diffused	10	20	50°	T-1 (3mm) Quad-Level WP934SB/4
WP934SB/4YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934SB/4GD	GaP	568	Green Diffused	10	25	50°	

All dimensions are in millimeters (inches). Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

Infrared & Phototransistor

Kingbright's selection of infrared emitting diode products are suitable for consumer applications, home automation, computer peripherals and industrial applications. Selections are available in both SMD and through-hole packages.



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Infrared Emitting Diode



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Phototransistor



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Photodiode



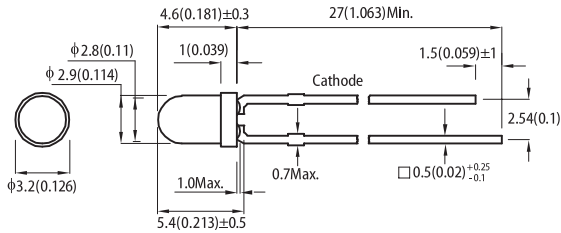
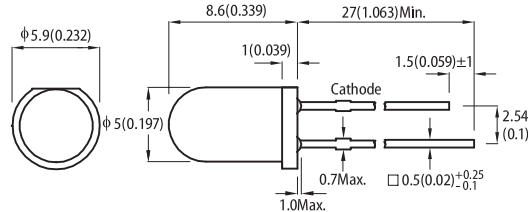
INFRARED EMITTING DIODE

Part Number	Material	λ_P (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APA1606SF4C-P22	GaAlAs	880	Water Clear	0.8	1.5	110°	1.6mm x 1.2mm x 0.6mm (Right Angle) Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT1608F3C	GaAs	940	Water Clear	0.8	2	150°	1.6mm x 0.8mm x 0.75mm (0603) Units: mm (inch) Tolerance: ± 0.1 (0.004)
APT2012F3C	GaAs	940	Water clear	0.8	2	160°	2.0mm x 1.25mm x 0.75mm (0805) Units: mm (inch) Tolerance: ± 0.1 (0.004)
AP2012SF4C	GaAlAs	880	Water Clear	0.8	1.5	160°	2.0mm x 1.25mm x 1.1mm (0805) Units: mm (inch) Tolerance: ± 0.1 (0.004)

INFRARED EMITTING DIODE

Part Number	Material	λ_P (nm)	Lens Type	Po (mW/sr) @20mA*50mA		Viewing Angle	Dimensions
				Min.	Typ.		
APA3010F3C-GX	GaAs	940	Water Clear	0.8	2	160°	3.0mm x 2.0mm x 1.0mm (Right Angle) Polarity mark APA3010 F3 1 ○ — — ○ 2 SF4 1 ○ — — ○ 2 Units: mm (inch) Tolerance: ± 0.15 (0.006)
APA3010SF4C	GaAlAs	880	Water Clear	0.8	1.5	160°	
APTD3216F3C-P22	GaAs	940	Water Clear	2	5	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens) Polarity mark APTD3216 F3 1 ○ — — ○ 2 SF4 1 ○ — — ○ 2 Units: mm (inch) Tolerance: ± 0.2 (0.008)
APTD3216SF4C	GaAlAs	880	Water Clear	1.6	4	40°	
AA3528SF4S-R	GaAlAs	880	Water Clear	1.2	2	120°	3.5mm x 2.8mm x 1.9mm Polarity mark AA3528 F3 1 ○ — — ○ 2 Units: mm (inch) Tolerance: ± 0.25 (0.01)
AM2520F3C03-P22	GaAs	940	Water Clear	3	8	20°	Subminiature Solid State Lamps Gull Wing Lead AM2520XXX03 F3 1 ○ — — ○ 2 Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*8	*16		

INFRARED EMITTING DIODE

Part Number	Material	λ_P (nm)	Lens Type	Po (mW/sr) @20mA*50mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP710A10F3C	GaAs	940	Water Clear	3	8	30°	T-1 (3mm) Round  WP710A10
				*12	*25		
WP710A10F3BT	GaAs	940	Blue Transparent	3	8	30°	 Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*12	*25		
WP710A10SF4BT-P22	GaAlAs	880	Blue Transparent	7	12	30°	
WP7113F3C	GaAs	940	Water Clear	8	20	20°	T-1 3/4 (5mm) Round  WP7113
				*25	*50		
WP7113F3BT	GaAs	940	Blue Transparent	8	20	20°	 Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*25	*50		
WP7113SF4C	GaAlAs	880	Water Clear	6	15	20°	
				*12	*25		
WP7113SF6C	GaAlAs	860	Water Clear	18	40	20°	
				*55	*100		
WP7113SF7C	GaAlAs	850	Water Clear	12	30	20°	
				*40	*90		

PHOTOTRANSISTOR

Part Number	Lens Type	Dimensions
AP2012P3C-P22	Water Clear	2.0mm x 1.25mm x 1.1mm (0805) Units: mm (inch) Tolerance: ± 0.1 (0.004)
APA3010P3BT-GX	Blue Transparent	
AA4040P3C-P22	Water Clear	
WP3DP3BT	Blue Transparent	
WP7113P3C	Water Clear	

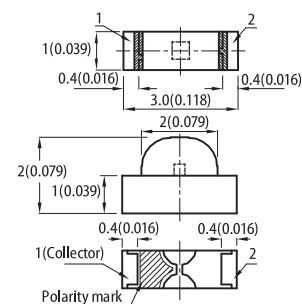
Electrical and Radiant Characteristics (Ta =25°C)

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition
Collector-to-Emitter Breakdown Voltage	$V_{BR\ CE}$	-	30	-	-	V	$I_C=100\mu A$ $E_e=0mW/cm^2$
Emitter-to-Collector Breakdown Voltage	$V_{BR\ EC}$	-	5	-	-	V	$I_E=100\mu A$ $E_e=0mW/cm^2$
Collector-to-Emitter Saturation Voltage	$V_{CE\ (SAT)}$	-	-	-	0.8	V	$I_C=2mA$ $E_e=20mW/cm^2$
Collector Dark Current	I_{CEO}	-	-	-	100	nA	$V_{CE}=10V$ $E_e=0mW/cm^2$
Rise Time (10% to 90%)	T_R	-	-	15	-	μs	$V_{CE}=5V$ $I_C=1mA$ $R_L=1K\Omega$
Fall Time (90% to 10%)	T_F	-	-	15	-	μs	
On State Collector Current	$I_{(ON)}$	AP2012P3C-P22	0.2	0.4	-	mA	$V_{CE}=5V$, $E_e=1mW/cm^2$ $\lambda=940nm$
		APA3010P3BT-GX	0.1	0.3			
		AA4040P3C-P22	0.35	0.6			
		WP3DP3BT	0.1	0.2			
		WP7113P3C	0.5	2.5			

Absolute Maximum Rating (Ta =25°C)

Parameter	Maximum Ratings
Collector-to-Emitter Voltage	30V
Emitter-to-Collector Voltage	5V
Power Dissipation at (or below) 25°C Free Air Temperature	100mW
Operating Temperature Range	-40°C~ +85°C
Storage Temperature Range	-40°C~ +85°C
WP3DP3BT WP7113P3C Lead Soldering Temperature (>5mm For 5 sec)	260°C

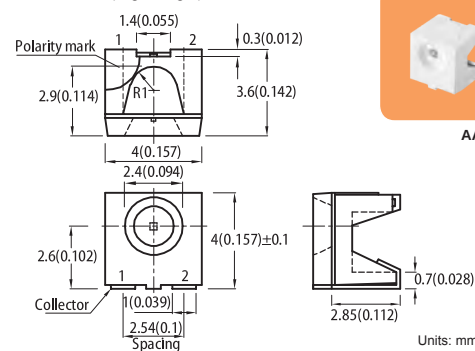
3.0mm x 2.0mm x 1.0mm (Right Angle)



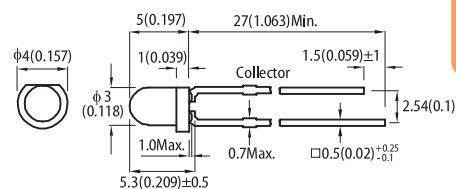
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

Units: mm (inch)
Tolerance: ± 0.15 (0.006)

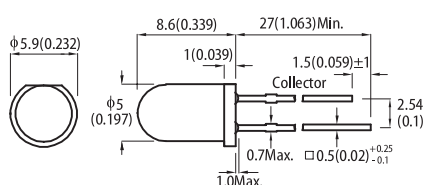
4.0mm x 4.0mm x 3.6mm (Right Angle)



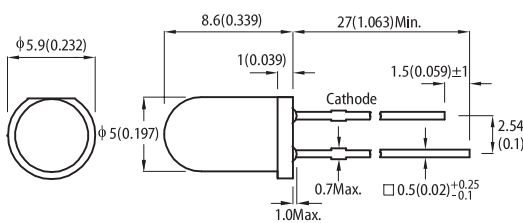
T-1 (3mm) Phototransistor



T-1 3/4 (5mm) Phototransistor



PHOTODIODE

Part Number	Lens Type	Dimensions
WP7113PD1BT/BD-P22	Black Diffused	T-1 3/4 (5mm) Photodiode  Units: mm (inch) Tolerance: ± 0.25 (0.01)



WP7113

Electrical and Optical Characteristics (Ta =25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Reverse Break down Voltage	$V_{(BR)R}$	33	170	-	V	$I_R = 100\mu A$ $H = 0mW/cm^2$
Reverse Dark Current	$I_{D(R)}$	-	-	10	nA	$V_R = 10V$ $H = 0mW/cm^2$
Open Circuit Voltage	V_{OC}	-	390	-	mV	$\lambda = 940nm$ $H = 5mW/cm^2$
Rise Time	T_R	-	6	-	nS	$V_R = 10V$ $\lambda = 940nm$ $R_L = 1000\Omega$
Fall Time	T_F	-	6	-	nS	
Light current	I_S	1.2	2.0	-	μA	$V_R = 5V$ $E_e = 0.08mW/cm^2$ $\lambda = 940nm$
Total Capacitance	C_T	-	5	-	pF	$V_R = 10V$ $F = 1MHz$ $H = 0mW/cm^2$
Range of spectral bandwidth	$\lambda_{0.1}$	670	-	1070	nm	-
Wavelength of peak sensitivity	λ_D	-	940	-	nm	-
Angle of half sensitivity	$2\theta_{1/2}$	-	20	-	deg	-

Absolute Maximum Rating (Ta =25°C)

Parameter	Maximum Ratings	Parameter	Maximum Ratings
Power Dissipation	150mW	Operating Temperature Range	-40°C~ +85°C
Lead Soldering Temperature (>5mm)	260°C for 5 sec	Storage Temperature Range	-40°C~ +85°C

Technical Notes



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Soldering Pattern



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Bin Code Systems



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Application Notes

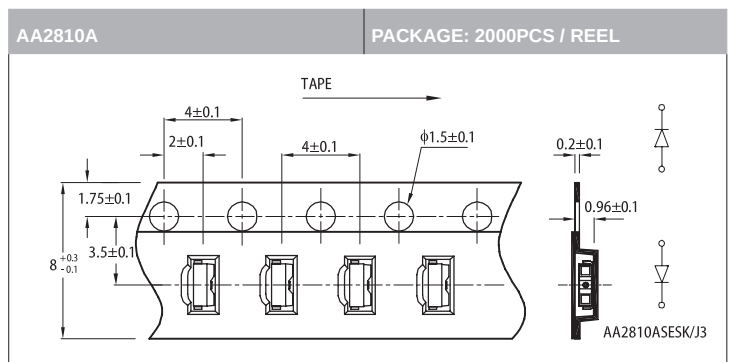
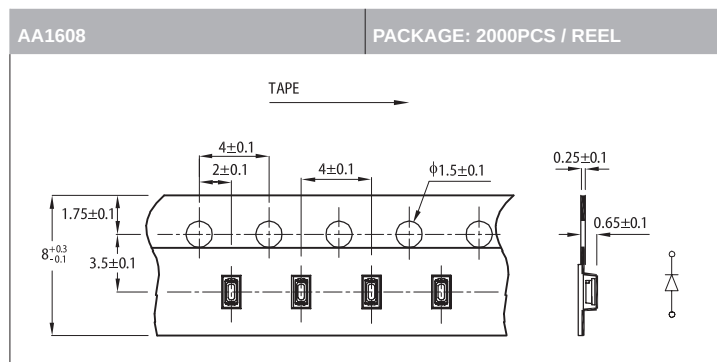
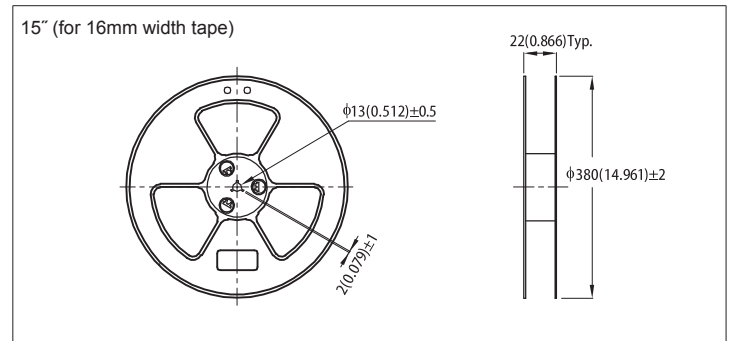
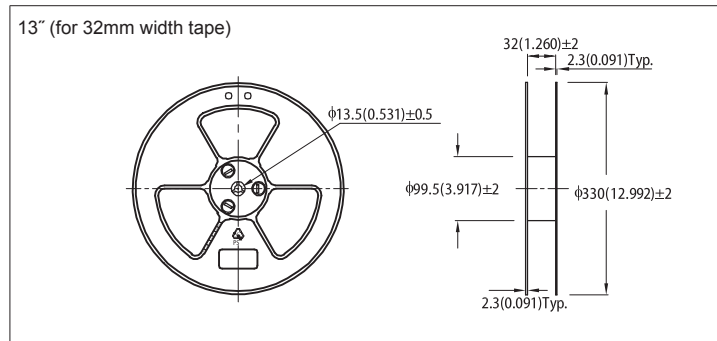
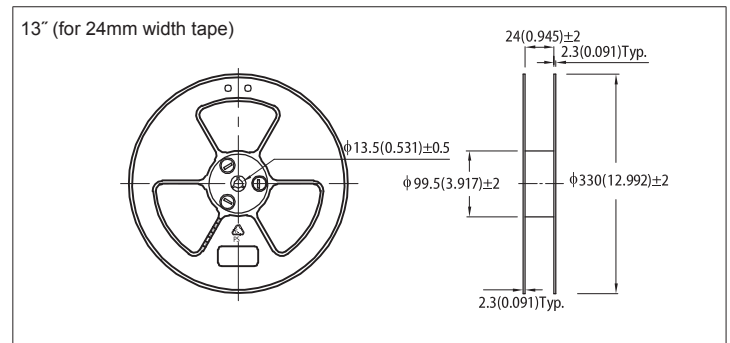
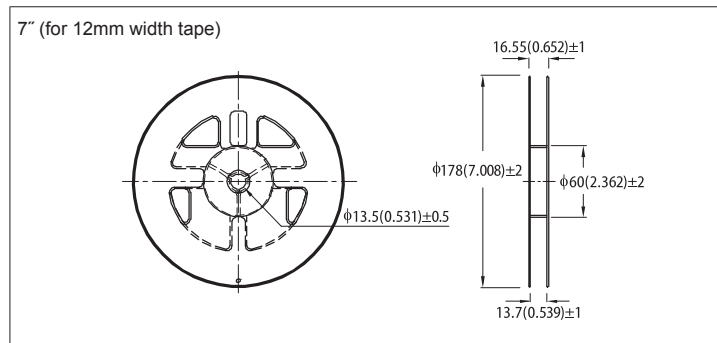
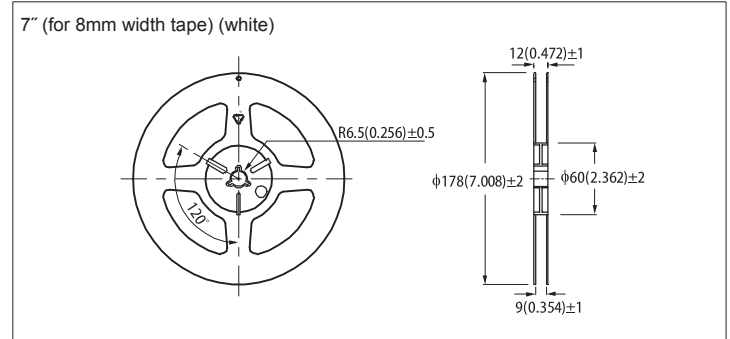
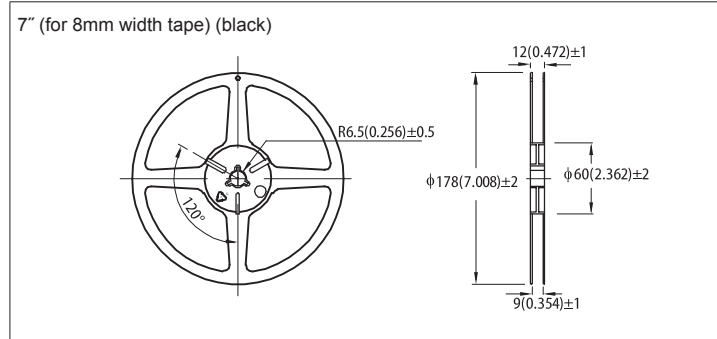
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CIE Chromaticity
Diagram



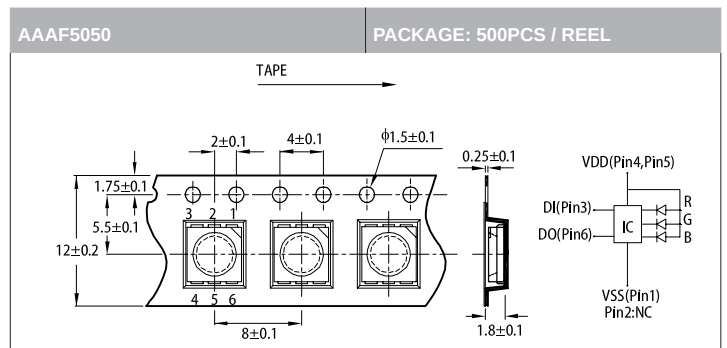
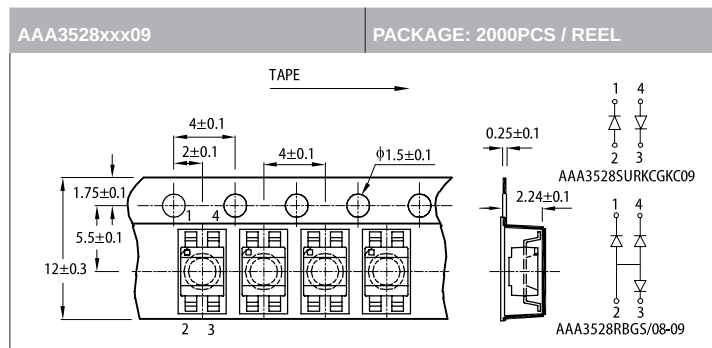
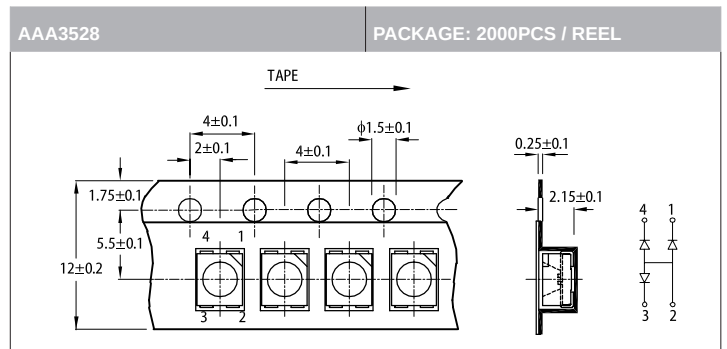
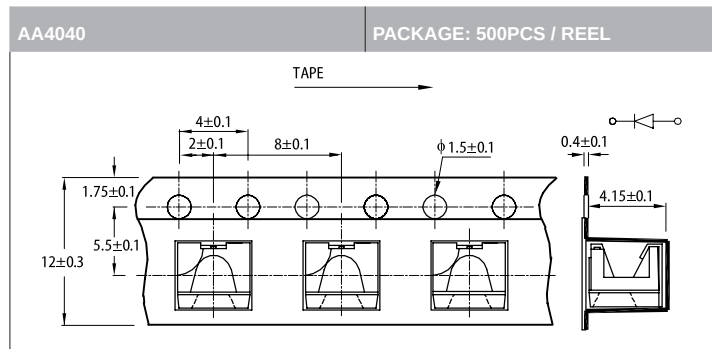
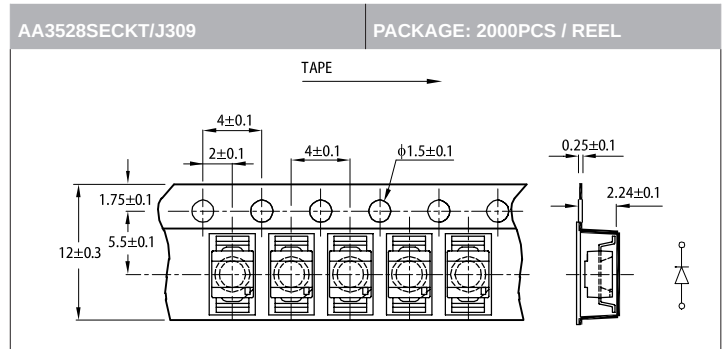
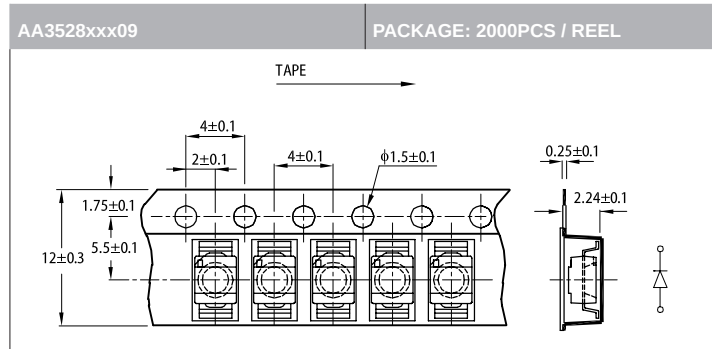
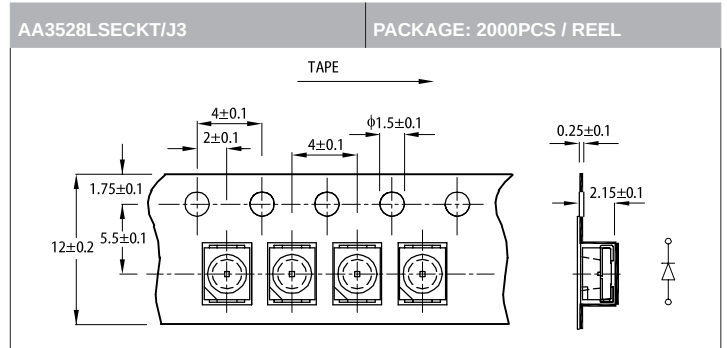
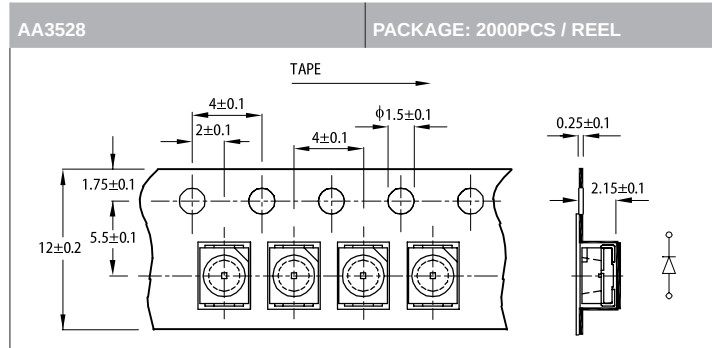
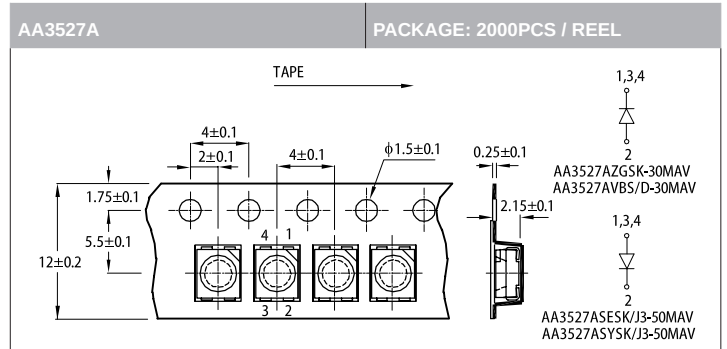
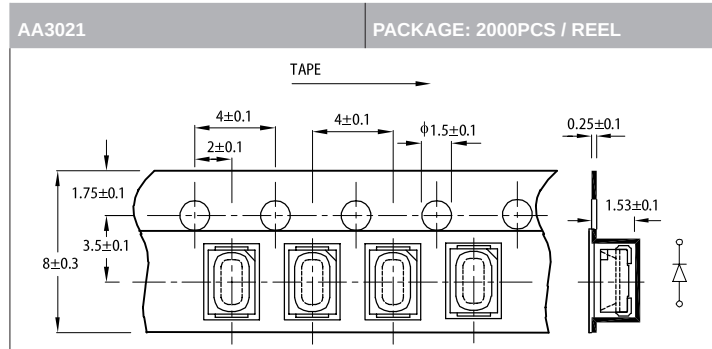
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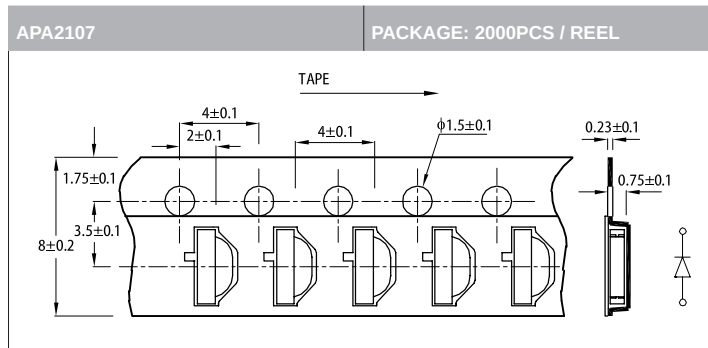
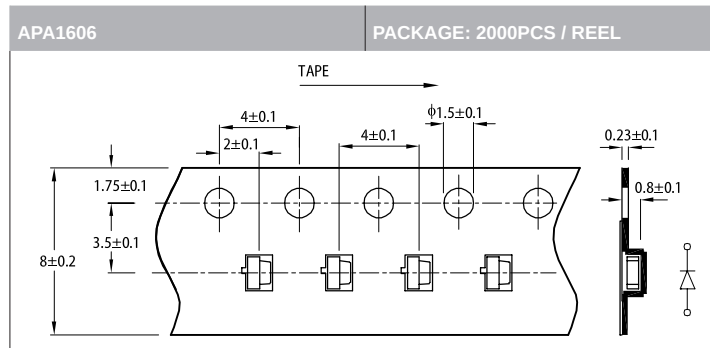
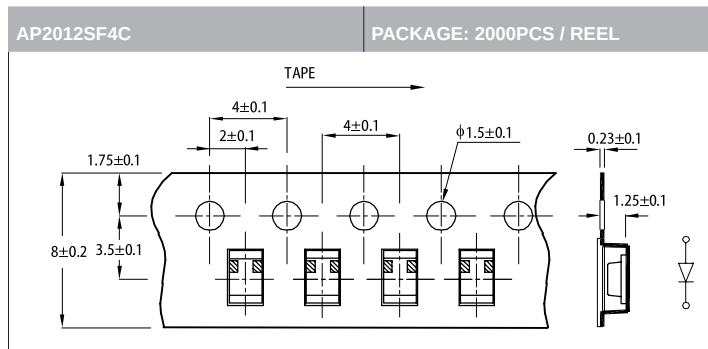
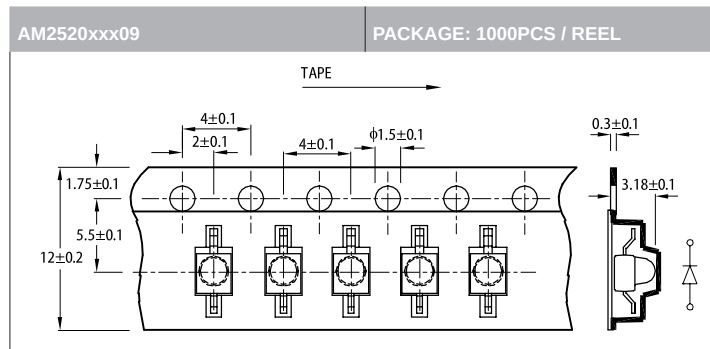
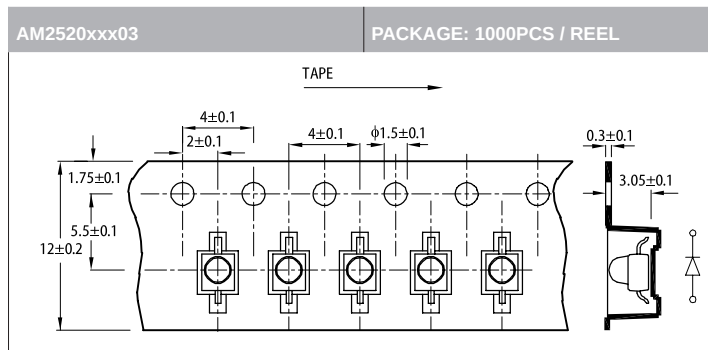
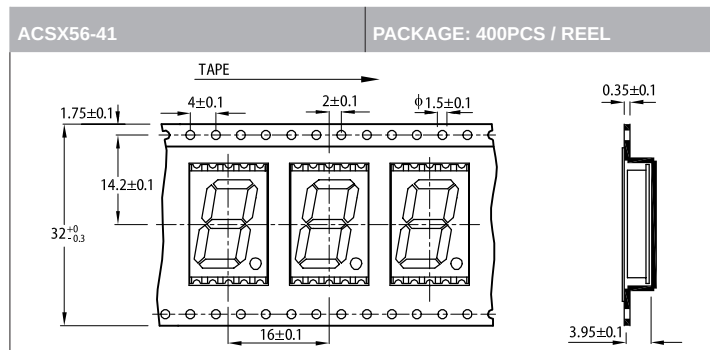
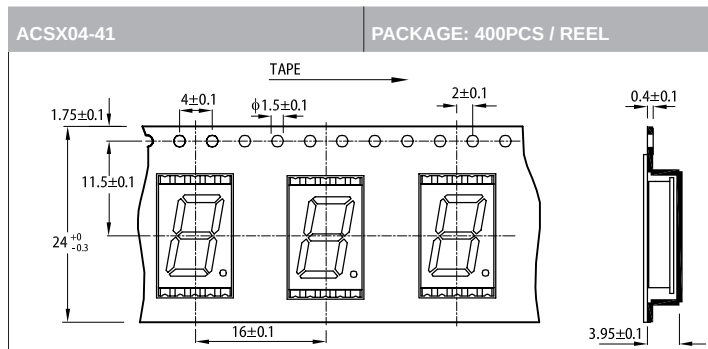
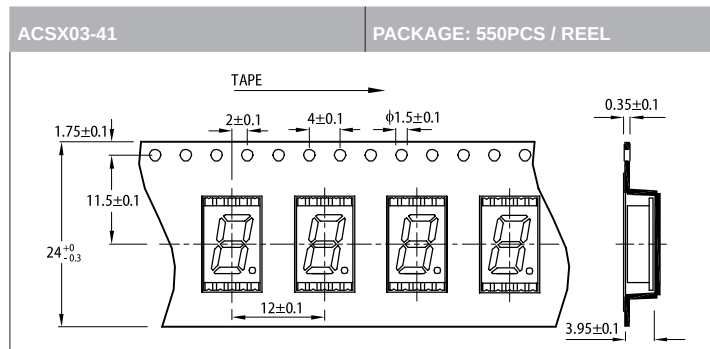
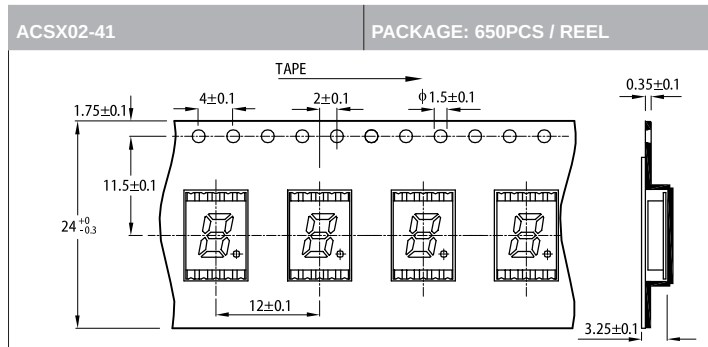
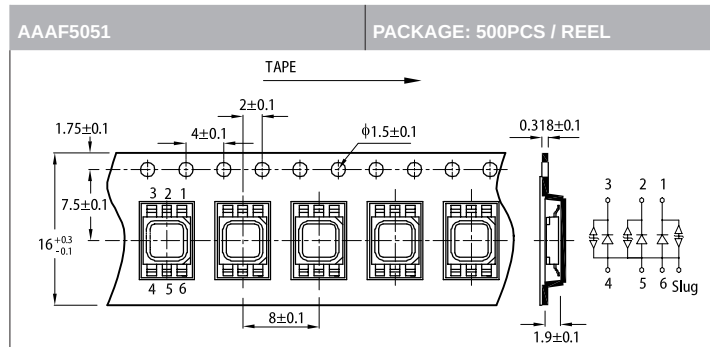
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APG0603	APHF1608	APT1612	AA3021	APB3025	APBL3025	APFA3010	APT2012	APTF1616	
APG1005	APHHS1005	APTD1608	AP2012	APB3227	APD3224	APFA3011	APT3216	APTL3216	
APG1608	APHM1608		APA1606	APBA3010	APDA1806	APHBM2012	APT1615	APTL3216xxx01	
			APA2107	APBD3224	APDA3020	APHCM2012	APTD2012	APTR3216	
7" (for 12mm width tape)			13" (for 24mm width tape)		13" (for 32mm width tape)		15" (for 16mm width tape)		
AA3527A	AAA3528	AM2520xxx09	ACSX02-41	ACSX04-41	ACSX56-41		AAAF5051		
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AA3528xxx09	AAAF5050								
AA4040	AM2520xxx03								



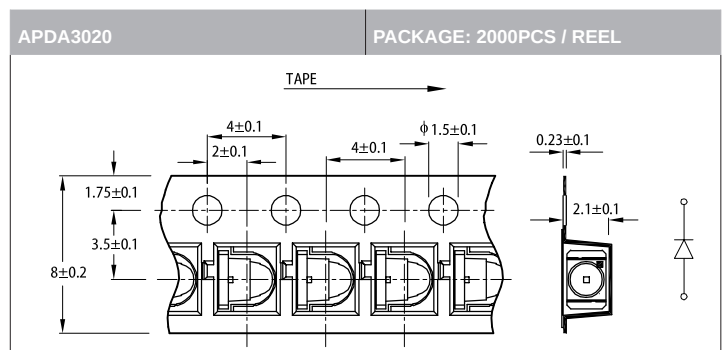
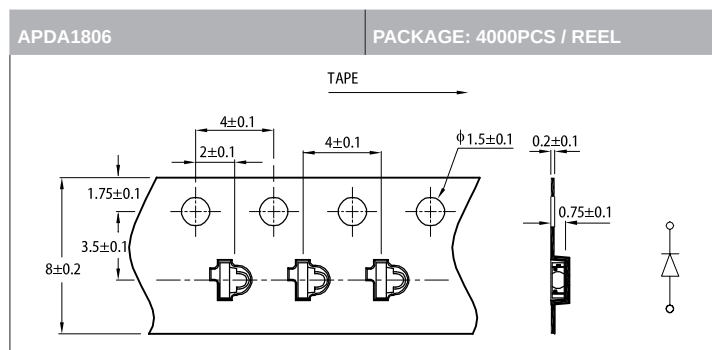
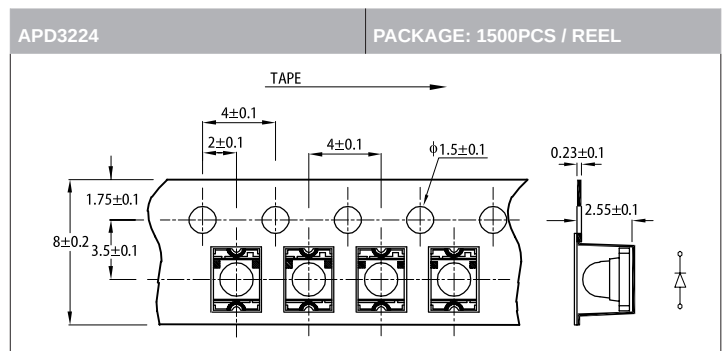
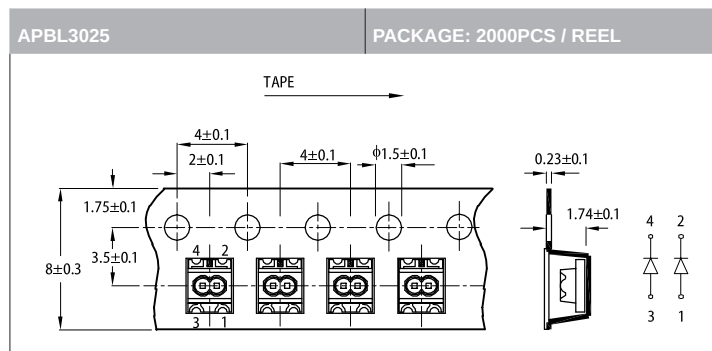
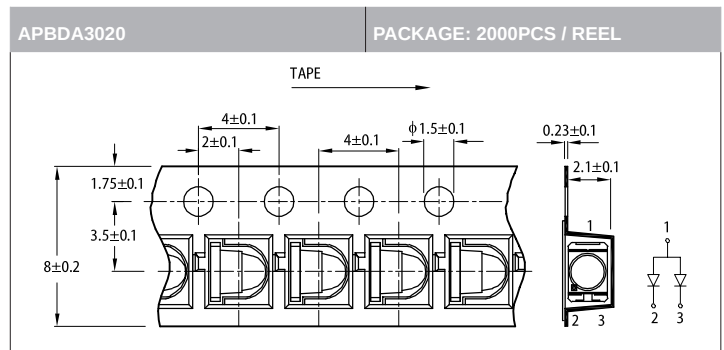
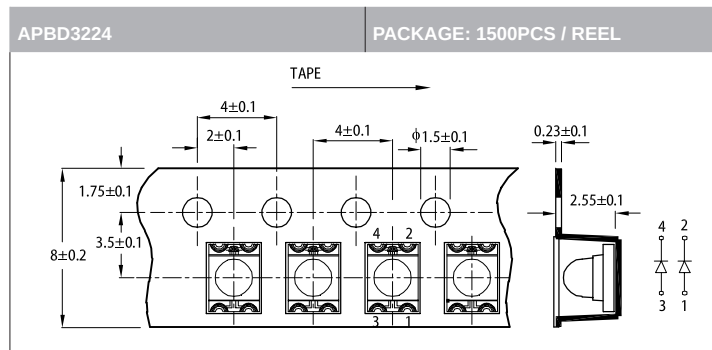
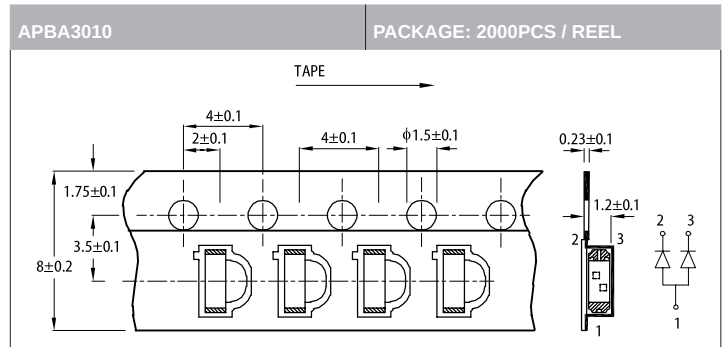
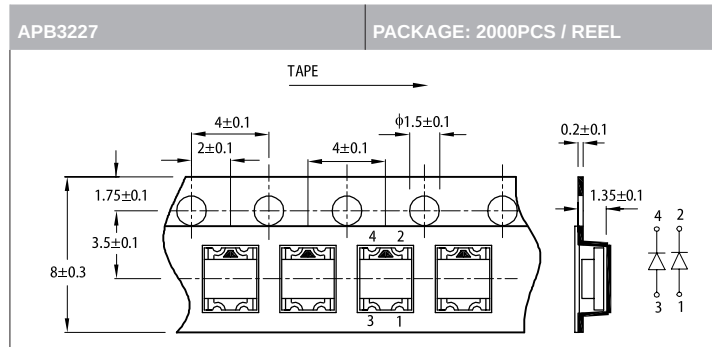
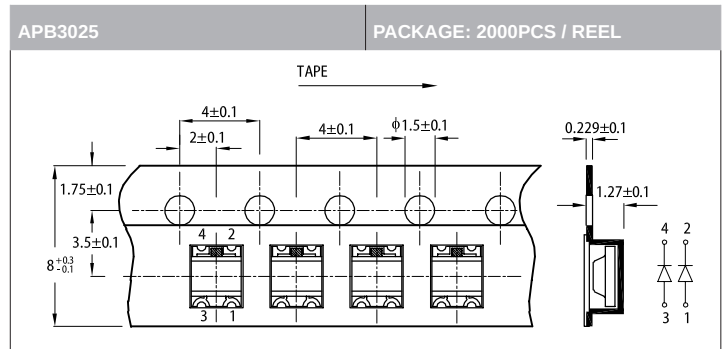
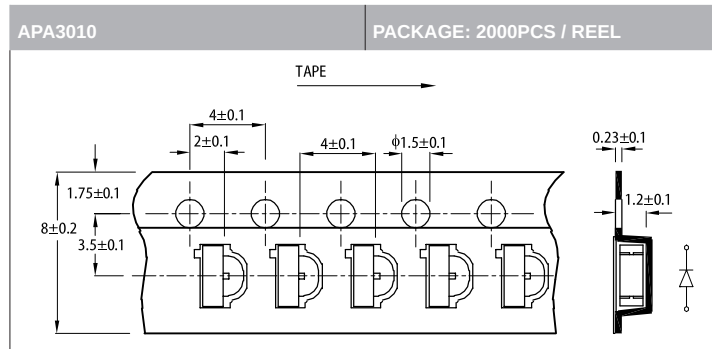
SMD TAPE SPECIFICATIONS



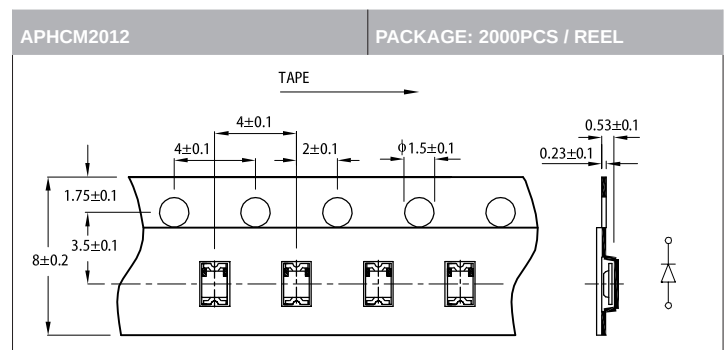
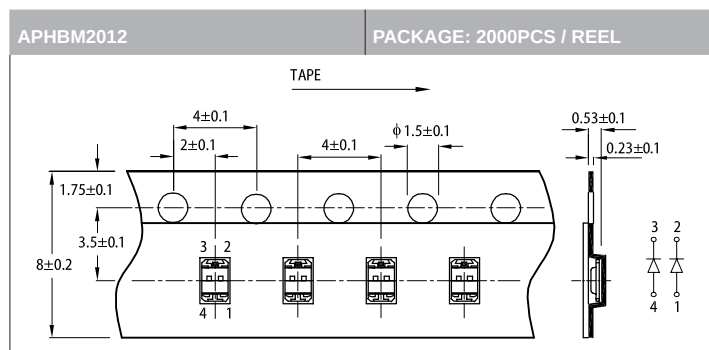
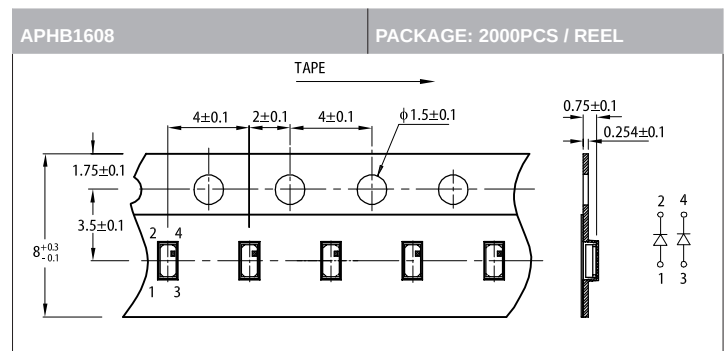
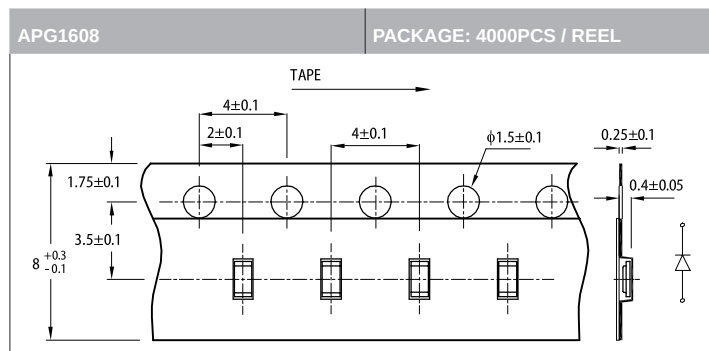
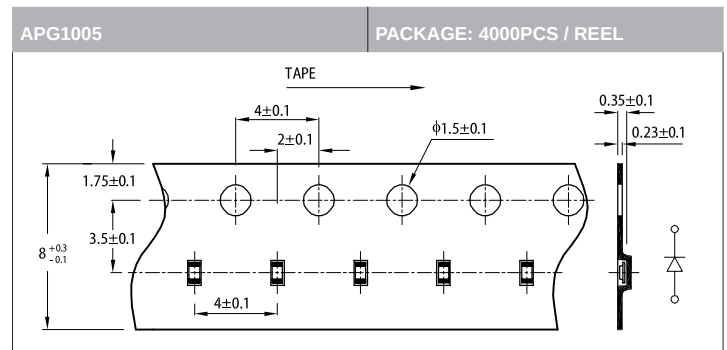
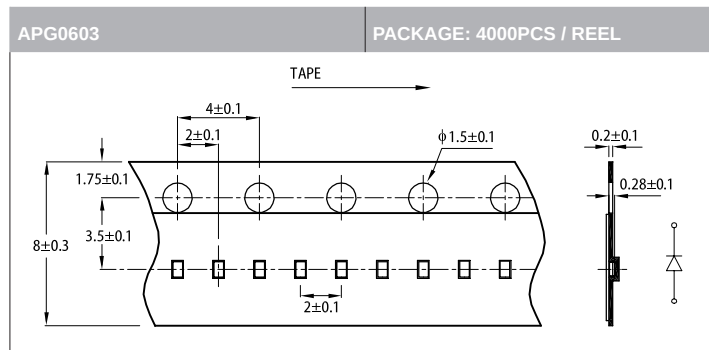
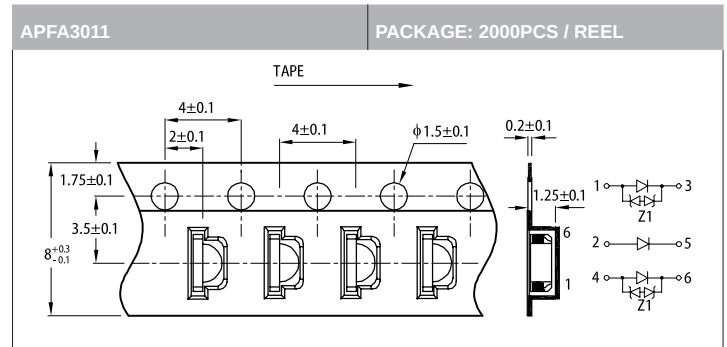
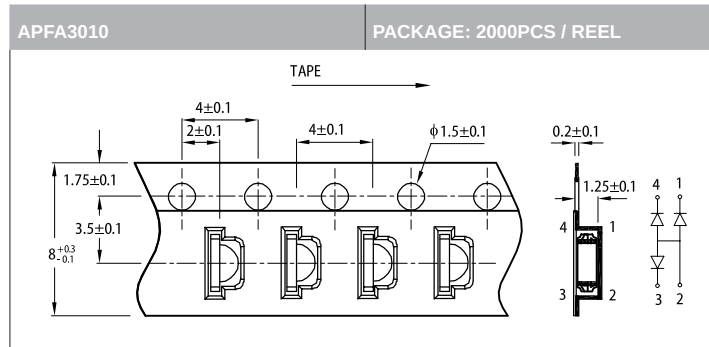
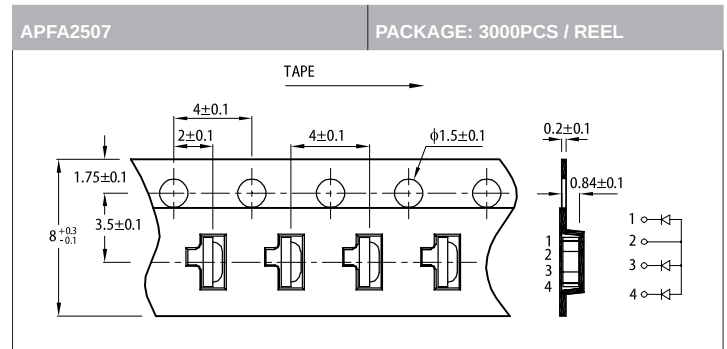
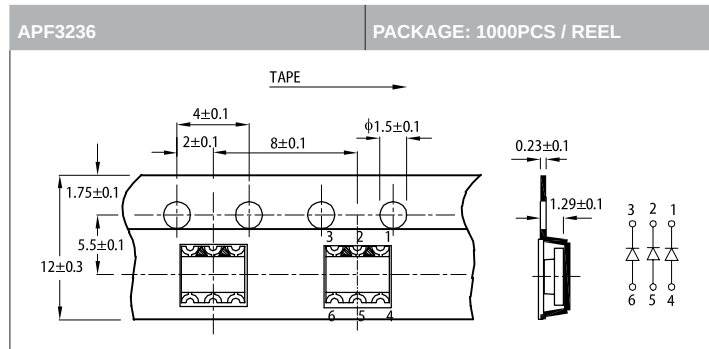
SMD TAPE SPECIFICATIONS



SMD TAPE SPECIFICATIONS

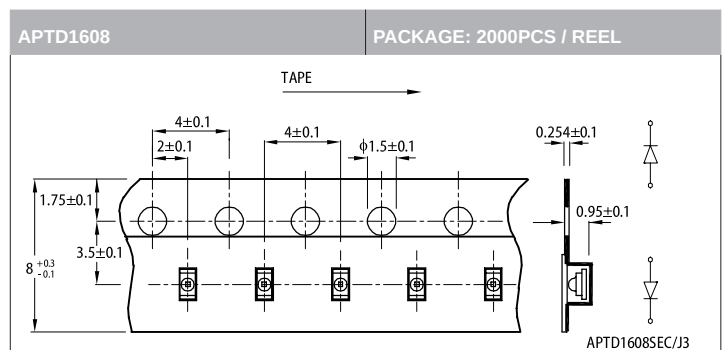
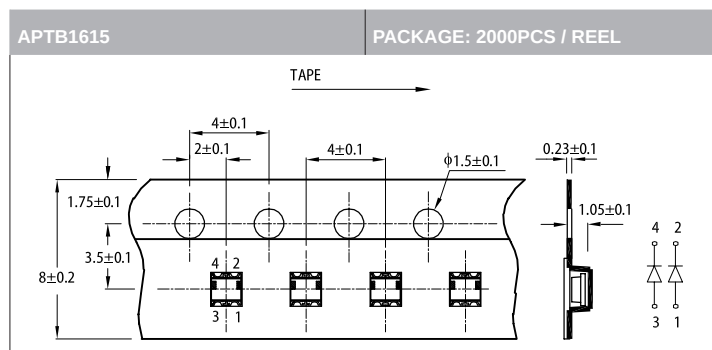
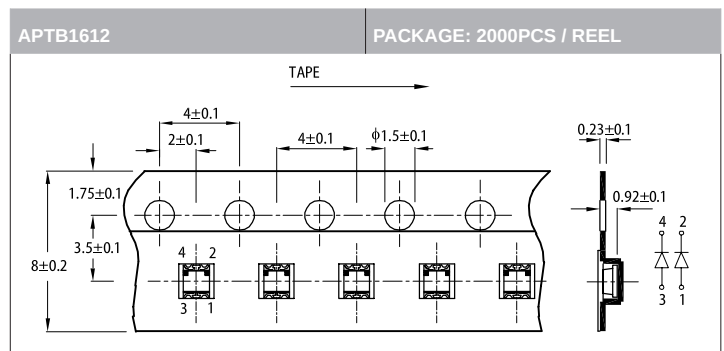
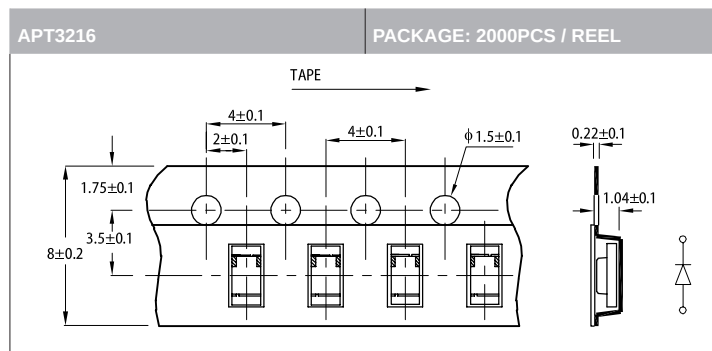
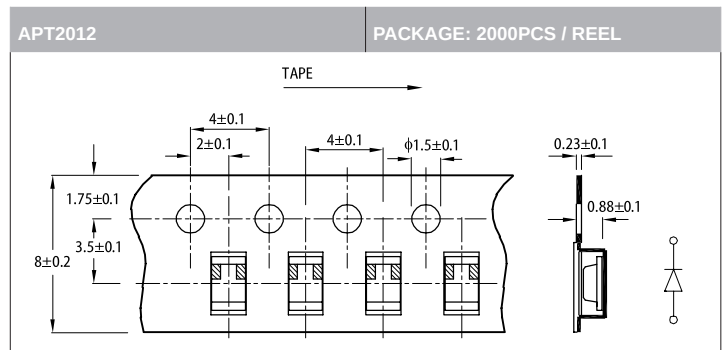
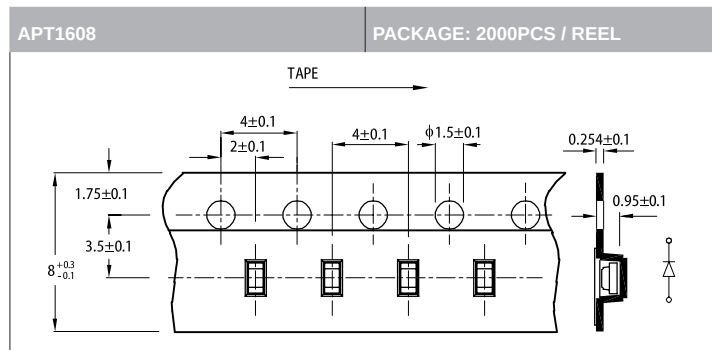
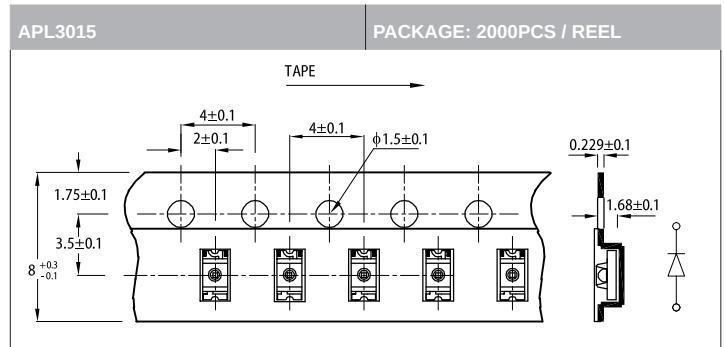
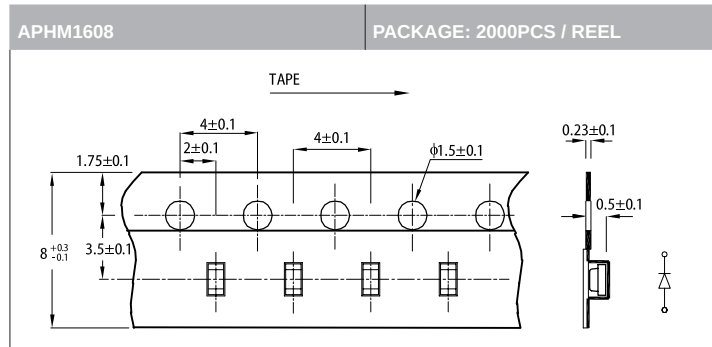
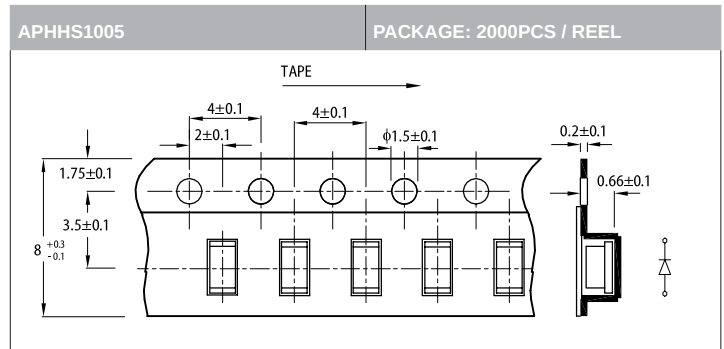
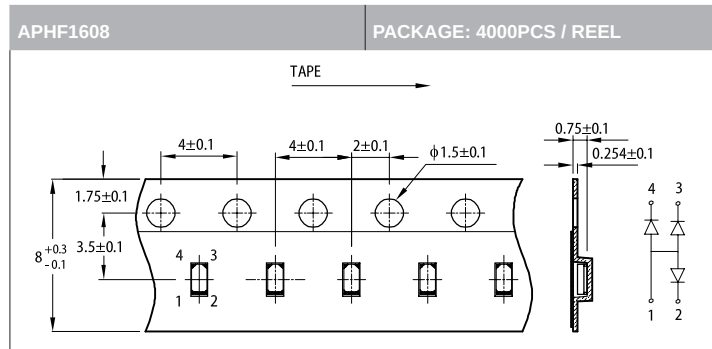


SMD TAPE SPECIFICATIONS



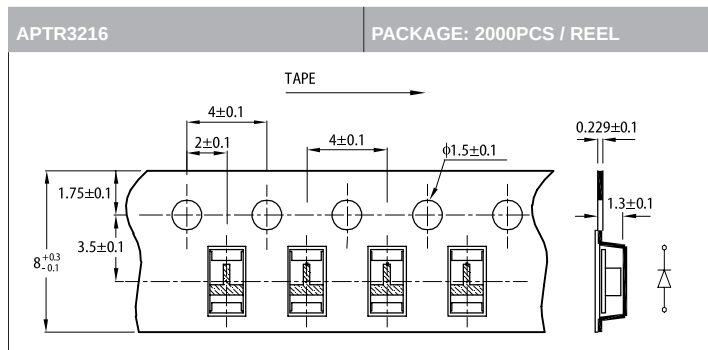
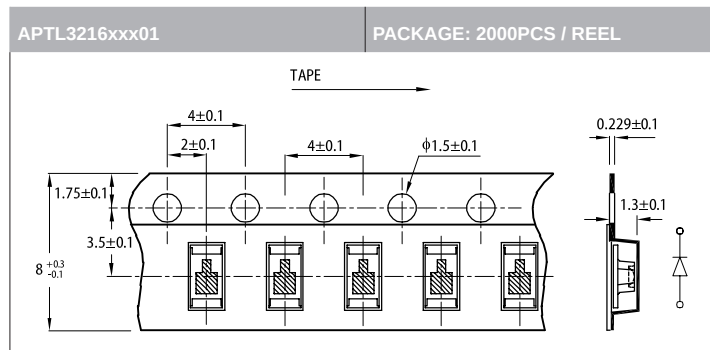
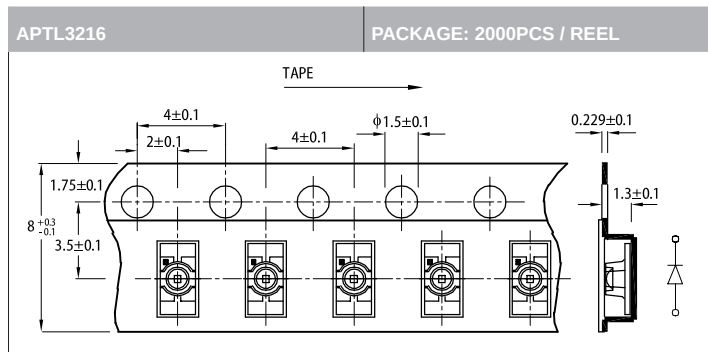
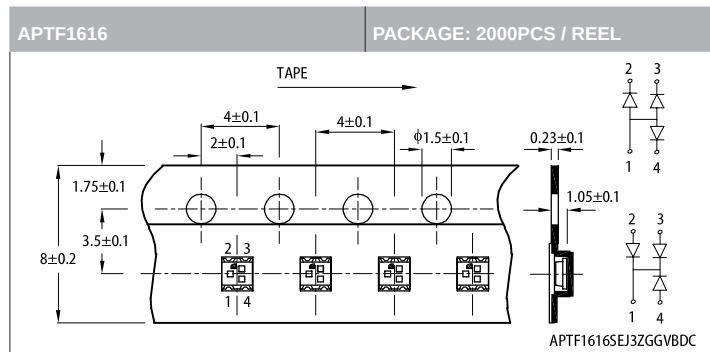
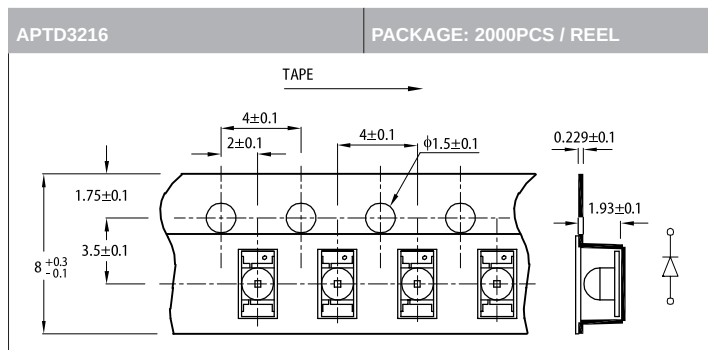
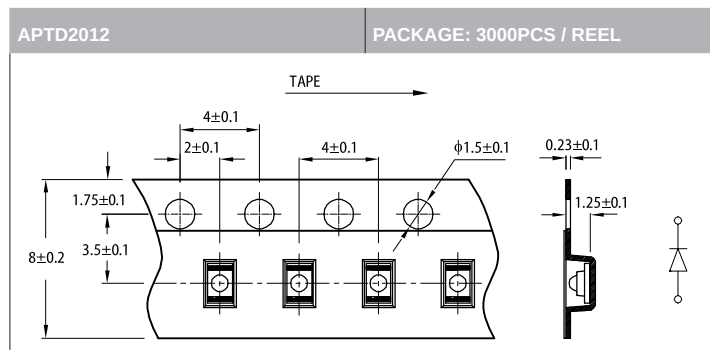
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SMD TAPE SPECIFICATIONS

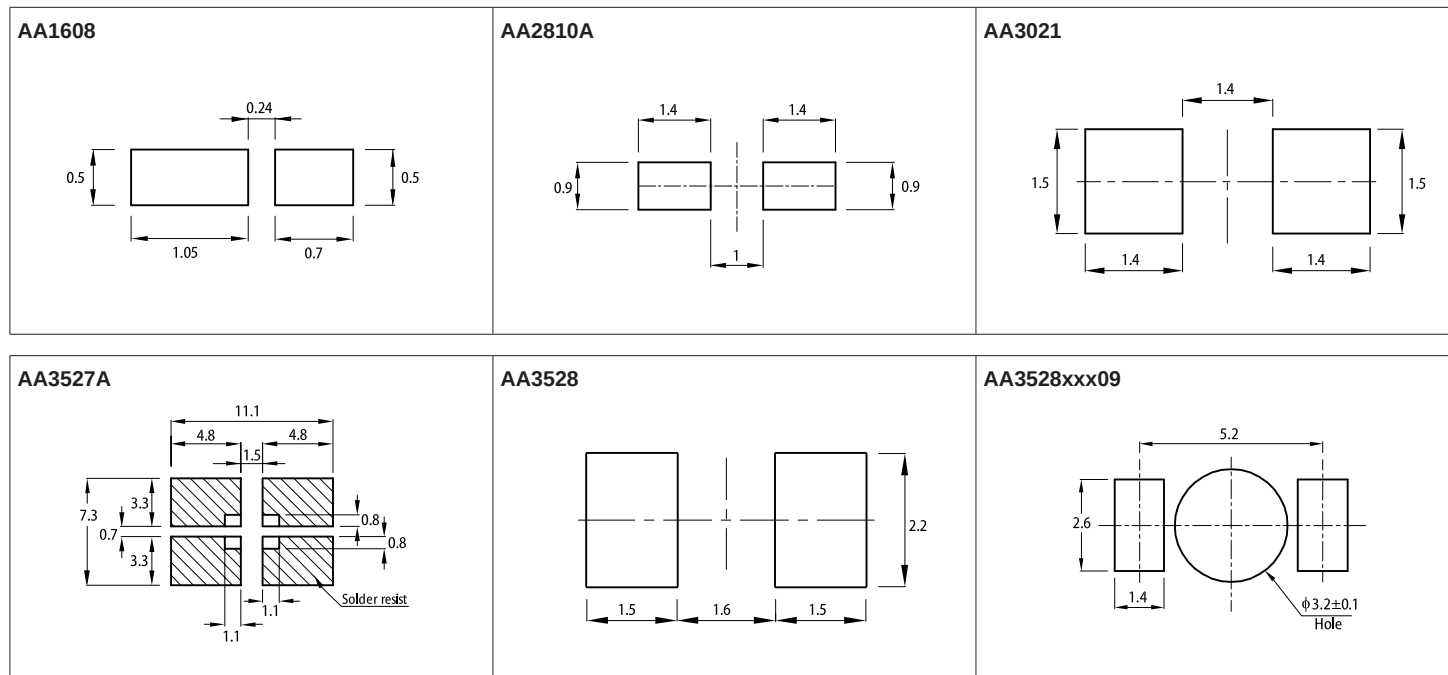


APTD1608SEC/J3

SMD TAPE SPECIFICATIONS

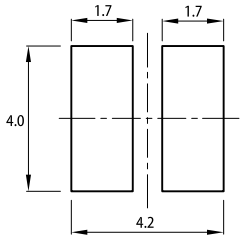
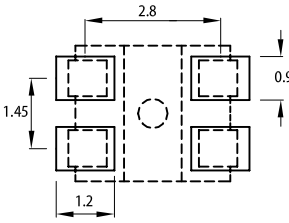
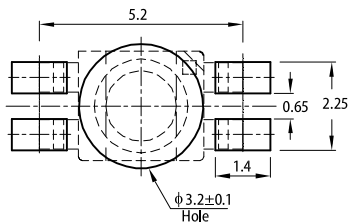
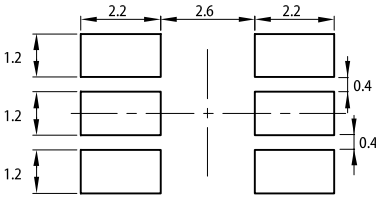
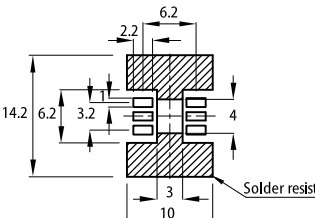
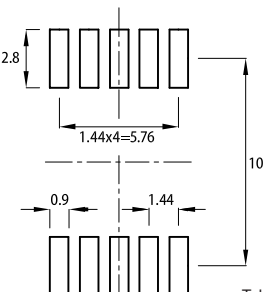
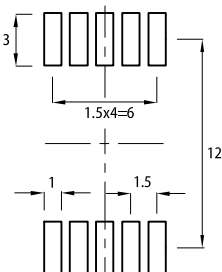
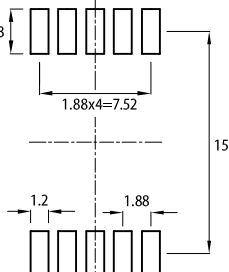
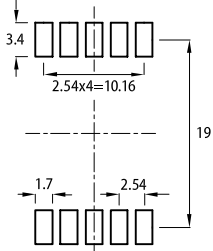
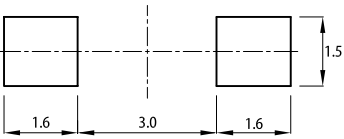
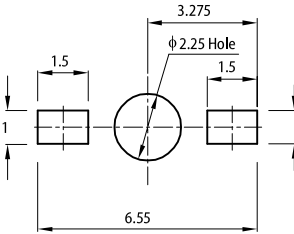
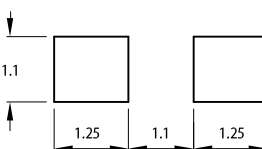
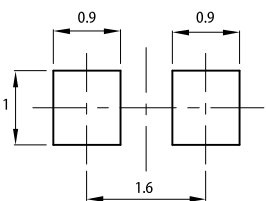
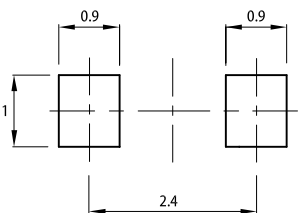
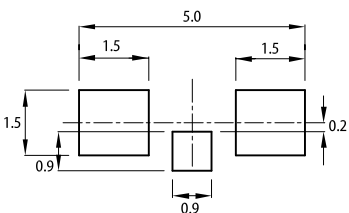


RECOMMENDED SOLDERING PATTERN



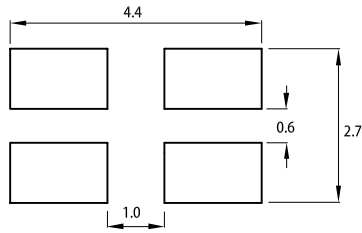
All dimensions are in millimeters. Tolerance is ± 0.1mm unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

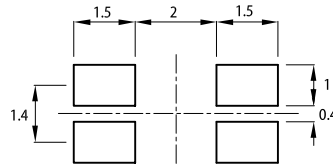
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RECOMMENDED SOLDERING PATTERN

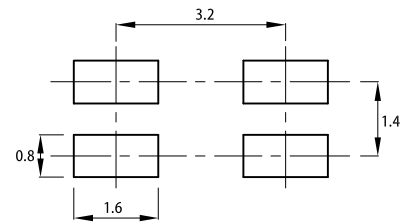
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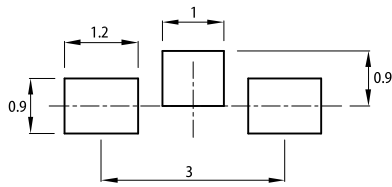
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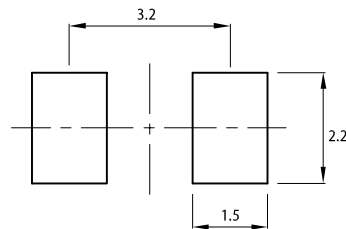
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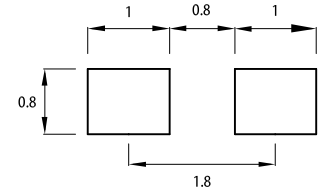
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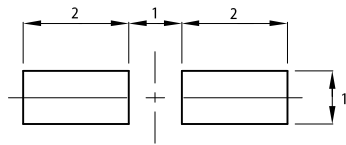
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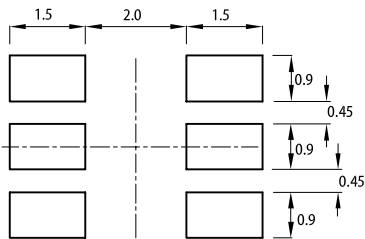
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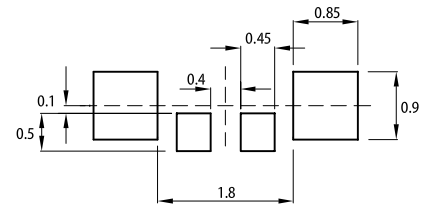
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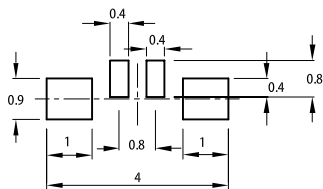
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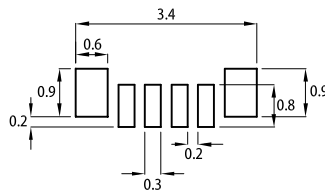
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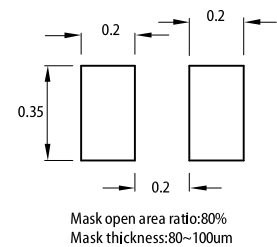
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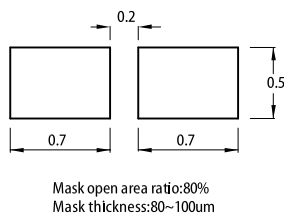
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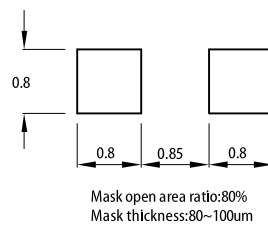
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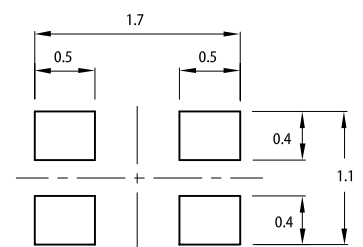
APG1005



APG1608



APHB1608



RECOMMENDED SOLDERING PATTERN

APHBM2012	APHCM2012	APHF1608
APHHS1005	APHM1608, APT1608, APTD1608	APL3015
APTD3216	APTB1612	APTB1615
APTD2012	APTD3216	APTF1616
APTL3216	APTL3216xxx01	APTR3216

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		E,I Hi.Eff.Red Orange (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	SR/J4 Super Bright Red (AlGaInP)	SURK Hyper Red (AlGaInP)	SURK/T Hyper Red (AlGaInP)	SUR/E Hyper Red (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	V
Forward current	I _F	30	25	30	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	160	130	155	150	185	150	200	mA
Power dissipation	P _D	75	62.5	75	75	75	75	75	mW
LED LAMPS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		E,I Hi.Eff.Red Orange (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	SR/J4 Super Bright Red (AlGaInP)	SURK Hyper Red (AlGaInP)	SURK/T Hyper Red (AlGaInP)	SUR/E Hyper Red (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.0	2.25	1.85	2.1	1.95	2.0	1.9	V
I _F =10mA		1.9	2.05	1.8	1.8	1.85	1.85	1.8	
I _F =2mA		1.7	1.85	1.65	1.65	1.75	1.75	1.7	
Forward voltage (max.) I _F =20mA	V _F	2.5	2.5	2.5	2.5	2.5	2.5	2.5	V
I _F =10mA		2.3	2.45	2.3	2.3	2.35	2.25	2.35	
I _F =2mA		2.1	2.25	2.1	2.1	2.2	2.15	2.2	
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	μA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	627	700	655	660	645	645	645	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	617	635	640	640	630	630	630	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	45	45	20	20	28	20	25	nm
Capacitance V _F =0V, f=1MHZ	C	15	40	45	45	35	35	45	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		SEK/J3 Hyper Red (AlGaInP)	SE/J3 Hyper Red (AlGaInP)	SE/E Hyper Red (AlGaInP)	SEK/J4 Super Bright Orange (AlGaInP)	N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK/T Super Bright Orange (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	V
Forward current	I _F	30	30	30	30	25	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	150	150	195	150	145	195	150	mA
Power dissipation	P _D	84	84	75	84	62.5	75	75	mW
LED LAMPS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		SEK/J3 Hyper Red (AlGaInP)	SE/J3 Hyper Red (AlGaInP)	SE/E Hyper Red (AlGaInP)	SEK/J4 Super Bright Orange (AlGaInP)	N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK/T Super Bright Orange (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.2	2.2	2.0	2.2	2.05	2.1	2.05	V
I _F =10mA		2.0	2.0	1.9	2.0	1.95	2.0	1.95	
I _F =2mA		1.8	1.8	1.8	1.8	1.85	1.85	1.8	
Forward voltage (max.) I _F =20mA	V _F	2.8	2.8	2.5	2.8	2.5	2.5	2.5	V
I _F =10mA		2.3	2.3	2.3	2.4	2.3	2.35	2.3	
I _F =2mA		2.15	2.15	2.1	2.2	2.1	2.2	2.2	
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	μA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _p	640	640	630	611	607	610	610	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	625	625	621	605	602	605	601	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ1/2	20	25	20	17	35	29	17	nm
Capacitance V _F =0V, f=1MHZ	C	27	27	25	27	15	15	15	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		SE Super Bright Orange (AlGaInP)	G,SG Green, Super Bright Green (GaP)	CGK/TT Green (AlGaInP)	CGK Green (AlGaInP)	CGK/T Green (AlGaInP)	ZGK Green (InGaN)	ZG Green (InGaN)	Unit
Reverse voltage	V _R	 5	 5	 5	 5	 5	 5	 5	V
Forward current	I _F	30	25	25	30	30	25	25	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	195	140	120	150	150	150	150	mA
Power dissipation	P _D	75	62.5	60	75	78	102.5	102.5	mW
LED LAMPS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:									
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		SE Super Bright Orange (AlGaInP)	G,SG Green, Super Bright Green (GaP)	CGK/TT Green (AlGaInP)	CGK Green (AlGaInP)	CGK/T Green (AlGaInP)	ZGK Green (InGaN)	ZG Green (InGaN)	Unit
Forward voltage (typ.) I _F =20mA	V _F	 2.0	 2.2	 2.0	 2.1	 2.1	 3.3	 3.3	V
I _F =10mA		1.9	2.0	1.97	2.0	1.95	3.0	3.0	
I _F =2mA		1.8	1.9	1.87	1.9	1.8	2.65	2.65	
Forward voltage (max.) I _F =20mA	V _F	2.5	2.5	2.4	2.5	2.6	4.1	4.1	V
I _F =10mA		2.4	2.4	2.35	2.45	2.4	3.4	3.4	
I _F =2mA		2.2	2.25	2.2	2.3	2.3	3.1	3.1	
Reverse current V _R =5V	I _R	10	10	10	10	10	50	50	μA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _p	610	565	572	574	574	515	515	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	605	568	571	570	570	525	525	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	29	30	20	20	15	35	30	nm
Capacitance V _F =0V, f=1MHZ	C	30	15	15	15	15	45	45	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		ZG/G Green (InGaN)	Y Yellow (GaAsP/GaP)	SYK Super Bright Yellow (AlGaInP)	SYK/T Super Bright Yellow (AlGaInP)	SY Super Bright Yellow (AlGaInP)	SYK/J3 Super Bright Yellow (AlGaInP)	QB/D Blue (InGaN)	VB/D Blue (InGaN)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	5	V
Forward current	I _F	30	30	30	30	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	100	140	175	150	150	140	150	100	mA
Power dissipation	P _D	120	75	75	75	75	75	120	120	mW
LED LAMPS:										
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:										
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		ZG/G Green (InGaN)	Y Yellow (GaAsP/GaP)	SYK Super Bright Yellow (AlGaInP)	SYK/T Super Bright Yellow (AlGaInP)	SY Super Bright Yellow (AlGaInP)	SYK/J3 Super Bright Yellow (AlGaInP)	QB/D Blue (InGaN)	VB/D Blue (InGaN)	Unit
Forward voltage (typ.) I _F =20mA	V _F	3.2	2.1	2.0	2.05	2.0	2.0	3.3	3.3	V
I _F =10mA		3.05	1.95	1.95	1.95	1.95	1.95	3.0	3.0	
I _F =2mA		2.8	1.85	1.85	1.8	1.8	1.85	2.65	2.65	
Forward voltage (max.) I _F =20mA	V _F	4.0	2.5	2.5	2.5	2.5	2.5	4.0	4.0	V
I _F =10mA		3.4	2.4	2.35	2.3	2.35	2.4	3.5	3.4	
I _F =2mA		3.1	2.2	2.2	2.2	2.2	2.2	3.1	3.1	
Reverse current V _R =5V	I _R	50	10	10	10	10	10	50	50	μA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _p	520	590	590	590	590	590	460	465	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	525	588	590	590	590	590	465	470	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ1/2	35	35	20	15	28	20	25	22	nm
Capacitance V _F =0V, f=1MHZ	C	100	20	20	25	25	45	100	100	pF

TECHNICAL DATA 5V WITH INTERNAL RESISTANCE

Absolute maximum ratings (T _A =25°C)		I Hi.Eff.Red (GaAsP/GaP)	SR Super Bright Red (GaAlAs)	G,SG Green,Super Bright Green (GaP)	Unit
					
Reverse voltage	V _R	5	5	5	V
Forward voltage (Max.) for 5V	V _F	6	6	6	V
Power dissipation for 5V	P _D	85	85	85	mW
LED LAMPS:					
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:					
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	°C
Operating Characteristics					
Forward current (typ.) V _F =5V	I _F	13	13	11.5	mA
Forward current (max.) V _F =5V	I _F	17.5	17.5	17.5	mA
Reverse current V _R =5V	I _R	10	10	10	μA
Peak Emission Wavelength V _F =5V	λ _p	627	655	565	nm
Dominant Wavelength V _F =5V	λ _D	617	640	568	nm
Spectral line half-width V _F =5V	Δλ _{1/2}	45	20	30	nm

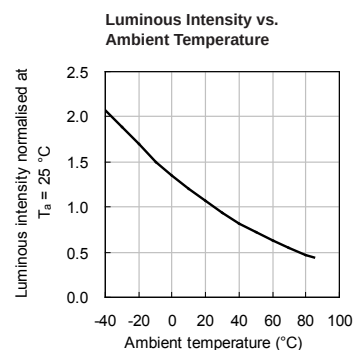
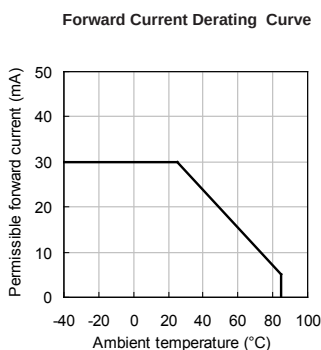
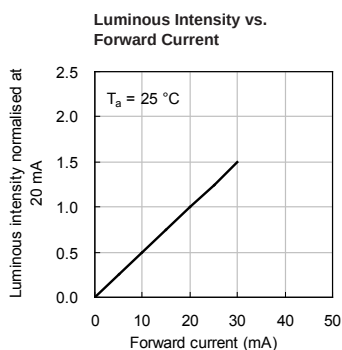
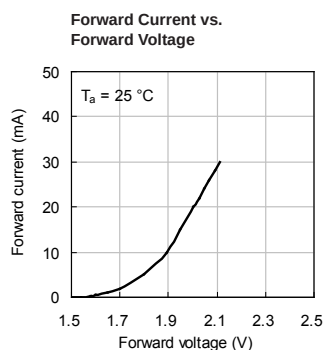
TECHNICAL DATA FOR INFRARED

Absolute maximum ratings (T _A =25°C)		F3 (GaAs)	SF4 (GaAlAs)	SF6 (GaAlAs)	SF7 (GaAlAs)	Unit
						
Reverse voltage	V _R	5	5	5	5	V
Forward current	I _F	50	50	50	50	mA
Forward current (Peak) 1/100 DutyCycle, 10μs Pulse Width	i _{FS}	1.2	1.2	1	1	A
Power dissipation	P _D	90	85	85	95	mW
LED LAMPS:						
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:						
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Operating Characteristics						
Forward voltage (typ.) I _F =20mA	V _F	1.2	1.3	1.35	1.4	V
Forward voltage (max.) I _F =20mA	V _F	1.6	1.6	1.6	1.6	V
Reverse current V _R =5V	I _R	10	10	10	10	μA
Peak Emission Wavelength I _F =20mA	λ _p	940	880	860	850	nm
Spectral line half-width I _F =20mA	Δλ _{1/2}	50	50	50	50	nm
Capacitance V _F =0V,f=1MHZ	C	90	90	30	30	pF

TECHNICAL DATA

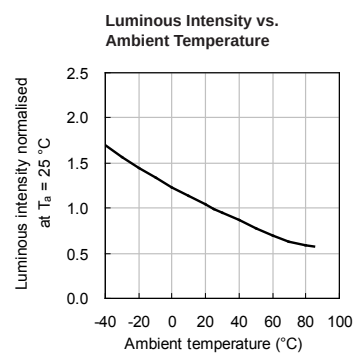
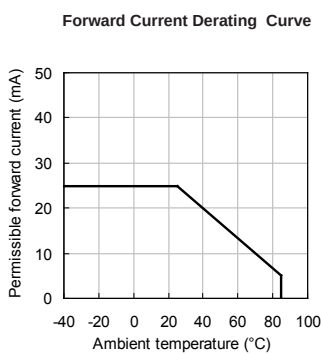
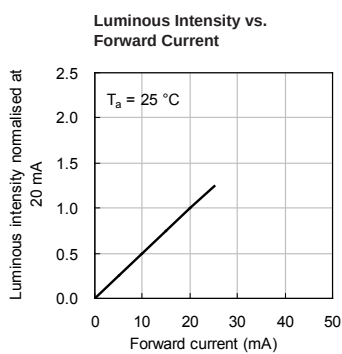
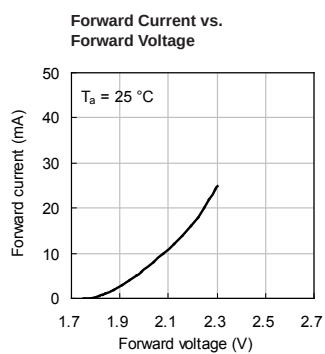
High Efficiency Red, Orange

E,I : GaAsP/GaP



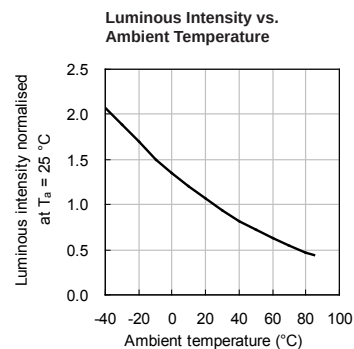
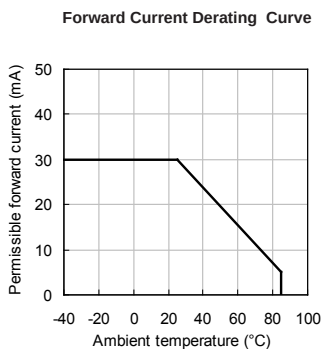
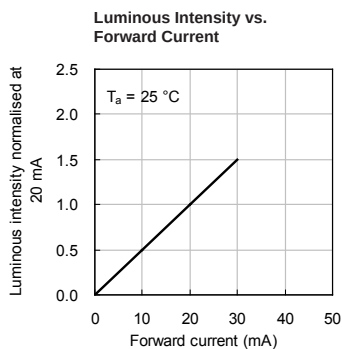
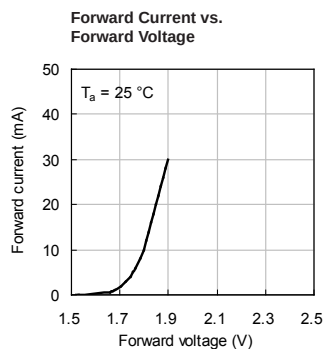
Bright Red

H : GaP



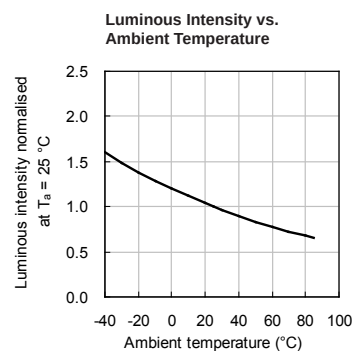
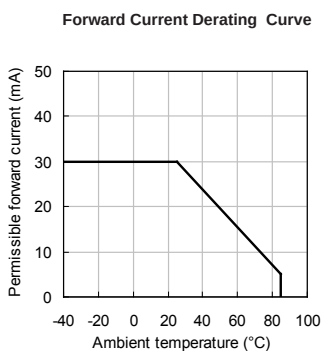
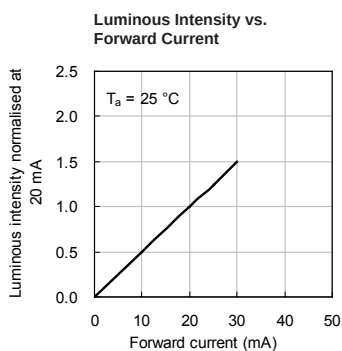
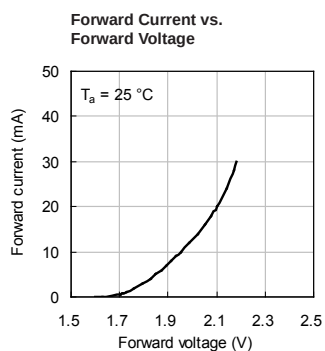
Super Bright Red

SR : GaAlAs



Super Bright Red

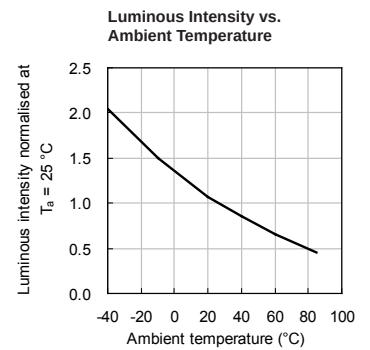
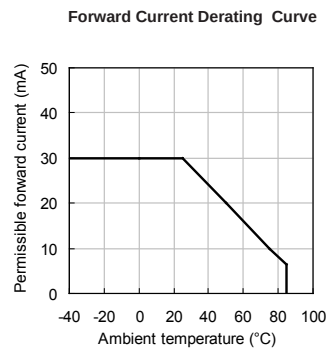
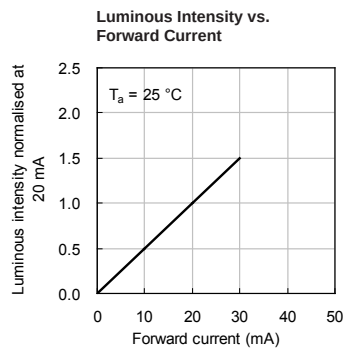
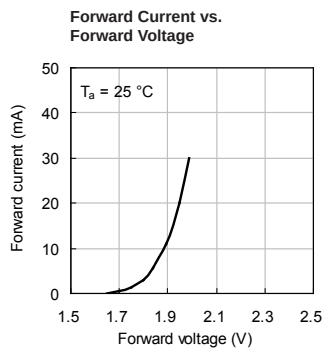
SR/J4 : AlGaInP



TECHNICAL DATA

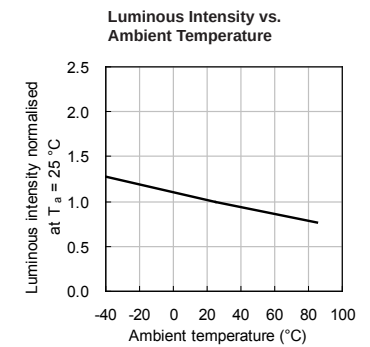
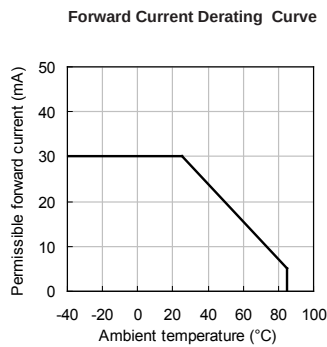
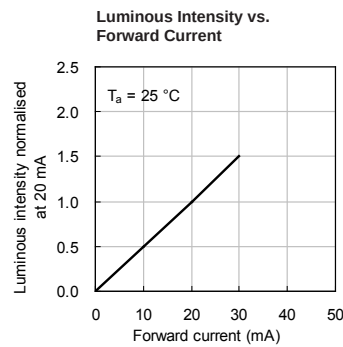
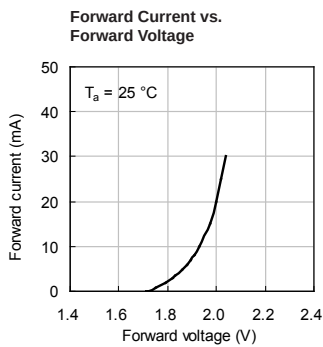
Hyper Red

SURK : AlGaInP



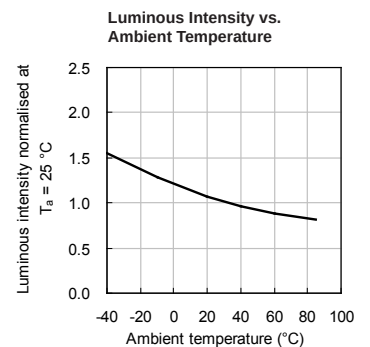
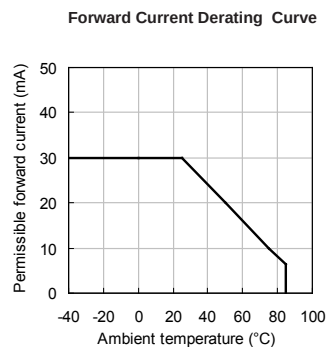
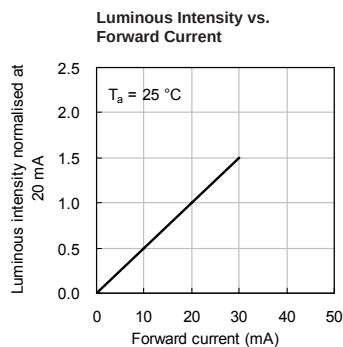
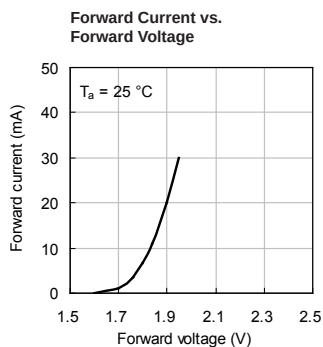
Hyper Red

SURK/T : AlGaInP



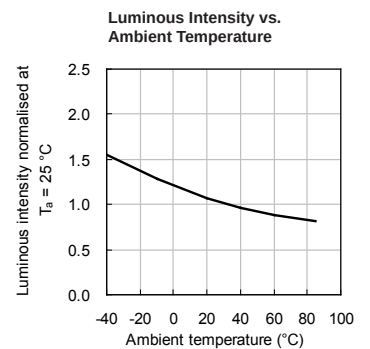
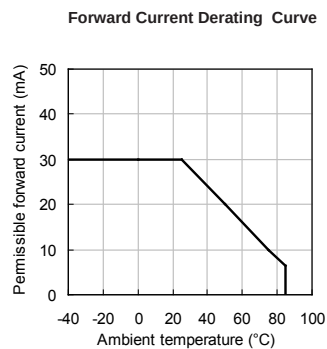
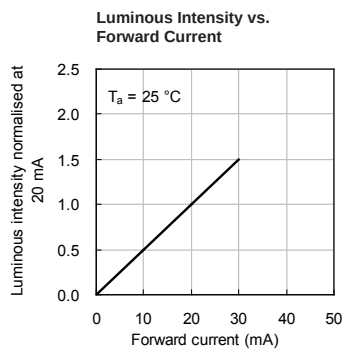
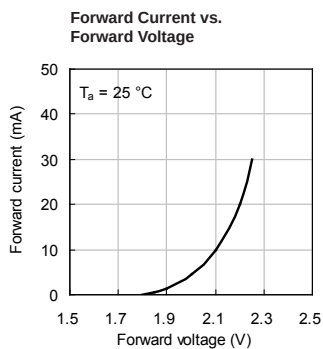
Hyper Red

SUR/E : AlGaInP



Hyper Red

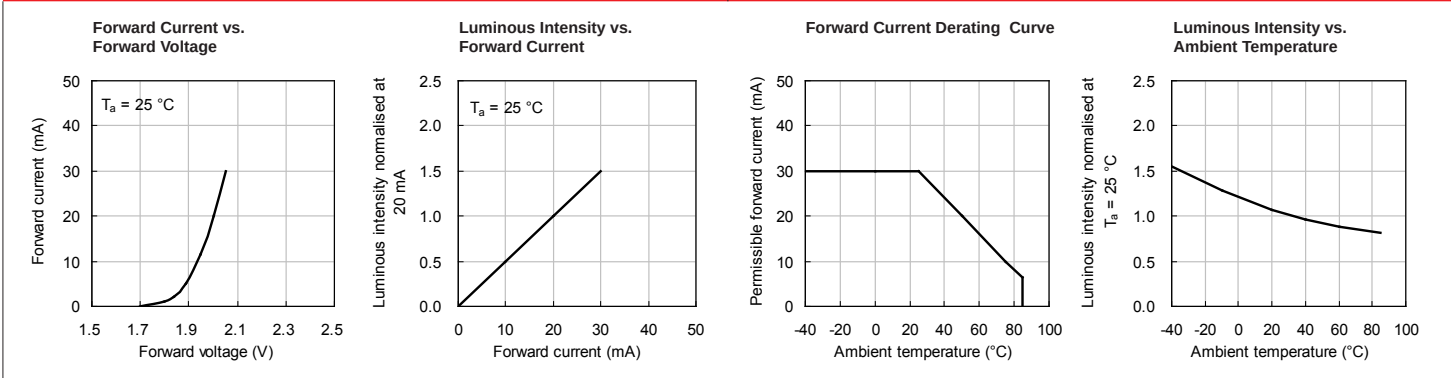
SEK/J3, SE/J3 : AlGaInP



TECHNICAL DATA

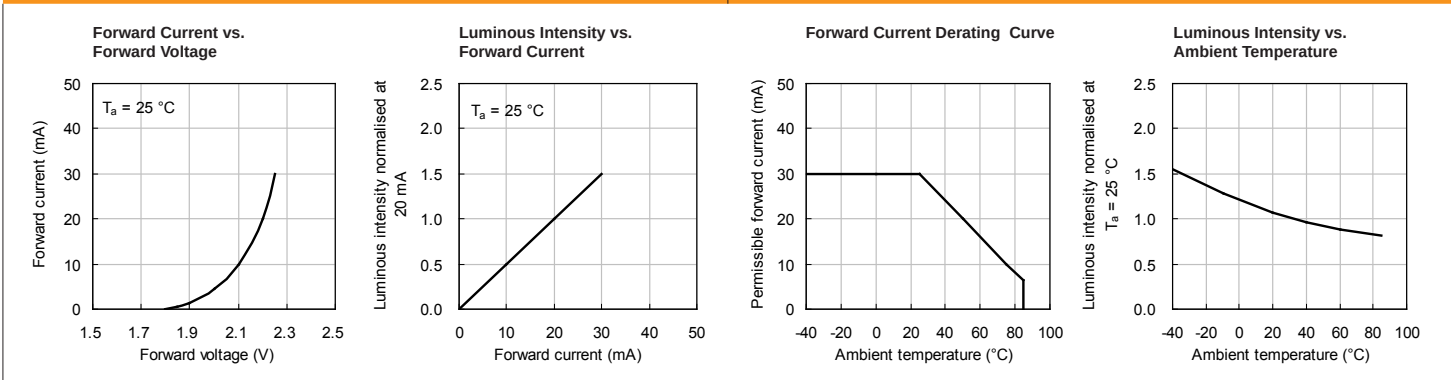
Hyper Red

SE/E : AlGaInP



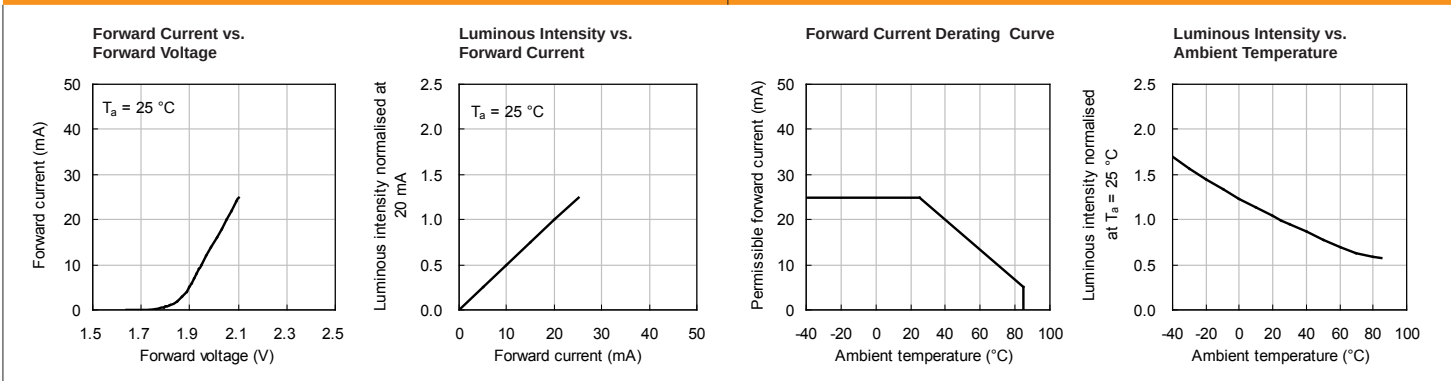
Super Bright Orange

SEK/J4 : AlGaInP



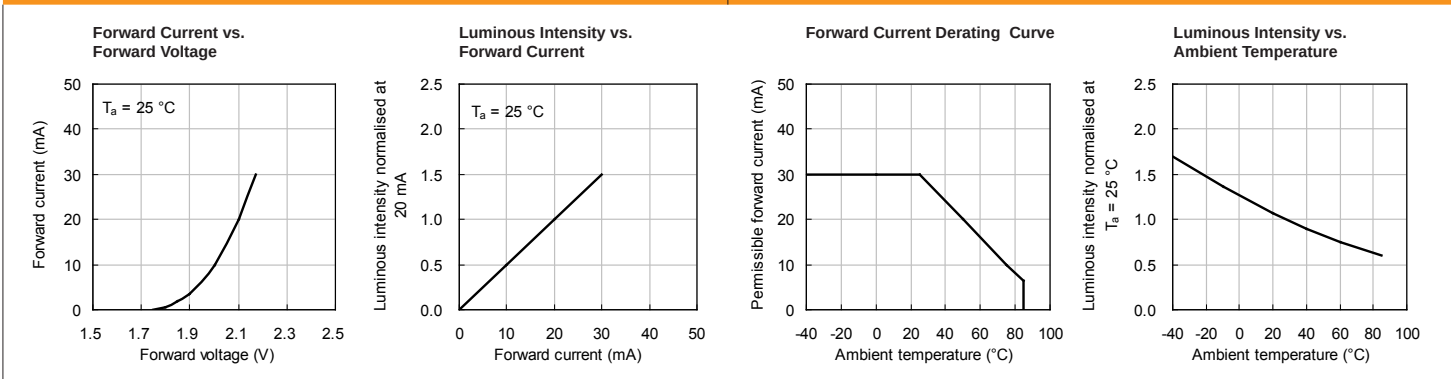
Pure Orange

N : GaAsP/GaP



Super Bright Orange

SEK : AlGaInP

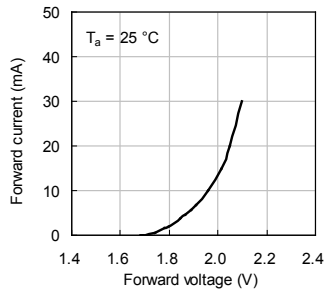


TECHNICAL DATA

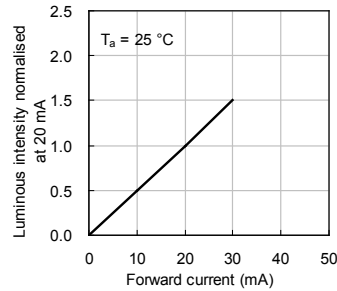
Super Bright Orange

SEK/IT : AlGaInP

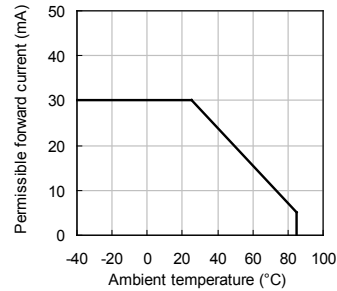
Forward Current vs. Forward Voltage



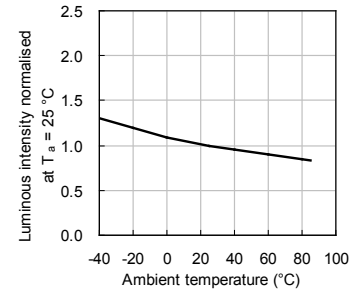
Luminous Intensity vs. Forward Current



Forward Current Derating Curve



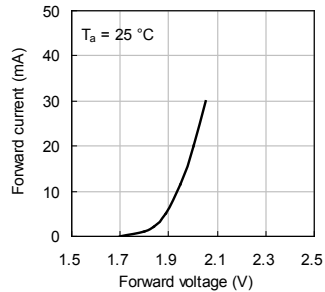
Luminous Intensity vs. Ambient Temperature



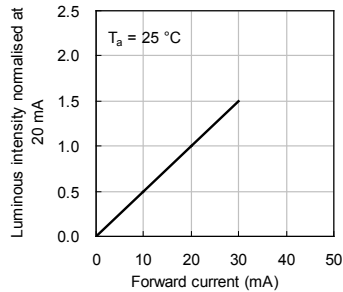
Super Bright Orange

SE : AlGaInP

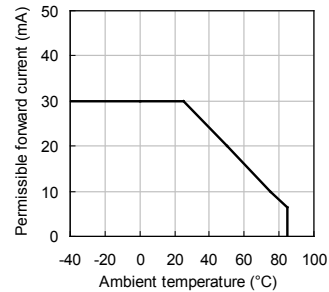
Forward Current vs. Forward Voltage



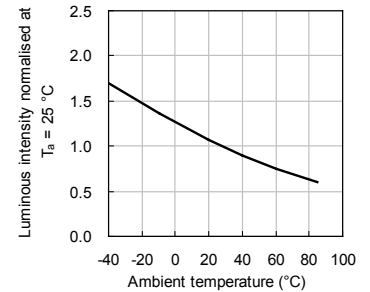
Luminous Intensity vs. Forward Current



Forward Current Derating Curve



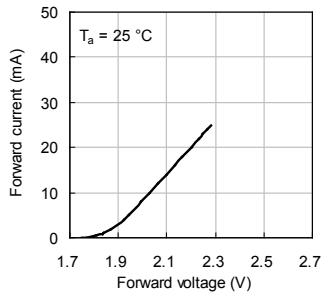
Luminous Intensity vs. Ambient Temperature



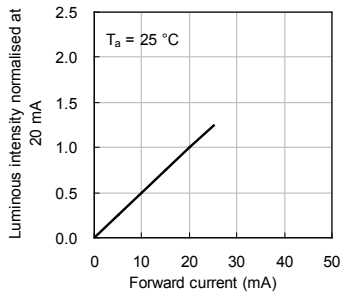
Green/Super Bright Green

G,SG : GaP

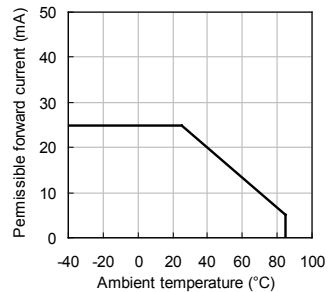
Forward Current vs. Forward Voltage



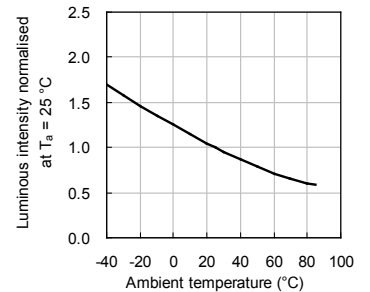
Luminous Intensity vs. Forward Current



Forward Current Derating Curve



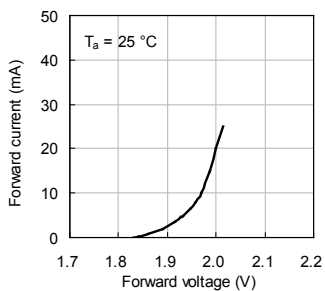
Luminous Intensity vs. Ambient Temperature



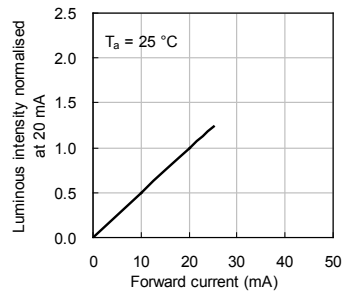
Green

CGK/TT : AlGaInP

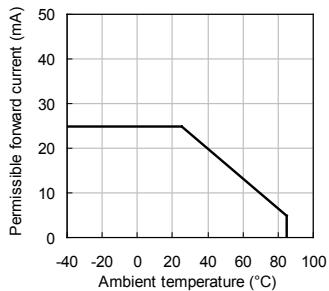
Forward Current vs. Forward Voltage



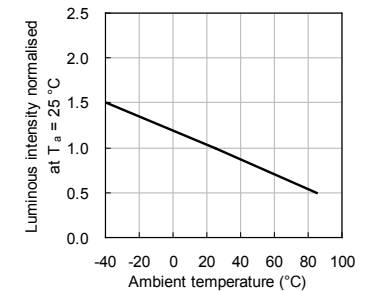
Luminous Intensity vs. Forward Current



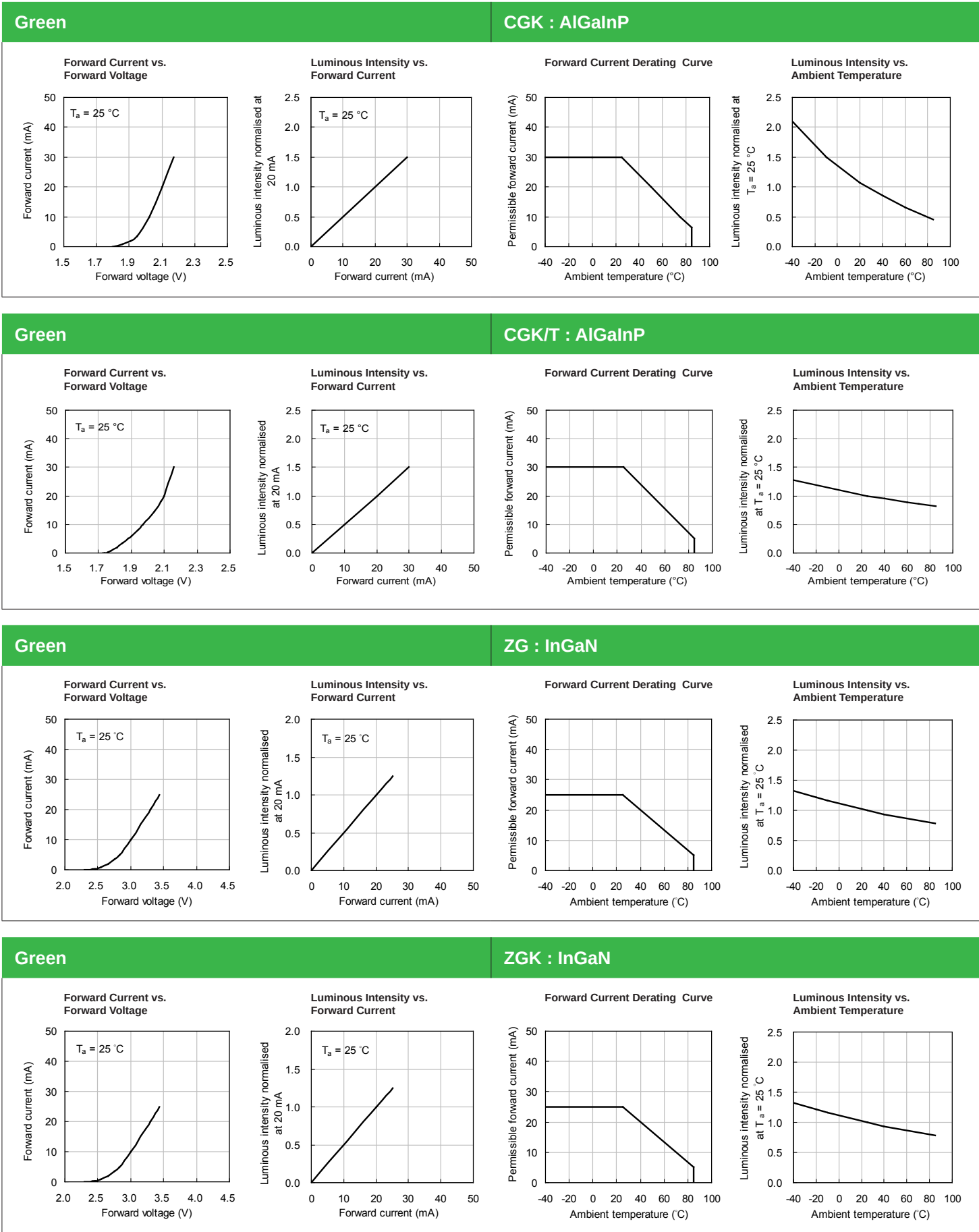
Forward Current Derating Curve



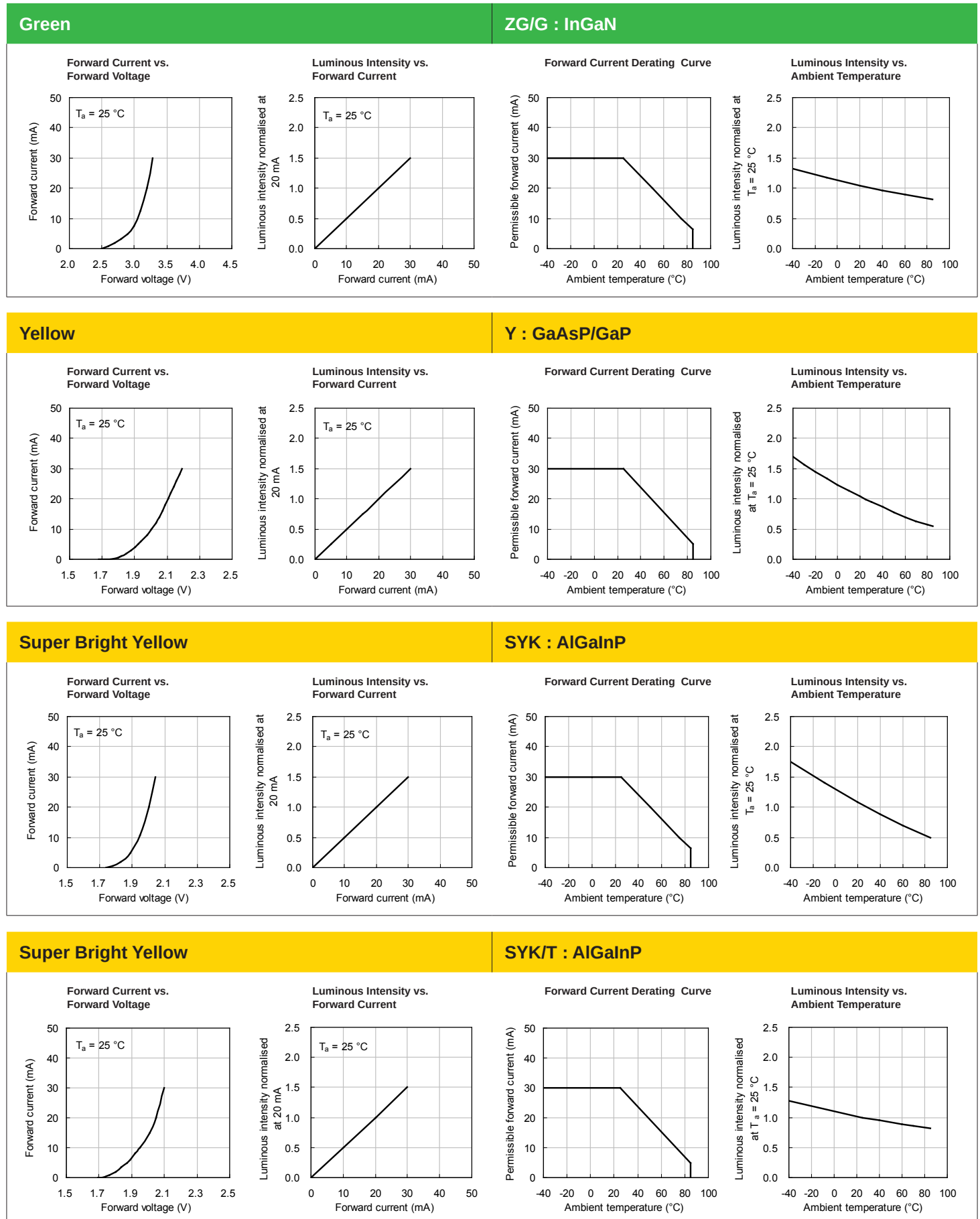
Luminous Intensity vs. Ambient Temperature



TECHNICAL DATA



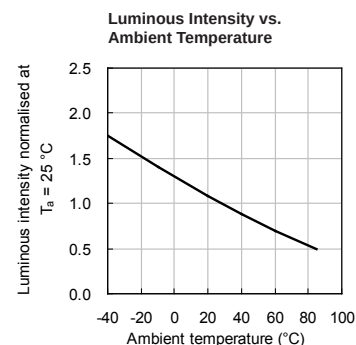
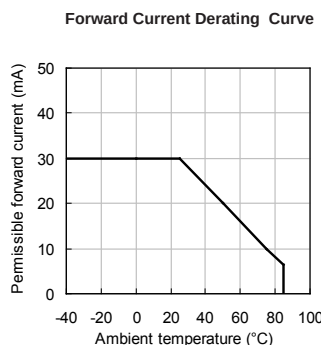
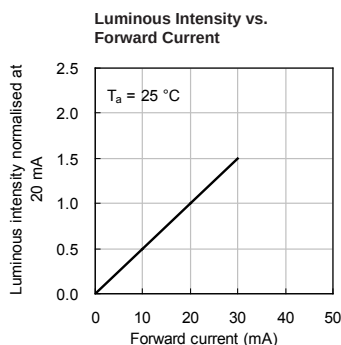
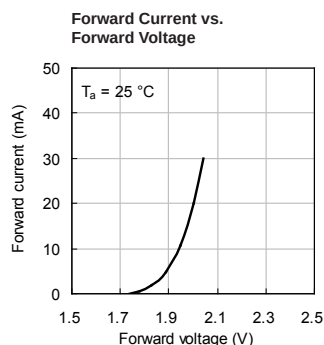
TECHNICAL DATA



TECHNICAL DATA

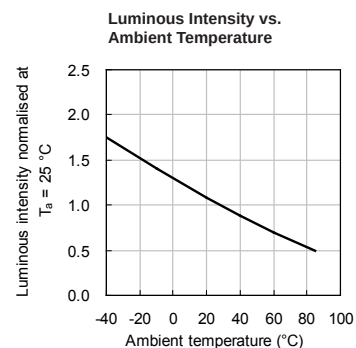
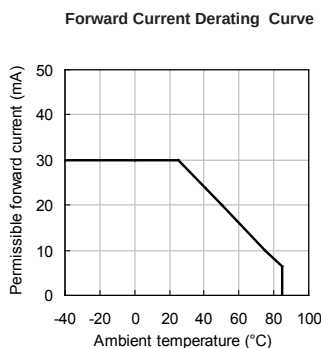
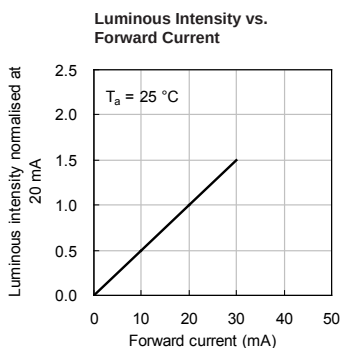
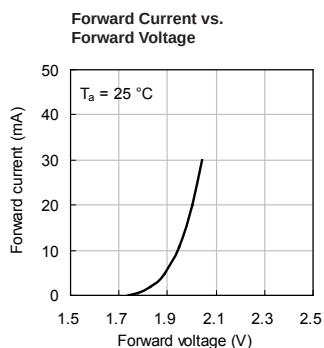
Super Bright Yellow

SY : AlGaInP



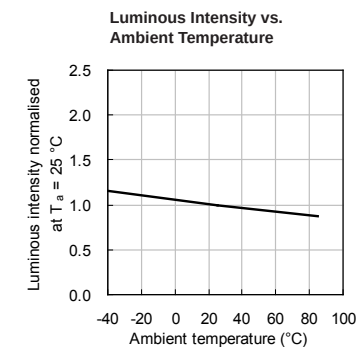
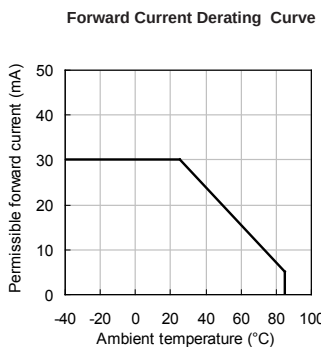
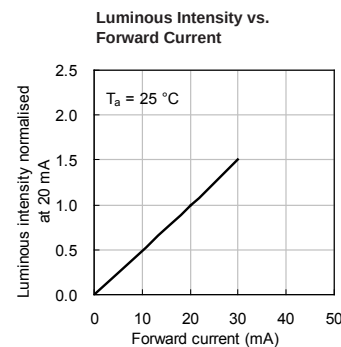
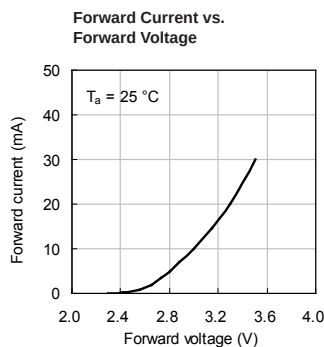
Super Bright Yellow

SYK/J3 : AlGaInP



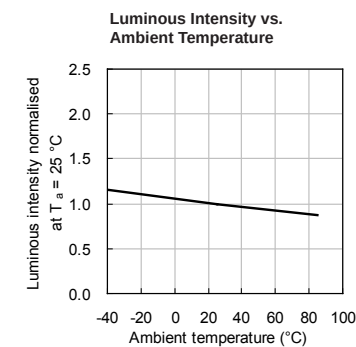
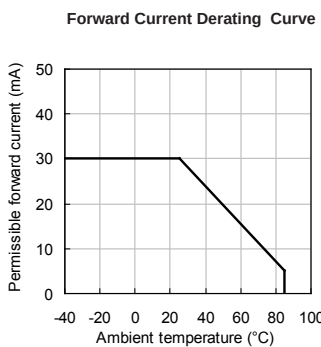
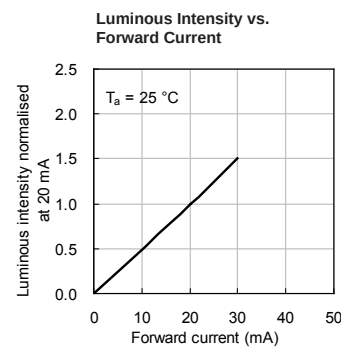
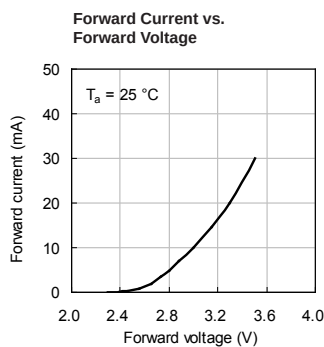
Blue

QB/D : InGaN

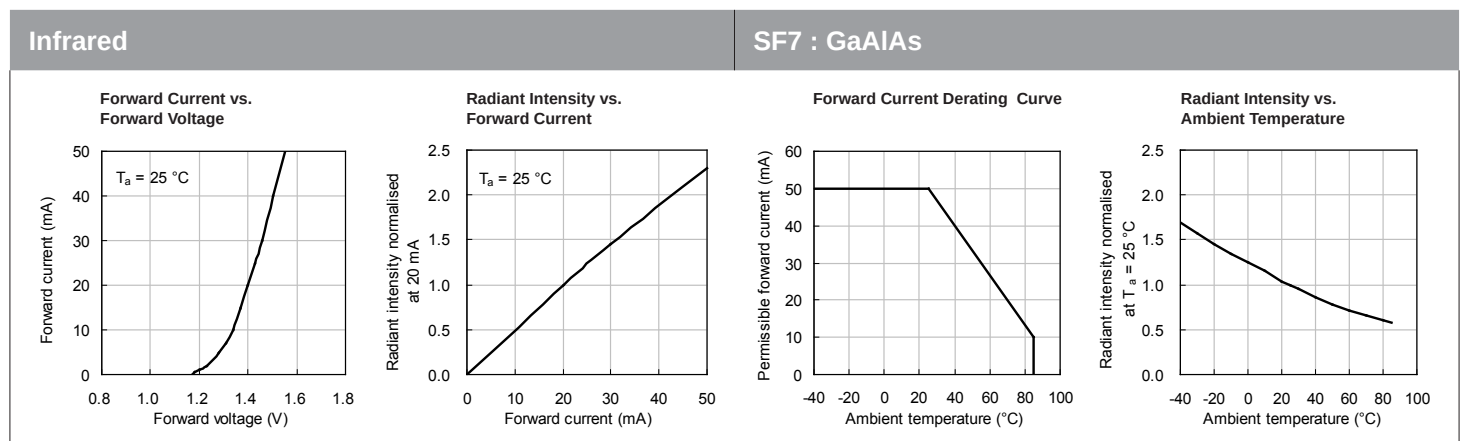
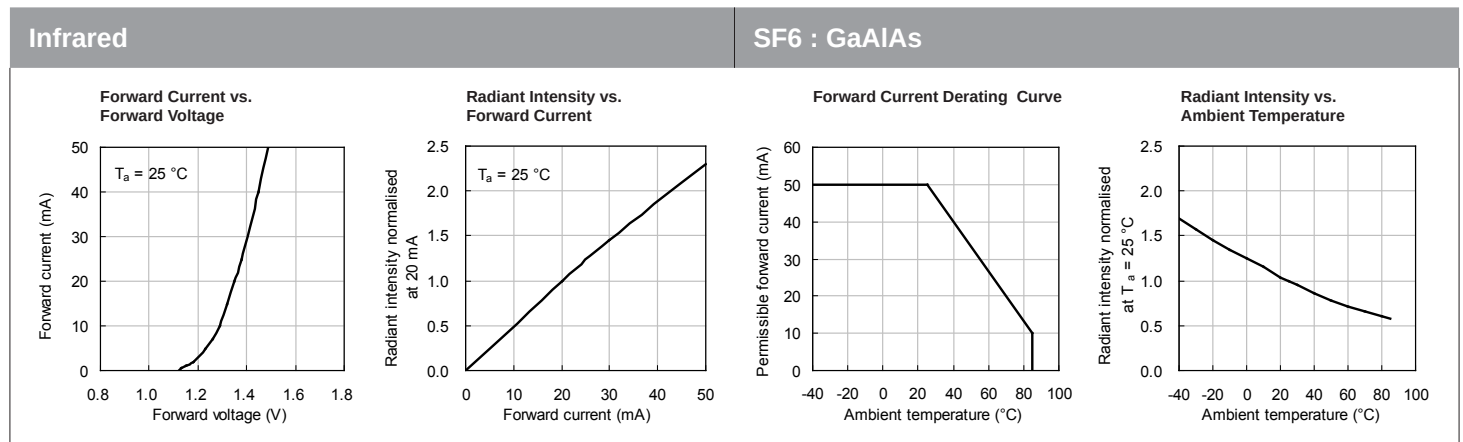
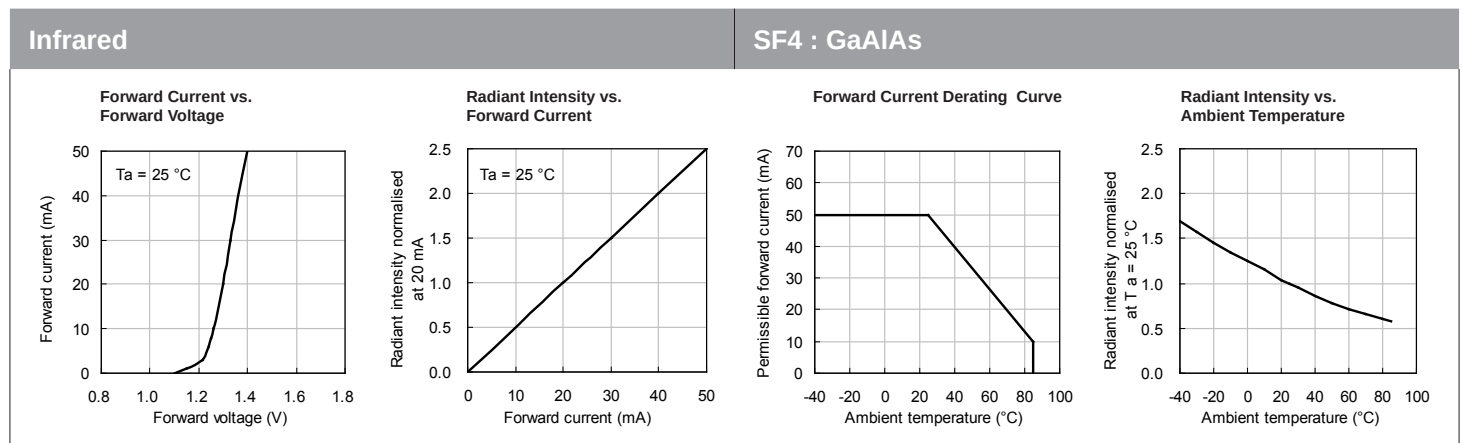
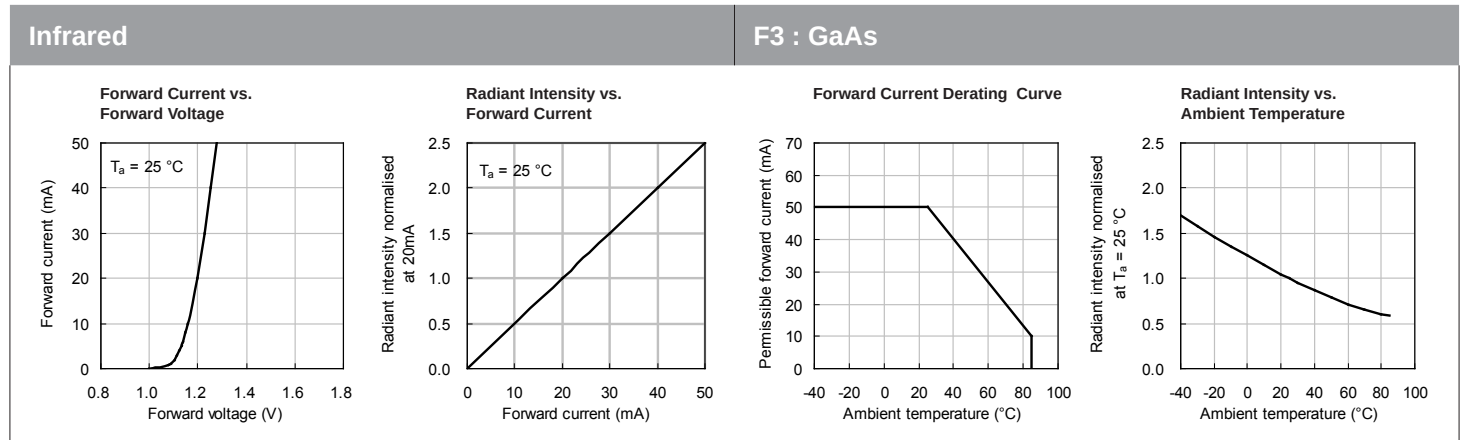


Blue

VB/D : InGaN



TECHNICAL DATA



BIN CODE SYSTEMS

SELECTION CODE FOR STANDARD AND LOW CURRENT LEDs (T _A =25°C Tolerance +/-15% I _F <15mA)					
Group	Light intensity in mcd		Group	Light intensity in mcd	
	Min.	Max.		Min.	Max.
F	0.1	0.2	W	120	180
G	0.2	0.35	X	180	250
H	0.35	0.5	Y	250	320
I	0.5	0.8	Z	320	450
K	0.8	1.2	ZA	450	550
L	1.2	2	ZB	550	700
M	2	4	ZC	700	1000
N	4	6	ZD	1000	1600
P	6	10	ZE	1600	2200
Q	10	15	ZF	2200	2800
R	15	20	ZG	2800	3400
S	20	30	ZH	3400	4300
T	30	50	ZM	4300	5200
U	50	80	ZN	5200	6300
V	80	120	ZP	6300	7400

SELECTION CODE FOR NPN PHOTOTRANSISTORS (T _A =25°C Tolerance +/-15%)					
Group	Photocurrent(mA)		Group	Photocurrent(mA)	
	Min.	Max.		Min.	Max.
F	0.1	0.2	L	1.2	2
G	0.2	0.35	M	2	4
H	0.35	0.5	N	4	6
I	0.5	0.8	P	6	10
K	0.8	1.2	-	-	-

SELECTION CODE FOR INFRARED EMITTING DIODES (T _A =25°C Tolerance +/-15%)					
Group	Radiant intensity in mW/sr		Group	Radiant intensity in mW/sr	
	Min.	Max.		Min.	Max.
AK	0.8	1.2	D	8	12
AL	1.2	2	E	12	20
A	2	3	F	20	40
B	3	5	G	40	55
C	5	8	H	55	80

SELECTION CODE FOR SUPER BRIGHT LEDs (T _A =25°C Tolerance +/-15% I _F ≥15mA)					
Group	Light intensity in mcd		Group	Light intensity in mcd	
	Min.	Max.		Min.	Max.
A	2	3	ZA	3100	3600
B	3	5	ZB	3600	4200
C	5	8	ZC	4200	5000
D	8	12	ZD	5000	6000
E	12	20	ZE	6000	7000
F	20	40	ZF	7000	8000
G	40	55	ZG	8000	9000
H	55	80	ZH	9000	11000
M	80	120	ZM	11000	14000
N	120	200	ZN	14000	18000
P	200	300	ZP	18000	22000
Q	300	400	ZQ	22000	27000
R	400	500	ZR	27000	35000
S	500	700	ZS	35000	43000
T	700	1000	ZT	43000	55000
U	1000	1300	ZU	55000	75000
V	1300	1600	ZV	75000	130000
W	1600	1900	ZW	130000	200000
X	1900	2300	ZX	200000	320000
Y	2300	2700	ZY	320000	490000
Z	2700	3100	ZZ	490000	800000

SELECTION CODE FOR DISPLAYS (T _A =25°C Tolerance +/-15% I _F ≤10mA)					
Group	Light intensity in ucd		Group	Light intensity in ucd	
	Min.	Max.		Min.	Max.
C	70	140	P	14000	21000
D	140	240	Q	21000	31000
E	240	360	R	31000	52000
F	360	560	S	52000	88000
G	560	900	T	88000	150000
H	900	1400	U	150000	255000
I	1400	2200	V	255000	433000
K	2200	3600	W	433000	736000
L	3600	5600	X	736000	1251000
M	5600	9000	Y	1251000	2126000
N	9000	14000	Z	2126000	3614000

BIN CODE SYSTEMS

SELECTION CODE FOR LUMINOUS FLUX (T _A =25°C; Tolerance: +/-15%)					
Group	Luminous Flux in lm		Group	Luminous Flux in lm	
	Min.	Max.		Min.	Max.
A1	0.5	0.6	B10	50	60
A2	0.6	0.7	B11	60	70
A3	0.7	0.8	B12	70	80
A4	0.8	1	B13	80	90
A5	1	1.2	B14	90	100
A6	1.2	1.4	C1	100	120
A7	1.4	1.7	C2	120	140
A8	1.7	2	C3	140	160
A9	2	2.4	C4	160	180
A10	2.4	2.9	C5	180	210
A11	2.9	3.5	C6	210	240
A12	3.5	4.2	C7	240	280
A13	4.2	5	C8	280	320
A14	5	6	C9	320	370
A15	6	7.2	C10	370	430
A16	7.2	8.6	C11	430	490
A17	8.6	10	C12	490	560
B1	10	12	C13	560	640
B2	12	14	C14	640	740
B3	14	17	C15	740	850
B4	17	20	C16	850	1000
B5	20	24	D1	1000	1200
B6	24	29	D2	1200	1400
B7	29	35	D3	1400	1600
B8	35	42	D4	1600	1800
B9	42	50	D5	1800	2100

COLOR CODE FOR GREEN LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)				
Group	Dom. Wavelength (nm)			
	Min.	Max.	Min.	Max.
0	556	559	-	-
1	559	561	515	520
2	561	563	520	525
3	563	565	525	530
4	565	567	530	535
5	567	569	535	540
6	569	571	-	-
7	571	573	-	-
8	573	575	-	-

COLOR CODE FOR BLUE LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)					
Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	445	450	3A	471	473
2	450	455	3B	473	475
3	455	460	4A	475	477
1A	460	463	4B	477	479
1B	463	466	5A	479	481
2A	466	469	5B	481	483
2B	469	471	5C	483	486

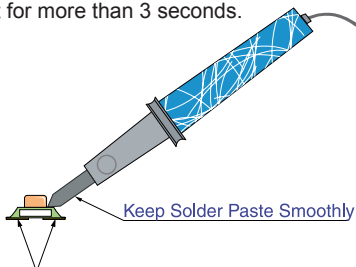
COLOR CODE FOR YELLOW LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)					
Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	581	584	5	590	592
2	584	586	6	592	594
3	586	588	7	594	597
4	588	590	8	597	600

SOLDERING INSTRUCTIONS						
Types	Dip soldering / * wave soldering			Iron soldering (with 1.5mm iron tip)		
	Temperature of the soldering bath	Maximum soldering time	Distance from solder joint to package	Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package
LEDS	<=260°C	3s	>=2mm	<=350°C	3s	>2mm
	<=260°C	5s	>=5mm	<=350°C	5s	>5mm
SMDS	-	-	-	<=350°C	3s (one time only)	-
DISPLAYS	*<=260°C	*3s	*>2mm	<=350°C	3s	>2mm

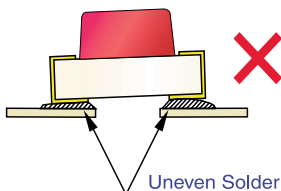
APPLICATION NOTES

General Notes

1. We recommend manual soldering operations only for repair and rework purposes. The soldering iron should be temperature-controlled to avoid damaging the component. The maximum soldering temperature is 300°C for Pb-Sn solder and 350°C for lead-free solder for normal lamps and displays. For blue (typ.:465nm), green (typ.:525nm), and all white LEDs, the maximum soldering iron temperature is 280°C. Do not place the soldering iron on the component for more than 3 seconds.



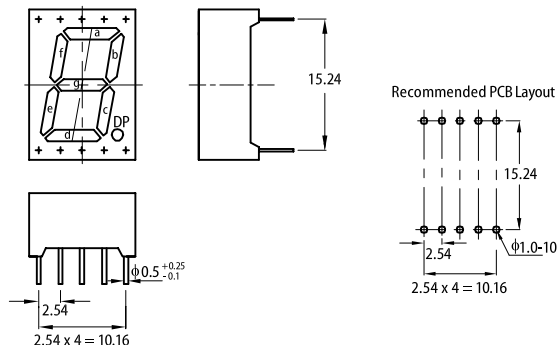
2. The tip of the soldering iron should never touch the epoxy lens.
3. Do not apply stress to the leads when the component is heated above 85°C, otherwise internal wire bonds may be damaged.
4. Through-Hole LEDs are incompatible with reflow soldering.
5. If the LED will undergo multiple soldering passes or face other processes where the part may be subjected to intense heat, please check with Kingbright for compatibility.
6. SMD products must be mounted according to specified soldering pad patterns. Solder paste must be evenly applied to each soldering pad to insure proper bonding and positioning of the component.



7. After soldering, allow at least three minutes for the component to cool down to room temperature before further operations.
8. Recommended PCB pin hole diameters for display products are listed below :

Square pin type : $\Phi 1\text{mm}$

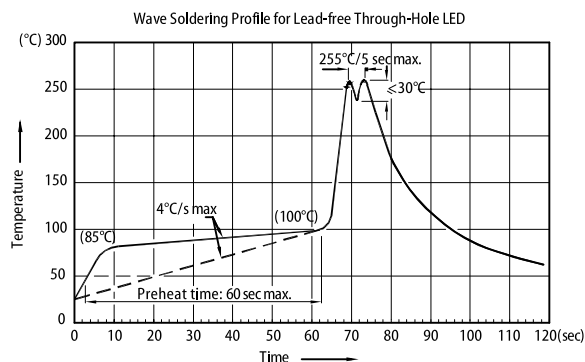
Round pin type : 2 x pin diameters



9. Data subject to change without notice. For additional detail of application notes, product information, and disclaimers, please visit our website at www.KingbrightUSA.com/ApplicationNotes/

Recommended Wave Soldering Profiles For Kingbright Through-Hole Products

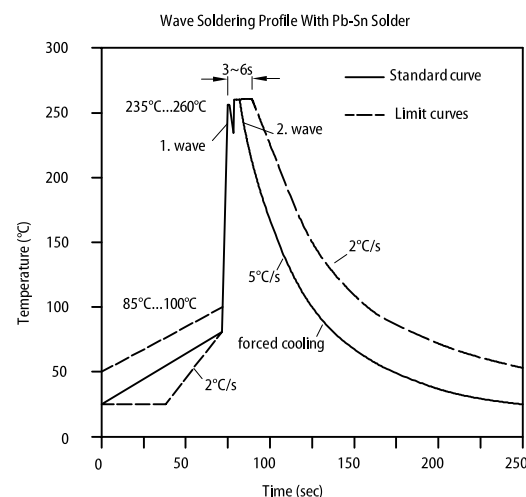
1. Lead-Free Wave Soldering Profile



Notes:

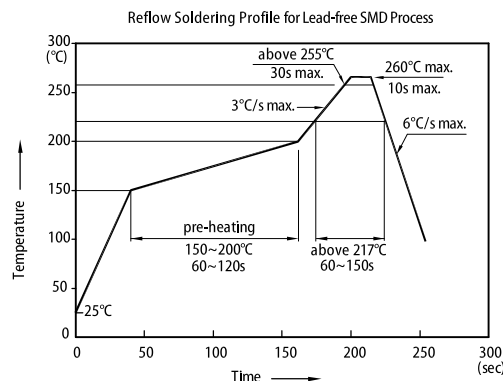
1. Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C.
2. Peak wave soldering temperature between 245°C ~ 255°C for 3 sec (5 sec max).
3. Do not apply stress to the epoxy resin while the temperature is above 85°C.
4. Fixtures should not incur stress on the component when mounting and during soldering process.
5. SAC 305 solder alloy is recommended.
6. No more than one wave soldering pass.
7. During wave soldering, the PCB top-surface temperature should be kept below 105°C.

2. Wave Soldering Profile With Pb-Sn Solder



Recommended Reflow Soldering Profiles For Kingbright SMD Products

1. Lead-Free Reflow Soldering Profile

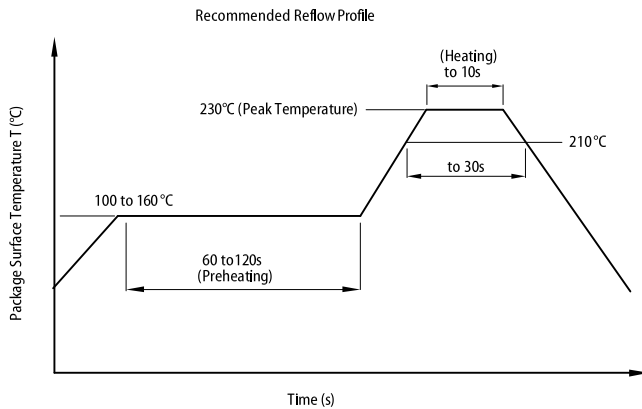


Notes:

1. Don't cause stress to the LEDs while it is exposed to high temperature.
2. The maximum number of reflow soldering passes is 2 times.

2. Reflow Soldering Profiles With Pb-Sn Solder

No more than two soldering passes with the recommended profile.



Static Electricity and Voltage Spikes in InGaN/GaN Products

InGaN/GaN products are sensitive to electrostatic discharge (ESD) and other transient voltage spikes. ESD and voltage spikes can affect the component's reliability, increase reverse current, and decrease forward voltage. This may result in reduced light intensity or cause component failure.

Kingbright InGaN/GaN products are stored in anti-static packaging for protection during transport and storage. Please note the anti-static measures below when handling Kingbright InGaN/GaN products.

Design Precautions

Products using InGaN/GaN components must incorporate protection circuitry to prevent ESD and voltage spikes from reaching the vulnerable component.

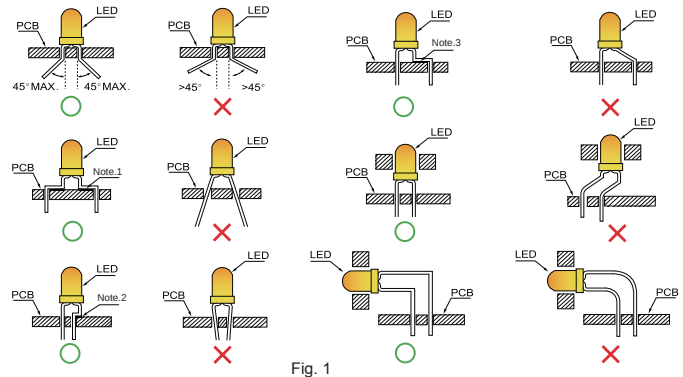
ESD Protection During Production

Static discharge can result when static-sensitive products come in contact with the operator or other conductors. The following procedures may decrease the possibility of ESD damage:

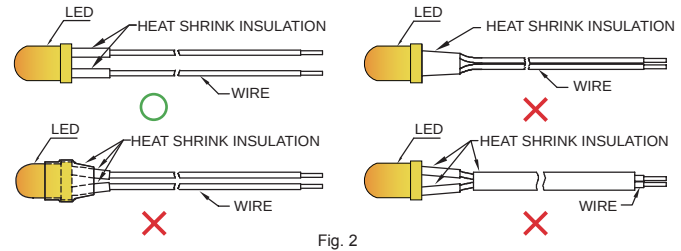
1. Minimize friction between the product and surroundings to avoid static buildup.
2. All manufacturing and testing equipment should be grounded.
3. All personnel in an ESD protected area should wear antistatic garments and wrist straps.
4. Set up ESD protection areas using grounded metal plating for component handling.
5. All workstations that handle IC and ESD-sensitive components must maintain an electrostatic potential of 150V or less.
6. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.
7. Use anti-static packaging for transport and storage.
8. All anti-static equipment and procedures should be periodically inspected and evaluated for proper functionality.

LED Mounting Method

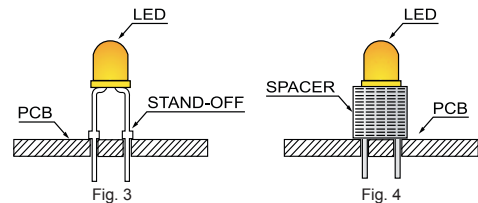
1. The lead pitch of the LED must match the pitch of the mounting holes on the PCB during component placement. Lead-forming may be required to insure the lead pitch matches the hole pitch. Refer to (Fig.1) for proper lead forming procedures.



2. When soldering wires to the LED, each wire joint should be separately insulated with heat-shrink tube to prevent short-circuit contact. Do not bundle both wires in one heat shrink tube to avoid pinching the LED leads. Pinching stress on the LED leads may damage the internal structures and cause failure. (Fig.2)



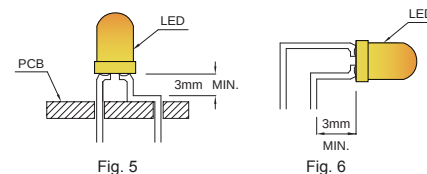
3. Use stand-offs (Fig.3) or spacers (Fig.4) to securely position the LED above the PCB.



4. Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.

Lead Forming Procedures

1. Maintain a minimum of 3mm clearance between the base of the LED lens and the first lead bend. (Fig. 5 and 6)



2. Lead forming or bending must be performed before soldering, never during or after soldering.
3. Do not stress the LED lens during lead-forming in order to prevent fractures in the epoxy lens and damage the internal structures.
4. During soldering, component covers and holders should leave clearance to avoid placing damaging stress on the LED during soldering. (Fig. 7)

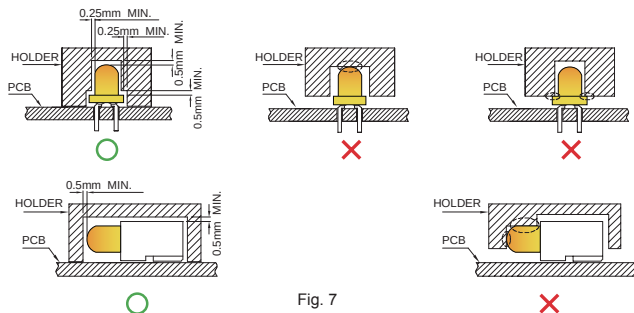


Fig. 7

5. During lead forming, use tools or jigs to hold the leads securely so that the bending force will not be transmitted to the LED lens and its internal structures. Do not perform lead forming once the component has been mounted onto the PCB. (Fig. 8)

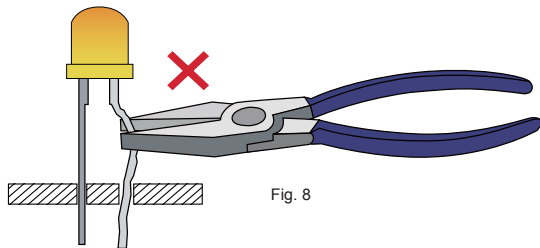


Fig. 8

6. Do not bend the leads more than twice. (Fig. 9)

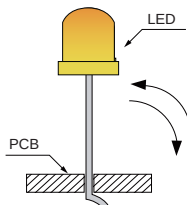


Fig. 9

7. After soldering or other high-temperature assembly, allow the LED to cool down to 50°C before applying outside force. (Fig. 10)
- In general, avoid placing excess force on the LED to avoid damage. For any questions, please consult with Kingbright representative for proper handling procedures.

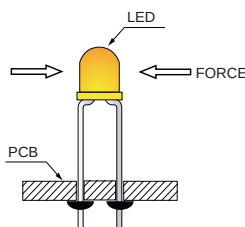


Fig. 10

Cleaning

For SMD and through-hole LEDs

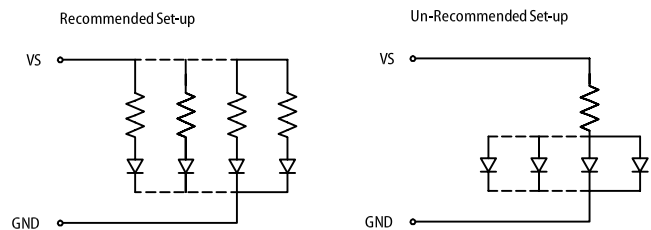
1. Isopropyl alcohol or deionized water are recommended for cleaning. Do not use acidic solvents or unknown chemicals, as they might cause corrosion or damage to the component.
2. Lightly wipe away any surface contaminants, and allow the component to dry under room temperature before further usage. Do not soak the component in solution.

For LED Displays

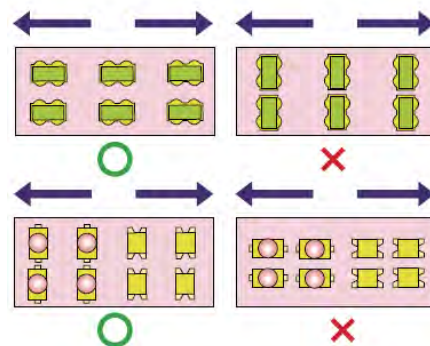
1. The component should be washed with only water, and immediately dried by forced-air to remove excess moisture. Do not use harsh organic solvents because they might damage the plastic parts.
2. The cleaning process should take place at room temperature and the component should not be washed for more than one minute.

Miscellaneous Design Notes

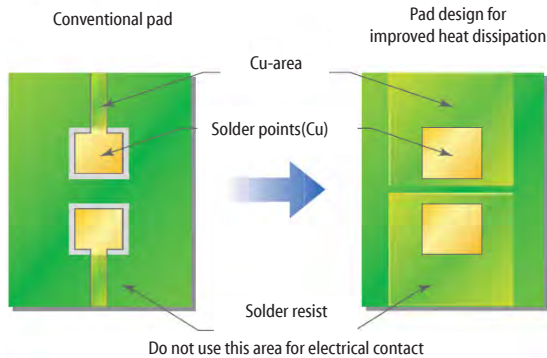
1. Protective current-limiting resistors may be necessary to operate the LEDs within the specified range.
2. LEDs mounted in parallel should each be placed in series with its own current-limiting resistor.



3. The driving circuit should be designed to avoid reverse voltages and transient voltage spikes when the circuit is powered up or shut down.
4. High temperatures can reduce device performance and reliability. Keep LED devices away from heat source for best performance.
5. The safe operation current should be chosen after considering the maximum ambient temperature of the operating environment.
6. During soldering, SMD components should be mounted such that the leads are placed perpendicular to the direction of PCB travel to ensure the solder on each lead melts simultaneously during reflow.

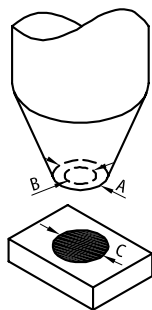


7. Optimal usage of high-power LED devices requires careful design by the end-user to optimize heat dissipation, such as increasing the size of the metal backing around the soldering pad. Refer to the product datasheet for specific design recommendations regarding heat dissipation.



Restrictions on Product Use

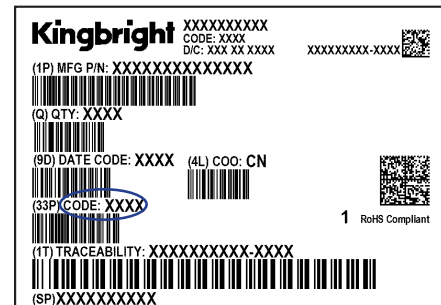
1. Not all devices and product families are available in every country.
2. The light output from UV, blue, white, and other high-power LEDs may cause injury to the human eye when viewed directly.
3. LED devices may contain gallium arsenide (GaAs) material. GaAs is harmful if ingested. GaAs dust and fumes are toxic. Do not break, cut, or pulverize LED devices. Do not dissolve LEDs in chemical solvents.
4. Semiconductor devices can fail or malfunction due to their sensitivity to electrical fluctuation and physical stress. It is the responsibility of the user to observe all safety standards when using Kingbright products, in order to avoid situations in which the malfunction or failure of a Kingbright product could cause injury, property damage, or the loss of human life. In developing designs, please insure that Kingbright products are used within specified operating conditions as set forth in the most recent product specification datasheet.
5. For LEDs with silicone encapsulation such as the AA series, the outer diameter of the pick-up nozzle must be longer than that of the LED's light emitting area. i. e. $A > C$, and B shall be shorter than the width of the LED.



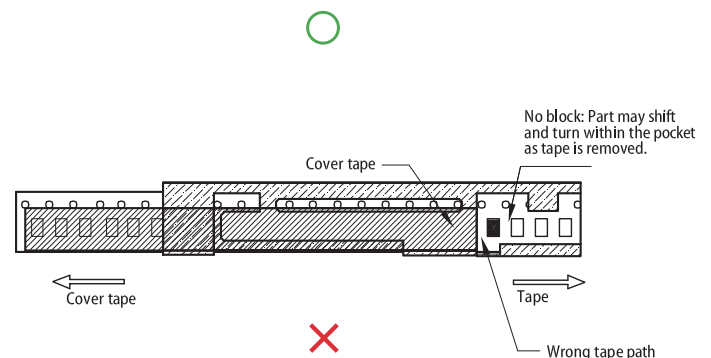
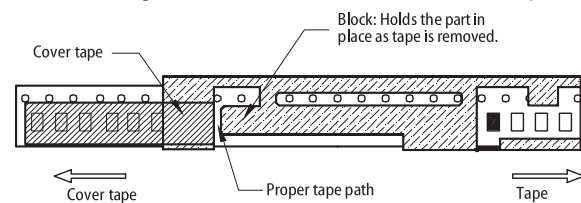
A is the outer diameter of the pick-up nozzle
B is the inner diameter of the pick-up nozzle
C is the diameter of lens

6. The size of the nozzle should be as large as possible if the tape is not involved.
7. The LEDs should not be exposed to an environment where high level of moisture or corrosive gases are present.
8. Prolonged reverse bias should be avoided, as it could cause metal migration, leading to an increase in leakage current or causing a short circuit.
9. Excess driving current and/or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

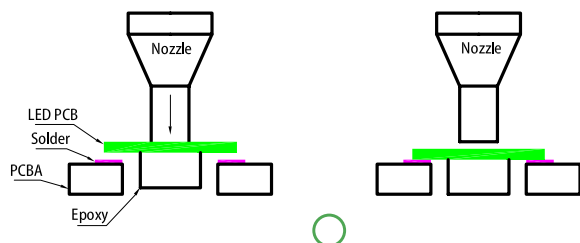
10. It is not recommended to assemble LEDs of different color or intensity bins together, as there may be perceivable color or intensity variation. Each bag contains parts from the same bin code. The bin code is printed on the bag's label as below.



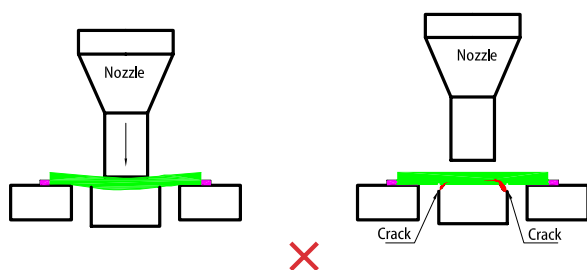
11. For the 0603, 1005 and 1608 series, an ESD ionizer should be used during SMT pick-and-place process to neutralize the charge and hence reduce electrostatic attraction.
12. Please do not apply stress directly to the LED during handling.
13. As silicone encapsulation is permeable to gases, some corrosive substances such as H_2S might corrode silver plating of leadframe. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.
14. The LEDs should not be exposed to an environment where high level of moisture or corrosive gases are present.
15. Prolonged reverse bias should be avoided, as it could cause metal migration, leading to an increase in leakage current or causing a short circuit.
16. Choosing the right feeder for small SMD components:
 - 16.1 When processing smaller SMD components (such as 0603, 1005, 1608, 1612, 1615, 2012), please use feeder with block to hold the part in place during cover tape removal, in order to prevent the component jumping or turning within the tape due to vibration or static cling.
 - 16.2 Feeder without block is more suitable for larger size components (such as 3216, 3528).
 - 16.3 Please insure the removed cover tape is properly threaded through the feeder as it is removed from the tape.



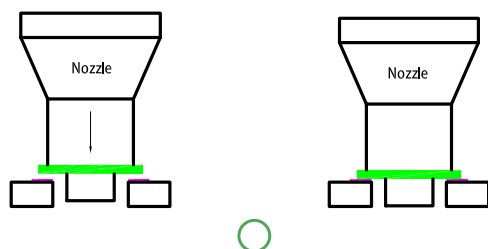
17. When placing reverse-mount LEDs, the nozzle must not place pressure on the part. Refer to the figures below, pressure on the LED will cause the LED to bend and potentially cause delamination or cracking between the component PCB and the epoxy lens. The damaged LED will be more prone to failure after undergoing high-temperature reflow soldering process.



Proper SMD placement. Nozzle does not press down on the LED.



Pressure from the nozzle can cause structural damage to the LED.



Consider using wider nozzles with diameter greater than the PCB hole opening. This will prevent pressure damage during placement.

Storage Control For SMD Products

- Before a sealed moisture barrier bag (MBB) is opened, contained LEDs shall be kept in an environment with temperature below 40°C and humidity below 90% RH. MBB shall be kept sealed until LEDs contained in the bag are ready to be used. Once MBB is opened, it shall be stored in an environment with temperature range of 5°C~30°C and humidity below 60% RH.
- After the MBB has been opened, the LEDs should be used according to the floor life specified in the table below.

IPC/JEDEC J-STD-020 Moisture Sensitivity Levels

Level	Floor Life	
	Time	Conditions
1	Unlimited	≤30°C / 85% RH
2	1 year	≤30°C / 60% RH
2a	4 weeks	≤30°C / 60% RH
3	168 hours	≤30°C / 60% RH
4	72 hours	≤30°C / 60% RH
5	48 hours	≤30°C / 60% RH
5a	24 hours	≤30°C / 60% RH
6	Time on Label (TOL)	≤30°C / 60% RH

3. If the Humidity Indicator Card (HIC)'s 10 % mark has changed, or the LEDs have not been used within the floor life specified, they should be baked with the following conditions to reset the floor life:

Type	Temperature	Humidity	Bake Time
When still in carrier tape	60±3°C	<5%RH	100H
When out of carrier tape	110°C	/	10H

* Not more than once

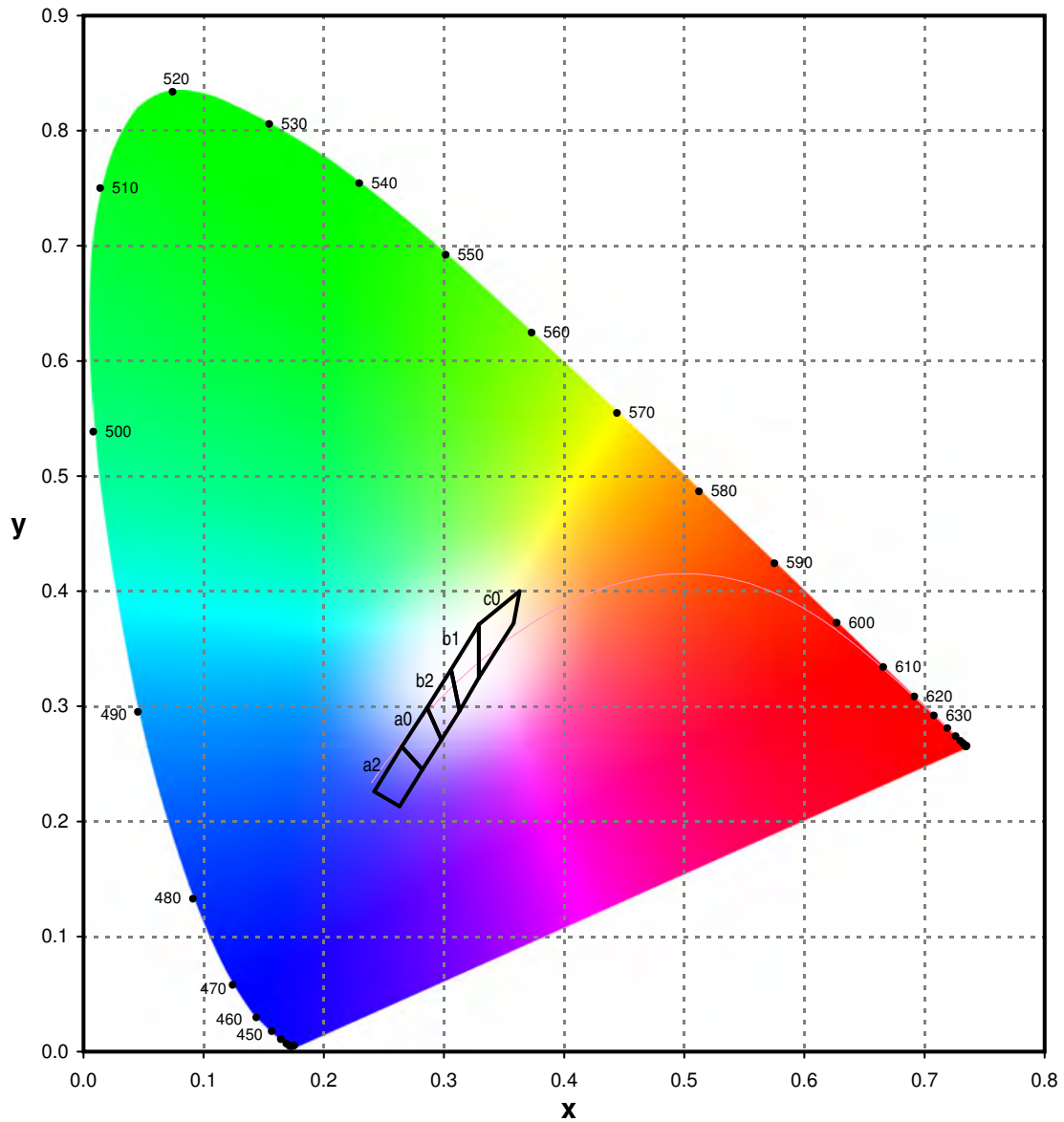
- Do not store LEDs in an environment where high humidity or acidic/basic chemicals are present, as they will degrade the LED's metallic surfaces.
- LED leadframe and soldering pads (cathode and anode) are plated with gold, tin, or other metals. Under long-term exposure to open air, the exposed pins and pads may become oxidized causing poor solderability. Therefore opened but unused parts must be stored in sealed containers. Suggest to store unused parts in the original moisture barrier bag.
- Moisture control for components already mounted on PCB: If the PCB will not undergo additional reflow soldering or high-temperature processes, then no special treatment is required for the mounted moisture-sensitive SMD components. If the PCB will undergo multiple reflow soldering or other high-temperature processes, including rework, then the SMD component's cumulative exposure time until the final high-temperature process must be controlled to within the specified time limit.

For Through-Hole Products

- Avoid continued exposure to the condensing moisture environment and keep the product away from rapid transitions in ambient temperature.
- LEDs should be stored with temperature ≤30°C and relative humidity < 60%.
- Product in the original sealed package is recommended to be assembled within 72 hours of opening. Product in opened package for more than a week should be baked for 30 (+10/-0) hours at 85 ~ 100°C.
- The LED leadframe surface is plated with silver. When the leadframe is stored under high-humidity environments, or exposed to certain chemical elements or gases, the surface may become discolored. Please maintain the cleanliness of the storage environment.
- If the storage conditions do not meet specification standards, the component pins may become oxidized requiring re-plating and re-sorting before use. Suggest customers consume LEDs as soon as possible, and avoid long-term storage of large inventories.

CIE CHROMATICITY DIAGRAM

White Bin Code



Bin	x	y
a2	0.263	0.213
	0.282	0.245
	0.265	0.265
	0.242	0.226
CCT: 15000K~		

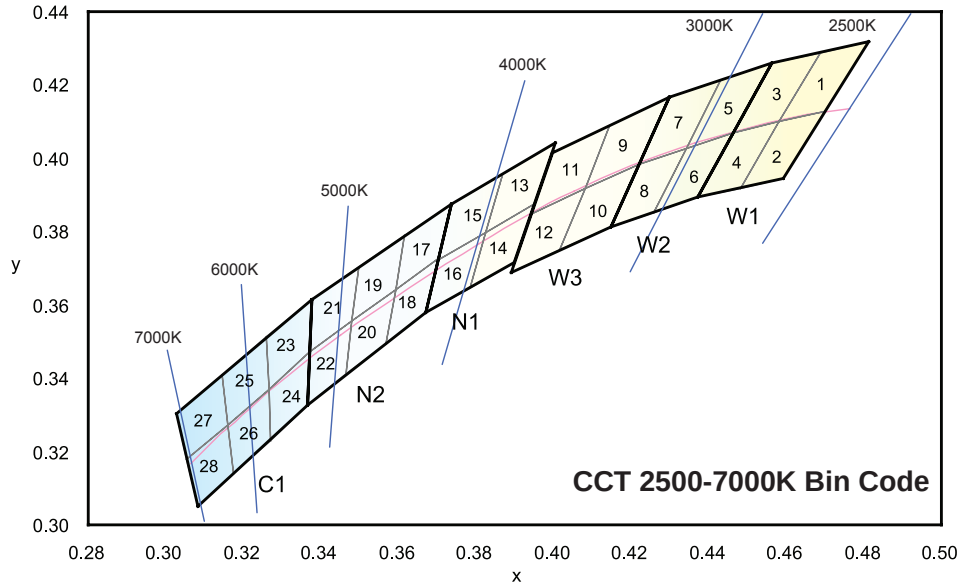
Bin	x	y
a0	0.282	0.245
	0.298	0.271
	0.286	0.299
	0.265	0.265
CCT: 9000~15000K		

Bin	x	y
b2	0.298	0.271
	0.313	0.296
	0.306	0.332
	0.286	0.299
CCT: 6800~9000K		

Bin	x	y
b1	0.313	0.296
	0.329	0.325
	0.329	0.371
	0.306	0.332
CCT: 5600~6800K		

Bin	x	y
c0	0.329	0.325
	0.358	0.372
	0.363	0.400
	0.329	0.371
CCT: 4600~5600K		

CIE CHROMATICITY DIAGRAM



Group	Chromaticity Regions	CCT (K)			Group	Chromaticity Regions	CCT (K)		
		Min.	Typ.	Max.			Min.	Typ.	Max.
W1	1, 2, 3, 4	2580	2700	2870	N1	13, 14, 15, 16	3710	4000	4260
W2	5, 6, 7, 8	2870	3000	3220	N2	17, 18, 19, 20, 21, 22	4260	4700	5310
W3	9, 10, 11, 12	3220	3500	3710	C1	23, 24, 25, 26, 27, 28	5310	6000	7040

	x	y		x	y		x	y		x	y
1	0.4582	0.4099	8	0.4147	0.3814	15	0.3702	0.3722	22	0.3481	0.3557
	0.4687	0.4289		0.4221	0.3984		0.3736	0.3874		0.3370	0.3472
	0.4813	0.4319		0.4342	0.4028		0.3869	0.3958		0.3364	0.3328
	0.4700	0.4126		0.4259	0.3853		0.3825	0.3798		0.3466	0.3411
2	0.4483	0.3919	9	0.4080	0.3916	16	0.3670	0.3578	23	0.3376	0.3616
	0.4582	0.4099		0.4146	0.4089		0.3702	0.3722		0.3260	0.3512
	0.4700	0.4126		0.4299	0.4165		0.3825	0.3798		0.3265	0.3371
	0.4593	0.3944		0.4221	0.3984		0.3783	0.3646		0.3370	0.3472
3	0.4465	0.4071	10	0.4017	0.3751	17	0.3736	0.3874	24	0.3370	0.3472
	0.4562	0.4260		0.4080	0.3916		0.3616	0.3788		0.3265	0.3371
	0.4687	0.4289		0.4221	0.3984		0.3592	0.3641		0.3270	0.3230
	0.4582	0.4099		0.4147	0.3814		0.3703	0.3726		0.3364	0.3328
4	0.4373	0.3893	11	0.3941	0.3848	18	0.3703	0.3726	25	0.3260	0.3512
	0.4465	0.4071		0.3996	0.4015		0.3592	0.3641		0.3144	0.3408
	0.4582	0.4099		0.4146	0.4089		0.3568	0.3495		0.3160	0.3274
	0.4483	0.3919		0.4080	0.3916		0.3670	0.3578		0.3265	0.3371
5	0.4342	0.4028	12	0.3889	0.3690	19	0.3616	0.3788	26	0.3265	0.3371
	0.4430	0.4212		0.3941	0.3848		0.3496	0.3702		0.3160	0.3274
	0.4562	0.4260		0.4080	0.3916		0.3481	0.3557		0.3175	0.3139
	0.4465	0.4071		0.4017	0.3751		0.3592	0.3641		0.3270	0.3230
6	0.4259	0.3853	13	0.3825	0.3798	20	0.3592	0.3641	27	0.3144	0.3408
	0.4342	0.4028		0.3869	0.3958		0.3481	0.3557		0.3028	0.3304
	0.4465	0.4071		0.4006	0.4044		0.3466	0.3411		0.3055	0.3177
	0.4373	0.3893		0.3950	0.3875		0.3568	0.3495		0.3160	0.3274
7	0.4221	0.3984	14	0.3783	0.3646	21	0.3496	0.3702	28	0.3160	0.3274
	0.4299	0.4165		0.3825	0.3798		0.3376	0.3616		0.3055	0.3177
	0.4430	0.4212		0.3950	0.3875		0.3370	0.3472		0.3081	0.3049
	0.4342	0.4028		0.3898	0.3716		0.3481	0.3557		0.3175	0.3139

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Custom Assembly LEDs

Kingbright's excellent manufacturing capability and flexibility can manifest your next design innovation.

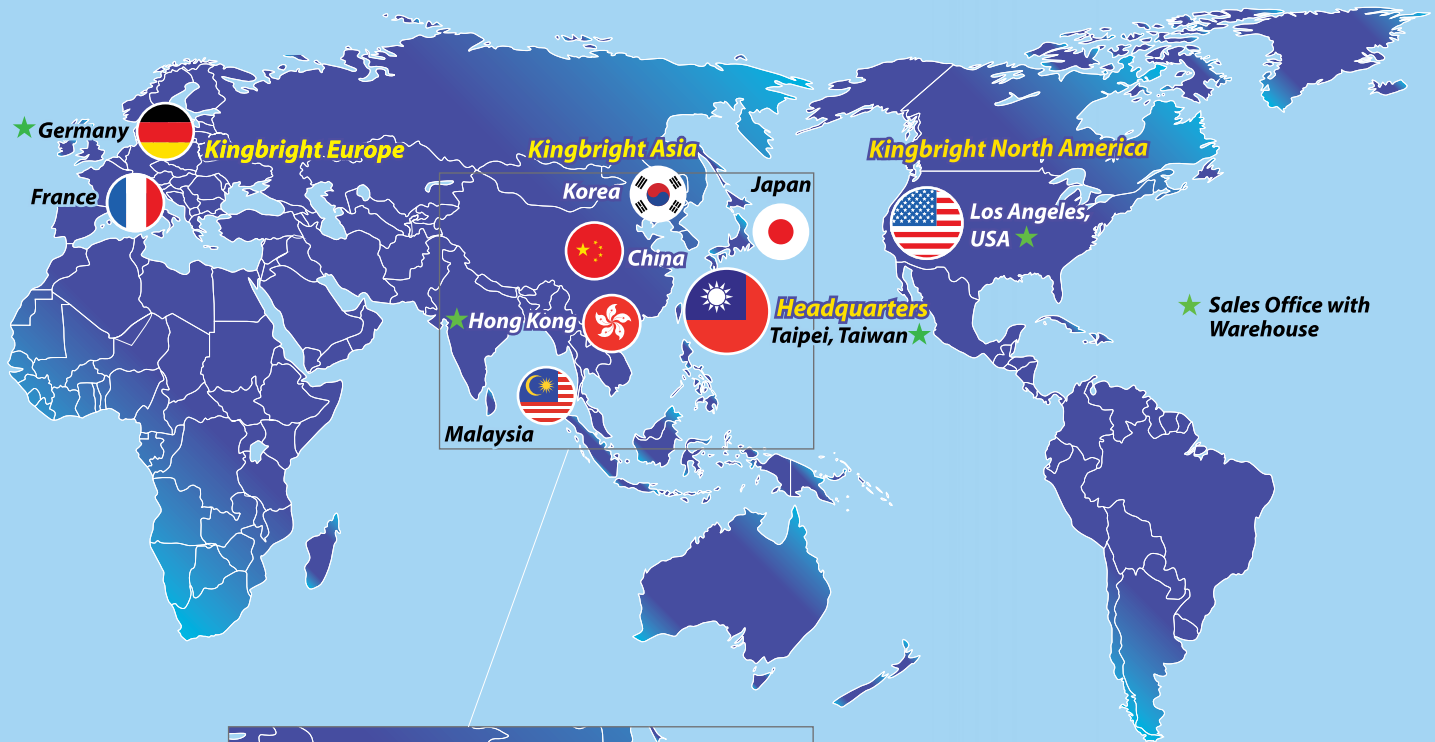


Kingbright is a specialized LED manufacturer that offers comprehensive custom LED solutions to meet your next design aspiration. Our broad line of LED selections from SMD LEDs, Displays, CBI, Through-Hole & special color packages will facilitate your specific requirements. Options are available in desired shape, form, intensity and color to further enhance your innovation. Please contact us at 1-909-468-0500 or email us at sales@kingbrightUSA.com for any special requirements or design objectives.

For a complete product selection and more about Kingbright, please visit our website at www.KingbrightUSA.com

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