

Kingbright

Optoelectronic Components

■ Quality ■ Efficiency ■ Service ■ Innovation

2016-2017

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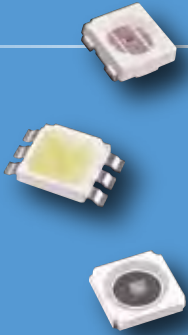


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High Brightness LED

0.5W High Brightness LED	03
1.5W High Brightness LED	03

Description

Kingbright's High Brightness LEDs offer ultimate design solutions for high brightness needs. Packages are available in various sizes and power outputs based on InGaN and AlInGaP technology. The cutting-edge package design comprises a low thermal resistance providing great heat dissipating capability. The distinctive element encompasses a built-in zener diode that can withstand ESD voltage up to 8000V providing superior protection against ESD (Electro Static Discharge) damages at the production line.

Features and Benefits

- High luminous flux and low power consumption
- High maximum junction temperature
- Low thermal resistance
- Superior ESD protection with built-in zener diode
- Wide operating temperature
- Available in various colors including RGB
- Available in various industry standard footprints for different design needs
- Excellent product quality and reliability



03 HIGH BRIGHTNESS LED > 0.5-1W High Brightness LED



SMD LED

Low Current LED	05
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Description

Kingbright offers an extensive selection of various Surface-Mount LEDs. The selection is an extension to the industry popular standard footprints of chip type, PLCC, and subminiatures packages to fulfill various surface mount requirements. With Kingbright's advanced production process, products are manufactured in excellent quality with great reliability and delivery with competitive lead time.

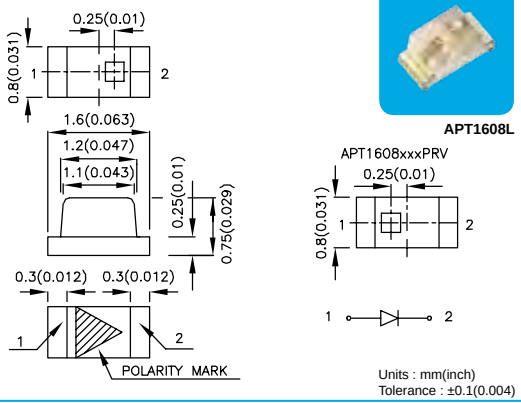
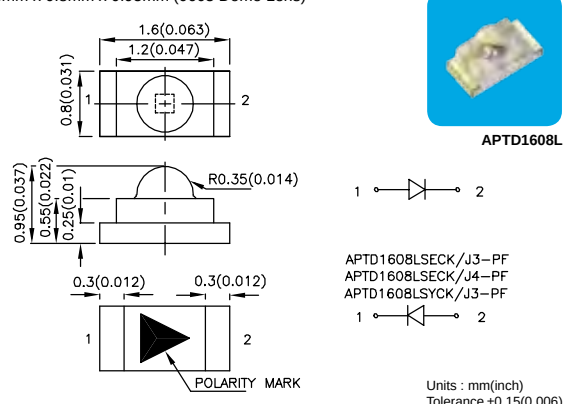
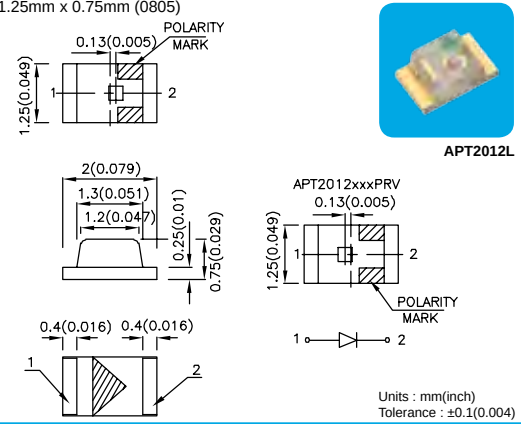
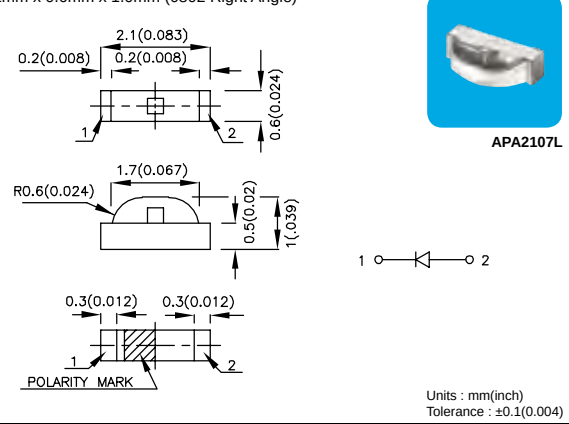
Kingbright SMD LEDs are featured with different options in size, shape, viewing angle, driving condition, color combination and mounting type. All Kingbright SMD LEDs are packaged in automation-friendly tape and reel to increase productivity and reduce assembly cost.

Features and Benefits

- Chip type, PLCC and Subminiature options
- Compact sizes including industry standard footprints: 0402, 0603, 0805, 1206 and many other options
- Packages with different viewing angle options from 15 degree to 130 degree for different design needs
- Available in various color selection: blue, green, yellow, orange, red, bi-color and RGB selection
- Mounting options include top-mount, right angle mount, and reversed-mount
- Capable of single-color, bi-color and tri-color combinations
- Robust and high reliability with competitive lead time



LOW CURRENT LED

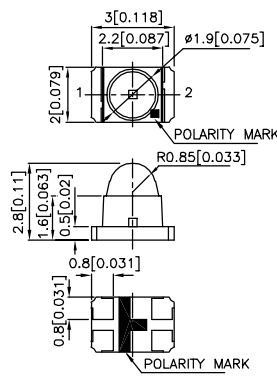
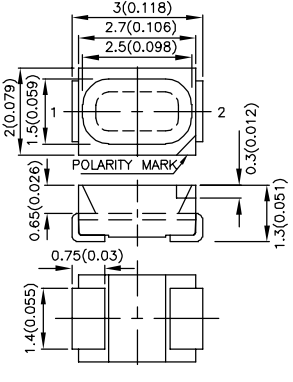
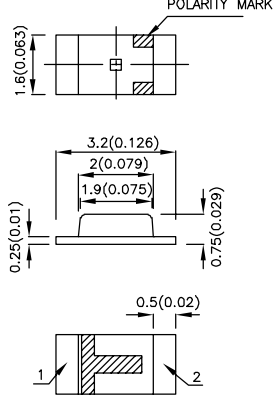
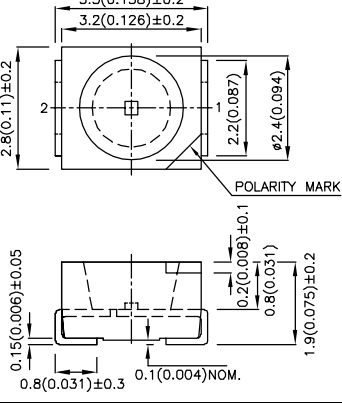
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APT1608LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	120°	1.6mm x 0.8mm x 0.75mm (0603)  APT1608L Units: mm(inch) Tolerance: $\pm 0.1(0.004)$
APT1608LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	120°	
APT1608LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	120°	
APT1608LZGCK	InGaIn	525	Water Clear	20	50	120°	
APT1608LVBC/D	InGaIn	470	Water Clear	15	24	120°	
APTD1608LSECK/J3-PF	AlGaInP	625	Water Clear	20	50	60°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens)  APTD1608L Units: mm(inch) Tolerance: $\pm 0.15(0.006)$
APTD1608LSECK/J4-PF	AlGaInP	605	Water Clear	80	150	60°	
APTD1608LSYCK/J3-PF	AlGaInP	590	Water Clear	30	55	60°	
APTD1608LZGCK	InGaIn	525	Water Clear	50	90	60°	
APTD1608LVBC/D	InGaIn	470	Water Clear	30	65	40°	
APT2012LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	120°	2.0mm x 1.25mm x 0.75mm (0805)  APT2012L Units: mm(inch) Tolerance: $\pm 0.1(0.004)$
APT2012LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	120°	
APT2012LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	120°	
APT2012LZGCK	InGaIn	525	Water Clear	20	50	120°	
APT2012LVBC/D	InGaIn	470	Water Clear	15	24	120°	
APA2107LSECK/J3-PRV	AlGaInP	625	Water Clear	15	30	120°	2.1mm x 0.6mm x 1.0mm (0802 Right Angle)  APA2107L Units: mm(inch) Tolerance: $\pm 0.1(0.004)$
APA2107LSECK/J4-PRV	AlGaInP	605	Water Clear	20	40	120°	
APA2107LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	30	120°	
APA2107LZGCK	InGaIn	525	Water Clear	20	40	120°	
APA2107LVBC/D	InGaIn	470	Water Clear	10	20	120°	

LOW CURRENT LED

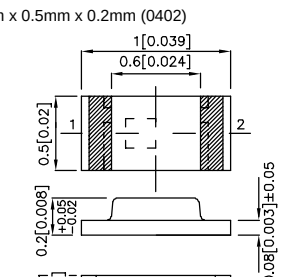
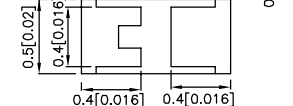
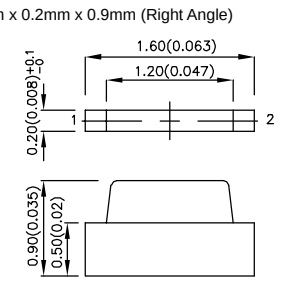
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SMD LED

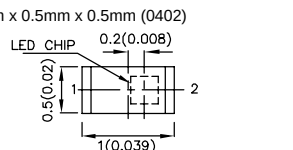
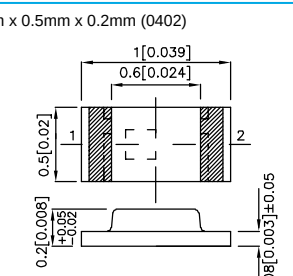
Low Current LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.		
APDA3020LSECK/J3-PF	AlGaInP	625	Water Clear	250	500	10°	3.0mm x 2.0mm x 2.8mm (1108 Right Angle)   APDA3020L 1 → 2 APDA3020LSECK/J3-PF APDA3020LSECK/J4-PF APDA3020LSYCK/J3-PF 1 → 2 Units: mm(inch) Tolerance: ±0.2(0.008)
APDA3020LSECK/J4-PF	AlGaInP	605	Water Clear	550	1000	10°	
APDA3020LSYCK/J3-PF	AlGaInP	590	Water Clear	180	500	10°	
APDA3020LZGCK	InGaN	525	Water Clear	250	600	10°	
APDA3020LVBC/D	InGaN	470	Water Clear	80	150	10°	
AA3021LSESK/J3-TR	AlGaInP	625	Water Clear	20	45	125°	3.0mm x 2.0mm x 1.3mm   AA3021L 1 → 2 AA3021LSESK/J3-TR AA3021LSESK/J4-TR AA3021LSYSK/J3-TR 1 → 2 Units: mm(inch) Tolerance: ±0.2(0.008)
AA3021LSESK/J4-TR	AlGaInP	605	Water Clear	30	60	125°	
AA3021LSYSK/J3-TR	AlGaInP	590	Water Clear	20	45	125°	
AA3021LZGSK	InGaN	525	Water Clear	80	180	125°	
AA3021LVBS/D	InGaN	470	Water Clear	20	50	125°	
APT3216LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	120°	3.2mm x 1.6mm x 0.75mm (1206)   APT3216L 1 → 2 Units: mm(inch) Tolerance: ±0.2(0.008)
APT3216LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	120°	
APT3216LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	120°	
APT3216LZGCK	InGaN	525	Water Clear	20	50	120°	
APT3216LVBC/D	InGaN	470	Water Clear	15	24	120°	
AA3528LSESK/J3	AlGaInP	625	Water Clear	30	50	120°	3.5mm x 2.8mm x 1.9mm   AA3528L 2 → 1 AA3528LSESK/J3 AA3528LSESK/J4 AA3528LSYSK/J3 2 → 1 Units: mm(inch) Tolerance: ±0.25(0.01)
AA3528LSESK/J4	AlGaInP	605	Water Clear	30	60	120°	
AA3528LSYSK/J3	AlGaInP	590	Water Clear	20	30	120°	
AA3528LZGSK	InGaN	525	Water Clear	50	90	120°	
AA3528LVBS/D	InGaN	470	Water Clear	30	45	120°	

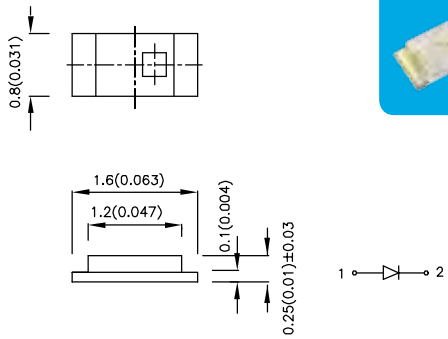
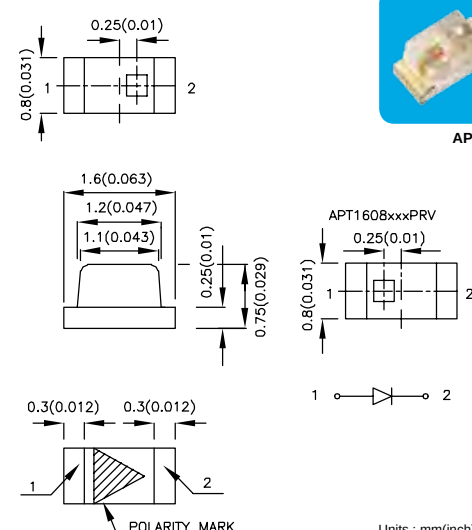
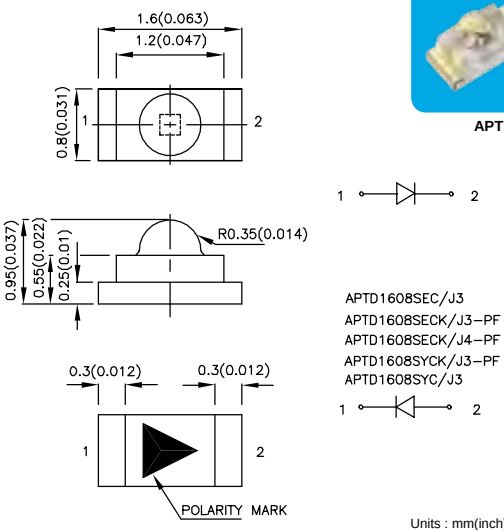
LOW CURRENT LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @5mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APG1005VGC-T-5MAV	InGaN	527	Water Clear	30	70	145°	1.0mm x 0.5mm x 0.2mm (0402)  APG1005-5MAV
APG1005PBC-T-5MAV	InGaN	467	Water Clear	20	28	145°	 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APGA1602QBC/KA-5MAV	InGaN	463	Water Clear	8	20	130°(H) 150°(V)	1.6mm x 0.2mm x 0.9mm (Right Angle)  APGA1602-5MAV Units : mm(inch) Tolerance : $\pm 0.1(0.004)$

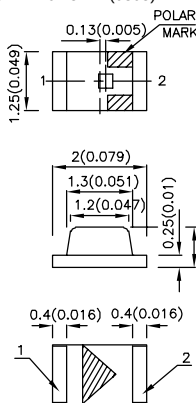
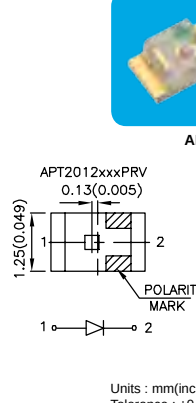
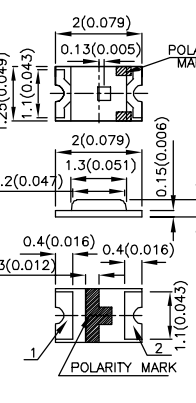
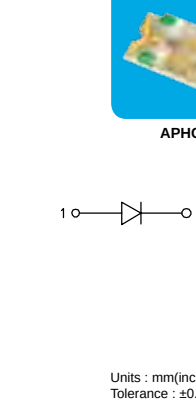
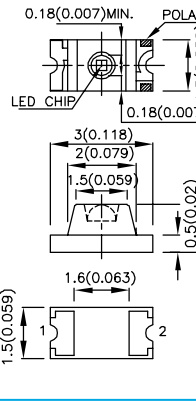
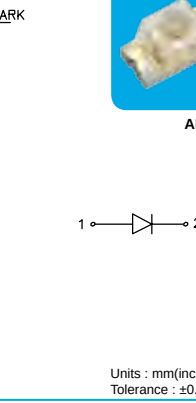
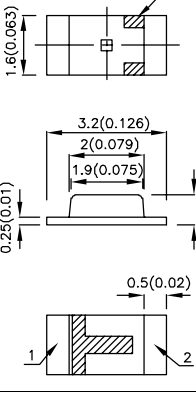
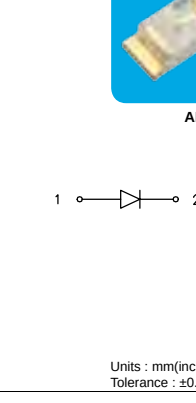
TOP-EMITTING CHIP SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APHHS1005SURCK	AlGaInP	630	Water Clear	40	70	120°	1.0mm x 0.5mm x 0.5mm (0402)  APHHS1005
APHHS1005SECK	AlGaInP	601	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	200	400	120°	
APHHS1005QBC/D	InGaN	465	Water Clear	40	60	120°	
APG1005SEC/E-T	AlGaInP	624	Water Clear	20	75	120°	1.0mm x 0.5mm x 0.2mm (0402)  APG1005
APG1005SEC-T	AlGaInP	605	Water Clear	40	90	120°	
APG1005SYC-T	AlGaInP	589	Water Clear	55	100	120°	
APG1005CGC-T	AlGaInP	571	Water Clear	12	35	120°	

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.		
APG1608SURKC/T	AlGaInP	630	Water Clear	55	110	120°	1.6mm x 0.8mm x 0.25mm (0603)  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	200	350	120°	
APG1608QBC/D	InGaN	465	Water Clear	40	100	120°	
APT1608EC	GaAsP/GaP	617	Water Clear	3	8	120°	1.6mm x 0.8mm x 0.75mm (0603)  APT1608 Units : mm(inch) Tolerance : ±0.1(0.004)
APT1608SRCPRV	GaAlAs	640	Water Clear	12	30	120°	
APT1608SURCK	AlGaInP	630	Water Clear	40	80	120°	
APT1608SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	120°	
APT1608SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	120°	
APT1608SECK	AlGaInP	601	Water Clear	80	180	120°	
APT1608YC	GaAsP/GaP	588	Water Clear	3	8	120°	
APT1608SYCK	AlGaInP	590	Water Clear	80	150	120°	
APT1608SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	120°	
APT1608SGC	GaP	568	Water Clear	5	12	120°	
APT1608CGCK	AlGaInP	570	Water Clear	20	50	120°	
APT1608ZGCK	InGaN	525	Water Clear	200	350	120°	
APT1608QBC/D	InGaN	465	Water Clear	40	100	120°	
APT1608VBC/D	InGaN	470	Water Clear	120	180	120°	
APTD1608SURCK	AlGaInP	630	Water Clear	80	250	60°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens)  APTD1608 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	800	60°	
APTD1608SECK/J4-PF	AlGaInP	605	Water Clear	1000	1600	60°	
APTD1608SECK	AlGaInP	601	Water Clear	200	500	60°	
APTD1608SYCK	AlGaInP	590	Water Clear	200	450	60°	
APTD1608SYCK/J3-PF	AlGaInP	590	Water Clear	400	800	60°	
APTD1608SYC/J3	AlGaInP	590	Water Clear	500	900	60°	
APTD1608CGCK	AlGaInP	570	Water Clear	80	190	60°	
APTD1608ZGCK	InGaN	525	Water Clear	500	900	60°	
APTD1608QBC/D	InGaN	465	Water Clear	80	200	40°	
APTD1608VBC/D	InGaN	470	Water Clear	200	350	40°	

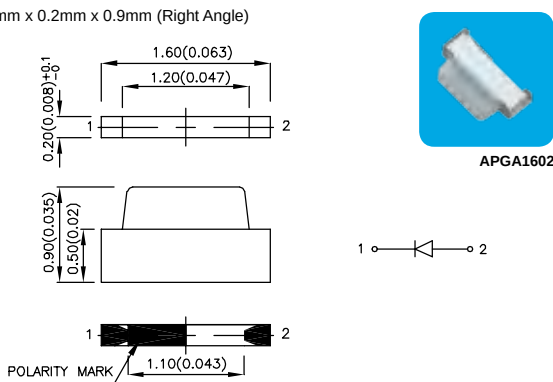
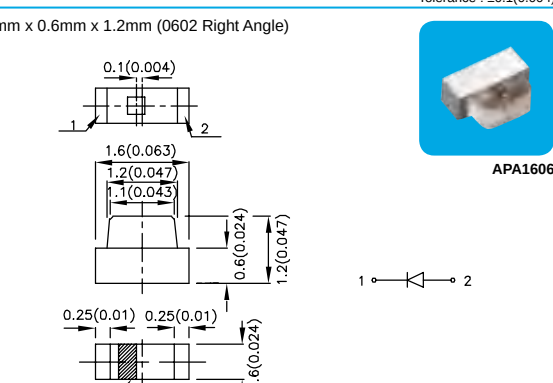
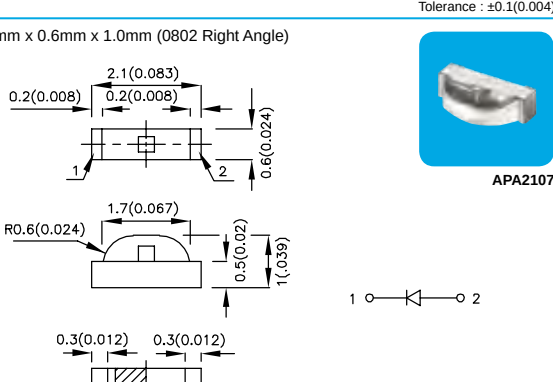
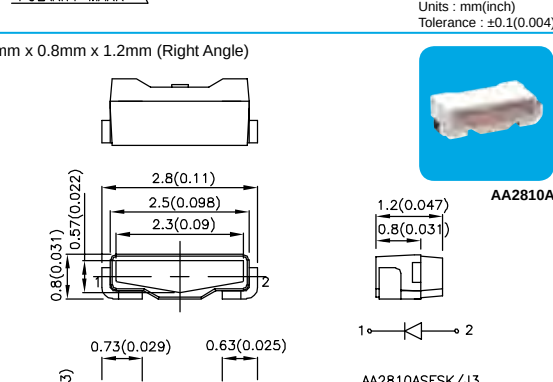
TOP-EMITTING CHIP SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APT2012EC	GaAsP/GaP	617	Water Clear	3	8	120°	2.0mm x 1.25mm x 0.75mm (0805)  APT2012  APT2012xxxPRV Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APT2012SRCPRV	GaAlAs	640	Water Clear	12	30	120°	
APT2012SURCK	AlGaInP	630	Water Clear	40	80	120°	
APT2012SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	120°	
APT2012SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	120°	
APT2012SECK	AlGaInP	601	Water Clear	80	180	120°	
APT2012YC	GaAsP/GaP	588	Water Clear	3	8	120°	
APT2012SYCK	AlGaInP	590	Water Clear	80	150	120°	
APT2012SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	120°	
APT2012SGC	GaP	568	Water Clear	5	12	120°	
APT2012CGCK	AlGaInP	570	Water Clear	20	50	120°	
APT2012ZGCK	InGaN	525	Water Clear	200	350	120°	
APT2012QBC/D	InGaN	465	Water Clear	40	100	120°	
APT2012VBC/D	InGaN	470	Water Clear	120	180	120°	
APHCM2012SURCK-F01	AlGaInP	630	Water Clear	40	80	110°	2.0mm x 1.25mm x 0.4mm (0805)  APHCM2012  APHCM2012xxxPRV Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APHCM2012SECK-F01	AlGaInP	601	Water Clear	80	180	110°	
APHCM2012SYCK-F01	AlGaInP	590	Water Clear	80	150	110°	
APHCM2012CGCK-F01	AlGaInP	570	Water Clear	20	50	110°	
APHCM2012ZGCK-F01	InGaN	525	Water Clear	200	350	110°	
APHCM2012QBC/D-F01	InGaN	465	Water Clear	40	100	110°	
APL3015EC-F01	GaAsP/GaP	617	Water Clear	5	12	70°	3.0mm x 1.5mm x 1.4mm (1106)  APL3015  APL3015xxxPRV Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APL3015SRCPRV-F01	GaAlAs	640	Water Clear	20	50	70°	
APL3015SURCK-F01	AlGaInP	630	Water Clear	120	180	70°	
APL3015SECK-F01	AlGaInP	601	Water Clear	120	350	70°	
APL3015SYCK-F01	AlGaInP	590	Water Clear	200	350	70°	
APL3015SGC-F01	GaP	568	Water Clear	8	18	70°	
APL3015CGCK-F01	AlGaInP	570	Water Clear	55	120	70°	
APL3015ZGCK-F01	InGaN	525	Water Clear	500	700	70°	
APL3015QBC/D-F01	InGaN	465	Water Clear	120	200	70°	
APT3216EC	GaAsP/GaP	617	Water Clear	3	8	120°	3.2mm x 1.6mm x 0.75mm (1206)  APT3216  APT3216xxxPRV Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APT3216SRCPRV	GaAlAs	640	Water Clear	12	30	120°	
APT3216SURCK	AlGaInP	630	Water Clear	40	80	120°	
APT3216SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	120°	
APT3216SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	120°	
APT3216SECK	AlGaInP	601	Water Clear	80	180	120°	
APT3216YC	GaAsP/GaP	588	Water Clear	3	8	120°	
APT3216SYCK	AlGaInP	590	Water Clear	80	150	120°	
APT3216SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	120°	
APT3216SGC	GaP	568	Water Clear	5	12	120°	
APT3216CGCK	AlGaInP	570	Water Clear	20	50	120°	
APT3216ZGCK	InGaN	525	Water Clear	200	350	120°	
APT3216QBC/D	InGaN	465	Water Clear	40	100	120°	
APT3216VBC/D	InGaN	470	Water Clear	120	180	120°	

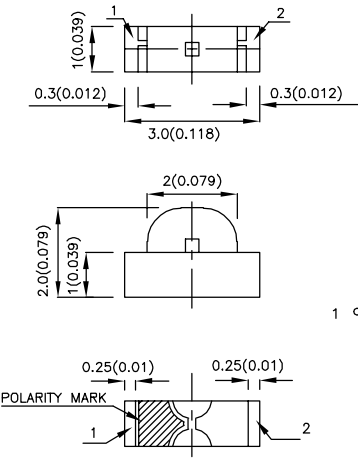
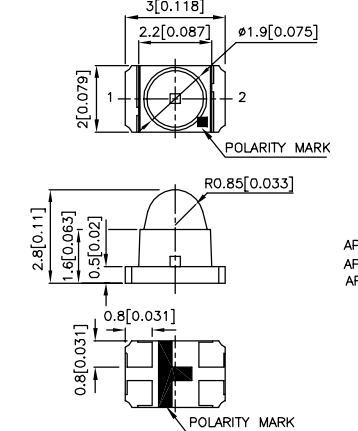
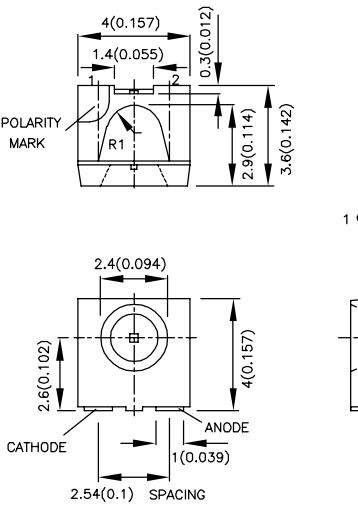
TOP-EMITTING CHIP SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APTL3216SURCK	AlGaInP	630	Water Clear	120	230	70°	3.2mm x 1.6mm x 1.1mm (1206) APTL3216 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APTL3216SECK	AlGaInP	601	Water Clear	200	350	70°	
APTL3216SYCK	AlGaInP	590	Water Clear	200	350	70°	
APTL3216CGCK	AlGaInP	570	Water Clear	55	100	70°	
APTL3216ZGCK	InGaN	525	Water Clear	500	1000	70°	
APTL3216QBC/D	InGaN	465	Water Clear	80	250	70°	
APTD3216EC	GaAsP/GaP	617	Water Clear	20	50	35°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens) APTD3216EC Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APTD3216SRCPRV	GaAlAs	640	Water Clear	80	150	35°	
APTD3216SURCK	AlGaInP	630	Water Clear	300	800	35°	
APTD3216SECK	AlGaInP	601	Water Clear	500	1000	35°	
APTD3216YC	GaAsP/GaP	588	Water Clear	20	40	35°	
APTD3216SYCK	AlGaInP	590	Water Clear	700	800	35°	
APTD3216SGC	GaP	568	Water Clear	20	50	35°	3.2mm x 2.4mm x 2.4mm (Dome Lens) APTD3216SGC Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APTD3216CGCK	AlGaInP	570	Water Clear	120	300	35°	
APTD3216ZGCK	InGaN	525	Water Clear	1300	2100	35°	
APTD3216QBC/D	InGaN	465	Water Clear	300	700	35°	
APD3224EC-F01	GaAsP/GaP	617	Water Clear	40	60	20°	
APD3224SURCK-F01	AlGaInP	630	Water Clear	700	1500	20°	
APD3224SECK-F01	AlGaInP	601	Water Clear	1000	1600	20°	3.5mm x 2.8mm x 3.2mm (Dome Lens) APD3224SECK-F01 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APD3224YC-F01	GaAsP/GaP	588	Water Clear	20	50	20°	
APD3224SYCK-F01	AlGaInP	590	Water Clear	1000	1300	20°	
APD3224SGC-F01	GaP	568	Water Clear	55	100	20°	
APD3224CGCK-F01	AlGaInP	570	Water Clear	400	600	20°	
APD3224ZGCK-F01	InGaN	525	Water Clear	1900	2900	20°	
APD3224QBC/D-F01	InGaN	465	Water Clear	400	800	20°	3.5mm x 2.8mm x 3.2mm (Dome Lens) APD3224QBC/D-F01 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APED3528SURCK-F01	AlGaInP	630	Water Clear	120	250	40°	
APED3528SECK/J3	AlGaInP	625	Water Clear	1000	1800	40°	
APED3528SECK/J4	AlGaInP	605	Water Clear	1000	1700	40°	
APED3528SYCK-F01	AlGaInP	590	Water Clear	300	500	40°	
APED3528SYCK/J3	AlGaInP	590	Water Clear	700	1300	40°	
APED3528CGCK-F01	AlGaInP	570	Water Clear	80	200	40°	3.5mm x 2.8mm x 3.2mm (Dome Lens) APED3528CGCK-F01 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APED3528ZGCK-F01	InGaN	525	Water Clear	1000	1500	40°	
APED3528QBC/D-F01	InGaN	465	Water Clear	300	400	40°	
APED3528VBC/D	InGaN	470	Water Clear	400	550	40°	

RIGHT ANGLE SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APGA1602SEC/E/KA	AlGaInP	624	Water Clear	55	120	150°(H) 120°(V)	1.6mm x 0.2mm x 0.9mm (Right Angle)  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APGA1602SYC/KA	AlGaInP	589	Water Clear	40	75	160°(H) 120°(V)	
APGA1602CGC/KA	AlGaInP	571	Water Clear	12	30	160°(H) 145°(V)	
APA1606SURCK	AlGaInP	630	Water Clear	40	80	110°	1.6mm x 0.6mm x 1.2mm (0602 Right Angle)  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APA1606SECK	AlGaInP	601	Water Clear	80	180	110°	
APA1606SYCK	AlGaInP	590	Water Clear	80	150	110°	
APA1606SGC	GaP	568	Water Clear	5	12	110°	
APA1606CGCK	AlGaInP	570	Water Clear	20	50	110°	
APA1606ZGCK	InGaIn	525	Water Clear	200	300	110°	
APA1606QBC/D	InGaIn	465	Water Clear	40	80	110°	
APA2107SRCPRV	GaAlAs	640	Water Clear	12	30	120°	2.1mm x 0.6mm x 1.0mm (0802 Right Angle)  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APA2107SURCK	AlGaInP	630	Water Clear	40	80	120°	
APA2107SECK/J3-PRV	AlGaInP	625	Water Clear	200	380	120°	
APA2107SECK/J4-PRV	AlGaInP	605	Water Clear	400	550	120°	
APA2107SECK	AlGaInP	601	Water Clear	80	180	120°	
APA2107SYCK	AlGaInP	590	Water Clear	80	150	120°	
APA2107SYCK/J3-PRV	AlGaInP	590	Water Clear	200	350	120°	
APA2107CGCK	AlGaInP	570	Water Clear	20	50	120°	
APA2107ZGCK	InGaIn	525	Water Clear	200	300	120°	
APA2107QBC/D	InGaIn	465	Water Clear	40	80	120°	
APA2107VBC/D	InGaIn	470	Water Clear	120	200	120°	
AA2810ASURSK	AlGaInP	630	Water Clear	40	100	110°	2.8mm x 0.8mm x 1.2mm (Right Angle)  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
AA2810ASESK/J3	AlGaInP	625	Water Clear	300	500	110°	
AA2810ASESK	AlGaInP	601	Water Clear	120	250	110°	
AA2810ASYSK/J3	AlGaInP	590	Water Clear	300	550	110°	
AA2810ACGSK	AlGaInP	570	Water Clear	20	60	110°	
AA2810AZGSK	InGaIn	525	Water Clear	400	600	110°	
AA2810AQBS/D	InGaIn	465	Water Clear	80	150	110°	

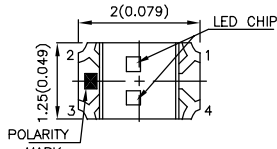
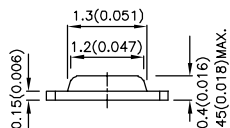
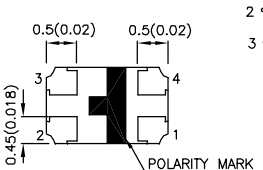
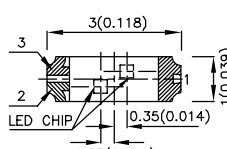
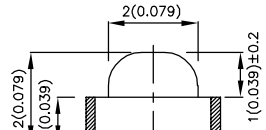
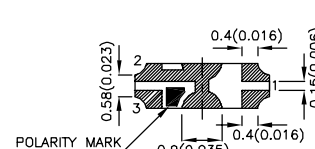
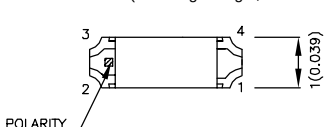
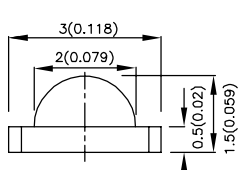
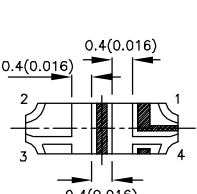
RIGHT ANGLE SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APA3010SRCPRV-GX	GaAlAs	640	Water Clear	12	30	120°	3.0mm x 1.0mm x 2.0mm (1104 Right Angle)  APA3010  Units : mm(inch) Tolerance : $\pm 0.15(0.006)$
APA3010SURCK-GX	AlGaInP	630	Water Clear	40	80	120°	
APA3010SECK-GX	AlGaInP	601	Water Clear	80	180	120°	
APA3010SYCK-GX	AlGaInP	590	Water Clear	80	150	120°	
APA3010CGCK-GX	AlGaInP	570	Water Clear	20	50	120°	
APA3010ZGCK-GX	InGaN	525	Water Clear	200	300	120°	
APA3010QBC/D-GX	InGaN	465	Water Clear	40	80	120°	
APDA3020SECK/J3-PF	AlGaInP	625	Water Clear	2300	3800	10°	3.0mm x 2.0mm x 2.8mm (1108 Right Angle)  APDA3020  Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APDA3020SECK/J4-PF	AlGaInP	605	Water Clear	2700	4500	10°	
APDA3020SYCK/J3-PF	AlGaInP	590	Water Clear	1900	3000	10°	
APDA3020ZGCK	InGaN	525	Water Clear	1000	1400	10°	
APDA3020VBC/D	InGaN	470	Water Clear	500	800	10°	
AA4040SRS	GaAlAs	640	Water Clear	20	60	120°	4.0mm x 4.0mm x 3.6mm (Right Angle)  AA4040  Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AA4040SURSK	AlGaInP	630	Water Clear	80	150	120°	
AA4040SESK	AlGaInP	601	Water Clear	80	220	120°	
AA4040SYSK	AlGaInP	590	Water Clear	120	250	120°	
AA4040CGSK	AlGaInP	570	Water Clear	40	90	120°	
AA4040ZGSK	InGaN	525	Water Clear	400	750	120°	
AA4040QBS/D	InGaN	465	Water Clear	80	220	120°	

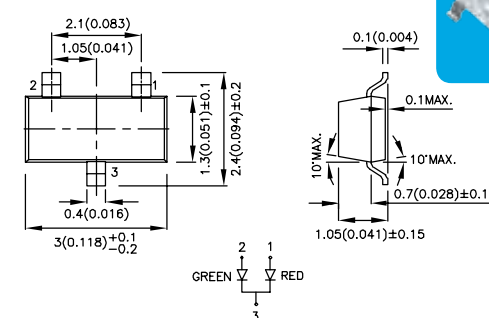
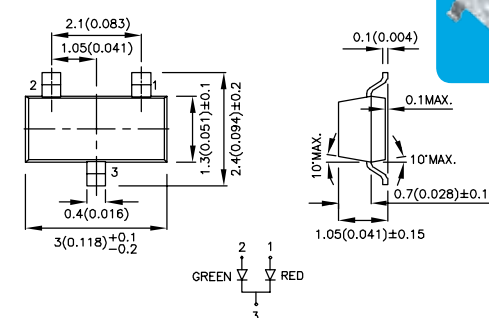
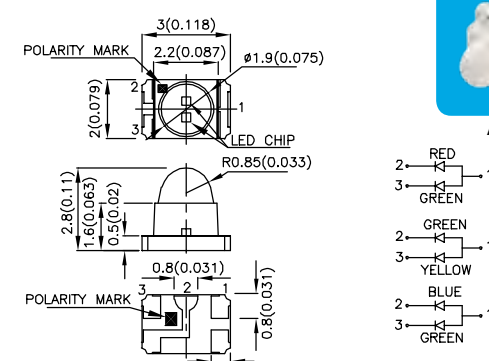
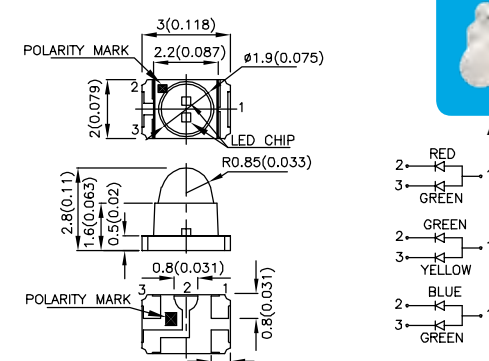
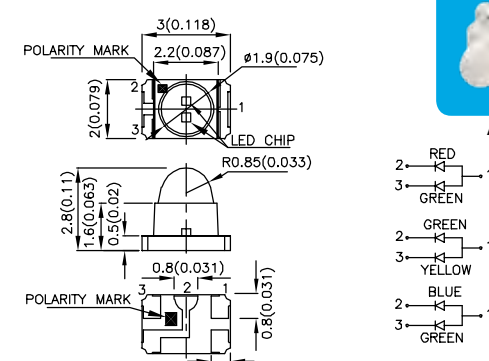
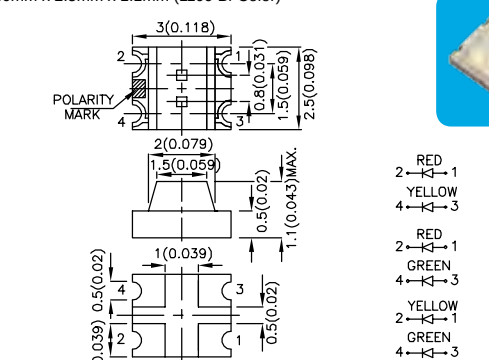
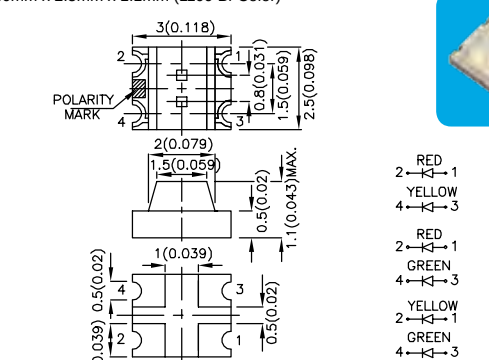
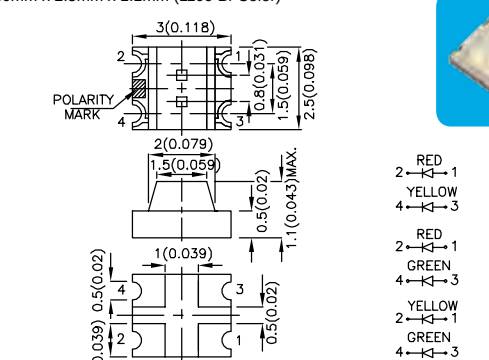
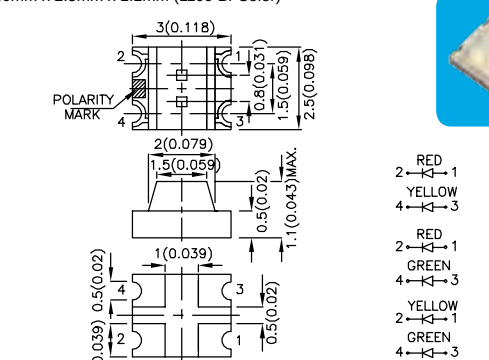
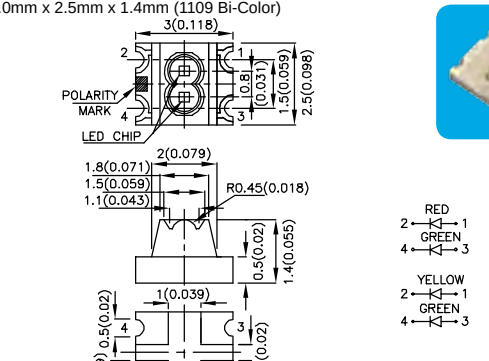
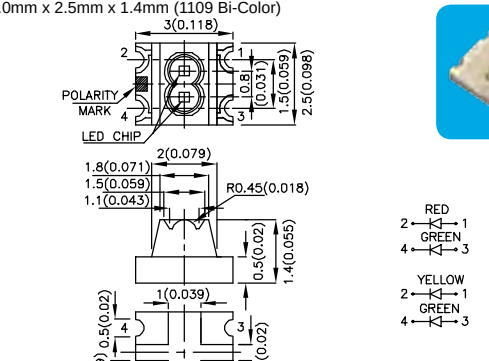
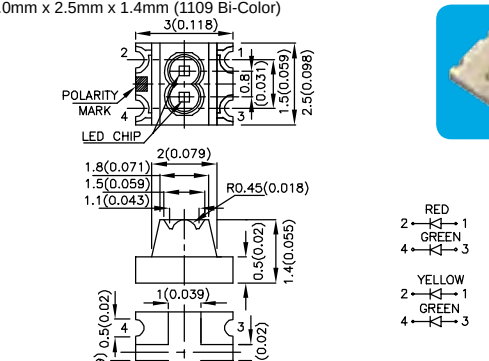
MULTI-COLOR SMD LED

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) Units : mm(inch) Tolerance : ±0.15(0.006)	
APHB1608CGKSURKC	AlGaInP	630		40	90			130°
APHB1608CGKSYKC	AlGaInP	570	Water Clear	20	50	130°		
	AlGaInP	630		40	90			
APHB1608ZGKSURKC	AlGaInP	590	Water Clear	20	50	130°		
	AlGaInP	590		80	150			
APHB1608ZGKSYKC	InGaN	525	Water Clear	200	350	130°		
	AlGaInP	630		40	90			
APHB1608QBDSURKC	InGaN	465	Water Clear	200	350	130°		
	AlGaInP	590		80	150			
APHB1608QBDSYKC	InGaN	465	Water Clear	40	70	130°		
	AlGaInP	630		40	90			
APHB1608QBDCGKC	InGaN	465	Water Clear	40	70	130°		
	AlGaInP	570		40	90			
APTB1612ESGC-F01	GaAsP/GaP	617	Water Clear	3	7	120°	1.6mm x 1.25mm x 0.65mm (0605 Bi-Color) Units : mm(inch) Tolerance : ±0.2(0.008)	
	APTB1612SURKCGKC-F01	AlGaInP		630	40			80
APTB1612SURKQBDC-F01	AlGaInP	570	Water Clear	20	50	120°		
	AlGaInP	570		20	50			
APTB1612YSGC-F01	GaAsP/GaP	588	Water Clear	40	80	120°		
	GaP	465		40	80			
APTB1612SYKCGKC-F01	GaAsP/GaP	588	Water Clear	3	8	120°		
	GaP	568		5	12			
APTB1615ESGC-F01	AlGaInP	590	Water Clear	80	120	120°		1.6mm x 1.5mm x 0.7mm (0606 Bi-Color) Units : mm(inch) Tolerance : ±0.2(0.008)
	APTB1615SURKCGKC-F01	AlGaInP		630	40			
APTB1615SURKQBDC-F01	AlGaInP	570	Water Clear	20	50	120°		
	AlGaInP	570		20	50			
APTB1615YSGC-F01	GaAsP/GaP	588	Water Clear	3	8	120°		
	GaP	568		5	12			
APTB1615SYKCGKC-F01	GaAsP/GaP	588	Water Clear	3	8	120°		
	GaP	568		5	12			
APTF1616SEEGQBDC	AlGaInP	621	Water Clear	55	110	120°	1.6mm x 1.6mm x 0.7mm (Full Color) Units : mm(inch) Tolerance : ±0.2(0.008)	
	APTF1616SEEGQBDC	InGaN		525	120			
APTF1616SEEGQBDC	InGaN	465		40	70			

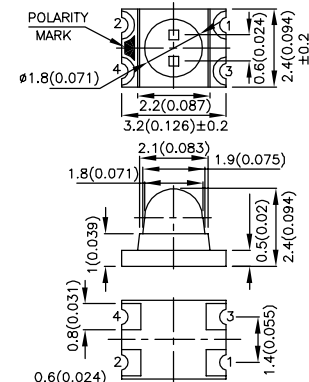
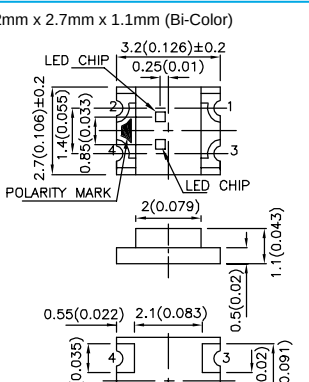
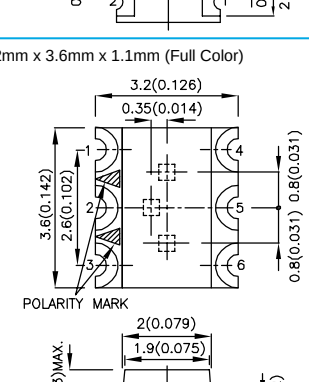
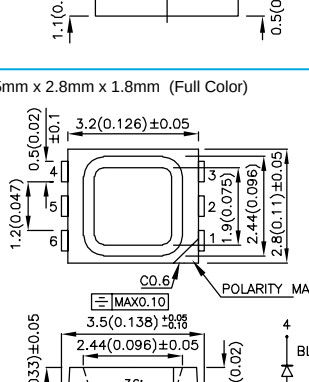
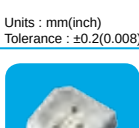
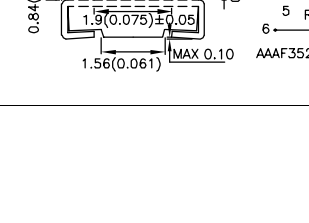
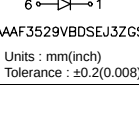
MULTI-COLOR SMD LED

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APHBM2012SURKCGKC	AlGaInP	630	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)     APHBM2012 RED 1 GREEN 3 GREEN 2 ORANGE 4 BLUE 1 RED 3 BLUE 2 GREEN 4 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		20	50		
APHBM2012CGKSEKC	AlGaInP	570	Water Clear	20	50	120°	
	AlGaInP	601		80	180		
APHBM2012CGKSYKC	AlGaInP	570	Water Clear	20	50	120°	
	AlGaInP	590		80	120		
APHBM2012QBDSURKC	InGaIn	465	Water Clear	40	80	120°	
	AlGaInP	630		40	80		
APHBM2012QBDCGKC	InGaIn	465	Water Clear	40	80	120°	
	AlGaInP	570		20	50		
APBA3010EYC-GX	GaAsP/GaP	617	Water Clear	3	8	140°	3.0mm x 1.0mm x 2.0mm (1104 Right Angle, Bi-Color)     APBA3010 YELLOW 3 RED 2 GREEN 3 RED 2 GREEN 3 YELLOW 2 Units : mm(inch) Tolerance : $\pm 0.15(0.006)$
	GaAsP/GaP	588		5	8		
APBA3010ESGC-GX	GaAsP/GaP	617	Water Clear	3	8	140°	
	GaP	568		5	15		
APBA3010YSGC-GX	GaAsP/GaP	588	Water Clear	5	8	140°	
	GaP	568		5	15		
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		
APFA3010SEEZQBDC	AlGaInP	621	Water Clear	80	140	120°	3.0mm x 1.0mm x 1.5mm (1104 Right Angle, Full Color)     APFA3010 GREEN 3 BLUE 2 RED 1 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
	InGaIn	525		200	300		
	InGaIn	465		40	70		

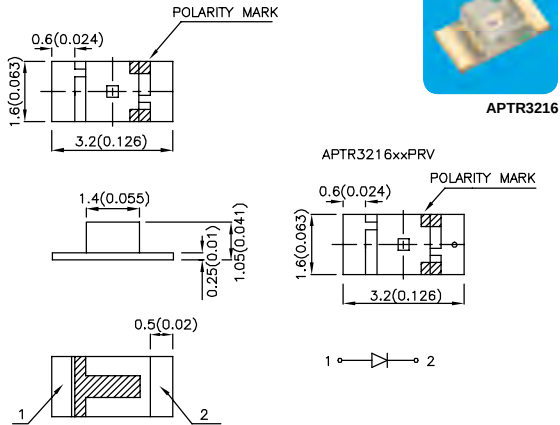
MULTI-COLOR SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
AM23ESGC	GaAsP/GaP	617	Water Clear	3	5	140°	SOT-23 Surface Mount LED Lamp (3mm x 1.3mm) 
	GaP	568		5	10		
AM23ESGW	GaAsP/GaP	617	White Diffused	3	5	140°	SOT-23 Surface Mount LED Lamp (3mm x 1.3mm) 
	GaP	568		5	9		
APBDA3020SURKCGKC-GX	AlGaInP	630	Water Clear	120	300	15°	3.0mm x 2.0mm x 2.8mm (Right Angle, Dome Lens) 
	AlGaInP	570		120	300		
APBDA3020CGKSYKC-GX	AlGaInP	570	Water Clear	120	280	15°	3.0mm x 2.0mm x 2.8mm (Right Angle, Dome Lens) 
	AlGaInP	590		400	700		
APBDA3020QBDCGKC-GX	InGaIn	465	Water Clear	120	300	15°	3.0mm x 2.0mm x 2.8mm (Right Angle, Dome Lens) 
	AlGaInP	570		120	300		
APB3025EYC-F01	GaAsP/GaP	617	Water Clear	3	8	120°	3.0mm x 2.5mm x 1.1mm (1109 Bi-Color) 
	GaAsP/GaP	588		5	10		
APB3025ESGC-F01	GaAsP/GaP	617	Water Clear	3	8	120°	3.0mm x 2.5mm x 1.1mm (1109 Bi-Color) 
	GaP	568		8	15		
APB3025SURKCGKC-F01	AlGaInP	630	Water Clear	40	70	120°	3.0mm x 2.5mm x 1.1mm (1109 Bi-Color) 
	AlGaInP	570		20	60		
APB3025YSGC-F01	GaAsP/GaP	588	Water Clear	5	10	120°	3.0mm x 2.5mm x 1.1mm (1109 Bi-Color) 
	GaP	568		8	15		
APBL3025ESGC-F01	GaAsP/GaP	617	Water Clear	8	15	100°	3.0mm x 2.5mm x 1.4mm (1109 Bi-Color) 
	GaP	568		12	20		
APBL3025SURKCGK-F01	AlGaInP	630	Water Clear	80	200	100°	3.0mm x 2.5mm x 1.4mm (1109 Bi-Color) 
	AlGaInP	570		55	120		
APBL3025YSGC-F01	GaAsP/GaP	588	Water Clear	5	15	100°	3.0mm x 2.5mm x 1.4mm (1109 Bi-Color) 
	GaP	568		12	20		

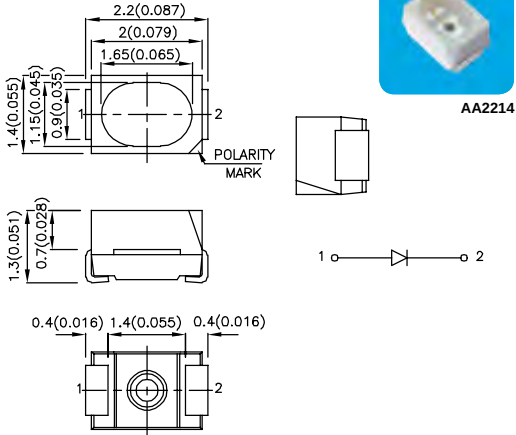
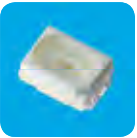
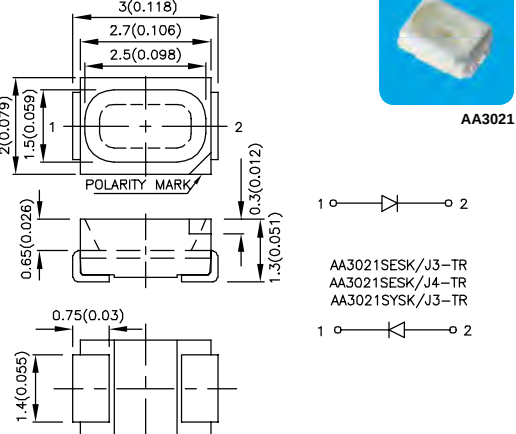
MULTI-COLOR SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APBD3224ESGC-F01	GaAsP/GaP	617	Water Clear	12	40	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)   APBD3224 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	GaP	568		20	55		
APBD3224SURKCGKC-F01	AlGaInP	630	Water Clear	120	400	20°	  APBD3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		80	280		
APBD3224SYKCGKC-F01	AlGaInP	590	Water Clear	400	800	20°	  APBD3229 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		80	280		
APB3227SEKCGKC	AlGaInP	601	Water Clear	80	180	100°	  APB3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		20	55		
APB3227SURKCGKC	AlGaInP	630	Water Clear	40	80	100°	  APB3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		20	55		
APB3227SURKZGKC	AlGaInP	630	Water Clear	40	80	100°	 APB3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	InGaN	525		200	350		
APB3227SYKCGKC	AlGaInP	590	Water Clear	80	150	100°	 APB3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	AlGaInP	570		20	55		
APB3227ZGKQBDC	InGaN	525	Water Clear	200	350	100°	 APB3227 Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
	InGaN	465		55	100		
APF3236SEEZGQBDC	AlGaInP	621	Water Clear	80	140	120°	3.2mm x 3.6mm x 1.1mm (Full Color) APF3236 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
	InGaN	525		200	330		
	InGaN	465		40	70		
AAAF3529SEEZGQBDS	AlGaInP	621	Water Clear	80	180	120°	3.5mm x 2.8mm x 1.8mm (Full Color) AAAF3529 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
	InGaN	525		400	580		
	InGaN	465		80	130		
AAAF3529VBDSEJ3ZGS	InGaN	470	Water Clear	200	300	120°	 AAAF3529 Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
	AlGaInP	625		400	560		
	InGaN	525		400	580		

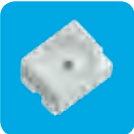
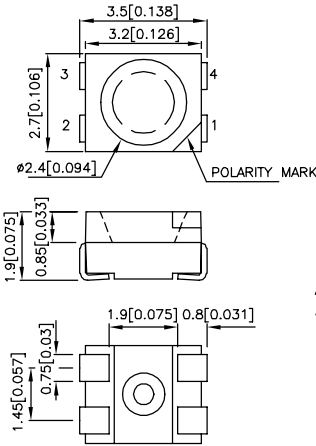
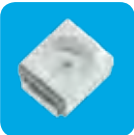
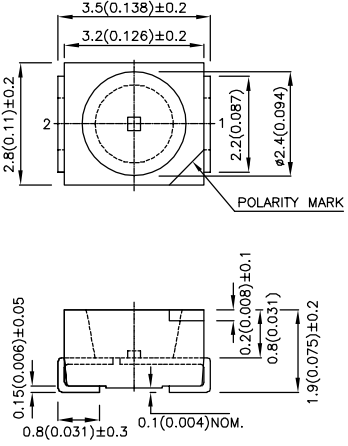
REVERSE MOUNT SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APTR3216EC	GaAsP/GaP	617	Water Clear	3	8	120°	3.2mm x 1.6mm x 1.05mm (1206 Reverse Mount)   Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
APTR3216SRCPRV	GaAlAs	640	Water Clear	12	30	120°	
APTR3216SURCK	AlGaInP	630	Water Clear	40	80	120°	
APTR3216SECK	AlGaInP	601	Water Clear	80	180	120°	
APTR3216YC	GaAsP/GaP	588	Water Clear	3	8	120°	
APTR3216SYCK	AlGaInP	590	Water Clear	80	150	120°	
APTR3216SGC	GaP	568	Water Clear	5	12	120°	
APTR3216CGCK	AlGaInP	570	Water Clear	20	50	120°	
APTR3216ZGCK	InGaN	525	Water Clear	200	350	120°	
APTR3216QBC/D	InGaN	465	Water Clear	40	100	120°	

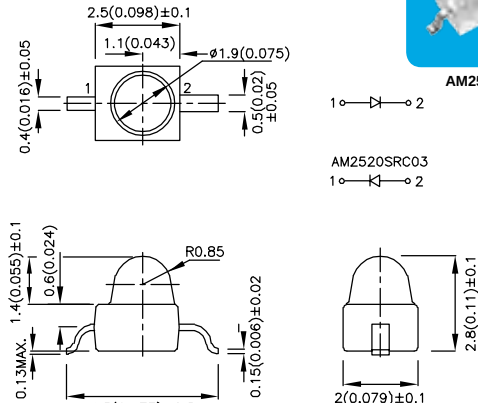
TOP-EMITTING PLCC SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AA2214SURSK	AlGaInP	630	Water Clear	55	100	120°	2.2mm x 1.4mm x 1.3mm   Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
AA2214SESK	AlGaInP	601	Water Clear	80	180	120°	
AA2214SYSK	AlGaInP	590	Water Clear	120	250	120°	
AA2214CGSK	AlGaInP	570	Water Clear	40	70	120°	
AA2214ZGSK	InGaN	525	Water Clear	400	650	120°	
AA2214QBS/D	InGaN	465	Water Clear	80	150	120°	
AA3021ES	GaAsP/GaP	617	Water Clear	8	18	125°	3.0mm x 2.0mm x 1.3mm   Units : mm(inch) Tolerance : $\pm 0.2(0.008)$
AA3021SURSK	AlGaInP	630	Water Clear	40	90	125°	
AA3021SESK/J3-TR	AlGaInP	625	Water Clear	300	450	125°	
AA3021SESK/J4-TR	AlGaInP	605	Water Clear	400	700	125°	
AA3021SESK	AlGaInP	601	Water Clear	120	300	125°	
AA3021YS	GaAsP/GaP	588	Water Clear	8	15	125°	
AA3021SYSK	AlGaInP	590	Water Clear	120	200	125°	
AA3021SYSK/J3-TR	AlGaInP	590	Water Clear	300	500	125°	
AA3021SGS	GaP	568	Water Clear	12	20	125°	
AA3021CGSK	AlGaInP	570	Water Clear	40	80	125°	
AA3021ZGSK	InGaN	525	Water Clear	400	700	125°	
AA3021QBS/D	InGaN	465	Water Clear	80	120	125°	
AA3021VBS/D	InGaN	470	Water Clear	200	450	125°	

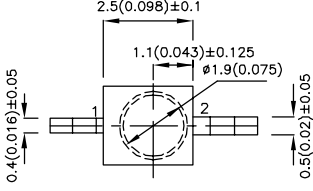
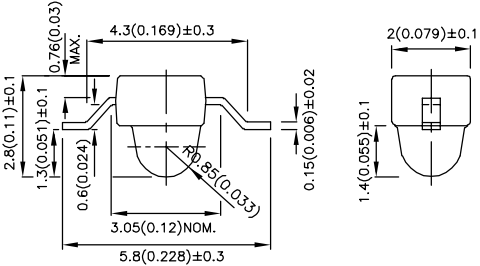
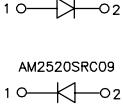
TOP-EMITTING PLCC SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA*30mA**50mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
AA3527ASURS-50MAV	AlGaInP	630	Water Clear	**120	**280	120°	3.5mm x 2.7mm x 1.9mm  AA3527A  POLARITY MARK 2  1,3,4 AA3527ASESK/J3-50MAV AA3527ASYSK/J3-50MAV 2  1,3,4 Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AA3527ASESK/J3-50MAV	AlGaInP	625	Water Clear	**1000	**1500	120°	
AA3527ASESK-50MAV	AlGaInP	601	Water Clear	**200	**400	120°	
AA3527ASYSK/J3-50MAV	AlGaInP	590	Water Clear	**1000	**1500	120°	
AA3527AZGSK-30MAV	InGaIn	525	Water Clear	*500	*700	120°	
AA3527AVBS/D-30MAV	InGaIn	470	Water Clear	*300	*600	120°	
AA3528EC	GaAsP/GaP	617	Water Clear	8	12	120°	3.5mm x 2.8mm x 1.9mm  AA3528  POLARITY MARK 2  1 AA3528SESK/J3 AA3528SESK/J4 AA3528SYSK/J3 2  1 Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AA3528SURCK	AlGaInP	630	Water Clear	55	100	120°	
AA3528SESK/J3	AlGaInP	625	Water Clear	300	450	120°	
AA3528SESK/J4	AlGaInP	605	Water Clear	500	800	120°	
AA3528SECK	AlGaInP	601	Water Clear	120	230	120°	
AA3528YC	GaAsP/GaP	588	Water Clear	8	15	120°	
AA3528SYCK	AlGaInP	590	Water Clear	80	200	120°	
AA3528SYSK/J3	AlGaInP	590	Water Clear	200	450	120°	
AA3528SGC	GaP	568	Water Clear	12	25	120°	
AA3528CGCK	AlGaInP	570	Water Clear	40	100	120°	
AA3528ZGCK	InGaIn	525	Water Clear	300	500	120°	
AA3528QBS/D	InGaIn	465	Water Clear	80	150	120°	
AA3528VBS/D	InGaIn	470	Water Clear	300	450	120°	

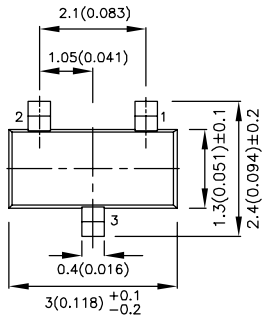
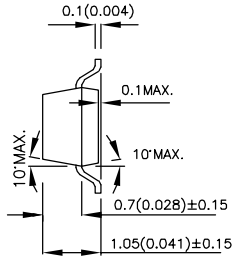
SUBMINIATURE SMD LED

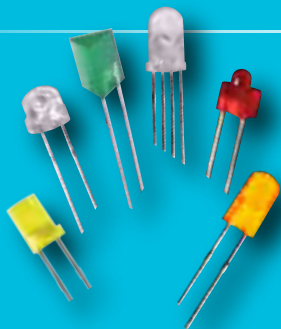
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
AM2520EC03	GaAsP/GaP	617	Water Clear	20	50	20°	Subminiature Solid State Lamps Gull Wing Lead  AM2520xxx03  1  2 AM2520SRC03 1  2 Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AM2520SRC03	GaAlAs	640	Water Clear	300	600	20°	
AM2520SURCK03	AlGaInP	630	Water Clear	500	1000	20°	
AM2520SECK03	AlGaInP	601	Water Clear	1000	1800	20°	
AM2520YC03	GaAsP/GaP	588	Water Clear	20	50	20°	
AM2520SYCK03	AlGaInP	590	Water Clear	1300	2300	20°	
AM2520SGC03	GaP	568	Water Clear	40	90	20°	
AM2520CGCK03	AlGaInP	570	Water Clear	400	800	20°	
AM2520ZGCK03	InGaIn	525	Water Clear	1600	2700	20°	
AM2520QBC/D03	InGaIn	465	Water Clear	300	900	20°	

SUBMINIATURE SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AM2520EC09	GaAsP/GaP	617	Water Clear	20	50	20°	Subminiature Solid State Lamps Z-Bend Lead  AM2520xxx09    Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AM2520SRC09	GaAlAs	640	Water Clear	300	600	20°	
AM2520SURCK09	AlGaInP	630	Water Clear	500	1000	20°	
AM2520SECK09	AlGaInP	601	Water Clear	1000	1800	20°	
AM2520YC09	GaAsP/GaP	588	Water Clear	20	50	20°	
AM2520SYCK09	AlGaInP	590	Water Clear	1300	2300	20°	
AM2520SGC09	GaP	568	Water Clear	40	90	20°	
AM2520CGCK09	AlGaInP	570	Water Clear	400	800	20°	
AM2520ZGCK09	InGaN	525	Water Clear	1600	2700	20°	
AM2520QBC/D09	InGaN	465	Water Clear	300	900	20°	

SOT-23 SMD LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AM23EC-F	GaAsP/GaP	617	Water Clear	3	5	140°	SOT-23 Surface Mount LED Lamp (3mm x 1.3mm)  AM23-F   1 ANODE 2 N.C. 3 CATHODE Units : mm(inch) Tolerance : $\pm 0.25(0.01)$
AM23ID-F	GaAsP/GaP	617	Red Diffused	3	7	140°	
AM23YC-F	GaAsP/GaP	588	Water Clear	3	8	140°	
AM23YD-F	GaAsP/GaP	588	Yellow Diffused	3	8	140°	
AM23SGC-F	GaP	568	Water Clear	5	10	140°	
AM23SGD3-F	GaP	568	Green Diffused	3	8	140°	



Through-Hole LED

Round LED	21
Oval LED	24
Rectangular LED	24
Cylindrical LED	26
Multi-Color LED	26
Low Current LED	28
Resistor LED	29
Blinking LED	29

Description

Kingbright through-hole LEDs are offered in variety of packages in different size, shape, viewing angle, color combinations, lens types and brightness. The extensive selections virtually fulfill all the needs in through-hole LED applications.

Kingbright also provides value added processes such as customized lead forming/cutting, tape-and-reel/tape-and-box packaging for automated insertion upon request.

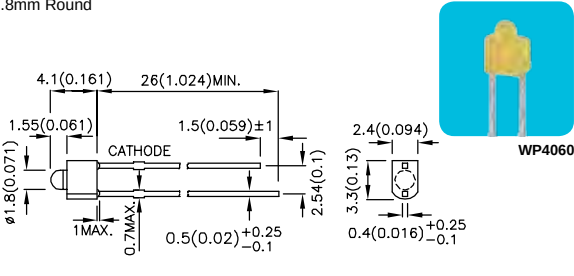
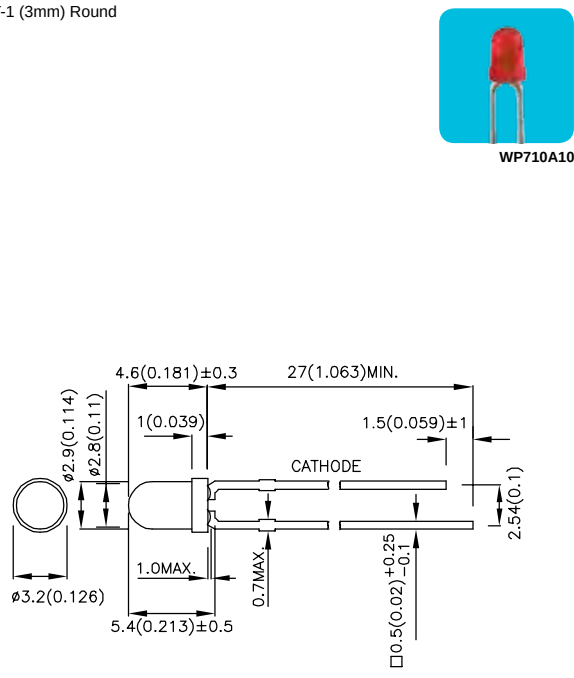
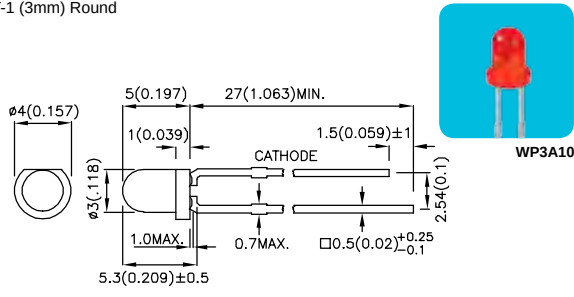
Features and Benefits

- High volume, robust reliability, cost-efficient solution
- Shape options include round, oval, cylindrical, rectangular with various sizes available in each type
- Lens types available in water clear, color transparent, white or color diffused
- Colors are available in blue, green, yellow, orange, red and others
- Special option featuring resistor LED, blinking LED, low current/voltage sorted LED and customized lead forming/cutting
- Wired version is available for panel mounting
- Standard packaging is in bulk. Tape-and reel and tape-and box packaging options are available



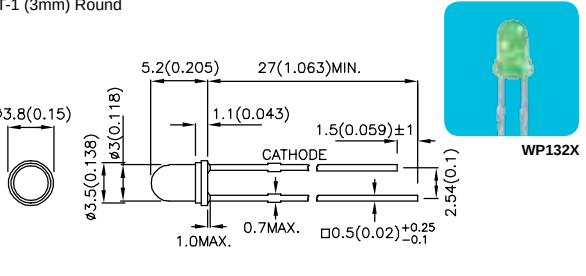
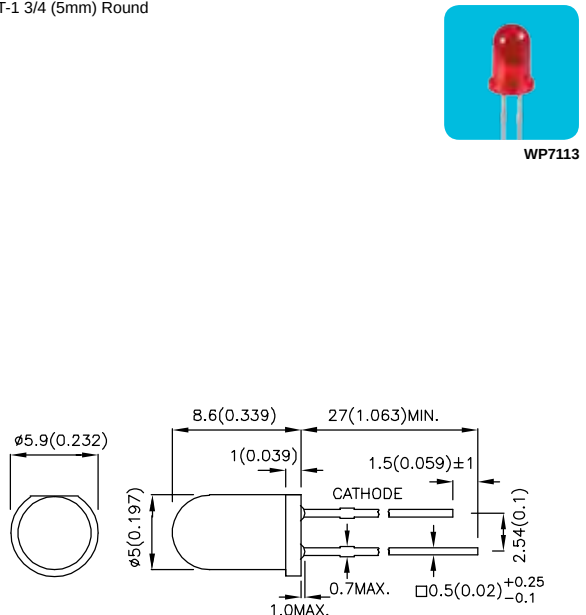
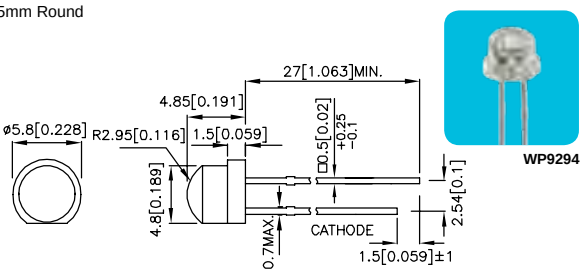
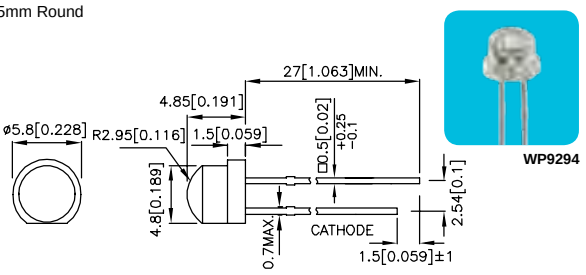
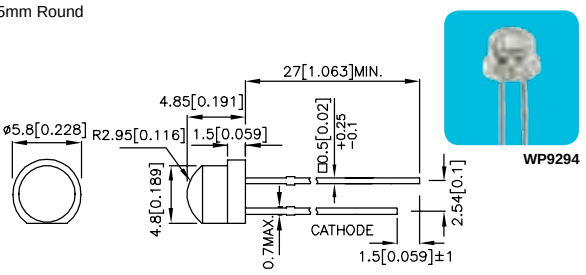
THROUGH-HOLE LED

ROUND LED

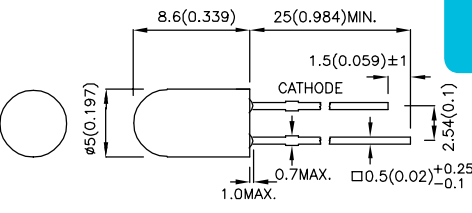
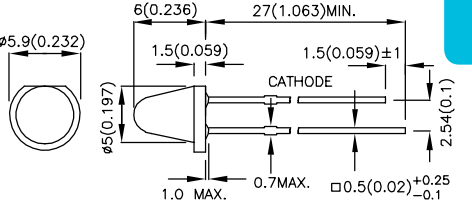
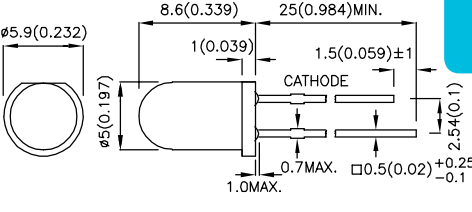
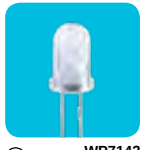
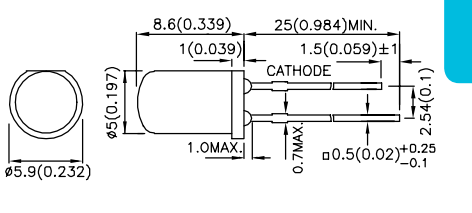
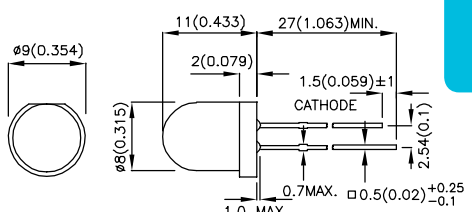
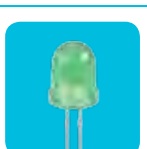
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP4060ED	GaAsP/GaP	617	Orange Diffused	4	8	70°	1.8mm Round 
WP4060ID	GaAsP/GaP	617	Red Diffused	4	8	70°	
WP4060SRD	GaAlAs	640	Red Diffused	*30	*80	70°	
WP4060YD	GaAsP/GaP	588	Yellow Diffused	4	8	70°	
WP4060GD	GaP	568	Green Diffused	6	12	70°	
WP710A10ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Round 
WP710A10IT	GaAsP/GaP	617	Red Transparent	12	30	34°	
WP710A10EC	GaAsP/GaP	617	Water Clear	12	30	34°	
WP710A10ND	GaAsP/GaP	602	Orange Diffused	10	20	40°	
WP710A10NC	GaAsP/GaP	602	Water Clear	12	30	34°	
WP710A10YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP710A10YT	GaAsP/GaP	588	Yellow Transparent	10	30	34°	
WP710A10YC	GaAsP/GaP	588	Water Clear	10	30	34°	
WP710A10GD	GaP	568	Green Diffused	10	25	40°	
WP710A10GT	GaP	568	Green Transparent	12	40	34°	
WP710A10GC	GaP	568	Water Clear	12	40	34°	
WP710A10SRC/D	GaAlAs	640	Water Clear	*120	*240	34°	
WP710A10SRD/D	GaAlAs	640	Red Diffused	*70	*140	40°	
WP710A10SRD/E	GaAlAs	640	Red Diffused	*80	*150	40°	
WP710A10SRD/F	GaAlAs	640	Red Diffused	*90	*160	40°	
WP710A10SRC/J4	AlGaInP	640	Water Clear	*750	*1500	34°	
WP710A10SRD/J4	AlGaInP	640	Red Diffused	*200	*500	40°	
WP710A10SURC/E	AlGaInP	630	Water Clear	*180	*400	34°	
WP710A10SEC/J3	AlGaInP	625	Water Clear	*1300	*2400	34°	
WP710A10SECK/J3	AlGaInP	625	Water Clear	*1000	*1600	34°	
WP710A10SEC/E	AlGaInP	621	Water Clear	*400	*900	34°	
WP710A10SECK/J4	AlGaInP	605	Water Clear	*1500	*3000	34°	
WP710A10SED	AlGaInP	601	Orange Diffused	*300	*650	40°	
WP710A10SET	AlGaInP	601	Orange Transparent	*350	*800	34°	
WP710A10SEC	AlGaInP	601	Water Clear	*350	*800	34°	
WP710A10SYD	AlGaInP	590	Yellow Diffused	*480	*900	40°	
WP710A10SYT	AlGaInP	590	Yellow Transparent	*700	*1200	34°	
WP710A10SYC	AlGaInP	590	Water Clear	*700	*1200	34°	
WP710A10SYC/J3	AlGaInP	590	Water Clear	*1600	*2800	34°	
WP710A10SYCK/J3	AlGaInP	590	Water Clear	*1600	*2600	34°	
WP710A10SGD	GaP	568	Green Diffused	*18	*40	40°	
WP710A10SGC	GaP	568	Water Clear	*30	*60	34°	
WP710A10CGCK	AlGaInP	570	Water Clear	*150	*330	34°	
WP710A10ZGCK	InGaIn	525	Water Clear	*5000	*8000	34°	
WP710A10ZGC/G	InGaIn	525	Water Clear	*8000	*14000	34°	
WP710A10QBC/D	InGaIn	465	Water Clear	*900	*1600	20°	
WP710A10VBC/D	InGaIn	470	Water Clear	*2100	*3700	20°	
WP3A10HD	GaP	635	Red Diffused	0.6	1.8	60°	T-1 (3mm) Round 
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°	

NOTES: 1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (0.01") unless otherwise noted.

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°	
WP132XNC	GaAsP/GaP	602	Water Clear	10	20	50°	
WP132XYD	GaAsP/GaP	588	Yellow Diffused	6	15	60°	
WP132XYT	GaAsP/GaP	588	Yellow Transparent	10	20	50°	
WP132XYC	GaAsP/GaP	588	Water Clear	10	20	50°	
WP132XGD	GaP	568	Green Diffused	15	25	60°	
WP132XGT	GaP	568	Green Transparent	20	40	50°	
WP132XGC	GaP	568	Water Clear	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°	
WP7113ND	GaAsP/GaP	602	Orange Diffused	12	30	30°	
WP7113NC	GaAsP/GaP	602	Water Clear	30	70	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	*900	*1800	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°	
WP7113SURC	AlGaInP	630	Water Clear	*1000	*1400	20°	
WP7113SURC/E	AlGaInP	630	Water Clear	*1100	*1500	20°	
WP7113SEC/J3	AlGaInP	625	Water Clear	*5000	*8000	20°	
WP7113SECK/J3	AlGaInP	625	Water Clear	*3600	*6000	20°	
WP7113SEC/E	AlGaInP	621	Water Clear	*1500	*2300	20°	
WP7113SECK/J4	AlGaInP	605	Water Clear	*4500	*7000	20°	
WP7113SED	AlGaInP	601	Orange Diffused	*600	*1000	30°	
WP7113SET	AlGaInP	601	Orange Transparent	*1400	*2200	20°	
WP7113SEC	AlGaInP	601	Water Clear	*1400	*2200	20°	
WP7113SYD	AlGaInP	590	Yellow Diffused	*650	*1200	30°	
WP7113SYT	AlGaInP	590	Yellow Transparent	*1900	*3100	20°	
WP7113SYC	AlGaInP	590	Water Clear	*1900	*3100	20°	
WP7113SYC/J3	AlGaInP	590	Water Clear	*4200	*6000	20°	
WP7113SYCK/J3	AlGaInP	590	Water Clear	*4000	*6000	20°	
WP7113SGD	GaP	568	Green Diffused	*18	*40	30°	5mm Round 
WP7113SGC	GaP	568	Water Clear	*120	*240	20°	
WP7113CGCK	AlGaInP	570	Water Clear	*400	*700	20°	
WP7113ZGCK	InGaIn	525	Water Clear	*7000	*12000	20°	
WP7113ZGC/G	InGaIn	525	Water Clear	*12000	*19000	20°	
WP7113QBC/D	InGaIn	465	Water Clear	*1700	*2700	16°	
WP7113VBC/D	InGaIn	470	Water Clear	*3500	*6000	20°	
WP9294SECK/J3	AlGaInP	625	Water Clear	*300	*600	130°	
WP9294SYCK/J3	AlGaInP	590	Water Clear	*300	*600	130°	5mm Round 
WP9294ZGC/G	InGaIn	525	Water Clear	*1900	*2600	60°	
WP9294QBC/G	InGaIn	465	Water Clear	*400	*700	60°	5mm Round 
WP9294QBC/G	InGaIn	465	Water Clear	*400	*700	60°	

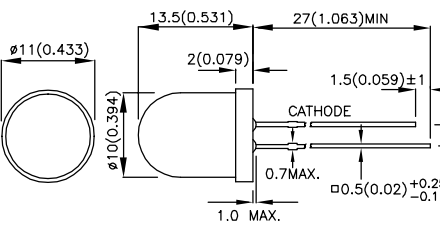
ROUND LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
WP1503ID	GaAsP/GaP	617	Red Diffused	12	40	60°	T-1 3/4 (5mm) Round  
WP1503IT	GaAsP/GaP	617	Red Transparent	25	50	30°	
WP1503EC	GaAsP/GaP	617	Water Clear	25	50	30°	
WP1503SRD	GaAlAs	640	Red Diffused	*120	*260	60°	
WP1503SRC/D	GaAlAs	640	Water Clear	*400	*800	30°	
WP1503SRC/J4	AlGaInP	640	Water Clear	*1900	*3000	30°	
WP1503YD	GaAsP/GaP	588	Yellow Diffused	15	30	60°	
WP1503YT	GaAsP/GaP	588	Yellow Transparent	20	50	30°	
WP1503YC	GaAsP/GaP	588	Water Clear	20	50	30°	
WP1503GD	GaP	568	Green Diffused	15	30	60°	
WP1503GT	GaP	568	Green Transparent	50	100	30°	
WP1503GC	GaP	568	Water Clear	50	100	30°	
WP1503SGT	GaP	568	Green Transparent	*80	*200	30°	
WP1503SGC	GaP	568	Water Clear	*80	*200	30°	
WP63ID	GaAsP/GaP	617	Red Diffused	8	12	60°	T-1 3/4 (5mm) Round  
WP63IT	GaAsP/GaP	617	Red Transparent	10	30	30°	
WP63SRD	GaAlAs	640	Red Diffused	*50	*100	60°	
WP63SRT	GaAlAs	640	Red Transparent	*120	*250	30°	
WP63SRC	GaAlAs	640	Water Clear	*120	*250	30°	
WP63YD	GaAsP/GaP	588	Yellow Diffused	5	10	60°	
WP63YT	GaAsP/GaP	588	Yellow Transparent	20	70	30°	
WP63GD	GaP	568	Green Diffused	8	16	60°	
WP63GT	GaP	568	Green Transparent	30	80	30°	
WP7143SRC/D	GaAlAs	640	Water Clear	*300	*600	30°	T-1 3/4 (5mm) Round  
WP7143SURC/E	AlGaInP	630	Water Clear	*600	*1000	30°	
WP7143SGC	GaP	568	Water Clear	*120	*300	30°	
WP7083SEDK/J3	AlGaInP	625	Orange Diffused	*500	*1100	60°	T-1 3/4 (5mm) Round  
WP7083SYDK/J3	AlGaInP	590	Yellow Diffused	*400	*900	60°	
WP7083ZGD/G	InGaN	525	Green Diffused	*1400	*2200	60°	
WP7083QBD/G	InGaN	465	Blue Diffused	*180	*360	60°	
WP793ID	GaAsP/GaP	617	Red Diffused	*30	*60	30°	8mm Round  
WP793SRC/D	GaAlAs	640	Water Clear	*500	*800	15°	
WP793SRD/D	GaAlAs	640	Red Diffused	*60	*140	30°	
WP793SRD/E	GaAlAs	640	Red Diffused	*140	*180	30°	
WP793SRC/J4	AlGaInP	640	Water Clear	*1300	*2000	15°	
WP793SRD/J4	AlGaInP	640	Red Diffused	*300	*600	30°	
WP793YD	GaAsP/GaP	588	Yellow Diffused	*20	*50	30°	
WP793GD	GaP	568	Green Diffused	*30	*60	30°	

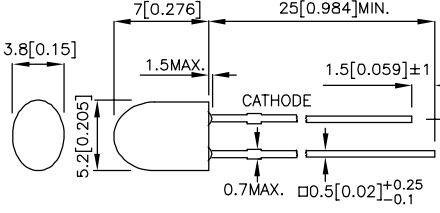
NOTES: 1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

THROUGH-HOLE LED

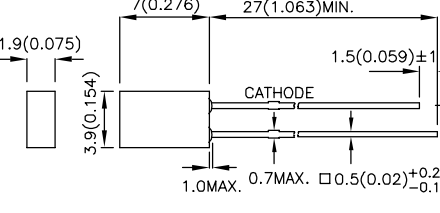
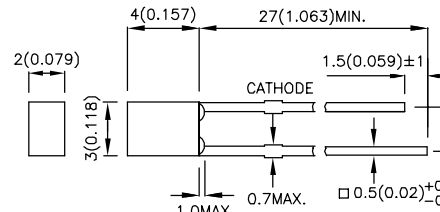
ROUND LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP813ID	GaAsP/GaP	617	Red Diffused	36	80	30°	10mm Round  
WP813SRC/D	GaAlAs	640	Water Clear	500	850	15°	
WP813SRD/D	GaAlAs	640	Red Diffused	110	180	30°	
WP813SRD/E	GaAlAs	640	Red Diffused	120	200	30°	
WP813SRC/J4	AlGaInP	640	Water Clear	1800	3000	15°	
WP813SRD/J4	AlGaInP	640	Red Diffused	300	600	30°	
WP813YD	GaAsP/GaP	588	Yellow Diffused	18	50	30°	
WP813GD	GaP	568	Green Diffused	20	60	30°	

OVAL LED

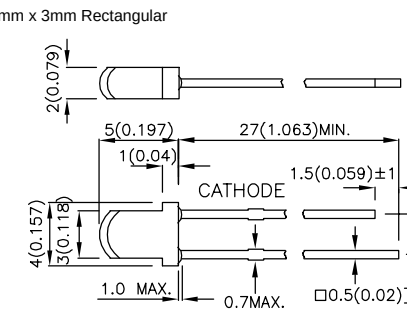
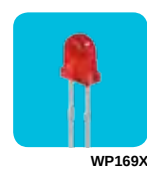
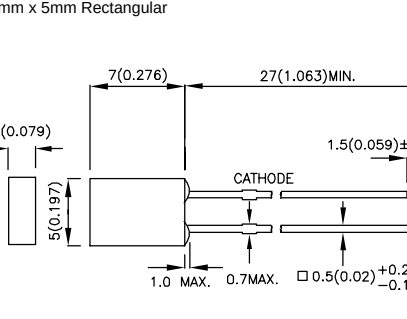
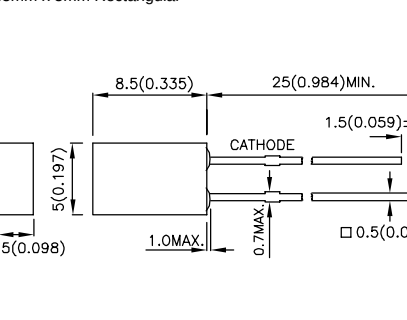
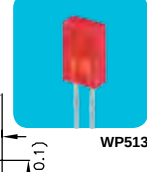
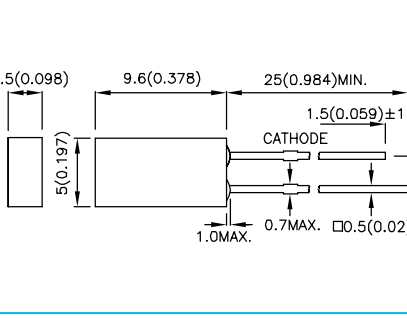
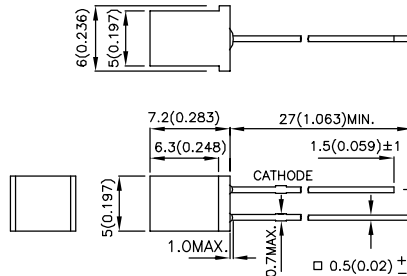
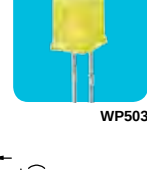
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP5603SIDLK/SD/J3	AlGaInP	625	Red Semi Diffused	1000	2000	80°(H) 40°(V)	5.2mm x 3.8mm Oval  
WP5603SYDLK/SD/J3	AlGaInP	590	Yellow Semi Diffused	600	1300	80°(H) 40°(V)	
WP5603ZGDL/SD/G	InGaIn	525	Green Semi Diffused	2300	5000	80°(H) 40°(V)	
WP5603QBDL/SD/G	InGaIn	465	Blue Semi Diffused	650	1100	80°(H) 40°(V)	

RECTANGULAR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP144IDT	GaAsP/GaP	617	Red Diffused	1.2	3	110°	1.9mm x 3.9mm Rectangular  
WP144SRDT	GaAlAs	640	Red Diffused	*20	*50	110°	
WP144EDT	GaAsP/GaP	617	Orange Diffused	1.2	3	110°	
WP144YDT	GaAsP/GaP	588	Yellow Diffused	1.5	4	110°	
WP144GDT	GaP	568	Green Diffused	2	6	110°	
WP914IDT	GaAsP/GaP	617	Red Diffused	1.2	4	100°	2mm x 3mm Rectangular  
WP914IT	GaAsP/GaP	617	Red Transparent	1.8	5	90°	
WP914GDT	GaP	568	Green Diffused	3	6	100°	
WP914GT	GaP	568	Green Transparent	3	8	90°	

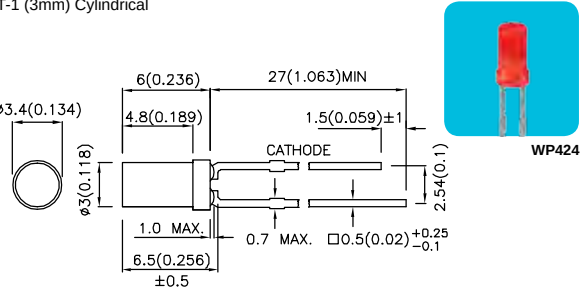
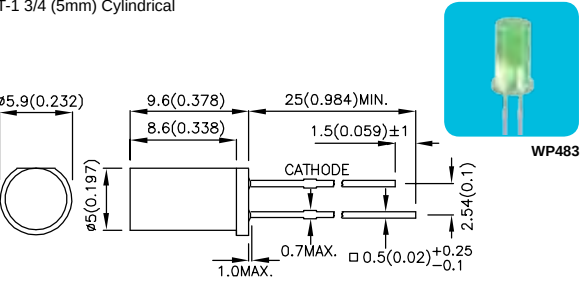
THROUGH-HOLE LED

RECTANGULAR LED

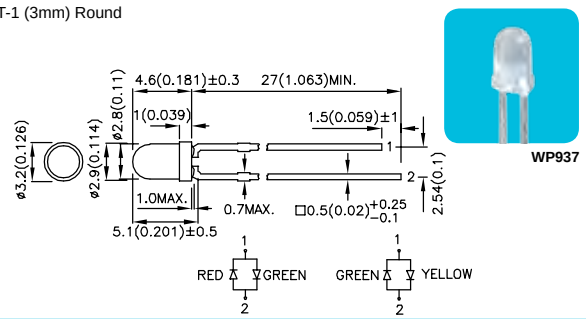
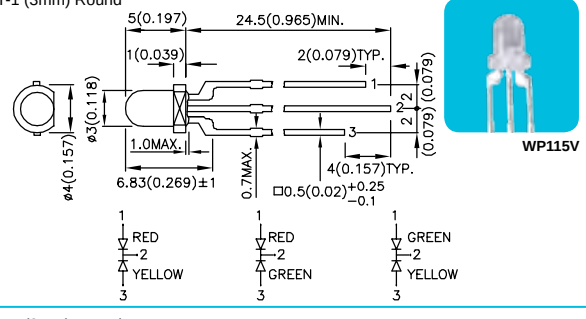
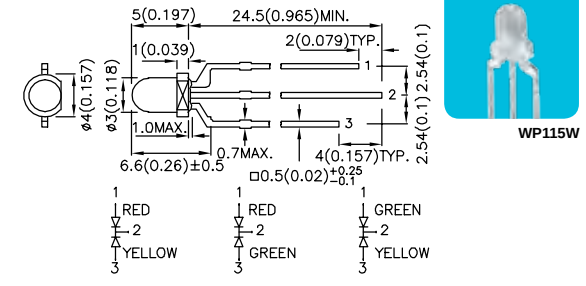
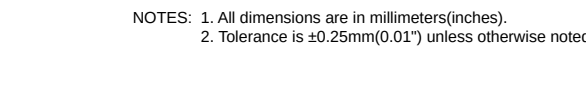
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP169XID	GaAsP/GaP	617	Red Diffused	8	14	60°	2mm x 3mm Rectangular   WP169X
WP169XYD	GaAsP/GaP	588	Yellow Diffused	5	10	60°	
WP169XGD	GaP	568	Green Diffused	8	15	60°	
WP113HDT	GaP	635	Red Diffused	0.2	0.6	110°	2mm x 5mm Rectangular   WP113
WP113IDT	GaAsP/GaP	617	Red Diffused	2	4	110°	
WP113SRDT	GaAlAs	640	Red Diffused	*10	*20	110°	
WP113EDT	GaAsP/GaP	617	Orange Diffused	2	4	110°	
WP113YDT	GaAsP/GaP	588	Yellow Diffused	1.2	4	110°	
WP113GDT	GaP	568	Green Diffused	1.2	5	110°	
WP513IDT	GaAsP/GaP	617	Red Diffused	1.2	3	110°	2.5mm x 5mm Rectangular   WP513
WP513YDT	GaAsP/GaP	588	Yellow Diffused	1.2	3	110°	
WP513GDT	GaP	568	Green Diffused	2	5	110°	
WP513SGDT	GaP	568	Green Diffused	*5	*10	110°	
WP383HDT	GaP	635	Red Diffused	0.5	1	110°	2.5mm x 5mm Rectangular   WP383
WP383IDT	GaAsP/GaP	617	Red Diffused	1.2	3	110°	
WP383SRDT	GaAlAs	640	Red Diffused	*12	*25	110°	
WP383EDT	GaAsP/GaP	617	Orange Diffused	1.2	3	110°	
WP383YDT	GaAsP/GaP	588	Yellow Diffused	1	2	110°	
WP383GDT	GaP	568	Green Diffused	1.2	4	110°	
WP503IDT	GaAsP/GaP	617	Red Diffused	1	2	110°	5mm x 5mm Square   WP503
WP503YDT	GaAsP/GaP	588	Yellow Diffused	1	3	110°	
WP503GDT	GaP	568	Green Diffused	1.5	3	110°	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

CYLINDRICAL LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
WP424HDT	GaP	635	Red Diffused	0.2	0.6	100°	T-1 (3mm) Cylindrical 
WP424IDT	GaAsP/GaP	617	Red Diffused	1.2	4	100°	
WP424SRDT	GaAlAs	640	Red Diffused	*12	*20	100°	
WP424EDT	GaAsP/GaP	617	Orange Diffused	1.2	4	100°	
WP424YDT	GaAsP/GaP	588	Yellow Diffused	1.2	3	100°	
WP424GDT	GaP	568	Green Diffused	2	6	100°	
WP483IDT	GaAsP/GaP	617	Red Diffused	1.2	4	100°	T-1 3/4 (5mm) Cylindrical 
WP483YDT	GaAsP/GaP	588	Yellow Diffused	1.2	3	100°	
WP483GDT	GaP	568	Green Diffused	1.5	3	100°	

MULTI-COLOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 201/2	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°	T-1 (3mm) Round 
	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°	T-1 (3mm) Round 
	GaP	568		10	30		
WP115VGYW	GaP	568	White Diffused	10	30	60°	T-1 (3mm) Round
	GaAsP/GaP	588		10	24		
WP115WEYW	GaAsP/GaP	617	White Diffused	12	20	60°	T-1 (3mm) Round
	GaAsP/GaP	588		10	20		
WP115WEGW	GaAsP/GaP	617	White Diffused	12	20	60°	T-1 (3mm) Round
	GaP	568		20	40		
WP115WGYW	GaP	568	White Diffused	15	40	60°	T-1 (3mm) Round
	GaAsP/GaP	588		10	20		

MULTI-COLOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP3VEYW	GaAsP/GaP	617	White Diffused	10	30	60°	T-1 (3mm) Round
	GaAsP/GaP	588		10	15		
WP3VEGW	GaAsP/GaP	617	White Diffused	10	30	60°	
	GaP	568		20	40		
WP3VGYW	GaP	568	White Diffused	15	40	60°	
	GaAsP/GaP	588		10	15		
WP57IID	GaAsP/GaP	617	Red Diffused	4	12	60°	T-1 3/4 (5mm) Round
	GaAsP/GaP	617		4	12		
WP57YYD	GaAsP/GaP	588	Yellow Diffused	6	12	60°	
	GaAsP/GaP	588		6	12		
WP57GGD	GaP	568	Green Diffused	8	20	60°	
	GaP	568		8	20		
WP57EYW	GaAsP/GaP	617	White Diffused	6	14	60°	
	GaAsP/GaP	588		4	10		
WP57EGW	GaAsP/GaP	617	White Diffused	6	14	60°	
	GaP	568		12	30		
WP57GYW	GaP	568	White Diffused	12	30	60°	
	GaAsP/GaP	588		4	10		
WP59EYW	GaAsP/GaP	617	White Diffused	20	40	60°	T-1 3/4 (5mm) Round
	GaAsP/GaP	588		20	40		
WP59EGW	GaAsP/GaP	617	White Diffused	20	40	60°	
	GaP	568		20	60		
WP59GYW	GaP	568	White Diffused	50	100	60°	
	GaAsP/GaP	588		20	40		
WP59SURKCGKW	AlGaInP	630	White Diffused	80	200	60°	
	AlGaInP	570		80	180		
WP59EYC	GaAsP/GaP	617	Water Clear	50	100	24°	
	GaAsP/GaP	588		40	80		
WP59EGC	GaAsP/GaP	617	Water Clear	50	100	24°	
	GaP	568		50	120		
WP59GYC	GaP	568	Water Clear	50	120	24°	
	GaAsP/GaP	588		40	80		
WP154A4SUREQBFGKC	AlGaInP	630	Water Clear	200	400	50°	T-1 3/4 (5mm) Full Color
	InGaIn	465		400	900		
	InGaIn	525		900	1600		
WP154A4SUREQBFGKW	AlGaInP	630	White Diffused	120	250	60°	
	InGaIn	465		300	500		
	InGaIn	525		600	1300		
WP799EGW	GaAsP/GaP	617	White Diffused	20	40	50°	8mm Round
	GaP	568		20	50		

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

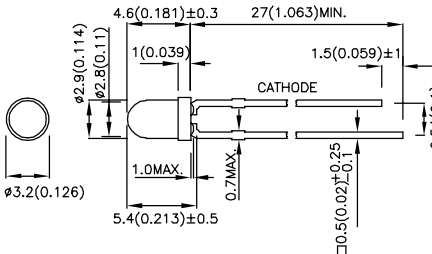
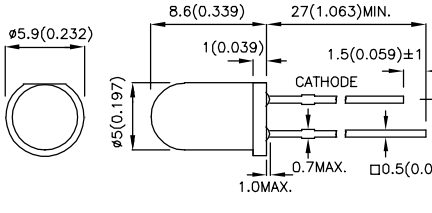
MULTI-COLOR LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP819EGW	GaAsP/GaP	617	White Diffused	30	60	50°	
	GaP	568		15	50		
WP117EYWT	GaAsP/GaP	617	White Diffused	1.2	4	110°	
	GaAsP/GaP	588		2	4		
WP117EGWT	GaAsP/GaP	617	White Diffused	1.2	4	110°	
	GaP	568		2	6		
WP117GYWT	GaP	568	White Diffused	2	6	110°	
	GaAsP/GaP	588		2	4		
WP119EGWT	GaAsP/GaP	617	White Diffused	4	10	110°	
	GaP	568		3	9		

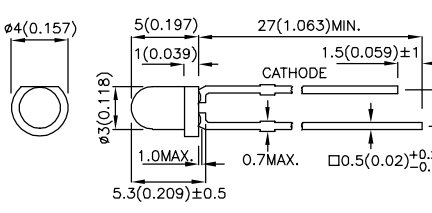
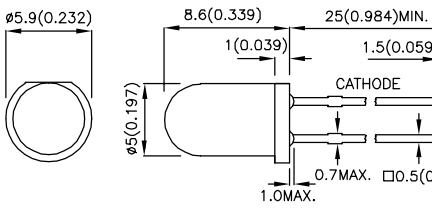
LOW CURRENT LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP710A10LID	GaAsP/GaP	617	Red Diffused	0.2	0.6	40°	
WP710A10LSRD	GaAlAs	640	Red Diffused	2	6	40°	
WP710A10LSECK/J3	AlGaInP	625	Water Clear	120	320	34°	
WP710A10LSECK/J4	AlGaInP	605	Water Clear	180	450	34°	
WP710A10LSYCK/J3	AlGaInP	590	Water Clear	120	200	34°	
WP710A10LYD	GaAsP/GaP	588	Yellow Diffused	0.7	1.5	40°	
WP710A10LGD	GaP	568	Green Diffused	1	2	40°	
WP710A10LZGCK	InGaIn	525	Water Clear	500	1100	34°	
WP710A10LVBC/D	InGaIn	470	Water Clear	180	450	20°	
WP7113LID	GaAsP/GaP	617	Red Diffused	0.7	2	30°	
WP7113LSRD	GaAlAs	640	Red Diffused	4	8	30°	
WP7113LSECK/J3	AlGaInP	625	Water Clear	180	550	20°	
WP7113LSECK/J4	AlGaInP	605	Water Clear	250	550	20°	
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

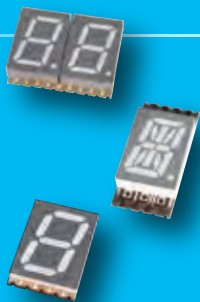
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) V=5V*V=14V		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP710A10ID5V	GaAsP/GaP	617	Red Diffused	6	14	40°	T-1 (3mm) Round  WP710A10xx5V/14V
WP710A10ID14V	GaAsP/GaP	617	Red Diffused	*5	*10	40°	
WP710A10SRD5V	GaAlAs	640	Red Diffused	25	50	40°	
WP710A10SRD14V	GaAlAs	640	Red Diffused	*20	*40	40°	
WP710A10YD5V	GaAsP/GaP	588	Yellow Diffused	7	15	40°	
WP710A10YD14V	GaAsP/GaP	588	Yellow Diffused	*6	*11	40°	
WP710A10GD5V	GaP	568	Green Diffused	12	25	40°	
WP710A10GD14V	GaP	568	Green Diffused	*8	*20	40°	
WP710A10SGD5V	GaP	568	Green Diffused	10	25	40°	
WP710A10SGD14V	GaP	568	Green Diffused	*8	*20	40°	
WP7113ID5V	GaAsP/GaP	617	Red Diffused	12	25	30°	T-1 3/4 (5mm) Round  WP7113xx5V/14V
WP7113ID14V	GaAsP/GaP	617	Red Diffused	*10	*22	30°	
WP7113SRD5V	GaAlAs	640	Red Diffused	70	110	30°	
WP7113SRD14V	GaAlAs	640	Red Diffused	*60	*100	30°	
WP7113YD5V	GaAsP/GaP	588	Yellow Diffused	10	22	30°	
WP7113YD14V	GaAsP/GaP	588	Yellow Diffused	*8	*20	30°	
WP7113SGD5V	GaP	568	Green Diffused	15	25	30°	
WP7113SGD14V	GaP	568	Green Diffused	*10	*22	30°	

BLINKING LED

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) V=9V		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP36BHD	GaP	635	Red Diffused	0.6	1.8	60°	T-1 (3mm) Round  WP36B
WP36BID	GaAsP/GaP	617	Red Diffused	6	15	60°	
WP36BSRD/B	GaAlAs	640	Red Diffused	40	100	60°	
WP36BYD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP36BGD	GaP	568	Green Diffused	12	25	60°	
WP56BHD	GaP	635	Red Diffused	1.2	4	60°	T-1 3/4 (5mm) Round  WP56B
WP56BID	GaAsP/GaP	617	Red Diffused	12	25	60°	
WP56BSRD/B	GaAlAs	640	Red Diffused	30	70	60°	
WP56BYD	GaAsP/GaP	588	Yellow Diffused	12	20	60°	
WP56BGD	GaP	568	Green Diffused	15	30	60°	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

SMD Display



7-Segment SMD Display	31
Alphanumeric SMD Display	33

Description

As pioneer of SMD displays technology, Kingbright continues to advance its SMD displays products by developing new Ultra-Thin SMD displays in various sizes to fulfill and exceed different design requirements. The SMD display's low profile design coupled with vivid crisp displaying capability allows designers to create smaller, lighter, and flashier products.

Features and Benefits

- Advanced chip-on-board technology
- Extensive selection including sizes in 0.2", 0.3", 0.4", 0.56" & 0.8"
- Available in various color selection: blue, green, red, yellow, and orange
- Packages are available in single-digit, dual-digit and alphanumeric
- Complies with industry standard pin-out configuration
- Standard surface color is gray, while also available in black, red, and green upon request
- Automation-friendly tape-and-reel package
- Moisture Sensitivity Level (MSL) rating of 2a with longer floor time of 4 weeks

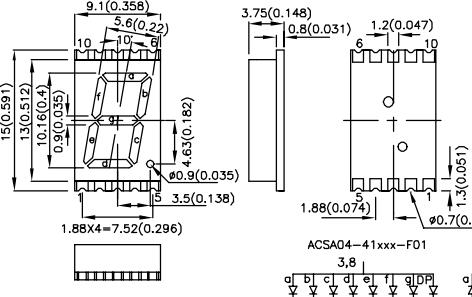
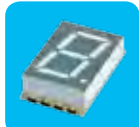
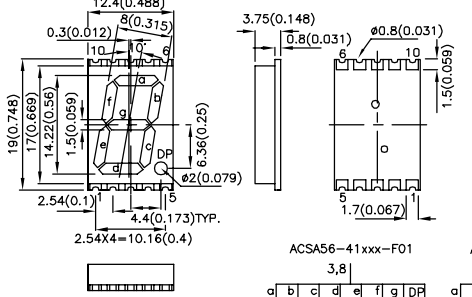


7-SEGMENT SMD DISPLAY

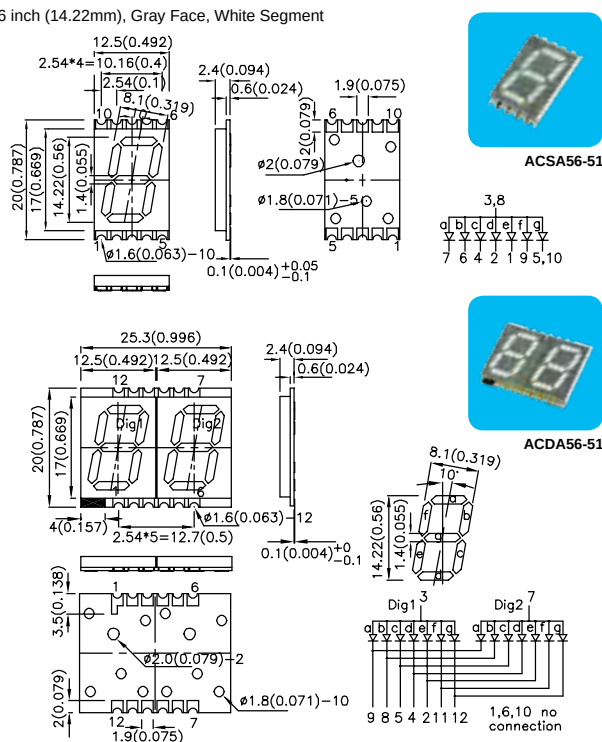
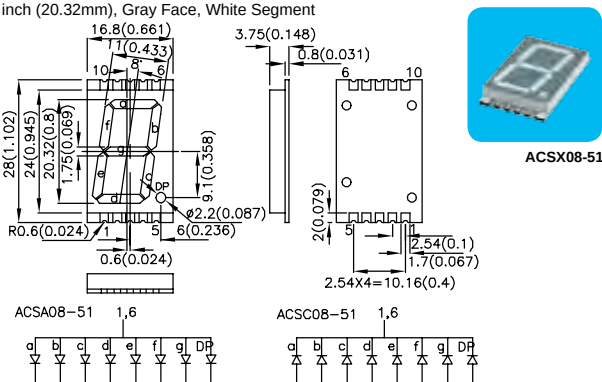
Part Number		Material	λ D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA02-41SURKWA-F01 ACDA02-41SURKWA-F01	ACSC02-41SURKWA-F01 ACDC02-41SURKWA-F01	AlGaInP	630	14000	30000	0.2 inch (5.08mm), Gray Face, White Segment  ACSX02-41  ACDX02-41  ACSX03-41  ACDX03-41
ACSA02-41SEKWA-F01 ACDA02-41SEKWA-F01	ACSC02-41SEKWA-F01 ACDC02-41SEKWA-F01	AlGaInP	601	21000	37000	
ACSA02-41SYKWA-F01 ACDA02-41SYKWA-F01	ACSC02-41SYKWA-F01 ACDC02-41SYKWA-F01	AlGaInP	590	21000	50000	
ACSA02-41CGKWA-F01 ACDA02-41CGKWA-F01	ACSC02-41CGKWA-F01 ACDC02-41CGKWA-F01	AlGaInP	570	3600	12000	
ACSA02-41SURKWA-F01 ACDA02-41SURKWA-F01	ACSC02-41SURKWA-F01 ACDC02-41SURKWA-F01	AlGaInP	630	14000	27000	
ACSA03-41SURKWA-F01 ACDA03-41SURKWA-F01	ACSC03-41SURKWA-F01 ACDC03-41SURKWA-F01	AlGaInP	630	14000	27000	0.3 inch (7.62mm), Gray Face, White Segment  ACSX03-41  ACDX03-41
ACSA03-41SEKWA-F01 ACDA03-41SEKWA-F01	ACSC03-41SEKWA-F01 ACDC03-41SEKWA-F01	AlGaInP	601	21000	46000	
ACSA03-41SYKWA-F01 ACDA03-41SYKWA-F01	ACSC03-41SYKWA-F01 ACDC03-41SYKWA-F01	AlGaInP	590	21000	36000	
ACSA03-41CGKWA-F01 ACDA03-41CGKWA-F01	ACSC03-41CGKWA-F01 ACDC03-41CGKWA-F01	AlGaInP	570	3600	12000	
ACSA03-41SURKWA-F01 ACDA03-41SURKWA-F01	ACSC03-41SURKWA-F01 ACDC03-41SURKWA-F01	AlGaInP	630	14000	27000	

NOTES: 1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

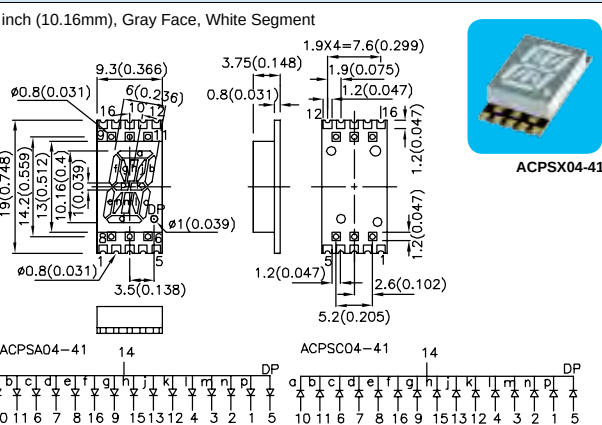
7-SEGMENT SMD DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA04-41SURKWA-F01 ACDA04-41SURKWA-F01	ACSC04-41SURKWA-F01 ACDC04-41SURKWA-F01	AlGaInP	630	14000	27000	0.4 inch (10.16mm) Gray Face, White Segment   ACSX04-41
ACSA04-41SEKWA-F01 ACDA04-41SEKWA-F01	ACSC04-41SEKWA-F01 ACDC04-41SEKWA-F01	AlGaInP	601	21000	60000	
ACSA04-41SYKWA-F01 ACDA04-41SYKWA-F01	ACSC04-41SYKWA-F01 ACDC04-41SYKWA-F01	AlGaInP	590	21000	35000	
ACSA04-41CGKWA-F01 ACDA04-41CGKWA-F01	ACSC04-41CGKWA-F01 ACDC04-41CGKWA-F01	AlGaInP	570	5600	11000	
ACSA56-41SURKWA-F01 ACDA56-41SURKWA-F01	ACSC56-41SURKWA-F01 ACDC56-41SURKWA-F01	AlGaInP	630	21000	44000	0.56 inch (14.22mm), Gray Face, White Segment   ACSX56-41
ACSA56-41SEKWA-F01 ACDA56-41SEKWA-F01	ACSC56-41SEKWA-F01 ACDC56-41SEKWA-F01	AlGaInP	601	31000	78000	
ACSA56-41SYKWA-F01 ACDA56-41SYKWA-F01	ACSC56-41SYKWA-F01 ACDC56-41SYKWA-F01	AlGaInP	590	31000	76000	
ACSA56-41CGKWA-F01 ACDA56-41CGKWA-F01	ACSC56-41CGKWA-F01 ACDC56-41CGKWA-F01	AlGaInP	570	9000	25000	
ACSA56-41ZGKWA-F01 ACDA56-41ZGKWA-F01	ACSC56-41ZGKWA-F01 ACDC56-41ZGKWA-F01	InGaN	525	52000	160000	
ACSA56-41QBWA/D-F01 ACDA56-41QBWA/D-F01	ACSC56-41QBWA/D-F01 ACDC56-41QBWA/D-F01	InGaN	465	5600	15000	

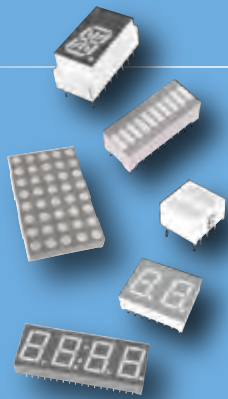
7-SEGMENT SMD DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA56-51SURKWA ACDA56-51SURKWA	-	AlGaInP	630	21000	76000	0.56 inch (14.22mm), Gray Face, White Segment 
ACSA56-51SYKWA ACDA56-51SYKWA	-	AlGaInP	590	52000	117000	
ACSA56-51CGKWA ACDA56-51CGKWA	-	AlGaInP	570	14000	26000	
ACSA56-51PBWA/A ACDA56-51PBWA/A	-	InGaN	465	1400	4000	
ACSA08-51SURKWA	ACSC08-51SURKWA	AlGaInP	630	21000	47000	0.8 inch (20.32mm), Gray Face, White Segment 
ACSA08-51SEKWA	ACSC08-51SEKWA	AlGaInP	601	31000	82000	
ACSA08-51SYKWA	ACSC08-51SYKWA	AlGaInP	590	31000	93000	
ACSA08-51CGKWA	ACSC08-51CGKWA	AlGaInP	570	9000	18000	
ACSA08-51ZGKWA	ACSC08-51ZGKWA	InGaN	525	52000	118000	
ACSA08-51QBWA/D	ACSC08-51QBWA/D	InGaN	465	3600	8700	

ALPHANUMERIC SMD DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACPSA04-41SURKWA	ACPSC04-41SURKWA	AlGaInP	630	14000	36000	0.4 inch (10.16mm), Gray Face, White Segment 
ACPSA04-41SEKWA	ACPSC04-41SEKWA	AlGaInP	601	21000	44000	
ACPSA04-41SYKWA	ACPSC04-41SYKWA	AlGaInP	590	21000	46000	
ACPSA04-41CGKWA	ACPSC04-41CGKWA	AlGaInP	570	5600	11000	

NOTES: 1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.25\text{mm}$ ($0.01''$) unless otherwise noted.



Through-Hole Display

Single Digit 7-Segment Through-Hole Display	35
Dual Digit 7-Segment Through-Hole Display	37
Three Digit 7-Segment Through-Hole Display	39
Four Digit 7-Segment Through-Hole Display	39
Dot Matrix	40
Bar Graph Array	40
Light Bar	41

Description

Though-hole displays have been a widely adopted solution for message, graphic displaying and status indication. Kingbright offers an extensive selection of through-hole displays in a variety of sizes and colors to fulfill various design requirements.

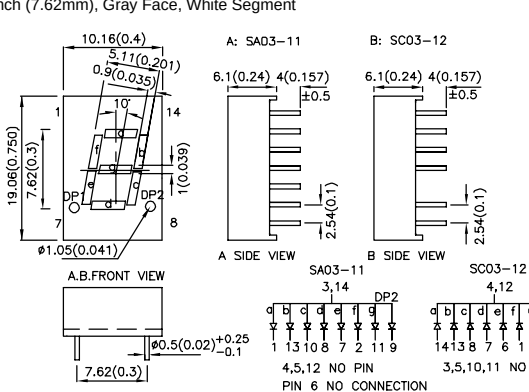
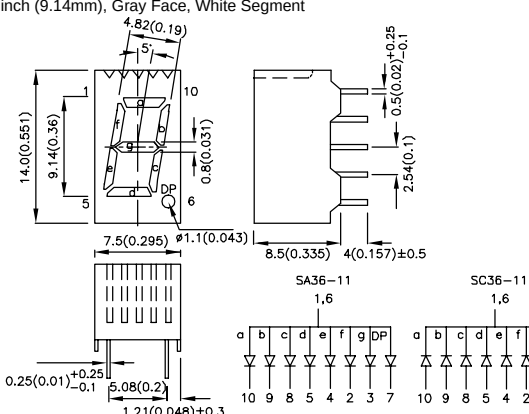
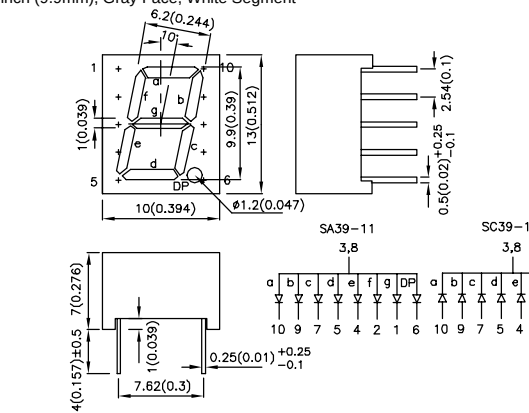
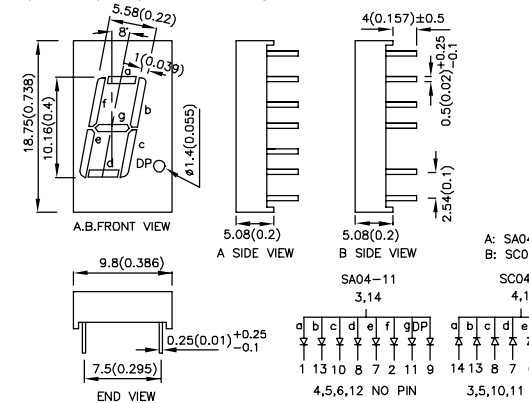
Features and Benefits

- Display types including 7-segment, alphanumeric, dot-matrix, light bar & bar graph
- Complies with industry standard pin-out configuration
- Single-color and bi-color options
- Advanced chip-on board technology
- Uniform light output with exceptional brightness
- Special pin length and right-angle package are available
- High reliability with competitive lead time



THROUGH-HOLE DISPLAY

SINGLE DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
SA03-11SURKWA	SC03-12SURKWA	AlGaInP	630	31000	67000	0.3 inch (7.62mm), Gray Face, White Segment  SA03-11 3,14 DP2 1 13 10 8 7 2 11 9 4,5,12 NO PIN PIN 6 NO CONNECTION SC03-12 4,12 DP2 14 13 8 7 6 1 2 9 3,5,10,11 NO PIN
SA03-11SYKWA	SC03-12SYKWA	AlGaInP	590	52000	100000	
SA03-11CGKWA	SC03-12CGKWA	AlGaInP	570	21000	57000	
SA36-11SURKWA	SC36-11SURKWA	AlGaInP	630	14000	28000	0.36 inch (9.14mm), Gray Face, White Segment  SA36-11 1,6 a b c d e f g DP 10 9 8 5 4 2 3 7 SC36-11 1,6 a b c d e f g DP 10 9 8 5 4 2 3 7
SA36-11SYKWA	SC36-11SYKWA	AlGaInP	590	21000	45000	
SA36-11CGKWA	SC36-11CGKWA	AlGaInP	570	3600	11000	
SA39-11SURKWA	SC39-11SURKWA	AlGaInP	630	21000	46000	0.39 inch (9.9mm), Gray Face, White Segment  SA39-11 3,8 a b c d e f g DP 10 9 7 5 4 2 1 6 SC39-11 3,8 a b c d e f g DP 10 9 7 5 4 2 1 6
SA39-11SYKWA	SC39-11SYKWA	AlGaInP	590	31000	86000	
SA39-11CGKWA	SC39-11CGKWA	AlGaInP	570	9000	21000	
SA04-11SURKWA	SC04-11SURKWA	AlGaInP	630	31000	80000	0.4 inch (10.16mm), Gray Face, White Segment  SA04-11 3,14 DP2 1 13 10 8 7 2 11 9 4,5,6,12 NO PIN SC04-11 4,12 DP2 14 13 8 7 6 1 2 9 3,5,10,11 NO PIN
SA04-11SYKWA	SC04-11SYKWA	AlGaInP	590	52000	130000	
SA04-11CGKWA	SC04-11CGKWA	AlGaInP	570	14000	30000	

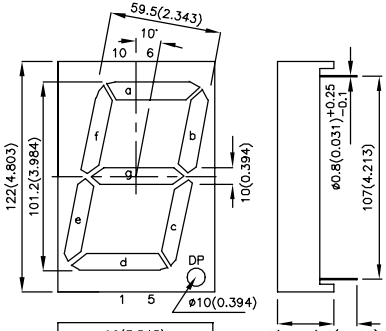
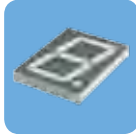
NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

THROUGH-HOLE DISPLAY

SINGLE DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
SA05-11SURKWA	SC05-11SURKWA	AlGaInP	630	31000	69000	0.5 inch (12.7mm), Gray Face, White Segment SX05
SA05-11SYKWA	SC05-11SYKWA	AlGaInP	590	52000	120000	
SA05-11CGKWA	SC05-11CGKWA	AlGaInP	570	14000	34000	
SA56-11SURKWA	SC56-11SURKWA	AlGaInP	630	31000	97000	0.56 inch (14.22mm), Gray Face, White Segment SX56
SA56-11SYKWA	SC56-11SYKWA	AlGaInP	590	52000	160000	
SA56-11CGKWA	SC56-11CGKWA	AlGaInP	570	14000	35000	
SA08-11SURKWA	SC08-11SURKWA	AlGaInP	630	21000	61000	0.8 inch (20.32mm), Gray Face, White Segment SX08
SA08-11SYKWA	SC08-11SYKWA	AlGaInP	590	52000	140000	
SA08-11CGKWA	SC08-11CGKWA	AlGaInP	570	14000	25000	
SA10-11SURKWA	SC10-11SURKWA	AlGaInP	630	88000	260000	1.02 inch (26mm), Gray Face, White Segment SX10
SA10-11SYKWA	SC10-11SYKWA	AlGaInP	590	150000	400000	
SA10-11CGKWA	SC10-11CGKWA	AlGaInP	570	52000	95000	

SINGLE DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

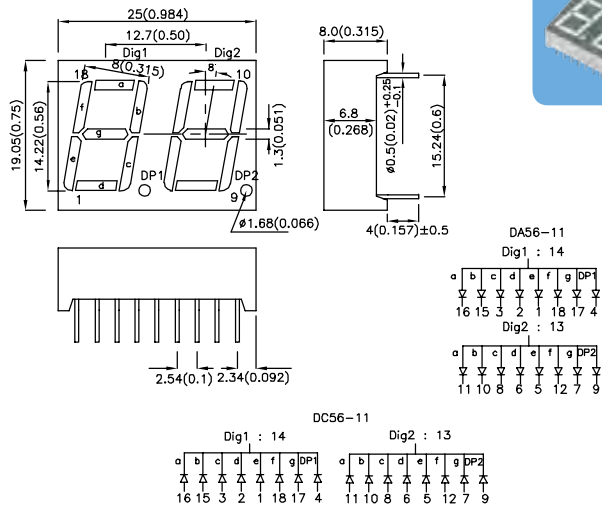
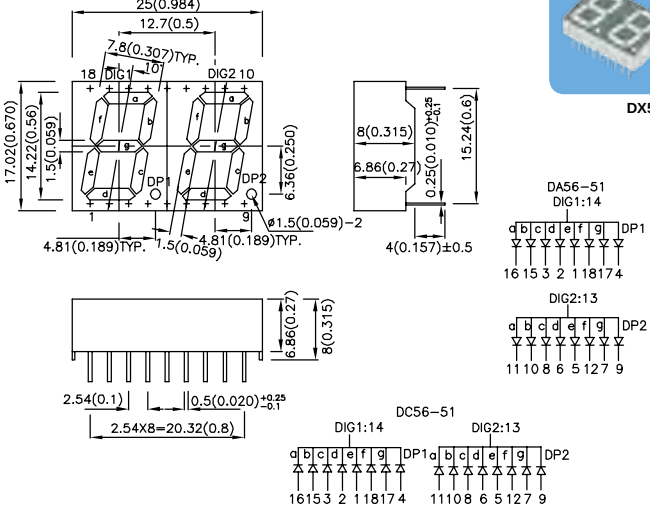
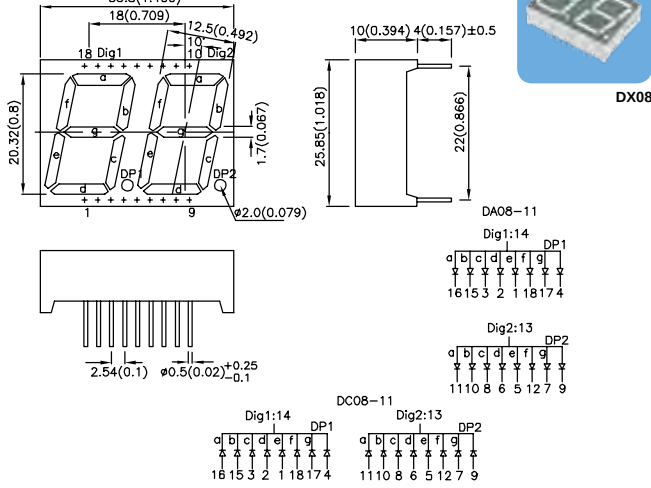
Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
SA40-18SURKWA	SC40-18SURKWA	AlGaInP	 630	88000	250000	3.984 inch (101.2mm), Gray Face, White Segment  
SA40-18SYKWA	SC40-18SYKWA	AlGaInP	 590	150000	450000	
SA40-18CGKWA	SC40-18CGKWA	AlGaInP	 570	31000	100000	

DUAL DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

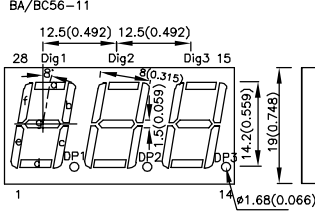
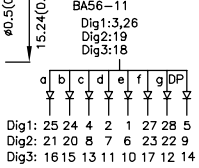
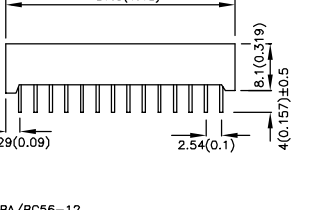
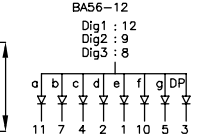
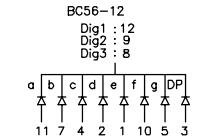
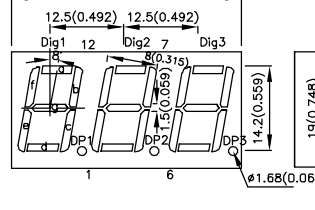
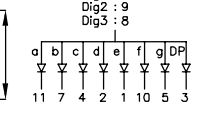
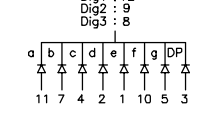
Part Number		Material	λ_D (nm)	I_V (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
DA03-11SURKWA	DC03-11SURKWA	AlGaInP	630	21000	47000	0.3 inch (7.62mm), Gray Face, White Segment DX03
DA03-11SYKWA	DC03-11SYKWA	AlGaInP	590	21000	54000	
DA03-11CGKWA	DC03-11CGKWA	AlGaInP	570	9000	16000	
DA04-11SURKWA	DC04-11SURKWA	AlGaInP	630	21000	54000	0.394 inch (10mm), Gray Face, White Segment DX04
DA04-11SYKWA	DC04-11SYKWA	AlGaInP	590	31000	84000	
DA04-11CGKWA	DC04-11CGKWA	AlGaInP	570	9000	25000	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

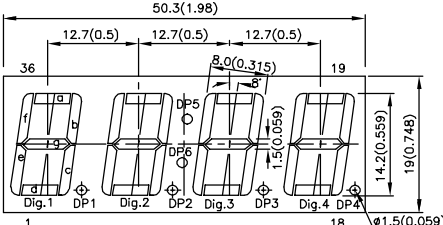
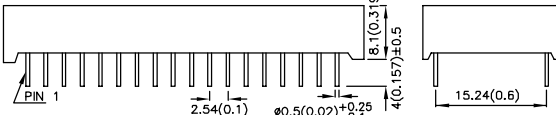
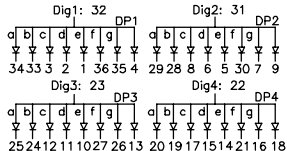
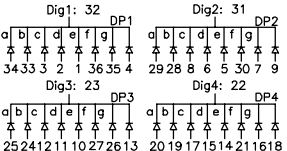
DUAL DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

Part Number		Material	λ_D (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
DA56-11SURKWA	DC56-11SURKWA	AlGaInP	630	31000	85000	0.56 inch (14.22mm), Gray Face, White Segment  DA56-11 Dig1 : 14 Dig2 : 13 DC56-11 Dig1 : 14 Dig2 : 13
DA56-11SYKWA	DC56-11SYKWA	AlGaInP	590	52000	130000	
DA56-11CGKWA	DC56-11CGKWA	AlGaInP	570	14000	35000	
DA56-51SURKWA	DC56-51SURKWA	AlGaInP	630	52000	100000	0.56 inch, (14.22mm), Gray Face, White Segment  DA56-51 DIG1:14 DIG2:13 DC56-51 DIG1:14 DIG2:13
DA56-51SYKWA	DC56-51SYKWA	AlGaInP	590	52000	120000	
DA56-51CGKWA	DC56-51CGKWA	AlGaInP	570	14000	23000	
DA08-11SURKWA	DC08-11SURKWA	AlGaInP	630	31000	75000	0.8 inch (20.32mm), Gray Face, White Segment  DA08-11 Dig1:14 Dig2:13 DC08-11 Dig1:14 Dig2:13
DA08-11SYKWA	DC08-11SYKWA	AlGaInP	590	52000	94000	
DA08-11CGKWA	DC08-11CGKWA	AlGaInP	570	14000	38000	

THREE DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

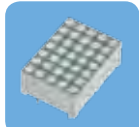
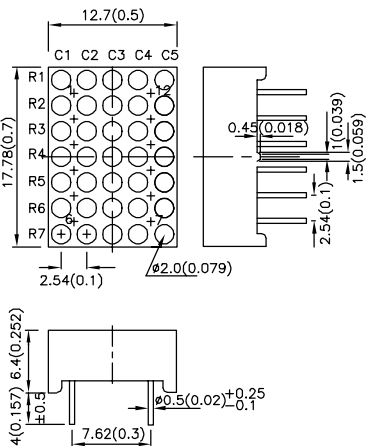
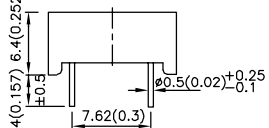
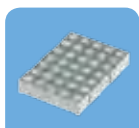
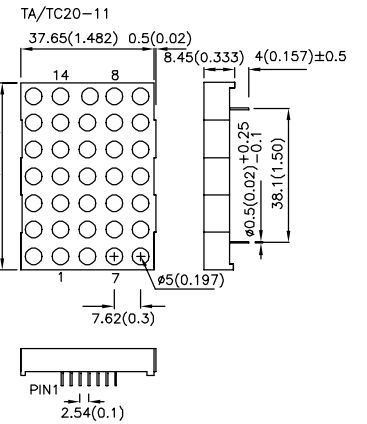
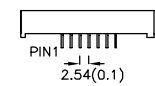
Part Number		Material	λ_D (nm)	I _v (uCd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
BA56-11SURKWA BA56-12SURKWA	BC56-11SURKWA BC56-12SURKWA	AlGaInP	 630	31000	73000	0.56 inch (14.22mm), Gray Face, White Segment   
BA56-11SYKWA BA56-12SYKWA	BC56-11SYKWA BC56-12SYKWA	AlGaInP	 590	52000	120000	  
BA56-11CGKWA BA56-12CGKWA	BC56-11CGKWA BC56-12CGKWA	AlGaInP	 570	14000	35000	  

FOUR DIGIT 7-SEGMENT THROUGH-HOLE DISPLAY

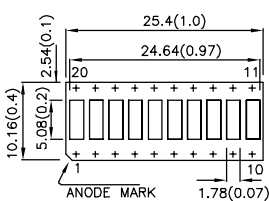
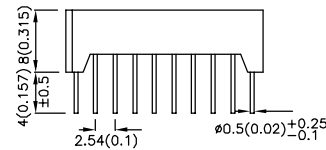
Part Number		Material	λ_D (nm)	I_V (uCd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
CA56-11SURKWA	CC56-11SURKWA	AlGaInP	 630	31000	72000	0.56 inch (14.22mm), Gray Face, White Segment  
CA56-11SYKWA	CC56-11SYKWA	AlGaInP	 590	52000	120000	
CA56-11CGKWA	CC56-11CGKWA	AlGaInP	 570	14000	35000	CA56-11  CC56-11 

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

DOT MATRIX

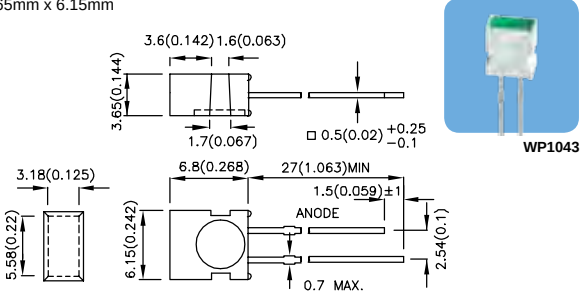
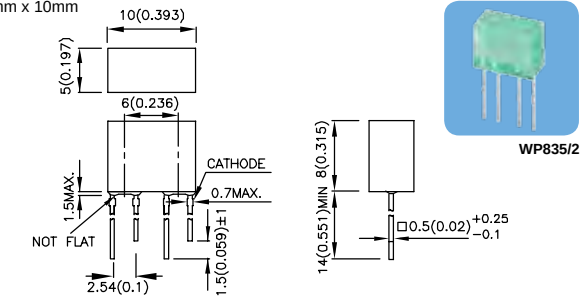
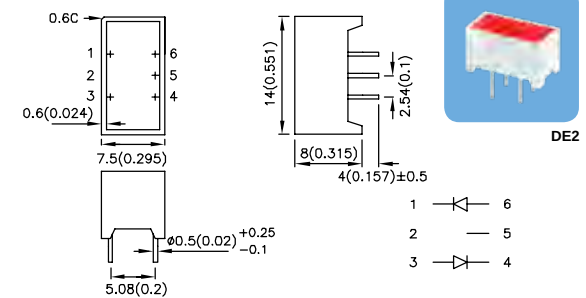
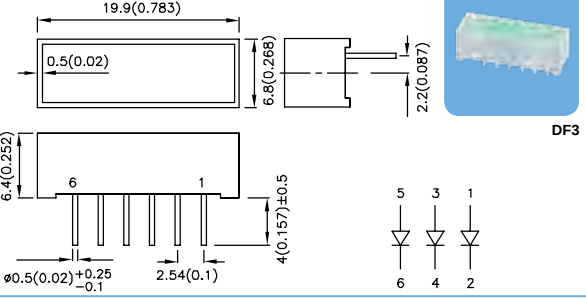
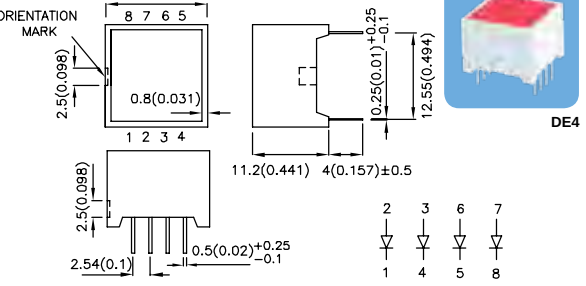
Part Number		Material	λD (nm)	Iv (ucd) @10mA		Dimensions
Column Anode	Column Cathode			Min.	Typ.	
TA07-11SURKWA	TC07-11SURKWA	AlGaInP	630	31000	90000	0.7 inch (18mm), 5x7, Gray Face, White Dot   
TA07-11SYKWA	TC07-11SYKWA	AlGaInP	590	52000	140000	
TA07-11CGKWA	TC07-11CGKWA	AlGaInP	570	21000	38000	
TA20-11SURKWA	TC20-11SURKWA	AlGaInP	630	52000	130000	2.0 inch (50mm), 5x7, Gray Face, White Dot   
TA20-11SYKWA	TC20-11SYKWA	AlGaInP	590	88000	160000	
TA20-11CGKWA	TC20-11CGKWA	AlGaInP	570	21000	52000	

BAR GRAPH ARRAY

Part Number	Emitting Color + λD (nm) + Material	Iv (ucd) @10mA		Description	Dimensions
		Min.	Typ.		
DC10SURKWA	Hyper Red 630 AlGaInP	31000	100000	10 Segments Bar graph- Display Gray Face White Segment	  
DC10SYKWA	Super Bright Yellow 590 AlGaInP	52000	110000		
DC10CGKWA	Green 570 AlGaInP	14000	28000		

THROUGH-HOLE DISPLAY

LIGHT BAR

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP1043ID	GaAsP/GaP	617	Red Diffused	2	4	100°	3.65mm x 6.15mm 
WP1043SRD	GaAlAs	640	Red Diffused	*20	*50	100°	
WP1043YD	GaAsP/GaP	588	Yellow Diffused	2	5	100°	
WP1043GD	GaP	568	Green Diffused	2	6	100°	
WP1043SGD	GaP	568	Green Diffused	*8	*16	100°	
WP835/2IDT	GaAsP/GaP	617	Red Diffused	2	5	120°	5mm x 10mm 
WP835/2SRDT	GaAlAs	640	Red Diffused	*12	*26	120°	
WP835/2YDT	GaAsP/GaP	588	Yellow Diffused	2	4	120°	
WP835/2GDT	GaP	568	Green Diffused	3	6	120°	
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA			Dimensions
				Min.	Typ.		
DE2SURKD	AlGaInP	630	Red Diffused	400	600		7.5mm x 14mm 
DE2SYKD	AlGaInP	590	Yellow Diffused	700	1100		
DE2CGKD	AlGaInP	570	Green Diffused	120	200		
DF3SURKD	AlGaInP	630	Red Diffused	400	620		6.8mm x 19.9mm 
DF3SYKD	AlGaInP	590	Yellow Diffused	700	1100		
DF3CGKD	AlGaInP	570	Green Diffused	120	270		
DE4SURKD	AlGaInP	630	Red Diffused	500	930		15mm x 15mm 
DE4SYKD	AlGaInP	590	Yellow Diffused	700	1200		
DE4CGKD	AlGaInP	570	Green Diffused	120	220		

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

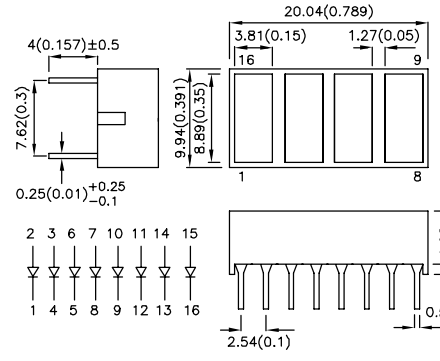
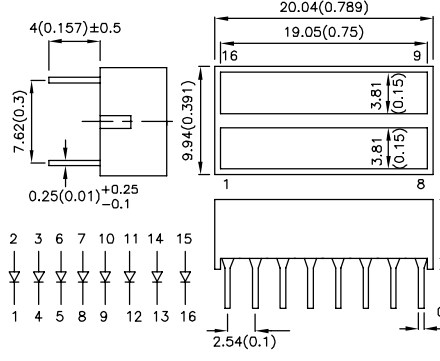
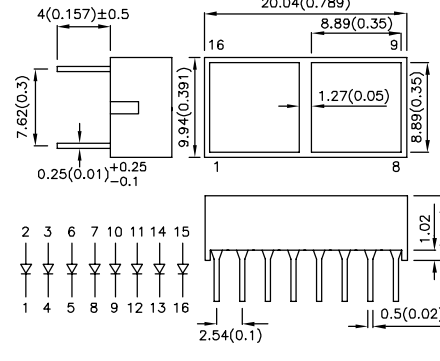
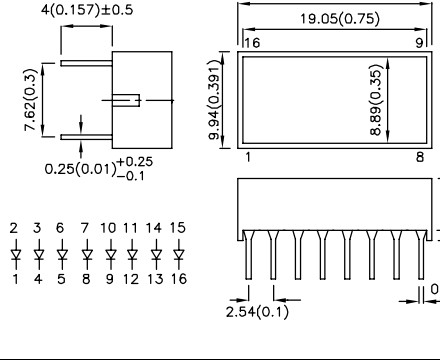
LIGHT BAR

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THROUGH-HOLE DISPLAY > Light Bar

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Dimensions
				Min.	Typ.	
KB-A100SURKW	AlGaInP	630	White Diffused	120	230	8.89mm x 3.81mm Size of Light Emitting Areas KB-A100SURKW
KB2400SYKW	AlGaInP	590	White Diffused	200	370	
KB2500CGKD	AlGaInP	570	Green Diffused	40	75	
KB-B100SURKW	AlGaInP	630	White Diffused	200	370	19.05mm x 3.81mm Size of Light Emitting Areas KB-B100SURKW
KB2450SYKW	AlGaInP	590	White Diffused	400	630	
KB2550CGKD	AlGaInP	570	Green Diffused	55	110	
KB-C100SURKW	AlGaInP	630	White Diffused	400	550	8.89mm x 8.89mm Size of Light Emitting Areas KB-C100SURKW
KB2755SYKW	AlGaInP	590	White Diffused	500	810	
KB2855CGKD	AlGaInP	570	Green Diffused	80	140	
KB-D100SURKW	AlGaInP	630	White Diffused	120	230	8.89mm x 3.81mm Size of Light Emitting Areas KB-D100SURKW
KB2700SYKW	AlGaInP	590	White Diffused	200	370	
KB2800CGKD	AlGaInP	570	Green Diffused	55	91	

LIGHT BAR

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @20mA		Dimensions
				Min.	Typ.	
KB-E100SURKW	AlGaInP	630	White Diffused	120	240	8.89mm x 3.81mm Size of Light Emitting Areas  KB-E100SURKW
KB2720SYKW	AlGaInP	590	White Diffused	300	400	
KB2820CGKD	AlGaInP	570	Green Diffused	20	47	
KB-F100SURKW	AlGaInP	630	White Diffused	120	230	3.81mm x 19.05mm Size of Light Emitting Areas  KB-F100SURKW
KB2735SYKW	AlGaInP	590	White Diffused	120	250	
KB2835CGKD	AlGaInP	570	Green Diffused	20	50	
KB-G100SURKW	AlGaInP	630	White Diffused	120	210	8.89mm x 8.89mm Size of Light Emitting Areas  KB-G100SURKW
KB2770SYKW	AlGaInP	590	White Diffused	80	180	
KB2870CGKD	AlGaInP	570	Green Diffused	20	54	
KB-H100SURKW	AlGaInP	630	White Diffused	120	230	8.89mm x 19.05mm Size of Light Emitting Areas  KB-H100SURKW
KB2785SYKW	AlGaInP	590	White Diffused	200	360	
KB2885CGKD	AlGaInP	570	Green Diffused	40	59	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.



Circuit Board Indicator

SMD CBI	45
Single-Level CBI	45
Bi-Level CBI	49
Tri-Level CBI	49
Quad-Level CBI	49

Description

Kingbright offers high quality circuit board indicators to meet wide range of applications and requirements. Surface mount type circuit board indicator is designed to simplify assembly process, reduce assembly cost and increase productivity.

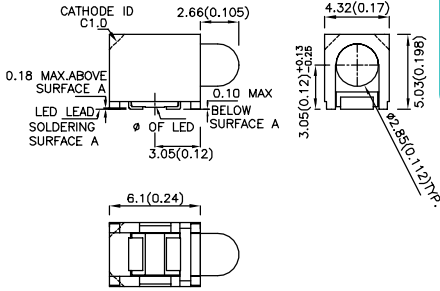
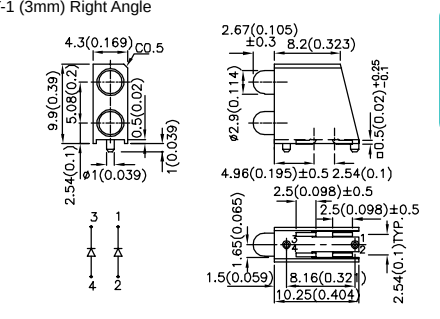
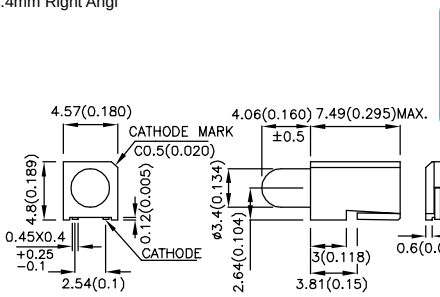
Various housing selections available, include single-level, bi-level, tri-level, and quad-level. Featuring in different sizes, shapes, lens type and flexible color combinations.

Features and Benefits

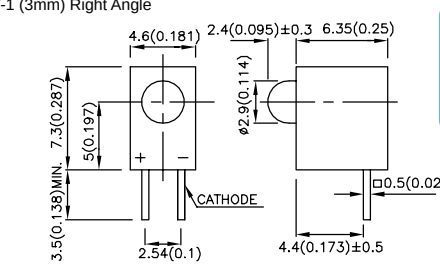
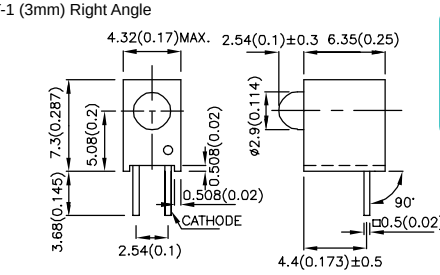
- High quality and excellent reliability
- Available in SMD and through-hole type
LED type is available in round and rectangular
- Housing type is available in various sizes and shapes
- A wide variety of circuit board indicators in single-level, bi-level, tri-level and quad-level are available
- Choice of customized color combinations
- Package options with interlock for easy stacking



SMD CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
AA3528AVU/AES	GaAsP/GaP	617	Water Clear	0.7	2	50°	Single Level Surface Mount CBI  AA3528AVU/A
AA3528AVU/ASRS	GaAlAs	640	Water Clear	8	18	50°	
AA3528AVU/AYS	GaAsP/GaP	588	Water Clear	3	6	50°	
AA3528AVU/ACGSK	AlGaInP	570	Water Clear	5	15	50°	
AA3528AVU/AQBS/D	InGaN	465	Water Clear	*10	*25	50°	
WP7104ALUP/2ID-0L	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Right Angle  WP7104ALUP/2-0L
WP7104ALUP/2SURDK-0L	AlGaInP	630	Red Diffused	*120	*240	40°	
WP7104ALUP/2YD-0L	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP7104ALUP/2GD-0L	GaP	568	Green Diffused	10	25	40°	
WP138A8QMP/ID/TG	GaAsP/GaP	617	Red Diffused	4	10	60°	3.4mm Right Angl  WP138A8QMP/
WP138A8QMP/SURDK/TG	AlGaInP	630	Red Diffused	*150	*300	60°	
WP138A8QMP/YD/TG	GaAsP/GaP	588	Yellow Diffused	4	8	60°	
WP138A8QMP/GD/TG	GaP	568	Green Diffused	6	12	60°	

SINGLE-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP934CB/ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Right Angle  WP934CB/
WP934CB/SRD	GaAlAs	640	Red Diffused	*50	*100	40°	
WP934CB/YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP934CB/GD	GaP	568	Green Diffused	10	25	40°	
WP934EW/ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Right Angle  WP934EW/
WP934EW/SRD	GaAlAs	640	Red Diffused	*50	*100	40°	
WP934EW/YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP934EW/GD	GaP	568	Green Diffused	10	25	40°	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

SINGLE-LEVEL CBI

Part Number	Material	λ D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
WP934RS/ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Right Angle WP934RS/ID
WP934RS/SRD	GaAlAs	640	Red Diffused	*50	*100	40°	
WP934RS/YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP934RS/GD	GaP	568	Green Diffused	10	25	40°	
WP130WDT/EYW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1 (3mm) Right Angle WP130WDT/EYW
	GaAsP/GaP	588		*10	*20		
WP130WDT/EGW	GaAsP/GaP	617	White Diffused	*10	*24	60°	
	GaP	568		*12	*30		
WP130WDT/GYW	GaP	568	White Diffused	*18	*40	60°	
	GaAsP/GaP	588		*10	*20		
WP42WUM/EYW	GaAsP/GaP	617	White Diffused	*4	*8	100°	T-1 (3mm) Right Angle WP42WUM/EYW
	GaAsP/GaP	588		*2	*6		
WP42WUM/EGW	GaAsP/GaP	617	White Diffused	*4	*8	100°	
	GaP	568		*4	*12		
WP42WUM/GYW	GaP	568	White Diffused	*4	*10	100°	
	GaAsP/GaP	588		*2	*6		
WP1384AD/ID	GaAsP/GaP	617	Red Diffused	8	16	60°	3.4mm Right Angle WP1384AD/ID
WP1384AD/SRD	GaAlAs	640	Red Diffused	*40	*90	60°	
WP1384AD/YD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP1384AD/GD	GaP	568	Green Diffused	10	20	60°	
WP1384AL/ID	GaAsP/GaP	617	Red Diffused	8	16	60°	3.4mm Right Angle WP1384AL/ID
WP1384AL/SRD	GaAlAs	640	Red Diffused	*40	*90	60°	
WP1384AL/YD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP1384AL/GD	GaP	568	Green Diffused	10	20	60°	

NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

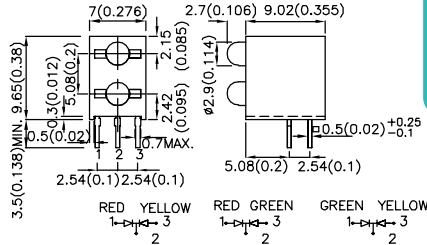
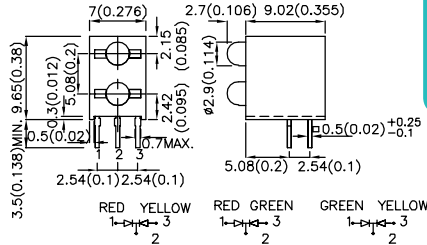
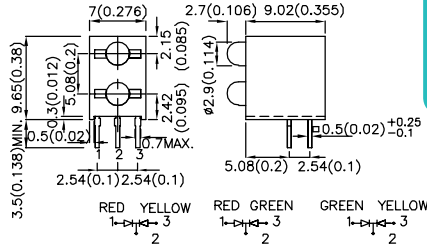
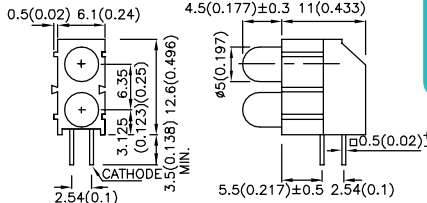
SINGLE-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.		
WP1533BQ/ID	GaAsP/GaP	617	Red Diffused	12	30	60°	4.7mm Right Angle WP1533BQ/
WP1533BQ/SRD	GaAlAs	640	Red Diffused	*140	*250	60°	
WP1533BQ/YD	GaAsP/GaP	588	Yellow Diffused	15	40	60°	
WP1533BQ/GD	GaP	568	Green Diffused	20	50	60°	
WP1503CB/ID	GaAsP/GaP	617	Red Diffused	12	40	60°	T-1 3/4 (5mm) Right Angle WP1503CB/
WP1503CB/SRD	GaAlAs	640	Red Diffused	*120	*260	60°	
WP1503CB/YD	GaAsP/GaP	588	Yellow Diffused	15	30	60°	
WP1503CB/GD	GaP	568	Green Diffused	15	30	60°	
WP150A9VS/EYW	GaAsP/GaP	617	White Diffused	*12	*30	30°	T-1 3/4 (5mm) Right Angle WP150A9VS/ RED YELLOW 1 2 3 RED GREEN 1 2 3 GREEN YELLOW 1 2 3
	GaAsP/GaP	588		*8	*20		
WP150A9VS/EGW	GaAsP/GaP	617	White Diffused	*12	*30	30°	
	GaP	568		*18	*50		
WP150A9VS/GYW	GaP	568	White Diffused	*18	*50	30°	
	GaAsP/GaP	588		*8	*20		
WP59BL/EYW	GaAsP/GaP	617	White Diffused	*20	*40	60°	T-1 3/4 (5mm) Right Angle WP59BL/ RED YELLOW 1 2 3 RED GREEN 1 2 3 GREEN YELLOW 1 2 3
	GaAsP/GaP	588		*20	*40		
WP59BL/EGW	GaAsP/GaP	617	White Diffused	*20	*40	60°	
	GaP	568		*20	*60		
WP59BL/GYW	GaP	568	White Diffused	*50	*100	60°	
	GaAsP/GaP	588		*20	*40		
WP59CB/EYW	GaAsP/GaP	617	White Diffused	*20	*40	60°	T-1 3/4 (5mm) Right Angle WP59CB/ RED YELLOW 1 2 3 RED GREEN 1 2 3 GREEN YELLOW 1 2 3
	GaAsP/GaP	588		*20	*40		
WP59CB/EGW	GaAsP/GaP	617	White Diffused	*20	*40	60°	
	GaP	568		*20	*60		
WP59CB/GYW	GaP	568	White Diffused	*50	*100	60°	
	GaAsP/GaP	588		*20	*40		

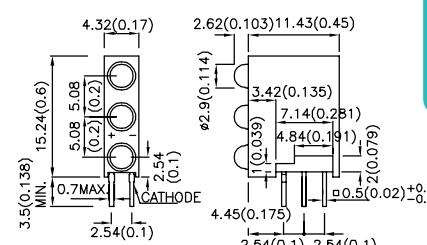
NOTES: 1. All dimensions are in millimeters(inches).
2. Tolerance is $\pm 0.25\text{mm}(0.01")$ unless otherwise noted.

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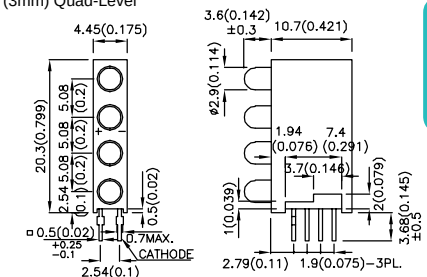
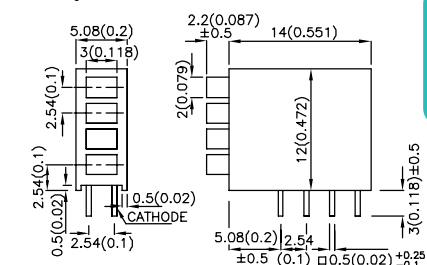
BI-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP130WCP/2EYW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1(3mm) Bi-Level 
	GaAsP/GaP	588		*10	*20		
WP130WCP/2EGW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1(3mm) Bi-Level 
	GaP	568		*12	*30		
WP130WCP/2GYW	GaP	568	White Diffused	*18	*40	60°	T-1(3mm) Bi-Level 
	GaAsP/GaP	588		*10	*20		
WP1503EB/2ID	GaAsP/GaP	617	Red Diffused	12	40	60°	T-1 3/4 (5mm) Bi-Level 
WP1503EB/2SRD	GaAlAs	640	Red Diffused	*120	*260	60°	
WP1503EB/2YD	GaAsP/GaP	588	Yellow Diffused	15	30	60°	
WP1503EB/2GD	GaP	568	Green Diffused	15	30	60°	

TRI-LEVEL CBI

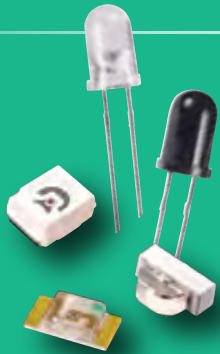
Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP934SA/3ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Tri-Level 
WP934SA/3SRD	GaAlAs	640	Red Diffused	*50	*100	40°	
WP934SA/3YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP934SA/3GD	GaP	568	Green Diffused	10	25	40°	

QUAD-LEVEL CBI

Part Number	Material	λ_D (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
WP934SB/4ID	GaAsP/GaP	617	Red Diffused	10	20	40°	T-1 (3mm) Quad-Level 
WP934SB/4SRD	GaAlAs	640	Red Diffused	*50	*100	40°	
WP934SB/4YD	GaAsP/GaP	588	Yellow Diffused	8	15	40°	
WP934SB/4GD	GaP	568	Green Diffused	10	25	40°	
WP914CK/4IDT	GaAsP/GaP	617	Red Diffused	1.2	4	100°	2mm x 3mm Quad-Level 
WP914CK/4YDT	GaAsP/GaP	588	Yellow Diffused	1.5	4	100°	
WP914CK/4GDT	GaP	568	Green Diffused	3	6	100°	

NOTES: 1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.25\text{mm}$ (0.01") unless otherwise noted.

Infrared & Phototransistor



Infrared Emitting Diode
Phototransistor

51

53

Description

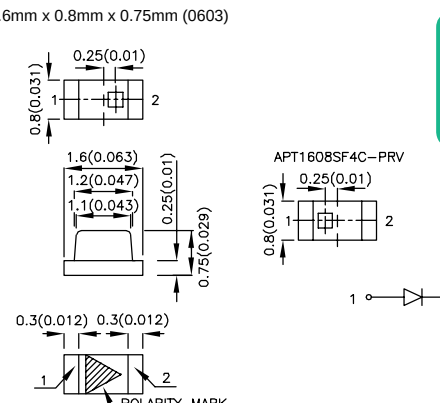
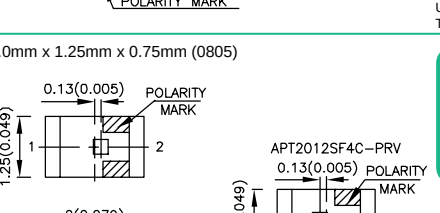
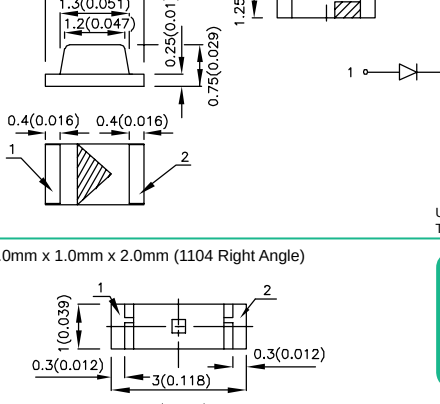
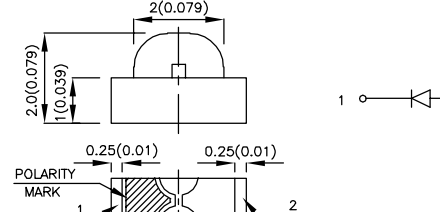
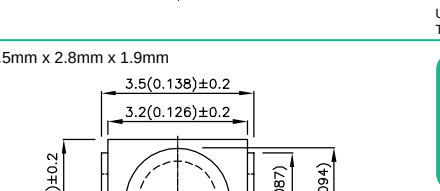
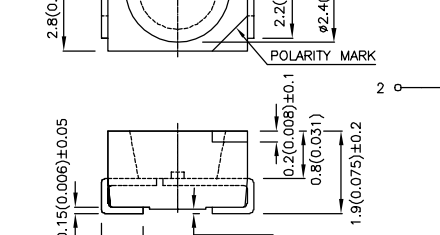
Kingbright Infrared & Phototransistor selections are available in SMD and Through-Hole packages. Featured in various sizes, shapes and viewing angles to fulfill specific design needs.

Features and Benefits

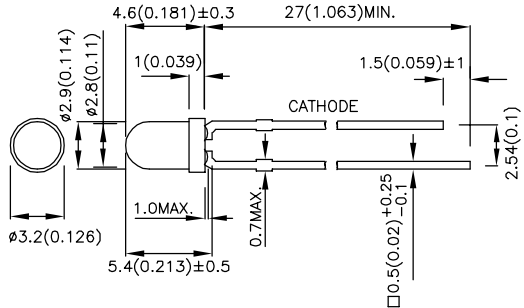
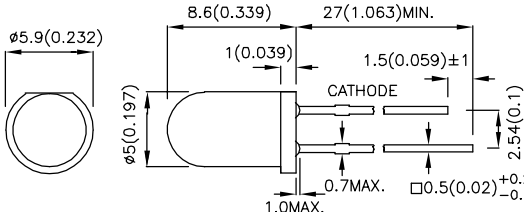
- Available in SMD & Through-Hole packages
- Various options in size, shape, and viewing angle
- Assorted wavelength selection on Infrared (standard 940nm, 880nm, and others)
- High quality and reliability
- Automation-friendly tape-and-reel package is available



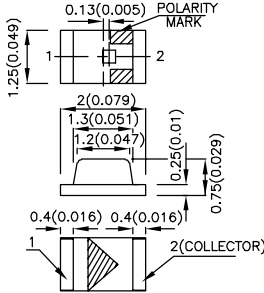
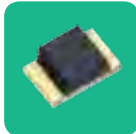
INFRARED EMITTING DIODE

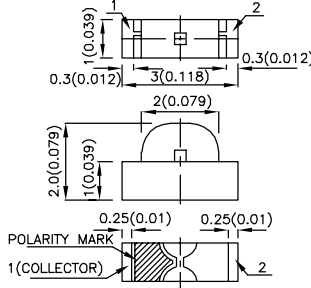
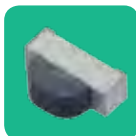
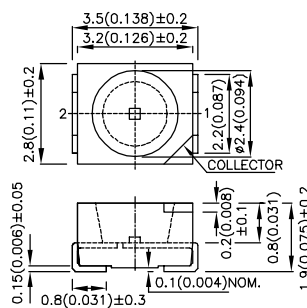
Part Number	Material	λ_P (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle 2 θ 1/2	Dimensions
				Min.	Typ.		
APT1608F3C	GaAs	940	Water Clear	0.8	2	120°	1.6mm x 0.8mm x 0.75mm (0603)  APT1608SF4C-PRV  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APT1608SF4C-PRV	GaAlAs	880	Water Clear	0.8	1.5	120°	
APT2012F3C	GaAs	940	water clear	0.8	2	120°	2.0mm x 1.25mm x 0.75mm (0805)  APT2012SF4C-PRV  Units : mm(inch) Tolerance : $\pm 0.1(0.004)$
APT2012SF4C-PRV	GaAlAs	880	Water Clear	0.8	1.5	120°	
APA3010F3C-GX	GaAs	940	Water Clear	0.8	2	120°	3.0mm x 1.0mm x 2.0mm (1104 Right Angle)  Units : mm(inch) Tolerance : $\pm 0.15(0.006)$
AA3528F3S	GaAs	940	Water Clear	1.2	2.5	120°	3.5mm x 2.8mm x 1.9mm  Units : mm(inch) Tolerance : $\pm 0.25(0.01)$

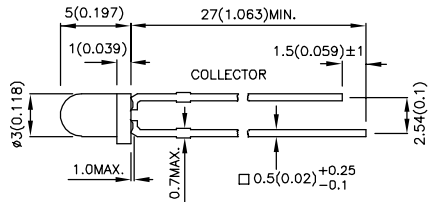
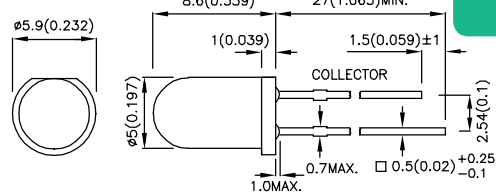
INFRARED EMITTING DIODE

Part Number	Material	λ_P (nm)	Lens Type	Po (mW/sr) @20mA*50mA		Viewing Angle 201/2	Dimensions
				Min.	Typ.		
WP710A10F3C	GaAs	940	Water Clear	3	8	34°	T-1 (3mm) Round  WP710A10 
				*12	*25		
WP710A10SF4C	GaAlAs	880	Water Clear	7	12	34°	
				*12	*30		
WP7113F3C	GaAs	940	Water Clear	8	20	20°	T-1 3/4 (5mm) Round  WP7113 
				*25	*50		
WP7113SF4C	GaAlAs	880	Water Clear	6	15	20°	
				*12	*25		

PHOTOTRANSISTOR

Part Number	Lens Type							Dimensions																																																																												
APT2012P3BT	Blue Transparent							2.0mm x 1.25mm x 0.75mm (0805)   APT2012 Units : mm(inch) Tolerance : ±0.1(0.004)																																																																												
APA3010P3BT-GX	Blue Transparent																																																																																			
AA3528P3S	Water Clear																																																																																			
WP3DP3BT	Blue Transparent																																																																																			
WP7113P3BT	Blue Transparent																																																																																			
Electrical And Radiant Characteristics (Ta =25°C) <table><tr><th>Parameter</th><th>Symbol</th><th>Part Number</th><th>Min.</th><th>Typ.</th><th>Max.</th><th>Unit</th><th>Test Condition</th></tr><tr><td>Collector-to-Emitter Breakdown Voltage</td><td>V_{BR CEO}</td><td>-</td><td>30</td><td>-</td><td>-</td><td>V</td><td>I_C=100μA Ee=0mW/cm²</td></tr><tr><td>Emitter-to-Collector Breakdown Voltage</td><td>V_{BR ECO}</td><td>-</td><td>5</td><td>-</td><td>-</td><td>V</td><td>I_E=100μA Ee=0mW/cm²</td></tr><tr><td>Collector-to-Emitter Saturation Voltage</td><td>V_{CE (SAT)}</td><td>-</td><td>-</td><td>-</td><td>0.8</td><td>V</td><td>I_C=2mA Ee=20mW/cm²</td></tr><tr><td>Collector Dark Current</td><td>I_{CEO}</td><td>-</td><td>-</td><td>-</td><td>100</td><td>nA</td><td>V_{CE}=10V Ee=0mW/cm²</td></tr><tr><td>Rise Time (10% to 90%)</td><td>T_R</td><td>-</td><td>-</td><td>15</td><td>-</td><td>μs</td><td>V_{CE}=5V I_C=1mA R_L=1KΩ</td></tr><tr><td>Fall Time (90% to 10%)</td><td>T_F</td><td>-</td><td>-</td><td>15</td><td>-</td><td>μs</td><td></td></tr><tr><td rowspan="5">On State Collector Current</td><td rowspan="5">I_(ON)</td><td>APT2012P3BT</td><td>0.1</td><td>0.3</td><td rowspan="5">-</td><td rowspan="5">mA</td><td rowspan="5">V_{CE}=5V, Ee=1mW/cm² λ=940nm</td></tr><tr><td>APA3010P3BT-GX</td><td>0.1</td><td>0.3</td></tr><tr><td>AA3528P3S</td><td>0.2</td><td>0.4</td></tr><tr><td>WP3DP3BT</td><td>0.1</td><td>0.2</td></tr><tr><td>WP7113P3BT</td><td>0.7</td><td>3</td></tr></table>									Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition	Collector-to-Emitter Breakdown Voltage	V _{BR CEO}	-	30	-	-	V	I _C =100μA Ee=0mW/cm²	Emitter-to-Collector Breakdown Voltage	V _{BR ECO}	-	5	-	-	V	I _E =100μA Ee=0mW/cm²	Collector-to-Emitter Saturation Voltage	V _{CE (SAT)}	-	-	-	0.8	V	I _C =2mA Ee=20mW/cm²	Collector Dark Current	I _{CEO}	-	-	-	100	nA	V _{CE} =10V Ee=0mW/cm²	Rise Time (10% to 90%)	T _R	-	-	15	-	μs	V _{CE} =5V I _C =1mA R _L =1KΩ	Fall Time (90% to 10%)	T _F	-	-	15	-	μs		On State Collector Current	I _(ON)	APT2012P3BT	0.1	0.3	-	mA	V _{CE} =5V, Ee=1mW/cm² λ=940nm	APA3010P3BT-GX	0.1	0.3	AA3528P3S	0.2	0.4	WP3DP3BT	0.1	0.2	WP7113P3BT	0.7	3
Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition																																																																													
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Collector Dark Current	I _{CEO}	-	-	-	100	nA	V _{CE} =10V Ee=0mW/cm²																																																																													
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		WP7113P3BT	0.7	3																																																																																
Absolute Maximum Rating (Ta =25°C) <table><tr><th>Parameter</th><th>Maximum Ratings</th></tr><tr><td>Collector-to-Emitter Voltage</td><td>30V</td></tr><tr><td>Emitter-to-Collector Voltage</td><td>5V</td></tr><tr><td>Power Dissipation at (or below) 25°C Free Air Temperature</td><td>100mW</td></tr><tr><td>Operating Temperature Range</td><td>-40°C~ +85°C</td></tr><tr><td>Storage Temperature Range</td><td>-40°C~ +85°C</td></tr><tr><td>WP3DP3BT WP7113P3BT Lead Soldering Temperature (>5mm For 5sec)</td><td>260°C</td></tr></table>									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 WP7113P3BT Lead Soldering Temperature (>5mm For 5sec)	260°C																																																														
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3.0mm x 1.0mm x 2.0mm (1104 Right Angle)		  APA3010 Units : mm(inch) Tolerance : ±0.15(0.006)
3.5mm x 2.8mm x 1.9mm		  AA3528 Units : mm(inch) Tolerance : ±0.25(0.01)

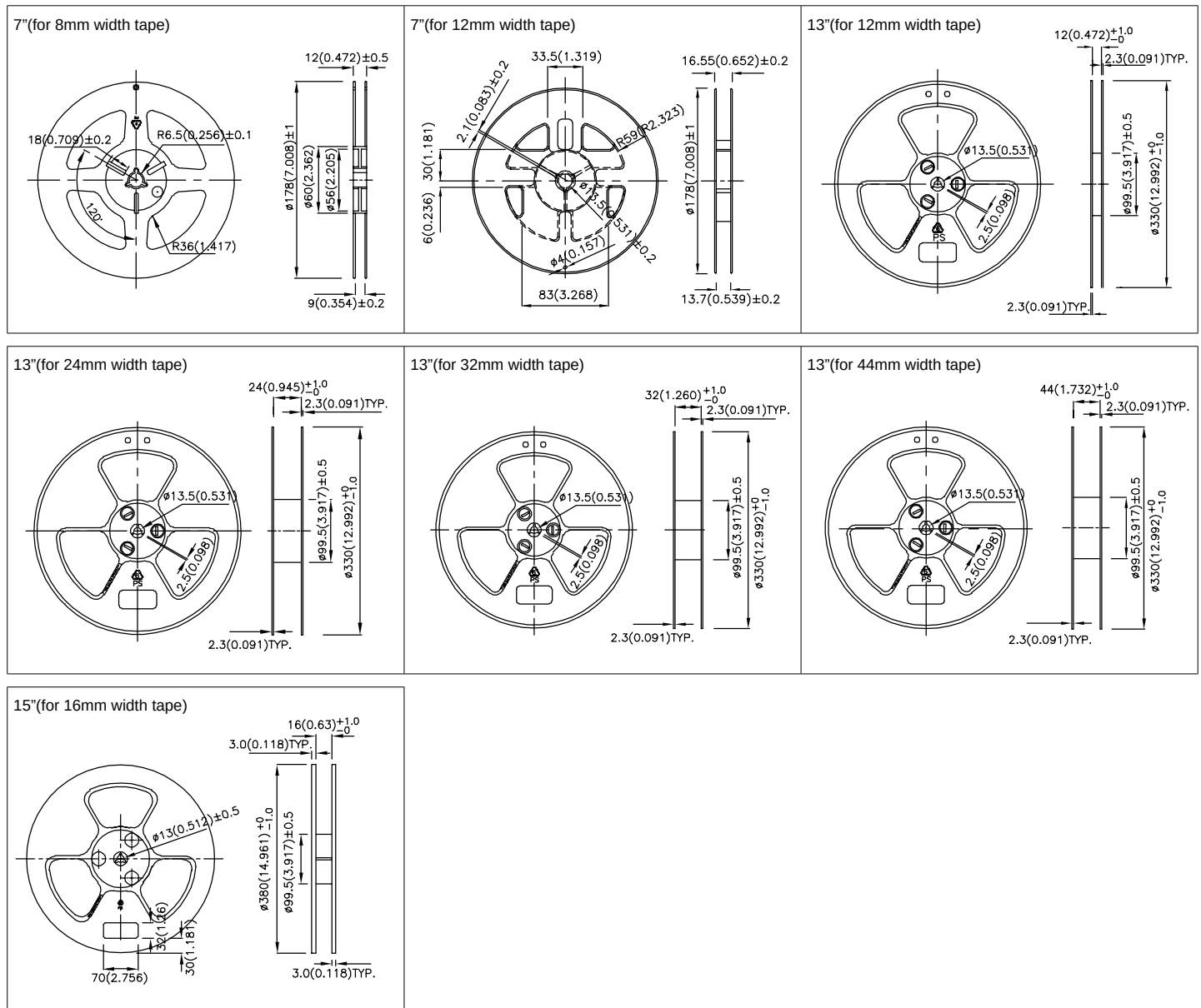
T-1 (3mm) Phototransistor		  WP3D Units : mm(inch) Tolerance : ±0.25(0.01)
T-1 3/4 (5mm) Phototransistor		  WP7113 Units : mm(inch) Tolerance : ±0.25(0.01)

Technical Notes

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SMD TAPE SPECIFICATIONS

Reel Dimensions	Part Number		Reel Dimensions	Part Number	Reel Dimensions	Part Number
7" (for 8mm width tape)	AA2214	APG1608	7" (for 12mm width tape)	AA3527A AA3528 AA4040 AAAF3529 AM2520xxx03 AM2520xxx09 APED3528 APF3236	13" (for 12mm width tape)	AA3535
	AA2810A	APGA1602			13" (for 24mm width tape)	ACDX02-41 ACDX03-41 ACSX02-41 ACSX03-41 ACSX04-41
	AA3021	APHB1608			13" (for 32mm width tape)	ACDX04-41 ACPSX04-41 ACSA56-51 ACSX56-41
	AM23	APHBM2012			13" (for 44mm width tape)	ACDA56-51 ACDX56-41 ACSX08-51
7" (for 8mm width tape)	APA1606	APHCM2012	7" (for 12mm width tape)	AA3527A AA3528 AA4040 AAAF3529 AM2520xxx03 AM2520xxx09 APED3528 APF3236	15" (for 16mm width tape)	AAAF5051
	APA2107	APHHS1005				
	APA3010	APL3015				
	APB3025	APT1608				
	APB3227	APT2012				
	APBA3010	APT3216				
	APBD3224	APTB1612				
	APBDA3020	APTB1615				
	APBL3025	APTD1608				
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	APDA3020	APTF1616				
	APFA3010	APTL3216				
	APG1005	APTR3216				



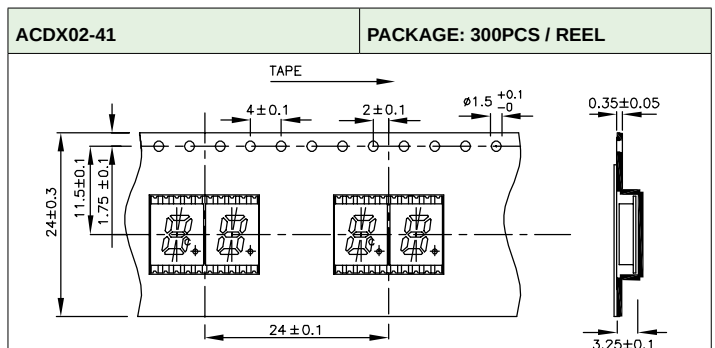
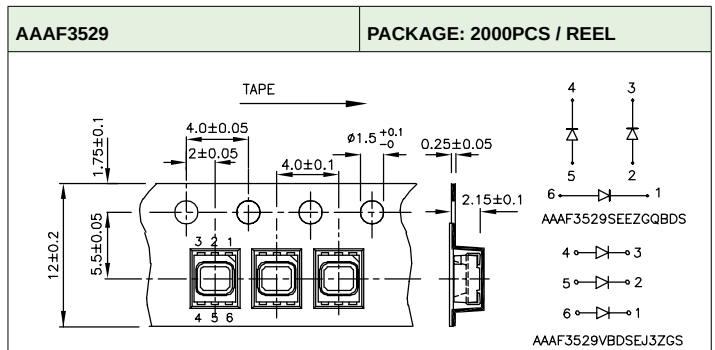
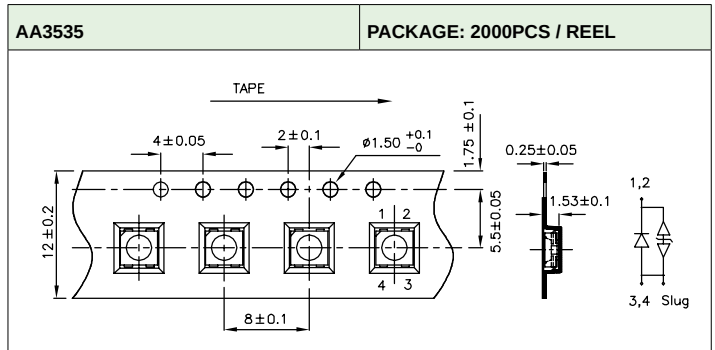
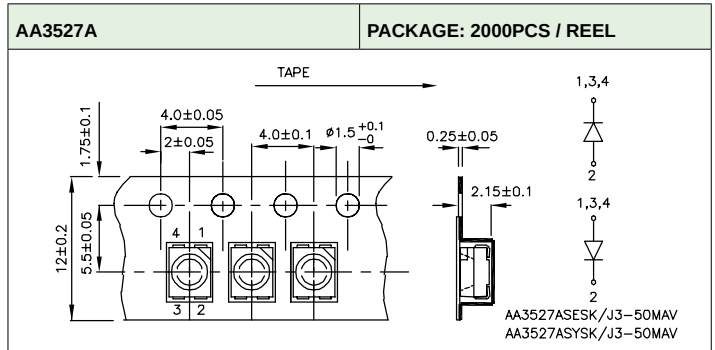
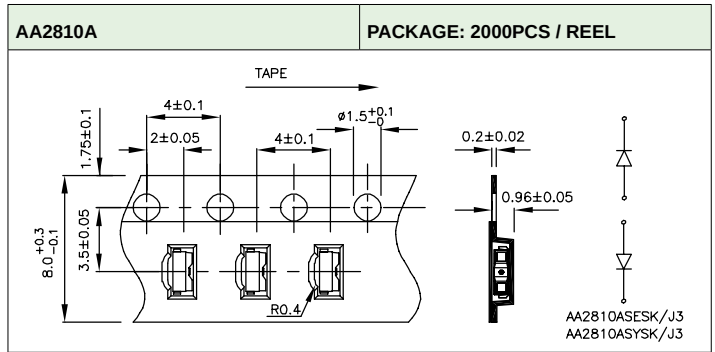
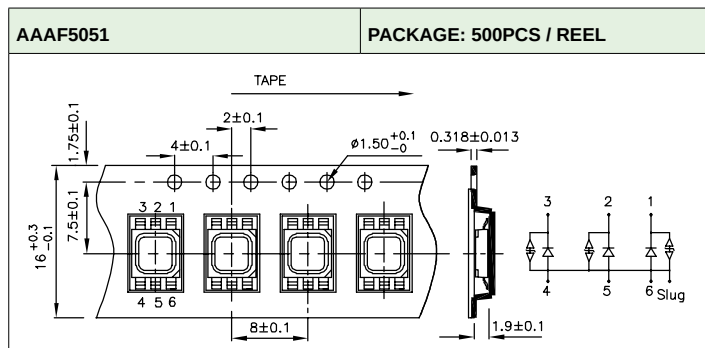
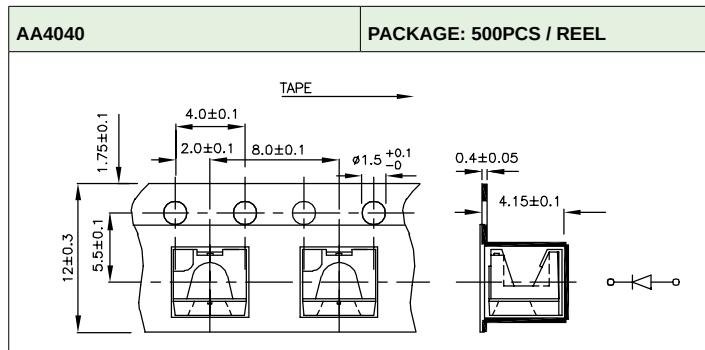
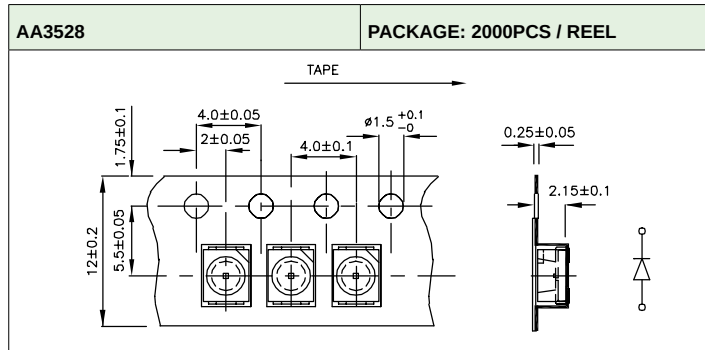
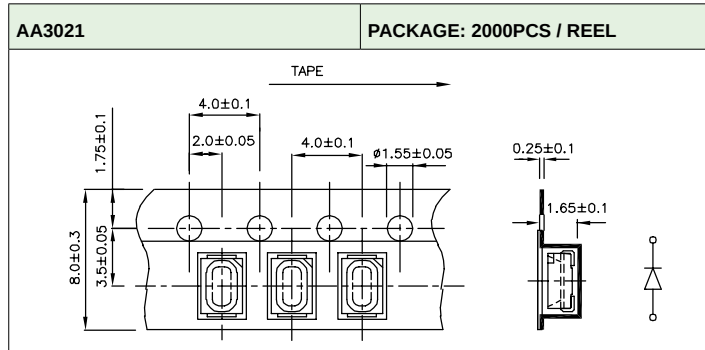
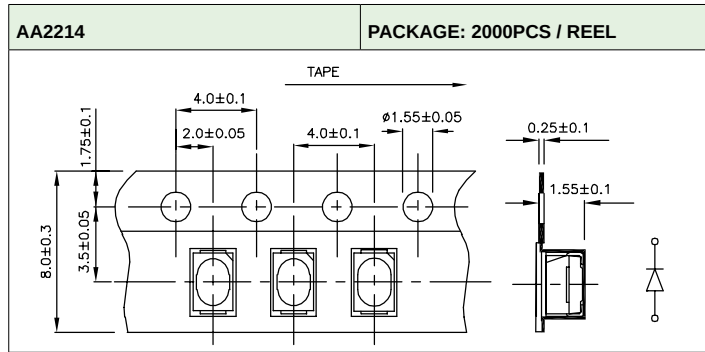
NOTE: 1. All dimensions are in millimeters(inches).

SMD TAPE SPECIFICATIONS

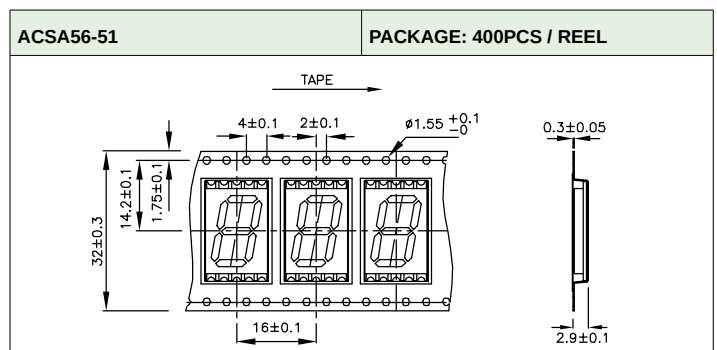
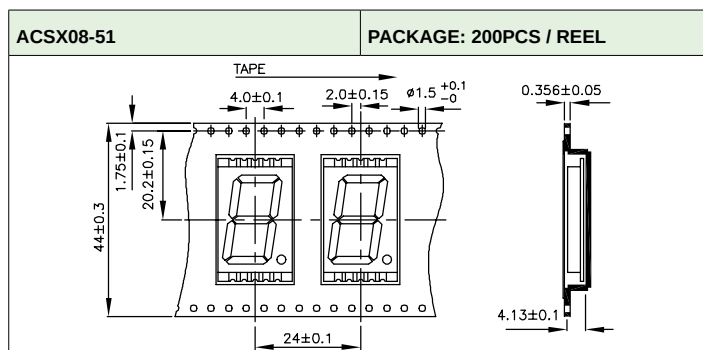
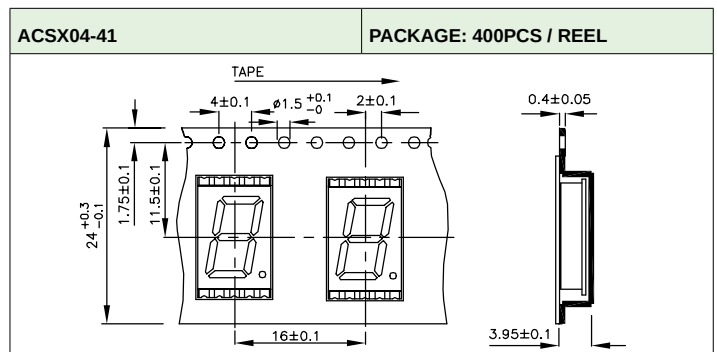
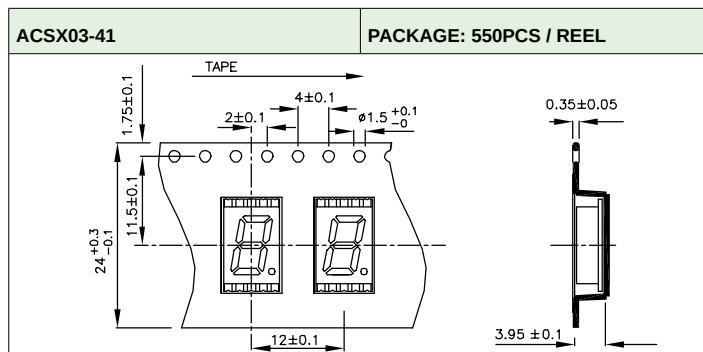
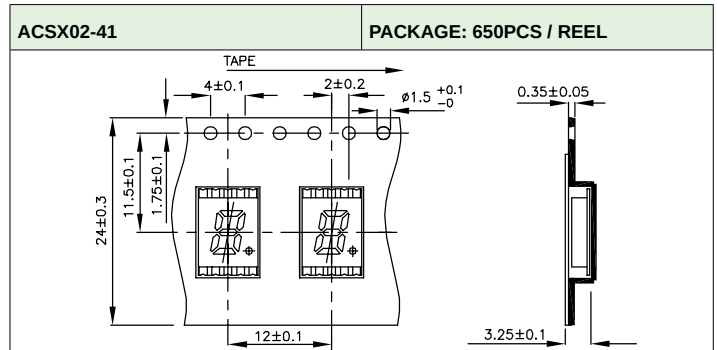
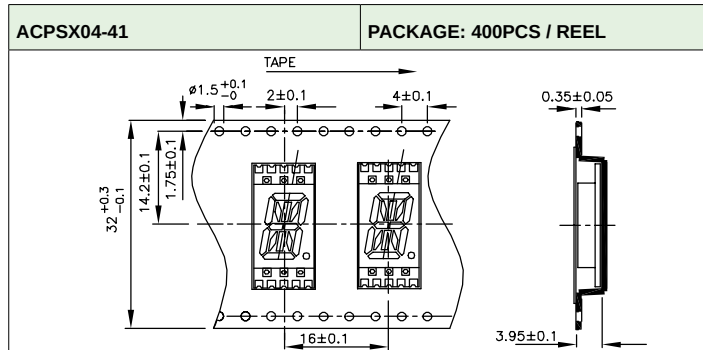
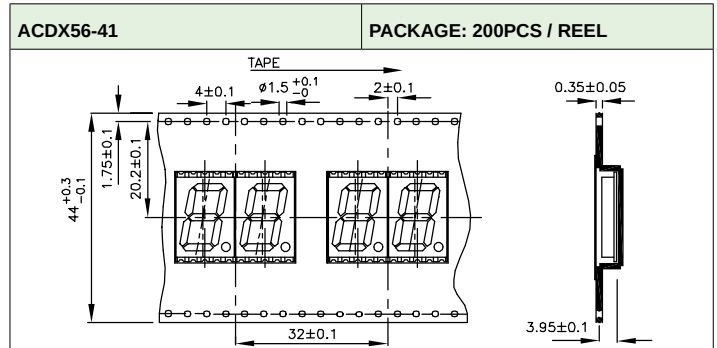
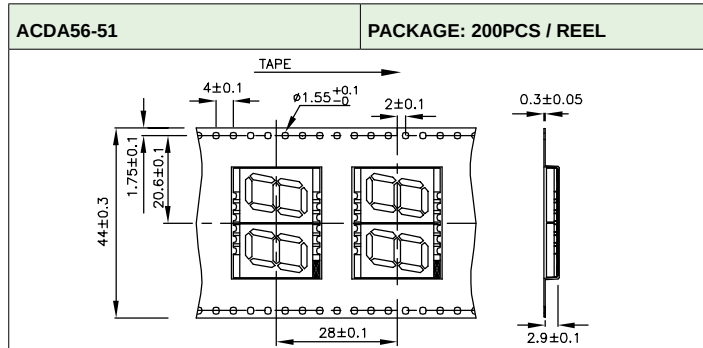
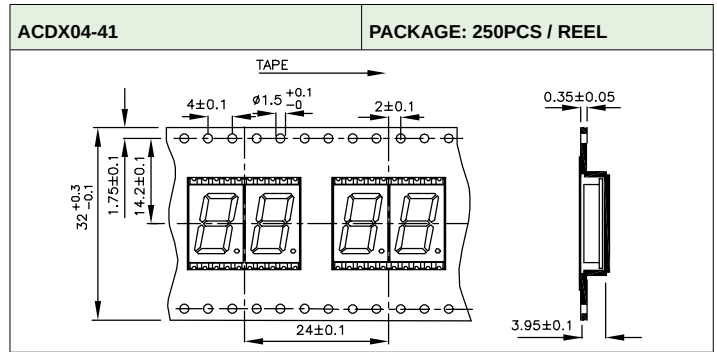
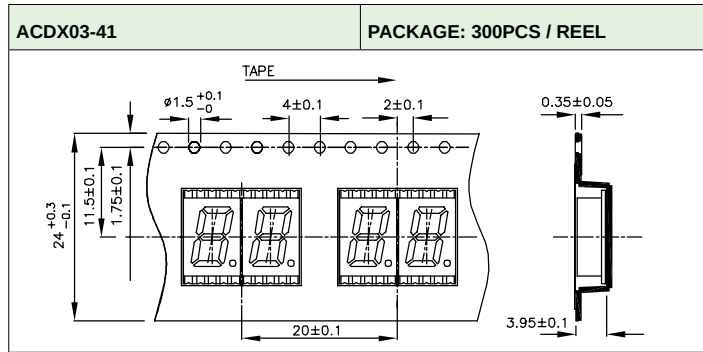
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TECHNICAL NOTES

SMD Tape Specifications



SMD TAPE SPECIFICATIONS



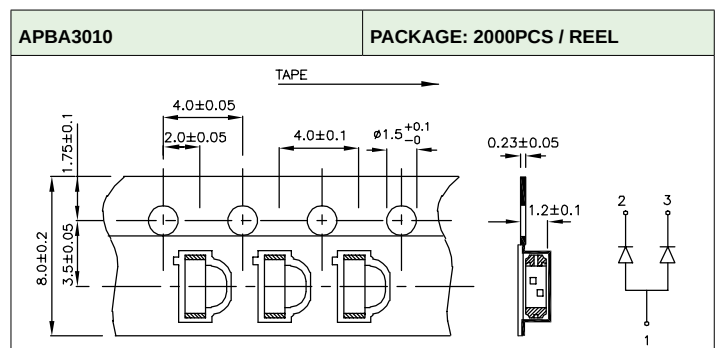
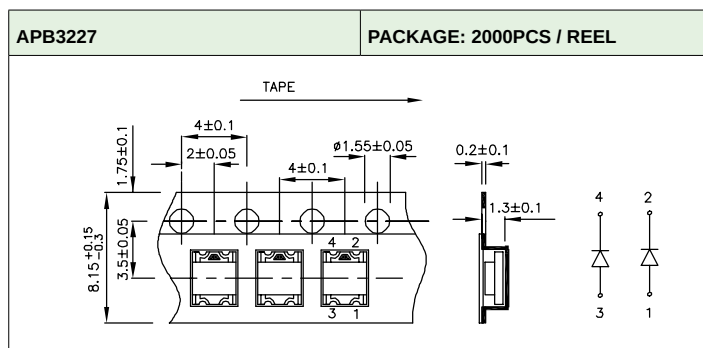
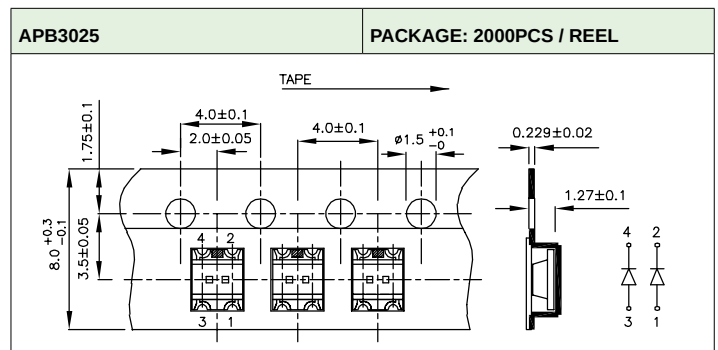
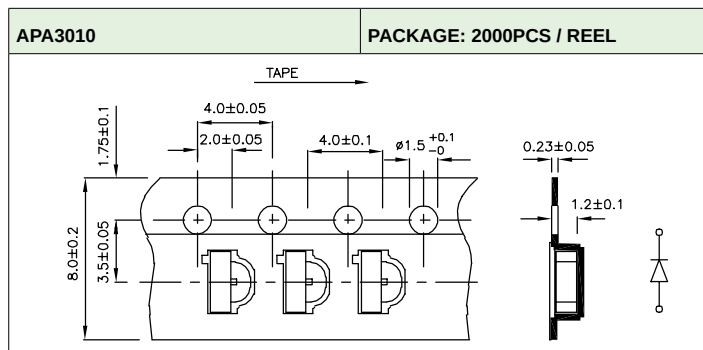
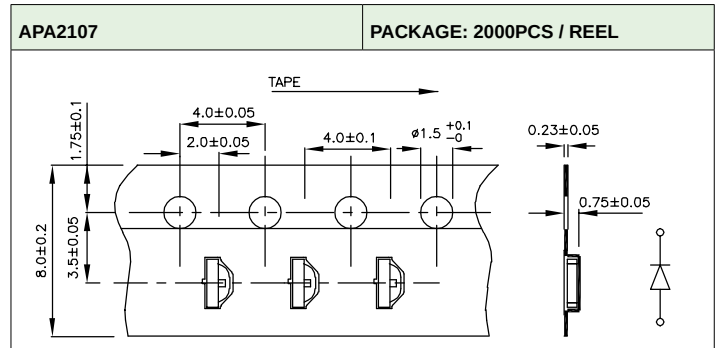
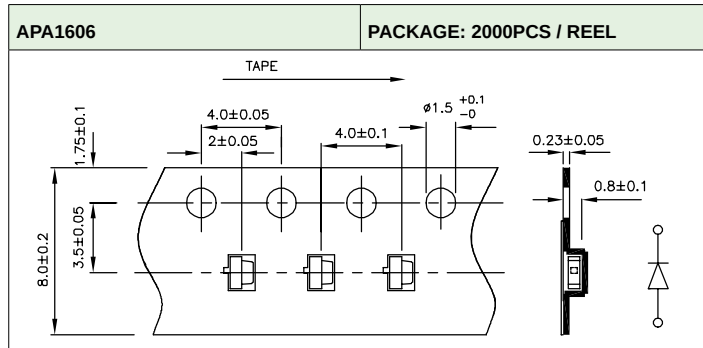
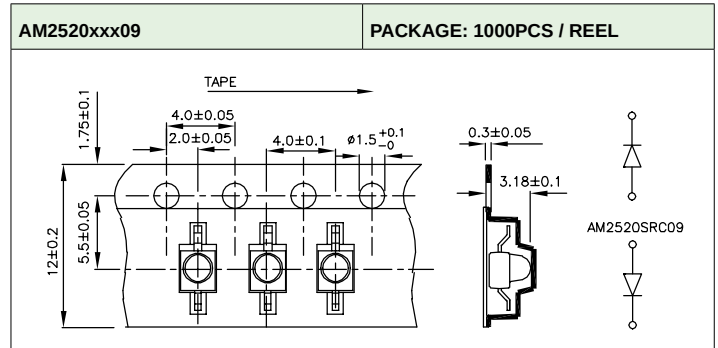
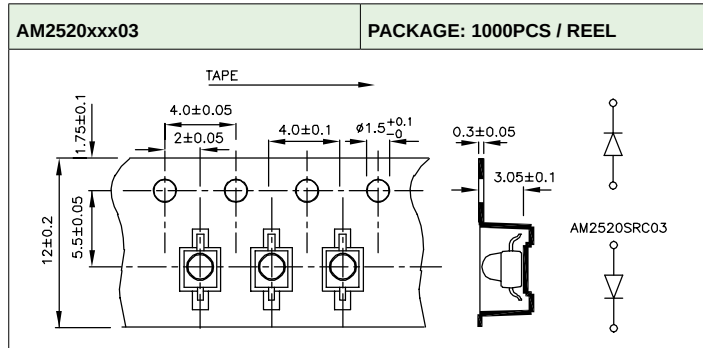
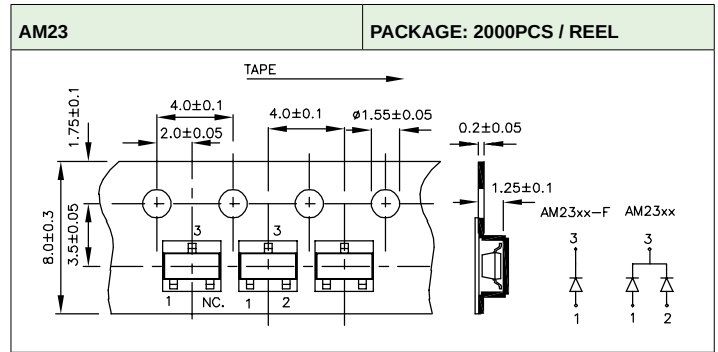
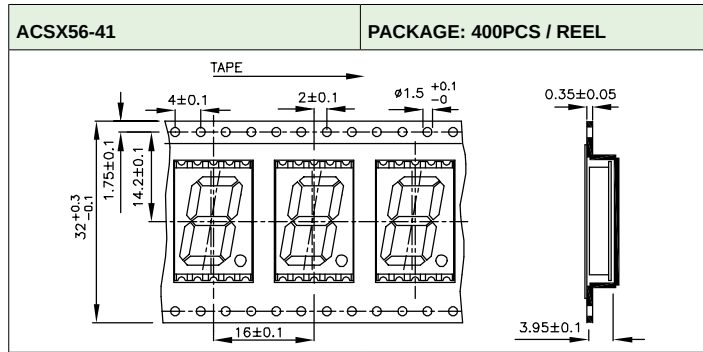
NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS

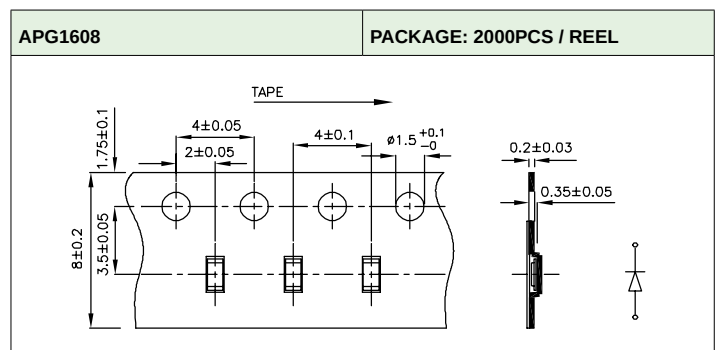
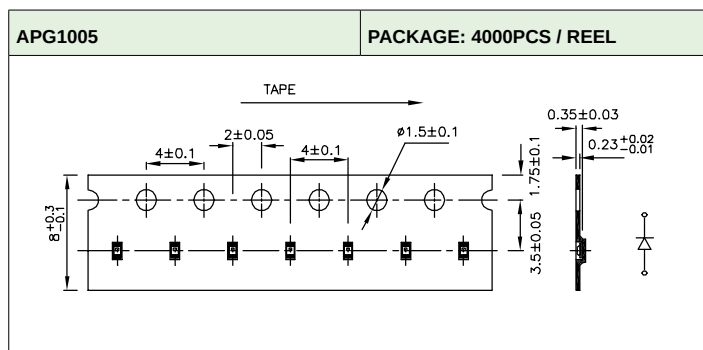
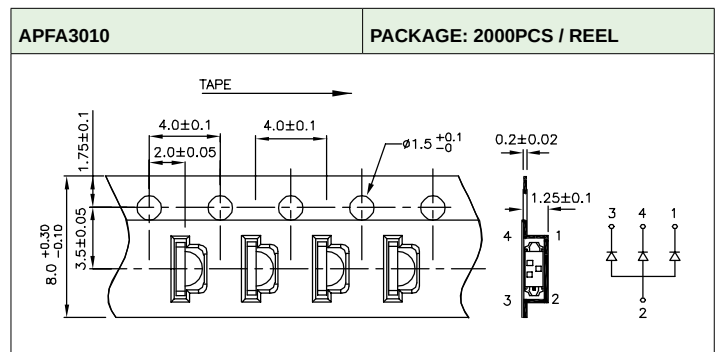
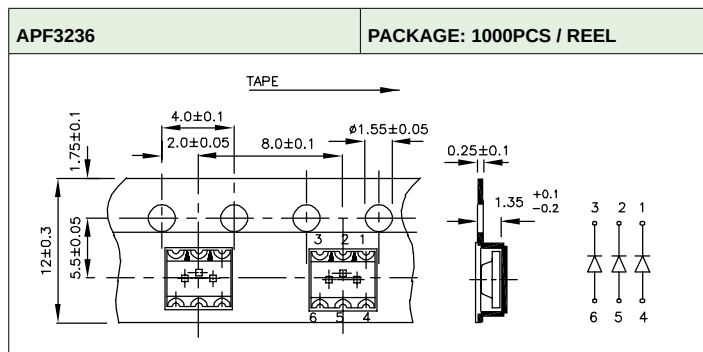
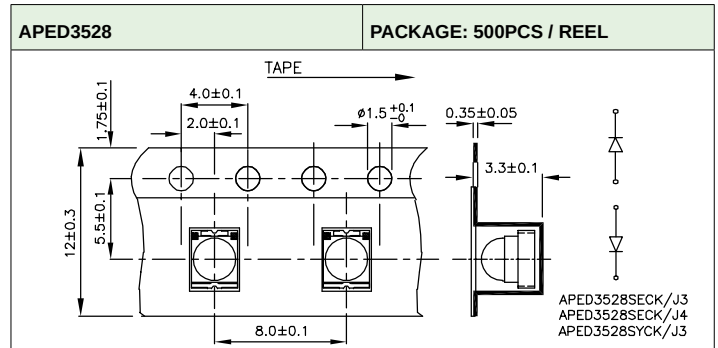
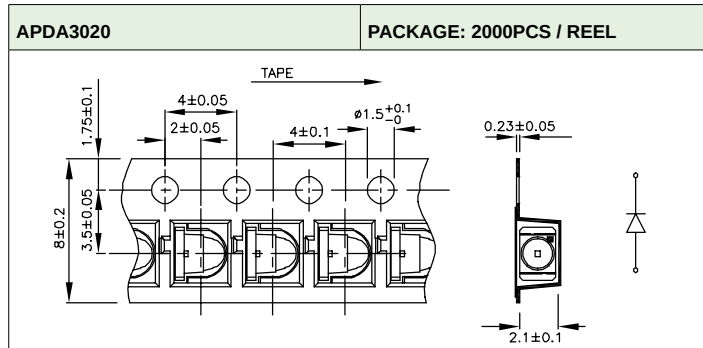
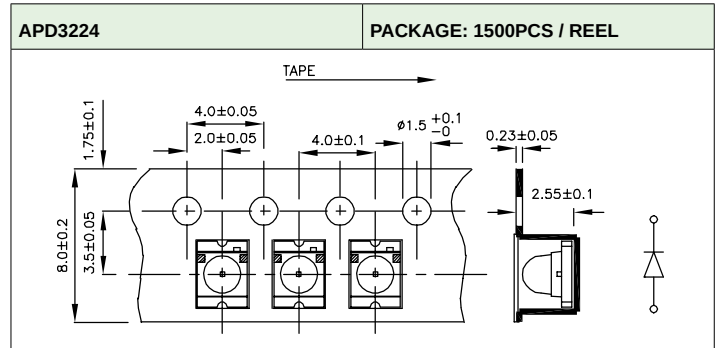
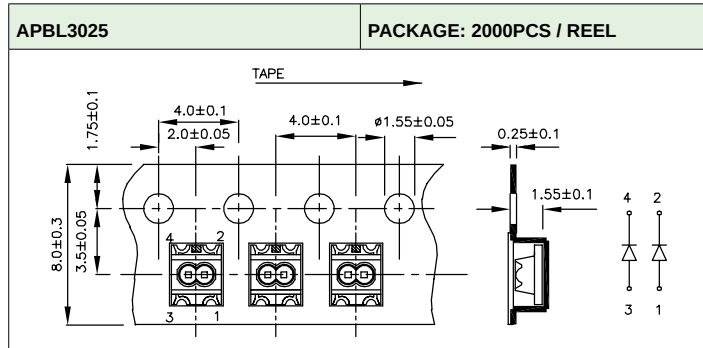
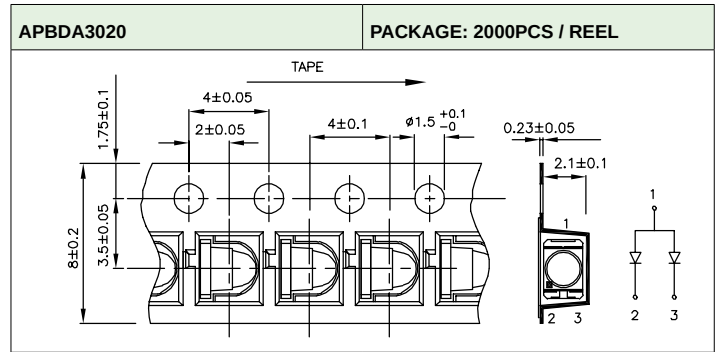
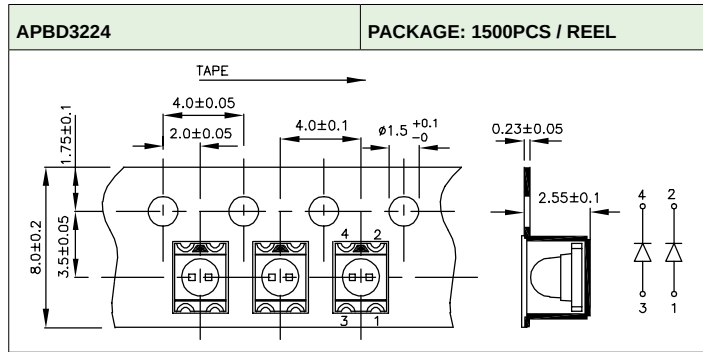
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TECHNICAL NOTES

SMD Tape Specifications

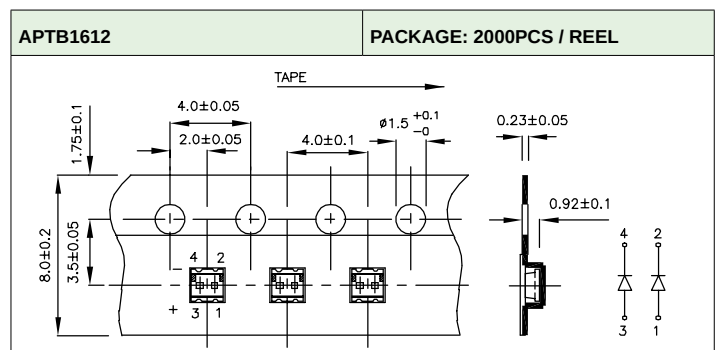
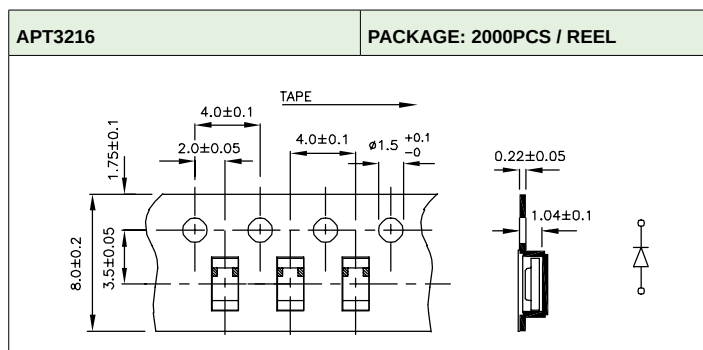
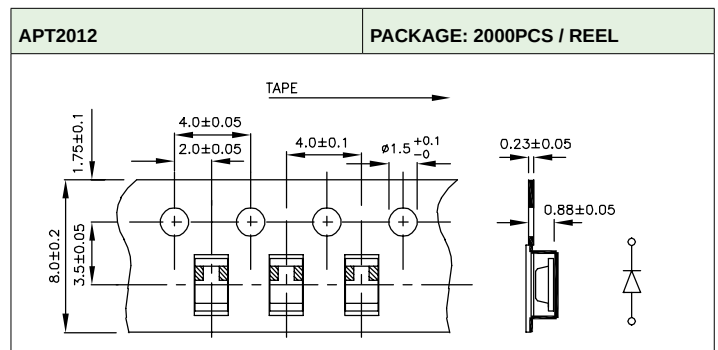
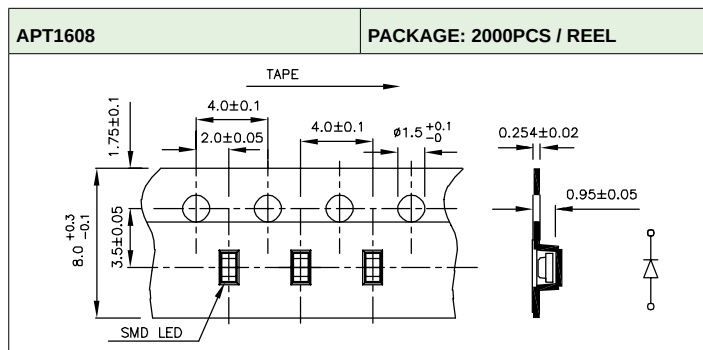
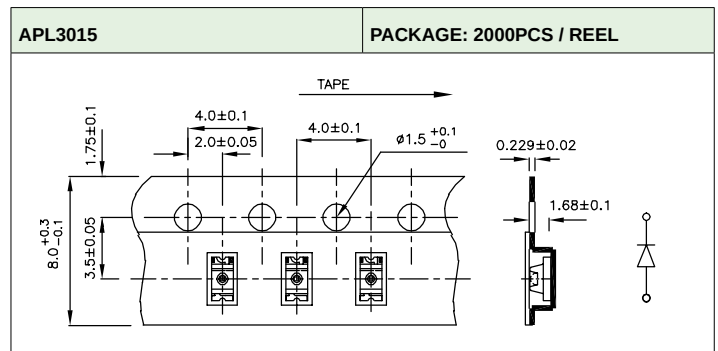
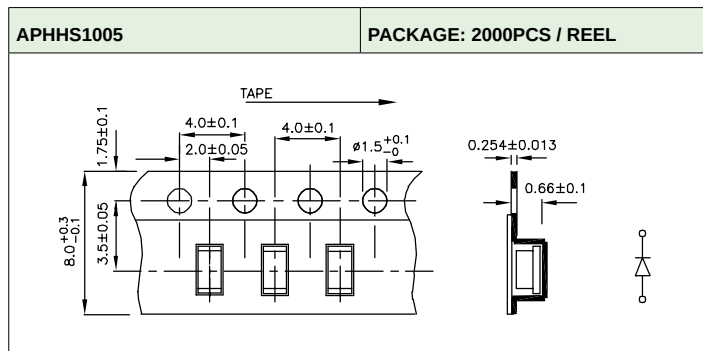
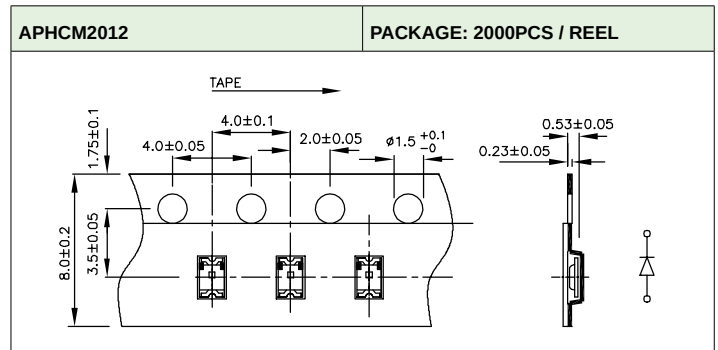
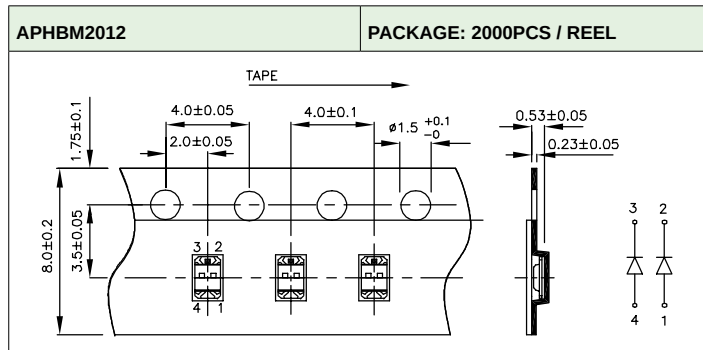
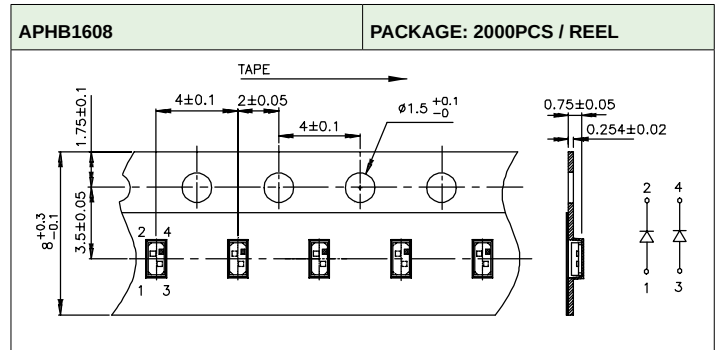
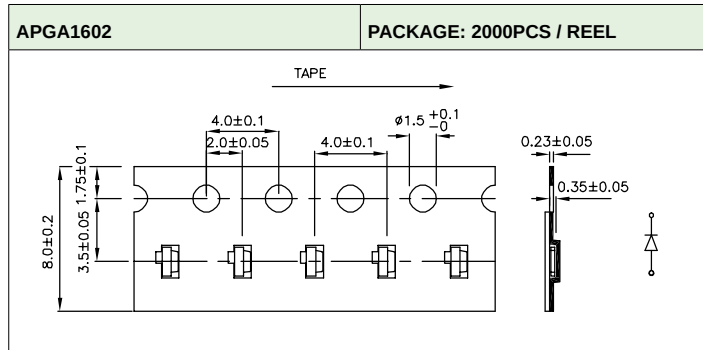


SMD TAPE SPECIFICATIONS

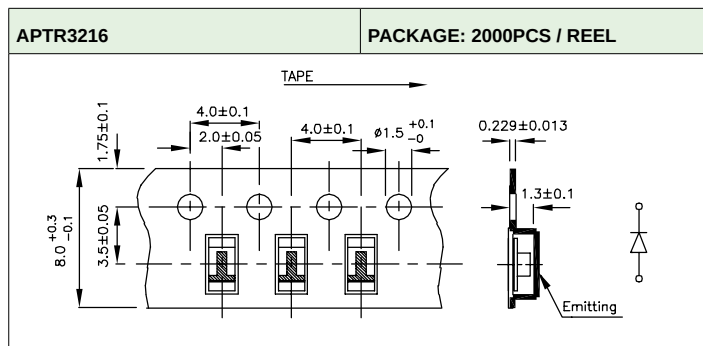
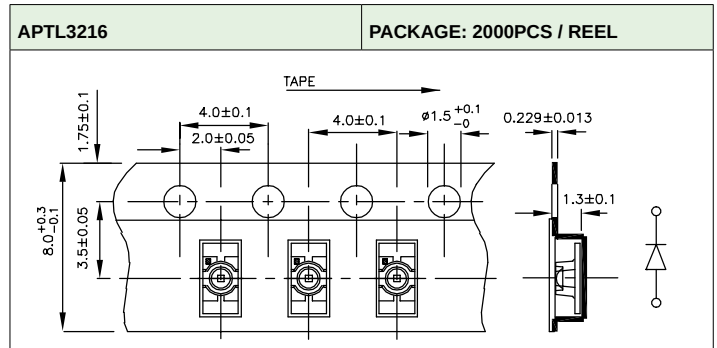
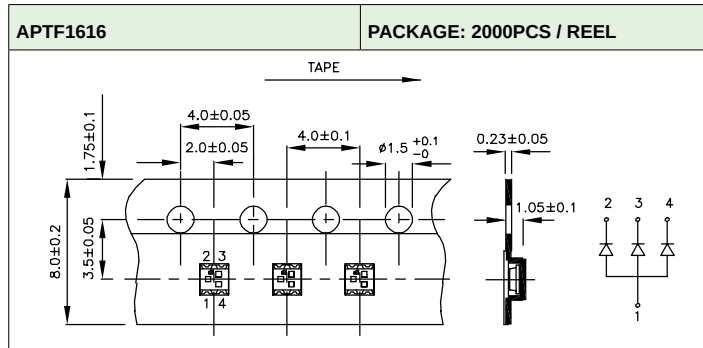
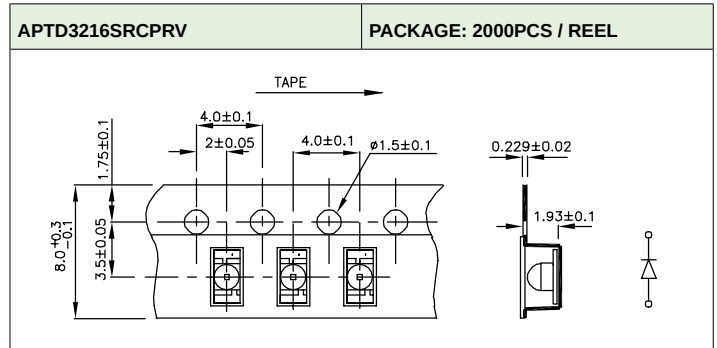
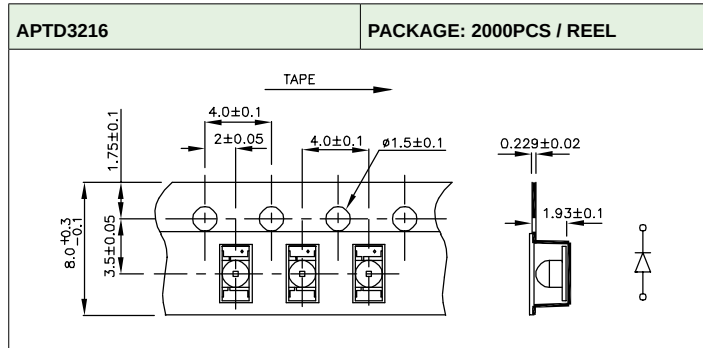
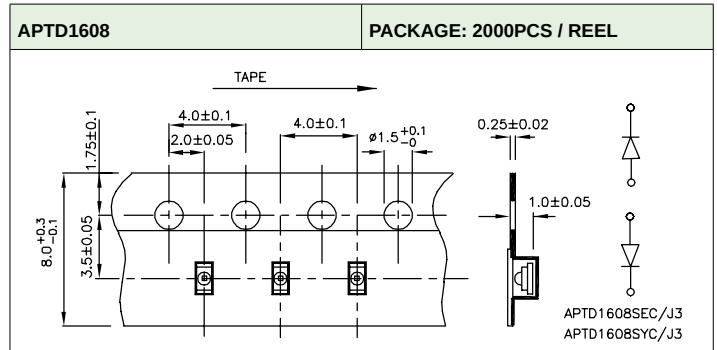
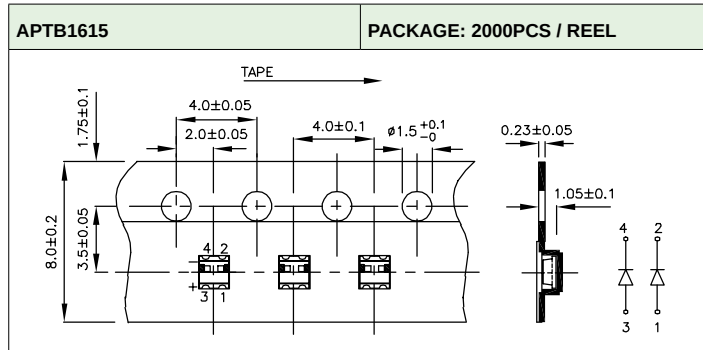


NOTE: 1. All dimensions are in millimeters.

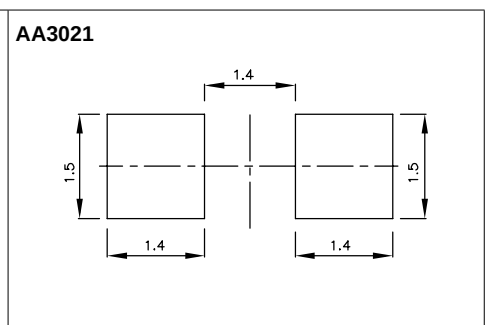
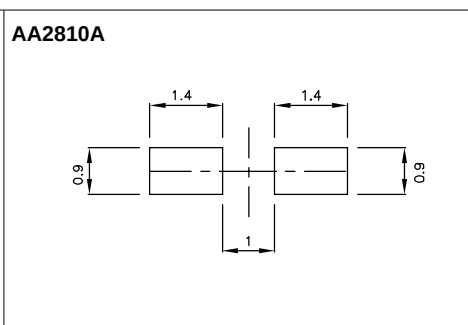
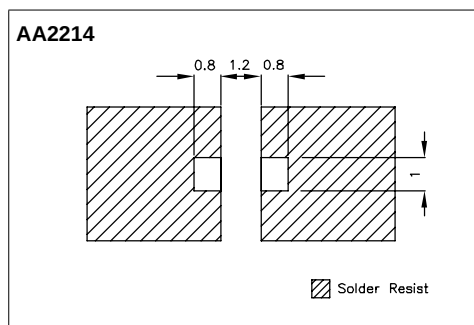
SMD TAPE SPECIFICATIONS



SMD TAPE SPECIFICATIONS



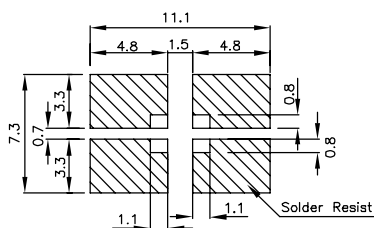
RECOMMENDED SOLDERING PATTERN



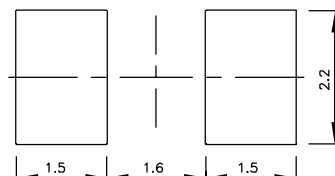
NOTES: 1. All dimensions are in millimeters.
2. Tolerance is ±0.1mm unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

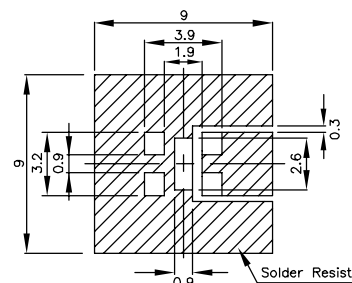
AA3527A



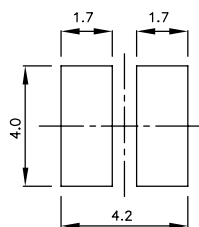
AA3528, APED3528



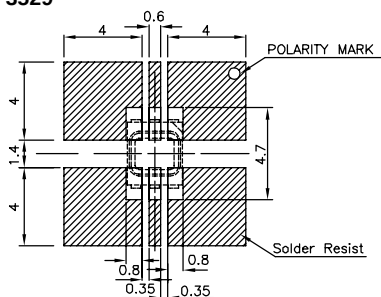
AA3535



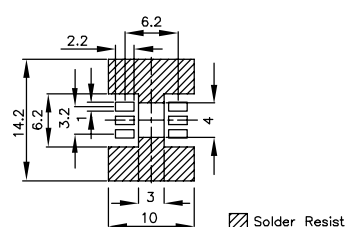
AA4040



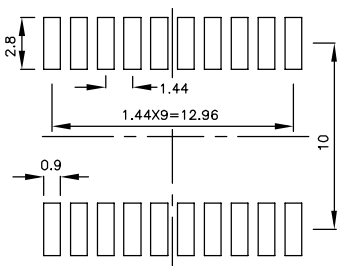
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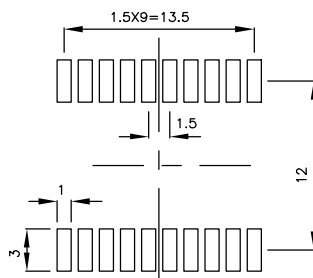
AAAF5051



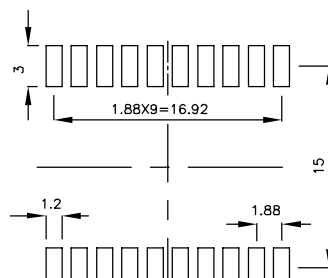
ACDX02-41



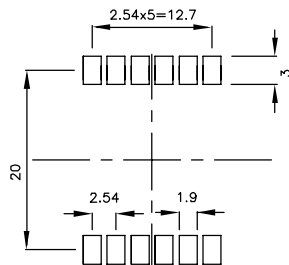
ACDX03-41



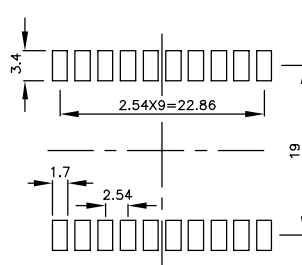
ACDX04-41



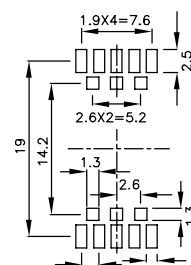
ACDA56-51



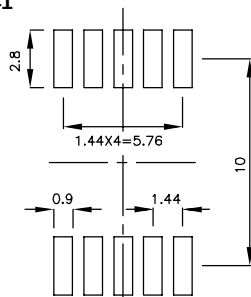
ACDX56-41



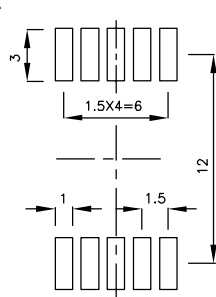
ACPSX04-41



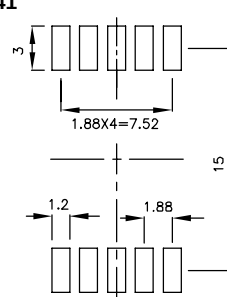
ACSX02-41



ACSX03-41

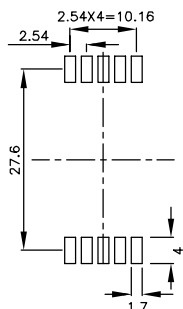


ACSX04-41

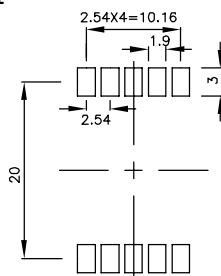


RECOMMENDED SOLDERING PATTERN

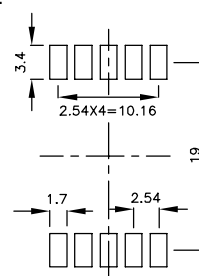
ACSX08-51



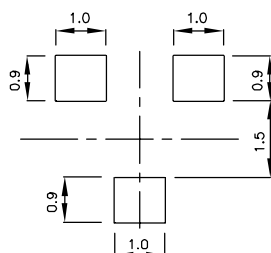
ACSA56-51



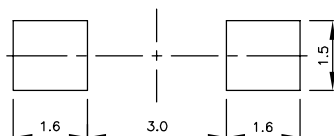
ACSX56-41



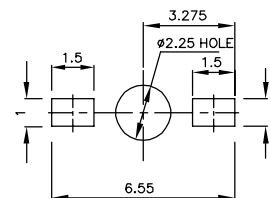
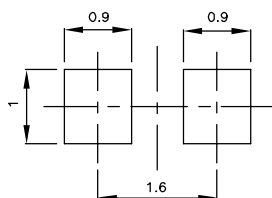
AM23-F,AM23xx



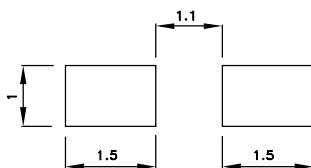
AM2520xxx03



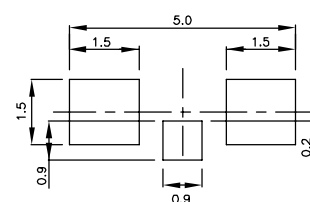
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**APA1606**

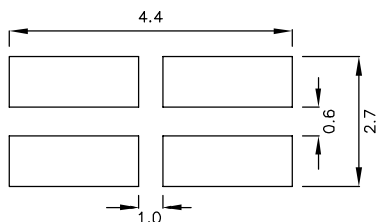
APA2107



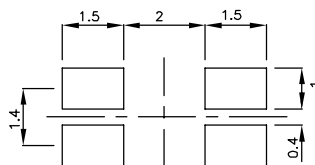
APA3010, APBA3010



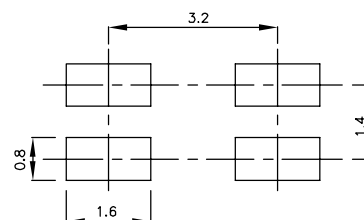
APB3025, APBL3025



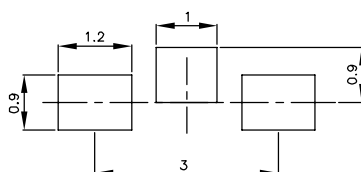
APB3227



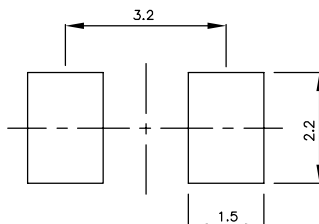
APBD3224



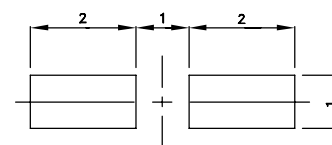
APBDA3020



APD3224



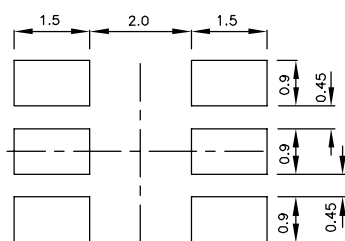
APDA3020



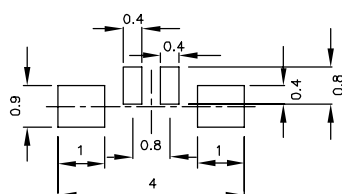
NOTES: 1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

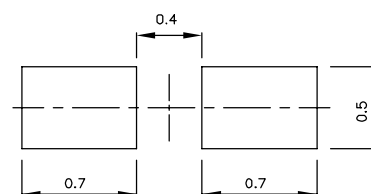
APF3236



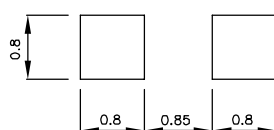
APFA3010



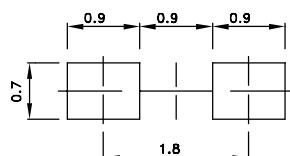
APG1005, APHHS1005



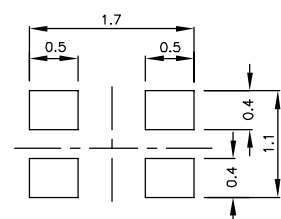
APG1608, APT1608, APTD1608



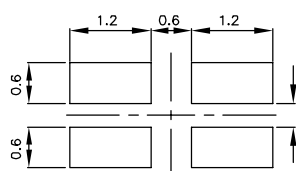
APGA1602



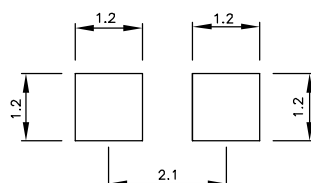
APHB1608



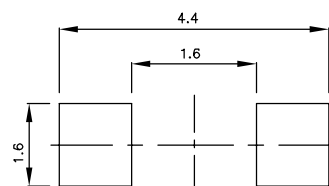
APHBM2012



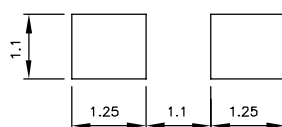
APHCM2012



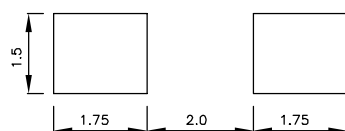
APL3015



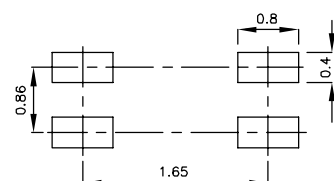
APT2012



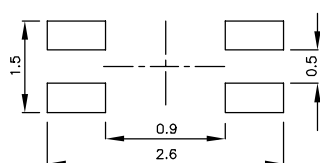
APT3216, APTD3216



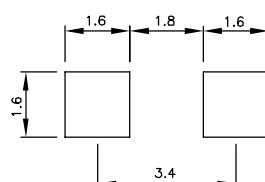
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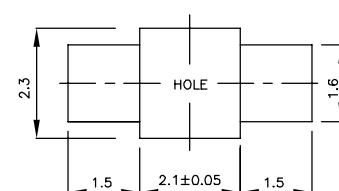
APTB1615, APTF1616



APTL3216



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 Hyper Red (AlGaInP)	SUR/E Hyper Red (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	5	V
Forward current	I _F	30	25	30	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	185	200	mA
Power dissipation	P _D	75	62.5	75	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	- 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		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 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	1.9	V
I _F =10mA		1.9	2.05	1.8	1.8	1.85	1.85	1.85	1.8	
I _F =2mA		1.7	1.85	1.65	1.65	1.75	1.75	1.7	1.7	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	627	700	655	660	645	645	645	645	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	617	635	640	640	630	630	630	630	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	45	45	20	20	28	20	27	25	nm
Capacitance V _F =0V, f=1MHZ	C	15	40	45	45	35	35	45	45	pF

TECHNICAL DATA

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TECHNICAL NOTES

Technical Data

Absolute maximum ratings (T _A =25°C)		SEK/J3 Hyper Red (AlGaInP)	SE/J3 Hyper Red (AlGaInP)	SE/E/KA Hyper Red (AlGaInP)	SEK/E/TT Hyper Red (AlGaInP)	SE/E Hyper Red (AlGaInP)	SEK/J4 Super Bright Orange (AlGaInP)	SE/J4 Super Bright Orange (AlGaInP)	SEK/TT Super Bright Orange (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	5	V
Forward current	I _F	30	30	20	25	30	30	30	25	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	150	150	100	120	195	150	150	120	mA
Power dissipation	P _D	84	84	48	60	75	84	84	60	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		SEK/J3 Hyper Red (AlGaInP)	SE/J3 Hyper Red (AlGaInP)	SE/E/KA Hyper Red (AlGaInP)	SEK/E/TT Hyper Red (AlGaInP)	SE/E Hyper Red (AlGaInP)	SEK/J4 Super Bright Orange (AlGaInP)	SE/J4 Super Bright Orange (AlGaInP)	SEK/TT Super Bright Orange (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.2	2.2	2.05	2.0	2.0	2.2	2.2	2.05	V
I _F =10mA		2.0	2.0	1.97	1.93	1.9	2.0	2.0	2.01	
I _F =2mA		1.8	1.8	1.85	1.8	1.8	1.8	1.8	1.93	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.8	2.8	2.4	2.4	2.5	2.8	2.8	2.4	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	640	640	632	632	630	611	611	611	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	625	625	624	624	621	605	605	605	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	20	25	20	20	20	17	17	17	nm
Capacitance V _F =0V, f=1MHZ	C	27	27	25	25	25	27	27	15	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK/T Super Bright Orange (AlGaInP)	SE Super Bright Orange (AlGaInP)	G,SG Green, Super Bright Green (GaP)	CG/KA Green (AlGaInP)	CGK/TT Green (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	V
Forward current	I _F	25	30	30	30	25	20	25	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	145	195	150	195	140	100	120	mA
Power dissipation	P _D	62.5	75	75	75	62.5	48	60	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		N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK/T Super Bright Orange (AlGaInP)	SE Super Bright Orange (AlGaInP)	G,SG Green, Super Bright Green (GaP)	CG/KA Green (AlGaInP)	CGK/TT Green (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.05	2.1	2.05	2.0	2.2	2.05	2.0	V
I _F =10mA		1.95	2.0	1.95	1.9	2.0	2.0	1.97	
I _F =2mA		1.85	1.85	1.8	1.8	1.9	1.92	1.87	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.5	2.5	2.4	2.4	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	607	610	610	610	565	573	572	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	602	601	601	601	568	571	571	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	35	29	17	29	30	15	20	nm
Capacitance V _F =0V, f=1MHZ	C	15	15	15	30	15	15	15	pF

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TECHNICAL NOTES

Technical Data

Absolute maximum ratings (T _A =25°C)		CGK Green (AlGaInP)	CGK/T Green (AlGaInP)	VG/TT Green (InGaN)	ZGK Green (InGaN)	ZG Green (InGaN)	ZG/G Green (InGaN)	Unit
Reverse voltage	V _R	● 5	● 5	● 5	● 5	● 5	● 5	V
Forward current	I _F	30	30	10	25	25	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	150	150	50	150	150	100	mA
Power dissipation	P _D	75	78	35	102.5	102.5	120	mW
LED LAMPS:								
Operating temperature	T _A	- 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	°C
LED DISPLAYS:								
Operating temperature	T _A	- 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	°C

Operating Characteristics		CGK Green (AlGaInP)	CGK/T Green (AlGaInP)	VG/TT Green (InGaN)	ZGK Green (InGaN)	ZG Green (InGaN)	ZG/G Green (InGaN)	Unit
Forward voltage (typ.) I _F =20mA	V _F	● 2.1	● 2.1	● /	● 3.3	● 3.3	● 3.2	V
I _F =10mA		2.0	1.95	3.2	3.0	3.0	3.05	
I _F =2mA		1.9	1.8	2.8	2.65	2.65	2.8	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.6	3.5	4.1	4.1	4.0	V
Reverse current V _R =5V	I _R	10	10	50	50	50	50	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	574	574	518	515	515	520	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	570	570	527	525	525	525	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	20	15	35	35	30	35	nm
Capacitance V _F =0V, f=1MHZ	C	15	15	100	45	45	100	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		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)	SY/J3 Super Bright Yellow (AlGaInP)	SY/KA Super Bright Yellow (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	5	V
Forward current	I _F	30	30	30	30	30	30	20	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	I _{FS}	140	175	150	150	140	140	100	mA
Power dissipation	P _D	75	75	75	75	75	75	48	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		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)	SY/J3 Super Bright Yellow (AlGaInP)	SY/KA Super Bright Yellow (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.1	2.0	2.05	2.0	2.0	2.0	2.05	V
I _F =10mA		1.95	1.95	1.95	1.95	1.95	1.95	1.95	
I _F =2mA		1.85	1.85	1.8	1.8	1.85	1.85	1.8	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.5	2.5	2.5	2.4	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	590	590	590	590	590	590	591	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	588	590	590	590	590	590	589	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	35	20	15	28	20	20	15	nm
Capacitance V _F =0V, f=1MHZ	C	20	20	25	25	45	45	25	pF

TECHNICAL DATA

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TECHNICAL NOTES

Technical Data

Absolute maximum ratings (T _A =25°C)		SYK/TT Super Bright Yellow (AlGaInP)	PB/TT Blue (InGaN)	QB/KA Blue (InGaN)	QB/D Blue (InGaN)	QB/F Blue (InGaN)	VB/D Blue (InGaN)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	25	10	20	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	I _{FS}	120	50	100	150	150	100	mA
Power dissipation	P _D	60	35	70	120	120	120	mW
LED LAMPS:								
Operating temperature	T _A	- 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	°C
LED DISPLAYS:								
Operating temperature	T _A	- 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	°C

Operating Characteristics		SYK/TT Super Bright Yellow (AlGaInP)	PB/TT Blue (InGaN)	QB/KA Blue (InGaN)	QB/D Blue (InGaN)	QB/F Blue (InGaN)	VB/D Blue (InGaN)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.05	/	3.1	3.3	3.3	3.3	V
I _F =10mA		2.01	3.0	2.95	3.0	3.0	3.0	
I _F =2mA		1.94	2.8	2.65	2.65	2.65	2.65	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.4	3.5	3.5	4.0	4.0	4.0	V
Reverse current V _R =5V	I _R	10	50	50	50	50	50	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	591	461	460	460	460	465	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	589	467	463	465	465	470	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	15	22	25	25	25	22	nm
Capacitance V _F =0V, f=1MHZ	C	25	110	100	100	100	100	pF

TECHNICAL DATA 5V/14V 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)	Y Yellow (GaAsP/GaP)	Unit
Reverse voltage	V _R	5	5	5	5	V
Forward voltage (Max.) for 5V	V _F	6	6	6	6	V
Forward voltage (Max.) for 14V	V _F	16	16	16	16	V
Power dissipation for 5V	P _D	85	85	85	85	mW
Power dissipation for 14V	P _D	160	160	160	160	mW
LED LAMPS:						
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:						
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		I Hi.Eff.Red (GaAsP/GaP)	SR Super Bright Red (GaAlAs)	G,SG Green, Super Bright Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Forward current (typ.) V _F =5V	I _F	13	13	11.5	13	mA
Forward current (typ.) V _F =14V	I _F	10.5	10.5	10.5	10.5	mA
Forward current (max.) V _F =5V	I _F	17.5	17.5	17.5	17.5	mA
Forward current (max.) V _F =14V	I _F	13.5	13.5	13.5	13.5	mA
Reverse current V _R =5V	I _R	10	10	10	10	uA
Peak Emission Wavelength V _F =5V,14V	λ _p	627	655	565	590	nm
Dominant Wavelength V _F =5V,14V	λ _D	617	640	568	588	nm
Spectral line half-width V _F =5V,14V	Δλ _{1/2}	45	20	30	35	nm

TECHNICAL DATA FOR BLINKING LED LAMPS

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TECHNICAL NOTES

Technical Data For Blinking LED Lamps

Absolute maximum ratings (T _A =25°C)		I Hi.Eff.Red (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Reverse voltage	V _R	 0.5	 0.5	 0.5	 0.5	 0.5	V
Forward voltage (max.)	V _F	14	14	14	14	14	V
Total Power dissipation	P _D	310	310	310	310	310	mW
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		I Hi.Eff.Red (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Forward current (min.) V _F =3.5V	I _F	 8	 8	 8	 8	 8	mA
Forward current (typ.) V _F =5V	I _F	22	22	22	22	22	mA
Supply current V _F =3.5V ~ 14V	I _{SON}	8 ~ 44	8 ~ 44	8 ~ 44	8 ~ 44	8 ~ 44	mA
Blink frequency V _F =3.5V ~ 14V	f	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	Hz
Peak Emission Wavelength	λ _p	627	700	655	565	590	nm
Dominant Wavelength	λ _D	617	635	640	568	588	nm
Spectral line half-width	Δλ _{1/2}	45	45	20	30	35	nm

TECHNICAL DATA FOR INFRARED

Absolute maximum ratings (T _A =25°C)		F3 (GaAs)	SF4 (GaAlAs)	Unit
Reverse voltage	V _R	5	5	V
Forward current	I _F	50	50	mA
Forward current (Peak) 1/100 Duty Cycle, 10μs Pulse Width	i _{FS}	1.2	1.2	A
Power dissipation	P _D	80	80	mW
LED LAMPS:				
Operating temperature	T _A	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	°C
LED DISPLAYS:				
Operating temperature	T _A	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	°C

Operating Characteristics		F3 (GaAs)	SF4 (GaAlAs)	Unit
Forward voltage (typ.) I _F =20mA	V _F	1.2	1.3	V
Forward voltage (max.) I _F =20mA	V _F	1.6	1.6	V
Reverse current V _R =5V	I _R	10	10	uA
Peak Emission Wavelength I _F =20mA	λ _p	940	880	nm
Spectral line half-width I _F =20mA	Δλ _{1/2}	50	50	nm
Capacitance V _F =0V,f=1MHZ	C	90	90	pF

TECHNICAL DATA

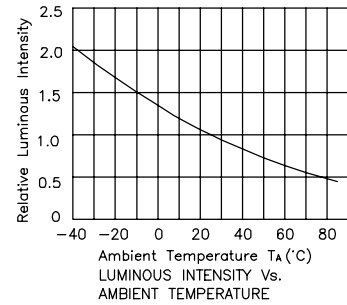
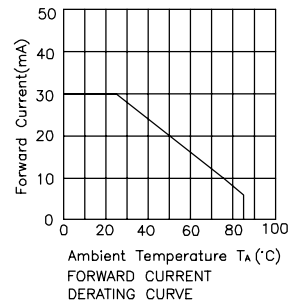
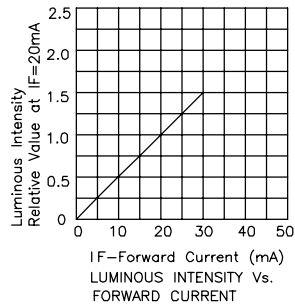
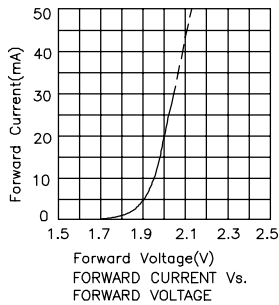
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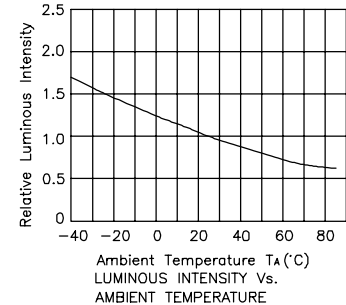
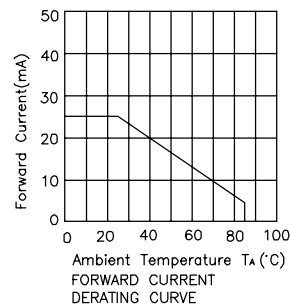
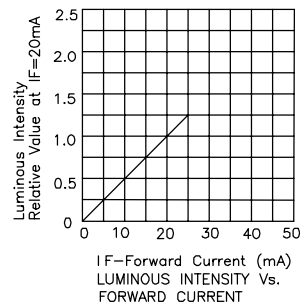
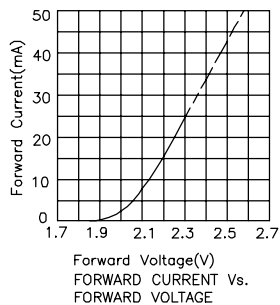
High Efficiency Red,Orange

E,I : GaAsP/GaP



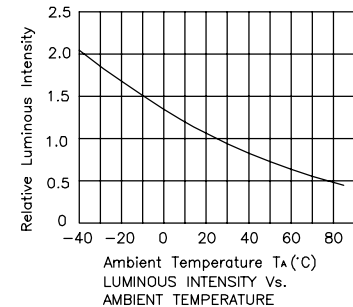
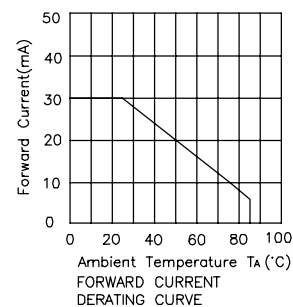
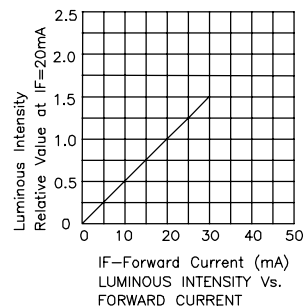
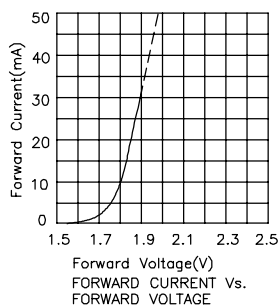
Bright Red

H : GaP



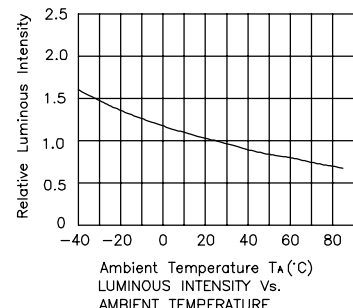
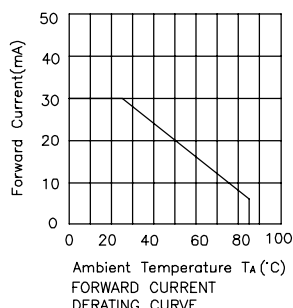
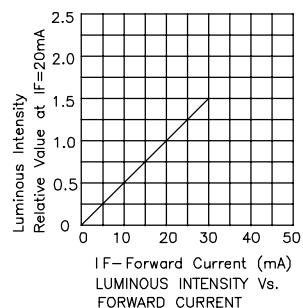
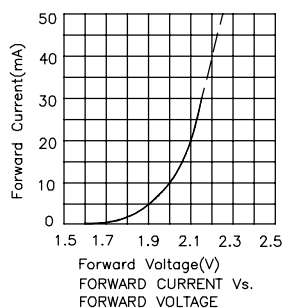
Super Bright Red

SR : GaAlAs



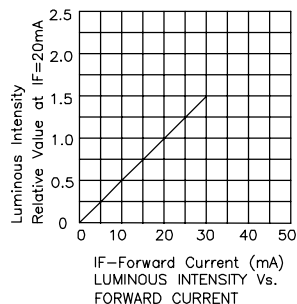
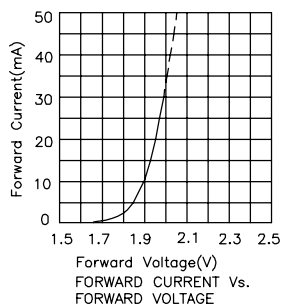
Super Bright Red

SR/J4 : AlGaInP

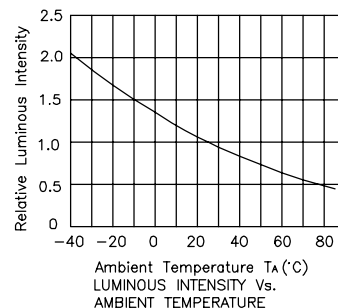
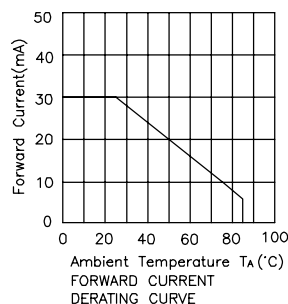


TECHNICAL DATA

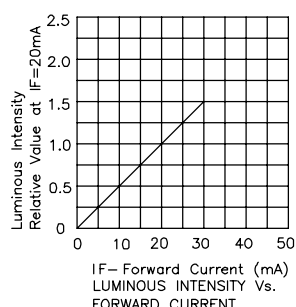
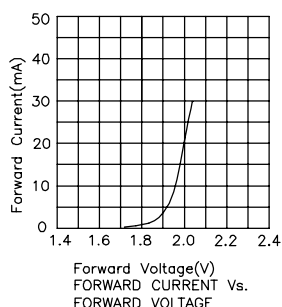
Hyper Red



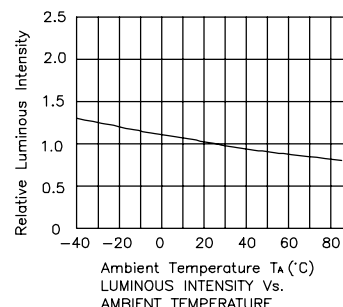
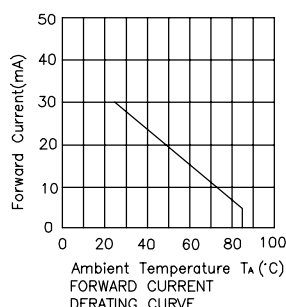
SURK : AlGaInP



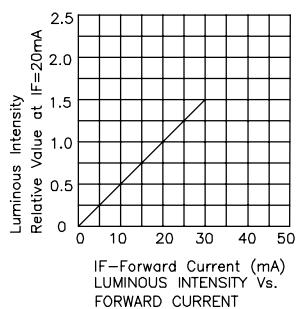
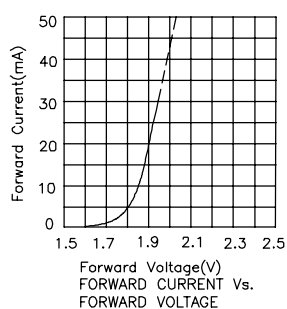
Hyper Red



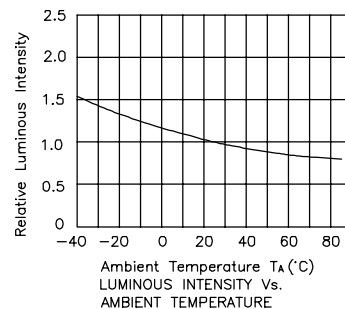
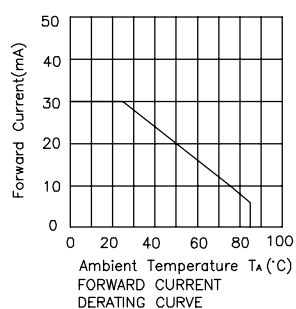
SURK/T : AlGaInP



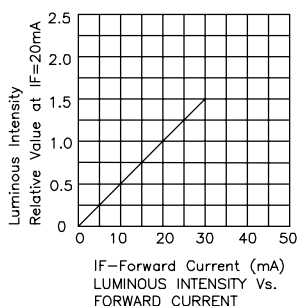
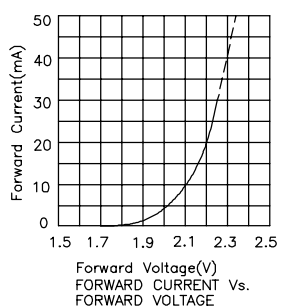
Hyper Red



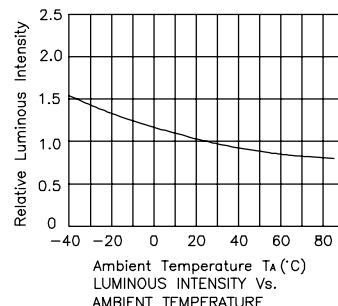
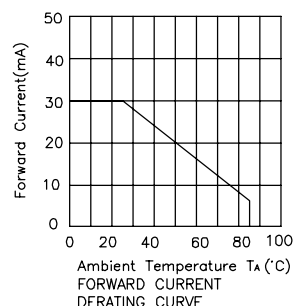
SUR, SUR/E : AlGaInP



Hyper Red



SEK/J3, SE/J3 : AlGaInP



TECHNICAL DATA

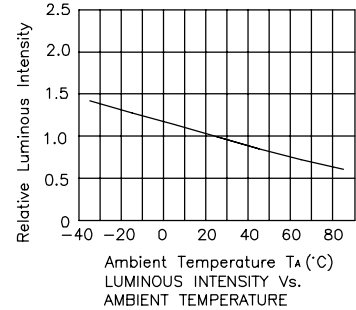
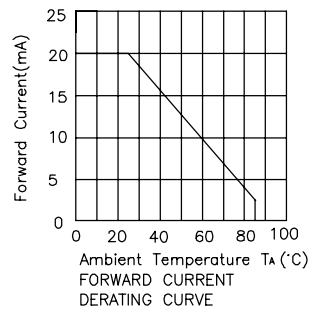
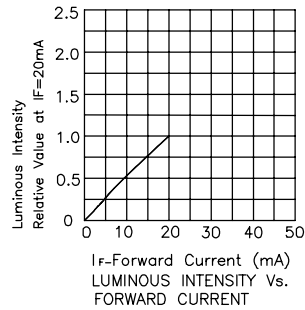
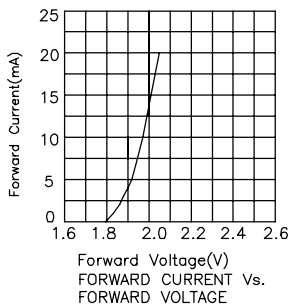
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TECHNICAL NOTES

Technical Data

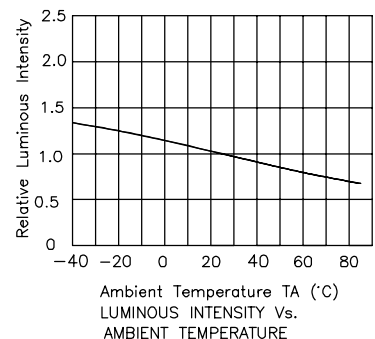
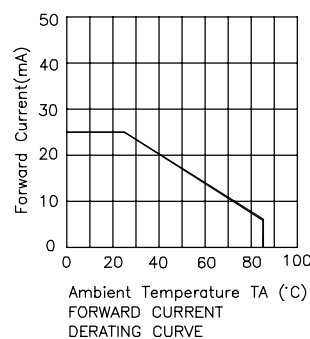
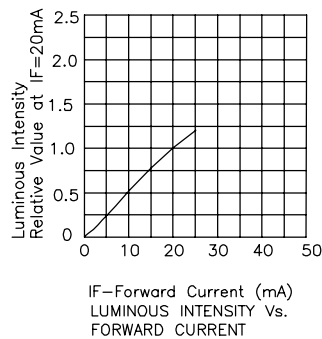
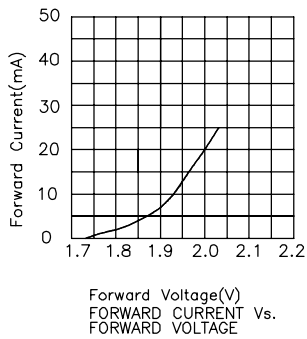
Hyper Red

SE/E/KA : AlGaInP



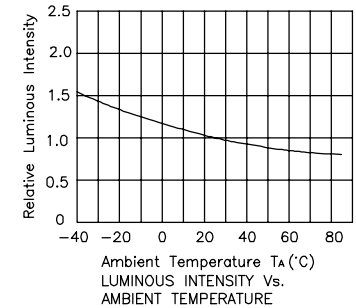
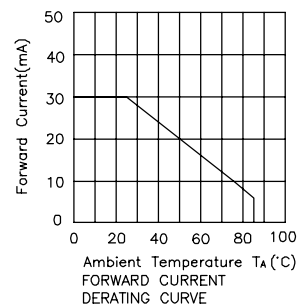
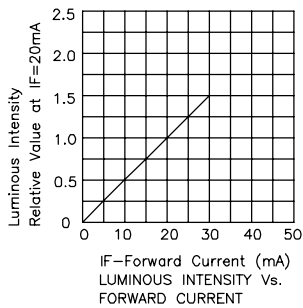
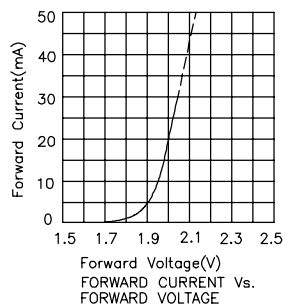
Hyper Red

SEK/E/TT : AlGaInP



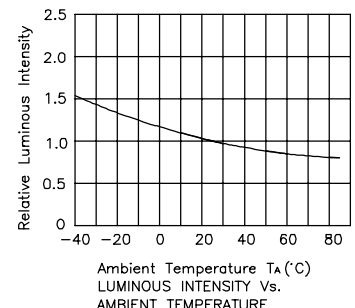
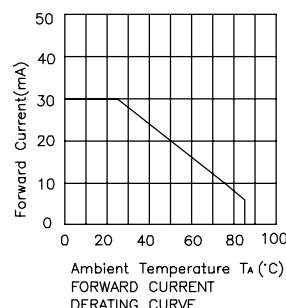
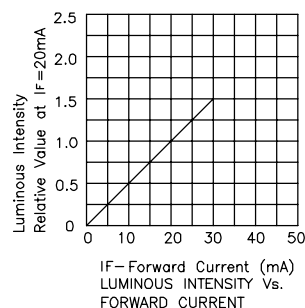
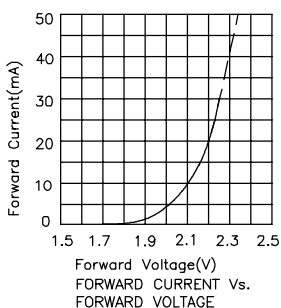
Hyper Red

SE/E : AlGaInP



Super Bright Orange

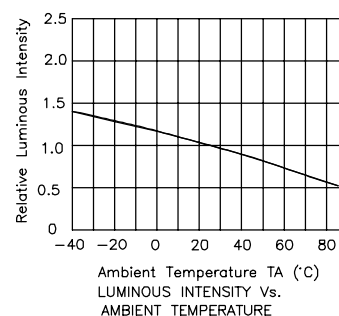
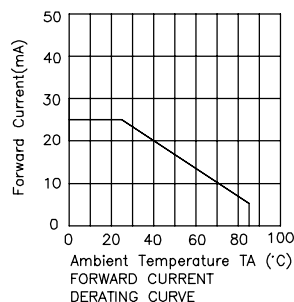
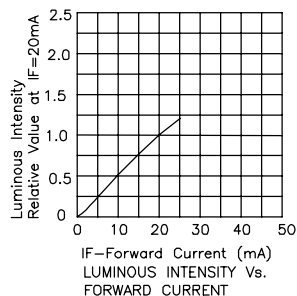
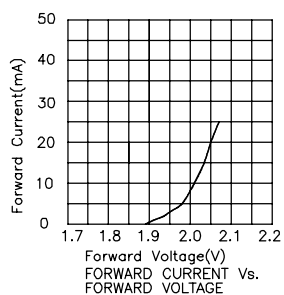
SEK/J4, SE/J4 : AlGaInP



TECHNICAL DATA

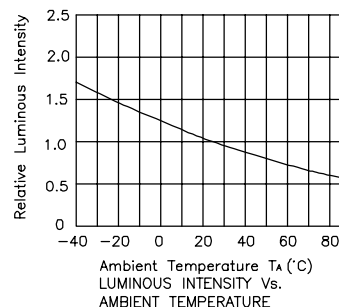
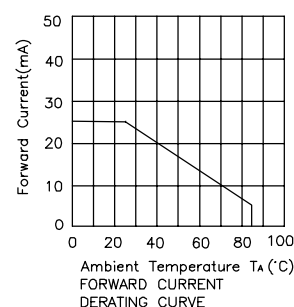
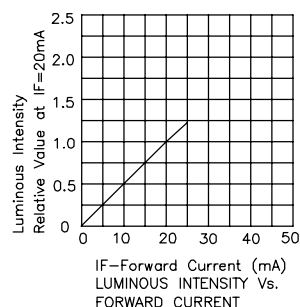
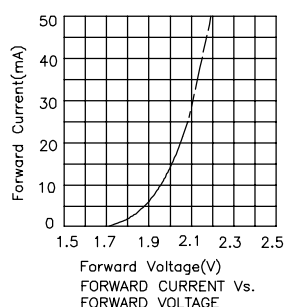
Super Bright Orange

SEK/TT : AlGaInP



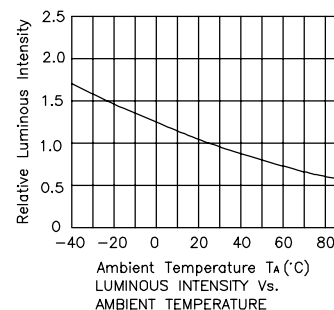
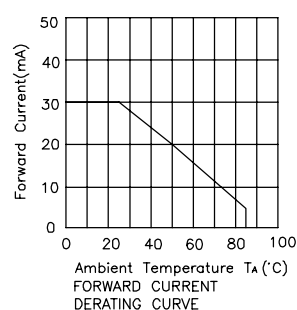
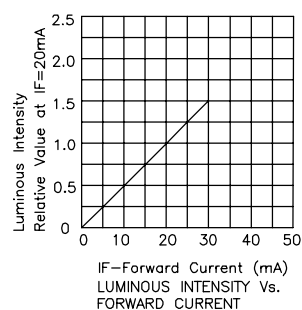
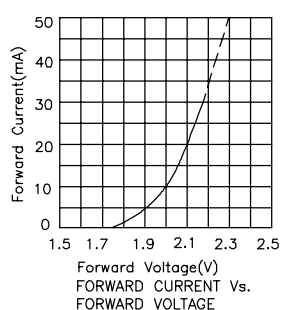
Pure Orange

N : GaAsP/GaP



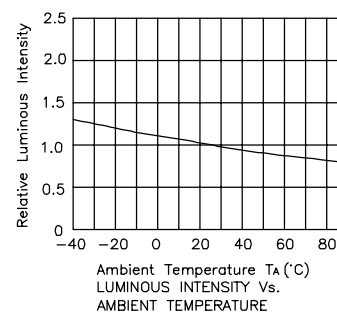
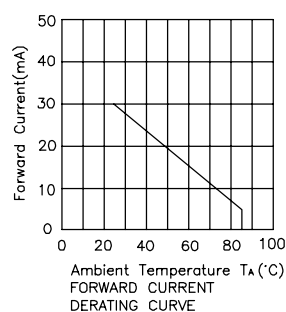
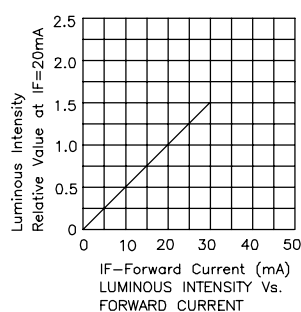
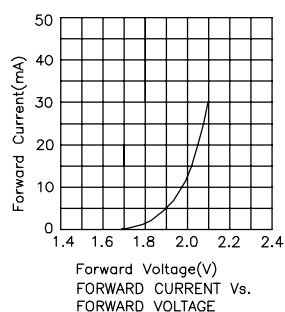
Super Bright Orange

SEK : AlGaInP



Super Bright Orange

SEK/T : AlGaInP



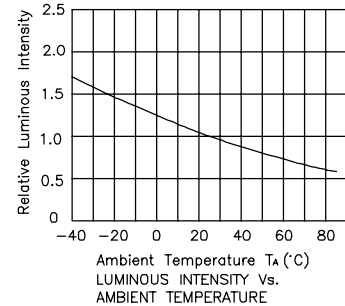
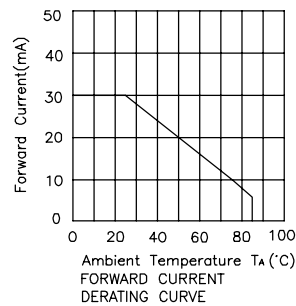
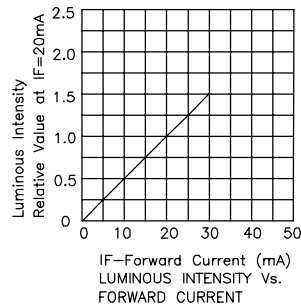
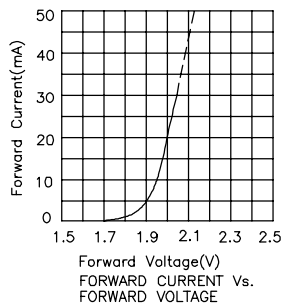
TECHNICAL DATA

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TECHNICAL NOTES > Technical Data

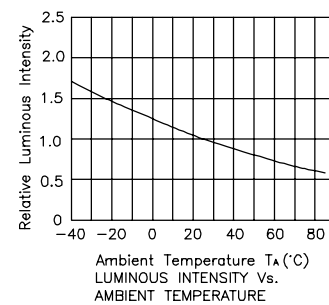
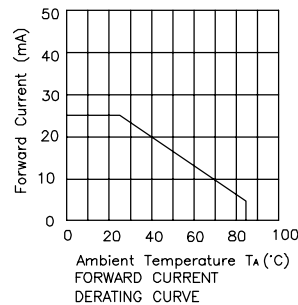
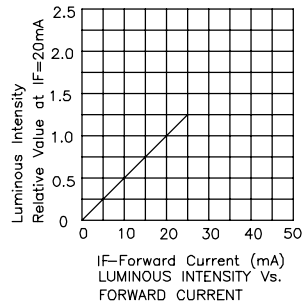
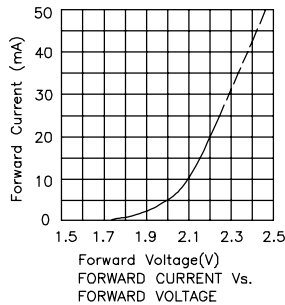
Super Bright Orange

SE : AlGaInP



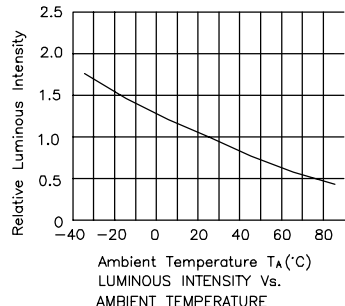
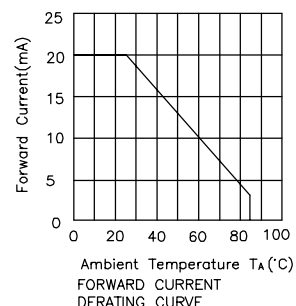
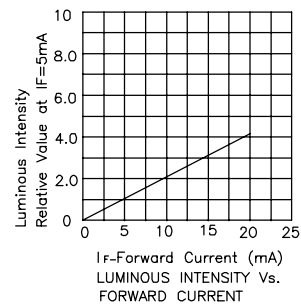
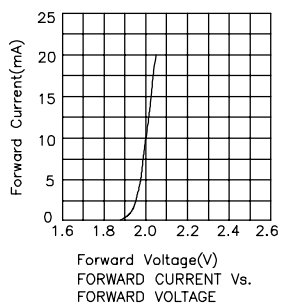
Green/Super Bright Green

G,SG : GaP



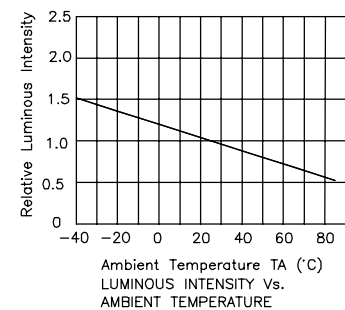
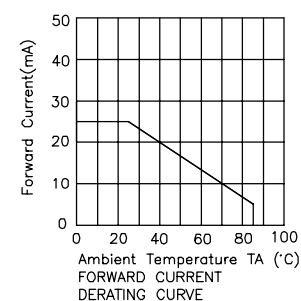
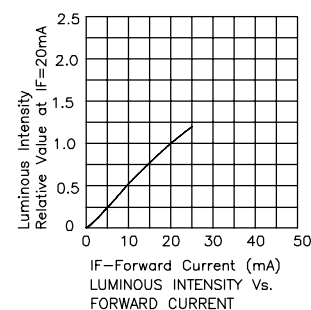
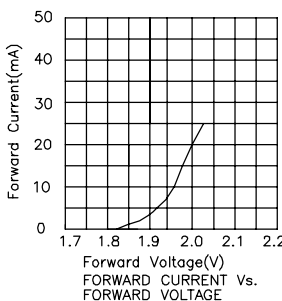
Green

CG/KA : AlGaInP

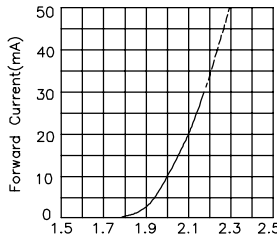
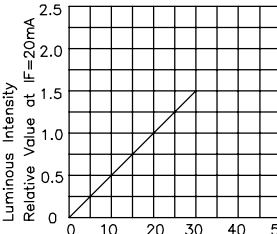
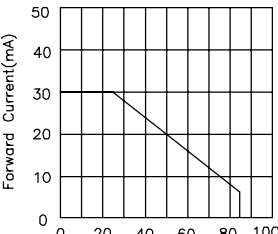
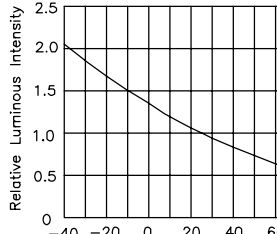
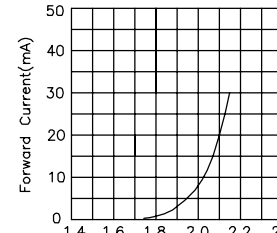
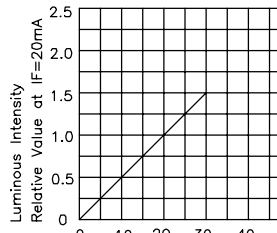
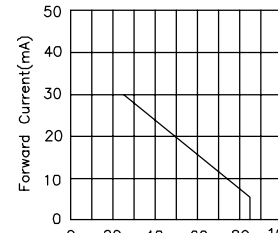
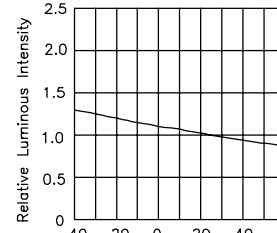
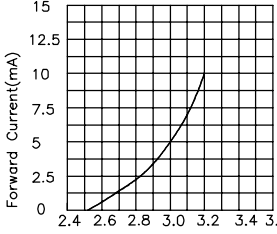
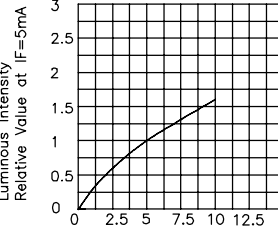
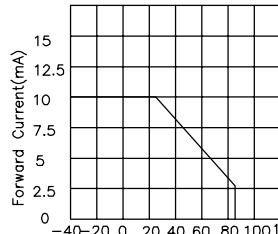
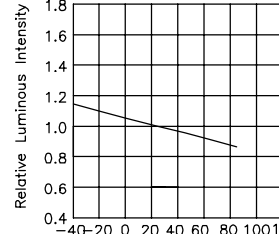
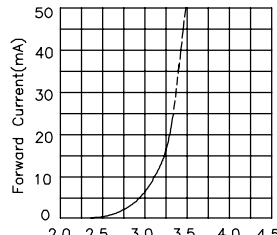
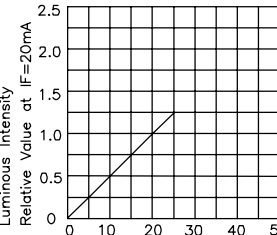
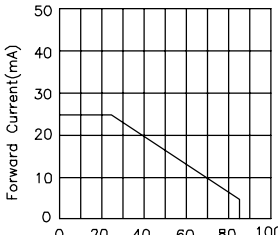
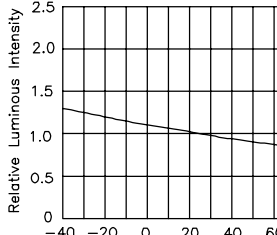


Green

CGK/TT : AlGaInP



TECHNICAL DATA

Green	CGK : AlGaInP		
 Forward Current(mA) FORWARD CURRENT Vs. FORWARD VOLTAGE	 IF-Forward Current (mA) LUMINOUS INTENSITY Vs. FORWARD CURRENT	 Ambient Temperature $T_A(^{\circ}\text{C})$ FORWARD CURRENT DERATING CURVE	 Ambient Temperature $T_A(^{\circ}\text{C})$ LUMINOUS INTENSITY Vs. AMBIENT TEMPERATURE
Green	CGK/T : AlGaInP		
 Forward Current(mA) FORWARD CURRENT Vs. FORWARD VOLTAGE	 IF-Forward Current (mA) LUMINOUS INTENSITY Vs. FORWARD CURRENT	 Ambient Temperature $T_A(^{\circ}\text{C})$ FORWARD CURRENT DERATING CURVE	 Ambient Temperature $T_A(^{\circ}\text{C})$ LUMINOUS INTENSITY Vs. AMBIENT TEMPERATURE
Green	VG/TT : InGaN		
 Forward Current(mA) FORWARD CURRENT Vs. FORWARD VOLTAGE	 Forward Current (mA) LUMINOUS INTENSITY Vs. FORWARD CURRENT	 Ambient Temperature $T_A(^{\circ}\text{C})$ FORWARD CURRENT DERATING CURVE	 Ambient Temperature $T_A(^{\circ}\text{C})$ LUMINOUS INTENSITY Vs. AMBIENT TEMPERATURE
Green	ZG : InGaN		
 Forward Current(mA) FORWARD CURRENT Vs. FORWARD VOLTAGE	 IF-Forward Current (mA) LUMINOUS INTENSITY Vs. FORWARD CURRENT	 Ambient Temperature $T_A(^{\circ}\text{C})$ FORWARD CURRENT DERATING CURVE	 Ambient Temperature $T_A(^{\circ}\text{C})$ LUMINOUS INTENSITY Vs. AMBIENT TEMPERATURE

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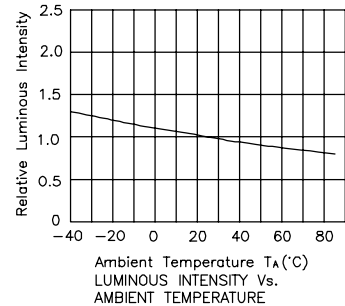
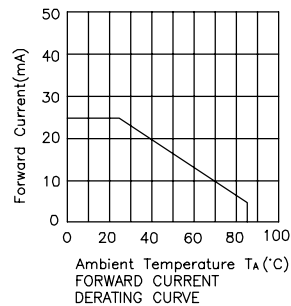
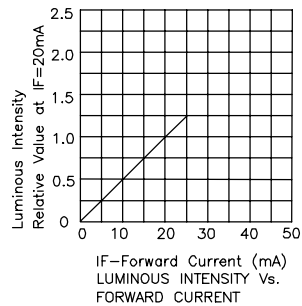
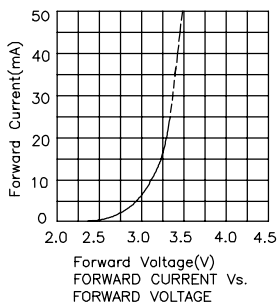
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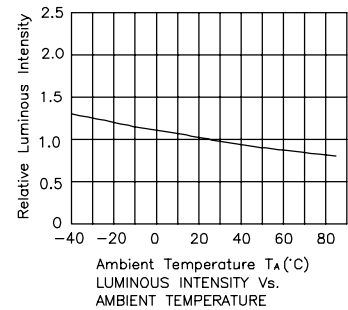
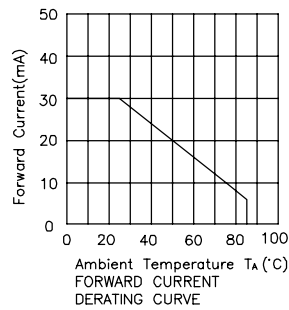
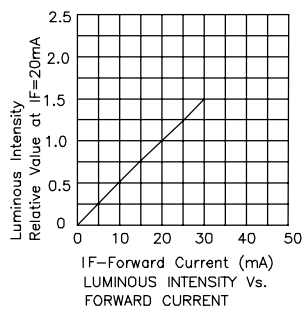
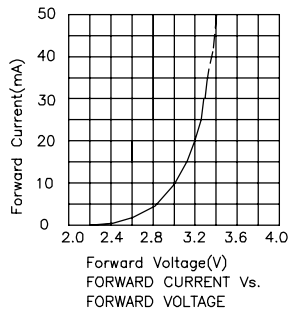
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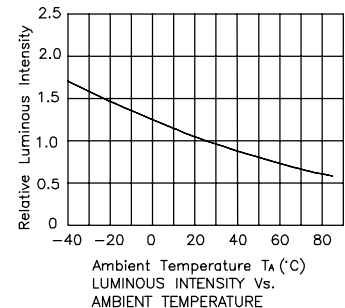
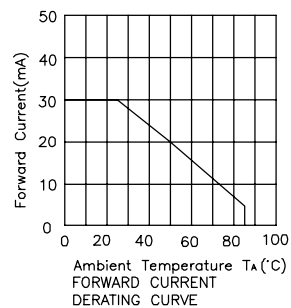
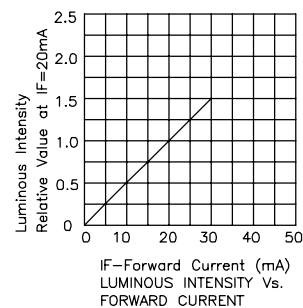
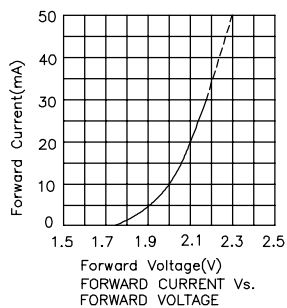
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ZG/G : InGaN



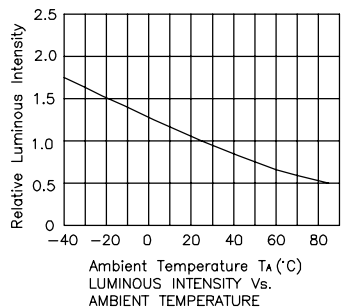
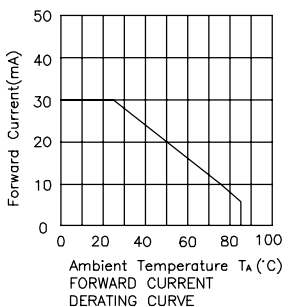
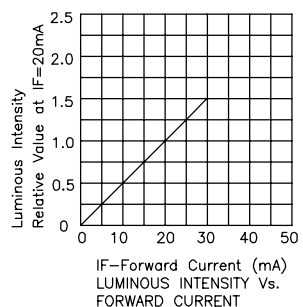
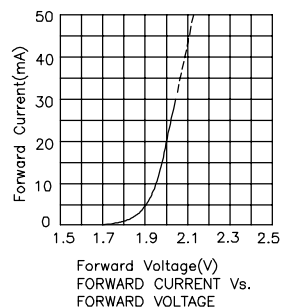
Yellow

Y : GaAsP/GaP



Super Bright Yellow

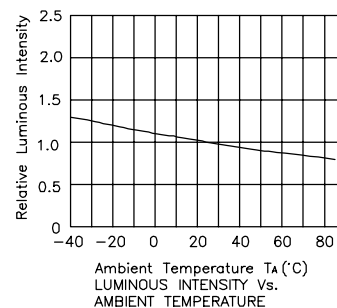
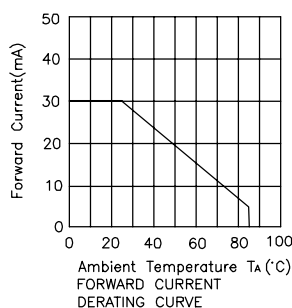
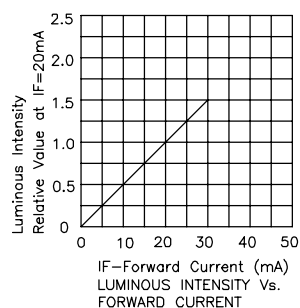
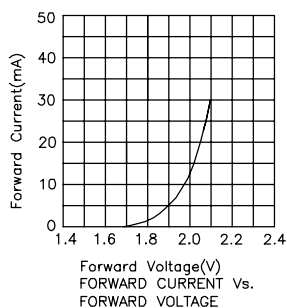
SYK : AlGaInP



TECHNICAL DATA

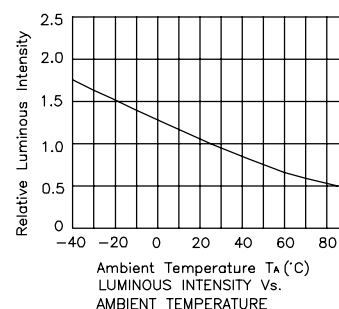
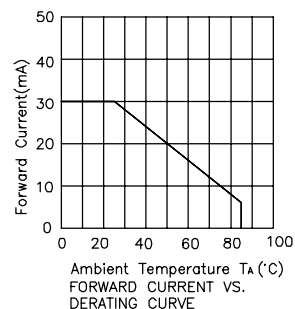
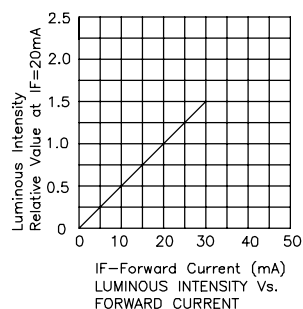
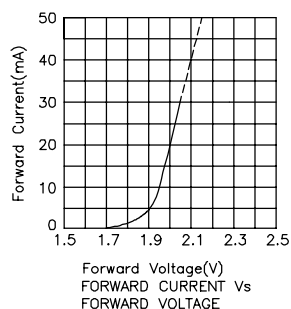
Super Bright Yellow

SYK/T : AlGaInP



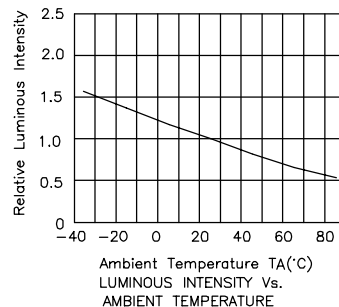
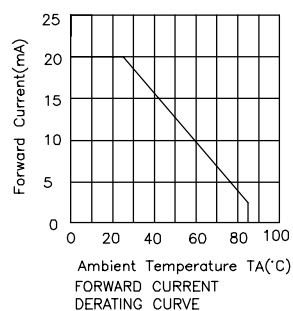
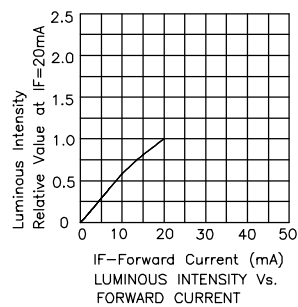
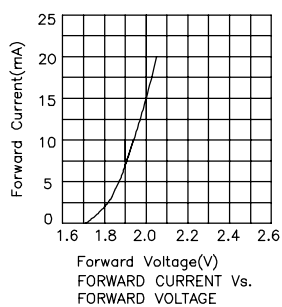
Super Bright Yellow

SY, SYK/J3, SY/J3 : AlGaInP



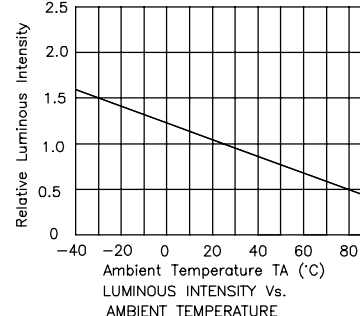
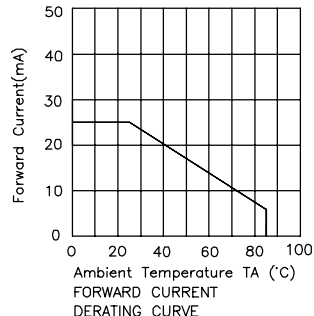
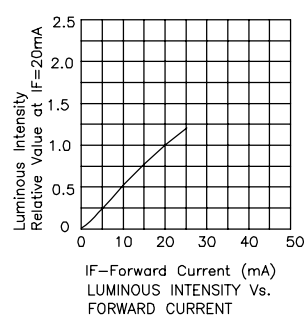
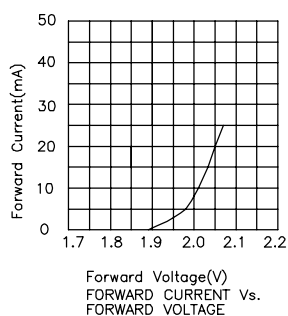
Super Bright Yellow

SY/KA : AlGaInP



Super Bright Yellow

SYK/TT : AlGaInP



TECHNICAL DATA

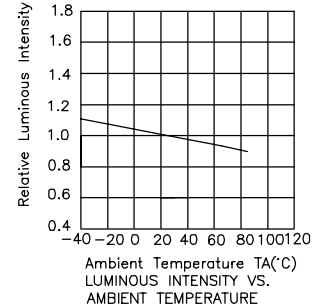
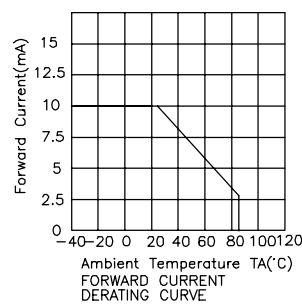
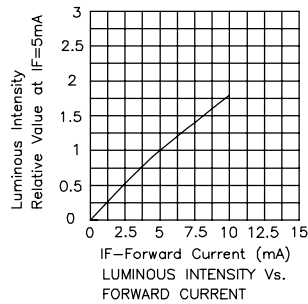
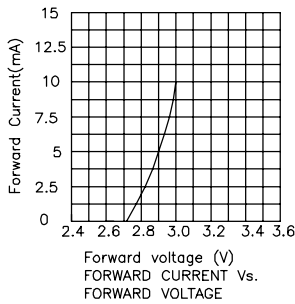
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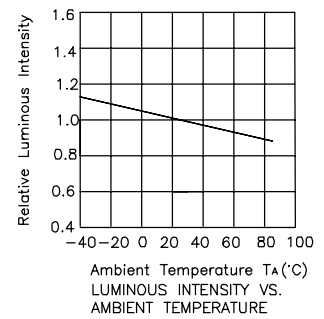
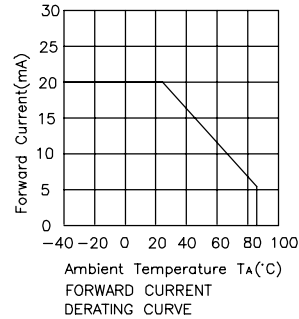
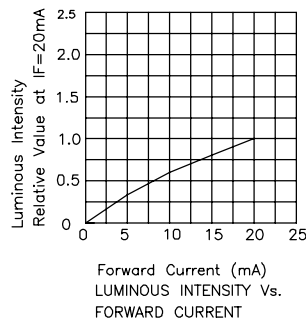
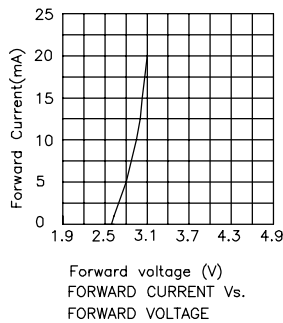
Blue

PB/TT : InGaN



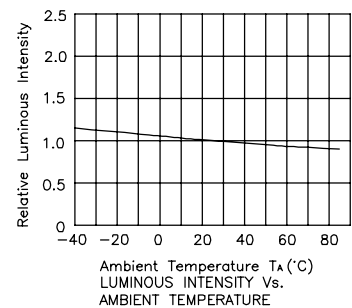
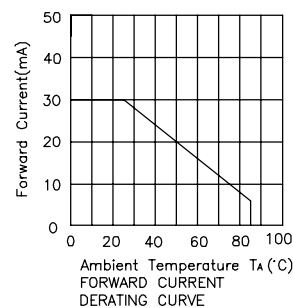
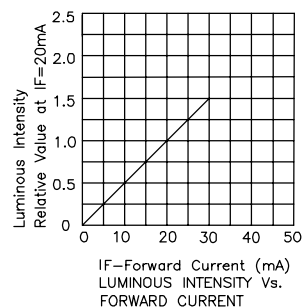
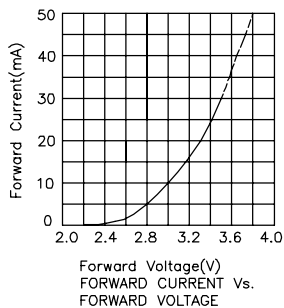
Blue

QB/KA : InGaN



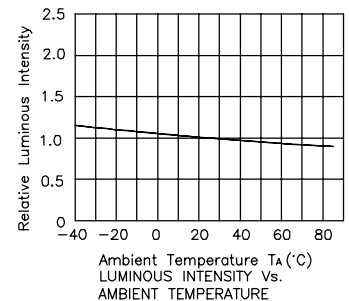
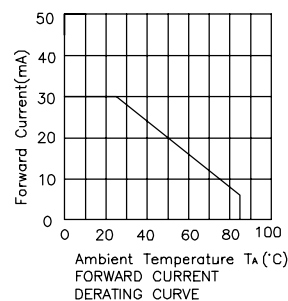
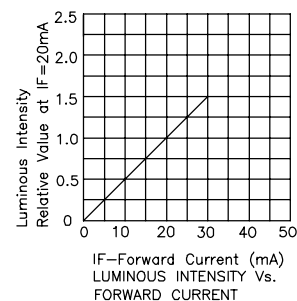
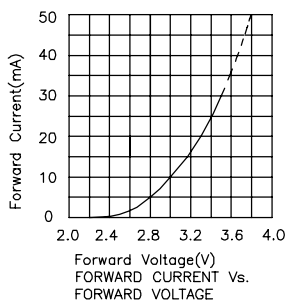
Blue

QB/D,QB/F : InGaN



Blue

VB/D : InGaN



BIN CODE SYSTEMS

SELECTION CODE FOR STANDARD AND LOW CURRENT LEDS (T _A =25°C Tolerance +/-15% IF<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% IF≥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%)					
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
PHOTOCOUPLER	<=260°C	3s	>2mm	<=310°C	3s	-
	-	-	-	<=260°C	10s	-

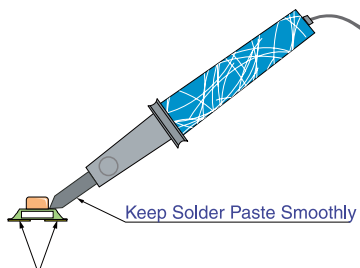
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ACSX03-41 SERIES.....	P-31	BA56-11 SERIES.....	P-39	SC05-11 SERIES.....	P-36	WP710A10SF4C.....	P-52
ACSX04-41 SERIES.....	P-32	BA56-12 SERIES.....	P-39	SC08-11 SERIES.....	P-36	WP710A10xxx14V SERIES.....	P-29
ACSX08-51 SERIES.....	P-33	BC56-11 SERIES.....	P-39	SC10-11 SERIES.....	P-36	WP710A10xxx5V SERIES.....	P-29
ACSX56-41 SERIES.....	P-32	BC56-12 SERIES.....	P-39	SC36-11 SERIES.....	P-35	WP7113 SERIES.....	P-22
AM23ESGx SERIES.....	P-15	CA56-11 SERIES.....	P-39	SC39-11 SERIES.....	P-35	WP7113F3C.....	P-52
AM23-F SERIES.....	P-19	CC56-11 SERIES.....	P-39	SC40-18 SERIES.....	P-37	WP7113L SERIES.....	P-28
AM2520xxx03 SERIES.....	P-18	DA03-11 SERIES.....	P-37	SC56-11 SERIES.....	P-36	WP7113P3BT.....	P-53
AM2520xxx09 SERIES.....	P-19	DA04-11 SERIES.....	P-37	TA07-11 SERIES.....	P-40	WP7113SF4C.....	P-52
APA1606 SERIES.....	P-11	DA08-11 SERIES.....	P-38	TA20-11 SERIES.....	P-40	WP7113xxx14V SERIES.....	P-29
APA2107 SERIES.....	P-11	DA56-11 SERIES.....	P-38	TC07-11 SERIES.....	P-40	WP7113xxx5V SERIES.....	P-29
APA2107L SERIES.....	P-5	DA56-51 SERIES.....	P-38	TC20-11 SERIES.....	P-40	WP7143 SERIES.....	P-23
APA3010 SERIES.....	P-12	DC03-11 SERIES.....	P-37	WP1043 SERIES.....	P-41	WP793 SERIES.....	P-23
APA3010F3C-GX.....	P-51	DC04-11 SERIES.....	P-37	WP113 SERIES.....	P-25	WP799EGW.....	P-27
APA3010P3BT-GX.....	P-53	DC08-11 SERIES.....	P-38	WP115V SERIES.....	P-26	WP813 SERIES.....	P-24
APB3025 SERIES.....	P-15	DC10 SERIES.....	P-40	WP115W SERIES.....	P-26	WP819EGW.....	P-28
APB3227 SERIES.....	P-16	DC56-11 SERIES.....	P-38	WP117 SERIES.....	P-28	WP835/2 SERIES.....	P-41
APBA3010 SERIES.....	P-14	DC56-51 SERIES.....	P-38	WP119EGWT.....	P-28	WP914 SERIES.....	P-24
APBD3224 SERIES.....	P-16	DE2 SERIES.....	P-41	WP130WCP/2 SERIES.....	P-49	WP914CK/4 SERIES.....	P-49
APBDA3020 SERIES.....	P-15	DE4 SERIES.....	P-41	WP130WDT/ SERIES.....	P-46	WP9294 SERIES.....	P-22
APBL3025 SERIES.....	P-15	DF3 SERIES.....	P-41	WP132X SERIES.....	P-22	WP934CA/2-90 SERIES.....	P-48
APD3224 SERIES.....	P-10	KB2400SYKW.....	P-42	WP1384AD/ SERIES.....	P-46	WP934CB/ SERIES.....	P-45
APDA3020 SERIES.....	P-12	KB2450SYKW.....	P-42	WP1384AL/ SERIES.....	P-46	WP934EB/2 SERIES.....	P-48
APDA3020L SERIES.....	P-6	KB2500CGKD.....	P-42	WP138A8QMP/ SERIES.....	P-45	WP934EW/ SERIES.....	P-45
APED3528 SERIES.....	P-10	KB2550CGKD.....	P-42	WP144 SERIES.....	P-24	WP934FG/2 SERIES.....	P-48
APF3236SEEZQBDC.....	P-16	KB2700SYKW.....	P-42	WP1503 SERIES.....	P-23	WP934MD/2 SERIES.....	P-48
APFA3010SEEZQBDC.....	P-14	KB2720SYKW.....	P-43	WP1503CB/ SERIES.....	P-47	WP934RS/ SERIES.....	P-46
APG1005 SERIES.....	P-7	KB2735SYKW.....	P-43	WP1503EB/2 SERIES.....	P-49	WP934SA/3 SERIES.....	P-49
APG1005-5MAV SERIES.....	P-7	KB2755SYKW.....	P-42	WP150A9VS/ SERIES.....	P-47	WP934SB/4 SERIES.....	P-49
APG1608 SERIES.....	P-8	KB2770SYKW.....	P-43	WP1533BQ/ SERIES.....	P-47	WP937 SERIES.....	P-26
APGA1602 SERIES.....	P-11	KB2785SYKW.....	P-43	WP154A4 SERIES.....	P-27		
APGA1602QBC/KA-5MAV.....	P-7	KB2800CGKD.....	P-42	WP169X SERIES.....	P-25		
APHB1608 SERIES.....	P-13	KB2820CGKD.....	P-43	WP36B SERIES.....	P-29		
APHBM2012 SERIES.....	P-14	KB2835CGKD.....	P-43	WP383 SERIES.....	P-25		

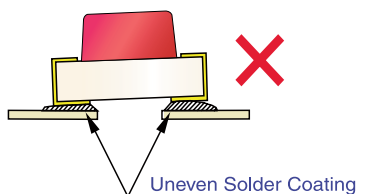
APPLICATION NOTES

General Notes

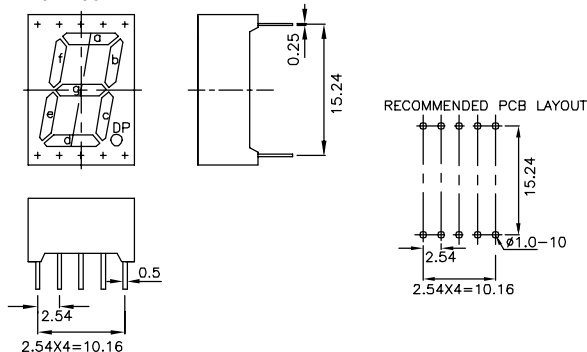
1. We recommend manual soldering operations only for repair and rework purposes. The soldering iron should not exceed 30W in power. The maximum soldering temperature is 300°C for Pb-Sn solder and 350°C for lead-free solder for normal lamps and displays. For blue (typ.:465nm), green (typ.:525nm), and 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. Refer to the product datasheet for details. Solder paste must be evenly applied to each soldering pad to insure proper bonding and positioning of the component.



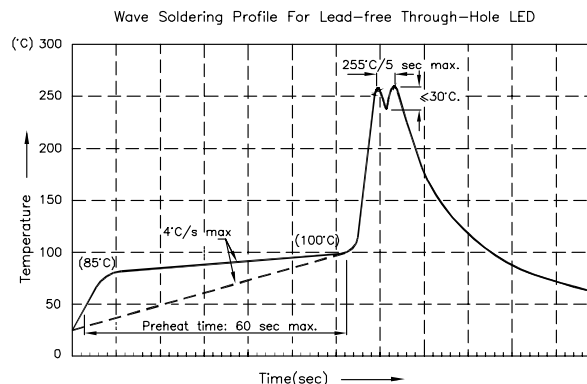
7. After soldering, allow at least three minutes for the component to cool down to room temperature before further operations.
8. Recommended PCB pin hole diameters for display products are listed below :
Round pin type : 2 x pin diameters
Square pin type :



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

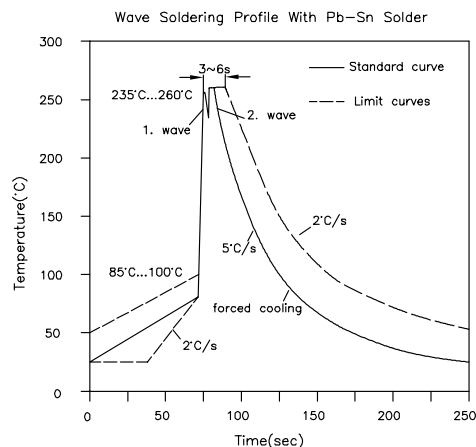
1. Lead-Free Wave Soldering Profile



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.

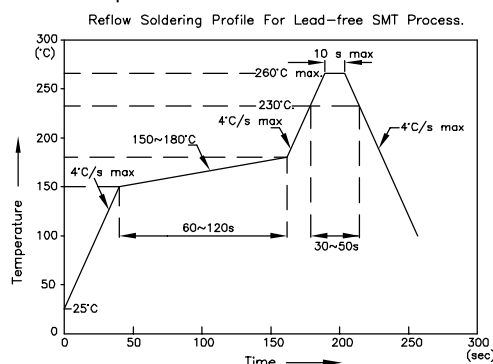
2. Wave Soldering Profile With Pb-Sn Solder



Recommended Reflow Soldering Profiles For Kingbright SMD Products

1. Lead-Free Reflow Soldering Profile

No more than two soldering passes with the recommended profile.

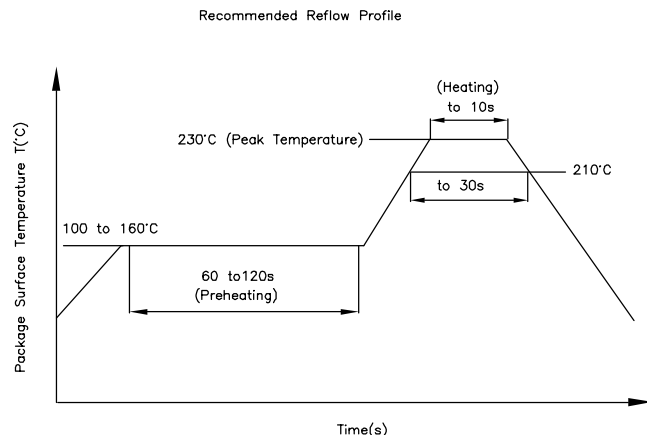


NOTES:

1. We recommend the reflow temperature 245°C(+/-5°C). The maximum soldering temperature should be limited to 260°C.
2. Don't cause stress to the epoxy resin while it is exposed to high temperature.
3. Number of reflow process shall be 2 times or less.

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.

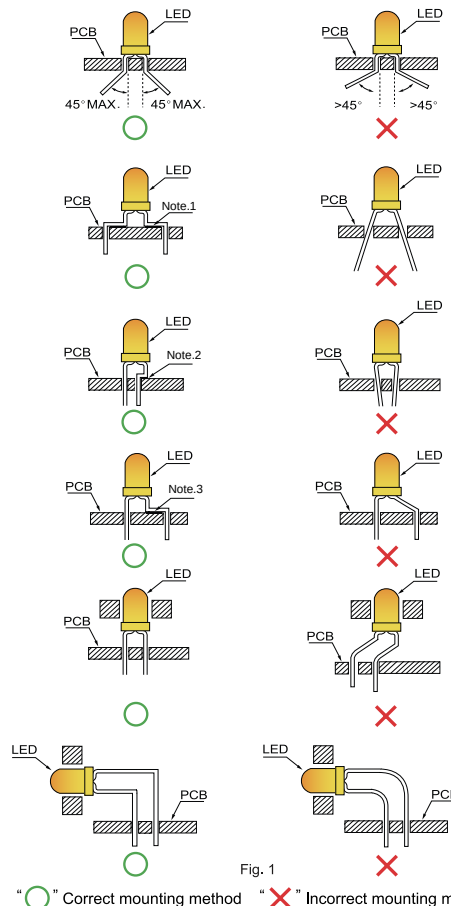
ESD Protection During Production

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 production machinery and test instruments must be electrically grounded.
3. Operators must wear anti-static bracelets.
4. Wear anti-static suit when entering work areas with conductive machinery.
5. Set up ESD protection areas using grounded metal plating for component handling.
6. All workstations that handle IC and ESD-sensitive components must maintain an electrostatic potential of 150V or less.
7. Maintain a humidity level of 50% or higher in production areas.
8. Use anti-static packaging for transport and storage.
9. 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.



"○" Correct mounting method "X" Incorrect mounting method

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)

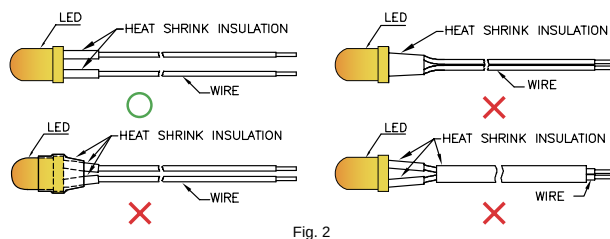


Fig. 2

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

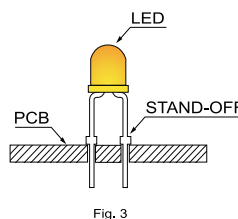


Fig. 3

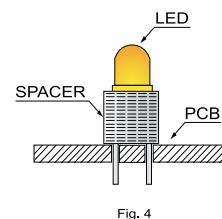


Fig. 4

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

Lead Forming Procedures

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

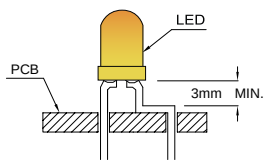


Fig. 5

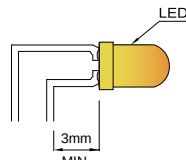


Fig. 6

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

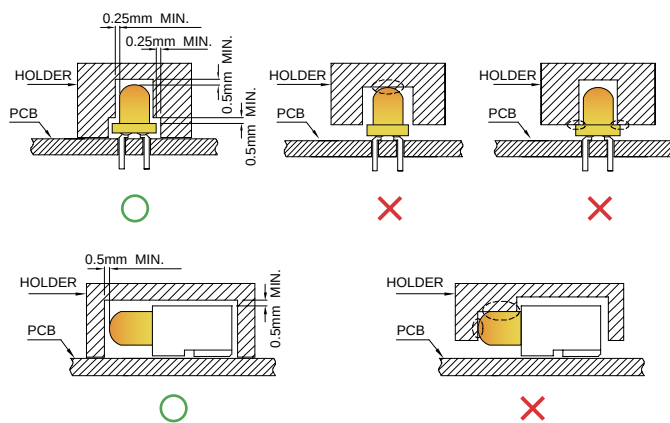


Fig. 7

- 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)

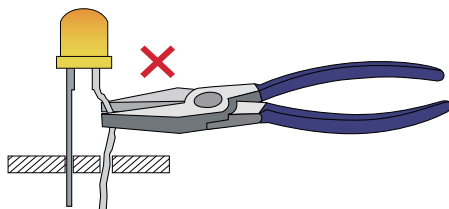


Fig. 8

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

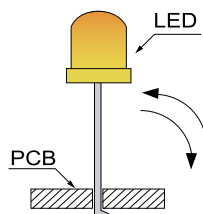


Fig. 9

- 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.

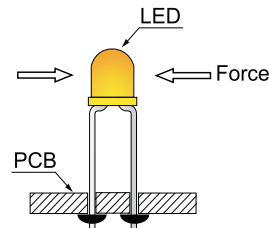


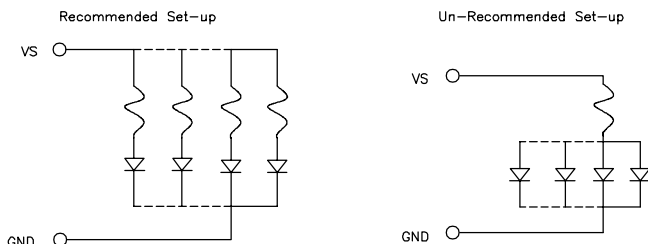
Fig. 10

Cleaning

- Do not use harsh organic solvents for cleaning because they may cloud or damage the LED lens.
- Isopropyl alcohol or deionized water are recommended solvents for cleaning.
- Special attention should be taken if other chemicals are used for cleaning because other solvents may damage the epoxy in the lens or housing.
- The cleaning process should take place at room temperature and the devices should not be washed for more than one minute.
- When water is used for cleaning, immediately use forced-air drying to remove excess moisture from the LED.
- Do not use acidic solvents or unknown chemicals to clean the component. Before using any cleaning solvent, check to insure the chemical composition will not corrode or damage epoxy resin, organosilicates, silicone resin, and silver plating, in order to prevent accidental damage or degraded function.
- Typically we suggest ethanol for cleaning SMD LEDs. Lightly wipe away any surface contaminants and avoid excessive force that might damage the lens surface or internal structures. Allow to dry under room temperature conditions before further usage. Do not soak the SMD LED in ethanol or other solutions.

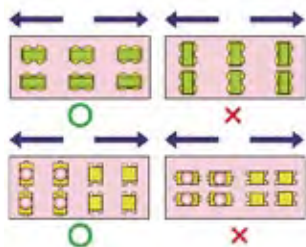
Miscellaneous Design Notes

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

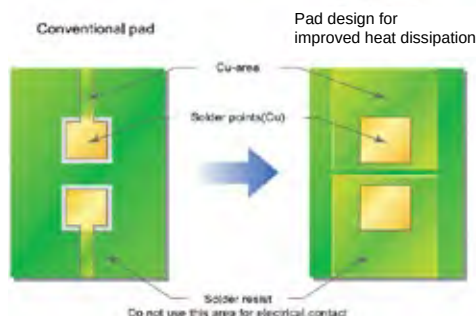


- The driving circuit should be designed to avoid reverse voltages and transient voltage spikes when the circuit is powered up or shut down.
- High temperatures can reduce device performance and reliability. Keep LED devices away from heat source for best performance.
- The safe operation current should be chosen after considering the maximum ambient temperature of the operating environment.

- 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.

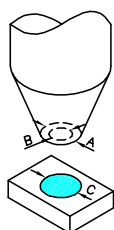


- Optimal usage of high-power LED devices requires careful design by the end-user to optimize heat dissipation, such as increasing the size of the metal backing around the soldering pad. Refer to the product datasheet for specific design recommendations regarding heat dissipation.



Restrictions on Product Use

- Not all devices and product families are available in every country.
- The light output from UV, blue, white, and other high-power LEDs may cause injury to the human eye when viewed directly.
- 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.
- 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.
- For LEDs with silicone encapsulation such as the AA and AT 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 pick-up nozzle
B is the inner diameter of the nozzle
C is the diameter of lens

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

Kingbright	
P/NO: XXXX	
QTY: XXX pcs	Q.C. Q C XX-XX-XXXX PASSED
S/N: XXXX	
CODE: XXX	
LOT NO: 	
RoHS Compliant	

Storage Control For SMD Products

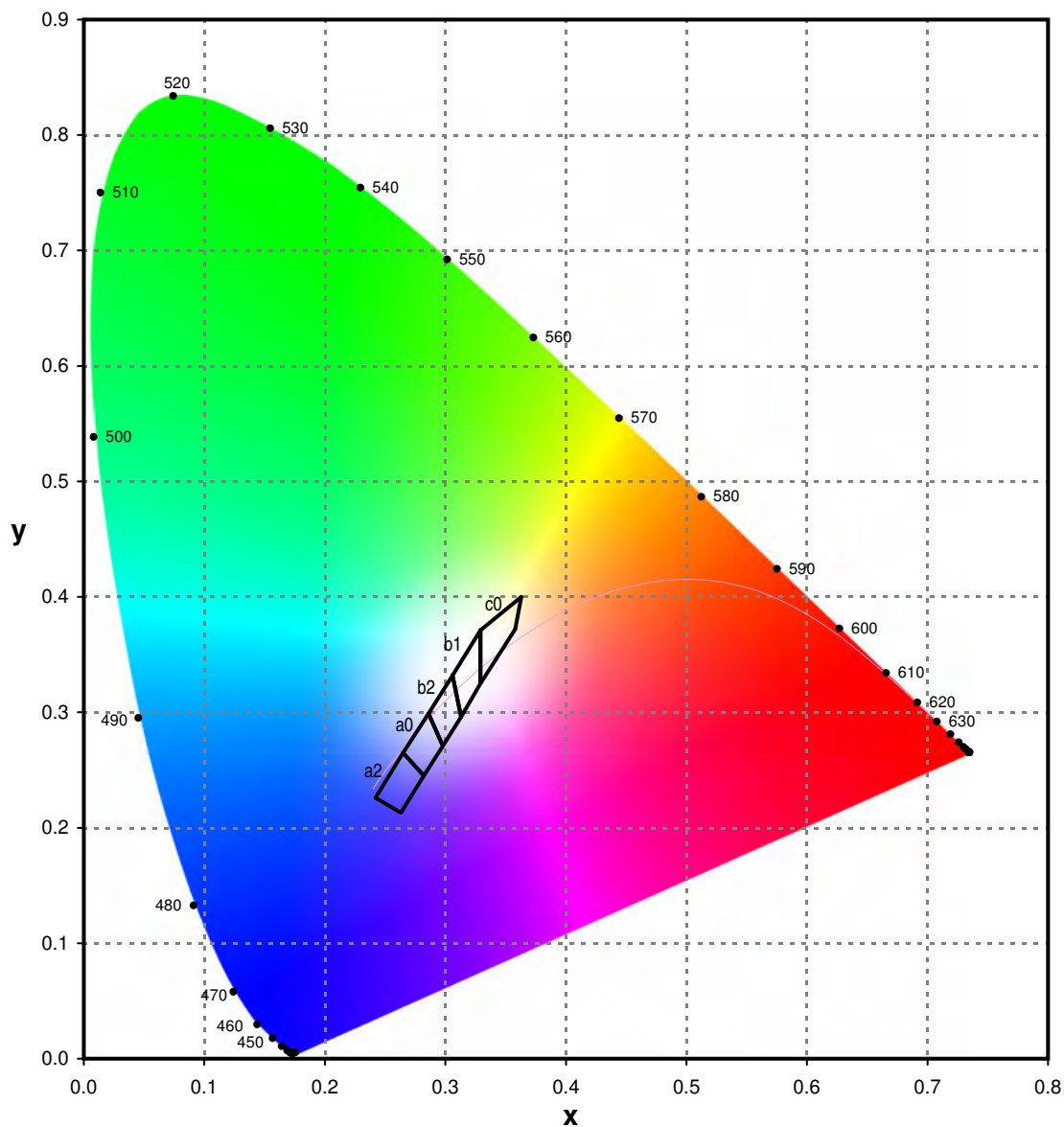
- Before a sealed moisture barrier bag (MBB) is opened, contained LEDs shall be kept in an environment with temperature below 40°C and humidity below 90% RH. MBB shall be kept sealed until LEDs contained in the bag are ready to be used. Once MBB is opened, it shall be stored in an environment with temperature range of 5°C~30°C and humidity below 60% RH.
- Once MBB is opened, all contained LEDs shall complete soldering process within the specified time frame according to the conditions labeled on Kingbright MBB.
- When the 10% spot of a humidity indicator card (HIC) from MBB indicates wet, the contained LEDs shall be baked according to the baking conditions labeled on Kingbright MBB before mounting.

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 $\leq 30^{\circ}\text{C}$ 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

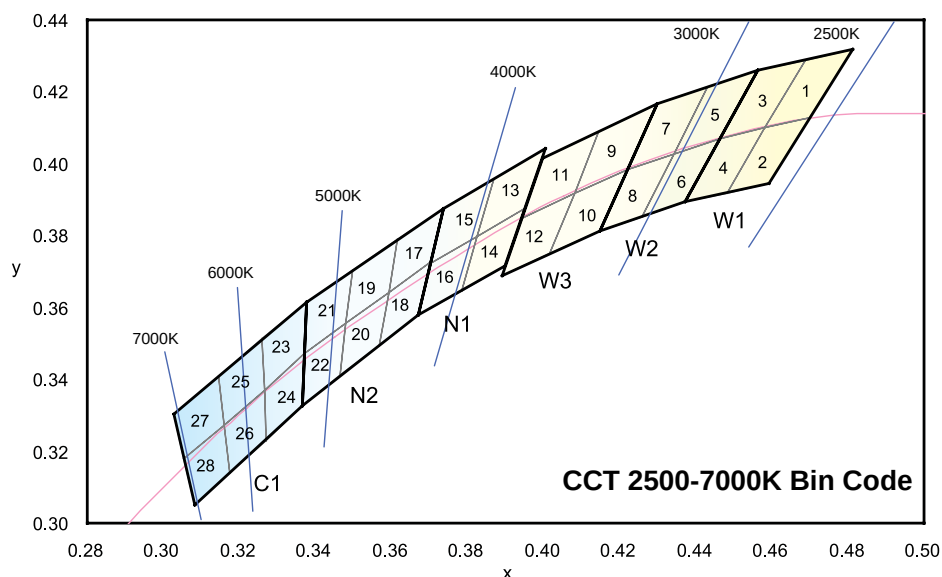


Bin	x	y
a2	0.263	0.213
	0.282	0.245
	0.265	0.265
	0.242	0.226
CCT: 15000K~		
Bin	x	y
a0	0.282	0.245
	0.298	0.271
	0.286	0.299
	0.265	0.265
CCT: 9000~15000K		

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



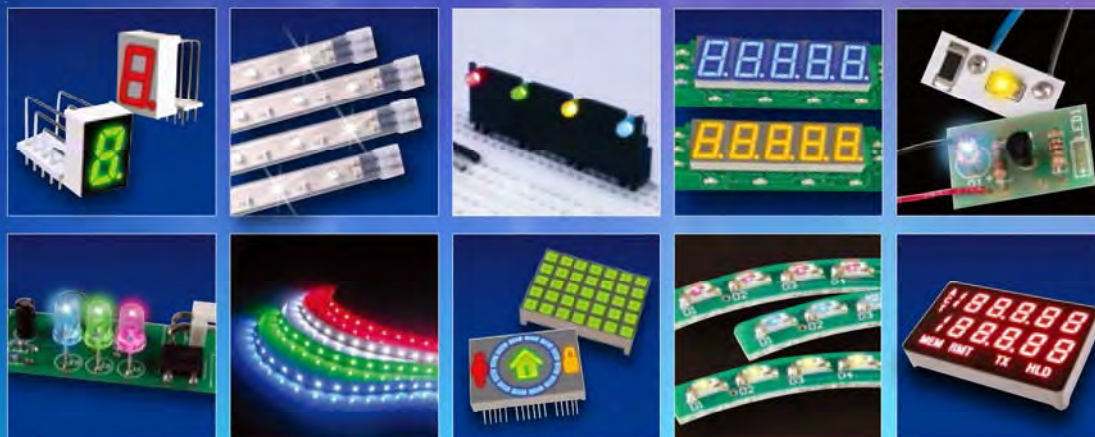
Group	Chromaticity Regions	CCT (K)		
		Min.	Typ.	Max.
W1	1, 2, 3, 4	2580	2700	2870
W2	5, 6, 7, 8	2870	3000	3220
W3	9, 10, 11, 12	3220	3500	3710

Group	Chromaticity Regions	CCT (K)		
		Min.	Typ.	Max.
N1	13, 14, 15, 16	3710	4000	4260
N2	17, 18, 19, 20, 21, 22	4260	4700	5310
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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