Kingbright



Optoelectronic Components

2026-2027

About KINGBRIGHT

An Innovative LED Solution Provider

Kingbright is a Taiwanese LED solution provider that offers innovative LED products with superior quality, reliability, and energy efficiency. With over 45 years of experience and 10 sales offices and warehouse locations around the globe, we are a leading LED manufacturer committed to excellence.

Our extensive range of products caters to various industries and applications, ensuring that we meet the diverse needs of our global customers. We are dedicated to continuous improvement and technological innovation, and always striving to exceed customer expectations and deliver exceptional value.













Kingbright

Table of Contents

SMD LED — 02

Low Current SMD LED
High Temperature SMD LED
Top-Emitting Chip SMD LED
Top-Emitting PLCC SMD LED
Right Angle SMD LED
Multi-Color SMD LED
Subminiature SMD LED
Reverse Mount SMD LED
SOT-23 SMD LED

THROUGH-HOLE LED — 28

Round LED
Rectangular LED
Cylindrical LED
Light Bar
Multi-Color LED
Low Current LED

SMD DISPLAY — 34

7-Segment SMD Display

CHAMELEON RGB+IC — 37

RGB + IC

CIRCUIT BOARD INDICATOR — 38

Single-Level CBI
Bi-Level CBI
Tri-Level CBI
Quad-Level CBI

INFRARED & PHOTOTRANSISTOR — 44

Infrared Emitting Diode
Photodiode
Phototransistor

OPTO-SENSOR — 52

Light Sensor
Color Sensor
Photointerrupter - Reflective Type
Photointerrupter - Transmissive Type
Photocoupler

TECHNICAL NOTES — 60

Bin Code Systems
Application Notes
CIE Chromaticity Diagram
Index

CUSTOM LED / LOCATION — 72

Custom Assembly LEDs
Kingbright Global Locations



SMD LED

Kingbright SMD (Surface-Mount Device) LEDs are energy-efficient with excellent intensity performance. Our innovative technology allows us to offer LEDs in compact sizes without compromising on quality. We have a complete selection of SMDs in a variety of sizes, viewing angles, color combinations, and light outputs to fulfill all design needs.

03 / Low Current SMD LED

10 / High Temperature SMD LED

11 / Top-Emitting Chip SMD LED

15 / Top-Emitting PLCC SMD LED

16 / Right Angle SMD LED

19 / Multi-Color SMD LED

25 / Subminiature SMD LED

26 / Reverse Mount SMD LED

27 / SOT-23 SMD LED





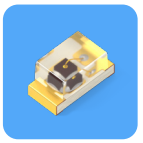






LOW CURRENT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APHHS1005LSECK/J3-PF	AlGaInP	625	Water Clear	15	35	120°	1.0mm x 0.5mm x 0.5mm (0402)
APHHS1005LSECK/J4-PF	AlGaInP	605	Water Clear	20	40	120°	
APHHS1005LSYCK/J3-PF	AlGaInP	590	Water Clear	10	20	120°	
APHHS1005LCGCK	AlGaInP	570	Water Clear	1.2	3.5	120°	
APHHS1005LZGCK-V	InGaN	525	Water Clear	80	180	140°	
APHHS1005LQBC/D-V	InGaN	465	Water Clear	6	15	140°	
AA1608LSURSK	AlGaInP	630	Water Clear	6	12	120°	1.6mm x 0.8mm x 0.55mm (0603)
AA1608LSESK	AlGaInP	605	Water Clear	6	15	120°	
AA1608LSYSK	AlGaInP	590	Water Clear	6	12	120°	
AA1608LCGSK	AlGaInP	570	Water Clear	2	6	120°	
AA1608LZGSK-295V	InGaN	525	Water Clear	80	140	120°	
AA1608LVBS/A-295V	InGaN	468	Water Clear	20	35	120°	
AA1608LQBS/D-295V	InGaN	465	Water Clear	15	25	120°	
APHD1608LSURCK	AlGaInP	630	Water Clear	4	15	100°	1.6mm x 0.8mm x 0.65mm (0603)
APHD1608LSYCK	AlGaInP	590	Water Clear	4	20	100°	
APHD1608LCGCK	AlGaInP	570	Water Clear	2	8	100°	
APHD1608LZGCK	InGaN	525	Water Clear	50	180	100°	
APHD1608LVBC/D	InGaN	470	Water Clear	30	65	100°	
APHD1608LQBC/D	InGaN	465	Water Clear	10	25	100°	
APT1608LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	120°	1.6mm x 0.8mm x 0.75mm (0603)
APT1608LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	120°	
APT1608LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	120°	
APT1608LZGCK	InGaN	525	Water Clear	50	100	130°	
APT1608LVBC/D	InGaN	470	Water Clear	15	24	130°	



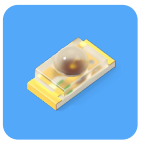
APHHS1005L

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



AA1608L

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



APHD1608L

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



APT1608L

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

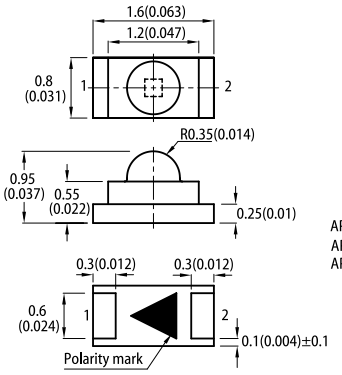
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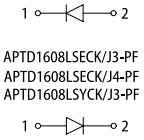
LOW CURRENT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTD1608LSURCK	AlGaInP	630	Water Clear	15	30	60°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens)
APTD1608LSECK/J3-PF	AlGaInP	625	Water Clear	50	120	60°	
APTD1608LSECK/J4-PF	AlGaInP	605	Water Clear	80	150	60°	
APTD1608LSYCK	AlGaInP	590	Water Clear	20	40	60°	
APTD1608LSYCK/J3-PF	AlGaInP	590	Water Clear	30	55	60°	
APTD1608LCGCK	AlGaInP	570	Water Clear	6	8	60°	
APTD1608LZGCK	InGaN	525	Water Clear	250	420	60°	
APTD1608LVBC/D	InGaN	470	Water Clear	30	65	40°	
APTD1608LQBC/D	InGaN	465	Water Clear	20	50	40°	
APT2012LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	140°	2.0mm x 1.25mm x 0.75mm (0805)
APT2012LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	140°	
APT2012LZGCK	InGaN	525	Water Clear	50	100	140°	
APT2012LVBC/D	InGaN	470	Water Clear	15	24	140°	
APTD2012LSURCK	AlGaInP	630	Water Clear	20	50	40°	2.0mm x 1.25mm x 1.05mm (0805 Dome Lens)
APTD2012LSYCK	AlGaInP	590	Water Clear	30	90	40°	
APTD2012LCGCK	AlGaInP	570	Water Clear	20	40	40°	
APTD2012LZGCK	InGaN	525	Water Clear	320	550	30°	
APTD2012LVBC/D	InGaN	470	Water Clear	30	90	30°	
APTD2012LQBC/D	InGaN	465	Water Clear	20	50	30°	
APA2107LSECK/J3-PRV	AlGaInP	625	Water Clear	15	30	140°	2.1mm x 1.0mm x 0.6mm (Right Angle)
APA2107LSECK/J4-PRV	AlGaInP	605	Water Clear	20	40	140°	
APA2107LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	30	140°	
APA2107LZGCK	InGaN	525	Water Clear	50	100	170°	
APA2107LVBC/D	InGaN	470	Water Clear	10	20	170°	



APTD1608L

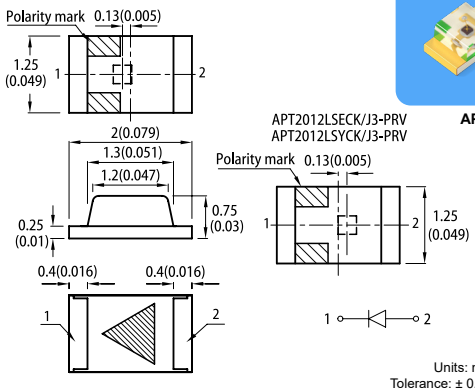




Units: mm (inch)
Tolerance: ± 0.15 (0.006)



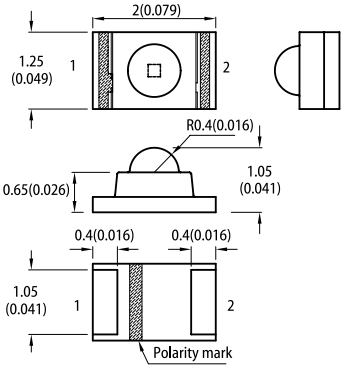
APT2012L



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



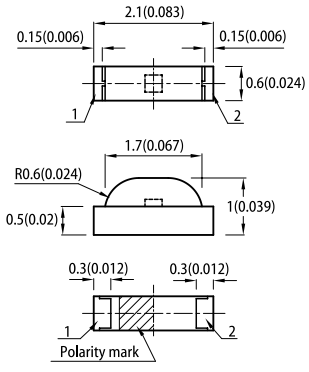
APTD2012L



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



APA2107L



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

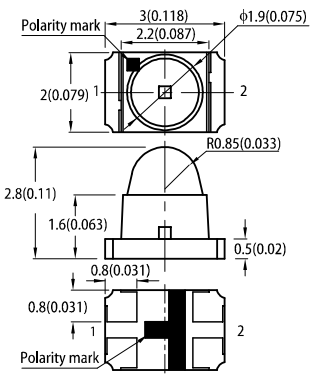
AP series custom-made is available upon request

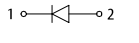
LOW CURRENT SMD LED

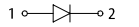
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APDA3020LSECK/J3-PF	AlGaInP	625	Water Clear	250	500	10°	3.0mm x 2.8mm x 2.0mm (Right Angle)
APDA3020LSECK/J4-PF	AlGaInP	605	Water Clear	550	1000	10°	
APDA3020LSYCK/J3-PF	AlGaInP	590	Water Clear	320	600	10°	
APDA3020LZGCK	InGaN	525	Water Clear	700	1500	10°	
APDA3020LVBC/D	InGaN	470	Water Clear	250	450	10°	
APT3216LSECK/J3-PRV	AlGaInP	625	Water Clear	20	40	140°	3.2mm x 1.6mm x 0.75mm (1206)
APT3216LSECK/J4-PRV	AlGaInP	605	Water Clear	30	50	140°	
APT3216LSYCK/J3-PRV	AlGaInP	590	Water Clear	15	25	140°	
APT3216LZGCK	InGaN	525	Water Clear	50	100	150°	
APT3216LVBC/D	InGaN	470	Water Clear	15	24	150°	
APTD3216LSURCK	AlGaInP	630	Water Clear	20	50	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)
APTD3216LCGCK	AlGaInP	570	Water Clear	15	25	40°	
APTD3216LVBC/D	InGaN	470	Water Clear	50	120	30°	
APTD3216LQBC/D	InGaN	465	Water Clear	40	100	30°	
AA3528LSECKT/J4	AlGaInP	605	Water Clear	30	60	120°	3.5mm x 2.8mm x 1.9mm
AA3528LZGCKT	InGaN	525	Water Clear	120	200	120°	



APDA3020L





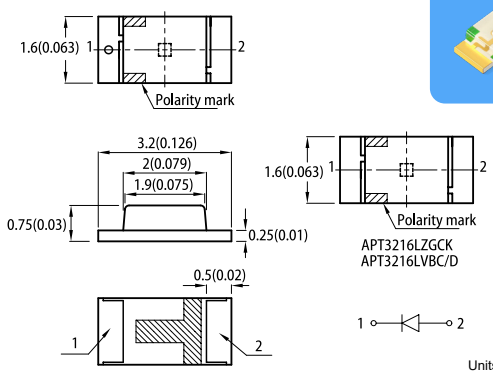


APDA3020LSECK/J3-PF
APDA3020LSECK/J4-PF
APDA3020LSYCK/J3-PF

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



APT3216L

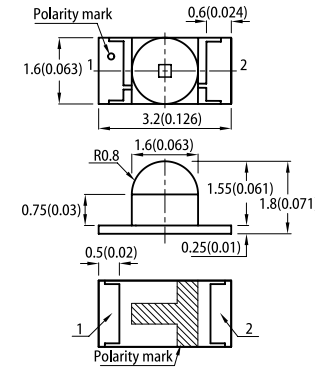


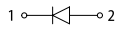
APT3216LZGCK
APT3216LVBC/D

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



APTD3216L

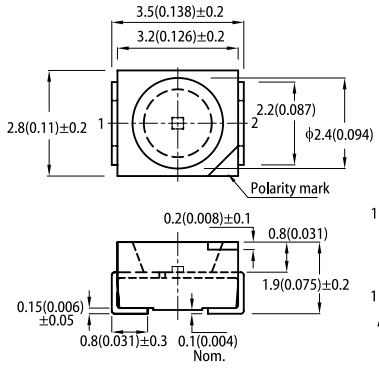


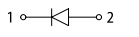


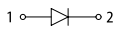
Units: mm (inch)
Tolerance: ± 0.2 (0.008)



AA3528L







AA3528LZGCKT

Units: mm (inch)
Tolerance: ± 0.25 (0.01)

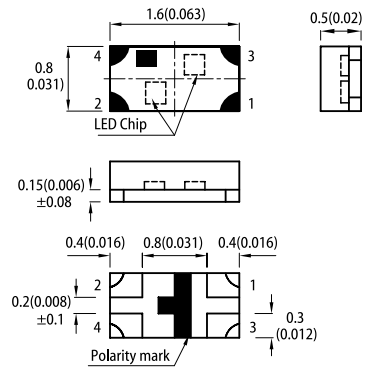
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LOW CURRENT SMD LED

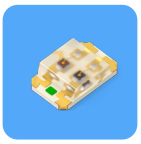
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA Min.	Iv (mcd) @2mA Typ.	Viewing Angle 2θ1/2	Dimensions
APHB1608LCGKSURKC	AlGaInP	570	Water Clear	1.2	3	130°	1.6mm x 0.8mm x 0.5mm (0603 Bi-Color)
	AlGaInP	630		2	8		
APHB1608LZGKSURKC	InGaN	525	Water Clear	50	80	130°	
	AlGaInP	630		2	8		
APHB1608LZGKSYKC	InGaN	525	Water Clear	50	80	130°	
	AlGaInP	590		6	10		
APHBM2012LSURKSYKC	AlGaInP	630	Water Clear	6	15	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)
	AlGaInP	590		6	10		
APHBM2012LSURKCGKC	AlGaInP	630	Water Clear	6	15	120°	
	AlGaInP	570		1.2	2		
APHBM2012LSURKZGKC	AlGaInP	630	Water Clear	6	15	120°	
	InGaN	525		50	90		
APHBM2012LZGKSYKC	InGaN	525	Water Clear	50	90	120°	
	AlGaInP	590		6	10		
APHBM2012LVBDZGKC	InGaN	470	Water Clear	10	20	120°	
	InGaN	525		50	90		
APBD3224LSURKCGKC	AlGaInP	630	Water Clear	10	30	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)
	AlGaInP	570		10	30		
APBD3224LSURKZGKC	AlGaInP	630	Water Clear	10	30	20°	
	InGaN	525		120	250		
APBD3224LSURKQBDC	AlGaInP	630	Water Clear	10	30	20°	
	InGaN	465		20	40		
APBD3224LQBDCGKC	InGaN	465	Water Clear	12	30	20°	
	AlGaInP	570		10	30		
APHF1608LSEEQBDZGKC	AlGaInP	621	Water Clear	4	15	140°	1.6mm x 0.8mm x 0.5mm (Full Color)
	InGaN	465		4	10		
	InGaN	525		50	90		



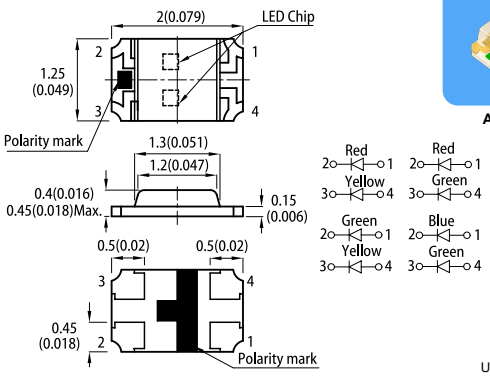
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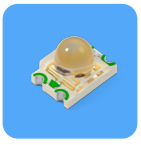
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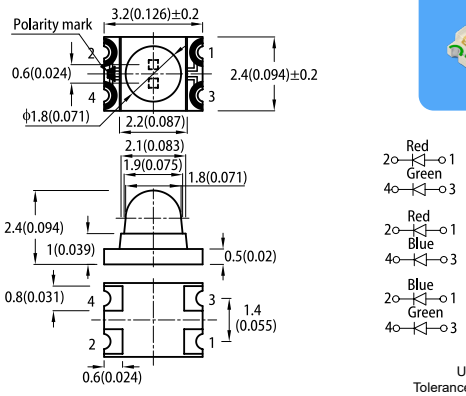
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Units: mm (inch)
Tolerance: ± 0.1 (0.004)



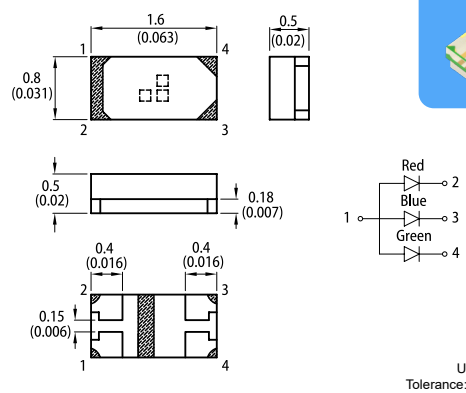
APBD3224L



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



APHF1608L



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

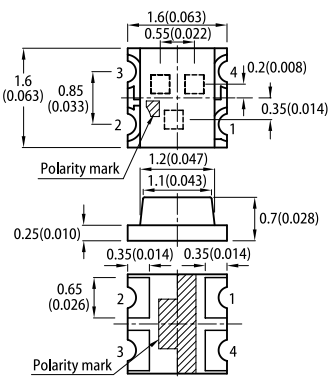
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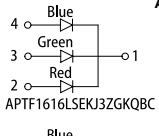
LOW CURRENT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTF1616LSEKJ3ZGKQBC	AlGaInP	625	Water Clear	20	40	130°	1.6mm x 1.6mm x 0.7mm (Full Color)
	InGaN	525		30	80		
	InGaN	465		6	14		
APTF1616LSEEZGKQBKC	AlGaInP	621	Water Clear	6	15	130°	
	InGaN	525		30	80		
	InGaN	465		6	14		
APFA2507LSURKSYKZGKC	AlGaInP	630	Water Clear	6	10	130°	2.5mm x 1.0mm x 0.7mm (Right Angle, Full Color)
	AlGaInP	590		6	15		
	InGaN	525		50	100		
APFA2507LQBDSEEZGKC	InGaN	465	Water Clear	4	10	130°	
	AlGaInP	621		6	10		
	InGaN	525		50	100		
APFA3010LSEKJ3ZGKQBC	AlGaInP	625	Water Clear	20	40	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)
	InGaN	525		50	90		
	InGaN	465		4	10		
APFA3010LSEEZGKQBKC	AlGaInP	621	Water Clear	6	15	150°	
	InGaN	525		50	90		
	InGaN	465		4	10		
AAA3528LSEEZGKQBKS	AlGaInP	621	Water Clear	10	20	120°	3.5mm x 2.8mm x 1.9mm (Full Color)
	InGaN	525		80	180		
	InGaN	465		12	30		



APTF1616L

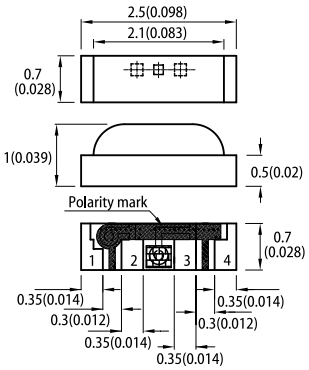


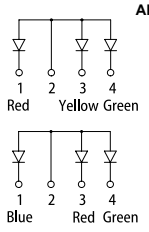


Units: mm (inch)
Tolerance: ± 0.2 (0.008)



APFA2507L

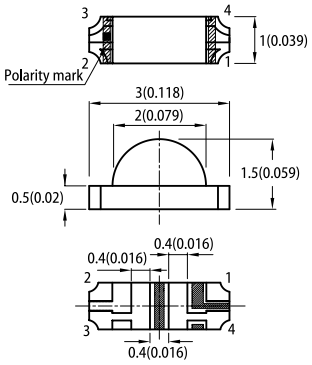


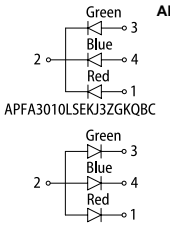


Units: mm (inch)
Tolerance: ± 0.15 (0.006)

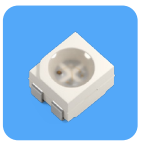


APFA3010L

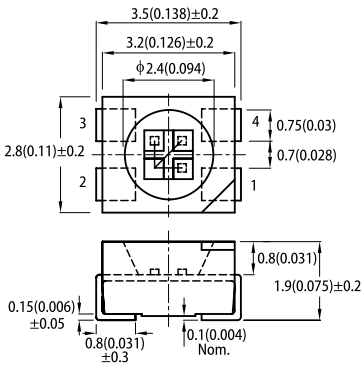


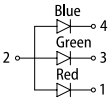


Units: mm (inch)
Tolerance: ± 0.2 (0.008)



AAA3528L



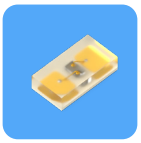


Units: mm (inch)
Tolerance: ± 0.25 (0.01)

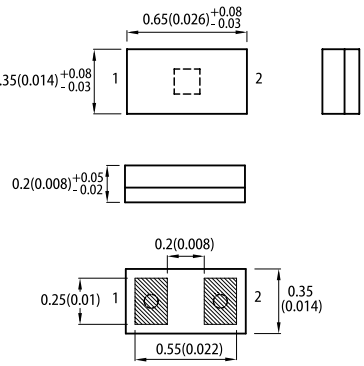
AP series custom-made is available upon request

LOW CURRENT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @5mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APG0201ZGC-5MAV	InGaN	525	Water Clear	180	280	140°	0.65mm x 0.35mm x 0.2mm (0201)
APG0201VBC/A-5MAV	InGaN	468	Water Clear	30	60	140°	
APG1005ZGC-5MAV	InGaN	525	Water Clear	120	280	140°	1.0mm x 0.5mm x 0.2mm (0402)
APG1005VBC-A1-5MAV	InGaN	468	Water Clear	20	60	140°	
APGA1602QBC/KA-5MAV	InGaN	463	Water Clear	8	20	150°	1.6mm x 0.9mm x 0.2mm (Right Angle)
APGB0607G22R23C	InGaN	525	Water Clear	50	200	140°	0.65mm x 0.65mm x 0.25mm (Bi-Color)
	AlGaInP	624		8	25		
APGB0607B7R23C	InGaN	468	Water Clear	20	40	140°	
	AlGaInP	624		8	25		
APGB0607B7Y7C	InGaN	468	Water Clear	20	40	140°	
	AlGaInP	589		4	20		
APGB0607B7G22C	InGaN	468	Water Clear	20	40	140°	
	InGaN	525		50	200		



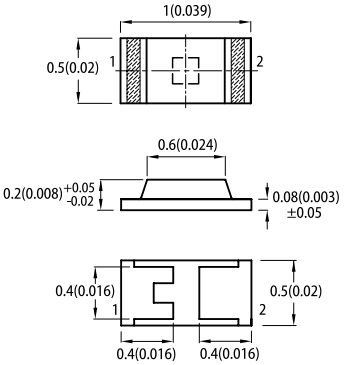
APG0201-5MAV



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



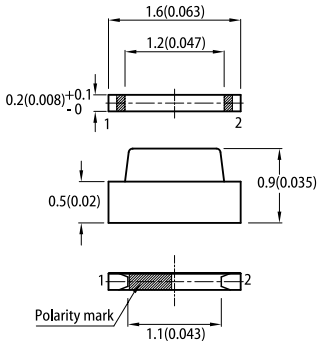
APG1005-5MAV



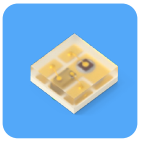
Units: mm (inch)
Tolerance: ± 0.1 (0.004)



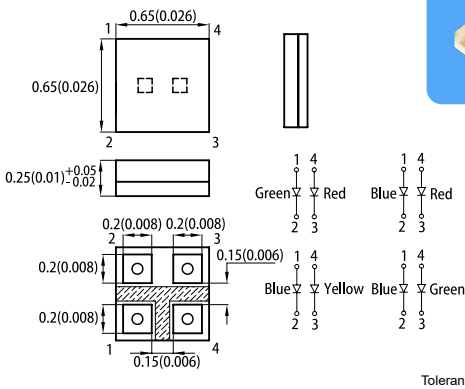
APGA1602-5MAV



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



APGB0607



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

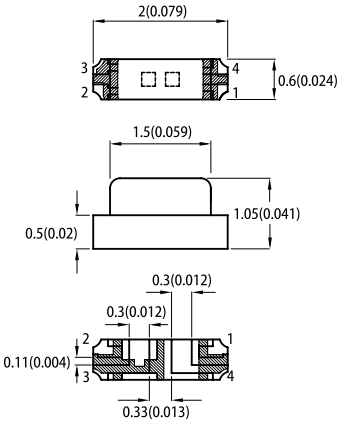
AP series custom-made is available upon request

LOW CURRENT SMD LED

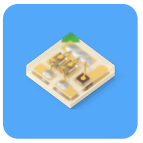
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @5mA Min.	Iv (mcd) @5mA Typ.	Viewing Angle 2θ1/2	Dimensions
APBA2006SURKVBDC-5MA	AlGaInP	630	Water Clear	6	20	140°	2.0mm x 1.05mm x 0.6mm (Right Angle, Bi-Color)
	InGaN	470		20	50		
APGF1012GBRC-07	InGaN	525	Water Clear	80	220	150°	1.0mm x 1.0mm x 0.25mm (Full Color)
	InGaN	465		10	23		
	AlGaInP	624		15	30		



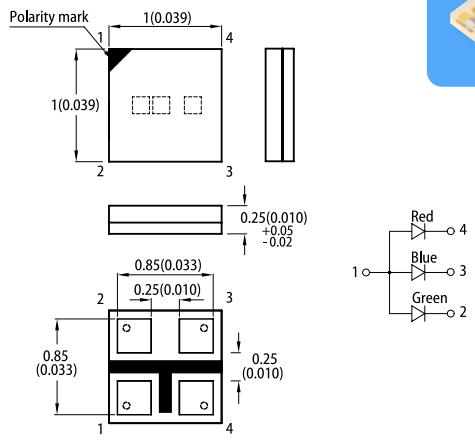
APBA2006-5MAV



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



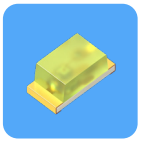
APGF1012



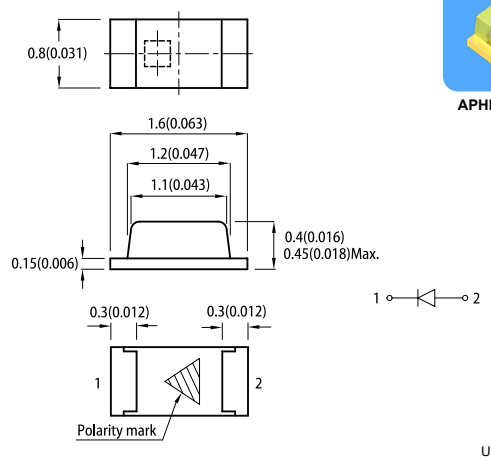
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

LOW CURRENT SMD LED

Part Number	Material	Chromaticity Coordinates	Lens Type	Iv (mcd) @5mA Min.	Iv (mcd) @5mA Max.	Viewing Angle 2θ1/2	Dimensions
APHM1608VRBXF/A-5MAV	InGaN	x=0.20 y=0.15	-	80	180	160°	1.6mm x 0.8mm x 0.45mm (0603)



APHM1608-5MAV



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

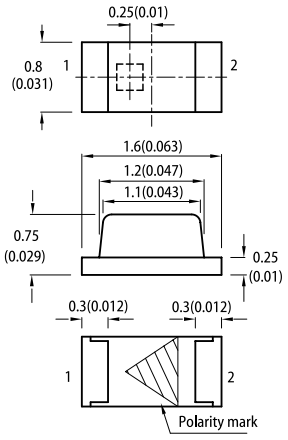
AP series custom-made is available upon request

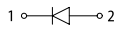
LOW CURRENT SMD LED

Part Number	Material	Chromaticity Coordinates	Lens Type	Iv (mcd) @5mA		Viewing Angle	Dimensions
				Min.	Max.	2θ1/2	
APT1608VRCXF/A-5MAV	InGaN	x=0.23 y=0.41	-	80	350	160°	1.6mm x 0.8mm x 0.75mm (0603)



APT1608-5MAV





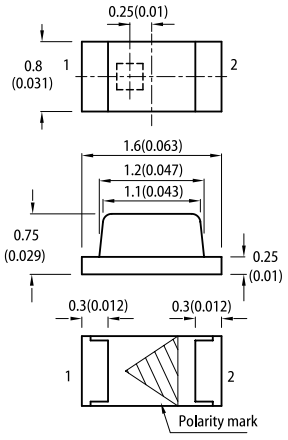
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

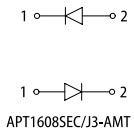
HIGH TEMPERATURE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA*2mA		Viewing Angle	Dimensions
				Min.	Max.	2θ1/2	
APT1608SEC/J3-AMT	AlGaInP	625	Water Clear	200	500	120°	1.6mm x 0.8mm x 0.75mm (0603)
APT1608SYC/J3-AMT	AlGaInP	590	Water Clear	300	1000	120°	
APT1608ZGC-AMT	InGaN	525	Water Clear	300	700	130°	



APT1608





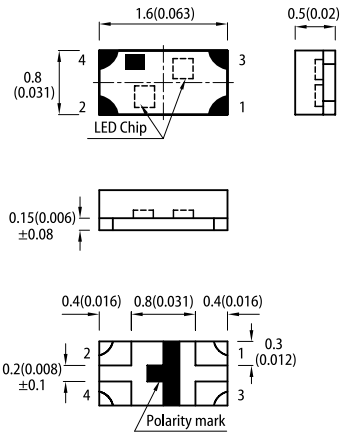
APT1608SEC/J3-AMT
APT1608SYC/J3-AMT

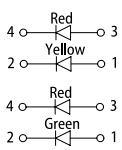
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA*2mA		Viewing Angle	Dimensions
				Min.	Max.	2θ1/2	
APHB1608Y2R2C-AMT	AlGaInP	590	Water Clear	80	300	130°	1.6mm x 0.8mm x 0.5mm (0603 Bi-Color)
	AlGaInP	630		40	120		
APHB1608LG3R2C-AMT	InGaN	525	Water Clear	*50	*180	130°	
	AlGaInP	630		*4	*15		



APHB1608





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

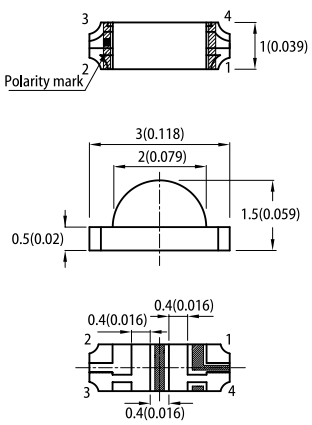
AP series custom-made is available upon request

HIGH TEMPERATURE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA*2mA Min.	Iv (mcd) @20mA*2mA Max.	Viewing Angle 2θ1/2	Dimensions
APFA3010R2G2C-C6-AMT	AlGaInP	630	Water Clear	55	200	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)
	AlGaInP	570		20	80		
AA4040SURCKT-AMT	AlGaInP	630	Water Clear	80	300	120°	4.0mm x 4.0mm x 3.6mm (Right Angle)
AA4040LSURCKT-AMT	AlGaInP	630	Water Clear	*6	*20	120°	
AA4040SYCKT/J3-AMT	AlGaInP	590	Water Clear	400	1000	120°	
AA4040LSYCKT/J3-AMT	AlGaInP	590	Water Clear	*20	*80	120°	
AA4040LCGCK-AMT	AlGaInP	570	Water Clear	*6	*20	120°	
AA4040ZGCKT-AMT	InGaN	525	Water Clear	500	1300	120°	
AA4040LZGCKT-AMT	InGaN	525	Water Clear	*80	*320	120°	
AA4040QBS/D-AMT	InGaN	465	Water Clear	120	400	120°	
AA4040LQBS/D-AMT	InGaN	465	Water Clear	*15	*50	120°	



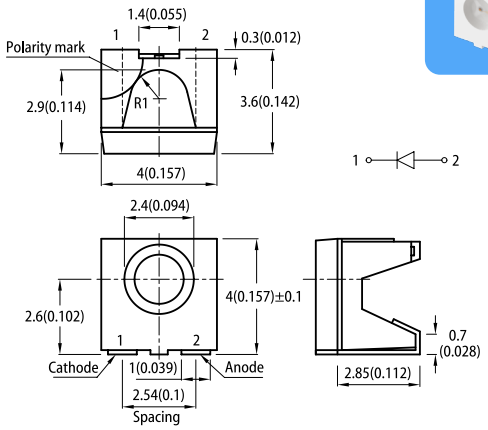
APFA3010



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



AA4040



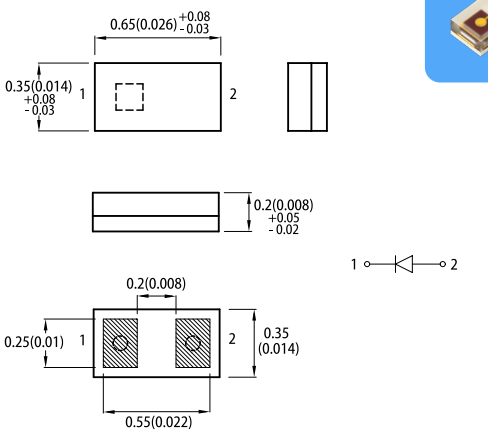
Units: mm (inch)
Tolerance: ± 0.25 (0.01)

TOP-EMITTING CHIP SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA Min.	Iv (mcd) @10mA Typ.	Viewing Angle 2θ1/2	Dimensions
APG0201SURC-TT	AlGaInP	631	Water Clear	10	35	140°	0.65mm x 0.35mm x 0.2mm (0201)
APG0201SEC-E-TT	AlGaInP	624	Water Clear	15	40	140°	
APG0201SEC-TT	AlGaInP	605	Water Clear	20	50	140°	
APG0201SYC-TT	AlGaInP	589	Water Clear	10	30	140°	
APG0201CGC-TT	AlGaInP	571	Water Clear	6	15	140°	



APG0201

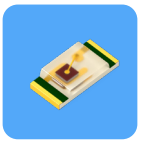


Units: mm (inch)
Tolerance: ± 0.1 (0.004)

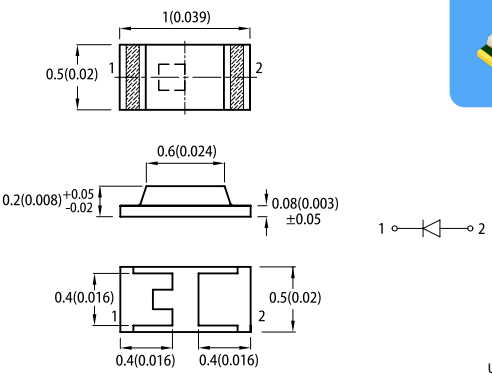
AP series custom-made is available upon request

TOP-EMITTING CHIP SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APG1005SEC/E-T	AlGaInP	624	Water Clear	40	80	120°	1.0mm x 0.5mm x 0.2mm (0402)
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°	
APHHS1005SURCK	AlGaInP	630	Water Clear	40	70	120°	1.0mm x 0.5mm x 0.5mm (0402)
APHHS1005SECK	AlGaInP	605	Water Clear	80	150	120°	
APHHS1005SYCK	AlGaInP	590	Water Clear	80	150	120°	
APHHS1005CGCK	AlGaInP	570	Water Clear	20	50	120°	
APHHS1005ZGCK	InGaN	525	Water Clear	400	550	140°	
APHHS1005QBC/D	InGaN	465	Water Clear	40	60	140°	
APG1608SURKC/T	AlGaInP	630	Water Clear	55	110	120°	1.6mm x 0.8mm x 0.25mm (0603)
APG1608SEKC/T	AlGaInP	601	Water Clear	55	100	120°	
APG1608SYKC/T	AlGaInP	590	Water Clear	55	120	120°	
APG1608CGKC/T	AlGaInP	570	Water Clear	20	50	120°	
APG1608ZGCK	InGaN	525	Water Clear	300	400	130°	
APG1608QBC/D	InGaN	465	Water Clear	40	100	130°	
APT1608SURCK	AlGaInP	630	Water Clear	40	80	120°	1.6mm x 0.8mm x 0.75mm (0603)
APT1608SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	120°	
APT1608SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	120°	
APT1608SECK	AlGaInP	605	Water Clear	80	180	120°	
APT1608SYCK	AlGaInP	590	Water Clear	80	150	120°	
APT1608SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	120°	
APT1608CGCK	AlGaInP	570	Water Clear	20	50	120°	
APT1608ZGCK	InGaN	525	Water Clear	300	550	130°	
APT1608VBC/D	InGaN	470	Water Clear	120	180	130°	
APT1608QBC/D	InGaN	465	Water Clear	40	100	130°	



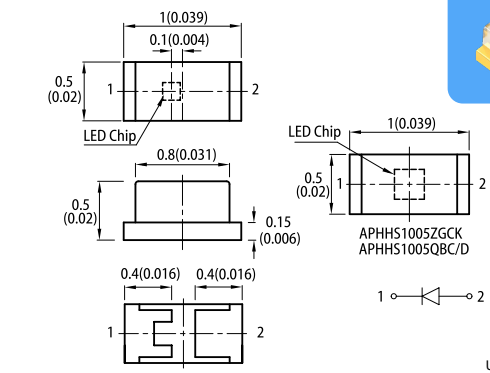
APG1005



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



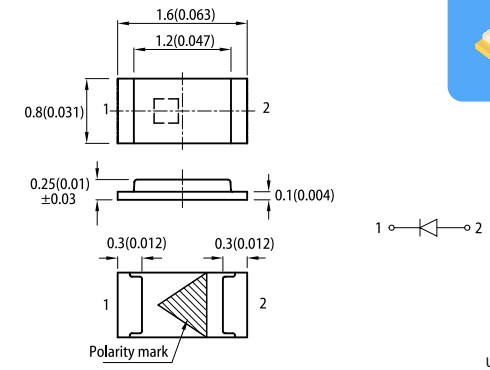
APHHS1005



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



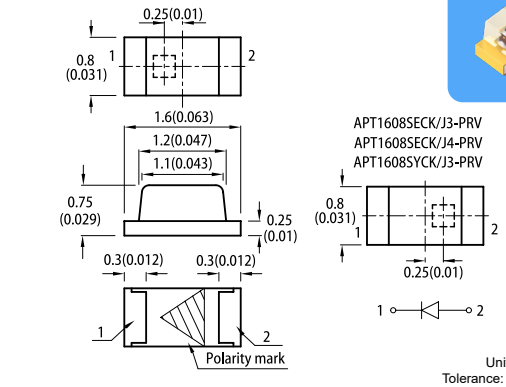
APG1608



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



APT1608



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

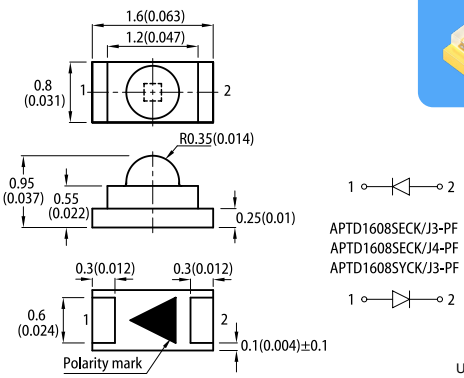
AP series custom-made is available upon request

TOP-EMITTING CHIP SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTD1608SURCK	AlGaInP	630	Water Clear	80	250	60°	1.6mm x 0.8mm x 0.95mm (0603 Dome Lens)
APTD1608SECK/J3-PF	AlGaInP	625	Water Clear	500	900	60°	
APTD1608SECK/J4-PF	AlGaInP	605	Water Clear	1000	1600	60°	
APTD1608SECK	AlGaInP	605	Water Clear	200	500	60°	
APTD1608SYCK	AlGaInP	590	Water Clear	300	600	60°	
APTD1608SYCK/J3-PF	AlGaInP	590	Water Clear	500	850	60°	
APTD1608CGCK	AlGaInP	570	Water Clear	80	190	60°	
APTD1608ZGCK	InGaN	525	Water Clear	700	1200	60°	
APTD1608ZGC	InGaN	525	Water Clear	700	1300	60°	
APTD1608VBC/D	InGaN	470	Water Clear	200	350	40°	
APTD1608QBC/D	InGaN	465	Water Clear	80	200	40°	
APHCM2012SURCK-F01	AlGaInP	630	Water Clear	40	80	140°	2.0mm x 1.25mm x 0.4mm (0805)
APHCM2012SECK-F01	AlGaInP	605	Water Clear	80	180	140°	
APHCM2012SYCK-F01	AlGaInP	590	Water Clear	80	150	140°	
APHCM2012CGCK-F01	AlGaInP	570	Water Clear	20	50	140°	
APHCM2012ZGC-F01	InGaN	525	Water Clear	300	600	140°	
APHCM2012QBC/D-F01	InGaN	465	Water Clear	40	100	140°	
APT2012SURCK	AlGaInP	630	Water Clear	40	80	140°	2.0mm x 1.25mm x 0.75mm (0805)
APT2012SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	140°	
APT2012SECK	AlGaInP	605	Water Clear	80	180	140°	
APT2012SYCK	AlGaInP	590	Water Clear	80	150	140°	
APT2012SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	140°	
APT2012CGCK	AlGaInP	570	Water Clear	20	50	140°	
APT2012ZGCK	InGaN	525	Water Clear	300	550	140°	
APT2012VBC/D	InGaN	470	Water Clear	120	180	140°	
APT2012QBC/D	InGaN	465	Water Clear	40	100	140°	
APL3015SURCK-F01	AlGaInP	630	Water Clear	120	180	70°	3.0mm x 1.5mm x 1.4mm
APL3015SECK-F01	AlGaInP	605	Water Clear	120	350	70°	
APL3015SYCK-F01	AlGaInP	590	Water Clear	200	350	70°	
APL3015CGCK-F01	AlGaInP	570	Water Clear	55	120	70°	
APL3015ZGC-F01	InGaN	525	Water Clear	1000	1500	50°	
APL3015QBC/D-F01	InGaN	465	Water Clear	120	200	50°	



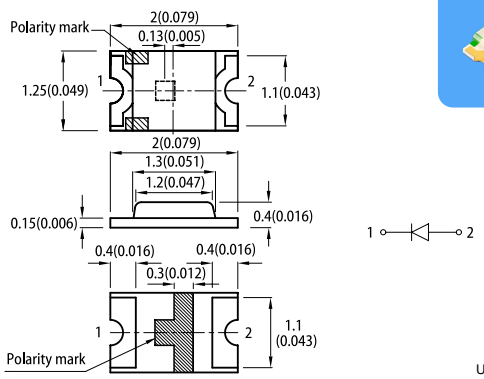
APTD1608



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



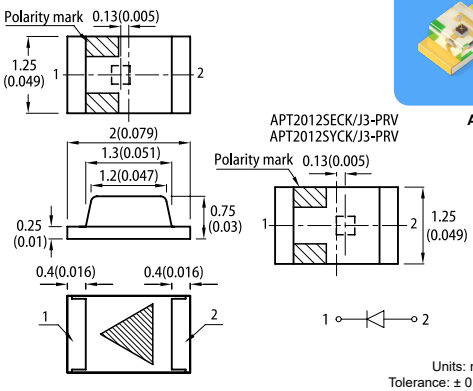
APHCM2012



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



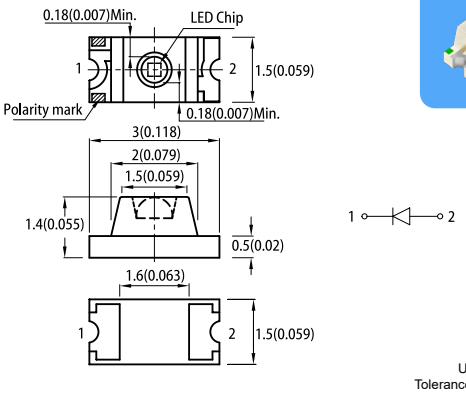
APT2012



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



APL3015



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

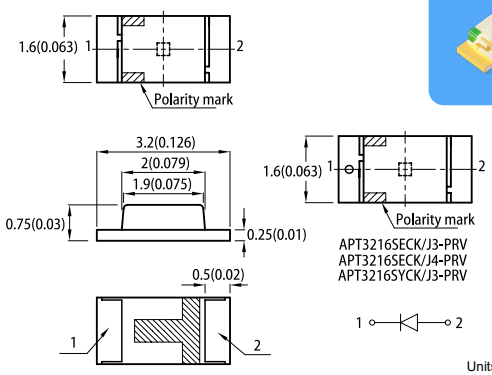
AP series custom-made is available upon request

TOP-EMITTING CHIP SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APT3216SURCK	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 1.6mm x 0.75mm (1206)
APT3216SECK/J3-PRV	AlGaInP	625	Water Clear	200	350	140°	
APT3216SECK/J4-PRV	AlGaInP	605	Water Clear	300	550	140°	
APT3216SECK	AlGaInP	605	Water Clear	80	180	140°	
APT3216SYCK	AlGaInP	590	Water Clear	80	150	140°	
APT3216SYCK/J3-PRV	AlGaInP	590	Water Clear	200	320	140°	
APT3216CGCK	AlGaInP	570	Water Clear	20	50	140°	
APT3216ZGC	InGaN	525	Water Clear	300	600	150°	
APT3216VBC/D	InGaN	470	Water Clear	120	180	150°	
APT3216QBC/D	InGaN	465	Water Clear	40	100	150°	
APTL3216SURCK	AlGaInP	630	Water Clear	120	230	80°	3.2mm x 1.6mm x 1.1mm (1206)
APTL3216SECK	AlGaInP	605	Water Clear	200	350	80°	
APTL3216SYCK	AlGaInP	590	Water Clear	200	350	80°	
APTL3216CGCK	AlGaInP	570	Water Clear	55	100	80°	
APTL3216ZGC	InGaN	525	Water Clear	700	1100	80°	
APTL3216QBC/D	InGaN	465	Water Clear	120	250	80°	
APTD3216SURCK	AlGaInP	630	Water Clear	300	800	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)
APTD3216EC	GaAsP/GaP	617	Water Clear	20	50	40°	
APTD3216SECK	AlGaInP	605	Water Clear	500	1000	40°	
APTD3216SYCK	AlGaInP	590	Water Clear	700	800	40°	
APTD3216CGCK	AlGaInP	570	Water Clear	120	300	40°	
APTD3216ZGCK	InGaN	525	Water Clear	2700	4000	30°	
APTD3216ZGC	InGaN	525	Water Clear	2700	4200	30°	
APTD3216QBC/D	InGaN	465	Water Clear	300	700	30°	
APD3224SURCK-F01	AlGaInP	630	Water Clear	1000	1300	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)
APD3224SECK-F01	AlGaInP	605	Water Clear	1000	1600	20°	
APD3224SYCK-F01	AlGaInP	590	Water Clear	1300	1600	20°	
APD3224CGCK-F01	AlGaInP	570	Water Clear	500	900	20°	
APD3224ZGCK-F01	InGaN	525	Water Clear	3600	6800	20°	
APD3224QBC/D-F01	InGaN	465	Water Clear	500	900	20°	



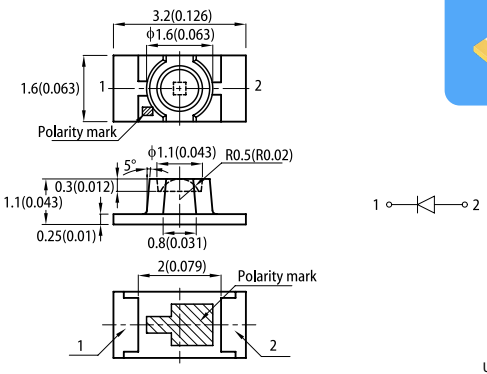
APT3216



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



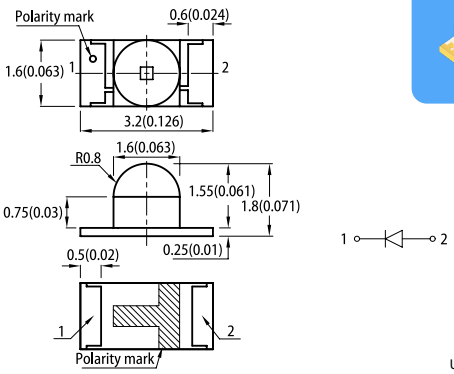
APTL3216



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



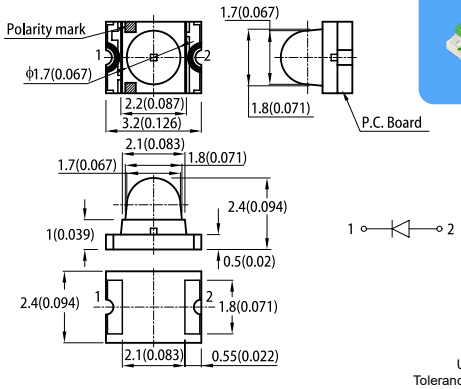
APTD3216



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



APD3224



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

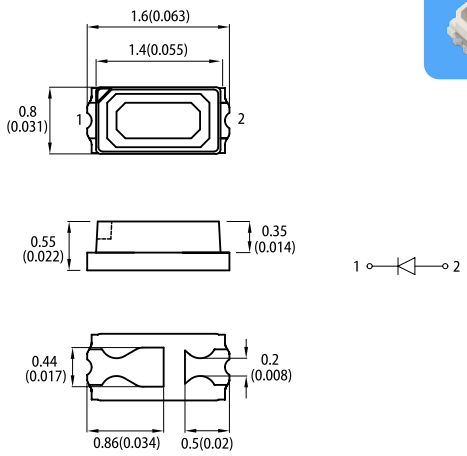
AP series custom-made is available upon request

TOP-EMITTING PLCC SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA*10mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AA1608SURSK	AlGaInP	630	Water Clear	40	160	120°	1.6mm x 0.8mm x 0.55mm (0603)
AA1608SESK	AlGaInP	605	Water Clear	80	120	120°	
AA1608SYSK	AlGaInP	590	Water Clear	55	240	120°	
AA1608CGSK	AlGaInP	570	Water Clear	40	80	120°	
AA1608ZGSK-10MAV	InGaN	525	Water Clear	*450	*700	120°	
AA1608VBS/A1-10MAV	InGaN	468	Water Clear	*50	*160	120°	
AA1608QBS/D-10MAV	InGaN	465	Water Clear	*50	*120	120°	
AA2214SURSK	AlGaInP	630	Water Clear	55	100	120°	2.2mm x 1.4mm x 1.3mm
AA2214SYSK	AlGaInP	590	Water Clear	120	250	120°	
AA2214CGSK	AlGaInP	570	Water Clear	40	70	120°	
AA2214ZGS	InGaN	525	Water Clear	500	900	120°	
AA2214QBS/D	InGaN	465	Water Clear	80	150	120°	
AA3021SURSK	AlGaInP	630	Water Clear	40	90	120°	3.0mm x 2.0mm x 1.3mm
AA3021SESK/J3-TR	AlGaInP	625	Water Clear	300	450	120°	
AA3021SESK	AlGaInP	605	Water Clear	120	300	120°	
AA3021SYSK	AlGaInP	590	Water Clear	120	200	120°	
AA3021CGSK	AlGaInP	570	Water Clear	40	80	120°	
AA3021ZGS	InGaN	525	Water Clear	400	800	120°	
AA3021VBS/D	InGaN	470	Water Clear	200	450	120°	
AA3021QBS/D	InGaN	465	Water Clear	80	120	120°	



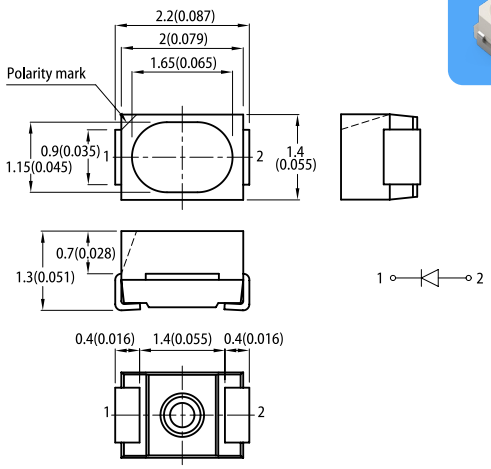
AA1608



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



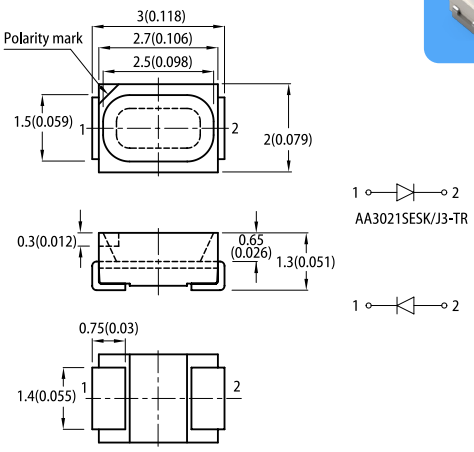
AA2214



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



AA3021



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

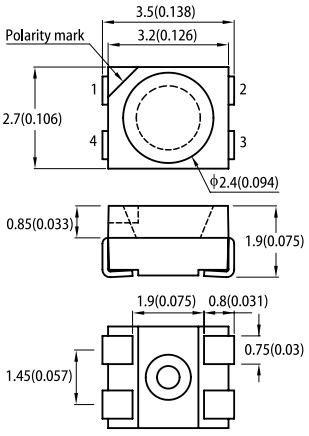
AP series custom-made is available upon request

TOP-EMITTING PLCC SMD LED

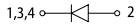
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA*50mA**30mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AA3527ASESK/J3-50MAV	AlGaInP	625	Water Clear	*1000	*1500	120°	3.5mm x 2.7mm x 1.9mm
AA3527ASYSK/J3-50MAV	AlGaInP	590	Water Clear	*1000	*1500	120°	
AA3527AZGSK-30MAV	InGaN	525	Water Clear	**500	**700	120°	
AA3527AVBS/D-30MAV	InGaN	470	Water Clear	**300	**600	120°	
AA3528SURCK	AlGaInP	630	Water Clear	55	100	120°	3.5mm x 2.8mm x 1.9mm
AA3528SECKT/J3	AlGaInP	625	Water Clear	500	700	120°	
AA3528CGCK	AlGaInP	570	Water Clear	40	100	120°	
AA3528ZGCK	InGaN	525	Water Clear	500	1000	120°	
AA3528QBS/D	InGaN	465	Water Clear	80	150	120°	



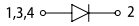
AA3527A



AA3527AZGSK-30MAV
AA3527AVBS/D-30MAV



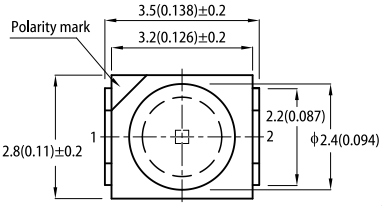
AA3527ASESK/J3-50MAV
AA3527ASYSK/J3-50MAV



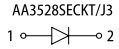
Units: mm (inch)
Tolerance: ± 0.25 (0.01)

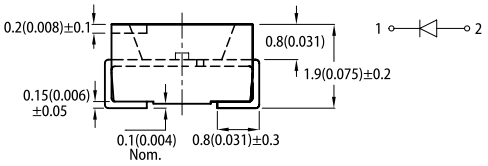


AA3528



AA3528SECKT/J3





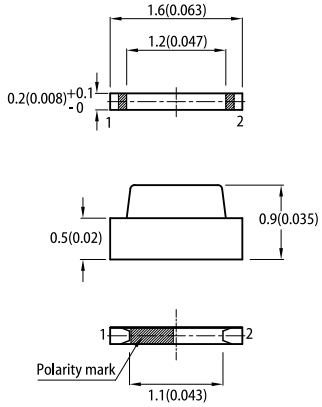
Units: mm (inch)
Tolerance: ± 0.25 (0.01)

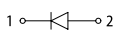
RIGHT ANGLE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APGA1602SEC/E/KA	AlGaInP	624	Water Clear	55	120	150°	1.6mm x 0.9mm x 0.2mm (Right Angle)
APGA1602SYC/KA	AlGaInP	589	Water Clear	40	75	150°	
APGA1602CGC/KA	AlGaInP	571	Water Clear	12	30	150°	



APGA1602





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

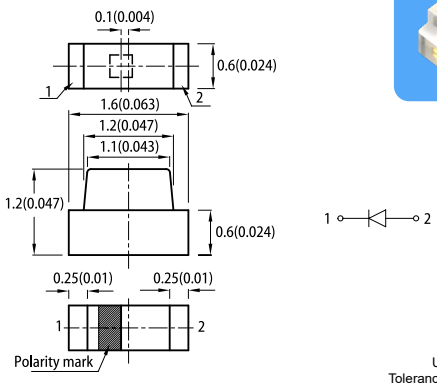
AP series custom-made is available upon request

RIGHT ANGLE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APA1606SURCK	AlGaInP	630	Water Clear	55	80	110°	1.6mm x 1.2mm x 0.6mm (Right Angle)
APA1606SECK	AlGaInP	605	Water Clear	80	180	110°	
APA1606SYCK	AlGaInP	590	Water Clear	80	150	110°	
APA1606CGCK	AlGaInP	570	Water Clear	20	50	110°	
APA1606ZGC	InGaN	525	Water Clear	200	400	110°	
APA1606VBC/D	InGaN	470	Water Clear	120	200	110°	
APA1606QBC/D	InGaN	465	Water Clear	40	80	110°	
APDA1806SURCK	AlGaInP	630	Water Clear	500	1200	25°	1.8mm x 1.5mm x 0.6 mm (Right Angle)
APDA1806SECK/J3-PRV	AlGaInP	625	Water Clear	1300	2600	25°	
APDA1806SECK	AlGaInP	605	Water Clear	500	1100	25°	
APDA1806SYCK	AlGaInP	590	Water Clear	500	1100	25°	
APDA1806CGCK	AlGaInP	570	Water Clear	120	400	25°	
APDA1806ZGCK	InGaN	525	Water Clear	1900	3200	25°	
APDA1806VBC/D	InGaN	470	Water Clear	400	800	25°	
APA2107SURCK	AlGaInP	630	Water Clear	55	80	140°	2.1mm x 1.0mm x 0.6mm (Right Angle)
APA2107SECK/J3-PRV	AlGaInP	625	Water Clear	200	380	140°	
APA2107SECK/J4-PRV	AlGaInP	605	Water Clear	400	550	140°	
APA2107SYCK	AlGaInP	590	Water Clear	80	150	140°	
APA2107CGCK	AlGaInP	570	Water Clear	20	50	140°	
APA2107ZGCK	InGaN	525	Water Clear	200	300	170°	
APA2107ZGC/G	InGaN	525	Water Clear	400	650	170°	
APA2107VBC/D	InGaN	470	Water Clear	120	200	170°	
AA2810ASURSK	AlGaInP	630	Water Clear	40	100	110°	2.8mm x 1.2mm x 0.8mm (Right Angle)
AA2810ASESK/J3	AlGaInP	625	Water Clear	300	500	110°	
AA2810ASESK	AlGaInP	605	Water Clear	80	150	110°	
AA2810ASYSK	AlGaInP	590	Water Clear	120	200	110°	
AA2810ASYSK/J3	AlGaInP	590	Water Clear	300	550	110°	
AA2810ACGSK	AlGaInP	570	Water Clear	40	70	110°	
AA2810AZGSK	InGaN	525	Water Clear	500	800	110°	
AA2810AVBS/D	InGaN	470	Water Clear	200	350	110°	
AA2810AQBS/D	InGaN	465	Water Clear	80	150	110°	



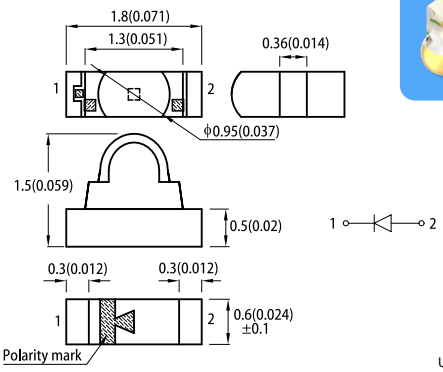
APA1606



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



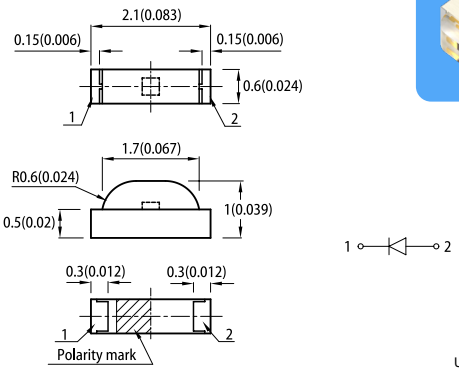
APDA1806



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



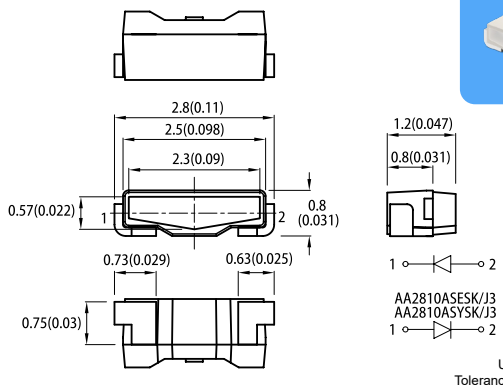
APA2107



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



AA2810A



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

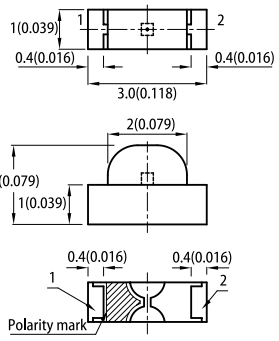
AP series custom-made is available upon request

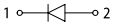
RIGHT ANGLE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APA3010SURCK-GX	AlGaInP	630	Water Clear	55	80	120°	3.0mm x 2.0mm x 1.0mm (Right Angle)
APA3010SECK-GX	AlGaInP	605	Water Clear	80	180	120°	
APA3010SYCK-GX	AlGaInP	590	Water Clear	80	150	120°	
APA3010CGCK-GX	AlGaInP	570	Water Clear	20	50	120°	
APA3010ZGC-GX	InGaN	525	Water Clear	200	400	120°	
APA3010QBC/D-GX	InGaN	465	Water Clear	40	80	120°	
APPA3010SURCK	AlGaInP	630	Water Clear	200	300	30°	3.0mm x 2.5mm x 1.0mm (Right Angle)
APPA3010SYCK	AlGaInP	590	Water Clear	300	450	30°	
APPA3010CGCK	AlGaInP	570	Water Clear	80	150	30°	
APDA3020SECK/J3-PF	AlGaInP	625	Water Clear	2300	3800	10°	3.0mm x 2.8mm x 2.0mm (Right Angle, Dome Lens)
APDA3020SECK/J4-PF	AlGaInP	605	Water Clear	7000	9000	10°	
APDA3020ZGCK	InGaN	525	Water Clear	3100	5800	10°	
APDA3020VBC/D	InGaN	470	Water Clear	1300	2300	10°	
AA4040SURSK	AlGaInP	630	Water Clear	80	150	120°	4.0mm x 4.0mm x 3.6mm (Right Angle)
AA4040SESK	AlGaInP	605	Water Clear	80	220	120°	
AA4040SYSK	AlGaInP	590	Water Clear	120	250	120°	
AA4040SYSK/J3	AlGaInP	590	Water Clear	400	550	120°	
AA4040CGCK	AlGaInP	570	Water Clear	40	90	120°	
AA4040ZGS	InGaN	525	Water Clear	500	850	120°	
AA4040QBS/D	InGaN	465	Water Clear	80	220	120°	



APA3010

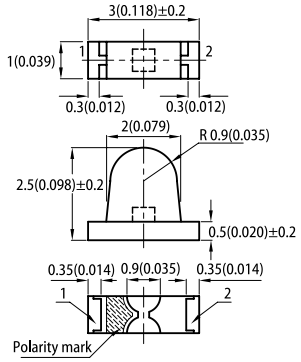


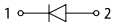


Units: mm (inch)
Tolerance: ± 0.15 (0.006)



APPA3010

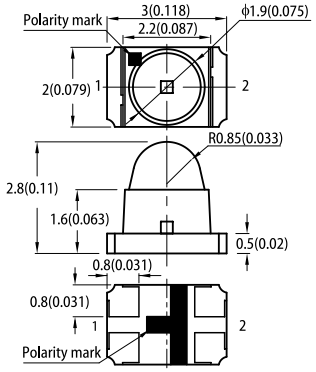


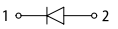


Units: mm (inch)
Tolerance: ± 0.15 (0.006)

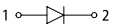


APDA3020





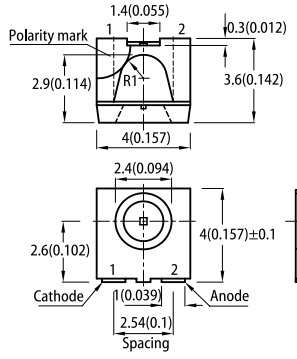
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APDA3020SECK/J4-PF

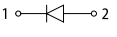


Units: mm (inch)
Tolerance: ± 0.2 (0.008)



AA4040





Units: mm (inch)
Tolerance: ± 0.25 (0.01)

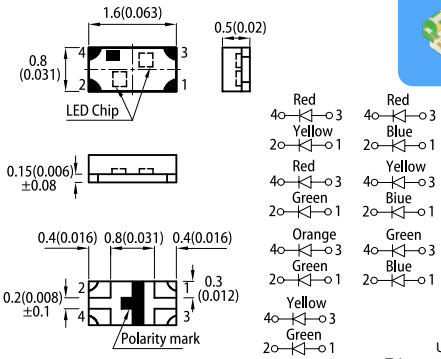
AP series custom-made is available upon request

MULTI-COLOR SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APHB1608SYKSURKC	AlGaInP	590	Water Clear	80	150	130°	1.6mm x 0.8mm x 0.5mm (0603 Bi-Color)
	AlGaInP	630		40	90		
APHB1608CGKSURKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	630		40	90		
APHB1608CGKSEKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	605		80	200		
APHB1608CGKSYKC	AlGaInP	570	Water Clear	20	50	130°	
	AlGaInP	590		80	150		
APHB1608ZGKSURKC	InGaN	525	Water Clear	200	350	130°	
	AlGaInP	630		40	90		
APHB1608ZGSYKC	InGaN	525	Water Clear	200	400	130°	
	AlGaInP	590		80	150		
APHB1608QBDSURKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	630		40	90		
APHB1608QBDSYKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	590		80	150		
APHB1608QBDCGKC	InGaN	465	Water Clear	40	70	130°	
	AlGaInP	570		20	50		
APHF1608SEEQBDZGKC	AlGaInP	621	Water Clear	40	120	140°	1.6mm x 0.8mm x 0.5mm (Full Color)
	InGaN	465		20	60		
	InGaN	525		200	480		
APTB1612SURKCGKC-F01	AlGaInP	630	Water Clear	40	80	150°	1.6mm x 1.25mm x 0.65mm (Bi-Color)
	AlGaInP	570		20	50		
APTB1612SURKQBDC-F01	AlGaInP	630	Water Clear	40	80	150°	
	InGaN	465		40	80		
APTB1612SYKCGKC-F01	AlGaInP	590	Water Clear	80	120	150°	
	AlGaInP	570		20	50		
APTB1615SURKCGKC-F01	AlGaInP	630	Water Clear	40	80	150°	1.6mm x 1.5mm x 0.7mm (Bi-Color)
	AlGaInP	570		20	50		
APTB1615SYKCGKC-F01	AlGaInP	590	Water Clear	80	120	150°	
	AlGaInP	570		20	50		



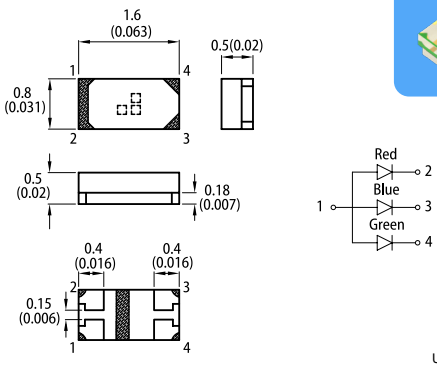
APHB1608



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



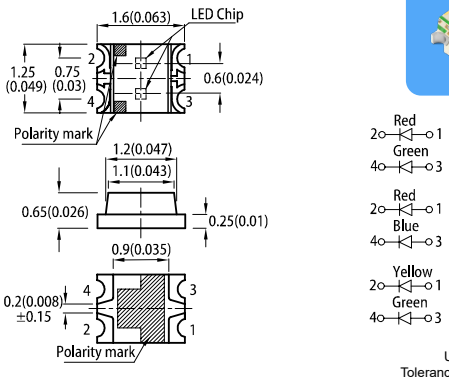
APHF1608



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



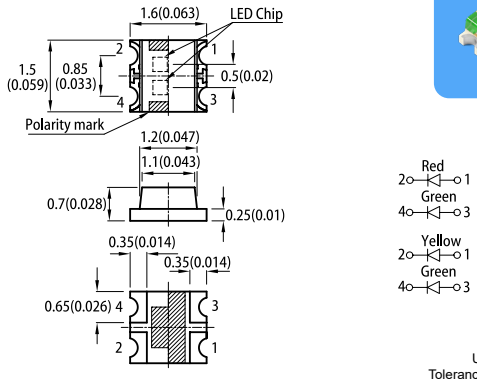
APTB1612



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



APTB1615



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

AP series custom-made is available upon request

MULTI-COLOR SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA Min.	Iv (mcd) @20mA Typ.	Viewing Angle 2θ1/2	Dimensions
APTF1616SURKCGKSYKC	AlGaInP	630	Water Clear	40	80	130°	1.6mm x 1.6mm x 0.7mm (Full Color)
	AlGaInP	570		20	50		
	AlGaInP	590		80	120		
APTF1616SEJ3ZGGVBDC	AlGaInP	625	Water Clear	200	360	130°	
	InGaN	525		500	750		
	InGaN	470		80	140		
APTF1616SEEZGKQBKC	AlGaInP	621	Water Clear	55	110	130°	
	InGaN	525		300	400		
	InGaN	465		40	70		
APTF1616SEEZGQBDC	AlGaInP	621	Water Clear	55	110	130°	
	InGaN	525		300	400		
	InGaN	465		40	70		
APBA2006SURKSYKC	AlGaInP	630	Water Clear	20	80	140°	2.0mm x 1.05mm x 0.6mm (Right Angle, Bi-Color)
	AlGaInP	590		40	100		
APBA2006SURKCGKC	AlGaInP	630	Water Clear	20	80	140°	
	AlGaInP	570		8	40		
APBA2006SURKZGKC	AlGaInP	630	Water Clear	20	80	140°	
	InGaN	525		100	450		
APBA2006SYKCGKC	AlGaInP	590	Water Clear	40	100	140°	
	AlGaInP	570		8	40		
APHBM2012SURKCGKC	AlGaInP	630	Water Clear	40	80	120°	2.0mm x 1.25mm x 0.45mm (0805 Super Thin, Bi-Color)
	AlGaInP	570		20	50		
APHBM2012SURKZGC	AlGaInP	630	Water Clear	40	80	120°	
	InGaN	525		300	500		
APHBM2012SURKZGKC	AlGaInP	630	Water Clear	40	80	120°	
	InGaN	525		300	450		
APHBM2012CGKSEKC	AlGaInP	570	Water Clear	20	50	120°	
	AlGaInP	605		80	180		
APHBM2012CGKSYKC	AlGaInP	570	Water Clear	20	50	120°	
	AlGaInP	590		80	120		
APHBM2012QBDSURKC	InGaN	465	Water Clear	40	80	120°	
	AlGaInP	630		40	80		
APHBM2012QBDCGKC	InGaN	465	Water Clear	40	80	120°	
	AlGaInP	570		20	50		
APFA2507R3G3C-CC	AlGaInP	625	Water Clear	200	400	130°	2.5mm x 1.0mm x 0.7mm (Right Angle)
	InGaN	525		400	550		
APFA2507R9G2C-C2	AlGaInP	621	Water Clear	20	40	130°	
	AlGaInP	570		20	45		
APFA2507Y2G2C-C2	AlGaInP	590	Water Clear	80	130	130°	
	AlGaInP	570		20	45		

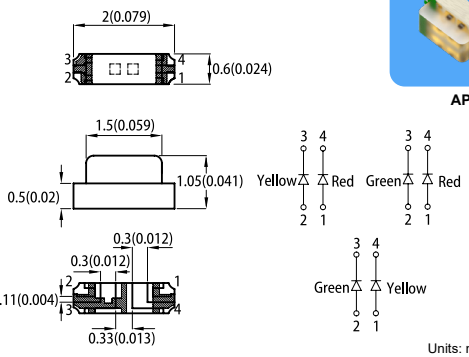


APTF1616

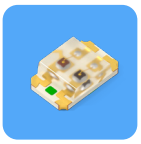
Units: mm (inch)
Tolerance: ± 0.2 (0.008)



APBA2006



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



APHBM2012

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

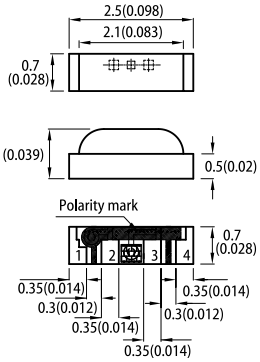
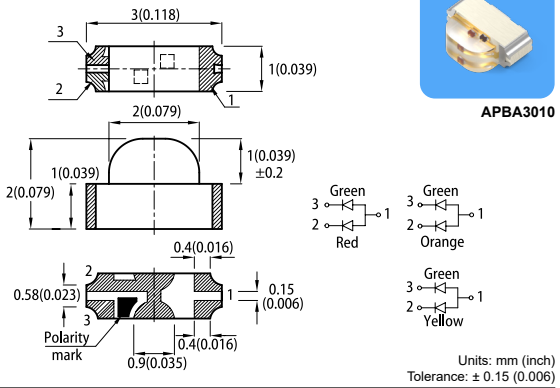
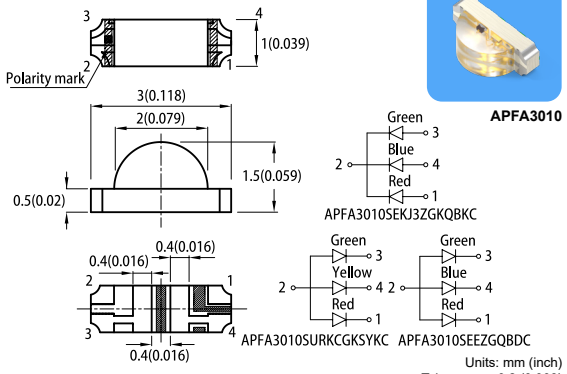
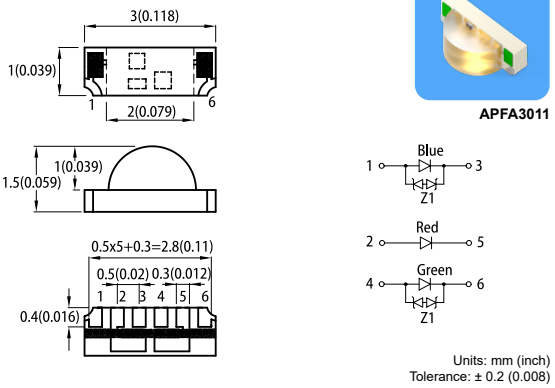


APFA2507

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

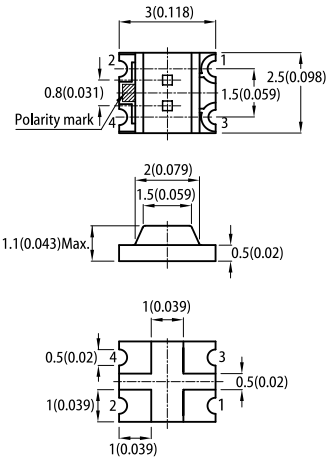
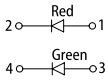
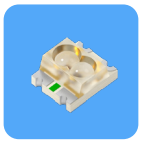
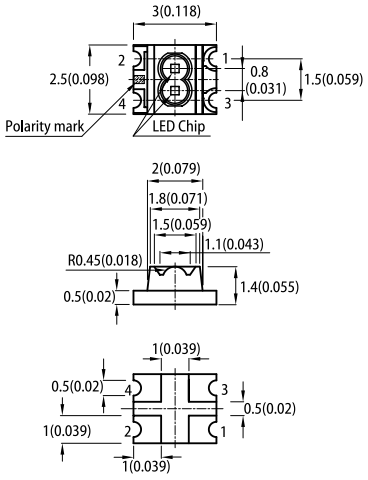
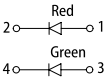
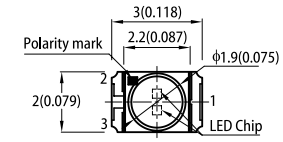
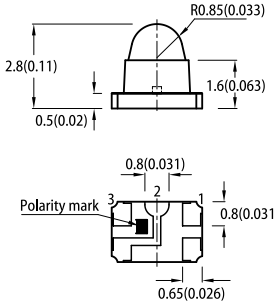
AP series custom-made is available upon request

MULTI-COLOR SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APFA2507QBDSEEZGKC	InGaN	465	Water Clear	40	65	130°	2.5mm x 1.0mm x 0.7mm (Right Angle, Full Color)   APFA2507 Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	621		80	110		
	InGaN	525		400	550		
APBA3010SURKCGKC-GX	AlGaInP	630	Water Clear	40	80	140°	3.0mm x 2.0mm x 1.0mm (Right Angle, Bi-Color)  APBA3010 Units: mm (inch) Tolerance: ± 0.15 (0.006)
	AlGaInP	570		40	70		
APBA3010SEKCGKC-GX	AlGaInP	605	Water Clear	80	150	140°	
	AlGaInP	570		40	70		
APBA3010SYKCGKC-GX	AlGaInP	590	Water Clear	80	120	140°	
	AlGaInP	570		40	70		
APFA3010SURKCGKSYKC	AlGaInP	630	Water Clear	55	80	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)  APFA3010 Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	45		
	AlGaInP	590		120	180		
APFA3010SEKJ3ZGKQBKC	AlGaInP	625	Water Clear	200	410	150°	
	InGaN	525		300	500		
	InGaN	465		40	70		
APFA3010SEEZGQBDC	AlGaInP	621	Water Clear	80	140	150°	
	InGaN	525		300	500		
	InGaN	465		40	70		
APFA3011-AK13/F	InGaN	470	Water Clear	80	150	150°	3.0mm x 1.5mm x 1.0mm (Right Angle, Full Color)  APFA3011 Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	625		200	410		
	InGaN	525		500	780		

AP series custom-made is available upon request

MULTI-COLOR SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APB3025SURKCGKC-F01	AlGaInP	630	Water Clear	40	70	160°	3.0mm x 2.5mm x 1.1mm (Bi-Color)  APB3025   Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		20	60		
APBL3025SURKCGK-F01	AlGaInP	630	Water Clear	120	300	50°	3.0mm x 2.5mm x 1.4mm (Bi-Color)  APBL3025   Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		80	150		
APBDA3020SURKCGKC-GX	AlGaInP	630	Water Clear	120	300	15°	3.0mm x 2.8mm x 2.0mm (Right Angle, Dome Lens)  APBDA3020    Units: mm (inch) Tolerance: ± 0.2 (0.008)
	AlGaInP	570		120	300		
APBDA3020CGKSYKC-GX	AlGaInP	570	Water Clear	120	280	15°	
	AlGaInP	590		400	700		

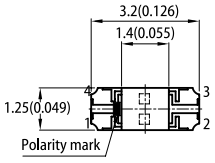
AP series custom-made is available upon request

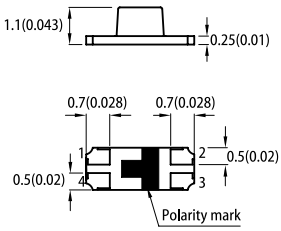
MULTI-COLOR SMD LED

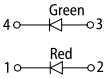
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTB3212SURKCGKC-01	AlGaInP	630	Water Clear	40	80	130°	3.2mm x 1.25mm x 1.1mm (Bi-Color)
	AlGaInP	570		20	50		
APTBD3216SURKCGKC-01	AlGaInP	630	Water Clear	300	600	30°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)
	AlGaInP	570		120	250		
APBD3224SURKCGKC-F01	AlGaInP	630	Water Clear	120	400	20°	3.2mm x 2.4mm x 2.4mm (Dome Lens)
	AlGaInP	570		80	280		
APBD3224SYKCGKC-F01	AlGaInP	590	Water Clear	400	800	20°	
	AlGaInP	570		80	280		



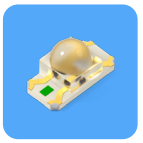
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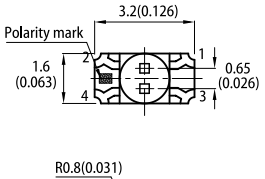


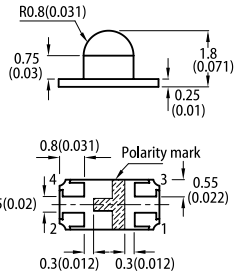


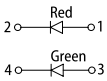
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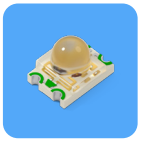
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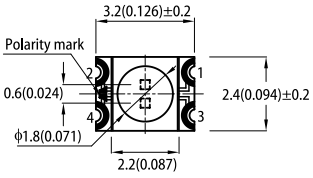


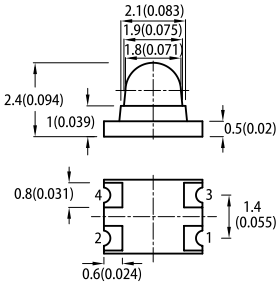


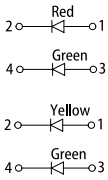
Units: mm (inch)
Tolerance: ± 0.2 (0.008)



APBD3224





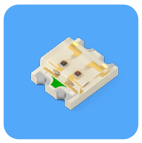


Units: mm (inch)
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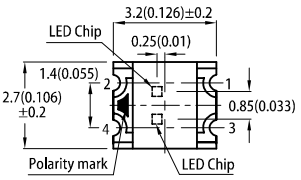
AP series custom-made is available upon request

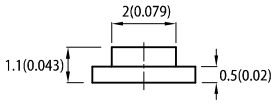
MULTI-COLOR SMD LED

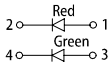
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APB3227SURKCGKC	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 2.7mm x 1.1mm (Bi-Color)
	AlGaInP	570		20	55		
APB3227SURKZGC	AlGaInP	630	Water Clear	40	80	140°	
	InGaN	525		300	600		
APF3236SEEZGQBDC	AlGaInP	621	Water Clear	80	140	150°	3.2mm x 3.6mm x 1.1mm (Full Color)
	InGaN	525		300	450		
	InGaN	465		40	70		
AAA3528SURKSYKC	AlGaInP	630	Water Clear	55	100	120°	3.5mm x 2.8mm x 1.9mm (Bi-Color)
	AlGaInP	590		120	240		

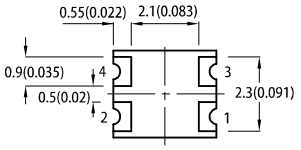


APB3227





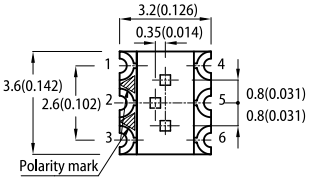


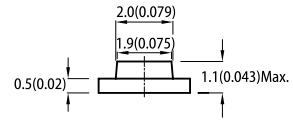


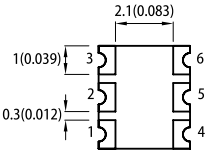
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

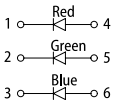


APF3236





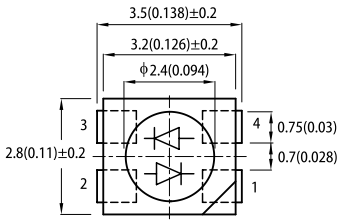


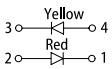


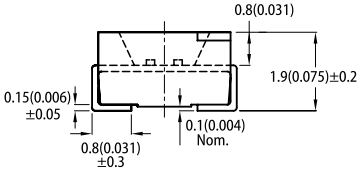
Units: mm (inch)
Tolerance: ± 0.2 (0.008)



AAA3528







Units: mm (inch)
Tolerance: ± 0.25 (0.01)

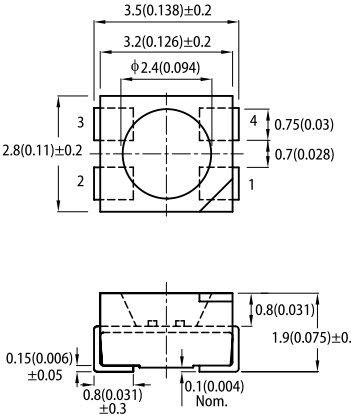
AP series custom-made is available upon request

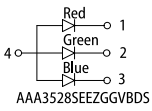
MULTI-COLOR SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AAA3528SEEZGKQBKS	AlGaInP	621	Water Clear	120	220	120°	3.5mm x 2.8mm x 1.9mm (Full Color)
	InGaN	525		500	700		
	InGaN	465		55	100		
AAA3528SEEZGGVBDS	AlGaInP	621	Water Clear	120	220	120°	
	InGaN	525		1000	1600		
	InGaN	470		200	330		
APTFD3535VBDSEJ3ZGGC	InGaN	470	Water Clear	300	500	50°	3.5mm x 3.5mm x 1.25mm (Full Color)
	AlGaInP	625		1000	1600		
	InGaN	525		1300	1900		

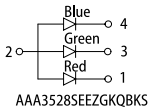


AAA3528





AAA3528SEEZGGVBDS

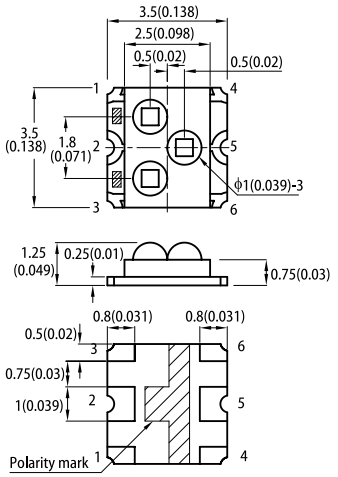


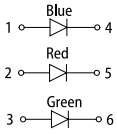
AAA3528SEEZGKQBKS

Units: mm (inch)
Tolerance: ± 0.25 (0.01)



APTFD3535





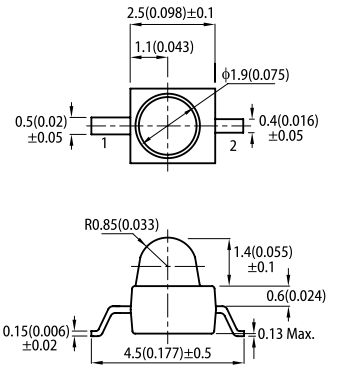
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

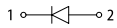
SUBMINATURE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AM2520CGCK03	AlGaInP	570	Water Clear	500	1000	20°	Subminiature Solid State Lamps Gull Wing Lead
AM2520ZGC03	InGaN	525	Water Clear	4200	7000	20°	



AM2520xxx03





Units: mm (inch)
Tolerance: ± 0.25 (0.01)

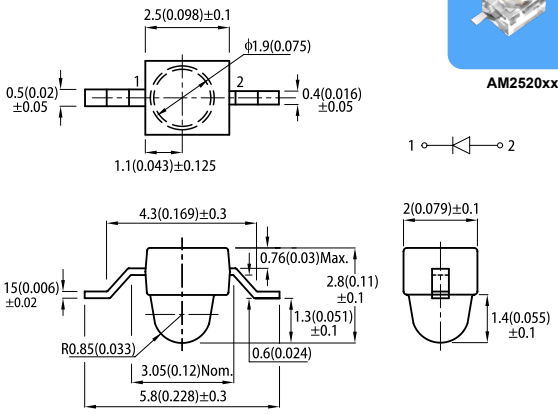
AP series custom-made is available upon request

SUBMINATURE SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AM2520CGCK09	AlGaInP	570	Water Clear	500	1000	20°	Subminiature Solid State Lamps Z-Bend Lead
AM2520ZGC09	InGaN	525	Water Clear	4200	7000	20°	



AM2520xxx09



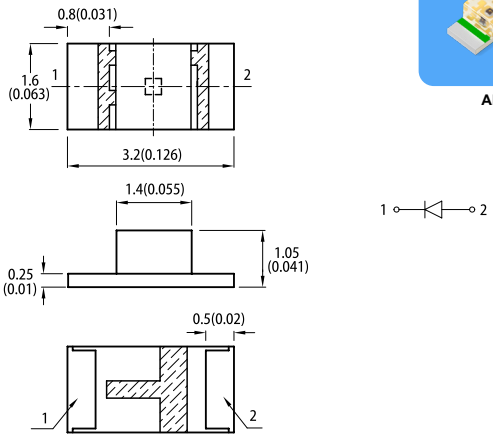
Units: mm (inch)
Tolerance: ± 0.25 (0.01)

REVERSE MOUNT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTR3216SURCK	AlGaInP	630	Water Clear	40	80	140°	3.2mm x 1.6mm x 1.05mm (1206 Reverse Mount)
APTR3216SECK	AlGaInP	605	Water Clear	80	180	140°	
APTR3216SYCK	AlGaInP	590	Water Clear	80	150	140°	
APTR3216CGCK	AlGaInP	570	Water Clear	20	50	140°	
APTR3216ZGCK	InGaN	525	Water Clear	300	550	140°	
APTR3216ZGC	InGaN	525	Water Clear	300	600	140°	
APTR3216ZGC/G	InGaN	525	Water Clear	500	800	140°	
APTR3216QBC/D	InGaN	465	Water Clear	40	100	140°	
APTL3216SURCK-01	AlGaInP	630	Water Clear	120	230	80°	3.2mm x 1.6mm x 1.1mm (1206 Reverse Mount)
APTL3216SECK-01	AlGaInP	605	Water Clear	200	350	80°	
APTL3216SYCK01	AlGaInP	590	Water Clear	200	350	80°	
APTL3216CGCK-01	AlGaInP	570	Water Clear	55	100	80°	
APTL3216ZGCK-01	InGaN	525	Water Clear	700	1000	80°	
APTL3216QBC/D-01	InGaN	465	Water Clear	120	250	80°	



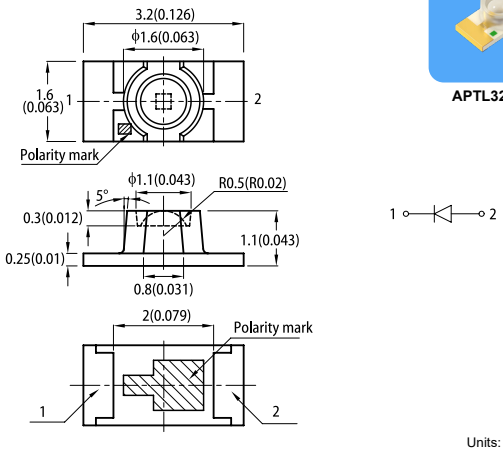
APTR3216



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



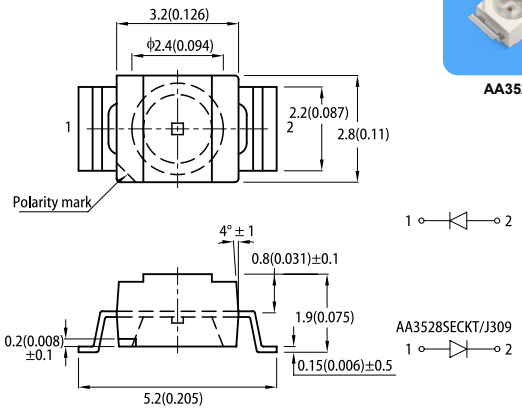
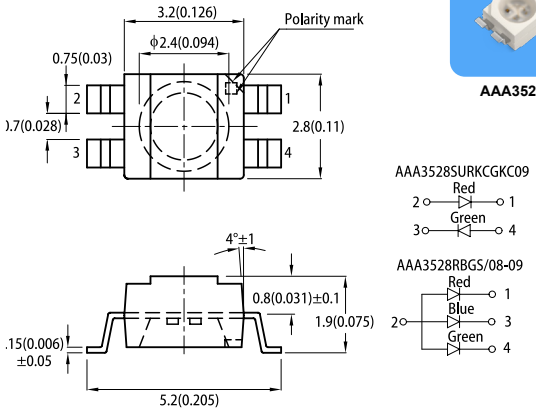
APTL3216xxx01



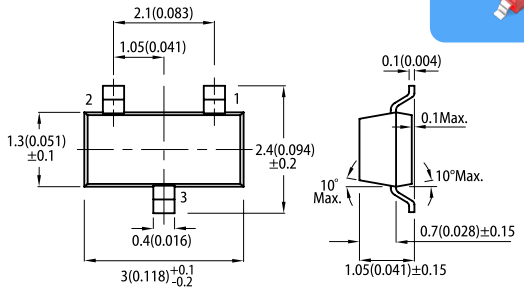
Units: mm (inch)
Tolerance: ± 0.1 (0.004)

AP series custom-made is available upon request

REVERSE MOUNT SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AA3528SURCKT09	AlGaInP	630	Water Clear	55	100	120°	3.2mm x 2.8mm x 1.9mm (Reverse Mount)  AA3528xxx09  Units: mm (inch) Tolerance: ± 0.25 (0.01)
AA3528SECKT/J309	AlGaInP	625	Water Clear	500	700	120°	
AA3528SECKT09	AlGaInP	605	Water Clear	120	230	120°	
AA3528ZGCKT09	InGaN	525	Water Clear	500	1000	120°	
AA3528QBS/D09	InGaN	465	Water Clear	80	150	120°	
AAA3528SURKCGKC09	AlGaInP	630	Water Clear	55	100	120°	3.2mm x 2.8mm x 1.9mm (Reverse mount, Multi-Color)  AAA3528xxx09  Units: mm (inch) Tolerance: ± 0.2 (0.008)
	InGaN	465					
	InGaN	525					
AAA3528RBGS/08-09	AlGaInP	630	Water Clear	55	110	120°	
	InGaN	465		55	100		
	InGaN	525		500	700		

SOT-23 SMD LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AM23SURTK-C2	AlGaInP	630	Red Transparent	20	60	170°	SOT-23 Surface Mount LED lamp (3mm x 1.3mm)  AM23  Units: mm (inch) Tolerance: ± 0.25 (0.01)

AP series custom-made is available upon request

Through-Hole LED

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

29 / Round LED

31 / Rectangular LED

31 / Cylindrical LED

32 / Light Bar

32 / Multi-Color LED

33 / Low Current LED









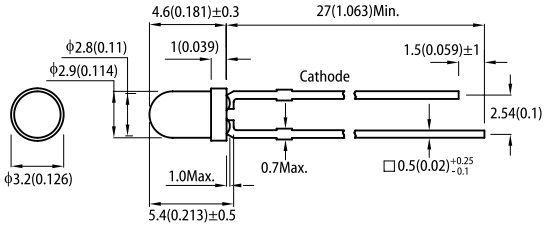


ROUND LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP710A10SRC/J4	AlGaInP	640	Water Clear	1400	2500	30°	T-1 (3mm) Round
WP710A10SRD/J4	AlGaInP	640	Red Diffused	500	1000	50°	
WP710A10SURCK	AlGaInP	630	Water Clear	400	900	30°	
WP710A10SURDK	AlGaInP	630	Red Diffused	200	400	50°	
WP710A10SURTK	AlGaInP	630	Red Transparent	400	900	30°	
WP710A10SURC/E	AlGaInP	630	Water Clear	500	1100	30°	
WP710A10SEC/E	AlGaInP	621	Water Clear	1200	2400	30°	
WP710A10SECK	AlGaInP	605	Water Clear	700	1400	30°	
WP710A10SEDK	AlGaInP	605	Orange Diffused	300	800	50°	
WP710A10SYT	AlGaInP	590	Yellow Transparent	700	1200	30°	
WP710A10SYCK	AlGaInP	590	Water Clear	700	1500	30°	
WP710A10SYDK	AlGaInP	590	Yellow Diffused	400	800	50°	
WP710A10SYCK/J3	AlGaInP	590	Water Clear	1900	3000	30°	
WP710A10CGCK	AlGaInP	570	Water Clear	300	600	30°	
WP710A10CGDK	AlGaInP	570	Green Diffused	80	250	50°	
WP710A10ZGCK	InGaN	525	Water Clear	8000	14000	30°	
WP710A10ZGDK	InGaN	525	Green Diffused	1600	3000	50°	
WP710A10ZGC/E	InGaN	525	Water Clear	10000	16000	30°	
WP710A10ZGC/G	InGaN	525	Water Clear	10500	16500	30°	
WP710A10VBC/D	InGaN	470	Water Clear	3600	5000	30°	
WP710A10QBC/D	InGaN	465	Water Clear	1300	2300	30°	
WP710A10QBC/G	InGaN	465	Water Clear	2500	4200	30°	
WP710A10QBD/D	InGaN	465	Blue Diffused	1000	2000	50°	



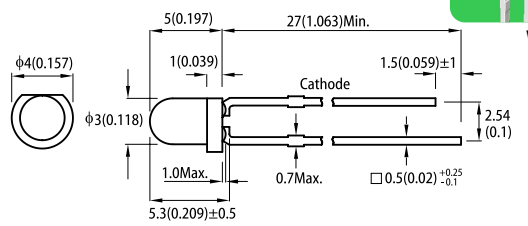
WP710A10



WP3A10SURDK	AlGaInP	630	Red Diffused	100	250	60°	T-1 (3mm) Round
WP3A10SYDK	AlGaInP	590	Yellow Diffused	300	500	60°	
WP3A10CGDK	AlGaInP	570	Green Diffused	80	150	60°	



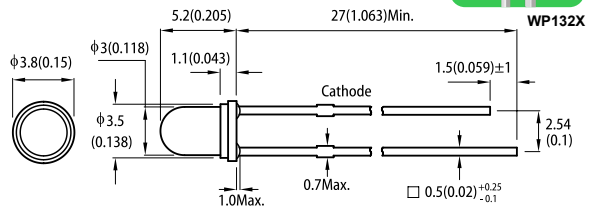
WP3A10



WP132XSURDK	AlGaInP	630	Red Diffused	180	360	60°	T-1 (3mm) Round
WP132XSYDK	AlGaInP	590	Yellow Diffused	300	600	60°	
WP132XCGDK	AlGaInP	570	Green Diffused	60	140	60°	



WP132X



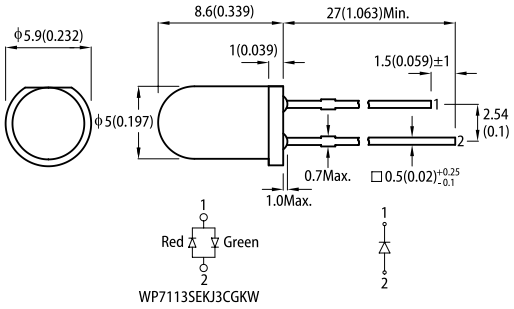
All dimensions are in millimeters (inches). Tolerance is ± 0.25mm (0.01") unless otherwise noted.

ROUND LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP7113SRC/J4	AlGaInP	640	Water Clear	2300	3700	20°	T-1 3/4 (5mm) Round
WP7113SRD/J4	AlGaInP	640	Red Diffused	550	900	30°	
WP7113SURCK	AlGaInP	630	Water Clear	1000	1900	20°	
WP7113SURDK	AlGaInP	630	Red Diffused	400	750	30°	
WP7113SURC/E	AlGaInP	630	Water Clear	2300	3300	20°	
WP7113SECK/J3	AlGaInP	625	Water Clear	5000	8500	20°	
WP7113SEC/E	AlGaInP	621	Water Clear	2300	3900	20°	
WP7113SECK	AlGaInP	605	Water Clear	1600	3000	20°	
WP7113SECK/J4	AlGaInP	605	Water Clear	5000	8900	20°	
WP7113SYCK	AlGaInP	590	Water Clear	1800	3000	20°	
WP7113SYDK	AlGaInP	590	Yellow Diffused	500	1000	30°	
WP7113SYCK/J3	AlGaInP	590	Water Clear	5000	7800	20°	
WP7113CGCK	AlGaInP	570	Water Clear	700	1400	20°	
WP7113CGDK	AlGaInP	570	Green Diffused	50	140	30°	
WP7113ZGCK	InGaN	525	Water Clear	14000	26000	20°	
WP7113ZGDK	InGaN	525	Green Diffused	1300	2700	30°	
WP7113ZGC/G	InGaN	525	Water Clear	18000	30000	20°	
WP7113VBC/D	InGaN	470	Water Clear	4300	7000	20°	
WP7113QBC/D	InGaN	465	Water Clear	3100	4500	20°	
WP7113QBD/D	InGaN	465	Blue Diffused	700	1600	30°	
WP7113SEKJ3CGKW	AlGaInP	625	White Diffused	700	1600	35°	
	AlGaInP	570		40	100		
WP1503SRC/J4	AlGaInP	640	Water Clear	3100	5200	20°	T-1 3/4 (5mm) Round
WP1503SURCK	AlGaInP	630	Water Clear	2300	4000	20°	
WP1503SURDK	AlGaInP	630	Red Diffused	600	1000	30°	
WP1503CGDK	AlGaInP	570	Green Diffused	100	200	30°	
WP7083SED/J3	AlGaInP	625	Orange Diffused	600	1200	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	400	900	60°	
WP793SRD/J4	AlGaInP	640	Red Diffused	900	1400	30°	8mm Round
WP793SURDK	AlGaInP	630	Red Diffused	500	1000	30°	
WP793SURCK	AlGaInP	630	Water Clear	2300	3400	15°	

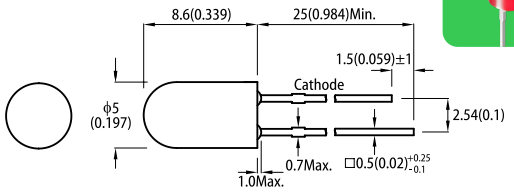


WP7113



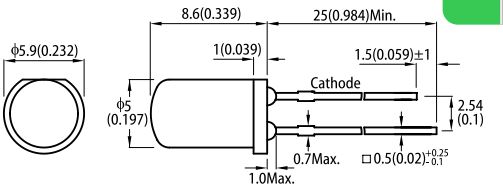


WP1503



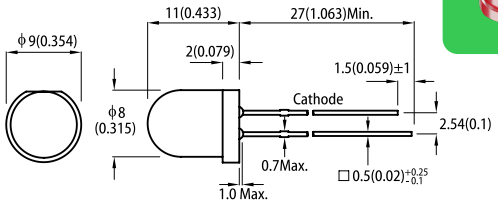


WP7083





WP793



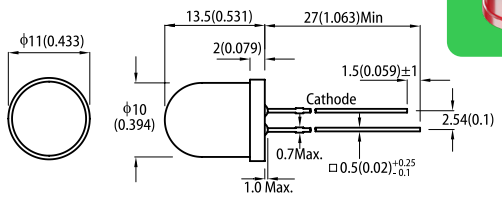
All dimensions are in millimeters (inches). Tolerance is ± 0.25mm (0.01") unless otherwise noted.

ROUND LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP813SRC/J4	AlGaInP	640	Water Clear	3600	7500	15°	10mm Round
WP813SRD/J4	AlGaInP	640	Red Diffused	400	800	30°	
WP813SURC	AlGaInP	630	Water Clear	1700	3100	15°	
WP813SURDK	AlGaInP	630	Red Diffused	300	650	30°	
WP813CGDK	AlGaInP	570	Green Diffused	55	100	30°	



WP813

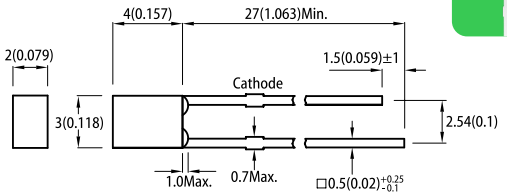


RECTANGULAR LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP914SURDK	AlGaInP	630	Red Diffused	25	60	140°	2mm x 3mm Rectangular
WP113SURDKT	AlGaInP	630	Red Diffused	25	50	140°	2mm x 5mm Rectangular
WP113SYDTK	AlGaInP	590	Yellow Diffused	70	120	140°	
WP113CGKDT	AlGaInP	570	Green Diffused	10	30	140°	

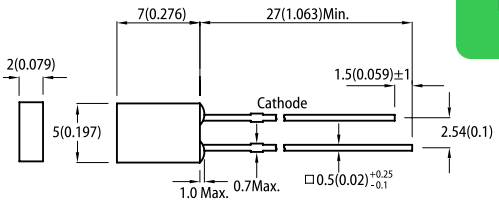


WP914





WP113

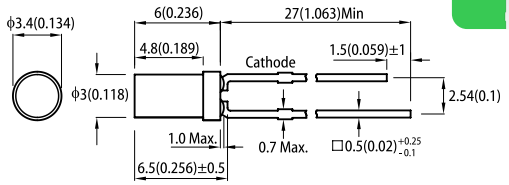


CYLINDRICAL LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP424SURDTK	AlGaInP	630	Red Diffused	40	80	140°	T-1 (3mm) Cylindrical
WP424SYDTK	AlGaInP	590	Yellow Diffused	55	120	140°	



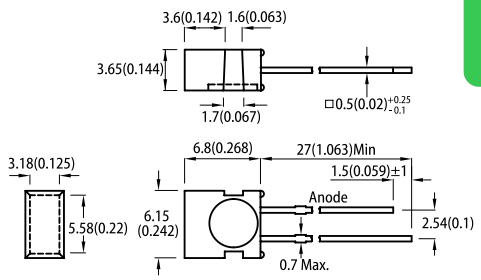
WP424



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

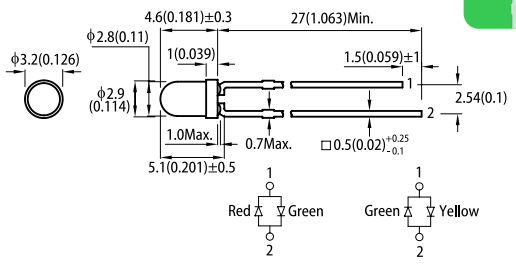
LIGHT BAR

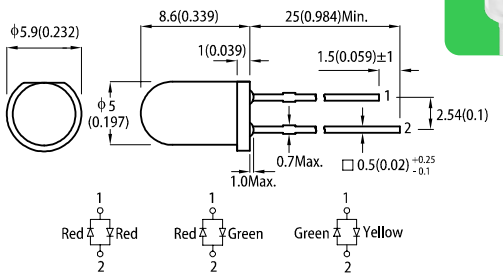
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA Min.	Iv (mcd) @20mA Typ.	Viewing Angle 2θ1/2	Dimensions
WP1043SURDTK	AlGaInP	630	Red Diffused	30	60	140°	3.65mm x 6.15mm  WP1043
WP1043SYDTK	AlGaInP	590	Yellow Diffused	80	150	140°	

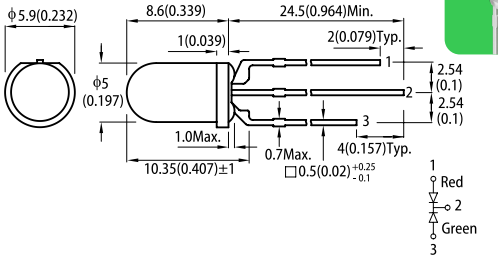


MULTI-COLOR LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA Min.	Iv (mcd) @20mA Typ.	Viewing Angle 2θ1/2	Dimensions
WP937SURKCGKW	AlGaInP	630	White Diffused	55	110	60°	T-1 (3mm) Round  WP937
	AlGaInP	570		40	80		
WP937CGKSYKW	AlGaInP	570	White Diffused	40	80	60°	
	AlGaInP	590		80	230		
WP57SURKSURKD	AlGaInP	630	Red Diffused	120	330	30°	T-1 3/4 (5mm) Round  WP57
	AlGaInP	630		120	330		
WP57SURKCGKW	AlGaInP	630	White Diffused	120	330	30°	
	AlGaInP	570		60	120		
WP57CGKSYKW	AlGaInP	570	White Diffused	60	120	30°	
	AlGaInP	590		80	180		
WP59SURKCGKW	AlGaInP	630	White Diffused	200	400	30°	T-1 3/4 (5mm) Round  WP59
	AlGaInP	570		80	180		
WP59SURKCGKC	AlGaInP	630	Water Clear	700	1500	20°	
	AlGaInP	570		450	900		







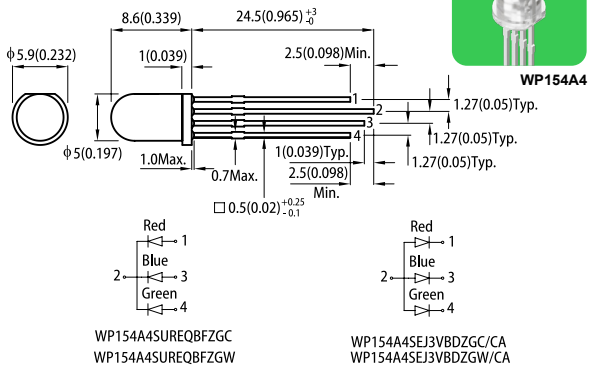
All dimensions are in millimeters (inches). Tolerance is ± 0.25mm (0.01") unless otherwise noted.

MULTI-COLOR LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA Min.	Iv (mcd) @20mA Typ.	Viewing Angle 2θ1/2	Dimensions
WP154A4SUREQBFZGC	AlGaInP	630	Water Clear	200	400	50°	T-1 3/4 (5mm) Full color
	InGaN	465		400	900		
	InGaN	525		1900	3600		
WP154A4SUREQBFZGW	AlGaInP	630	White Diffused	200	430	60°	
	InGaN	465		300	500		
	InGaN	525		1000	2000		
WP154A4SEJ3VBDZGC/CA	AlGaInP	625	Water Clear	1000	1500	50°	
	InGaN	470		1000	1800		
	InGaN	525		2300	3600		
WP154A4SEJ3VBDZGW/CA	AlGaInP	625	White Diffused	900	1500	60°	
	InGaN	470		200	400		
	InGaN	525		700	1500		
WP483SEKJ3CGKWT	AlGaInP	625	White Diffused	80	200	140°	T-1 3/4 (5mm) Cylindrical
	AlGaInP	570		8	20		

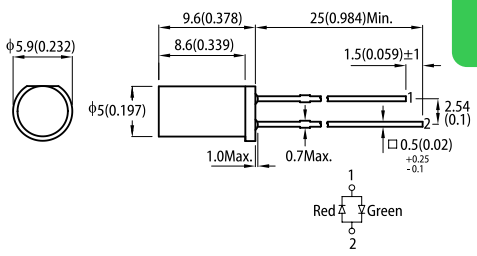


WP154A4





WP483

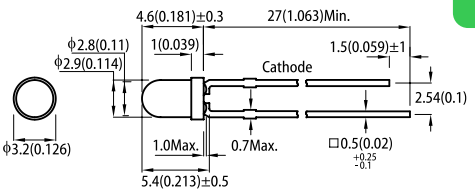


LOW CURRENT LED

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @2mA Min.	Iv (mcd) @2mA Typ.	Viewing Angle 2θ1/2	Dimensions
WP710A10LSURDK	AlGaInP	630	Red Diffused	10	20	50°	T-1 (3mm) Round
WP710A10LSECK/J3	AlGaInP	625	Water Clear	120	320	30°	
WP710A10LSECK/J4	AlGaInP	605	Water Clear	180	450	30°	
WP710A10LSYCK/J3	AlGaInP	590	Water Clear	120	200	30°	
WP710A10LSYDK	AlGaInP	590	Yellow Diffused	25	50	50°	
WP710A10LCGDK	AlGaInP	570	Green Diffused	4	8	50°	
WP710A10LZGCK	InGaN	525	Water Clear	700	2600	30°	
WP710A10LVBC/D	InGaN	470	Water Clear	320	700	30°	
WP7113LSURDK	AlGaInP	630	Red Diffused	40	70	30°	T-1 3/4 (5mm) Round
WP7113LSECK/J3	AlGaInP	625	Water Clear	400	1000	20°	
WP7113LSYCK/J3	AlGaInP	590	Water Clear	320	800	20°	
WP7113LSYDK	AlGaInP	590	Yellow Diffused	20	70	30°	
WP7113LCGDK	AlGaInP	570	Green Diffused	6	12	30°	
WP7113LZGCK	InGaN	525	Water Clear	2200	4300	20°	
WP7113LVBC/D	InGaN	470	Water Clear	550	1600	20°	

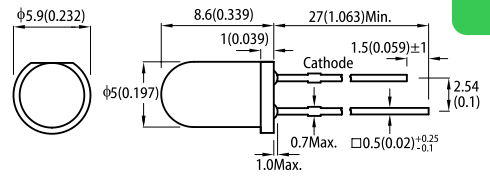


WP710A10L





WP7113L



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

SMD Display

Kingbright SMD display products are available in both 7-segment and alphanumeric formats in various font sizes and colors. SMD displays are commonly used in healthcare, consumer electronics, industrial, and commercial applications that require character and text displays.

35 /
7-Segment SMD Display









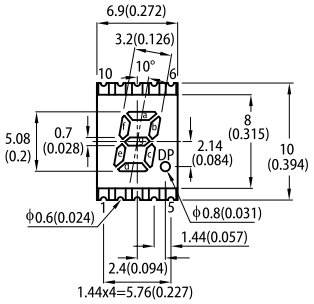


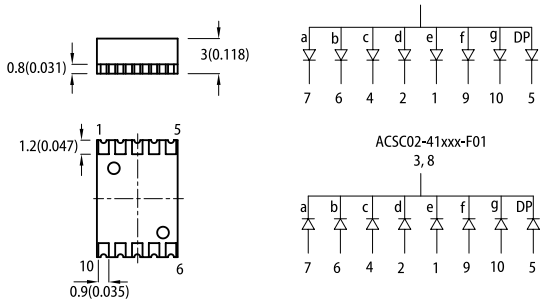
7-SEGMENT SMD DISPLAY

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



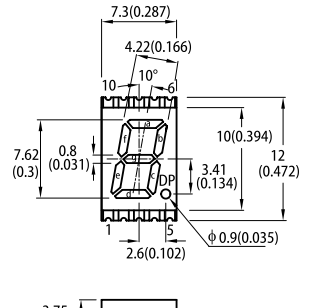
ACSX02-41

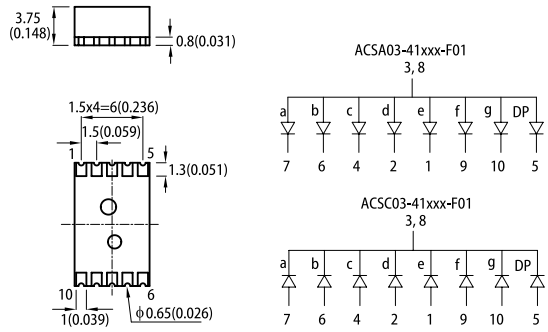






ACSX03-41

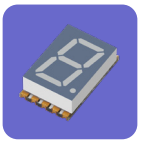




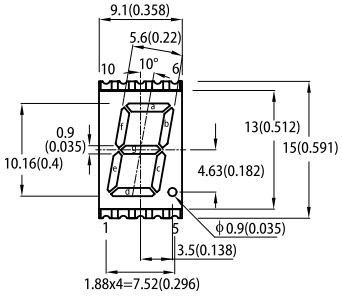
All dimensions are in millimeters (inches). Tolerance is ± 0.25mm (0.01") unless otherwise noted.

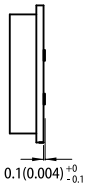
7-SEGMENT SMD DISPLAY

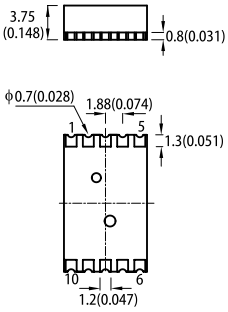
Part Number		Material	λD (nm)	Iv (ucd) @10mA		Dimensions
Common Anode	Common Cathode			Min.	Typ.	
ACSA04-41SURKWA-F01	ACSC04-41SURKWA-F01	AlGaInP	630	9000	20000	0.4 inch (10.16mm), Gray Face, White Segment
ACSA04-41SEKWA-F01	ACSC04-41SEKWA-F01	AlGaInP	605	9000	15000	
ACSA04-41SYKWA-F01	-	AlGaInP	590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

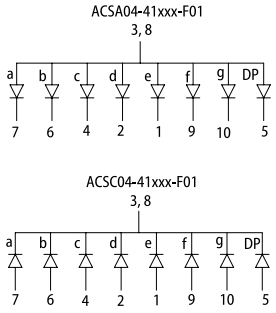


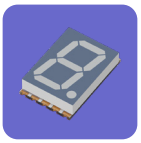
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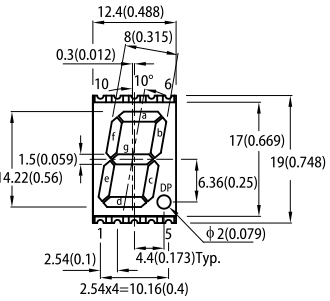


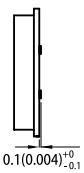


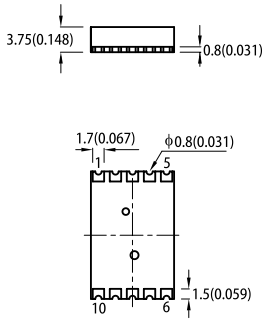


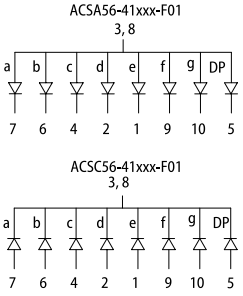


ACSX56-41









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

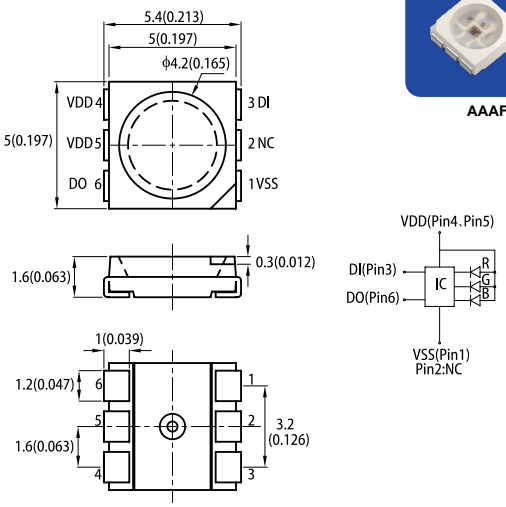
Chameleon RGB+IC

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

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @ VDD = 5V, Gray Scale Level = 255		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AAAF5050-MC-K12	AlGaInP	625	Water Clear	200	360	120°	5.0mm x 5.0mm x 1.6mm (RGB+IC)
	InGaN	525		400	600		
	InGaN	465		80	150		



AAAF5050



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

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



Circuit Board Indicator

Kingbright circuit board indicators come in a variety of configurations and color combinations that meet the specifications of your design requirements. They are perfect for applications ranging from diagnostic equipment and industrial equipment to data storage applications.

39 / Single-Level CBI

41 / Bi-Level CBI

43 / Tri-Level CBI

43 / Quad-Level CBI









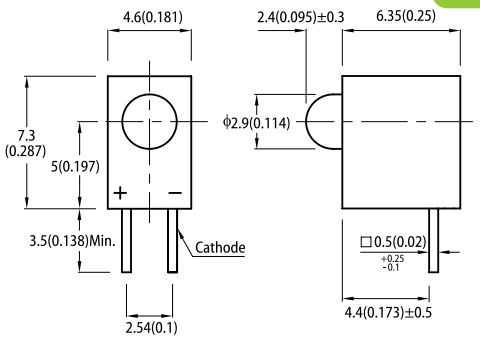


SINGLE-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP934CB/ID	GaAsP/GaP	617	Red Diffused	12	30	50°	T-1 (3mm) Right Angle
WP934CB/YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934CB/GD	GaP	568	Green Diffused	10	25	50°	
WP934EW/SURDK	AlGaInP	630	Red Diffused	*200	*400	50°	T-1 (3mm) Right Angle
WP934EW/ID	GaAsP/GaP	617	Red Diffused	12	30	50°	
WP934EW/YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934EW/GD	GaP	568	Green Diffused	10	25	50°	
WP130WDT/EGW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1 (3mm) Right Angle
	GaP	568		*12	*30		
WP130WDT/GYW	GaP	568	White Diffused	*18	*40	60°	
	GaAsP/GaP	588		*10	*20		

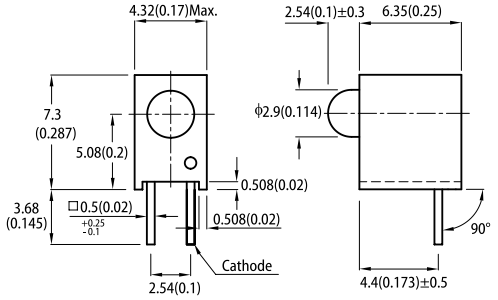


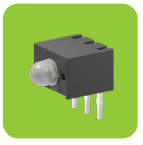
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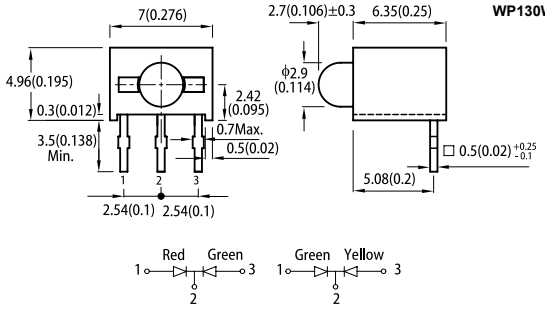


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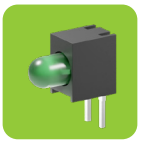
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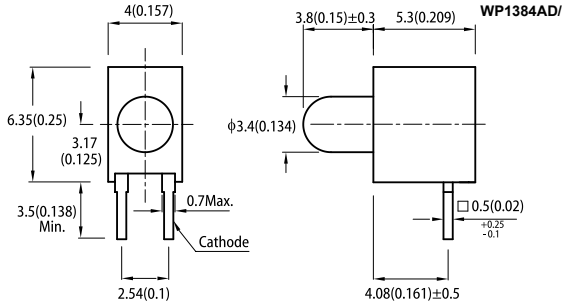
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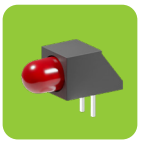
SINGLE-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP1384AD/ID	GaAsP/GaP	617	Red Diffused	12	30	60°	3.4mm Right Angle
WP1384AD/YD	GaAsP/GaP	588	Yellow Diffused	8	15	60°	
WP1384AD/GD	GaP	568	Green Diffused	10	20	60°	
WP1533BQ/ID	GaAsP/GaP	617	Red Diffused	15	45	30°	4.7mm Right Angle
WP1533BQ/GD	GaP	568	Green Diffused	20	50	30°	
WP1503CB/ID	GaAsP/GaP	617	Red Diffused	30	70	30°	T-1 3/4 (5mm) Right Angle
WP1503CB/YD	GaAsP/GaP	588	Yellow Diffused	15	30	30°	
WP1503CB/GD	GaP	568	Green Diffused	15	30	30°	

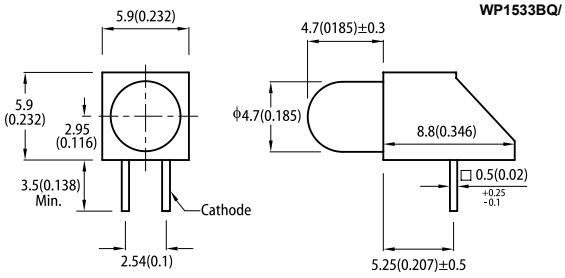


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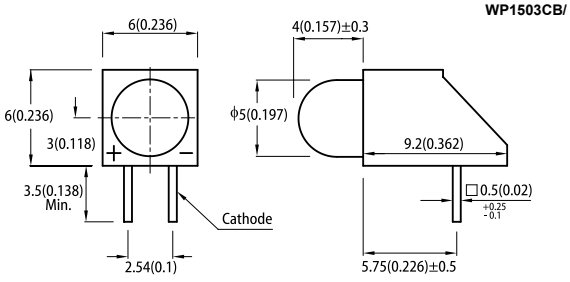


WP1533BQ/





WP1503CB/



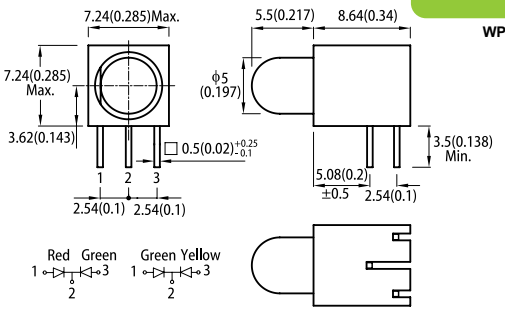
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SINGLE-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP59BL/EGW	GaAsP/GaP	617	White Diffused	20	40	30°	T-1 3/4 (5mm) Right Angle
	GaP	568		20	60		
WP59BL/GYW	GaP	568	White Diffused	50	100	30°	
	GaAsP/GaP	588		20	40		
WP154A4AVSSUREQBFZGW	AlGaInP	630	White Diffused	200	430	60°	T-1 3/4 (5mm) Right Angle
	InGaN	465		300	500		
	InGaN	525		1000	2000		
WP154A4AVS/RGB-CA	AlGaInP	625	White Diffused	900	1500	60°	
	InGaN	470		200	400		
	InGaN	525		700	1500		

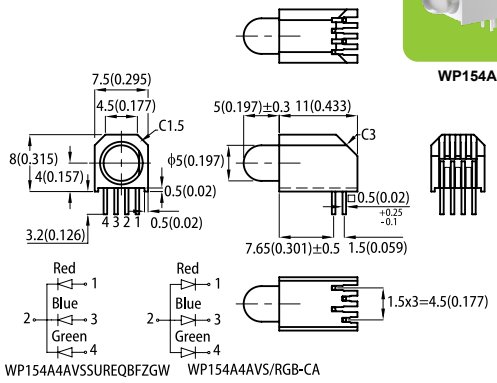


WP59BL/





WP154A4AVS/

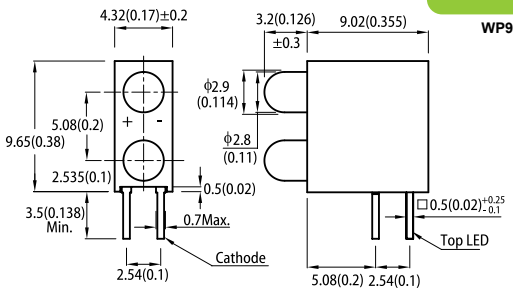


BI-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP934EB/2ID	GaAsP/GaP	617	Red Diffused	12	30	50°	T-1 (3mm) Bi-Level
WP934EB/2YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934EB/2GD	GaP	568	Green Diffused	10	25	50°	

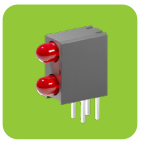
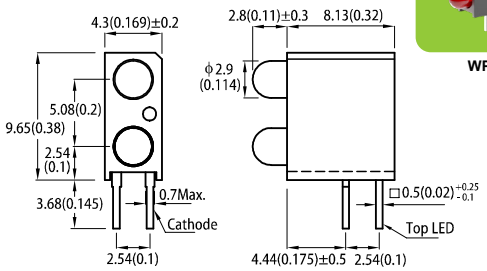
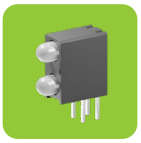
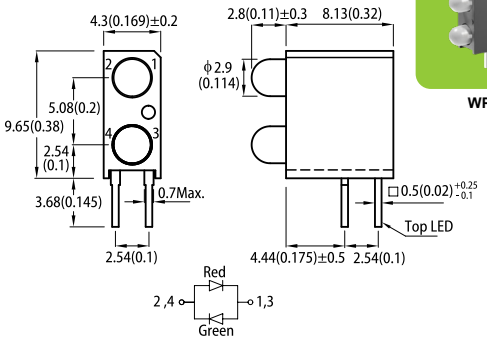
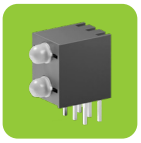
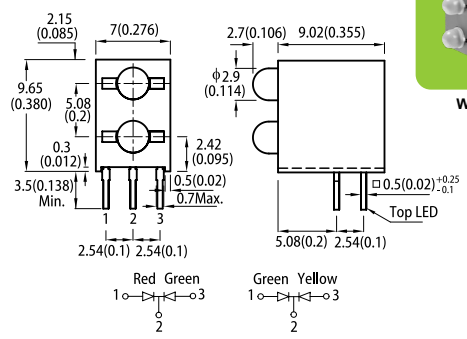
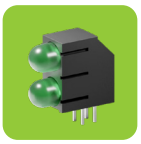
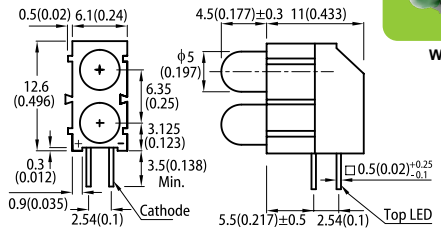


WP934EB/2



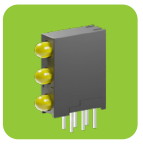
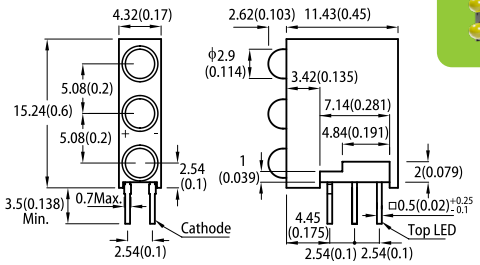
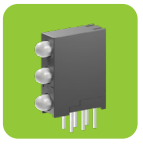
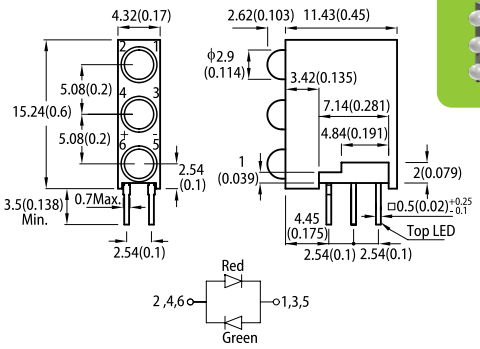
All dimensions are in millimeters (inches). Tolerance is ± 0.25mm (0.01") unless otherwise noted.

BI-LEVEL CBI

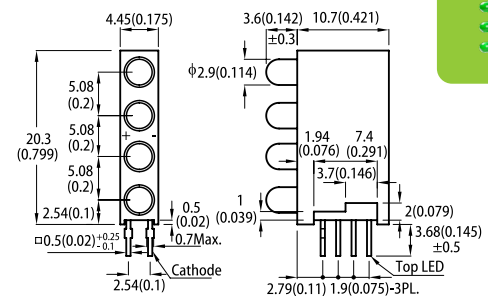
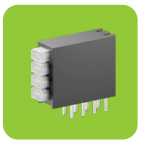
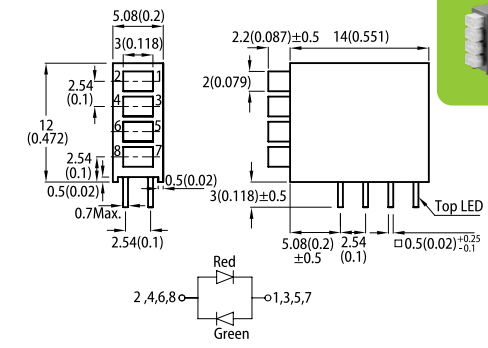
Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP934MD/2ID	GaAsP/GaP	617	Red Diffused	12	30	50°	T-1 (3mm) Bi-Level  WP934MD/2 
WP934MD/2YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934MD/2GD	GaP	568	Green Diffused	10	25	50°	
WP937MD/2EGW	GaAsP/GaP	617	White Diffused	*4	*10	60°	T-1 (3mm) Bi-Level  WP937MD/2 
	GaP	568		*6	*14		
WP130WCP/2EGW	GaAsP/GaP	617	White Diffused	*10	*24	60°	T-1(3mm) Bi-Level  WP130WCP/2 
	GaP	568		*12	*30		
WP130WCP/2GYW	GaP	568	White Diffused	*18	*40	60°	
	GaAsP/GaP	588		*10	*20		
WP1503EB/2GD	GaP	568	Green Diffused	15	30	30°	T-1 3/4 (5mm) Bi-Level  WP1503EB/2 

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

TRI-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP934SA/3ID	GaAsP/GaP	617	Red Diffused	12	30	50°	T-1 (3mm) Tri-Level  WP934SA/3 
WP934SA/3YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934SA/3GD	GaP	568	Green Diffused	10	25	50°	
WP937SA/3EGW	GaAsP/GaP	617	White Diffused	*4	*10	60°	T-1 (3mm) Tri-Level  WP937SA/3 
	GaP	568		*6	*14		

QUAD-LEVEL CBI

Part Number	Material	λD (nm)	Lens Type	Iv (mcd) @10mA*20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
WP934SB/4ID	GaAsP/GaP	617	Red Diffused	12	30	50°	T-1 (3mm) Quad-Level  WP934SB/4 
WP934SB/4YD	GaAsP/GaP	588	Yellow Diffused	8	15	50°	
WP934SB/4GD	GaP	568	Green Diffused	10	25	50°	
WP917CK/4EGWT	GaAsP/GaP	617	White Diffused	*2	*6	140°	2mm x 3mm Quad-Level  WP917CK/4 
	GaP	568		*5	*10		

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

Infrared & Phototransistor

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

45 / Infrared Emitting Diode

49 / Photodiode

50 / Phototransistor



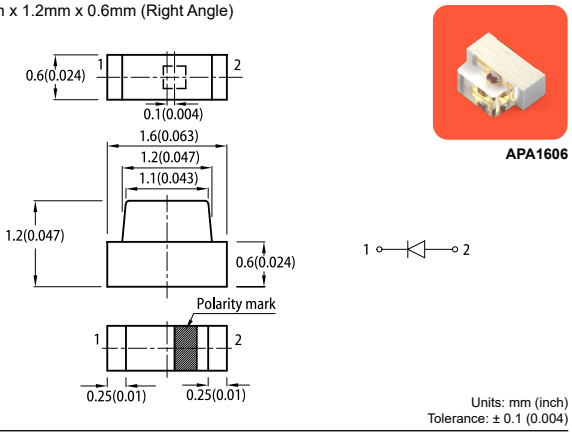
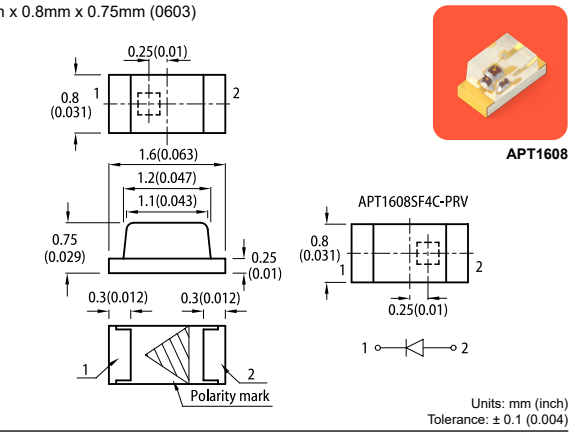
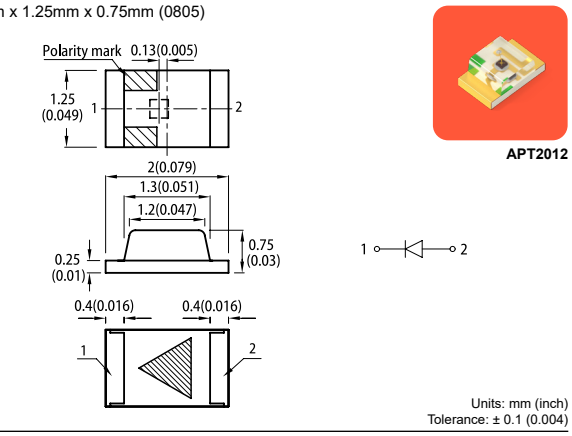
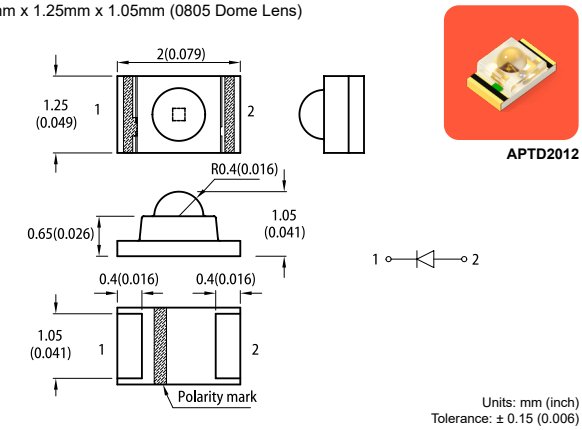




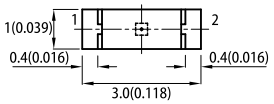
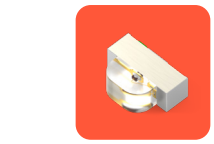
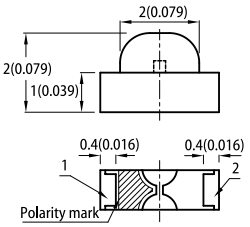
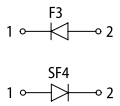
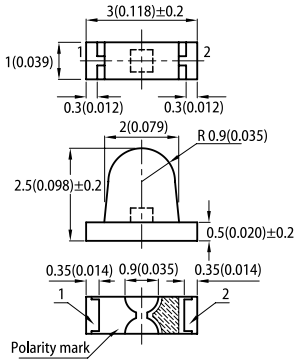
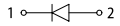
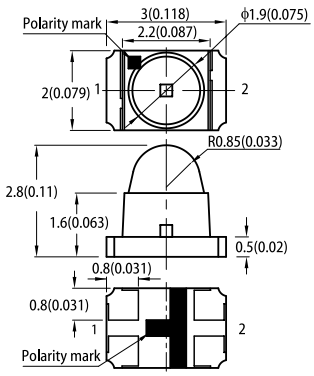
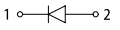
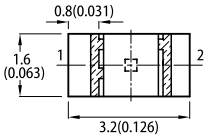
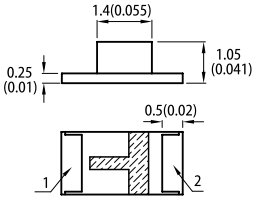
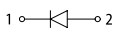




INFRARED EMITTING DIODE

Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APA1606SF4C-P22	GaAlAs	880	Water Clear	0.8	1.5	110°	1.6mm x 1.2mm x 0.6mm (Right Angle) 
APT1608F3C	GaAs	940	Water Clear	0.8	2	150°	1.6mm x 0.8mm x 0.75mm (0603) 
APT1608SF4C-PRV	GaAlAs	880	Water Clear	0.8	1.5	150°	
APT2012F3C	GaAs	940	Water Clear	0.8	2	160°	2.0mm x 1.25mm x 0.75mm (0805) 
APTD2012F3C	GaAs	940	Water Clear	1.2	3	40°	2.0mm x 1.25mm x 1.05mm (0805 Dome Lens) 

INFRARED EMITTING DIODE

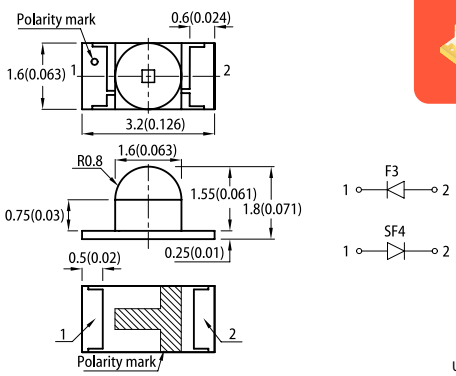
Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APA3010F3C-GX	GaAs	940	Water Clear	0.8	2	160°	3.0mm x 2.0mm x 1.0mm (Right Angle)   APA3010   Units: mm (inch) Tolerance: ± 0.15 (0.006)
APA3010SF4C	GaAlAs	880	Water Clear	0.8	1.5	160°	
APPA3010SF4C-P22	GaAlAs	880	Water Clear	1	2.5	30°	3.0mm x 2.5mm x 1.0mm (Right Angle)   APPA3010  Units: mm (inch) Tolerance: ± 0.15 (0.006)
APDA3020F3C-P22	GaAs	940	Water Clear	3	6.5	10°	3.0mm x 2.0mm x 2.8mm (Right Angle)   APDA3020  Units: mm (inch) Tolerance: ± 0.2 (0.008)
APTR3216F3C	GaAs	940	Water Clear	0.8	2	140°	3.2mm x 1.6mm x 1.05mm (1206 Reverse Mount)   APTR3216   Units: mm (inch) Tolerance: ± 0.2 (0.008)

INFRARED EMITTING DIODE

Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA*100mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
APTD3216F3C-P22	GaAs	940	Water Clear	2	5	40°	3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)
APTD3216SF4C	GaAlAs	880	Water Clear	1.6	4	40°	
AA4040SF4BT-P22	GaAlAs	880	Blue Transparent	*8	*16	90°	4.0mm x 4.0mm x 3.6mm (Right Angle)
AM2520SF3C03-100MAV	AlGaAs	940	Water Clear	*80	*120	20°	Subminiature Solid State Lamps Gull Wing Lead
AM2520SF3C09-100MAV	AlGaAs	940	Water Clear	*80	*120	20°	Subminiature Solid State Lamps Z-Bend Lead



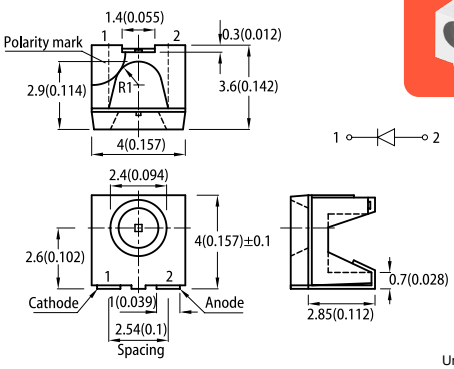
APTD3216



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



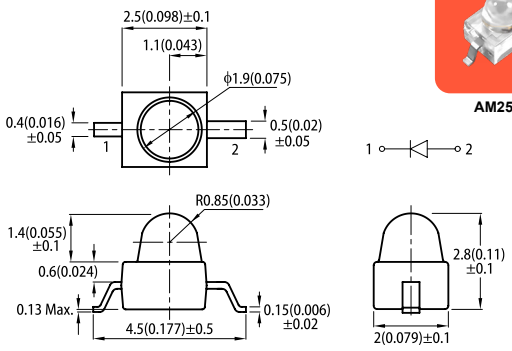
AA4040



Units: mm (inch)
Tolerance: ± 0.25 (0.01)



AM2520xxx03



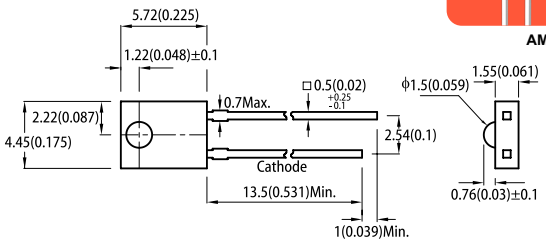
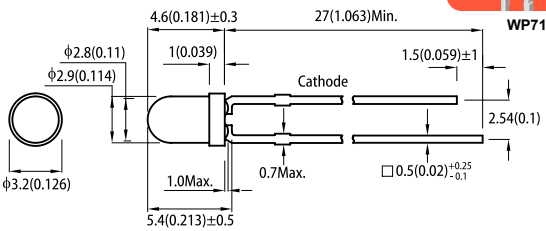
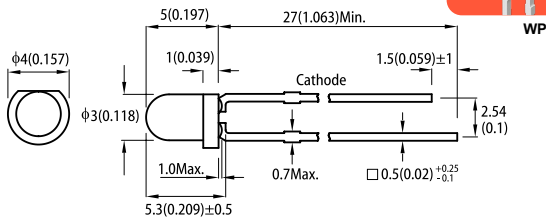
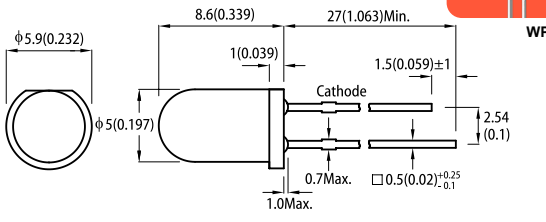
Units: mm (inch)
Tolerance: ± 0.25 (0.01)



AM2520xxx09

Units: mm (inch)
Tolerance: ± 0.25 (0.01)

INFRARED EMITTING DIODE

Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA*50mA		Viewing Angle	Dimensions
				Min.	Typ.	2θ1/2	
AM4457F3C	GaAs	940	Water Clear	2	5	70°	1.5mm (Side Look)  AM4457  Units: mm (inch) Tolerance: ± 0.25 (0.01)
WP710A10F3C	GaAs	940	Water Clear	3	8	30°	T-1 (3mm) Round  WP710A10  Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*12	*25		
WP710A10F3BT	GaAs	940	Blue Transparent	3	8	30°	
				*12	*25		
WP710A10SF4C	GaAlAs	880	Water Clear	7	12	30°	
				*12	*30		
WP710A10SF4BT-P22	GaAlAs	880	Blue Transparent	7	12	30°	
WP3A10F3C	GaAs	940	Water Clear	3	8	50°	T-1 (3mm) Round  WP3A10  Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*8	*15		
WP3A10SF4C	GaAlAs	880	Water Clear	3	8	50°	
				*5	*16		
WP3A10SF7C	GaAlAs	850	Water Clear	8	16	50°	
				*15	*50		
WP7113F3C	GaAs	940	Water Clear	8	20	20°	T-1 3/4 (5mm) Round  WP7113  Units: mm (inch) Tolerance: ± 0.25 (0.01)
				*25	*50		
WP7113F3BT	GaAs	940	Blue Transparent	8	20	20°	
				*25	*50		
WP7113SF4C	GaAlAs	880	Water Clear	6	15	20°	
				*15	*40		
WP7113SF4BT-P22	GaAlAs	880	Blue Transparent	6	15	20°	
				*15	*40		
WP7113SF6C	GaAlAs	860	Water Clear	18	40	20°	
				*55	*100		
WP7113SF6BT-P22	GaAlAs	860	Blue Transparent	18	40	20°	
				*55	*100		
WP7113SF7C	GaAlAs	850	Water Clear	12	30	20°	
				*40	*90		

PHOTODIODE

Part Number	Lens Type
AM2520PD1BT03	Black Diffused
AM2520PD1BT09	Black Diffused
WP3DPD1BT/BD	Black Diffused
WP7113PD1BT/BD-P22	Black Diffused

Electrical and Optical Characteristics T_A =25°C

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Conditions
Reverse Break Down Voltage	$V_{(BR)R}$	-	33	170	-	V	I_R = 100μA H = 0mW/cm²
Reverse Dark Current	$ID_{(R)}$	-	-	-	10	nA	V_R = 10V H = 0mW/cm²
Open Circuit Voltage	V_{OC}	-	-	390	-	mV	λ = 940nm H = 5mW/cm²
Rise Time	t_r	-	-	6	-	ns	V_R = 10V λ = 940nm R_L = 1000Ω
Fall Time	t_f	-	-	6	-	ns	
Light Current	I_S	AM2520PD1BT03	0.7	1.5	-	μA	V_R = 5V Ee = 0.08mW/cm² λ = 940nm
		AM2520PD1BT09	0.7	1.5			
		WP3DPD1BT/BD	0.3	1.0			
		WP7113PD1BT/BD-P22	1.2	2.0			
Total Capacitance	C_T	-	-	5	-	pF	V_R = 10V F = 1MHZ H = 0mW/cm²
Range of Spectral Bandwidth	$λ_{0.1}$	-	670	-	1070	nm	-
Wavelength of Peak Sensitivity	$λ_P$	-	-	940	-	nm	-

Absolute Maximum Rating T_A =25°C

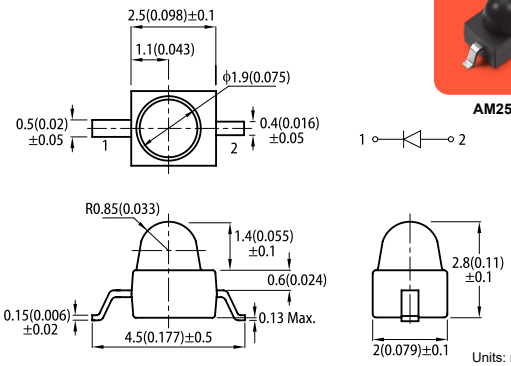
Parameter	Maximum Ratings
Power Dissipation	150mW
Operating Temperature Range	-40°C~ +85°C
Storage Temperature Range	-40°C~ +85°C
WP3DPD1BT/BD WP7113PD1BT/BD-P22 Lead Soldering Temperature (>5mm)	260°C for 5 sec

Dimensions

Subminiature Solid State Lamps Gull Wing Lead



AM2520xxx03



Units: mm (inch)
Tolerance: ± 0.25 (0.01)

Subminiature Solid State Lamps Z-Bend Lead



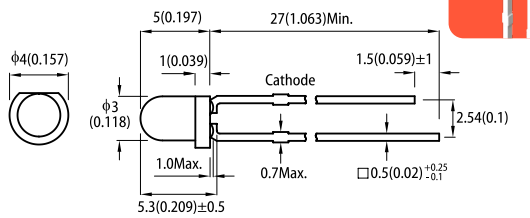
AM2520xxx09

Units: mm (inch)
Tolerance: ± 0.25 (0.01)

T-1 (3mm) Photodiode



WP3D

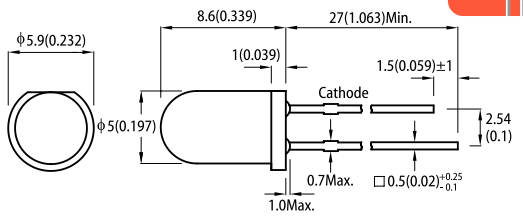


Units: mm (inch)
Tolerance: ± 0.25 (0.01)

T-1 3/4 (5mm) Photodiode



WP7113



Units: mm (inch)
Tolerance: ± 0.25 (0.01)

PHOTOTRANSISTOR

Part Number	Lens Type
APT2012P3BT	Black Diffused
APA3010P3BT-GX	Black Diffused
APDA3020P3C-P22	Water Clear
APTD3216P3C-P22	Water Clear

Electrical and Radiant Characteristics T_A =25°C

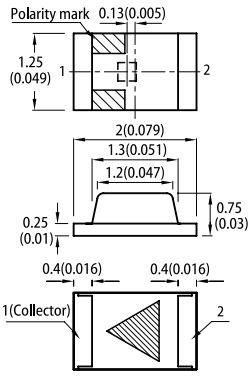
Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Conditions
Collector-to-Emitter Breakdown Voltage	$V_{BR\ CEO}$	-	30	-	-	V	I_C = 100μA Ee = 0mW/cm²
Emitter-to-Collector Breakdown Voltage	$V_{BR\ ECO}$	-	5	-	-	V	I_E = 100μA Ee = 0mW/cm²
Collector-to-Emitter Saturation Voltage	$V_{CE\ (SAT)}$	-	-	-	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			
		APDA3020P3C-P22	0.35	0.8			
		APTD3216P3C-P22	0.4	1			

Absolute Maximum Rating T_A =25°C

Parameter	Maximum Ratings
Collector-to-Emitter Voltage	30V
Emitter-to-Collector Voltage	5V
Power Dissipation at (or below) 25°C Free Air Temperature	100mW
Operating Temperature Range	-40°C~ +85°C
Storage Temperature Range	-40°C~ +85°C

Dimensions

2.0mm x 1.25mm x 0.75mm (0805)

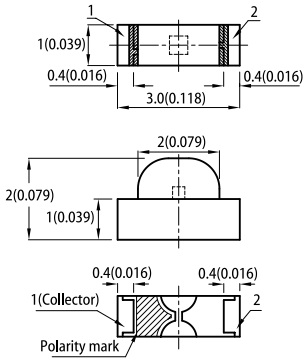




APT2012

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

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

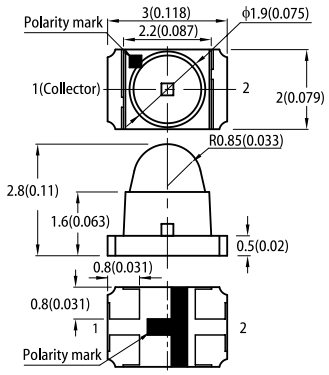




APA3010

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

3.0mm x 2.8mm x 2.0mm (Right Angle)

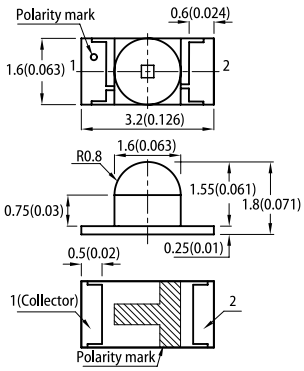




APDA3020

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

3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)





APTD3216

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

PHOTOTRANSISTOR

Part Number	Lens Type
AA3528P3S	Water Clear
AM4457P3C-F-R	Water Clear
WP3DP3BT	Blue Transparent
WP3DP3BT/BD-P22	Black Diffused
WP7113P3C	Water Clear
WP7113P3BT	Blue Transparent

Electrical and Radiant Characteristics T_A =25°C

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Conditions
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	$I_{(ON)}$	AA3528P3S	0.2	0.4	-	mA	V_{CE} = 5V Ee = 1mW/cm² λ = 940nm
		AM4457P3C-F-R	0.35	0.8			
		WP3DP3BT	0.3	0.8			
		WP3DP3BT/BD-P22	0.3	0.8			
		WP7113P3C	0.5	2.5			
		WP7113P3BT	0.7	3			

Absolute Maximum Rating T_A =25°C

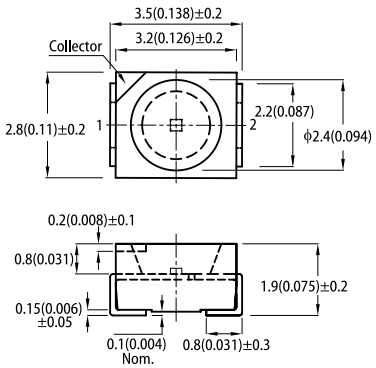
Parameter	Maximum Ratings
Collector-to-Emitter Voltage	30V
Emitter-to-Collector Voltage	5V
Power Dissipation at (or below) 25°C Free Air Temperature	100mW
Operating Temperature Range	-40°C~ +85°C
Storage Temperature Range	-40°C~ +85°C
AM4457P3C-F-R WP3DP3BT WP3DP3BT/BD-P22 WP7113P3C WP7113P3BT Lead Soldering Temperature (>5mm For 5 sec)	260°C

Dimensions

3.5mm x 2.8mm x 1.9mm



AA3528

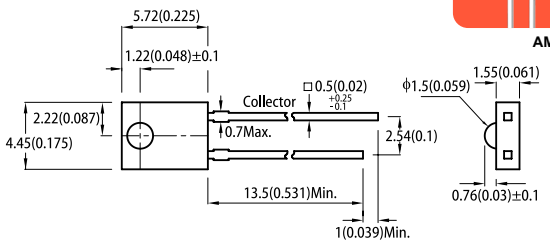


Units: mm (inch)
Tolerance: ± 0.25 (0.01)

1.5mm (Side Look)



AM4457

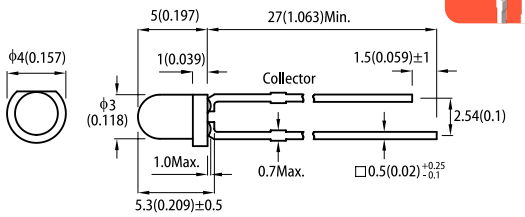


Units: mm (inch)
Tolerance: ± 0.25 (0.01)

T-1 (3mm) Phototransistor



WP3D

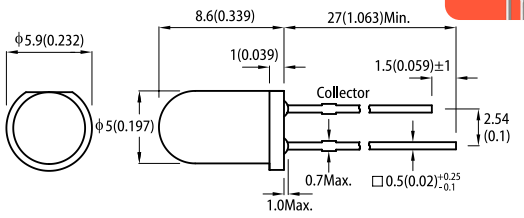


Units: mm (inch)
Tolerance: ± 0.25 (0.01)

T-1 3/4 (5mm) Phototransistor



WP7113



Units: mm (inch)
Tolerance: ± 0.25 (0.01)

Opto-Sensor

Kingbright opto-sensors can be used in many industries, including manufacturing, automation, robotics, and automotive applications. Our opto-sensors offer accuracy, reliability, and versatility in various sizes and packages.

53 / Light Sensor

54 / Color Sensor

55 / Photointerrupter-Reflective Type

56 / Photointerrupter-Transmissive Type

58 / Photocoupler









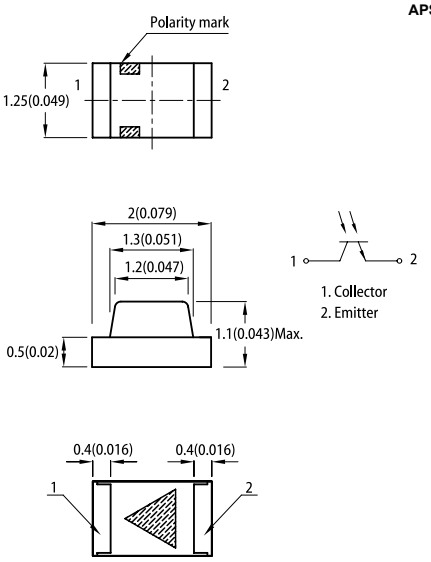


LIGHT SENSOR

Part Number	Lens Type	Dimensions
APS2012SP1C	Water Clear	2.0mm x 1.25mm x 1.1mm (Ambient Light Sensor)
APS3227SP1C-P22	Water Clear	3.2mm x 2.7mm x 1.1mm (Ambient Light Sensor)



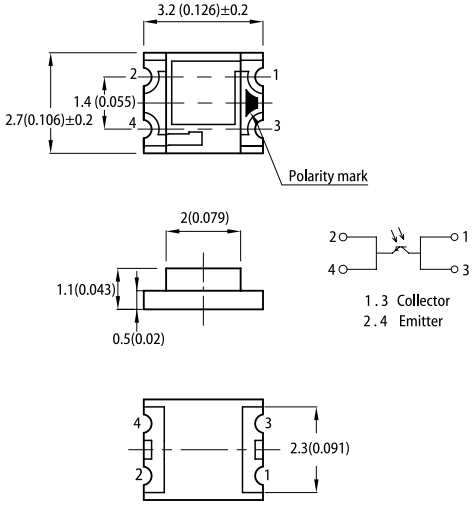
APS2012



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



APS3227



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

Electrical and Optical Characteristics T_A =25°C

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Conditions
Collector Emitter Breakdown Voltage	B_{Vceo}	-	60	-	-	V	Iceo = 100μA
Emitter Collector Breakdown Voltage	B_{Veco}	-	4	-	-	V	Ieco = 100μA
Collector Dark Current	I_D	-	-	10	100	nA	V_{CE} = 5V, Ev = 0Lx
Light Current (1)	I_{PH1}	-	-	6	-	μA	V_{CE} = 5V, Ev = 100Lx [1]
Light Current (2)	I_{PH2}	-	-	130	-	μA	V_{CE} = 5V, Ev = 1000Lx [1]
Light Current (3)	I_{PH3}	-	-	950	-	μA	V_{CE} = 5V, Ev = 1000Lx [2]
Light Current (4)	I_{PH4}	-	-	420	-	μA	V_{CE} = 5V, Ev = 1000Lx [3]
Light Test Current	I_{TPH}	APS2012SP1C	10	-	300	μA	V_{CE} = 5V, Ev = 100Lx, at 630nm LED [4]
		APS3227SP1C-P22	40	-	290	μA	
Rise Time (10% to 90%)	t_r	-	-	3.24	-	μs	R_L = 50Ω, V_R = 5V, F = 1KHz, CCT/K = 11195, 1000Lux
Fall Time (90% to 10%)	t_f	-	-	1	-	μs	
Saturation Output Voltage	V_O	-	4.5	4.7	-	V	V_{CC} = 5V, Ev = 1000Lx [1] R_L = 75KΩ
Response Wavelength	λ	-	390	-	700	nm	>10% Response
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	-	-	-	0.4	V	I_C = 10mA
Range of Spectral Bandwidth	$\lambda_{0.1}$	-	390	-	950	nm	-
Wavelength of Peak Sensitivity	λ_P	-	-	580	-	nm	-

Notes:
1. White Fluorescent light (Color Temperature = 6200K) is used as light source.
2. Illuminance by CIE standard illuminant-A/2856K,incandescet lamp.
3. Sunlight (Color Temperature = 4600K) is used as light source.
4. 630nm LED is substituted in mass production.

Absolute Maximum Rating T_A =25°C

Parameter	Symbol	Maximum Ratings	Test Conditions
Collector Emitter Voltage	V_{ceo}	60V	Iceo = 100μA
Emitter-Collector Voltage	V_{eco}	4V	Ieco = 100μA
Operating Temperature	T_{opr}	-40°C~ +85°C	-
Storage Temperature	T_{stg}	-40°C~ +85°C	-

All dimensions are in millimeters (inches)

COLOR SENSOR

Part Number	Lens Type	Dimensions
APS5130PD7C-P22	Water Clear	5.12mm x 3mm x 1.1mm (RGB Color Sensor)



APS5130

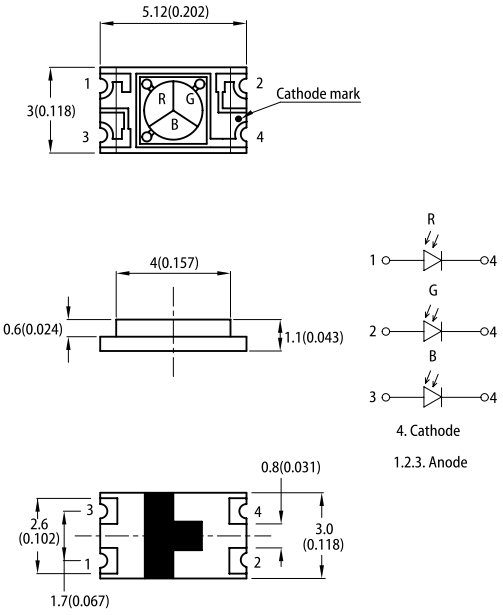
Electrical and Optical Characteristics T_A =25°C

Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Light Current (1)	I_{L1}	100Lux [1] V_R = 5V	Red	-	0.039	-	μA
			Green	-	0.042	-	
			Blue	-	0.022	-	
Light Current (2)	I_{L2}	1000Lux [1] V_R = 5V	Red	-	0.427	-	μA
			Green	-	0.498	-	
			Blue	-	0.262	-	
Diameter of The Irradiation Sensitive Area	D	-		-	2.0	-	mm
Irradiation Sensitive Area Per Element	A	-		-	0.85	-	mm^2
Photo Sensibility of The Single Color Areas	S_{MAX}	λ_R = 620nm λ_G = 550nm λ_B = 470nm		-	0.33 0.25 0.18	-	A/W
Reverse Dark Current	I_D	V_R = 5V		-	-	10	nA
Rise Time(10% to 90%)	t_r	R_L = 50Ω, V_R = 10V, F = 10KHz, 630nm lamp		-	5.7	-	μs
		R_L = 50Ω, V_R = 10V, F = 10KHz, 520nm lamp		-	5.4	-	
		R_L = 50Ω, V_R = 10V, F = 10KHz, 470nm lamp		-	5.4	-	
Fall Time(90% to 10%)	t_f	R_L = 50Ω, V_R = 10V, F = 10KHz, 630nm lamp		-	221	-	μs
		R_L = 50Ω, V_R = 10V, F = 10KHz, 520nm lamp		-	566	-	
		R_L = 50Ω, V_R = 10V, F = 10KHz, 470nm lamp		-	795	-	
Range of Spectral Bandwidth	$\lambda_{0.1}$	Red		570	-	670	nm
		Green		450	-	650	
		Blue		370	-	530	
Wavelength of Peak Sensitivity	λ_P	Red		-	620	-	nm
		Green		-	550	-	
		Blue		-	470	-	

Notes:
1. White fluorescent light (Color Temperature = 6500K) is used as light source.
2. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

Absolute Maximum Rating T_A =25°C

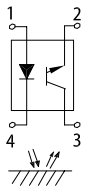
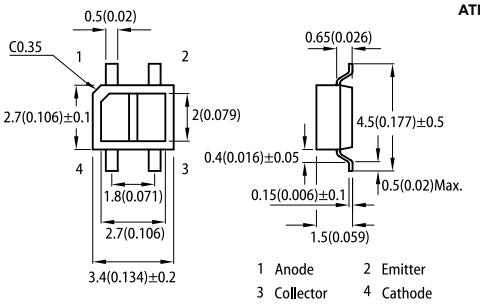
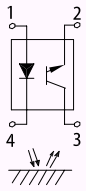
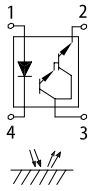
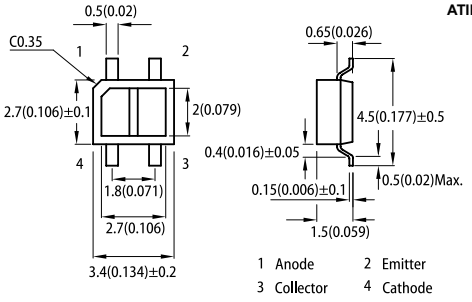
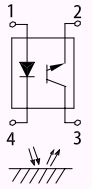
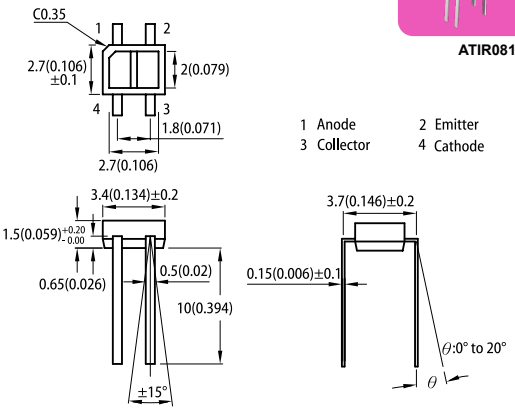
Parameter	Symbol	Maximum Ratings
Reverse Voltage	V_R	10V
Operating Temperature	T_{opr}	-40°C~ +85°C
Storage Temperature	T_{stg}	-40°C~ +85°C
Soldering Temperature	T_{sd}	260°C



Units: mm (inch)
Tolerance: ± 0.25 (0.01)

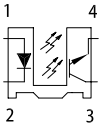
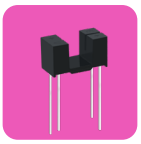
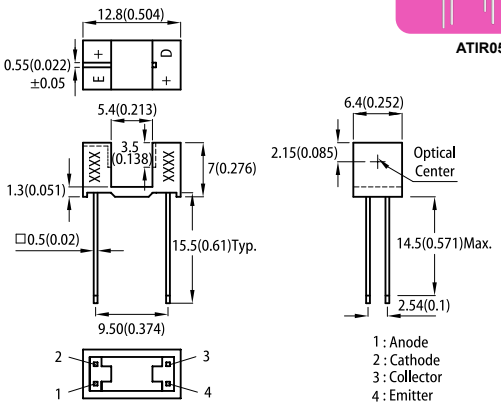
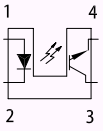
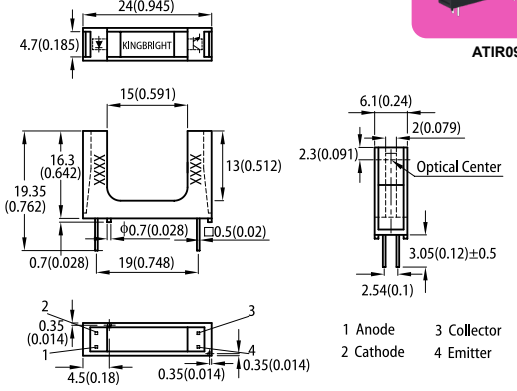
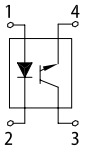
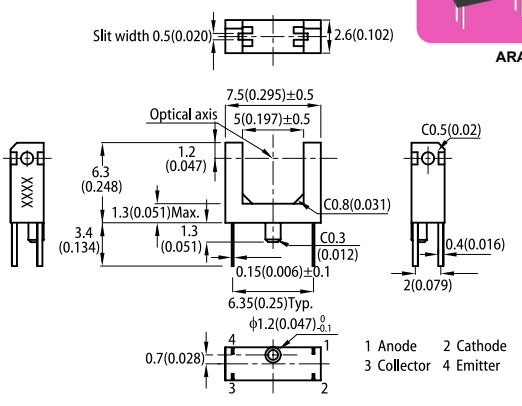
All dimensions are in millimeters (inches)

PHOTOINTERRUPTER – REFLECTIVE TYPE

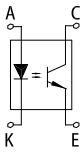
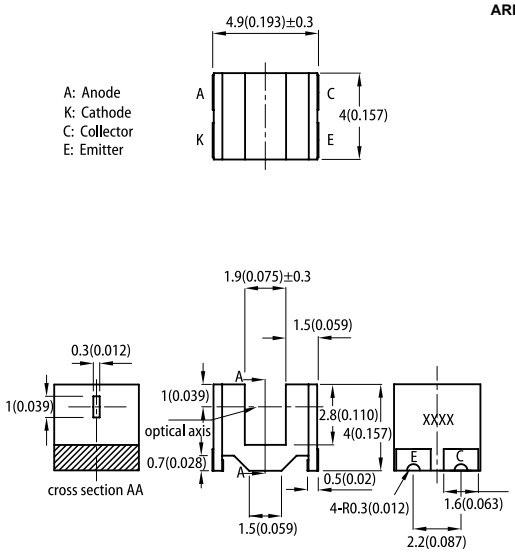
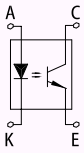
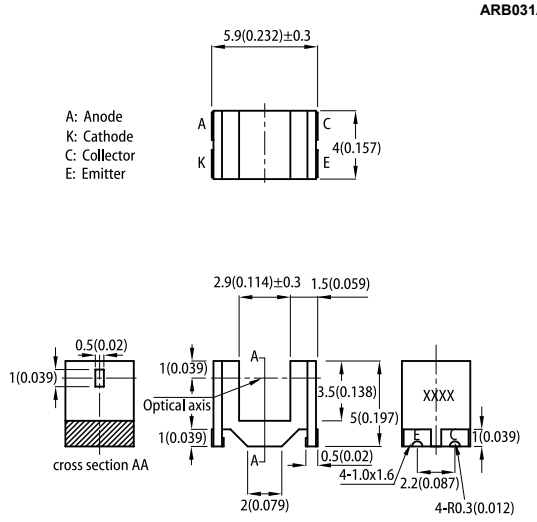
Part Number	IC (μA)				$V_{CE(sat)}$ (V)			Response Time(μs) Typ.			Pin Configuration	Dimensions
	Min.	Typ.	Max.	Test Conditions	Typ.	Max.	Conditions	t_r	t_f	Test Conditions		
ATIR0711S	10	-	400	I_F = 4mA V_{CE} = 2V	-	0.4	I_F = 20mA I_C = 0.1mA	20	20	V_{CE} = 2V I_C = 100μA R_L = 1KΩ d = 1mm		ATIR0711S, ATIR0711S-F  ATIR0711S  1 Anode 2 Emitter 3 Collector 4 Cathode
ATIR0711S-F	100	-	250	I_F = 4mA V_{CE} = 2V	-	0.4	I_F = 20mA I_C = 0.1mA	20	20	V_{CE} = 2V I_C = 100μA R_L = 1KΩ d = 1mm		Units: mm (inch) Tolerance: ± 0.25 (0.01)
ATIR0721DS	-	10000	-	I_F = 4mA V_{CE} = 2V	-	1	I_F = 40mA I_C = 1mA	80	70	V_{CE} = 2V I_C = 10mA R_L = 100Ω d = 1mm		ATIR0721DS  ATIR0721DS  1 Anode 2 Emitter 3 Collector 4 Cathode Units: mm (inch) Tolerance: ± 0.25 (0.01)
ATIR0811S	10	-	400	I_F = 4mA V_{CE} = 2V	-	0.4	I_F = 20mA I_C = 0.1mA	20	20	V_{CE} = 2V I_C = 100mA R_L = 1KΩ d = 1mm		ATIR0811S  ATIR0811S  1 Anode 2 Emitter 3 Collector 4 Cathode Units: mm (inch) Tolerance: ± 0.25 (0.01)

All dimensions are in millimeters (inches)

PHOTOINTERRUPTER - TRANSMISSIVE TYPE

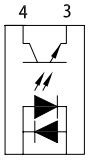
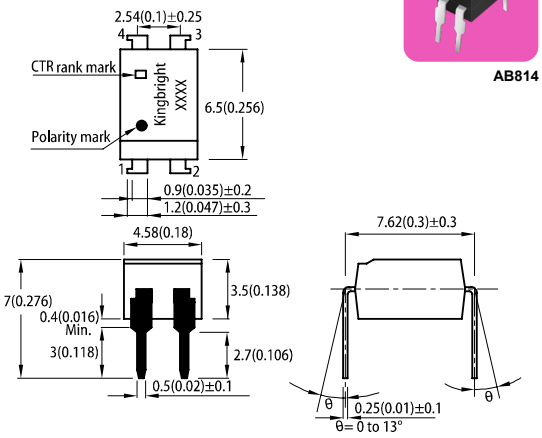
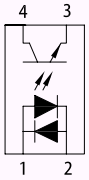
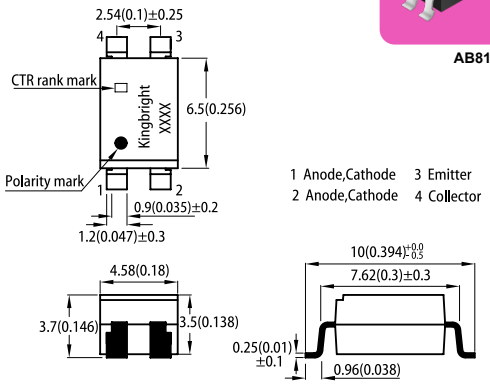
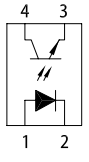
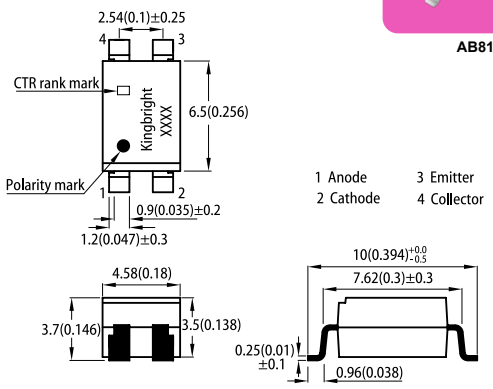
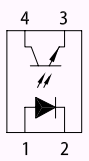
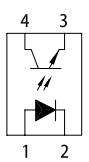
Part Number	CTR(%)				$V_{CE(sat)}$ (V)			Response Time(μs) Typ.			Pin Configuration	Dimensions
	Min.	Typ.	Max.	Test Conditions	Typ.	Max.	Conditions	t_r	t_f	Test Conditions		
ATIR0511S	-	10	-	I_F = 20mA V_{CE} = 5V	-	0.4	I_F = 40mA I_C = 1mA	5	4	V_{CE} = 2V I_C = 2mA R_L = 100Ω		ATIR0511S  ATIR0511S  Units: mm (inch) Tolerance: ± 0.25 (0.01)
ATIR0911S	-	9.5	-	I_F = 20mA V_{CE} = 5V	-	0.4	I_F = 40mA I_C = 1mA	5	4	V_{CE} = 2V I_C = 2mA R_L = 100Ω		ATIR0911S  ATIR0911S  Units: mm (inch) Tolerance: ± 0.25 (0.01)
ARA021	2.5	-	50	I_F = 10mA V_{CE} = 2V	0.1	0.4	I_F = 20mA I_C = 0.25mA	15	15	V_{CE} = 5V R_L = 1KΩ I_C = 1mA		ARA021  ARA021  Units: mm (inch) Tolerance: ± 0.15 (0.006)

PHOTOINTERRUPTER - TRANSMISSIVE TYPE

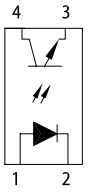
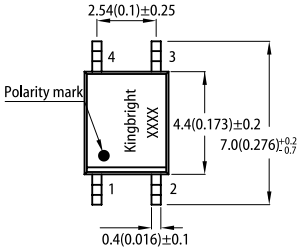
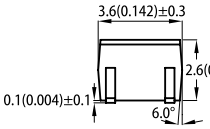
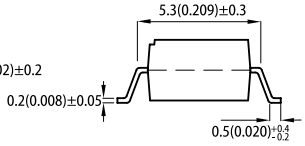
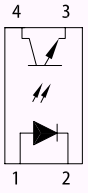
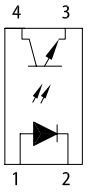
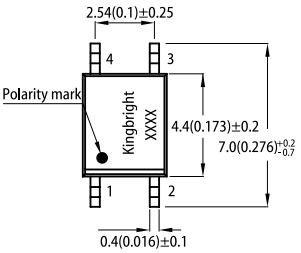
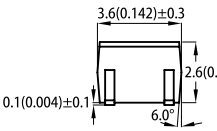
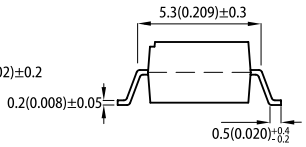
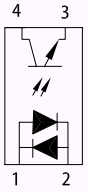
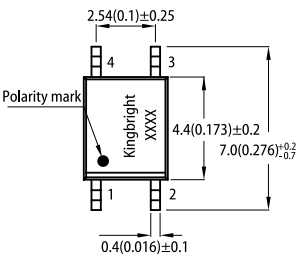
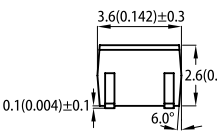
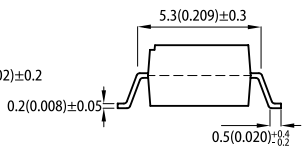
Part Number	IC (μA)				$V_{CE(sat)}$ (V)			Response Time(μs) Typ.			Pin Configuration	Dimensions
	Min.	Typ.	Max.	Test Conditions	Typ.	Max.	Conditions	t_r	t_f	Test Conditions		
ARB011	50	650	-	I_F = 5mA V_{CE} = 5V	0.1	0.4	I_C = 50μA I_F = 20mA	8	10	V_{CE} = 5V R_L = 1KΩ I_C = 100μA		ARB011  ARB011  Units: mm (inch) Tolerance: ± 0.15 (0.006)
ARB031A	50	150	500	I_F = 5mA V_{CE} = 5V	0.1	0.4	I_C = 50μA I_F = 20mA	8	10	V_{CE} = 5V R_L = 1KΩ I_C = 100μA		ARB031A  ARB031A  Units: mm (inch) Tolerance: ± 0.15 (0.006)

All dimensions are in millimeters (inches)

PHOTOCOUPLER

Part Number	CTR(%)				$V_{CE(sat)}$ (V)			Response Time(μs) Typ.			Pin Configuration	Dimensions
	Min.	Typ.	Max.	Test Conditions	Typ.	Max.	Conditions	t_r	t_f	Test Conditions		
AB814B	120	-	300	I_F = ±1mA V_{CE} = 5V	0.1	0.2	I_F = ±20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB814B  AB814  Units: mm (inch) Tolerance: ± 0.5 (0.02)
AB814B-B	120	-	300	I_F = ±1mA V_{CE} = 5V	0.1	0.2	I_F = ±20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB814B-B  AB814-B  Units: mm (inch) Tolerance: ± 0.5 (0.02)
AB817A-B	80	-	160	I_F = 5mA V_{CE} = 5V	0.1	0.2	I_F = 20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB817A-B, AB817B-B, AB817D-B  AB817-B  Units: mm (inch) Tolerance: ± 0.5 (0.02)
AB817B-B	130	-	260	I_F = 5mA V_{CE} = 5V	0.1	0.2	I_F = 20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		
AB817D-B	300	-	600	I_F = 5mA V_{CE} = 5V	0.1	0.2	I_F = 20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L =100Ω		

PHOTOCOUPLER

Part Number	CTR(%)				$V_{CE(sat)}$ (V)			Response Time(μs) Typ.			Pin Configuration	Dimensions
	Min.	Typ.	Max.	Test Conditions	Typ.	Max.	Conditions	t_r	t_f	Test Conditions		
AB356N2T	130	-	260	I_F = 5mA V_{CE} = 5V	0.1	0.2	I_F = 20mA I_C = 1mA	6	8	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB356N2T, AB356N6T  AB356NT  1 Anode 3 Emitter 2 Cathode 4 Collector  
AB356N6T	130	-	400	I_F = 5mA V_{CE} = 5V	0.1	0.2	I_F = 20mA I_C =1mA	6	8	V_{CE} = 2V I_C = 2mA R_L = 100Ω		
AB357NT	50	-	600	I_F = 5mA V_{CE} = 5V	-	0.2	I_F = 20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB357NT  AB357NT  1 Anode 3 Emitter 2 Cathode 4 Collector  
AB354NT	20	-	300	I_F = ±1mA V_{CE} = 5V	0.1	0.2	I_F = ±20mA I_C = 1mA	4	3	V_{CE} = 2V I_C = 2mA R_L = 100Ω		AB354NT  AB354NT  1 Anode,Cathode 3 Emitter 2 Cathode,Anode 4 Collector  

All dimensions are in millimeters (inches)

Technical Notes

61 /
Bin Code Systems

63 /
Application Notes

68 /
CIE Chromaticity Diagram

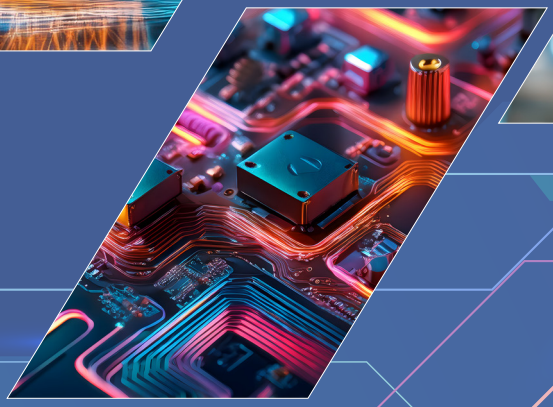
70 /
Index











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	Q	10	15

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	G	40	55
AL	1.2	2	H	55	80
A	2	3	M	80	120
B	3	5	N	120	200
C	5	8	P	200	300
D	8	12	Q	300	400
E	12	20	R	400	500
F	20	40	S	500	700

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% IF≤10mA)

Group	Light intensity in ucd		Group	Light intensity in ucd	
	Min.	Max.		Min.	Max.
C	70	140	P	14000	21000
D	140	240	Q	21000	31000
E	240	360	R	31000	52000
F	360	560	S	52000	88000
G	560	900	T	88000	150000
H	900	1400	U	150000	255000
I	1400	2200	V	255000	433000
K	2200	3600	W	433000	736000
L	3600	5600	X	736000	1251000
M	5600	9000	Y	1251000	2126000
N	9000	14000	Z	2126000	3614000

BIN CODE SYSTEMS

SELECTION CODE FOR LUMINOUS FLUX

(T_A=25°C; Tolerance: +/-15%)

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

COLOR CODE FOR GREEN LEDS + DISPLAYS

(T_A=25°C; Tolerance: +/-1nm)

Group	Dom. Wavelength (nm)			
	Min.	Max.	Min.	Max.
0	556	559	-	-
1	559	561	515	520
2	561	563	520	525
3	563	565	525	530
4	565	567	530	535
5	567	569	535	540
6	569	571	-	-
7	571	573	-	-
8	573	575	-	-

COLOR CODE FOR BLUE LEDS + DISPLAYS

(T_A=25°C; Tolerance: +/-1nm)

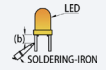
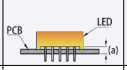
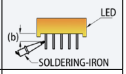
Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	445	450	3A	471	473
2	450	455	3B	473	475
3	455	460	4A	475	477
1A	460	463	4B	477	479
1B	463	466	5A	479	481
2A	466	469	5B	481	483
2B	469	471	5C	483	486

COLOR CODE FOR YELLOW LEDS + DISPLAYS

(T_A=25°C; Tolerance: +/-1nm)

Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	581	584	5	590	592
2	584	586	6	592	594
3	586	588	7	594	597
4	588	590	8	597	600

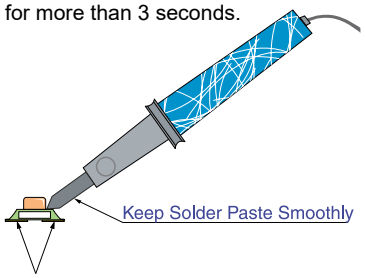
SOLDERING INSTRUCTIONS

Types	Dip soldering / * wave soldering				Iron soldering (with 1.5mm iron tip)			
	Temperature of the soldering bath	Maximum soldering time	Distance from solder joint to package (a)	Figure	Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package (b)	Figure
THROUGH-HOLE LED	<=260°C	3s	>=2mm		<=350°C	3s	>2mm	
	<=260°C	5s	>=5mm		<=350°C	5s	>5mm	
SMD	-	-	-	-	<=350°C	3s (one time only)	-	-
DISPLAY	*<=260°C	*3s	*>2mm		<=350°C	3s	>2mm	
PHOTOCOUPLER	<=260°C	3s	-	-	<=310°C	3s	-	-
	-	-	-		<=260°C	10s	-	

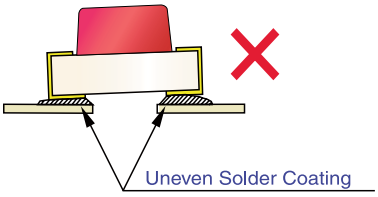
APPLICATION NOTES

General Notes

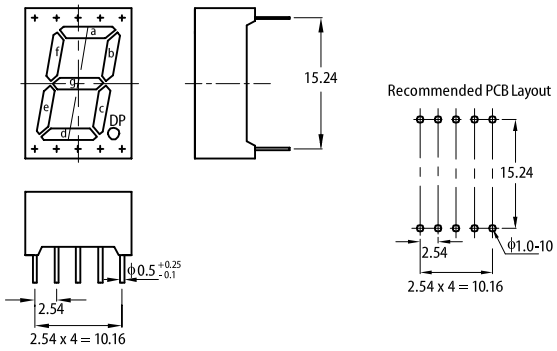
1. We recommend manual soldering operations only for repair and rework purposes. The soldering iron should be temperature-controlled to avoid damaging the component. The maximum soldering temperature is 300°C for Pb-Sn solder and 350°C for lead-free solder for normal lamps and displays. For blue (typ.:465nm),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



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



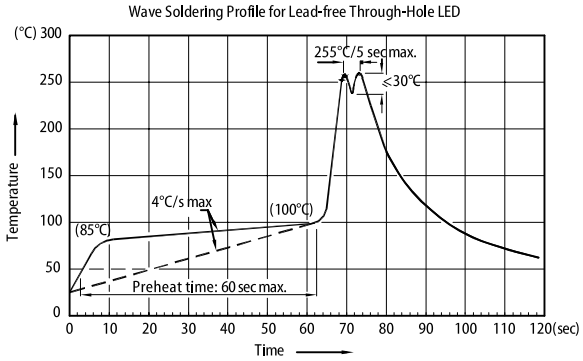
7. After soldering, allow at least three minutes for the component to cool down to room temperature before further operations.
8. Recommended PCB pin hole diameters for display products are listed below :
   Square pin type :Φ1mm
   Round pin type : 2 x pin diameters



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

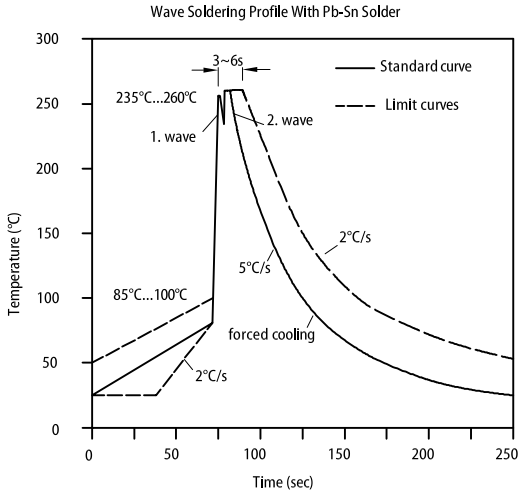
Recommended Wave Soldering Profiles For Kingbright Through-Hole Products

1. Lead-Free Wave Soldering Profile



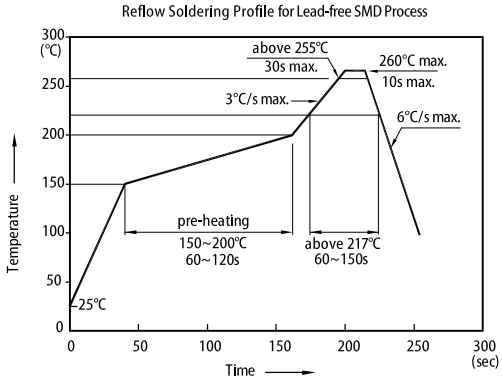
Notes:
1.Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C.
2.Peak wave soldering temperature between 245°C ~ 255°C for 3 sec (5 sec max).
3.Do not apply stress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

2. Wave Soldering Profile With Pb-Sn Solder



Recommended Reflow Soldering Profiles For Kingbright SMD Products

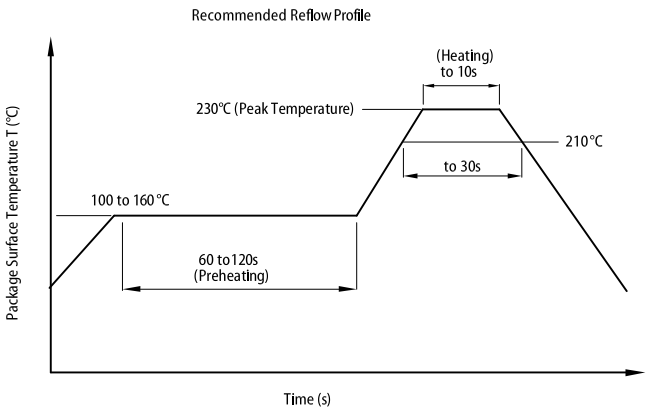
1. Lead-Free Reflow Soldering Profile



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

2. Reflow Soldering Profiles With Pb-Sn Solder

No more than two soldering passes with the recommended profile.



Static Electricity and Voltage Spikes in InGaN/GaN Products

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

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

ESD Protection During Production

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

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

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.

Note 1-3: Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.

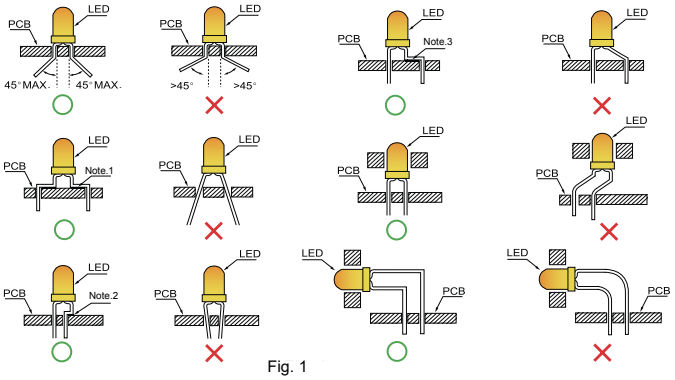


Fig. 1

"○" Correct mounting method "✕" 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)

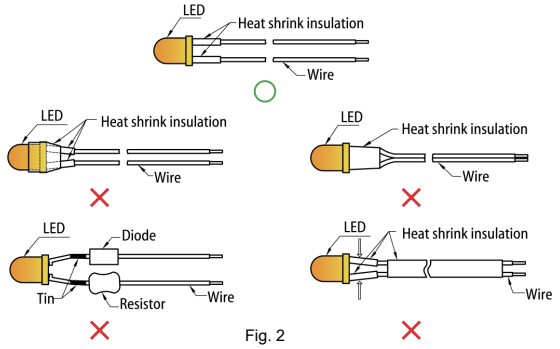


Fig. 2

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

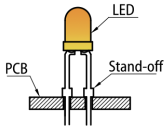


Fig. 3

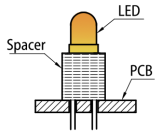


Fig. 4

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

Lead Forming Procedures

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

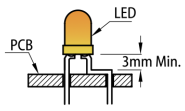


Fig. 5

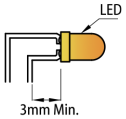


Fig. 6

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

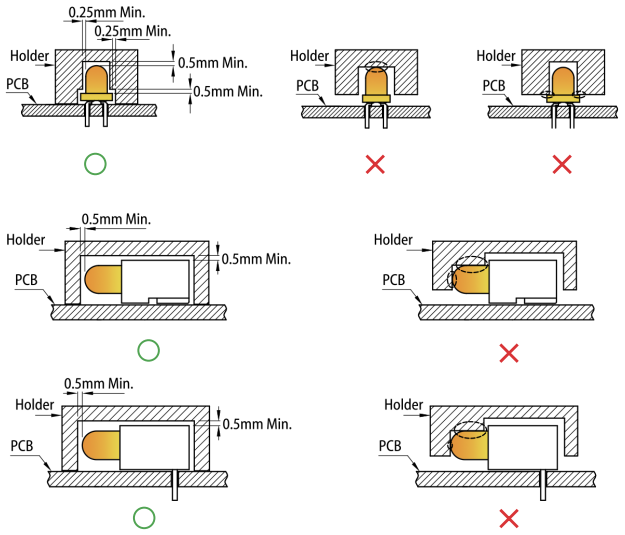


Fig. 7

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

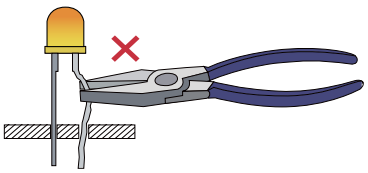


Fig. 8

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

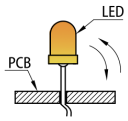


Fig. 9

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

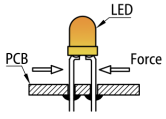


Fig. 10

Cleaning

For SMD and through-hole LEDs

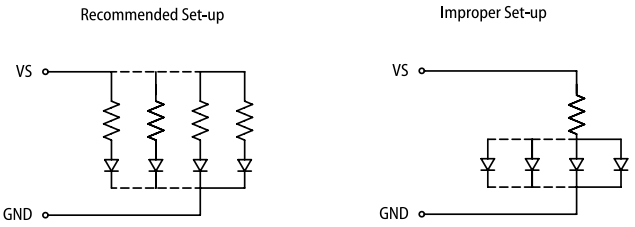
1. Isopropyl alcohol or deionized water are recommended for cleaning. Do not use acidic solvents or unknown chemicals, as they might cause corrosion or damage to the component.
2. Lightly wipe away any surface contaminants, and allow the component to dry under room temperature before further usage. Do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

For LED Displays

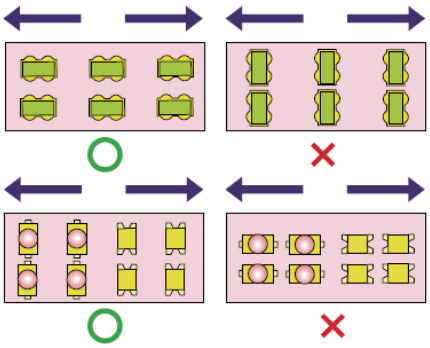
1. The component should be washed with only water, and immediately dried by forced-air to remove excess moisture. Do not use harsh organic solvents because they might damage the plastic parts.
2. The cleaning process should take place at room temperature and the component should not be washed for more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

Miscellaneous Design Notes

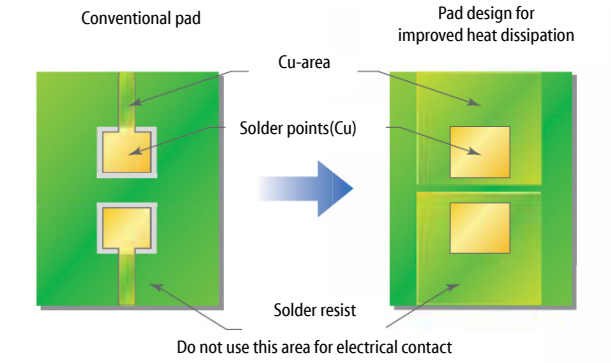
1. Protective current-limiting resistors may be necessary to operate the LEDs within the specified range.
2. LEDs mounted in parallel should each be placed in series with its own current-limiting resistor.



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

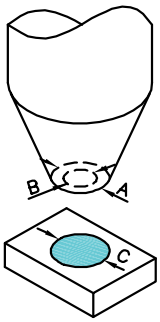


7. Optimal usage of high-power LED devices requires careful design by the end-user to optimize heat dissipation, such as increasing the size of the metal backing around the soldering pad.
   Refer to the product datasheet for specific design recommendations regarding heat dissipation.



Restrictions on Product Use

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

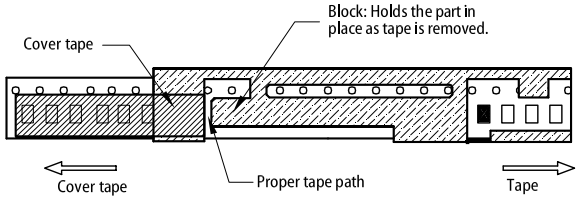


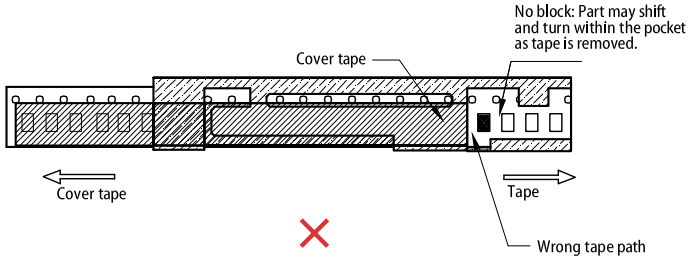
A is the outer diameter of the pick-up nozzle
B is the inner diameter of the pick-up nozzle
C is the diameter of lens

6. The size of the nozzle should be as large as possible if the tape is not involved.
7. The LEDs should not be exposed to an environment where high level of moisture or corrosive gases are present.
8. When the LED is off, do not apply forward or reverse voltage, as this can lead to electrochemical migration, potentially causing damage to the LED, particularly in humid conditions.
9. Excess driving current and/or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.
10. It is not recommended to assemble LEDs of different color or intensity bins together, as there may be perceivable color or intensity variation. Each bag contains parts from the same bin code. The bin code is printed on the bag's label as below.

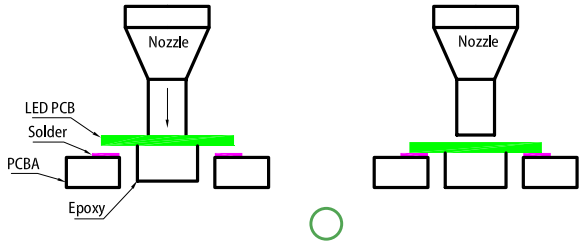


11. For the 0603, 1005 and 1608 series, an ESD ionizer should be used during SMT pick-and-place process to neutralize the charge and hence reduce electrostatic attraction.
12. Please do not apply stress directly to the LED during handling.
13. As silicone encapsulation is permeable to gases, some corrosive substances such as H_2S might corrode silver plating of leadframe. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.
14. The LEDs should not be exposed to an environment where high level of moisture or corrosive gases are present.
15. For right angle SMD LEDs, the solder stencil should be at least 5mil in thickness, to prevent poor solder wetting due to insufficient solder paste.
16. Choosing the right feeder for small SMD components:
    16.1 When processing smaller SMD components (2.0×1.2mm or smaller), please use feeder with a block to hold the tape in place during cover tape removal, in order to prevent the component from jumping or turning within the tape due to vibration or static cling.
    16.2 Feeder without block is more suitable for larger size components, such as 3216, 3528 series.
    16.3 Please insure the removed cover tape is properly threaded through the feeder as it is removed from the tape.

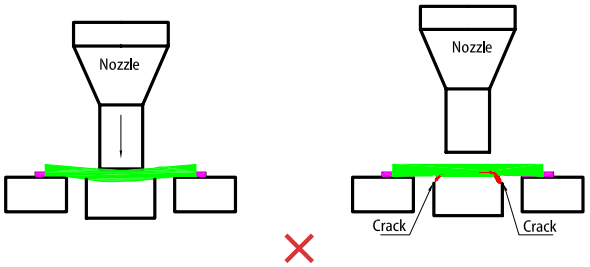




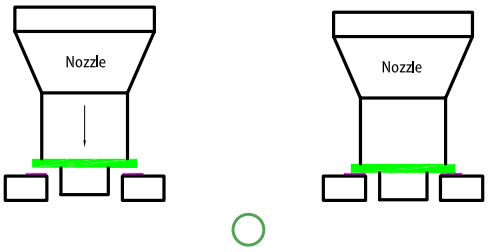
17. When placing reverse-mount LEDs, the nozzle must not place pressure on the part. Refer to the figures below, pressure on the LED will cause the LED to bend and potentially cause delamination or cracking between the component PCB and the epoxy lens. The damaged LED will be more prone to failure after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



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



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



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

Storage Control

For SMD Products

1. 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.
2. After the MBB has been opened, the LEDs should be used according to the floor life specified in the table below.

IPC/JEDEC J-STD-020 Moisture Sensitivity Levels

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

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

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

* Not more than once

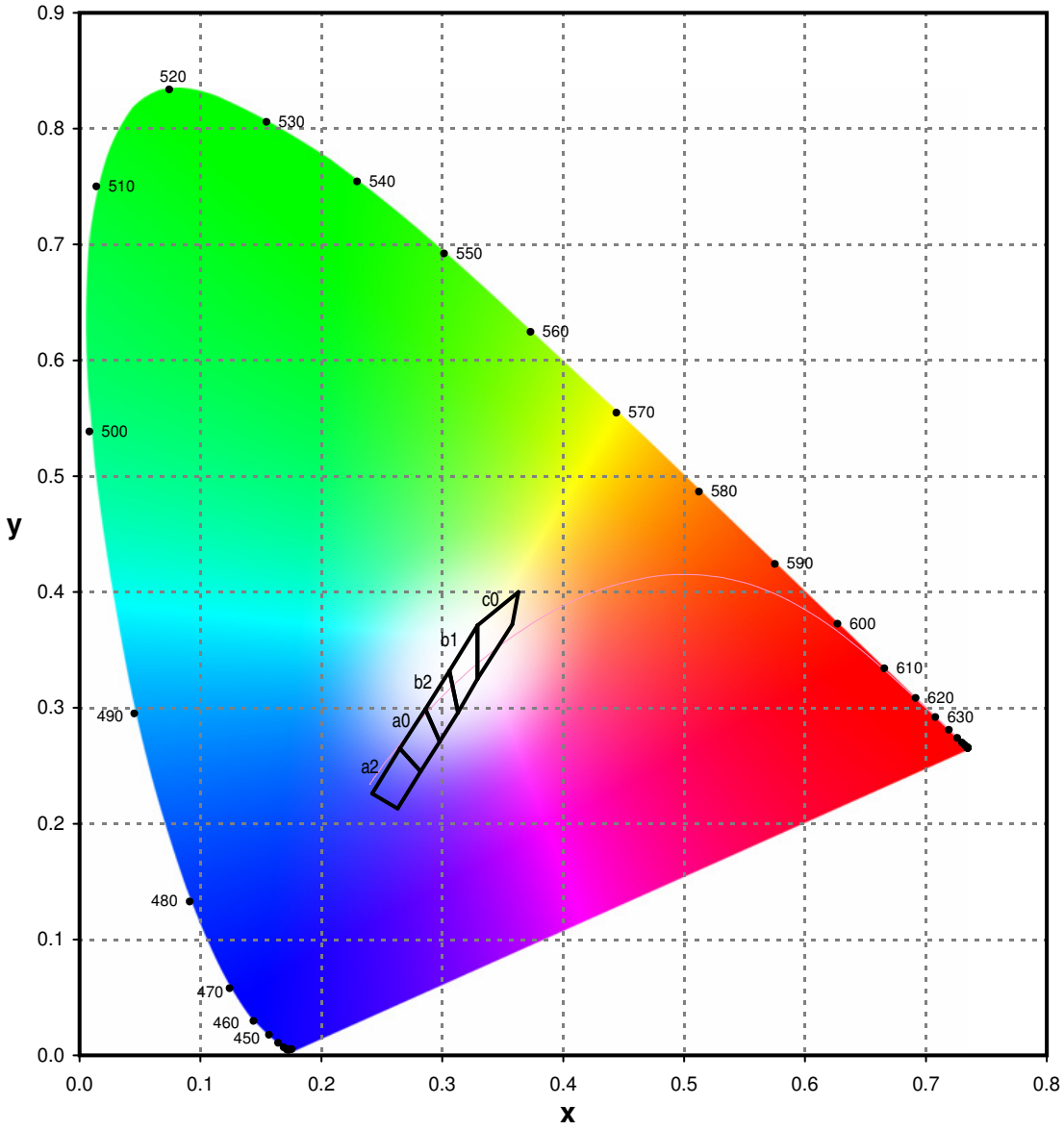
4. Do not store LEDs in an environment where high humidity or acidic/ basic chemicals are present, as they will degrade the LED's metallic surfaces.
5. LED leadframe and soldering pads (cathode and anode) are plated with gold, tin, or other metals. Under long-term exposure to open air, the exposed pins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

For Through-Hole Products

1. Avoid continued exposure to the condensing moisture environment and keep the product away from rapid transitions in ambient temperature.
2. The LEDs should be stored at temperature <30°C and relative humidity <70%. If the packaging is opened but not used within three months, the unused LEDs should be stored in a sealed container with nitrogen atmosphere and moisture absorbent material.
3. The LED leadframe surface is plated with tin. 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.
4. 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~		

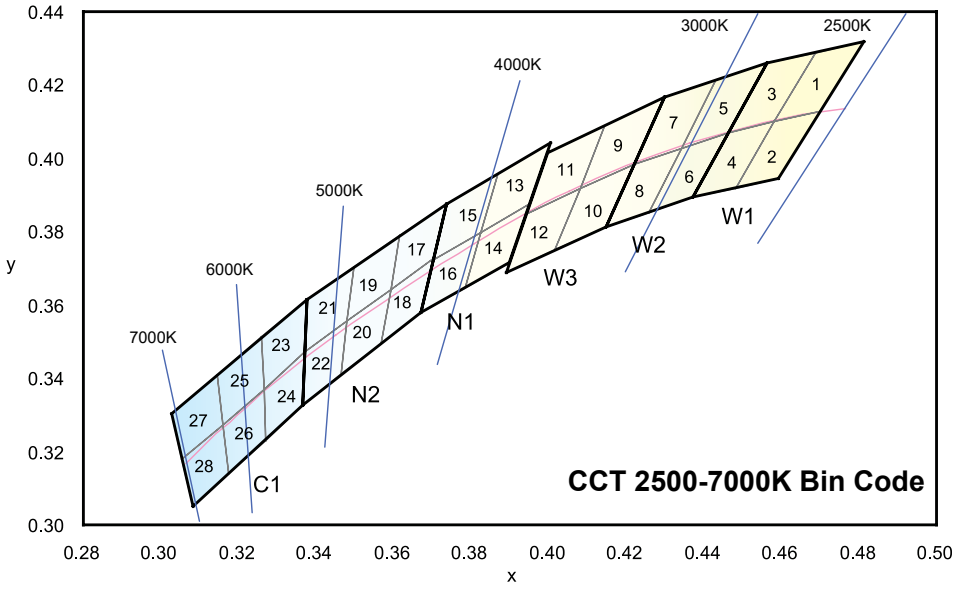
Bin	x	y
b2	0.298	0.271
	0.313	0.296
	0.306	0.332
	0.286	0.299
CCT: 6800~9000K		

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

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

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

INDEX

AA1608 SERIES P-15
AA1608L SERIES P-03
AA2214 SERIES P-15
AA2810A SERIES P-17
AA3021 SERIES P-15
AA3527A SERIES P-16
AA3528 SERIES P-16
AA3528L SERIES P-05
AA3528P3S P-51
AA3528xxx09 SERIES P-27
AA4040 SERIES P-18
AA4040-AMT SERIES P-11
AA4040SF4BT-P22 ..... P-47
AAA3528LSEEZGKQBKS P-07
AAA3528SEEZGGVBDS P-25
AAA3528SEEZGKQBKS P-25
AAA3528SURKSYKC P-24
AAA3528xxx09 SERIES P-27
AAAF5050-MC-K12 ..... P-37
AB354NT P-59
AB356N2T P-59
AB356N6T P-59
AB357NT P-59
AB814B P-58
AB814B-B P-58
AB817A-B P-58
AB817B-B P-58
AB817D-B P-58
ACSX02-41 SERIES P-35
ACSX03-41 SERIES P-35
ACSX04-41 SERIES P-36
ACSX56-41 SERIES P-36
AM23SURTK-C2 ..... P-27
AM2520PD1BT03 ..... P-49
AM2520PD1BT09 ..... P-49
AM2520SF3C03-100MAV P-47
AM2520SF3C09-100MAV P-47
AM2520xxx03 SERIES P-25
AM2520xxx09 SERIES P-26
AM4457F3C P-48
AM4457P3C-F-R P-51
APA1606 SERIES P-17
APA1606SF4C-P22 ..... P-45
APA2107 SERIES P-17
APA2107L SERIES P-04
APA3010 SERIES P-18
APA3010F3C-GX P-46
APA3010P3BT-GX P-50
APA3010SF4C P-46
APB3025SURKCGKC-F01 ..... P-22
APB3227 SERIES P-24
APBA2006 SERIES P-20
APBA2006SURKVBDC-5MA P-09
APBA3010 SERIES P-21
APBD3224 SERIES P-23
APBD3224L SERIES P-06
APBDA3020 SERIES P-22
APBL3025SURKCGK-F01 ..... P-22
APD3224 SERIES P-14
APDA1806 SERIES P-17
APDA3020 SERIES P-18
APDA3020F3C-P22 ..... P-46
APDA3020L SERIES P-05
APDA3020P3C-P22 ..... P-50
APF3236SEEZGQBDC P-24
APFA2507L SERIES P-07
APFA2507QBDSEEZGKC P-21
APFA2507R3G3C-CC P-20
APFA2507R9G2C-C2 ..... P-20
APFA2507Y2G2C-C2 ..... P-20
APFA3010 SERIES P-21
APFA3010L SERIES P-07
APFA3010R2G2C-C6-AMT P-11
APFA3011-AK13/F P-21
APG0201 SERIES P-11
APG0201-5MAV SERIES P-08
APG1005 SERIES P-12
APG1005-5MAV SERIES P-08
APG1608 SERIES P-12
APGA1602 SERIES P-16
APGA1602QBC/KA-5MAV P-08
APGB0607 SERIES P-08
APGF1012GBRC-07 ..... P-09
APHB1608 SERIES P-19
APHB1608-AMT SERIES P-10
APHB1608L SERIES P-06
APHBM2012 SERIES P-20
APHBM2012L SERIES P-06
APHCM2012 SERIES P-13
APHD1608L SERIES P-03
APHF1608LSEEQBDZGKC P-06
APHF1608SEEQBDZGKC P-19
APHHS1005 SERIES P-12
APHHS1005L SERIES P-03
APHM1608VRBXF/A-5MAV P-09
APL3015 SERIES P-13
APPA3010 SERIES P-18
APPA3010SF4C-P22 ..... P-46
APS2012SP1C P-53
APS3227SP1C-P22 ..... P-53

INDEX

APS5130PD7C-P22 ..... P-54
APT1608 SERIES P-12
APT1608-AMT SERIES P-10
APT1608F3C P-45
APT1608L SERIES P-03
APT1608SF4C-PRV P-45
APT1608VRCXF/A-5MAV P-10
APT2012 SERIES P-13
APT2012F3C P-45
APT2012L SERIES P-04
APT2012P3BT P-50
APT3216 SERIES P-14
APT3216L SERIES P-05
APTB1612 SERIES P-19
APTB1615 SERIES P-19
APTB3212SURKCGKC-01 ..... P-23
APTBD3216SURKCGKC-01 ..... P-23
APTD1608 SERIES P-13
APTD1608L SERIES P-04
APTD2012F3C P-45
APTD2012L SERIES P-04
APTD3216 SERIES P-14
APTD3216F3C-P22 ..... P-47
APTD3216L SERIES P-05
APTD3216P3C-P22 ..... P-50
APTD3216SF4C P-47
APTF1616 SERIES P-20
APTF1616L SERIES P-07
APTFD3535VBDSEJ3ZGGC P-25
APTL3216 SERIES P-14
APTL3216xxx01 SERIES P-26
APTR3216 SERIES P-26
APTR3216F3C P-46
ARA021 ..... P-56
ARB011 ..... P-57
ARB031A P-57
ATIR0511S P-56
ATIR0711S P-55
ATIR0711S-F P-55
ATIR0721DS P-55
ATIR0811S P-55
ATIR0911S P-56
WP1043 SERIES P-32
WP113 SERIES P-31
WP130WCP/2 SERIES P-42
WP130WDT/ SERIES P-39
WP132X SERIES P-29
WP1384AD/ SERIES P-40
WP1503 SERIES P-30
WP1503CB/ SERIES P-40
WP1503EB/2GD P-42
WP1533BQ/ SERIES P-40
WP154A4 SERIES P-33
WP154A4AVS/ SERIES P-41
WP3A10 SERIES P-29
WP3A10F3C P-48
WP3A10SF4C P-48
WP3A10SF7C P-48
WP3DP3BT P-51
WP3DP3BT/BD-P22 ..... P-51
WP3DPD1BT/BD P-49
WP424 SERIES P-31
WP483SEKJ3CGKWT P-33
WP57 SERIES P-32
WP59 SERIES P-32
WP59BL/ SERIES P-41
WP7083 SERIES P-30
WP710A10 SERIES P-29
WP710A10F3BT P-48
WP710A10F3C P-48
WP710A10L SERIES P-33
WP710A10SF4BT-P22 ..... P-48
WP710A10SF4C P-48
WP7113 SERIES P-30
WP7113F3BT P-48
WP7113F3C P-48
WP7113L SERIES P-33
WP7113P3BT P-51
WP7113P3C P-51
WP7113PD1BT/BD-P22 ..... P-49
WP7113SEKJ3CGKW P-30
WP7113SF4BT-P22 ..... P-48
WP7113SF4C P-48
WP7113SF6BT-P22 ..... P-48
WP7113SF6C P-48
WP7113SF7C P-48
WP793 SERIES P-30
WP813 SERIES P-31
WP914SURDK P-31
WP917CK/4EGWT P-43
WP934CB/ SERIES P-39
WP934EB/2 SERIES P-41
WP934EW/ SERIES P-39
WP934MD/2 SERIES P-42
WP934SA/3 SERIES P-43
WP934SB/4 SERIES P-43
WP937 SERIES P-32
WP937MD/2EGW P-42
WP937SA/3EGW P-43

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