

# Infrared & Phototransistor

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



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Infrared Emitting Diode

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Photodiode

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Phototransistor

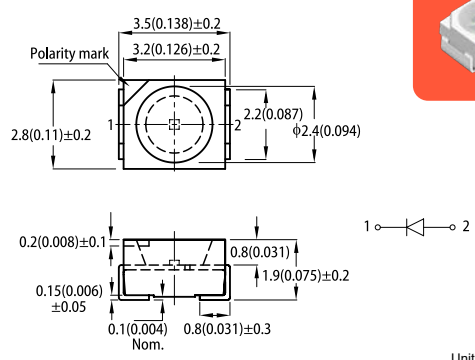
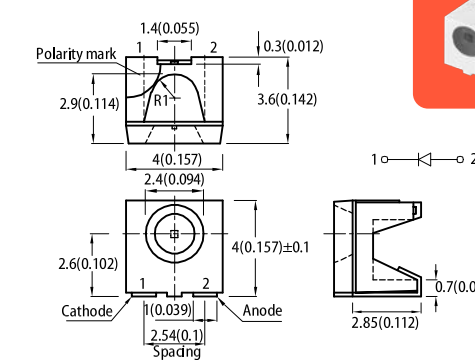
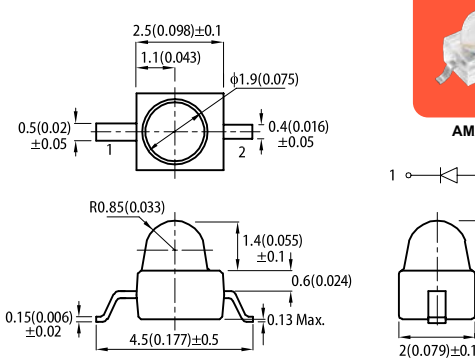
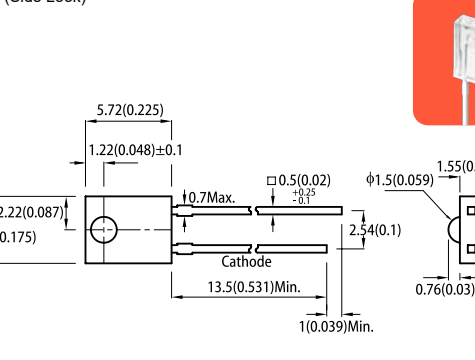
INFRARED EMITTING DIODE

Part Number	Material	$\lambda_P$ (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle 2 $\theta$ 1/2	Dimensions
				Min.	Typ.		
APA1606SF4C-P22	GaAlAs	880	Water Clear	0.8	1.5	110°	<p>1.6mm x 1.2mm x 0.6mm (Right Angle)</p> <p>Units: mm (inch) Tolerance: <math>\pm 0.1</math> (0.004)</p>
APT1608F3C	GaAs	940	Water Clear	0.8	2	150°	<p>1.6mm x 0.8mm x 0.75mm (0603)</p> <p>Units: mm (inch) Tolerance: <math>\pm 0.1</math> (0.004)</p>
APT2012F3C	GaAs	940	Water clear	0.8	2	160°	<p>2.0mm x 1.25mm x 0.75mm (0805)</p> <p>Units: mm (inch) Tolerance: <math>\pm 0.1</math> (0.004)</p>
AP2012SF4C	GaAlAs	880	Water Clear	0.8	1.5	160°	<p>2.0mm x 1.25mm x 1.1mm (0805)</p> <p>Units: mm (inch) Tolerance: <math>\pm 0.1</math> (0.004)</p>


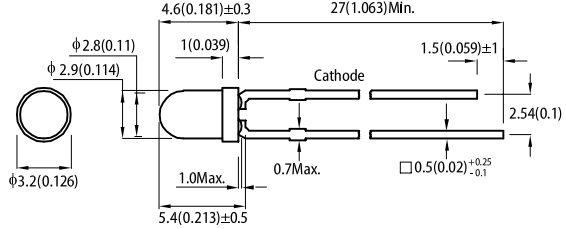

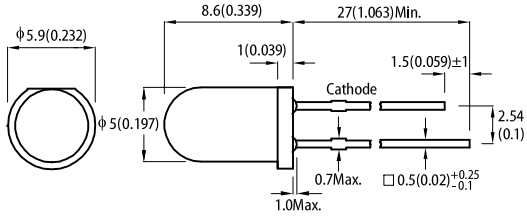
INFRARED EMITTING DIODE

Part Number	Material	$\lambda_P$ (nm)	Lens Type	Po (mW/sr) @20mA		Viewing Angle	Dimensions
				Min.	Typ.		
APA3010F3C-GX	GaAs	940	Water Clear	0.8	2	160°	<p>3.0mm x 2.0mm x 1.0mm (Right Angle)</p> <p><b>APA3010</b></p> <p>F3 1 ○ ◀ ○ 2</p> <p>SF4 1 ○ ▶ ○ 2</p> <p>Units: mm (inch) Tolerance: ± 0.15 (0.006)</p>
APA3010SF4C	GaAlAs	880	Water Clear	0.8	1.5	160°	
APPA3010SF4C-P22	GaAlAs	880	Water Clear	1	2.5	30°	<p>3.0mm x 2.5mm x 1.0mm (Right Angle)</p> <p><b>APPA3010</b></p> <p>1 ○ ◀ ○ 2</p> <p>Units: mm (inch) Tolerance: ± 0.15 (0.006)</p>
APDA3020F3C-P22	GaAs	940	Water Clear	3	6.5	10°	<p>3.0mm x 2.0mm x 2.8mm (Right Angle)</p> <p><b>APDA3020</b></p> <p>1 ○ ◀ ○ 2</p> <p>Units: mm (inch) Tolerance: ± 0.2 (0.008)</p>
APTD3216F3C-P22	GaAs	940	Water Clear	2	5	40°	<p>3.2mm x 1.6mm x 1.8mm (1206 Dome Lens)</p> <p><b>APTD3216</b></p> <p>F3 1 ○ ◀ ○ 2</p> <p>SF4 1 ○ ▶ ○ 2</p> <p>Units: mm (inch) Tolerance: ± 0.2 (0.008)</p>
APTD3216SF4C	GaAlAs	880	Water Clear	1.6	4	40°	

INFRARED EMITTING DIODE

Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA *50mA **100mA		Viewing Angle 2θ1/2	Dimensions
				Min.	Typ.		
AA3528SF4S-R	GaAlAs	880	Water Clear	1.2	2	120°	<p>3.5mm x 2.8mm x 1.9mm</p>  <p>Units: mm (inch) Tolerance: ± 0.25 (0.01)</p>
AA4040SF4BT-P22	GaAlAs	880	Blue Transparent	**8	**16	90°	<p>4.0mm x 4.0mm x 3.6mm (Right Angle)</p>  <p>Units: mm (inch) Tolerance: ± 0.25 (0.01)</p>
AM2520F3C03-P22	GaAs	940	Water Clear	3	8	20°	<p>Subminiature Solid State Lamps Gull Wing Lead</p>  <p>Units: mm (inch) Tolerance: ± 0.25 (0.01)</p>
				*8	*16		
AM4457F3C	GaAs	940	Water Clear	2	5	70°	<p>1.5mm (Side Look)</p>  <p>Units: mm (inch) Tolerance: ± 0.25 (0.01)</p>

INFRARED EMITTING DIODE

Part Number	Material	λP (nm)	Lens Type	Po (mW/sr) @20mA*50mA		Viewing Angle 2θ1/2	Dimensions
				Min.	Typ.		
WP710A10F3C	GaAs	■ 940	Water Clear	3	8	30°	T-1 (3mm) Round  WP710A10
				*12	*25		
WP710A10F3BT	GaAs	■ 940	Blue Transparent	3	8	30°	
				*12	*25		
WP710A10SF4BT-P22	GaAlAs	■ 880	Blue Transparent	7	12	30°	
WP7113F3C	GaAs	■ 940	Water Clear	8	20	20°	T-1 3/4 (5mm) Round  WP7113
				*25	*50		
WP7113F3BT	GaAs	■ 940	Blue Transparent	8	20	20°	
				*25	*50		
WP7113SF4C	GaAlAs	■ 880	Water Clear	6	15	20°	
				*15	*40		
WP7113SF6C	GaAlAs	■ 860	Water Clear	18	40	20°	
				*55	*100		
WP7113SF7C	GaAlAs	■ 850	Water Clear	12	30	20°	
				*40	*90		

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

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

PHOTODIODE

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


Electrical and Optical Characteristics (Ta =25°C)

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition
Reverse Break down Voltage	$V_{(BR)R}$	-	33	170	-	V	$I_R = 100\mu A$ $H = 0mW/cm^2$
Reverse Dark Current	$I_{D(R)}$	-	-	-	10	nA	$V_R = 10V$ $H = 0mW/cm^2$
Open Circuit Voltage	$V_{OC}$	-	-	390	-	mV	$\lambda = 940nm$ $H = 5mW/cm^2$
Rise Time	$T_R$	-	-	6	-	ns	$V_R = 10V$ $\lambda = 940nm$ $R_L = 1000\Omega$
Fall Time	$T_F$	-	-	6	-	ns	
Light current	$I_s$	AM2520PD1BT03	0.7	1.5	-	$\mu A$	$V_R = 5V$ $E_e = 0.08mW/cm^2$ $\lambda = 940nm$
		WP3DPD1BT/BD	0.3	1.0	-		
		WP7113PD1BT/BD-P22	1.2	2.0	-		
Total Capacitance	$C_T$	-	-	5	-	pF	$V_R = 10V$ $F = 1MHz$ $H = 0mW/cm^2$
Range of spectral bandwidth	$\lambda_{0.1}$	-	670	-	1070	nm	-
Wavelength of peak sensitivity	$\lambda_p$	-	-	940	-	nm	-

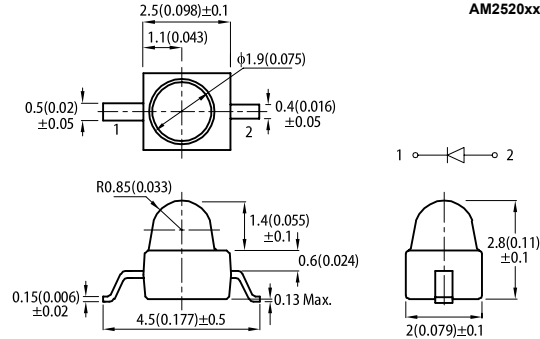
Absolute Maximum Rating (Ta =25°C)

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

Subminiature Solid State Lamps Gull Wing Lead




AM2520xxx03

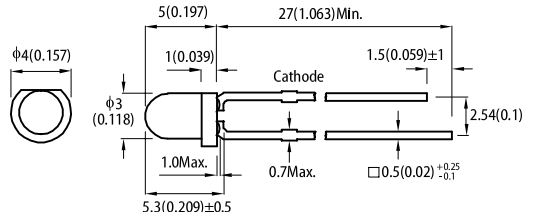


Units: mm (inch)  
Tolerance: ± 0.25 (0.01)

T-1 (3mm) Photodiode




WP3D

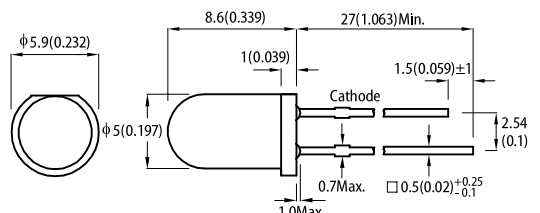


Units: mm (inch)  
Tolerance: ± 0.25 (0.01)

T-1 3/4 (5mm) Photodiode



WP7113



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

## PHOTOTRANSISTOR

Part Number	Lens Type	Dimensions
AP1608P1C-P22	Water Clear	1.6mm x 0.8mm x 1.1mm (0603)
APT2012P3BT	Black Diffused	
AP2012P3C-P22	Water Clear	
APA3010P3BT-GX	Black Diffused	
APDA3020P3C-P22	Water Clear	



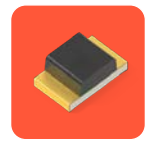
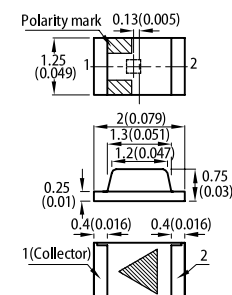
AP1608

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

### Electrical and Radiant Characteristics (Ta =25°C)

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition
Collector-to-Emitter Breakdown Voltage	$V_{BR\ CE0}$	-	30	-	-	V	$I_C=100\mu A$ $E_e=0mW/cm^2$
Emitter-to-Collector Breakdown Voltage	$V_{BR\ EC0}$	-	5	-	-	V	$I_E=100\mu A$ $E_e=0mW/cm^2$
Collector-to-Emitter Saturation Voltage	$V_{CE(SAT)}$	-	-	-	0.8	V	$I_C=2mA$ $E_e=20mW/cm^2$
Collector Dark Current	$I_{CEO}$	-	-	-	100	nA	$V_{CE}=10V$ $E_e=0mW/cm^2$
Rise Time (10% to 90%)	$T_R$	-	-	15	-	$\mu s$	$V_{CE}=5V$ $I_C=1mA$ $R_L=1K\Omega$
Fall Time (90% to 10%)	$T_F$	-	-	15	-	$\mu s$	
On State Collector Current	$I_{(ON)}$	AP1608P1C-P22	0.1	0.3	-	mA	$V_{CE}=5V$ $E_e=1mW/cm^2$ $\lambda=940nm$
		APT2012P3BT	0.1	0.3			
		AP2012P3C-P22	0.2	0.4			
		APA3010P3BT-GX	0.1	0.3			
		APDA3020P3C-P22	0.35	0.8			

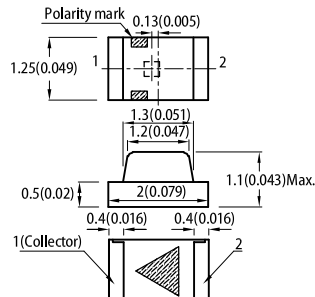
2.0mm x 1.25mm x 0.75mm (0805)



APT2012

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

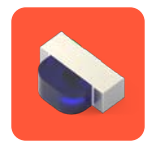
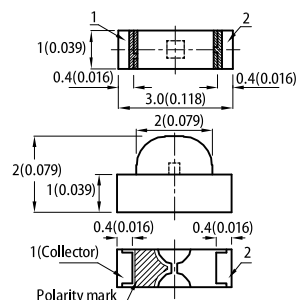
2.0mm x 1.25mm x 1.1mm (0805)



AP2012

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

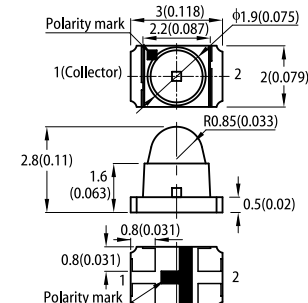
3.0mm x 2.0mm x 1.0mm (Right Angle)



APA3010

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

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



APDA3020

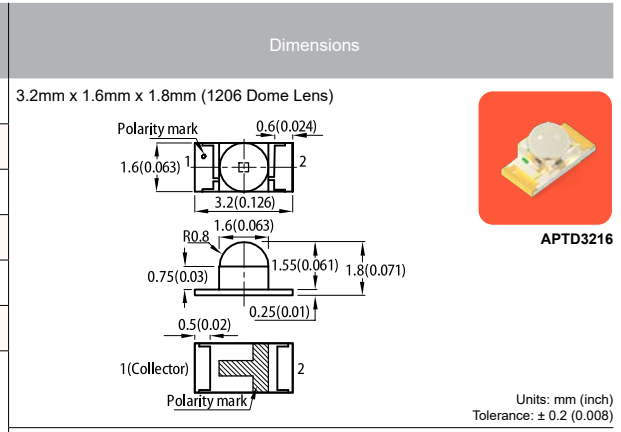
Units: mm (inch)  
Tolerance: ± 0.2 (0.008)

### Absolute Maximum Rating (Ta =25°C)

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

PHOTOTRANSISTOR

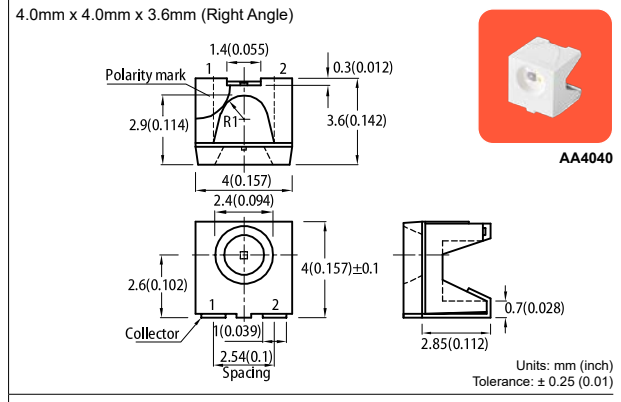
Part Number	Lens Type
APTD3216P3C-P22	Water Clear
AA4040P3C-P22	Water Clear
AM4457P3C-F-R	Water Clear
WP3DP3BT	Blue Transparent
WP3DP3BT/BD-P22	Black Diffused
WP7113P3C	Water Clear



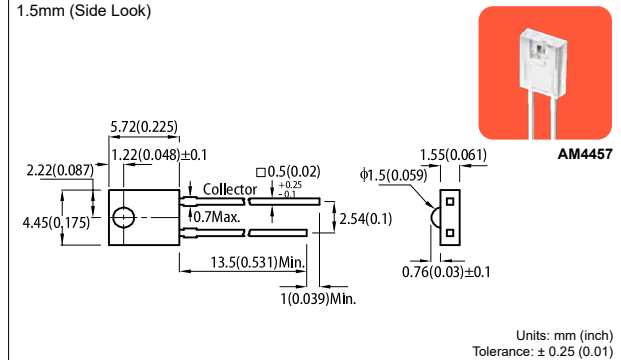
APTD3216

Electrical and Radiant Characteristics (Ta =25°C)

Parameter	Symbol	Part Number	Min.	Typ.	Max.	Unit	Test Condition
Collector-to-Emitter Breakdown Voltage	$V_{BR\ CE0}$	-	30	-	-	V	$I_C=100\mu A$ $E_e=0mW/cm^2$
Emitter-to-Collector Breakdown Voltage	$V_{BR\ EC0}$	-	5	-	-	V	$I_E=100\mu A$ $E_e=0mW/cm^2$
Collector-to-Emitter Saturation Voltage	$V_{CE(SAT)}$	-	-	-	0.8	V	$I_C=2mA$ $E_e=20mW/cm^2$
Collector Dark Current	$I_{CEO}$	-	-	-	100	nA	$V_{CE}=10V$ $E_e=0mW/cm^2$
Rise Time (10% to 90%)	$T_R$	-	-	15	-	$\mu s$	$V_{CE}=5V$ $I_C=1mA$ $R_L=1K\Omega$
Fall Time (90% to 10%)	$T_F$	-	-	15	-	$\mu s$	
On State Collector Current	$I_{(ON)}$	APTD3216P3C-P22	0.4	1	-	mA	$V_{CE}=5V$ $E_e=1mW/cm^2$ $\lambda=940nm$
		AA4040P3C-P22	0.35	0.6			
		AM4457P3C-F-R	0.35	0.8			
		WP3DP3BT	0.3	0.8			
		WP3DP3BT/BD-P22	0.3	0.8			
		WP7113P3C	0.5	2.5			



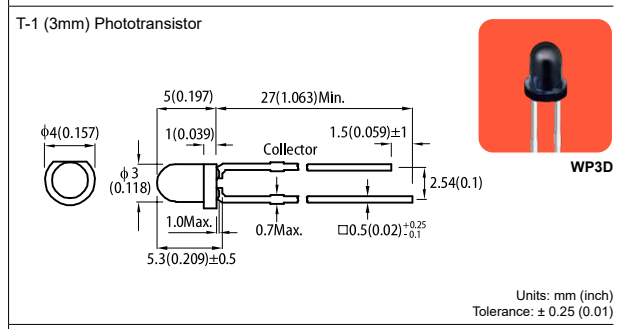
AA4040



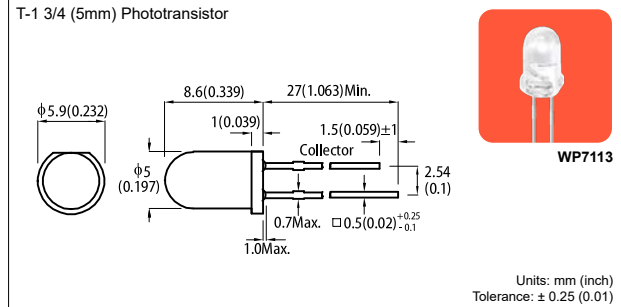
AM4457

Absolute Maximum Rating (Ta =25°C)

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



WP3D



WP7113