SUPER INTENSITY VISIBLE LED / INFRARED LED / PHOTO DETECTOR

Stanley super-intensity visible and infrared LEDs (660 nm to 925 nm) are suitable as light sources for optical communications, bar-code readers and sensors. The package of the □□-311, □□-511 and □□-1011 series used for light sourcing and reception can be easily combined with lenses since the position determination accuracy is very high.

▼INFRARED LED FOR OPTICAL COMMUNICATIONS USE

Ta=25℃

Type No.	Absolute Maximun Ratings							Electro-Optical Characteristics										fig.
	Power Dissipation	Forward Current	Derating	Peak Forward Current	Reverse Voltage	Operating Temperature	Storage Temperature	Radiant Intensity I_E			Forward Voltage V_F			Reverse Current I_R		Cut-Off Frequency	Wavelength Peak	Spectral Line Half Width	
	Pd	I_F	ΔI_F	I_{FM}	V_R	Topr	Tstg	MIN.	TYP.	I_F	TYP.	MAX.	I_F	MAX.	V_R	Fc TYP.	λp TYP.	$\Delta\lambda$ TYP.	
FH1011	140	70	0.93	300	4	−30~+85	−30~+100	0.6	1.2	30	2	2.5	30	100	4	7	660	30	1
FH511	140	70	0.93	300	4	−30~+85	−30~+100	0.3	0.6	30	1.75	20	30	100	4	7	660	30	
BN511	150	100	1.33	1000	4	−30~+85	−30~+100	0.4	0.8	20	1.2	1.5	20	100	4	1.8	925	50	
DN511	150	100	1.33	1000	5	−30~+85	−30~+100	5	9	50	1.55	2	50	100	5	30	850	40	
KR311	140	70	0.93	300	5	−30~+85	−30~+100	1	1.7	50	2.1	2.5	50	100	5	7	660	30	2
DN311	150	100	1.33	1000	5	−30~+85	−30~+100	1	3.5	50	1.55	2	50	100	5	30	850	40	
Units	mW	mA	mA/℃	mA	V	℃	℃	mW/sr		mA	V		mA	μA	V	MHz	nm		

※I_{FM} condition: tw ≦ 100 μs and duty ≦ 1/100　※Fc condition: I_F=50 mA DC + 10 mAp-p

▼PHOTO DETECTOR

•Phototransistor

Ta=25℃

Type No.	Absolute Maximum Ratings						Electro-Optical Characteristics													fig.
	Collector Dissipation	Collector-Emitter Breakdown Voltage	Emitter-Collector Breakdown Voltage	Collector Current	Operating Temp.	Storage Temp.	Photo Current I_C				Response Time					Dark Current I_{CEO}		Collector Saturation Voltage V_{CE}		Peak Sensitive Wavelength λp	
	Pc	V_{CEO}	V_{ECO}	I_C	Topr	Tstg	MIN.	TYP.	V_{CE}	Ee	Tr	Tf	V_{CE}	I_C	R_L	MAX.	V_{CEO}	TYP.	I_C	TYP.	
PS5132	100	30	5	30	−30~+85	−30~+100	2.1	6.3	5	10	5	5	10	2	100	0.2	10	0.1	0.5	880	3
Units	mW	V		mA	℃		mA		V	mW/cm²	μsec		V	mA	Ω	μA	V	V	mA	nm	

•PIN Photodiode

Type No.	Absolute Maximum Ratings				Electro-Optical Characteristics													fig.
	Power Dissipation	Reverse Voltage	Operating Temperature	Storage Temperature	Photo Current Ie			Response Time Tr·Tf			Capacitance C_T			Dark Current I_D		Peak Sensitive Wavelength λp		
	Pd	V_R	Topr	Tstg	TYP.	V_R	Ee	TYP.	V_R	R_L	TYP.	V_R	f	MAX.	V_R	TYP.	V_R	
PP513F	30	30	-30~+85	-30~+100	2.9	5	5	1.4	30	50	20	10	1	10	10	950	0	3
Units	mW	V	℃		μA	V	mW/cm²	nsec	V	Ω	pF	V	MHz	nA	V	nm	V	

※A standard tungsten filament lamp with 2.856K is used for the color temperature.

▼PACKAGE DIMENSIONS Unit : mm

fig.1

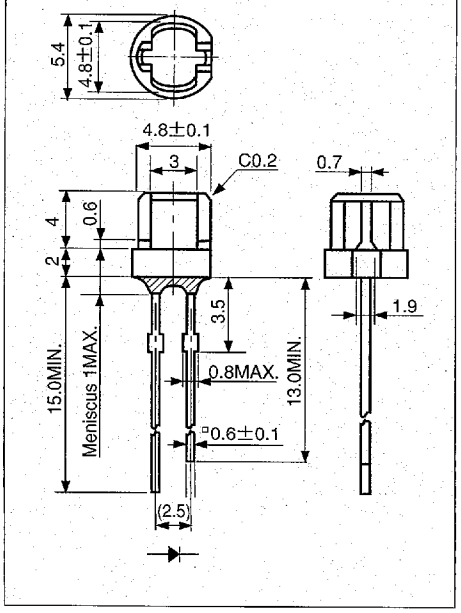


fig. 2

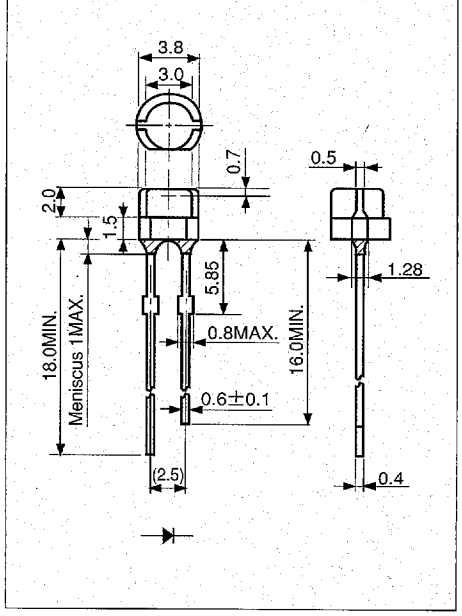
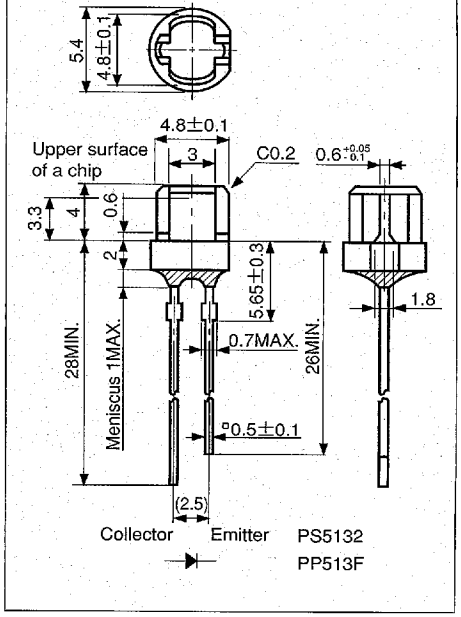


fig.3



8

■SUPER INTENSITY INFRARED LED

Stanley's infrared LEDs feature the high intensity / high speed DN series. Four wavelengths(850, 880, 925 and 950) are available in a variety of package sizes to accomodate any design requirement matched with one of our phototransistors or pin photodiodes the ideal source-receiver combination can be achieved.

▼CHARACTERISTICS BY MATERIAL

Ta=25℃

Type No.	Type	Shape	Absolute Maximun Ratings: Power Dissipation Pd	Forward Current IF	Derating IF	Peak Forward Current IFM ※	Reverse Voltage VR	Operating Temperature Topr	Storage Temperature Tstg
AN	501	GaAs	75	50	0.67	500	5	-30～+85	-30～+100
	TO-18		150	100	1.0	1000		-40～+125	-55～+125
								-30～+85	-30～+100
BN	501	GaAs	60	40	0.53	500	4	-30～+85	-30～+100
	TO-18		100	50	0.67	1000		-40～+125	-55～+125
								-30～+85	-30～+100
CN	501	GaAlAs	75	50	0.67	500	5	-30～+85	-30～+100
	TO-18		150	100	1.0	1000		-40～+125	-55～+125
								-30～+85	-30～+100
DN	501	GaAlAs	150	50	0.67	500	5	-30～+85	-30～+100
	TO-18		150	100	1.0	1000		-40～+125	-55～+125
								-30～+85	-30～+100
Units			mW	mA	mA/℃	mA	V	℃	℃

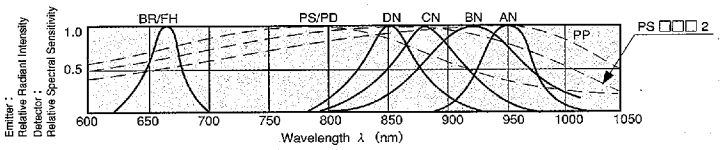
Ta=25℃

Type No.	Electro-Optical Characteristics: Forward Voltage VF TYP	VF MAX	IF	Reverse Current IR MAX	VR	Peak λp TYP	Wavelength (Spectral Line Half Width) Δλ TYP	IF	Cut-Off Frequency Fc ※ TYP	IF	Response Time Tr·Tf TYP	IF
AN	1.3	1.5	50	10	5	950	45	50	0.5	50	700	50
BN	1.2	1.5	20	10	4	925	50	20	1.8	20	200	20
CN	1.45	1.8	50	10	5	880	65	50	0.65	50	500	50
DN	1.55	2.0	50	100	5	850	40	50	30	50	10	50
Units	V		mA	μA	V	nm		mA	MHz	mA	nsec	mA

※I FM condition tw≦100 μs, Duty≦1/100

※Fc condition IF=50madc+10m Ap-p(AN, CN, DN), IF=20mAD+4mAp-p(BN)

▼SPECTRAL DISTRIBUTION



Note for infrared LEDs

Among infrared LEDs, those with CN, DN and NR emit in visible range.

▼PACKAGE DIMENSIONS Unit : mm

fig. 4

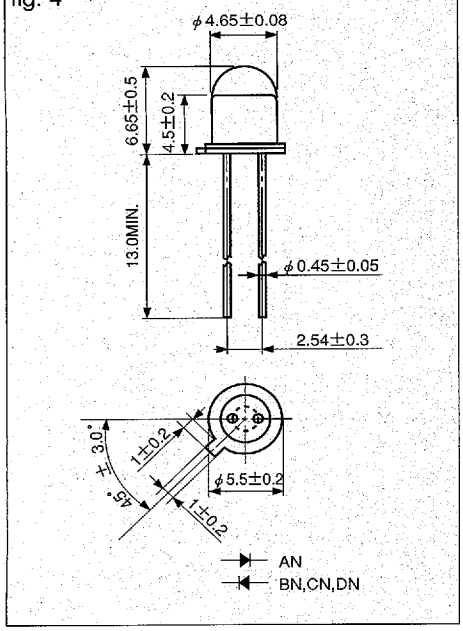


fig. 5

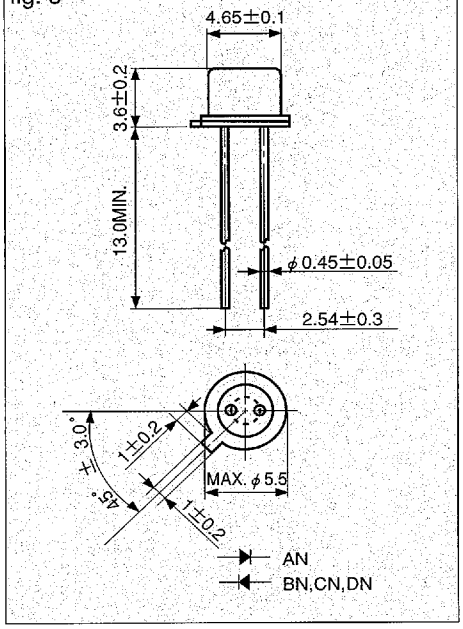
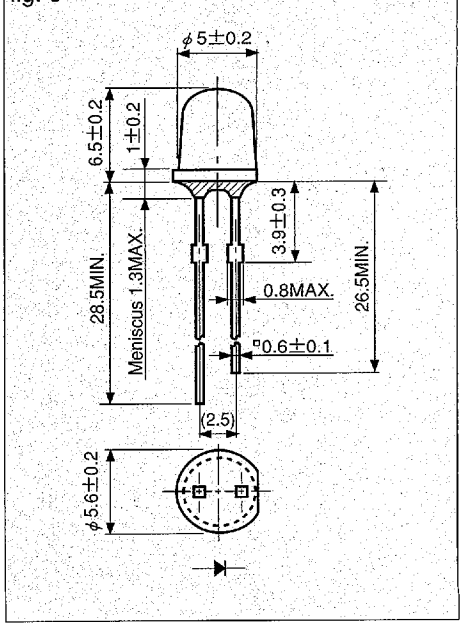
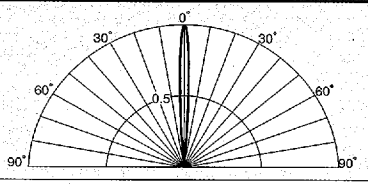
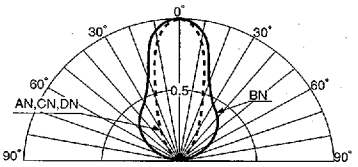
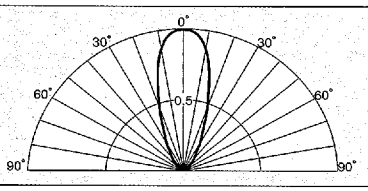
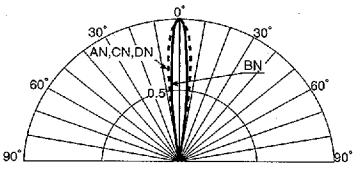


fig. 6



▼CHARACTERISTICS BY SHAPE

Ta=25℃

Shape	Type No.	Peak Wavelength λp		Radiant intensity Ie			Output Power Po		Cut-Off Frequency Fc		Spatial Distribution	fig.
		TYP.	IF	MIN.	TYP.	IF	TYP.	IF	TYP.	IF		
	AN106	950	50	15	25	50	3.5	50	0.5	50		4
	BN106	925	20	2.0	4.0	20	—	—	1.8	20		
	CN106	880	50	20	30	50	4.5	50	0.65	50		
	DN106	850	50	25	70	50	7	50	30	50		
	AN202	950	50	1.5	2.5	50	4	50	0.5	50		5
	BN202	925	20	0.15	0.3	20	—	—	1.8	20		
	CN202	880	50	2.0	3.0	50	5	50	0.65	50		
	DN202	850	50	2.5	4.0	50	8	50	30	50		
	AN304	950	50	6	15	50	9	50	0.5	50		6
	CN304	880	50	10	20	50	9	50	0.65	50		
	DN304	850	50	15	30	50	15	50	30	50		
	AN305	950	50	10	25	50	8	50	0.5	50		7
	BN301	925	20	3	7	20	—	—	1.8	20		8
	CN305	880	50	15	30	50	8	50	0.65	50		7
	DN305	850	50	25	80	50	12	50	30	50		
Unit		nm	mA	mW/sr		mA	mW	mA	MHz	mA		

▼PACKAGE DIMENSIONS Unit : mm

fig. 7

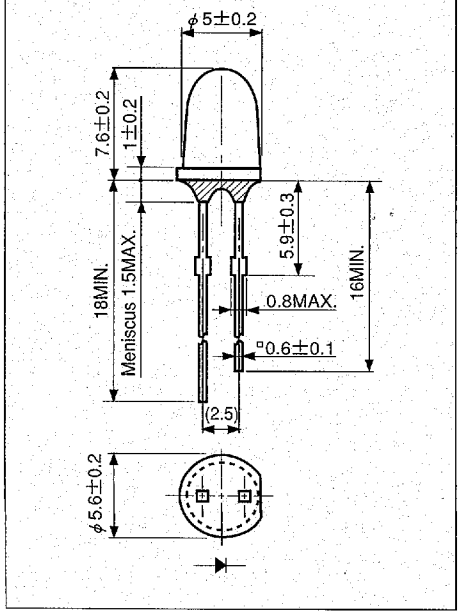
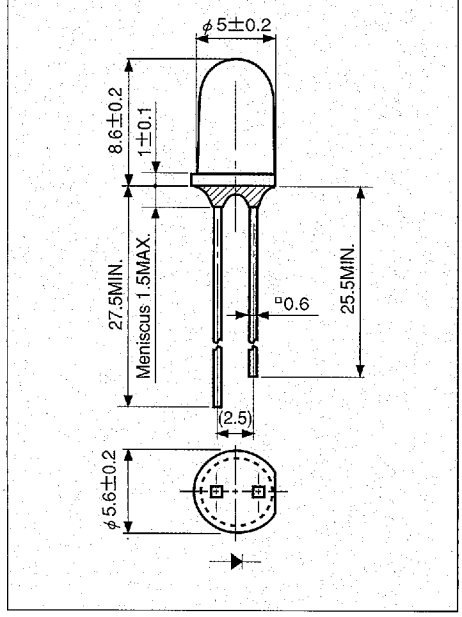


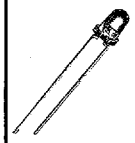
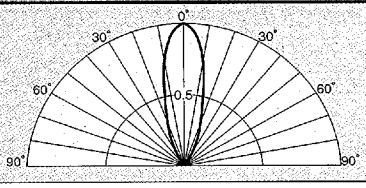
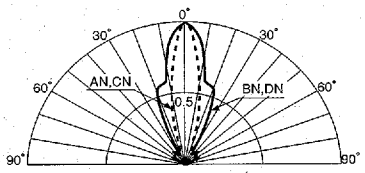
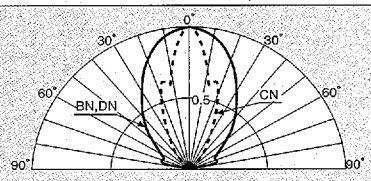
fig. 8



SUPER INTENSITY INFRARED LED

▼CHARACTERISTICS BY SHAPE

Ta=25℃

Shape	Type No.	Peak Wavelength λp		Radiant intensity Ie			Output Power Po		Cut-Off Frequency Fc		Spatial Distribution	fig.
		TYP.	IF	MIN.	TYP.	IF	TYP.	IF	TYP.	IF		
	AN306	950	50	7	14	50	5	50	0.5	50		9
	BN306	925	20	1.3	2.6	20	1	20	1.8	20		
	CN306	880	50	9	18	50	7	50	0.65	50		
	DN319	850	50	10	20	50	8	50	30	50		10
	AN501	950	50	3	5	50	6	50	0.5	50		11
	BN501	925	20	0.5	1.5	20	—	—	1.8	20		
	CN501	880	50	3	6	50	9	50	0.65	50		
	DN501	850	50	5.2	10.4	50	10	50	30	50		
	BN504	925	20	0.5	1	20	—	—	1.8	20		12
	CN504	880	50	3	5	50	7	50	0.65	50		
	DN504	850	50	4	8	50	12	50	30	50		
Units		nm	mA	mW/sr		mA	mW	mA	MHz	mA		

▼PACKAGE DIMENSIONS Unit : mm

fig. 9

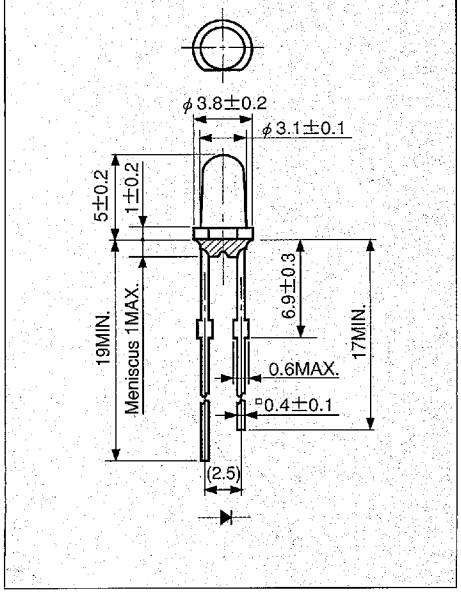


fig. 10

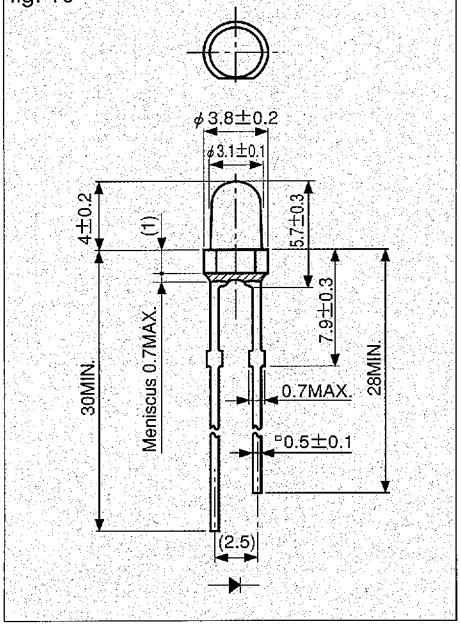
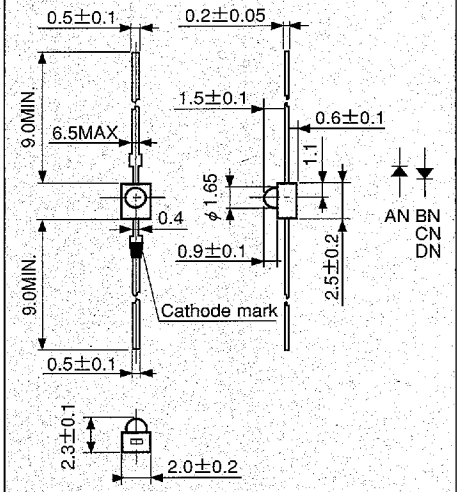
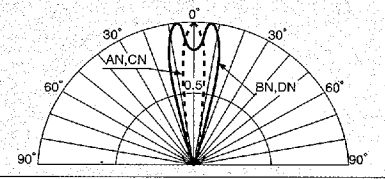
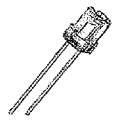
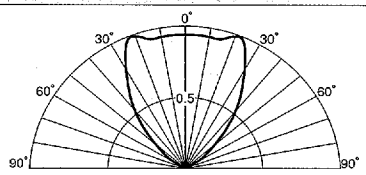
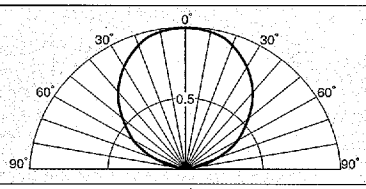
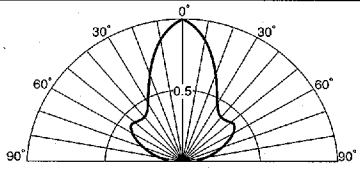


fig. 11



▼CHARACTERISTICS BY SHAPE

Ta=25℃

Shape	Type No.	Peak Wavelength λp		Radiant Intensity Ie			Output Power Po		Cut-Off Frequency Fc		Spatial Distribution	fig.
		TYP.	IF	MIN.	TYP.	IF	TYP.	IF	TYP.	IF		
	AN505	950	50	2	4	50	6	50	0.5	50		13
	BN505	925	20	0.5	1.5	20	—	—	1.8	20		
	CN505	880	50	2.5	5	50	7	50	0.65	50		
	DN505	850	50	4	8	50	12	50	30	50		
	BN511	925	20	0.4	0.8	20	—	—	1.8	20		1
	DN511	850	50	5	9	50	12	50	30	50		
	DN311	850	50	1	3.5	50	10	50	30	50		2
	AN1102W	950	20	0.5	2	20	0.8	20	0.5	20		14
	DN1102W	850	20	0.8	4	20	1.6	20	30	20		
Units		nm	mA	mW/sr		mA	mW	mA	MHz	mA		

▼PACKAGE DIMENSIONS Unit : mm

fig. 12

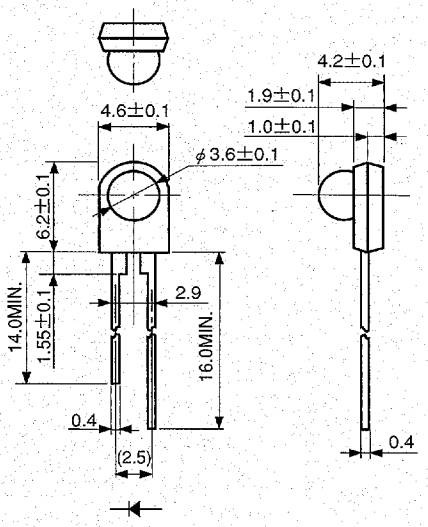


fig. 13

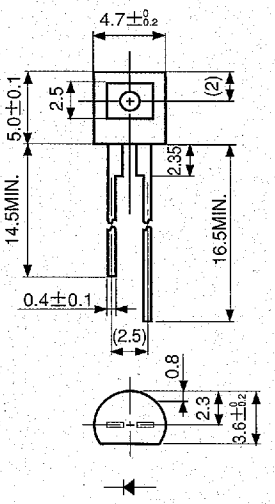
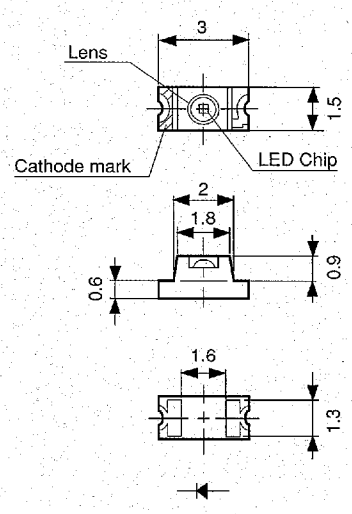


fig. 14



8

■PHOTOTRANSISTOR

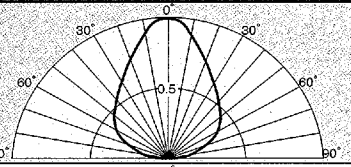
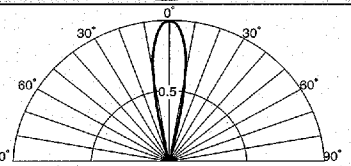
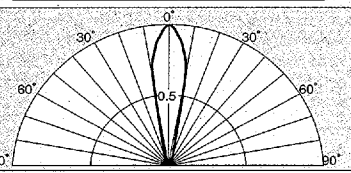
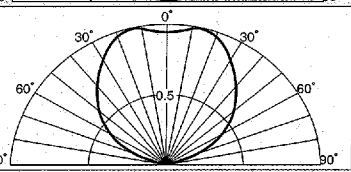
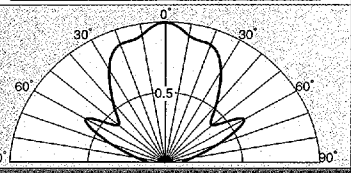
▼CHARACTERISTICS BY MATERIAL

Ta=25℃

Type No.	Type	Absolute Maximum Ratings: Collector Dissipation Pd	Collector-Emitter Breakdown Voltage VCEO	Emitter-Collector Breakdown Voltage VECO	Collector Current Ic	Operating Temp. Topr	Storage Temp. Tstg	Electro-Optical Characteristics: Dark Current ICEO MAX.	ICEO VCE	Response Time Tr·Tf TYP.	VCE	Ic	RL	Peak Sensitive Wavelength λp TYP.
PS	TO-18	150	30	5	50	−30~+125	−30~+150	0.2	10	5	10	2	100	800
PS	502	60	30	5	20	−30~+85	−30~+100	0.2	10	5	10	2	100	800
		100	30	5	30	−30~+85	−30~+100	0.2	10	5	10	2	100	800
PS □□□ 2	TO-18	150	30	5	50	−30~+125	−30~+150	0.2	10	5	10	2	100	880
	502	60	30	5	20	−30~+85	−30~+100	0.2	10	5	10	2	100	880
		100	30	5	30	−30~+85	−30~+100	0.2	10	5	10	2	100	880
PD	TO-18	150	30	5	50	−30~+125	−30~+150	0.2	10	400	10	2	100	800
PD	502	60	30	5	20	−30~+85	−30~+100	0.2	10	400	10	2	100	800
		100	30	5	30	−30~+85	−30~+100	0.2	10	400	10	2	100	800
Units		mW	V	V	mA	℃	℃	μA	V	μsec	V	mA	Ω	nm

▼CHARACTERISTICS BY SHAPE

Ta=25℃

Shape	Type No.	Features	Peak Sensitive Wavelength λp TYP.	Photo Current Ic MIN.	Ic TYP.	Ic VCE	Ic Ee	Spatial Distribution	fig
	PS202	TO-18 can type, flat lens	800	0.6	3	5	10		15
	PS2022		880	0.1	2.5	5	1		
	PD202		800	2	6	5	0.01		
	PS302	φ5 molded epoxy type, high-directivity lens	800	1	5	5	1		16
	PS3022		880	1.5	7	5	1		
	PD302		800	2	12	5	0.01		
	PS3062	φ3 molded epoxy type, high-directivity lens	880	1.2	6	5	1		17
	PD306		800	0.5	2	5	0.01		
	PS3072	φ3 molded epoxy type	880	2	7	5	1		18
	PD307		800	0.8	3	5	0.01		
	PS4032	φ3 molded epoxy type, flat lens	880	1.5	5	5	10		19
	PD403		800	0.5	2	5	0.1		
Units			nm	mA		V	mW/cm²		

▼PACKAGE DIMENSIONS Unit : mm

fig. 15

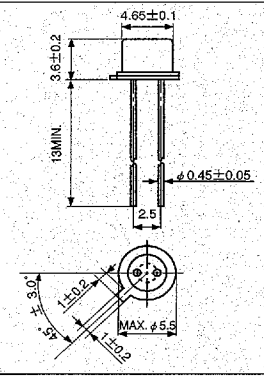


fig. 16

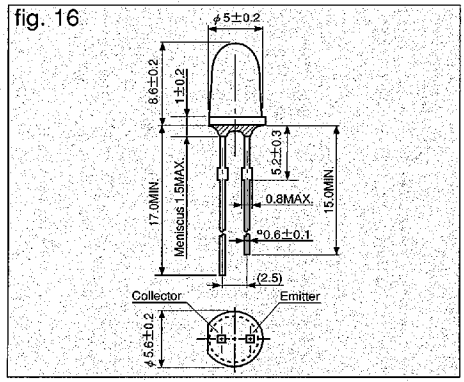
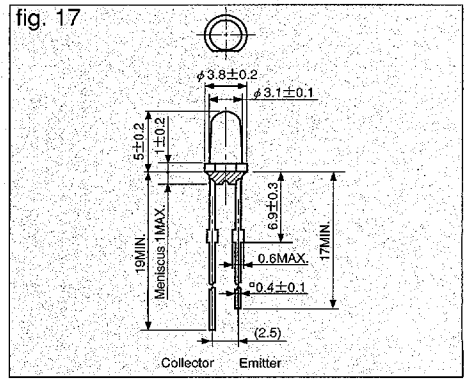
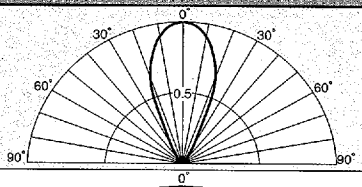
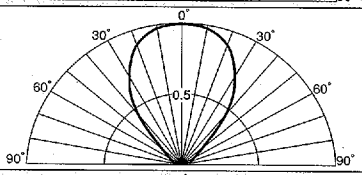
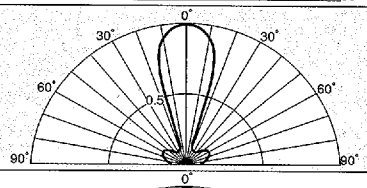
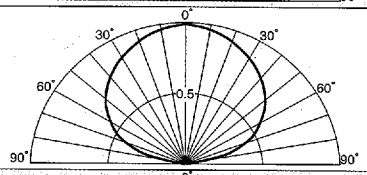
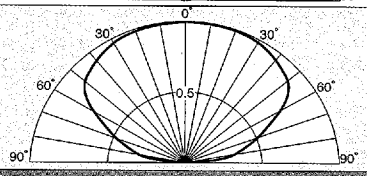


fig. 17



▼CHARACTERISTICS BY SHAPE

Ta=25℃

Shape	Type No.	Features	Peak Sensitive Wavelength λp TYP.	Photo Current Ic MIN.	Ic TYP.	Ic VCE	Ic Ee	Spatial Distribution	fig.
	PS502	φ3.4 axial-lead type	800	3	15	5	10		20
	PS5022		880	0.4	2	5	1		
	PD502		800	1	4	5	0.01		
	PS504	φ3.6 side-view type	800	2	10	5	10		21
	PS5042		880	0.4	1.4	5	1		
	PD504		800	0.5	2	5	0.1		
	PS505	Side-view type, high directivity	800	3	14	5	10		22
	PS5052		880	0.3	1.4	5	1		
	PS5132	φ5 molded epoxy type with high precise flat lens	880	2.1	6.3	5	10		3
	PS1101W	Chip type	880	0.7	3.5	5	5		23
Units			nm		mA	V	mW/cm²		

▼PACKAGE DIMENSIONS Unit : mm

fig. 18

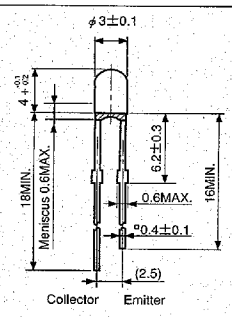


fig. 19

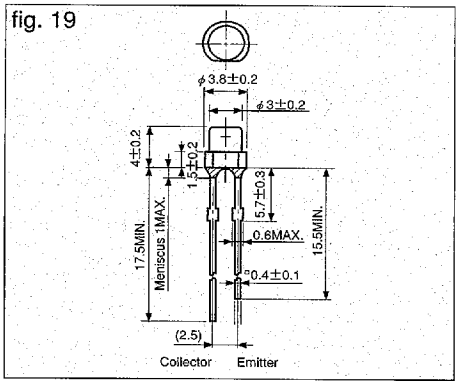


fig. 20

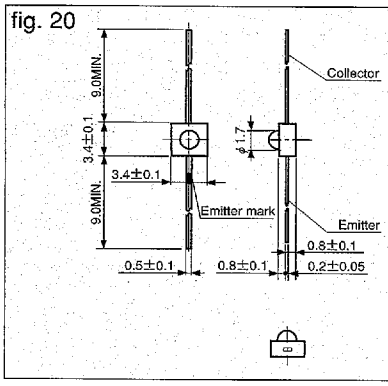


fig. 21

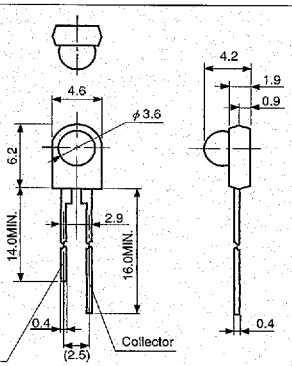


fig. 22

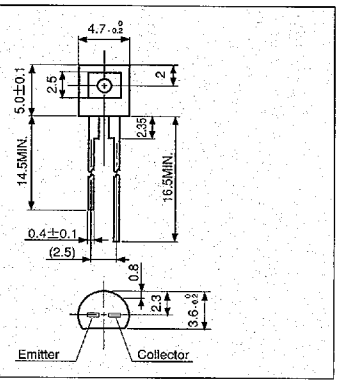
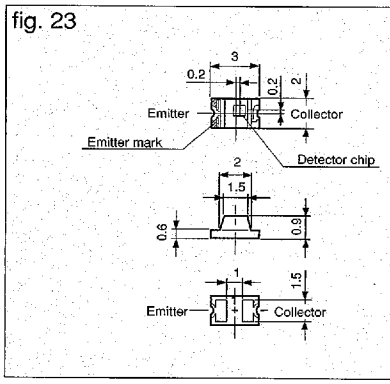


fig. 23



■PIN PHOTODIODE

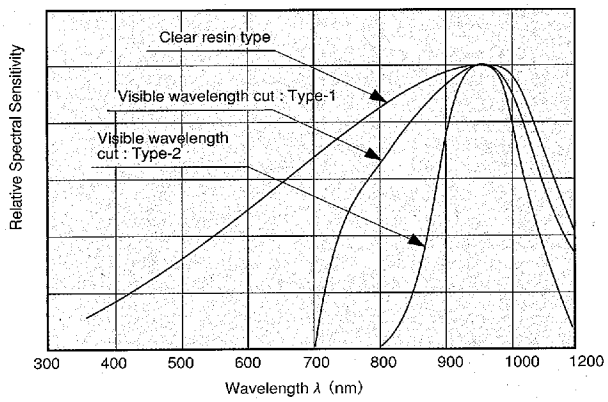
▼CHARACTERISTICS

Ta=25℃

Type No.	Absolute Maximum Ratings				Electro-Optical Characteristics													fig.
	Power Dissipation	Reverse Voltage	Operating Temp.	Storage Temp.	Photo Current I_P			Response Time Tr, Tf			Capacitance C_T			Dark Current I_D		Peak Sensitive Wavelength λ_P		
	Pd	V_R	Topr.	Tstg	TYP.	V_R	Ee ※	TYP.	V_R	RL	TYP.	V_R	f	MAX.	V_R	TYP.	V_R	
PP202	50	80	-30～+100	-30～+125	13	5	5	50	10	1,000	8	10	1	10	10	950	0	24
PP403	75	30	-30～+85	-30～+100	1.5	5	0.5	20	10	1,000	7	10	1	10	10	950	0	25
PP513F	30	30	-30～+85	-30～+100	2.9	5	5	1.4	30	50	20	10	1	10	10	950	0	3
PP506	150	30	-30～+85	-30～+100	6.5	5	0.5	100	10	1,000	13	10	1	30	10	950	0	
PP506-1	150	30	-30～+85	-30～+100	5.5	5	0.5	100	10	1,000	13	10	1	30	10	950	0	26
PP506-2	150	30	-30～+85	-30～+100	3.5	5	0.5	100	10	1,000	13	10	1	30	10	950	0	
PP601	100	30	-30～+85	-30～+100	6	5	0.5	100	10	1,000	25	10	1	30	10	950	0	
PP601-1	100	30	-30～+85	-30～+100	4.8	5	0.5	100	10	1,000	25	10	1	30	10	950	0	27
PP601-2	100	30	-30～+85	-30～+100	3	5	0.5	100	10	1,000	25	10	1	30	10	950	0	
PP602	500	30	-20～+70	-20～+70	440	12	5	200	12	1,000	60	12	1	100	12	950	0	28
PP701	500	30	-20～+70	-20～+70	1100	12	5	200	12	1,000	60	12	1	100	12	950	0	29
PP801	300	12	-20～+70	-20～+70	190	12	5	150	12	1,000	35	12	1	20	12	950	0	30
Units	mW	V	℃		μA	V	mW/cm²	nsec	V	Ω	pF	V	MHz	nA	V	nm	V	

※A standard tungsten filament lamp with 2,856K is used for the color temperature.

▼SPECTRAL SENSITIVITY CHARACTERISTICS



▼PACKAGE DIMENSIONS Unit : mm

fig.24

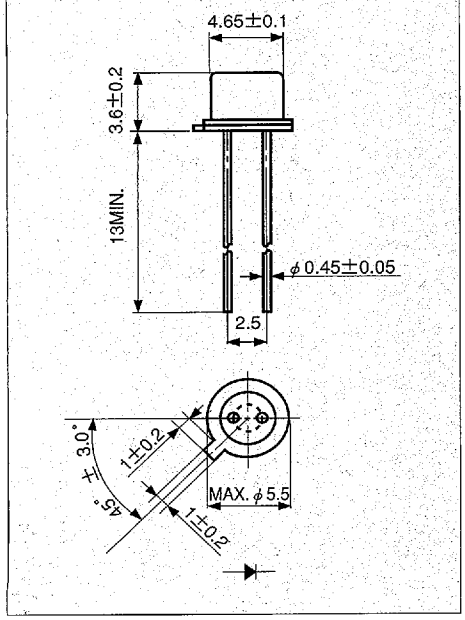


fig.25

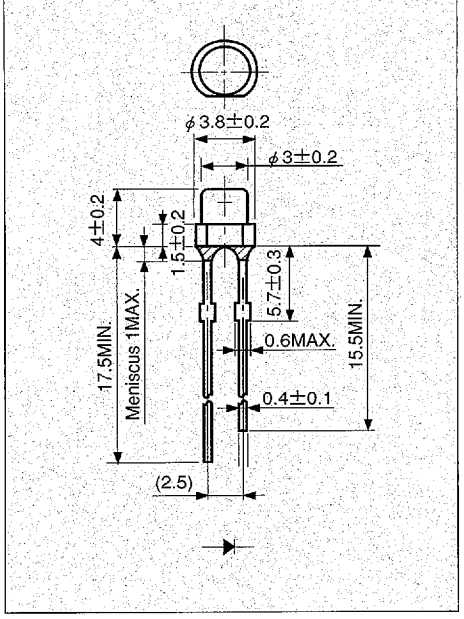
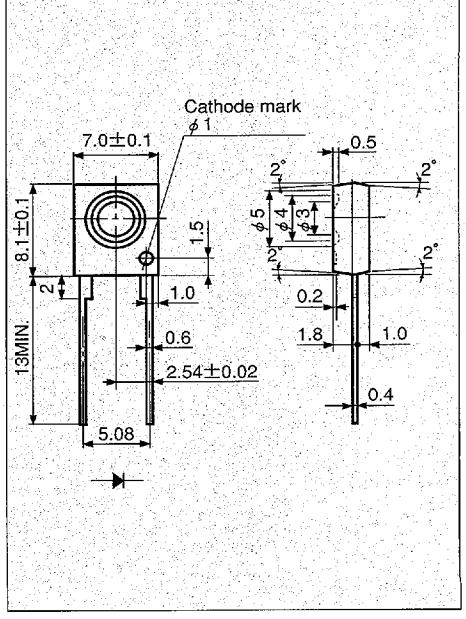


fig.26



▼PACKAGE DIMENSIONS Unit : mm

fig.27

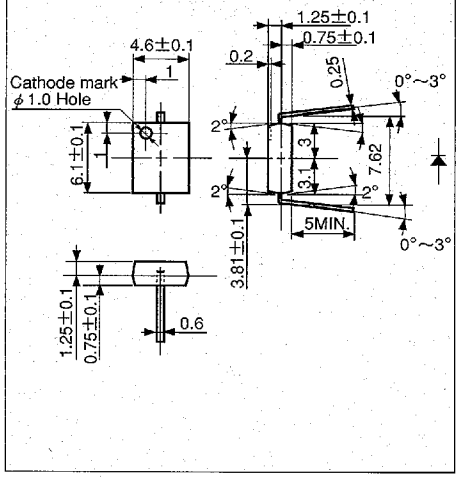


fig.28

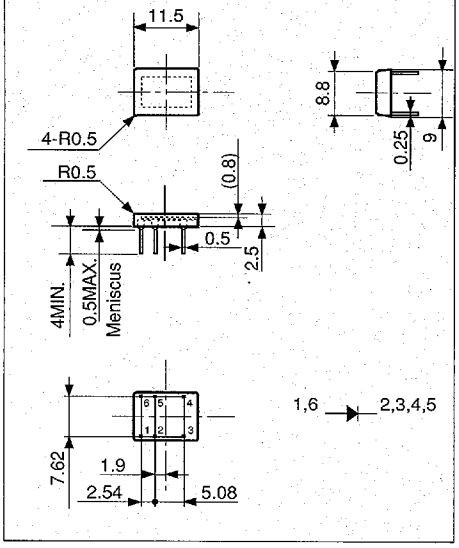


fig.29

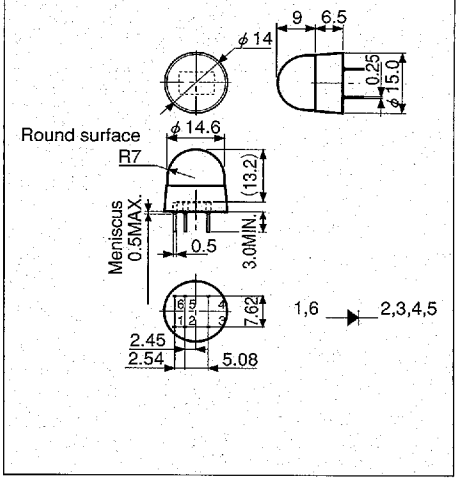
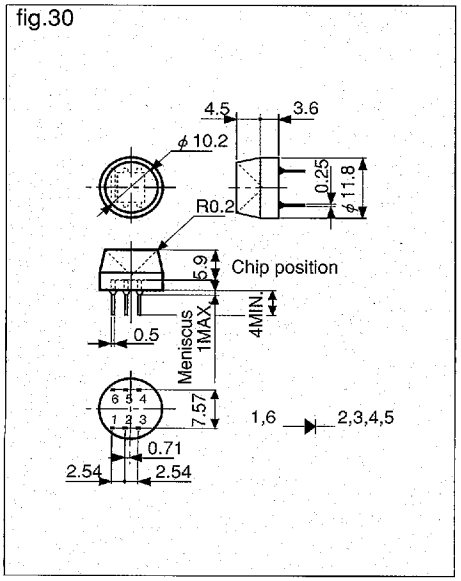
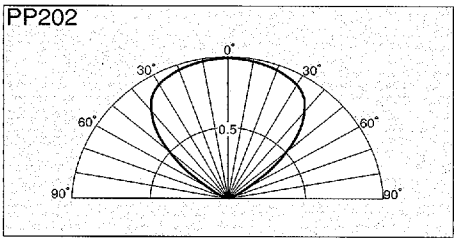


fig.30

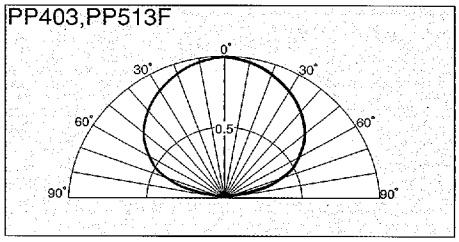


▼SPATIAL DISTRIBUTION

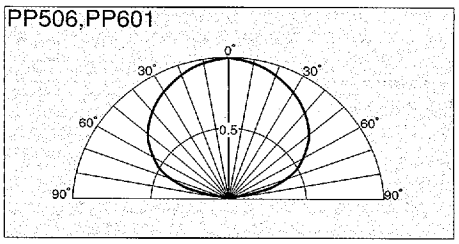
PP202



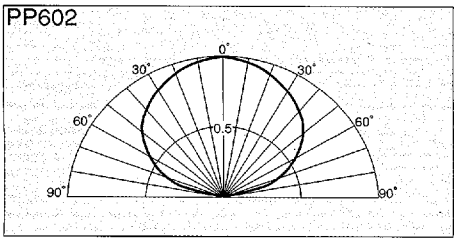
PP403,PP513F



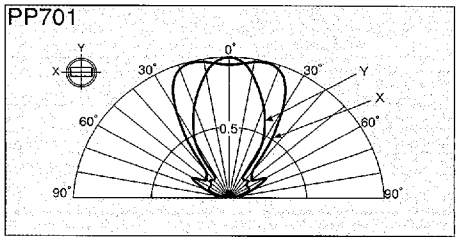
PP506,PP601



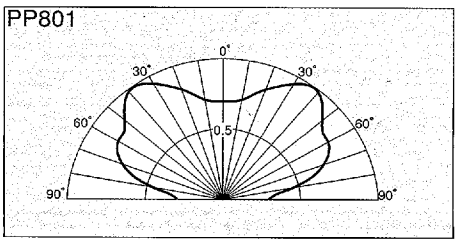
PP602



PP701



PP801



WIRELESS TRANSMISSION DEVICES

Wireless transmission devices include infrared LEDs with a peak wavelength of 850 nm, high intensity outputs of 15 mW (DN304) and 12 mW (DN305), high response time and the frequency of 30 MHz, and pin photo diodes with each size of package. Stanley will satisfy customers' needs for opto-spatial transmission applications such as audio transmission, data transmission LAN, etc.

▼LED DN SERIES

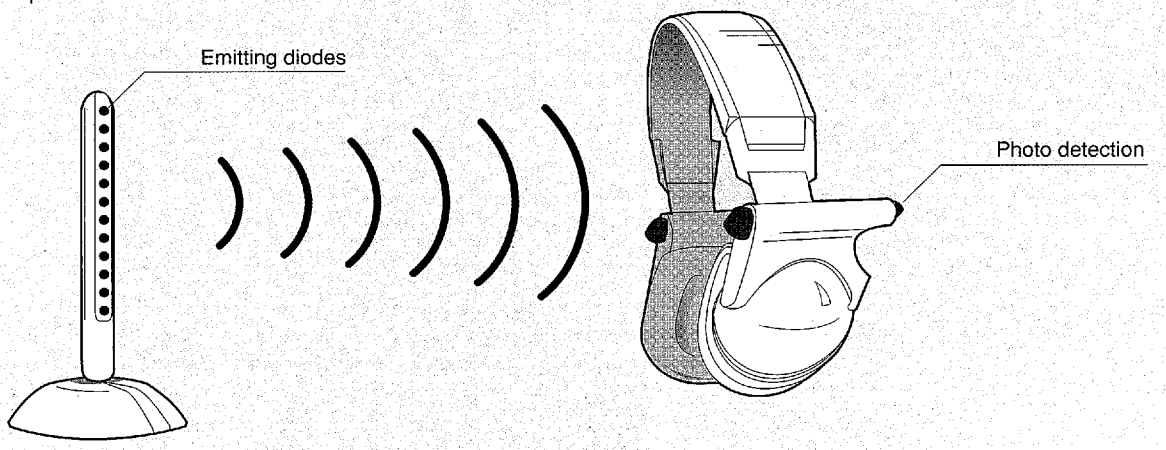
Type No.	Radiant Intenstiy Ie			Photo output Po		Cut-Off Frequency Fc		Features	page
	MIN.	TYP.	IF	TYP.	IF	TYP.	IF		
DN304	15	30	50	15	50	30	50	φ5 package Wide distribution	85
DN305	25	80	50	12	50	30	50	φ5 package Narrow distribution	
Units	mW/sr		mA	mW	mA	MHz	mA		

▼PIN PHOTO DIODE PP SERIES

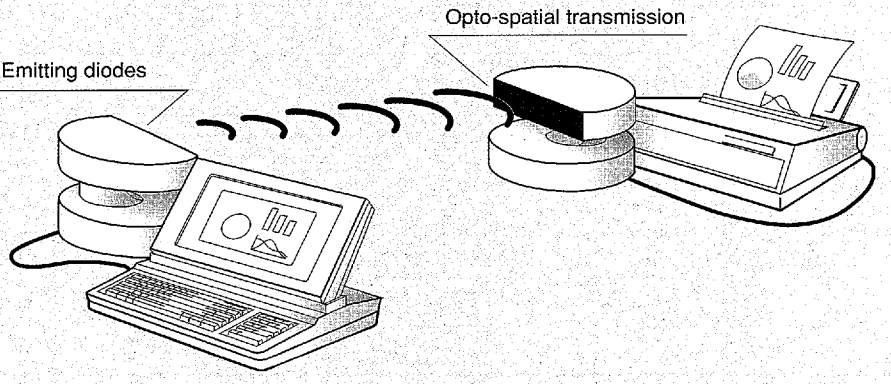
Type No.	Photo Current IP			Response Time Tr · Tf			Capacitance Ct			Detection Area	Features	page
	TYP.	VR	Ee	TYP.	VR	RL	TYP.	VR	f			
PP506-1	5.5	5	0.5	100	10	1000	13	10	1	6.68	Side View / Visible wavelength cut	90
PP601-1	4.8	5	0.5	100	10	1000	25	10	1	6.68	DIP package / Visible wavelength cut	
PP602	440	12	5	200	12	1000	60	12	1	35.9	Flat package / Large side chip	
PP701	1100	12	5	200	12	1000	60	12	1	35.9	Flat package with Lens / Large side chip	
PP801	190	12	5	150	12	1000	35	12	1	19.0	Coneshaped Lens Wide distribution	
Units	μA	V	mW/cm²	nsec	V	Ω	pF	V	MHz	mm²		

▼APPLICATION EXAMPLES

Wireless headphones



Data transmission



■LED USED FOR CAMERAS

LEDs used for cameras have a peak emission wavelength of 720 nm with high-intensity output. Because the LEDs are driven by a high pulse current, they can reach such high outputs. These LEDs are most suitable for auto-focus light sources or auxiliary light sources in the dark or in low ambient lighting conditions.

▼CHARACTERISTICS

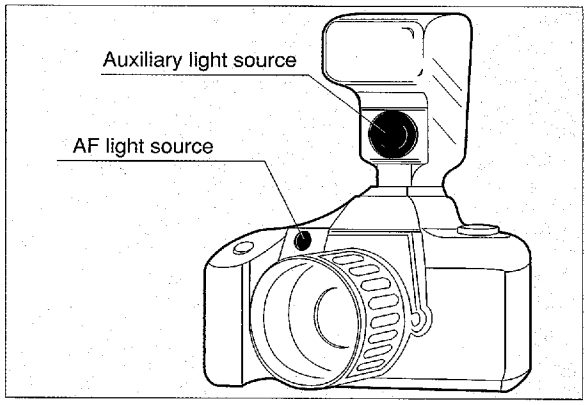
Ta=25℃

Type No.	Material	Absolute Maximum Ratings						
		Power Dissipation Pd	Forward Current I_F	※1 Derating I_F	Peak Foward Current I_{FM}	Reverse Voltage V_R	Operating Temp. Topr	Storage Temp. Tstg
NR312	GaAlAs	200	100	1.33	150	3	-30～+85	-30～+100
NR403AF	GaAlAs	200	100	1.33	450	5	-30～+70	-30～+100
NR513	GaAlAs	200	100	1.33	450	5	-30～+70	-30～+100
Units		mW	mA	mA/℃	mA	V	℃	℃

▼SPECTRAL SENSITIVITY CHARACTERISTICS

Ta=25℃

Type No.	Electro-Optical Characteristics													fig.
	Radiant Intenstiy I_E			Photo output Po		Forward Voltage V_F			Reverse Current I_R		Wavelength λ_P	$\Delta\lambda$		
	MIN.	TYP.	I_F	TYP.	I_F	TYP.	MIN.	I_F	MAX.	V_R	TYP.	TYP.	I_F	
NR312	9.5	19.0	50	15	50	1.9	2.1	50	100	3	695	30	50	31
NR403AF	1.25	1.55	50	17	50	1.75	2.0	50	100	5	720	30	50	32
NR513	1.6	2.0	50	14	50	1.75	2.0	50	100	5	720	30	50	33
Units	mW/sr		mA	mW	mA	V		mA	μA	V	nm		mA	



▼PACKAGE DIMENSIONS Unit : mm

fig.31

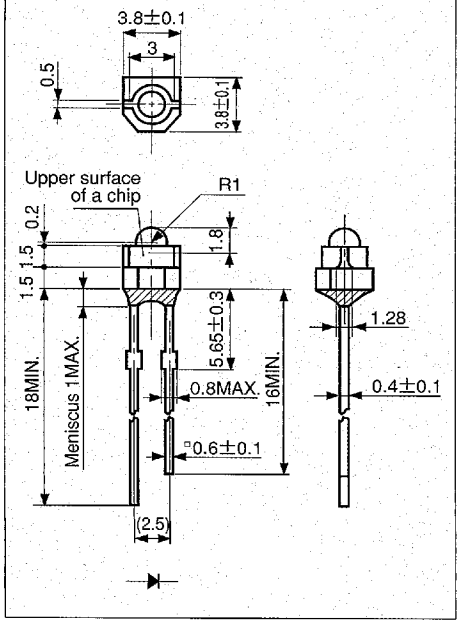


fig.32

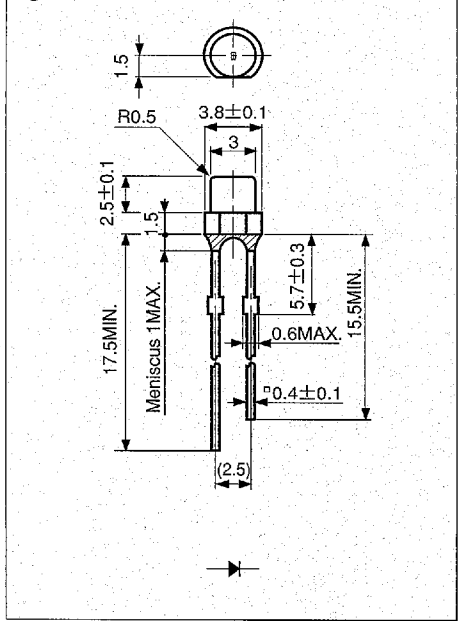


fig.33