

# Optical Semiconductor Devices

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# Visible LEDs

## InGaAlP High-Brightness (Package Size :φ 5)

Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications
	Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)			
Red	1530	4500	6°	TLSU180P	TLSU180P(TU)	623	636	Transparent	30	Pilot lamps (narrow range)
	4760	14000	7°	TLRMJ20TP		626	636	Transparent	50	
	4760	11000		TLRH20TP		613	623	Transparent	50	
	2720	9000		TLRMH20TP		626	636	Transparent	50	
	2720	9000		TLSE20TP		613	623	Transparent	50	
	2720	8000		TLRME20TP		626	636	Transparent	50	
	2720	7000		TLRE20TP		630	644	Transparent	50	
	2720	10000	8°	TLRH180P	TLRH180P(VV)	613	623	Transparent	50	
	1530	8000		TLSE180P		613	623	Transparent	50	
	1530	5000	8°	TLRH180P	TLRH180P(UV)	630	644	Transparent	50	
	850	3000		TLRE180AP	TLRE180AP(TU)	630	644	Transparent	50	
	2720	6500	12°	TLRH38TP		613	623	Transparent	50	
	1530	4800		TLRMH38TP		626	636	Transparent	50	
	2720	7000	15°	TLRMJ38TP		626	636	Transparent	50	
	1530	4200		TLRMH151P		626	636	Transparent	50	
	1530	4500	20°	TLRMJ17TP		626	636	Transparent	50	
	1530	4500		TLRH17TP		613	623	Transparent	50	
	850	3200		TLRMH17TP		626	636	Transparent	50	
	850	3000		TLSE17TP		613	623	Transparent	50	
	850	2400		TLRME17TP		626	636	Transparent	50	
	476	1500		TLRE17TP		630	644	Transparent	50	
	272	900		TLSU156P	TLSU156P(QR)	623	636	Transparent	30	
	85	270		TLRE138P		630	644	Red, diffusing	50	
	850	2700	22°	TLRH157P	TLRH157P(ST)	613	623	Transparent	50	
	850	2240		TLRMH157P		626	636	Transparent	50	
	476	1900		TLSE157P	TLSE157P(ST)	613	623	Transparent	50	
	476	1700		TLRH157P	TLRH157P(ST)	630	644	Transparent	50	
	272	1000	25°	TLRE157AP	TLRE157AP(RS)	630	644	Transparent	50	
	850	1900		TLRH16TP		613	623	Transparent	50	
	476	1500		TLRMH16TP		626	636	Transparent	50	
	476	1500		TLSE16TP		613	623	Transparent	50	
	476	1000		TLSE16CP		613	623	Red, transparent	50	
	476	900		TLRMH156P		626	636	Transparent	50	
	272	1200		TLRME16TP		626	636	Transparent	50	
	272	800		TLRE16TP		630	644	Transparent	50	
	153	600	30°	TLRE16CP		630	644	Red, transparent	50	
	153	500		TLRME17DP		626	636	Red, diffusing	50	
	476	1400		TLRH156P	TLRH156P(RS)	613	623	Transparent	50	
	850	2100		TLRMJ16TP		626	636	Transparent	50	
	272	900		TLSE156P	TLSE156P(RS)	613	623	Transparent	50	
272	800	TLRH156P		TLRH156P(QR)	630	644	Transparent	50		
153	550	TLSU113P			623	636	Red, transparent	30		
153	450	TLRE156AP		TLRE156AP(PQ)	630	644	Transparent	50		
272	650	35°	TLRMH265P		626	636	Milky-white, diffusing	50		
47.6	250		40°	TLSU114P	TLSU114P(NP)	623	636	Red, diffusing	30	
47.6	150	75°	TLRE25TP		613	644	Transparent	50		
27.2	80	90°	TLRE263AP	TLRE263AP(MN)	630	644	Transparent	50		
8.5	20	130°	TLRE11TP		613	644	Transparent	50		
8.5	15	150°	TLRE261AP		630	644	Transparent	50		
Orange	2720	7000	6°	TLOU180P	TLOU180P(UV)	605	612	Transparent	30	Pilot lamps (narrow range)
	4760	15000	7°	TLOH20TP		605	612	Transparent	50	
	4760	10000		TLOE20TP		605	612	Transparent	50	
	2720	10000	8°	TLOH180P	TLOH180P(VV)	605	612	Transparent	50	
	1530	7000		TLOE180AP	TLOE180AP(UV)	605	612	Transparent	50	
	2720	7500	12°	TLOH38TP		605	612	Transparent	50	
	1530	5000		TLOH17TP		605	612	Transparent	50	
	1530	4500	20°	TLOE17TP		605	612	Transparent	50	
	476	900		TLOU156P	TLOU156P(RS)	605	612	Transparent	30	
	476	800	22°	TLOU172P		605	612	Orange, transparent	30	
	850	2800		TLOH157P	TLOH157P(TU)	605	612	Transparent	50	
	476	2800	25°	TLOE157AP	TLOE157AP(ST)	605	612	Transparent	50	
	850	2300		TLOH16TP		605	612	Transparent	50	
	850	2000		TLOE16TP		605	612	Transparent	50	
476	1600	TLOE16CP			605	612	Orange, transparent	50		

Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications
	Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)			
Orange	476	1500	30°	TLOH156P	TLOH156P(ST)	605	612	Transparent	50	Message boards Back lighting
	272	1000		TLOE156AP	TLOE156AP(RS)	605	612	Transparent	50	
	272	900		TLOU113P	TLOU113P(RS)	605	612	Orange, transparent	30	
	272	900		TLOE266	TLOE266(RS)	605	612	Orange, transparent	50	
	47.6	250	40°	TLOU114P	TLOU114P(NP)	605	612	Orange, diffusing	30	Back lighting (wide range)
	153	350	75°	TLOE25TP		605	612	Transparent	50	
	47.6	260	90°	TLOE263AP	TLOE263AP(PQ)	605	612	Transparent	50	
	27.2	65	130°	TLOE11TP		605	612	Transparent	50	
15.3	50	150°	TLOE261AP	TLOE261AP(LM)	605	612	Transparent	50		
Yellow	850	4300	6°	TLYU180P	TLYU180P(TU)	587	590	Transparent	30	Pilot lamps (narrow range)
	4760	13000	7°	TLYH20TP		587	590	Transparent	50	
	2720	9500		TLYE20TP		587	590	Transparent	50	
	2720	8000	8°	TLYH180P	TLYH180P(VW)	587	590	Transparent	50	
	1530	4700		TLYE180AP	TLYE180AP(UV)	587	590	Transparent	50	
	2720	7000	12°	TLYH38TP		587	590	Transparent	50	
	2200	4500	15°	TLYH151P		587	590	Transparent	50	
	1530	4800	20°	TLYH177P		587	590	Transparent	50	
	850	3000		TLYE177P		587	590	Transparent	50	
	153	500		TLYU156P	TLYU156P(QR)	587	590	Transparent	30	
	153	400		TLYU172P		587	590	Yellow, transparent	30	
	850	2500	22°	TLYH157P	TLYH157P(TU)	587	590	Transparent	50	
	476	2200		TLYE157AP	TLYE157AP(ST)	587	590	Transparent	50	
	850	2200	25°	TLYH16TP		587	590	Transparent	50	
	476	1500		TLYE16TP		587	590	Transparent	50	
	476	1200		TLYE16CP		587	590	Yellow, transparent	50	
	476	1400	30°	TLYH156P	TLYH156P(RS)	587	590	Transparent	50	
	272	700		TLYE156AP	TLYE156AP(QR)	587	590	Transparent	50	
	153	500		TLYU113P		587	590	Yellow, transparent	30	
	47.6	130	40°	TLYU114P	TLYU114P(MN)	587	590	Yellow, diffusing	30	
	85	300	75°	TLYE25TP		587	590	Transparent	50	
	47.6	170	90°	TLYE263AP	TLYE263AP(NP)	587	590	Transparent	50	
	15.3	45	130°	TLYE11TP		587	590	Transparent	50	
	8.5	27	150°	TLYE261AP	TLYE261AP(JK)	587	590	Transparent	50	
Pure yellow	2720	8000	5°	TLPYE23TP		580	583	Transparent	50	Pilot lamps (narrow range)
	476	2000	18°	TLPYE19TP		580	583	Transparent	50	Message boards Back lighting
	272	750	30°	TLPYE18TP		580	583	Transparent	50	
Green	2720	7000	5°	TLGE23TP		571	574	Transparent	50	Pilot lamps (narrow range)
	1530	4000		TLGU23TP		571	574	Transparent	30	
	1530	5000	7°	TLGE183P		571	574	Transparent	50	
	476	1300	18°	TLGE19TP		571	574	Transparent	50	
	476	1700	20°	TLGE159P	TLGE159P(ST)	571	574	Transparent	50	
	476	1400		TLGE174P		571	574	Green, transparent	50	
	272	800	28°	TLGE158P	TLGE158P(QR)	571	574	Transparent	50	
	272	700	30°	TLGE18TP		571	574	Transparent	50	
	153	500		TLGE18CP		571	574	Green, transparent	50	
	85	200		TLGU18TP		571	574	Transparent	30	
	47.6	180		TLGU18CP		571	574	Green, transparent	30	
	47.6	120	45°	TLGU13CP		571	574	Green, transparent	30	
	27.2	70	55°	TLGU13DP		571	574	Green, diffusing	30	
	27.2	90	75°	TLGE25TP		571	574	Transparent	50	
8.5	20	130°	TLGE11TP		571	574	Transparent	50		
Green (New Color)	1530	5000	5°	TLFGE23TP		565	568	Transparent	50	Pilot lamps (narrow range)
	272	800	18°	TLFGE19TP		565	568	Transparent	50	Message boards Back lighting
	85	300	30°	TLFGE18TP		565	568	Transparent	50	
Pure green	850	3000	5°	TLPGE23TP		558	562	Transparent	50	Pilot lamps (narrow range)
	476	1600		TLPGU23TP		558	562	Transparent	30	
	476	2000	7°	TLPGE183P	TLPGE183P(ST)	558	562	Transparent	50	
	153	500	18°	TLPGE19TP		558	562	Transparent	50	
	153	430	20°	TLPGE159P		558	562	Transparent	50	
	85	150	28°	TLPGE158P		558	562	Transparent	50	
	85	200	30°	TLPGE18TP		558	562	Transparent	50	
	27.2	90		TLPGU18TP		558	562	Transparent	30	
	27.2	80	45°	TLPGU13CP		558	562	Green, transparent	30	
	15.3	35	55°	TLPGU13DP		558	562	Green, diffusing	30	
2.72	8	130°	TLPGE11TP		558	562	Transparent	50	Back lighting (wide range)	

InGaAlP High-Brightness (Package Size :φ 3)

Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications
	Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)			
Red	476	4000	9°	TLSU163		623	636	Pale red, transparent	30	Pilot lamps
	476	1600		TLSU160		623	636	Transparent	30	
	2720	4500		TLSH160		613	623	Transparent	50	
	850	1800	10°	TLRH160	TLRH160(ST)	630	644	Transparent	50	
	476	1200		TLRE160A	TLRE160A(RS)	630	644	Transparent	50	
	1530	3500		TLSE50T		613	623	Transparent	50	
	850	2200	16°	TLRME50T		626	636	Transparent	50	
	850	1800		TLRE50T		630	644	Transparent	50	
	153	450	18°	TLSU164		623	636	Pale red, diffusing	30	
	153	300	35°	TLSU125	TLSU125(PQ)	623	636	Transparent	30	
	85	270		TLSU123	TLSU123(PQ)	623	636	Red, transparent	30	
	272	800	40°	TLSH125		613	623	Transparent	50	
	85	180		TLSU126		623	636	Milky-white, diffusing	30	
	47.6	100		TLSU124	TLSU124(MN)	623	636	Red, diffusing	30	
	272	800	45°	TLSE53T		613	623	Transparent	50	
	272	600		TLRME53T		626	636	Transparent	50	
	153	400		TLRE53T		630	644	Transparent	50	
	47.6	170	60°	TLSU262	TLSU262(NP)	623	636	Transparent	30	
	85	330		TLRME68TG◆		626	636	Transparent	50	
	85	220	80°	TLRH262	TLRH262(NP)	630	644	Transparent	50	
85	200	TLSE62T			613	623	Transparent	50		
47.6	180	TLRME62T			626	636	Transparent	50		
47.6	150	TLRE262A		TLRE262A(MN)	630	644	Transparent	50		
47.6	130	TLSU268G◆			623	636	Transparent	30		
47.6	120	TLRE62T			630	644	Transparent	50		
15.3	45	120°	TLRE60T		630	644	Transparent	50		
8.5	25	140°	TLRE260A		630	644	Transparent	50		
Orange	476	2500	9°	TLOU160		605	612	Transparent	30	Pilot lamps
	850	2300	10°	TLOH160	TLOH160(TU)	605	612	Transparent	50	
	476	1500		TLOE160A	TLOE160A(ST)	605	612	Transparent	50	
	1530	4500	16°	TLOE50T		605	612	Transparent	50	
	85	400	35°	TLOU123		605	612	Orange, transparent	30	
	47.6	180	40°	TLOU124		605	612	Orange, diffusing	30	
	272	1000	45°	TLOE53T		605	612	Transparent	50	
	47.6	300		TLOU262	TLOU262(PQ)	605	612	Transparent	30	
	47.6	200	60°	TLOU267		605	612	Orange, transparent	30	
	153	450	80°	TLOH262	TLOH262(PQ)	605	612	Transparent	50	
	153	350		TLOE62T		605	612	Transparent	50	
	85	300		TLOE262A	TLOE262A(PQ)	605	612	Transparent	50	
27.2	100	120°		TLOE60T		605	612	Transparent	50	
15.3	70	140°	TLOE260A	TLOE260A(LM)	605	612	Transparent	50		
Yellow	476	1500	9°	TLYU160	TLYU160(ST)	587	590	Transparent	30	Pilot lamps
	850	4300	10°	TLYH160	TLYH160(TU)	587	590	Transparent	50	
	476	2300		TLYE160A	TLYE160A(ST)	587	590	Transparent	50	
	1530	3500	16°	TLYE50T		587	590	Transparent	50	
	85	220	35°	TLYU123	TLYU123(NP)	587	590	Yellow, transparent	30	
	47.6	110	40°	TLYU124	TLYU124(MN)	587	590	Yellow, diffusing	30	
	272	800	45°	TLYE53T		587	590	Transparent	50	
	47.6	150		TLYU262	TLYU262(MN)	587	590	Transparent	30	
	47.6	90	60°	TLYU267		587	590	Yellow, transparent	30	
	85	340		TLYE68TG◆		587	590	Transparent	50	
	85	280	80°	TLYH262	TLYH262(PQ)	587	590	Transparent	50	
	85	250		TLYE62T		587	590	Transparent	50	
	85	240		TLYE262A	TLYE262A(NP)	587	590	Transparent	50	
27.2	85	120°		TLYE60T		587	590	Transparent	50	
15.3	40	140°	TLYE260A	TLYE260A(KL)	587	590	Transparent	50		
Pure yellow (New Color)	850	2500	16°	TLPYE50T		580	583	Transparent	50	Pilot lamps
	153	450	45°	TLPYE53T		580	583	Transparent	50	
	47.6	150	80°	TLPYE62T		580	583	Transparent	50	Back lighting (wide range)

◆: Mount flush with PCB

Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications	
	Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)				
Green	850	2400	9°	TLGE160	TLGE160(TU)	571	574	Transparent	50	Pilot lamps	
	476	1200	10°	TLGU50T		571	574	Transparent	30		
	476	1500	16°	TLGE50T		571	574	Transparent	50		
	153	500	35°	TLGE125	TLGE125(QR)	571	574	Transparent	50		
	153	450		TLGE123	TLGE123(PQ)	571	574	Green, transparent	50		
	47.6	170	40°	TLGU53T		571	574	Transparent	30		
	47.6	150		TLGU53C		571	574	Green, transparent	30		
	153	400	45°	TLGE53T		571	574	Transparent	50		
	27.2	80	50°	TLGU53D		571	574	Green, diffusing	30		
	47.6	220	65°	TLGE262	TLGE262(NP)	571	574	Transparent	50		Back lighting (wide range)
	27.2	70	80°	TLGU62T		571	574	Transparent	30		
	47.6	155		TLGE68TG◆		571	574	Transparent	50		
	47.6	110		TLGE62T		571	574	Transparent	50		
	15.3	50	120°	TLGE60T		571	574	Transparent	50		
8.5	45	TLGE260		TLGE260(KL)	571	574	Transparent	50			
Green (New Color)	272	1000	16°	TLFGE50T		565	568	Transparent	50	Pilot lamps	
	85	200	45°	TLFGE53T		565	568	Transparent	50	Back lighting (wide range)	
	27.2	70	80°	TLFGE62T		565	568	Transparent	50		
Pure green	272	450	9°	TLPGE160		558	562	Transparent	50	Pilot lamps	
	153	450	10°	TLPGU50T		558	562	Transparent	30		
	153	600	16°	TLPGE50T		558	562	Transparent	50		
	47.6	150	35°	TLPGE125		558	562	Transparent	50		
	27.2	80	40°	TLPGU53T		558	562	Transparent	30		
	27.2	70		TLPGU53C		558	562	Green, transparent	30		
	47.6	130	45°	TLPGE53T		558	562	Transparent	50		
	15.3	40	50°	TLPGU53D		558	562	Green, diffusing	30	Back lighting (wide range)	
	15.3	45	65°	TLPGE262		558	562	Transparent	50		
	15.3	45	80°	TLPGE62T		558	562	Transparent	50		
8.5	25	TLPGU62T			558	562	Transparent	30			

◆ : Mount flush with PCB

### InGaAlP High-Brightness (Package Size :φ 10, Elliptical)

Package size (mm)	Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications
		Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)			
φ10	Red	4760	19000	4°	TLRH190P	TLRH190P(WX)	630	644	Transparent	50	Traffic light
	Orange	8500	33000		TLOH190P	TLOH190P(XY)	605	612	Transparent	50	
	Yellow	8500	30000		TLYH190P	TLYH190P(XY)	587	590	Transparent	50	
Elliptical 5 × 5.8	Red	476	1200	30°/50°	TLRMJ27T		626	636	Transparent	50	Message boards
		272	750		TLSE27C		613	623	Red, transparent	50	
		153	400		TLRME27C		626	636	Red, transparent	50	
		85	300	30°/60°	TLRE27C		630	644	Red, transparent	50	
		153	450		TLRH247	TLRH247(PQ)	630	644	Transparent	50	
		85	350		TLRE248		630	644	Red, transparent	50	
	Orange	85	450	30°/45°	TLOU248		605	612	Orange, transparent	30	
		272	800	30°/50°	TLOE27C		605	612	Orange, transparent	50	
		153	370	30°/60°	TLOE248		605	612	Orange, transparent	50	
	Yellow	272	650	30°/50°	TLYE27C		587	590	Yellow, transparent	50	
		153	700	30°/60°	TLYH247	TLYH247(QR)	587	590	Transparent	50	
	Green	85	250	30°/50°	TLGE27C		571	574	Green, transparent	50	
			180		TLGU27C		571	574	Green, transparent	30	
		153	400	30°/60°	TLGE247	TLGE247(PQ)	571	574	Transparent	50	
360		TLGE248			571	574	Green, transparent	50			
Pure green	27.2	90		TLPGE247	TLPGE247(LM)	558	562	Transparent	50		

### InGaAlP High-Brightness (Bi-Color)

Package size (mm)	Color of Emitted Light	Intensity Iv (mcd) @IF = 20 mA		Viewing Angle 2θ1/2	Product Number		Typical Emitting Wavelength		Lens Type	Maximum DC Forward Current Rating IF (mA) @Ta = 25°C	Typical Applications
		Min	Typ.		Open Rank	Rank Specified	λd (nm)	λp (nm)			
φ5	Red/Green	476/272	1100/500	30°/30°	TLRMHGH48T		626/571	636/574	Transparent	50 (Total)	Message boards
φ7.5	Red/Green	476/272	1200/450	35°/35°	TLRMHGH88T		626/571	636/574	Transparent	50 (Total)	

### InGaAlP Surface-Mount LED Lamps : 1.6 × 0.8 mm size

Package (mm)	Color of Emitted Light	Product No.	Luminous Intensity typ. (mcd) @20 mA	Viewing Angle typ. (°)	Packing Type (embossed taping)
1.6(L)×0.8(W)×0.6(H) (PCB type)	Red	⇧ TLRE1008A(T04)/(T05)	70	100-140	Taping No.: T04 4-mm pitch 4000pcs/reel  Taping No.: T05 2-mm pitch 8000pcs/reel
	Red	⇧ TLSE1008A(T04)/(T05)	140		
	Orange	⇧ TLOE1008A(T04)/(T05)	180		
	Yellow	⇧ TLYE1008A(T04)/(T05)	105		
	Pure yellow	⇧ TLPYE1008A(T04)/(T05)	70		
	Green	⇧ TLGE1008A(T04)/(T05)	70		
	Green	⇧ TLFGE1008A(T04)/(T05)	40		
	Pure green	⇧ TLPGE1008A(T04)/(T05)	18		
	Red	⇧ TLSU1008A(T04)/(T05)	60		
	Orange	⇧ TLOU1008A(T04)/(T05)	78		
	Amber	⇧ TLAU1008A(T04)/(T05)	30		
	Yellow	⇧ TLYU1008A(T04)/(T05)	30		
	Green	⇧ TLGU1008A(T04)/(T05)	30		
	Pure green	⇧ TLPGU1008A(T04)/(T05)	6		
1.6(L)×0.8(W)×0.6(H) (ESC type)	Red	⇧ TLRMV1020(T14)/(T15)	Δ15	140-160	Taping No.: T14 4-mm pitch 4000pcs/reel  Taping No.: T15 2-mm pitch 8000pcs/reel
	Red	⇧ TLSV1020(T14)/(T15)	Δ30		
	Orange	⇧ TLOV1020(T14)/(T15)	Δ38		
	Yellow	⇧ TLYV1020(T14)/(T15)	Δ25		
	Green	⇧ TLGV1020(T14)/(T15)	Δ14		
	Pure green	⇧ TLPGV1020(T14)/(T15)	Δ3.5		
	Red	⇧ TLSU1020(T14)/(T15)	70		
	Orange	⇧ TLOU1020(T14)/(T15)	85		
	Yellow	⇧ TLYU1020(T14)/(T15)	60		
	Green	⇧ TLGU1020(T14)/(T15)	18		

⇧: Dry-packed product

Δ: @IF = 5mA

### InGaAlP Surface-Mount LED Lamps : 2.0 × 1.25 mm size

Package (mm)	Color of Emitted Light	Product No.	Luminous Intensity typ. (mcd) @20 mA	Viewing Angle typ. (°)	Packing Type (embossed taping)
2.0(L)×1.25(W)×1.1(H) (PCB type)	Red	⇧ TLRE1002A(T02)	70	120-140	Taping No.: T02 4-mm pitch 3000pcs/reel
	Red	⇧ TLSE1002A(T02)	140		
	Orange	⇧ TLOE1002A(T02)	180		
	Yellow	⇧ TLYE1002A(T02)	105		
	Pure yellow	⇧ TLPYE1002A(T02)	70		
	Green	⇧ TLGE1002A(T02)	70		
	Green	⇧ TLFGE1002A(T02)	40		
	Pure green	⇧ TLPGE1002A(T02)	18		
	Red	⇧ TLRU1002A(T02)	45		
	Red	⇧ TLSU1002A(T02)	60		
	Orange	⇧ TLOU1002A(T02)	78		
	Amber	⇧ TLAU1002A(T02)	30		
	Yellow	⇧ TLYU1002A(T02)	30		
	Green	⇧ TLGU1002A(T02)	30		
	Pure green	⇧ TLPGU1002A(T02)	6		

⇧: Dry-packed product

### InGaAlP Surface-Mount LED Lamps : 3.2 × 2.4 mm size with φ 2 lens

Package (mm)	Color of Emitted Light	Product No.	Luminous Intensity typ. (mcd) @20 mA	Viewing Angle typ. (°)	Packing Type (embossed taping)
3.2(L)×2.4(W)×2.4(H) with φ2 lens	Red	◇ TLRE1005B(T03)	450	30-40	Taping No.: T03 4-mm pitch 1000pcs/reel
	Red	◇ TLSE1005B(T03)	1000		
	Orange	◇ TLOE1005B(T03)	1500		
	Yellow	◇ TLYE1005B(T03)	850		
	Pure yellow	◇ TLPYE1005B(T03)	350		
	Green	◇ TLGE1005B(T03)	350		
	Green	◇ TLFGE1005B(T03)	250		
Pure green	◇ TLPGE1005B(T03)	130			

◇: Dry-packed product

### InGaAlP Surface-Mount LED Lamps : 3.2 × 2.8 mm size

Package (mm)	Color of Emitted Light	Product No.	Luminous Intensity typ. (mcd) @20 mA	Viewing Angle typ. (°)	Packing Type (embossed taping)
3.2(L)×2.8(W)×1.9(H)	Red	◇ TLRMH1100A(T11)	150	120	Taping No.: T11 4-mm pitch 2000pcs/reel
	Red	◇ TLSH1100A(T11)	260		
	Orange	◇ TLOH1100A(T11)	270		
	Yellow	◇ TLYH1100A(T11)	220		
	Red	◇ TLRE1100(T11)	100		
	Red	◇ TLSE1100(T11)	180		
	Orange	◇ TLOE1100(T11)	180		Taping No.: T11 4-mm pitch 2000pcs/reel
	Yellow	◇ TLYE1100(T11)	150		
	Green	◇ TLGE1100(T11)	100		
	Pure green	◇ TLPGE1100(T11)	25		
	White	◇ TLWA1100	100		
	Blue	◇ TLBC1100	45		
	Green	◇ TLEGC1100	180		

◇: Dry-packed product

### InGaAlP Surface-Mount LED Lamps : 3.2 × 2.8 mm size with φ 2.8 lens

Package (mm)	Color of Emitted Light	Product No.	Luminous Intensity typ. (mcd) @20 mA	Viewing Angle typ. (°)	Packing Type (embossed taping)
3.2(L)×2.8(W)×3.4(H) with φ2.8 lens	Red	◇ TLRE1102(T10)	320	65	Taping No.: T10 8-mm pitch 500pcs/reel
	Red	◇ TLSE1102(T10)	600		
	Orange	◇ TLOE1102(T10)	650		
	Yellow	◇ TLYE1102(T10)	480		
	Green	◇ TLGE1102(T10)	300		
	Pure green	◇ TLPGE1102(T10)	75		

◇: Dry-packed product

# Photo Couplers

## Phototransistor Output Devices

Product No.	Pin Configuration	Features	CTR (%)			@If (mA), VCE (V)	VCE0 (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>												
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO								
4N25 (SHORT)		JEDEC type 4N25 (short) can be used in place of products 25A to 28.	-	20	-	10, 10	30	2500	○												
4N25A (SHORT)			JEDEC type 4N35 (short) can be used in place of products 36 and 37.	-	100									-	80	○					
4N26 (SHORT)				JEDEC type 4N38 (short) can be used in place of 4N38A (short).	-									10							
4N27 (SHORT)			Mini-flat Low input current	-	100	1200	1, 0.5	80	3750	○											
TLP124				BV	200										±1, 0.5	○					
TLP126			Mini-flat AC input Low input current	-	100	1200	±5, 5														○
				GB	100	○															
TLP130			Mini-flat AC input Internal base connection	-	50		600												5, 5	○	
	GB			100	○																
TLP131	Mini-flat Internal base connection		-	50													600	1, 0.5	○		
TLP137	Mini-flat Low input current Internal base connection		GB	100	1200	5, 5	○														
		BV	200	○																	
TLP180	Mini-flat AC input	-	50		600	5, 5	○					○ <sup>(6)</sup>	Δ <sup>(6)</sup>	○							
		GB	100	○																	
TLP181 <sup>(2)</sup>	Mini-flat Standard	-	50			600	5, 5				○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○							
		GB	100	300																	
		GR	100																		

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standards

Note 2: TLP181 is manufactured in Thailand by Toshiba Semiconductor Thailand as well as in Japan.

Note 6: VDE0884-approved with option (V4)



Product No.	Pin Configuration	Features	CTR (%)			@If (mA), VCE (V)	VCE0 (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO
TLP280		Half-pitch mini-flat Lead pitch = 1.27 mm AC input	-	50	600	±5, 5	80	2500	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○	
			GB	100									
TLP280-4		Half-pitch mini-flat 4-ch type Lead pitch = 1.27 mm AC input	-	50	600	±5, 5	80	2500	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○	
			GB	100									
TLP281		Half-pitch mini-flat Lead pitch = 1.27 mm	-	50	600	5, 5	80	2500	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○	
			GB	100									
TLP281-4		Half-pitch mini-flat 4-ch type Lead pitch = 1.27 mm	-	50	600	5, 5	80	2500	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○	
			GB	100									
* TLP283		Half-pitch mini-flat Low input current High speed	-	100	400	1, 5	100	2500	Δ				
* TLP283-4		Four TLP283 channels	-	100	400	1, 5	100	2500	Δ				
TLP320		4-pin small package AC input 150-mA If rating	-	20	80	±100, 1	55	5000					
TLP320-2		Two TLP320 channels	-	20	80	±100, 1	55	5000					
TLP320-4		Four TLP320 channels	-	20	80	±100, 1	55	5000	○				
TLP321		4-pin small package High VCE0	-	50	600	5, 5	80	5000					
			GB	100									
TLP321-2		Two TLP321 channels	-	50	600	5, 5	80	5000					
			GB	100									
TLP321-4		Four TLP321 channels	-	50	600	5, 5	80	5000					
			GB	100									
TLP330		150-mA If rating AC input Internal base connection	-	20	80	±100, 1	55	5000	○				

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standards

Note 6: VDE0884-approved with option (V4)

\*: New product

Phototransistor Output Devices (continued)

Product No.	Pin Configuration	Features	CTR (%)			@I <sub>F</sub> (mA), V <sub>CE</sub> (V)	V <sub>CEO</sub> (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>							
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO			
TLP331		Low input current Internal base connection	-	100	1200	1, 0.5	55	5000	○							
			BV	200												
TLP332		Low input current No internal base connection	-	100	600	5, 5	80	5000	○	○ <sup>(4)</sup>	△ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
			BV	200												
TLP421 TLP421F		4-pin small package VDE0884 approved with option (D4) SEMKO-approved	-	50	600	5, 5	80	5000	○	○ <sup>(4)</sup>	△ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
			GB	100												
			GR	100												
TLP504A		Standard	-	50	600	5, 5	55	2500	○							
			GB	100												
TLP521-1 <sup>(2)</sup>		4-pin small package Standard	A	50	600	5, 5	55	2500	○							
			GB	100												
			BL	200												
			YG	50												
			GR	100												
			GRL	100												
			GRH	150												
			Y	50												
TLP521-2 <sup>(2)</sup>		Two TLP521-1channels	A	50	600	5, 5	55	2500	○							
			GB	100												
			GR	100												
			BL	200												
TLP521-4		Four TLP521-1channels	A	50	600	5, 5	55	2500	○							
			GB	100												
TLP620 <sup>(2)</sup>		AC input 4-pin small package VDE0884 approved with option (D4) SEMKO-approved	-	50	600	±5, 5	55	5000	○	△ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
TLP620F <sup>(2)</sup>															GB	100
															GR	100
TLP620-2 <sup>(2)</sup>		Two TLP620 channels SEMKO-approved	-	50	600	±5, 5	55	5000	○	△ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
			GB	100												
TLP620-4		Four TLP620 channels	-	50	600	±5, 5	55	5000	○	△ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
			GB	100												

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol △ : Design which meets safety standards

Note 2: TLP521-1 and TLP620 are manufactured in Thailand by Toshiba Semiconductor Thailand as well as in Japan.

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

Product No.	Pin Configuration	Features	CTR (%)			@I <sub>F</sub> (mA), V <sub>CE</sub> (V)	V <sub>CEO</sub> (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>																					
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO																	
TLP621 <sup>(2)</sup>		4-pin small package VDE0884-approved with option (D4) SEMKO-approved	-	50	600	5, 5	55	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>																	
TLP621F <sup>(2)</sup>			GB	100																										
			BL	200																										
			YG	50	300																									
			GR	100																										
			GRL	100										200																
			GRH	150	300																									
	Y	50	150																											
TLP621-2		Two TLP621 channels VDE0884-approved with option (D4) SEMKO-approved	-	50	600	1, 0.5	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>	○ <sup>(5)</sup>																		
	GB	100																												
	GR	100	300																											
TLP621-4		Four TLP621 channels VDE0884-approved with option (D4)	-	50	600									1, 0.5	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>	○ <sup>(5)</sup>										
	GB	100																												
TLP624		4-pin small package Low input current	-	100	1200																	1, 0.5	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>	○ <sup>(5)</sup>		
			BV	200																										
TLP624-2		Two TLP624 channels	-	100		200	1, 0.5	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>	○ <sup>(5)</sup>																	
	BV	200																												
TLP624-4		Four TLP624 channels	-	100		200																								
	BV	200																												

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standards

Note 2: TLP621 is manufactured in Thailand by Toshiba Semiconductor Thailand as well as in Japan.

Note 3: VDE0884

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

### Phototransistor Output Devices (continued)

Product No.	Pin Configuration	Features	CTR (%)			@If (mA), VCE (V)	VCE0 (V)	BVs (Vrms)	Safety Standards <sup>(1)</sup>					
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO	
TLP626		4-pin small package AC input Low input current	-	100										
			BV	200										
TLP626-2		Two TLP626 channels	-	100	1200	±1, 0.5	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>	○ <sup>(5)</sup>		
			BV	200										
TLP626-4		Four TLP626 channels	-	100										
			BV	200										
TLP628		4-pin small package High VCE0 (350-V)	-	50										
			GB	100										
TLP628-2		Two TLP628 channels	-	50	600	5, 5	350	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>			
			GB	100										
TLP628-4		Four TLP628 channels	-	50										
			GB	100										
TLP629		4-pin small package 150-mA If rating DC input	-											
TLP629-2		Two TLP629 channels	-	20	80	100, 1	55	5000	○	Δ <sup>(3)</sup>	Δ <sup>(3)</sup>			
TLP629-4		Four TLP629 channels	-											
TLP630		Standard AC input Internal base connection	-	50	600	±5, 5	55	5000	○					
			GB	100										

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standards

Note 3: VDE0884

Note 5: BS EN60065, BS EN60950

Product No.	Pin Configuration	Features	CTR (%)			@I <sub>F</sub> (mA), V <sub>CE</sub> (V)	V <sub>CEO</sub> (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
			Rank	Min	Max				UL	TUV	VDE	BSI	SEMKO
TLP631		Standard High isolation Internal base connection	-	50	600	5, 5	55	5000	○				
			GB	100									
			BL	200									
			YG	50									
			GR	100									
TLP632		Standard No internal base connection	-	50	600	5, 5	55	5000	○				
			GB	100									
			BL	200									
			YG	50									
			GR	100									
TLP731		VDE0884-approved with option (D4)	-	50	600	5, 5	55	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
			GB	100									
TLP732		VDE0884-approved with option (D4) No internal base connection	-	50	600	5, 5	55	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
			GB	100									
TLP733 TLP733F		VDE0884-approved with option (D4) SEMKO-approved	-	50	600	5, 5	55	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
			GB	100									
			GR	100									
TLP734 TLP734F		VDE0884-approved with option (D4) SEMKO-approved No internal base connection	-	50	600	5, 5	55	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
			GB	100									
			GR	100									
CNY17-2		Direct replacement for CNY17 Series	-	63	125	10, 5	70	2500	Δ				
CNY17-3			-	100	200								
CNY17-4			-	160	320								

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

## Diode Output Device

Product No.	Pin Configuration	Features	CTR (%)		I <sub>LEAK</sub> (nA)		V <sub>KAO</sub> (V)	Safety Standards <sup>(1)</sup>					
			Min	@I <sub>F</sub> (mA)	Max	@V <sub>KA</sub> (V)		UL	TUV	VDE	BSI	SEMKO	
TLP722		4-pin small package High-speed SEMKO-approved	0.1	10	50	10	30	○	○ <sup>(4)</sup>	Δ <sup>(4)</sup>			○ <sup>(7)</sup>

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 7: SS EN60065, SS EN60950

# Photodarlington Transistor Output Devices

Product No.	Pin Configuration	Features	CTR (%)		V <sub>CE</sub> (sat) (V)		V <sub>CEO</sub> (V)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
			Min	@ I <sub>F</sub> (mA), V <sub>CE</sub> (V)	Max	@ I <sub>C</sub> (mA), I <sub>F</sub> (mA)			UL	TUV	VDE	BSI	SEMKO
4N29 (SHORT)		JEDEC type 4N29 (short) can be used in place of products 29A to 31.	100	10, 10	1.0	2, 8	30	2500	○				
4N29A (SHORT)			50		1.2								
4N30 (SHORT)													
4N31 (SHORT)		JEDEC type 4N32 (short) can be used in place of products 32A and 33.	500	1.0									
4N32 (SHORT)													
4N32A (SHORT)													
4N33 (SHORT)													
TLP127		Mini-flat High V <sub>CEO</sub>	1000	1, 1	1.2	100, 10	300	2500	○	○ <sup>(6)</sup>	Δ <sup>(6)</sup>	○ <sup>(5)</sup>	
TLP371		High V <sub>CEO</sub>	1000	1, 1	1.2	100, 10	300	5000	○				
TLP372	High V <sub>CEO</sub> No internal base connection												
TLP523		4-pin small package General-purpose	500	1, 1	1.0	50, 10	55	2500	○				
TLP523-2	Two TLP523 channels												
TLP523-4	Four TLP523 channels												
TLP627 <sup>(2)</sup>		High V <sub>CEO</sub> 4-pin small package	1000	1, 1	1.2	100, 10	300	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP627-2 <sup>(2)</sup>	Two TLP627 channels												
TLP627-4	Four TLP627 channels												
TLP627A		High V <sub>CEO</sub> 4-pin small package	1500	1, 1.2	1.2	100, 10	350	5000	○	Δ	Δ	Δ	Δ

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 2: TLP627 is manufactured in Thailand by Toshiba Semiconductor Thailand, as well as in Japan.

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 6: VDE0884-approved with option (V4)

Note 7: SS EN60065, SS EN60950

## Photodiode Output Devices

Product No.	Pin Configuration	Features	IFT		V <sub>TM</sub>		V <sub>DRM</sub> (V)	BVs (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
			Max (mA)	Max (V)	@I <sub>TM</sub> (mA)	UL			TUV	VDE	BSI	SEMKO	
TLP141G		Mini-flat General-purpose	10	1.3	100	400	2500	○					
TLP541G		Standard	7	1.3	100	400	2500	○					
TLP741G		VDE0884-approved with option (D4)	10	1.3	100	400	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>	
TLP741J						600							
TLP747G		VDE0884-approved with option (D4) SEMKO-approved	15	1.3	100	400	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>	
TLP747JF						600							

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

# Phototriac Output Devices

Product No.	Pin Configuration	Features	IFT		V <sub>TM</sub>		V <sub>DRM</sub> (V)	BVs (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>									
			Rank	Max (mA)	Max (V)	@I <sub>TM</sub> (mA)			UL	TUV	VDE	BSI	SEMKO					
TLP160G		Mini-flat Non-zero-voltage turn-on	-	10	2.8	70	400	2500	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>							
TLP160J/165J		Mini-flat High V <sub>DRM</sub> ● VDE0884-registered with option (V4)	-	10										IFT7	7	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>
TLP161G		Mini-flat Zero-voltage turn-on	-	10			IFT7		7	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>						
TLP161J/166J		Mini-flat High V <sub>DRM</sub> ● VDE0884-registered with option (V4)	-	10			IFT7		7	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>						
TLP168J		Mini-flat Zero-voltage turn-on Extra-low IFT	-	3						○								
TLP260J		Mini-flat High V <sub>DRM</sub> ● VDE0884-registered with option (V4)	-	10						3000	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>					
TLP525G		4-pin small package																
TLP525G-2		Two TLP525G channels	-	10			3.0		100	400	2500	○						
TLP525G-4		Four TLP525G channels																
TLP560G		Non-zero-voltage turn-on Standard	-	10			3.0		100	400	2500	○						
TLP560J		Low IFT	-	10	IFT7	7		600										
TLP561G		Standard Low IFT	-	10	IFT7	7		400		○								
TLP561J		Zero-voltage turn-on	-	10	IFT5	5		600										
TLP762J		Non-zero-voltage turn-on VDE0884-approved with option (D4) SEMKO-approved	-	10	3.0	100		600		4000						○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>
TLP762JF																		
TLP763J		VDE0884-approved with option (D4) SEMKO-approved	-	10	3.0	100	600	4000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>					
TLP763JF		Zero-voltage turn-on																

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 6: VDE0884-approved with option (V4): TLP165J/TLP166J

Note 7: SS EN60065, SS EN60950



Product No.	Pin Configuration	Features	IFT		V <sub>TM</sub>		V <sub>DRM</sub> (V)	BVs (Vrms)	Safety Standards <sup>(1)</sup>				
			Rank	Max (mA)	Max (V)	@I <sub>TM</sub> (mA)			UL	TUV	VDE	BSI	SEMKO
TLP3022 (S)		Short package Direct replacement for XXX3020/3021/3022	-	10	3.0	100	400	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP3023 (S)		Short package Direct replacement for XXX3023	-	5									
TLP3042 (S)		Short package Direct replacement for XXX3040/3041/3042	-	10	3.0	100	400	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP3043 (S)		Short package Direct replacement for XXX3043	-	5									
TLP3051 (S)		Short package Direct replacement for XXX3050/3051	-	15	3.0	100	600	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP3052 (S)		Short package Direct replacement for XXX3052	-	10									
TLP3062 (S)		Short package Direct replacement for XXX3060/3061/3062	-	10	3.0	100	600	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP3063 (S)		Short package Direct replacement for XXX3063	-	5									
TLP3064 (S)		Short package Extra-low IFT	-	3									

Note 1: In the safety standard column:

Symbol ○ : Approved

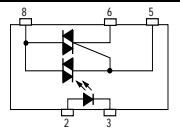
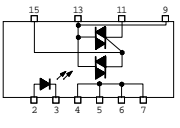
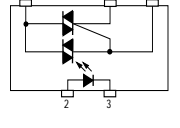
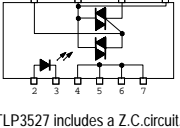
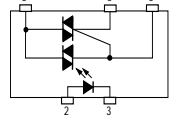
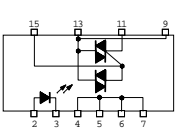
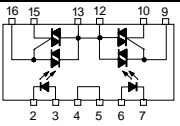
Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

## AC Power Output (photocoupled relay) Devices

Product No.	Pin Configuration	Features	IFT		ITM	V <sub>DRM</sub> (V)	BVs (Vrms)	Safety Standards <sup>(1)</sup>				
			Rank	Max (mA)	@Ta = 40°C (Arms)			UL	TUV	VDE	BSI	SEMKO
TLP3502	 <p>TLP3503 includes a Z.C.circuit.</p>	Direct control up to 0.5-Arms load Zero-voltage turn-on (TLP3503)	-	10	0.5	400	2500	○				
TLP3503			IFT7	7								
			IFT5	5								
TLP3520	 <p>TLP3521 includes a Z.C.circuit.</p>	Direct control up to 1.0-Arms load Zero-voltage turn-on (TLP3521)	-	10	1.0	400	2500	○				
TLP3521			IFT7	7								
			IFT5	5								
TLP3506	 <p>TLP3507 includes a Z.C.circuit.</p>	Direct control up to 0.5-Arms load Zero-voltage turn-on (TLP3507)	-	10	0.5	600	2500	○				
TLP3507												
TLP3526	 <p>TLP3527 includes a Z.C.circuit.</p>	Direct control up to 1.0-Arms load Zero-voltage turn-on (TLP3527)	-	10	1.0	600	2500	○				
TLP3527												
TLP3502A		Direct control up to 0.6-Arms load	-	10	0.6	400	2500	○				
			IFT7	7								
			IFT5	5								
TLP3520A		Direct control up to 1.2-Arms load	-	10	1.2	400	2500	○				
			IFT7	7								
			IFT5	5								
TLP3530		Two-channel type { 1.0 A <sub>rms</sub> [for 1 ch] { 1.4 A <sub>rms</sub> [for 2 ch]	-	10	1.0 [for 1 channel] 1.4 [for 2 channels]	400	2500	○				

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Z.C.: Zero-cross

# Photo-IC Output Devices

Product No.	Pin Configuration	Features	Data Rate (NRZ) (typ.)	CTR		BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
					@I <sub>F</sub> (mA)		UL	TUV	VDE	BSI	SEMKO
6N135		Standard	1 Mbit/s	7% min	16	2500	○				
6N136				19% min							
6N137		High speed	10 Mbits/s	700% typ.	5		○				
6N138		High CTR	300 Kbits/s	300% min	1.6		○				
6N139				400% min							
TLP112		Mini-flat High speed	1 Mbit/s	10% min	16		○				
TLP112A		Mini-flat High CTR		20% min							
TLP113		Mini-flat High speed	10 Mbits/s	Open-collector	10						
TLP114A		Mini-flat High CMR	1 Mbit/s	20% min	16		○	○ <sup>(6)</sup>	Δ <sup>(6)</sup>		
TLP114A (IGM)				25% min							
TLP115		Mini-flat High CMR	10 Mbits/s	Open-collector	10	○					
TLP115A		Mini-flat Low input current High CMR									5
TLP250		Medium-power IGBT/MOSFET Direct drive VDE0884-approved with option (D4)	0.2 μs	±0.5 Apeak (min)	5	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>			
TLP250F											2500
TLP251		Low-power IGBT/MOSFET Direct drive VDE0884-approved with option (D4)	0.3 μs	±0.1 Apeak (min)	5	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>			
TLP251F											2500
* TLP351		Low-power IGBT/MOSFET Direct drive Low supply current	0.3 μs	±0.2 Apeak (min)	5	○	Δ				
* TLP351F											3750
TLP550		Standard	1 Mbit/s	10% min (19% min for rank O)	16	○					
TLP557		Giant transistor direct drive	1 μs	0.25-A constant current output	5	○					

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 6: VDE0884-approved with option (V4)

\*: New product

Photo-IC Output Devices (continued)

Product No.	Pin Configuration	Features	Data Rate (NRZ) (typ.)	CTR	@If (mA)	BV <sub>s</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
							UL	TUV	VDE	BSI	SEMKO
TLP558		3-state output Low input Inverter logic	5 Mbits/s	3-state output	1.6	2500	○				
TLP559		Internal shield High CMR	1 Mbit/s	20% min	16		○				
TLP559 (IGM)				25% min	10						
TLP651		High isolation Base connection	1 Mbit/s	10% min (19% min for rank O)	16	5000	○				
TLP750		IEC 950 satisfied VDE0884-approved with option (D4)	1 Mbit/s	10% min (19% min for rank O)	16		○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP751		Base connection IEC 65 satisfied VDE0884-approved with option (D4)	1 Mbit/s	4% min	16	○					
TLP759/759F		Internal shield IEC 950 satisfied VDE0884-approved with option (D4)	1 Mbit/s	20% min	16	5000	○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	Δ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP759 (IGM) 759F (IGM)				25% min	10						
TLP2200		3-state output Low input Buffer logic	5 Mbit/s	3-state output	1.6	2500	○				
TLP2530		Dual-channel version of 6N135	1 Mbit/s	7% min	16		○				
TLP2531			Dual-channel version of 6N136	1 Mbit/s	19% min	16	○				
TLP2601		High CMR High speed	10 Mbit/s	Open-collector	5	○					
TLP2630		Dual-channel version of 6N137	10 Mbit/s	Open-collector	5	○					
TLP2631		High CMR Dual-channel version of TLP2601	10 Mbit/s	Open-collector	5	○					

Note 1: In the safety standard column:

Symbol ○ : Approved

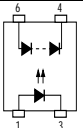
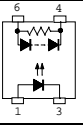
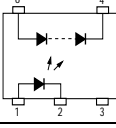
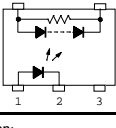
Symbol Δ : Design which meets safety standard

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

## Photovoltaic Output Devices

Product No.	Pin Configuration	Features	Short-Circuit Current ( $\mu\text{A}$ )			Open Voltage Voc (V)		BVs (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>				
			Rank	Min	@I <sub>f</sub> (mA)	Min	@I <sub>f</sub> (mA)		UL	TUV	VDE	BSI	SEMKO
TLP190B		Mini-flat High output current	–	12	10	7	10	2500	○				
TLP191B		Mini-flat High output current Internal shunt resistor	–	24	20	7	20		○				
TLP590B		High output current	–	12	10	7	10		○				
			C20	20									
TLP591B		High output current Internal shunt resistor	–	24	20	7	20	○					
			C40	40									

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

## MOSFET Output (photorelay) Devices

Product No.	Pin Configuration	Features	IFT		RON		V <sub>OFF</sub> (V)	BV <sub>S</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>						
			Rank	Max (mA)	Max (Ω)	@I <sub>F</sub> (mA)			@I <sub>ON</sub> (A)	UL	TUV	VDE	BSI	SEMKO	
TLP172A		2.54 SOP4 Low cost Low trigger current High output current General-purpose	–	3	2	5	0.4 [AC]	60	1500	○					
TLP172G		2.54 SOP4 Low cost Low trigger current General-purpose For modems	–	3	50	5	0.11 [AC]	350	○						
TLP174G		2.54 SOP4 Low trigger current Current-limiting function For modems	–	3	35	5	0.12 [AC]	350	○					○ <sup>(7)</sup>	
TLP176A		2.54 SOP4 Low trigger current High output current	–	3	2	5	0.4 [AC]	60	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>				
TLP176D		2.54 SOP4 Low trigger current For PBXes	–	3	8	5	0.15 [AC]	200	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>				
TLP176G		2.54 SOP4 Low trigger current General-purpose For modems	–	3	35	5	0.12 [AC]	350	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>		
TLP176GA		2.54 SOP4 Low trigger current General-purpose For modems	–	3	35	5	0.12 [AC]	400	Δ						
TLP192A		2.54 SOP6 Low cost Low trigger current High output current	–	3	2	5	0.4 [AC]	60	1500	○					
TLP192G		2.54 SOP6 Low cost Low trigger current For modems	–	3	50	5	0.11 [AC]	350	○						
TLP197A		2.54 SOP6 Low trigger current High output current	–	3	2	5	0.4 [AC]	60	○						
TLP197D		2.54 SOP6 Low trigger current General-purpose	–	3	8	5	0.2 [AC]	200	○						
TLP197G		2.54 SOP6 Low trigger current For modems	–	3	35	5	0.12 [AC]	350	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>		
TLP197GA		2.54 SOP6 Low trigger current For modems	–	3	35	5	0.12 [AC]	400	Δ						
TLP200D		2.54 SOP8 Tow TLP176D channels	–	3	8	5	0.15 [AC]	200	1500	○					
TLP202A		2.54 SOP8 Tow TLP172A channels	–	3	2	5	0.4 [AC]	60	○						
TLP202G		2.54 SOP8 Tow TLP172G channels	–	3	50	5	0.11 [AC]	350	○						
TLP204G		2.54 SOP8 Tow TLP174G channels	–	3	35	5	0.12 [AC]	350	○					○ <sup>(7)</sup>	
TLP206A		2.54 SOP8 Tow TLP176A channels	–	3	2	5	0.4 [AC]	60	○						
TLP206G		2.54 SOP8 Tow TLP176G channels	–	3	35	5	0.12 [AC]	350	○	Δ <sup>(6)</sup>	○ <sup>(6)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>		
TLP206GA		2.54 SOP8 Tow TLP176GA channels	–	3	35	5	0.12 [AC]	350	Δ						

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 5: BS EN60065, BS EN60950

Note 6: VDE0884-approved with option (V4)

Note 7: SS EN60065, SS EN60950

Product No.	Pin Configuration	Features	IFT		RON		V <sub>OFF</sub> (V)	BV <sub>S</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>					
			Rank	Max (mA)	Max (Ω)	@I <sub>F</sub> (mA)			@I <sub>ON</sub> (A)	UL	TUV	VDE	BSI	SEMKO
TLP222A		DIP4 Low cost Low trigger current High output current	–	3	2	5	0.5 [DC]	60	2500	○				
TLP222G		DIP4 Low cost Low trigger current General-purpose For modems	–	3	50	5	0.12 [AC]	350		○				○ <sup>(7)</sup>
TLP222G-2		DIP8 Two TLP222G channels	–	3	50	5	0.12 [AC]	350		○				○ <sup>(7)</sup>
TLP225A		DIP4 For DC use only	–	5	1.1	10	0.5 [DC]	60		○				
TLP224G		DIP4 Low trigger current	–	3	35	5	0.12 [AC]	350		○			Δ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP224GA		DIP4 Low trigger current Current-limiting function	–	3	35	5	0.12 [AC]	400		Δ				○ <sup>(7)</sup>
TLP224G-2		DIP8 Two TLP224G channels	–	3	35	5	0.12 [AC]	350		○			Δ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP227A		DIP4 Low trigger current	–	3	2	5	0.5 [AC]	60		○				○ <sup>(7)</sup>
TLP227A-2		Two TLP227A channels	–	3	2	5	0.5 [AC]	60		○				○ <sup>(7)</sup>
TLP227G		DIP4 Low trigger current	–	3	35	5	0.12 [AC]	350		○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP227G(N)		DIP4 Low trigger current General-purpose For modems	–	3	35	5	0.12 [AC]	350		○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP227G-2		DIP8 Two TLP227G channels	–	3	35	5	0.12 [AC]	350		○	Δ <sup>(4)</sup>	○ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>
TLP227G-2(N)		DIP8 Two channels High V <sub>OFF</sub>	–	5	30	10	0.12 [AC]	400		○				
TLP227GA		DIP4 Low trigger current	–	3	35	5	0.12 [AC]	400		Δ				○ <sup>(7)</sup>
TLP227GA-2		DIP8 Two TLP227GA channels	–	3	35	5	0.12 [AC]	400	Δ				○ <sup>(7)</sup>	

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standard

Note 5: BS EN60065, BS EN60950

Note 6: VDE0884-approved with option (V4)

Note 7: SS EN60065, SS EN60950

MOSFET Output (photorelay) Devices (continued)

Product No.	Pin Configuration	Features	IFT		RON			V <sub>OFF</sub> (V)	BVs (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>					
			Rank	Max (mA)	Max (Ω)	@I <sub>F</sub> (mA)	@I <sub>ON</sub> (A)			UL	TUV	VDE	BSI	SEMKO	
TLP270D		SOP16 (14-pin) For DAA in modems	-	3	8	5	0.15 [AC]	200	1500	○			○ <sup>(5)</sup>		
TLP270G		SOP16 (14-pin) For DAA in modems	-	3	35	5	0.12 [AC]	350		○				○ <sup>(5)</sup>	
TLP3110		MFSOP6 (4-pin) Low CR Coff ≤ 150pF For testers	-	4	1.2	10	0.35 [AC]	60		○					
TLP3111		MFSOP6 (4-pin) Low CR Coff ≤ 15pF For testers	-	4	20	10	0.1 [AC]	80		○					
TLP3113		2.54SOP4 (4-pin) Lower CR Coff ≤ 1.4pF For testers	-	4	35	5	0.08 [AC]	40		Δ					
TLP3114		2.54SOP4 (4-pin) Lower CR Coff ≤ 7pF For testers	-	4	3	5	0.25 [AC]	40		Δ					
TLP3115		2.54SOP4 (4-pin) Lower CR Coff ≤ 14pF For testers	-	4	1.5	5	0.3 [AC]	40		Δ					
TLP3116		2.54SOP4 (4-pin) Lower CR Coff ≤ 2pF For testers	-	4	15	5	0.12 [AC]	40		Δ					
TLP3130		2.54SOP4 (4-pin) Lower CR Coff ≤ 2.5pF For testers	-	4	8	5	0.16 [AC]	20		Δ					
TLP3131		2.54SOP4 (4-pin) Lower CR Coff ≤ 12pF For testers	-	4	1.5	5	0.3 [AC]	20		Δ					
TLP3540		I <sub>OFF</sub> ≤ 4mA DIP8 High output current For testers	-	5	0.12	10	2 [AC]	60	1500	○					
TLP4006G		DIP8 1a1b (N.C. + N.O.) General-purpose	-	3	25	5	0.12 [AC]	350	2500	Δ					
TLP4026G		2.54SOP8 1a1b (N.C. + N.O.) General-purpose	-	3	25	5	0.12 [AC]	350	1500	Δ					
TLP4176G		2.54SOP4 1b (Normally Close) General-purpose	-	3	25	5	0.12 [AC]	350	1500	Δ					
TLP4227G		DIP4 1b (Normally Close) General-purpose	-	3	25	5	0.15 [AC]	350	2500	○				○ <sup>(7)</sup>	

Note 1: In the safety standard column:

Symbol ○ : Approved

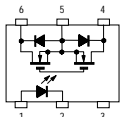
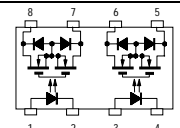
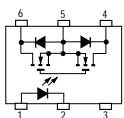
Symbol Δ : Design which meets safety standards

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950



Product No.	Pin Configuration	Features	IFT		RON		V <sub>OFF</sub> (V)	BV <sub>S</sub> (V <sub>rms</sub> )	Safety Standards <sup>(1)</sup>												
			Rank	Max (mA)	Max (Ω)	@I <sub>F</sub> (mA)			@I <sub>ON</sub> (A)	UL	TUV	VDE	BSI	SEMKO							
TLP4197G		2.54SOP6 1b (Normally Close) General-purpose	–	3	25	5	0.12 [AC]	350	1500	Δ											
TLP4597G		DIP6 1b (Normally Close) General-purpose	–	3	25	5	0.15 [AC]	350	2500	○				○ <sup>(7)</sup>							
TLP4206G		2.54SOP8 Two TLP4176G channels	–	3	25	5	0.12 [AC]	350	1500	Δ											
TLP4227G-2		DIP8 Two TLP4176G channels	–	3	25	5	0.15 [AC]	350	2500	○				○ <sup>(7)</sup>							
TLP592A		DIP6 Low cost Low trigger current High output current	–	3	2	5	0.5 [AC]	60	2500	○											
TLP592G		DIP6 Low cost Low trigger current General-purpose	–	3	50	5	0.12 [AC]	350		○											
TLP598A		DIP6 Low trigger current available High output current	–	5	2	10	0.3 [AC]	60		○					○ <sup>(7)</sup>						
TLP599A			IFT2	2																	
TLP597A			IFT2	2																	
TLP598B		DIP6 Low trigger current available	–	5	4	10	0.2 [AC]	100													
TLP599B			IFT2	2																	
TLP598G			IFT2	2																	
TLP599G		DIP6 Low trigger current High V <sub>OFF</sub>	–	5	12	10	0.15 [AC]	400													
TLP597G			IFT2	2																	
TLP597GA			IFT2	2																	
TLP594G		DIP6 Low trigger current General-purpose Current-limiting function	–	3	35	5	0.12 [AC]	350								○					
TLP797GA		DIP6 High isolation voltage	–	3	35	5	0.12 [AC]	400								○	Δ	Δ	Δ	Δ	Δ
TLP797J		DIP6 High isolation voltage	–	3	45	5	0.1 [AC]	600								○	Δ	Δ	Δ	Δ	Δ
TLP797JF	DIP6 High isolation voltage	–	3	45	5	0.1 [AC]	600	○	Δ							Δ	Δ	Δ	Δ		
TLP798G	DIP6 High isolation voltage IEC950 standard SEMKO-approved Low trigger current available	–	5	12	10	0.15 [AC]	400	○	○ <sup>(4)</sup>							Δ <sup>(4)</sup>	○ <sup>(5)</sup>	○ <sup>(7)</sup>			
		IFT2	2																		

Note 1: In the safety standard column:

Symbol ○ : Approved

Symbol Δ : Design which meets safety standards

Note 4: VDE0884-approved with option (D4)

Note 5: BS EN60065, BS EN60950

Note 7: SS EN60065, SS EN60950

# Photo Sensors

## Infrared LEDs

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)									Application
		Rank Product No.	Radiant intensity (mW/sr)			Radiant power(mW)			Peak emission wavelength (nm)	Half-value angle (°)	
			Min	Max	IF(mA)	Min	Max	IF(mA)			
TLN108	TO-18(lens can)	-	10	-	50	-	-	-	940	±8	Opto-electronic switch
TLN201	TO-18(lens can)	-	20	-	50	-	-	-	880	±7	
TLN102	TO-18(flat can)	-	2	-	50	-	-	-	940	±31	
TLN105B	φ5	-	12	-	50	-	-	-	950	±23.5	Remote control
TLN110	φ5	-	15	-	50	-	-	-	940	±8	Opto-electronic switch
TLN115A	φ5	-	15	-	50	-	-	-	950	±21	Remote control
		TLN115A(B)	19	-							
* TLN231	φ5	-	35	-	50	-	-	-	870	±16	Space optical transmission
* TLN233	φ5	-	46	-	50	-	-	-	870	±13	Opto-electronic switch
TLN227	φ5	-	-	-	-	14	-	50	870	±5	Space optical transmission
TLN225	φ4.9	-	-	-	-	14	-	50	870	±21	
TLN226	φ4.9	-	-	-	-	14	-	50	870	±13	
TLN210	φ3.6 side view	-	-	-	-	7	-	300◆◆	875	±32	
TLN212	φ3.6 side view	-	-	-	-	8	-	300◆◆	870	±35	Used only for cameras (for light projection)
TLN217	φ3.6 side view	-	-	-	-	12	-	300◆◆	870	±32.5	Used only for cameras (for light projection)
TLN103A	φ3	-	0.5	-	20	-	-	-	940	±80	Opto-electronic switch
TLN113	φ3	-	0.8	4.8	20	-	-	-	940	±40	
		TLN113(B)	1.25	3							
		TLN113(C)	2	4.8							
		TLN113(BC)	1.25	4.8							
TLN203	φ3	-	1	-	20	-	-	-	880	±35	
TLN119	φ3	-	2.5	10	20	-	-	-	945	±30	
		TLN119(A)	2.5	6							
		TLN119(B)	4.2	10							
**TLN238	φ3	-	40	-	50	-	-	-	870	±18	Space optical transmission Opto-electronic switch
TLN208	φ2.7	-	-	-	-	7	-	300◆◆	875	±27	Used only for cameras (for light projection)
TLRA270◆	φ2	-	-	-	-	12	-	150◆◆	695	±15	Used only for cameras (for auxiliary lighting)
TLN117	Small side view	-	2	-	20	-	-	-	940	±15	
		TLN117(B)	2	7.5							
		TLN117(C)	5	18.7							
TLN104	Double-end	-	-	-	-	1.5	-	20	940	±20	
		TLN104(B)	-	-		2.5	6				
TLN104(LB)	Double-end (DIP)	-	-	-	-	1.5	-	20	940	±20	
		TLN104(B, LB)	-	-		2.5	6				
☆TLRH9002(T02)◆	SMD, 2.0(L) × 1.25(W) × 1.1(H)	-	Min. Iv = 42mcd.	-	30	-	-	-	650	±55 ±65	
☆TLRH9100(T09)◆	SMD, 3.0(L) × 2.8(W) × 1.9(H)	-	Min. Iv = 55mcd.	-	30	-	-	-	650	±55	
☆TLRH9100(T11)◆	SMD, 3.0(L) × 2.8(W) × 1.9(H)	-	Min. Iv = 55mcd.	-	30	-	-	-	650	±55	

◆: Red LED, ◆◆: t = 10 ms ON, ☆: Moisture-Proof Packing

Note: If = forward current

\*: New product

\*\* : Under development

## Phototransistors and Photodarlington Transistors

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)									Photodarlington Transistor	Application
		Rank Product No.	Light current (μA)			Dark current (μA)		Peak sensitive wavelength (nm)	Half-value angle (°)	Visible ray cut		
			Min	Max	E(mW/cm <sup>2</sup> )	Max	VCE(V)					
TPS601A	TO-18 (lens can)	—	100	—	0.1	0.2	30	800	±10	—	—	
		TPS601A(A)	100	300								
		TPS601A(B)	200	600								
		TPS601A(C)	400	1200								
TPS604	TO-18(lens can, with base)	—	60	—	0.1	0.2	30	800	±10	—	—	
TPS614	TO-18(flat can, with base)	—	600	—	10	0.2	30	800	±42	—	—	
TPS610	φ5	—	100	—	0.1	0.1	24	800	±8	—	—	
TPS611	φ5	—	30	—	0.1	0.1	24	900	±8	•	—	
TPS603A	φ3	—	6	—	0.1	0.1	10	720	±55	—	—	
TPS612	φ3	—	14	180	0.1	0.1	10	870	±30	•	—	
		TPS612(B)	24	60								
		TPS612(C)	42	105								
		TPS612(BC)	24	105								
TPS613	φ3	—	20	260	0.1	0.1	10	720	±30	—	—	
		TPS613(B)	34	85								
		TPS613(C)	60	150								
		TPS613(BC)	34	150								
TPS615	φ3	—	20	150	0.1	0.1	24	800	±30	—	—	
		TPS615(A)	20	50								
		TPS615(B)	34	85								
		TPS615(C)	60	150								
		TPS615(AB)	20	85								
TPS616	φ3	—	10	75	0.1	0.1	24	900	±30	•	—	
		TPS616(A)	10	25								
		TPS616(B)	17	42.5								
		TPS616(C)	30	75								
		TPS616(AB)	10	42.5								
		TPS616(BC)	17	75								
TPS621	Small side view	—	40	—	0.1	0.1	24	820	±15	—	—	
		TPS621(A)	40	120								
		TPS621(B)	80	240								
TPS622	Small side view	—	27	—	0.1	0.1	24	870	±15	•	—	
		TPS622(A)	27	80								
		TPS622(B)	55	165								
TPS625	Small side view	—	600	—	0.1	0.25	16	820	±15	—	•	
		TPS625(A)	600	3600								
		TPS625(B)	2500	15000								
		TPS625(C)	5000	—								
TPS626	Small side view	—	400	—	0.1	0.25	16	870	±15	•	•	
		TPS626(A)	400	2400								
		TPS626(B)	1700	10200								
		TPS626(C)	3000	—								
TPS606	Double-end	—	10	—	0.1	0.1	10	720	±20	—	—	
		TPS606(B)	10	30								
		TPS606(C)	20	60								
		TPS606(D)	40	125								
TPS605	Double-end	—	200	—	0.01	0.25	16	720	±20	—	•	
		TPS605(A)	200	1200								
		TPS605(B)	800	4800								
TPS606(LB)	Double-end (DIP)	—	10	—	0.1	0.1	10	720	±20	—	—	
		TPS606(B, LB)	10	30								
		TPS606(C, LB)	20	60								
		TPS606(D, LB)	40	125								
TPS605(LB)	Double-end (DIP)	—	200	—	0.01	0.25	16	720	±20	—	•	
		TPS605(A, LB)	200	1200								
		TPS605(B, LB)	800	4800								

Note: E = radiant incidence; VCE = collector-emitter voltage

## Photodiodes

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)							Application
		Short-circuit current (μA)		Dark current (nA)		Peak sensitive wavelength (nm)	Half-value angle (°)	Visible ray cut	
		min	E (mW/cm <sup>2</sup> )	max	V <sub>R</sub> (V)				
TPS703	Side view, pin type	0.9	0.1	30	10	960	±65	○	Remote control
TPS704		0.5	0.1	30	10	1000	±65	○	
TPS705	TO-92, pin type	0.5	0.1	30	10	970	±65	○	
TPS706		1.0	0.1	30	10	970	±65	○	
TPS708	TO-18 (lens can)	1.0	0.1	60	10	850	±15	—	Opto-electronic switch

Note: E = radiant incidence; V<sub>R</sub> = reverse voltage

## Photodiodes (for fiber-optic use)

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)								Applications
		Fiber-coupled sensitivity (A/W)				Peak sensitive wavelength (nm)	Cut-off frequency (MHz)			
		Typ.	V <sub>R</sub> (V)	λ (nm)	P <sub>I</sub> (μW)		Typ.	V <sub>R</sub> (V)	R <sub>L</sub> (Ω)	
TPS721A	Flat side view	0.36	10	660	1	840	70	10	50	Plastic fiber Polymer-clad fiber
TPS723A	Flat side view	0.37	10	660	1	840	15	10	50	Plastic fiber Polymer-clad fiber

Note: V<sub>R</sub> = reverse voltage; λ = emission wavelength; P<sub>I</sub> = optical output at fiber end; R<sub>L</sub> = load resistance

## Photo-ICs

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)							Application	
		Output format		Threshold radiant incidence (mW/cm <sup>2</sup> )			Peak sensitive wavelength (nm)	Half-value angle (°)		Visible ray cut
		With resistor	Open collector	L→H max	H→L max	V <sub>CC</sub> (V)				
TPS811	Small side view	—	○	0.3	—	5	900	±15	○	Opto-electronic switch
TPS812		—	○	—	0.3	5	900	±15	○	
TPS813		○	—	0.3	—	5	900	±15	○	
TPS814		○	—	—	0.3	5	900	±15	○	
* TPS842A		—	○	—	0.3	2.7-15	900	±15	○	
TPS816		○	—	0.08	0.1	5	900	±65	○	
TPS818	Side view	—	○ Open emitter	I <sub>L</sub> = 240 μA (typ.) @ E <sub>V</sub> = 100lx		5	560	±65	—	Illuminance sensor
TPS820	Small side view, Linear output	—	○ Open emitter	I <sub>L</sub> = 1 mA (min) @ E = 0.1mW/cm <sup>2</sup>		5	870	±15	○	Opto-electronic switch
* TPS819	SMD(3.2×2.4×1.1) Linear output	—	○ Open emitter	I <sub>L</sub> = 70 μA (typ.) @ E <sub>V</sub> = 100lx◆		3	550	±45	—	Illuminance sensor
☆ * TPS850	SMD(3.2×2.4×1.1) Linear output	—	○ Open emitter	I <sub>L</sub> = 230 μA (typ.) @ E <sub>V</sub> = 100 lx◆		3	640	±45	—	Illuminance sensor
☆ * TPS851	SMD(2.1×2.0×0.7) Linear output	—	○ Open emitter	I <sub>L</sub> = 52 μA (typ.) @ E <sub>V</sub> = 100lx◆		3	600	±60	—	Illuminance sensor

◆: Fluoresce light is used as light source.

☆: Moisture-Proof Packing

Note: V<sub>CC</sub> = power supply voltage, I<sub>L</sub> = light current, E = radiant incidence

\*: New product

## Photo-ICs (for use in remote controls)

Product No.	Features	Opto-Electronic Characteristics (Ta = 25°C)							Application	
		Output format		Transmission range (m)		Carrier frequency (kHz)	Sensitive wavelength (nm)	Half-value angle (°)		Visible ray cut
		With resistor	Open collector	Typ.	V <sub>CC</sub> (V)					
TPS830	Side view	○	—	6	5	455	>700	±63/±30	○	High-speed remote control (f <sub>o</sub> =455KHz)
TPS831	Oval lens	○	—	6	5	455	>800	±63/±30	○	

Note: V<sub>CC</sub> = power supply voltage

Photo-interrupters (phototransistor output, photodarlington transistor output)

Product No.	Features	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)				Absolute Maximum Ratings★	Output Format		Applications
				Current transfer ratio (%)					Collector-emitter voltage (V)	S	
				Min	Max	If (mA)	VCE (V)				
TLP803	Double-sided screw mount	5	0.5	2.5	60	20	5	35	○		
TLP853		5	0.5	20	–	10	2	30		○	
TLP507A		3	1	30	440	10	2	30		○	
TLP800A		3	1	10	165	20	5	30	○		
TLP822	Single-sided screw mount	5	0.5	5	75	10	2	35	○		
TLP862		5	0.5	30	1200	1	2	30		○	
TLP825		3	0.5	6	90	10	2	35	○		
TLP865		3	0.5	50	2000	1	2	30		○	
TLP827	PWB direct-mount type	5	0.5◆◆	5	75	10	2	35	○		
TLP832		5	0.5	5	100	10	2	35	○		
TLP833		5	0.5	5	100	10	2	35	○		
TLP838		5	0.5	5	100	10	2	35	○		
TLP866		5	0.5	30	1200	1	2	30		○	
TLP867		5	0.5◆◆	30	1200	1	2	30		○	
TLP831		4.2	0.5◆◆	5	100	10	2	35	○		
TLP801A		3	1	10	165	20	5	30	○		
TLP824		3	0.5	6	90	10	2	35	○		
TLP864		3	0.5	50	2000	1	2	30		○	
TLP871		3	0.5	50	2000	1	2	30		○	
TLP813		2.2	0.2◆◆	2.5	50	20	5	35	○		
TLP863		2.2	0.2◆◆	25	1000	1	2	30		○	
TLP830		2	0.15	3	20	10	2	35	○		
TLP869		2	0.15◆	30	1200	1	2	30		○	
TLP814		PWB direct-mount type, ultra-compact	1.5	0.4	2	–	5	0.6	35	○	
TLP810			1	0.4	5	30	5	0.6	35	○	
TLP812			1	0.4	5	–	5	0.6	35	○	
TLP836	1		0.1◆◆◆	0.27	–	10	5	35	○		
TLP818	PWB direct-mount type with dust cover	5	0.5	2.5	32	20	5	35	○		
TLP828	PWB direct-mount type, dust-proof type	5	–	7.5	150	10	2	35	○		

★: Ta = 25°C ◆: Width of slit on LED side is 0.5 mm. ◆◆: Horizontal slit; ◆◆◆: Width of slit on LED side is 0.15 mm.

Note: S = phototransistor output; D = photodarlington transistor output; PWB = printed wiring board;

If = forward current; VCE = collector-emitter voltage

Printers  
Fax machines  
Copiers  
Image scanners  
Fan heaters  
VCRs  
Optical mice  
Vending machines  
Ticket vendors  
Tape readers  
Trackballs

## Photo-interrupters (photo-IC output)

Product No.	Features	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)					Applications
				Output format		Threshold input current (mA)			
				With resistor	Open-collector	L→H max	H→L max	V <sub>CC</sub> (V)	
TLP1000A	Double-sided screw mount	3	1	○		2.5	—	5	Printers Fax machines Copiers Image scanners Fan heaters VCRs Optical mice Vending machines Ticket vendors Tape readers
TLP1001A		3	1	○		—	2.5	5	
TLP1006A		3	0.5	○		4	—	5	
TLP1007A		3	0.5	○		—	4	5	
TLP1016		3	0.5		○	4	—	5	
TLP1017		3	0.5		○	—	4	5	
TLP1002A	Single-sided screw mount	5	1	○		3	—	5	
TLP1003A		5	1	○		—	3	5	
TLP1024		3	0.5		○	4	—	5	
TLP1034		3	0.5	○		4	—	5	
TLP1018	PWB direct-mount type	5	0.5		○	6	—	5	
TLP1033		5	0.5		○	—	3	2.7-5.5	
TLP1037		5	0.5		○	—	3	2.7-5.5	
TLP1039		5	0.5		○	—	3	2.7-5.5	
TLP1004A		3	0.5	○		4	—	5	
TLP1005A		3	0.5	○		—	4	5	
TLP1014		3	0.5		○	4	—	5	
TLP1015		3	0.5		○	—	4	5	
TLP1020		2.2	0.2◆◆		○	10	—	5	
TLP1031		2	0.15		○	—	4	2.7-5.5	
TLP1025	PWB direct-mount type, ultra-compact	1	0.1◆◆		○	—	6	7	
TLP1023	PWB direct-mount type with dust cover	5	0.5		○	—	7	5	

◆: Width of slit on LED side is 0.5 mm. ◆◆: Horizontal slit; ◆◆◆: Width of slit on LED side is 0.15 mm.

Note: PWB = printed wiring board; V<sub>CC</sub> = power supply voltage

## Photo-interrupters (with connector)

Product No.	Features	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)				Applications
				Operating supply voltage (V)	Output format		Connector manufacturer	
					With resistor	Open collector		
TLP1224	Double-sided screw-mount type	5	0.5	21 to 26		○	Tyco Electronics AMP	Printers Copiers Fax machines Vending machines Machine tools FA equipment Amusement equipment Terminal equipment for financial institutions
TLP1224 (C1)		5	0.5	21 to 26		○	Tyco Electronics AMP	
TLP1211	Single-sided screw-mount type	12	1	4.5 to 5.5		○	Japan Aviation Electronics Industry	
TLP1201A		5	0.5	4.5 to 5.5		○	Tyco Electronics AMP	
TLP1201A (C1)		5	0.5	4.5 to 5.5		○	Molex Japan Co., Ltd.	
TLP1201A (C2)		5	0.5	4.5 to 5.5		○	Japan Solderless Terminal Mfg.	
TLP1204 (C1)		3	0.5	4.5 to 5.5	○		Tyco Electronics AMP	
TLP1204 (C3)		3	0.5	4.5 to 5.5	○		Tyco Electronics AMP	
TLP1208 (C3)		3	0.5	10.8 to 13.2	○		Tyco Electronics AMP	
TLP1205	Single-sided screw-mount type, detection gap × 2	3	0.5	4.5 to 5.5	○		Tyco Electronics AMP	
TLP1215 (C1)	Snap-in mount type	5	0.5	4.5 to 5.5		○	Tyco Electronics AMP	
TLP1217 (C2)		5	0.5	4.5 to 5.5		○	Hirose Electric Co., Ltd.	
TLP1230 (C4)		5	0.5	V <sub>CE</sub> ≤ 35 V		Phototransistor output	Molex Japan Co., Ltd.	
TLP1231 (C5)		5	0.5	V <sub>CE</sub> ≤ 35 V		Phototransistor output	Tyco Electronics AMP	
TLP1241 (C5)		5	0.5	V <sub>CE</sub> ≤ 35 V		Phototransistor output	Tyco Electronics AMP	
TLP1242 (C6)		5	0.5	V <sub>CE</sub> ≤ 35 V		Phototransistor output	Tyco Electronics AMP	
** TLP1243 (C8)		5	0.7	V <sub>CE</sub> ≤ 35 V		Phototransistor output	Tyco Electronics AMP	
TLP1251 (C5)		5	0.5	4.5 to 5.5		○	Tyco Electronics AMP	
TLP1252 (C6)		5	0.5	4.5 to 5.5		○	Tyco Electronics AMP	
TLP1253 (C6)		5	0.5	4.5 to 5.5		○	Tyco Electronics AMP	
TLP1254 (C6)	5	0.5	2.70 to 3.63		○	Tyco Electronics AMP		

\*\* : Under development

## Photoreflective Sensors

Product No.	Features	Detecting distance (mm)	Product No. rank	Electrical Characteristics (Ta = 25°C)						Output type		Applications			
				Collector current (μA)				Dark current (μA)		S	D				
				Min	Max	If (mA)	VCE (V)	Max	VCE (V)						
TLP907	Compact flat	0.7	–	500	15,000	4	2	0.25	16	–	○	VCRs Cameras Printers Headphone stereos			
			TLP907(R)	500	1900										
			TLP907(O)	1450	5400										
			TLP907(Y)	4500	15,000										
TLP907 (LB)	Compact DIP	0.7	–	500	15,000	4	2	0.25	16	–	○		VCRs Cameras Printers Headphone stereos		
			TLP907(R-LB)	500	1900										
			TLP907(O-LB)	1450	5400										
			TLP907(Y-LB)	4500	15,000										
TLP908	Compact flat	0.7	–	50	750	10	5	0.1	10	○	–			VCRs Cameras Printers Headphone stereos	
			TLP908(R)	50	150										
			TLP908(O)	110	330										
TLP908 (LB)	Compact DIP	0.7	–	50	750	10	5	0.1	10	○	–				VCRs Cameras Printers Headphone stereos
			TLP908(R-LB)	50	150										
			TLP908(O-LB)	110	330										
TLP909	One-sided mount type	3.8	–	1000	20,000	10	2	0.25	16	–	○	Copiers			
* TLP921	PWB direct-mount type, One-sided mount type	8	–	580	2600	20	5	0.1	24	0	–	Equipment that senses the levels of various liquids (optical prism used)			

Note: If = forward current; VCE = collector-emitter voltage, S: Photo transistors, D: Photodarlington Transistors

\*: New Product

# Fiber-Optic Devices (TOSLINK™)

## Fiber-Optic Modules (simplex type)

Fiber-Optic Transmitting Module	Fiber-Optic Receiving Module	Data Rate (b/s, NRZ)	Transmission Distance (m) <sup>(1)</sup> max	Emission Wavelength (nm) <sup>(1)</sup>	Pulse Width Distortion (ns) <sup>(1)</sup>	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Fiber-Optic Connectors <sup>(8)</sup>
TOTX111	TORX111 <sup>(2)</sup>	DC to 6M	10	670	±55	-20 to 70	APF (980/1000)	TOFC100-□□
TOTX170 <sup>(3)</sup>	TORX170	DC to 6M	1000 800	800	±55	-40 to 70	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX170A <sup>(3)</sup>	TORX170	DC to 6M	40	650	±55	-40 to 70	APF (980/1000)	TOCP100-□□B/TOCP100P-□□B TOCP155-□□B/TOCP155P-□□B
TOTX173	TORX173	DC to 6M	10	660	±20	-20 to 70	APF (970/1000) APF (980/1000)	TOCP172-□□B
TOTX176 <sup>(7)</sup>	TORX176 <sup>(7)</sup>	DC to 6M	10	660	±20	-20 to 70		
TOTX178A <sup>(7)</sup>	TORX178A <sup>(7)</sup>	0.1 to 6M	5	660	±30	-20 to 70		
TOTX178S	TORX178S	0.1 to 6M	5	660	±30	-20 to 70		
TOTX179 <sup>(7)</sup>	TORX179 <sup>(7)</sup>	0.1 to 12M	5	650	±25	-20 to 70		
TOTX179P	TORX179P	0.1 to 12.8M	5	650	±25	-20 to 70		
TOTX179L <sup>(7)(13)(14)</sup>	TORX179L <sup>(7)(13)(14)</sup>	0.1 to 12.8M	5	650	±25	-20 to 70		
TOTX179PL <sup>(13)(14)</sup>	TORX179PL <sup>(13)(14)</sup>	0.1 to 12.8M	5	650	±25	-20 to 70		
TOTX179S	TORX179S	0.1 to 12.8M	5	650	±25	-20 to 70		
TOTX140 <sup>(7)(10)</sup>	TORX178B <sup>(7)</sup>	0.1 to 6M	5	660	±30	-20 to 70		
TOTX141 <sup>(7)(10)</sup>	TORX141 <sup>(7)(10)</sup>	0.1 to 15M	10	650	±25	-20 to 70		
TOTX141P <sup>(10)</sup>	TORX141P <sup>(10)</sup>	0.1 to 15M	10	650	±25	-20 to 70		
TOTX141L <sup>(7)(10)(13)(14)</sup>	TORX141L <sup>(7)(10)(13)(14)</sup>	0.1 to 15M	10	650	±25	-20 to 70		
TOTX141PL <sup>(10)(13)(14)</sup>	TORX141PL <sup>(10)(13)(14)</sup>	0.1 to 15M	10	650	±25	-20 to 70		
TOTX180 <sup>(9)</sup>	TORX180 <sup>(9)</sup>	DC to 6M	1000 800	800	±55	-40 to 85	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX180 <sup>(9)</sup>	TORX186 <sup>(9)</sup>	DC to 8M	1000 700	800	±42	-40 to 85	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX180A <sup>(3)(9)</sup>	TORX180 <sup>(9)</sup>	DC to 6M	40	650	±55	-40 to 85	APF (980/1000)	TOCP100-□□B/TOCP100P-□□B TOCP155-□□B/TOCP155P-□□B
TOTX193	TORX193	DC to 6M	10	660	±25	-40 to 85	APF (980/1000)	-
TOTX193K <sup>(7)</sup>	TORX193K <sup>(7)</sup>	DC to 6M	10	660	±25	-40 to 85		
TOTX194 <sup>(3)</sup>	TORX194	DC to 10M	1000 700	800	±30	-40 to 85	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX195 <sup>(3)</sup>	TORX194	DC to 10M	50	670	±30	-40 to 85	APF (980/1000)	TOCP100-□□B/TOCP100P-□□B TOCP155-□□B/TOCP155P-□□B
TOTX196	TORX196	DC to 6M	1000 800	800	±55	-40 to 85	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX196	TORX198 <sup>(2)</sup>	DC to 6M	1000 800	800	±55	-40 to 85	PCF (200/300) H-PCF (200/230)	TOCP100Q-□□B/TOCP100X-□□B CF-1071 Series <sup>(12)</sup>
TOTX197	TORX196	DC to 6M	40	670	±55	-40 to 85	APF (980/1000)	TOCP100-□□B/TOCP100P-□□B TOCP155-□□B/TOCP155P-□□B
TOTX197	TORX198 <sup>(2)</sup>	DC to 6M	40	670	±55	-40 to 85	APF (980/1000)	TOCP100-□□B/TOCP100P-□□B TOCP155-□□B/TOCP155P-□□B

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Note 1: Indicates values when Ta = 25°C

Note 2: These fiber-optic receiving modules have analog output pins for monitoring the amount of received light.

Note 3: External resistances must be changed according to the transmission distance.

Note 7: These are panel mount type fiber-optic modules.

Note 8: □□ or □□ B in optical fiber names with or without fiber-optic connectors represent the optical fiber's length and the unit of measurement in which the length is expressed.  
The unit of length is represented by C (for cm) or M (for meters)

Note 9: These are fiber-optic modules in a ceramic package.

Note 10: Vcc = 2.7 V~3.6 V

Note 11: Under development

Note 12: Manufactured by Sumitomo Electric Industries, Ltd.

Note 13: Shutter system.

Note 14: New products.



## Fiber-Optic Modules (duplex type)

Fiber-Optic Transceiving Module	Data Transmission Rate (b/s, NRZ)	Transmission Distance (m) <sup>(1)</sup> max	Emission Wavelength (nm) <sup>(1)</sup>	Pulse Width Distortion (ns) <sup>(1)</sup>	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Fiber-Optic Connectors <sup>(8)</sup>
TODX270 <sup>(3)</sup>	DC to 6M	1000	800	±55	-40 to 70	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		800				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX270A <sup>(3)</sup>	DC to 6M	40	650	±55	-40 to 70	APF (980/1000)	TOCP200-□□B/TOCP200P-□□B TOCP255-□□B/TOCP255P-□□B
TODX280 <sup>(9)</sup>	DC to 6M	1000	800	±55	-40 to 85	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		800				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX280A <sup>(3)(9)</sup>	DC to 6M	40	650	±55	-40 to 85	APF (980/1000)	TOCP200-□□B/TOCP200P-□□B TOCP255-□□B/TOCP255P-□□B
TODX283 <sup>(9)</sup>	DC to 50M	100	650	±7	-10 to 70	PCF (200/300)	PN-type connector
		10				APF (980/1000)	
TODX286 <sup>(9)</sup>	DC to 8M	1000	800	±42	-40 to 85	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		700				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX294 <sup>(3)</sup>	DC to 10M	1000	800	±30	-40 to 85	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		700				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX295 <sup>(3)</sup>	DC to 10M	50	670	±30	-40 to 85	APF (980/1000)	TOCP200-□□B/TOCP200P-□□B TOCP255-□□B/TOCP255P-□□B
TODX296	DC to 6M	1000	800	±55	-40 to 85	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		800				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX297	DC to 6M	40	670	±55	-40 to 85	APF (980/1000)	TOCP200-□□B/TOCP200P-□□B TOCP255-□□B/TOCP255P-□□B
TODX298 <sup>(2)</sup>	DC to 8M	1000	800	±42	-40 to 85	PCF (200/300)	TOCP200Q-□□B/TOCP200X-□□B
		700				H-PCF (200/230)	CF-2071 Series <sup>(11)</sup>
TODX2402 <sup>(12)</sup>	20 to 250M	20 (250M)	650	—	0 to 60 (250M)	APF (980/1000)	New-SMI optical connector
		50 (125M)			-10 to 70 (125M)		
TODX2801 <sup>(13)</sup>	20 to 125M	100	650	—	-10 to 70	GIPCF (200/300)	PN-type connector
		10				APF (980/1000)	

Note 1: Indicates values when Ta = 25°C

Note 2: These fiber-optic receiving modules have analog output pins for monitoring the amount of received light.

Note 3: External resistances must be changed according to the transmission distance.

Note 8: -□□ or -□□ B in optical fiber names with or without fiber-optic connectors represent the optical fiber's length and the unit of measurement in which the length is expressed.

The unit of length is represented by C (for cm) or M (for meters)

Note 9: These are fiber-optic modules in a ceramic package.

Note 11: Manufactured by Sumitomo Electric Industries, Ltd.

Note 12: New products

Note 13: Under development

## Optical Fiber with Fiber-Optic Connectors (simplex type)

Optical Fiber Name with Fiber-Optic Connector <sup>(8)</sup>	Lock Structure	Fiber-Optic Connector	Compatible Optical Fiber (core/clad diameter) (μm)	Optical Fiber <sup>(8)</sup>	
TOCP100-□□B	Lever lock	TOCP100K	APF (980/1000)	TOFC100-□□	
TOCP100P-□□B		TOCP100PK		TOFC100P-□□	
TOCP155-□□B	Friction lock	TOCP155K		TOFC100-□□	
TOCP155P-□□B		TOCP155PK		TOFC100P-□□	
TOCP100Q-□□B	Lever lock	TOCP100QK		PCF (200/300)	TOFC100Q-□□
TOCP100X-□□B		TOCP100XK			TOFC100X-□□
TOCP150Q-□□B	Friction lock	TOCP150QK	TOFC100Q-□□		
TOCP150X-□□B		TOCP150XK	TOFC100X-□□		
TOCP172-□□B	Friction lock	—	APF (970/1000)		—

## Optical Fiber with Fiber-Optic Connectors (duplex type)

Optical Fiber Name with Fiber-Optic Connector <sup>(8)</sup>	Lock Structure	Fiber-Optic Connector	Compatible Optical Fiber (core/clad diameter) (μm)	Optical Fiber <sup>(8)</sup>	
TOCP200-□□B	Lever lock	TOCP200K	APF (980/1000)	TOFC200-□□	
TOCP200P-□□B		TOCP200PK		TOFC200P-□□	
TOCP255-□□B	Friction lock	TOCP255K		TOFC200-□□	
TOCP255P-□□B		TOCP255PK		TOFC200P-□□	
TOCP200Q-□□B	Lever lock	TOCP200QK		PCF (200/300)	TOFC200Q-□□
TOCP200X-□□B		TOCP200XK			TOFC200X-□□

Types P and X denote a reinforced type of optical fiber.

Note 8: -□□ or -□□ B in optical fiber names with or without fiber-optic connectors represent the optical fiber's length and the unit of measurement in which the length is expressed.  
The unit of length is represented by C (for cm) or M (for meters)

Example: TOCP100-10MB

This is an optical fiber product with fiber-optic connectors. It is constructed from TOCP100K optical fiber, is 10 m long and has a TOCP100K fiber-optic connector fitted at each end.

## Adapters

Type Name	Connection Loss (Db)	Operating Temperature (°C)	Compatible Optical Fiber with Fiber-Optic Connector Product No.
TOCA100	2.0	-20 to 70	TOCP100-□□B, TOCP100P-□□B TOCP100Q-□□B, TOCP100X-□□B TOCP150Q-□□B, TOCP150X-□□B
TOCA150	3.5	-20 to 70	TOCP100-□□B, TOCP100P-□□B TOCP155-□□B, TOCP155P-□□B
TOCA200	2.0	-20 to 70	TOCP200-□□B, TOCP200P-□□B TOCP200Q-□□B, TOCP200X-□□B
TOCA250	3.5	-20 to 70	TOCP200-□□B, TOCP200P-□□B TOCP255-□□B, TOCP255P-□□B

## Visible Laser Diodes

	Absolute Maximum Ratings (Tc = 25°C)		Opto-Electronic Characteristics (Tc = 25°C)							Remarks
	Optical output power	Case temperature	Threshold current	Operation current	Peak lasing wavelength	Beam divergence		Monitor current	Test condition	
						Horizontal	Perpendicular			
	Symbol	Po	Tc	Ith	Iop	λp	θ//	θ⊥	Im	
Unit	(mW)	(°C)	(mA)	(mA)	(nm)	(°)	(°)	(mA)	(mW)	
Product No.	–	–	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	–
TOLD9443MD	10	–10 to 70	45	60	650	8	28	0.2	10	for DVD
TOLD9462MD	7	–10 to 70	23	30	650	8	28	0.18	5	for DVD
TOLD9471MD	7	–30 to 85	40	50	650	8	28	0.15	5	for DVD-Navigation
TOLD2000MDA	7	–10 to 70	25	35	650	9	28	0.15	5	TWINLD for DVD
	7		20	35	790	10	32	0.35	5	
TOLD2001MDA	10	–10 to 70	45	55	650	9	28	0.13	7	TWINLD for DVD
	10		30	55	790	10	32	0.6	10	
TOLD9453MB	50(Pulse80)	–10 to 70	30	85	656	9	22	–(◆)	50 (cw)	for Rewritable-DVD

Note: Package: φ5.6mm

For detailed information on Package for slim application, contact your Toshiba sales office.

◆: Photodiode is not built-in the MB type

## Optical Communication Devices

### Optical Transmitters/Receivers/Transponders/Transceivers for 2.5 Gb/s and 10 Gb/s

These products can be customized.

For the most up-to-date information, please refer to the "Optical Communication Devices" page on the Toshiba Semiconductor website. Please click on "Catalog" in the lefthand frame to display a list of documents relating to Toshiba optical communication devices.

<[http://www.semicon.toshiba.co.jp/eng/prd/ccd/ft\\_ccd.html](http://www.semicon.toshiba.co.jp/eng/prd/ccd/ft_ccd.html)>

# CCD and CMOS Image Sensors

## Linear Image Sensors

Classification	Product No.	Photo sensitive Pixels		Data Rate (MHz)	Package	Resolution (DPI)	Uses	Remark			
		Type/Lamp	Number						Size(μm)		
Lens reduction type	TCD1205D	B/W	2048	14 × 200	80	20PIN DIP	---	Barcode readers			
	TCD1208AP		2160	14 × 14	2	22PIN Cerdip	B4 200	Scanners Fax machines			
	TCD1209D		2048		20		A4 300				
	TCD1252AP		2700	11 × 11	3	22PIN DIP	A4 300				
	TCD1304AP		3648	8 × 200	1	22PIN DIP	---	Barcode readers			
	TCD1305P			8 × 64							
	TCD1501D		5000	7 × 7	12	22PIN Cerdip	A3 400	Photocopiers, scanners			
	TCD1503D				20 × 2						
	TCD1703C				20 × 2	22PIN DIP					
	TCD1704C				20 × 4	24PIN DIP					
	TCD1706D				7400	25 × 4			22PIN Cerdip	A3 600	
	TCD1707D				7450	25 × 2					
	TCD1708D		15 × 2								
	TCD1711D		30 × 2								
	TCD2255D	color	2700 × 3Line	8 × 8	5	22PIN Cerdip	A4 300	Color scanners			
	TCD2503C		5000 × 3Line	14 × 14	13 × 2	24PIN DIP	A3 400	Color photocopiers, scanners			
	TCD2558D-1		5340 × 3Line	7 × 7	10	22PIN Cerdip	A4 600	Color scanners			
	TCD2560D		5400 × 3Line	5.25 × 5.25	6						
	TCD2561D		5340 × 4Line	7 × 7	color: 10 B/W: 10 × 2	24PIN DIP	A3 600	Color photocopiers, scanners			
	TCD2700C		7500 × 3Line	8 × 8	20 × 2						
	TCD2701C		7500 × 3Line	9.325 × 9.325	25 × 2	68PIN Cerdip					
	TCD2702D		7350 × 3Line								
	TCD2703D		7500 × 4Line	5 × 5	color: 12 B/W: 12 × 2	22PIN Cerdip					
	TCD2704D										
	TCD2705D		7300 × 3Line	10 × 10	30 × 2	68PIN Cerdip					
	TCD2903D		10680 × 3Line	4 × 4	10	22PIN Cerdip	A4 1200	Color scanners			
	TCD2905D		5400 × 6Line	5.25 × 5.25			A4 2400				
	TCD2953D		10680 × 6Line	4 × 4							
CIS module	CIPS308BS621	YG	7296	24 × 40	21	35PIN connector	A3 600	MFP, Color photocopiers			
	CIPS27BSA00	R	1054	18 × 45	0.5	13PIN Pad	27 mm 1400	Barcode readers	ES: '01/2Q		
	CIPS54CS301	R.G.B	644	50 × 40	2.5	12PIN connector	54 mm 300	Mobile	ES: '01/1Q		
	CIPS109CS302		1288		2.5 × 2		A6 300	Check readers	ES: '01/1Q		
	CIPS109CS600		2576	5	A6 600		ES: '02/3Q				
	CIPS218CF602		5152	24 × 40	5 × 2	15PIN connector	A4 600	MFP, Color scanners			
	CIPS218CF601							MFP			
	CIPS218CFA02		10304	11 × 35	5	12PIN connector	A4 1200	Flatbed color scanners			
	CIPS218CFB00		20608	8 × 20	3		A4 2400/1200/600		MP: '02/4Q		
	CIPS299CF600		7084	24 × 40	5 × 4	20PIN connector	A3 600	MFP			
	CIPS299CS600				5	12PIN connector					

## CMOS Area Image Sensors

Sensor					Digital Signal Processor	
Optical Format	Type Number	Total Pixel Number	Color / Mono	Power Consumption	Type Number	Package
1/4 inch	TCM5063T	698(H) × 502(V) (350kpix)	Color (R, G, B)	58(mW)	TC90A70F	LQFP80-P-1212-0.50A
1/7 inch	TCM5073T	392(H) × 306(V) (120kpix)	Color (R, G, B)	30(mW)	TC90A81F	LQFP64-P-1010-0.50A