



Optical Semiconductor Devices

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Visible Laser Diodes

Part Number (Note 1)	Maximum Ratings (Tc = 25°C)		Electrical/Optical Characteristics (Tc = 25°C)							Remarks / Applications
	Optical Output Power Po (mW)	Case Temperature Tc (°C)	Threshold Current Ith (mA) Typ.	Operating Current Iop (mA) Typ.	Peak Lasing Wavelength λp (nm) Typ.	Beam Divergences		Monitor Current Im (mA) Typ.	Test Condition Po (mW)	
TOLD2000MDA/SDA ★	7	-10 to 70	25	35	650	9	28	0.12	5	DVDs
	7		20	35	790	10	32	0.35	5	Dual-wavelength laser
TOLD2000FDA ◆	7	-10 to 70	25	35	650	9	28	0.05	5	DVDs
	7		20	35	790	10	32	0.10	5	Dual-wavelength laser
TOLD2003SDA ★	7	-30 to 85	40	50	655	9	28	0.15	5	DVD navigations
	7		35	55	790	10	32	0.35	5	
TOLD2100ME ★	100 (pulse: 200)	-10 to 75	55	135	658	9.5	17.5	— (Note 2)	80	Rewritable DVDs
	10		45	55	790	10	32		10	
TOLD2101ME ★ **	100 (pulse: 250)	-10 to 75	55	135	658	9.5	17.5	— (Note 2)	80	Rewritable DVDs
	10		45	55	790	10	32		10	
TOLD9456ME ★	100 (pulse: 200)	-10 to 75	50	130	658	9.5	17.5	— (Note 2)	80	Rewritable DVDs
TOLD9457ME ★	100 (pulse: 250)	-10 to 75	50	130	658	9.5	17.5	— (Note 2)	80	Rewritable DVDs
TOLD9458ME ★ **	150 (pulse: 350)	-10 to 75	60	180	658	9.5	17.5	— (Note 2)	120	Rewritable DVDs

◆: Lead(Pb)-Free

★: Lead(Pb)-Free-Finished

Note 1: MDA and ME: φ5.6 mm metal can package, SDA: D-cut metal can package, FDA: Lead frame package

Note 2: The TOLD2100ME, TOLD2101ME, TOLD9456ME, TOLD9457ME and TOLD9458ME do not incorporate monitor photodiodes.

- For details of applications other than optical disk systems, please contact your nearest Toshiba sales representative.

** : Under development

Visible LEDs

Dual-Color LED Lamps

Part Number	Source Color	Optical Characteristics (Ta = 25°C)					Maximum DC Forward Current Rating If (mA) @Ta = 25°C	Typical Applications	
		Intensity (mcd) If = 20 mA		Viewing Angle 2θ1/2 (°)	Typical Emitting Wavelength				Lens Color
		Min	Typ.		λd (nm)	λp (nm)			
TLRMHGH48T(F)	Red/Green	476/272	1100/500	30/30	626/571	636/574	Colorless clear	50 (Total)	Message boards
TLRMHGH48M(F)		272/153	450/220	40/40	626/571	636/574	Colorless diffused	50 (Total)	

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

High-Brightness LED Lamps (φ5)

Part Number	Source Color	Optical Characteristics (Ta = 25°C)					Maximum DC Forward Current Rating If (mA) @Ta = 25°C	Typical Applications	
		Intensity (mcd) If = 20 mA		Viewing Angle 2θ1/2 (°)	Typical Emitting Wavelength				Lens Color
		Min	Typ.		λ.d (nm)	λ.p (nm)			
TLSU180P(F)	Red	1530	4500	6	623	636	Colorless clear	30	Pilot lamps (narrow range)
TLRME20CP(F)		4760	12000	7	626	636	Red clear	50	
TLSH20TP(F)		4760	11000		613	623	Colorless clear	50	
TLRMH20TP(F)		2720	9000		626	636	Colorless clear	50	
TLSE20TP(F)		2720	9000		613	623	Colorless clear	50	
TLRME20TP(F)		2720	8000	626	636	Colorless clear	50		
TLRE20TP(F)		2720	7000	630	644	Colorless clear	50		
TLSH38TP(F)		2720	6500	12	613	623	Colorless clear	50	
TLRMH38TP(F)		1530	4800		626	636	Colorless clear	50	
TLSH17TP(F)		1530	4500	20	613	623	Colorless clear	50	
TLRMH17TP(F)		850	3200		626	636	Colorless clear	50	
TLSE17TP(F)		850	3000		613	623	Colorless clear	50	
TLRME17TP(F)		850	2400		626	636	Colorless clear	50	
TLRE17TP(F)		476	1500		630	644	Colorless clear	50	
TLSU156P(F)		272	900		623	636	Colorless clear	30	
TLSH16TP(F)		850	1900		613	623	Colorless clear	50	
TLRMH16TP(F)		476	1500		626	636	Colorless clear	50	
TLSE16TP(F)		476	1500	613	623	Colorless clear	50		
TLSE16CP(F)		476	1000	613	623	Red clear	50		
TLRME16TP(F)		272	1200	626	636	Colorless clear	50		
TLRE16TP(F)		272	800	630	644	Colorless clear	50		
TLRME16CP(F)		272	800	626	636	Red clear	50		
TLRE16CP(F)		153	600	630	644	Red clear	50		
TLRME17DP(F)		153	500	626	636	Red diffused	50		
TLSU113P(F)		153	550	30	623	636	Red clear	30	
TLSU114P(F)		47.6	250	40	623	636	Red diffused	30	
TLRE25TP(F)		47.6	150	75	630	644	Colorless clear	50	
TLRE11TP(F)		8.5	20	130	630	644	Colorless clear	50	
TLOU180P(F)	Orange	2720	7000	6	605	612	Colorless clear	30	Pilot lamps (narrow range)
TLOH20TP(F)		4760	15000	7	605	612	Colorless clear	50	
TLOE20TP(F)		4760	10000		605	612	Colorless clear	50	
TLOH38TP(F)		2720	7500	12	605	612	Colorless clear	50	
TLOH17TP(F)		1530	5000	20	605	612	Colorless clear	50	
TLOE17TP(F)		1530	4500		605	612	Colorless clear	50	
TLOE17CP(F)		1530	3500		605	612	Orange clear	50	
TLOU156P(F)		476	900		605	612	Colorless clear	30	
TLOU172P(F)		476	800	605	612	Orange clear	30		
TLOH16TP(F)		850	2300	25	605	612	Colorless clear	50	
TLOE16TP(F)		850	2000		605	612	Colorless clear	50	
TLOE16CP(F)		476	1600		605	612	Orange clear	50	
TLOU113P(F)		272	900		605	612	Orange clear	30	
TLOU114P(F)		47.6	250	40	605	612	Orange diffused	30	
TLOE25TP (F)		153	350	75	605	612	Colorless clear	50	
TLOE11TP (F)		27.2	65	130	605	612	Colorless clear	50	
TLYU180P(F)	Yellow	850	4300	6	587	590	Colorless clear	30	Pilot lamps (narrow range)
TLYH20TP(F)		4760	13000	7	587	590	Colorless clear	50	
TLYE20TP(F)		2720	9500		587	590	Colorless clear	50	
TLYH38TP(F)		2720	7000	12	587	590	Colorless clear	50	
TLYH17TP(F)		1530	4800	20	587	590	Colorless clear	50	
TLYE17TP(F)		850	3000		587	590	Colorless clear	50	
TLYE17CP(F)		850	3000		587	590	Yellow clear	50	
TLYU156P(F)		153	500		587	590	Colorless clear	30	
TLYU172P(F)		153	400	587	590	Yellow clear	30		
TLYH16TP(F)		850	2200	25	587	590	Colorless clear	50	
TLYE16TP(F)		476	1500		587	590	Colorless clear	50	
TLYE16CP(F)		476	1200		587	590	Yellow clear	50	
TLYU113P(F)		153	500		587	590	Yellow clear	30	
TLYU114P(F)		47.6	130	40	587	590	Yellow diffused	30	
TLYE25TP(F)		85	300	75	587	590	Colorless clear	50	
TLYE11TP(F)		15.3	45	130	587	590	Colorless clear	50	

• All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

Part Number	Source Color	Optical Characteristics (Ta = 25°C)						Maximum DC Forward Current Rating If (mA) @Ta = 25°C	Typical Applications	
		Intensity (mcd) If = 20 mA		Viewing Angle 201/2 (°)	Typical Emitting Wavelength		Lens Color			
		Min	Typ.		λd (nm)	λp (nm)				
TLPYE23TP(F)	Pure yellow	2720	8000	5	580	583	Colorless clear	50	Pilot lamps (narrow range)	
TLPYE19TP(F)		476	2000	18	580	583	Colorless clear	50		
TLPYE18TP(F)		272	750	30	580	583	Colorless clear	50	Message boards Backlighting	
TLGE23TP(F)	Green	2720	7000	5	571	574	Colorless clear	50	Pilot lamps (narrow range)	
TLGU23TP(F)		1530	4000		571	574	Colorless clear	30		
TLGE19TP(F)		476	1300	18	571	574	Colorless clear	50		
TLGE18TP(F)		272	700	30	571	574	Colorless clear	50	Message boards Backlighting	
TLGE18CP(F)		153	500		571	574	Green clear	50		
TLGU18TP(F)		85	200		571	574	Colorless clear	30		
TLGU18CP(F)		47.6	180		571	574	Green clear	30		
TLGU13CP(F)		47.6	120	45	571	574	Green clear	30	Backlighting (wide range)	
TLGU13DP(F)		27.2	70	55	571	574	Green diffused	30		
TLGE25TP(F)		27.2	90	75	571	574	Colorless clear	50		
TLGE11TP(F)		8.5	20	130	571	574	Colorless clear	50	Pilot lamps (narrow range)	
TLFGE23TP(F)	1530	5000	5	565	568	Colorless clear	50			
TLFGE19TP(F)	272	800	18	565	568	Colorless clear	50			
TLFGE19CP(F)	272	800		565	568	Green clear	50			
TLFGE18TP(F)	85	300	30	565	568	Colorless clear	50	Message boards Backlighting		
TLPGE23TP(F)	Pure green	850	3000	5	558	562	Colorless clear	50	Pilot lamps (narrow range)	
TLPGU23TP(F)		476	1600		558	562	Colorless clear	30		
TLPGE19TP(F)		153	500	18	558	562	Colorless clear	50		
TLPGE18TP(F)		85	200	30	558	562	Colorless clear	50	Message boards Backlighting	
TLPGU18TP(F)		27.2	90		558	562	Colorless clear	30		
TLPGU13CP(F)		27.2	80		45	558	562	Green clear		30
TLPGU13DP(F)		15.3	35		55	558	562	Green diffused		30
TLPGE11TP(F)		2.72	8	130	558	562	Colorless clear	50	Backlighting (wide range)	

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High-Brightness LED Lamps (φ3)

Part Number	Source Color	Optical Characteristics (Ta = 25°C)					Maximum DC Forward Current Rating If (mA) @Ta = 25°C	Typical Applications		
		Intensity (mcd) If = 20 mA		Viewing Angle 201/2 (°)	Typical Emitting Wavelength				Lens Color	
		Min	Typ.		λd (nm)	λp (nm)				
TLSU163(F)	Red	476	4000	9	623	636	Red clear	30	Pilot lamps	
TLSU160(F)		476	1600		623	636	Colorless clear	30		
TLSE50T(F)		1530	3500		16	613	623	Colorless clear		50
TLRME50C(F)		1530	3500	626		636	Red clear	50		
TLRME50T(F)		850	2200	626		636	Colorless clear	50		
TLRE50T(F)		850	1800	18	630	644	Colorless clear	50		
TLSU164(F)		153	450		623	636	Red diffused	30		
TLSU125(F)		153	300		35	623	636	Colorless clear		30
TLSU123(F)		85	270	623		636	Red clear	30		
TLSU126(F)		85	180	40	623	636	Colorless diffused	30		
TLSU124(F)		47.6	100		623	636	Red diffused	30		
TLSE53T(F)		272	800	45	613	623	Colorless clear	50		
TLRME53T(F)		272	600		626	636	Colorless clear	50		
TLRE53T(F)		153	400		630	644	Colorless clear	50		
TLSU262(F)		47.6	170	60	623	636	Colorless clear	30	Backlighting (wide range)	
TLRME68TG(F) Δ		85	330	80	626	636	Colorless clear	50		
TLRME68CG(F) Δ		85	260		626	636	Red clear	50		
TLSE62T(F)		85	200		613	623	Colorless clear	50		
TLRME62T(F)		47.6	180		626	636	Colorless clear	50		
TLSU268G(F) Δ		47.6	130		623	636	Colorless clear	30		
TLRE62T(F)		47.6	120	100	630	644	Colorless clear	50		
TLRME68DG(F) Δ		47.6	140		626	636	Red diffused	50		
TLRE60T(F)		15.3	45	120	630	644	Colorless clear	50		
TLOU160(F)	Orange	476	2500	9	605	612	Colorless clear	30		Pilot lamps
TLOE50C(F)		2720	7000	16	605	612	Orange clear	50		
TLOE50T(F)		1530	4500		605	612	Colorless clear	50		
TLOU123(F)		85	400	35	605	612	Orange clear	30		
TLOU124(F)		47.6	180	40	605	612	Orange diffused	30		
TLOE53T(F)		272	1000	45	605	612	Colorless clear	50		
TLOU262(F)		47.6	300	60	605	612	Colorless clear	30	Backlighting (wide range)	
TLOU267(F)		47.6	200		605	612	Orange clear	30		
TLOE62T(F)		153	350	80	605	612	Colorless clear	50		
TLOE60T(F)		27.2	100	120	605	612	Colorless clear	50		
TLYU160(F)	Yellow	476	1500	9	587	590	Colorless clear	30	Pilot lamps	
TLYE50T(F)		1530	3500	16	587	590	Colorless clear	50		
TLYE50C(F)		1530	3500		587	590	Yellow clear	50		
TLYU123(F)		85	220	35	587	590	Yellow clear	30		
TLYU124(F)		47.6	110	40	587	590	Yellow diffused	30		
TLYE53T(F)		272	800	45	587	590	Colorless clear	50		
TLYU262(F)		47.6	150	60	587	590	Colorless clear	30	Backlighting (wide range)	
TLYU267(F)		47.6	90		587	590	Yellow clear	30		
TLYE68TG(F) Δ		85	340	80	587	590	Colorless clear	50		
TLYE68CG(F) Δ		85	300		587	590	Yellow clear	50		
TLYE62T(F)		85	250	100	587	590	Colorless clear	50		
TLYE68DG(F) Δ		47.6	150		587	590	Yellow diffused	50		
TLYE60T(F)		27.2	85	120	587	590	Colorless clear	50		
TLPYE50T(F)		Pure yellow	850	2500	16	580	583	Colorless clear	50	Pilot lamps
TLPYE53T(F)			153	450	45	580	583	Colorless clear	50	
TLPYE62T(F)	47.6		150	80	580	583	Colorless clear	50	Backlighting (wide range)	

Δ : Mount flush with PCB

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

Part Number	Source Color	Optical Characteristics (Ta = 25°C)						Maximum DC Forward Current Rating If (mA) @Ta = 25°C	Typical Applications
		Intensity (mcd) If = 20 mA		Viewing Angle 2θ1/2 (°)	Typical Emitting Wavelength		Lens Color		
		Min	Typ.		λd (nm)	λp (nm)			
TLGU50T(F)	Green	476	1200	10	571	574	Colorless clear	30	Pilot lamps
TLGE50T(F)		476	1500	16	571	574	Colorless clear	50	
TLGU53T(F)		47.6	170	40	571	574	Colorless clear	30	
TLGU53C(F)		47.6	150		571	574	Green clear	30	
TLGE53T(F)		153	400	45	571	574	Colorless clear	50	
TLGU53D(F)		27.2	80	50	571	574	Green diffused	30	Backlighting (wide range)
TLGU62T(F)		27.2	70	80	571	574	Colorless clear	30	
TLGE68TG(F) Δ		47.6	155		571	574	Colorless clear	50	
TLGE68CG(F) Δ		47.6	110		571	574	Green clear	50	
TLGE62T(F)		47.6	110		571	574	Colorless clear	50	
TLGE68DG(F) Δ		15.3	45	100	571	574	Green diffused	50	
TLGE60T(F)		15.3	50	120	571	574	Colorless clear	50	
TLFGE50T(F)	Fresh green	272	1000	16	565	568	Colorless clear	50	Pilot lamps
TLFGE50C(F)		272	1000		565	568	Green clear	50	
TLFGE53T(F)		85	200	45	565	568	Colorless clear	50	
TLFGE68CG(F) Δ		27.2	70	80	565	568	Green clear	50	Backlighting (wide range)
TLFGE62T(F)		27.2	70		565	568	Colorless clear	50	
TLFGE68DG(F) Δ		15.3	30		100	565	568	Green diffused	
TLPGU50T(F)	Pure green	153	450	10	558	562	Colorless clear	30	Pilot lamps
TLPGE50T(F)		153	600	16	558	562	Colorless clear	50	
TLPGU53T(F)		27.2	80	40	558	562	Colorless clear	30	
TLPGU53C(F)		27.2	70		558	562	Green clear	30	
TLPGE53T(F)		47.6	130	45	558	562	Colorless clear	50	
TLPGU53D(F)		15.3	40	50	558	562	Green diffused	30	Backlighting (wide range)
TLPGE62T(F)		15.3	45	80	558	562	Colorless clear	50	
TLPGU62T(F)		8.5	25		558	562	Colorless clear	30	

Δ : Mount flush with PCB

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

High-Brightness LED Lamps (Other)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)						Maximum DC Forward Current Rating If (mA) @ Ta = 25°C	Typical Applications
			Intensity (mcd) If = 20 mA		Viewing Angle 201/2 (°)	Typical Emitting Wavelength		Lens Color		
			Min	Typ.		λd (nm)	λp (nm)			
TLSE27C(F)	Red	Elliptical 5 x 5.8	272	750	30/50	613	623	Red clear	50	Message boards
TLRME27C(F)			153	400		626	636	Red clear	50	
TLRE27C(F)			85	300		630	644	Red clear	50	
TLOU248(F)	Orange		85	450	30/45	605	612	Orange clear	30	
TLOE27C(F)			272	800	30/50	605	612	Orange clear	50	
TYE27C(F)	Yellow		272	650	30/50	587	590	Yellow clear	50	
TLGE27C(F)	Green		85	250	30/50	571	574	Green clear	50	
TLGU27C(F)			47.6	180		571	574	Green clear	30	
TLRE28C(F)	Red	Elliptical 4.3 x 5	85	200	80/50	630	644	Red clear	50	
TLRME28C(F)			85	200		626	636	Red clear	50	
TLSE28C(F)			85	300		613	623	Red clear	50	
TYE28C(F)	Yellow		153	350		587	590	Yellow clear	50	
TLOE28C(F)	Orange		153	500		605	612	Orange clear	50	
TLGE28C(F)	Green		47.6	150		571	574	Green clear	50	
TLOE33CP(F) *	Orange	Arched 5 x 2.5	1530	4000	10	605	612	Orange clear	50	Backlighting
TYE33CP(F) *	Yellow		1530	3500		587	590	Yellow clear	50	
TLPYE33CP(F) *	Pure yellow		476	1400		580	583	Yellow clear	50	
TLFGE33CP(F) *	Fresh green		153	400		565	568	Green clear	50	
TLGE33CP(F) *	green		272	800		571	574	Green clear	50	
TLGE33TP(F) *			476	1300		571	574	Colorless clear	50	

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

*: New product

Surface-Mount LED Lamps (1608)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)					Packaging Specification	
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 2θ1/2 (°)		If (mA)
			Min	Typ.	λd (nm)	λp (nm)			
TLRE1008A(T04)/(T05) ☆	Red	1.6(L) x 0.8(W) x 0.6(H) (PCB type)	27.2	70	630	644	100 to 140	20	Embossed taping Taping No.: T04 4-mm pitch 4000 pcs/reel Taping No.: T05 2-mm pitch 8000 pcs/reel
TLSE1008A(T04)/(T05) ☆	Red		47.6	140	613	623			
TLOE1008A(T04)/(T05) ☆	Orange		47.6	180	605	612			
TYE1008A(T04)/(T05) ☆	Yellow		27.2	105	587	590			
TLPYE1008A(T04)/(T05) ☆	Pure yellow		27.2	70	580	583			
TLGE1008A(T04)/(T05) ☆	Green		27.2	70	571	574			
TLFGE1008A(T04)/(T05) ☆	Fresh green		15.3	40	565	568			
TLPGE1008A(T04)/(T05) ☆	Pure green		4.76	18	558	562			
TLSU1008A(T04)/(T05) ☆	Red		27.2	60	623	636			
TLOU1008A(T04)/(T05) ☆	Orange		27.2	78	605	612			
TLAU1008A(T04)/(T05) ☆	Amber		8.5	30	592	596			
TYU1008A(T04)/(T05) ☆	Yellow		8.5	30	587	590			
TLGU1008A(T04)/(T05) ☆	Green		8.5	30	571	574			
TLPGU1008A(T04)/(T05) ☆	Pure green		1.53	6	558	562			
TLRV1022(T14,F)/(T15,F) ☆	Red	1.6(L) x 0.8(W) x 0.45(H) (ESC type)	4.76	15	630	644	140	5	Embossed taping Taping No.: T14 4-mm pitch 4000 pcs/reel Taping No.: T15 2-mm pitch 8000 pcs/reel
TLRMV1022(T14,F)/(T15,F) ☆	Red		4.76	20	626	636			
TLSV1022(T14,F)/(T15,F) ☆	Red		8.5	30	613	623			
TLOV1022(T14,F)/(T15,F) ☆	Orange		8.5	38	605	612			
TYV1022(T14,F)/(T15,F) ☆	Yellow		8.5	25	587	590			
TLGV1022(T14,F)/(T15,F) ☆	Green		4.76	14	571	574			
TLPGV1022(T14,F)/(T15,F) ☆	Pure green		1.53	3.5	561	558			

☆: Dry-packed

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

Surface-Mount LED Lamps (2125)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)					Packaging Specification	
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 2θ1/2 (°)		If (mA)
			Min	Typ.	λd (nm)	λp (nm)			
TLRE1002A(T02) ☆	Red	2.0(L) x 1.25(W) x 1.1(H)	27.2	70	630	644	120 to 140	20	Embossed taping Taping No.: T02 4-mm pitch 3000 pcs/reel
TLSE1002A(T02) ☆	Red		47.6	140	613	623			
TLOE1002A(T02) ☆	Orange		47.6	180	605	612			
TYE1002A(T02) ☆	Yellow		27.2	105	587	590			
TLPYE1002A(T02) ☆	Pure yellow		27.2	70	580	583			
TLGE1002A(T02) ☆	Green		27.2	70	571	574			
TLFGE1002A(T02) ☆	Fresh green		15.3	40	565	568			
TLPGE1002A(T02) ☆	Pure green		4.76	18	558	562			
TLRU1002A(T02) ☆	Red		15.3	45	630	644			
TLSU1002A(T02) ☆	Red		27.2	60	623	636			
TLOU1002A(T02) ☆	Orange		27.2	78	605	612			
TLAU1002A(T02) ☆	Amber		8.5	30	592	596			
TYU1002A(T02) ☆	Yellow		8.5	30	587	590			
TLGU1002A(T02) ☆	Green		8.5	30	571	574			
TLPGU1002A(T02) ☆	Pure green		1.53	6	558	562			
TLEGC1002(T02) ** ☆	Green		40	120	535	520	10		
TLBC1002(T02) ** ☆	Blue		16	45	472	470			

☆: Dry-packed

** : Under development

- All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

Surface-Mount LED Lamps (2214)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)					Packaging Specification	
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 2θ1/2 (°)		IF (mA)
			Min	Typ.	λd (nm)	λp (nm)			
TLRF1060(T18) * ☆	Red	2.2(L) x 1.4(W) x 1.3(H)	40	100	630	644	100	20	Embossed taping Taping No.: T18 4-mm pitch 3000 pcs/reel
TLSF1060(T18) * ☆	Red		100	200	613	623			
TLOF1060(T18) * ☆	Orange		100	220	605	612			
TLYF1060(T18) * ☆	Yellow		63	180	587	590			
TLPYF1060(T18) * ☆	Pure yellow		40	100	580	583			
TLGF1060(T18) * ☆	Green		40	80	571	574			
TLFGF1060(T18) * ☆	Fresh green		25	50	565	568			
TLPGF1060(T18) * ☆	Pure green		10	20	558	562			
TLBD1060(T18) ** ☆	Blue		16	40	470	468			
TLEGD1060(T18) ** ☆	Green		63	160	528	523			

☆: Dry-packed

• All of the above products are Lead(Pb)-Free. For details, please contact your nearest Toshiba sales representative.

*: New product

** : Under development

Surface-Mount LED Lamps (with φ2 Lens-Top)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)					Packaging Specification	
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 2θ1/2 (°)		If (mA)
			Min	Typ.	λd (nm)	λp (nm)			
TLRE1005B(T03) ☆	Red	3.2(L) x 2.4(W) x 2.4(H) with φ2 lens	153	450	630	644	30	20	Embossed taping Taping No.: T03 4-mm pitch 1000 pcs/reel
TLSE1005B(T03) ☆	Red		272	1000	613	623			
TLOE1005B(T03) ☆	Orange		476	1500	605	612			
TLYE1005B(T03) ☆	Yellow		272	850	587	590			
TLPYE1005B(T03) ☆	Pure yellow		153	430	580	583			
TLGE1005B(T03) ☆	Green		153	350	571	574			
TLFGE1005B(T03) ☆	Fresh green		85	260	565	568			
TLPGE1005B(T03) ☆	Pure green		47.6	130	558	562			

☆: Dry-packed

Large Size SMD LED Lamps (Flat-Top)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)						Packaging Specification
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 201/2 (°)	If (mA)	
			Min	Typ.	λ.d (nm)	λ.p (nm)			
TLRMH1100B(T11) ☆	Red	3.2(L) x 2.8(W) x 1.9(H)	63	150	626	636	120	20	Embossed taping Taping No.: T11 4-mm pitch 2000 pcs/reel
TLSH1100B(T11) ☆	Red		160	260	613	623			
TLOH1100B(T11) ☆	Orange		160	270	605	612			
TLYH1100B(T11) ☆	Yellow		100	220	587	590			
TLRE1100B(T11) ☆	Red		40	100	630	644			
TLSE1100B(T11) ☆	Red		63	180	613	623			
TLOE1100B(T11) ☆	Orange		63	180	605	612			
TLYE1100B(T11) ☆	Yellow		63	150	587	590			
TLGE1100B(T11) ☆	Green		40	100	571	574			
TLPGE1100B(T11) ☆	Pure green		10	25	558	562			
TLBA1100B(T11) ☆	Blue		4	7	465	428			
TLGTE1100B(T11) ** ☆	Bluish green		160	300	505	496			
TLEGE1100B(T11) ** ☆	Green		160	350	528	523			
TLEGD1100B(T11) ** ☆	Green		100	180	528	523			
TLBD1100B(T11) ** ☆	Blue		25	45	470	468			
TLWH1100(T11) ☆	White		250	420	▲ 0.33/0.32				
TLWD1100(T11) ☆	White		63	180	▲ 0.32/0.3				
TLWA1100(T11) ☆	White		63	100	▲ 0.33/0.32				
TLBGA1100(T11) ☆	Bluish green		63	100	▲ 0.15/0.32				
TLRPA1100(T11) ☆	Reddish purple		40	70	▲ 0.35/0.20				
TLRMH1106(T11) ☆	Red		160	380	626	636			
TLSH1106(T11) ☆	Red		250	500	613	623			
TLOH1106(T11) ☆	Orange		250	600	605	612			
TLYH1106(T11) ☆	Yellow		250	450	587	590			
TLGH1106(T11) ☆	Green		100	200	571	574			

☆: Dry-packed

** : Under development

▲ : CIE1931 (chromaticity coordinate) (typ.)

• The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

Large Size SMD LED Lamps (Lens-Top)

Part Number	Source Color	Package Size (mm)	Optical Characteristics (Ta = 25°C)					Packaging Specification	
			Intensity Iv (mcd)		Typical Emitting Wavelength		Viewing Angle 2θ1/2 (°)		If (mA)
			Min	Typ.	λd (nm)	λp (nm)			
TLRH1102B(T10) ☆	Red	3.2(L) x 2.8(W) x 3.4(H) with φ2.8 lens	160	400	630	644	65	20	Embossed taping Taping No.: T10 8-mm pitch 500 pcs/reel
TLRMH1102B(T10) ☆	Red		160	480	626	636			
TLSH1102B(T10) ☆	Red		400	850	613	623			
TLOH1102B(T10) ☆	Orange		400	950	605	612			
TLYH1102B(T10) ☆	Yellow		250	700	587	590			
TLRE1102B(T10) ☆	Red		100	320	630	644			
TLSE1102B(T10) ☆	Red		250	600	613	623			
TLOE1102B(T10) ☆	Orange		250	650	605	612			
TLYE1102B(T10) ☆	Yellow		160	480	587	590			
TLGE1102B(T10) ☆	Green		100	300	571	574			
TLPGE1102B(T10) ☆	Pure green		25	75	558	562			

☆: Dry-packed

Photosensors

Infrared LEDs and Visible LEDs for Sensor Light Sources

Part Number	Part Number with Rank	Package	Electrical/Optical Characteristics (Ta = 25°C)								Applications
			Radiant Intensity			Radiant Power			Peak Emission Wavelength (nm)	Half-Value Angle (°)	
			Min (mW/sr)	Max (mW/sr)	If (mA)	Min (mW)	Max (mW)	If (mA)			
TLN108(F)	—	TO-18CAN with lens	10	—	50	—	—	—	940	±8	Optoelectronic switches
TLN201(F)	—	TO-18CAN with lens	20	—	50	—	—	—	880	±7	
TLN105B(F)	—	φ5	12	—	50	—	—	—	950	±23.5	Remote controls
TLN110(F)	—	φ5	15	—	50	—	—	—	940	±8	Optoelectronic switches
TLN115A(F)	—	φ5	15	—	50	—	—	—	950	±21	Remote controls
	TLN115A(B,F)		19	—							
TLN231(F)	—	φ5	35	—	50	—	—	—	870	±16	Fiberless optical transmissions, optoelectronic switches
TLN233(F)	—	φ5	46	—	50	—	—	—	870	±13	
TLN227(F)	—	φ5	—	—	—	14	—	50	870	±5	Fiberless optical transmissions
TLN225(F)	—	φ4.9	—	—	—	14	—	50	870	±21	
TLN226(F)	—	φ4.9	—	—	—	14	—	50	870	±13	
TLN210(F)	—	φ3.6 and side-view package	—	—	—	7	—	300 (Note 2)	875	±32	Used only for cameras (for light projection)
TLN212(F)	—	φ3.6 and side-view package	—	—	—	8	—	300 (Note 2)	870	±35	
TLN217(F)	—	φ3.6 and side-view package	—	—	—	12	—	300 (Note 2)	870	±32.5	
TLN119(F)	—	φ3	2.5	10	20	—	—	—	945	±30	Optoelectronic switches
	TLN119(B,F)		4.2	10							
TLN238(F)	—	φ3	40	—	50	—	—	—	870	±18	Fiberless optical transmissions, optoelectronic switches
TLOH9202 ◆ (Note 1)	—	φ3.1 SOP	Iv = 13cd Typ.	—	20	—	—	—	612	±4	Used only for cameras (for auxiliary lighting)
TLOH9203 ◆ (Note 1)	—	φ3.1 SOP	Iv = 15cd Typ.	—	20	—	—	—	612	±4	Used only for cameras (for auxiliary lighting)
TLN117(F)	—	Small side-view package	2	—	20	—	—	—	940	±15	Optoelectronic switches
	TLN117(B,F)		2	7.5							
	TLN117(C,F)		5	18.7							

◆: Lead(Pb)-Free

Note: If = forward current; Iv: Intensity

Note 1: Orange LED

Note 2: t = 10 ms ON

• The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Phototransistors

Part Number	Part Number with Rank	Package	Electrical/Optical Characteristics (Ta = 25°C)								Applications
			Light Current			Dark Current		Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light	
			Min (μA)	Max (μA)	E (mW/cm ²)	Max (μA)	V _{CE} (V)				
TPS601A(F)	—	TO-18CAN with lens	100	—	0.1	0.2	30	800	±10	—	Optoelectronic switches
	TPS601A(A,F)		100	300							
	TPS601A(B,F)		200	600							
	TPS601A(C,F)		400	1200							
TPS610(F)	—	φ5	100	—	0.1	0.1	24	800	±8	—	
TPS611(F)	—	φ5	30	—	0.1	0.1	24	900	±8	●	
TPS615(F)	—	φ3	20	150	0.1	0.1	24	800	±30	—	
	TPS615(A,F)		20	50							
	TPS615(B,F)		34	85							
	TPS615(C,F)		60	150							
	TPS615(AB,F)		20	85							
	TPS615(BC,F)		34	150							
TPS616(F)	—	φ3	10	75	0.1	0.1	24	900	±30	●	
	TPS616(A,F)		10	25							
	TPS616(B,F)		17	42.5							
	TPS616(C,F)		30	75							
	TPS616(AB,F)		10	42.5							
	TPS616(BC,F)		17	75							
TPS622(F)	—	Small side-view package	27	—	0.1	0.1	24	870	±15	●	
	TPS622(A,F)		27	80							
	TPS622(B,F)		55	165							

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

• The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photodiodes

Part Number	Package	Electrical/Optical Characteristics (Ta = 25°C)							Applications
		Short-Circuit Current		Dark Current		Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light	
		Min (μA)	E (mW/cm²)	Max (nA)	VR (V)				
TPS703(F)	Side-view package	0.9	0.1	30	10	960	±65	●	Remote controls
TPS704(F)		0.5	0.1	30	10	1000	±65	●	

Note: E = radiant incidence; V_R = reverse voltage

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photo-ICs (Digital Output)

Part Number	Package	Electrical/Optical Characteristics (Ta = 25°C)								Applications
		Output Type		Threshold Radiant Incidence			Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light	
		With Resistor	Open-Collector	L → H Max (mW/cm²)	H → L Max (mW/cm²)	Vcc (V)				
TPS841(F)	Small side-view package	—	●	0.3	—	2.7 to 15	900	±15	●	Optoelectronic switches
TPS842A(F)		—	●	—	0.3	2.7 to 15	900	±15	●	
TPS843(F)		●	—	0.3	—	2.7 to 15	900	±15	●	
TPS844(F)		●	—	—	0.3	2.7 to 15	900	±15	●	
TPS816(F)	Side-view package, optical modulation	●	—	0.08	0.1	5	900	±65	●	High-speed optical remote controllers (fo = 455 kHz)
TPS830(F)	Side-view package, oval lens	●	—	L = 3 m (min)		5	900	±63/±30	●	
TPS831(F)		●	—			5	940	±63/±30	●	

Note: V_{CC} = power supply voltage; L: Transmission range; fo: Carrier frequency

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photo-ICs (Analog Output)

Part Number	Part Number with Rank	Package	Electrical/Optical Characteristics (Ta = 25°C)									Applications
			Light Current				Dark Current		Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light	
			Min (μA)	Max (μA)	Ev (lx)	Vcc (V)	Max (μA)	Vcc (V)				
TPS820(F)	—	Small side-view package	(1500)	(6000)	E = 0.1 mW/cm ²	5	0.5	5	870	±15	●	Optoelectronic switches
TPS850	◆	Chip type SMD: 3.2(L) x 2.4(W) x 1.1(H)	180	300	100	3	0.5	3.3	640	±40	—	Illuminance sensor
TPS851	◆	Chip type	37	74	100	3	0.17	3.3	600	±55	—	
	TPS851(A)	37	62									
	TPS851(B)	44	74									
TPS852	◆	Chip type	27	54	100	3	0.1	3.3	600	±55	—	
	TPS852(A)	30	50									
TPS853	◆ *	Chip type	37	74	100	3	0.17	3.3	600	±55	—	
	TPS853(A)	42	70									
TPS855(F)	—	Side-view package	210	350	100	5	0.5	5.5	640	±65	—	

◆: Lead(Pb)-Free

*: New product

Note: V_{CC} = power supply voltage; Ev: Illuminance; E = radiant incidence

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photointerrupters (Phototransistor Output)

Part Number	Package	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)				Maximum Ratings (Ta = 25°C)	Applications
				Current Transfer Ratio				Collector-Emitter Voltage (V)	
				Min (%)	Max (%)	IF (mA)	VCE (V)		
TLP832(F)	PWB direct mounting	5	0.5	5	100	10	2	35	Printers, fax machines, copiers, image scanners, VCRs, vending machines, cameras
TLP833(F)		5	0.5	5	100	10	2	35	
TLP841 ◆		5	0.5	2.5	50	10	2	35	
TLP831(F)		4.2	0.5 (Note 1)	5	100	10	2	35	
TLP830(F)		2	0.15	3	20	10	2	35	
TLP828(F)	PWB direct mounting, dust-proof type	5	—	7.5	150	10	2	35	
TLP844 ◆	PWB direct mounting, ultra-compact package	2	0.3	3.5	35	5	2	35	
TLP846 ◆		1.2	0.15	3	24	5	2	35	
TLP846 (R) ◆		1.2	0.15	4	20	5	2	35	

◆: Lead(Pb)-Free

Note: PWB = printed wiring board; IF = forward current; VCE = collector-emitter voltage

Note 1: Horizontal slit

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photointerrupters (Photo-IC Output)

Part Number	Package	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)					Applications
				Output Type		Threshold Input Current			
				With Resistor	Open-Collector	L → H Max (mA)	H → L Max (mA)	Vcc (V)	
TLP1033A(F)	PWB direct mounting	5	0.5	—	●	—	3	2.7 to 15	Printers, fax machines, copiers, image scanners, vending machines, amusement equipment
TLP1032(F) *				—	●	3	—	2.7 to 15	

Note: PWB = printed wiring board; Vcc = power supply voltage

*: New product

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photointerrupters (with Connector)

Part Number	Package	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)			Connector Manufacturer	Applications
				Operating Supply Voltage (V)	Output Type			
					With Resistor	Open-Collector		
TLP1241(C5,F)	Snap-in mounting	5	0.5	V _{CE} ≤ 35 V	—	Phototransistor output	Tyco Electronics AMP K.K.	Printers, copiers, fax machines, vending machines, FA equipment, amusement equipment
TLP1242(C6,F)			0.5	V _{CE} ≤ 35 V	—	Phototransistor output	Tyco Electronics AMP K.K.	
TLP1243(C8) ◆			0.7	V _{CE} ≤ 35 V	—	Phototransistor output	Tyco Electronics AMP K.K.	
TLP1251(C5,F)			0.5	4.5 to 5.5	—	●	Tyco Electronics AMP K.K.	
TLP1252(C6,F)			0.5	4.5 to 5.5	—	●	Tyco Electronics AMP K.K.	
TLP1253(C6,F)			0.5	4.5 to 5.5	—	●	Tyco Electronics AMP K.K.	
TLP1255(C8) ◆			0.7	2.97 to 5.5	—	●	Tyco Electronics AMP K.K.	

◆: Lead(Pb)-Free

Note: VCE: Collector-emitter voltage

- The suffix (F) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Photocouplers and Photorelays

Transistor Output

Part Number	Pin Configuration	Features	CTR				V _{CEO} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Min (%)	Max (%)	@I _F / V _{CE} (mA) (V)			UL	TÜV	VDE	BSI	IEC
TLP124		Mini-flat 6-pin MFSOP Low input drive current	— BV	100 200	1200	1/0.5	80	3750	○				
TLP126		Mini-flat 6-pin MFSOP AC input Low input drive current	—	100	1200	±1/0.5			○				
TLP130		Mini-flat 6-pin MFSOP AC input Internal base connection	— GB	50 100	600	±5/5			○				
TLP131		Mini-flat 6-pin MFSOP General-purpose Internal base connection	— GB	50 100	600	5/5			○				
TLP137		Mini-flat 6-pin MFSOP Low input drive current Internal base connection	— BV	100 200	1200	1/0.5			○				
TLP180		Mini-flat 6-pin MFSOP AC input SEMKO-approved	— GB	50 100	600	±5/5			○	○ ⁽¹⁾	△	◎ EN 60950 EN 60065	△ 60950 60065
TLP181		Mini-flat 6-pin MFSOP General-purpose High CTR SEMKO-approved	— GB Y GR BL YH GRL GRH	50 100 50 100 200 75 100 150	600 150 300 600 150 200 300	5/5			○	△	○ ⁽¹⁾	◎ EN 60950 EN 60065	△ 60950 60065

Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option V4.

Part Number	Pin Configuration	Features	CTR				V _{CEO} (V)	BVS 1 Minute (V _{rms})	Safety Standards ⁽²⁾						
			Rank	Min (%)	Max (%)	@I _F / V _{CE} (mA) (V)			UL	TÜV	VDE	BSI	IEC		
TLP280		4-pin SOP Lead pitch: 1.27 mm AC input SEMKO-approved	—	50	600	±5/5	80	2500	○	△	○ ⁽¹⁾	◎ EN 60950 EN 60065	△ 60950 60065		
TLP280-4		16-pin SOP 4-channel version of the TLP280 Lead pitch: 1.27 mm AC input SEMKO-approved	GB	100					600	±5/5	○	△	○ ⁽¹⁾	◎ EN 60950 EN 60065	△ 60950 60065
			TLP281		4-pin SOP Lead pitch: 1.27 mm General-purpose SEMKO-approved	—					50	600	5/5	○	△
GB	100														
Y	50	150													
GR	100	300													
BL	200	600													
YH	75	150													
GRL	100	200													
GRH	150	300													
BLL	200	400													
TLP281-4		16-pin SOP 4-channel version of the TLP281 Lead pitch: 1.27 mm SEMKO-approved	—	50	600	5/5			○	△	○ ⁽¹⁾	◎ EN 60950 EN 60065	△ 60950 60065		
			GB	100											
TLP283		4-pin SOP Lead pitch: 1.27 mm Low input drive current High-speed switching	—	100	400	1/5			100	2500	○				
TLP283-4		16-pin SOP 4-channel version of the TLP283 Lead pitch: 1.27 mm Low input drive current High-speed switching													
TLP320		4-pin DIP High input current AC input I _F = 150 mA	—	20	80	±100/1	55	5000	○			◎ EN 60950 EN 60065	△ 60950 60065		
TLP320-2		8-pin DIP Dual channel version of the TLP320	—	20											
TLP320-4		16-pin DIP 4-channel version of the TLP320	—	20											
TLP330		6-pin DIP High input current AC input I _F = 150 mA	—	20	80	±100/1	55	5000	○						

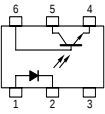
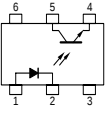
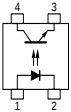
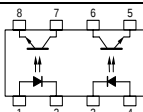
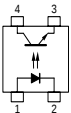
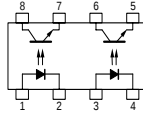
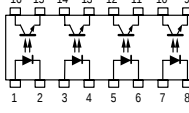
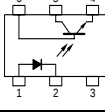
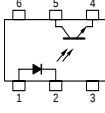
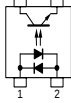
Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option V4.

Transistor Output (Continued)

Part Number	Pin Configuration	Features	CTR				V _{CEO} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Min (%)	Max (%)	@I _F / V _{CE} (mA) (V)			UL	TÜV	VDE	BSI	IEC
TLP331		6-pin DIP Low input drive current Internal base connection	—	100	1200	1/0.5	55	5000	○				
			BV	200									
TLP332		6-pin DIP Low input drive current No internal base connection	—	100									
			BV	200									
TLP421 TLP421F		4-pin DIP High isolation voltage UL-approved (double protection) EN60747-approved with option (D4) SEMKO-approved	—	50	600	5/5	80	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
			GB	100									
			BL	200									
			GR	100	300								
			Y	50	150								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								
TLP504A		8-pin DIP General-purpose	—	50	600	5/5	55	2500	○				
			GB	100									
TLP521-1		4-pin DIP General-purpose	A	50	600	5/5	55	2500	○				
			GB	100	600								
			Y	50	150								
			GR	100	300								
			BL	200	600								
TLP521-2		8-pin DIP Dual channel version of the TLP521-1	A	50	600	5/5	55	2500	○				
			GB	100									
TLP521-4		16-pin DIP 4-channel version of the TLP521-1	A	50	600	5/5	55	2500	○				
			GB	100									
TLP531 ⁽³⁾		6-pin DIP General-purpose Internal base connection	A	50	600	5/5	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
			GB	100									
			BL	200	300								
			GR	100	150								
			Y	50									
TLP532 ⁽³⁾		6-pin DIP General-purpose High EMI immunity No internal base connection	A	50	600	5/5	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
			GB	100									
			BL	200	300								
			GR	100	150								
			Y	50									
TLP620 TLP620F		4-pin DIP AC input EN60747-approved with option (D4) SEMKO-approved	—	50	600	±5/5	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
			GB	100									

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Note (3): The products with the ranks Y and BL are limited in production. For details, please contact your nearest Toshiba sales representative.

Part Number	Pin Configuration	Features	CTR				V _{CEO} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Min (%)	Max (%)	@ I _F / V _{CE} (mA) (V)			UL	TÜV	VDE	BSI	IEC
TLP620-2		8-pin DIP Dual channel version of the TLP620 EN60747-approved with option (D4) SEMKO-approved	—	50	600	±5/5	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP620-4		16-pin DIP 4-channel version of the TLP620 EN60747-approved with option (D4)	—	50									
TLP621 TLP621F		4-pin DIP High isolation voltage UL-approved (double protection) EN60747-approved with option (D4) SEMKO-approved	—	50	600	5/5	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP621-2		8-pin DIP Dual channel version of the TLP621 EN60747-approved with option (D4) SEMKO-approved	GB	100	600								
			Y	50	150								
TLP621-4		16-pin DIP 4-channel version of the TLP621 EN60747-approved with option (D4)	GB	100	600								
			BL	200	600								
TLP624		4-pin DIP Low input drive current BSI-approved	—	100	1200	1/0.5	55	5000	○	△ EN 60747	△ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP624-2		8-pin DIP Dual channel version of the TLP624 BSI-approved	BV	200									
			—	100									
TLP624-4		16-pin DIP 4-channel version of the TLP624 BSI-approved	—	100	1200	±1/0.5	55	5000	○	△ EN 60747	△ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP626		4-pin DIP Low input drive current AC input BSI-approved	BV	200									

Note (2): Legend in the Safety Standards column:

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TÜV and VDE: EN60747-5-2-approved with option D4.

Transistor Output (Continued)

Part Number	Pin Configuration	Features	CTR				V _{CE0} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Min (%)	Max (%)	@I _F / V _{CE} (mA) (V)			UL	TÜV	VDE	BSI	IEC
TLP626-2		8-pin DIP Dual channel version of the TLP626 BSI-approved	—	100	1200	±1/0.5	55	5000	○	△ EN 60747	△ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
			BV	200									
TLP626-4		16-pin DIP 4-channel version of the TLP626 BSI-approved	—	100	1200	±1/0.5	55	5000	○	△ EN 60747	△ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
			BV	200									
TLP628		4-pin DIP High V _{CE0} V _{CE0} = 350 V	—	50	600	5/5	350	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP628-2		8-pin DIP Dual channel version of the TLP628	—	50	600	5/5	350	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP628-4		16-pin DIP 4-channel version of the TLP628	—	50	600	5/5	350	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP629		4-pin DIP High input current I _F = 150 mA DC input	—	20	80	100/1	55	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP629-2		8-pin DIP Dual channel version of the TLP629	—	20	80	100/1	55	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP629-4		16-pin DIP 4-channel version of the TLP629	—	20	80	100/1	55	5000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP630		6-pin DIP AC input High isolation voltage	—	50	600	±5/5	55	5000	○				
			GB	100									
TLP631		6-pin DIP General-purpose Internal base connection	—	50	600	5/5	55	5000	○				
			GB	100									
TLP632		6-pin DIP General-purpose High EMI immunity No internal base connection	—	50	600	5/5	55	5000	○				
			GB	100									
TLP733 TLP733F		6-pin DIP EN60747-approved with option (D4) SEMCO-approved	—	50	600	5/5	55	4000	○	△ EN 60747	◎ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
			GB	100									
TLP734 TLP734F		6-pin DIP EN60747-approved with option (D4) SEMCO-approved No internal base connection	—	50	600	5/5	55	4000	○	△ EN 60747	◎ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
			GB	100									

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Darlington Transistor Output

Part Number	Pin Configuration	Features	CTR		V _{CE(sat)}		V _{CE0} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Min (%)	@I _F / V _{CE} (mA) (V)	Max (V)	@I _C / I _F (mA)			UL	TÜV	VDE	BSI	IEC
TLP127		Mini-flat 6-pin MFSOP High V _{CE0}	1000	1/1	1.2	100/10	300	2500	○	○ ⁽¹⁾	△	⊙ EN 60950 EN 60065	△ 60950 60065
TLP371		6-pin DIP High V _{CE0} SEMKO-approved	1000	1/1	1.2	100/10	300	5000	○				
TLP372		6-pin DIP High V _{CE0} No internal base connection											
TLP373		6-pin DIP High V _{CE0} Large emitter-collector distance	1000	1/1	1.2	100/10	300	5000	○				
TLP523		4-pin DIP General-purpose	500	1/1	1.0	50/10	55	2500	○				
TLP523-2		8-pin DIP Dual channel version of the TLP523											
TLP523-4		16-pin DIP 4-channel version of the TLP523											
TLP570		6-pin DIP General-purpose High EMI immunity	1000	1/1	1.2	100/10	35	2500	○				
TLP571		6-pin DIP General-purpose Internal base connection											

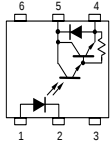
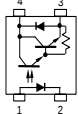
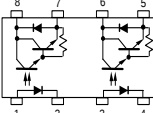
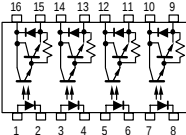
Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option V4.

Darlington Transistor Output (Continued)

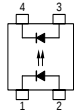
Part Number	Pin Configuration	Features	CTR		V _{CE(sat)}		V _{CE0} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Min (%)	@I _F / V _{CE} (mA) (V)	Max (V)	@I _C / I _F (mA)			UL	TÜV	VDE	BSI	IEC
TLP572		6-pin DIP General-purpose Built-in R _{BE}	1000	1/1.2	1.2	100/10	55	2500	○				
TLP627		4-pin DIP High V _{CE0} BSI-approved SEMKO-approved	1000	1/1	1.2	100/10	300	5000	○	△ EN 60747	◎ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
TLP627-2		8-pin DIP Dual channel version of the TLP627 BSI-approved SEMKO-approved											
TLP627-4		16-pin DIP 4-channel version of the TLP627 BSI-approved											

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Diode Output

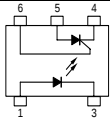
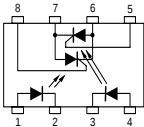
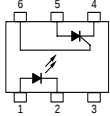
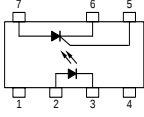
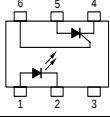
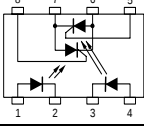
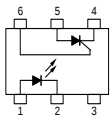
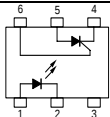
Part Number	Pin Configuration	Features	CTR		I _{LEAK}		V _{KAO} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Min (%)	@I _F (mA)	Max (nA)	@V _{KA} (V)			UL	TÜV	VDE	BSI	IEC
TLP722		4-pin DIP General-purpose High-speed response SEMKO-approved	0.1	10	50	10	30	4000	○	△ EN 60747	△ EN 60747	△ EN 60065 EN 60950	△ 60065 60950

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Thyristor Output

Part Number	Pin Configuration	Features	IFT	V _{TM}		V _{DRM} (V)	BVs 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Max (mA)	Max (V)	@I _{TM} (mA)			UL	TÜV	VDE	BSI	IEC
TLP141G		Mini-flat 6-pin MFSOP General-purpose	10	1.3	100	400	2500	○				
TLP511GA		8-pin DIP Bidirectional thyristor pair Low trigger current	7	1.3	100	400	2500	○				
TLP541G		6-pin DIP General-purpose Low trigger current	7	1.3	100	400		○				
TLP542G		8-pin DIP Large anode-cathode distance (SCR)	7	1.3	100	400		○				
TLP543J			10	1.3	100	600		○				
TLP545J		6-pin DIP High V _{DRM}	10	1.3	100	600		○				
TLP611J		8-pin DIP Bidirectional thyristor pair High isolation voltage	10	1.3	100	600	5000	○				
TLP641G		6-pin DIP General-purpose High isolation voltage	7	1.3	100	400		○				
TLP641J		6-pin DIP High V _{DRM} High isolation voltage	10	1.3	100	600		○				
TLP747G		6-pin DIP	15	1.3	100	400	4000	○	△ EN 60747	◎ EN 60747	◎ EN 60065 EN 60950	△ 60950
TLP747GF		EN60747-approved with option (D4)				600						
TLP747J		Internal creepage: 4 mm (min)										
TLP747JF		SEMKO-approved										

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Triac Output

Part Number	Pin Configuration	Features	IFT		V _{TM}		V _{DRM} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾							
			Rank	Max (mA)	Max (V)	@I _{TM} (mA)			UL	TÜV	VDE	BSI	IEC			
TLP160G		Mini-flat 6-pin MFSOP Non-zero cross	—	10	2.8	70	400	2500	○	Δ ⁽¹⁾	○ ⁽¹⁾					
TLP165J			IFT7	7					600	○	Δ ⁽¹⁾	○ ⁽¹⁾				
TLP160J			IFT5	5			400			○	Δ ⁽¹⁾	○ ⁽¹⁾				
TLP161G			IFT7	7					600	○	Δ ⁽¹⁾	○ ⁽¹⁾				
TLP166J		Mini-flat 6-pin MFSOP Zero cross	—	10			2.8			70	400	2500	○	Δ ⁽¹⁾	○ ⁽¹⁾	
TLP161J			IFT7	7					600				○	Δ ⁽¹⁾	○ ⁽¹⁾	
TLP168J			—	3							600		○			
			Mini-flat 6-pin MFSOP Zero cross Low trigger current													
TLP260J		Mini-flat 6-pin MFSOP Non-zero cross	—	10					2.8		70		600	3000	○	Δ ⁽¹⁾
TLP360J TLP360JF		4-pin DIP EN60747-approved with option (D4) Non-zero cross	—	10	2.8	70		600	5000		○		◎ EN 60747	Δ		
			IFT7	7												
TLP361J TLP361JF		4-pin DIP EN60747-approved with option (D4) Zero cross	—	10	2.8	70		600	5000		○		◎ EN 60747	Δ		
			IFT7	7												
TLP363J TLP363JF		4-pin DIP EN60747-approved with option (D4) Zero cross High impulse noise immunity	—	10	2.8	70	600	5000	○	◎ EN 60747	Δ					
TLP525G		4-pin DIP	—	10	3.0	100	400	2500	○							
TLP525G-2		8-pin DIP Dual channel version of the TLP525G	—	10												
TLP525G-4		16-pin DIP 4-channel version of the TLP525G	—	10												
TLP560G		6-pin DIP General-purpose Non zero cross	—	10	3.0	100	400	2500	○							
TLP560J			IFT7	7										600		
			IFT5	5			400									
TLP561G			IFT7	7										600		
TLP561J		6-pin DIP General-purpose Zero cross	—	10	3.0	100	400	2500	○							
			IFT7	7										600		
			IFT5	5			400									
			IFT7	7										600		

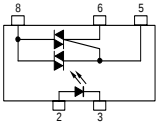
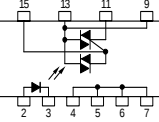
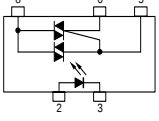
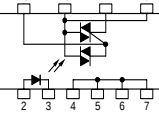
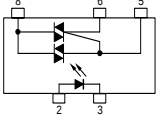
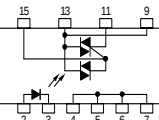
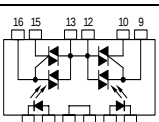
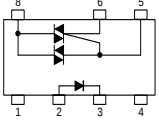
Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved Δ: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4 for DIP, V4 for MFSOP.

AC Power Output

Part Number	Pin Configuration	Features	IFT		ITM (Arms)	VDRM (V)	BVS 1 Minute (Vrms)	Safety Standards ⁽²⁾					
			Rank	Max (mA)	@Ta = 40°C			UL	TÜV	VDE	BSI	IEC	
TLP3502 TLP3503	 The TLP3503 offers a ZC version.	8-pin DIP Direct control of a load of up to 0.5 Arms	—	10	0.5	400	2500	○					
TLP3520 TLP3521	 The TLP3521 offers a ZC version.	16-pin DIP Direct control of a load of up to 1 Arms	IFT7	7									
			IFT5	5									
TLP3506 TLP3507	 The TLP3507 offers a ZC version.	8-pin DIP Direct control of a load of up to 0.5 Arms High VDRM	—	10	0.5	600		○					
TLP3526 TLP3527	 The TLP3527 offers a ZC version.	16-pin DIP Direct control of a load of up to 1 Arms High VDRM	—	10									1
TLP3502A	 The TLP3502A offers a ZC version.	8-pin DIP Direct control of a load of up to 0.6 Arms Non-zero cross	—	10	0.6	400		○					
TLP3520A	 The TLP3520A offers a ZC version.	16-pin DIP Direct control of a load of up to 1.2 Arms Non-zero cross	IFT7	7									
			IFT5	5									
TLP3530	 The TLP3530 offers a ZC version.	16-pin DIP Dual channel Direct control of a load of up to 1.0 Arms (for 1ch) or 1.4 Arms load (for 2 ch) Non-zero cross	—	10	1 [For 1channel]	400		○					
			IFT7	7	1.4 [For two channels]								
TLP3616 TLP3617	 The TLP3617 offers a ZC version.	8-pin DIP Direct control of a load of up to 1 Arms High VDRM	—	10	1 (1.2 @Ta = 25°C)	600		△	⊙ EN 60747				

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

IC Output

Part Number	Pin Configuration	Features	Data Rate (Typ. @NRZ)	CTR	@IF(IN) (mA)	BVs 1 Minute (Vrms)	Safety Standards ⁽²⁾				
							UL	TÜV	VDE	BSI	IEC
6N135		JEDEC-compliant High-speed	1 Mbits/s	7% min	16	2500	○				
6N136				19% min							
6N137		JEDEC-compliant High-speed	10 Mbits/s	700% typ.	5		○				
6N138		JEDEC-compliant High CTR High-speed	300 Kbits/s	300% min	1.6		○				
6N139				400% min	0.5						
TLP102		Mini-flat 6-pin MFSOP Inverter logic High CMR	250 ns	Totempole output	3	3750	△				
TLP106		Mini-flat 6-pin MFSOP Buffer logic High CMR	250 ns	Totempole output	3		△				
TLP112		Mini-flat 6-pin MFSOP High-speed, High CMR	1 Mbits/s	10% min	16	2500	○				
TLP112A		Highly sensitive version of the TLP112		20% min							
TLP113		Mini-flat 6-pin MFSOP High-speed Logic output	10 Mbits/s	Open-collector output	10	3750	○				
TLP114A		Mini-flat 6-pin MFSOP	1 Mbits/s	20% min	16		○	○ ⁽¹⁾	△		
TLP114A(IGM)		High CMR version of the TLP112A	0.45 μs	25% min	10						
TLP115		Mini-flat 6-pin MFSOP High CMR version of the TLP113	10 Mbits/s	Open-collector output	10	2500	○				
TLP115A		Highly sensitive version of the TLP115			5			○ ⁽¹⁾	△		
TLP116		Mini-flat 6-pin MFSOP Ultra-high speed	20 MBd	Totempole output	5	3750	○				
TLP250 TLP250F		8-pin DIP Direct drive of a medium- power IGBT/MOSFET High-speed EN60747-approved with option (D4)	0.15 μs	Peak output current: ±1.5 (max)	5	2500	○	△ EN 60747	◎ EN 60747		
TLP250(INV) TLP250F(INV)		8-pin DIP Direct drive of a medium- power IGBT/MOSFET High-speed For inverter applications	0.15 μs	Peak output current: ±2.0 (max)	5		○	△ EN 60747	◎ EN 60747		

Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4 for DIP, V4 for MFSOP.

IC Output (Continued)

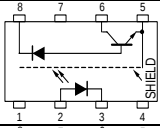
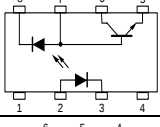
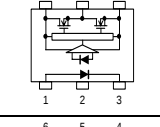
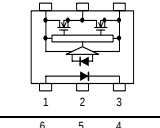
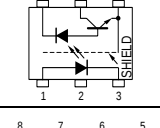
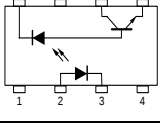
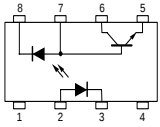
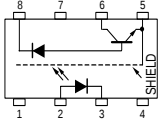
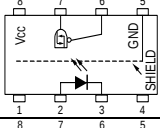
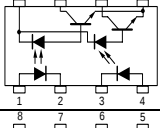
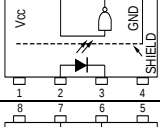
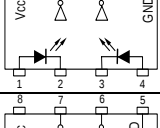
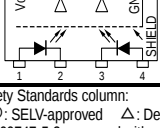
Part Number	Pin Configuration	Features	Data Rate (Typ. @NRZ)	CTR	@IF(IN) (mA)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
							UL	TÜV	VDE	BSI	IEC
TLP251 TLP251F		8-pin DIP Direct drive of a small-power IGBT/MOSFET EN60747-approved with option (D4)	0.25 µs	Peak output current: ±0.4 (max)	5	2500	○	△ EN 60747	⊙ EN 60747		
TLP350 TLP350F		8-pin DIP Direct drive of a medium-power IGBT/MOSFET High-speed Low power dissipation	0.26 µs	Peak output current: ±2.5 (max)	5	3750	○	△ EN 60747	⊙ ⁽⁴⁾ EN 60747		
TLP351 TLP351F		8-pin DIP Direct drive of a small-power IGBT/MOSFET High-speed Low power dissipation	0.2 µs	Peak output current: ±0.6 (max)	5		○	⊙ EN 60747			
TLP512		6-pin DIP 6-pin package version of the TLP550	1 Mbits/s	20% min	16	2500	○				
TLP513		6-pin DIP 6-pin package version of the TLP552	10 Mbits/s	Logic output Open-collector	5						
TLP550		8-pin DIP No internal base connection High-speed High CMR	1 Mbits/s	10% min (19% (min) for rank O)	16		○				
TLP551		8-pin DIP Internal base connection High-speed	1 Mbits/s		16						
TLP552		8-pin DIP High-speed Logic output	10 Mbits/s	Open-collector	5		○				
TLP553		8-pin DIP High-speed Low input drive current	300 Kbits/s	400% min	0.5		○				
TLP554		8-pin DIP High-speed High CMR version of the TLP552	10 Mbits/s	Open-collector	5		○				
TLP555		8-pin DIP Low input current High-speed High Vcc operation	5 Mbits/s	3-state output	1.6		○				
TLP557		8-pin DIP High-speed Direct drive of a power transistor	1 µs	Constant current output: 0.25 A	5		○				
TLP558		8-pin DIP Inverted logic version of the TLP555	5 Mbits/s	3-state output	1.6		○				

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

Note (4): TLP350F: VDE-approval pending

Part Number	Pin Configuration	Features	Data Rate (Typ. @NRZ)	CTR	@IF(IN) (mA)	BVs 1 Minute (Vrms)	Safety Standards ⁽²⁾				
							UL	TÜV	VDE	BSI	IEC
TLP559		8-pin DIP High CMR version of the TLP550	1 Mbits/s	20% min	16	2500	○				
TLP559(IGM)		No internal base connection	0.45 µs	25% min	10						
TLP651		8-pin DIP High isolation voltage Internal base connection High-speed	1 Mbits/s	10% min (19% (min) for rank O)	16	5000	○				
TLP701 TLP701F		6-pin SDIP Direct drive of a small-power IGBT/MOSFET High-speed Low power dissipation	0.25 µs	Output current: ±0.6 (max)	5		○	⊙ EN 60747	△ EN 60747		
TLP705 TLP705F		6-pin SDIP Direct drive of a small-power IGBT/MOSFET Ultra-high speed Low power dissipation	0.1 µs	Output current: ±0.45 (max)	5		○				
TLP719 TLP719F		6-pin SDIP High CMR	1 Mbits/s	20% min	16		○	⊙ EN 60747	△ EN 60747		
TLP750 TLP750F		8-pin DIP High isolation voltage High CMR EN60747-approved with option (D4) SEMKO-approved	1 Mbits/s	10% min (19% (min) for rank O)	16		○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP751 TLP751F		8-pin DIP High isolation voltage Internal base connection EN60747-approved with option (D4) SEMKO-approved	1 Mbitss	10% min	16						
TLP759 TLP759F		8-pin DIP IEC950 design standard version of the TLP559	1 Mbits/s	20% min	16		○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP759(IGM) TLP759F(IGM)		EN60747-approved with option (D4) SEMKO-approved	0.45 µs	25% min	10						
TLP2200		8-pin DIP Low input current High-speed High Vcc operation	5 Mbits/s	3-state output	1.6	2500	○				
TLP2530		Dual channel of the 6N135 and the TLP550	1 Mbits/s	7% min	16		○				
TLP2531		Dual channel of the 6N136 and the TLP550	1 Mbits/s	19% min	16		○				
TLP2601		8-pin DIP High CMR High-speed	10 Mbits/s	Open-collector output	5		○				
TLP2630		Dual channel of the 6N137 and the TLP552	10 Mbits/s	Open-collector output	5		○				
TLP2631		High CMR Dual channel version of the TLP554	10 Mbits/s	Open-collector output	5		○				

Note (2): Legend in the Safety Standards column:
 ○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)
 TÜV and VDE: EN60747-5-2-approved with option D4.

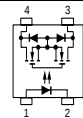
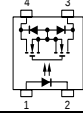
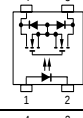
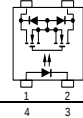
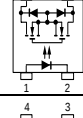
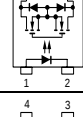
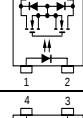
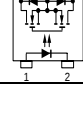
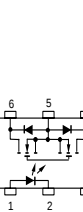
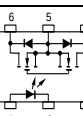
Photovoltaic Output

Part Number	Pin Configuration	Features	Short-Circuit Current (μA)			Open Voltage Voc (V)		BV's 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Min	@If(mA)	Min	@If(mA)		UL	TÜV	VDE	BSI	IEC
TLP190B		Mini-flat 6-pin MFSOP	—	12	10	7	10	2500	○				
TLP191B		Mini-flat 6-pin MFSOP Built-in shunt regulator	—	24	20	7	20		○				
TLP590B		6-pin DIP General-purpose	—	12	10	7	10		○				
			C20	20									
TLP591B		6-pin DIP Built-in shunt regulator	—	24	20	7	20		○				
			C40	40									
TLP3904		4-pin SSOP General-purpose	—	5	10	7	10	1500	△				
TLP3914		4-pin SSOP High output	—	20	10	7	10		△				
TLP3924		4-pin SSOP High output	—	4	10	30	10		△				

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

Photorelays (MOSFET Output, 1-Form-A)

Part Number	Pin Configuration	Features	IFT		RON			VOFF(V)	BV's 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@IF (mA)	@ION (A)			UL	TÜV	VDE	BSI	IEC
TLP172A		4-pin SOP Lead pitch: 2.54 mm Low trigger current High output current	—	3	2	5	0.4 [AC]	60	1500	○				
TLP172G		4-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.11 [AC]	350		○				
TLP174G		4-pin SOP Lead pitch: 2.54 mm Current-limiting function	—	3	35	5	0.12 [AC]	350		○				
TLP174GA		Limit current: 150 to 300 mA						400						
TLP176A		4-pin SOP Lead pitch: 2.54 mm Low trigger current High output current	—	3	2	5	0.4 [AC]	60		○	△	○ ⁽¹⁾		
TLP176D		4-pin SOP Lead pitch: 2.54 mm Low trigger current Low On-resistance	—	3	8	5	0.2 [AC]	200		○	△	○ ⁽¹⁾		
TLP176G		4-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.12 [AC]	350		○	△	○ ⁽¹⁾	○ EN 60065 EN 60950	△ 60065 60950
TLP176GA		4-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.12 [AC]	400		○			○ EN 60065 EN 60950	△ 60065 60950
TLP179D		4-pin SOP Lead pitch: 2.54 mm Low trigger current Coff 15 pF (typ.)	—	3	50	5	0.05 [AC]	200		○				
TLP192A		6-pin SOP Lead pitch: 2.54 mm Low trigger current High output current	—	3	2	5	0.4 [AC]	60		○				
TLP192G		6-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.11 [AC]	350		○				
TLP197A		6-pin SOP Lead pitch: 2.54 mm Low trigger current High output current	—	3	2	5	0.4 [AC]	60		○				
TLP197D		6-pin SOP Lead pitch: 2.54 mm Low trigger current Low On-resistance	—	3	8	5	0.2 [AC]	200		○				
TLP197G		6-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.12 [AC]	350		○	△	○ ⁽¹⁾	○ EN 60065 EN 60950	△ 60065 60950
TLP197GA		6-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose	—	3	35	5	0.12 [AC]	400		○			○ EN 60065 EN 60950	△ 60065 60950

Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option V4.

Photorelays (MOSFET Output, 1-Form-A) (Continued)

Part Number	Pin Configuration	Features	I _{FT}		R _{ON}			V _{OFF} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@I _F (mA)	@I _{ON} (A)			UL	TÜV	VDE	BSI	IEC
TLP199D		6-pin SOP Lead pitch: 2.54 mm Low trigger current C _{OFF} 15 pF (typ.)	—	3	50	5	0.05 [AC]	200	1500	○				
TLP200D		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP176D	—	3	8	5	0.2 [AC]	200		○				
TLP202A		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP172A	—	3	2	5	0.4 [AC]	60		○				
TLP202G		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP172G	—	3	50	5	0.11 [AC]	350		○				
TLP206A		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP176A	—	3	2	5	0.4 [AC]	60		○				
TLP206G		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP176G	—	3	35	5	0.12 [AC]	350		○	△	○ ⁽¹⁾	○ EN 60065 EN 60950	△ 60065 60950
TLP206GA		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP176GA	—	3	35	5	0.12 [AC]	400		○			○ EN 60065 EN 60950	△ 60065 60950
TLP209D		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP179D	—	3	50	5	0.05 [AC]	200		○				
TLP222A		4-pin DIP Low trigger current	—	3	2	5	0.5 [AC]	60	2500	○				
TLP222A-2		8-pin DIP Low trigger current High output current	—	3	2	5	0.5 [AC]	60		○				
TLP222G		4-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	50	5	0.12 [AC]	350		○			○ EN 60065 EN 60950	△ 60065 60950
TLP222G-2		8-pin DIP Dual channel version of the TLP222G SEMKO-approved	—	3	50	5	0.12 [AC]	350		○			○ EN 60065 EN 60950	△ 60065 60950
TLP224G		4-pin DIP Current-limiting function Limit current: 150 to 300 mA SEMKO-approved	—	3	35	5	0.12 [AC]	350		○			△ EN 60065 60950	△ 60065 60950

Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option V4.

Part Number	Pin Configuration	Features	I _{FT}		R _{ON}			V _{OFF} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@I _F (mA)	@I _{ON} (A)			UL	TÜV	VDE	BSI	IEC
TLP224G-2		8-pin DIP Dual channel version of the TLP224G SEMKO-approved	—	3	35	5	0.12 [AC]	350	2500	○			○ EN 60065 60950	△ 60065 60950
TLP225A		4-pin DIP For DC use only	—	5	1.1	10	0.5 [DC]	60		○				
TLP227A		4-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	2	5	0.5 [AC]	60		○				△ 60950
TLP227A-2		8-pin DIP Dual channel version of the TLP227A SEMKO-approved	—	3	2	5	0.5 [AC]	60		○				△ 60950
TLP227G		4-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	35	5	0.12 [AC]	350		○	○ EN 60747	△ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
TLP227G-2		8-pin DIP Dual channel version of the TLP227G SEMKO-approved	—	3	35	5	0.12 [AC]	350		○	○ EN 60747	△ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950
TLP227GA		4-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	35	5	0.12 [AC]	400		○				△ 60950
TLP227GA-2		8-pin DIP Dual channel version of the TLP227GA SEMKO-approved	—	3	35	5	0.12 [AC]	400		○	△	○	○	△ 60950
TLP592A		6-pin DIP Low trigger current High output current	—	3	2	5	0.5 [AC]	60	2500	○				
TLP592G		6-pin DIP Low trigger current General-purpose	—	3	50	5	0.12 [AC]	350		○				
TLP594G		6-pin DIP Current-limiting function Limit current: 150 to 300 mA Low trigger current	—	3	35	5	0.12 [AC]	350	2500	○				
TLP597A		6-pin DIP Low trigger current High output current SEMKO-approved	—	3	2	5	0.5 [AC]	60	2500	○				△ 60950
TLP597G		6-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	35	5	0.12 [AC]	350		○	○ EN 60747	△ EN 60747	◎ EN 60065 EN 60950	△ 60065 60950

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4.

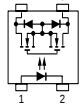
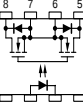
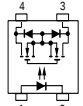
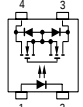
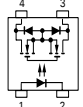
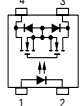
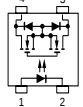
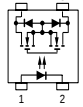
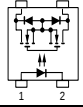
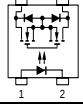
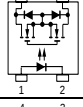
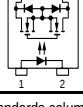
Photorelays (MOSFET Output, 1-Form-A) (Continued)

Part Number	Pin Configuration	Features	IFT		RON			VOFF(V)	BVs 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@IF (mA)	@ION (A)			UL	TÜV	VDE	BSI	IEC
TLP597GA		6-pin DIP Low trigger current General-purpose SEMKO-approved	—	3	35	5	0.12 [AC]	400	2500	○				△ 60950
TLP598AA		6-pin DIP Low trigger current High output current	—	3	2	5	0.5 [AC]	60		△				
TLP598GA		6-pin DIP Low trigger current Low On-resistance	—	3	12	5	0.15 [AC]	400		△				
TLP797GA		6-pin DIP High isolation voltage IEC950-compliant	—	3	35	5	0.12 [AC]	400	5000	△	△	⊙ EN 60747		
TLP797J		6-pin DIP High isolation voltage	—	3	35	5	0.1 [AC]	600		○	△	△	△	△
TLP797JF		6-pin DIP High isolation voltage	—	3	35	5	0.1 [AC]	600		△	△	△	△	△
TLP798GA		6-pin DIP Low trigger current Low On-resistance	—	3	12	5	0.15 [AC]	400		△				
TLP3110		6-pin MFSOP Low CR Coff: 100 pF (Typ.) For measuring instruments	—	4	1.2	5	0.35 [AC]	60	1500	○				
TLP3111		6-pin MFSOP Low CR Coff: 11 pF (Typ.) For measuring instruments	—	4	20	5	0.1 [AC]	80		○				
TLP3113		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 10 pF x Ω Coff: 0.6 pF (Typ.) For measuring instruments	—	4	35	5	0.08 [AC]	40		○				
TLP3114		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 10 pF x Ω Coff: 5 pF (Typ.) For measuring instruments	—	4	3	5	0.25 [AC]	40		○				
TLP3115		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 10 pF x Ω Coff: 10 pF (Typ.) For measuring instruments	—	4	1.5	5	0.3 [AC]	40		○				
TLP3116		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 10 pF x Ω Coff: 1 pF (Typ.) For measuring instruments	—	4	15	5	0.12 [AC]	40		○				
TLP3120		6-pin SOP Lead pitch: 2.54 mm Low CR Ion: 1.25 A (Max) For measuring instruments	—	5	0.15	5	1.25 [AC]	80		○				
TLP3121		4-pin SOP Lead pitch: 2.54 mm Low CR: 30 pF x Ω For measuring instruments	—	4	1.2	5	0.35 [AC]	80		○				

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2:approved with option D4.

Part Number	Pin Configuration	Features	IFT		RON			VOFF(V)	BV's 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@IF (mA)	@ION (A)			UL	TÜV	VDE	BSI	IEC
TLP3122		4-pin SOP Lead pitch: 2.54 mm High output current ION: 1 A (max) @Ta: 50°C For measuring instruments	—	3	0.7	5	1 [AC]	60	1500	○				
TLP3125		8-pin SOP Lead pitch: 2.54 mm Low On-resistance Low trigger current For measuring instruments	—	3	4	5	0.2 [AC]	400		○				
TLP3130		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 5 pF x Ω Coff: 1 pF (typ.) For measuring instruments	—	4	8	5	0.16 [AC]	20		○				
TLP3131		4-pin SOP Lead pitch: 2.54 mm Ultra-low CR: 5 pF x Ω Coff: 5 pF (typ.) For measuring instruments	—	4	1.5	5	0.3 [AC]	20		○				
TLP3212		4-pin SSOP Lead pitch: 1.27 mm Ultra-low CR: 20 pF x Ω Coff: 20 pF (typ.) For measuring instruments	—	5	1.5	5	0.4 [AC]	60		△				
TLP3213		4-pin SSOP Lead pitch: 1.27 mm Ultra-low CR: 15 pF x Ω Coff: 0.6 pF (typ.) For measuring instruments	—	4	35	5	0.08 [AC]	40		△				
TLP3214		4-pin SSOP Lead pitch: 1.27 mm Ultra-low CR: 10 pF x Ω Coff: 5 pF (typ.) For measuring instruments	—	4	3	5	0.25 [AC]	40		△				
TLP3215		4-pin SSOP Lead pitch: 1.27 mm Ultra-low CR: 10 pF x Ω Coff: 10 pF (typ.) For measuring instruments	—	4	1.5	5	0.3 [AC]	40		△				
TLP3216		4-pin SSOP Lead pitch: 1.27 mm Ultra-low CR: 10 pF x Ω Coff: 1 pF (typ.) For measuring instruments	—	4	15	5	0.12 [AC]	40		△				
TLP3217		4-pin SSOP Lead pitch: 1.27 mm Low CR Coff: 3.5 pF (typ.) For measuring instruments	—	5	12	10	0.12 [AC]	80		△				
TLP3230		4-pin SSOP Ultra-low CR: 5 pF x Ω Coff: 1 pF (typ.) For measuring instruments	—	4	8	5	0.16 [AC]	20		△				
TLP3231		4-pin SSOP Ultra-low CR: 5 pF x Ω Coff: 5 pF (typ.) For measuring instruments	—	4	1.2	5	0.3 [AC]	20		△				

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

Photorelays (MOSFET Output, 1-Form-A) (Continued)

Part Number	Pin Configuration	Features	IFT		RON			VOFF(V)	BVs 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@IF (mA)	@ION (A)			UL	TÜV	VDE	BSI	IEC
TLP3540		8-pin DIP Low On-resistance Ion: 2 A (max) Measuring instruments and power lines	—	5	0.12	5	2 [AC]	60	1500	○				
TLP3542		6-pin DIP Low On-resistance Ion: 2.5 A (max) For measuring instruments	—	3	0.1	10	2.5 [AC]	60	2500	△				

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

Photorelays (MOSFET Output, 1-Form-B)

Part Number	Pin Configuration	Features	I _{FT}		R _{ON}			V _{OFF} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@I _F (mA)	@I _{ON} (A)			UL	TÜV	VDE	BSI	IEC
TLP4006G		8-pin DIP Low trigger current General-purpose 1-Form-A/1-Form-B	—	3	25	1-Form-A 5 1-Form-B 0	0.12 [AC]	350	2500	○				
TLP4007G		8-pin DIP Low trigger current General-purpose 1-Form-A/1-Form-B	—	3	50	1-Form-A 5 1-Form-B 0	0.1 [AC]	350		○				
TLP4026G		8-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-A/1-Form-B	—	3	25	1-Form-A 5 1-Form-B 0	0.12 [AC]	350	1500	○				
TLP4027G		8-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-A/1-Form-B	—	3	50	1-Form-A 5 1-Form-B 0	0.09 [AC]	350		○				
TLP4172G		4-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-B	—	3	50	0	0.09 [AC]	350		○				
TLP4176G		4-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-B	—	3	25	0	0.12 [AC]	350		○				
TLP4192G		6-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-B	—	3	50	0	0.09 [AC]	350		○				
TLP4197G		6-pin SOP Lead pitch: 2.54 mm Low trigger current General-purpose 1-Form-B	—	3	25	0	0.12 [AC]	350		○				
TLP4202G		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP4172G 2-Form-B	—	3	50	0	0.09 [DC]	350		○				
TLP4206G		8-pin SOP Lead pitch: 2.54 mm Dual channel version of the TLP4176G 2-Form-B	—	3	25	0	0.12 [DC]	350		○				
TLP4222G		4-pin DIP Low trigger current General-purpose 1-Form-B	—	3	50	0	0.1 [AC]	350	2500	○				
TLP4222G-2		Dual channel version of the TLP4222G 2-Form-B	—	3	50	0	0.1 [AC]	350		○				

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

Photorelays (MOSFET Output, 1-Form-B) (Continued)

Part Number	Pin Configuration	Features	IFT		RON			VOFF(V)	BV's 1 Minute (Vrms)	Safety Standards ⁽²⁾				
			Rank	Max (mA)	Max (Ω)	@IF (mA)	@ION (A)			UL	TÜV	VDE	BSI	IEC
TLP4227G		4-pin DIP Low trigger current General-purpose 1-Form-B SEMKO-approved	—	3	25	0	0.15 [AC]	350	2500	○				△ 60950
TLP4227G-2		Dual channel version of the TLP4227G SEMKO-approved 2-Form-B	—	3	25	0	0.15 [AC]	350		○				△ 60950
TLP4592G		6-pin DIP Low trigger current General-purpose 1-Form-B	—	3	50	0	0.1 [AC]	350		○				
TLP4597G		6-pin DIP Low trigger current General-purpose 1-Form-B SEMKO-approved	—	3	25	0	0.15 [AC]	350		○				△ 60950

Note (2): Legend in the Safety Standards column:

○: Approved ◎: SELV-approved △: Design which meets safety standard (as of 06/05)

Products Manufactured by Toshiba Semiconductor Thailand Co., Ltd.

Part Number	Pin Configuration	Features	V _{CEO} (V)	BV _s 1 Minute (V _{rms})	Safety Standards ⁽²⁾				
					UL	TÜV	VDE	BSI	IEC
TLP180(T)		Mini-flat 6-pin MFSOP AC input SEMKO-approved	80	3750	○	○ ⁽¹⁾	△		
TLP181(T)		Mini-flat 6-pin MFSOP Transistor output General-purpose	80	3750	○	△	○ ⁽¹⁾	⊙ EN 60950	△ 60950
TLP521-1(T)		4-pin DIP Transistor output General-purpose	55	2500	○				
TLP521-2(T)		Dual channel version of the TLP521-1(T)			○				
TLP620(T)		4-pin DIP Transistor output AC input SEMKO-approved	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP620-2(T)		Dual channel version of the TLP620(T) SEMKO-approved			○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	
TLP621(T)		4-pin DIP Transistor output High isolation voltage SEMKO-approved	55	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP621-2(T)		Dual channel version of the TLP621(T) SEMKO-approved			○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	
TLP627(T)		4-pin DIP Darlington transistor output High V _{CEO} SEMKO-approved	300	5000	○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	△ 60065 60950
TLP627-2(T)		Dual channel version of the TLP627(T) SEMKO-approved			○	△ EN 60747	⊙ EN 60747	⊙ EN 60065 EN 60950	

Note (1): The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note (2): Legend in the Safety Standards column:

○: Approved ⊙: SELV-approved △: Design which meets safety standard (as of 06/05)

TÜV and VDE: EN60747-5-2-approved with option D4 for DIP, V4 for MFSOP.

Note that the products manufactured by Toshiba Semiconductor Thailand Co., Ltd. are not available in Japan.

Fiber-Optic Devices (TOSLINK™)

Fiber-Optic Modules (Simplex Type)

Transmitting Module	Receiving Module	Data Rate (Mb/s, NRZ)	Transmission Distance (m) ⁽¹⁾	Emission Wavelength (nm) ⁽¹⁾	Pulse Width Distortion (ns) ⁽¹⁾	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Fiber-Optic Connectors
TOTX170A ⁽³⁾	TORX170	DC to 6	40	650	±55	−40 to 70	APF(980/1000)	LUCT1-TC1000-xxM ⁽¹¹⁾ TOCP100-xxMBT ⁽¹²⁾
TOTX178A ⁽⁶⁾	TORX178B ⁽⁶⁾	0.1 to 6	5	650	±30	−20 to 70	APF(980/1000)	RFA4011-xxx ⁽¹³⁾
TOTX178S	TORX178S	0.1 to 6	5	650	±30	−20 to 70	APF(980/1000)	
TOTX179 ⁽⁶⁾	TORX179 ⁽⁶⁾	0.1 to 12.8	5	650	±25	−20 to 70		
TOTX179P	TORX179P	0.1 to 12.8	5	650	±25	−20 to 70	APF(980/1000)	
TOTX179L ⁽⁶⁾⁽⁹⁾	TORX179L ⁽⁶⁾⁽⁹⁾	0.1 to 12.8	5	650	±25	−20 to 70		
TOTX179PL ⁽⁹⁾	TORX179PL ⁽⁹⁾	0.1 to 12.8	5	650	±25	−20 to 70		
TOTX179S	TORX179S	0.1 to 12.8	5	650	±25	−20 to 70		
TOTX141 ⁽⁴⁾⁽⁶⁾	TORX141 ⁽⁴⁾	0.1 to 15	10	650	±20	−20 to 70		
TOTX141P ⁽⁴⁾	TORX141P ⁽⁴⁾	0.1 to 15	10	650	±20	−20 to 70		
TOTX141L ⁽⁴⁾⁽⁶⁾⁽⁹⁾	TORX141L ⁽⁴⁾⁽⁶⁾⁽⁹⁾	0.1 to 15	10	650	±20	−20 to 70		
TOTX141PL ⁽⁴⁾⁽⁹⁾	TORX141PL ⁽⁴⁾⁽⁹⁾	0.1 to 15	10	650	±20	−20 to 70		
TOTX180A ⁽³⁾⁽⁷⁾	TORX180 ⁽⁷⁾	DC to 6	40	650	±55	−40 to 85	APF(980/1000)	LUCT1-TC1000-xxM ⁽¹¹⁾ TOCP100-xxMBT ⁽¹²⁾
TOTX193	TORX193	DC to 6	10	660	±25	−40 to 85	APF(980/1000)	—
TOTX193K ⁽⁶⁾	TORX193K ⁽⁶⁾	DC to 6	10	660	±25	−40 to 85		
TOTX195 ⁽³⁾	TORX194	DC to 10	50	670	±30	−40 to 85	APF(980/1000)	LUCT1-TC1000-xxM ⁽¹¹⁾ TOCP100-xxMBT ⁽¹²⁾
TOTX197	TORX196	DC to 6	40	670	±55	−40 to 85	APF(980/1000)	LUCT1-TC1000-xxM ⁽¹¹⁾ TOCP100-xxMBT ⁽¹²⁾
TOTX197	TORX198 ⁽²⁾	DC to 6	40	670	±55	−40 to 85	APF(980/1000)	LUCT1-TC1000-xxM ⁽¹¹⁾ TOCP100-xxMBT ⁽¹²⁾

Note: TOSLINK is a trademark of Toshiba Corporation.

Note (1): All values at Ta = 25°C

Note (2): This fiber-optic receiving module has analog output pins for monitoring the amount of received light.

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

Note (4): Vcc = 2.7 to 3.6 V

Note (6): These are panel-mount type fiber-optic modules.

Note (7): These fiber-optic modules are housed in a ceramic package.

Note (9): Shutter-equipped

Note (11): Manufactured by Asahi Kasei EMD Corporation.

Note (12): Manufactured by Toray Industries, Inc.

Note (13): Manufactured by Mitsubishi Rayon Co., Ltd.

Note (14): For details on optical fiber cables with connectors, contact the respective manufactures.

- The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

Transmitting Module	Data Rate (Mb/s, NRZ)	Emission Wavelength (nm) ⁽¹⁾	Fiber Output Power (dBm) ⁽¹⁾	Pulse Width Distortion (ns) ⁽¹⁾	Supply Voltage (V)	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Connectors
TOTX141(F,T) ⁽⁶⁾⁽¹⁰⁾	DC to 15	650	-21 to -15	±20	2.7 to 3.6	-20 to 70	APF(980/1000)	RFA4011-*** ⁽¹³⁾
TOTX141P(F,T) ⁽¹⁰⁾	DC to 15	650	-21 to -15	±20	2.7 to 3.6	-20 to 70		
TOTX147(F,T) ⁽⁶⁾⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	2.7 to 3.6	-20 to 70		
TOTX147L(F,T) ⁽⁶⁾⁽⁹⁾⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	2.7 to 3.6	-20 to 70		
TOTX147PL(F,T) ⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	2.7 to 3.6	-20 to 70		
TOTX177(F,T) ⁽⁶⁾⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	5 ± 0.25	-20 to 70		
TOTX177L(F,T) ⁽⁶⁾⁽⁹⁾⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	5 ± 0.25	-20 to 70		
TOTX177PL(F,T) ⁽¹⁰⁾	DC to 15	650	-21 to -15	±15	5 ± 0.25	-20 to 70		
TOTX178A(F,T) ⁽⁶⁾⁽¹⁰⁾	DC to 6	650	-21 to -15	±30	5 ± 0.25	-20 to 70		
TOTX178S(F,T) ⁽¹⁰⁾	DC to 6	650	-21 to -15	±30	5 ± 0.25	-20 to 70		
TOTX179(F,T) ⁽⁶⁾⁽¹⁰⁾	DC to 12.8	650	-21 to -15	±25	5 ± 0.25	-20 to 70		
TOTX179P(F,T) ⁽¹⁰⁾	DC to 12.8	650	-21 to -15	±25	5 ± 0.25	-20 to 70		
TOTX179S(F,T) ⁽¹⁰⁾	DC to 12.8	650	-21 to -15	±25	5 ± 0.25	-20 to 70		

Receiving Module	Data Rate (Mb/s, NRZ)	Maximum Receivable Power (dBm) ⁽¹⁾	Minimum Receivable Power (dBm) ⁽¹⁾	Pulse Width Distortion (ns) ⁽¹⁾	Supply Voltage (V)	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Connectors
TORX147(F,T) ⁽⁶⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	2.7 to 3.6	-20 to 70	APF(980/1000)	RFA4011-*** ⁽¹³⁾
TORX147L(F,T) ⁽⁶⁾⁽⁹⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	2.7 to 3.6	-20 to 70		
TORX147PL(F,T) ⁽⁹⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	2.7 to 3.6	-20 to 70		
TORX177(F,T) ⁽⁶⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	5 ± 0.25	-20 to 70		
TORX177L(F,T) ⁽⁶⁾⁽⁹⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	5 ± 0.25	-20 to 70		
TORX177PL(F,T) ⁽⁹⁾⁽¹⁰⁾	0.1 to 15	-14.5	-24	±15	5 ± 0.25	-20 to 70		

Note: TOSLINK is a trademark of Toshiba Corporation.

Note (1): All values at Ta = 25°C

Note (2): This fiber-optic receiving module has analog output pins for monitoring the amount of received light.

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

Note (4): Vcc = 2.7 to 3.6 V

Note (6): These are panel-mount fiber-optic modules.

Note (7): These fiber-optic modules are housed in a ceramic package.

Note (9): Shutter-equipped

Note (10): The products listed above are manufactured by Toshiba Semiconductor Thailand Co., Ltd. For the availability of the products, contact the Toshiba distributors.

Note (13): Manufactured by Mitsubishi Rayon Co., Ltd.

- The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

Fiber-Optic Modules (Duplex Type)

Transceiving Module	Data Rate (Mb/s, NRZ)	Transmission Distance (m) ⁽¹⁾	Emission Wavelength (nm) ⁽²⁾	Pulse Width Distortion (ns) ⁽³⁾	Operating Temperature (°C)	Compatible Optical Fiber (μm)	Compatible Optical Fiber with Fiber-Optic Connectors
TODX270A ⁽³⁾	DC to 6	40	650	±55	−40 to 70	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾ TOCP200-xxMBT ⁽¹²⁾
TODX280A ^{(3)/(7)}	DC to 6	40	650	±55	−40 to 85	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾ TOCP200-xxMBT ⁽¹²⁾
TODX283 ⁽⁷⁾	DC to 50	10(APF) 100(PCF)	650	±7	−10 to 70	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾ TOCP200-xxMBT ⁽¹²⁾
						H-PCF(200/230)	CF-2001/2071 Series ⁽⁸⁾ PCK202HV Series ⁽⁸⁾
TODX295 ⁽³⁾	DC to 10	50	670	±30	−40 to 85	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾ TOCP200-xxMBT ⁽¹²⁾
TODX297	DC to 6	40	670	±55	−40 to 85	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾ TOCP200-xxMBT ⁽¹²⁾
TODX2402(F)	20 to 250	20(250M)	650	—	0 to 60 (250M)	APF(980/1000)	RFA4412M-xxx ⁽¹³⁾
	20 to 125	50(125M)			−10 to 70 (125M)		
TODX2404(F)	50 to 500	10	660	—	0 to 60	APF(980/1000)	RFA4412M-xxx ⁽¹³⁾
TODX2701(F)	20 to 125	20(APF) 100(GI-PCF)	650	—	−10 to 70	APF(980/1000)	LUCT2-1000W-xxM ⁽¹¹⁾
						GI-PCF(200/230)	TOCP200-xxMBT ⁽¹²⁾

Note: TOSLINK is a trademark of Toshiba Corporation.

Note (1): All values at Ta = 25°C

Note (2): This fiber-optic receiving module has analog output pins for monitoring the amount of received light.

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

Note (5): Manufactured by Sumitomo Electric Industries, Ltd.

Note (7): These fiber-optic modules are housed in a ceramic package.

Note (8): Manufactured by Sumitomo Electric Industries (SEI), Ltd.

Note (11): Manufactured by Asahi Kasei EMD Corporation.

Note (12): Manufactured by Toray Industries, Inc.

Note (13): Manufactured by Mitsubishi Rayon Co., Ltd.

Note (14): For details on optical fiber cables with connectors, contact the respective manufactures.

- The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

SFF Optical Transceivers

Part Number	Data Rate (Gb/s)	Transmission Target Distance	LD Type	Wavelength (nm)	PD Type	Operating Case Temperature (°C)	Example Interface	Remarks
TOTR210	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	0 to 70	up to 2.5 Gb/s transmission 1000BASE-SX	(3) (8)
TOTR210-T	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	0 to 70	up to 2.5 Gb/s transmission 1000BASE-SX	(1) (3) (8)
TOTR310-F	Up to 2.5	Up to 12 km (SMF)	FP	1310	PIN PD	0 to 70	SR-1 (OC-48) I-16 (STM-16) 1000BASE-LX	(3) (8)
TOTR310-FT	Up to 2.5	Up to 12 km (SMF)	FP	1310	PIN PD	0 to 70	SR-1 (OC-48) I-16 (STM-16) 1000BASE-LX	(1) (3) (8)
TOTR310-D-x	Up to 2.5	Up to 21 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	PIN PD	0 to 70	IR-1 (OC-48) S-16.1 (STM-16)	(8)
TOTR310-DA-x	Up to 2.5	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	APD	0 to 70	LR-1 (OC-48) L-16.1 (STM-16)	(8)
TOTR310-DAC-x	Up to 2.5	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	APD	-10 to 70	LR-1 (OC-48) L-16.1 (STM-16)	(2) (8)
TOTR360-D-x	Up to 2.5	Up to 40 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	PIN PD	0 to 70	IR-2 (OC-48) S-16.2 (STM-16)	(8)
TOTR360-DA-x	Up to 2.5	Up to 80 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	APD	0 to 70	LR-2 (OC-48) L-16.2 (STM-16)	(8)
TOTR360-DAC-x	Up to 2.5	Up to 80 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	APD	-10 to 70	LR-2 (OC-48) L-16.2 (STM-16)	(2) (8)
TOTR213-20	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	820	PIN PD	0 to 70	1000BASE-SX	(9)
TOTR213-50	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	0 to 70	1000BASE-SX	(9)

Note (1): 2 x 5 pin package

Note (2): Built-in DC-DC converter for an APD bias voltage power supply

Note (3): MU optical connector types are in development.

Note (8): The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

Note (9): Bi-directional optical transceiver for single fiber.

SFP Optical Transceivers

Part Number	Data Rate (Gb/s)	Transmission Target Distance	LD Type	Wavelength (nm)	PD Type	Operating Case Temperature (°C)	Example Interface	Remarks
TOTR2151 TOTR2151(HT)	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	−10 to 70 −40 to 85	2.5 Gb/s transmission 1000BASE-SX, Fiber Channel	(4) (6) (8)
TOTR3151F TOTR3151F(HT)	Up to 2.5	Up to 12 km (SMF)	FP	1310	PIN PD	−10 to 70 −40 to 85	SR-1 (OC-48), I-16 (STM-16) 1000BASE-LX, Fiber Channel	(4) (6) (8)
TOTR310P-D-x	Up to 2.5	Up to 21 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	PIN PD	−10 to 70	IR-1 (OC-48) S-16.1 (STM-16)	(4) (8)
TOTR310P-DA-x	Up to 2.5	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	APD	−10 to 70	LR-1 (OC-48) L-16.1 (STM-16)	(4) (8)
TOTR360P-D-x	Up to 2.5	Up to 40 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	PIN PD	−10 to 70	IR-2 (OC-48) S-16.2 (STM-16)	(4) (8)
TOTR360P-DA-x	Up to 2.5	Up to 80 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	APD	−10 to 70	LR-2 (OC-48) L-16.2 (STM-16)	(4) (8)
TOTR2161 TOTR2161(HT)	Up to 2.5	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	−10 to 70 −40 to 85	2.5 Gb/s transmission 1000BASE-SX, Fiber Channel	(5) (6) (8)
TOTR3161F TOTR3161F(HT)	Up to 2.5	Up to 12 km (SMF)	FP	1310	PIN PD	−10 to 70 −40 to 85	SR-1 (OC-48), I-16 (STM-16) 1000BASE-LX, Fiber Channel	(5) (6) (8)
TOTR311P-D-x	Up to 2.5	Up to 21 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	PIN PD	−10 to 70	IR-1 (OC-48) S-16.1 (STM-16)	(5) (6) (8)
TOTR311P-DA-x	Up to 2.5	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	APD	−10 to 70	LR-1 (OC-48) L-16.1 (STM-16)	(5) (6) (8)
TOTR361P-D-x	Up to 2.5	Up to 40 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	PIN PD	−10 to 70	IR-2 (OC-48) S-16.2 (STM-16)	(5) (6) (8)
TOTR361P-DA-x	Up to 2.5	Up to 80 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	APD	−10 to 70	LR-2 (OC-48) L-16.2 (STM-16)	(5) (6) (8)
TOTR2150 TOTR2150(HT)	Up to 1.25	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	−10 to 70 −40 to 85	1000BASE-SX	(4) (6) (8)
TOTR2160 TOTR2160(HT)	Up to 1.25	Up to 550 m (50 µm MMF)	VCSEL	850	PIN PD	−10 to 70 −40 to 85	1000BASE-SX	(5) (6) (8)
TOTR3150F TOTR3150F(HT)	Up to 1.25	Up to 10 km (SMF)	FP	1310	PIN PD	−10 to 70 −40 to 85	1000BASE-LX	(4) (6) (8)
TOTR3160F TOTR3160F(HT)	Up to 1.25	Up to 10 km (SMF)	FP	1310	PIN PD	−10 to 70 −40 to 85	1000BASE-LX	(5) (6) (8)
TOTR311P-DG-x	Up to 1.25	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	PIN PD	−10 to 70	1.25 Gb/s transmission 622 Mb/s transmission L-4.1 (STM-4) LR-1 (OC-12)	(5) (8)
TOTR311P-DAG-x	Up to 1.25	Up to 40 km (SMF)	DFB	1290-1350 (20 nm grid x 4ch)	APD	−10 to 70	1000BASE-HX 622 Mb/s transmission	(5) (8)
TOTR361P-DG-x	Up to 1.25	Up to 80 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	PIN PD	−10 to 70	1000BASE-DX (40 km) 1000BASE-ZX (80 km) 622 Mb/s transmission	(5) (7) (8)
TOTR361P-DAG-x	Up to 1.25	Up to 100 km (SMF)	DFB	1470-1610 (20 nm grid x 8ch)	APD	−10 to 70	1000BASE-VX 622 Mb/s transmission	(5) (8)

Note (4): Without a digital diagnostic monitoring (DDM) function and a pull de-latch bail

**: Under development

Note (5): With a digital diagnostic monitoring (DDM) function and a pull de-latch bail

Note (6): MU optical connectors may also be available.

Note (7): 622 Mb/s Interface: SDH (STM-4) S-4.21 (15 km) L-4.2 (80 km), SONET (OC-12) IR-2 (42 km) LR-2 (85 km)

Note (8): The above products may be available in Lead(Pb)-Free versions. For details, please contact your nearest Toshiba sales representative.

Image Sensors

CCD Linear Image Sensors

Part Number	Style	Photosensitive Pixels (Picture Elements)			Sensitivity (Typ.) (V/lx · s)	Data Rate (MHz)	Other Features
		Type/Lamp	Effective Pixels	Size (μm)			
TCD1706DG ◆	Lens reduction type	B/W	7400	4.7 x 4.7	15	25 x 4	Single 5-V power supply
TCD1708DG ◆			7450			15 x 2	
TCD1709DG ◆			7500	7 x 7	15	25 x 4	
TCD1710DG ◆			7500 x 2 lines	4.7 x 4.7	15	15 x 2	
TCD1711DG ◆			7450		15	30 x 2	
TCD1712DG ◆			7500 x 2 lines		15		
TCD2558DG-1 ◆		Color	5340 x 3 lines	7 x 7	R:8.5, G:12.7, B:9.5	10	
TCD2561DG-1 ◆			5340 x 4 lines	7 x 7	R:10.4, G:14.4, B:8.7, B/W:21.0	Color:10, B/W:10 x 2	
TCD2702ADG ◆			7350 x 3 lines	9.325 x 9.325	R:7.8, G:11.5, B:3.7	25 x 2	2-line interlace
TCD2703ADG ◆			7500 x 3 lines		R:9.3, G:14.5, B:4.8		
TCD2704DG-1 ◆			7500 x 4 lines	5 x 5	R:4.9, G:6.3, B:4.2, B/W:10.8	Color:12, B/W:12 x 2	
TCD2705DG ◆			7300 x 3 lines	10 x 10	R:3.6, G:4.7, B:2.7	30 x 2	
TCD2706DG ◆			7500 x 3 lines	9.325 pitch	R:8.8, G:12.8, B:4.5		
TCD2707DG ◆			7450 x 4 lines	4.7 x 4.7	R:5.5, G:8.5, B:4.2, B/W:12.8	Color:20, B/W:25 x 2	
TCD2709DG ◆			7450 x 3 lines		R:5.5, G:8.5, B:4.2	25 x 2	
TCD2905BFG ◆			5400 x 6 lines	5.25 x 5.25	R:4.7, G:6.4, B:3.7	10	
TCD2908BFG ◆			5400 x 8 lines	5.25 x 5.25	R:4.9, G:6.7, B:3.6, B/W:22.4	Color:10, B/W:10 x 2	
TCD2955BFG ◆			14240 x 6 lines	3 x 4	R:1.5, G:2.0, B:1.1	10	Overflow drain
TCD2957BFG ◆			10680 x 6 lines	2.625 x 3.9	R:1.7, G:2.1, B:1.1	10	Electronic Shutter
CIPS317CF603	CIS module	Color	7488 x 3 colors	23 x 34	—	80/3 Color	
CIPS308BS620A		YG	7296	24 x 40	—	90	Shading adjustment, 10-bit ADC
CIPS218CF601		RGB	5152	24 x 40	—	5 x 2	

◆: Lead(Pb)-Free

- The products shown in bold are also manufactured in offshore fabs.

Package	Resolution (DPI)	Applications	Remarks
22-pin Cerdip	A3: 600	Photocopiers, scanners	
68-pin Cerdip			
22-pin Cerdip			
22-pin Cerdip			
22-pin Cerdip	A4: 600	Color scanners	
		Photocopiers, color scanners	
68-pin Cerdip	A3: 600	Photocopiers, color scanners	
22-pin Cerdip			
68-pin Cerdip			
22-pin Cerdip			ES: '05/3Q
22-pin CLCC	A4: 1200	Color scanners	
32-pin CLCC	A4: 3200		
22-pin CLCC	A4: 2400		
40-pin connector	A3: 600	Color scanners, MFPs	
24-pin connector, 8-pin connector		Photocopiers, MFPs	ES: 3 months after order
15-pin connector	A4: 600	MFPs	

Area Image Sensors (Dynastron™)

Part Number	Package	Features					Power Supply (V)
		Optical Format (Inches)	Total Pixel Count (PIX)	Color/Mono	Power Consumption (mW)	Digital Signal Processor	
TCM8230MD	20-pin package with optical lens	1/6	704 x 502 (350 K)	Color (RGB)	40 (30 fps)	Incorporated	1.5/2.8

- Dynastron is a trademark of Toshiba Corporation.