

# SEMICONDUCTOR GENERAL CATALOG

## Sensors/Image Pickup Devices

Photosensors  
Image Sensors  
Magnetic Sensors

# 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	
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		
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	
TLN117(F)	—	Small side-view package	2	—	20	—	—	—	940	±15	Optoelectronic switches	
	TLN117(B,F)		2	7.5								
	TLN117(C,F)		5	18.7								
TLOH9204	☆	—	6-pin SMD	15◆	—	20	—	—	612	±4	Specifically designed for digital still cameras	
TLN241	* ☆ ▲	—	1.6(L) x 0.95(W) x 0.6(H) (PCB-mounted)	—	—	—	11	—	30	850	±78/87	Infrared lighting

☆: Dry-packed

◆: Luminous intensity (cd)

▲: Sample available

Note: If = forward current

• Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

\*: New product

## Phototransistors (for Optical Sensors)

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/cm²)	Max (μA)	VCE (V)				
TPS601A(F)	—	TO-18CAN with lens	100	—	0.1	0.2	30	800	±10	—	
	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(B,F)		34	85							
	TPS615(C,F)		60	150							
	TPS615(BC,F)		34	150							
TPS616(F)	—	φ3	10	75	0.1	0.1	24	900	±30	●	
	TPS616(B,F)		17	42.5							
	TPS616(C,F)		30	75							
	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

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## 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/cm <sup>2</sup> )	Max (nA)	V <sub>R</sub> (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<sub>R</sub> = reverse voltage

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## Photo-ICs (Analog Output)

Part Number	Package	Electrical/Optical Characteristics (Ta = 25°C)										Applications
		Part Number with Rank	Light Current			Dark Current		Peak Sensitive Wavelength (nm)	Half-Value Angle (°)	Impermeable to Visible Light		
			Min (μA)	Max (μA)	E <sub>v</sub> (lx)	V <sub>CC</sub> (V)	Max (μA)				V <sub>CC</sub> (V)	
TPS820(B,F)	Side-view package	—	1500	6000	E = 0.1 mW/cm <sup>2</sup>	5	0.5	5	870	±15	●	Optoelectronic switches
<i>TPS851(E)</i> ☆	Chip type	—	37	74	100	3	0.17	3.3	600	±55	—	Ambient light sensor
TPS851(E,A)		37	62									
<i>TPS852(T)/TPS852(K)</i> ☆		—	27	54	100	3	0.1	3.3	600	±55	—	
TPS852(A,T)/TPS852(A,K)		30	50									
<i>TPS853(E)</i> ☆		—	37	74	100	3	0.1	3.3	600	±55	—	
TPS853(E,A)		42	70									
<i>TPS856(T)/TPS856(K)</i> ☆		—	40	80	100	3	0.1	3	550	±55	—	
TPS856(A,T)/TPS856(A,K)		44.1	73.7									
<i>TPS859(T)/TPS859(K)</i> ☆	—	160	320	100	3	0.2	3	550	±55	—		
TPS859(A,T)/TPS859(A,K)	180	300										

☆: Dry-packed

Note 1: V<sub>CC</sub> = power supply voltage; E<sub>v</sub>: Illuminance; E = radiant incidence

Note 2: (T) = For world wide except japan, (K) = For japan

- The products shown in italic are manufactured by Toshiba semiconductor (Thailand) Co.,Ltd.
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## Photointerrupters (Phototransistor Output)

Part Number	Part Number with Rank	Package	Gap (mm)	Slit Width (mm)	Electrical Characteristics (Ta = 25°C)				Absolute Maximum Ratings (Ta = 25°C)	Applications
					Current Transfer Ratio					
					Min (%)	Max (%)	If (mA)	VCE (V)	Collector-Emitter Voltage (V)	
TLP832(F)	—	PWB direct mounting	5	0.5	5	100	10	2	35	Printers, fax machines, copiers, image scanners, vending machines
TLP833(F)	—		5	0.5	5	100	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	
TLP848(E)	☆	Surface-mount, ultra-compact package	1.2	0.3	3	24	5	2	15	Cameras, cellular phones
TLP848(R)	—		1.2	0.3	4	20	5	2	15	

☆: Dry-packed

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

Note 1: Horizontal slit

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

## 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		
TLP1243(C8)	Snap-in mounting	5	0.7	VCE ≤ 35 V	—	Phototransistor output	Tyco Electronics AMP K.K.	Printers, copiers, fax machines, vending machines, FA equipment, amusement equipment

Note: VCE: collector-emitter voltage

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

# Image Sensors

## CCD Linear Image Sensors

Part Number	Style	Photosensitive Pixels (Picture Elements)			Sensitivity (Typ.) (V/lx · s)	Data Rate (Max) (MHz)	Other Features
		Type/Lamp	Effective Pixels	Size (µm)			
<b>TCD1103GFG</b> ☆	Lens reduction type	B/W	1500	5.5 x 64	79	2	Digital shutter Sample-and-hold
<b>TCD1254GFG</b> ☆			2500	5.25 x 64	103	2	
TCD1706DG			7400	4.7 x 4.7	15	25 x 4	
TCD1710DG			7500 x 2 Line		15	15 x 2	
TCD1711DG			7450		15	30 x 2	
TCD2563BFG		5340 x 4 Line	5.25 x 8.4	R:22.6, G:28.0, B:17.0	Color:25, B/W:25 x 2	TDI	
TCD2564DG		5400 x 3 Line	7 x 7	R:9.6, G:8.9, B:3.8	30 x 2		
TCD2565BFG		7500 x 4 Line	5.25 x 5.25	R:10.2, G:9.2, B:4.0, B/W:14.7	Color:35, B/W:35 x 2	2-line distance (color)	
TCD2709DG		7450 x 3 Line	4.7 x 4.7	R:5.7, G:5.2, B:2.2	25 x 2		
TCD2710DG		7500 x 3 Line	9.325 x 9.325	R:9.3, G:14.5, B:4.8	30 x 2		
TCD2712DG		7500 x 3 Line	9.325 x 9.325	R:14.1, G:22.2, B:9.1	30 x 4		
TCD2713DG		7500 x 4 Line	9.325 x 9.325	R:13.1, G:18.4, B:7.6, B/W:23.8	Color:35 x 2, B/W:35 x 4	2-line distance (color)	
TCD2715DG		7450 x 3 Line	4.7 x 4.7	R:5.7, G:5.2, B:2.2	30		
TCD2716DG		7450 x 3 Line	4.7 x 4.7	R:9.1, G:8.5, B:3.8	30 x 2		
TCD2717BFG		7500 x 4 Line	4.7 x 4.7	R:8.0, G:7.2, B:3.1	Color:35, B/W:35 x 2	2-line distance (color)	
TCD2915BFG		10680 x 3 Line	2.625 x 8.4	R:5.6, G:7.0, B:4.3	20		
TCD2916BFG		10680 x 4 Line		R:6.7, G:7.0, B:4.3, B/W-H:17.4, B/W-H:11.3	Color:25, B/W:25 x 2		
TCD2964BFG		21360 x 6 Line	2 x 4	R:1.3, G:1.5, B:0.7	10	Overflow drain	

☆: Dry-packed

\*: New product

- The products shown in bold are also manufactured in offshore fabs.
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## Area Image Sensors (Dynastron™)

Part Number	Package	Features			
		Optical Format (Inches)	Total Pixel Count (PIX)	Color/Mono	Digital Signal Processor
TCM9001MD	Camera module	1/10	648 (H) x 492 (V) (VGA)	Color (RGB)	Yes
TCM9200MD	Camera module	1/4	1648 (H) x 1216 (V) (2.0M)	Color (RGB)	Yes

- Dynastron is a trademark of Toshiba Corporation.
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Package	Resolution (DPI)	Applications	Remarks	
16PIN GLCC	—	Barcode readers		
22PIN Cerdip	A3 600	Photocopiers, scanners		
22PIN CLCC	A4 600	Photocopiers, color scanners		
22PIN Cerdip				
22PIN CLCC			ES: OK	
22PIN Cerdip				
68PIN Cerdip	A3 600			
22PIN Cerdip				
32PIN CLCC				
22PIN CLCC				
22PIN CLCC	A4 1200			
32PIN CLCC	A4 4800		Color scanners	

# Magnetic Sensors

## Magnetic Sensors (Digital Output)

Part Number	Pole	Output	Supply Voltage V <sub>CC</sub> (V)			Supply Current @ V <sub>CC</sub> = 2.3 to 2.7 V						Magnetic Flux Density						Operating Frequency (Hz)			Package
						Average Current I <sub>CC</sub> (μA)			Operating Current I <sub>CCON</sub> (mA)			Operating Point B <sub>ON</sub> (mT)			Releasing Point B <sub>OFF</sub> (mT)						
			min	typ.	max	min	typ.	max	min	typ.	max	min	typ.	max	min	typ.	max	min	typ.	max	
TCS10SPU	S	Push-pull	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	UFV
TCS10SLU		Open-drain	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS11SLU		Open-drain with inverting output	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS10NPU	N	Push-pull	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS10NLU		Open-drain	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS11NLU		Open-drain with inverting output	2.3	—	3.6	—	5.5	9.5	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS10DPU	S/N	Push-pull	2.3	—	3.6	—	8.5	13.2	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS10DLU		Open-drain	2.3	—	3.6	—	8.5	13.2	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS11DLU		Open-drain with inverting output	2.3	—	3.6	—	8.5	13.2	—	0.7	1.3	—	1.8	2.5	0.3	0.8	—	—	25	—	
TCS20DPR		Push-pull	2.3	—	3.6	—	★7.3	★13.2	—	★0.7	★1.1	—	3.4	4.4	0.9	2.0	—	—	25	—	
TCS20DLR	Open-drain	2.3	—	3.6	—	★7.3	★13.2	—	★0.7	★1.1	—	3.4	4.4	0.9	2.0	—	—	25	—	SOT-23F	

Note: The UFV package measures 2.0 × 2.1 × 0.7 mm and is a variant of SC-88A.

The SOT-23F package measures 2.9 × 2.4 × 0.8 mm (Similar package as SOT-23).

★: When V<sub>CC</sub> = 2.3 V

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