

Photo-IC for Illuminance Sensor (linear output type)TPS818

PRODUCT GUIDE

TPS818

Overview

The TPS818 is a photo-IC of linear output (current output type) which integrates a photodiode and a current amp circuit onto a single chip. A luminous efficiency correction filter mounted on the detector ensures accurate luminosity output levels. The device's excellent output linearity enables automatic adjustment of the luminosity of a TV screen or PC monitor in accordance with the ambient brightness of the operating environment.

Features

▶ **Photodiode and current amp circuit integrated onto one chip**

▶ **High sensitivity**

Light current $I_L = 240\mu\text{A}$ (typ.) @ $E_v = 100\text{ lx}$

- I_L value is approximately x22500 that of a photodiode with the same detector area.
- I_L value is approximately x45 that of a phototransistor with the same detector area.

▶ **Reduced light current variation**

Minimum-to-maximum range ($\pm 25\%$ of typical rating) is 1.67 times width.

▶ **Output linearity to illumination is excellent**

Output voltage can be set for any load resistance.

▶ **A luminous efficiency correction filter is mounted on the detector; hence, accurate luminosity levels are output.**

$\lambda_p = 560\text{ nm}$ (typ.)

- The device is normally unaffected by light output by short-infrared LED.

▶ **Low current consumption**

$I_{CC} = 1\mu\text{A}$ (max) @ $V_{CC} = 5.5\text{ V}$

▶ **Environmentally-friendly silicon is used as the chip material.**

(It is suitable for replacement from CdS.)

Applications

- ▶ Luminosity adjustment of TV screens, CRT monitors and liquid-crystal monitors
- ▶ Notebook PCs and portable information devices
- ▶ Cellular phones
- ▶ Home appliances

Appearance



Maximum Ratings ($T_a = 25\text{ }^{\circ}\text{C}$)

Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{CC}	-0.5~7	V
Output Voltage	V_{OUT}	$\leq V_{CC}$	V
Light Current	I_L	10	mA
Allowable Power Dissipation	P	150	mW
Operating Temperature Range	T_{opr}	-25~85	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-40~100	$^{\circ}\text{C}$
Soldering Temperature Range (5 sec)(Note1)	T_{sol}	260	$^{\circ}\text{C}$

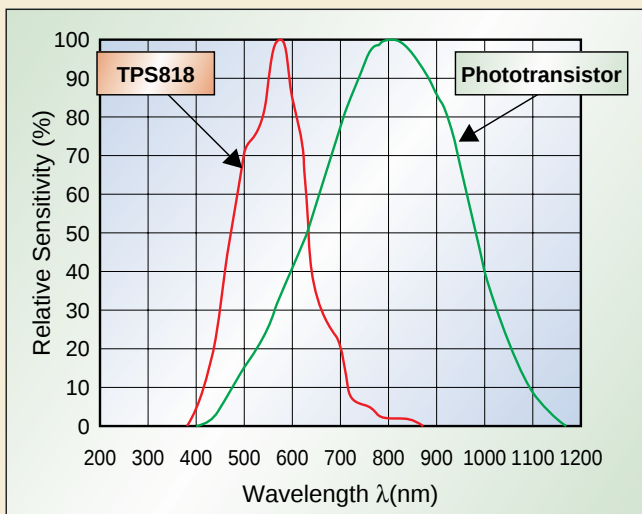
Note 1: Apply soldering temperature for 5 sec under the lead stopper.

Opto-Electrical Characteristics ($T_a = 25\text{ }^{\circ}\text{C}$, $V_{CC} = 5\text{ V}$)

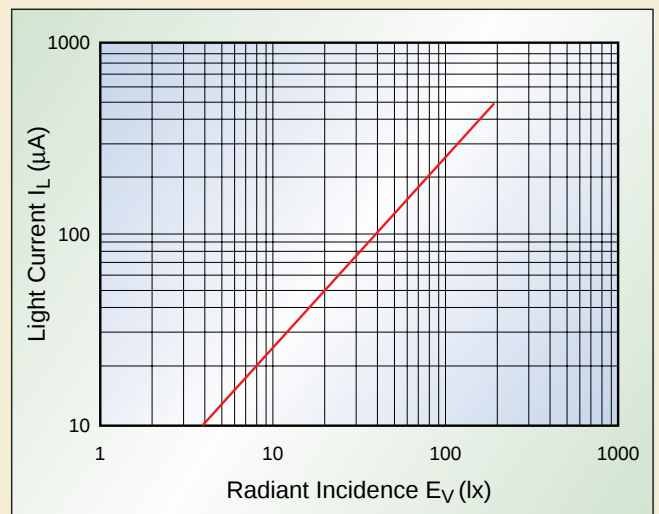
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Supply Voltage	V_{CC}		4.5	5	5.5	V
Consumption Current	I_{CC}	$V_{CC} = 5.5\text{ V}$, $E_V = 0$	–	0.01	1	μA
Light Current (1)	$I_L (1)$	$E_V = 10\text{ lx}$ (note2)	18	24	30	μA
Light Current (2)	$I_L (2)$	$E_V = 100\text{ lx}$ (note2)	180	240	300	μA
Dark Current	I_{LEAK}	$V_{CC} = 5.5\text{ V}$, $E_V = 0$	–	–	0.5	μA
Peak Sensitivity Wavelength	λ_P		–	560	–	nm
Switching time	t_r	$R_L = 10\text{ k}\Omega$, $\lambda = 570\text{ nm}$	–	0.3	–	ms
	t_f		–	0.8	–	

Note 2: The light used is a CIE standard A light source (color temperature = 2870°K)

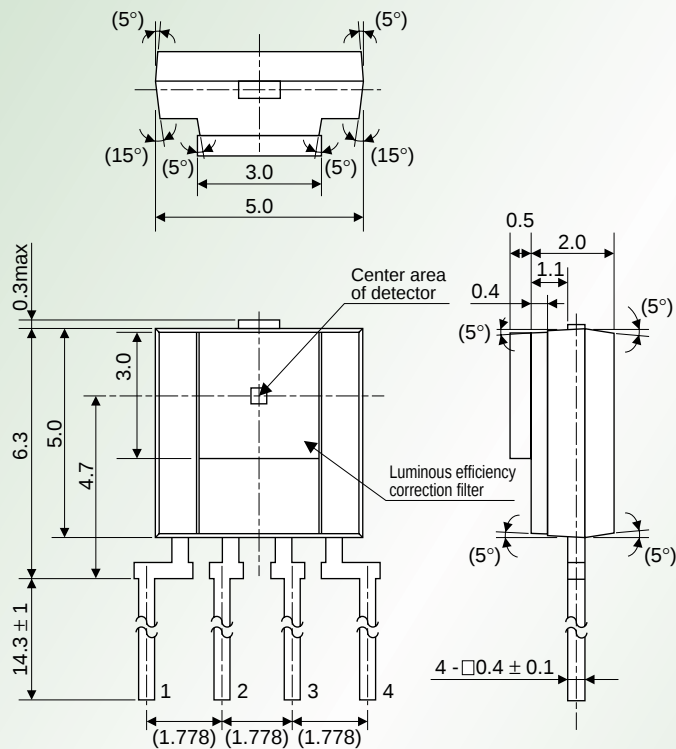
Spectral Response



Light Current – Emission (lux)



Package Dimensions



Unit: mm

Tolerance unless otherwise specified: $\pm 0.2\text{mm}$

(): reference value

Luminous efficiency correction filter: $3 \times 3 \times 0.5$

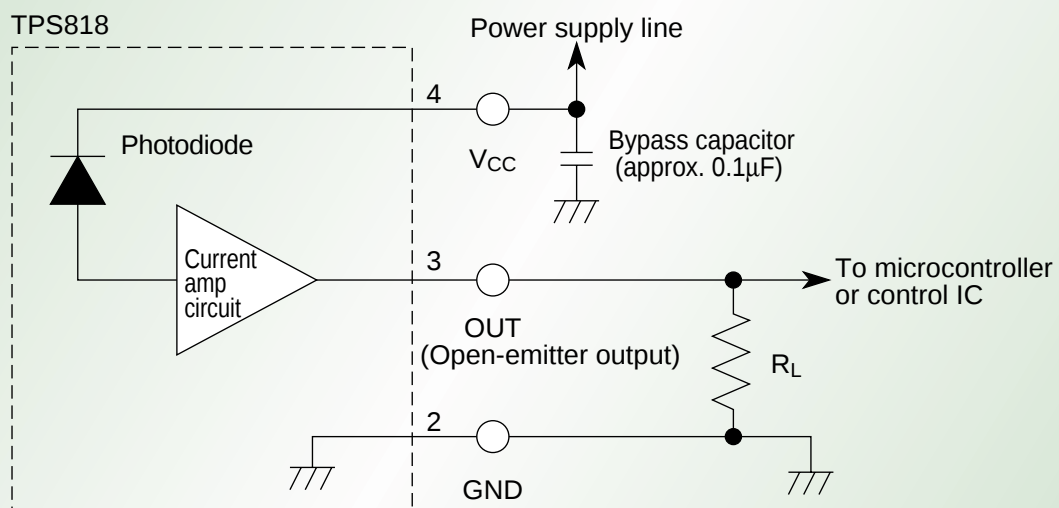
4-pin side-view clear plastic package

Luminous efficiency correction filter is mounted on the detector

Pin configuration

- ① NC
- ② GND
- ③ OUT
- ④ V_{CC}

Internal Circuit Block Diagram and Circuit Example



Application Example

TV screens



Liquid crystal display monitors

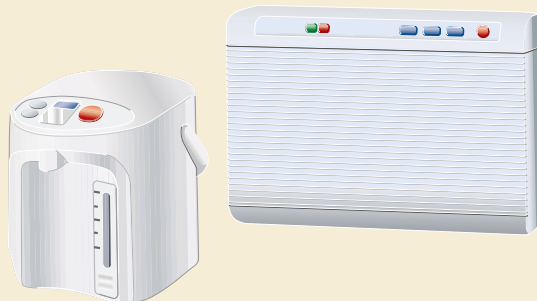


Monitors room illumination (brightness) and automatically adjusts screen's or monitor's brightness. Easy on the eyes and minimizes power consumption.

Cellular phones



Home appliances



Reduces power consumption by automatically sensing ambient illumination (brightness) so as to determine either that the cellular phone or home appliance is not in use or that it is night-time.

Handling precautions

- When forming the leads, bend each lead under the lead stopper. Soldering must be performed after the leads have been formed.
- Soldering must be performed under the stopper.
- To stabilize the power line insert a bypass capacitor of up to 0.01 μ F between Vcc and GND, close to the device.

**Toshiba America
Electronic Components, Inc.**
Headquarters-Irvine, CA

9775 Toledo Way, Irvine, CA 92618, U.S.A.
Tel: (949)455-2000 Fax: (949)859-3963

Boulder, CO

3100 Arapahoe Avenue, Ste. 500,
Boulder, CO 80303, U.S.A.
Tel: (303)442-3801 Fax: (303)442-7216

Boynton Beach, FL(Orlando)

11924 W. Forest Hill Blvd., Ste. 22-337,
Boynton Beach, FL 33414, U.S.A.
Tel: (561)374-6193 Fax: (561)374-6194

Deerfield, IL(Chicago)

One Pkwy., North, Suite 500, Deerfield,
IL 60015-2547, U.S.A.
Tel: (847)945-1500 Fax: (847)945-1044

Duluth, GA(Atlanta)

3700 Crestwood Parkway, Ste. 460,
Duluth, GA 30096, U.S.A.
Tel: (770)931-3363 Fax: (770)931-7602

Edison, NJ

2035 Lincoln Hwy. Ste. #3000, Edison
NJ 08817, U.S.A.
Tel: (732)248-8070 Fax: (732)248-8030

Orange County, CA

2 Venture Plaza, #500 Irvine, CA 92618, U.S.A.
Tel: (949)453-0224 Fax: (949)453-0125

Portland, OR

1700 NW 167th Place, #240,
Beaverton, OR 97006, U.S.A.
Tel: (503)629-0818 Fax: (503)629-0827

Richardson, TX(Dallas)

777 East Campbell Rd., Suite 650, Richardson,
TX 75081, U.S.A.
Tel: (972)480-0470 Fax: (972)235-4114

San Jose Engineering Center, CA

1060 Rincon Circle, San Jose, CA 95131, U.S.A.
Tel: (408)526-2400 Fax: (408)526-2410

Wakefield, MA(Boston)

401 Edgewater Place, Suite #360, Wakefield,
MA 01880-6229, U.S.A.
Tel: (781)224-0074 Fax: (781)224-1095

Toshiba Electronics Europe GmbH
Düsseldorf Head Office

Hansaallee 181, D-40549 Düsseldorf
Germany
Tel: (0211)5296-0 Fax: (0211)5296-400

München Office

Büro München Hofmannstrasse 52,
D-81378, München, Germany
Tel: (089)748595-0 Fax: (089)748595-42

Toshiba Electronics France SARL

Immeuble Robert Schumann 3 Rue de Rome,
F-93561, Rosny-Sous-Bois, Cedex, France
Tel: (1)48-12-48-12 Fax: (1)48-94-51-15

Toshiba Electronics Italiana S.R.L.

Centro Direzionale Colleoni
Palazzo Perseo Ingr. 2-Piano 6,
Via Paracelso n.12,
1-20041 Agrate Brianza Milan, Italy
Tel: (039)68701 Fax: (039)6870205

Toshiba Electronics España, S.A.

Parque Empresarial San Fernando Edificio Europa,
1ª Planta, ES-28831 Madrid, Spain
Tel: (91)660-6700 Fax: (91)660-6799

Toshiba Electronics(UK) Limited

Riverside Way, Camberley Surrey,
GU15 3YA, U.K.
Tel: (01276)69-4600 Fax: (01276)69-4800

Toshiba Electronics Scandinavia AB

Gustavslundsvägen 12, 2nd Floor
S-161 15 Bromma, Sweden
Tel: (08)704-0900 Fax: (08)80-8459

**Toshiba Electronics Asia
(Singapore) Pte. Ltd.**

Singapore Head Office
438B Alexandra Road, #06-08/12 Alexandra
Technopark, Singapore 119968
Tel: (278)5252 Fax: (271)5155, (270)6056

Bangkok Office

135 Moo 5 Bangkadi Industrial Park, Tivanon Rd.,
Bangkadi Amphur Muang Pathumthani, Bangkok,
12000, Thailand
Tel: (02)501-1635 Fax: (02)501-1638

**Toshiba Electronics Trading
(Malaysia)Sdn. Bhd.**

Kuala Lumpur Head Office
Suite W1203, Wisma Consplant, No.2,
Jalan SS 16/4, Subang Jaya, 47500 Petaling Jaya,
Selangor Darul Ehsan, Malaysia
Tel: (3)731-6311 Fax: (3)731-6307

Penang Office

Suite 13-1, 13th Floor, Menard Penang Garden,
42-A, Jalan Sultan Ahmad Shah,
100 50 Penang, Malaysia
Tel: 4-226-8523 Fax: 4-226-8515

Toshiba Electronics Philippines, Inc.

26th Floor, Citibank Tower, Valero Street, Makati,
Manila, Philippines
Tel: (02)750-5510 Fax: (02)750-5511

Toshiba Electronics Asia, Ltd.
Hong Kong Head Office

Level 11, Top Glory Insurance Building, Grand Century
Place, No.193, Prince Edward Road West,
Mong Kok, Kowloon, Hong Kong
Tel: 2375-6111 Fax: 2375-0969

Beijing Office

Rm 714, Beijing Fortune Building,
No.5 Dong San Huan Bei-Lu, Chao Yang District,
Beijing, 100004, China
Tel: (010)6590-8795 Fax: (010)6590-8791

Chengdu Office

Unit F, 18th Floor, New Times Plaza, 42 Wenwu Road,
Xinhua Avenue, Chengdu, 610017, China
Tel: (028)675-1773 Fax: (028)675-1065

Shenzhen Office

Rm 3010-3012, Office Tower Shun Hing Square,
Di Wang Commercial Centre, 333 ShenNan
East Road, Shenzhen, 518008, China
Tel: (0755)246-1582 Fax: (0755)246-1581

Toshiba Electronics Korea Corporation
Seoul Head Office

14/F, KEC B/D, 257-7 Yangjae-Dong,
Seocho-ku, Seoul, Korea
Tel: (02)589-4334 Fax: (02)589-4302

Kumi Office

6/F, Ssangyong Investment Securities B/D,
56 Songjung-Dong, Kumi City
Kyeongbuk, Korea
Tel: (82)546-456-7613 Fax: (82)546-456-7617

**Toshiba Technology Development
(Shanghai) Co., Ltd.**

23F, Shanghai Senmao International Building, 101
Yin Cheng East Road, Pudong New Area, Shanghai,
200120, China
Tel: (021)6841-0666 Fax: (021)6841-5002

**Tsurong Xiamen Xiangyu Trading
Co., Ltd.**

8N, Xiamen SEZ Bonded Goods Market Building,
Xiamen, Fujian, 361006, China
Tel: (0592)562-3798 Fax: (0592)562-3799

**Toshiba Electronics Taiwan
Corporation**
Taipei Head Office

17F, Union Enterprise Plaza Bldg. 109
Min Sheng East Rd., Section 3, 0446 Taipei,
Taiwan R.O.C.
Tel: (02)514-9988 Fax: (02)514-7892

Kaohsiung Office

16F-A, Chung-Cheng Bldg., Chung-Cheng 3Rd.,
80027, Kaohsiung, Taiwan R.O.C.
Tel: (07)222-0826 Fax: (07)223-0046

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