

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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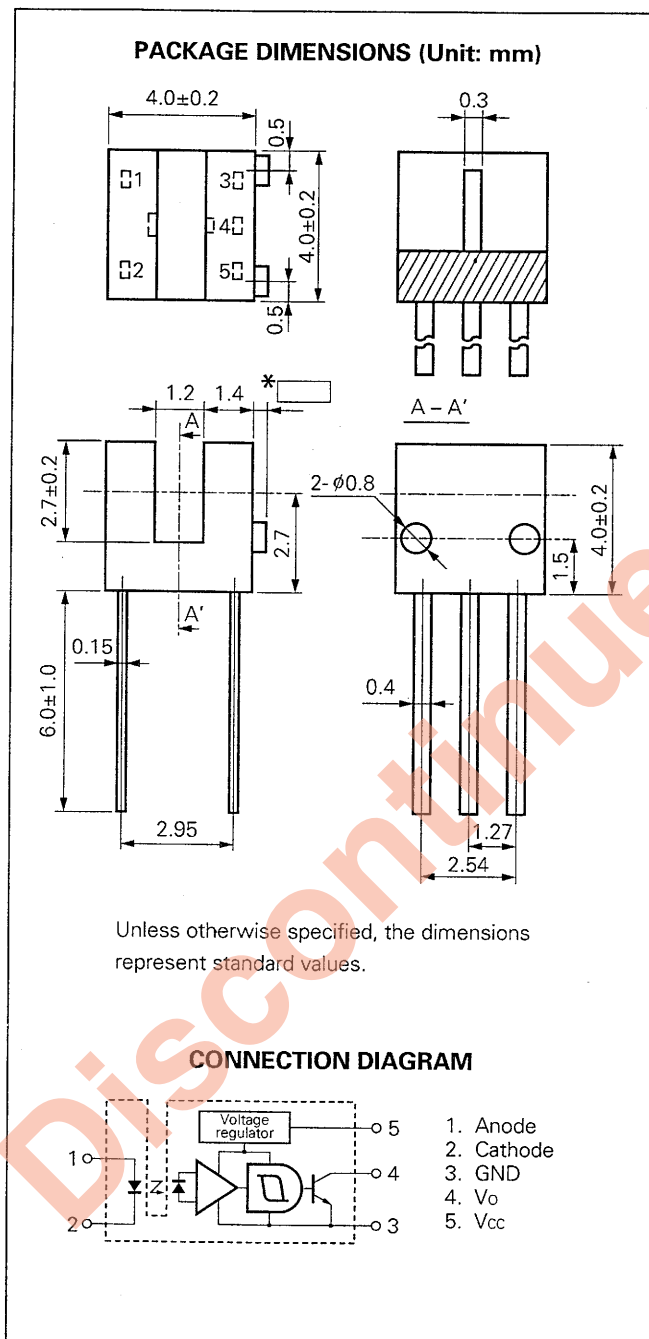
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PHOTO INTERRUPTERS

PS5701LC, PS5702LC

SMALL TYPE PHOTO IC INTERRUPTER



DESCRIPTION

The PS5701LC, PS5702LC are small photo interrupters comprising small internal devices (infrared LED and Si monolithic integrated circuit including a Photo Diode) and a housing case.

Since the device is of small size, it is suitable for small equipment such as cameras and FDD's.

FEATURES

- Very small size (4 × 4 × 4 mm)
- Built-in schmitt trigger circuit
- Low threshold input current
($I_{FLH} = 5 \text{ mA MAX. @ } V_{CC} = 5 \text{ V}$)
- TTL, LSTTL, CMOS compatible
- Wide supply voltage capability
($V_{CC} = 4.5 \text{ to } 17 \text{ V}$)
- High resolution
(slit width on light receiving side: 0.3 mm)
- Active "Low" type
- Open collector output

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

APPLICATIONS

- Lens position control of auto focus cameras, film feed sensors, etc.
- Various disk sensors of FDD's (track 0 sensor, etc.)

*

Product name	Pin length (Unit: mm)
PS5701LC	0.3
PS5702LC	0.6

ABSOLUTE MAXIMUM RATINGS ($T_a = 25\text{ }^{\circ}\text{C}$)

PARAMETER		SYMBOL	RATING	UNIT
Diode	Reverse Voltage	V_R	6	V
	Forward Current	I_F	50	mA
	Power Dissipation	P_D	75	mW
Detector	Supply Voltage	V_{CC}	17	V
	Output Voltage	V_O	28	V
	Low Level Output Current	I_{OL}	50	mA
	Power Dissipation	P_C	250	mW
Operating Temperature		T_{opt}	-30 to +85	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-40 to +100	$^{\circ}\text{C}$

RECOMMENDED OPERATING CONDITIONS ($T_a = 25\text{ }^{\circ}\text{C}$)

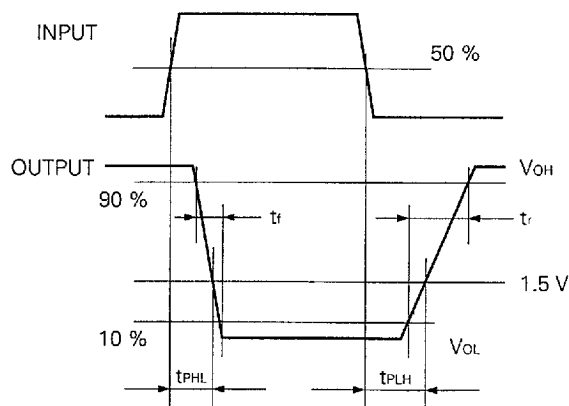
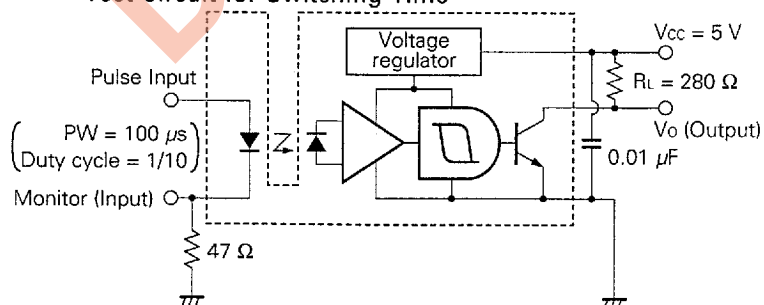
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Temperature	T_{opt}	-10		+60	$^{\circ}\text{C}$
Supply Voltage	V_{CC}	4.5	5	12	V
Forward Current	I_F	5		20	mA

* By-pass capacitor of more than $0.01\text{ }\mu\text{F}$ is used between V_{CC} and GND near device.

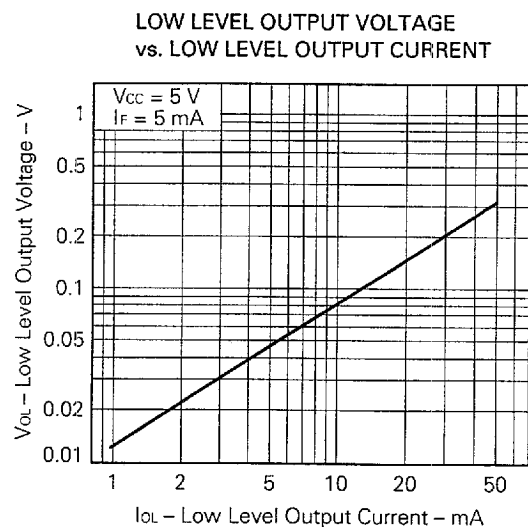
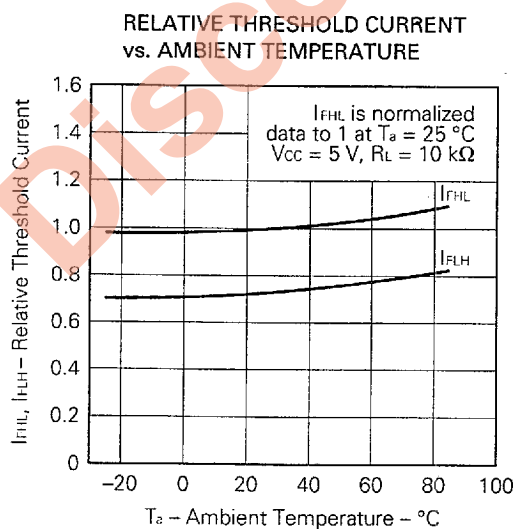
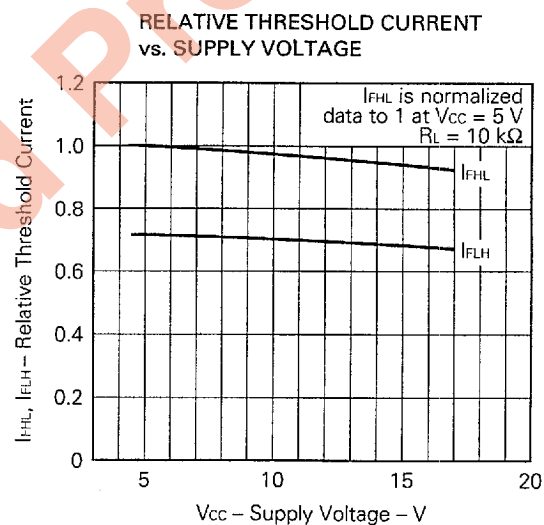
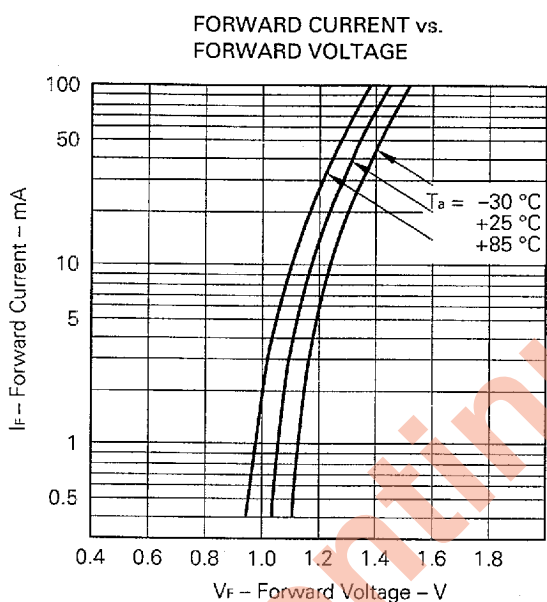
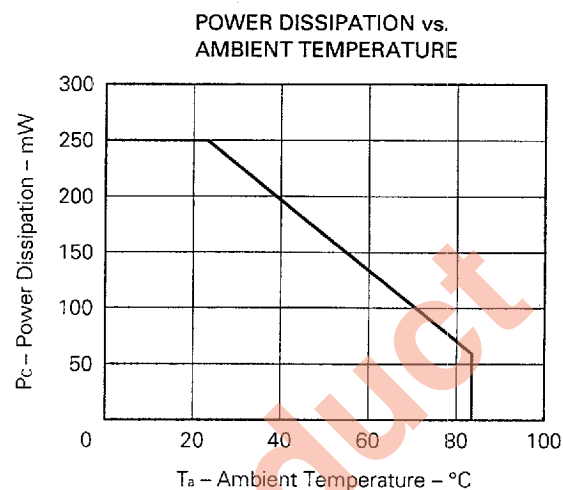
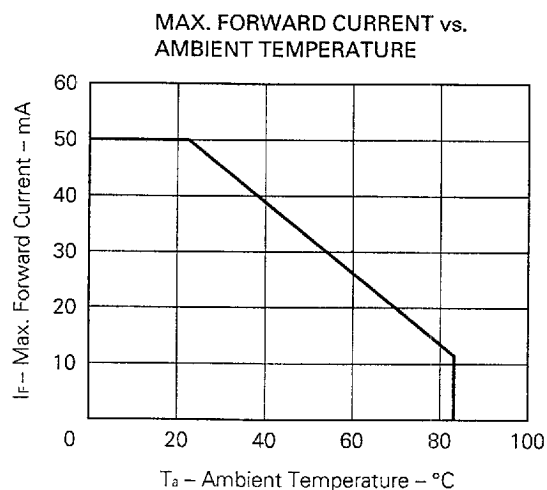
ELECTRICAL CHARACTERISTICS ($T_a = 25\text{ }^{\circ}\text{C}$, $R_L = 10\text{ k}\Omega$)

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V_F		1.1	1.4	V	$I_F = 5\text{ mA}$
	Reverse Current	I_R			10	μA	$V_R = 5\text{ V}$
	Junction Capacitance	C_t		20		pF	$V = 0$, $f = 1\text{ MHz}$
Detector	Operating Supply Voltage	V_{CC}	4.5		17	V	
	Low Level Output Voltage	V_{OL}		0.15	0.4	V	$V_{CC} = 5\text{ V}$, $I_F = 5\text{ mA}$, $I_{OL} = 16\text{ mA}$
	High Level Output Voltage	V_{OH}	4.9			V	$V_{CC} = 5\text{ V}$, $I_F = 0$
	Low Level Output Current	I_{CCL}		2.5	5	mA	$V_{CC} = 5\text{ V}$, $I_F = 5\text{ mA}$
	High Level Output Current	I_{CCH}		1	3	mA	$V_{CC} = 5\text{ V}$, $I_F = 0$
Coupled	Threshold Input Current	I_{FHL}			5	mA	$V_{CC} = 5\text{ V}$
	Hysteresis Ratio	I_{FHL}/I_{FLH}		0.7			$V_{CC} = 5\text{ V}$
	Propagation Delay Time *)	t_{PHL}		3		μs	$V_{CC} = 5\text{ V}$ $I_F = 5\text{ mA}$ $R_L = 280\text{ }\Omega$
	Propagation Delay Time *)	t_{PLH}		3		μs	
	Rise Time *)	t_r		100		ns	
	Fall Time *)	t_f		50		ns	

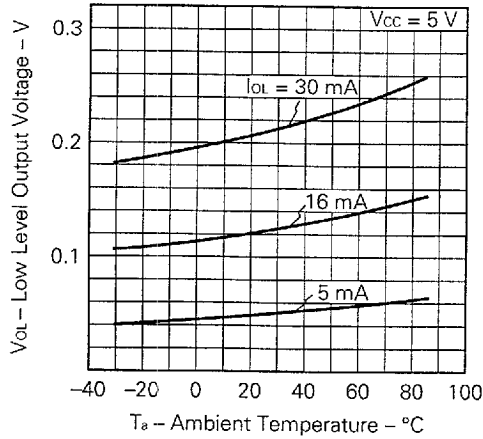
*) Test Circuit for Switching Time



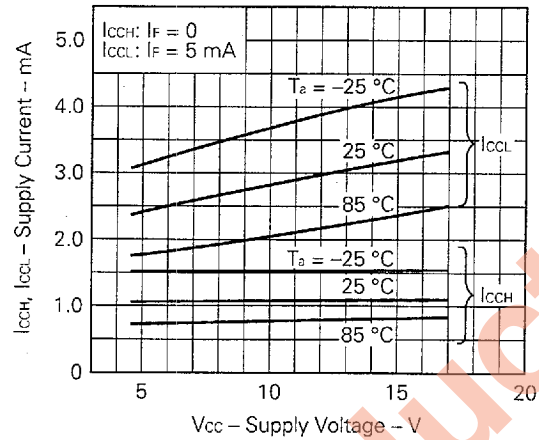
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



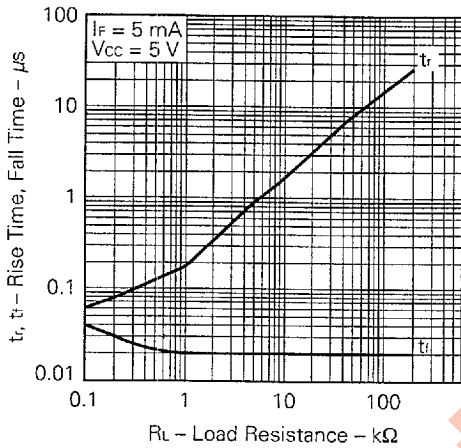
LOW LEVEL OUTPUT VOLTAGE
vs. AMBIENT TEMPERATURE



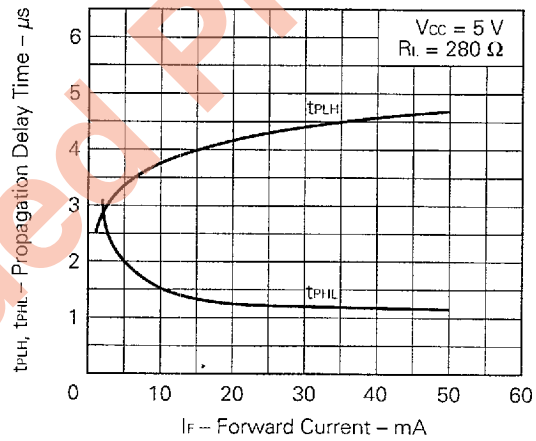
SUPPLY CURRENT vs.
SUPPLY VOLTAGE



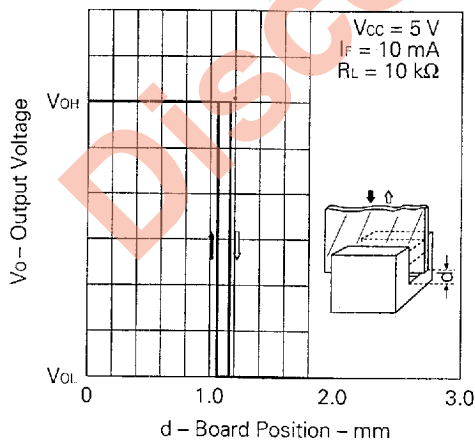
RISE TIME, FALL TIME
vs. LOAD RESISTANCE



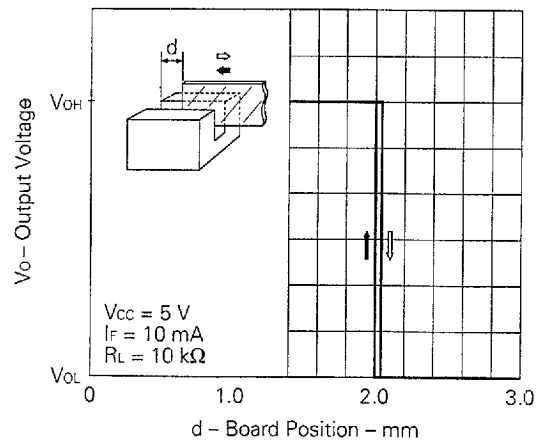
PROPAGATION DELAY TIME
vs. FORWARD CURRENT



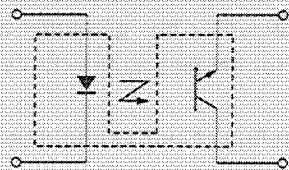
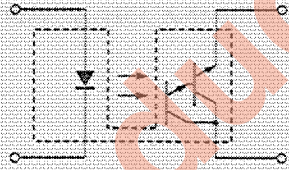
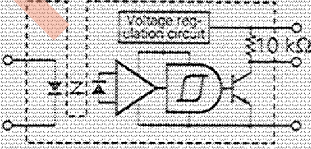
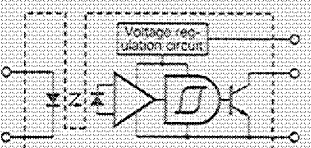
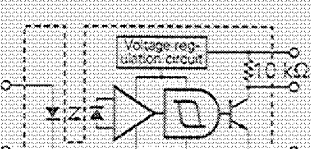
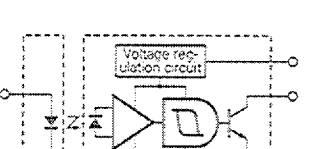
OUTPUT CHARACTERISTIC



OUTPUT CHARACTERISTIC



SMALL TYPE INTERRUPTER FAMILY

TYPE NO.	OUTPUT TYPE	BLOCK DIAGRAM
PS4701 PS4702	[Photo transistor output type] • Single transistor type	
PS4751 PS4752	[Photo transistor output type] • Darlington transistor type	
PS5701HR PS5702HR	[IC built-in digital output type] • Active high (Blocked state: output·low level) • Built-in pull-up resistor	
PS5701HC PS5702HC	[IC built-in digital output type] • Active high (Blocked state: output·low level) • Open collector output	
PS5701LR PS5702LR	[IC built-in digital output type] • Active low (Blocked state: output·high level) • Built-in pull-up resistor	
PS5701LC PS5702LC	[IC built-in digital output type] • Active low (Blocked state: output·high level) • Open collector output	

HANDLING PRECAUTIONS:

- Soldering

Photo Interrupter has generally a little less mechanical and thermal strength than other resin-molded semiconductor devices as they have less additives. Therefore please note on the following points.

- (a) Soldering of leads should be made at the point 2 mm or more from the root of the case at 260 °C and within 5 s.
- (b) Please keep the package temperature less than 100 °C.
- (c) If the temperature of the molded portion rises in addition to the residual stress between the leads, the possibility that open or short circuit occurs due to the deformation or destruction of the resin will increase.

- On cleaning the device:

- (a) Cleaning with unsuitable solvent may impair the resin of the package and the following solvents should be used at the temperature of less than 45 °C and for less than 3 minutes of immersion time.
Ethanol, Methanol, Isopropyl-alcohol
- (b) Ultrasonic cleaning will add some stress on the devices. The degree of the stress differs depending on the oscillation output power, the size of the PCB and the mounting methods of the devices, therefore it should be confirmed by making an experiment at actual conditions that the cleaning does not have any problem on the devices.

[MEMO]

Discontinued Product

[MEMO]

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Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.