

TOSHIBA PHOTO IC Si MONOLYTHIC PHOTO IC

# TPS830

HIGH-SPEED OPTICAL REMOTE CONTROLLERS

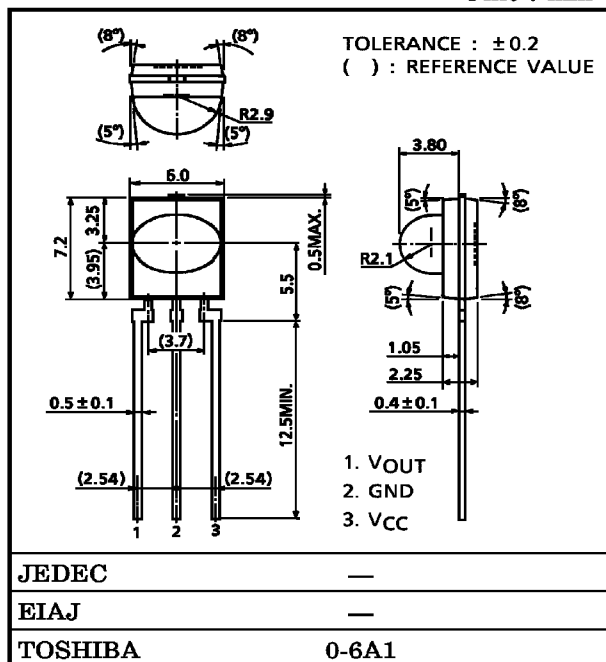
CORDLESS CONTROLLERS FOR VIDEO-GAMES

ELECTRONIC ORGANIZERS AND OTHER NEW  
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IR DATA COMMUNICATION

Unit : mm

- The TPS830 is a photo IC which includes a photodiode, I-V converter, band-pass filter and AGC amplifier on a single chip.
- The device's carrier frequency is as follows  
:  $f_0 = 455 \text{ kHz}$  (Typ.)
- The device's supply voltage is as follows  
:  $V_{CC} = 5 \text{ V}$
- Visible light cut-off frequency :  $\lambda > 700 \text{ nm}$
- The TLN105B and TLN221 are available as infrared LEDs for remote controllers.



Weight : 0.3 g (Typ.)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	7	V
Output Current	$I_O$	$\pm 10$	$\mu\text{A}$
Operating Temperature Range	$T_{opr}$	$-20 \sim 60$	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	$-30 \sim 100$	$^\circ\text{C}$
Soldering Temperature Range (5 s)	$T_{sol}$	260	$^\circ\text{C}$

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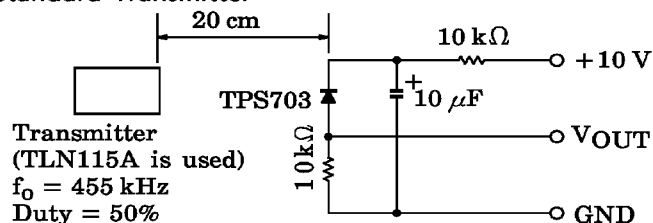
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OPTO-ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5\text{ V}$ ,  $T_a = 25^\circ\text{C}$ ,  $C = 1000\text{ pF}$  : Note 1)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{CC}$	—	3	5	7	V
Supply Current	$I_{CC}$	$E=0$	—	1.2	3.0	mA
Electromagnetic Sensitivity	$E_S$	(Note 5)	—	250	—	$V_{p-p}/m$
Transmission Range	L (Note 3)	The burst wave shown in (Note 4) is transmitted by a standard transmitter. (Note 2)	3	6	—	m
High-Level Output Voltage	$V_{OH}$	External light intensity $< 500\text{ lx}$ Output Current $< 10\text{ }\mu\text{A}$	4.0	—	—	V
Low-Level Output Voltage	$V_{OL}$		—	—	0.5	V
ON Pulse Width	$T_{ON}$	Output Current $< 10\text{ }\mu\text{A}$	16	25	40	$\mu\text{s}$
OFF Pulse Width	$T_{OFF}$		—	63	—	$\mu\text{s}$
Carrier Frequency	$f_o$	—	—	455	—	kHz
Peak Sensitivity Wavelength	$\lambda_P$	—	—	900	—	nm
Radiation Angle	$\theta_H$	Horizontal angle, $L/2$ (Note 6)	$\pm 55$	$\pm 63$	—	$^\circ$
	$\theta_V$	Vertical angle, $L/2$ (Note 6)	$\pm 25$	$\pm 30$	—	$^\circ$

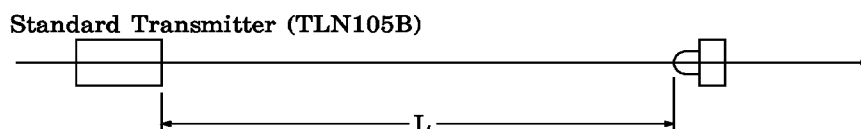
(Note 1) : Measurements for the TPS830 are based on a standard circuit that includes a 1000 pF capacitor between  $V_O$  and GND to prevent oscillation.

(Note 2) : Standard Transmitter



In the figure above, the transmitter shall be set as the output  $V_{OUT}$  will be 80 mVpp. The TPS703 in this application has a short circuit current  $I_{sc} = 1.24\text{ }\mu\text{A}$  measured at  $E = 0.1\text{ mW/cm}^2$ . ( $E$  is the radiant incidence using a CIE standard light source A)

(Note 3) : Transmission Range L



Maximum distance at which burst waves can be received from the transmitter unit, and at which data can be processed by the receiver unit.

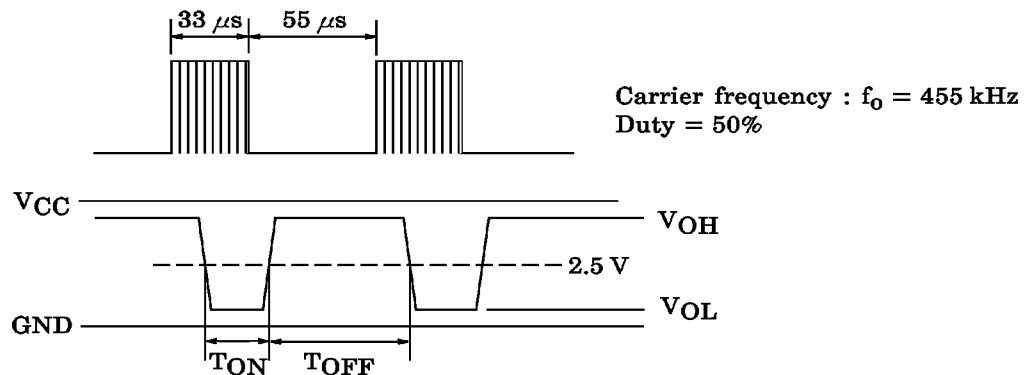
Note that when signals other than the recommended burst wave are transmitted, transmission range may be reduced or a malfunction may occur.

(\*) TLN105B is used as an LED for standard transmitter.

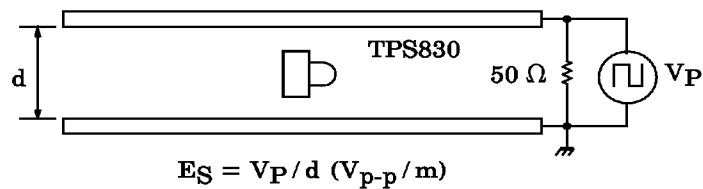
When selecting TLN221, transmission range is 1.2 times than TLN105B.

Example : 6 m (@TLN105B)  $\Rightarrow$  7.2 m (@TLN221)

(Note 4) : Burst Wave



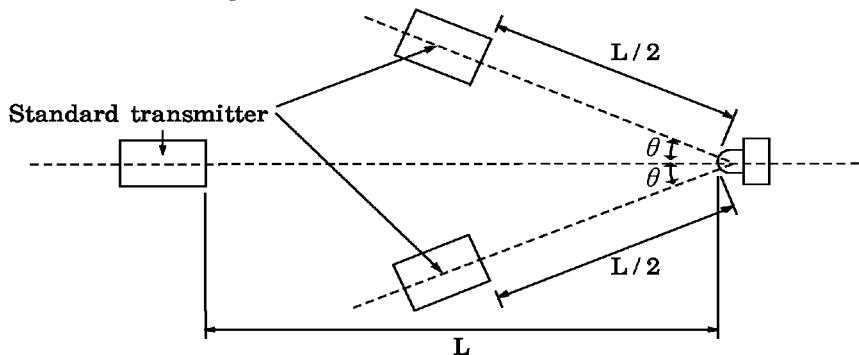
(Note 5) : Electromagnetic Sensitivity



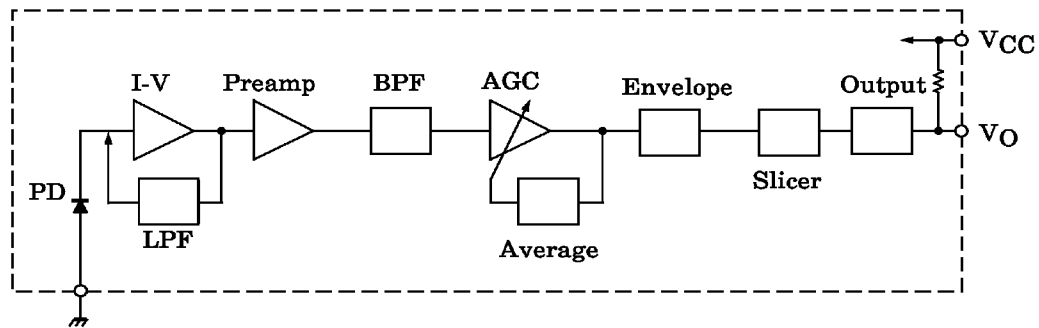
Mount the device between two parallel boards separated by a distance of  $d$ .  
Apply voltages modulated using frequencies ranging from 10 kHz to 50 MHz across the boards and read off the voltage at which noise is generated in the output from the device.

(\*) Using under strong electromagnetic fields may affect the device.  
Please evaluate devices under such environment before it is actually used.

(Note 6) : Radiation Angle



Circuit Block Diagram



## PRECAUTIONS

1. If a lead is formed, it should be formed at a distance of 2 mm from the body of the device. Forming the lead should not cause stress to the body of the device. Soldering must be performed after lead forming.
2. Insert a bypass condenser of up to  $0.01 \mu\text{F}$  between  $V_{CC}$  and GND near the device to stabilize the power supply line.
3. Within  $100 \mu\text{s}$  of  $V_{CC}$  turning on, the output voltage changes to stabilize the inner circuit.

