TOSHIBA PHOTO IC Si MONOLYTHIC PHOTO IC

TPS830

HIGH-SPEED OPTICAL REMOTE CONTROLLERS

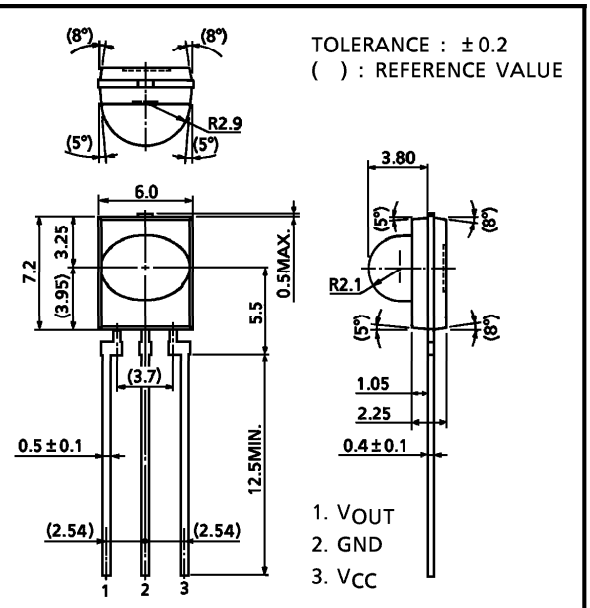
CORDLESS CONTROLLERS FOR VIDEO-GAMES

ELECTRONIC ORGANIZERS AND OTHER NEW PORTABLE INFORMATION TOOLS

IR DATA COMMUNICATION

- 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 kHz (Typ.)
- The device's supply voltage is as follows
  : V_{CC} = 5 V
- Visible light cut-off frequency : $\lambda > 700$ nm
- The TLN105B and TLN221 are available as infrared LEDs for remote controllers.

Unit : mm



JEDEC	—
EIAJ	—
TOSHIBA	0-6A1

Weight : 0.3 g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

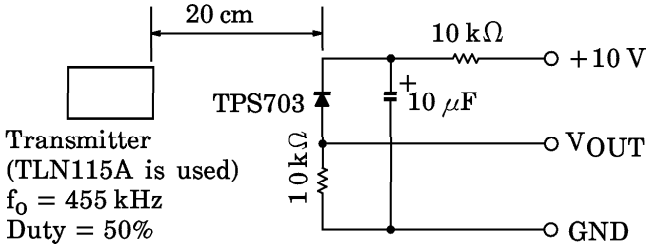
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	7	V
Output Current	I_O	±10	μA
Operating Temperature Range	T_{opr}	−20~60	°C
Storage Temperature Range	T_{stg}	−30~100	°C
Soldering Temperature Range (5 s)	T_{sol}	260	°C

OPTO-ELECTRICAL CHARACTERISTICS (V_{CC} = 5 V, Ta = 25°C, C = 1000 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) External light intensity < 500 ℓx Output Current < 10 μA	3	6	—	m
High-Level Output Voltage	V_{OH}		4.0	—	—	V
Low-Level Output Voltage	V_{OL}		—	—	0.5	V
ON Pulse Width	T_{ON}		16	25	40	μs
OFF Pulse Width	T_{OFF}		—	63	—	μs
Carrier Frequency	f_o	—	—	455	—	kHz
Peak Sensitivity Wavelength	λ_P	—	—	900	—	nm
Radiation Angle	θ_H	Horizontal angle, L / 2 (Note 6)	±55	±63	—	°
	θ_V	Vertical angle, L / 2 (Note 6)	±25	±30	—	°

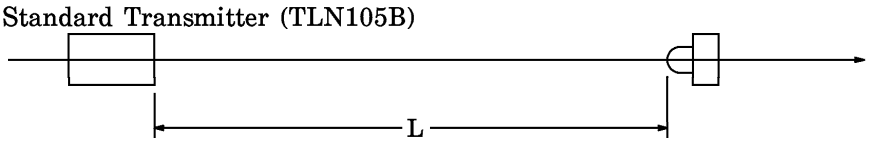
(Note 1) : Measurements for the TPS830 are based on a standard circuit that includes a 1000 pF capacitor between V_O and GND to prevent oscillation.

(Note 2) : Standard Transmitter



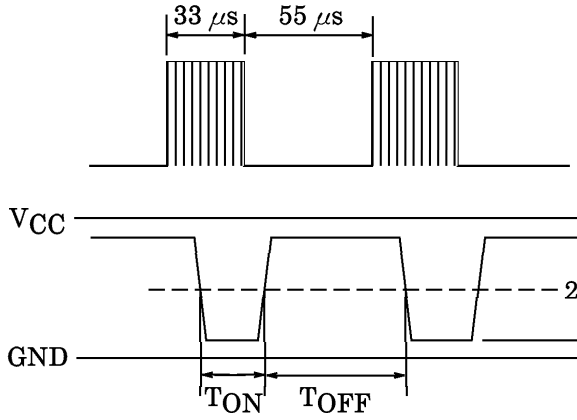
In the figure above, the transmitter shall be set as the output V_{OUT} will be 80 mVpp. The TPS703 in this application has a short circuit current I_{sc} = 1.24 μA measured at E = 0.1 mW / cm². (E is the radiant incidence using a CIE standard light source A)

(Note 3) : Transmission Range L

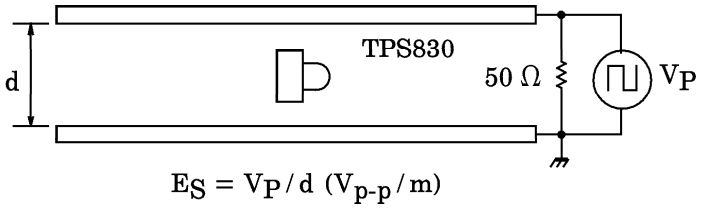


Maximum distance at which burst waves can be received from the transmitter unit, and at which data can be processed by the receiver unit.
Note that when signals other than the recommended burst wave are transmitted, transmission range may be reduced or a malfunction may occur.
(*) TLN105B is used as an LED for standard transmitter.
When selecting TLN221, transmission range is 1.2 times than TLN105B.
Example : 6 m (@TLN105B) ⇒ 7.2 m (@TLN221)

(Note 4) : Burst Wave



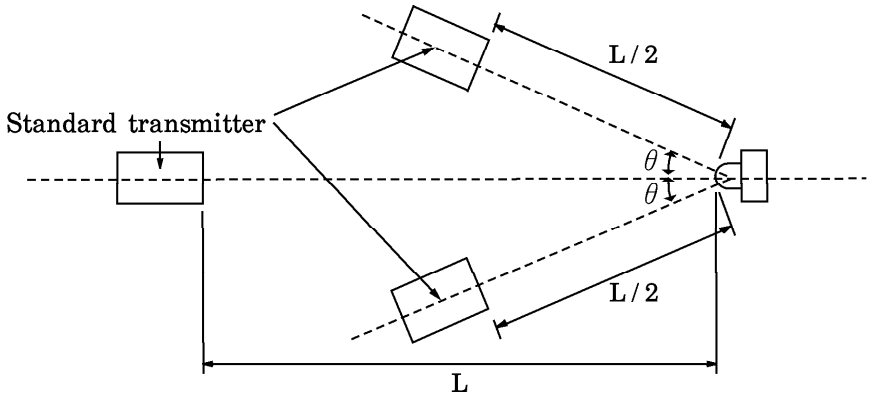
(Note 5) : Electromagnetic Sensitivity



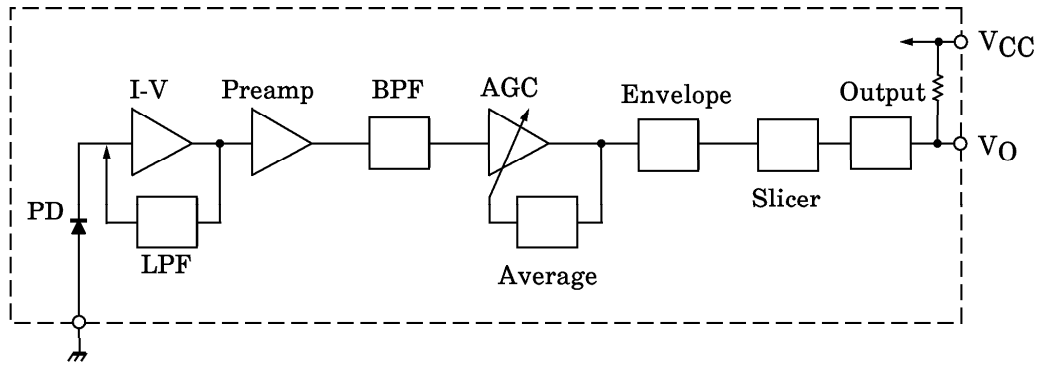
$E_S = V_P / d$ (V_{p-p} / m)

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



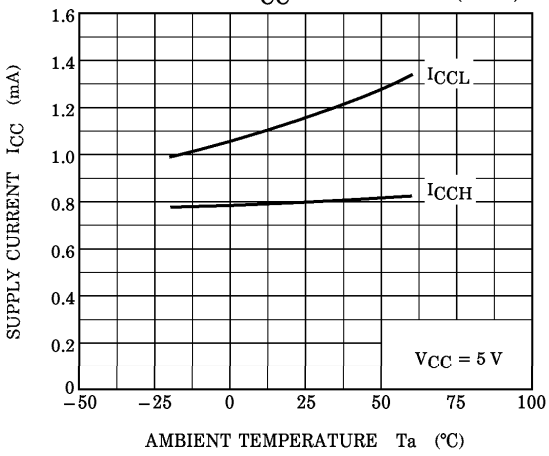
Circuit Block Diagram



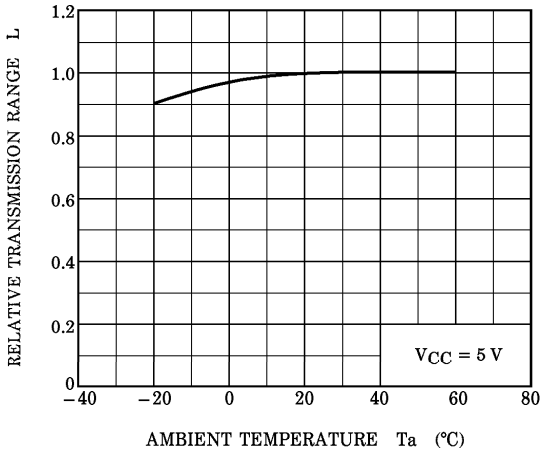
PRECAUTIONS

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 μF between V_{CC} and GND near the device to stabilize the power supply line.
3. Within 100 μs of V_{CC} turning on, the output voltage changes to stabilize the inner circuit.

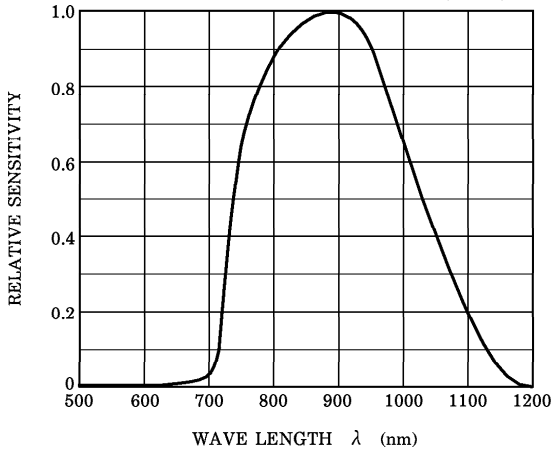
I_{CC} – Ta (TYP.)



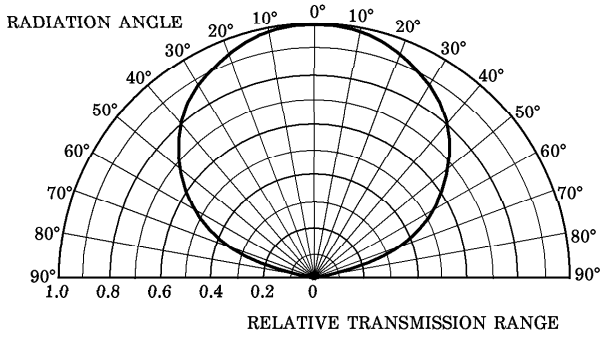
RELATIVE L – Ta (TYP.)



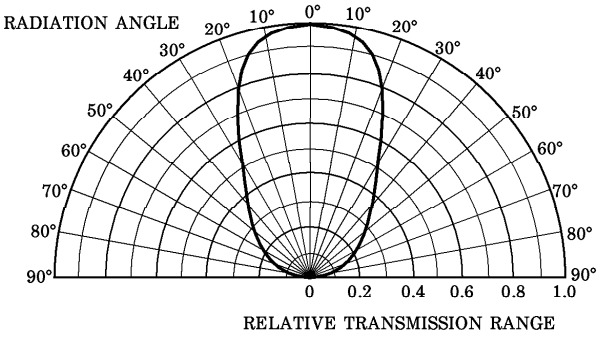
SPECTRAL RESPONSE (TYP.)



DIRECTIONAL SENSITIVITY CHARACTERISTICS (TYP.)
(Ta = 25°C)
HORIZONTAL



DIRECTIONAL SENSITIVITY CHARACTERISTICS (TYP.)
(Ta = 25°C)
VERTICAL



CARRIER FREQUENCY CHARACTERISTICS (TYP.)