IS455

Linear Output Type OPIC Light Detector

■ Features

1. Liner output
2. Capable of output voltage level adjustment due to external resistor

■ Applications

1. Copiers

■ Outline Dimensions   （Unit : mm）

Internal connection diagram

①I_O
②GND
③GND
④V_{CC}
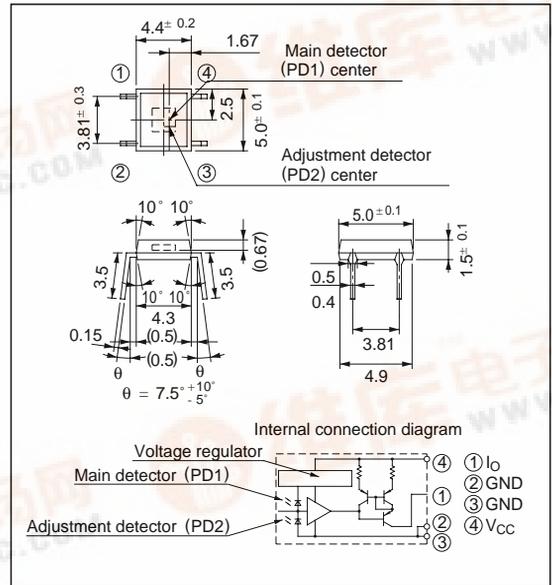
*" OPIC " （Optical IC）is a trademark of the SHARP Corporation.
An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Enlarged Figure of Light Detecting Portion   （Unit : μm）
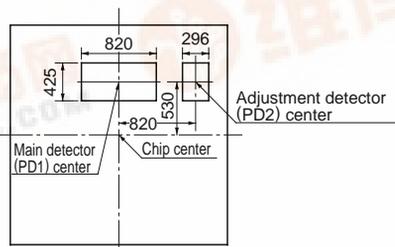
■ Absolute Maximum Ratings   （Ta= 25°C）

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	- 0.5 to +8	V
Output voltage	V_O	- 0.5 to V_{CC}	V
Output current	I_O	- 10	mA
Power dissipation	P_O	150	mW
Operating temperature	T_{opr}	- 25 to + 85	°C
Storage temperature	T_{stg}	- 40 to + 85	°C
Soldering temperature	T_{sol}	260	°C

*1 For 3 seconds at the position of 1mm from the bottom face of resin package.

■ Electro-optical Characteristics

$(\text{Ta} = 25°\text{C}, V_{CC} = 5V)$

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply current	I_{CC}	$E_V = 0$ lx	0.2	0.55	1.0	mA
Output current 1	I_{O1}	$E_V = 10$ lx [*2]	- 6.5	- 10	- 13.5	μA
Output current 2	I_{O2}	$E_V = 1\ 000$ lx [*2]	- 0.65	- 1	- 1.35	mA
[*3] Output current ratio	R_{IO}	-	92	100	108	-
Dark output current	I_{od}	$E_V = 0$	-	- 10	- 500	nA
Peak sensitivity wavelength	λ_P	-	-	700	-	nm

*2 E_V: Illuminance by CIE standard light source A（tungsten lamp）

*3 $R_{IO} = \dfrac{I_{O2}}{I_{O1}}$

■ Recommended Operating Conditions

Parameter	Symbol	MIN.	MAX.	Unit
Supply voltage	V_{CC}	4.5	5.5	V
[*4] Illuminance	E_V	10	5 000	lx
Output voltage	V_O	0	V_{CC} -1.5	V
Oparating temperature	T_{opr}	- 10	70	°C

*4 E_V: Illuminamce by standard light source A（tungsten lamp）

**Fig. 1 Power Dissipation vs. Ambient Temperature**
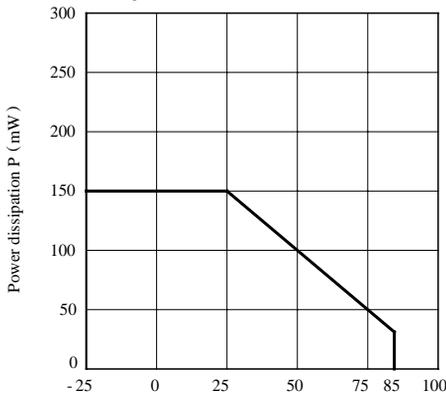

**Fig. 2 Output Current vs. Illuminance**
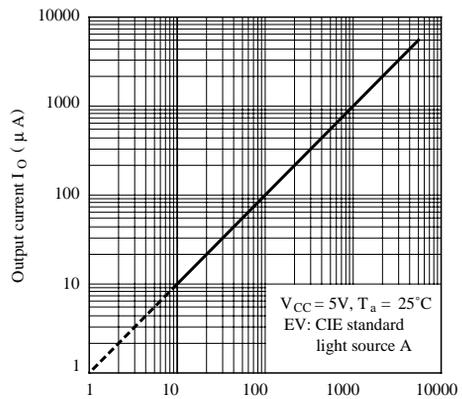
Fig. 3 Spectral Sensitivity

Relative sensitivity（%）

Wavelength λ（nm）

$V_{CC} = 5V$
$T_a = 25°C$
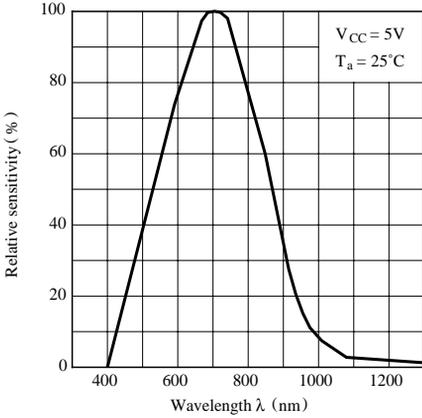
Fig. 4 Relative Output Current vs. Ambient Temperature

Relative output current

Ambient temperature T_a（°C）

$V_{CC} = 5V$
$E_V = 1000\ lx$
CIE standard light source A
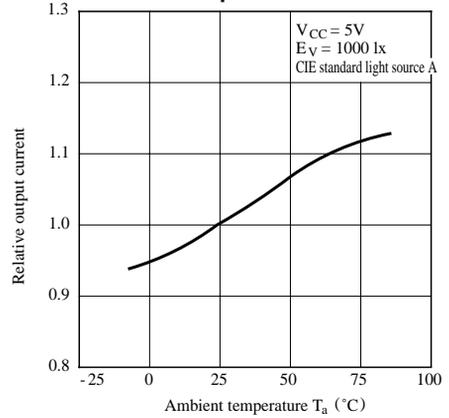
Fig. 5 Dark Output Current vs. Ambient Temperture

Dark output current I_{od}（A）

Ambient temperature T_a（°C）

$V_{CC} = 5V$
$E_V = 0$
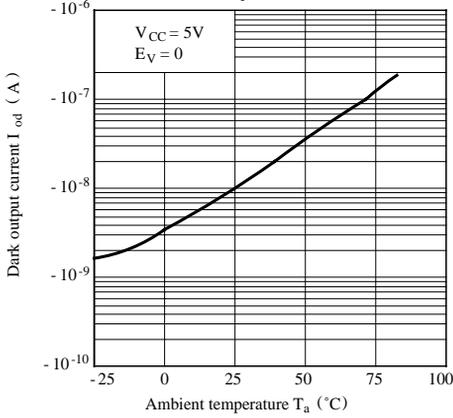
Fig. 6 Output Current vs. Supply Voltage

Output current I_O（mA）

Supply voltage V_{CC}（V）

$E_V = 1000\ lx$
CIE standard light source A
$T_a = 25°C$

Fig. 7 Output Current vs. Output Voltage

Output current I_O（mA）

$E_V = 1\ 000\ lx$
800 lx
600 lx
400 lx
200 lx
$V_{CC} = 5V,\ T_a = 25°C$
CIE standard light source A
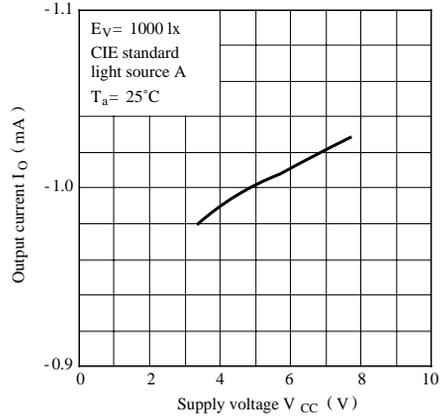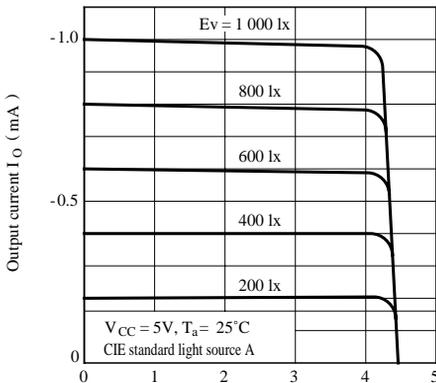
Test Circuit for Output Current vs. Output Voltage

Main detector
PD1

Adjustment detector
PD2

Voltage regulator

V_{CC}

5V

V_O

I_O

GND
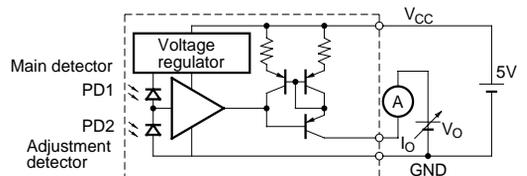
Fig. 8 Supply Current vs. Supply Voltage

$T_a = 25°C$
CIE standard light source A
$Ev = 1\ 000lx$
$100lx$
$10lx$ $0lx$

Supply current I_{CC} (mA)
Supply voltage V_{CC} (V)
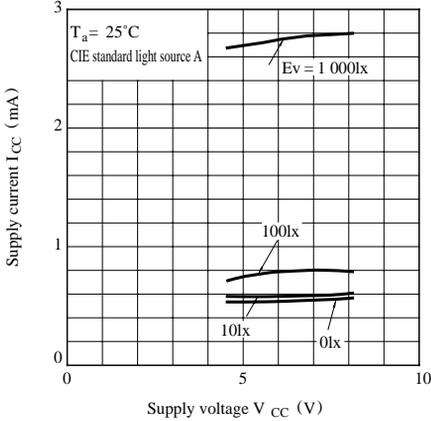
Fig. 9 Supply Current vs. Threshold Illuminance

$Vcc = 5V$
$V_O = 0$
CIE standard light source A

Supply current I_{CC} (mA)
Threshold illuminance Ev (lx)

Fig.10 Frequency

$V_{CC} = 5V$
$R_L = 1kΩ$
$^*Ev = 1\ 000lx$
$^*Ev = 100lx$

AC output voltage V_{OP} (mV)
Frequency f (Hz)
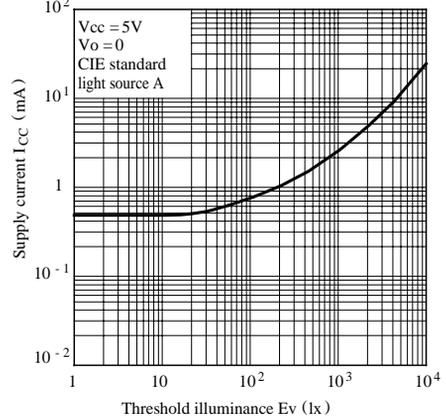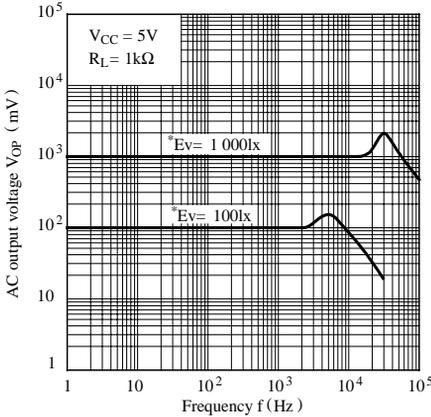
Test Circuit For Frequency

Main detector
Voltage regulator
V_{CC}
LED
$_{DP1}$
$λ$ P= 660nm
$_{DP2}$
$47Ω$ CRT
Adjustment detector
I_O V_O 5V
$1kΩ$ CRT
GND
Output voltage V_O
V_{OP}
Time t
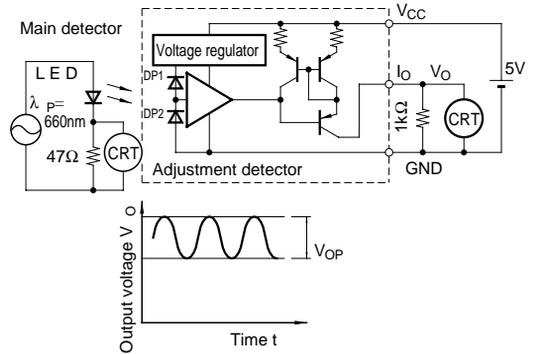
Fig.11 Supply Voltage Rejection Ratio vs. Ripple Frequency（1）

$Vcc = 5 + \frac{1}{2}sin2\pi\ ft$ (V)
$E_V = 0$
$R_L = 30kΩ$ $3.3kΩ$
$10kΩ$

Supply voltage rejection ratio PSRR (dB)
Frequency （1） f (Hz)
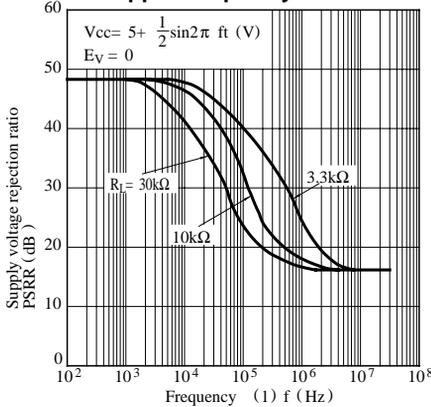
Fig.12 Supply Voltage Rejection Ratio vs. Ripple Frequency（2）

$Vcc = 5 + \frac{1}{2}sin\ 2\pi\ ft$ (V)
$E_V = 100lx$ CIE standard light source A
$3.3kΩ$
$10kΩ$
$R_L = 30kΩ$

Supply voltage rejection ratio PSRR (dB)
Frequency（2）f (Hz)