

# Photo IC for power monitor

## S8515

Provides high-speed output based on external reference voltage



S8515 is a photo IC having a high-speed amplifier that converts the photocurrent generated by input light into a voltage based on the external  $V_{ref}$  (reference voltage) and amplifies the voltage. S8515 contains a PIN photodiode specifically designed for laser power monitors to obtain good response waveforms with no trailing tail. The amplifier gain can be adjusted by changing a feedback resistor  $R_f$  externally connected to the inverting amplifier.

### Features

- High-speed response: 50 MHz Typ.
- Analog output  
(Photodiode + current-to-voltage conversion amplifier + inverting amplifier)

### Applications

- Laser power monitors for CD-R/RW pickups

### ■ Absolute maximum ratings ( $T_a=25\text{ }^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Supply voltage	$V_{cc}$	-0.5 to +7	V
Output current	$I_o$	2	mA
Power dissipation *1	P	300	mW
Operating temperature	$T_{opr}$	-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to +80	$^\circ\text{C}$
Soldering	-	230 $^\circ\text{C}$ , 5 s	-

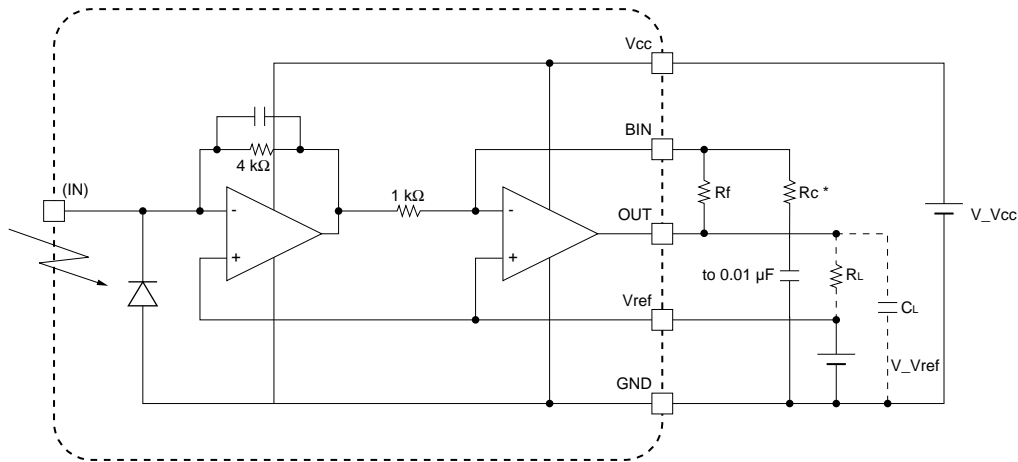
\*1: Derate power dissipation at a rate of -4 mW/ $^\circ\text{C}$  above  $T_a=25\text{ }^\circ\text{C}$

### ■ Electrical and optical characteristics ( $T_a=25\text{ }^\circ\text{C}$ , $V_{cc}=5\text{ V}$ , $V_{ref}=2.8\text{ V}$ , $\lambda=780\text{ nm}$ , $R_f=2\text{ k}\Omega$ \*2)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photo sensitivity	S	Photodiode, $\lambda=780\text{ nm}$	-	0.45	-	A/W
Photo sensitivity	ST	Photodiode + amp, $\lambda=780\text{ nm}$	-0.60	-0.67	-0.74	V/(mW/mm <sup>2</sup> )
Operation supply voltage	$V_{cc}$		4.5	5	5.5	V
Current consumption	$I_{cc}$	No input	-	13	20	mA
Output offset voltage	$V_{off}$	No input	-10	0	+10	mV
Output offset voltage drift	$\Delta V_{off}$	Entire $T_{opr}$ range	-2	0	+2	mV
Response time	$t_r, t_f$	Output amplitude: 2 V	-	8	-	ns
Settling time	$t_s$	Output amplitude: 2 V Rise: 1 %	-	30	-	ns
Minimum output voltage	$V_o \text{ min}$	Output amplitude < 2 V	-	-	0.5	V

\*2: Bypass capacitors (0.1  $\mu\text{F}$  ceramic capacitor) have to be connected between  $V_{cc}$  and GND and also between  $V_{ref}$  and GND within 7 mm from the wire lead.

■ IC block diagram and external connection

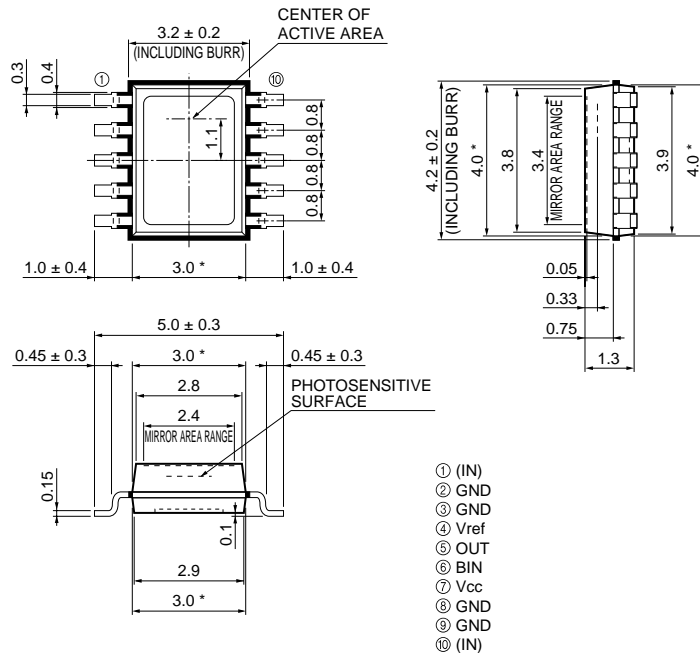


Rf: Inverting amplifier feedback resistance (1.2 kΩ to 3.9 kΩ), Rc: Phase-compensation resistance, RL: Load resistance, CL: Load capacitance

\*Rc is used for phase-compensating the second stage amplifier. Adjust this resistance to obtain an optimum response for the middle value of Rf.

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■ Dimensional outline (unit: mm)



- ① (IN)
- ② GND
- ③ GND
- ④ Vref
- ⑤ OUT
- ⑥ BIN
- ⑦ Vcc
- ⑧ GND
- ⑨ GND
- ⑩ (IN)

Tolerance unless otherwise noted:  $\pm 0.1$ ,  $\pm 2^\circ$   
 Shaded area indicates burr.  
 Chip position accuracy with respect to the package dimensions marked \*  
 $X \leq \pm 0.2$ ,  $Y \leq \pm 0.2$

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