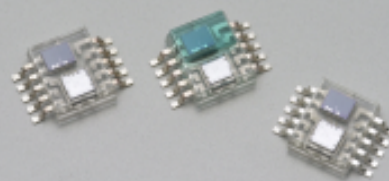


Photo IC for photometry

S6446 series, S6975

Photo IC incorporating a dual-element photodiode and log amp



S6446 series and S6975 are designed for camera exposure meters. These photo ICs consist of a dual-element (ball-in-box) photodiode and an IC integrating a logarithmic amplifier circuit and a thermosensor, etc.

Features

- Photometry in central and peripheral areas
- Clear miniature plastic package (4.5 × 5.5 mm)
- Low noise
- Built-in thermosensor
- S6446-20: With visual-compensation filter
- S6975: Large photometric output change
(Logarithmic amplifier gain is 1.5 times larger than S6446.)

Applications

- Camera auto exposure meter
- Various photometric applications

■ Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Supply voltage	Vcc	-0.3 to +7	V
Input voltage	POC terminals	-0.3 to Vcc+0.3	V
	Other terminals	Do not input voltage	-
Operating temperature	Topr	-20 to +60	°C
Storage temperature	Tstg	-30 to +80	°C
Soldering	-	230 °C, 3 s	-

■ Recommended operating conditions

■ Recommended operating conditions				
Parameter	Symbol	S6446/-20	S6975	Unit
Supply voltage	Vcc	3.0 to 3.5	4.5 to 5.5	V
		4.5 to 5.5		
Operating temperature	Topr	-15 to +40		°C

■ Optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ	*1	-	320 to 1100	-	nm
			-	320 to 730	-	
Peak sensitivity wavelength	λ_p	*1	-	960	-	nm
			-	560	-	
Short circuit current	Isc	100 k Ω , "A" light source	Center	250	-	nA
			Peripheral	2.5	-	μ A
			*1 Center	22	-	nA
			*1 Peripheral	220	-	nA

■ Temperature characteristics *2 (Ta= -15 to +40 °C, based on a value at 25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Terminal
Terminal voltage change	ΔV_{rf4}		-30	-	30	mV	VR⑥
Output voltage temperature coefficient	α		-	17.8	-	mV/°C	TO④
Output voltage temperature coefficient	β	Output voltage S6446/-20: 500 mV, S6975: 780 mV	-	2500	-	ppm/°C	PO⑧
		Output voltage S6446/-20: 1000 mV, S6975: 1550 mV	-	2900	-		
		Output voltage S6446/-20: 1500 mV, S6975: 2300 mV	-	3000	-		
		Output voltage S6446/-20: 2000 mV, S6975: 3100 mV	-	3100	-		

*1: When used with a standard visual compensation filter (0.5 mm thick)

*2: S6446/-20: Vcc=3.2 V, S6975: Vcc=5.0 V

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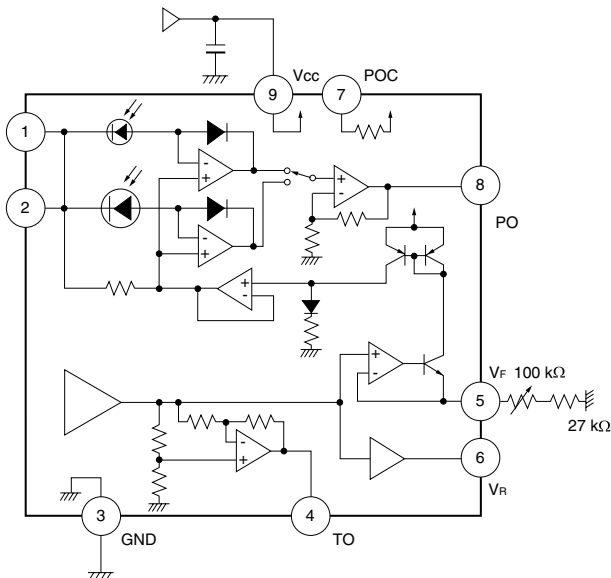
■ Electrical and optical characteristics *3 (Ta=25 °C)

Parameter	Symbol	Condition		S6446/-20			S6975			Unit	Terminal
				Min.	Typ.	Max.	Min.	Typ.	Max.		
Current consumption	I _{cc}	V _{cc} =6.5 V, 100 k Ω , “A” light source *4		-	3.5	6.0	-	3.5	6.0	mA	V _{cc} ⑨
H Input voltage	V _{IH}			V _{cc} × 0.7	-	-	V _{cc} × 0.7	-	-	V	POC⑦ Output switching
L Input voltage	V _{IL}			-	-	V _{cc} × 0.3	-	-	V _{cc} × 0.3		
L Input current	I _{IL}	V _{IN} =0 V		-220	-110	-52	-333	-167	-83		
Terminal voltage	V _r f			2.05	2.20	2.35	3.25	3.5	3.75	V	V _R ⑥
Load regulation	ΔV _r f	Load current 0 to 2 mA (with respect to 0.5 mA)		-12	-	12	-12	-	12	mV	Reference voltage
Output voltage	V _{TO}			1.2	-	1.68	1.2	-	1.68	V	TO④
Load regulation	ΔV _{TO}	R _L =100 kΩ (with respect to no load)		-10	-	10	-10	-	10	mV	Thermo- sensor
Output voltage 1	V _{POS}	100 k Ω , “A” light source, VF terminal ⑤	POC terminal ⑦ open	1229	1369	1509	1912	2130	2348	mV	PO⑧ Photometric output
	V _{POA}	VF terminal resistance 47 kΩ, *4	POC terminal GND	963	1103	1243	1498	1715	1933		
Output voltage 1 switching response	t _s	Time required to reach within specified V _{POA} value after open POC terminal is set to GND level		-	-	5	-	-	5	ms	
Output voltage 1 load regulation	ΔV _{PO1}	R _L =100 kΩ (with respect to no load)		-10	-	10	-10	-	10	mV	
Output voltage 1 change	ΔV _{PO2}	VF terminal resistance 27 kΩ		140	170	270	218	265	420	mV	
	ΔV _{PO3}	VF terminal resistance 100 kΩ		-270	-170	-140	-420	-265	-218		
Output change 1	ΔV _{PO4}	Difference between output voltage at 1 k Ω and output voltage 1, *4		521	545	569	791	828	865	mV	
Output change 2	ΔV _{PO5}	Difference between output voltage at 0.1 k Ω and output voltage 1, *4	POC terminal ⑦ open	769	817	865	1167	1242	1317	mV	
			POC terminal ⑦ GND	793		841	1205		1279		
Power supply response	t _p	Time required to reach within specified ΔV _{PO5} value after power is turned on		-	-	80	-	-	80	ms	

*3: S6446/-20: V_{cc}=3.2 V, S6975: V_{cc}=5.0 V

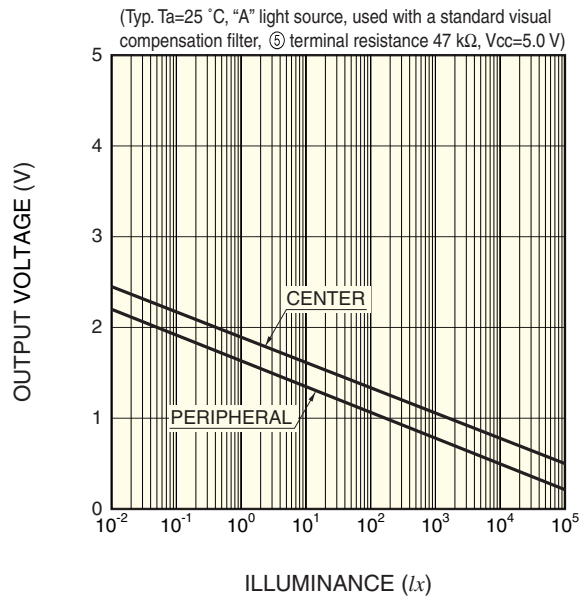
*4: When used with a standard visual compensation filter (0.5 mm thick)

■ Equivalent circuit

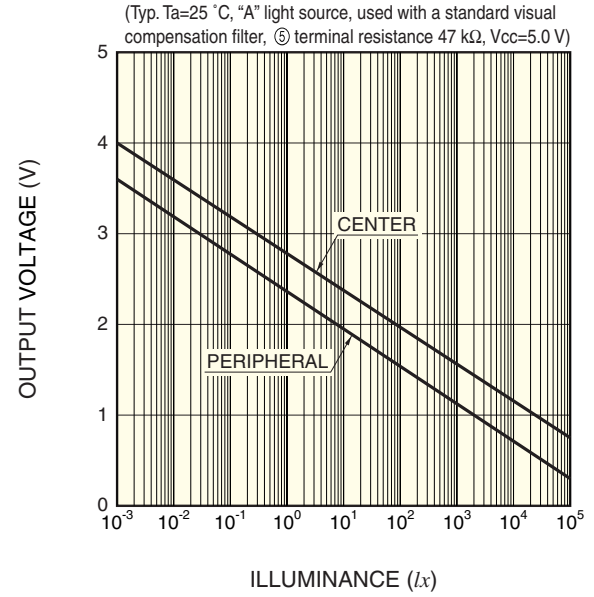


■ Photometric output vs. illuminance

S6446 series

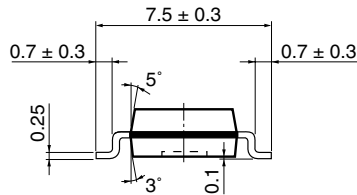
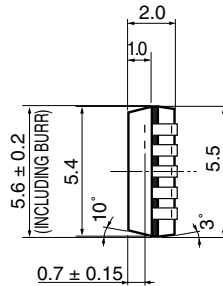
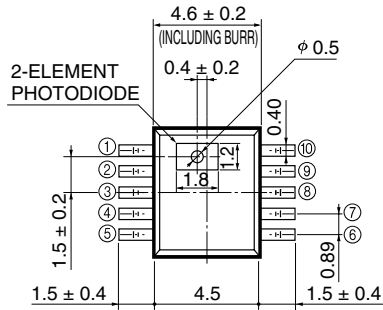


S6975



■ Dimensional outlines (unit: mm)

S6446, S6975

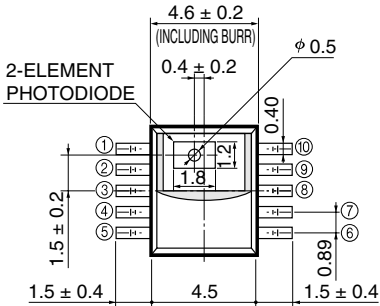


- ① CATHODE
- ② CATHODE
- ③ GND
- ④ TO (THERMOSENSOR)
- ⑤ VF (PHOTOMETRIC OUTPUT ADJUSTMENT)
- ⑥ VR (REF VOLTAGE OUTPUT)
- ⑦ POC (SELECTS CENTRAL ELEMENT WHEN "H" OR OPEN)
- ⑧ PO (PHOTOMETRIC OUTPUT)
- ⑨ Vcc
- ⑩ NC

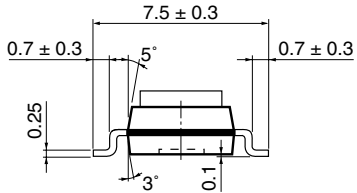
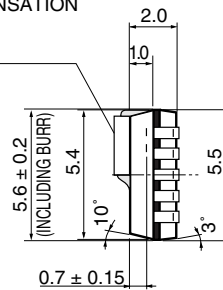
Tolerance unless otherwise noted: ± 0.1 , $\pm 2^\circ$
Shaded area indicates burr.

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S6446-20



VISUAL COMPENSATION FILTER
($2.6 \times 3.9 \times 0.5$)



- ① CATHODE
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- ③ GND
- ④ TO (THERMOSENSOR)
- ⑤ VF (PHOTOMETRIC OUTPUT ADJUSTMENT)
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- ⑨ Vcc
- ⑩ NC

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