

2-CHANNEL SPD SENSOR BUILT-IN DETECT AMOUNT OF LIGHT

DESCRIPTION

The M52979F is a semiconductor integrated circuit designed to detect quantity of light and used for cameras and illuminometers. Because a high-sensitivity SPD sensor is built in this IC, it is possible not only to reduce the space and expenses to mount it but also to conduct wide-ranging detection of light volume.

FEATURES

- A 2-channel SPD sensor is built in.(1-channel for spot and one for average)
- Wide-ranging detection of light volume.
- A temperature sensor circuit and a temperature constant reference voltage circuit are built in.
- Small-sized transparent molded plastic package.

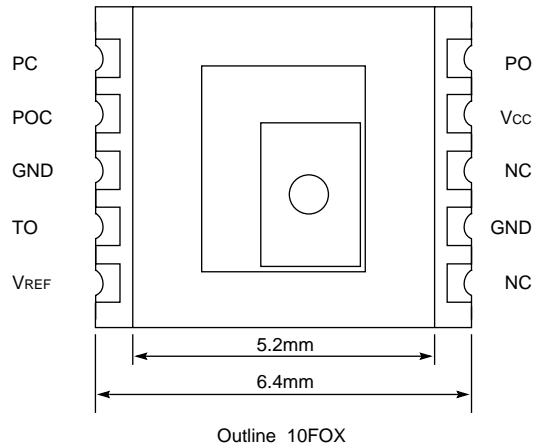
APPLICATION

Automatic exposure control for cameras,illuminometers.

RECOMMENDED OPERATING CONDITION

Supply voltage range.....2.8 to 6.5V
 Rated supply voltage.....4.65V
 Light input range.....SPOT 1 to 100000 lux
 AVE. 0.1 to 14400 lux

PIN CONFIGURATION (TOP VIEW)



DESCRIPTION OF PIN

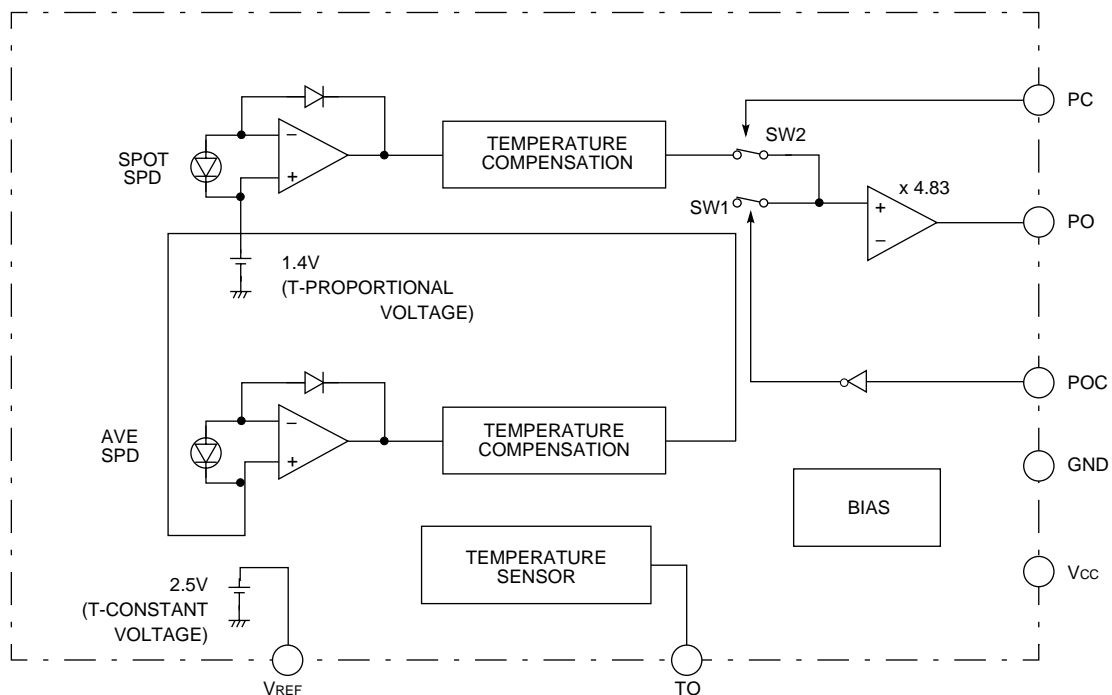
- PC : Sensor switch2
 POC : Sensor switch1
 TO : Temperature sensor output
 VREF : T-CONSTANT voltage
 PO : Photometry output

SWITCH OF MODE

PC	SW2 (SPOT)
H	ON
L	OFF

POC	SW1 (AVE)
H	OFF
L	ON

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply voltage		-0.3 to 7.0	V
Pd	Power dissipation		180	mW
VIN	Input voltage		-0.3 to Vcc+0.3	V
IO(max)	Output current	Pin VREF	10	mA
		Pin TO and PO	1	
Topr	Operating temperature		-20 to 60	°C
Tstg	Storage temperature		30 to 85	°C
Kq	Thermal derating		-3.0	mW/°C

RECOMMENDED OPERATING CONDITION (Ta=25°C unless otherwise noted)

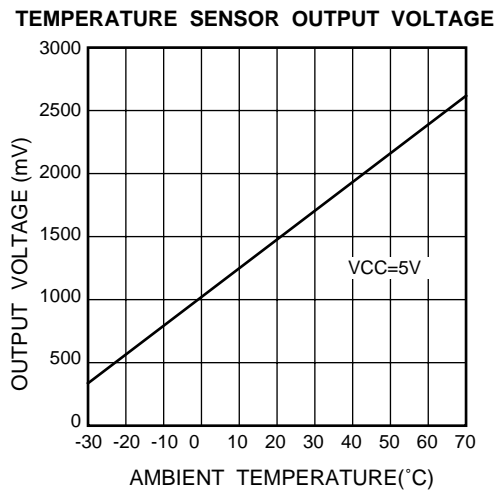
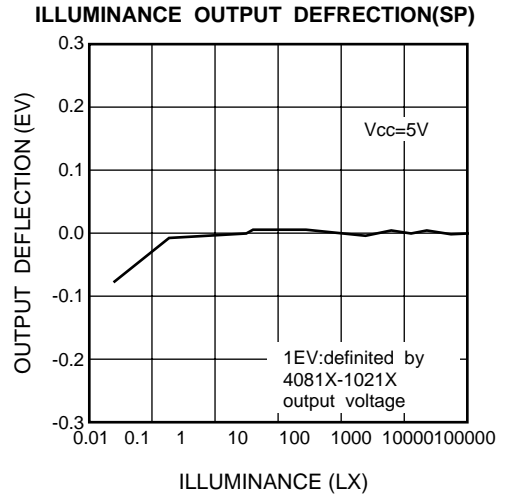
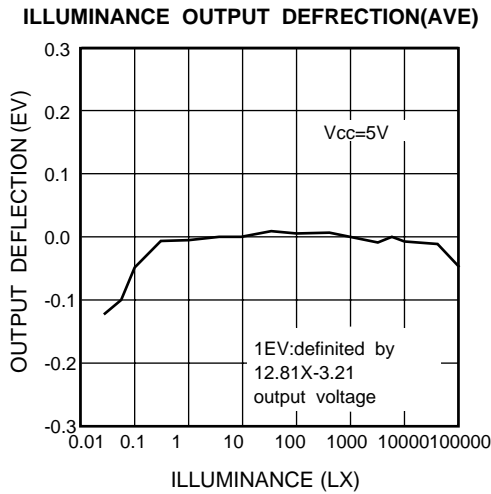
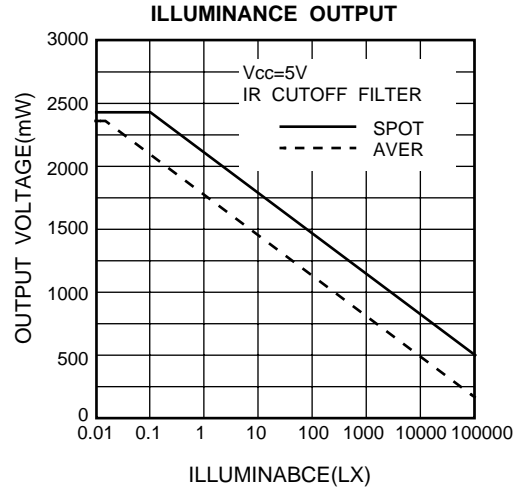
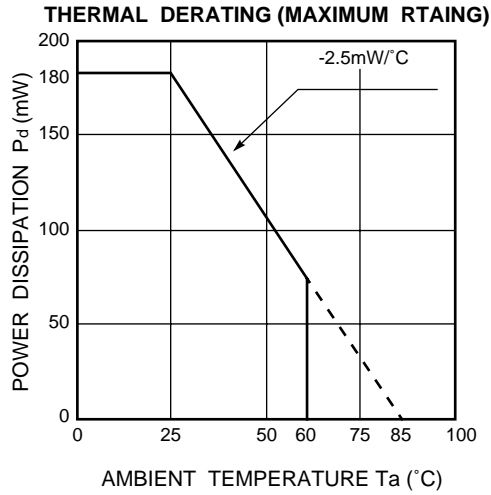
Symbol	Parameter	Limits			Unit
		Min	Typ	Max	
Vcc	Supply voltage	2.8	5.0	6.5	V
Lopr1	Operating illuminance "SP"	1 to 100000			lux
Lopr2	Operating illuminance "AVE"	0.1 to 14400			lux

ELECTRICAL CHARACTERISTICS (Ta=25°C, light source 4500°C, illuminance: measured after transmitting products through CM 500 filter, unless otherwise noted)

Symbol	Parameter	Test point	Test Conditions	Limits			Unit
				Min.	Typ.	Max.	
Icc	Circuit current	9	illuminance:200 lux, POC:(2pin)"H"		5	7	mA
POCH	H input voltage	2	value detected as "H"	Vcc-0.8			V
POCL	L input voltage	2	Value detected as H(current pull-out)			Vcc-2.2	V
PCCR	Non-operating current	2				10	μA
POCI	Ground current	2		-550		-80	μA
TOV	Absolute value of temperature sensor output	4		1270	1550	1730	mV
dTOV1	Supply voltage variance 1	4	Output voltage variance at Vcc 3V ±0.2V	-5		5	mV
dTOV2	Supply voltage variance 2	4	Output voltage variance at Vcc 4.65V ±1.85V	-45		45	mV
dTO1	Output voltage temperature coefficient	4	Ta=25°C(reference), Ta=-15 to 40°C	20.4	22.1	23.8	mV/°C
dTO2	Accuracy of temperature sensor	4	Ta=10 to 40°C	-1.2		1.2	°C
		4	Ta=-15 to 10°C	-3.0		3.0	
VREF	Absolute value of output at VREF pin	5		2300	2500	2700	mV
dVREF1	VREF output voltage load variance1	5	Load current:-2mA	-20		20	mV
dVREF2	VREF output voltage load variance2	5	Output voltage variance at Vcc 3V±0.2V	-5		5	mV
dVREF3	VREF output voltage load variance3	5	Output voltage variance at Vcc 4.65V±1.85V	-45		45	mV
VPOS	Absolute value of photometry output	10	SP side, illuminance 8 lux	1490	1750	1980	mV
dVPOS1	Photometry output supply voltage variance 1	10	SP side.Output voltage variance at Vcc 3V±0.2V	-5		5	mV
dVPOS2	Photometry output supply voltage variance 2	10	SP side.Output voltage variance at Vcc 4.65V±1.85V	-45		45	mV
dEVS1	Variance per level (1EV)	10	SP side.Variance when illuminance changes from 20 to 40	80	86	92	mV
dEVS2	Photometry output linearity	10	SP side,illuminance : 1 to 100000 lux	-0.3		0.3	mV
VPOA	Absolute value of photometry output	10	AVE side, illuminance 8 lux	1190	1400	1630	mV
dVPOA1	Photometry output supply voltage variance 1	10	AVE side.Output voltage variance at Vcc 3V±0.2V	-5		5	mV
dVPOA2	Photometry output supply voltage variance 2	10	AVE side.Output voltage variance at Vcc 4.65V±1.85V	-45		45	mV
dEVA1	Variance per level (1EV)	10	AVE side.Variance when illuminance changes from 20 to 40	80	86	92	mV
dEVA2	Photometry output linearity	10	AVE side,illuminance : 1 to 14400 lux	-0.3		0.3	EV
trs	Power supply response 1	10	SP side, illuminance 1 lux		25	60	ms
tra	Power supply response 2	10	AVE side, illuminance 0.1 lux		40	150	ms
trc1	Switching response 1	10	SP → AVE, illuminance 0.1 to 14400 lux		0.01	3	ms
trc2	Switching response 2	10	AVE → SP, illuminance 1 to 100000 lux		0.01	3	ms

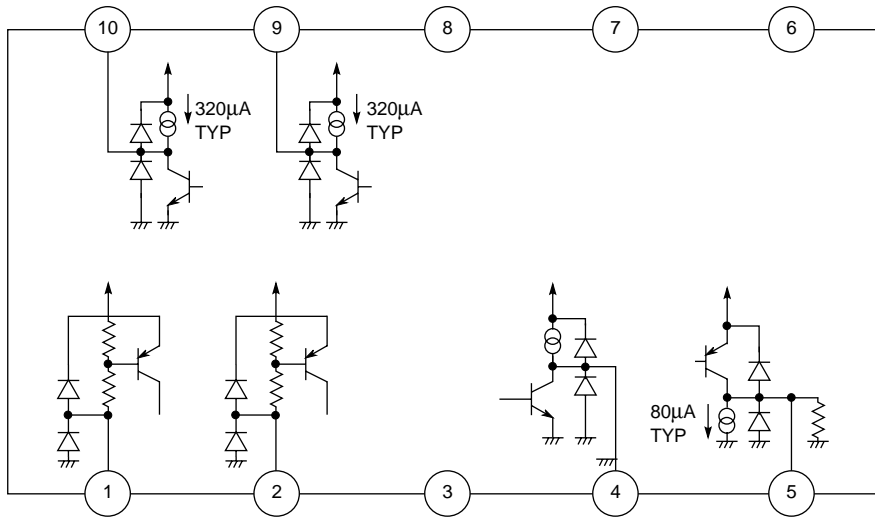
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TYPICAL CHARACTERISTICS

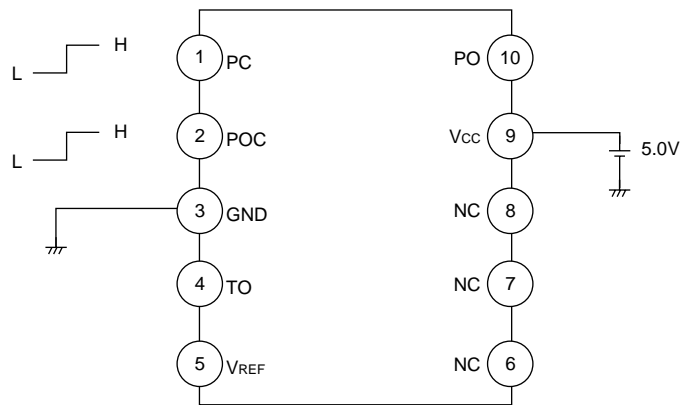


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I/O SYSTEM

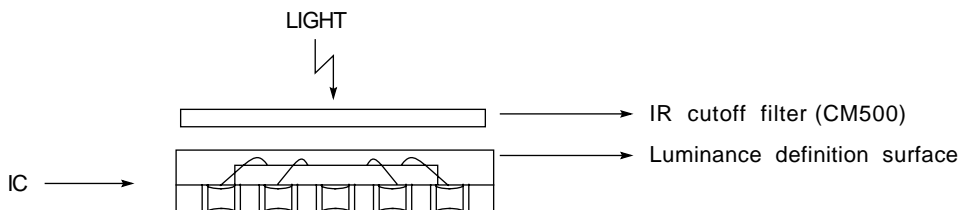


EXAMPLE



Method to switch photometric amplifier : 2-pin (POC)H - SP side, L - AVE side

Conditions on light for photometric amplifier IR cutoff filter : CM500 (glass filter)
 Light source color temperature : 4500°K



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TEMPERATURE SENSOR OUTPUT VOLTAGE

- Temperature conversion method based on temperature sensor output voltage.
- V_{ta} : Temperature sensor output voltage at $T_a=25^{\circ}\text{C}$
 V_{to} : Temperature sensor output voltage at ambient temperature

Conversion formula Ambient temperature
 $= (V_{to} - V_{ta}) / 22.14\text{mV} + 298^{\circ}\text{K}$

PHOTOMETRY OUTPUT VOLTAGE

- Calculate the photometry output voltage at $T_a=25^{\circ}\text{C}$
- Ambient temperature: photometry output voltage at ambient temperature $T_a (^{\circ}\text{K})$: V_o

Conversion formula Photometry output voltage at $T_a=25^{\circ}\text{C}$
 $= V_o / T_a \times 298^{\circ}\text{K}$
 Conversion error range $\pm 0.4\text{EV}$ (-15 to 40°C)

SENSOR FORM

