

# Si photodiode S2592/S3477 series

Thermoelectrically cooled photodiode for low-light-level detection in UV to near IR



S2592/S3477 series sensors combine a UV to near infrared Si photodiode with a thermoelectric cooler. A thermistor is also included in the same package to sense the Si photodiode chip temperature. This allows stable operation over long periods of time, making these sensors suitable for low-light-level detection where a high S/N is required.

S2592 series is hermetically sealed in a TO-8 package, and S3477 series in a TO-66 package. A dedicated temperature controller (C1103-04) and heatsink (A3179 series) are also available as options (sold separately).

## Features

- High S/N
- High UV sensitivity
- Built-in thermistor allows stable operation

## Applications

- Low-light-level detection

### ■ General ratings

Parameter	S2592-03	S3477-03	S2592-04	S3477-04	Unit
Built-in photodiode			S1336 series		-
Window material			Sapphire glass		-
Active area	2.4 × 2.4		5.8 × 5.8		mm
Package	TO-8	TO-66	TO-8	TO-66	

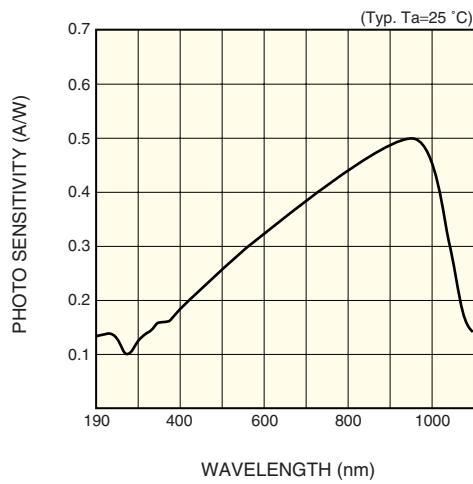
### ■ Absolute maximum ratings

Parameter	Symbol	Value	Unit
Reverse voltage	VR	5	V
Operating temperature	Topr	-40 to +70	°C
Storage temperature	Tstg	-55 to +85	°C
Allowable current for thermoelectric cooler	Ite	1.5	A
Thermistor power dissipation	Pth	0.2	mW

### ■ Electrical and optical characteristics (Typ. Ta=25 °C)

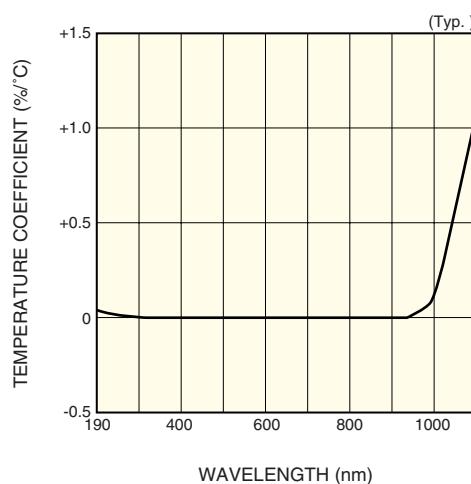
Parameter	Symbol	Condition	S2592-03	S3477-03	S2592-04	S3477-04	Unit
Spectral response range	$\lambda$			190 to 1100			nm
Peak sensitivity wavelength	$\lambda_p$			960			nm
Photo sensitivity	S	$\lambda=\lambda_p$		0.5			A/W
Short circuit current	Isc	$V_R=0$ V, 2856 K	100 $\mu$ A	5	28		$\mu$ A
Dark current	Id	$V_R=10$ mV		10	25		pA
Temperature coefficient of dark current	T CID			1.15			times/°C
Rise time	tr	$V_R=0$ V, $R_L=1$ k $\Omega$	0.2		1		$\mu$ s
Terminal capacitance	Ct	$V_R=0$ V		65	380		pF
Shunt resistance	R sh	$V_R=10$ mV	1		0.4		G $\Omega$
Noise equivalent power	NEP		8.1 × 10 <sup>-15</sup>		1.3 × 10 <sup>-14</sup>		W/Hz <sup>1/2</sup>
Cooling temperature	ΔT			35			°C

## ■ Spectral response



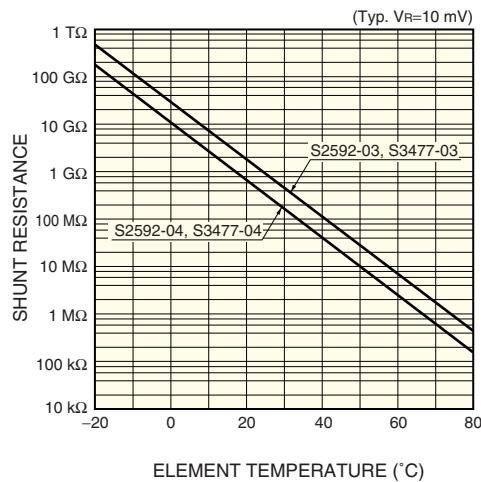
KSPDB0182EA

## ■ Photo sensitivity temperature characteristic



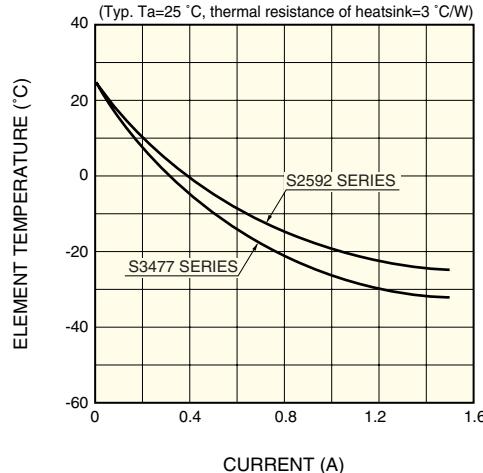
KSPDB0053EB

## ■ Shunt resistance vs. element temperature



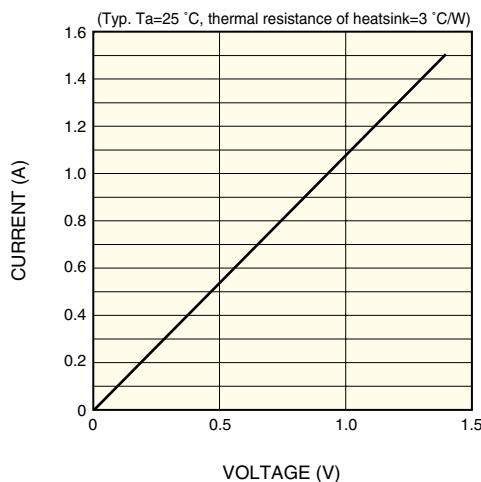
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## ■ Cooling characteristics of TE-cooler



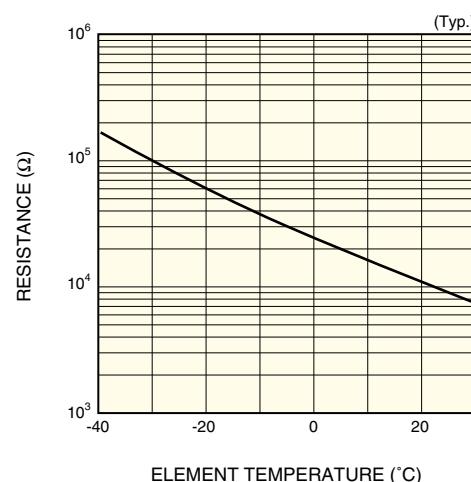
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## ■ Current vs. voltage characteristic of TE-cooler



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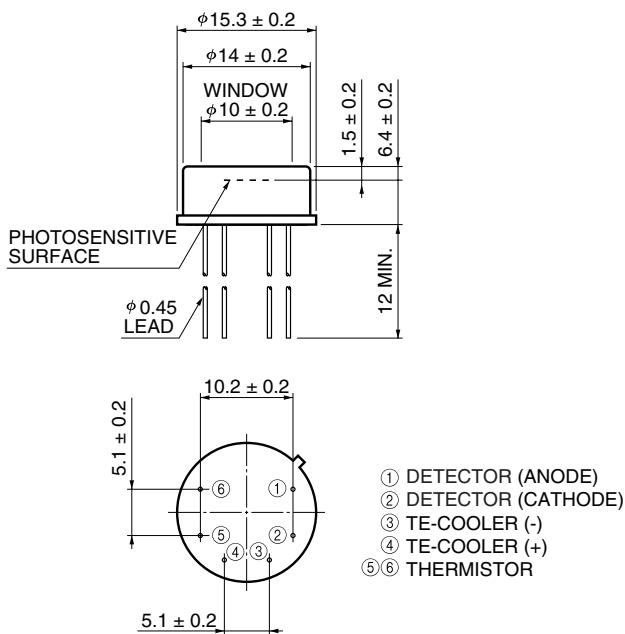
## ■ Thermistor temperature characteristic



KIRDB0116EA

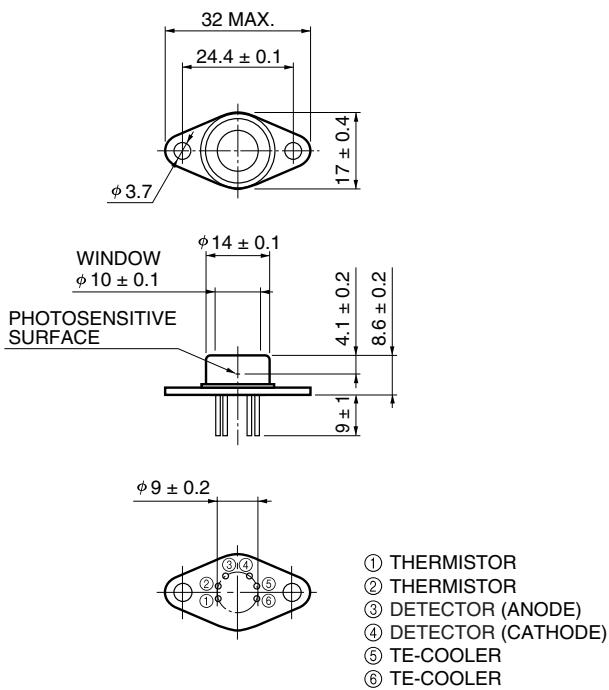
■ Dimensional outlines (unit: mm)

## S2592 series



KSPDA0133EA

## S3477 series



KSPDA0134EA

## Temperature controller for TE-cooled detector

C1103-04



By adjusting the current flowing through the thermoelectric cooler in a one-stage or two-stage thermoelectrically cooled detector, C1103-04 maintains the detector element at a constant temperature. The cooling temperature can be easily set by using the control knob on the front panel.

## ■ Accessories

Instruction manual

4-conductor cable (with a connector)

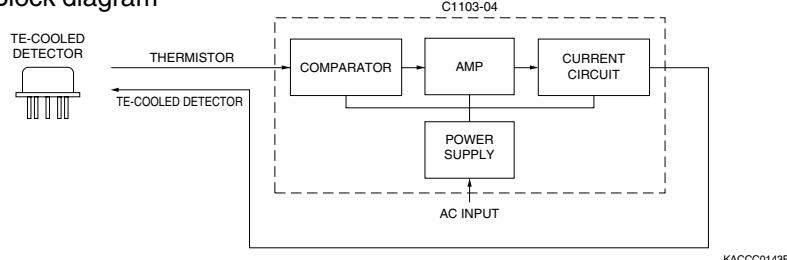
A4372-05

## ■ Specifications (common)

Setting element temperature	-30 to +20 °C
Applicable detectors	One-stage or two-stage thermoelectrically cooled detectors
Temperature stability	Within $\pm 0.1$ °C
Temperature control output current	1.2 A Max.
Power supply	100 V $\pm 10\%$ · 50/60 Hz *
Power consumption	30 VA
Dimensions and weight	108 (W) $\times$ 87 (H) $\times$ 190 (D) mm/1.9 kg approx.
Operating temperature	+10 to +40 °C
Operating humidity	Equal to or less than 90 %
Storage temperature	+10 to +40 °C

\* Power requirement (AC line voltage) can be selected from among 100 V, 115 V and 230 V at the factory prior to shipping.

## ■ Block diagram



C1103-04 conforms to European EMC directives (89/336/EEC) and LVD (73/23/EEC).

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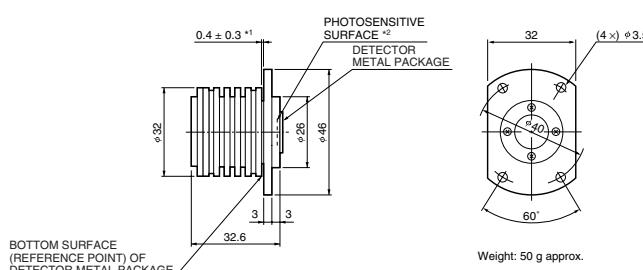
## Heatsink for TE-cooled detector (TO-8 package)

A3179 series

A3179 series heatsinks are designed for thermoelectrically cooled detectors having a 6-pin TO-8 package. Heat dissipation capacity for A3179 is about 35 °C versus the ambient temperature 25 °C, while A3179-01 is about 40 °C.

## ■ Dimensional outlines (unit: mm)

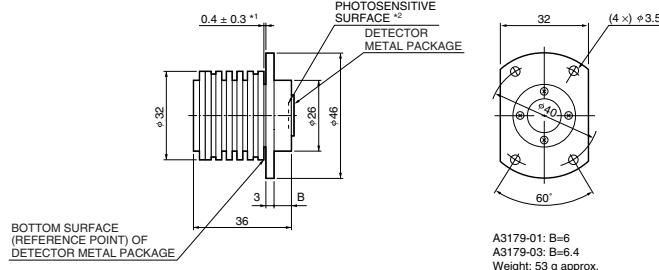
## A3179



\*1: When detector element is installed.  
\*2: The position of the photosensitive surface differs according to the detector element used.  
Refer to the dimensional outline for the detector.

KIRDA0018EB

## A3179-01



\*1: When detector element is installed.  
\*2: The position of the photosensitive surface differs according to the detector element used.  
Refer to the dimensional outline for the detector.

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