HAMAMATSU
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InAsSb photovoltaic detector

P12691-201G

High-speed response and high sensitivity in the 8 µm spectral band Thermoelectrically cooled infrared detector with no liquid nitrogen required

The P12691-201G is an infrared detector that provides high sensitivity in the 8 µm spectral band by employing our unique crystal growth technology, back-illuminated structure and integrating a lens. The InAsSb photovoltaic detector has a PN junction that ensures high-speed response and high reliability. Typical applications include gas analysis such as NO, NO_2, SO_2, and H_2S. The P12691-201G is easy to use as it uses a compact package (TO-8) not requiring liquid nitrogen.

Features

- **High-speed response**
- **High sensitivity**
- **High reliability**
- **Compact, thermoelectrically cooled TO-8 package**
- **RoHS compliant**
- **Can be assembled in a module with QCL**

Applications

- **Gas analysis**
- **Radiation thermometers**
- **Thermal imaging**
- **Remote sensing**
- **FTIR**
- **Spectrophotometers**

Options (sold separately)

Heatsink for two-stage TE-cooled type	**A3179-01**
Temperature controller	**C1103-04**
Infrared detector module with preamp	**C4159-07**

Structure

Parameter	Specification	Unit
Window material	Ge with AR coating	-
Package	TO-8	-
Cooling	Two-stage TE cooler	-
Photosensitive area	ϕ1.0	mm

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Thermistor power dissipation	Pd_th	0.2	mW
TE-cooler allowable current	I_{TE} max.	1	A
Reverse voltage	V_R	0.1	V
Operating temperature*1	Topr	-40 to +60	°C
Storage temperature*1	Tstg	-55 to +60	°C

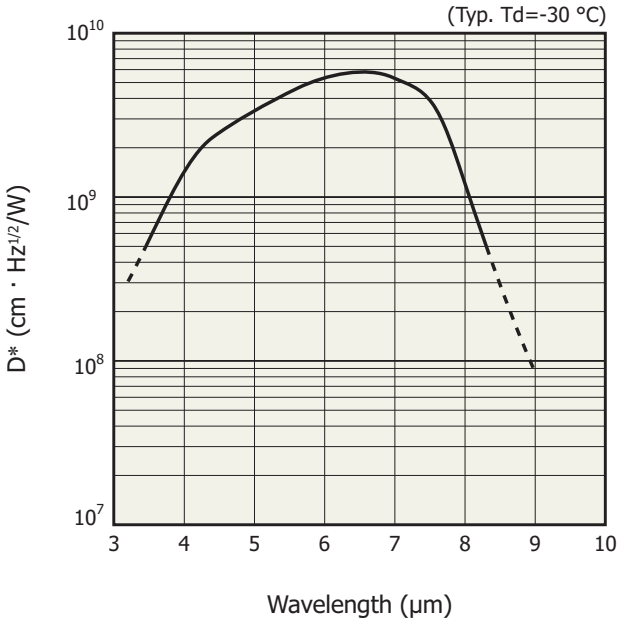
*1: No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

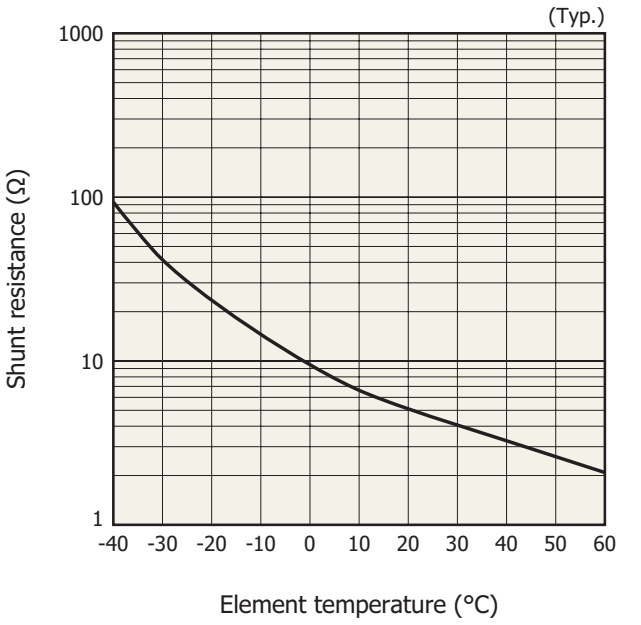
Electrical and optical characteristics (Tchip=-30 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak sensitivity wavelength	λp		-	6.7	-	µm
Cutoff wavelength	λc		8.1	8.3	-	µm
Photosensitivity	S	λ=λp	0.8	1.2	-	A/W
Shunt resistance	Rsh	VR=10 mV	13	40	-	Ω
Detectivity	D*	(λp, 1200, 1)	4.0×10^{9}	6.0×10^{9}	-	cm·Hz$^{1/2}$/W
Noise equivalent power	NEP	λ=λp	-	1.5×10^{-11}	2.3×10^{-11}	W/Hz$^{1/2}$
Rise time	tr	VR=0 V, RL=50 Ω 0 to 63%	-	-	10	ns

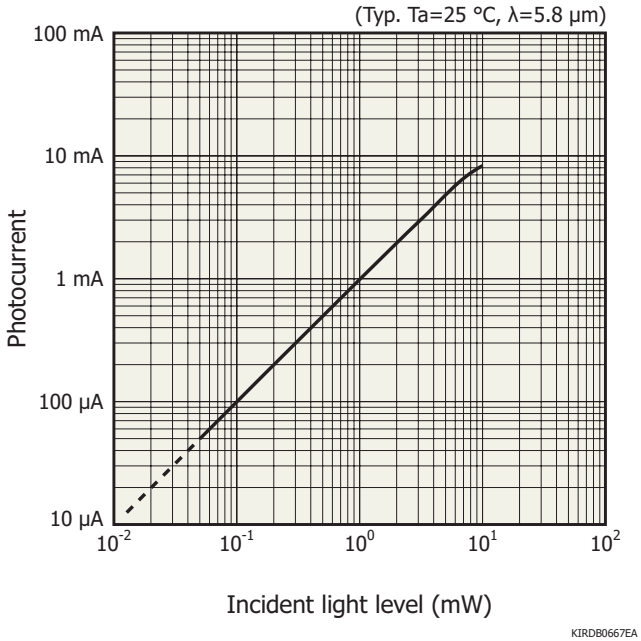
Spectral response (D*)



Shunt resistance vs. element temperature



Linearity

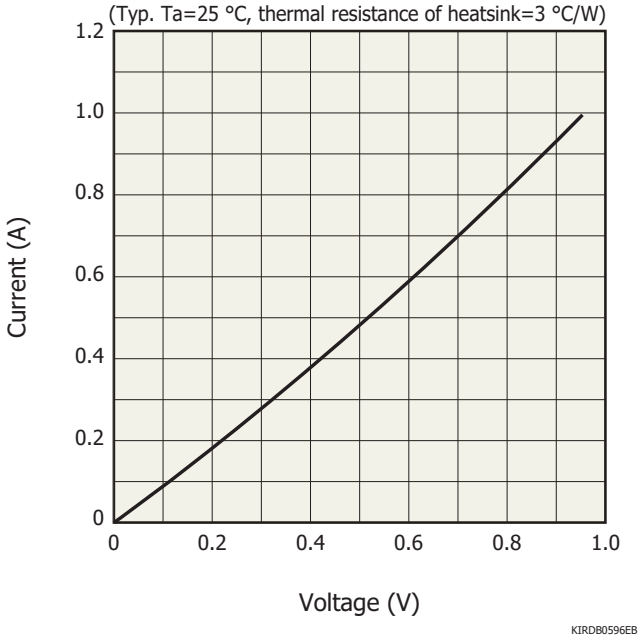


Specifications of two-stage TE-cooler (Ta=25 °C)

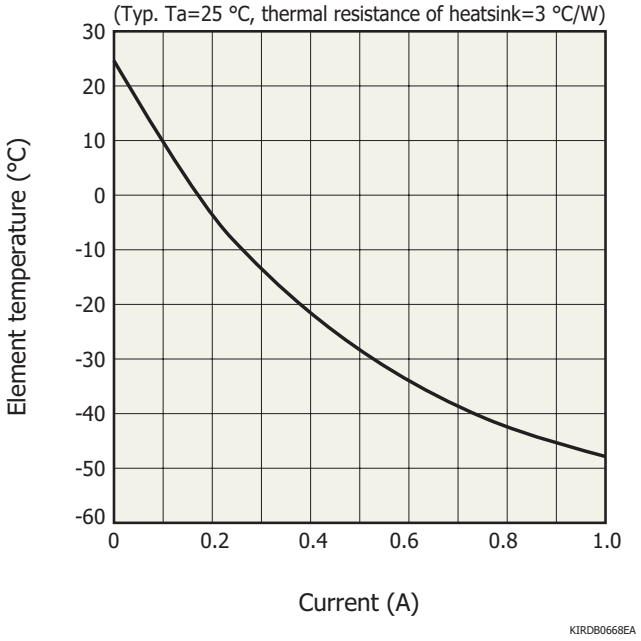
Parameter	Symbol	Min.	Typ.	Max.	Unit
TE cooler allowable current	ITE max.	-	-	1.0	A
TE cooler allowable voltage	VTE max.	-	-	0.95	V
Thermistor resistance	Rth	8.1	9.0	9.9	kΩ
Thermistor B constant*2	B	3232	3298	3364	K
Thermistor power dissipation	Pd_th	-	-	0.2	mW

*2: T1=25 °C, T2=-30 °C

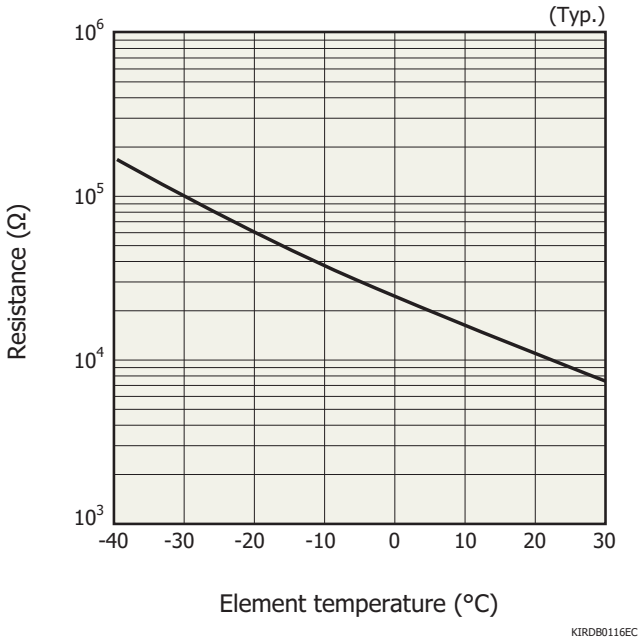
Current vs. voltage characteristics of TE-cooler



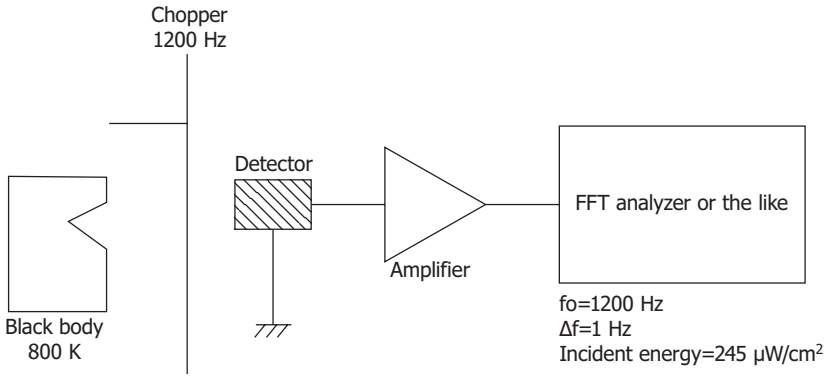
Cooling characteristics of TE-cooler



Thermistor temperature characteristics



Block diagram for characteristic measurement



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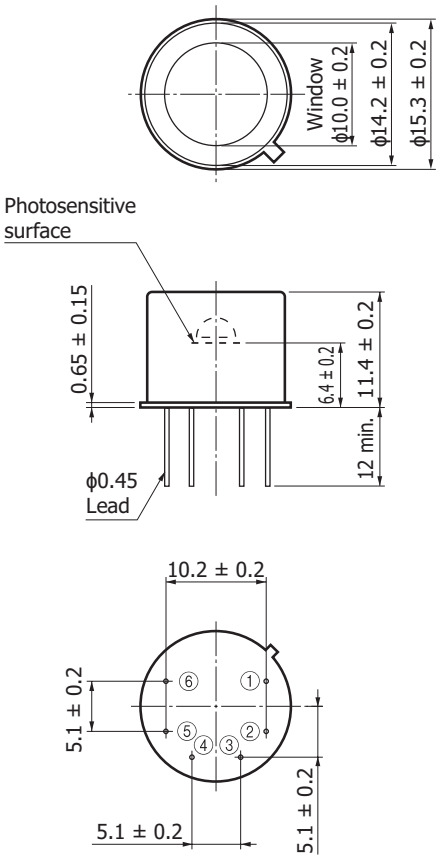
Dimensional outline (unit: mm)



① Detector (anode)
② Detector (cathode)
③ TE-cooler (-)
④ TE-cooler (+)
⑤⑥ Thermistor

KIRDA0242EB

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Safety consideration
· Compound opto-semiconductors (photosensors, light emitters)

■ Technical note
· Compound semiconductor photosensors

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