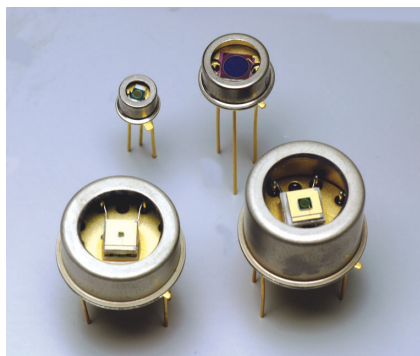


InGaAs PIN photodiodes



G12181 series

**Long wavelength type
(cutoff wavelength: 1.85 to 1.9 μm)**

Features

- Cutoff wavelength: 1.85 to 1.9 μm
- Low cost
- Photosensitive area: φ0.3 to φ3 mm
- Low noise
- High sensitivity
- High reliability
- High-speed response

Applications

- Optical power meters
- Gas analyzers
- Moisture meters
- NIR (near infrared) photometry

Options

- Amplifier for InGaAs PIN photodiode **C4159-03**
- Heatsink for one-stage TE-cooled type **A3179**
- Heatsink for two-stage TE-cooled type **A3179-01**
- Temperature controller for TE-cooled type **C1103-04**

Structure / Absolute maximum ratings

Type no.	Dimensional outline /Window material*1	Package	Cooling	Photosensitive area (mm)	Absolute maximum ratings						
					Thermister power dissipation (mW)	TE-cooler allowable current (A)	TE-cooler allowable voltage (V)	Reverse voltage VR max (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)	Soldering conditions
G12181-003K	(1)/B	TO-18	Non-cooled	φ0.3	-	-	-	-	-40 to +85*2	-55 to +125*2	260 °C or less, within 10 s
G12181-005K				φ0.5							
G12181-010K				φ1							
G12181-020K	(2)/B	TO-5	Non-cooled	φ2	-	-	-	-	-40 to +85*2	-55 to +125*2	
G12181-030K				φ3							
G12181-103K				(3)/B							
G12181-105K	φ0.5										
G12181-110K	φ1										
G12181-120K	φ2										
G12181-130K	φ3										
G12181-203K	(4)/B	TO-8	Two-stage TE-cooled	φ0.3	0.2	1.0	1.2	1	-40 to +70*2	-55 to +85*2	
G12181-205K				φ0.5							
G12181-210K				φ1							
G12181-220K				φ2							
G12181-230K				φ3							

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.

*1: B=Borosilicate glass

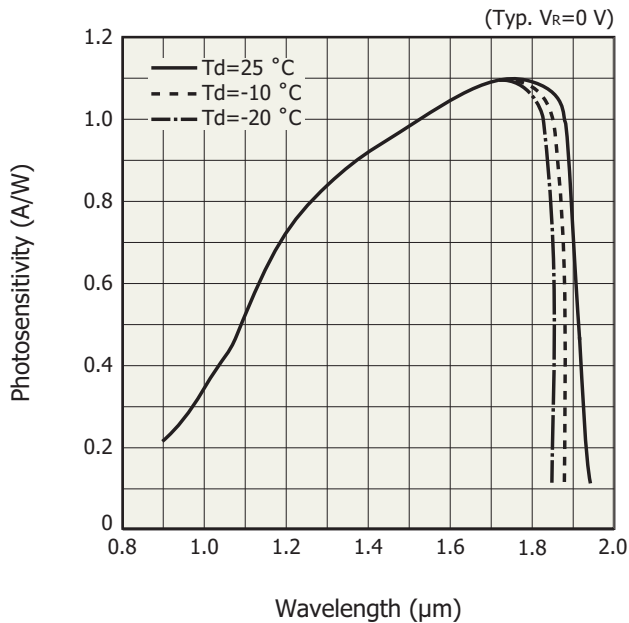
*2: No condensation

The G12181 series may be destroyed or deteriorated by electrostatic discharge, etc. Be carefull when using the G12181 series.

Electrical and optical characteristics (Typ., unless otherwise noted)

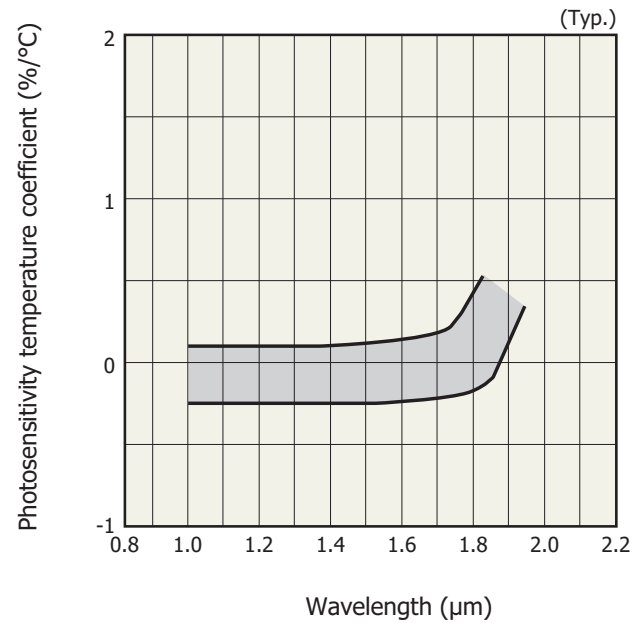
Type no.	Measurement Condition		Spectral response range λ (μm)	Peak sensitivity wavelength λ_p (μm)	Photo sensitivity S $\lambda = \lambda_p$		Dark current I _D V _R =0.5 V		Temp. coefficient of I _D V _R =0.5 V	Cutoff frequency f _c V _R =0 V R _L =50 Ω		Terminal capacitance C _t V _R =0 V f=1 MHz		Shunt resistance R _{sh} V _R =10 mV		Detectivity D* $\lambda = \lambda_p$		Noise equivalent power NEP $\lambda = \lambda_p$	
	Element temperature (°C)	Spectral response range λ (μm)			Min. (A/W)	Typ. (A/W)	Typ. (nA)	Max. (nA)		Min. (MHz)	Typ. (MHz)	Typ. (pF)	Max. (pF)	Min. (M Ω)	Typ. (M Ω)	Min. (cm ² Hz ^{1/2} /W)	Typ. (cm ² Hz ^{1/2} /W)	Typ. (W/Hz ^{1/2})	Max. (W/Hz ^{1/2})
G12181-003K	25	0.9 to 1.9	1.75	0.9	1.1	1.07	1	10	1.07	40	90	25	50	3 × 10 ¹¹	1 × 10 ¹²	2 × 10 ⁻¹⁴	5 × 10 ⁻¹⁴		
G12181-005K							3	30		15	35	70	150			4	20	3 × 10 ⁻¹⁴	8.5 × 10 ⁻¹⁴
G12181-010K							10	100		5	10	230	500			1	5	6 × 10 ⁻¹⁴	2 × 10 ⁻¹³
G12181-020K							50	500		1.2	2.5	1000	2000			0.2	1	1.5 × 10 ⁻¹³	4 × 10 ⁻¹³
G12181-030K							100	1000		1	1.5	2000	3000			0.1	0.5	2 × 10 ⁻¹³	5 × 10 ⁻¹³
G12181-103K	-10	0.9 to 1.87	1.75	0.9	1.1	1.07	0.1	1	1.07	40	140	22	50	2 × 10 ¹²	5.5 × 10 ¹²	5 × 10 ⁻¹⁵	1.5 × 10 ⁻¹⁴		
G12181-105K							0.3	3		15	50	64	150			50	250	7 × 10 ⁻¹⁵	2 × 10 ⁻¹⁴
G12181-110K							1	10		5	16	200	500			13	65	1.5 × 10 ⁻¹⁴	4 × 10 ⁻¹⁴
G12181-120K							5	50		1.2	3.5	900	2000			2.8	14	3.5 × 10 ⁻¹⁴	9 × 10 ⁻¹⁴
G12181-130K							10	100		1	1.8	1800	3000			1.3	6.5	5 × 10 ⁻¹⁴	1.5 × 10 ⁻¹³
G12181-203K	-20	0.9 to 1.85	1.75	0.9	1.1	1.07	0.05	0.5	1.07	40	150	20	50	3 × 10 ¹²	8.5 × 10 ¹²	3.5 × 10 ⁻¹⁵	9 × 10 ⁻¹⁵		
G12181-205K							0.15	1.5		15	53	60	150			110	550	5 × 10 ⁻¹⁵	1.5 × 10 ⁻¹⁴
G12181-210K							0.5	5		5	17	195	500			28	150	1 × 10 ⁻¹⁴	3 × 10 ⁻¹⁴
G12181-220K							2.5	25		1.2	3.7	850	2000			5.5	28	2.5 × 10 ⁻¹⁴	6.5 × 10 ⁻¹⁴
G12181-230K							5	50		1	1.9	1700	3000			2.8	14	3.5 × 10 ⁻¹⁴	9 × 10 ⁻¹⁴

Spectral response



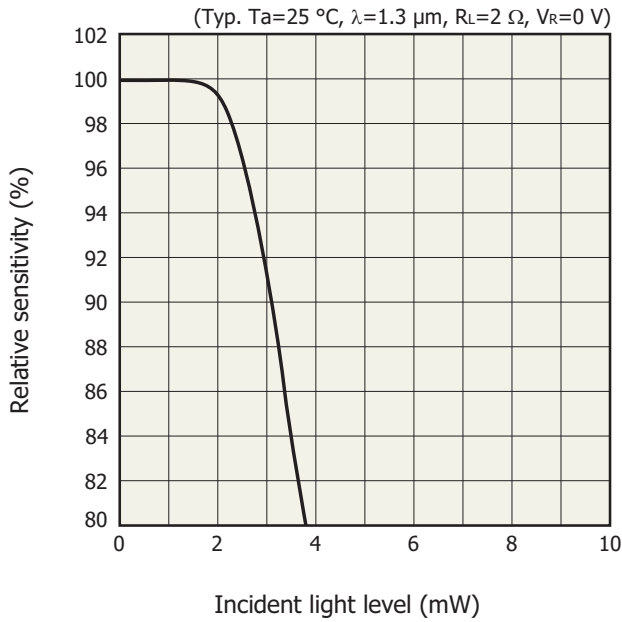
KIRDB0483EC

Photosensitivity temperature characteristics



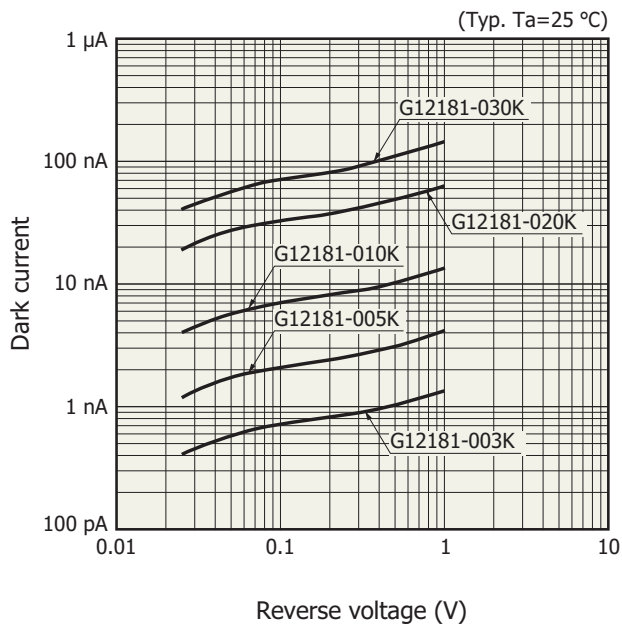
KIRDB0208EA

Linearly (G12181-010K)

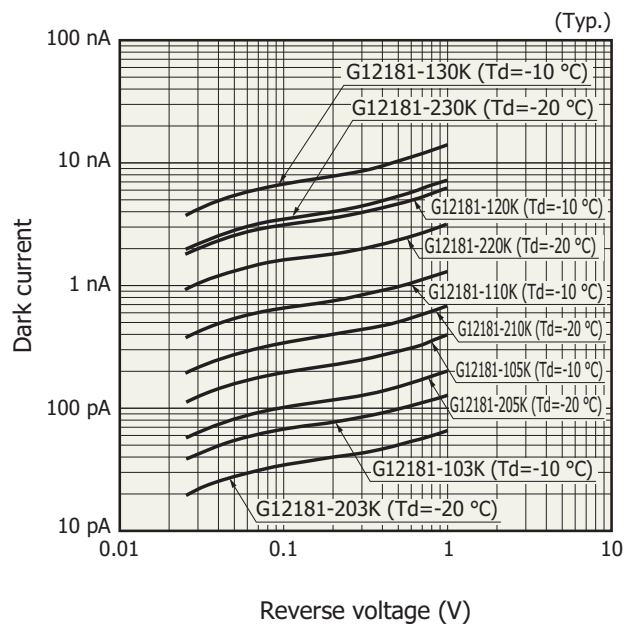


Dark current vs. reverse voltage

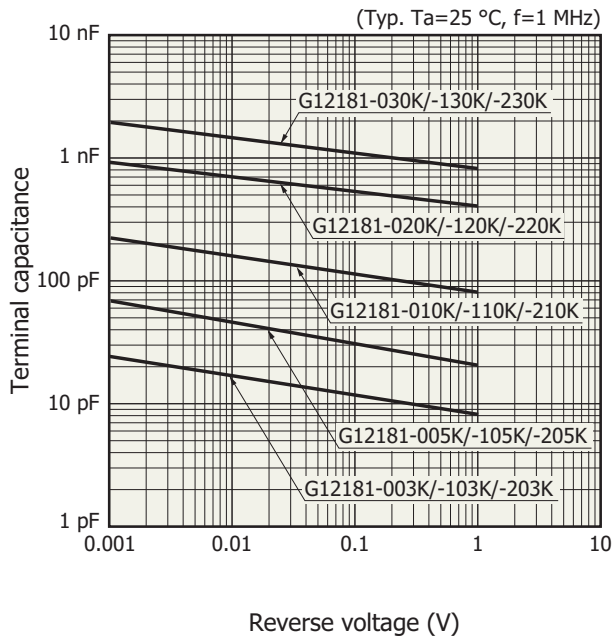
Non-cooled type



TE-cooled type

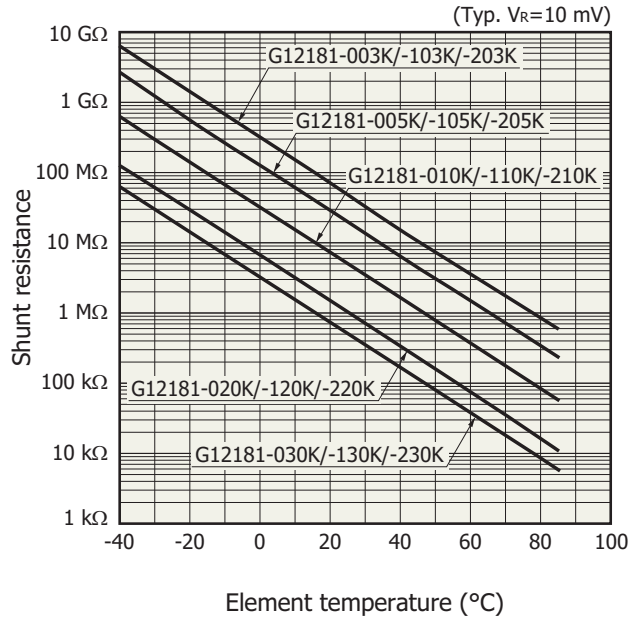


Terminal capacitance vs. reverse voltage



KIRDB0485EB

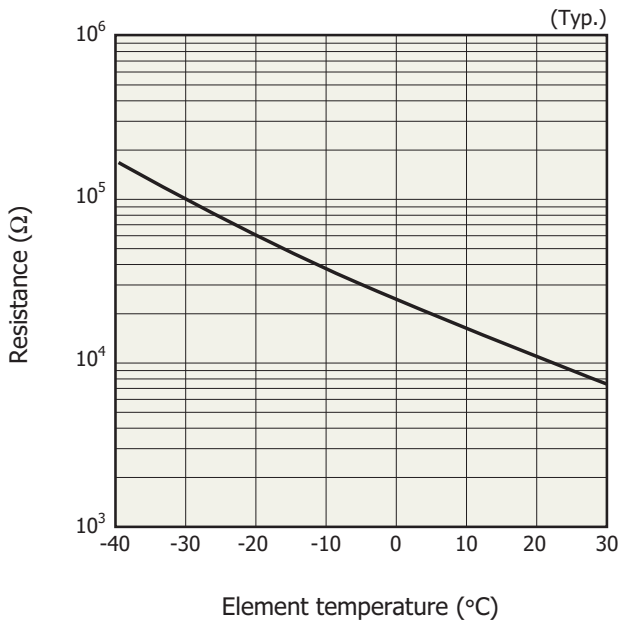
Shunt resistance vs. element temperature



KIRDB0486EB

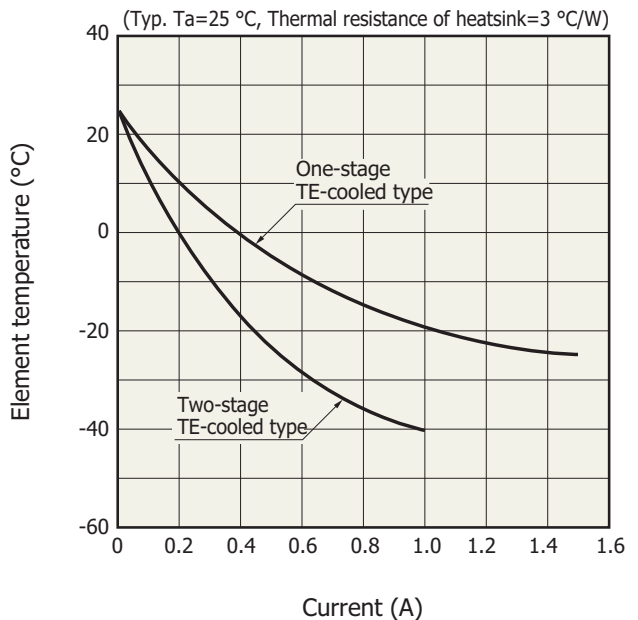
The operating temperature for one-stage and two-stage TE-cooled types is up to 70 °C.

Thermistor temperature characteristics



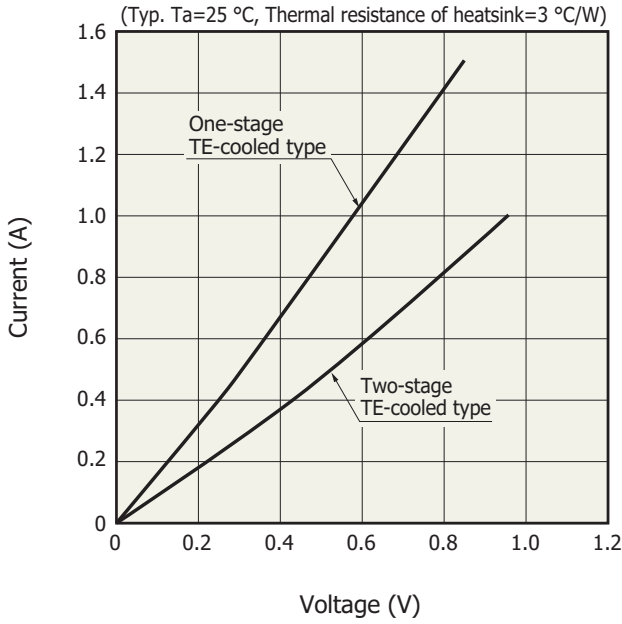
KIRDB0116EA

Cooling characteristics of TE-cooler



KIRDB0231EA

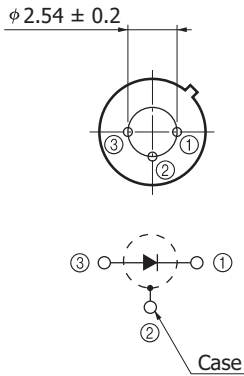
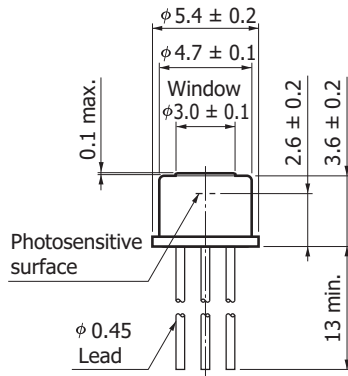
Current vs. voltage (TE-cooler)



KIRD80115EB

Dimensional outlines (unit: mm)

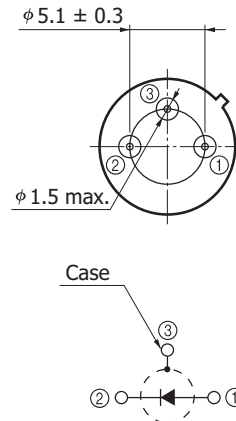
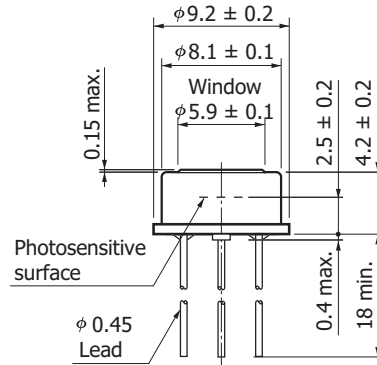
(1) G12181-003K/-005K/-010K



Distance from photosensitive area center to cap center
 $-0.2 \leq X \leq +0.2$
 $-0.2 \leq Y \leq +0.2$

KIRDA0220EA

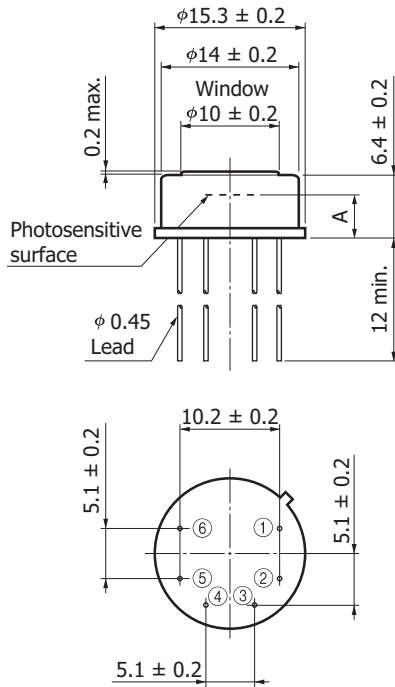
(2) G12181-020K/-030K



Distance from photosensitive area center to cap center
 $-0.2 \leq X \leq +0.2$
 $-0.2 \leq Y \leq +0.2$

KIRDA0221EA

(3) G12181-103K/-105K/-110K/-120K/-130K



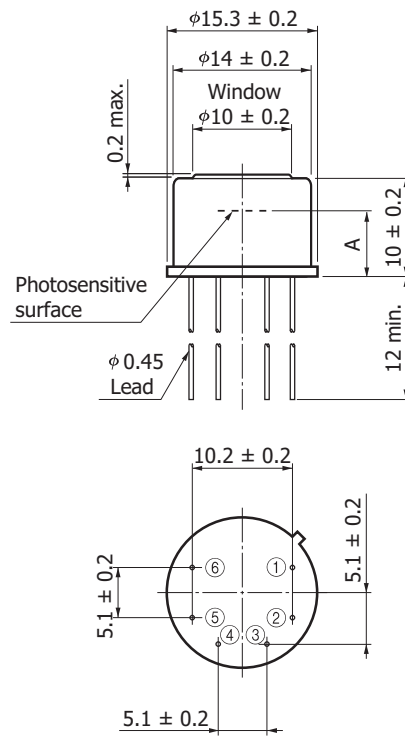
- ① Detector (anode)
- ② Detector (cathode)
- ③ TE-cooler (-)
- ④ TE-cooler (+)
- ⑤⑥ Thermistor

Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

	G12181-103K /-105K/-110K	G12181-120K /-130K
A	4.3 ± 0.2	4.4 ± 0.2

KIRDA0224EA

(4) G12181-203K/-205K/-210K/-220K/-230K



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

Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

	G12181-203K /-205K/-210K	G12181-220K /-230K
A	6.6 ± 0.2	6.7 ± 0.2

KIRDA0225EA

Information described in this material is current as of April, 2013.

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The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.

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