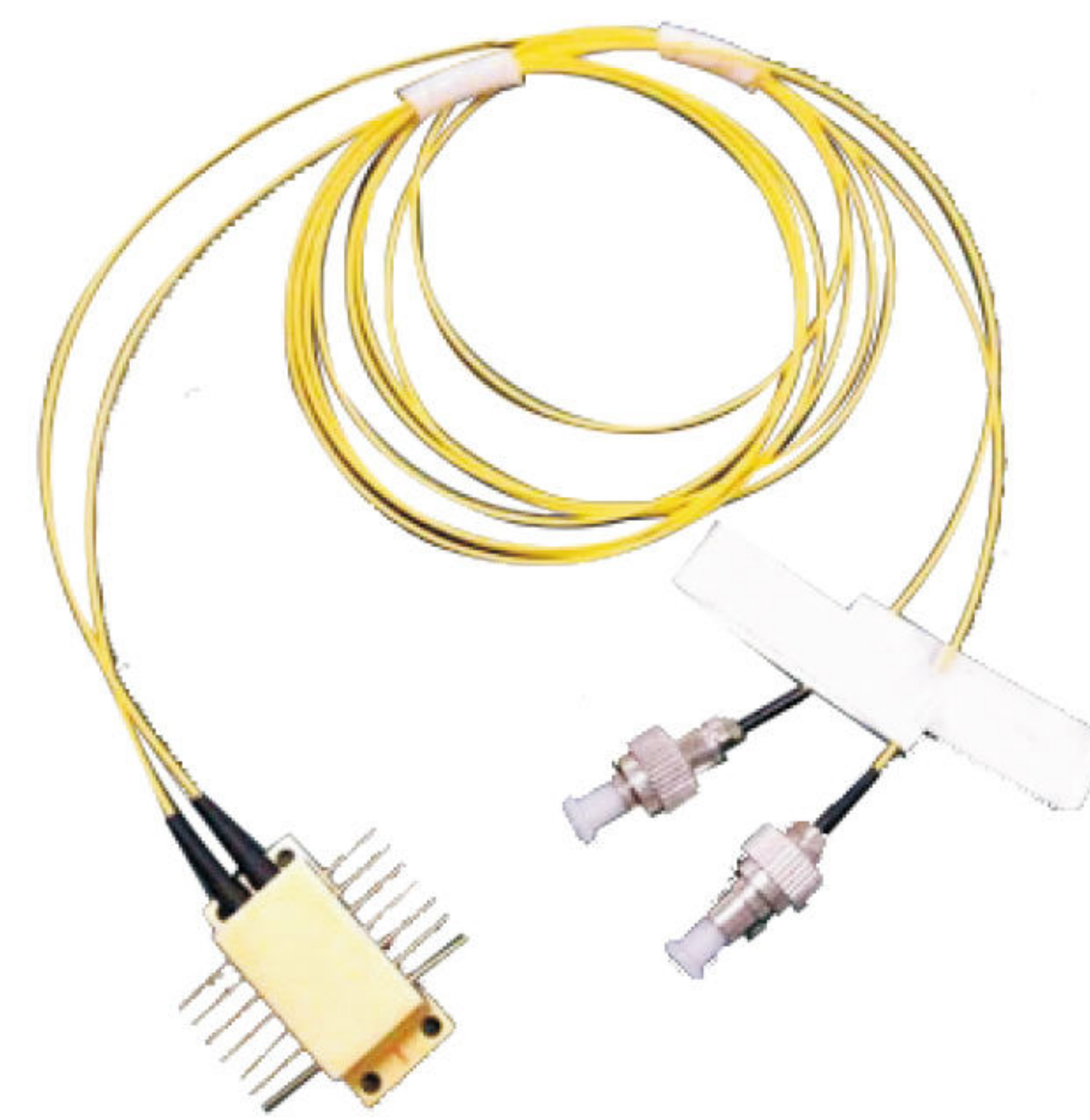


OP430D Dual Channel InGaAs SPAD Detector

Product Features

- Working wavelength: 0.95 μm ~1.65 μm ;
- Designed for single photon detection applications;
- Internal integrated three-stage TEC cooler;
- Butterfly hermetically sealed dual channel module with pigtail.



Main photoelectric indicators

Linear mode parameters

Characteristic Parameters	Test conditions (TC=25 \pm 5 $^{\circ}$ C unless otherwise specified)	Minimal	Greatest	Unit
Effective detection surface diameter d	-	25	-	μm
Spectral Response Range	-	950	1650	nm
Reverse breakdown voltage V_{BR}	$I_R=10\ \mu\text{A}, \Phi_e=0$	60	85	V
Responsiveness R_e	$\Phi_e=1\ \mu\text{W}, V_R=(V_{BR}-1)\text{V}, \lambda=1550\ \text{nm}\pm 50\ \text{nm}$	8	-	A/W
Dark Current I_D	$V_{DC}=(V_{BR}-1)\text{V}, \Phi_e=0$	-	1	nA
Capacitance C_{tot}	$V_{DC}=(V_{BR}-1)\text{V}, f=1\ \text{MHz}$	-	0.2	pF
Temperature coefficient of breakdown voltage η	$T_C=-45\sim+30\ ^{\circ}\text{C}, I_R=10\ \mu\text{A}, \Phi_e=0$	0.10	0.2	V/ $^{\circ}$ C

Geiger model parameters

Characteristic Parameters	Test conditions (TC=25 \pm 5 $^{\circ}$ C unless otherwise specified)	Minimal	Greatest	Unit
Single Photon Detection Efficiency PDE	$T_A = -40 \pm 5\ ^{\circ}\text{C}, \mu = 1, f_g = 1.0\ \text{GHz}, f_P = 500\ \text{kHz}, DCR \leq 2.5\ \text{kHz}, \lambda = 1.55\ \mu\text{m}$	3	-	%
Dark Count Rate DCR	$T_A = -40 \pm 5\ ^{\circ}\text{C}, f_g = 1.0\ \text{GHz}, SPDE = 20\%, \lambda = 1.55\ \mu\text{m}$	-	2.5	kHz
Post-Pulse Probability APP (500 ns)	$T_A = -40 \pm 5\ ^{\circ}\text{C}, \mu = 1, f_g = 1.0\ \text{GHz}, f_P = 500\ \text{kHz}, DCR \leq 3.0\ \text{kHz}, SPDE = 10\%, \lambda = 1.55\ \mu\text{m}$	-	4	%
Time Jitter T_J	SPDE=10%	-	300	ps

Note: λ is the wavelength of incident light, T_A is the value of test temperature, μ is the average number of photons per pulse, f_g is the frequency of gating signal, and f_P is the frequency of optical pulse signal.

Absolute maximum ratings and recommended operating conditions

Serial Number	Parameters	Rated Value
1	Storage temperature T_{STG}	-50 $^{\circ}$ C~+85 $^{\circ}$ C
2	Operating ambient temperature T_C	-50 $^{\circ}$ C~60 $^{\circ}$ C
3	Welding temperature T_{sld} (time)	260 $^{\circ}$ C(10s)
4	Reverse DC bias voltage v_{DC}	$V_B+5\text{V}$
5	Input optical power Φ_e (continuous)	1mW
6	Forward current I_F (continuous)	200 μA
7	Electrostatic Discharge Sensitivity ESD	$\geq 300\text{V}$
8	Pigtail Tension	3.0N
9	TEC Voltage	11.9 V
10	TEC Current	0.8 A

Serial Number	Parameters	Rated Value
Recomm endation	1 APD chip operating temperature T_{th}	-50°C~-30°C
Referral working conditions	2 Reverse DC bias voltage V_{DC}	$V_{BR}+1V$ to $V_{BR}+5V$

Typical Characteristic Curve

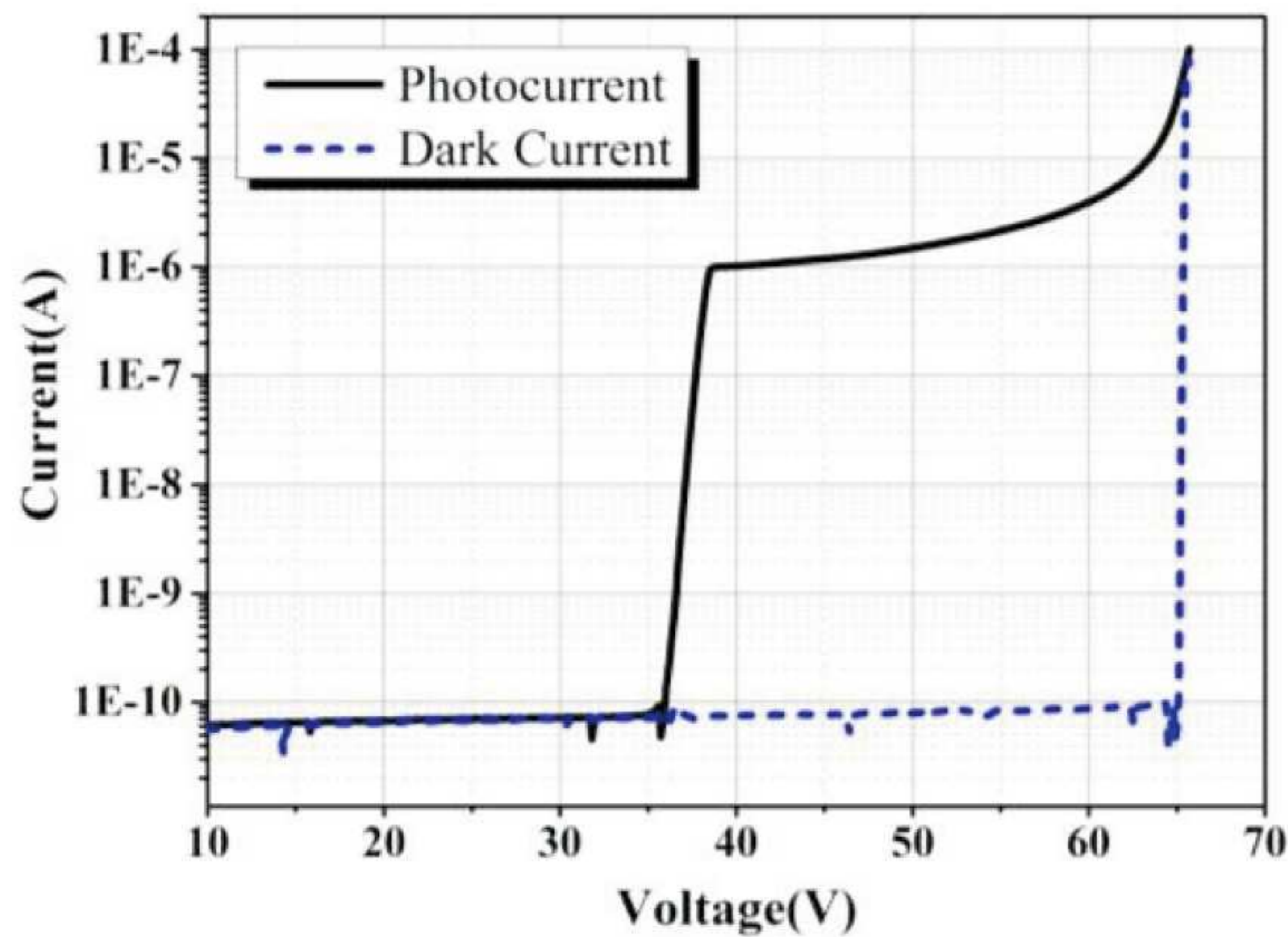


Fig. 1 Photocurrent and dark current curves

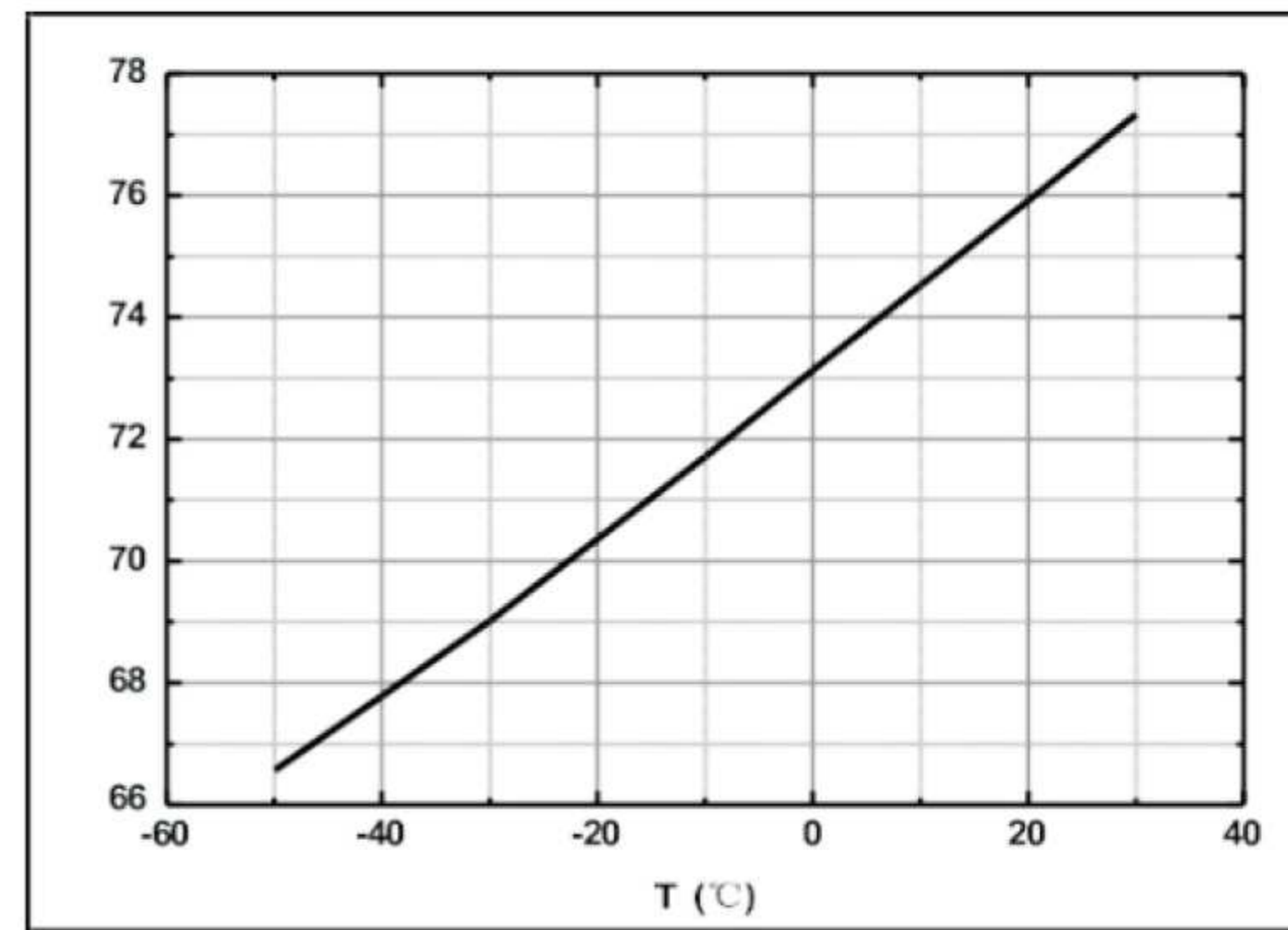


Fig. 2 Temperature coefficient of breakdown voltage

Package form factor, dimensions, equivalent circuitry, and pin definitions (in mm)

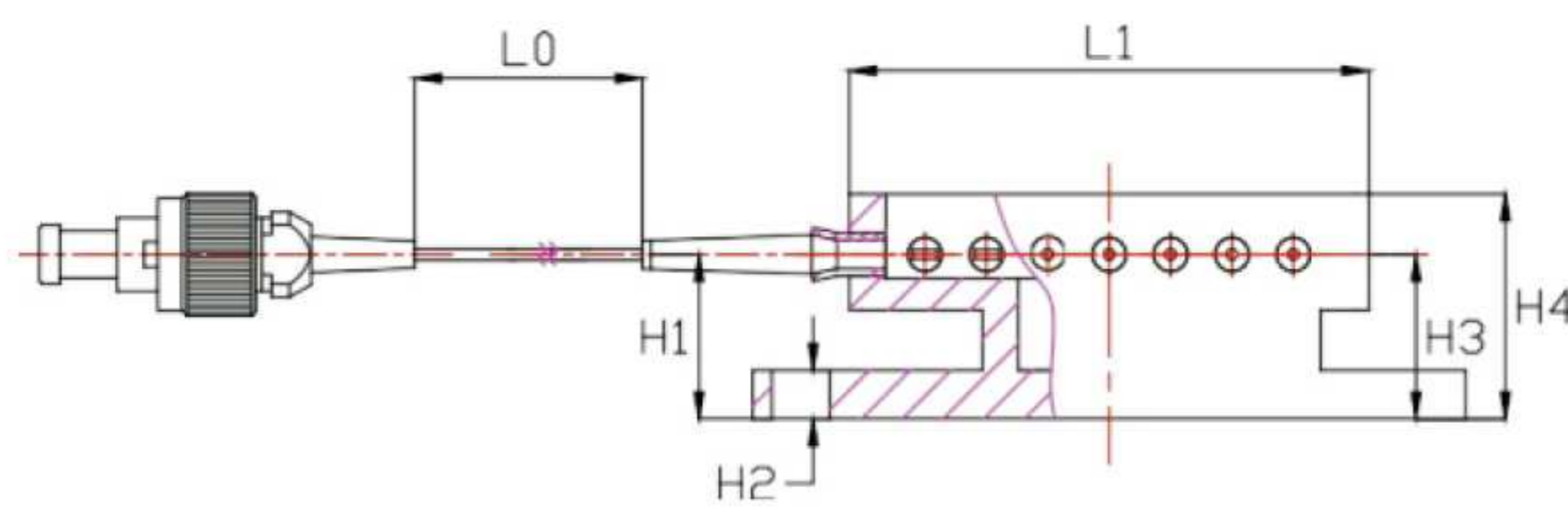
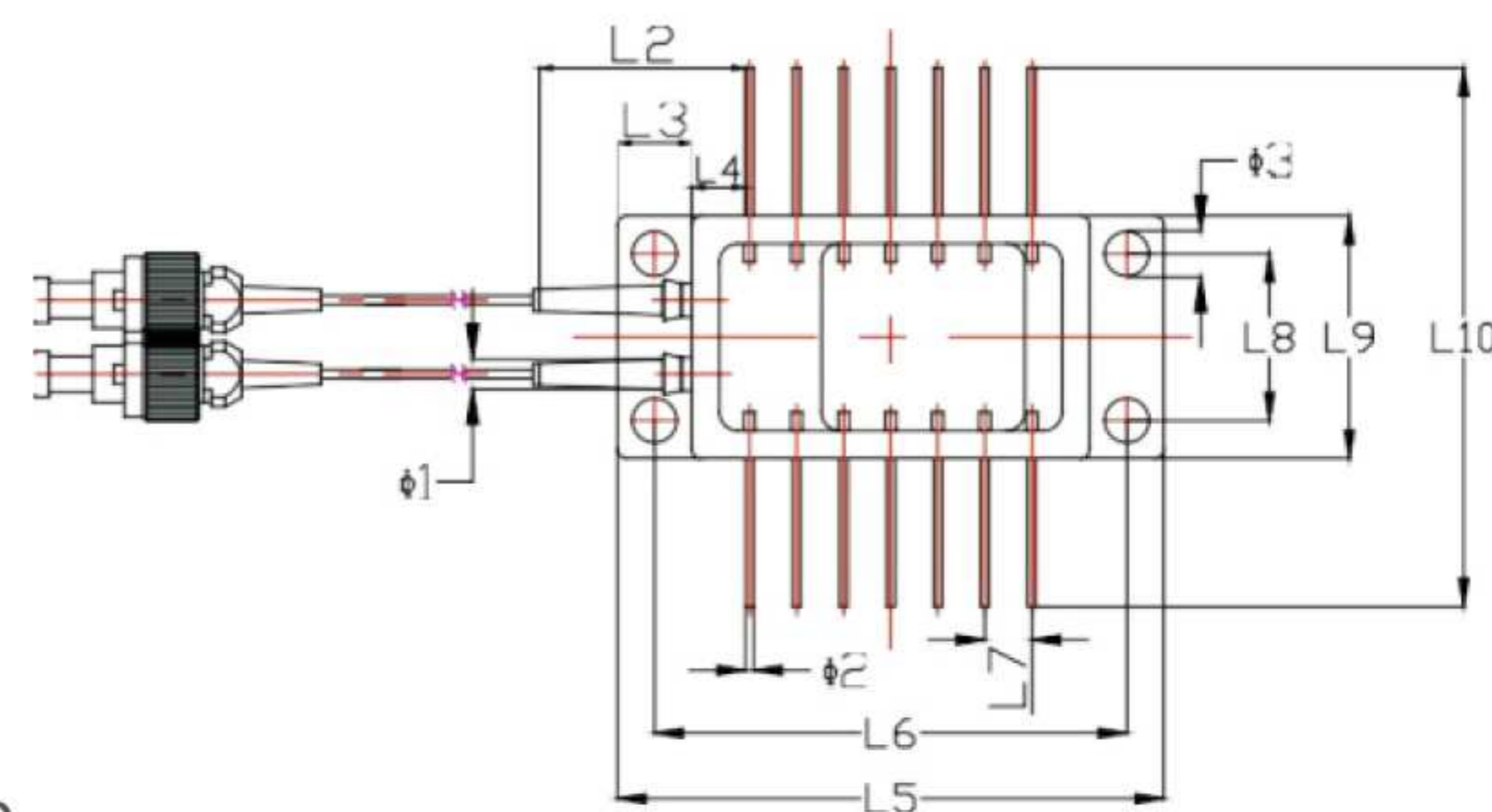


Figure 3 Product form factor



The external dimensions of the product are shown in Table 2.

notation	minimum value	nominal value	maximum values	notation	minimum value	nominal value	maximum values	notation	minimum value	nominal value	maximum values
H1	6.5	-	7.0	L2	10.0	-	30.0	L8	8.8	-	9.2
H2	1.8	-	2.2	L3	3.8	-	4.2	L9	12.5	-	13.5
H3	6.5	-	7.0	L4	3.0	-	3.3	L10	28.5	-	30.5
H4	9.0	-	10.5	L5	29.2	-	29.8	phi1	3.0	-	6.6
L0	1000.0	-	-	L6	24.5	-	25.5	phi2	0.35	-	0.50
L1	21.2	-	21.8	L7	-	2.54	-	phi3	2.2	-	2.6

Output Port Definitions

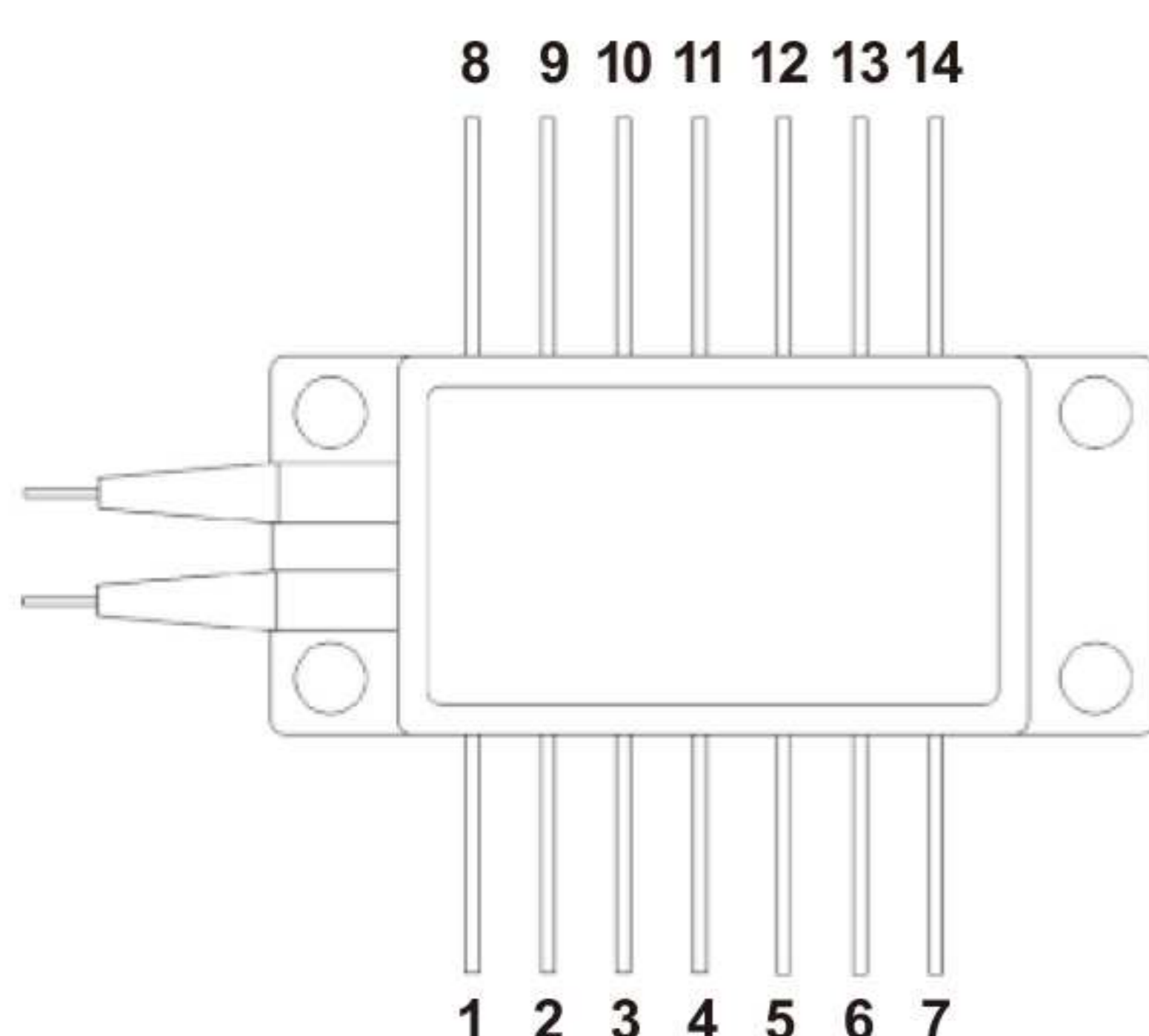


Fig. 4 Pin arrangement and numbering (top view)

Outlet Numbering	Name (symbol)	Outlet Numbering	name (of a thing)
1	reserve	8	reserve
2	reserve	9	reserve
3	Diode I (N-pole)	10	Diode II (N-pole)
4	Diode I signal output (V_{out})	11	Diode II signal output (V_{out})
5	Diode I (P-pole)	12	Diode II (P-pole)
6	Thermistor (R_{th})	13	Thermistor (R_{th})
7	Chiller Positive (TEC+)	14	Chiller Positive (TEC-)

TEC\NTC Electrical Parameters

NTC (Temperature Sensitive Resistor): $R_T = 10k\Omega@25^\circ C$, $\beta = 3450$, 5%.

TEC (temperature difference cooler): $I_{MAX} = 0.8 A$, $V_{MAX} = 11.9 V$, $T_{HMAX} = 200^\circ C$.