5mm Cylindrical With Flange With Flange Phototransistor Technical Data Sheet

Part No.: DL-503PTE-1PT

◆ **Features:**

1. Fast response time.
2. High photo sensitivity.
3. Small junction capacitance.
4. The product itself will remain within RoHS compliant Version.

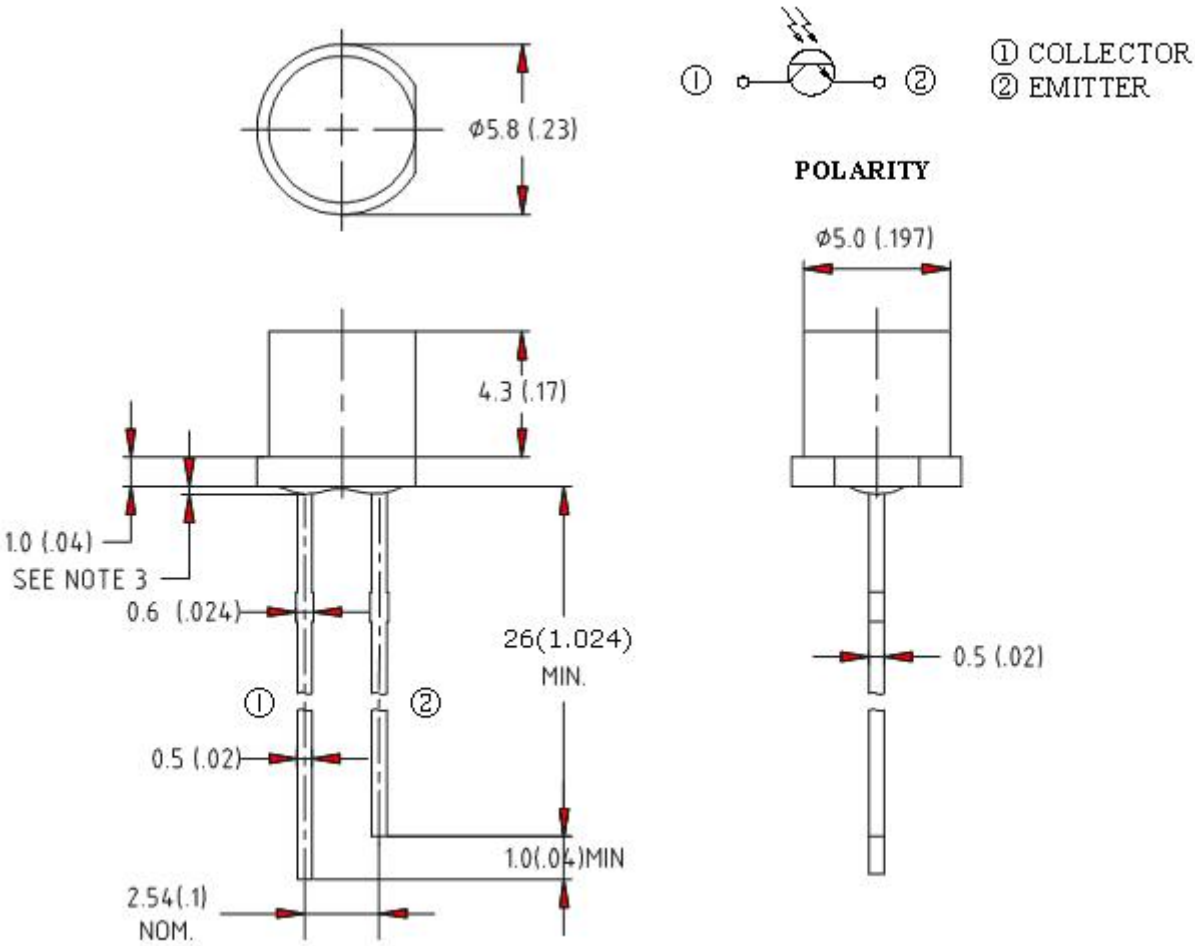
◆ **Descriptions:**

1. The 503PT is a high speed and high sensitive silicon NPN phototransistor in a standard Φ5 package.
2. Due to its black epoxy, the device is matched to visible light and infrared radiation.

◆ **Applications:**

1. Infrared applied system.
2. Optoelectronic automatic control system.
3. Optoelectronic switch.
4. Camera.
5. Printer.
6. Counters and sorters.
7. Encoders.
8. Floppy disk drive.
9. Video camera, tape and card readers.
10. Position sensors.

◆ **Package Dimension:**



Part No.	Chip Material	Lens Color	Source Color
DL-503PTE-1PT	Silicon	Water Clear	Phototransistor

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010”) unless otherwise specified
3. Protruded resin under flange is 1.00 mm (.039”) max.
4. Specifications are subject to change without notice.

◆ **Absolute Maximum Ratings at Ta=25℃**

Parameters	Symbol	Rating	Unit
Power Dissipation	P_D	75	mW
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Collector-Voltage	V_{ECO}	5	V
Collector Current	I_C	20	mA
Operating Temperature	T_{OPR}	-40 to +85	℃
Storage Temperature	T_{STG}	-40 to +100	℃
Lead Soldering Temperature	T_{SOL}	260℃	℃

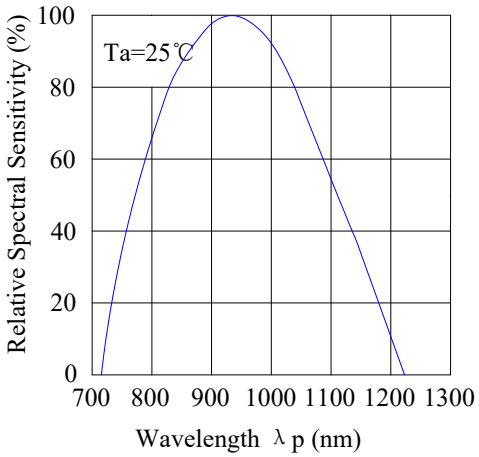
Electrical Optical Characteristics at Ta=25℃

Parameters	Symbol	Min.	Typ.	Max.	Unit	Condition
Collector-Emitter Breakdown Voltage	BV_{CEO}	30	---	---	V	I_C=100μA, Ee=0mW/cm²
Emitter-Collector Breakdown Voltage	BV_{ECO}	5	---	---	V	I_E=100μA, Ee=0mW/cm²
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	---	---	0.40	V	I_C=0.70mA, Ee=1mW/cm²
Collector Dark Current	I_{CEO}	---	---	100	nA	Ee=0mW/cm², V_{CE}=20V
On-State Collector Current	$I_{C(ON)}$	0.70	2.00	---	mA	Ee=1mW/cm², V_{CE}=5V
Optical Rise Time (10% to 90%)	T_R	---	15	---	μs	V_{CE}=5V, I_C=1mA, R_L=1000Ω
Optical Fall Time (90% to 10%)	T_F	---	15	---		
Reception Angle	$2\theta_{1/2}$	---	100	---	Deg	
Wavelength Of Peak Sensitivity	λP	---	940	---	nm	
Rang Of Spectral Bandwidth	λP	700	---	1200	nm	

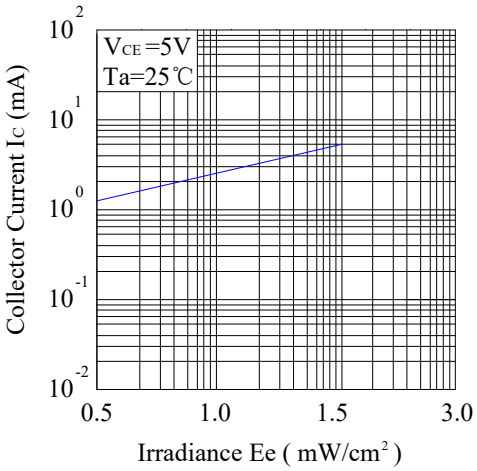
◆ Typical Electrical / Optical Characteristics Curves

(25℃ Ambient Temperature Unless Otherwise Noted)

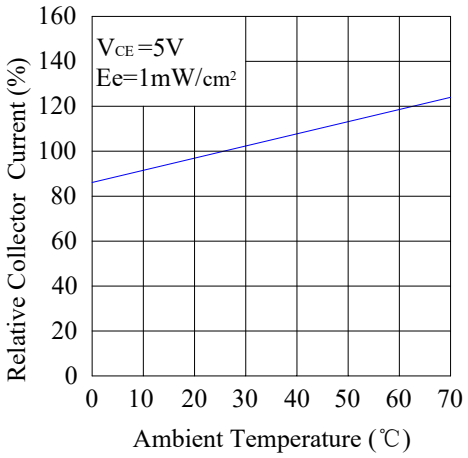
Spectral Sensitivity



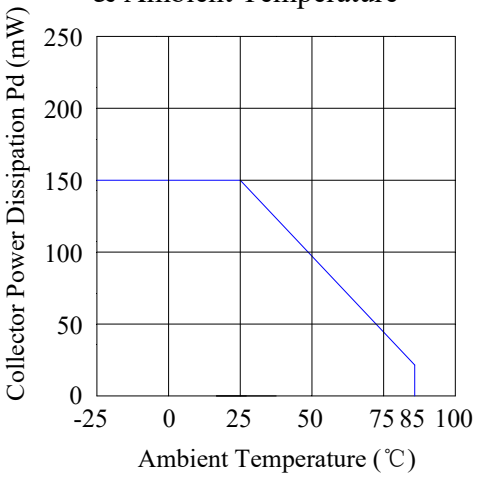
Collector Current & Irradiance



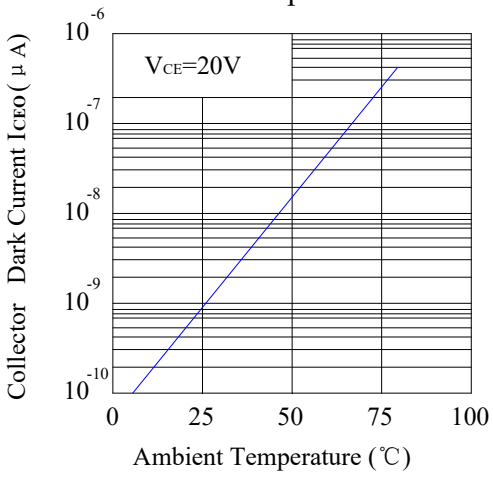
Relative Collector Current & Ambient Temperature



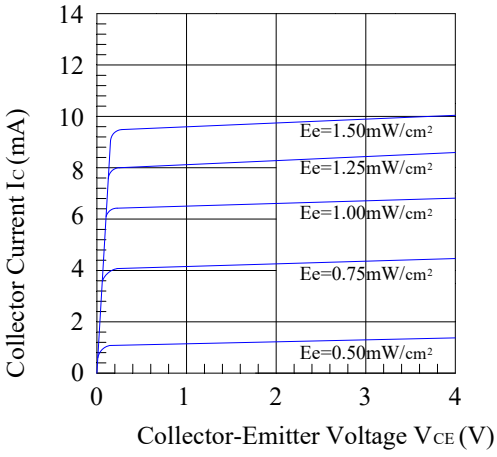
Collector Power Dissipation & Ambient Temperature



Collector Dark Current & Ambient Temperature



Collector Current & Collector-Emitter Voltage



◆ **Reliability Test Item And Condition:**

The reliability of products shall be satisfied with items listed below:

Confidence level: 90%.

LTPD: 10%.

No.	Item	Test Conditions	Test Hours/ Cycles	Sample Sizes	Failure Judgment Criteria	Ac/ Re
1	Reflow Soldering	TEMP.: 260℃±5℃ 5secs	6mins	22pcs	$Ic_{(ON)} \leqq L \times 0.8$ L: Lower Specification Limit	0/1
2	Temperature Cycle	H: +100℃ 15mins ↕ 5 mins L: -40℃ 15mins	50Cycles	22pcs		0/1
3	Thermal Shock	H: +100℃ 15mins ↕ 10mins L: -10℃ 5mins	50Cycles	22pcs		0/1
4	High Temperature Storage	TEMP.: +100℃	1000hrs	22pcs		0/1
5	Lower Temperature Storage	TEMP.: -40℃	1000hrs	22pcs		0/1
6	DC Operating Life	V_{CE}=5V	1000hrs	22pcs		0/1
7	High Temperature/ High Humidity	85℃ / 85% R.H	1000hrs	22pcs		0/1

◆ **Please read the following notes before using the product:**

1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package, the phototransistor should be kept at 30℃ or less and 90% RH or less.

2.3 The phototransistor should be used within a year.

2.4 After opening the package, the phototransistor should be kept at 30℃ or less and 70% RH or less.

2.5 The phototransistor should be used within 168 hours (7 days) after opening the package.

3. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260℃ for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

4. Repairing

Repair should not be done after the phototransistor had been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the phototransistor will or will not be damaged by repairing.

5. Caution in ESD

Static Electricity and surge damages the phototransistor. It is recommended to use a wrist band or anti-electrostatic glove when handling the phototransistor. All devices equipment and machinery must be properly grounded.