



光电开关

Opto Interrupter

**QX-T1406AT**

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### 概述 Description

T1406 由红外发射二极管和 NPN 硅光晶体管组成，它们并排封装在黑色热塑性外壳中的汇聚光轴上。光电晶体管只接收来自 IR 的辐射，这是正常情况。但当物体在中间时，光电晶体管不能接收辐射。

The T1406 consist of an infrared emitting diode and a silicon photo transistor, encased side-by-side on converging optical axis in a black thermoplastic housing. The photo transistor receives radiation from the IR LED only, This is the normal situation. But when an object is in between, photo transistor could not receives the radiation.

### 特性 Features

- 可靠性高、辐射强度高、低电压驱动  
High reliability、High radiant intensity、Low forward voltage
- 感应速度快、感光度强  
Fast response time、High photo sensitivity
- 截止感应波长 940nm  
Cut-off visible wavelength  $\lambda_d=940\text{nm}$
- 无铅材料、RoHs 认证  
Pb.Free、RoHS compliant version

### 应用 Applications

- 打印机、非接触开关  
Printer、Non-contact Switching
- 智能电子产品  
Intelligent Electronic Products
- 工业机械设备  
Industrial Intelligent Equipment
- 安防防护应用  
Safety Application Products

### 最大额定值 Absolute Maximum Ratings (Ta=25°C)

| 参数<br>Parameter                                   |                                                  | 符号<br>Symbol       | 额定值<br>Rating | 单位<br>Unit |
|---------------------------------------------------|--------------------------------------------------|--------------------|---------------|------------|
| 输入端发射极<br>Input Emitter                           | 功率<br>Power Dissipation                          | Pd                 | 75            | mW         |
|                                                   | 持续正向电流<br>Forward Current                        | I <sub>F</sub>     | 50            | mA         |
|                                                   | 反向电压<br>Reverse Voltage                          | V <sub>R</sub>     | 5             | V          |
|                                                   | 脉冲正向电流<br>Peak Forward Current <sup>(*)</sup>    | I <sub>FP</sub>    | 100           | mA         |
| 输出端接收极<br>output Detector                         | 功率<br>Collector Power Dissipation                | P <sub>C</sub>     | 100           | mW         |
|                                                   | 集电极-发射极电压<br>Collector-Emitter Breakdown Voltage | BV <sub>CEO</sub>  | 30            | V          |
|                                                   | 发射极-集电极电压<br>Emitter-Collector Breakdown Voltage | BV <sub>ECO</sub>  | 5             | V          |
|                                                   | 集电极电流<br>Collector Current                       | I <sub>C(ON)</sub> | 50            | mA         |
| 工作温度<br>Operating Temperature                     |                                                  | T <sub>opr</sub>   | -25~+65       | °C         |
| 存储温度<br>Storage Temperature                       |                                                  | T <sub>stg</sub>   | -40~+70       | °C         |
| 焊接温度<br>Lead Soldering Temperature <sup>(*)</sup> |                                                  | T <sub>sol</sub>   | 260           | °C         |

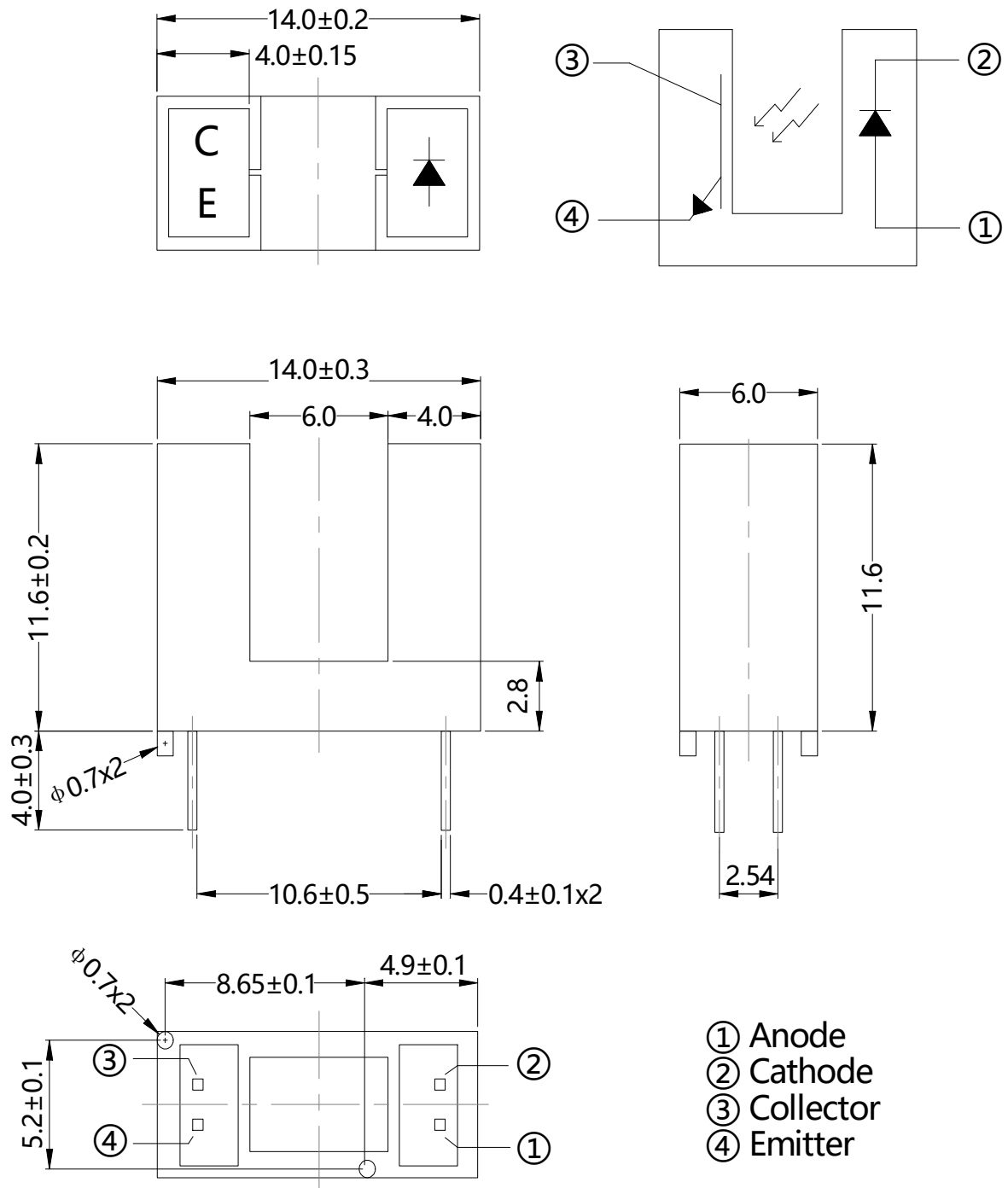
注\*: 1、脉宽少于等于 100us, 占空比少于等于 1% Pulse width≤100μs,Duty cycle≤ 1%

2、波峰焊, t=5 秒 Wave soldering, t= 5sec

### 光电特性 Electro-optical Characteristics (Ta=25°C)

| 参数<br>Parameter                     |                                        | 符号<br>Symbol         | 条件<br>Condition                                                   | 最小<br>Min. | 典型<br>Typ. | 最大<br>Max. | 单位<br>Unit |
|-------------------------------------|----------------------------------------|----------------------|-------------------------------------------------------------------|------------|------------|------------|------------|
| 输入端<br>Input                        | 正向电压<br>Forward Voltage                | V <sub>F</sub>       | I <sub>F</sub> =20mA                                              | -          | 1.2        | 1.5        | V          |
|                                     | 反向电流<br>Reverse Current                | I <sub>R</sub>       | V <sub>R</sub> =5V                                                | -          | -          | 10         | μA         |
|                                     | 峰值波长<br>Peak Wavelength                | λ <sub>P</sub>       | I <sub>F</sub> =20mA                                              | -          | 940        | -          | nm         |
| 输出端<br>Output                       | 暗电流<br>Dark Current                    | I <sub>CEO</sub>     | E <sub>e</sub> =0mW/cm <sup>2</sup><br>V <sub>CE</sub> =20V       | -          | -          | 100        | nA         |
|                                     | 集电极-发射极的工作电压<br>C-E Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> =2mA<br>E <sub>e</sub> =1mW/cm <sup>2</sup>        | -          | -          | 0.4        | V          |
| 转换特性<br>Transfer<br>Characteristics | 上升时间<br>Rise Time                      | T <sub>r</sub>       | I <sub>C</sub> =1mA, V <sub>CE</sub> =5V<br>R <sub>L</sub> =1000Ω | -          | 15         | -          | μS         |
|                                     | 下降时间<br>Fall Time                      | T <sub>f</sub>       |                                                                   | -          | 15         | -          |            |
|                                     | 光电流<br>Collector Current               | I <sub>C(ON)</sub>   | I <sub>F</sub> =20mA<br>V <sub>CE</sub> =5V                       | 2.0        | 5.0        | -          | mA         |

### 产品尺寸 Package Dimension



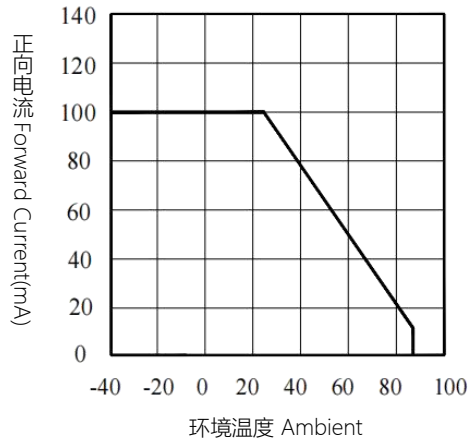
备注 Notes:

- 1、所有尺寸为毫米标识  
All dimensions are in millimeters
- 2、公差为 $\pm 0.20$ mm，除非另有说明  
Tolerance is  $\pm 0.20$ mm unless otherwise noted
- 3、引脚间距是在引脚从封装中露出的地方进行测量  
Lead spacing is measured where the leads emerge from the package

**发射管特性曲线图 Typical Electro-Optical Characteristics Curves-IR**

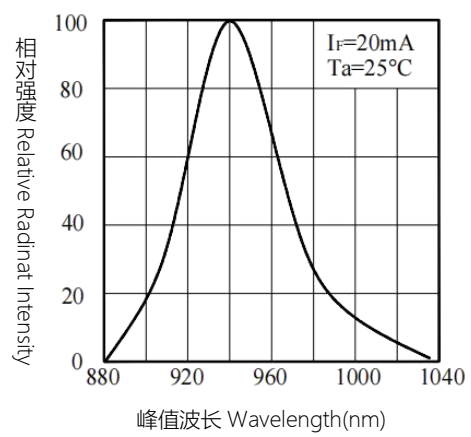
正向电流与环境温度的关系

Forward Current vs. Ambient Temperature



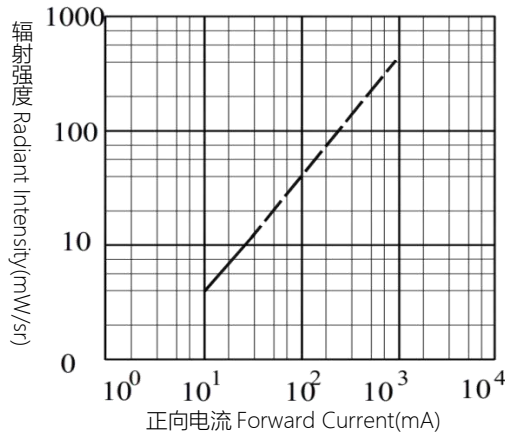
波长曲线图

Spectral Distribution



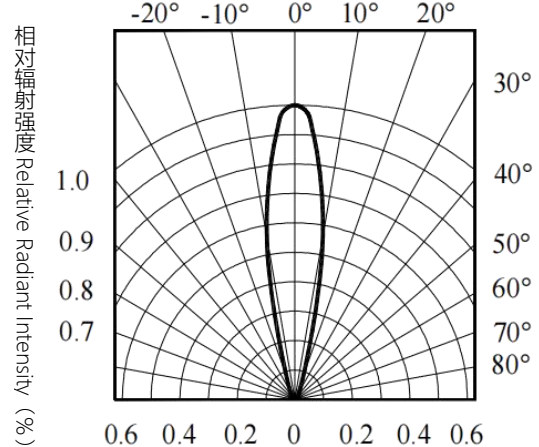
辐射强度与正向电流的关系

Radiant Intensity vs. Forward Current



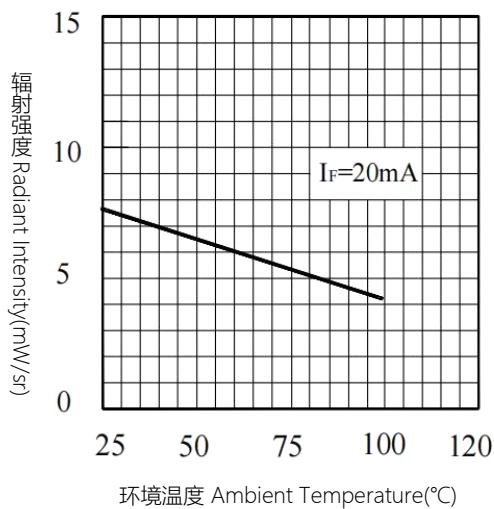
辐射强度与正位移角的关系

Relative Radiant Intensity vs. Angular Displacement



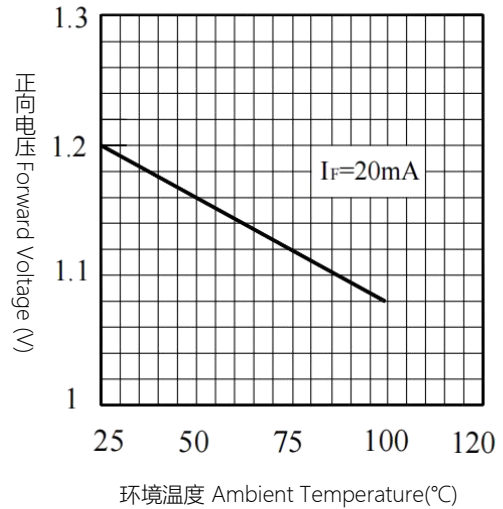
辐射强度与环境温度的关系

Radiant Intensity vs. Ambient Temperature (°C)



正向电压与环境温度的关系

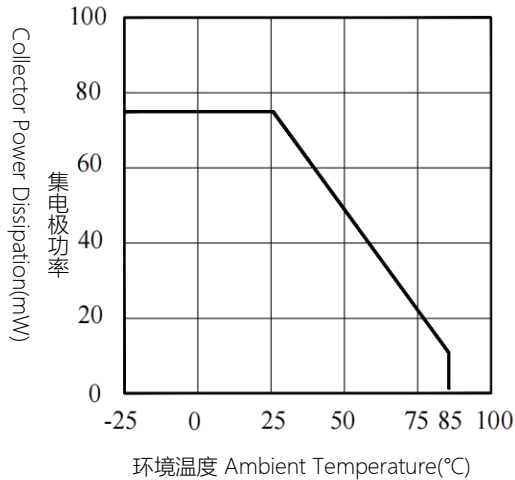
Forward Voltage vs. Ambient Temperature (°C)



## 接收管特性曲线图 Typical Electro-Optical Characteristics Curves-PT

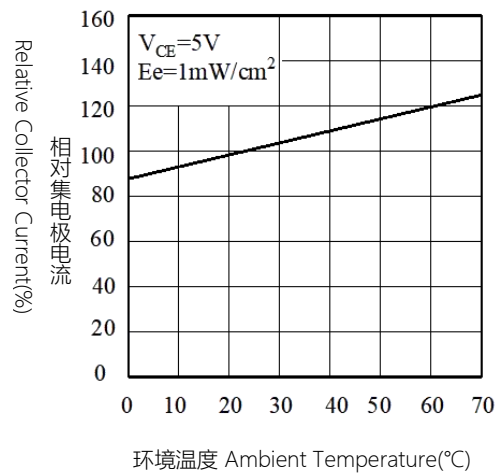
集电极功率与环境温度的关系

Collector Power Dissipation vs. Ambient Temperature



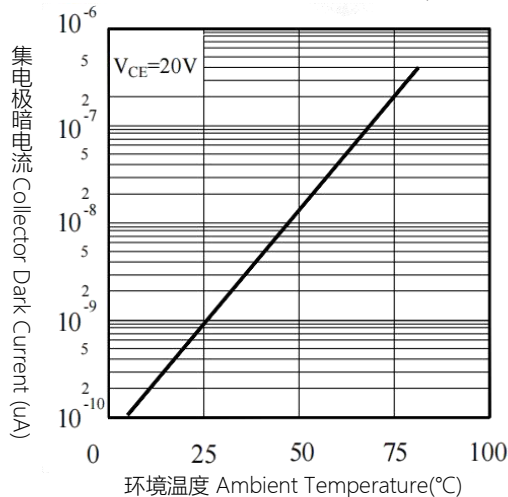
相对集电极电流与环境温度的关系

Relative Collector Current vs. Ambient Temperature



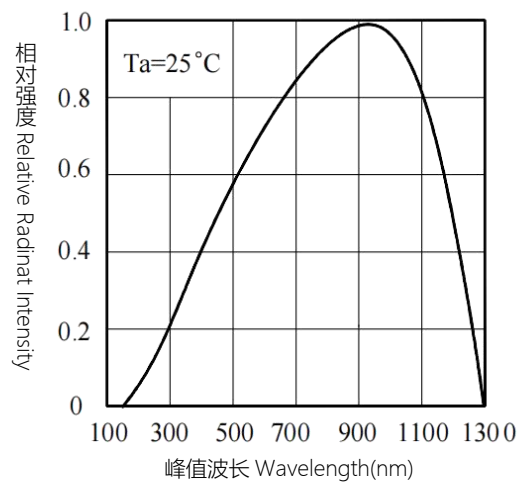
集电极暗电流与环境温度的关系

Collector Dark Current vs. Ambient Temperature



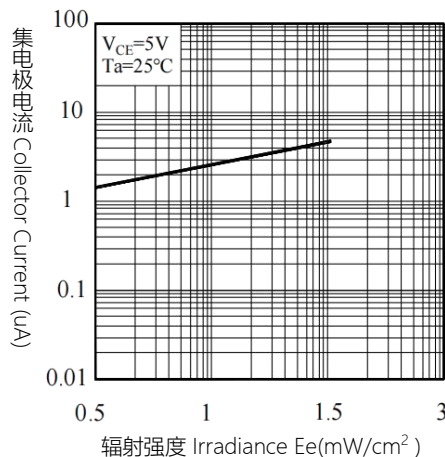
感应波长曲线图

Spectral Sensitivity



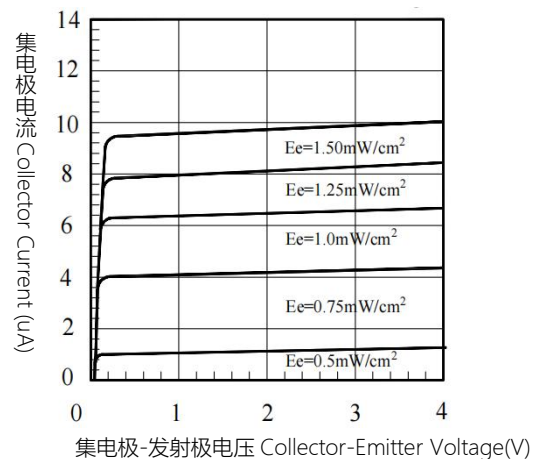
集电极电流与辐射强度的关系

Collector Current vs. Irradiance



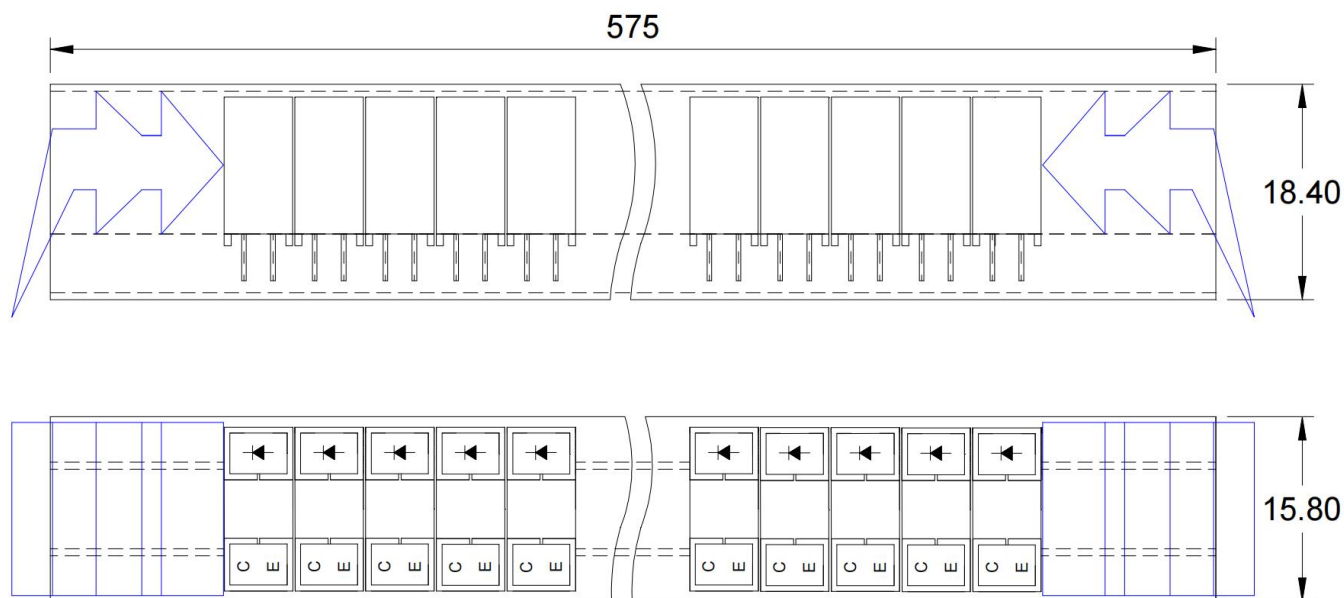
集电极电流与集电极-发射极电压的关系

Collector Current vs. Collector-Emitter Voltage



## 包装规格 Packing Specification

- 管装 90 只/管 90PCS/per tube



## 波峰焊温度曲线图 Wave Soldering Profile

