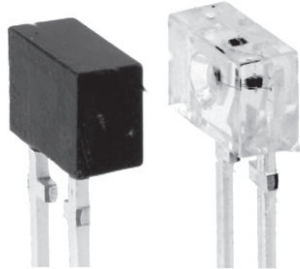


Matched Pairs of Emitters and Detectors



96 12317_1

DESCRIPTION

The TCZT8020 include matched infrared emitters and phototransistors in leaded packages, used to assemble custom-designed transmissive sensors or reflective sensors. The phototransistor package blocks visible light.

FEATURES

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 4.4 x 2 x 3
- Typical output current under test: $I_C = 0.5 \text{ mA}$
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Angle of half intensity: $\varphi = \pm 25^\circ$
- S420P: single detector component (dark epoxy)
- V420P: single emitter component (clear epoxy)
- Lead (Pb)-free soldering released
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



APPLICATIONS

- Custom-design sensors for various distances
- Reflective sensors
- Transmissive sensors

| PRODUCT SUMMARY | | | |
|-----------------|----------------|---|-------------------------------------|
| PART NUMBER | GAP WIDTH (mm) | TYPICAL OUTPUT CURRENT UNDER TEST ⁽¹⁾ (mA) | DAYLIGHT BLOCKING FILTER INTEGRATED |
| TCZT8020 | Variable | 0.5 | Yes |

Note

⁽¹⁾ Conditions like in table basic characteristics/coupler

| ORDERING INFORMATION | | | |
|----------------------|-----------|--------------------------------|---|
| ORDERING CODE | PACKAGING | VOLUME ⁽¹⁾ | REMARKS |
| TCZT8020 | Bulk | MOQ: 2000 pairs, 1000 pcs/bulk | Detectors and emitters in separate bulk |

Note

⁽¹⁾ MOQ: minimum order quantity

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | |
|--|---|-----------|---------------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| COUPLER | | | | |
| Ambient temperature range | | T_{amb} | - 55 to + 85 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | - 55 to + 100 | $^{\circ}\text{C}$ |
| Soldering temperature | Distance to package 2 mm, $t \leq 5\text{ s}$ | T_{sd} | 260 | $^{\circ}\text{C}$ |
| INPUT (EMITTER) | | | | |
| Reverse voltage | | V_R | 6 | V |
| Forward current | | I_F | 60 | mA |
| Forward surge current | $t \leq 10\text{ }\mu\text{s}$ | I_{FSM} | 1 | A |
| Power dissipation | $T_{amb} \leq 25\text{ }^{\circ}\text{C}$ | P_V | 100 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |
| OUTPUT (DETECTOR) | | | | |
| Collector emitter voltage | | V_{CEO} | 70 | V |
| Emitter collector voltage | | V_{ECO} | 7 | V |
| OUTPUT (DETECTOR) | | | | |
| Collector current | | I_C | 50 | mA |
| Collector peak current | $t_p/T = 0.5, t \leq 10\text{ ms}$ | I_{CM} | 100 | mA |
| Power dissipation | $T_{amb} \leq 25\text{ }^{\circ}\text{C}$ | P_V | 150 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |

ABSOLUTE MAXIMUM RATINGS

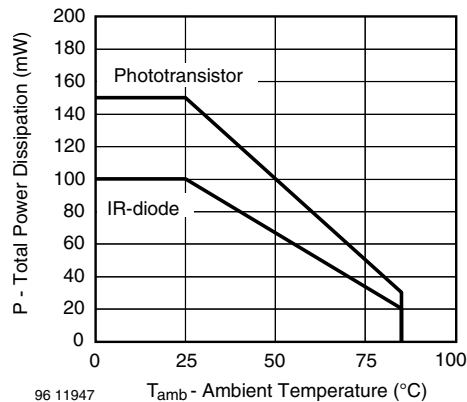


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|---|-------------|------|------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| COUPLER | | | | | | |
| Collector current | $V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, $d = 4\text{ mm}$ ⁽¹⁾ | I_C | 0.25 | 0.5 | | mA |
| I_C/I_F | $V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, $d = 4\text{ mm}$ | CTR | 1.25 | 2.5 | | % |
| Collector emitter saturation voltage | $I_F = 20\text{ mA}$, $I_C = 25\text{ }\mu\text{A}$ | V_{CEsat} | | | 0.4 | V |
| Cut-off frequency | $I_F = 10\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_L = 100\text{ }\Omega$ | f_C | | 110 | | kHz |
| INPUT (EMITTER) | | | | | | |
| Forward voltage | $I_F = 50\text{ mA}$ | V_F | | 1.25 | 1.6 | V |
| Radiant intensity | $I_F = 60\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | | | 7.8 | mW/sr |
| Peak wavelength | $I_F = 100\text{ mA}$ | λ_P | 940 | | | nm |
| Virtual source diameter | DIN EN ISO 1146/1:2005 | d | | 1.1 | | mm |
| OUTPUT (DETECTOR) | | | | | | |
| Collector emitter voltage | $I_C = 1\text{ mA}$ | V_{CEO} | 70 | | | V |
| Emitter collector voltage | $I_E = 100\text{ }\mu\text{A}$ | V_{ECO} | 7 | | | V |
| Collector dark current | $V_{CE} = 25\text{ V}$, $I_F = 0\text{ A}$, $E = 0\text{ lx}$ | I_{CEO} | | | 100 | nA |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-on time | $V_S = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 10) | t_{on} | | 15 | | μs |
| Turn-off time | $V_S = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 10) | t_{off} | | 10 | | μs |

Note

⁽¹⁾ Characteristics are measurement with $d = 4\text{ mm}$ (0.55") distance between emitter and detector, within a common axis of 0.5 mm (0.02") and with parallel alignment within 5°

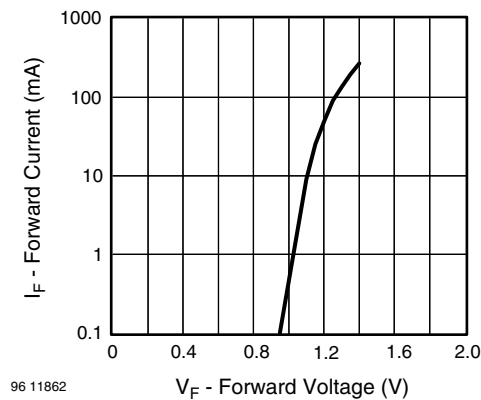
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 2 - Forward Current vs. Forward Voltage

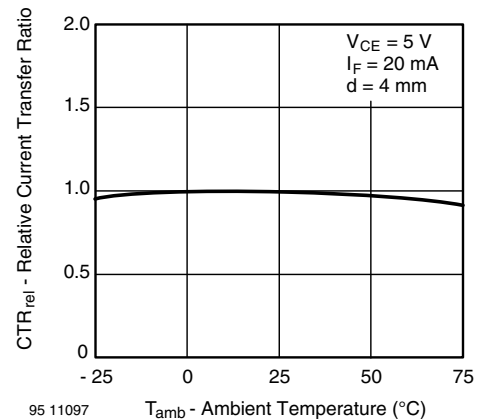


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

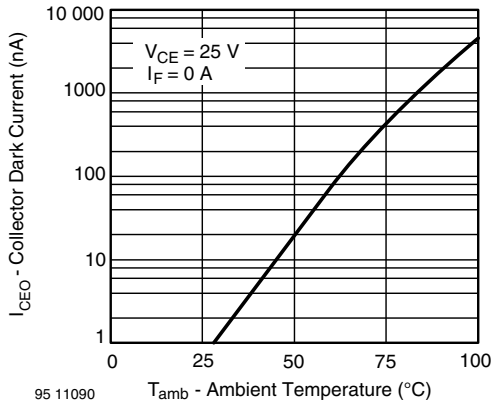


Fig. 4 - Collector Dark Current vs. Ambient Temperature

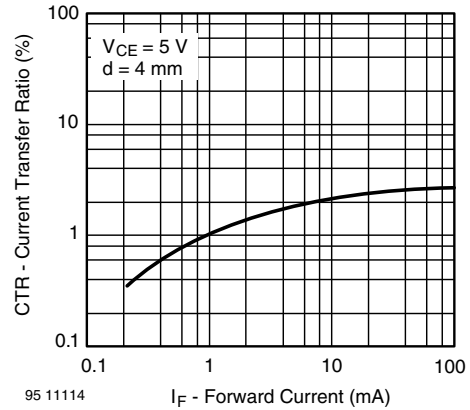


Fig. 7 - Current Transfer Ratio vs. Forward Current

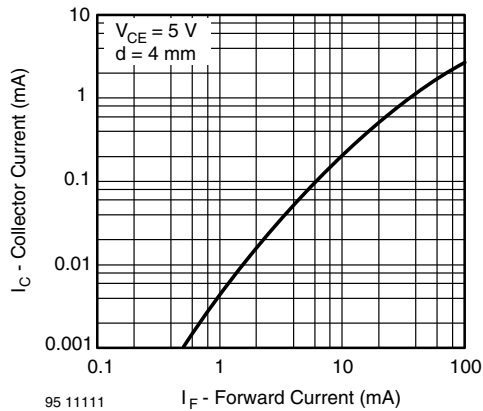


Fig. 5 - Collector Current vs. Forward Current

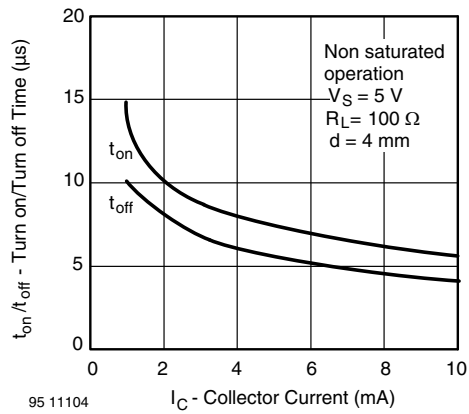


Fig. 8 - Turn on/off Time vs. Forward Current

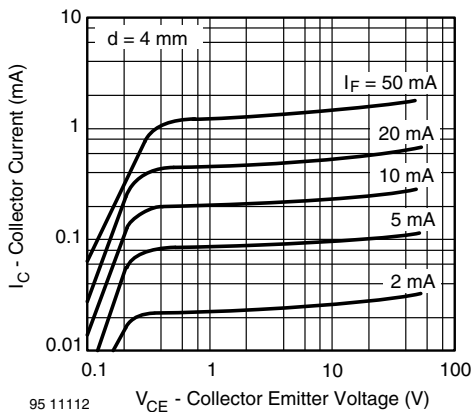


Fig. 6 - Collector Current vs. Collector Emitter Voltage

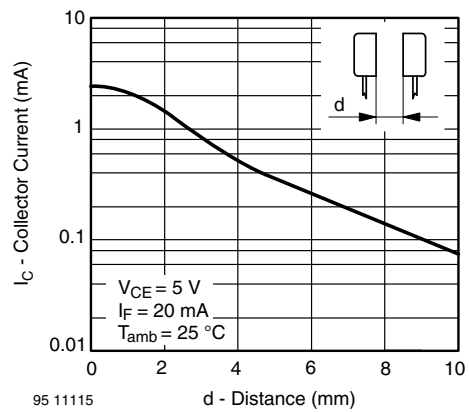


Fig. 9 - Collector Current vs. Distance

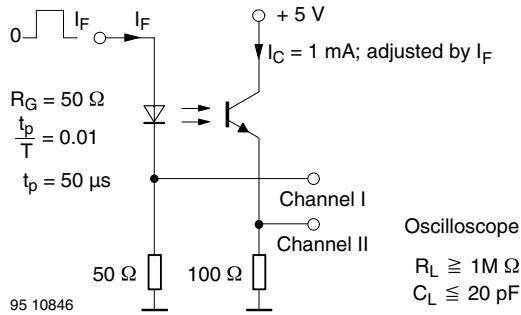


Fig. 10 - Pulse Diagram

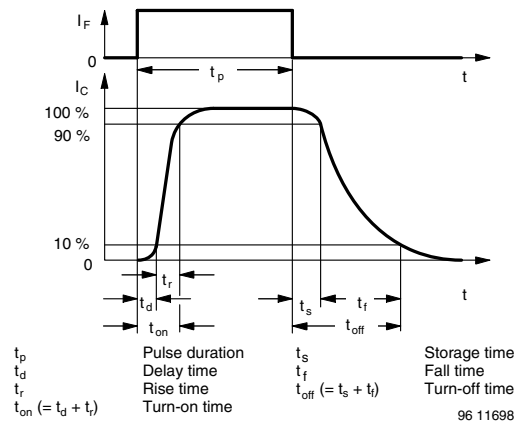
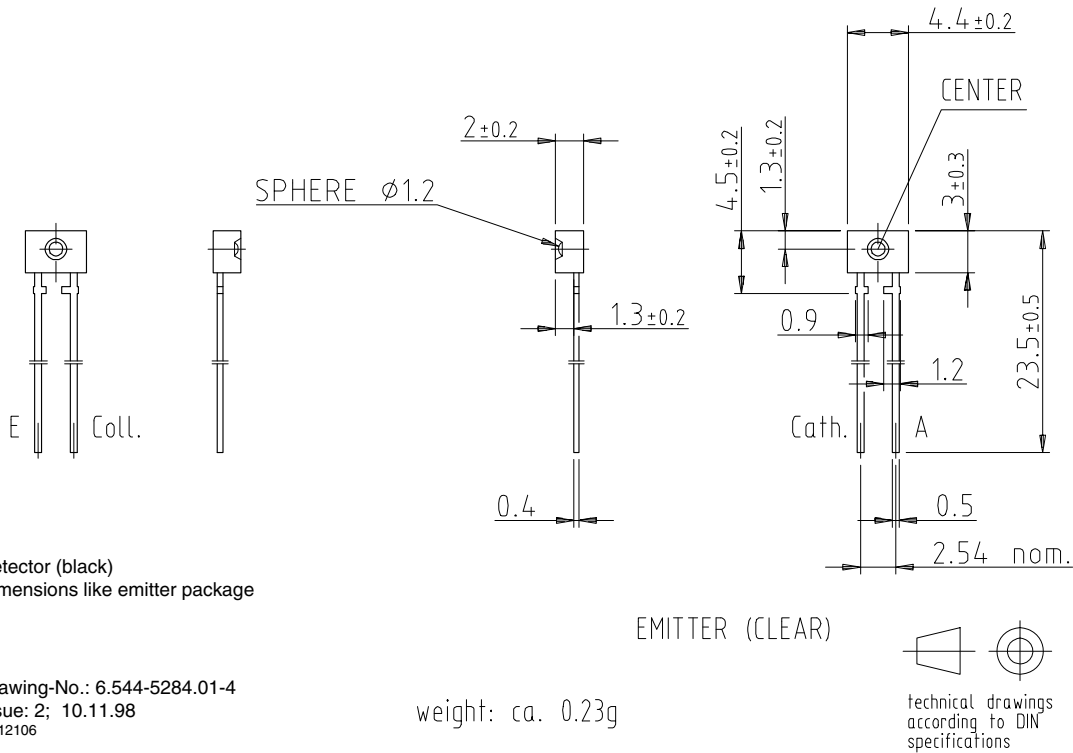


Fig. 11 - Switching Times

PACKAGE DIMENSIONS in millimeters




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