

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
- V420P: single emitter component
- Lead (Pb)-free soldering released
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC


RoHS
COMPLIANT

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

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾

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



ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
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	$^\circ\text{C}$

Note

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

ABSOLUTE MAXIMUM RATINGS

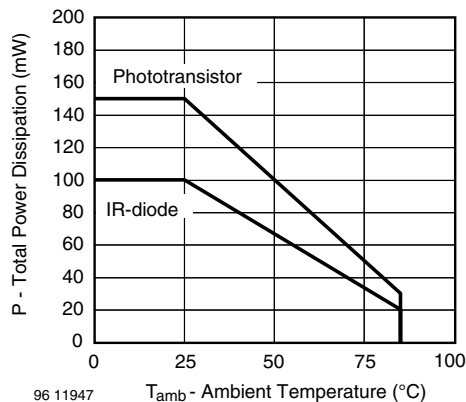


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (1)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER						
Collector current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}, d = 4 \text{ mm}^{(2)}$	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) $T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

(2) 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

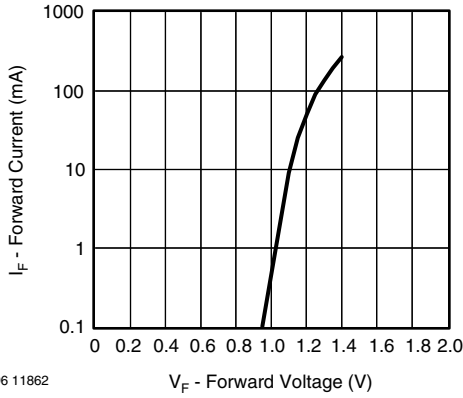


Fig. 2 - Forward Current vs. Forward Voltage

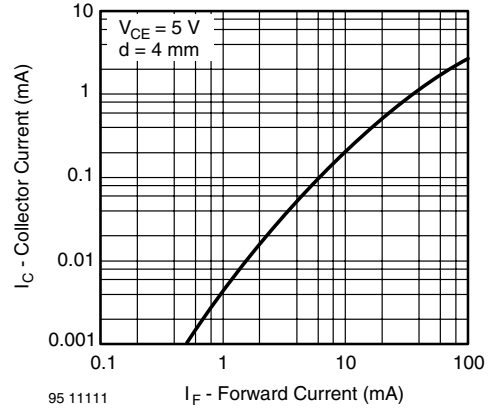


Fig. 5 - Collector Current vs. Forward Current

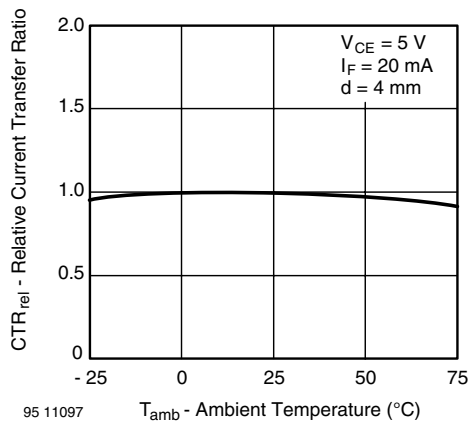


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

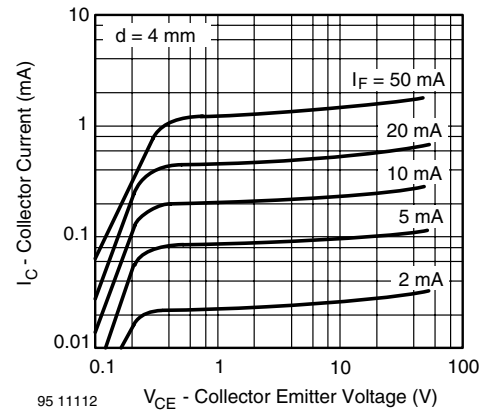


Fig. 6 - Collector Current vs. Collector Emitter Voltage

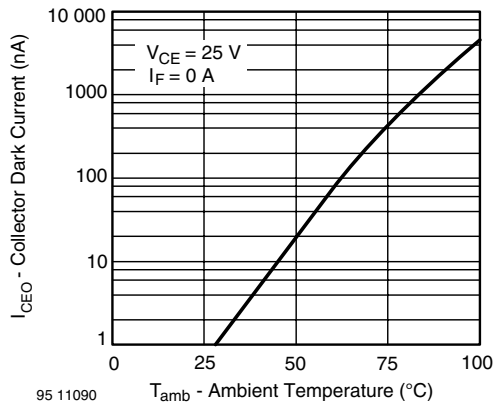


Fig. 4 - Collector Dark Current vs. Ambient Temperature

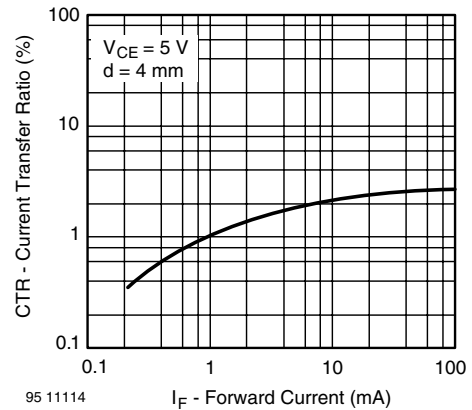


Fig. 7 - Current Transfer Ratio vs. Forward Current

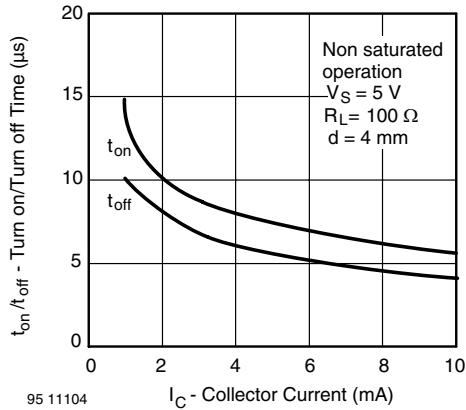


Fig. 8 - Turn on/off Time vs. Forward Current

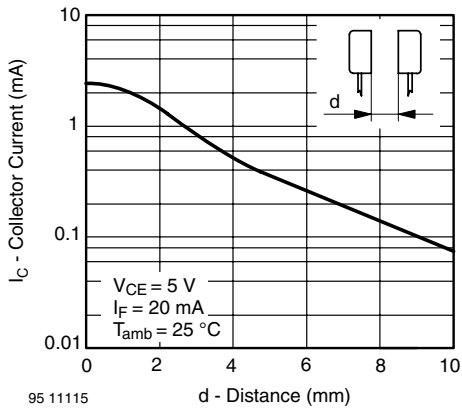


Fig. 9 - Collector Current vs. Distance

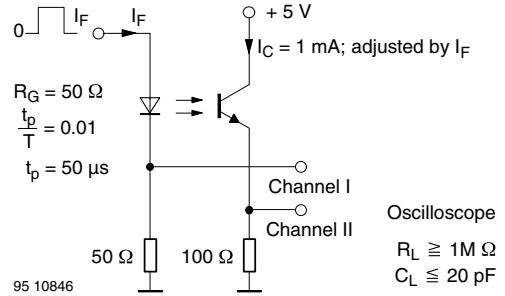


Fig. 10 - Pulse Diagram

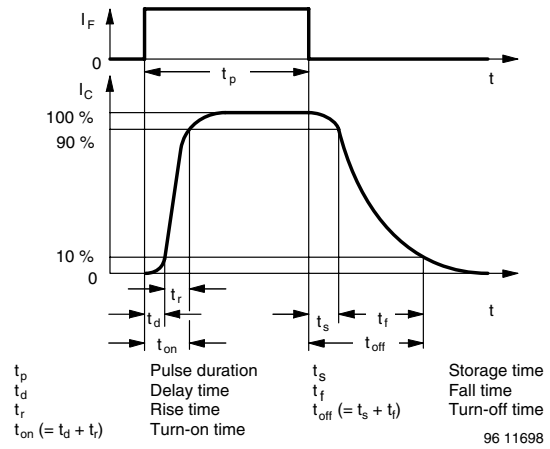
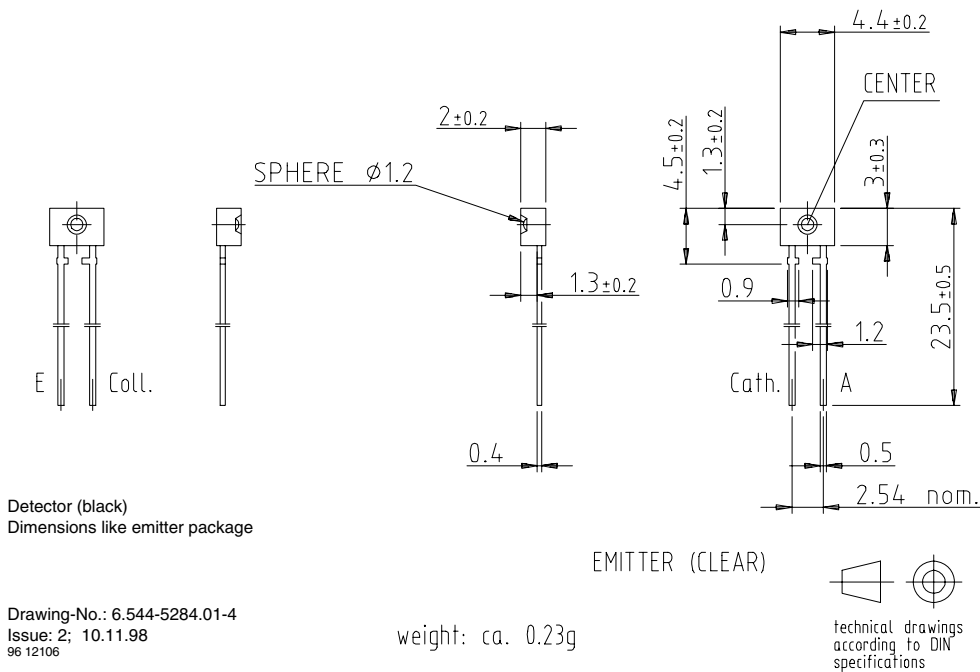


Fig. 11 - Switching Times

PACKAGE DIMENSIONS in millimeters



Detector (black)
Dimensions like emitter package

Drawing-No.: 6.544-5284.01-4
Issue: 2; 10.11.98
96 12106

weight: ca. 0.23g

EMITTER (CLEAR)

technical drawings
according to DIN
specifications



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