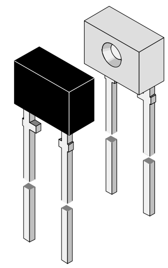
Matched Pairs of Emitters and Detectors

Description

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



Features

- Package type: Leaded
- Detector type: Phototransistor
- Dimensions:
  L 4.4 mm x W 2 mm x H 3 mm
- Typical output current under test: I_C = 0.5 mA
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Angle of half intensity: $\varphi = \pm 25°$
- S420P: single detector component
- V420P: single emitter component
- Lead (Pb)-free soldering released
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC
- Minimum order quantity: 2500 pairs in bulk

Pb
Pb-free
e4

Applications

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

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Coupler

Parameter	Test condition	Symbol	Value	Unit
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 ≤ 5 s	T_{sd}	260	°C

Input (Emitter)

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	t ≤ 10 µs	I_{FSM}	1	A
Power dissipation	T_{amb} ≤ 25 °C	P_V	100	mW
Junction temperature		T_j	100	°C

Output (Detector)

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter voltage		V_{CEO}	70	V
Emitter-collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5$, $t \leq 10$ ms	I_{CM}	100	mA
Power dissipation	$T_{amb} \leq 25$ °C	P_V	150	mW
Junction temperature		T_j	100	°C

CTR

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
I_C/I_F	$V_{CE} = 5$ V, $I_F = 20$ mA	CTR	0.0125	0.025		

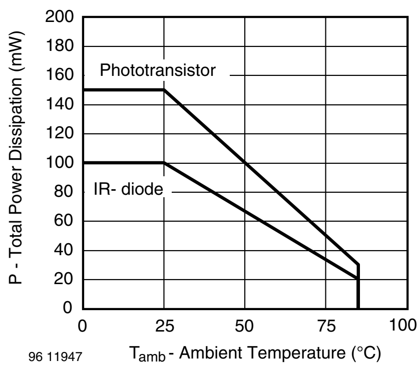


Figure 1. Power Dissipation Limit vs. Ambient Temperature

Electrical Characteristics

$T_{amb} = 25$ °C, unless otherwise specified

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector current	$V_{CE} = 5$ V, $I_F = 20$ mA	I_C [1)]	0.25	0.5		mA
I_C/I_F	$V_{CE} = 5$ V, $I_F = 20$ mA	CTR	1.25	2.5		
Collector emitter saturation voltage	$I_F = 20$ mA, $I_C = 25$ µA	V_{CEsat}			0.4	V
Cut-off frequency	$I_F = 10$ mA, $V_{CE} = 5$ V, $R_L = 100\ \Omega$	f_C		110		kHz

[1)] Characteristics are measurement with 4 mm (0.55") distance between emitter and detector, within a common axis of 0.5 mm (0.02") and with parallel alignment within 5°

Input (Emitter)

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	$I_F = 50$ mA	V_F		1.25	1.6	V
Radiant intensity	$I_F = 60$ mA, $t_P = 20$ ms	I_e			7.8	mW/sr
Peak wavelength	$I_F = 100$ mA	λ_P	940			nm
Virtual source diameter	DIN EN ISO 1146/1:2005	Ø		1.1		mm

Output (Detector)

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector emitter voltage	I_C = 1 mA	V_{CEO}	70			V
Emitter collector voltage	I_E = 100 µA	V_{ECO}	7			V
Collector dark current	V_{CE} = 25 V, I_F = 0, E = 0	I_{CEO}			100	nA

Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Turn-on time	V_S = 5 V, I_C = 1 mA, R_L = 100 Ω (see figure 10)	t_{on}		15.0		µs
Turn-off time	V_S = 5 V, I_C = 1 mA, R_L = 100 Ω (see figure 10)	t_{off}		10.0		µs

Typical Characteristics

T_{amb} = 25 °C, unless otherwise specified

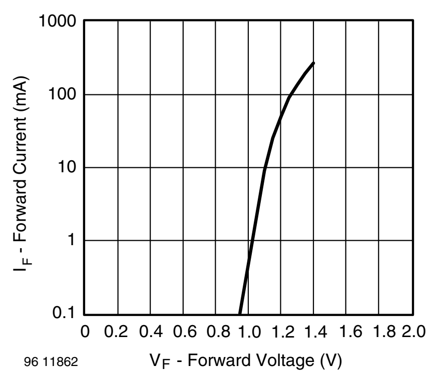


Figure 2. Forward Current vs. Forward Voltage

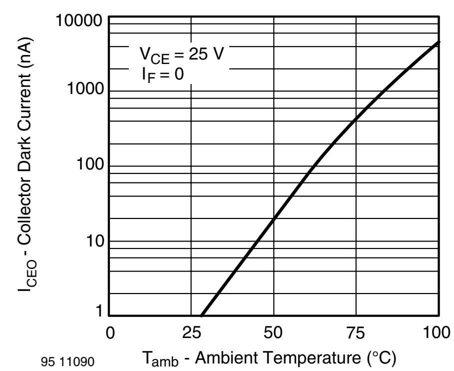


Figure 4. Collector Dark Current vs. Ambient Temperature

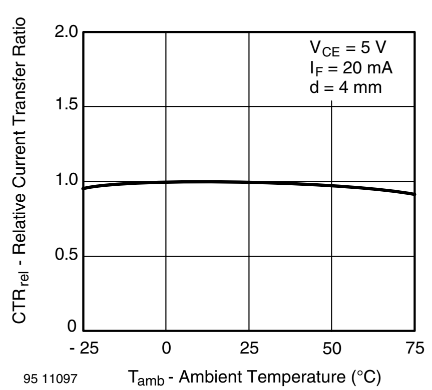


Figure 3. Relative Current Transfer Ratio vs. Ambient Temperature

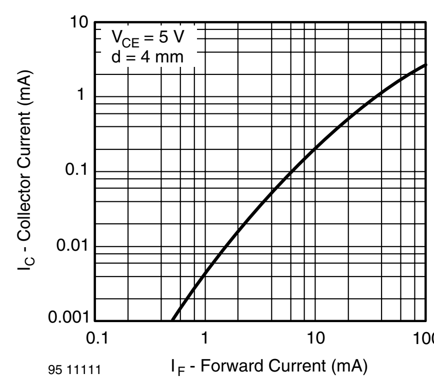


Figure 5. Collector Current vs. Forward Current

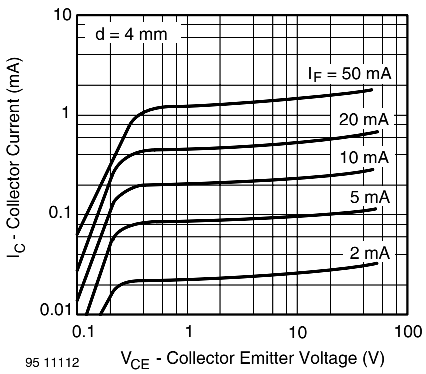


Figure 6. Collector Current vs. Collector Emitter Voltage

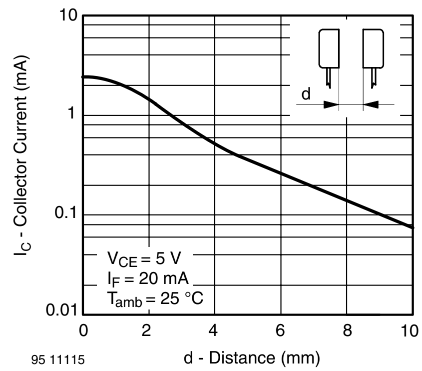


Figure 9. Collector Current vs. Distance

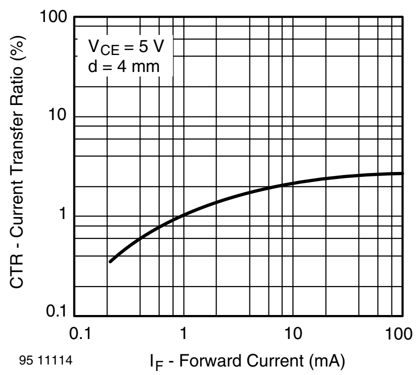


Figure 7. Current Transfer Ratio vs. Forward Current

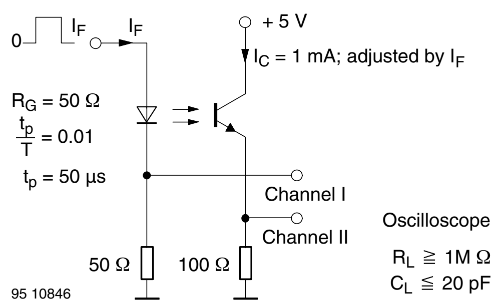


Figure 10. Pulse diagram

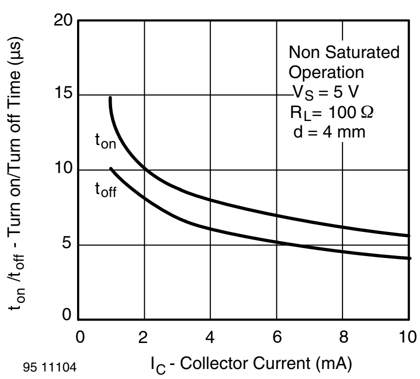


Figure 8. Turn on/off Time vs. Forward Current

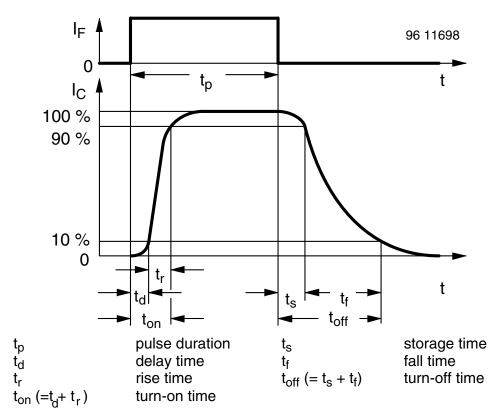
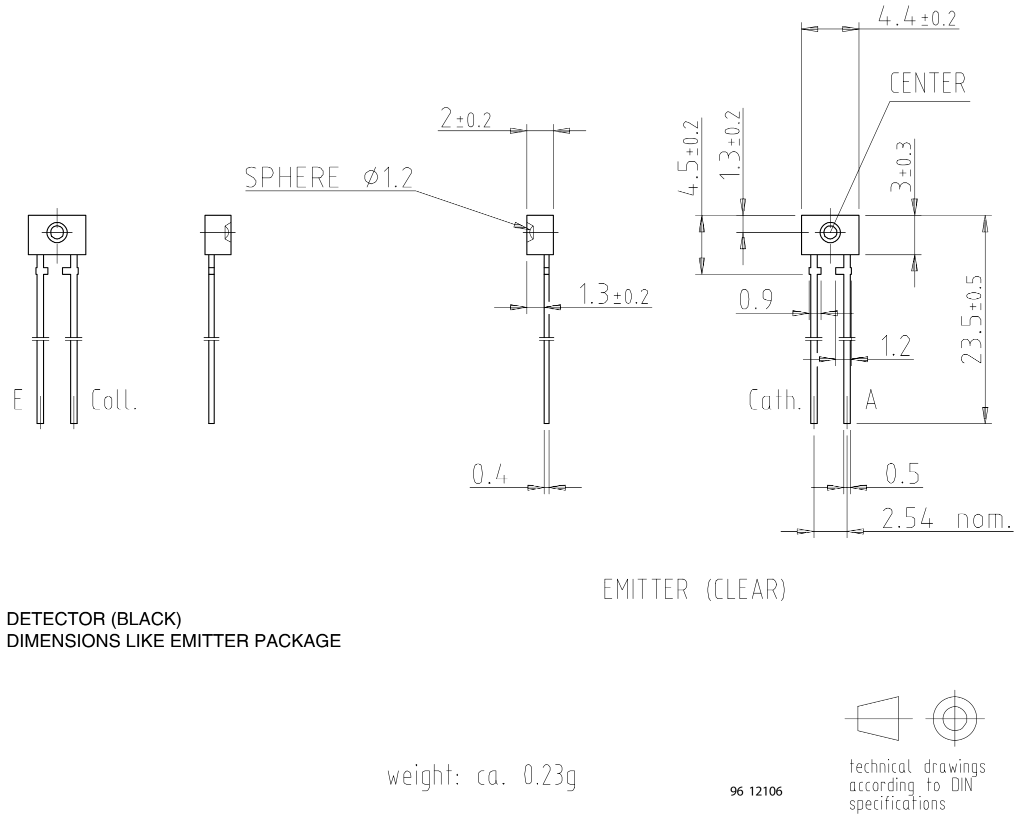


Figure 11. Switching Times

Package Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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