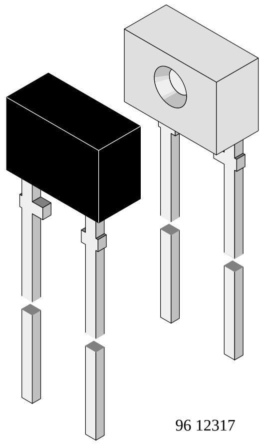
TCZT8020

Matchable Pairs – Emitter and Detector

Description

Pairs of infrared-emitting diode and phototransistor, matched in their optical and electrical features. These pairs enable a lot of applications. They can be used both for transmissive or reflective sensor functions. The peak wavelength of the emitter is λ = 950 nm.



96 12317

Applications

Generally used for industrial processing and controlling; end of tape detector

Features

- Subminiature case with lens
- Detector with optical filter, protected against ambient light
- Detector case black for easy identification of the emitter and detector
- Emitter-angle of half intensity $\pm\varphi$ = 25°
- Detector-angle of half sensitivity $\pm\varphi$ = 25°
- Emitter and detector in sideview case

Absolute Maximum Ratings

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reserve 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)

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

Emitter and Detector matched

Parameters	Test Conditions	Symbol	Value	Unit
Ambient temperature range		T_{amb}	–55 to +85	°C
Storage temperature range		T_{stg}	–55 to +100	°C
Soldering temperature	2 mm from case, t ≤ 5 s	T_{sd}	260	°C

Electrical Characteristics

T_{amb} = 25°C

Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	I_F = 50 mA	V_F		1.25	1.6	V
Breakdown voltage	I_R = 100 μA	$V_{(BR)}$	5			V

Output (Detector)

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

Emitter and Detector matched

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector current	I_F = 20 mA, V_{CE} = 5 V	I_C	0.25	0.5		mA
I_C/I_F	I_F = 20 mA, V_{CE} = 5 V	CTR	0.0125	0.025		
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 Ω	f_c		110		kHz

2) Characteristics are measured at a distance of 4 mm (0.55”) within a common axis of 0.5 mm (0.02”) and parallel within 5°.

Switching Characteristics

V_S = 5 V

Type	R_L = 100 Ω (see figure 1)							R_L = 1 kΩ		
	t_d[µs]	t_r[µs]	t_{on}[µs]	t_s[µs]	t_f[µs]	t_{off}[µs]	I_C[mA]	t_{on}[µs]	t_{off}[µs]	I_F[mA]
TCZT8020			15			10	1			

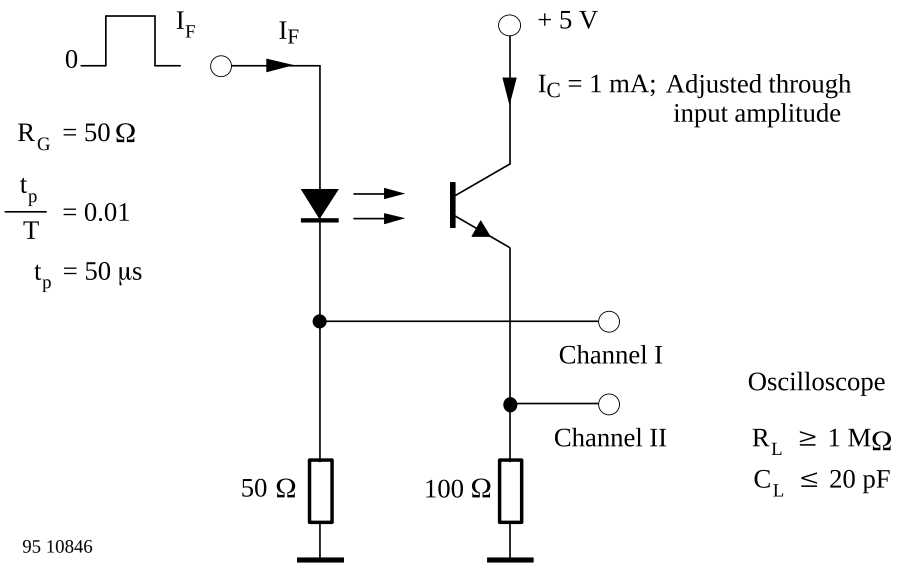


Figure 1. Test circuit

Typical Characteristics (T_{amb} = 25°C, unless otherwise specified)

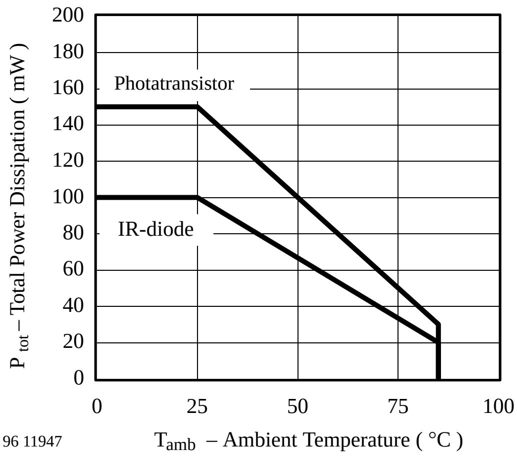


Figure 2. Total Power Dissipation vs. Ambient Temperature

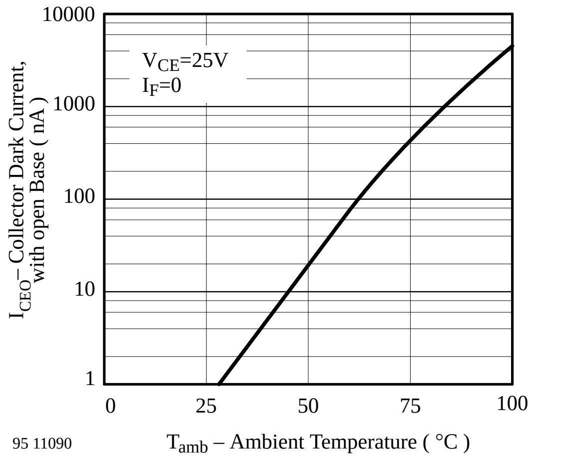


Figure 5. Collector Dark Current vs. Ambient Temperature

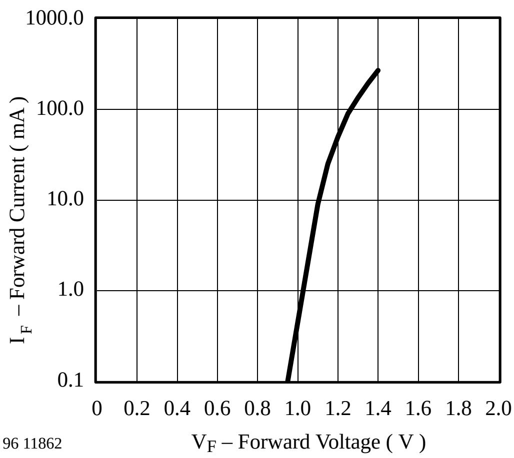


Figure 3. Forward Current vs. Forward Voltage

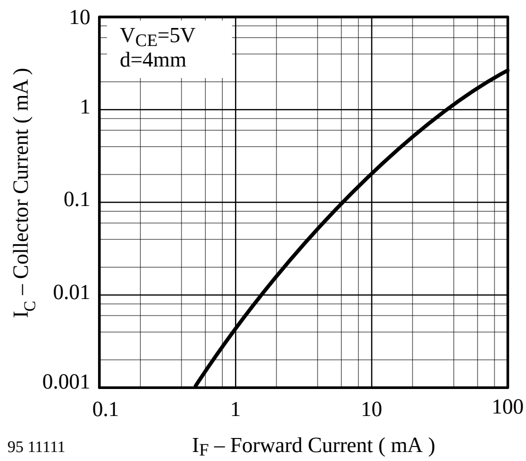


Figure 6. Collector Current vs. Forward Current

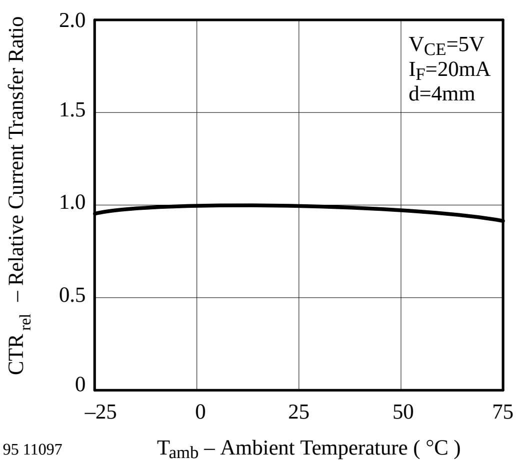


Figure 4. Rel. Current Transfer Ratio vs. Ambient Temperature

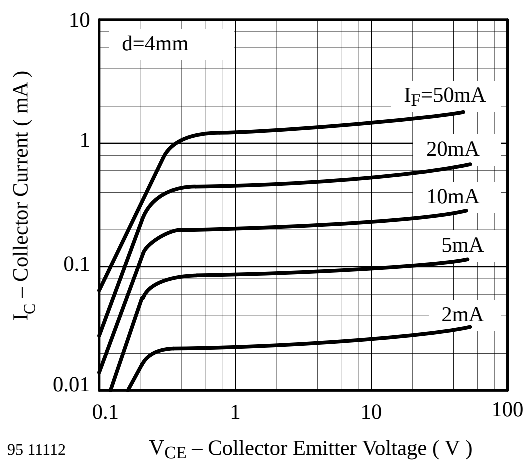


Figure 7. Collector Current vs. Collector Emitter Voltage

Typical Characteristics (T_{amb} = 25°C, unless otherwise specified)

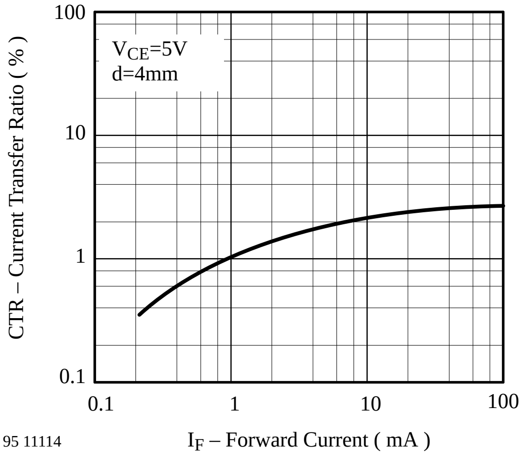


Figure 8. Current Transfer Ratio vs. Forward Current

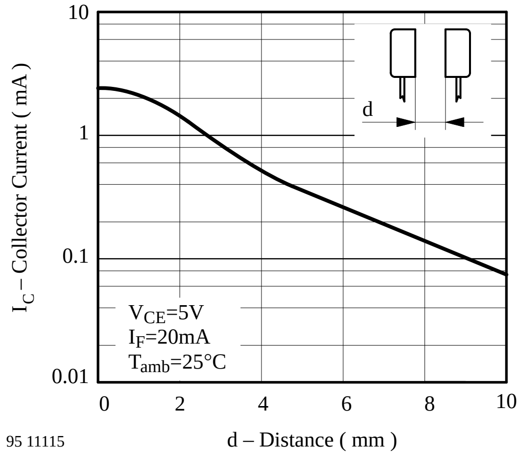


Figure 10. Collector Current vs. Distance

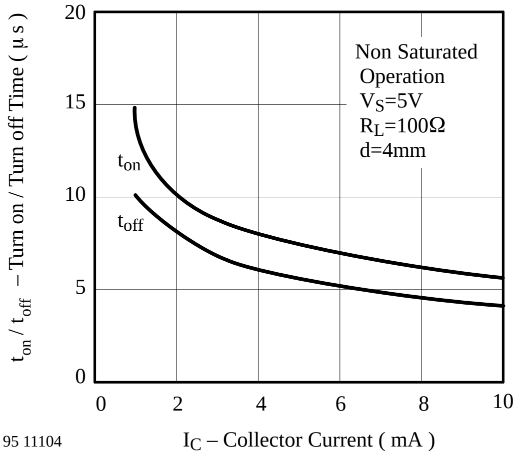
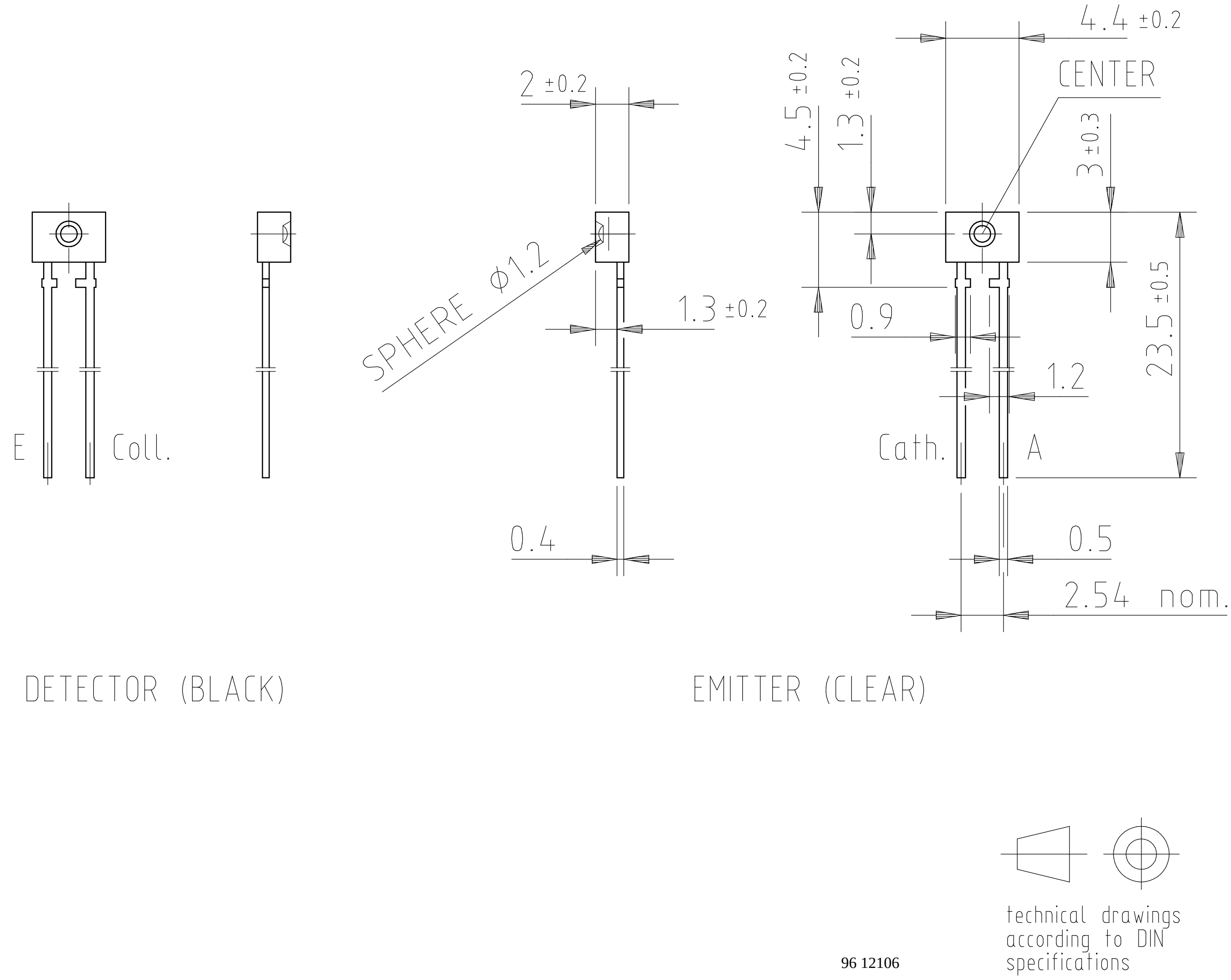


Figure 9. Turn on / off Time vs. Collector Current

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic 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.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division 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.

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

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423