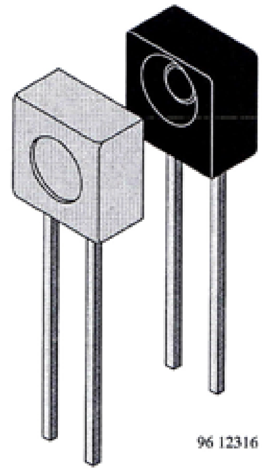
Matchable Pairs – Emitter and Detector

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 $\lambda = 950$ nm.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Applications

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

Features

- Miniature 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 $\pm\varphi = 35°$
- Detector-angle of half sensitivity $\pm\varphi = 35°$
- Emitter and detector in sideview case
- Selected in groups for matching pairs

Absolute Maximum Ratings

Emitter – V472P

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10$ µs	I_{FSM}	1	A
Power dissipation	$T_{amb} \leq 25°C$	P_V	100	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	–40 to +85	°C
Storage temperature range		T_{stg}	–40 to +100	°C
Soldering temperature	2 mm from case, $t \leq 5$ s	T_{sd}	260	°C

Detector – S472P

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
Collector peak current	$t_p/T = 0.5$, $t_p \leq 10$ ms	I_{CM}	100	mA
Power dissipation	$T_{amb} \leq 25°C$	P_V	150	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	–40 to +85	°C
Storage temperature range		T_{stg}	–40 to +100	°C
Soldering temperature	2 mm from case, $t \leq 5$ s	T_{sd}	260	°C

Basic Characteristics ($T_{amb} = 25°C$)

Emitter – V472P

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50$ mA	V_F		1.25	1.6	V
Junction capacitance	$V_R = 0$, f = 1 MHz	C_j		50		pF
Radiant power	$I_F = 50$ mA, $t_p \leqq 20$ ms	ϕ_e		5		mW
Temp. coefficient of ϕ_e	$I_F = 50$ mA	$TK_{\phi e}$		–1		%/K
Angle of half intensity		φ		±35		deg
Peak wavelength	$I_F = 50$ mA	λ_p		950		nm
Spectral bandwidth	$I_F = 50$ mA	$\Delta\lambda$		50		nm

Detector – S472P

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	$I_C = 1$ mA	V_{CEO}	70			V
Emitter collector voltage	$I_C = 100$ µA	V_{ECO}	7			V
Collector dark current	$V_{CE} = 25$ V, $I_f = 0$, E = 0	I_{CEO}			100	nA
Angle of half sensitivity		φ		±35		deg
Wavelength of peak sensitivity		λ_p		920		nm
Range of spectral bandwidth		$\lambda_{0.5}$		850...980		nm
Collector emitter saturation voltage	$E_e = 1$ mW/cm^2, $\lambda = 950$ nm, $I_C = 0.1$ mA	V_{CEsat}			0.3	V

Type Decicated Characteristics

Emitter – V472P

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Radiant intensity	$I_F = 50$ mA, $t_p \leqq$ 20ms	A2	I_e	2.3		3.7	mW/sr
		B1	I_e	3.0		4.4	mW/sr
		B2	I_e	3.6		5.0	mW/sr
		B3	I_e	4.0		5.5	mW/sr
		B4	I_e	4.5		6.0	mW/sr

Detector – S472P

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Collector light current	$V_{CE} = 5$ V, $E_e = 1$ mW/cm^2, $\lambda_p = 950$ nm	A2	I_{ca}	1.7		2.8	mA
		B1	I_{ca}	2.2		4.2	mA
		B2	I_{ca}	3.4		5.5	mA

Switching Characteristics

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Delay time	$V_S = 5$ V, $I_C = 5$ mA, $R_L = 100\ \Omega$ (see figure 1)	t_d		1.8		µs
Rise time		t_r		1.6		µs
Fall time		t_f		1.7		µs
Storage time		t_s		o.3		µs
Turn-on time		t_{on}		3.4		µs
Turn-off time		t_{off}		2.0		µs

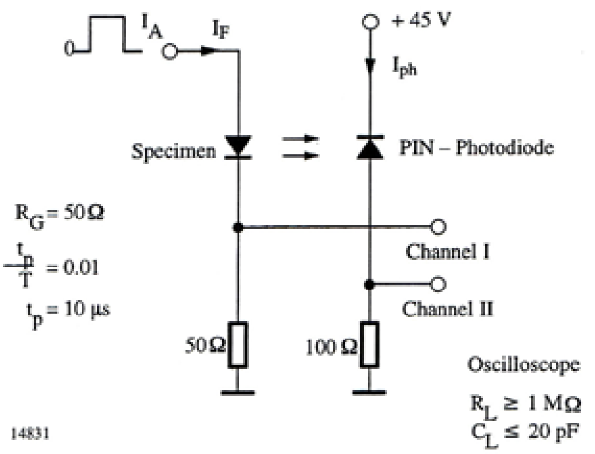


Figure 1. Test circuit Emitter

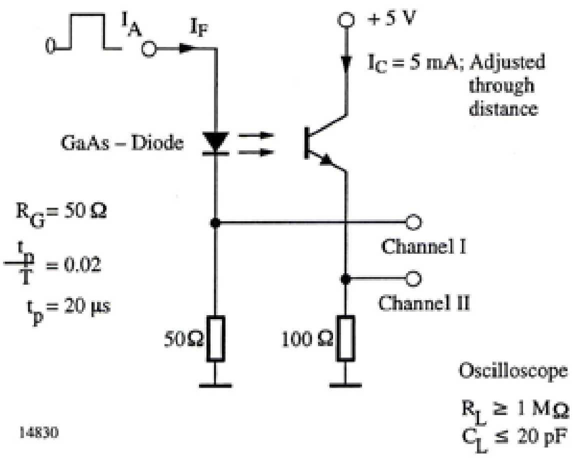


Figure 1. Test circuit Detector

Matching Scheme

		S472P		
		A2	B1	B2
V	A2			x
4	B1		x	
7	B2	x	x	
2	B3	x		
p	B4	x		

x = accepted combination

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

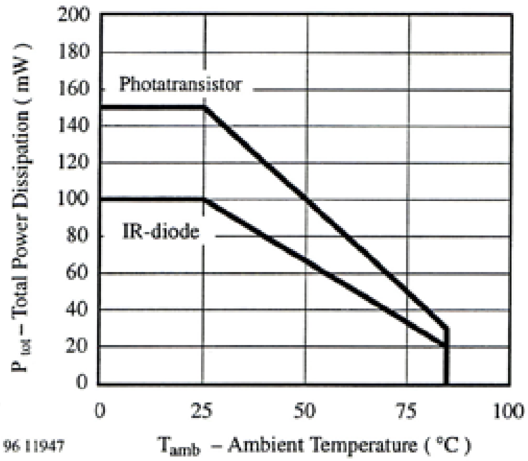


Figure 2. Total Power Dissipation vs. Ambient Temperature

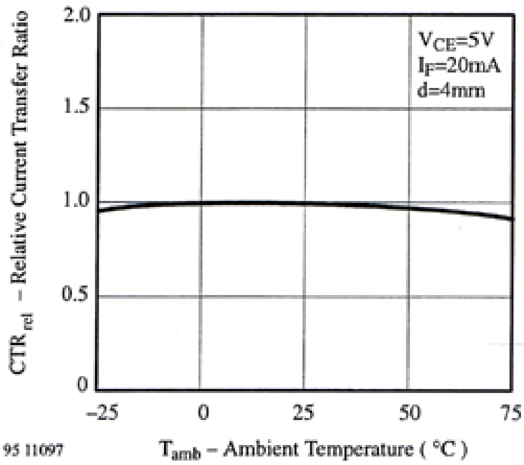


Figure 4. Rel. Current Transfer Ratio vs. Ambient Temperature

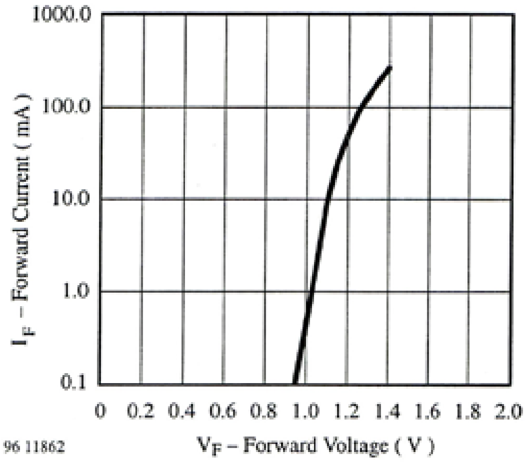


Figure 3. Forward Current vs. Forward Voltage

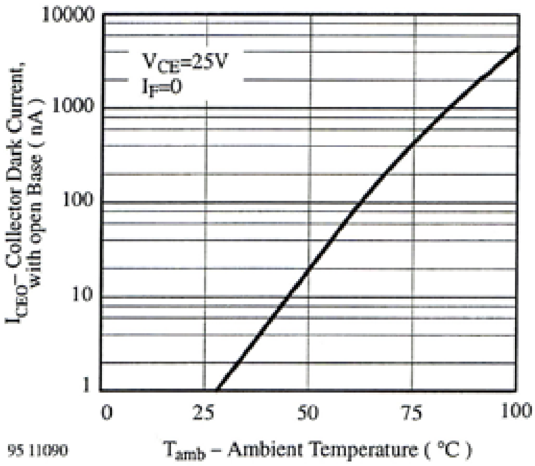


Figure 5. Collector Dark Current vs. Ambient Temperature

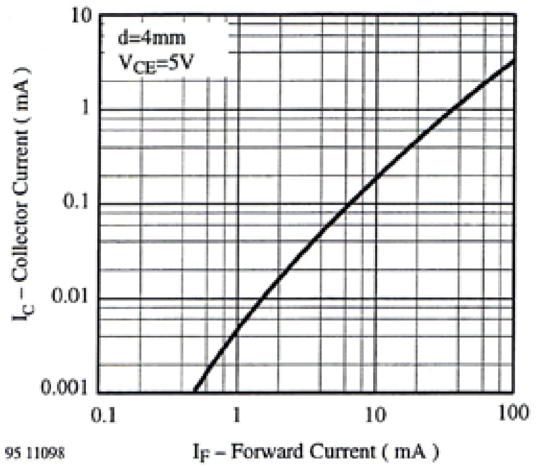


Figure 6. Collector Current vs. Forward Current

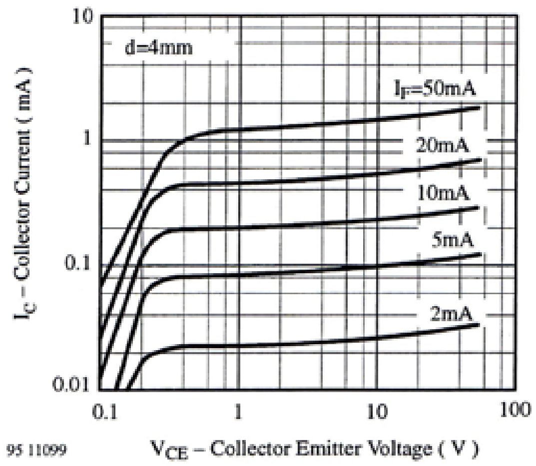


Figure 7. Collector Current vs. Collector Emitter Voltage

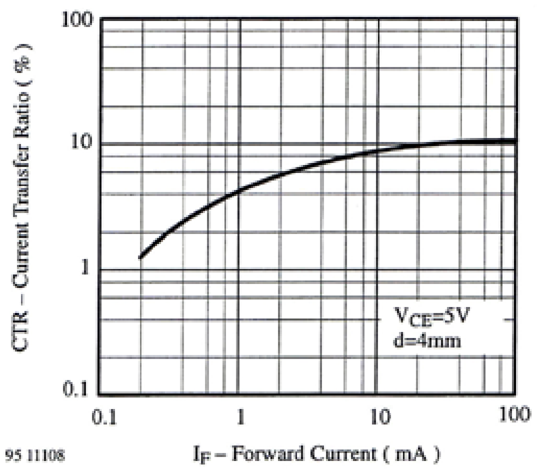


Figure 8. Current Transfer Ratio vs. Forward Current

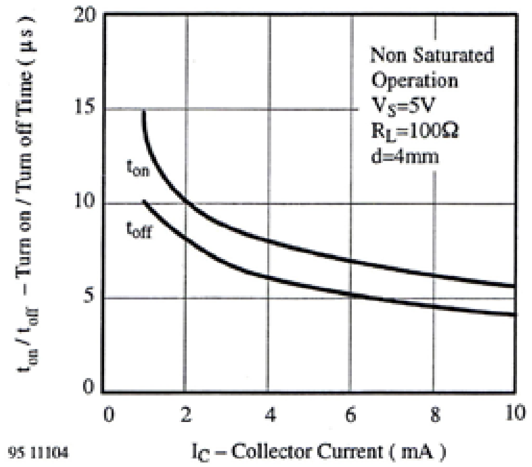


Figure 9. Turn on / off Time vs. Collector Current

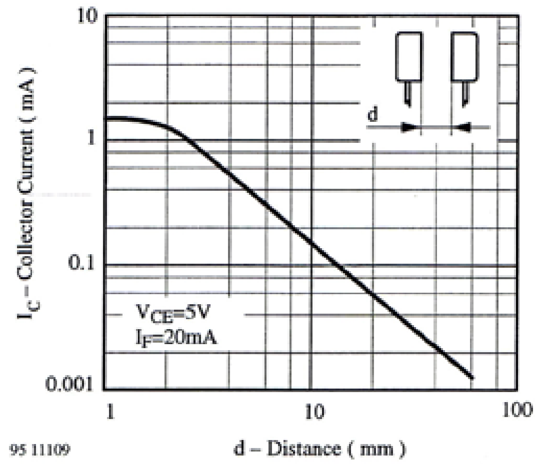


Figure 10. Collector Current vs. Distance

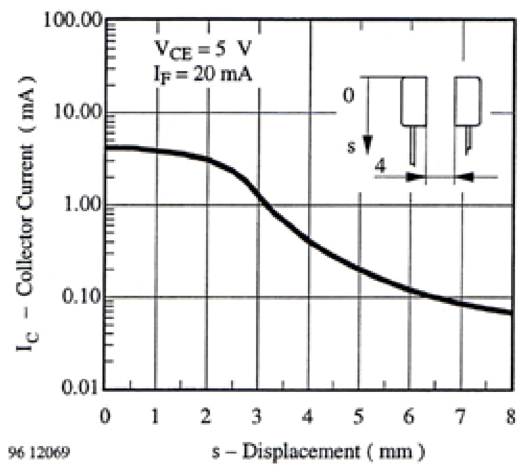
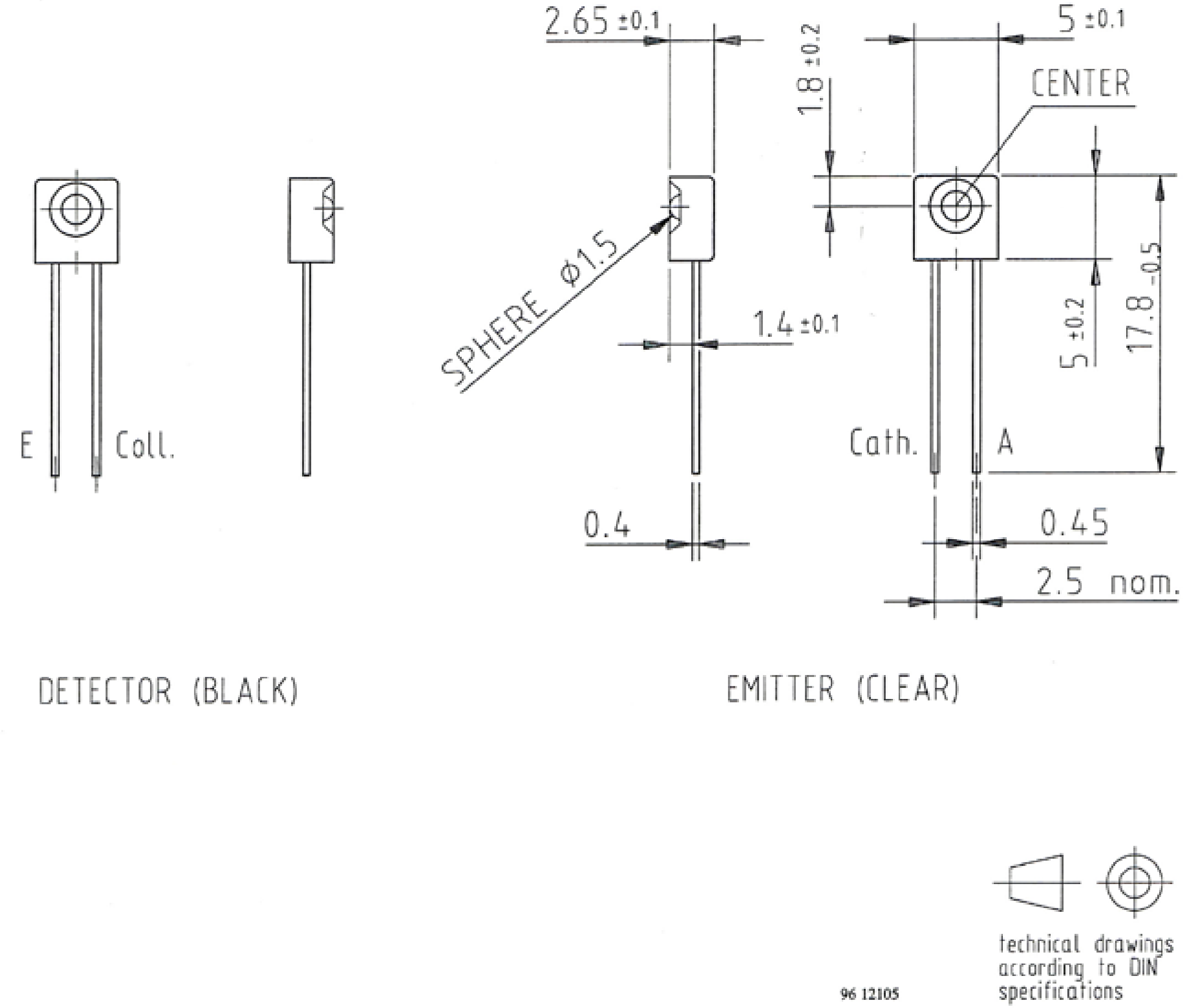


Figure 11. Collector Current vs. Displacement

Dimensions in mm



weight: 0.25 g

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.

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