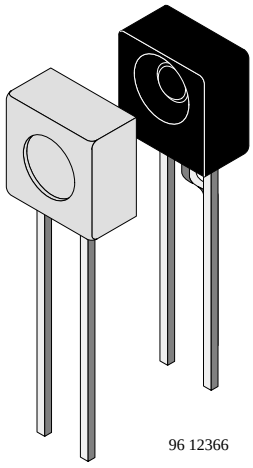
Matchable Pairs – Emitter and Detector

Description

Pairs of infrared-emitting diode and photologic detector, 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. The detector consists of a photologic IC with Schmitt trigger and open collector output.



Applications

- Detection of opaque material, documents etc
- Paper position sensor in copy machines
- Position sensor for shaft encoders

Handling precaution:

Connect a capacitor C of more than 100 nF between V_{S1} and Ground!

Features

- Output level “LOW” when infrared beam is not interrupted
- TTL compatible
- Small dimensions
- Detector provided with optical filter
- Emitter and detector in side view case
- Miniature plastic case with lens
- Operating angle $\pm \varphi = 35°$

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	$t_p \leq 10$ s	I_{FSM}	3	A
Power dissipation	$T_{amb} \leq 25°C$	P_v	100	mW
Junction temperature		T_j	100	°C

Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Supply voltages		V_{S1}	16	V
		V_{S2}	20	V
Output current		I_o	20	mA
Power dissipation	$T_{amb} \leq 85°C$	P_v	50	mW
Junction temperature		T_j	100	°C

Emitter and Detector matched

Parameters	Test Conditions	Symbol	Value	Unit
Ambient temperature range		T_{amb}	–25 to +85	°C
Storage temperature range		T_{stg}	–40 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	$V_{(BR)}$	6			V
Junction capacitance	$V_R = 0$, f = 1 MHz	C_j		50		pF

Output (Detector)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Supply voltage range		V_{S1}	4.5		16	V

Emitter and Detector matched [1)]

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Supply current	$V_{S1} = 16$ V	I_{s1}		3	5	mA
Output current	$V_{S1} = V_{S2} = 16$ V, $I_F = 0$	I_{OH}			1	µA
Input threshold current	$V_{S1} = 5$ V	I_{FT}		3	10	mA
Hysteresis	$V_{S1} = 5$ V	I_{Foff}/I_{Fon}		80		%
Output voltage	$I_{OL} = 16$ mA, $I_F > I_{FT}$ $V_{S1} = 5$ V			0.15	0.4	V
Switching frequency	$I_F = 3 \times I_{FT}$, $R_L = 1$ kΩ $V_{S1} = V_{S2} = 5$ V	f_{sw}		200		KHz

1) Characteristics are measured at a separation distance of 4 mm (1.55”) within a common axis of 0.5 mm (0.02”) and parallel within 5°.

Switching Characteristics

(see figure 1)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Rise time	$V_{S1} = V_{S2} = 5$ V, $I_F = 3 \times I_{FT}$, $R_L = 1$ kΩ	t_r		50		ns
Turn-on time		t_{pHL}		1		µs
Fall time		t_f		20		ns
Turn-off time		t_{pLH}		3		µs

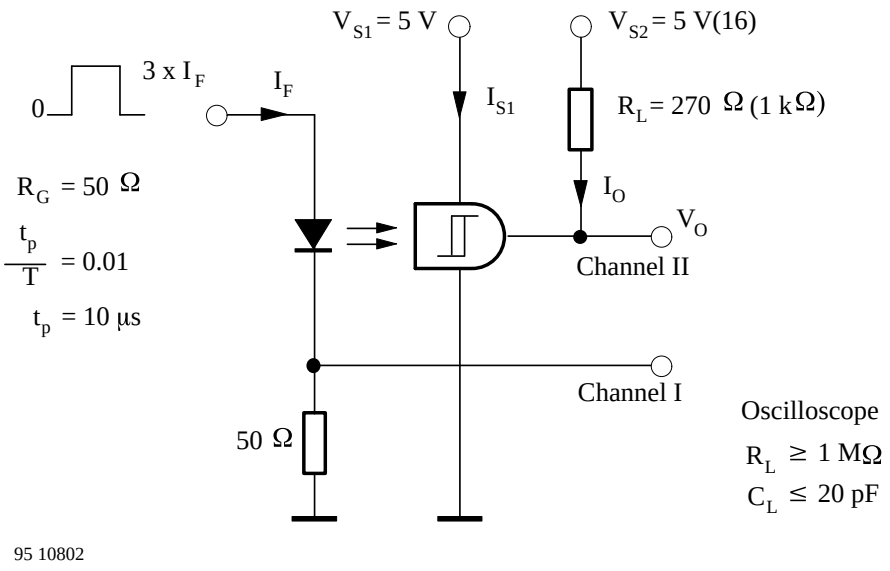


Figure 1. Test circuit

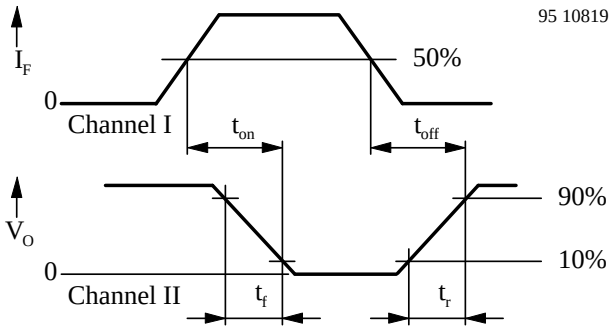


Figure 2. Pulse diagram

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

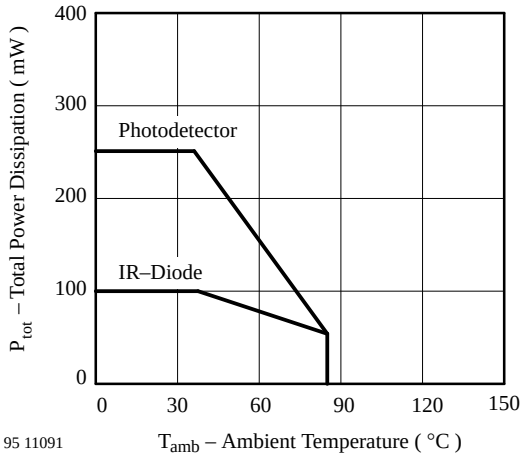


Figure 3. Total Power Dissipation vs. Ambient Temperature

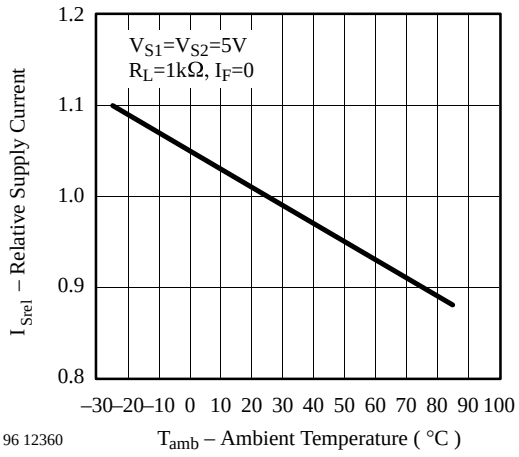


Figure 6. ISrel(Tamb)

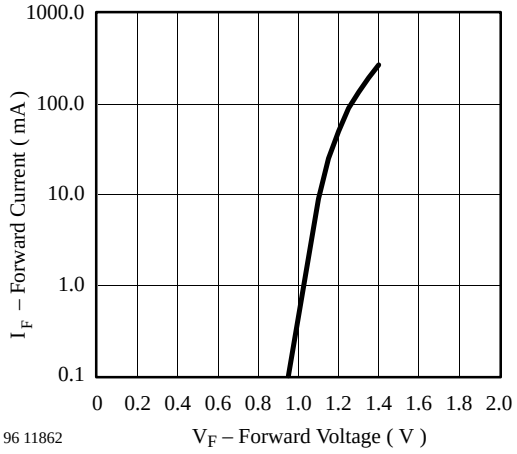


Figure 4. Forward Current vs. Forward Voltage

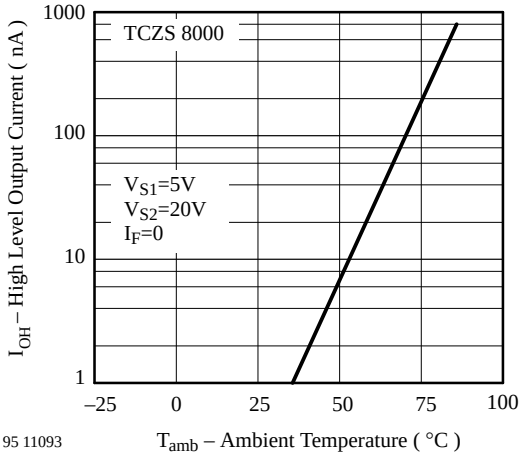


Figure 7. High Level Output Current vs. Ambient Temp.

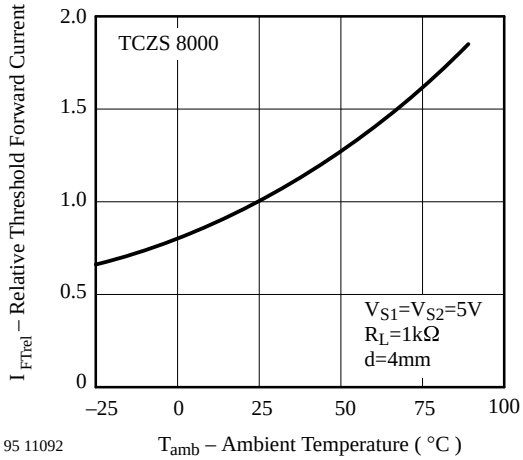
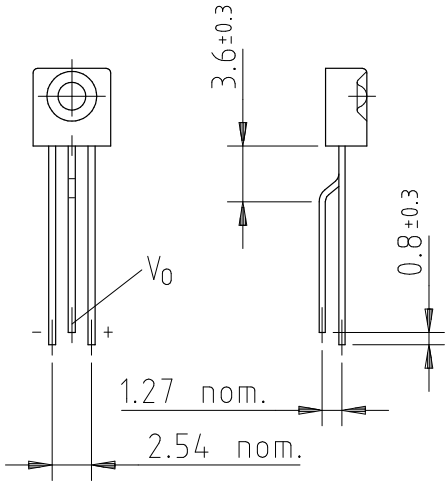
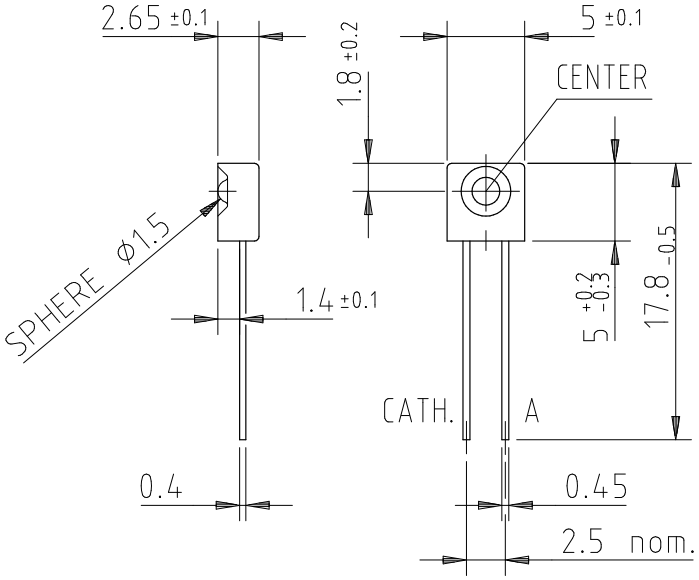


Figure 5. Rel. Thresh. Forw. Current vs. Ambient Temperature

Dimensions in mm



DETECTOR (BLACK)



EMITTER (CLEAR)

96 12104

technical drawings
according to DIN
specifications

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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