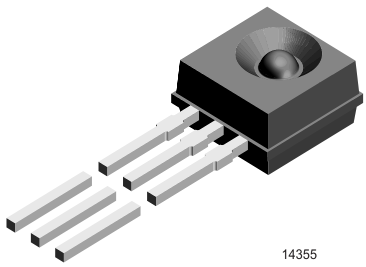
Silicon Photodetector with Logic Output

Description

TEKS5400 is a high sensitive photo Schmitt Trigger in a sideview molded plastic package with spherical lens. It is designed with an infrared filter to spectrally match to GaAs IR emitters (λ = 950 nm).

The photodetector is case compatible to the TSKS5400 GaAs IR emitting diode, allowing the user to assemble his own optical sensor.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Features

- Very high photo sensitivity
- Supply voltage range 4.5 to 16 V
- Low current consumption (2 mA)
- Side view plastic package with lens
- Angle of half sensitivity φ = ± 30°
- TTL and CMOS compatible
- Open collector output
- Output signal inverted (active ‘low")
- Case compatible with TSKS5400
- Lead-free device

Parts Table

Part	Type differentiation	Ordering code	Remarks
TEKS5400-FSZ	1.27 mm Pin distance (lead to lead)	TEKS5400-FSZ	Height of taping 27 mm
TEKS5400-FGZ	2.00 mm Pin distance (lead to lead)	TEKS5400-FGZ	Height of taping 27 mm

Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Supply voltage		V_{S1}	18	V
Output current		I_O	20	mA
Power dissipation		P_V	100	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 25 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	t ≤ 5 s, 2 mm from body	T_{sd}	260	°C

Handling Precautions

Caution:
Connect a capacitor C of 100 nF between V_{S1} and ground!

Basic Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Supply voltage		V_{S1}/V_{S2}	4.5		16	V
Supply current	V_{S1} = 16 V	I_{S1}		2	5	mA
Irradiance for threshold "On"	λ = 950 nm, V_{S1} = 5 V	E_{eon}	25	50	85	$\mu W/cm^2$
Hysteresis	V_{S1} = 5 V	E_{eoff}/E_{eon}		80		%
Angle of half sensitivity		φ		±30		°
Wavelength of peak sensitivity		λ_p		920		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		600 to 1020		nm
Output voltage	I_{OL} = 16 mA, V_{S1} = 5 V, $E_e \geq E_{on}$	V_{OL}		0.2	0.4	V
High level output current	$V_{S1} = V_{S2}$ = 16 V, I_F = 0	I_{OH}			1	μA

Switching Characteristics

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

Parameter	Test condition	Symbol	Typ.	Unit
Rise time	$V_{S1} = V_{S2}$ = 5 V, R_L = 1 kΩ, $E_e = 3 * E_{eon}$, λ = 950 nm	t_r	100	ns
Fall time	$V_{S1} = V_{S2}$ = 5 V, R_L = 1 kΩ, $E_e = 3 * E_{eon}$, λ = 950 nm	t_f	20	ns
Turn-on time	$V_{S1} = V_{S2}$ = 5 V, R_L = 1 kΩ, $E_e = 3 * E_{eon}$, λ = 950 nm	t_{on}	1.5	μs
Turn-off time	$V_{S1} = V_{S2}$ = 5 V, R_L = 1 kΩ, $E_e = 3 * E_{eon}$, λ = 950 nm	t_{off}	3.0	μs
Cut off frequency	$V_{S1} = V_{S2}$ = 5 V, R_L = 1 kΩ, $E_e = 3 * E_{eon}$, λ = 950 nm	f_{sw}	200	kHz

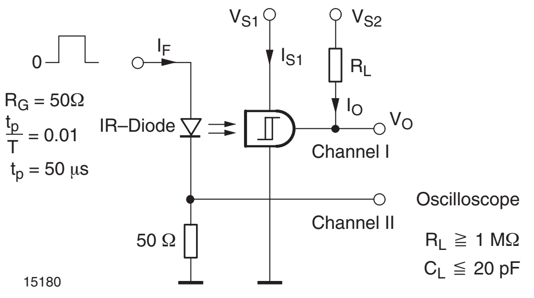


Fig. 1 Test Circuit

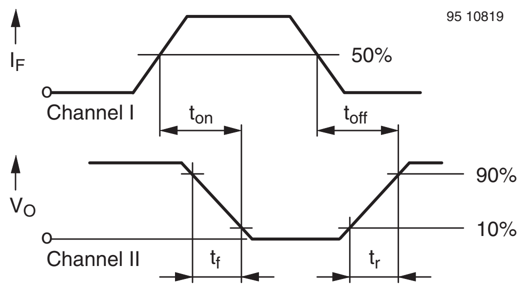


Fig. 2 Pulse Diagram

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

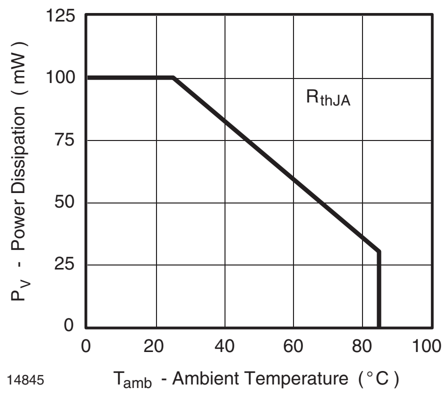


Fig. 3 Power Dissipation vs. Ambient Temperature

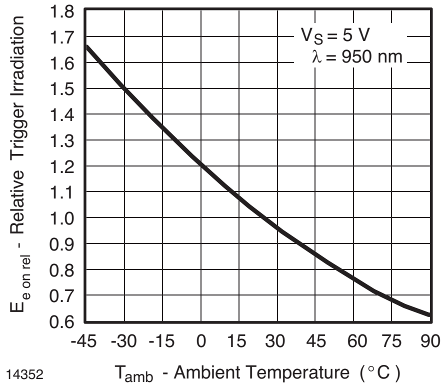


Fig. 6 Rel. Trigger Irradiation vs. Ambient Temperature

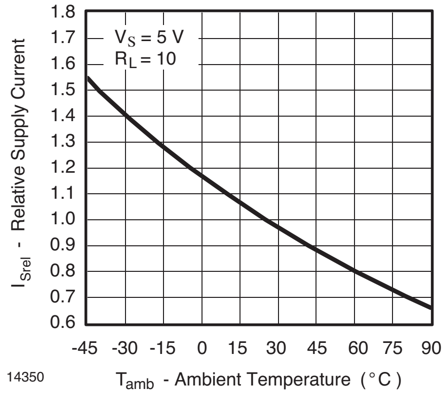


Fig. 4 Rel. Supply Current vs. Ambient Temperature

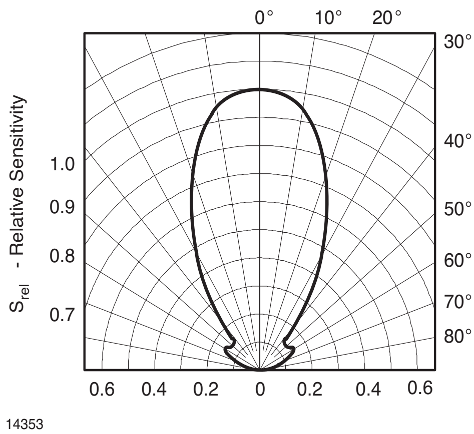


Fig. 7 Relative Radiant Sensitivity vs. Angular Displacement

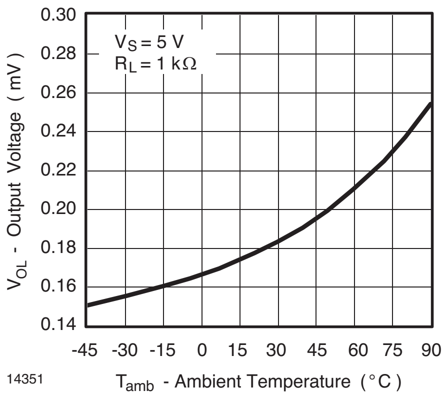
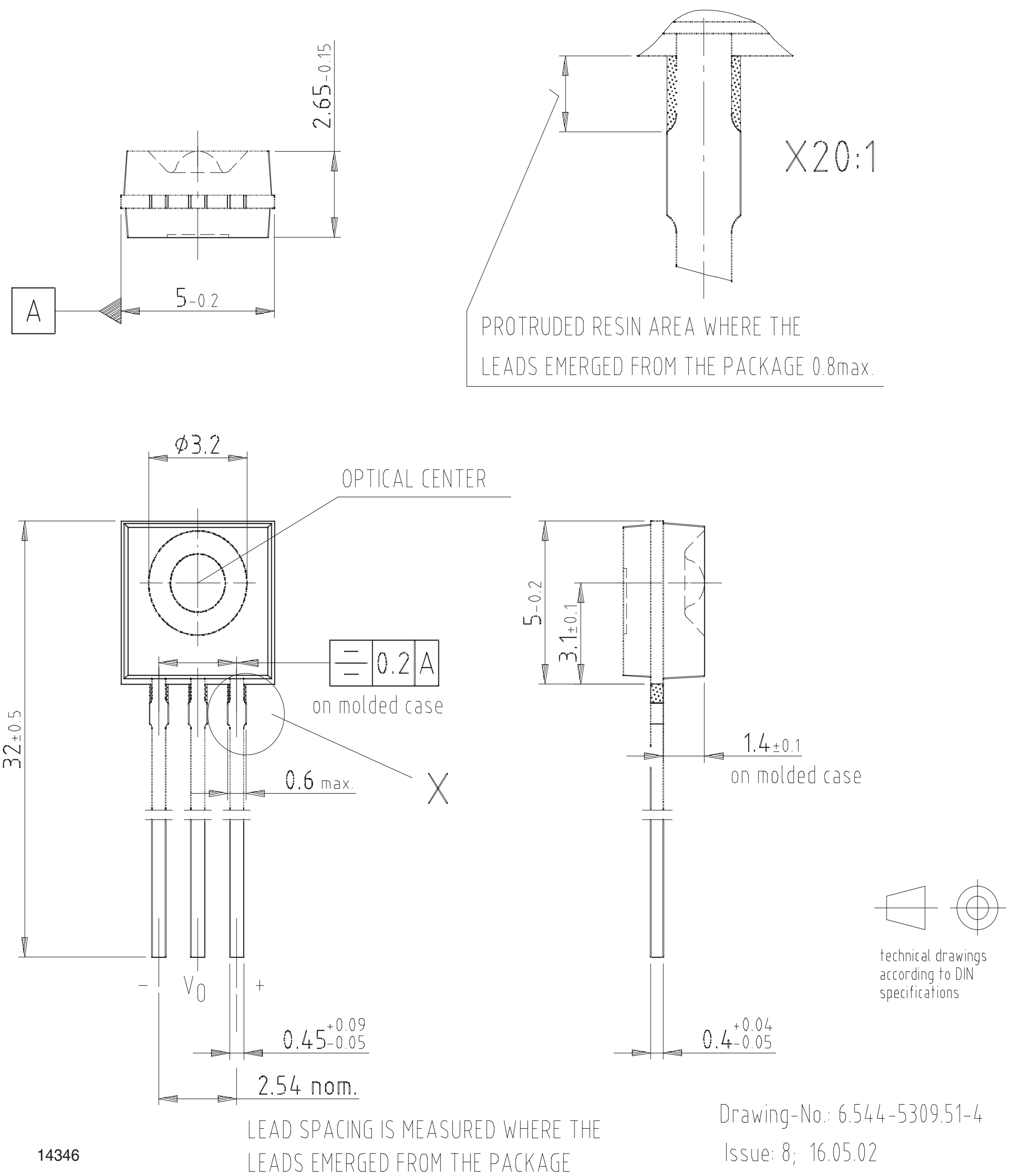


Fig. 5 Output Voltage vs. Ambient Temperature

Package Dimensions in mm



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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 operatingsystems 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.

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