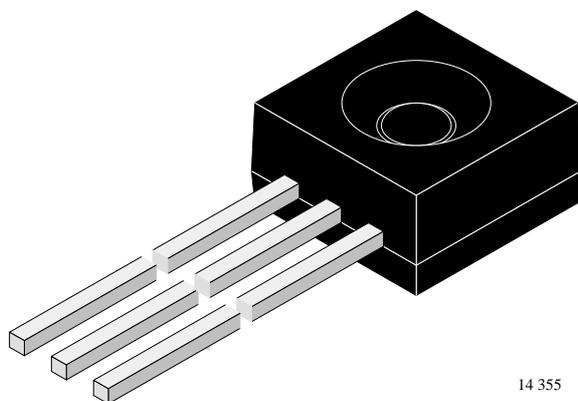


Silicon Photodetector with Logic Output

Description

TEKS5412 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 ($\lambda_p=950\text{nm}$).

The photodetector is case compatible to the TSKS5412 GaAs IR emitting diode, allowing the user to assemble his own optical sensor.



14 355

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 $\varphi = \pm 30^\circ$
- TTL and CMOS compatible
- Open collector output
- Output signal inverted (active “low”)
- Case compatible with TSKS5412
- Option X01: High rel. device for advanced applications

- Taped and reeled according to IEC 286 part 2
- Packing AMMOPACK: 2,000 pcs
- Ordering code number: TEKS5412X01ASZ
- Visual inspection according to QSV 5610

Absolute Maximum Ratings

$T_{amb} = 25^\circ\text{C}$

Parameter	Test Conditions	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	$^\circ\text{C}$
Operating Temperature Range		T_{amb}	-40...+85	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-40...+100	$^\circ\text{C}$
Soldering Temperature	$t \leq 5 \text{ s, } 2 \text{ mm from body}$	T_{sd}	260	$^\circ\text{C}$

Handling Precautions

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

Basic Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Supply Voltage		V_{S1}	4.5		16	V
Supply Current	$V_{S1} = 16\text{ V}$	I_{S1}		2	5	mA
Irradiance for Threshold "On"	$\lambda=950\text{nm}, V_{S1}=5\text{V}$	E_{con}	32	50	60	$\mu\text{W}/\text{cm}^2$
Hysteresis	$V_{S1} = 5\text{ V}$	E_{coff}/E_{con}		80		%
Angle of Half Sensitivity		ϕ		± 30		deg
Wavelength of Peak Sensitivity		λ_p		920		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		600... 1020		nm
Output Voltage	$I_{OL}=16\text{mA}, V_{S1}=5\text{V}, E_e \geq E_{on}$	V_{OL}		0.2	0.4	V
High Level Output Current	$V_{S1}=V_{S2}=16\text{V}, I_F=0$	I_{OH}			1	μA

Switching Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Rise Time	$V_{S1}=V_{S2}=5\text{V}, R_L=1\text{k}\Omega$ $E_e=3 \cdot E_{con}, \lambda=950\text{nm}$	t_r		100		ns
Fall Time		t_f		20		ns
Turn-On Time		t_{on}		1.5		μs
Turn-Off Time		t_{off}		3		μs
Switching Frequency		f_{sw}		200		kHz

Additional Tests

- 100% inspection of body with infrared camera.
test criteria: no cracks allowed
- 100% functional test at $T_{amb} = -40^{\circ}\text{C}$
test criteria: $V_{OL} > 4\text{ V}$ at $E_e = 0$

TSKS5412X01 / TEKS5412X01 matched (for Reference only)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Input threshold current	$V_{S1} = 5\text{ V}$	I_{FT}		1.5		mA
Hysteresis	$V_{S1} = 5\text{ V}$	I_{Foff}/I_{Fon}		80		%
Output voltage	$I_{OL} = 16\text{ mA}, I_F > I_{FT}$ $V_{S1} = 5\text{ V}$			0.2	0.4	V
Switching frequency	$I_F = 3 \times I_{FT}, R_L = 1\text{ k}\Omega$ $V_{S1} = V_{S2} = 5\text{ V}$	f_{sw}		200		kHz
Electrical setup	$V_{S2} = 5\text{ V}, t_p > 40\text{ }\mu\text{s},$ $T > 50\text{ ns}$				7	μs

Remark: Parameter tested with test fixture provided by Kostal (LENKWINKELSENSOR)

Typical Characteristics ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

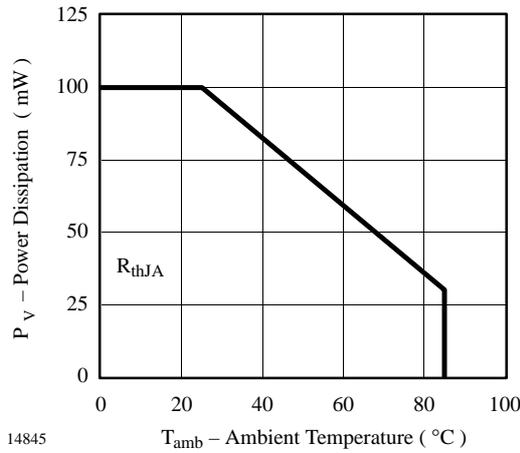


Figure 3. Power Dissipation vs. Ambient Temperature

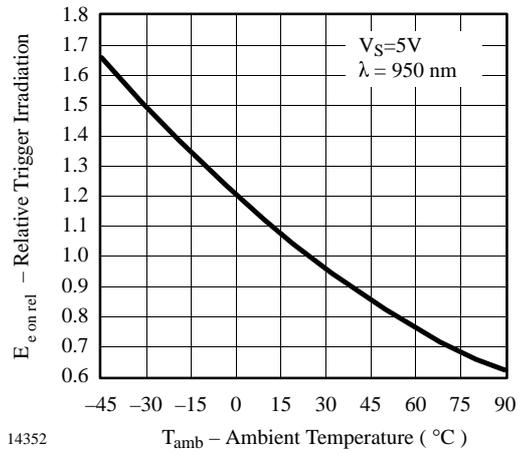


Figure 6. Relative Trigger Irradiation vs. Ambient Temperature

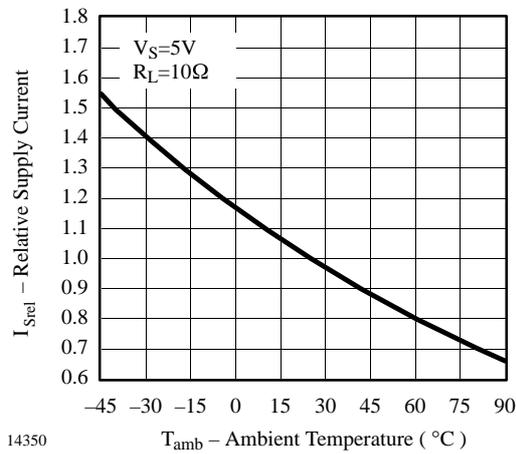


Figure 4. Relative Supply Current vs. Ambient Temperature

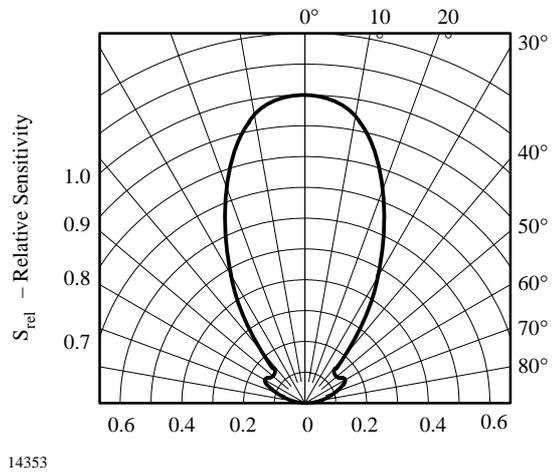


Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

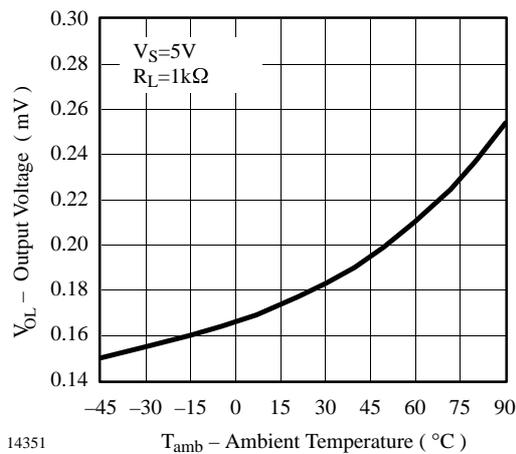
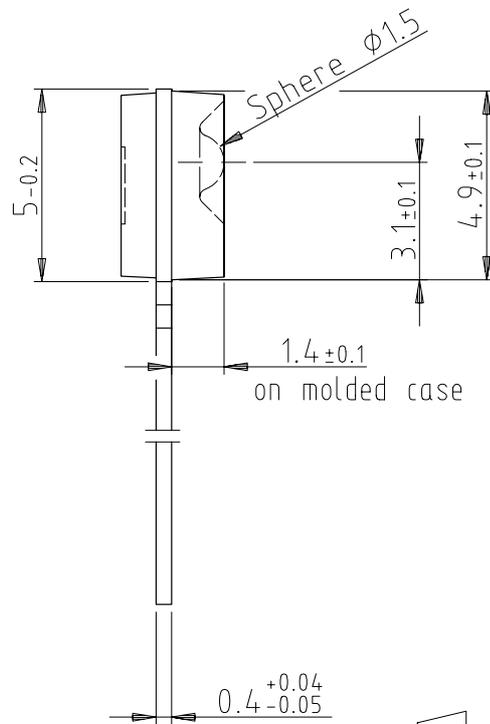
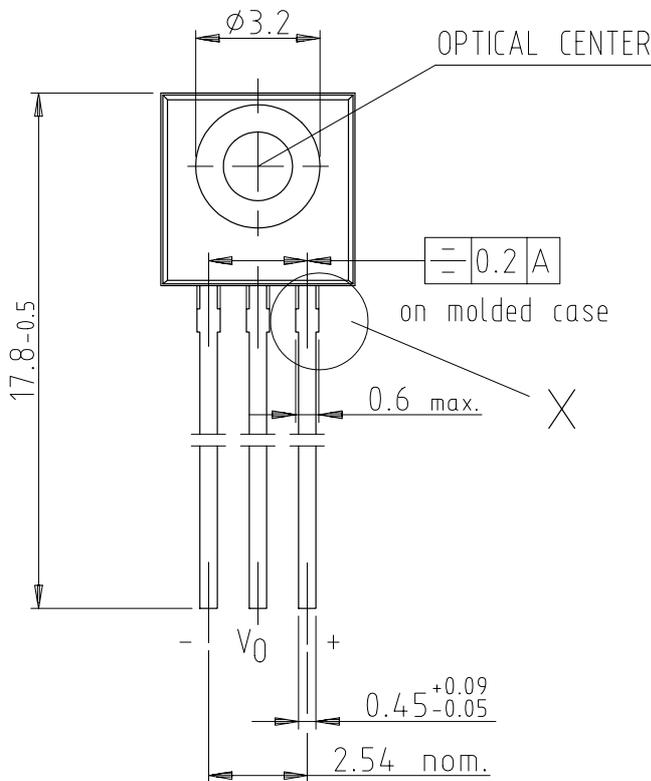
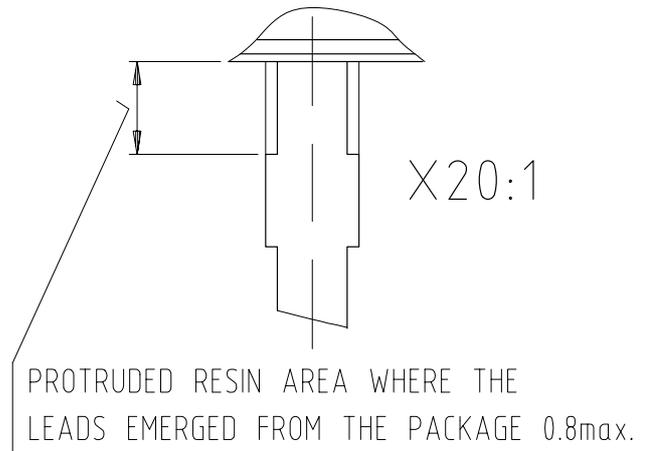
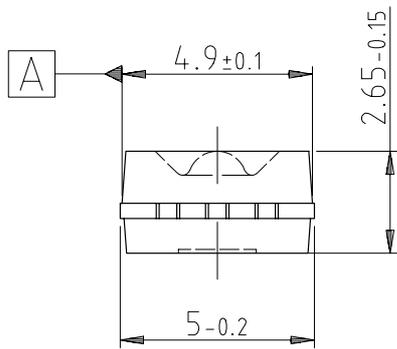
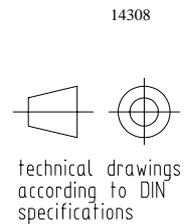


Figure 5. Output Voltage vs. Ambient Temperature

Dimensions in mm



LEAD SPACING IS MEASURED WHERE THE LEADS EMERGED FROM THE PACKAGE



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.

We reserve the right to make changes to improve technical design and may do so without further notice. Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay-Telefunken products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Telefunken against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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