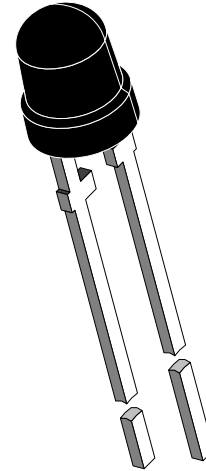


Silicon Darlington Phototransistor

Description

S289P is an extra high sensitive monolithic silicon epitaxial planar Darlington phototransistor in a standard T-1 (\varnothing 3 mm) package.

The epoxy package itself is an IR filter, spectrally matched to GaAs IR emitters with $\lambda_p > 850\text{nm}$. A plastic lens provides a wide viewing angle of $\pm 30^\circ$.



94 8396

Features

- Extra high radiant sensitivity
- Very low temperature drift
- Standard T-1 (\varnothing 3 mm) package with IR filter
- Wide viewing angle $\varphi = \pm 30^\circ$
- Suitable for near infrared radiation

Applications

Any applications requiring high sensitivity at low light levels e.g.
 Direct driving of relays and small motors
 Special light barriers and switches

Absolute Maximum Ratings

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

Parameter	Test Conditions	Symbol	Value	Unit
Collector Emitter Voltage		V_{CEO}	40	V
Collector Current		I_{C}	0.1	A
Peak Collector Current	$t_p/T = 0.05, t_p \leq 10 \text{ ms}$	I_{CM}	1	A
Total Power Dissipation	$T_{\text{amb}} \leq 25^\circ\text{C}$	P_{tot}	185	mW
Junction Temperature		T_{j}	100	$^\circ\text{C}$
Operating Temperature Range		T_{amb}	-55...+100	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55...+100	$^\circ\text{C}$
Soldering Temperature	$t \leq 5 \text{ s}$	T_{sd}	260	$^\circ\text{C}$
Thermal Resistance Junction/Ambient		R_{thJA}	400	K/W

Basic Characteristics

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	$I_C = 1\text{ mA}$	$V_{(BR)CE\ O}$	40			V
Collector Dark Current	$V_{CE} = 20\text{ V}, E = 0$	I_{CEO}		10	200	nA
Collector Light Current	$E_e = 0.3\text{ mW/cm}^2,$ $\lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$	I_{ca}	4	15		mA
Angle of Half Sensitivity		ϕ		± 30		deg
Wavelength of Peak Sensitivity		λ_p		920		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		830...1000		nm
Collector Emitter Saturation Voltage	$E_e = 0.3\text{ mW/cm}^2,$ $\lambda = 950\text{ nm}, I_C = 1\text{ mA}$	V_{CEsat}		0.75	1.1	V
Turn-On Time	$V_S = 5\text{ V}, I_C = 5\text{ mA},$ $R_L = 100\ \Omega$	t_{on}		40		μs
Turn-Off Time	$V_S = 5\text{ V}, I_C = 5\text{ mA},$ $R_L = 100\ \Omega$	t_{off}		50		μs

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

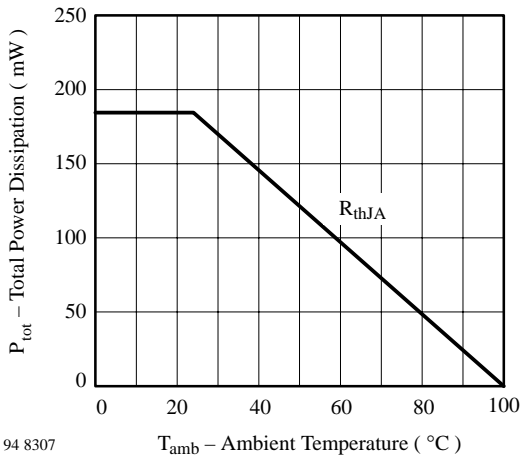


Figure 1. Total Power Dissipation vs. Ambient Temperature

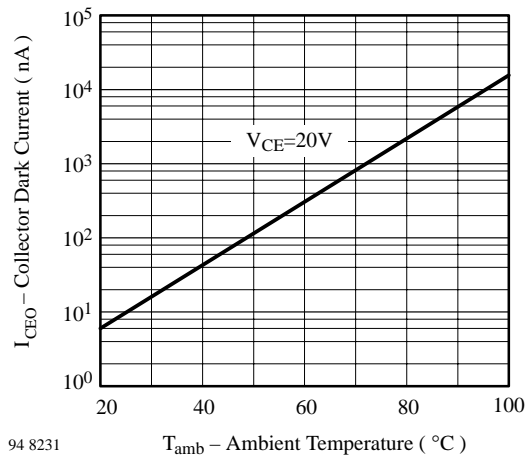
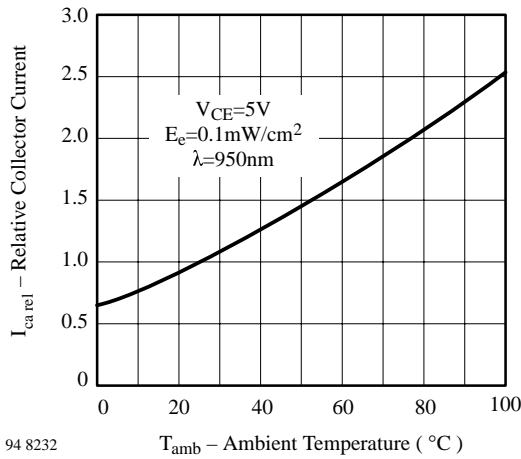
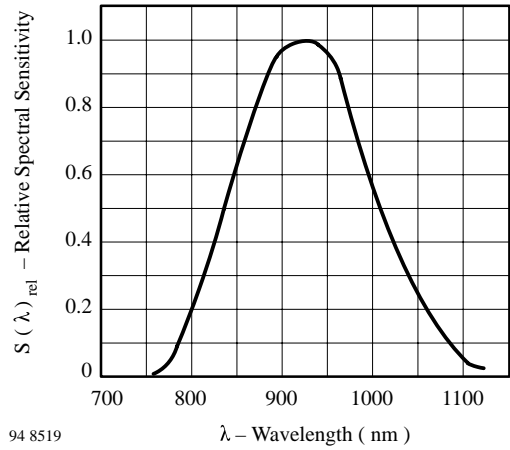


Figure 2. Collector Dark Current vs. Ambient Temperature



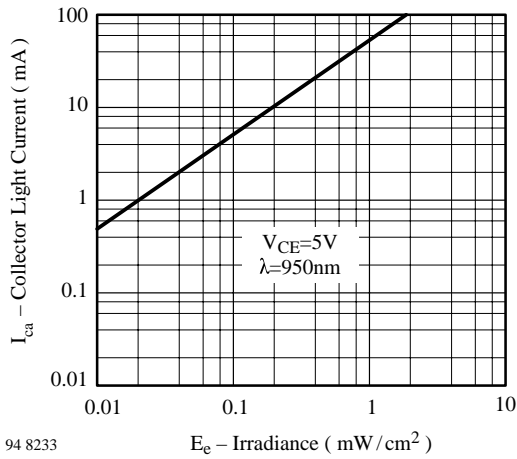
94 8232

Figure 3. Relative Collector Current vs. Ambient Temperature



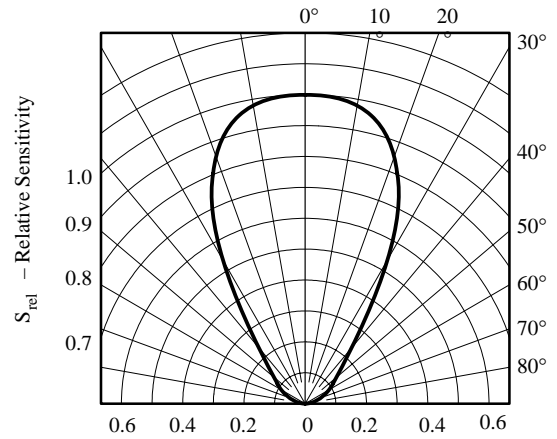
94 8519

Figure 6. Relative Spectral Sensitivity vs. Wavelength



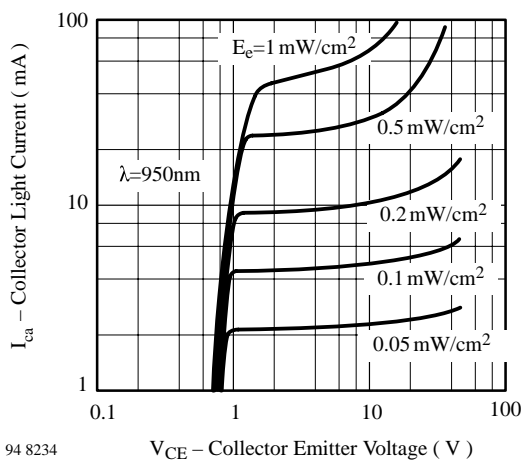
94 8233

Figure 4. Collector Light Current vs. Irradiance



94 8520

Figure 7. Relative Radiant Sensitivity vs. Angular Displacement



94 8234

Figure 5. Collector Light Current vs. Collector Emitter Voltage



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-Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Semiconductors 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



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.