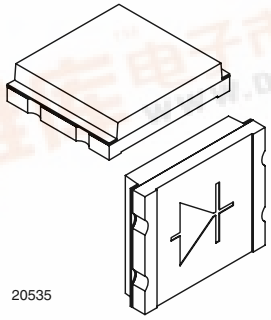
Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Solder Process, AEC-Q101 Released

Description

TEMD5010X01 is a high speed and high sensitive PIN photodiode. It is a miniature Surface Mount Device (SMD) including the chip with a 7.5 mm^2 sensitive area, detecting visible and near infrared radiation.



Features

- Product designed and qualified acc. AEC-Q101 for the automotive market
- Large radiant sensitive area: A = 7.5 mm^2
- Wide angle of half sensitivity $\varphi = \pm 65°$
- High photo sensitivity for visible and near infrared radiation
- Fast response times
- Small junction capacitance
- Plastic package
- Floor life: 72 h, MSL 4, acc. J-STD-20
- Lead (Pb)-free component
- Component in accordance to ELV 2000/53/EC, RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

- Automotive sensors
- Infrared detectors
- Ambient light detectors
- High speed photo detectors

Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	60	V
Power dissipation	$T_{amb} \leq 25$ °C	P_V	215	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	In accordance with fig. 8	T_{sd}	260	°C
Thermal resistance junction/ ambient		R_{thJA}	350	K/W

Electrical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 50 mA	V_F		1	1.3	V
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}		2	30	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		70		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		25	40	pF

Optical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Open circuit voltage	E_e = 1 mW/cm², λ = 950 nm	V_o		350		mV
Temperature coefficient of V_o	E_e = 1 mW/cm², λ = 950 nm	TK_{Vo}		- 2.6		mV/K
Short circuit current	E_e = 1 mW/cm², λ = 950 nm	I_k		50		µA
Temperature coefficient of I_k	E_e = 1 mW/cm², λ = 950 nm	TK_{Ik}		0.1		%/K
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	45	55		µA
Angle of half sensitivity		φ		± 65		deg
Wavelength of peak sensitivity		λ_p		900		nm
Range of spectral bandwidth		$\lambda_{0.5}$		600 to 1050		nm
Noise equivalent power	V_R = 10 V, λ = 950 nm	NEP		4×10^{-14}		W/√ Hz
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_r		100		ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f		100		ns

Typical Characteristics

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

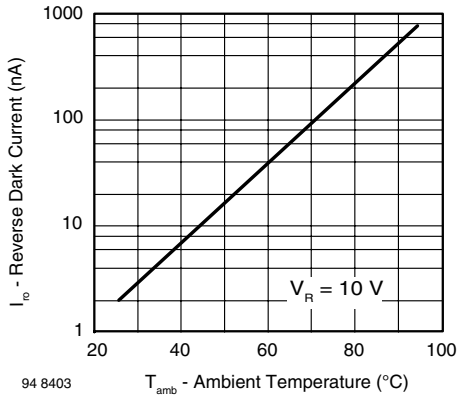


Figure 1. Reverse Dark Current vs. Ambient Temperature

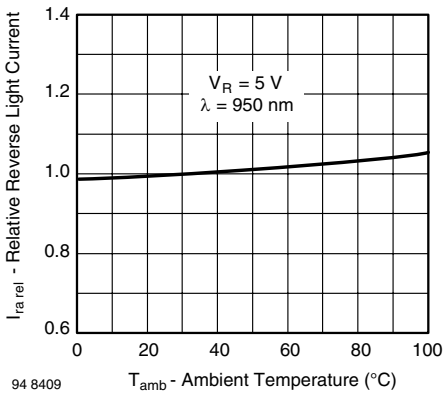


Figure 2. Relative Reverse Light Current vs. Ambient Temperature

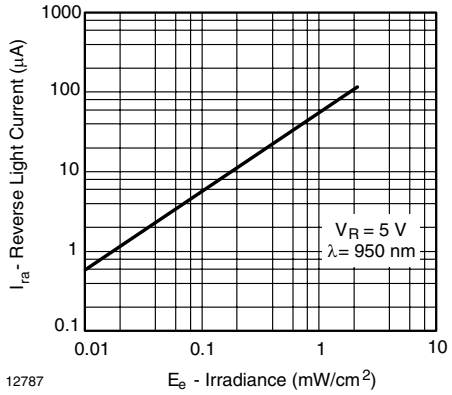


Figure 3. Reverse Light Current vs. Irradiance

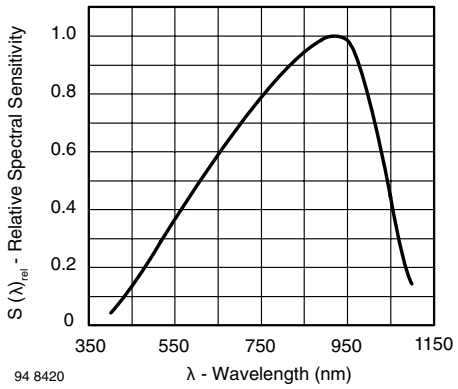


Figure 6. Relative Spectral Sensitivity vs. Wavelength

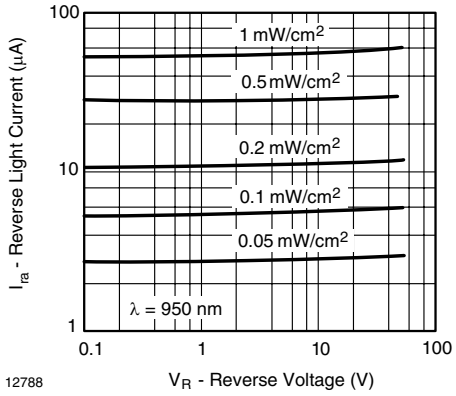


Figure 4. Reverse Light Current vs. Reverse Voltage

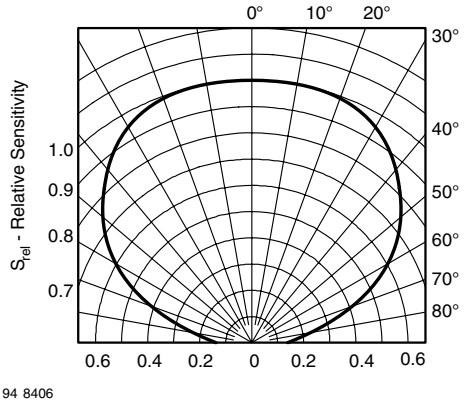


Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

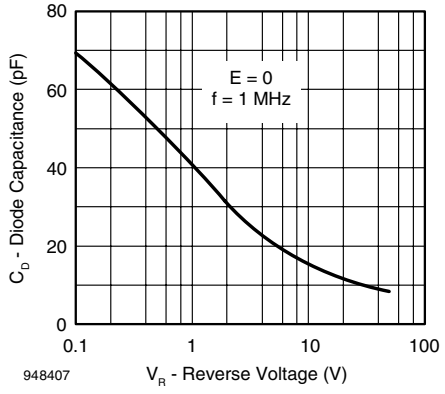
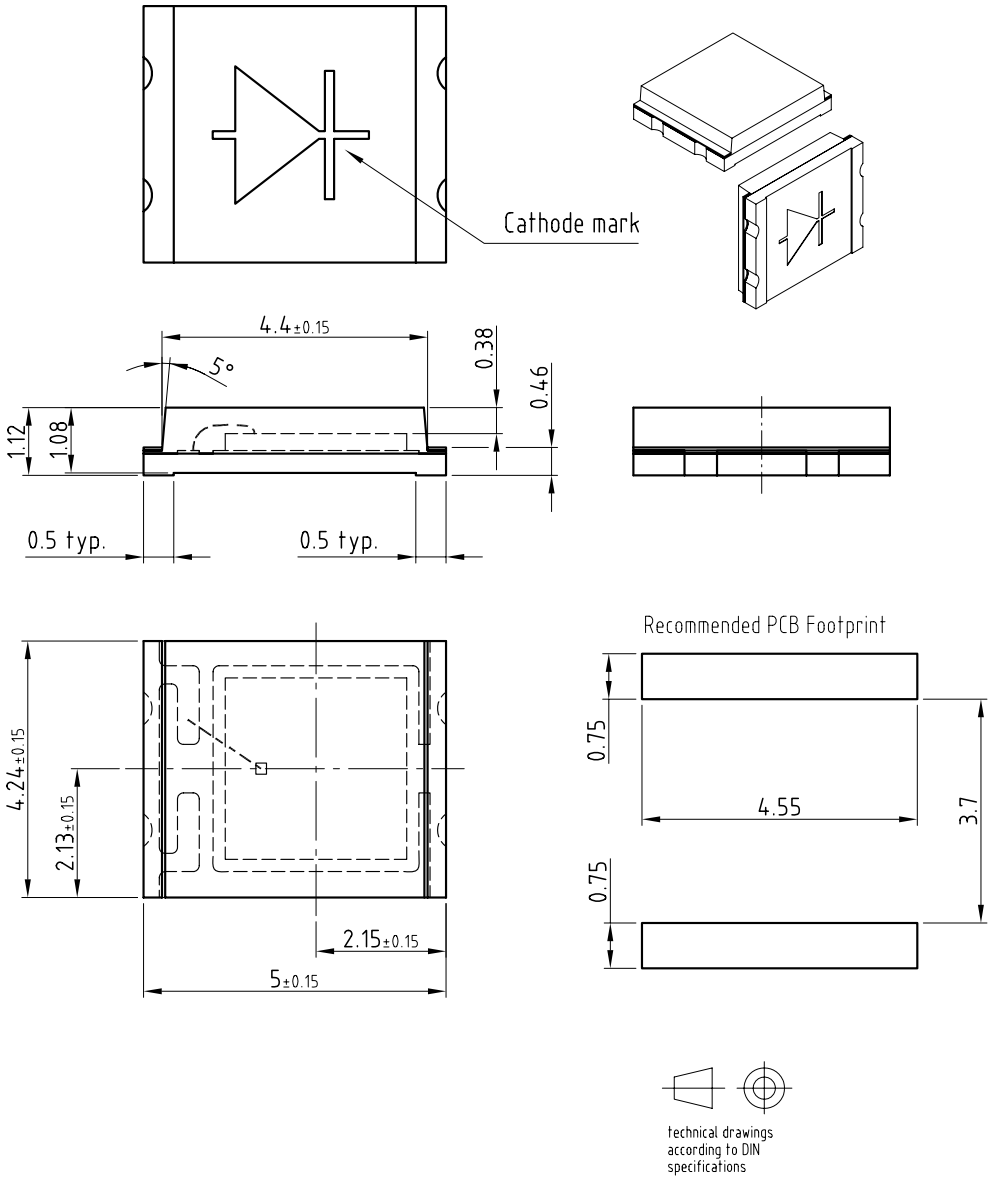


Figure 5. Diode Capacitance vs. Reverse Voltage

Package Dimensions in millimeters



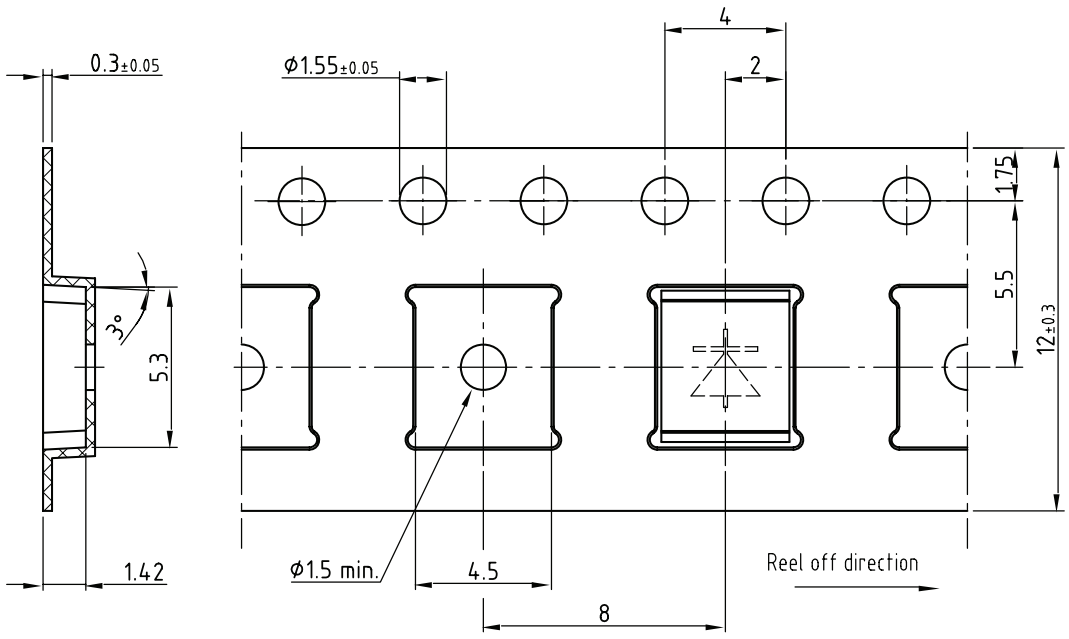
technical drawings
according to DIN
specifications

Drawing-No.: 6.541-5060.01-4
Issue: 2; 26.04.07
20536

Not indicated tolerances ± 0.1

Minimum order quantity (MOQ): 1500 pcs (1 reel)

Taping Dimensions in millimeters



Drawing-No.: 9.700-5293.01-4
Issue: 1; 03.12.04
20537

Not indicated tolerances ±0.1

Reflow Solder Profiles

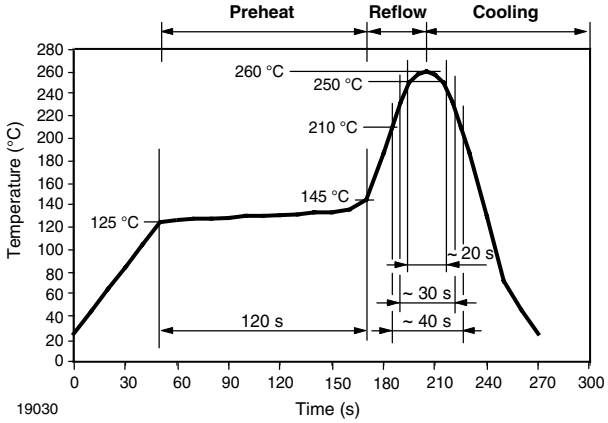


Figure 8. Lead (Pb)-free (Sn) Reflow Solder Profile

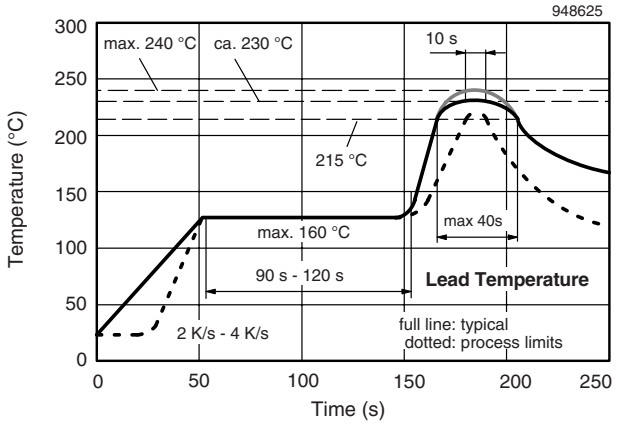


Figure 9. Lead Tin (SnPb) Reflow Solder Profile

Drypack

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

Floor Life

Floor life (time between soldering and removing from MBB) must not exceed the time indicated in J-STD-020. TEMD5110 is released for:
Moisture Sensitivity Level 4, according to JEDEC, J-STD-020
Floor Life: 72 h
Conditions: T_{amb} < 30 °C, RH < 60 %

Drying

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or Label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 % or 96 h at 60 °C (+ 5 °C), RH < 5 %.

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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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