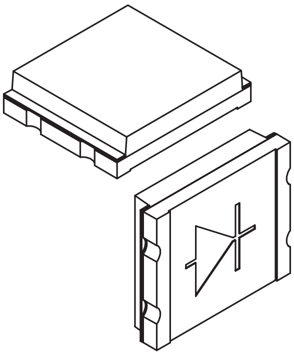
Silicon PIN Photodiode

Description

TEMD5110 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 and an infrared bandpass filter matched to IR Emitters operating at wavelength 870 nm or 950 nm.



Features

- Large radiant sensitive area (A = 7.5 mm^2)
- Wide angle of half sensitivity $\varphi = \pm 65°$
- High photo sensitivity
- Fast response times
- Small junction capacitance
- Plastic package with IR filter (λ = 870...950 nm)
- Lead-free component
- Component in accordance to ELV 2000/53/EC, RoHS 2002/95/EC and WEEE 2002/96/EC

Pb

Pb-free

e4

Applications

High speed photo detector

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	$t \leq 3$ s	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/cm^2, λ = 950 nm	V_o		350		mV
Temp. Coefficient of V_o	E_e = 1 mW/cm^2, λ = 950 nm	TK_{Vo}		-2.6		mV/K
Short Circuit Current	E_e = 1 mW/cm^2, λ = 950 nm	I_k		50		μA
Temp. Coefficient of I_k	E_e = 1 mW/cm^2, λ = 950 nm	TK_{Ik}		0.1		%/K
Reverse Light Current	E_e = 1 mW/cm^2, 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		940		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		790 to 1050		nm
Noise Equivalent Power	V_R = 10 V, λ = 950 nm	NEP		4 x 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 (Tamb = 25 °C unless otherwise specified)

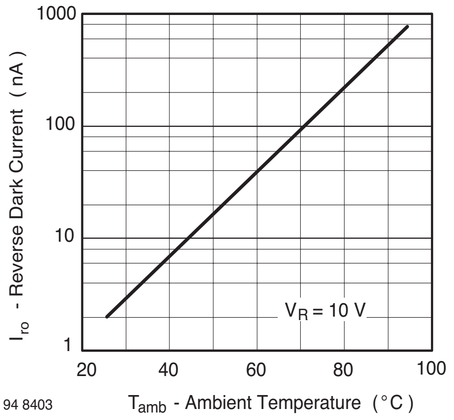


Figure 1. Reverse Dark Current vs. Ambient Temperature

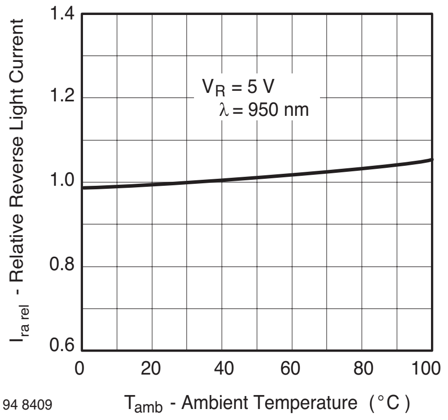


Figure 2. Relative Reverse Light Current vs. Ambient Temperature

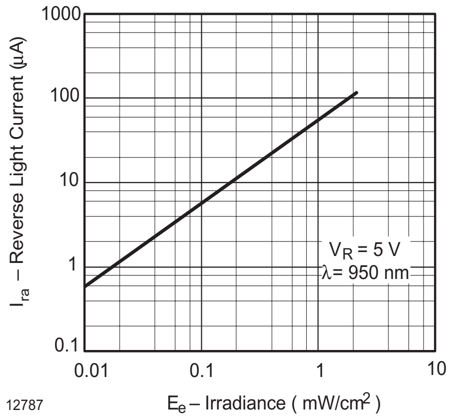


Figure 3. Reverse Light Current vs. Irradiance

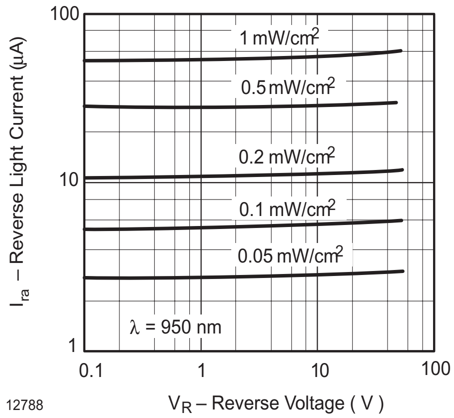


Figure 4. Reverse Light Current vs. Reverse Voltage

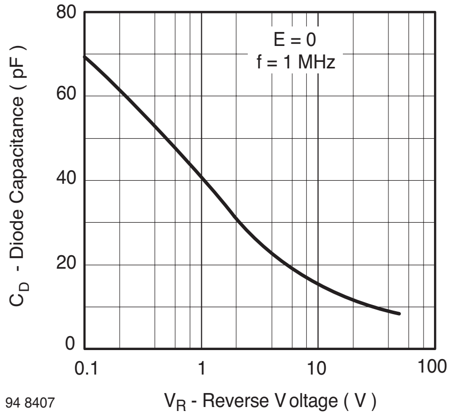


Figure 5. Diode Capacitance vs. Reverse Voltage

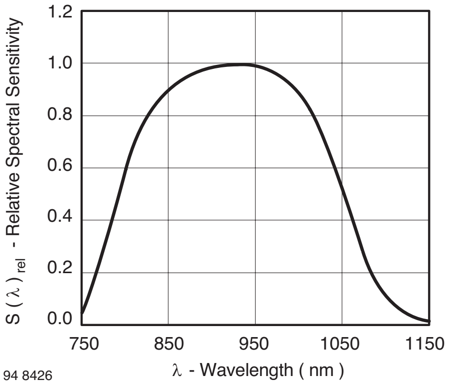


Figure 6. Relative Spectral Sensitivity vs. Wavelength

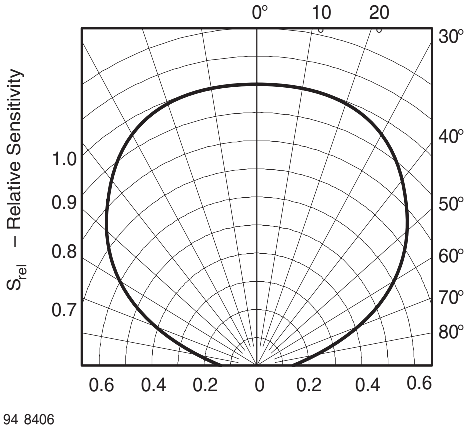
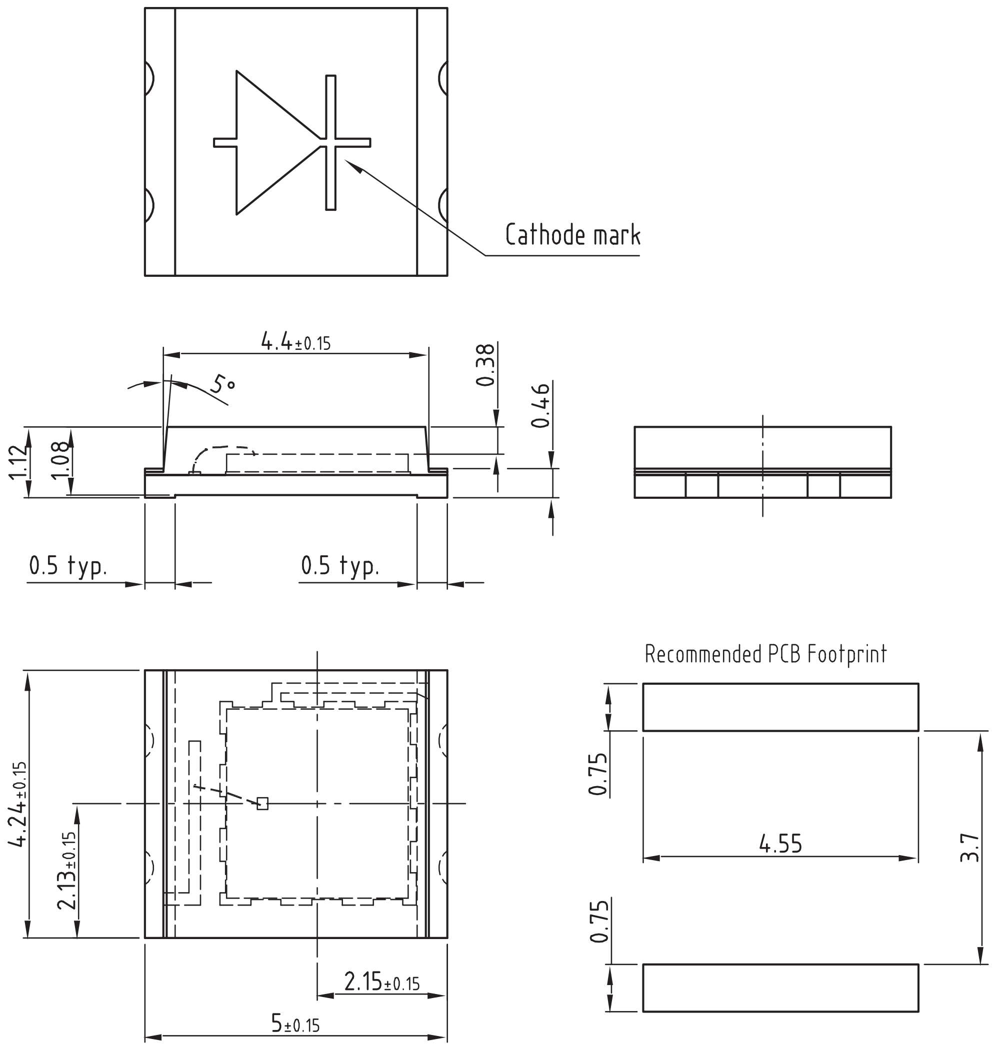


Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

Package Dimensions in mm

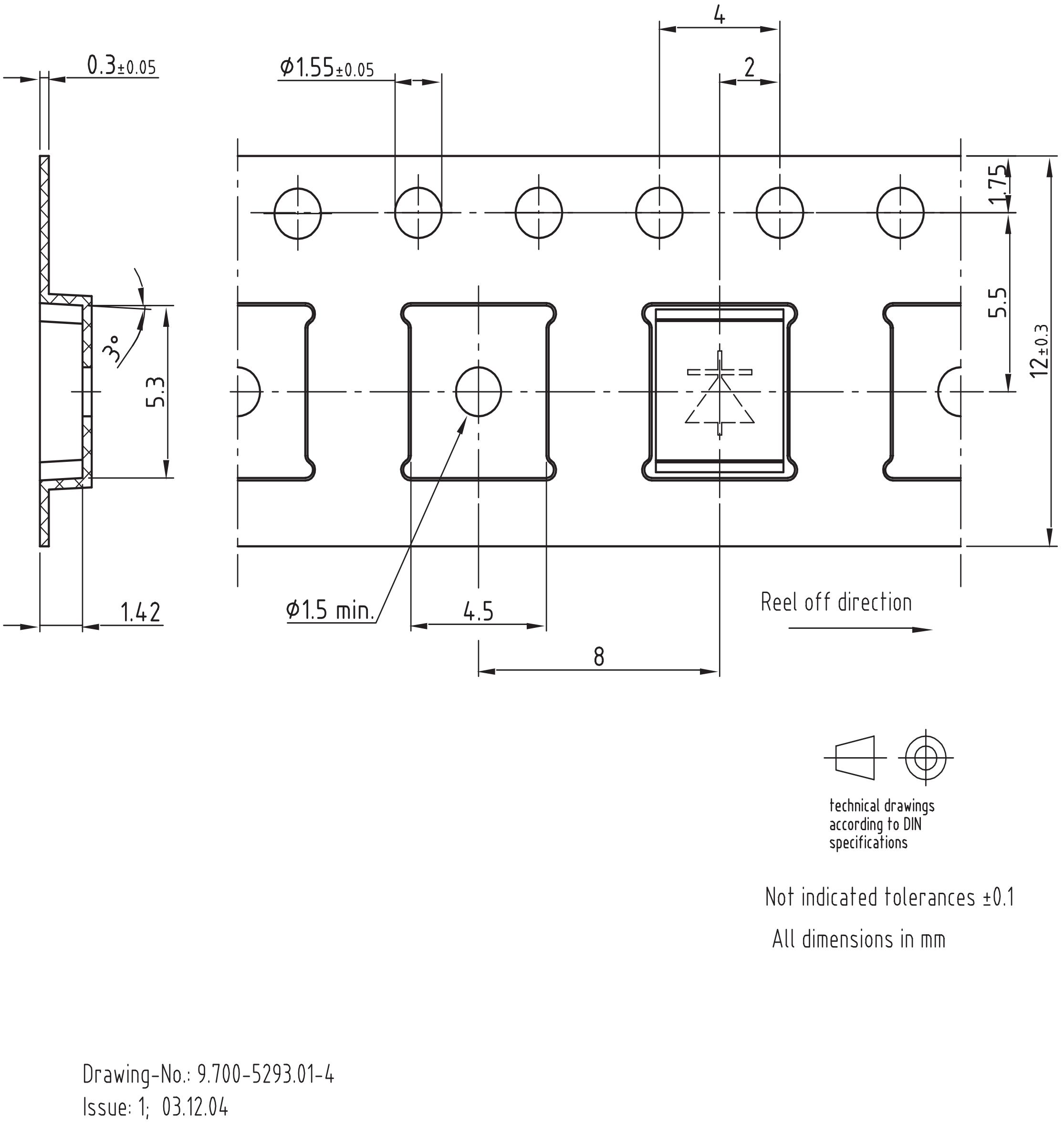


technical drawings
according to DIN
specifications

All dimensions in mm
Not indicated tolerances ±0.1

Drawing-No.: 6.541-5060.01-4
Issue: 1; 13.12.04

Taping


4
0.3±0.05
Φ1.55±0.05
2
1.75
5.5
12±0.3
3°
5.3
1.42
Φ1.5 min.
4.5
8
Reel off direction
technical drawings
according to DIN
specifications
Not indicated tolerances ±0.1
All dimensions in mm
Drawing-No.: 9.700-5293.01-4
Issue: 1; 03.12.04

Reflow Solder Profiles

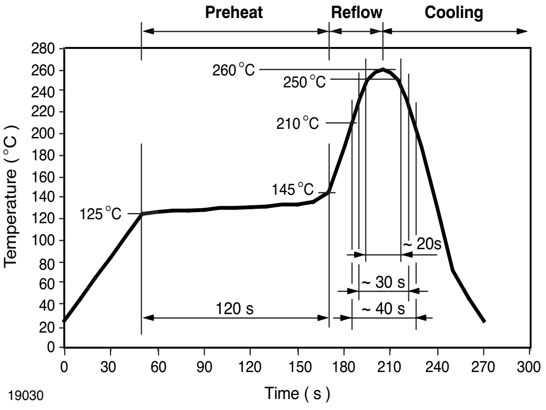


Figure 8. Lead-Free (Sn) Reflow Solder Profile

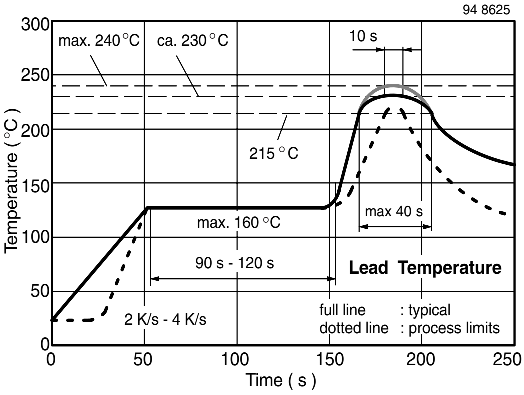


Figure 9. Lead Tin (SnPb) Reflow Solder Profile

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 @ 40 °C (+ 5 °C), RH < 5 % or 96 h @ 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 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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