

# Fast Response Silicon Photodiodes

For Industrial &  
Commercial Applications

SILICON PN PHOTODIODES ■

Silicon Photodiodes – VTP Series



## Silicon Photodiodes – VTP Series

### Applications

- Smoke detection
- Barcode scanning
- Light meters
- Pulse oximeters

### Features and Benefits

- Visible to IR spectral range
- Integral visible rejection filters available
- 1 to 2 % linearity over 7 to 9 decades
- Low dark currents
- High shunt resistance
- Low capacitance

### Product Description

Photodiodes in this series have been designed for low junction capacitance. The lower the capacitance, the faster the response of the photodiode when the RC time constant is your limiting factor. Also, speed can be further increased by reverse biasing the photodiodes. These devices have excellent response in the IR region and are well matched to IR LEDs (VTE series). Some photodiodes are available in packages which incorporate a visible rejection filter, effectively blocking light below 700 nm. Photodiodes made with the VTP process are suitable for operation under reverse bias conditions but may be used in the photovoltaic mode. Typical reverse breakdown voltages are around 140V. Low dark currents under reverse bias are also a feature of this series.

### Product Table

## Silicon Photodiodes – VTP Series

Symbol	Package	Active Area mm <sup>2</sup>	Minimum Short Circuit	Maximum Dark	Junction Capacitance	Radiometric Sensitivity @ $\lambda_p$	Spectral Range $\lambda_{\text{RANGE}}$ nm	Typical Peak Wavelength $\lambda_p$ nm	Typical Noise
			Current @ 100fc, 2850K $\mu\text{A}$	Current @ $V_R = 10\text{V}$ (nA)	max $C_j$ pF	typ $S_R$ A/W			Equivalent Power W/ $\sqrt{\text{Hz}}$
VTP100H	Flat Sidelooker IRT	7.45	35	30	50 @ $V_R = 3\text{V}$	0.5	725-1150	925	$2.5 \times 10^{-14}$
VTP100CH	Flat Sidelooker	7.45	50	30	50 @ $V_R = 3\text{V}$	0.55	400-1150	925	$9.0 \times 10^{-14}$
VTP1012H	TO-46	1.6	10	7 @ $V_R = 50\text{V}$	6 @ $V_R = 15\text{V}$	0.55	400-1150	925	$8.7 \times 10^{-14}$
VTP1112H	TO-46 lensed	1.6	30	7 @ $V_R = 50\text{V}$	6 @ $V_R = 15\text{V}$	0.55	400-1150	925	$8.7 \times 10^{-14}$
VTP1188SH	Lensed Ceramic	11	200 (Typical)	30 @ $V_R = 10\text{mV}$	300 @ $V_R = 0\text{V}$	0.55	400-1100	925	-
VTP1232H	T-1 3/4 flat	2.326	100	25	100 @ $V_R = 0\text{V}$	0.6	400-1100	920	-
VTP1232FH	T-1 3/4 flat	2.326	21	25	100 @ $V_R = 0\text{V}$	0.6	400-1100	920	-
VTP1332H	T-1 3/4 lensed IRT	2.326	75	25	100 @ $V_R = 0\text{V}$	0.55	725-1100	920	-
VTP1332FH	T-1 3/4 flat IRT	2.326	17	25	100 @ $V_R = 0\text{V}$	0.55	725-1100	920	-
VTP3310LAH	T-1 Lensed	0.684	24	35 @ $V_R = 50\text{V}$	25 @ $V_R = 3\text{V}$	0.55	400-1150	925	$1.9 \times 10^{-13}$
VTP3410LAH	T-1 lensed IRT	0.684	15	35 @ $V_R = 50\text{V}$	25 @ $V_R = 3\text{V}$	0.55	700-1150	925	$1.9 \times 10^{-13}$
VTP3420LA	T-1 lensed IRT	1.64	34	35	150 @ $V_R = 0\text{V}$	0.55	700-1150	925	-

Electrical characteristics at  $T_{\text{Ambient}} = 25^\circ\text{C}$

Product Table

Silicon Photodiodes – VTP Series

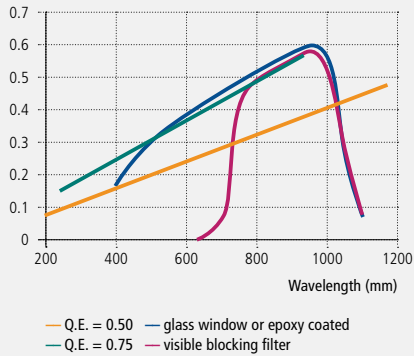
Symbol	Package	Active Area mm <sup>2</sup>	Minimum Short Circuit	Maximum Dark	Junction Capacitance	Radiometric Sensitivity @ $\lambda_p$	Spectral Range $\lambda_{\text{RANGE}}$ nm	Typical Peak Wavelength $\lambda_p$ nm	Typical Noise Equivalent Power W/√Hz
			Current @ 100fc, 2850K $\mu\text{A}$	Current @ $V_R = 10\text{V}$ (nA)	max $C_j$ pF	typ $S_R$ AW			
VTP413H	Lensed Sidelooker IRT	7.45	120 (Typical)	20	50 @ $V_R = 3\text{V}$	0.55	725-1150	925	$2.3 \times 10^{-14}$
VTP4085H	Ceramic	21	200 (Typical)	100 @ $V_R = 0.1\text{V}$	Typical 350 @ $V_R = 0\text{V}$	0.55	400-1100	925	-
VTP4085SH	Ceramic	21	200 (Typical)	50 @ $V_R = 0.1\text{V}$	Typical 350 @ $V_R = 0\text{V}$	0.55	400-1100	925	-
VTP5050H	TO-5	7.45	40	18 @ $V_R = 50$	24 @ $V_R = 15\text{V}$	0.55	400-1150	925	$1.4 \times 10^{-13}$
VTP6060H	TO-8	20.6	120	35 @ $V_R = 50\text{V}$	60 @ $V_R = 15\text{V}$	0.55	400-1150	925	$1.9 \times 10^{-13}$
VTP7110H	Lensed Sidelooker	0.684	6	35	25 @ $V_R = 3\text{V}$	0.55	400-1150	925	$1.9 \times 10^{-13}$
VTP7210H	Lensed Sidelooker IRT	0.684	5	35	25 @ $V_R = 3$	0.55	700-1150	925	$1.9 \times 10^{-13}$
VTP7840H	Lensed Sidelooker IRT	5.27	50	20	40 @ $V_R = 3\text{V}$	0.55	725-1150	925	$5.3 \times 10^{-14}$
VTP8350H	Ceramic	7.45	65	30	50 @ $V_R = 3\text{V}$	0.55	400-1150	925	$1.8 \times 10^{-13}$
VTP8440H	8 mm ceramic	5.16	30	15 @ $V_R = 50\text{V}$	15 @ $V_R = 15\text{V}$	0.55	400-1150	925	$1.3 \times 10^{-13}$
VTP8551H	Mini-Dip	7.45	50	30	50 @ $V_R = 3\text{V}$	0.55	400-1150	925	$1.8 \times 10^{-13}$
VTP8651H	Mini-Dip IRT	7.45	35	30	50 @ $V_R = 3\text{V}$	0.5	725-1150	925	$2.0 \times 10^{-13}$
VTP8740BTRH	SMT clear			20	50 @ $V_R = 3\text{V}$	0.6	400-1150	925	$2.0 \times 10^{-13}$
VTP8740STRH	SMT clear	5.269	75	20	50 @ $V_R = 3\text{V}$	0.6	400-1150	925	$2.0 \times 10^{-13}$
VTP8840BTRH	SMT IRT			20	50 @ $V_R = 3\text{V}$	0.6	750-1150	925	$2.0 \times 10^{-13}$
VTP8840STRH	SMT IRT	5.269	50	20	50 @ $V_R = 3\text{V}$	0.6	750-1150	925	$2.0 \times 10^{-13}$
VTP9412H	6 mm ceramic	1.6	10	7 @ $V_R = 50\text{V}$	6 @ $V_R = 15\text{V}$	0.55	400-1150	925	$8.7 \times 10^{-14}$
VTP9812FH	T-1 3/4 flat	1.548	0.7	10	150 @ $V_R = 10\text{V}$	0.034	400-700	580	-

Electrical characteristics at  $T_{\text{Ambient}} = 25^\circ\text{C}$

Graph 1

Absolute Spectral Response \*

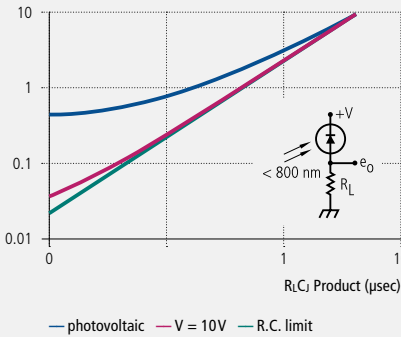
Radiometric Sensitivity, A/W



Graph 2

Rise/Fall Times – Non Saturated \*

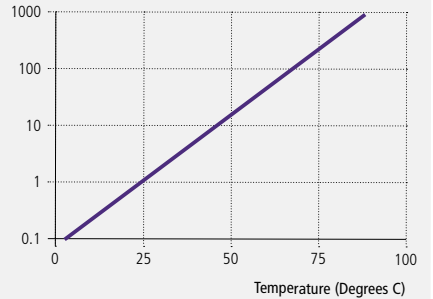
Response Time ( $\mu\text{sec}$  10–90%)



Graph 3

Relative Dark Current vs. Temperature \*

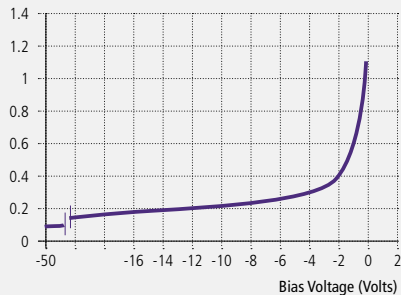
Relative Dark Current



Graph 4

Rel. Junction Capacitance vs. Voltage \*

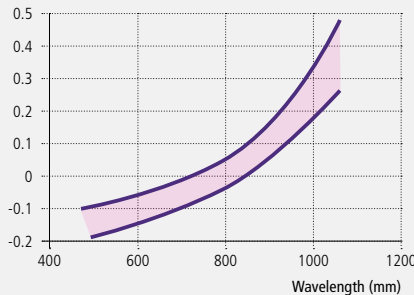
Relative Capacitance



Graph 5

Temp. Coefficient of Light Current vs. Wavelength \*

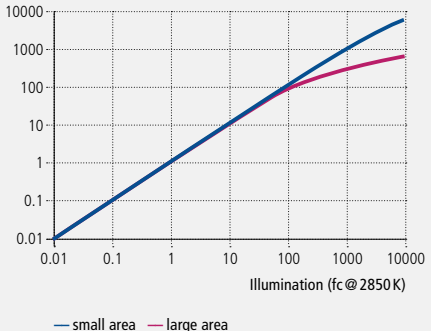
Temperature Coefficient (%) / Degree (C)



Graph 6

Rel. Short Circuit Current vs. Illumination \*

Relative Short Circuit Current



\* Typical characteristic curves @  $25^\circ\text{C}$  (unless otherwise noted)