

Silicon PIN Photodiode



FEATURES

- Package type: surface-mount
- Technology: homogeneous
- Package form: top view
- Dimensions (L x W x H in mm):
4.72 x 4.72 x 0.75
- AEC-Q101 qualified
- Floor life: 186 h, MSL 3, according to J-STD-020
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

K857PH is a 4-quadrant photo detector in surface-mount package. Each quadrant PD has an active area of 1.6 mm².

PRODUCT SUMMARY

COMPONENT	I_{ra} (μA) ($E_e = 1.0 \text{ mW/cm}^2, \lambda = 850 \text{ nm}, V_R = 5 \text{ V}$)	ϕ (°)	$\lambda_{0.1}$ (nm)
K857PH	10	± 60	710 to 1100

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
K857PH	Tape and reel	MOQ: 1000 pcs, 1000 pcs per reel	Top view
K857PH-GS15	Tape and reel	MOQ: 5000 pcs, 5000 pcs per reel	Top view

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	10	V
Operating temperature range		T_{amb}	-40 to +110	$^\circ\text{C}$
Storage temperature range		T_{stg}	-40 to +110	$^\circ\text{C}$
Soldering temperature	According to reflow solder profile Fig. 8	T_{sd}	260	$^\circ\text{C}$
ESD safety HBM	$\pm 2000 \text{ V}$, 1.5 k Ω , 100 pF, 3 pulses	ESD_{HBM}	2.0	kV

BASIC CHARACTERISTICS, SINGLE QUADRANT ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	V_F	-	1.25	1.5	V
Reverse dark current	$V_R = 10\text{ V}, E = 0$	I_{ro}	-	1.0	10	nA
Diode capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$	C_D	-	18	-	pF
	$V_R = 3\text{ V}, f = 1\text{ MHz}, E = 0$	C_D	-	6	-	pF
Reverse light current	$E_e = 1\text{ mW/cm}^2, \lambda = 850\text{ nm}, V_R = 5\text{ V}$	I_{ra}	-	10	-	μA
	$E_e = 1\text{ mW/cm}^2, \lambda = 940\text{ nm}, V_R = 5\text{ V}$	I_{ra}	-	11	-	μA
Angle of half sensitivity		ϕ	-	± 60	-	$^{\circ}$
Wavelength of peak sensitivity		λ_p	-	950	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	710 to 1100	-	nm
Rise time	$V_R = 10\text{ V}, R_L = 50\text{ }\Omega, \lambda = 950\text{ nm}$	t_r	-	3.9	-	μs
Fall time	$V_R = 10\text{ V}, R_L = 50\text{ }\Omega, \lambda = 950\text{ nm}$	t_f	-	2.5	-	μs

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

 Values measured / estimated per quadrant q [$q = 1, 2, 3, 4$]

CROSS-TALK SPECIFICATION			
Laser illumination (850 nm, 65 μm spot diameter, radiant power 0.7 mW) of center of PD quadrant 1 ($q = 1$), $V_R, q = 5\text{ V}$ applied to all quadrants ($q = 1, 2, 3, 4$)			
ILLUMINATED	MEASURED PARAMETER	TYP. VALUE	UNIT
Yes	$I_{ra_850_1}$	100	%
No	$I_{ra_850_2}$	0.1	%
No	$I_{ra_850_3}$	0.1	%
No	$I_{ra_850_4}$	0.05	%

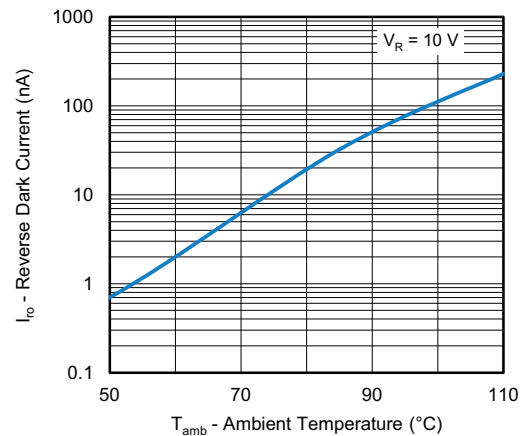
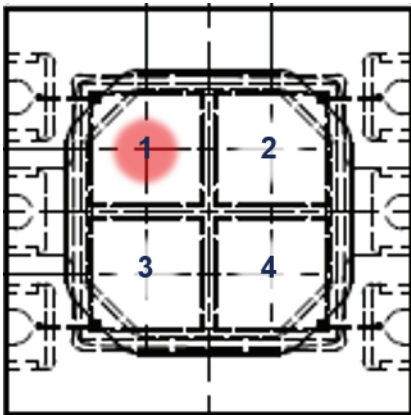


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

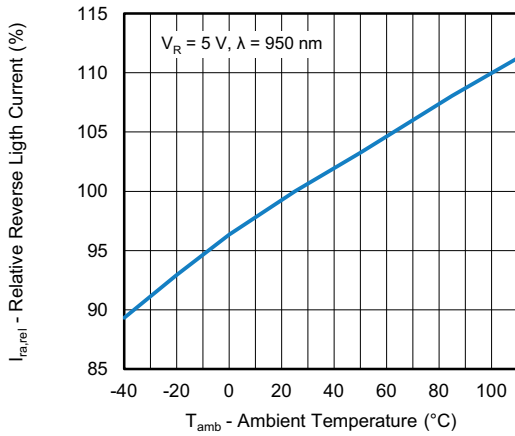


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

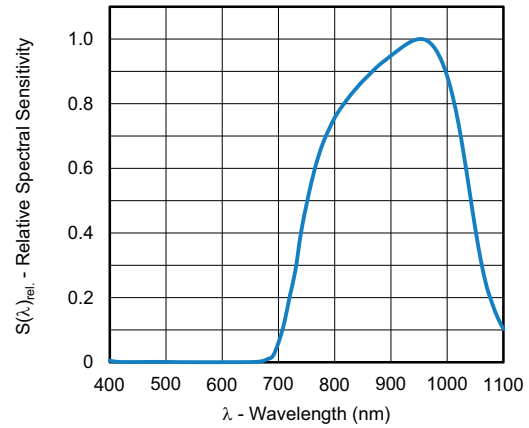


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

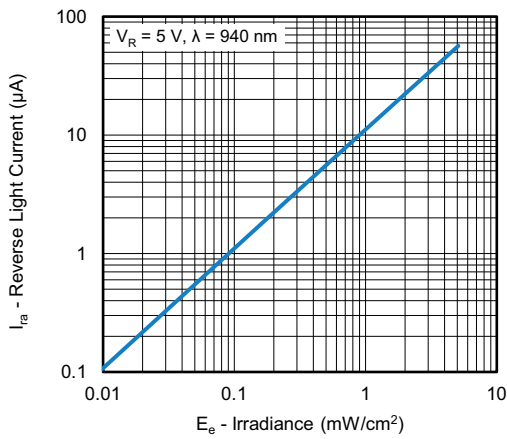


Fig. 3 - Reverse Light Current vs. Irradiance

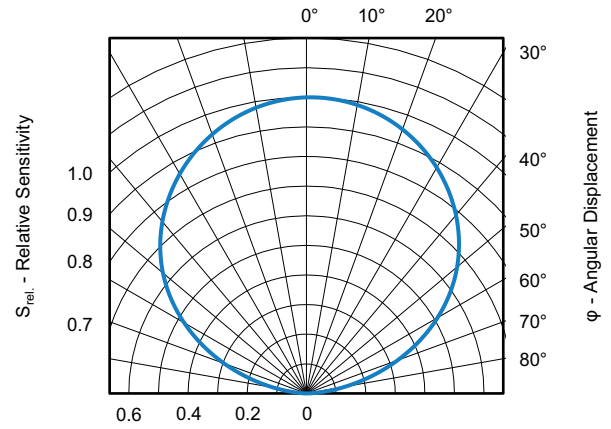


Fig. 6 - Relative Sensitivity vs. Angular Displacement

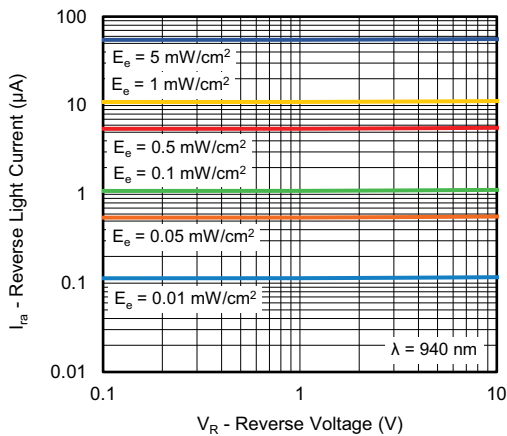


Fig. 4 - Reverse Light Current vs. Reverse Voltage

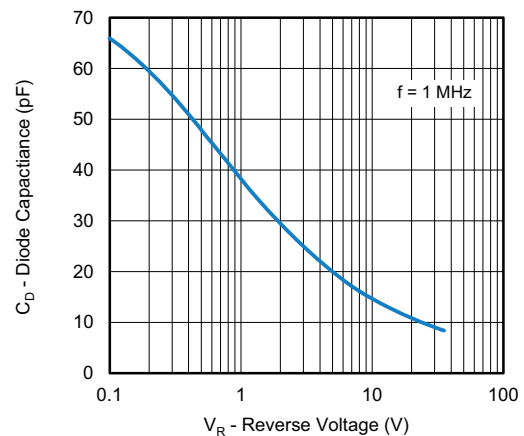
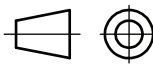
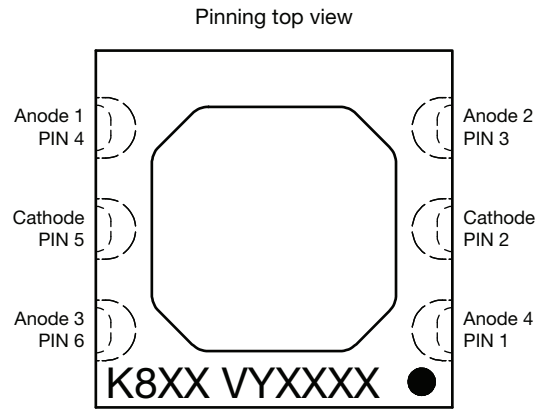
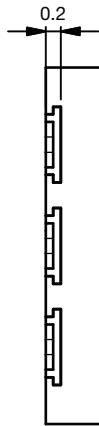
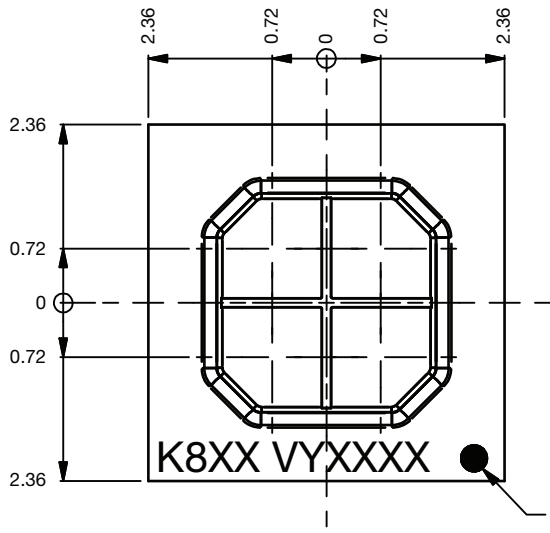
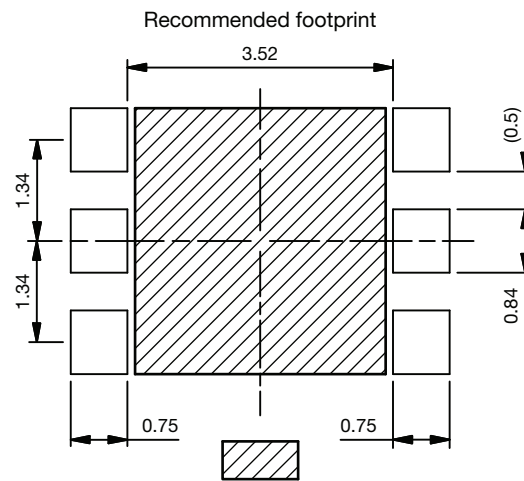
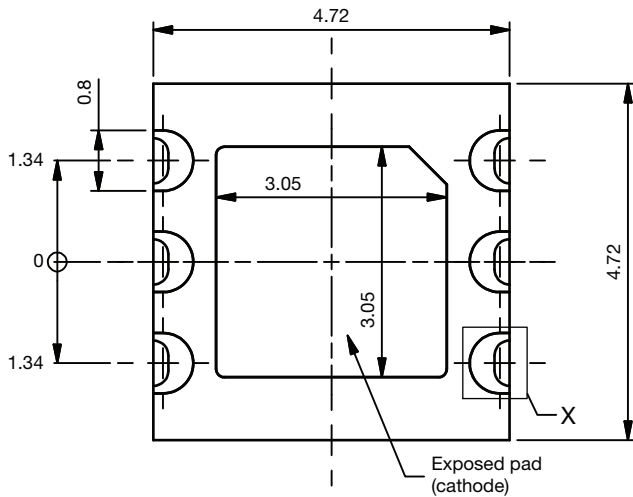
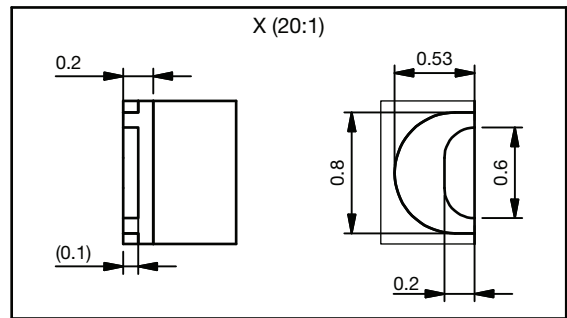


Fig. 7 - Diode Capacitance vs. Reverse Voltage (applied to all four anode contacts)

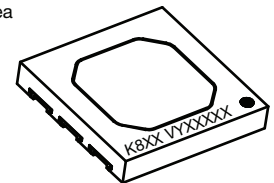
PACKAGE DIMENSIONS in millimeters



Technical drawings according to DIN specifications



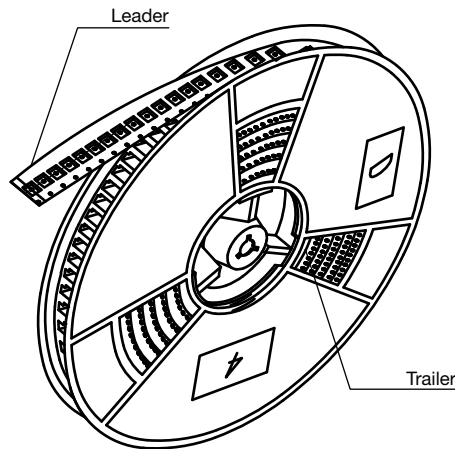
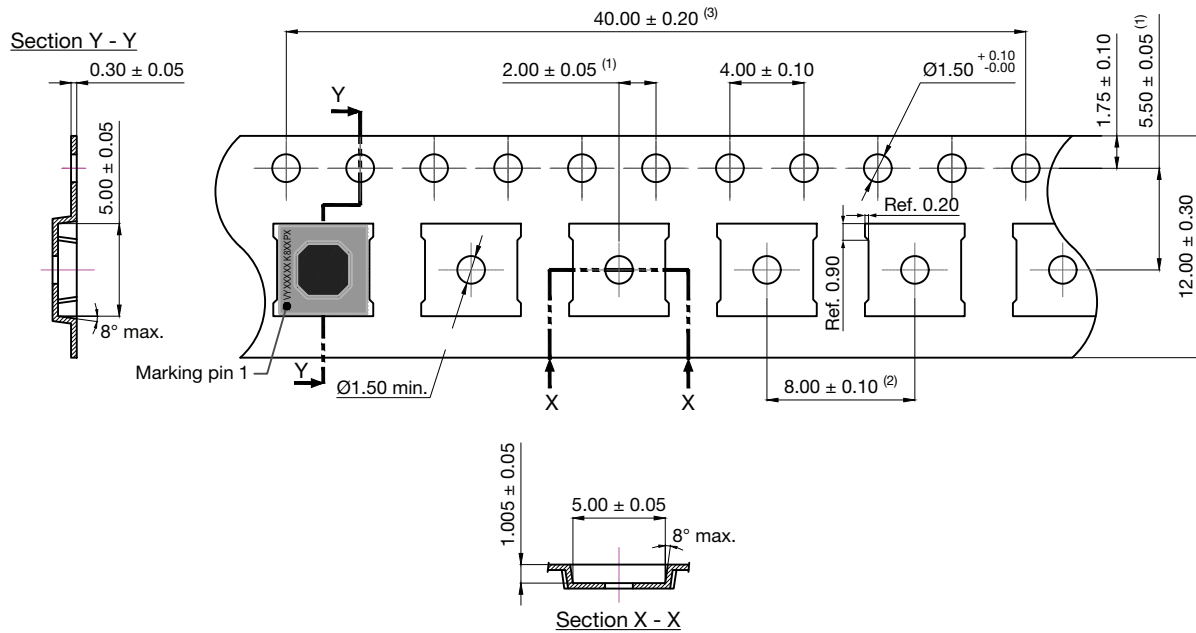
No routing in this area



Not indicated tolerances ± 0.1 mm

Drawing No.: 6.550-5356.01-4
Issue: 2; 19.02.2021

Active area photodiodes:	
Single PD:	1.6 mm ²
All PDs:	6.4 mm ²
Total opening:	7.1 mm ²

TAPE AND REEL DIMENSIONS in millimeters

Notes

- Allowable camber to be 1 mm per 250 mm in length for single winding and 2 mm per 250 mm in length for cross winding
- (1) Measure from centerline of sprocket hole to centerline of pocket
- (2) Measure from centerline of pocket to centerline of pocket
- (3) Pitch tolerance for sprocket hole, 10 pitch cumulative tolerance is ± 0.2 mm

SOLDER PROFILE



19841

Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020D

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

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

Floor life: 168 h

Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, RH < 60 %

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at 40 °C (+ 5 °C), RH < 5 %

or

96 h at 60 °C (+ 5 °C), RH < 5 %



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