



# InGaAs PIN Photodiode

## Wavelength Range:

0.9  $\mu\text{m}$  - 1.7  $\mu\text{m}$

0.6  $\mu\text{m}$  - 1.7  $\mu\text{m}$

1.2  $\mu\text{m}$  - 2.2  $\mu\text{m}$

## Package Type:

Chip

CLCC

TO-Can

TO-Can with 1,2 Stage Cooler





---

## Contents:

<b>0.9 <math>\mu\text{m}</math> - 1.7 <math>\mu\text{m}</math> InGaAs PIN Photodiode</b>	-----	03
• SPECIFICATIONS	-----	05
• CHIP DIAGRAM / PACKAGE OUTLINE	-----	06
• EXAMPLE CURVES	-----	10
<b>0.6 <math>\mu\text{m}</math> - 1.7 <math>\mu\text{m}</math> InGaAs PIN Photodiode</b>	-----	11
• SPECIFICATIONS	-----	13
• CHIP DIAGRAM / PACKAGE OUTLINE	-----	14
• EXAMPLE CURVES	-----	17
<b>1.2 <math>\mu\text{m}</math> – 2.2 <math>\mu\text{m}</math> InGaAs PIN Photodiode</b>	-----	18
• SPECIFICATIONS	-----	19
• CHIP DIAGRAM / PACKAGE OUTLINE	-----	20
• EXAMPLE CURVES	-----	23
<b>0.9 <math>\mu\text{m}</math> - 1.7<math>\mu\text{m}</math> InGaAs Quadrant PIN Photodiode</b>	-----	24
• SPECIFICATIONS	-----	25
• CHIP DIAGRAM / PACKAGE OUTLINE	-----	26
• EXAMPLE CURVES	-----	27



## InGaAs PIN Photodiode (0.9 $\mu\text{m}$ - 1.7 $\mu\text{m}$ )

PIN0500-17-D / T0

PIN1000-17-D / T0 / T1 / C

PIN2000-17-D / T0 / T2 / C

PIN3000-17-D / T0

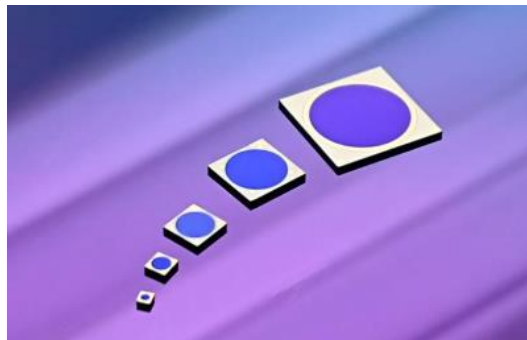
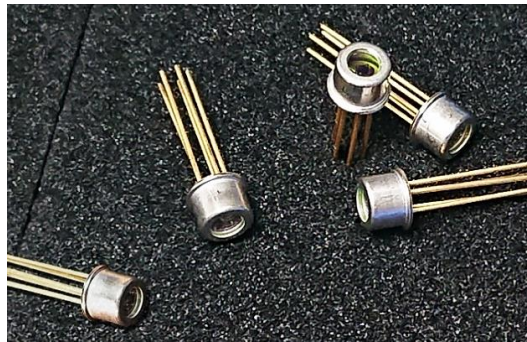
PIN5000-17-D

### FEATURES

- Highly Reliable Planar Device
- Low Leakage Current
- High Shunt Resistance
- High Responsivity
- Low Stray Absorption

### APPLICATIONS

- Power Monitoring
- Spectral Analysis
- Light Detection and Ranging (LIDAR)
- Remote Temperature Sensors
- Humidity Detection
- Ice/Slush Detection
- Gas Leak Detection
- Single-Photodiode SWIR Camera
- Covert IR Sensing
- Optical Powering





## GENERAL DESCRIPTIONS

MODEL NO.	Spectral Range	Aperture Size	Package Type
	$\mu\text{m}$	$\mu\text{m}$	---
PIN0500-17-D	0.9 – 1.7	$\varnothing$ 455	---
PIN0500-17-T0			TO-46 / 3P
PIN1000-17-D		$\varnothing$ 950	---
PIN1000-17-T0			TO-46 / 3P
PIN1000-17-T1			TO-46 / 5P
PIN1000-17-C			6CLCC (3.0SQ)
PIN2000-17-D		$\varnothing$ 1850	---
PIN2000-17-T0			TO-39 / 3P
PIN2000-17-T2			TO-39 / 8P
PIN2000-17-C			8CLCC (5.0SQ)
PIN3000-17-D		$\varnothing$ 3000	---
PIN3000-17-T0			TO-39 / 3P
PIN5000-17-D		$\varnothing$ 5000	---

## ABSOLUTE MAXIMUM RATINGS

MODEL NO.	Reverse Voltage		Reverse Current		Forward Current		<sup>1</sup> Ambient Temperature			
	V		mA		mA		In Operation		In Storage	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	°C		°C	
PIN0500-17-D	---	20	---	10	---	10	-40	+85	-40	+125
PIN0500-17-T0	---								-40	+85
PIN1000-17-D	---	20							-40	+125
PIN1000-17-T0									-40	+85
PIN1000-17-T1									-40	+85
PIN1000-17-C									-40	+85
PIN2000-17-D	---	15							-40	+125
PIN2000-17-T0									-40	+85
PIN2000-17-T2									-40	+85
PIN2000-17-C									-40	+85
PIN3000-17-D	---	10							-40	+125
PIN3000-17-T0									-40	+85
PIN5000-17-D	---	5							-40	+125

<sup>1</sup>Non-condensing environment.



SPECIFICATIONS ( $T_{\text{AMB}} = 23\text{ }^{\circ}\text{C}$ )

MODEL NO.	Dark Current		Shunt Resistance		Capacitance				3dB Bandwidth	
	nA		M $\Omega$		pF				MHz	
	@ -5 V		@ -10 mV		@ 1 MHz, 0V		@ 1 MHz, -5 V		@ -5 V, 50 $\Omega$	
	Typ.	Max.	Min.	Typ.	Typ.	Max.	Typ.	Max.	Min.	Typ.
PIN0500-17-D	0.3	0.6	150	500	35	50	20	25	80	100
PIN0500-17-T0										
PIN1000-17-D	1	2	50	200	120	160	60	80	30	40
PIN1000-17-T0										
PIN1000-17-T1										
PIN1000-17-C										
PIN2000-17-D	5	10	10	40	400	800	200	400	8	15
PIN2000-17-T0										
PIN2000-17-T2										
PIN2000-17-C										
PIN3000-17-D	10	20	5	20	900	1300	500	700	4.5	6
PIN3000-17-T0										
PIN5000-17-D	25	50	2	8	1800	2200	1400	1600	1.5	2

MODEL NO.	Responsivity						<sup>2</sup> Saturation Power		NEP	
	A/W						mW		$10^{-14}$ W/ $\sqrt{\text{Hz}}$	
	@ 0.85 $\mu\text{m}$ , 0 V		@ 1.30 $\mu\text{m}$ , 0 V		@ 1.55 $\mu\text{m}$ , 0 V		@ 1.55 $\mu\text{m}$ , 0 V, -0.2 dB		@ 1.55 $\mu\text{m}$ , 0 V, 1 KHz	
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Typ.	Max.
PIN0500-17-D	0.1	0.2	0.85	0.95	0.95	1.0	5	7	0.5	1
PIN0500-17-T0	0.1	0.15	0.8	0.9	0.9	0.95				
PIN1000-17-D	0.1	0.2	0.85	0.95	0.95	1.0				
PIN1000-17-T0	0.1	0.15	0.8	0.9	0.9	0.95	5	7	1.2	2.4
PIN1000-17-T1	0.1	0.2	0.85	0.95	0.95	1.0				
PIN1000-17-C	0.1	0.15	0.8	0.9	0.85	0.95				
PIN2000-17-D	0.1	0.2	0.85	0.95	0.95	1.0	2	4	2.4	4.8
PIN2000-17-T0	0.1	0.15	0.8	0.9	0.9	0.95				
PIN2000-17-T2	0.1	0.2	0.85	0.95	0.95	1.0				
PIN2000-17-C	0.1	0.15	0.8	0.9	0.85	0.95				
PIN3000-17-D	0.1	0.2	0.85	0.95	0.95	1.0	1.5	3	4	8
PIN3000-17-T0	0.1	0.15	0.8	0.9	0.9	0.95				
PIN5000-17-D	0.1	0.2	0.85	0.95	0.95	1.0	0.1	0.2	6	12

MODEL NO.	<sup>3</sup> Max. Cooling Capability, $\Delta T_{\text{MAX}}$	
	$^{\circ}\text{C}$	
	$T_{\text{Heatsink}} = 20\text{ }^{\circ}\text{C}$	
	Min.	Typ.
PIN1000-17-T1	35	40
PIN2000-17-T2	55	60

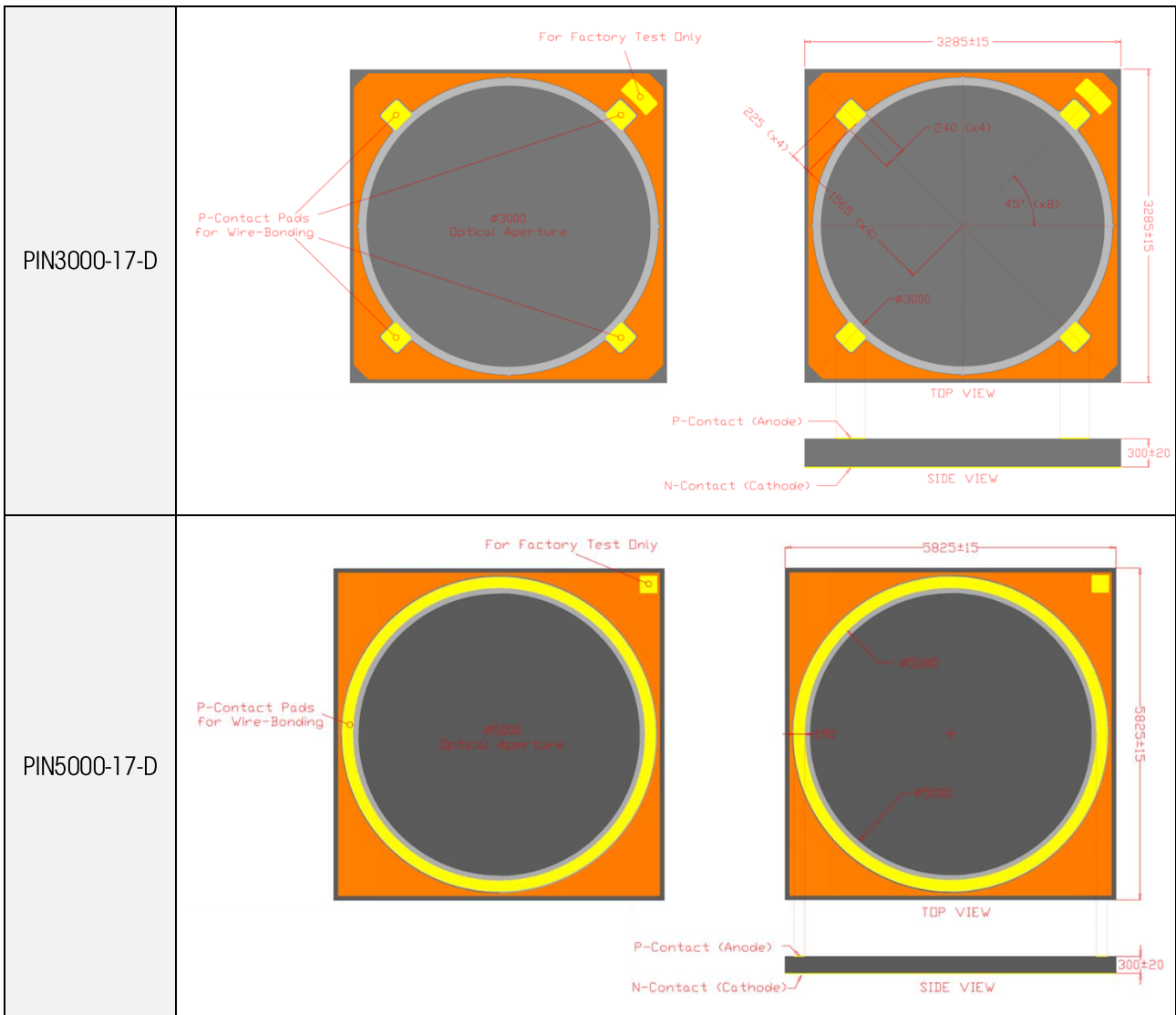
<sup>2</sup>Measured at the aperture center with an  $1/e^2$  beam diameter of 250  $\mu\text{m}$ .

<sup>3</sup>Adequate heatsink and thermal interface material are the prerequisites for stable operation.



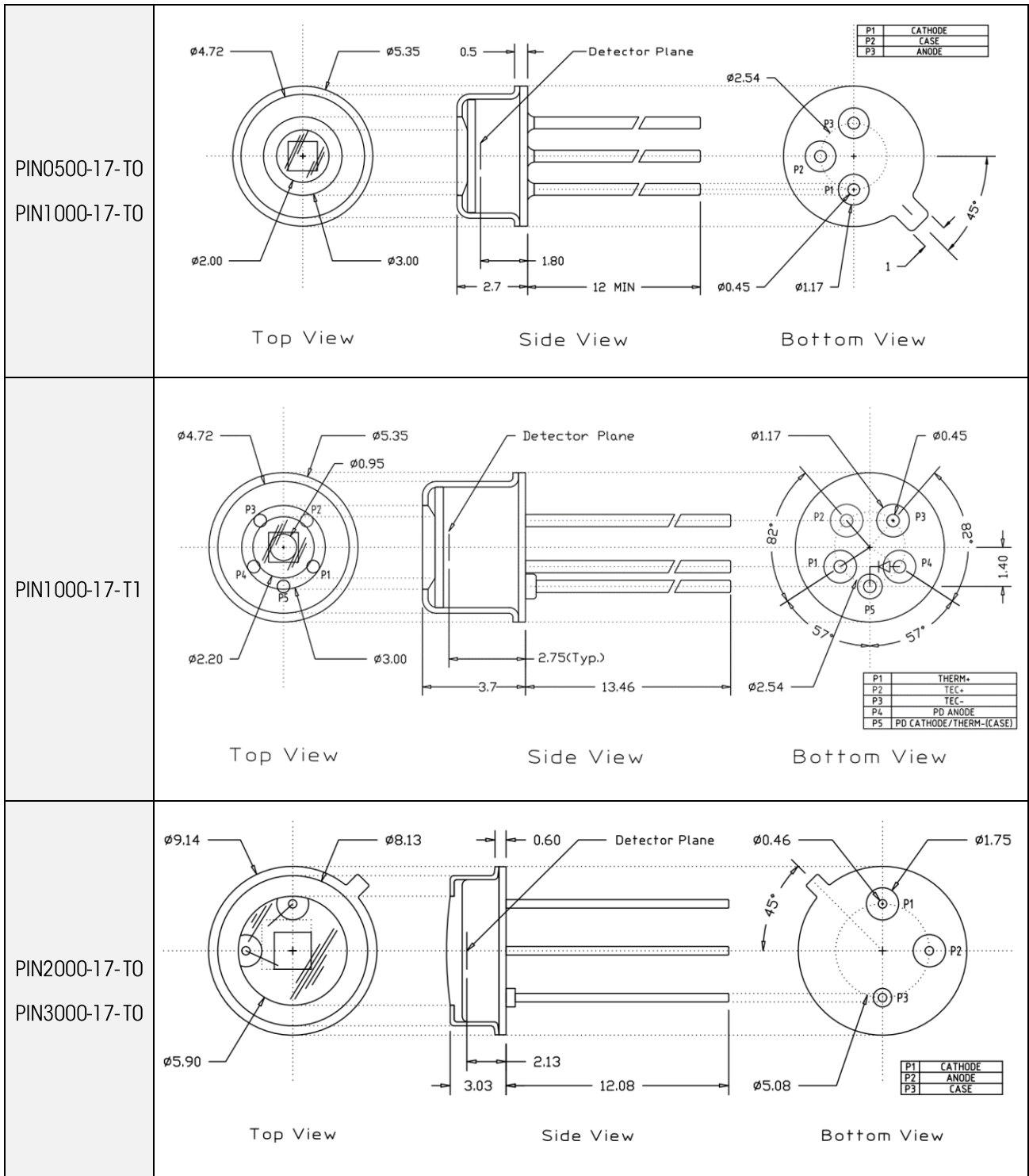
CHIP DIAGRAM (UNIT:  $\mu\text{m}$ )

<p>PIN0500-17-D</p>	
<p>PIN1000-17-D</p>	
<p>PIN2000-17-D</p>	

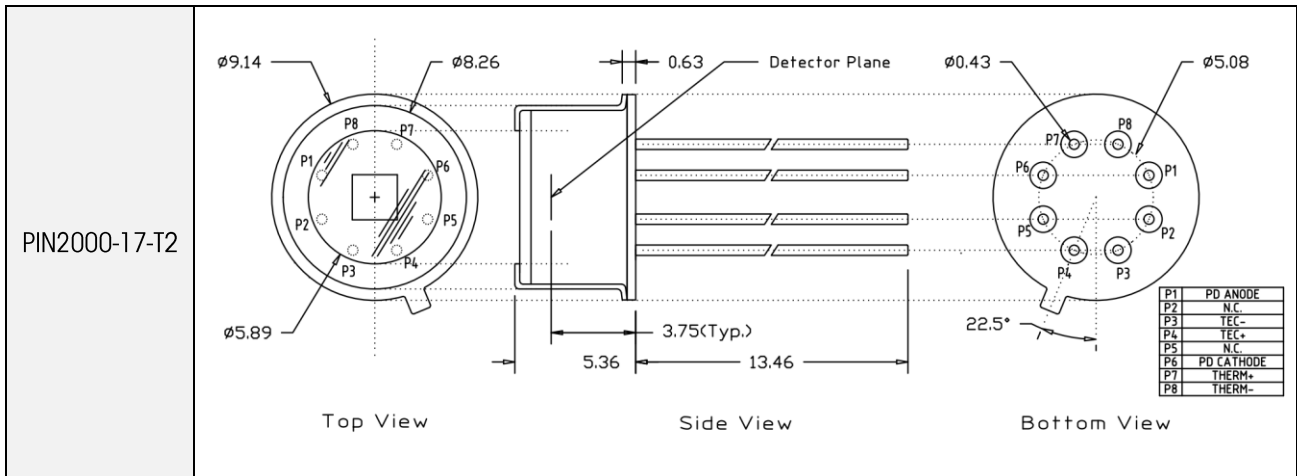




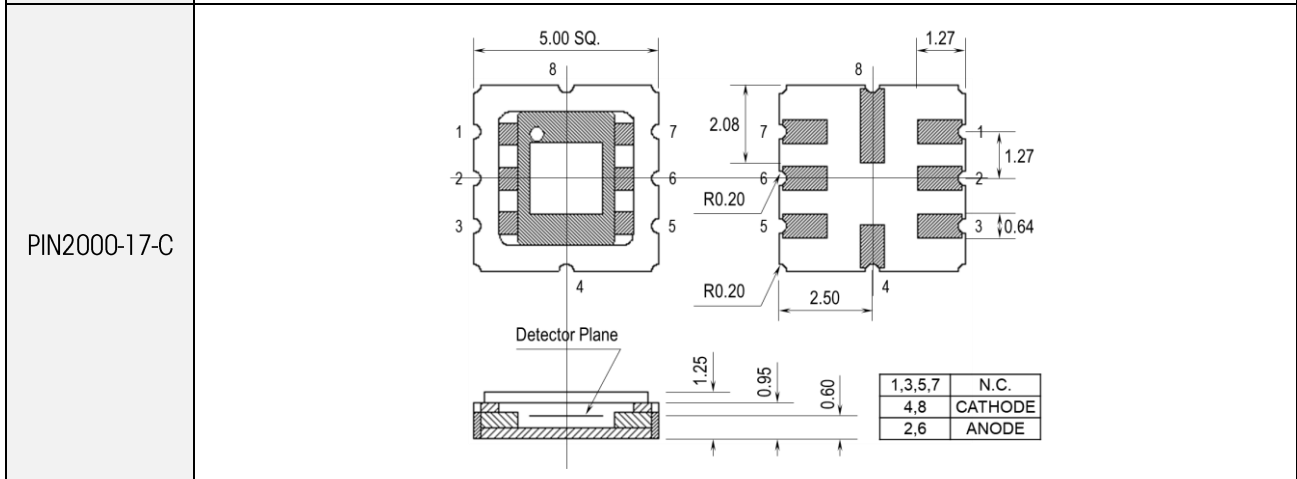
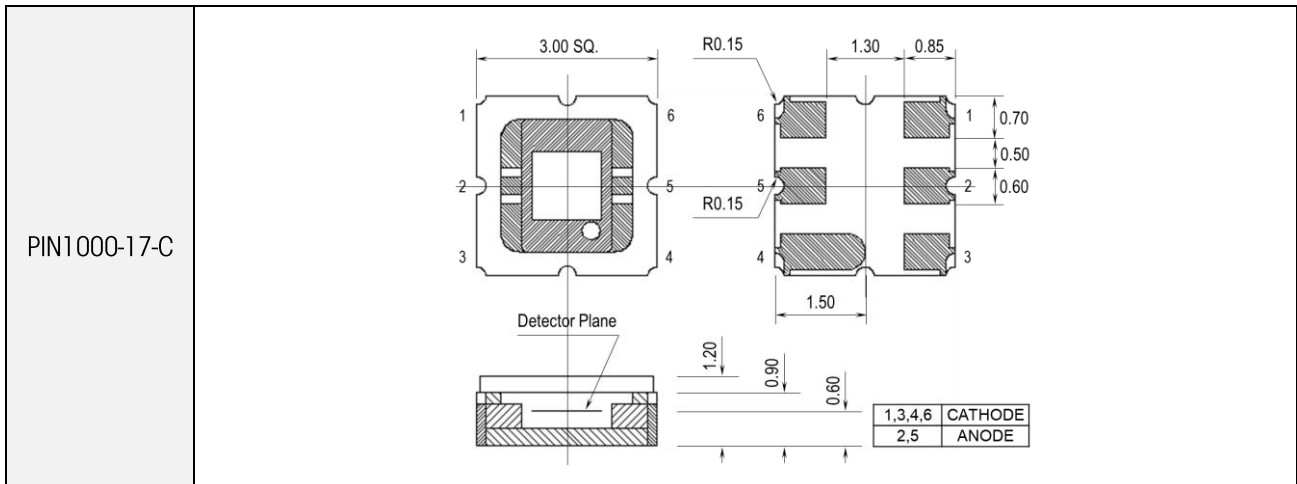
PACKAGE OUTLINE (UNIT: mm)







NOTE: Product serial numbers of PINxxx-17-Tx are printed on the side wall of the cap.

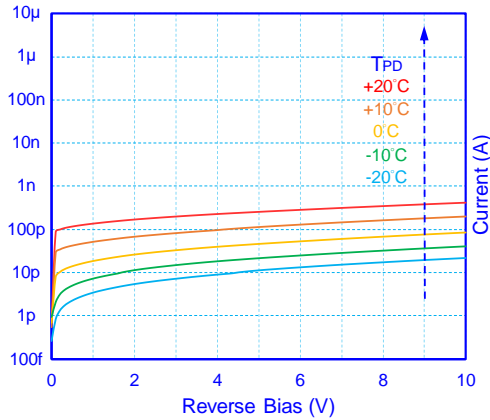


NOTE: Product serial numbers of PINxxx-17-C are printed on the back side of the package.

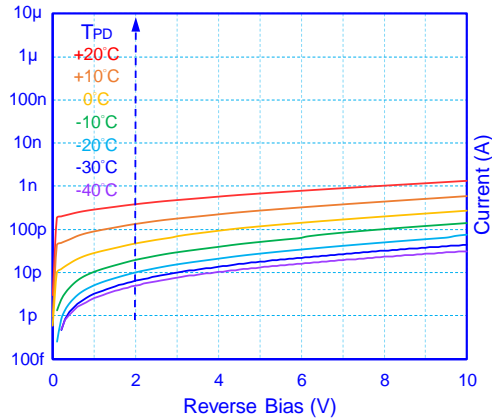


EXAMPLE CURVES ( $T_{\text{AMB}}=23^{\circ}\text{C}$ )

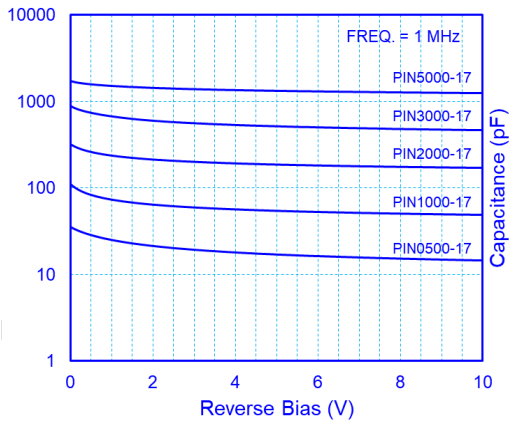
Dark Current (PIN1000)



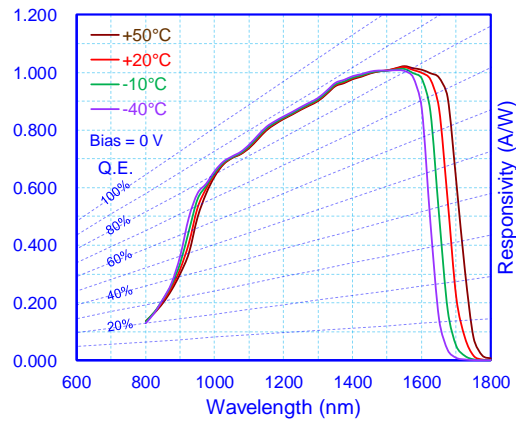
Dark Current (PIN2000)



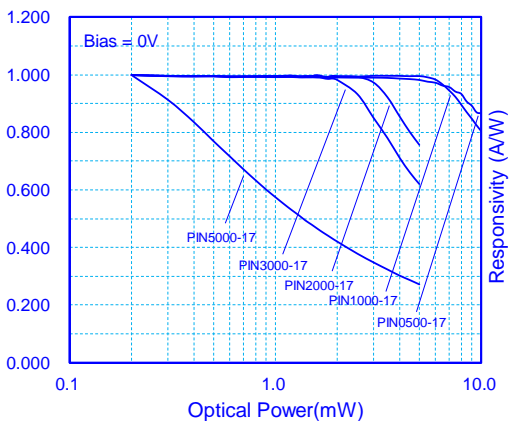
Dark Capacitance



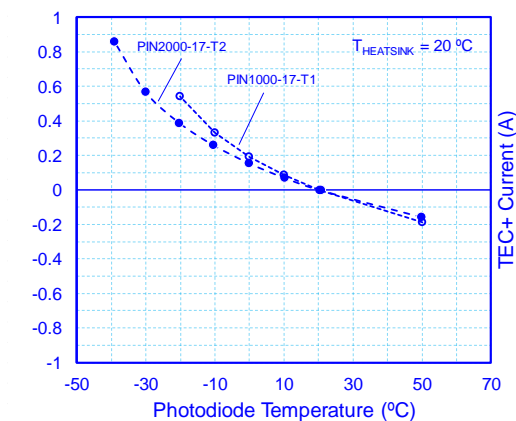
Responsivity Spectrum



Normalized Response Linearity



TEC Performance



\*Non-condensing environment

Note: The example curves are subject to change without notice.



## InGaAs PIN Photodiode (0.6 $\mu\text{m}$ - 1.7 $\mu\text{m}$ )

PIN0500-17V-D /TO

PIN1000-17V-D /TO

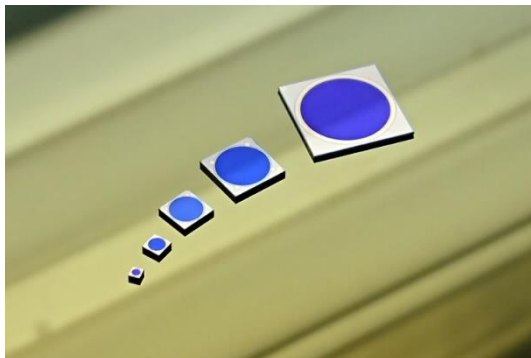
PIN2000-17V-D /TO

### FEATURES

- Highly Reliable Planar Device
- VIS-SWIR Operation
- Low Leakage Current
- High Shunt Resistance
- High Responsivity
- Low Stray Absorption

### APPLICATIONS

- Power Monitoring
- Spectral Analysis
- Light Detection and Ranging (LIDAR)
- Remote Temperature Sensors
- Humidity Detection
- Ice/Slush Detection
- Gas Leak Detection
- Single-Photodiode SWIR Camera
- Covert IR Sensing
- Optical Powering





## GENERAL DESCRIPTIONS

MODEL NO.	Spectral Range	Aperture Size	Package Type
	$\mu\text{m}$	$\mu\text{m}$	---
PIN0500-17V-D	0.6 - 1.7	$\varnothing$ 455	---
PIN0500-17V-T0			TO-46 / 3P
PIN1000-17V-D		$\varnothing$ 950	---
PIN1000-17V-T0			TO-46 / 3P
PIN1000-17V-C			6CLCC (3.0SQ)
PIN2000-17V-D		$\varnothing$ 1850	---
PIN2000-17V-T0			TO-39 / 3P
PIN2000-17V-C			8CLCC (5.0SQ)

## ABSOLUTE MAXIMUM RATINGS

MODEL NO.	Reverse Voltage		Reverse Current		Forward Current		<sup>1</sup> Ambient Temperature			
	V		mA		mA		In Operation		Storage	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	°C		°C	
PIN0500-17V-D	---	10	---	2	---	5	-40	+85	-40	+125
PIN0500-17V-T0									-40	+85
PIN1000-17V-D									-40	+125
PIN1000-17V-T0									-40	+85
PIN1000-17V-C									-40	+85
PIN2000-17V-D									-40	+125
PIN2000-17V-T0									-40	+85
PIN2000-17V-C									-40	+85

<sup>1</sup>Non-condensing environment.



SPECIFICATIONS ( $T_{\text{AMB}} = 23\text{ }^{\circ}\text{C}$ )

MODEL NO.	Dark Current		Shunt Resistance		Capacitance				3dB Bandwidth	
	nA		M $\Omega$		pF				MHz	
	@ -5 V		@ -10 mV		@ 1 MHz, 0V		@ 1 MHz, -5 V		@ -5 V, 50 $\Omega$	
	Typ.	Max.	Min.	Typ.	Typ.	Max.	Typ.	Max.	Min.	Typ.
PIN0500-17V-D	0.5	1	100	320	35	50	20	25	80	100
PIN0500-17V-T0										
PIN1000-17V-D	2	5	20	80	120	160	60	80	30	40
PIN1000-17V-T0										
PIN1000-17V-C										
PIN2000-17V-D	10	20	5	20	400	800	200	400	8	15
PIN2000-17V-T0										
PIN2000-17V-C										

MODEL NO.	Responsivity								<sup>2</sup> Saturation Power	
	A / W								mW	
	@ 0.65 $\mu\text{m}$ , 0 V		@ 0.85 $\mu\text{m}$ , 0 V		@ 1.30 $\mu\text{m}$ , 0 V		@ 1.55 $\mu\text{m}$ , 0 V		@ 1.55 $\mu\text{m}$ , 0 V, -0.2 dB	
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
PIN0500-17V-D	0.2	0.3	0.35	0.45	0.8	0.9	0.9	0.95	0.5	1
PIN0500-17V-T0	0.2	0.25	0.35	0.4	0.8	0.85	0.85	0.9		
PIN1000-17V-D	0.2	0.3	0.35	0.45	0.8	0.9	0.9	0.95	0.5	2
PIN1000-17V-T0	0.2	0.25	0.35	0.4	0.8	0.85	0.85	0.9		
PIN1000-17V-C	0.2	0.25	0.35	0.4	0.8	0.85	0.85	0.9		
PIN2000-17V-D	0.2	0.3	0.35	0.45	0.8	0.9	0.9	0.95	0.2	0.5
PIN2000-17V-T0	0.2	0.25	0.35	0.4	0.8	0.85	0.85	0.9		
PIN2000-17V-C	0.2	0.25	0.35	0.4	0.8	0.85	0.85	0.9		

MODEL NO.	NEP	
	$10^{-14}\text{ W}/\sqrt{\text{Hz}}$	
	@ 1.55 $\mu\text{m}$ , 0 V, 1 KHz	
	Typ.	Max.
PIN0500-17V-D	1.5	3
PIN0500-17V-T0		
PIN1000-17V-D	2.5	5
PIN1000-17V-T0		
PIN1000-17V-C		
PIN2000-17V-D	6	12
PIN2000-17V-T0		
PIN2000-17V-C		

<sup>2</sup>Measured at the aperture center with an  $1/e^2$  beam diameter of 250  $\mu\text{m}$ .

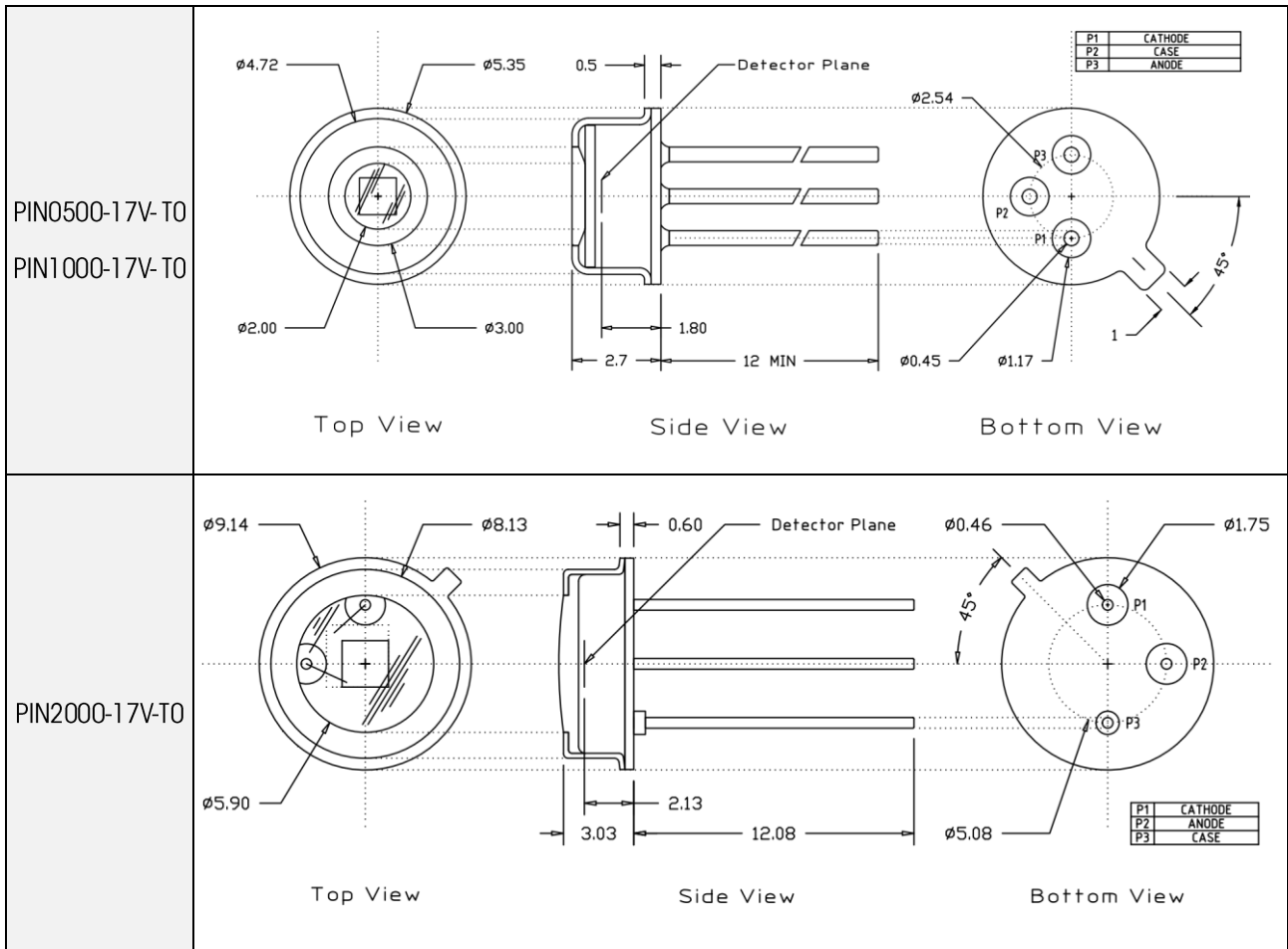


CHIP DIAGRAM (UNIT:  $\mu\text{m}$ )

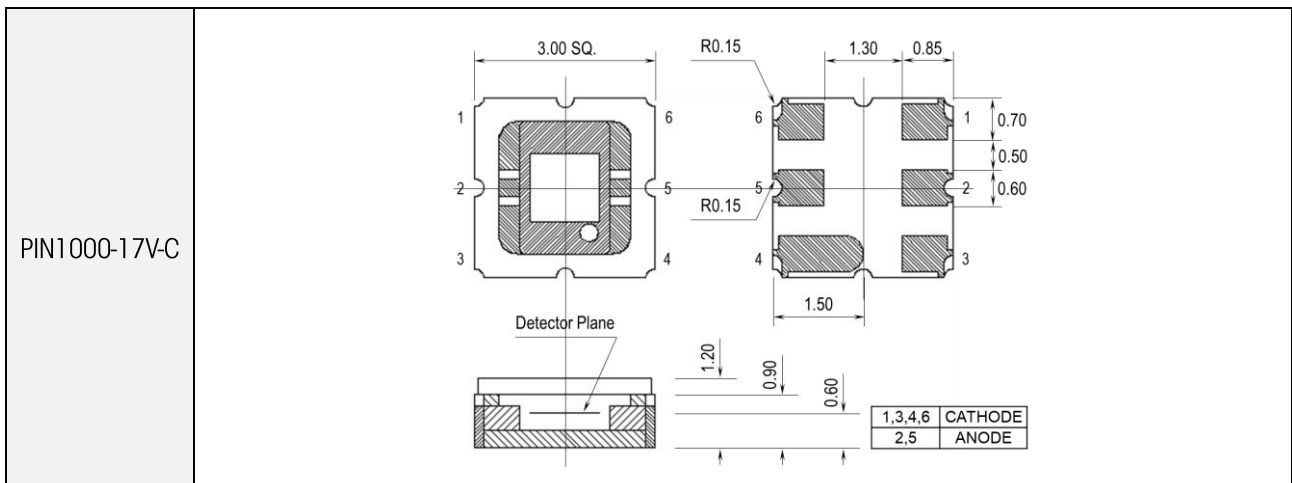
<p>PIN0500-17V-D</p>	
<p>PIN1000-17V-D</p>	
<p>PIN2000-17V-D</p>	

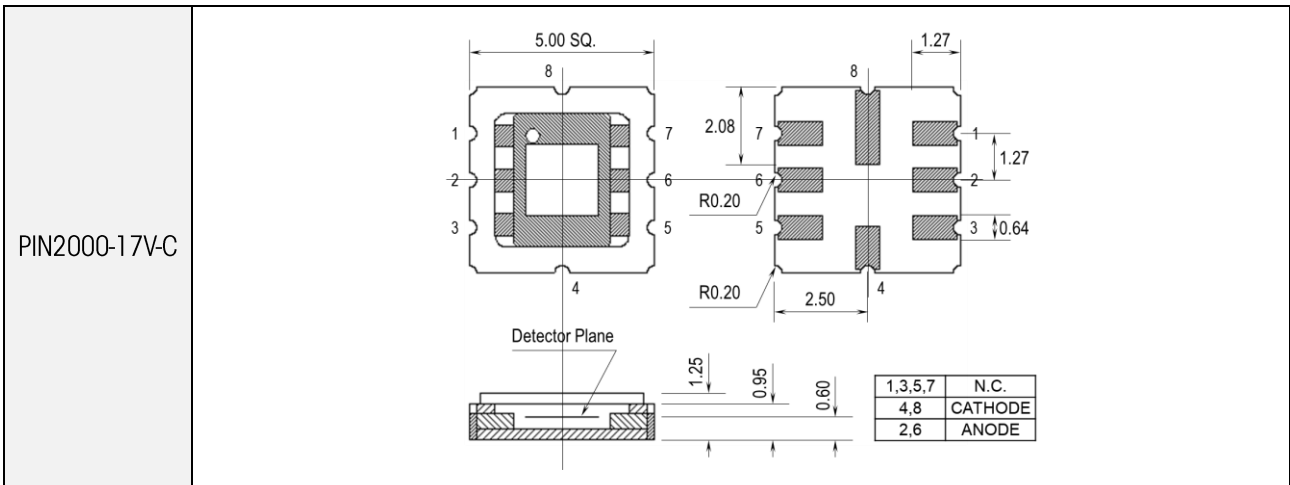


PACKAGE OUTLINE (UNIT: mm)



NOTE: Product serial numbers of PINxxx-17V-Tx are printed on the side wall of the cap.



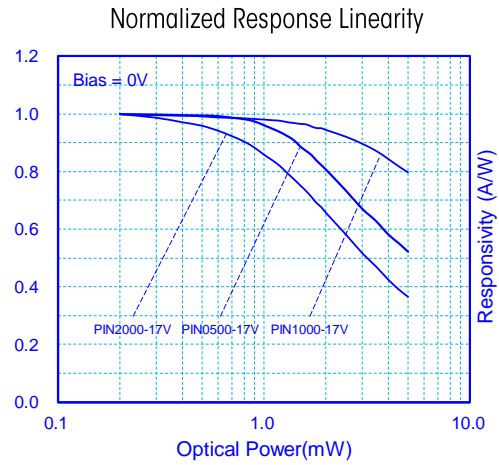
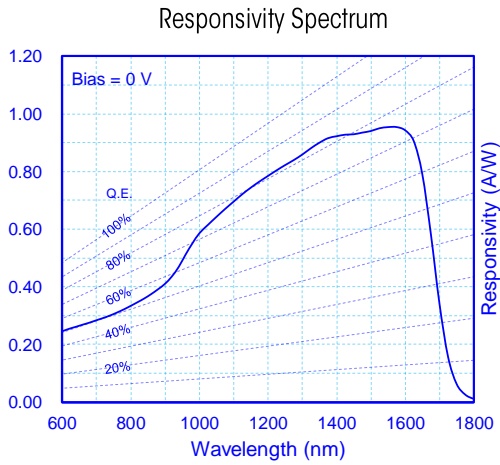
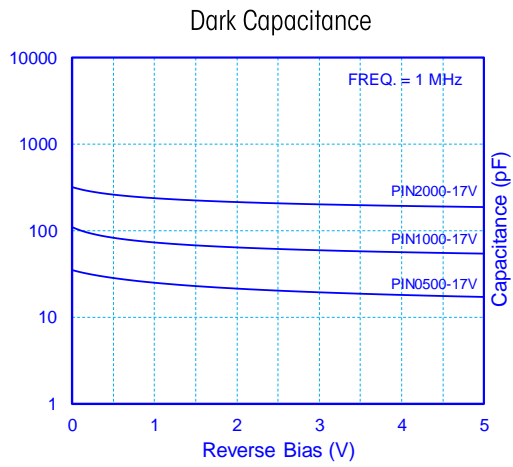
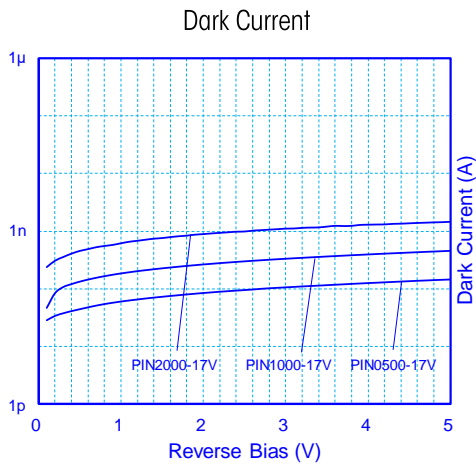


NOTE: Product serial numbers of PINxxxx-17V-C are printed on the back side of the package.





## EXAMPLE CURVES ( $T_{\text{AMB}}=23^{\circ}\text{C}$ )



Note: The example curves are subject to change without notice.



## InGaAs PIN Photodiode (1.2 $\mu\text{m}$ - 2.2 $\mu\text{m}$ )

PIN1000-22-D / TO / T1

PIN2000-22-D / TO / T2

### FEATURES

- Highly Reliable Planar Device
- Low Leakage Current
- High Responsivity in 1.2 - 2.2  $\mu\text{m}$  Spectral Range
- Low Stray Absorption

### APPLICATIONS

- Power Monitoring
- Spectral Analysis
- Light Detection and Ranging (LIDAR)
- Remote Temperature Sensors
- Ice/Slush/Moisture Detection
- Gas Leak Detection
- Single-Photodiode SWIR Camera
- Covert IR Sensing



### GENERAL DESCRIPTIONS

MODEL NO.	Spectral Range	Aperture Size	Package Type
	$\mu\text{m}$	$\mu\text{m}$	---
PIN1000-22-D	1.2 - 2.2	$\varnothing$ 950	---
PIN1000-22-T0			TO-46 / 3P
PIN1000-22-T1			TO-46 / 5P
PIN2000-22-D		$\varnothing$ 1850	---
PIN2000-22-T0			TO-39 / 3P
PIN2000-22-T2			TO-39 / 8P

<sup>1</sup>Wavelength range in which the photodiode has a quantum efficiency higher than 40% at 23°C.



## ABSOLUTE MAXIMUM RATINGS

MODEL NO.	Reverse Voltage		Reverse Current		Forward Current		TEC Current		<sup>2</sup> Ambient Temperature			
	V		mA		mA		A		In Operation		Storage	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	°C		°C	
PIN1000-22-D	---	1.5	---	10	---	10	---	---	-40	+85	-55	+125
PIN1000-22-T0							---	---			-40	+85
PIN1000-22-T1							---	0.65			-40	+85
PIN2000-22-D	---	1	---	10	---	10	---	---	-40	+85	-55	+125
PIN2000-22-T0							---	---			-40	+85
PIN2000-22-T2							---	0.85			-40	+85

<sup>2</sup>Non-condensing environment.

## SPECIFICATIONS ( $T_{\text{AMB}} = 23\text{ }^{\circ}\text{C}$ )

MODEL NO.	Dark Current		Shunt Resistance		Capacitance				3dB Bandwidth	
	$\mu\text{A}$		$\text{K}\Omega$		$\text{pF}$				MHz	
	@ -0.5 V		@ -10 mV		@ 1 MHz, 0V		@ 1 MHz, -0.5 V		@ -0.5 V, 50 $\Omega$	
	Typ.	Max.	Min.	Typ.	Typ.	Max.	Typ.	Max.	Min.	Typ.
PIN1000-22-D	2.5	5	20	40	450	600	300	400	6	10
PIN1000-22-T0										
PIN1000-22-T1										
PIN2000-22-D	10	20	5	10	1800	2300	1400	1800	1.5	2
PIN2000-22-T0										
PIN2000-22-T2										

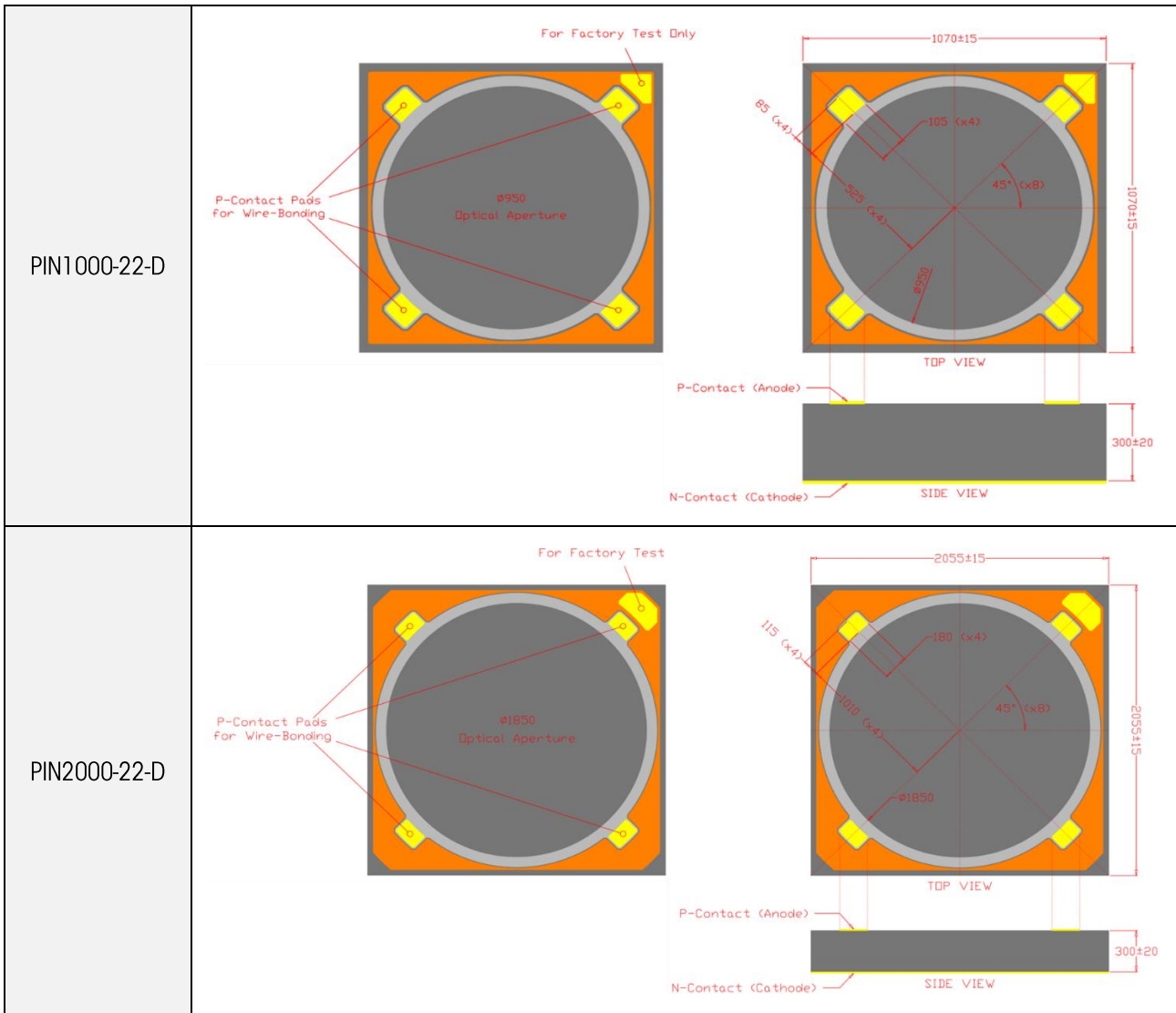
MODEL NO.	Responsivity		Responsivity		<sup>3</sup> Saturation Power		NEP		<sup>4</sup> Max. Cooling Capability, $\Delta T_{\text{MAX}}$	
	A/W		A/W		mW		$10^{-12}\text{ W}/\sqrt{\text{Hz}}$		°C	
	@ 1.55 $\mu\text{m}$ , 0 V		@ 1.9 $\mu\text{m}$ , 0 V		@ 1.55 $\mu\text{m}$ , 0 V, -0.2 dB		@ 1.9 $\mu\text{m}$ , 0 V, 1 KHz		$T_{\text{Heatsink}}=20\text{ }^{\circ}\text{C}$	
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Typ.	Max.	Min.	Typ.
PIN1000-22-D	0.95	1.0	1.05	1.1	1.0	2.0	3	5	---	---
PIN1000-22-T0	0.9	0.95	1.0	1.05					---	---
PIN1000-22-T1	0.95	1.0	1.05	1.1					35	40
PIN2000-22-D	0.95	1.0	1.05	1.1	0.5	1.0	6	10	---	---
PIN2000-22-T0	0.9	0.95	1.0	1.05					---	---
PIN2000-22-T2	0.95	1.0	1.05	1.1					55	60

<sup>3</sup>Measured at the aperture center with an  $1/e^2$  beam diameter of 250  $\mu\text{m}$ .

<sup>4</sup>Adequate heatsink and thermal interface material are the prerequisites for stable operation.

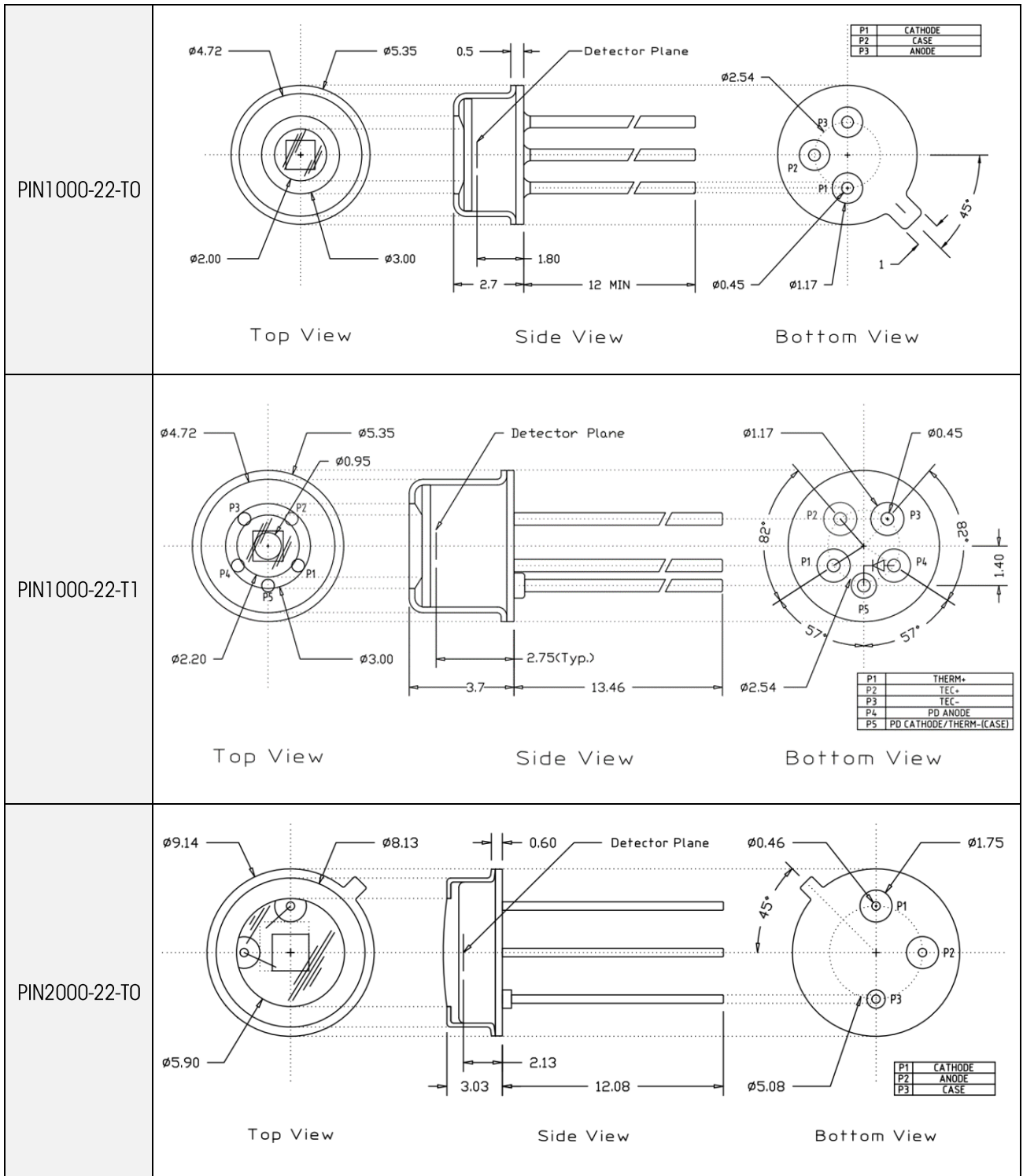


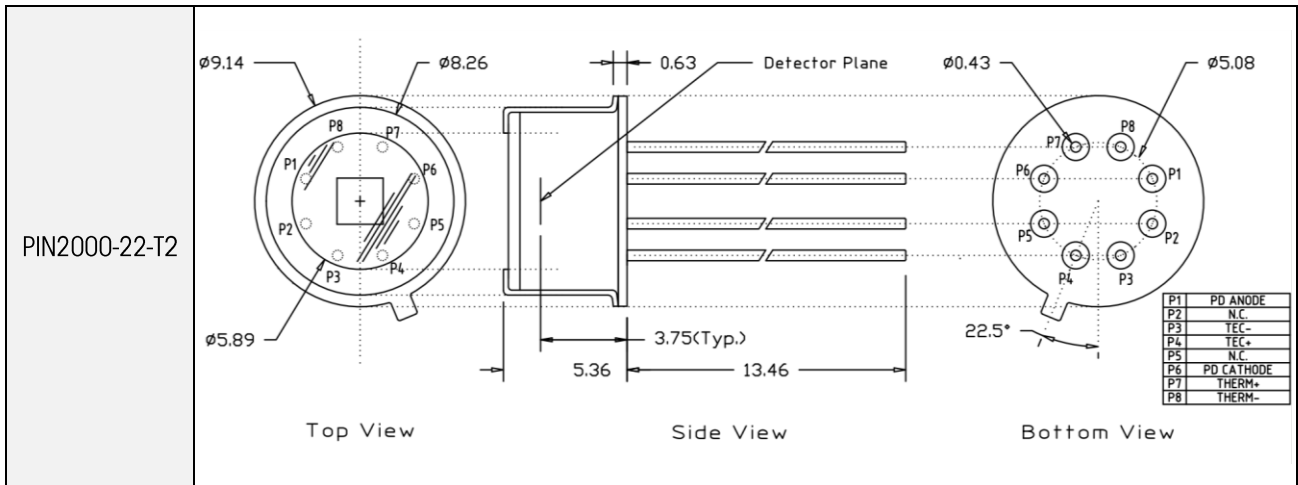
### CHIP DIAGRAM (UNIT: $\mu\text{m}$ )





PACKAGE OUTLINE (UNIT: mm)



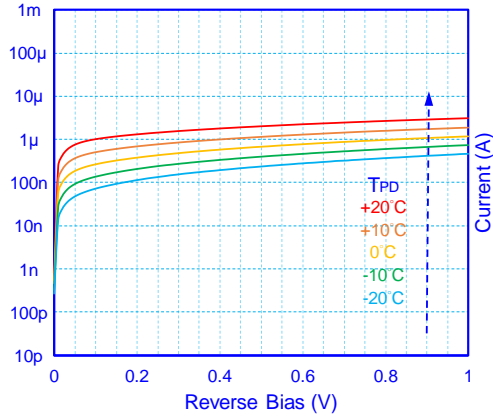


NOTE: Product serial numbers of PINxxxx-22-Tx are printed on the side wall of the cap.

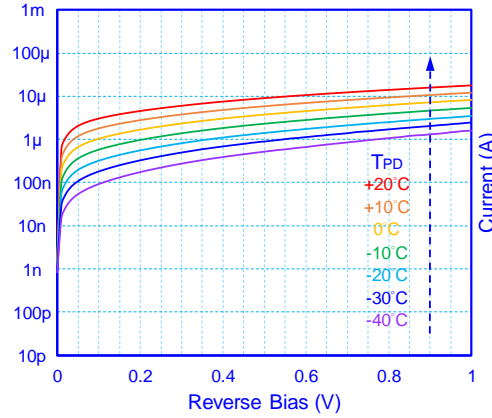


EXAMPLE CURVES ( $T_{\text{AMB}}=23^{\circ}\text{C}$ )

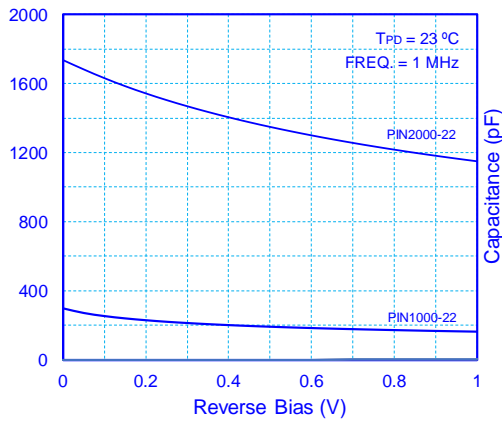
Dark Current (PIN1000)



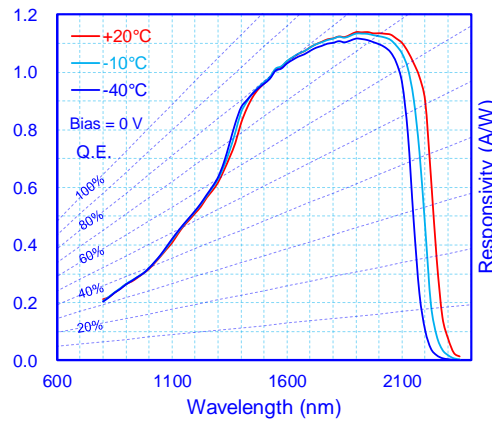
Dark Current (PIN2000)



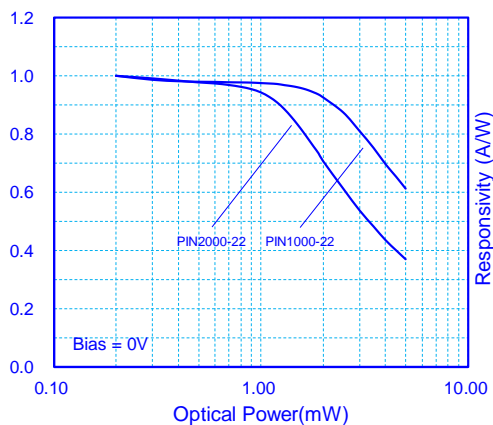
Dark Capacitance



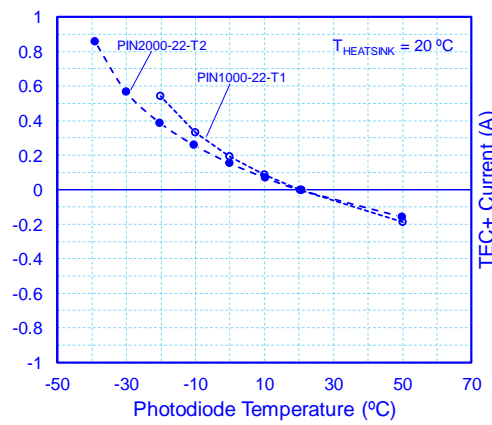
Responsivity Spectrum



Normalized Response Linearity



TEC Performance



\*Non-condensing environment

Note: The example curves are subject to change without notice.



## InGaAs Quadrant PIN Photodiode Chip (0.9 $\mu\text{m}$ - 1.7 $\mu\text{m}$ )

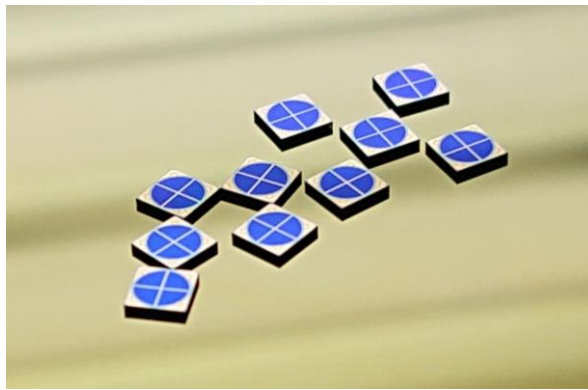
PIN2000Q-17-D

### FEATURES

- Highly Reliable Planar Device
- Low Leakage Current
- High Shunt Resistance
- High Responsivity
- Low Stray Absorption

### APPLICATIONS

- Light Detection and Ranging (LIDAR)
- Beam Alignment
- Light Spot Position Detection
- Remote Optical Control



### GENERAL DESCRIPTIONS

MODEL NO.		PIN2000Q-17-D
PARAMETER	UNIT	VALUE
Spectral Range	$\mu\text{m}$	0.9 – 1.7
Aperture Size / Active Area	$\mu\text{m}/\text{mm}^2$	$\varnothing 1860 / 0.625 \times 4$
Gap	$\mu\text{m}$	75
Chip Dimension		
Length	$\mu\text{m}$	$2055 \pm 15$
Width	$\mu\text{m}$	$2055 \pm 15$
Thickness	$\mu\text{m}$	$300 \pm 20$



ABSOLUTE MAXIMUM RATINGS ( $T_{\text{AMB}} = 23^{\circ}\text{C}$ )

Model No.		PIN2000Q-17-D	
Parameter	Unit	Min.	Max.
Reverse Voltage	V	---	5
Reverse Current	mA	---	2
Forward Current	mA	---	2
Operating Temperature	$^{\circ}\text{C}$	-40	+85
Storage Temperature	$^{\circ}\text{C}$	-40	+125

SPECIFICATIONS ( $T_{\text{AMB}} = 23^{\circ}\text{C}$ )

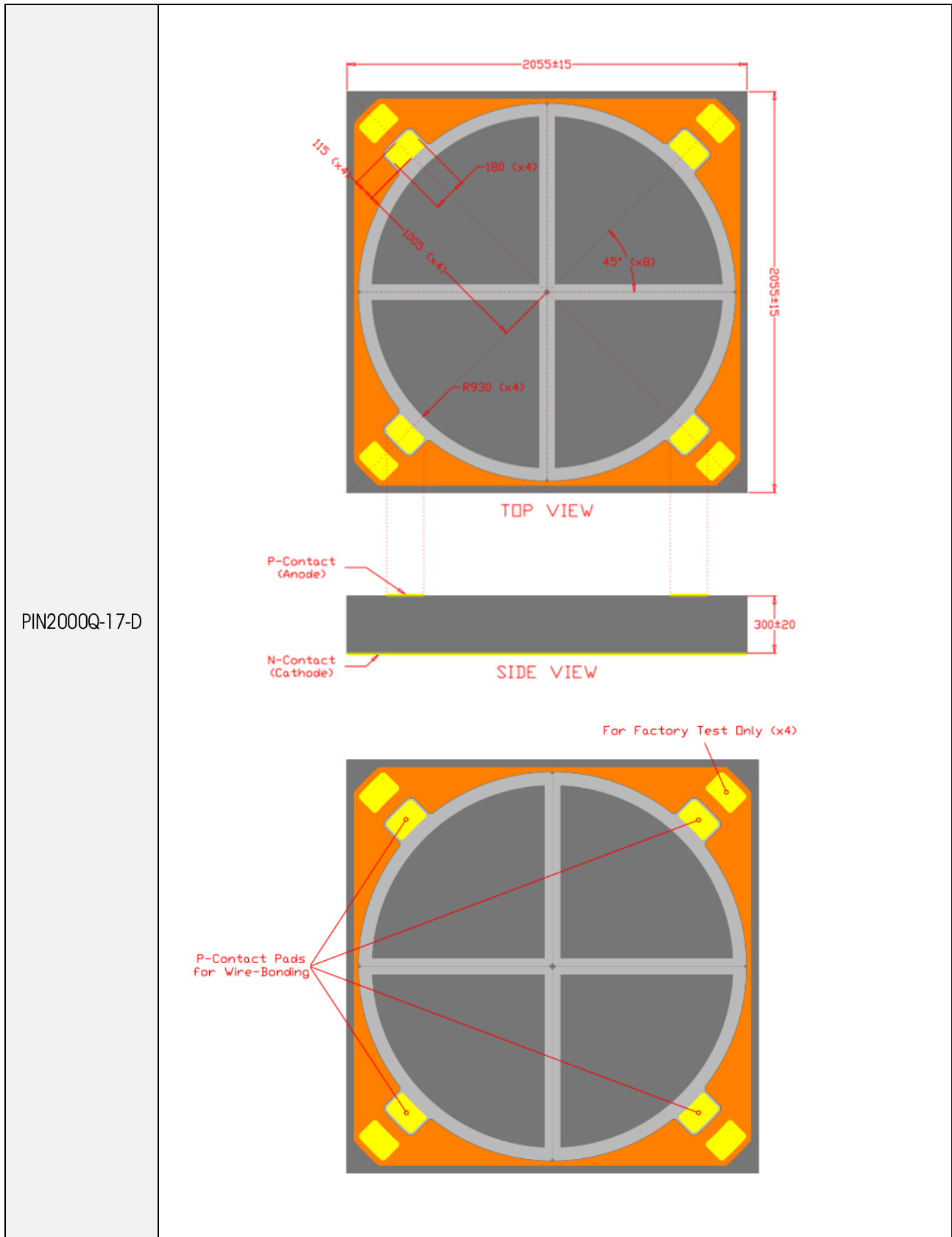
Model No.		PIN2000Q-17		
<sup>1</sup> Spectral Range ( $\mu\text{m}$ )		0.9 – 1.7		
Parameter	Unit	Min.	Typ.	Max.
Dark Current @ -5 V	nA	---	1	2
Shunt Resistance @ -10mV	M $\Omega$	40	150	---
Capacitance @ 1MHz	pF			
@ 0 V		---	160	200
@ -5 V		---	80	100
3dB Bandwidth @ -5 V, 50 $\Omega$	MHz	25	35	---
Responsivity @ 0 V	A/W			
@ 0.85 $\mu\text{m}$		0.1	0.2	---
@ 1.30 $\mu\text{m}$		0.85	0.90	---
@ 1.55 $\mu\text{m}$	0.95	1.00	---	
<sup>2</sup> Saturation Power @ 1.55 $\mu\text{m}$ , 0 V, -0.2 dB	mW	3	4.5	---
NEP @ 1.55 $\mu\text{m}$ , 0 V, 1 KHz	10 <sup>-14</sup> W/ $\sqrt{\text{Hz}}$	---	2	4

<sup>1</sup>1.2 – 2.2  $\mu\text{m}$  wavelength range is also available. Please contact us for further information.

<sup>2</sup>Measured at the aperture center with an  $1/e^2$  beam diameter of 250  $\mu\text{m}$ .



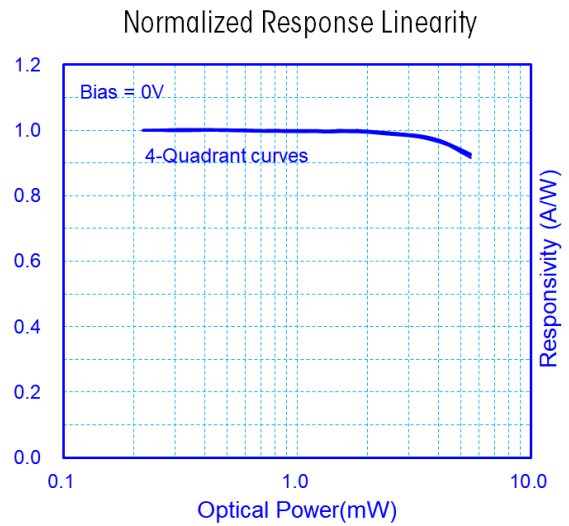
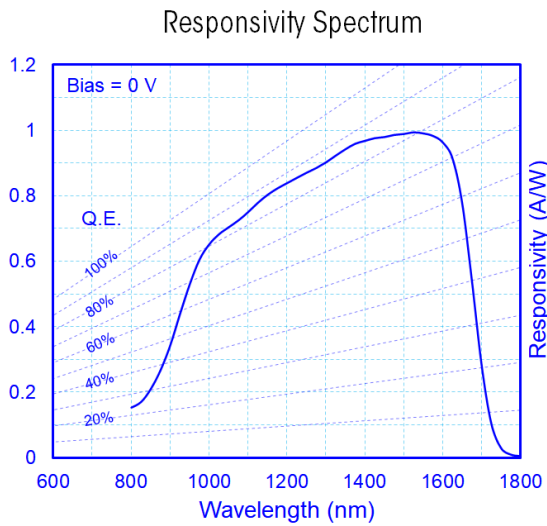
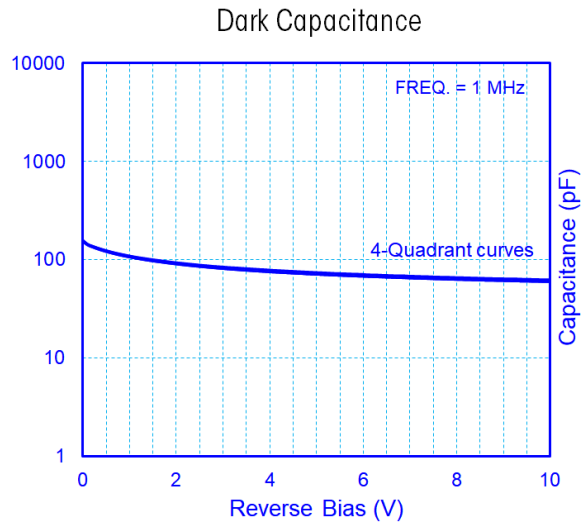
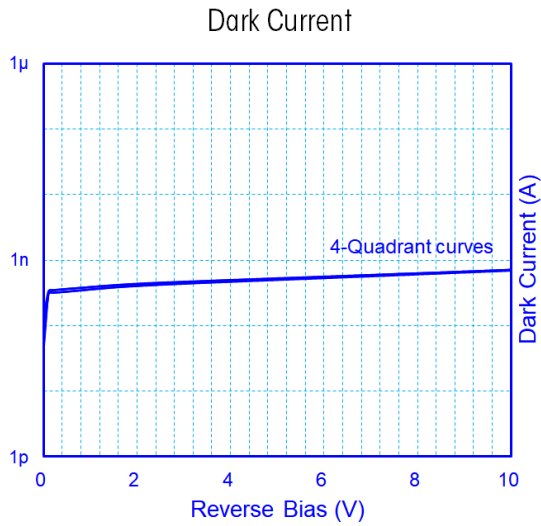
CHIP DIAGRAM (UNIT:  $\mu\text{m}$ )



PIN2000Q-17-D



EXAMPLE CURVES ( $T_{\text{AMB}}=23^{\circ}\text{C}$ )



Note: The example curves are subject to change without notice.