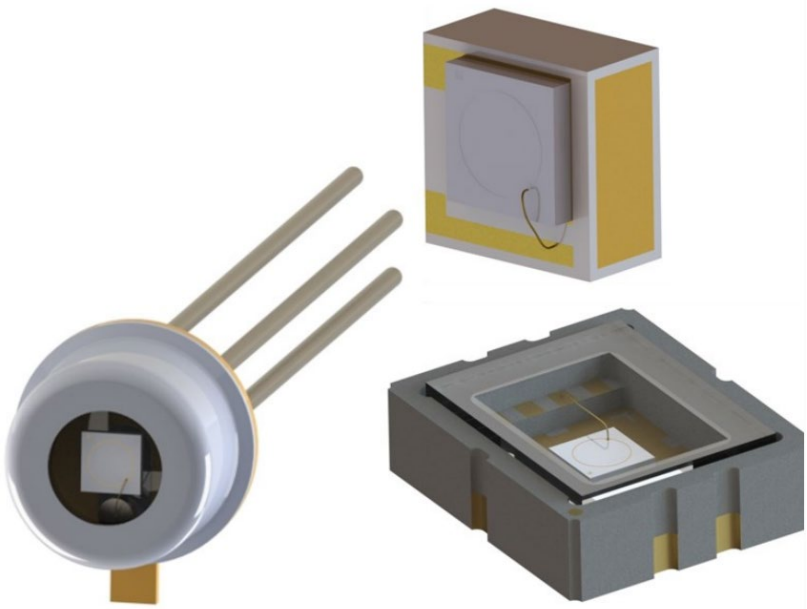
GPD OPTOELECTRONICS

# Small Area InGaAs Photodiode

*1.7µm cutoff wavelength*

*100µm – 1mm dia. active areas*



## APPLICATIONS

- Optical Power Meter
- Spectroscopy
- Optical Testing
- Medical Diagnostics
- Fiber Optic Receivers
- Free-Space Communication

## AVAILABLE OPTIONS

- Through-Hole and Ceramic SMT Packaging
- High Quantum Efficiency
- Low Polarization-Dependent Loss
- Custom Lenses, Filters, and Anti-Reflective Coatings
- Fiber-Optic Packaging
- Integrated Electronics:
  - Thermo-Electric Cooler
  - Transimpedance Amplifier

## SPECIFICATIONS

**Small Area InGaAs Photodiodes**

| Part Number | N17S10-XX | N17S15-XX | N17S30-XX | N17S50-XX | N17S100-XX | Units |
|---|---|---|---|---|---|---|
| **Optoelectronic Characteristics @ 23 ºC ± 2 ºC** | | | | | | |
| Active Diameter | **100** | **150** | **300** | **500** | **1000** | µm |
| Spectral Response Range | 800-1700 | 800-1700 | 800-1700 | 800-1700 | 800-1700 | nm |
| Peak Wavelength (typ) | **1550** | **1550** | **1550** | **1550** | **1550** | nm |
| Responsivity @ 850 nm (min/typ) | 0.2/0.35 | 0.2/0.35 | 0.2/0.35 | 0.2/0.35 | 0.2/0.35 | A/W |
| Responsivity @ 1300 nm (min/typ) | 0.85/1.0 | 0.85/1.0 | 0.85/1.0 | 0.85/1.0 | 0.85/1.0 | A/W |
| Responsivity @ 1550 nm (min/typ) | 0.93/1.1 | 0.93/1.1 | 0.93/1.1 | 0.93/1.1 | 0.93/1.1 | A/W |
| RSHUNT @ 10mV (min/typ) | 1000/2000 | 1000/2000 | 200/550 | 180/250 | 50/180 | MΩ |
| IDARK @ VR (typ/max) | 0.05/1 @ 5 V | 0.1/1 @ 5 V | 0.5 5 @ 5 V | 0.8/5 @ 5 V | 1/8 @ 5 V | nA |
| Capacitance @ 0 V (max) | 1.9 | 2.4 | **25** | **40** | **250** | pF |
| Capacitance @ VR (max) | 2.5 @ 5 V | 1.8 @ 5 V | 8 @ 5 V | 18 @ 5 V | 110 @ 5 V | pF |
| NEP @ λPEAK @ 5 V (min) | **4** | **6** | **12** | **16** | **22** | fW/Hz1/2 |
| Linearity (±0.2 dB) @ 5V (min/typ) | 6/8 | 6/8 | 6/8 | 6/8 | 6/8 | dBm |
| Storage Temperature | -40 to 125 | -40 to 125 | -40 to 125 | -40 to 125 | -40 to 125 | ºC |
| Operating Temperature | -40 to 85 | -40 to 85 | -40 to 85 | -40 to 85 | -40 to 85 | ºC |
| **Maximum Ratings @ 23 °C ± 2 °C** | | | | | | |
| Reverse Voltage | **25** | **25** | **25** | **20** | 15 | V |
| Reverse Current | 10 | 10 | 10 | 10 | 10 | mA |
| Forward Current | 10 | 10 | 10 | 10 | 10 | mA |



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Figure 1. InGaAs Response vs. Wavelength vs. Temperature

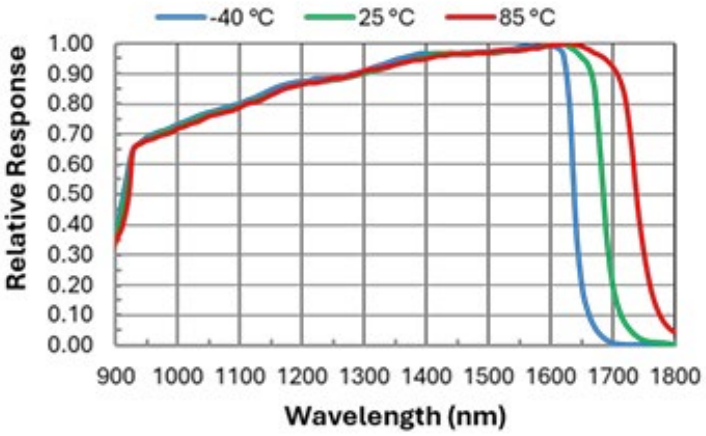



Figure 2. InGaAs Response vs. Wavelength vs. Temperature (Cont.)

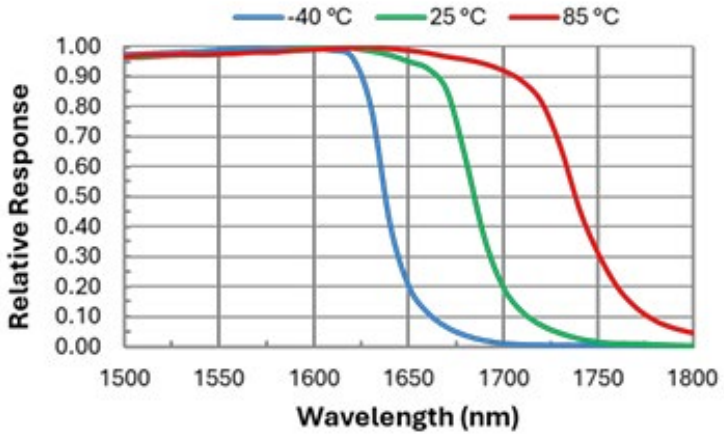



Figure 3. Dark Current vs. Reverse Voltage vs. Diameter

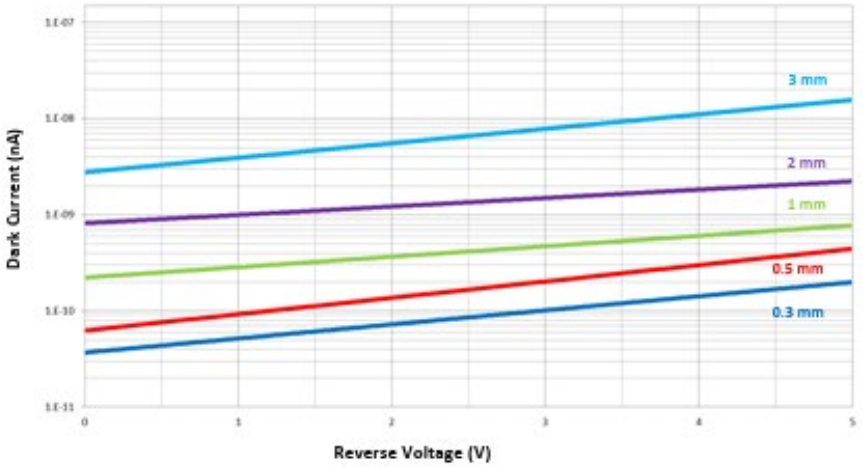
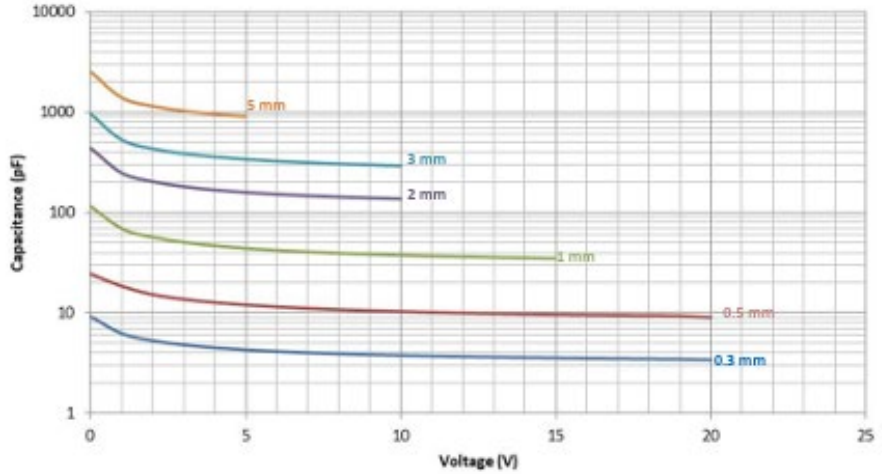



Figure 4. Capacitance (pF) vs. Reverse Voltage (V) vs. Diameter (mm)







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## PACKAGING CAPABILITIES

| Packaging Configurations | | | |
|---|---|---|---|
| Diameter (µm) | TO Header | | Ceramic Leadless Chip Carrier |
| | TO-46 | TO-18 | LCC-6 |
| 100 | • | • | |
| 150 | • | • | |
| 300 | • | • | |
| 500 | • | • | • |
| 1000 | • | • | • |
| **Window (Other Options Available)** | | | |
| Material | Molded Clear Glass | | Borosilicate Glass |
| Thickness (mm) | 0.25 | | 0.5 |

## GPD QUALIFICATIONS

**Our compliance, certificates, and capabilities**

- ✓ ISO 9001:2005
- ✓ Quality Assurance Provisions
- ✓ DDTC/ITAR registered
- ✓ MIL-STD-883
- ✓ MIL-STD-750
- ✓ Space-qualified designs
- ✓ High-reliable assembly and environmental/ radiation test
- ✓ Manufactured in Salem, NH



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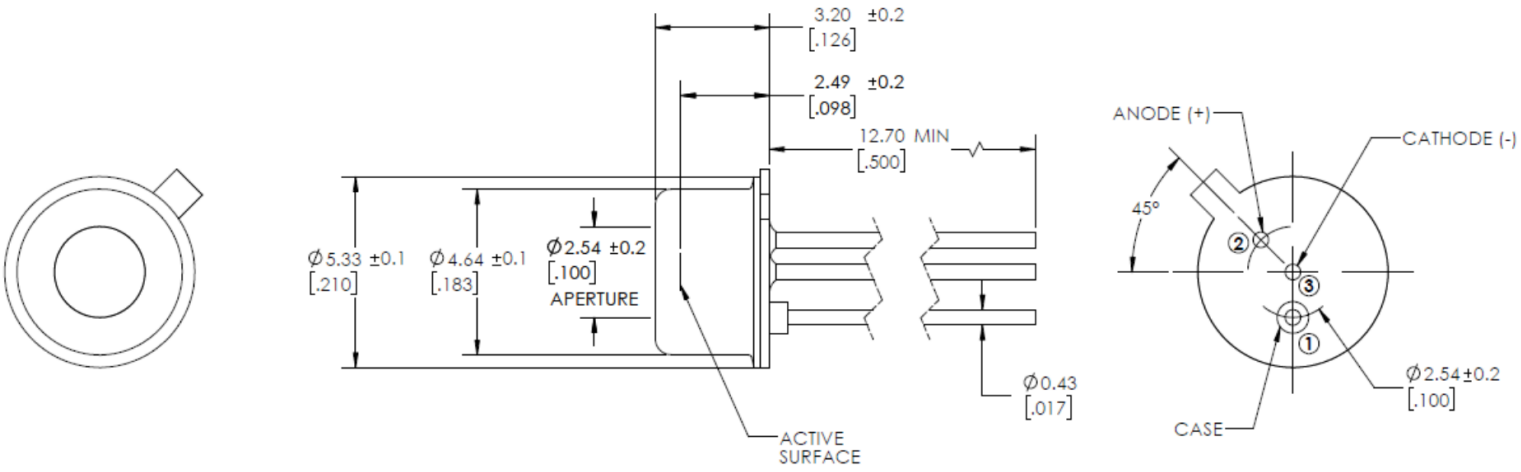
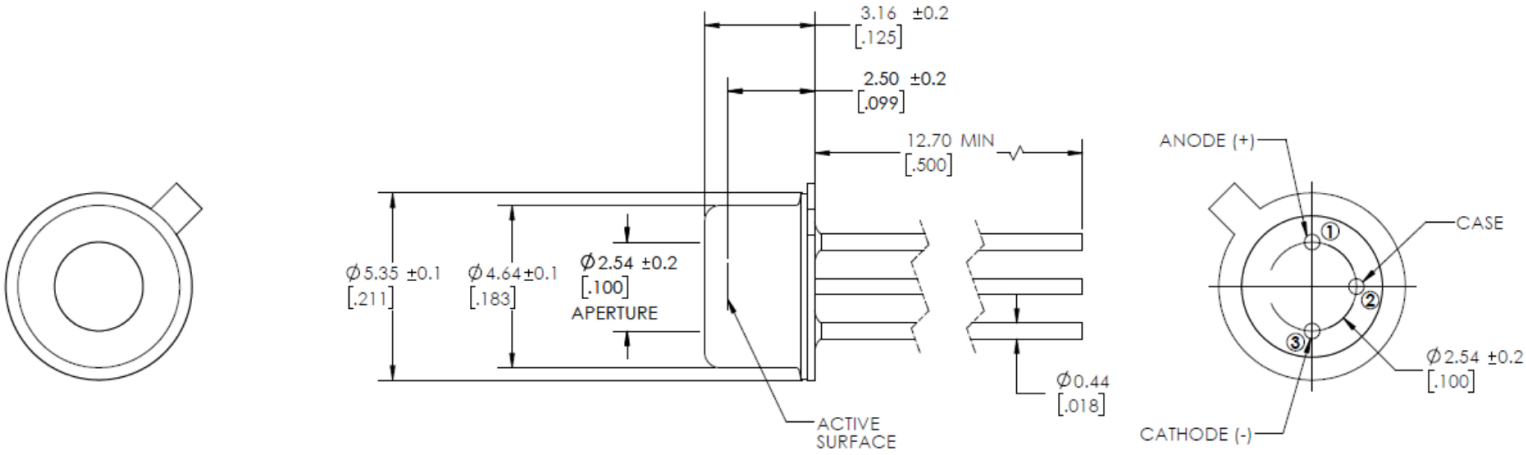
## Packaging Outline

### TO-46




### TO-18




**DIMENSIONS IN MM [INCH]**

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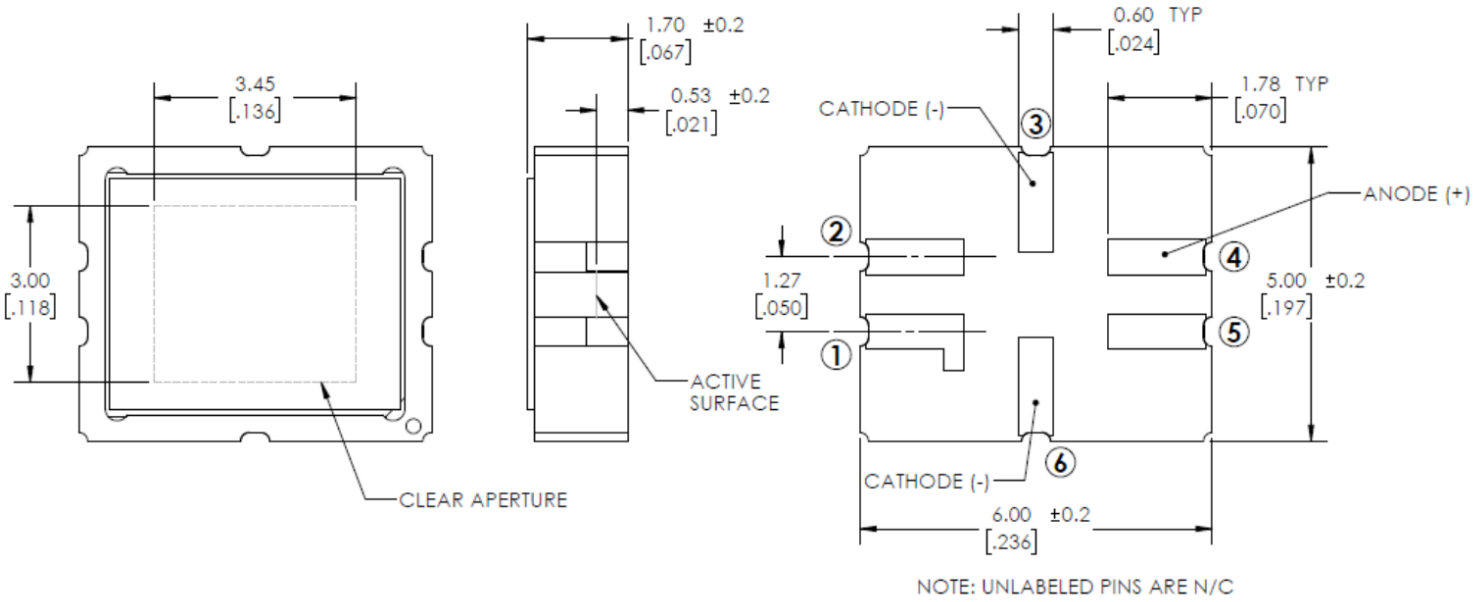
## Packaging Outline

### LCC-6




**DIMENSIONS IN MM [INCH]**

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## ORDERING INFORMATION

GPD is proud to offer multiple packaging solutions to best fit the needs of your application. Our Standard configurations are mentioned below, and custom packaging is also available.

Selection is based on the size of the photodiode and the package requirements of your application. Refer to packaging capabilities chart below for more information.

**N17S10-T46**

| Material |
|---|
| InGaAs PIN Photodiode |

| Performance | |
|---|---|
| S | Standard |
| C | Custom |

| Cut-off Wavelength | |
|---|---|
| 17 | 1.7µm |
| 19 | 1.9µm |
| 21 | 2.05µm |
| 22 | 2.2µm |
| 26 | 2.6µm |

| Diameter | |
|---|---|
| 10 | 100µm |
| 15 | 150µm |
| 30 | 300µm |
| 50 | 500µm |
| 100 | 1000µm |

| Package* | |
|---|---|
| T46 | TO-46 |
| T18 | TO-18 |
| LCC6 | 6 contact |
| CS | Ceramic Substrate |
| *More packages available upon request | |

**NOTE:** GPD Optoelectronics may update product details without prior notice, and any use or application of our products is at your own discretion.



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## Handling and Processing Precautions

### Electrostatic Discharge (ESD) Warning

Our detectors are highly susceptible to damage from electrostatic discharge (ESD). To prevent damage, use ESD protective measures, such as grounding straps, when unpacking and handling these devices.

To guarantee the optimal performance of a photodiode, it is crucial to adhere strictly to the device's electrical specifications. Photodiodes are highly sensitive to values that surpass their absolute maximum ratings. Exceeding these limits can lead to damage or total failure of the device. Users should employ handling techniques that avoid electrostatic discharges and other electrical surges during both the handling and operation of these devices.

### Cleanroom Packaging and Handling

Our detectors are packaged in a clean state under cleanroom conditions, eliminating the need for cleaning before processing. In fact, cleaning is not recommended as it may introduce contaminants.

### Processing Guidelines

To maintain the cleanliness of our detectors:

- Process under the cleanest conditions possible, including clean workplaces and room air.
- Wear suitable gloves or fingerstalls to prevent fingerprint contamination (mainly fats and organic acids).
- Ensure the soldering process is designed to prevent the need for post-soldering cleaning.

### Cleaning Optical Windows (if necessary)

If exceptional circumstances require cleaning the optical windows:

- First, identify the type of contamination.
- For loose particles, gently blow them off with nitrogen gas or clean, dry air.
- For attached particles or other contaminating materials, clean with solvents such as isopropyl alcohol, or First Contact™ Polymer



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