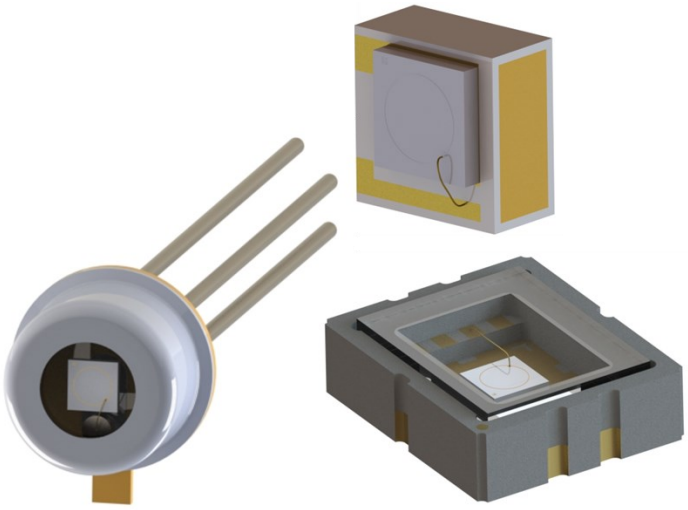
Germanium Photodiodes

800-1700 nm wavelength

1 - 5 mm dia. & 10 mm sq. active areas



APPLICATIONS

- Optical Power Measurement
- Spectroscopy
- Optical Testing
- Medical Diagnostics
- Fiber Optic receivers

AVAILABLE OPTIONS

- Through-Hole and Ceramic SMT Packaging
- Custom Lenses, Filters, and Anti-Reflective Coatings
- Fiber-Optic Packaging
- Integrated Electronics:
  - Thermo-Electric Cooler
  - Transimpedance Amplifier

Specifications

Germanium Photodiodes		
Optoelectronic Characteristics @ 23 ºC ± 2 ºC		
Spectral Response Range	800-1700	nm
Responsivity @ 850 nm (typ)	0.30	A/W
Responsivity @ 1300 nm (typ)	0.75	A/W
Responsivity @ 1550 nm (typ)	0.85	A/W
Linearity	10	dBm
Storage Temperature	-40 to 125	ºC
Operating Temperature	-40 to 85	ºC
Maximum Ratings @ 23 °C ± 2 °C		
Reverse Current	20	mA
Forward Current	10	mA

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Figure 1. Responsivity vs. Wavelength

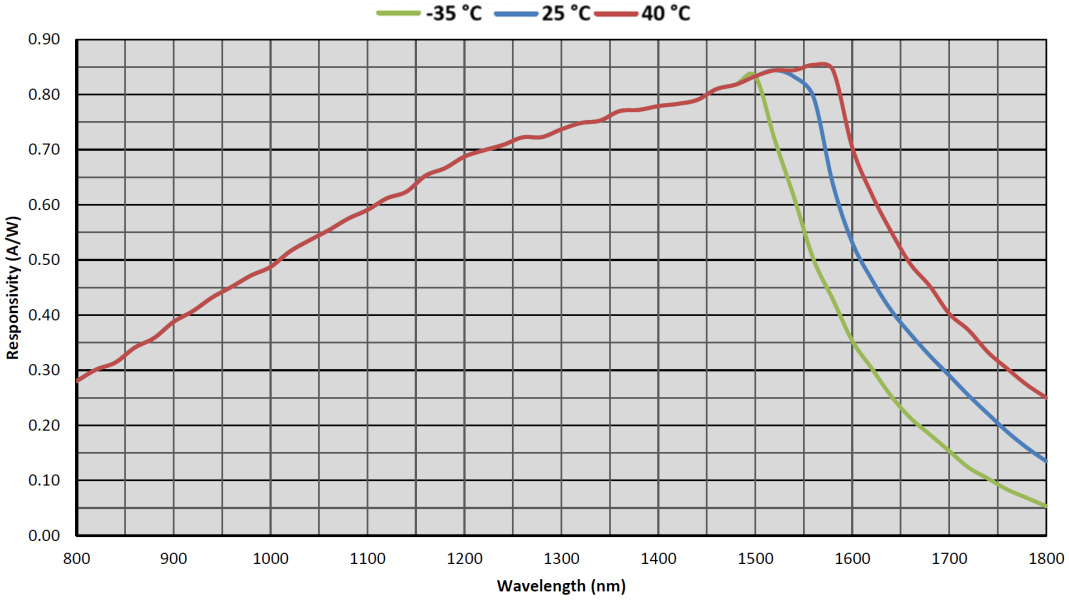

Figure 2. Capacitance vs. Reverse Bias

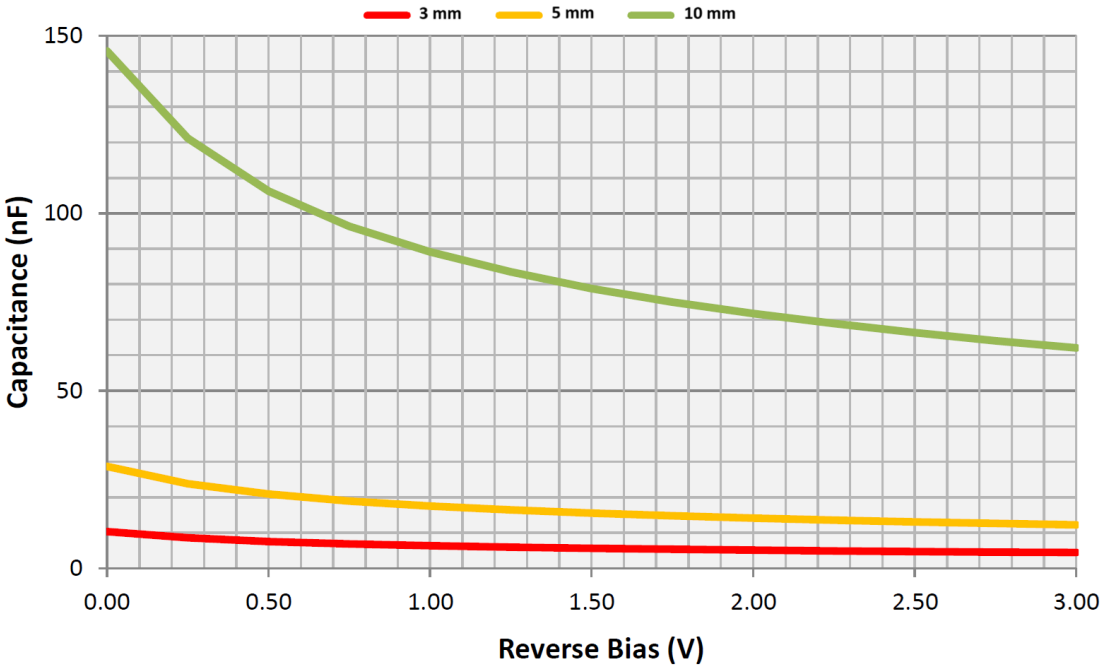

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Figure 3. Dark Current vs. Reverse Bias

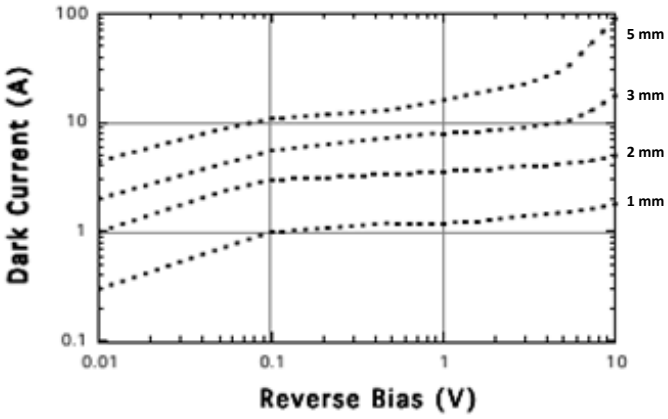


Figure 4. Shunt Resistance vs. Temperature

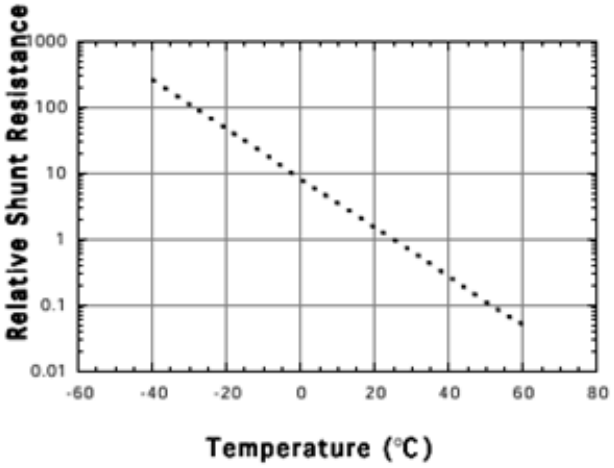
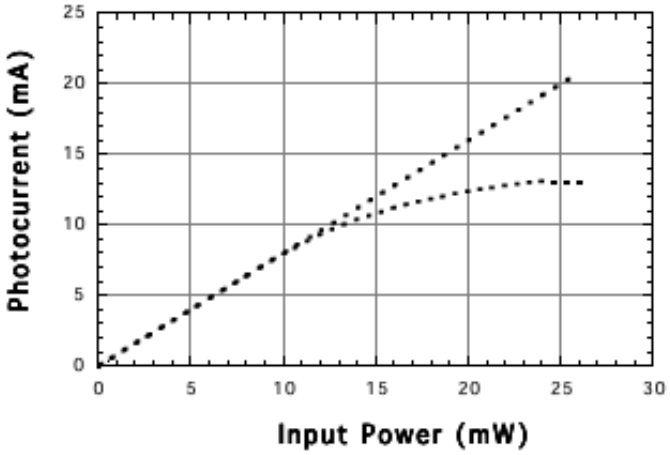


Figure 5. Photocurrent vs. Input Power



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Germanium Photodiodes

800-1700 nm wavelength

1 - 5 mm dia. & 10 mm sq. active areas

Packaging Capabilities

Packaging Configurations								
Size	**TO Headers**					**Ceramic Leadless Chip Carriers**		
	TO-46	**TO-18**	**TO-5**	**TO-8**	**TO-9**	**LCC-6**	**LCC-28**	**BNC**
1 mm dia.	•	•				•		
2 mm dia.			•			•		
3 mm dia.			•				•	•
5 mm dia.				•			•	•
10x10 mm					•			•

Window (Other Options Available)			
Material	**Molded Clear Glass**	**Sapphire**	**Borosilicate Glass**
Thickness (mm)	**0.25**	**0.5**	**0.5**

GPD QUALIFICATIONS

Our compliance, certificates, and capabilities

- ✓ **ISO 9001:2015**
- ✓ **Quality Assurance Provisions**
- ✓ **DDTC/ITAR registered**
- ✓ **MIL-STD-883**
- ✓ **MIL-STD-750**
- ✓ **Space-qualified designs**
- ✓ **High-reliability assembly and environmental/ radiation test**
- ✓ **Manufactured in Salem, NH**

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Specifications

1 mm Diameter Germanium Photodiode Performance Specifications				
Part Number	**GB100-XX**	**GH100-XX**	**GV100-XX**	
Optoelectronic Characteristics @ 23 ºC ± 2 ºC				**Units**
R_{SHUNT} @ 10mV (min/typ)	20/40	60/100	200/280	kΩ
I_{DARK} (max)	4	1.5	0.5	µA
Capacitance (max)	95	300	1500	pF
$V_{REVERSE}$	15	2	0.3	V
NEP (typ)	1.5	1	0.6	$pW/Hz^{1/2}$
Maximum Reverse Voltage	15	3	0.3	V

2 mm Diameter Germanium Photodiode Performance Specifications				
Part Number	**GB200-XX**	**GH200-XX**	**GV200-XX**	
Optoelectronic Characteristics @ 23 ºC ± 2 ºC				**Units**
R_{SHUNT} @ 10mV (min/typ)	6/12	30/60	80/120	kΩ
I_{DARK} (max)	10	3	1	µA
Capacitance (max)	360	2200	7000	pF
$V_{REVERSE}$	10	2	0.3	V
NEP (typ)	3	1.4	0.8	$pW/Hz^{1/2}$
Maximum Reverse Voltage	15	3	0.5	V

GB Series: Designed for high-speed applications with reverse bias >5V
GH Series: Designed for applications with reverse bias <5 V
GV Series: Designed for zero bias applications

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Specifications

3 mm Diameter Germanium Photodiode Performance Specifications				
Part Number	**GB300-XX**	**GH300-XX**	**GV300-XX**	
Optoelectronic Characteristics @ 23 ºC ± 2 ºC				**Units**
R_{SHUNT} @ 10mV (min/typ)	4/8	25/35	40/65	kΩ
I_{DARK} (max)	20	4	2	µA
Capacitance (max)	1200	7000	14000	pF
$V_{REVERSE}$	5	1	0.25	V
NEP (typ)	4	2	1	$pW/Hz^{1/2}$
Maximum Reverse Voltage	10	3	0.5	V

5 mm Diameter Germanium Photodiode Performance Specifications				
Part Number	**GB500-XX**	**GH500-XX**	**GV500-XX**	
Optoelectronic Characteristics @ 23 ºC ± 2 ºC				**Units**
R_{SHUNT} @ 10mV (min/typ)	2/4	10/15	15/20	kΩ
I_{DARK} (max)	30	10	5	µA
Capacitance (max)	3000	17000	40000	pF
$V_{REVERSE}$	3	1	0.1	V
NEP (typ)	5	3	2	$pW/Hz^{1/2}$
Maximum Reverse Voltage	10	3	0.3	V

GB Series: Designed for high-speed applications with reverse bias >5V
GH Series: Designed for applications with reverse bias <5 V
GV Series: Designed for zero bias applications

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Specifications

10 x 10 mm Germanium Photodiode Performance Specifications				
Part Number	**GB10M-XX**	**GH10M-XX**	**GV10M-XX**	
Optoelectronic Characteristics @ 23 ºC ± 2 ºC				**Units**
R_{SHUNT} @ 10mV (min/typ)	Contact GPD for More Information	2/3.5	Contact GPD for More Information	kΩ
I_{DARK} (max)		50		µA
Capacitace (max)		90000		pF
$V_{REVERSE}$		0.5		V
NEP (typ)		6		$pW/Hz^{1/2}$
Maximum Reverse Voltage		1		V

GB Series: Designed for high-speed applications with reverse bias >5V
GH Series: Designed for applications with reverse bias <5 V
GV Series: Designed for zero bias applications

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Germanium Photodiodes

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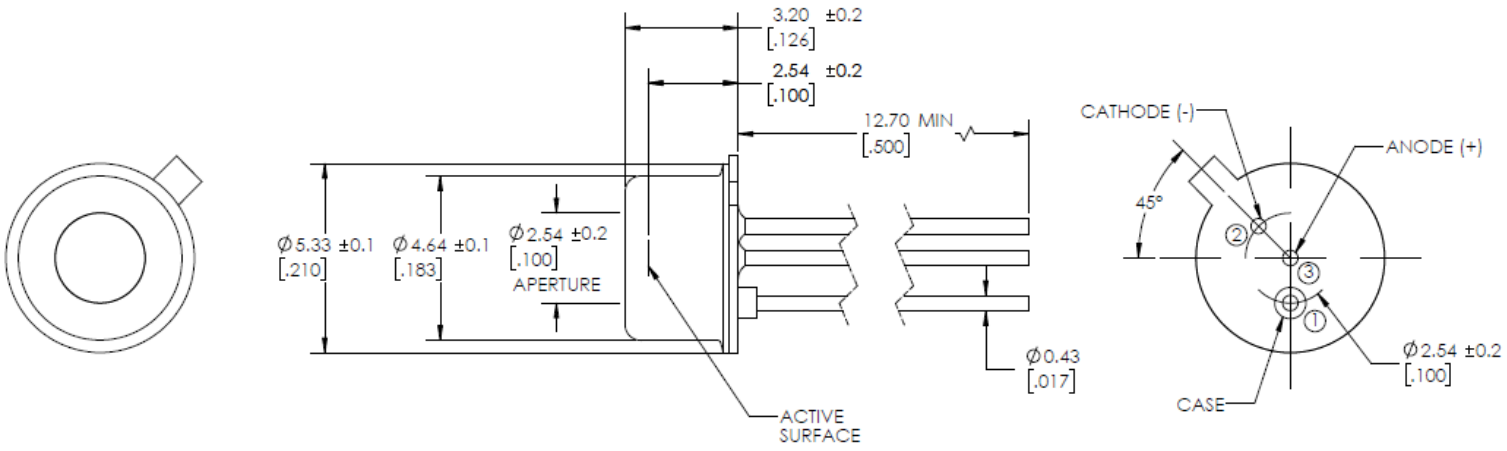
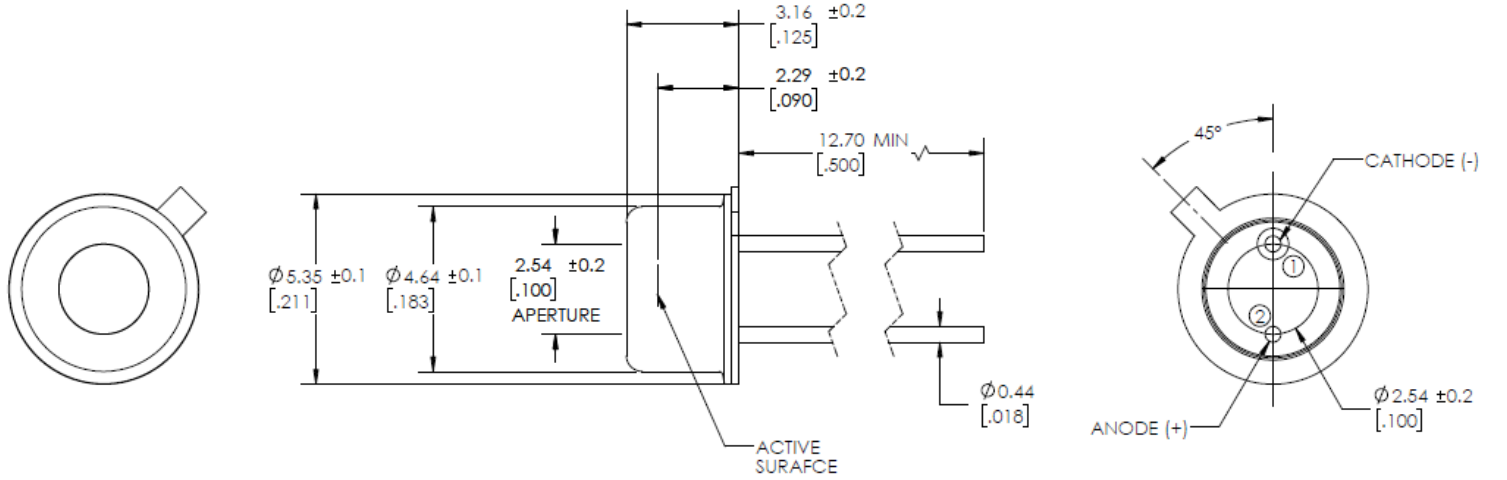
Package Outlines

TO-46



TO-18



DIMENSIONS IN MM [INCH]

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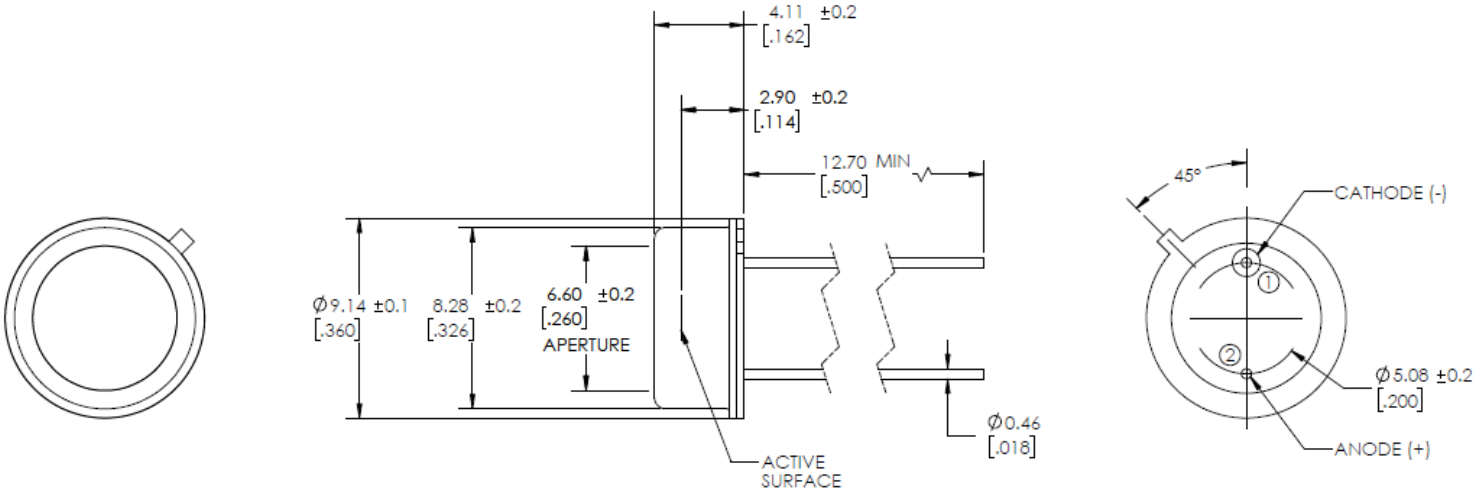
Germanium Photodiodes

800-1700 nm wavelength

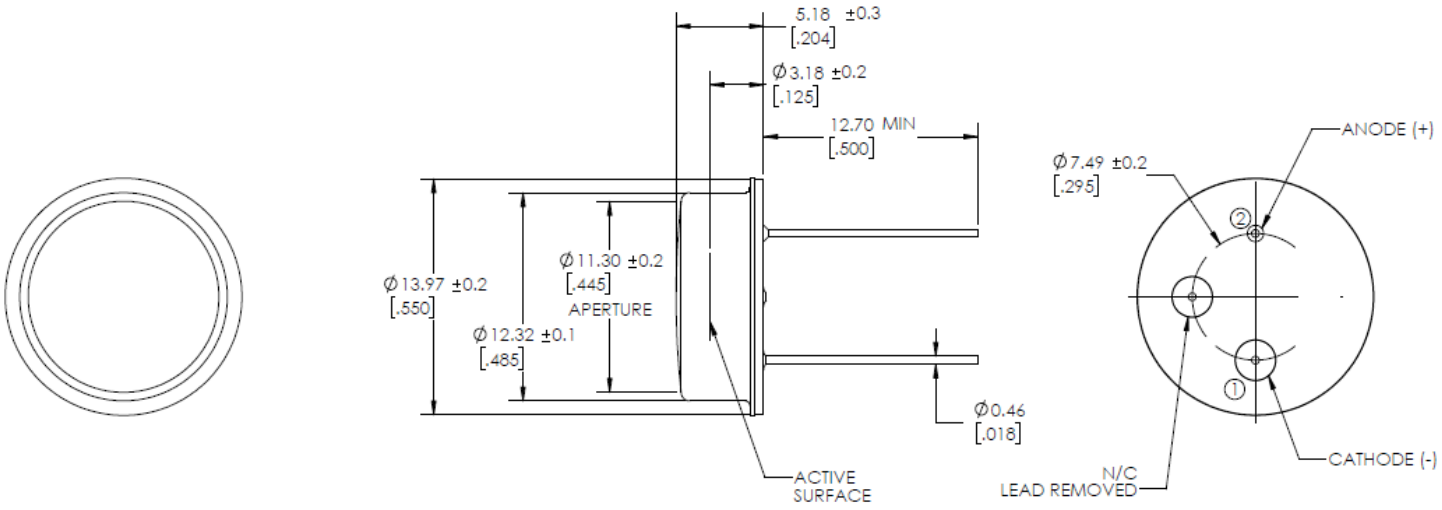
1 - 5 mm dia. & 10 mm sq. active areas

Package Outlines

TO-5



TO-8



DIMENSIONS IN MM [INCH]

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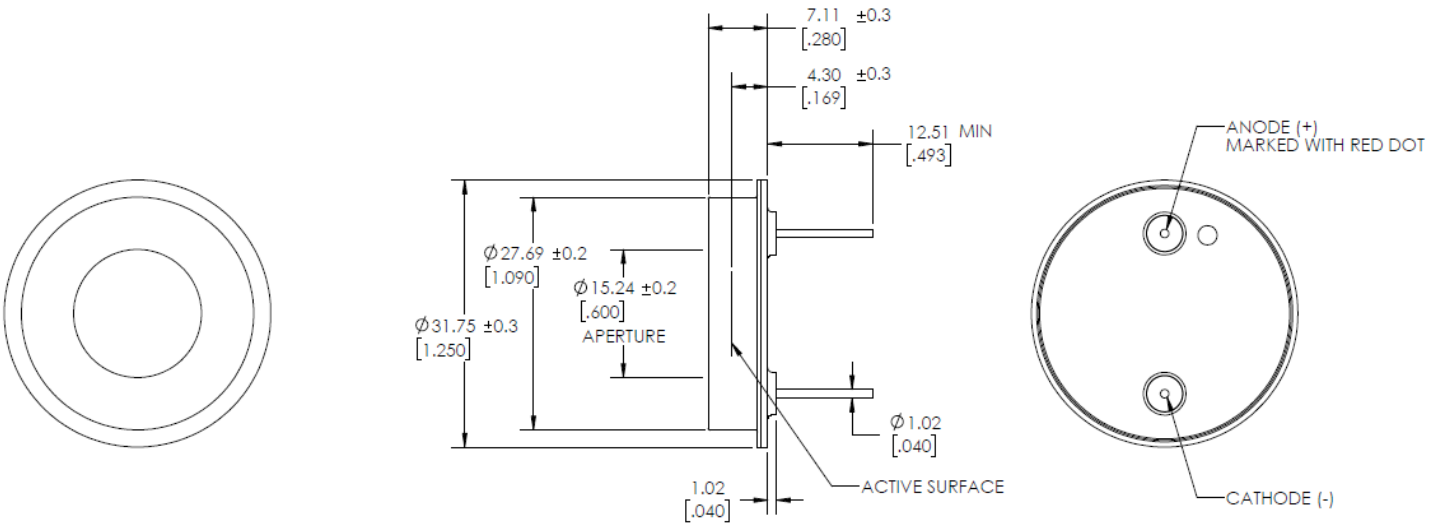
Package Outlines

TO-9



DIMENSIONS IN MM [INCH]

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Germanium Photodiodes

800-1700 nm wavelength

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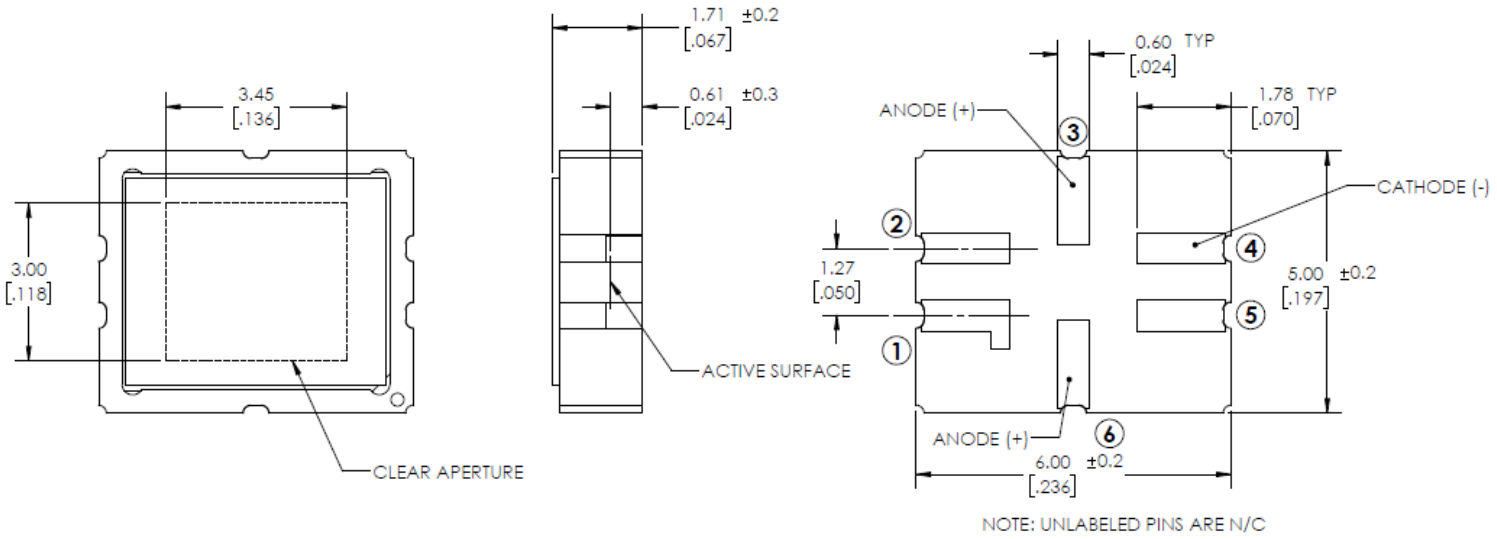
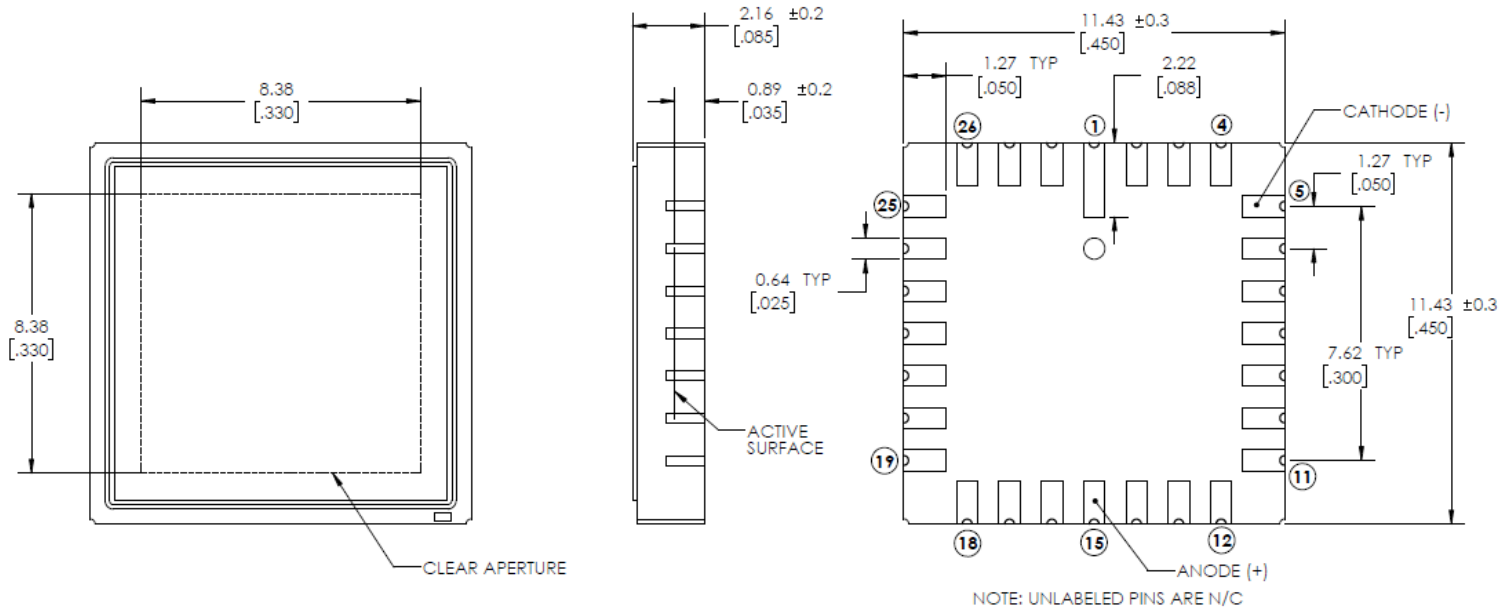
Package Outlines

LCC-6



LCC-28



DIMENSIONS IN MM [INCH]

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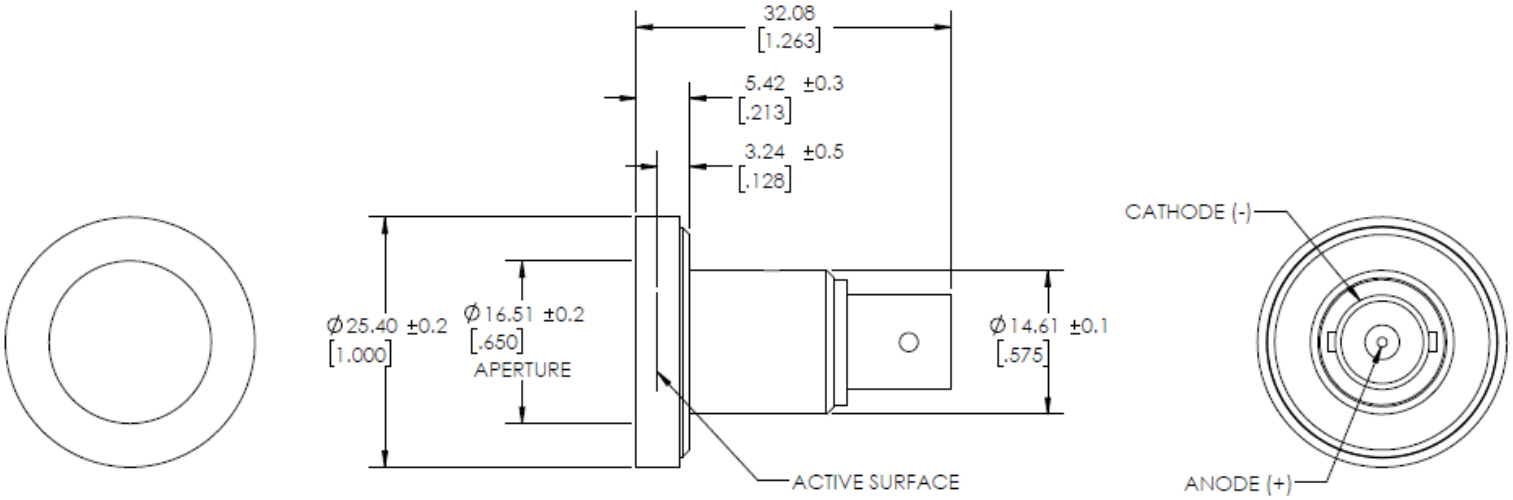
Package Outlines

BNC



DIMENSIONS IN MM [INCH]

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Germanium Photodiodes

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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.

GB100-T46

Material
Germanium Photodiode

Performance	
B	HB performance (formerly GM series) Designed for high-speed applications with reverse bias >5V
H	HS performance, Designed for applications with reverse bias <5 V
V	VHS performance, Designed for zero bias applications
R	VHR performance, Designed for zero bias applications requiring high shunt resistance
C	Custom performance

Diameter	
100	1 mm
200	2 mm
300	3 mm
500	5 mm

Square	
10M	10x10mm

Package*	
T46	TO-46
T18	TO-18
T5	TO-5
T8	TO-8
T9	TO-9
LCC6	6 contact
LCC28	28 contact
BNC	BNC
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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