

TECHSPEC<sup>®</sup> 20mm Dia. x 2mm Thick, 8-12μm AR Coated, Ge Window



Germanium (Ge) Windows

Stock **#63-213** 20+ In Stock

-

1

+

S\$959<sup>00</sup>

ADD TO CART

| Volume Pricing |                               |
|----------------|-------------------------------|
| Qty 1+         | S\$959.00 each                |
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SPECIFICATIONS

General

Protective Window

Type:

Physical & Mechanical Properties

Protective as needed

Bevel:

|                 |                          |
|-----------------|--------------------------|
| 90.00           | Clear Aperture (%):      |
| 18.00           | Clear Aperture CA (mm):  |
| 20.00 +0.0/-0.1 | Diameter (mm):           |
| 2.00 ±0.1       | Thickness (mm):          |
| Fine Ground     | Edges:                   |
| 780.00          | Knoop Hardness (kg/mm²): |
| <1              | Parallelism (arcmin):    |
| 0.28            | Poisson's Ratio:         |
| 102.7           | Young's Modulus (GPa):   |

### Optical Properties

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| BBAR (8000-12000nm)               | Coating:                               |
| R <sub>avg</sub> <3.0% @ 8 - 12µm | Coating Specification:                 |
| 4.002 @ 11µm                      | Index of Refraction (n <sub>d</sub> ): |
| Germanium (Ge)                    | Substrate:                             |
| λ/10 @ 10.6µm                     | Surface Flatness (P-V):                |
| 60-40                             | Surface Quality:                       |
| 8000 - 12000                      | Wavelength Range (nm):                 |

### Material Properties

|      |                                                              |
|------|--------------------------------------------------------------|
| 6.1  | Coefficient of Thermal Expansion CTE (10 <sup>-6</sup> /°C): |
| 5.33 | Density (g/cm³):                                             |

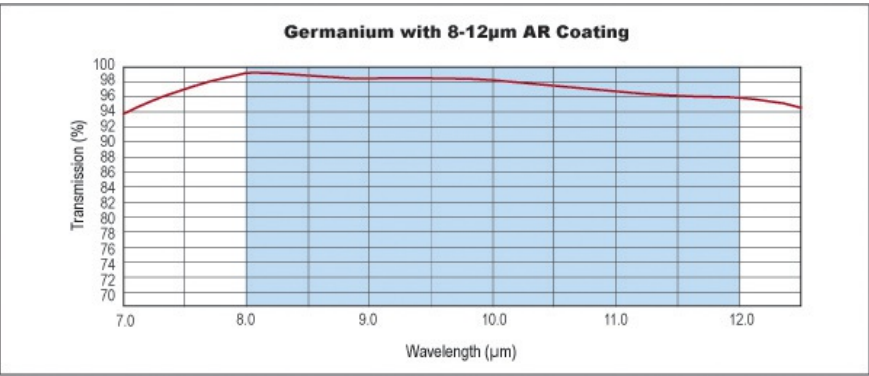
### Regulatory Compliance

|           |                             |
|-----------|-----------------------------|
| Compliant | RoHS 2015:                  |
| View      | Certificate of Conformance: |
| Compliant | REACH 241:                  |

## PRODUCT DETAILS

- Uncoated or with AR Coatings Designed for a Variety of IR Ranges
  - Minimal Chromatic Aberration Due to Low Dispersion
  - Ideal for Infrared Applications Requiring Rugged Optics
  - **DLC Coated Germanium Windows** are also Available
  - Due to material supply chain disruptions with germanium, there may be increased lead times and price changes on our germanium products. For more information, please contact our **customer service team**.
  - Edmund Optics has limited remaining inventory of this part number and no raw material available to supply more once this is depleted. Please contact our Product Support Engineers to help with an alternate solution for your needs. Customer Service can provide you the latest price and availability.
- TECHSPEC® Germanium (Ge) Windows are available off-the-shelf with three anti-reflection coating options: 3 - 5µm for mid-infrared applications, 3 - 12µm for broadband multispectral applications, or 8 - 12µm for thermal imaging applications. Due to its high index of refraction (around 4.0 from 2 - 14µm), an anti-reflection coating is recommended on these germanium windows for sufficient transmission in the region of interest. Germanium is subject to thermal runaway, meaning the transmission decreases as temperature increases. As such, TECHSPEC Germanium (Ge) Windows should be used at temperatures below 100°C. Germanium’s high density (5.33 g/cm3) should be considered when designing for weight-sensitive systems. The Knoop Hardness of germanium (780) is approximately twice that of magnesium fluoride, making it ideal for infrared applications requiring rugged optics.

## TECHNICAL INFORMATION



| AR COATED GERMANIUM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|---|----|---|----|---|----|---|----|---|----|---|----|---|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><p>Ge with 3-5μm AR Coating<br/>Typical Transmission</p><table border="1"><thead><tr><th>Wavelength (μm)</th><th>Transmission (%)</th></tr></thead><tbody><tr><td>2</td><td>20</td></tr><tr><td>3</td><td>80</td></tr><tr><td>4</td><td>95</td></tr><tr><td>5</td><td>95</td></tr><tr><td>6</td><td>90</td></tr><tr><td>7</td><td>85</td></tr><tr><td>8</td><td>80</td></tr><tr><td>9</td><td>75</td></tr><tr><td>10</td><td>70</td></tr><tr><td>11</td><td>65</td></tr><tr><td>12</td><td>60</td></tr><tr><td>13</td><td>55</td></tr><tr><td>14</td><td>50</td></tr><tr><td>15</td><td>45</td></tr><tr><td>16</td><td>40</td></tr></tbody></table></div>   | Wavelength (μm)  | Transmission (%) | 2 | 20 | 3 | 80 | 4 | 95 | 5 | 95 | 6 | 90 | 7 | 85 | 8 | 80 | 9 | 75 | 10 | 70 | 11 | 65 | 12 | 60 | 13 | 55 | 14 | 50 | 15 | 45 | 16 | 40 | <p>Typical transmission of a 3mm thick Ge window with BBAR (3000-5000nm) coating at 0° AOI.</p> <p>The blue shaded region indicates the coating design wavelength range, with the following specification:</p> <p><math>R_{avg} &lt; 3\%</math> @ 3000 - 5000nm</p> <p>Data outside this range is not guaranteed and is for reference only.</p> <p><a href="#">Click Here to Download Data</a></p> |
| Wavelength (μm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Transmission (%) |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 85               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 75               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 70               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 65               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 60               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 55               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 45               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
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| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 90               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 85               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 80               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 75               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 70               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
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| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 85               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 40               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 60               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 90               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 95               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 90               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 85               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 80               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 75               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 70               |                  |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                    |

SPECIAL HANDLING

Germanium Optics Handling and Cleaning Guidelines

Germanium optics require special handling and cleaning procedures. Always wear gloves during handling to prevent contamination, and wash hands afterward. Avoid contact between Germanium dust and the eyes, skin, or clothing. When not in use, store optics sealed and covered at temperatures between 20°C and 25°C. Do not expose them to temperatures exceeding 100°C when in use.

Handling Guidelines

- Always wear **gloves** to prevent damage from skin oils.
- If Germanium dust is present, take the following precautions:
  - Wear safety glasses to protect eyes.
  - Use a dust mask or face mask to avoid inhalation.
  - Wear **gloves** to prevent skin contact.
- Maintain storage temperature between 20°C and 25°C with humidity below 30%.
- Wrap Germanium optics in a **lens cloth** or **pouch** and seal in a **container** when not in use.
- Germanium is brittle and heavy — always place it on soft surfaces and avoid dropping it.

Approved Cleaning Solvents

- Ethanol
- Isopropyl Alcohol
- Methanol
- Reagent-Grade Acetone
- Liquid CO<sub>2</sub>
- [Shop Now](#)

CUSTOM

Edmund Optics offers comprehensive custom manufacturing services for optical and imaging components tailored to your specific application requirements. Whether in the prototyping phase or preparing for full-scale production, we provide flexible solutions to meet your needs. Our experienced engineers are here to assist—from concept to completion.

Our capabilities include:

- Custom dimensions, materials, coatings, and more
- High-precision surface quality and flatness
- Tight tolerances and complex geometries
- Scalable production—from prototype to volume

Learn more about our [custom manufacturing capabilities](#) or submit an inquiry [here](#).

COMPATIBLE MOUNTS

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