

## 2651A/2651E Broadband Photodiode



### Applications

- Forward-path and return-path broadband video transport
- FTTx receivers
- EDFA and network monitors

### Features

- Low cost package
- Low capacitance,  $\leq 0.4$  pF
- Low dark current,  $\leq 50$  nA at  $+85^{\circ}\text{C}$
- 1 GHz flat response,  $\pm 0.5$  dB
- Extended bandwidth option
- High responsivity
  - $\geq 0.85$  mA/mW at 1310 nm
  - $\geq 0.95$  mA/mW at 1550 nm
- Telcordia GR-468 compliant
- RoHS compliant

The 2651 provides the proven high performance of Ortel's photodiode technology in a very practical, cost-effective package. The 2651A features high linearity and low capacitance over a 1 GHz bandwidth. The extended bandwidth 2651E offers high linearity and low capacitance up to 3 GHz. These broadband photodiodes are housed in a small, environmentally rugged coaxial package.

The 2651 broadband photodetector is designed to provide the performance and flexibility needed to meet the expanding applications of two-way communications networks. This photodiode is used today in forward-and return-path applications, including AM-VSB CATV, QAM 64/256, PON, FTTC and FTTH receivers.

The 2651A and 2651E photodiodes are compliant with all criteria of the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) guidelines 2002/95/EC.

### Performance Highlights

|                                     | Min  | Typ  | Max  | Units                    |
|-------------------------------------|------|------|------|--------------------------|
| Operating Case Temperature          | -40  | 25   | +85  | $^{\circ}\text{C}$       |
| Wavelength                          | 1100 | -    | 1600 | nm                       |
| Responsivity, 1310 nm               | 0.85 | -    | -    | A/W                      |
| 1550 nm                             | 0.95 | -    | -    |                          |
| Dark Current, $25^{\circ}\text{C}$  | -    | -    | 5    | nA                       |
| 85 $^{\circ}\text{C}$               | -    | -    | 50   |                          |
| Capacitance                         | -    | 0.35 | 0.4  | pF                       |
| Bandwidth, 2651A                    | -    | -    | 1000 | MHz                      |
| 2651E                               | -    | -    | 3000 |                          |
| Gain Flatness, $< 1$ GHz            | -    | -    | 1.0  | $\text{dB}_{\text{p-p}}$ |
| Gain Up-Tilt, 2651E, 1 GHz to 3 GHz | 2    | -    | 4    | dB                       |
| DSO, 2651A/E, $< 1$ GHz             | -    | -    | -75  | dBc                      |
| 2651E, 1 GHz – 3 GHz                | -    | -    | -65  |                          |
| DTB, 2651A/E, $< 1$ GHz             | -    | -    | -85  | dBc                      |
| 2651E, 1 GHz – 3 GHz                | -    | -    | -75  |                          |
| Bias Voltage                        | 10   | 12   | 15   | V                        |

See following pages for complete specifications and operating conditions.

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter                   | Symbol    | Min | Max | Unit |
|-----------------------------|-----------|-----|-----|------|
| Operating Temperature Range | $T_{op}$  | -40 | 85  | °C   |
| Storage Temperature Range   | $T_{stg}$ | -40 | 85  | °C   |
| Input Power Saturation      | $P_{IN}$  | -   | 10  | mW   |
| Reverse Voltage             | $V_R$     | -   | 30  | V    |
| Forward Current             | $I_F$     | -   | 10  | mA   |

### DC/Optical Characteristics

| Parameter             | Condition | Min  | Typ   | Max  | Unit |
|-----------------------|-----------|------|-------|------|------|
| Wavelength            | -         | 1100 | -     | 1600 | nm   |
| Responsivity          | 1310 nm   | 0.85 | -     | -    | A/W  |
|                       | 1550 nm   | 0.95 | -     | -    |      |
| Dark Current          | 25°C      | -    | -     | 5    | nA   |
|                       | 85°C      | -    | -     | 50   |      |
| Capacitance           | -         | -    | 0.35  | 0.4  | pF   |
| Optical Return Loss   | -         | -    | -     | -40  | dB   |
| Bias Voltage          | -         | 10   | 12    | 15   | V    |
| Fiber Buffer          | -         | -    | 900   | -    | μm   |
| Fiber Core / Cladding | -         | -    | 9/125 | -    | μm   |

### RF Characteristics

| Parameter                       | Condition                                  | Min | Typ | Max  | Unit |
|---------------------------------|--------------------------------------------|-----|-----|------|------|
| Frequency Range <sup>1</sup>    | 2651A                                      | -   | -   | 1000 | MHz  |
|                                 | 2651E                                      | -   | -   | 3000 |      |
| Frequency Response <sup>1</sup> | 2651A/E, peak-to-valley, < 1 GHz           | -   | -   | 1    | dB   |
| Frequency Response <sup>1</sup> | 2651E up-tilt gain <sup>2</sup>            | 2   | -   | 4    | dB   |
| DSO <sup>1,3</sup>              | 2651A/E, 1310 nm, two tone test            | -   | -   | -75  | dBc  |
|                                 | 2651E, 1310 nm, two tone test <sup>4</sup> | -   | -   | -65  |      |
| DTB <sup>1,3</sup>              | 2651A/E, 1310 nm, two tone test            | -   | -   | -85  | dBc  |
|                                 | 2651E, 1310 nm, two tone test <sup>4</sup> | -   | -   | -75  |      |

1. Characterized with resistive load of 75Ω.

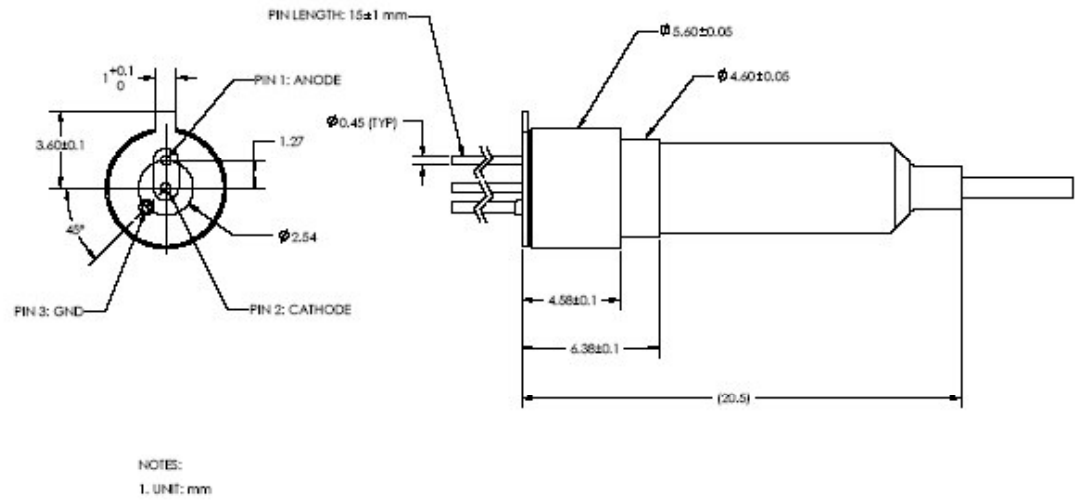
2. 1 GHz to 3 GHz.

3. Each test laser has 40% OMI. Distortion products are measured at 81, 449, 600, 850. Optical  $P_{in}$  = 0 dBm.  $V_{pd}$  = 12V.

4. Additional test frequencies of 1500, 2000, and 2500 MHz.

Outline Drawing

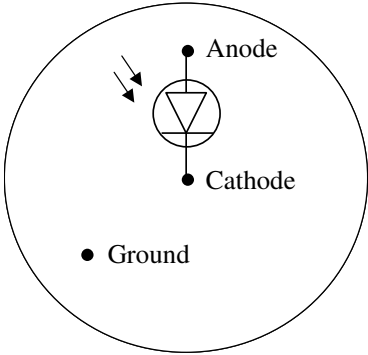
Dimensions are in mm.



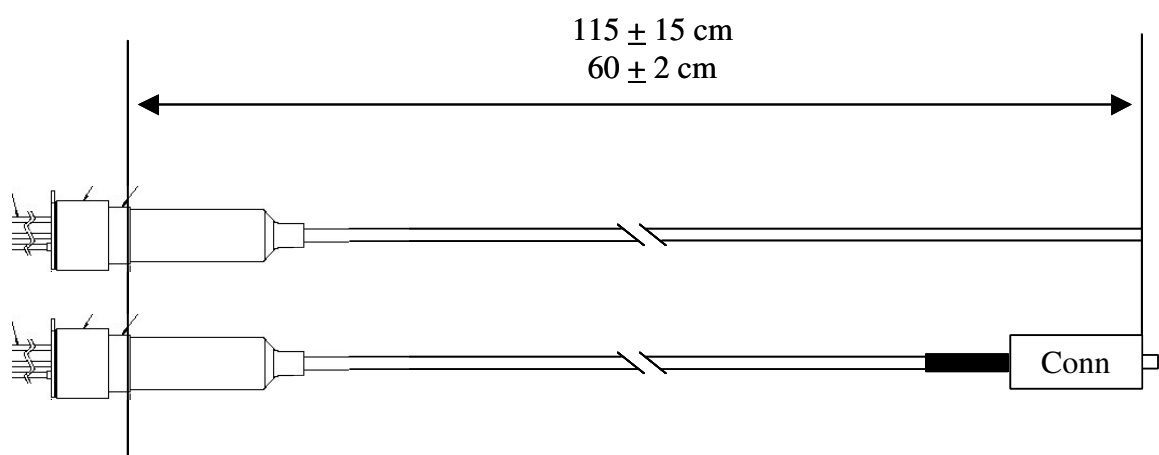
Pinout

| Pin | Description |
|-----|-------------|
| 1   | Anode       |
| 2   | Cathode     |
| 3   | Ground      |

Block Diagram

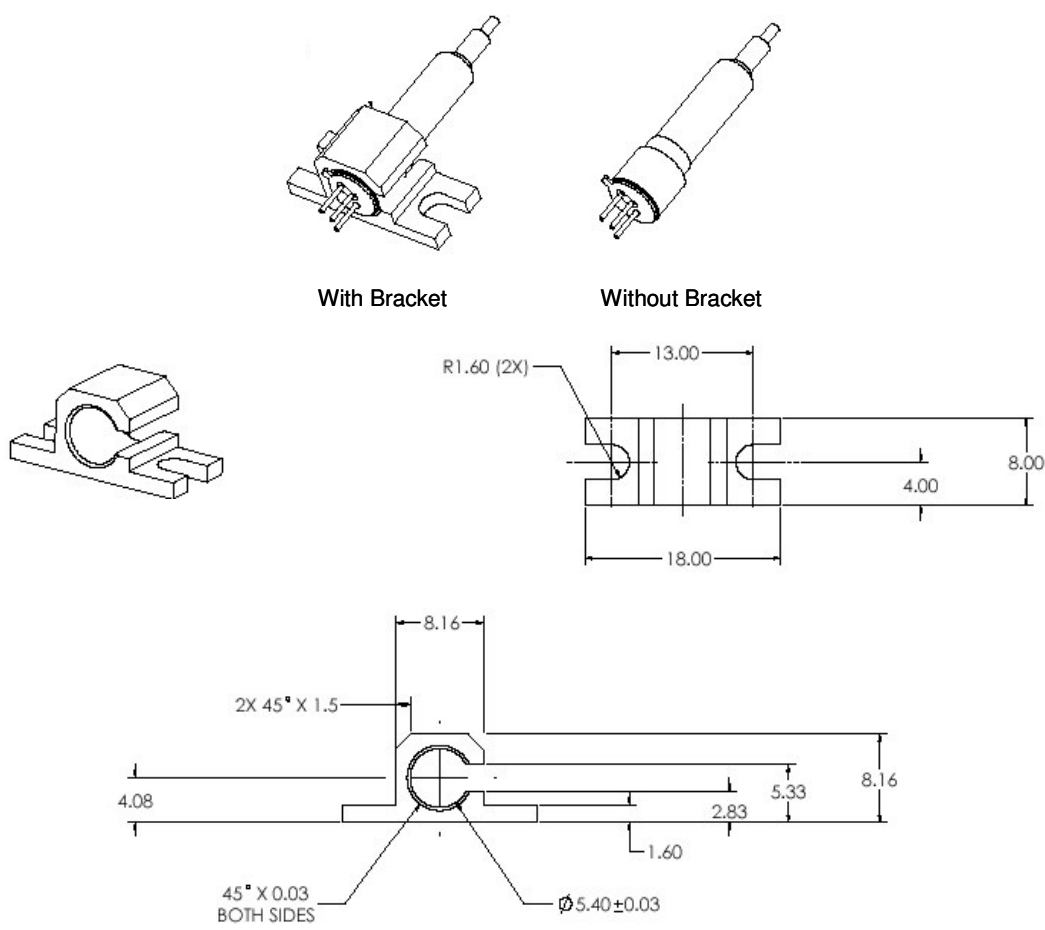


Fiber Length

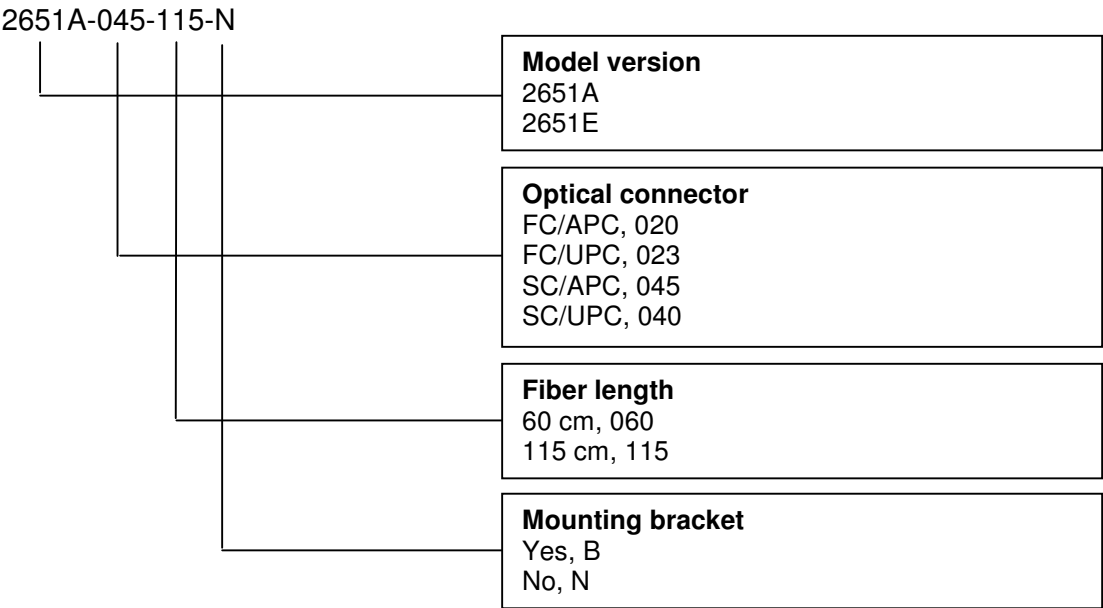


Mounting Bracket

Dimensions are in mm .



Ordering Information – Model Number Options



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