



D131540KA

40 GHz

High-Power Photodetector

PRODUCT OVERVIEW

Based on a state-of-the-art uni-traveling carrier (UTC) epitaxy, our D13 series photodetectors offer high-power handling capability and high-speed operation simultaneously. It has a responsivity of 0.4 A/W at 1550 nm and a high saturation photocurrent of 32 mA at 40 GHz. The D131540KA is capable of delivering 15 dBm RF output power at 20 GHz, and 12 dBm at 40 GHz. The photodetector also demonstrates excellent linearity for photonic links, with a third-order intercept point (OIP3) greater than 30 dBm. Extended frequency response or power rating are available in customized photodetector package.



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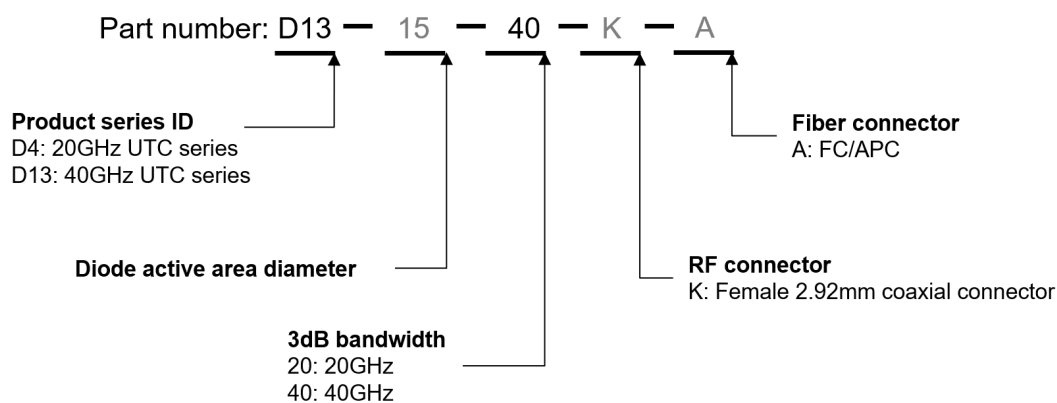
FEATURES

- 40 GHz bandwidth
- Ultra-high power
- High-linearity
- Integrated bias tee

APPLICATIONS

- Microwave photonics
- RF-over-fiber link
- Metro and long-haul transmission
- Datacenter interconnects

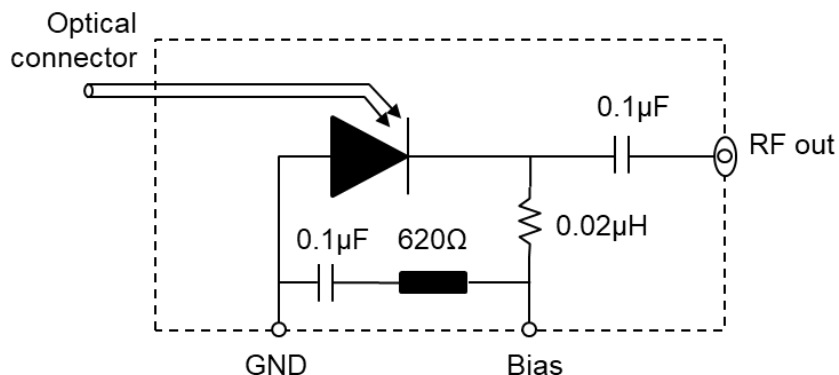
PRODUCT SELECTION



PIN DESCRIPTIONS

| Pin # | Symbol | Description |
|-------|------------|--------------------|
| 1 | V_{bias} | Photodetector bias |
| 2 | GND | Package ground |

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Operation in excess of the absolute maximum ratings may cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions other than those given in the operational sections of the datasheet. Maximum ratings for optical powers and bias voltage are linked. None of the limits shall be exceeded, even if the other parameter limit is not reached yet.

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------------|------------|------------------------------|------|------|------|------|
| Bias voltage | V_{bias} | — | -6 | | 0 | V |
| Maximum average optical power | P_{opt} | Continuous wave (CW) | | | 20 | dBm |
| Maximum peak optical power | P_{peak} | Pulse <50 ns, duty cycle <5% | | | 23 | dBm |
| Fiber bend radius | | — | 20 | | | mm |

ENVIRONMENTAL SPECIFICATIONS

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|----------------------------|------------|-----------|------|------|------|------|
| Operating case temperature | T_{case} | — | 0 | | 50 | °C |
| Storage temperature | T_{sto} | — | -40 | | 85 | °C |

OPERATING CONDITIONS

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|------------|----------------------|------|------|------|------|
| Average optical power range | P_{opt} | — | | | 19 | dBm |
| Photocurrent range | I_{dc} | Continuous wave (CW) | 0 | | 32 | mA |
| Operating wavelength range | λ | — | 1530 | | 1565 | nm |
| Bias voltage | V_{bias} | — | -6 | -5 | -4 | V |

ELECTRO-OPTICAL SPECIFICATIONS ¹

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---------------------|------------|------------------|------|------|------|---------|
| DC responsivity | R | Measured at -5 V | 0.35 | 0.4 | | A/W |
| Dark current | I_{dark} | Measured at -5 V | | 0.1 | 10 | μ A |
| 3 dB roll-off | f_{3dB} | D131540KA, 30 mA | 35 | 40 | | GHz |
| Optical return loss | ORL | | | | 25 | dB |

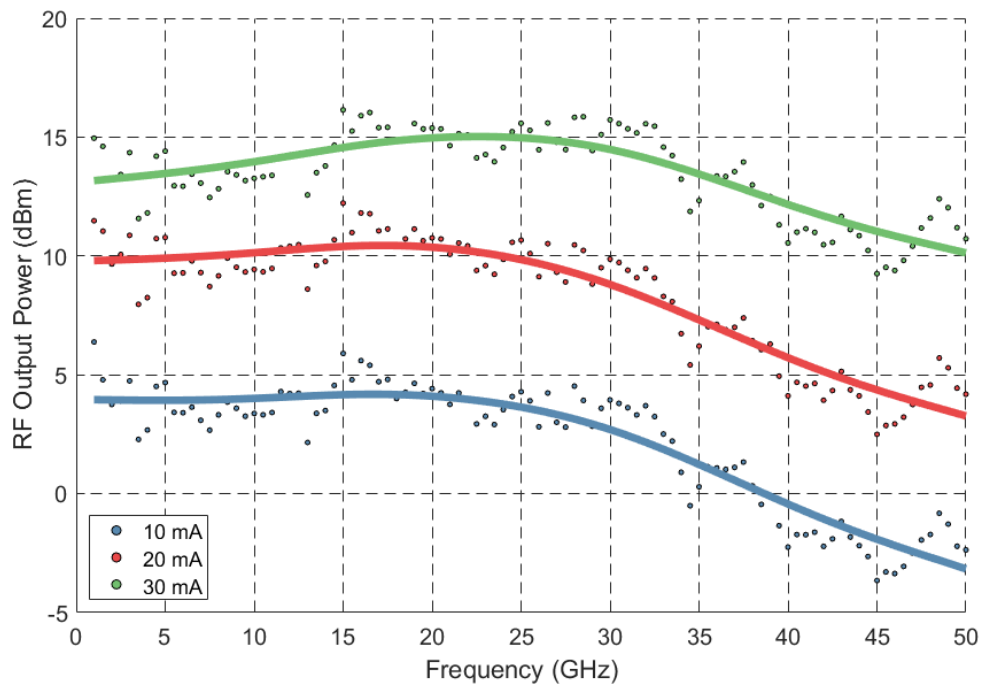
Notes:

- $\lambda = 1550$ nm, $T_{case} = 25$ °C
- Low cutoff frequency (3dB) <0.5GHz

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SAMPLE DATA

Measured output RF power using a two-tone heterodyne setup, where two equal power, wavelength-tuned lasers are used to generate the RF signal incident on the photodetector. The output RF power is proportional to the square of photocurrent. The frequency roll-off is a strong function of photocurrent.



MECHANICAL SPECIFICATIONS

It is recommended to mount the photodetector using the through holes prior to use. All units in mm.

