



**D42820KA**

**20 GHz**

**High-Power Photodetector**

## **PRODUCT OVERVIEW**

Based on a state-of-the-art uni-traveling carrier (UTC) epitaxy, our D4 series photodetectors offer high-power handling capability and high-speed operation simultaneously. It has a responsivity of 0.45 A/W at 1550 nm and a high saturation photocurrent of 60 mA at 20 GHz. The D42820KA is capable of delivering 18 dBm RF output power at 10 GHz, and 16 dBm at 20 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.



# 20 GHz High-Power Photodetector

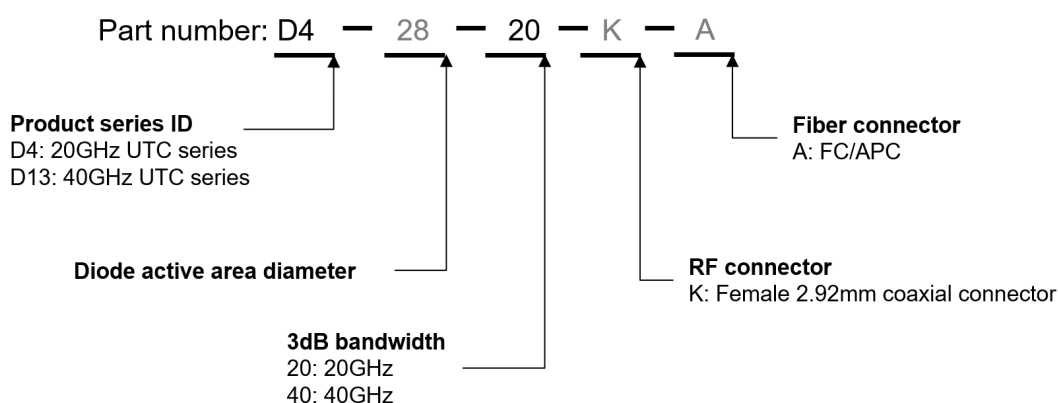
## FEATURES

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

## APPLICATIONS

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

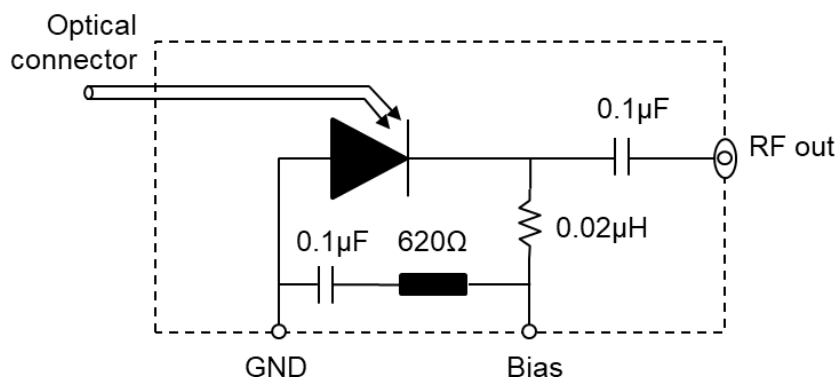
## PRODUCT SELECTION



## 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	$V_{bias}$	—	-7		0	V
Maximum average optical power	$P_{opt}$	Continuous wave (CW)			23	dBm
Maximum peak optical power	$P_{peak}$	Pulse <50 ns, duty cycle <5%			26	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	$P_{opt}$	—			21.5	dBm
Photocurrent range	$I_{dc}$	Continuous wave (CW)	0		60	mA
Operating wavelength range	$\lambda$	—	1530		1565	nm
Bias voltage	$V_{bias}$	—	-7	-6	-5	V

## ELECTRO-OPTICAL SPECIFICATIONS <sup>1</sup>

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
DC responsivity	R	Measured at -5 V	0.4	0.45		A/W
Dark current	$I_{dark}$	Measured at -5 V		0.1	10	μA
3 dB roll-off	$f_{3dB}$	D42820KA, 60 mA	18	20		GHz
Optical return loss	ORL				25	dB

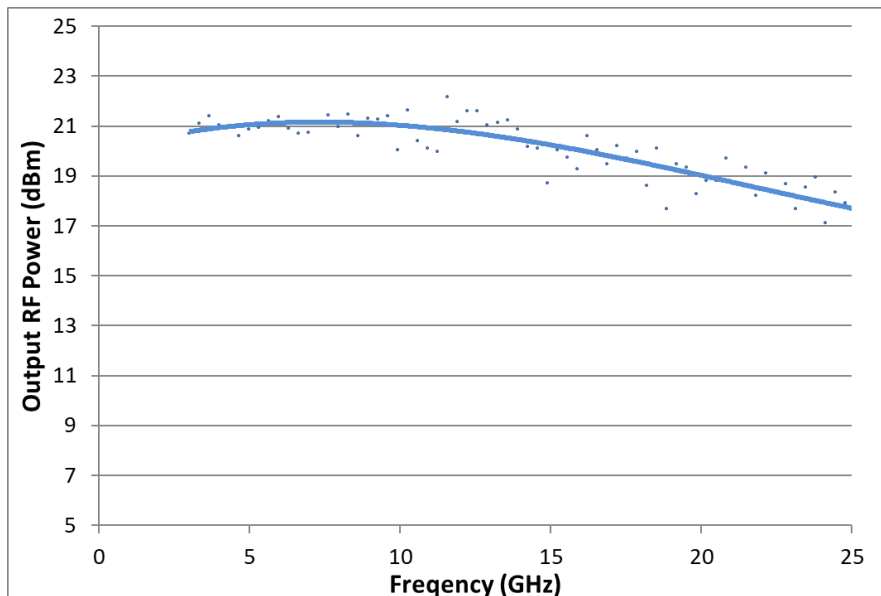
Notes:

- $\lambda = 1550$  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.

