

# High Speed Digital Fiber Coupled InGaAs Photodiode

(1260 to 1600nm, SM, MM, up to 25Gbps, TIA integrated)



DATASHEET

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## Features

- 25 Gbps
- Wide Temperature Operating Range
- Received Signal Strength Indicator
- TIA Built-in
- 1K Ohm Transimpedance Gain

## Applications

- Communication
- RF over Fiber (RFoF)

The HSF-D is a fiber-coupled InGaAs PIN photodiode integrated with a high-speed transimpedance amplifier (TIA), supporting data rates up to 25 Gb/s. It offers a flat response across a wide operating temperature range and is available with single-mode and multimode fiber coupling options, making it versatile for various high-speed optical communication applications. The multimode fiber coupling uses fiber tip lens technology for high efficacy.

## Specifications

(Measure at 23 for SM28 fiber)

Parameter	Min	Typical	Max	Unit	Test Condition
Supply Voltage		3.3	3.6	V	
Supply Current		26	35	mA	@3.3V
Response Spectrum	1260		1600	nm	@3.3V
Bandwidth		18		GHz	-3 dB bandwidth
Overload	2.2			dBm	@3.3V
Sensitivity			-14.5	dBm	25.78 Gbps, 1310 nm, ER = 4 dB, BER = 10 <sup>-5</sup>
Optical Return Loss			-27	dB	CW = 1310 nm
RSSI Offset Current			100	nA	@3.3V
Responsivity	0.7	0.8		A/W	1310 nm, 50 % VBR, M=2, Pin -20 dBm
Dark Current		100		nA	VBr
Output Impedance		100			Differential
Max. Output Voltage		300		mV <sub>p-p</sub>	Differential
Low Frequency Cutoff	25	100		KHz	

## Photodiode Absolute Maximum Ratings

Parameter	Min	Typical	Max	Unit	Condition
Voltage			3.6	V	
Input Optical Power			5	dBm	
Storage Temperature		-40	90	°C	
Storage Humidity			85	% r.H.	
Operating Temperature		-40	85	°C	
Soldering Temperature			260	°C	10 sec
ESD Susceptibility		100		V	HBM

### Note:

The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

Operating at maximum operating specs for prolonged periods of time will damage the device.

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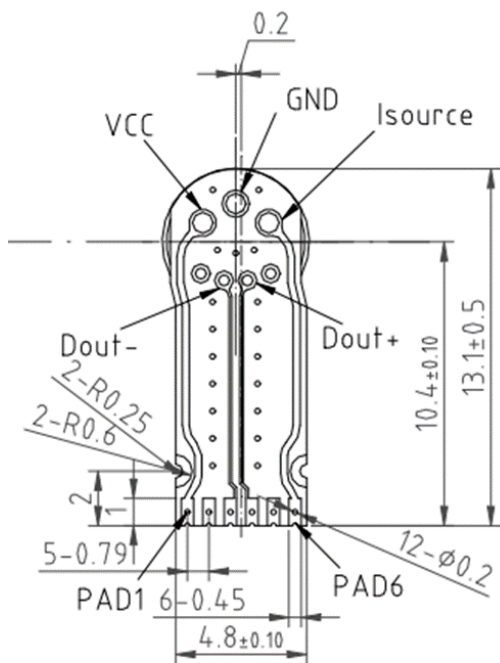


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### Mechanical Dimensions (mm)

\*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

### PIN Configuration (Bottom View)



Pad	Function
1	Vcc
2,5	GND
3	Dout(-)
4	Dout(+)
6	Isource

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## Ordering Information

Prefix	Wavelength	Speed	TEC Cooling	Package	Fiber Type	Fiber Cover	Fiber Length	Connector
HSFD-	900 - 1620 = 1	25GHz = H	No = 1	Standard = 1 Special = 0	SM28 = 1 50/125 = 2	0.9mm tube = 3 Bare fiber = 1 Special = 0	0.25m = 1 0.5m = 2 1.0 m = 3 1.5 m = 5 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

## Application Notes

### Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

### Fiber Cleanliness

Fibers with smaller core diameters (<5  $\mu\text{m}$ ) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

### Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the handling by expanding the core side at the fiber ends.

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## Typical Performance Curves (Top 23°C, 801 PTs, 16 AVGs, 1.5% smoothing)

RF performance dependent on PCB design and optimization. Data shown with Ground-backed Co-planner waveguide. Single ended measurement, port two is terminated with 50 Ohm load.

