SFH Transmitter & Receiver

THE PARTNER FOR OPTICAL DATA TRANSMISSION
POF Transceiver

Never stop thinking

Plastic Fiber Components

Plastic Fiber Optic Transmitter Diodes and Photo Detector Receivers

Features

- Wavelengths: 650 nm, 660 nm, 950 nm
- Operating temperature range: -40°C to +85°C
- 2.2 mm aperture holds standard 1000 micron plastic fiber
- No fiber stripping required
- Good linearity
- Molded microlens for efficient coupling

Plastic Connector Housing

- Mounting screw attached to the connector
- Interference-free transmission from light-tight housing
- Transmitter and receiver can be flexibly positioned
- No crosstalk
- Auto insertable and wave solderable
- Supplied in tubes

Applications

- Household electronics
- Power electronics
- Optical networks
- Medical instruments
- Automotive electronics
- Light barriers

Photo Detector Receivers

Features

- Supply voltage range: 0.5 V to 15 V
- Operating temperature range: -40°C to +85°C
- Transfer rate: < 5 Mbit/s
- Bipolar IC with open-collector output
- Digital output: TTL compatible
- Sensitive in visible and near IR range
- Low switching threshold

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PLASTIC fiberoptic transmitterdiodes and photo-detector receivers

PLASTIC FIBER LINKS use simple and inexpensive LEDs and photodiodes as transmitters and receivers, respectively.
The most common type plastic optical fiber is composed of a polymethylmethacrylate (PMMA) core encased in fluoride-based carbon polymer.

FEATURES

- Wavelengths: 650 nm, 660 nm, 950 nm
- Data rate DC up to 50 Mbit/s
- Operating temperature range;
- -40°C to + 85°C
- 2.2 mm aperture holds standard 1000 micron plastic fiber
- No fiber stripping required (SFHxxx)

APPLICATION

- Household electronics
- Power electronics
- Optical networks
- Medical instruments
- Automotive electronics

INFINEON TRANSCEIVERS will be used in the proven SFHxxx series

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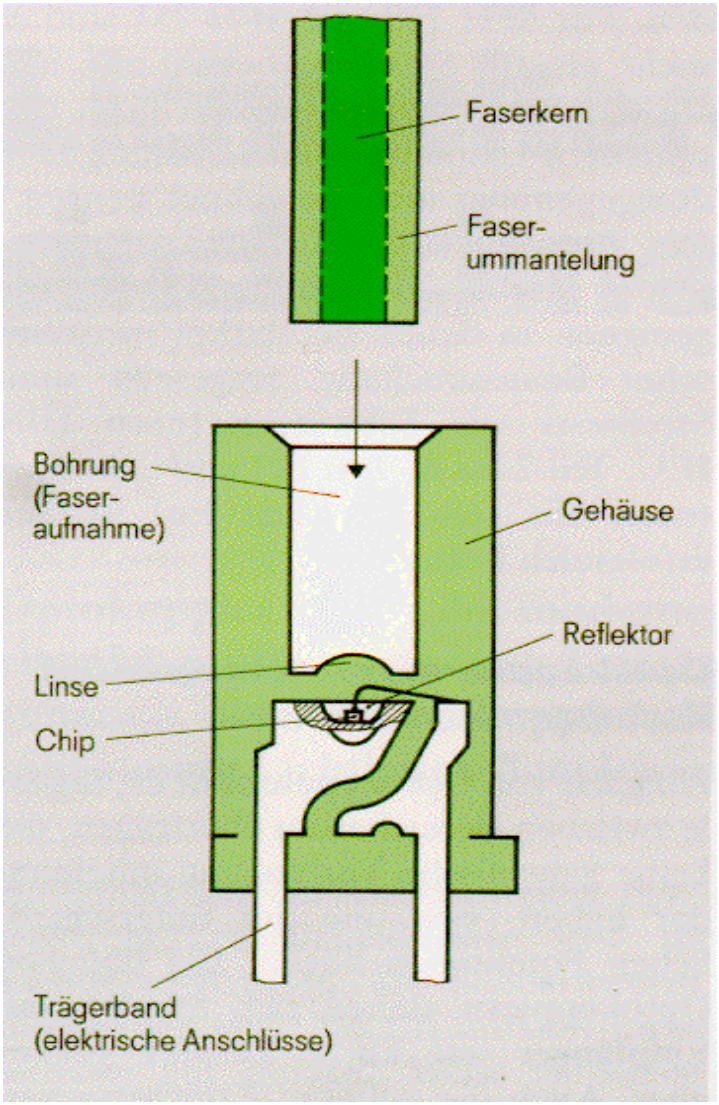

Easy coupling
Standard POF
2,2 mm Diameter
1 mm Corediameter

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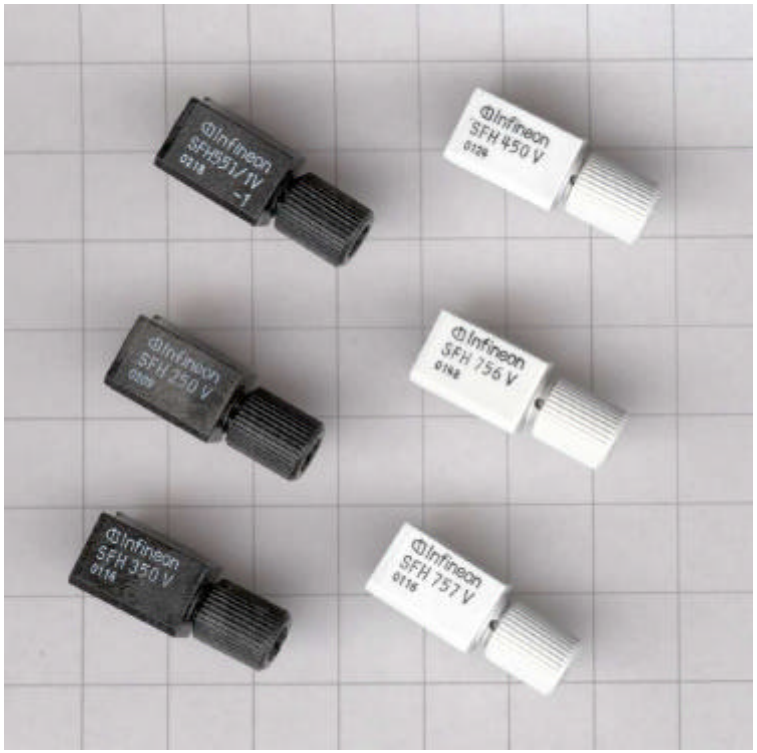
„Lochdiode“ Transmitter
and Receiver
“Lochdiode” and
“Verbinder”



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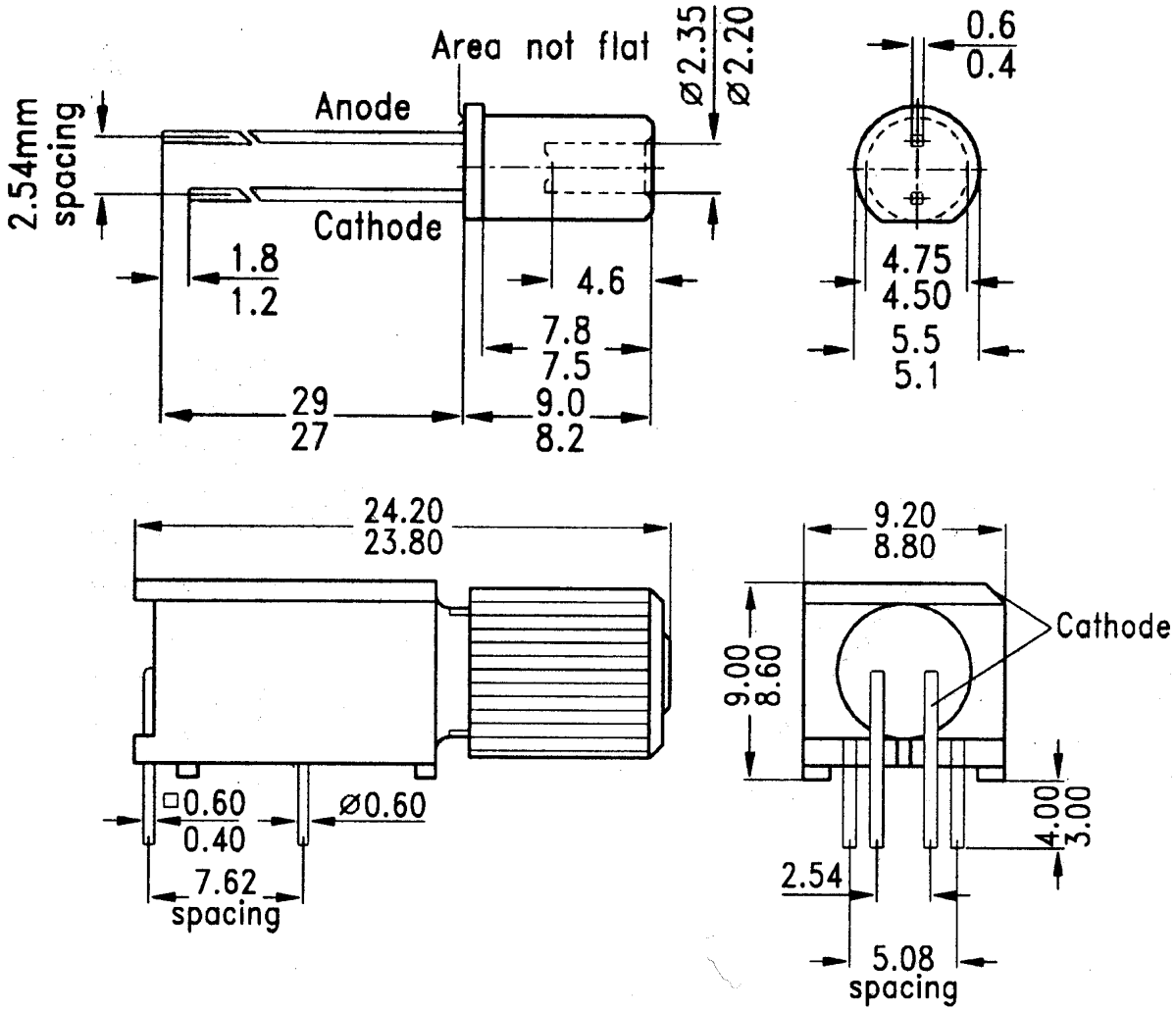

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Actual Type Overview in Year 2003

SFH250	Photodiode (usable up to 100 MHz)
SFH350	Phototransistor (usable up to 100 kHz)
SFH551/1	Integrated Receiver DC - 5 Mbit/s TTL out
SFH450	Transmitter (LED only) 950 nm 1µs
SFH750 (discontinued)	Transmitter (LED only) 650 nm 100ns
SFH756	Transmitter (LED only) 650 nm 100ns
SFH757	Transmitter (LED only) 650 nm 30ns

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POF Transceiver Keydata Photodiode SFH250

Parameter	Symbol	Value	Unit
Maximum Photosensitivity Wavelength	λ_{Smax}	850	nm
Photosensitivity Spectral Range (S=10% S_{max})	λ	400 to 1100	nm
Dark Current (V_R=20V)	I_R	1 (≤10)	nA
Capacitance (f = 1 MHz, V_R = 0V)	C_O	11	pF
Rise and Fall Times of Photo Current (R_L=50Ω, V_R=30V, λ=880nm) 10% to 90% 90% to 10%	 t_R t_F	 0,01 0,01	 µs µs
Photo Current (Φ_{IN}= 10 µW coupled from the End of a Plastic fiber, V_R=5V) λ=660nm λ=950nm	 I_P I_P	 3(≥1,6) 4(≥2,5)	 µA µA

In connection with a suitable preamplifier this photodiode can ce used for optical receiver with datarate up to 100Mbit/s
In this case high reverse voltage (10 V) at the diode is needed in order to decrease the capacity and increase the speed

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POF Transceiver

Keydata Phototransistor SFH350

Parameter	Symbol	Value	Unit
Maximum Photosensitivity Wavelength	λ_{Smax}	850	nm
Photosensitivity Spectral Range (S=10% S_{max})	λ	400 to 1100	nm
Dark Current (V_R=20V)	I_R	1 (≤10)	nA
Capacitance (f = 1 MHz, without light) (V_{CE} = 0V) (V_{CB} = 0V) (V_{EB} = 0V)	 C_{CE} C_{CB} C_{EB}	 10,5 21,5 20,5	 pF pF pF
Rise and Fall Times of Photo Current (R_L=1kΩ, V_{CE}=5V, I_C=1,0mA,λ=959nm) 10% to 90% 90% to 10%	 t_R t_F	 20 20	 µs µs
Current Gain	HFE	500	
Collector Dark Current (V_{CE} = 5V)	I_{CE0}	2(≤50)	nA
Photo Current (V_{CE}=5V, Φ_{IN}= 10 µW coupled from the End of a Plastic fiber, λ=660nm)	I_{CE}	0,8 (≥0,16)	mA
Temperature Coefficient HFE	TC_{HFE}	0,55	%/K

This photodiode can ce used for optical receiver with high sensitivity in low frequency application

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POF Transceiver Keydata Digital Receiver SFH551/1

- Bipolar IC with open-collector output
- Digital output, TTL compatible
- Sensitive in visible and near IR range
- Low switching threshold
- Transfer rate ≤5 Mbit/s

Parameter	Symbol	Values	Unit
Maximum Photosensitivity Wavelength	λ_{Smax}	700	nm
Photosensitivity Spectral Range (S=80% S_{max})	λ	600 to 780	nm
SFH 551/1 Optical threshold power (λ =660nm)	Φ_{INth}	≤ 6 ≤ - 22	µW dBm
Maximum optical power (λ=660nm) maximum value of tpLH at maximum power !	Φ_{INL}	1000 0	µW dBm
Optical power for output high without errors (λ=660nm)	Φ_{INH}	≤0,1 ≤ -40	µW dBm
Propagation delay (optical input to electrical output, with fast optical pulse) Depends on received optical power level	t_{PHL} t_{PLH}	< 100 < 250	ns ns
Current Consumption (without output current)	Icc	4	mA

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POF Transceiver Keydata POF LED SFH450

Parameter	Symbol	Value	Unit
Peak Wavelength	λ_{Peak}	950	nm
Spectral Bandwidth	$\Delta\lambda$	55	nm
Switching Times (R_G=50Ω, $I_{F(LOW)}$=0,1mA, $I_{F(HIGH)}$=50mA) 10% to 90% 90% to 10%	 t_R t_F	 1 1	 µs µs
Capacitance (f = 1 MHz, V_R = 0V)	C_O	40	pF
Forward Voltage (I_F= 10 mA)	V_F	1,3 (≤1,5)	V
Output Power coupled into Plastic fiber (I_F= 10 mA) see Note 1	Φ_{IN}	90 (≥40)	µW

Wavelength is not optimized for POF !

POF Transceiver — Keydata POF LED SFH756

Parameter	Symbol	Value	Unit
Peak Wavelength	λ_{Peak}	660	nm
Spectral Bandwidth	$\Delta\lambda$	25	nm
Switching Times (R_G=50Ω, $I_{F(LOW)}$=0,1mA, $I_{F(HIGH)}$=50mA) 10% to 90% 90% to 10%	 t_R t_F	 0,1 0,1	 µs µs
Capacitance (f = 1 MHz, V_R = 0V)	C_O	30	pF
Forward Voltage (I_F= 50 mA)	V_F	2,1 (≤2,8)	V
Output Power coupled into Plastic fiber (I_F= 10 mA) see Note 1	Φ_{IN}	200 (≥100)	µW

Wavelength is optimized for POF
Proposed transmitter for systems working with SFH551/1

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POF Transceiver

Keydata POF LED SFH757

Parameter	Symbol	Values	Unit
Peak wavelength	λ_{Peak}	650	nm
Spectral bandwidth	$\Delta\lambda$	25	nm
Switching times (R_L= 50 Ω, I_F = 50 mA) 10 % … 90 %	t_R	15 (<17)	ns
90 % … 10 %	t_F	18 (<20)	ns
Capacitance (f = 1 MHz, V_R = 0 V)	C_O	30	pF
Forward voltage (I_F = 50 mA)	V_F	2.1 (≤ 2.8)	V
Output power coupled into plastic fiber			
(I_F = 10 mA)	Φ_{IN}	150 (≥ 100)	µW

High speed transmitter for about 50 Mbit/s
up to 100 Mbit/s (with peaking)

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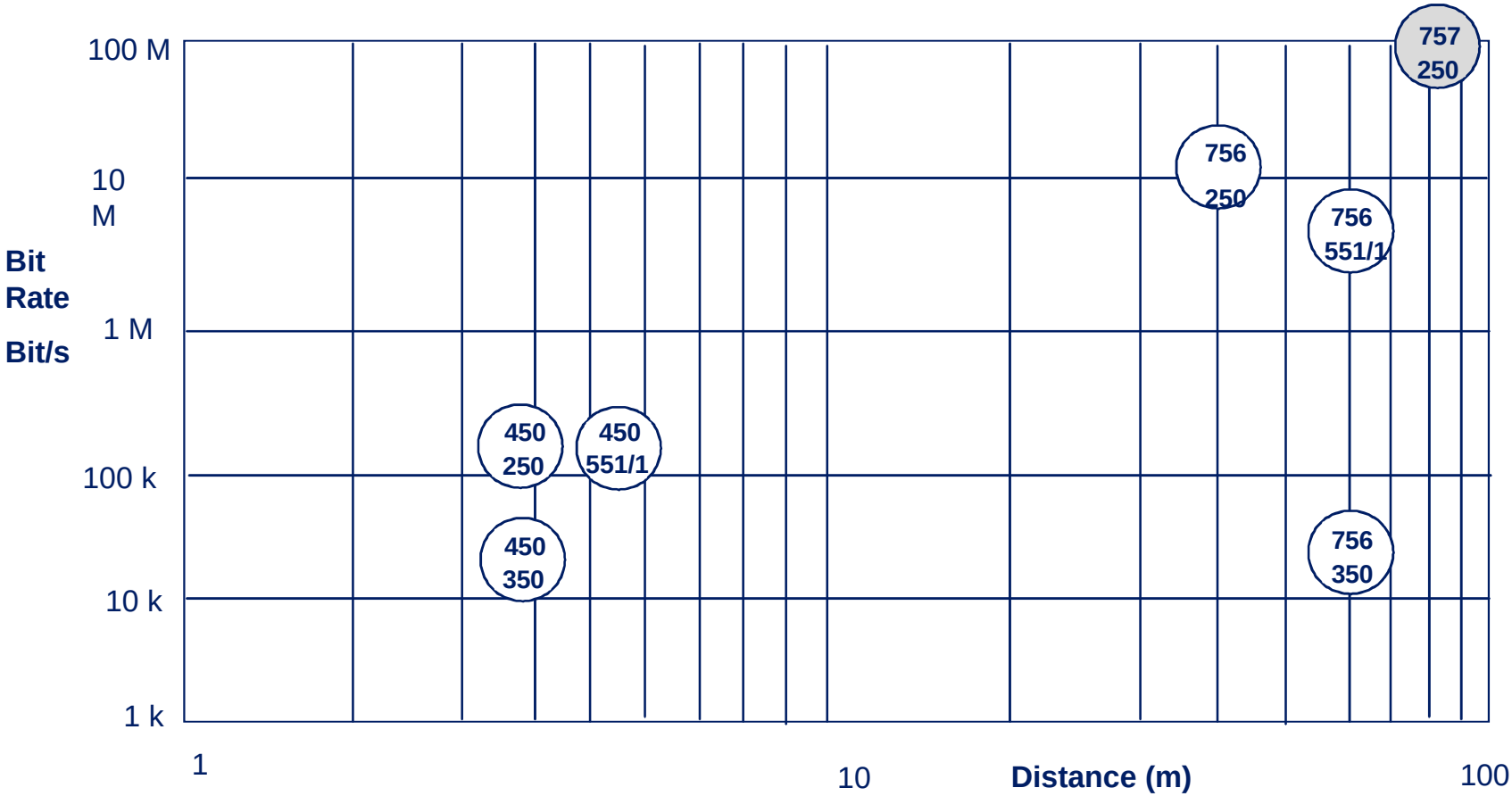
Application Fields of SFHxxx Components



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Some System Configuration:

SFH350 with SFH450	Low speed short length with PMMA fiber limited by receiver
SFH350 with SFH756	Low speed long length with PMMA fiber limited by receiver
SFH250 with SFH450	Medium speed short length with PMMA fiber limited by transmitter
SFH250 with SFH756	Medium speed long length with PMMA fiber
SFH250 with SFH757	High speed long length with PMMA fiber Depends on receiver design
SFH551/1 with SFH450	Low speed short length with PMMA fiber limited by transmitter
SFH551/1 with SFH756	Max. 5Mbit/s speed, long length with PMMA fiber limited by receiver
SFH551/1 with SFH757	Low speed short length with PMMA fiber limited by receiver