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Industrial Fiber Optics, Inc.
IF-E33

For any questions, you can email us directly:
sales@integrated-circuit.com

SCIENCE PROJECT KIT

THINGS TO DO IN FIBER OPTICS

Supplemental Information

- **Parts list**
- **Component data**
- **Errata sheet**

INDUSTRIAL FIBER OPTICS

IF-E33 Component list

Quantity	Part Number	Description
1	08VT83B	Cadmium sulfide photocell
1	35LS026	2.0 volt penlight
1		Red T1$^3/_4$ (5 mm) LED
1		Green T1$^3/_4$ (5 mm) LED
1		Yellow T1$^3/_4$ (5 mm) LED
1	LD271	Infrared T1$^3/_4$ (5 mm) LED
1	SFH300-2	Phototransistor
1	SFH203P	Photodiode
1	IF-D92	Fiber optic phototransistor
1	IF-E91A	Fiber optic infrared LED
3 meters	IF-C-E1000	1000 µm core plastic fiber
1 meter		62.5/125 core/cladding glass fiber
1 meter		3/16 inch inside diameter light pipe
1		*Fiber Optic Communications, Experiments, & Projects* by Waldo T. Boyd
1 set		Device data sheets

Warranty Information

This kit was carefully inspected before leaving the factory. If any components were damaged in shipping, *Industrial Fiber Optics* will replace them at its discretion. Since soldering and incorrect assembly can damage electrical components, no warranty can be made after assembly has begun. If any parts become damaged, replacements may be obtained from most radio/electronics supply shops.

Industrial Fiber Optics recognizes that responsible service to our customers is the basis of our continued operation. We welcome and solicit your feedback about our products and how they might be modified to best suit your needs.

Errata Sheet

(Some components specified in the Fiber Optic Communications, Experiments & Projects *text must be replaced by others provided in this* Science Project Kit.*)*

Page 130: Replace Q1, Archer 276-130 with the IF-D92.

Page 142: Replace LED, Archer 276-142 with IF-E91A.

Page 149: Use plastic fiber optic cable furnished in kit.

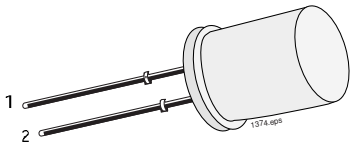
Page 155: Use the remaining cable from **Project 3**.

Page 159: Use the 62.5/125 glass fiber enclosed for replacement to the Corning optical waveguide, 1505. The plastic fiber enclosed in this kit can be terminated by following the instructions on the **IF-D92** data sheet. Polishing of the fibers, as mentioned in **Appendix F**, is unnecessary but will reduce the light lost at the fiber ends.

SFH203P

Photodiode

The SFH203P is a planar PIN photodiode in a T1^3/4 (5 mm) clear plastic package with a flat lens. This flat window has no effect on the beam path of optical lens systems. The cathode is denoted by a shorter lead. Features include low junction capacitance and fast switching speeds. Because of its high cutoff frequency, this diode is particularly well suited for use as a high-modulation bandwidth optical sensor.



1 Anode
2 Cathode

Maximum Ratings

Operating and Storage Temperature (T_{OP}, T_{STG}) ..... -55 to + 100°C
Soldering Temperature (> 2 mm from case bottom)
Dip Soldering Time (T_S) t < 5 s ..... 260°C
Iron Soldering Time (T_S) t < 3 s ..... 300°C
Reverse Voltage (V_R) ..... 50 V
Power Dissipation (P_{TOT}) T_A=25°C ..... 200 mW

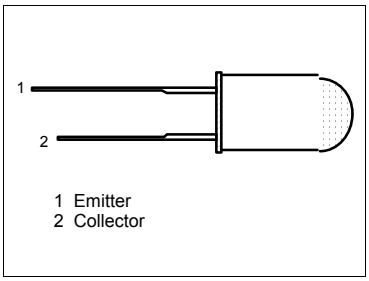
Characteristics (T_A-25°C)

Parameter	Symbol	Value	Units
Wavelength, Maximum Sensitivity	λ_{smax}	850	nm
Spectral Range, Photosensitivity (S=10% of S_{MAX})	λ	400 - 1100	nm
Radiant Sensitive Area	A	1	mm^2
Chip Area Dimensions	L × W	1 × 1	mm
Distance, chip to surface to case surface	H	0.4 - 0.7	mm
Half Angle	φ	± 75	Degrees
Dark Current (V_R=20 V, E=0)	I_D	1 (<10)	nA
Spectral Sensitivity (λ=850 nm)	S_λ	0.62	A/W
Photosensitivity (V_R=5 V, Standard Light, T=2856 K)	S	9.5(>5)	nA/lx
Rise/Fall Time (R_L= 50 Ω, V_R=20 V, λ=850 nm, I_P=800 µA)	t_R, t_F	5	ns
Forward Voltage (I_F=80 mA, E_E=0)	V_F	1.3	V
Capacitance (V_R=0, f=1 MHz, E=0	C_{CE}	11	pF
Noise Equivalent Power (V_R=20 V, λ=850 nm)	NEP	2.9×10^{-14}	W/√Hz

SFH300-2

Phototransistor

The SFH300-2 is a highly sensitive epitaxial NPN silicon planar phototransistor. It is enclosed in a T1 3/4 (5 mm) clear plastic package. The collector is denoted by a "flat" on the case bottom and the shorter electrical lead.



Maximum Ratings

Operating and Storage Temperature (T_{OP}, T_{STG}) ..... -55 to + 100°C
Soldering Temperature (> 2 mm from case bottom)
Dip Soldering Time (T_S) t < 5 s ..... 260°C
Iron Soldering Time (T_S) t < 3 s ..... 300°C
Collector Emitter Voltage (V_{CE}) ..... 35 V
Collector Current (I_C) ..... 50 mA
Collector Peak Current (I_{CS}) t < 10 µs ..... 100 mA
Emitter Collector Voltage (V_{EC}) ..... 7 V
Power Dissipation (P_{TOT}) T_A=25°C..... 200 mW
Thermal Resistance (R_{thJA}) .....375 K/W

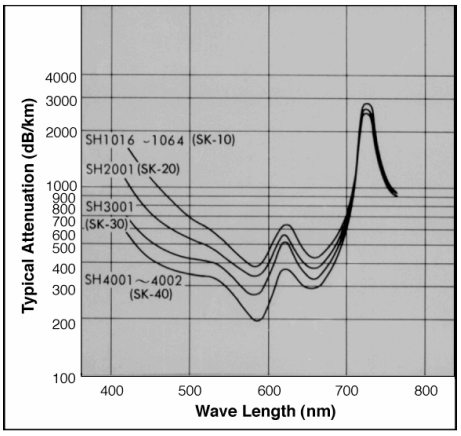
Characteristics (T_A-25°C)

Parameter	Symbol	Value	Units
Wavelength, Maximum Sensitivity	λ_{Smax}	850	nm
Spectral Range, Photosensitivity (S=10% of S_{MAX})	λ	420 - 1130	nm
Radiant Sensitive Area	A	0.12	mm^2
Chip Area Dimensions	L × W	0.5 × 0.5	mm
Distance, chip to surface to case surface	H	4.1 - 4.7	mm
Half Angle	φ	± 25	Degrees
Capacitance (V_{CE}=0 V, f=1 MHz, E=0	C_{CE}	6.5	pF
Dark Current (V_{CE}=35 V, E=0)	I_{CEO}	5 (<100)	nA
Photocurrent λ=950 nm (E_E=0.5 mW/cm^2, V_{CE}=5 V E_E=1000 lx (Normal Standard Lighting), V_{CE}=5 V	I_{PCE} I_{PCE}	1 - 2 5.4	mA mA
Rise/Fall Time (I_C=1 mA, V_{CC}=5 V, R_L= 1 KΩ)	t_R, t_F	10	µs
Collector Emitter Saturation Voltage (I_C=I_{PCE}min 1 × .3, E_E=0.5 mW/cm^2	V_{CEsat}	140	mV

IF-C-E1000

Plastic Optical Fiber

The IF-C-E1000 is a superior high-performance plastic optical fiber being offered commercially. It is step-index fiber consisting of a core of high-purity polymethyl-methacrylate, a cladding of special fluorinated polymer and a polyethylene jacket for environmental protection. The fiber is designed to provide high transmission in the visible region of the electromagnetic spectrum. (Data displayed on the right as P/N SH4001.) This fiber is particularly suited for short-distance data transmission.



Maximum Ratings

Operating and Storage Temperature (T_{OP}, T_{STG}) .....-0 to + 70°C

Characteristics (T_A-25°C)

Parameter	Symbol	Value	Units
Core Refractive Index	n_2	1.492	
Cladding Refractive Index	n_1	1.419	
Numerical Aperture	NA	.46	
Acceptance Angle	φ	55	Degrees
Jacket Outer Diameter	O.D.	2.2 ± .2	mm
Cladding Thickness		10 ± 2	µm
Core Diameter		980 ± 45	µm

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