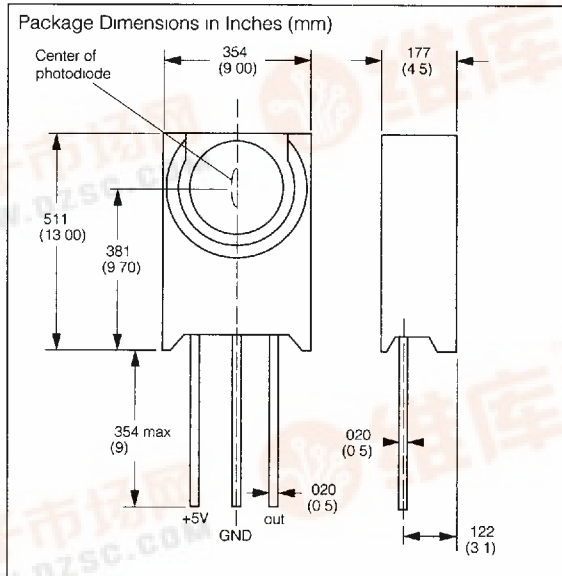


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**SFH505A**

**IR Receiver/Demodulator Device**

T-41-90



**FEATURES**

- Photodiode with Hybrid Integrated Circuit
- 30 kHz Carrier Frequency
- Black Epoxy Package with Daylight Filter Optimized for 950 nm
- High Immunity Against Ambient Light
- Low Power Consumption
- 5 V Supply Voltage
- High Sensitivity
- Internal EMI/RFI Shield

**DESCRIPTION**

The SFH505A incorporates a silicon PIN photodiode, IR detector IC, and demodulator in a lensed and filtered plastic housing. The device is compact, rugged and has a high immunity to ambient light and RFI/EMI interference because of its internal shielding.

Applications include remote control with televisions, video games, garage door openers, electronic toys, and automobiles

**Maximum Ratings**

Operating/Storage Temperature (T <sub>OP</sub> , T <sub>STG</sub> )	... -25° to +85°C
Soldering Temperature (≥2 mm from case) (T <sub>S</sub> ) t <sub>≤3</sub> s	... 260°C
Supply Voltage (V <sub>CC</sub> )	... -0.3 to +7.0V
Output Voltage (V <sub>O</sub> )	... -0.3 to +7.0V
Output Current (I <sub>O</sub> )	... 3 mA

**Characteristics (T<sub>A</sub>=25°C)**

Parameter	Symbol	Value	Unit
Operating Voltage Range	V <sub>CC</sub>	4.5 to 5.5	V
Operating Temperature Range	T <sub>A</sub>	0 to 70°	°C
Switching Threshold (950 nm, f=30 kHz)	E <sub>ES</sub> <sup>(1)</sup>	40	nW/cm <sup>2</sup>
Wavelength, Maximum Sensitivity	λ <sub>Smax</sub>	950	nm
Spectral Sensitivity Range (S=10% of S <sub>MAX</sub> )	Δλ	±160	nm
Half Angle	φ	±50	Deg
Current Consumption	I <sub>CC</sub>	0.65	mA
Output Voltage (I <sub>O</sub> =100 μA)	V <sub>Olow</sub>	<0.4	V
Output (output high, V <sub>O</sub> =5 V)	I <sub>O</sub>	<10	μA
Turn-on Time <sup>(2)</sup> (E <sub>E</sub> =250 nW/cm <sup>2</sup> , f=30 kHz)	t <sub>ON</sub>	100	μs
Turn-off Time <sup>(2)</sup> (E <sub>E</sub> =250 nW/cm <sup>2</sup> , f=30 kHz)	t <sub>OFF</sub>	200	μs
Conducting Time (E <sub>E</sub> =200 μW/cm <sup>2</sup> , f=30 kHz)	t <sub>LOW</sub>	700	μs
(E <sub>E</sub> =250 μW/cm <sup>2</sup> , f=30 kHz)	t <sub>LOW</sub>	500	μs

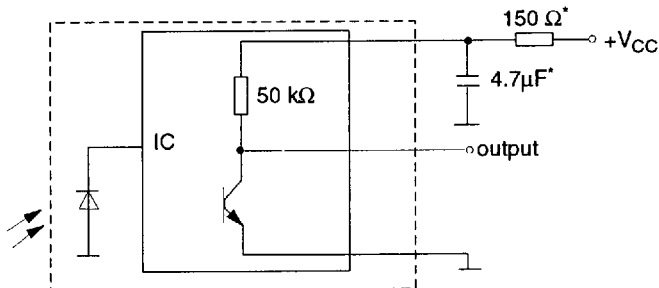
Notes 1. A 30 m transmission distance is possible when used with IR emitter SFH415 at I<sub>F</sub>=1 A (I<sub>E</sub>=400 mW/sr)  
2. See Figure 2

Photodiodes



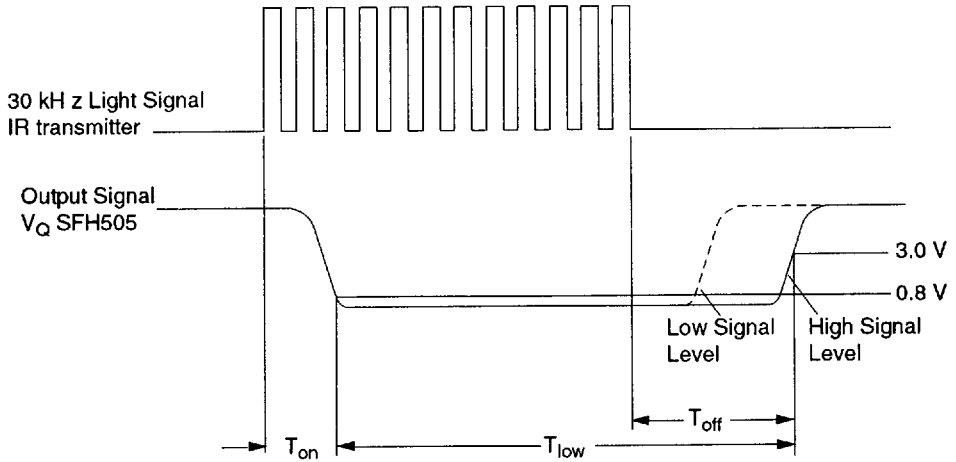
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Figure 1. External Circuit



\* Blocking devices if required

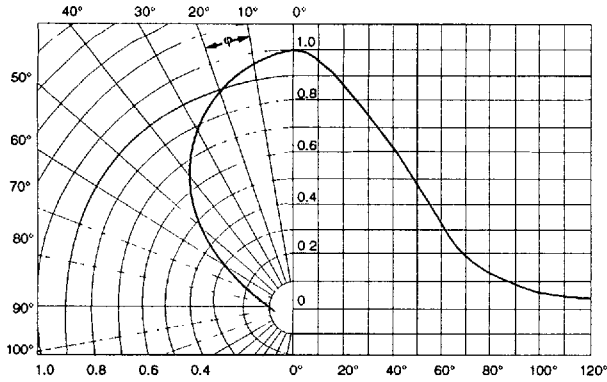
Figure 2. Timing Diagram



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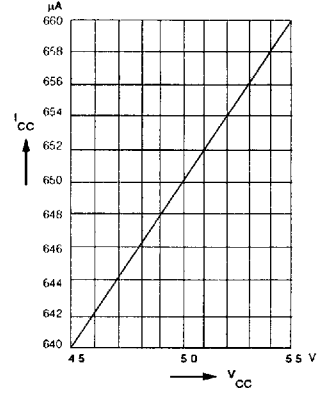
**Directional characteristics**

$S_{REL} = f(\rho)$



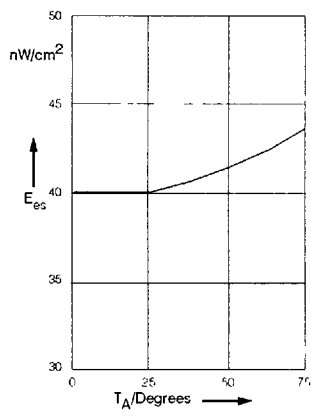
**Current consumption**

$I_{CC} = f(V_{CC})$



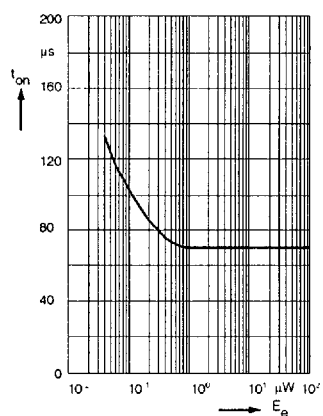
**Switching threshold**

$E_{ES} = f(T_A)$



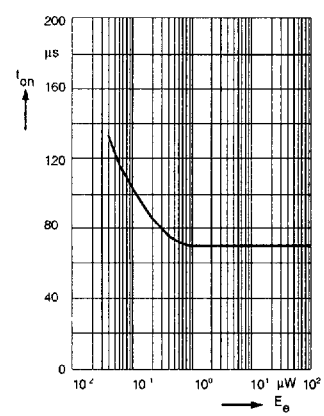
**Turn-on time  $t_{on} = f(E_e)$**

$f = 30 \text{ kHz, 12 pulses}$



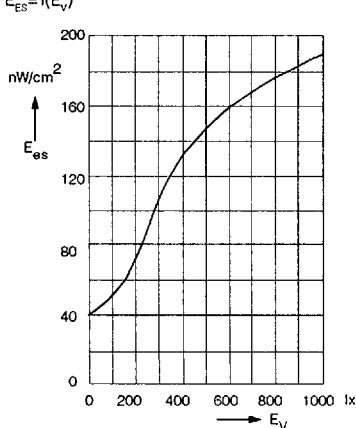
**Turn-off time  $t_{off} = f(E_e)$**

$f = 30 \text{ kHz, 12 pulses}$



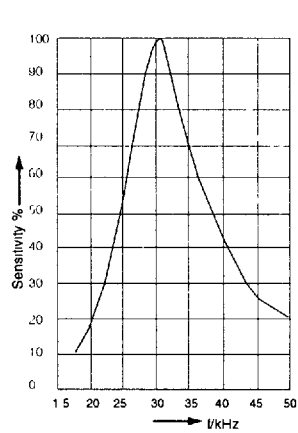
**Extraneous light effect to switching threshold**

$E_{ES} = f(E_v)$



**Relative spectral sensitivity**

$f = (f)$



Photodiodes