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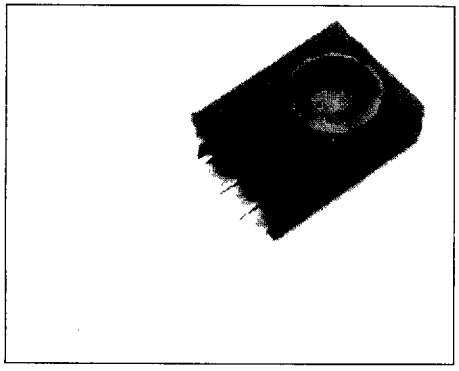
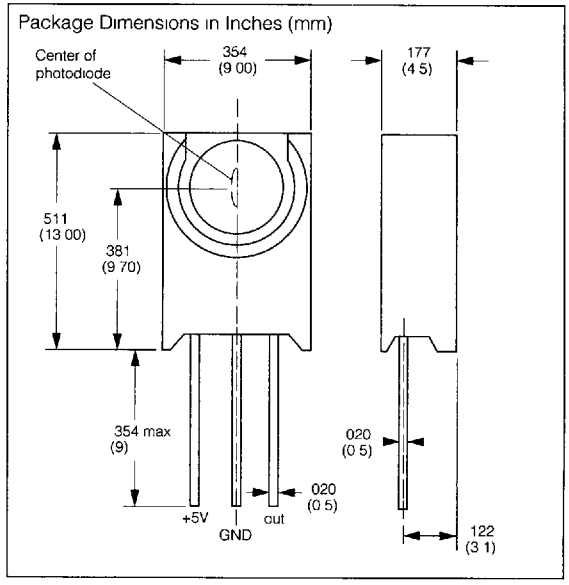
# SFH505A

## IR Receiver/Demodulator Device

T-41-90






### FEATURES

- **Photodiode with Hybrid Integrated Circuit**
- **30 kHz Carrier Frequencey**
- **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 ($T_{OP}$, $T_{STG}$) . . . ....–25° to +85°C
Soldering Temperature (≥2 mm from case) ($T_S$) t≤3 s . ... . 260°C
Supply Voltage ($V_{CC}$) .. . . –0 3 to +7 0V
Output Voltage ($V_Q$) . . . –0 3 to +7 0V
Output Current ($I_Q$) . . . . . 3 mA

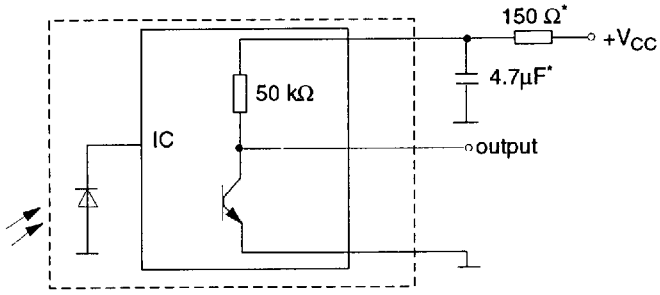
### Characteristics ($T_A$=25°C)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Operating Voltage Range | $V_{CC}$ | 4 5 to 5.5 | V |
| Operating Temperature Range | $T_A$ | 0 to 70° | °C |
| Switching Threshold (950 nm, f=30 kHz) | $E_{ES}$(1) | 40 | nW/cm² |
| Wavelength, Maximum Sensitivity | $\lambda_{Smax}$ | 950 | nm |
| Spectral Sensitivity Range (S=10% of $S_{MAX}$) | $\Delta\lambda$ | ±160 | nm |
| Half Angle | $\varphi$ | ±50 | Deg |
| Current Consumption | $I_{CC}$ | 0.65 | mA |
| Output Voltage ($I_Q$=100 µA) | $V_{Qlow}$ | <0 4 | V |
| Output (output high, $V_Q$=5 V) | $I_Q$ | <10 | µA |
| Turn-on Time(2) ($E_E$=250 nW/cm, f=30 kHz) | $t_{ON}$ | 100 | µs |
| Turn-off Time(2) ($E_E$=250 nW/cm, f=30 kHz) | $t_{OFF}$ | 200 | µs |
| Conducting Time ($E_E$=200 µW/cm, f=30 kHz) | $t_{LOW}$ | 700 | µs |
| ($E_E$=250 µW/cm, f=30 kHz) | $t_{LOW}$ | 500 | µs |

Notes 1. A 30 m transmission distance is possible when used with IR emitter SFH415 at $I_F$=1 A ($I_E$=400 mW/sr)
2 See Figure 2

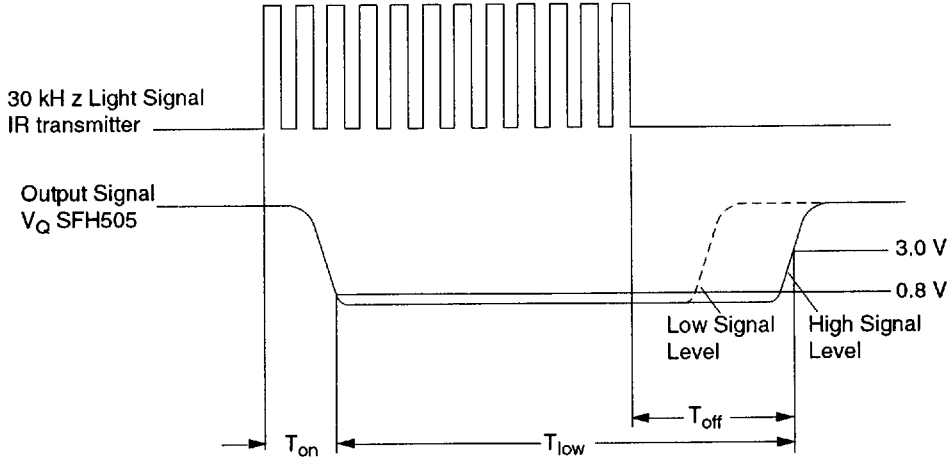
Photodiodes

**Figure 1. External Circuit**




* Blocking devices if required

**Figure 2. Timing Diagram**



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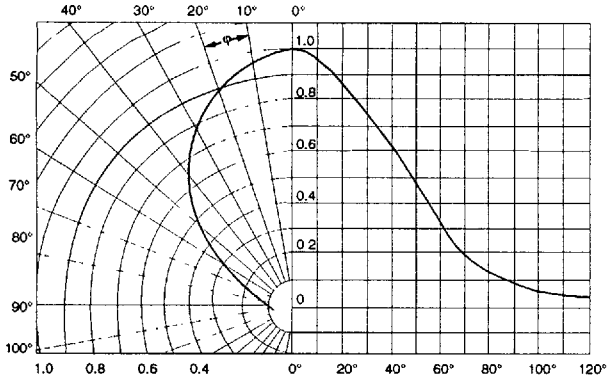
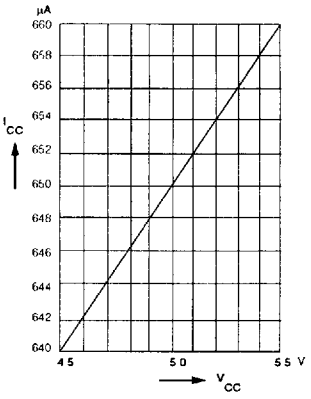
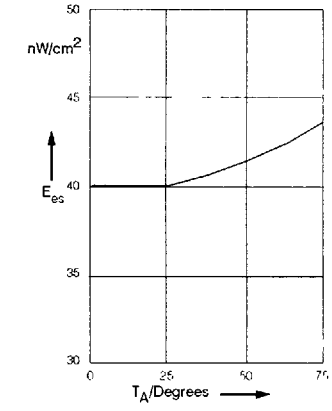
**Directional characteristics**
$S_{REL} = f(\rho)$



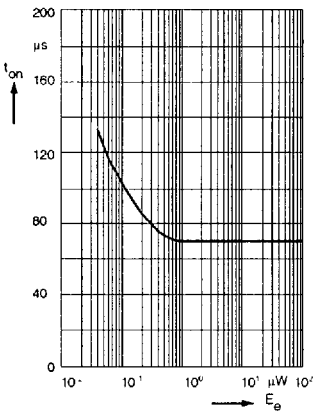

**Current consumption**
$I_{CCL} = f(V_{CC})$




**Switching threshold**
$E_{ES} = f(T_A)$




**Turn-on time** $t_{ON} = f(E_E)$
f = 30 kHz, 12 pulses

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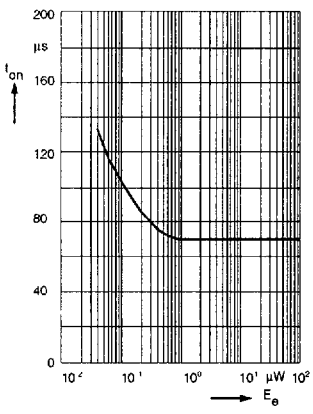
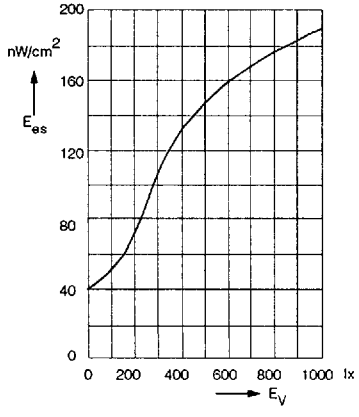



**Extraneous light effect to switching threshold**
$E_{ES} = f(E_V)$




**Relative spectral sensitivity**
f = (f)