

### FEATURES

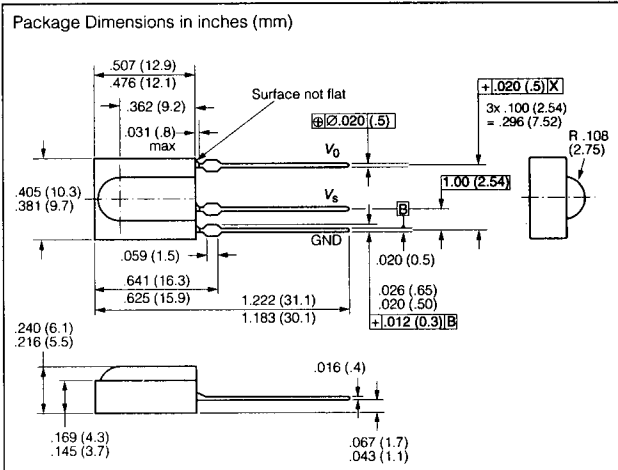
- Photodiode with Hybrid Integrated Circuit
- Several Carrier Frequencies
- Black Epoxy Resin with Daylight Filter Optimized for 950 nm
- High Immunity Against Ambient Light
- Low Power Consumption
- 5 V Supply Voltage
- High Sensitivity (Internal Shield Case)
- TTL and CMOS Compatibility
- Continuous Transmission Possible ( $t_{pi}/T \leq 0.4$ )
- Application
  - IR Remote Control Preamplifier Module

### DESCRIPTION

The SFH506 is a family of miniaturized receivers for infrared remote control systems. The demodulated output signal can be directly decoded by a microprocessor.

### Maximum Ratings

|   |                     |
|---|---------------------|
| Operating/Storage Temperature Range ( $T_A$ , $T_{STG}$ )     | .....-25° to +85°C  |
| Junction Temperature ( $T_J$ )                                | ..... +100°C        |
| Soldering Temperature (solder joint $\geq 2$ mm from package) | ..... +260°C        |
| Soldering Time, $t \leq s$                                    |                     |
| Supply Voltage, Pin 2 ( $V_{CC}$ )                            | .....-0.3 to +6.0 V |
| Supply Current, Pin 2 ( $I_{CC}$ )                            | ..... 5 mA          |
| Output Voltage, Pin 3 ( $V_O$ )                               | .....-0.3 to +6.0 V |
| Output Current, Pin 3 ( $I_O$ )                               | ..... 5 mA          |
| Power Dissipation ( $P_{tot}$ ) $T_A \leq 85^\circ C$         | ..... 50 mW         |



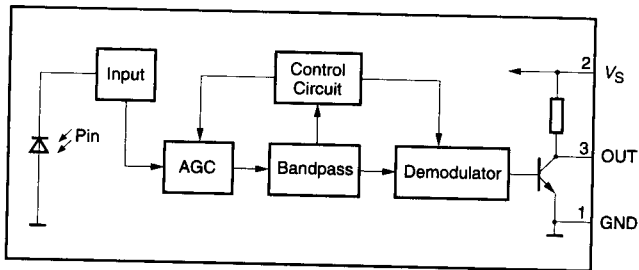
### Characteristics ( $T_A=25^\circ C$ )

| Parameter  | Symbol           | Value          | Unit              |
|--|------------------|----------------|-------------------|
| Threshold Irradiance, $t_{po}=t_{p0} \pm 160 \mu s$ (test signal, see Figure 3)                  | $E_{emin}^{(1)}$ | 0.35 typ.      | mW/m <sup>2</sup> |
|  | $E_{emax}^{(1)}$ | 0.5 max.<br>20 | W/m <sup>2</sup>  |
| Wavelength, Maximum Sensitivity  | $\lambda_{Smax}$ | 950            | nm                |
| Spectral Sensitivity Range ( $S=10\%$ of $S_{MAX}$ )   | $\Delta\lambda$  | 830 to 1100    | nm                |
| Half Angle   | $\varphi$        | $\pm 55$       | Deg.              |
| Current Consumption, Pin 2<br>$V_S=5$ V, $E_V=0$<br>$V_S=5$ V, $E_V=4000$ lx, Sunlight           | $I_{CC}$         | 0.5            | mA                |
|  | $I_{CC}$         | 1.0            | mA                |
| Output Voltage, Pin 3<br>( $I_O=0.5$ A, $E_e=0.5$ mW/m <sup>2</sup> ,<br>$f=f_0$ , $T_p/T=0.4$ ) | $V_{Olow}$       | <250           | mV                |

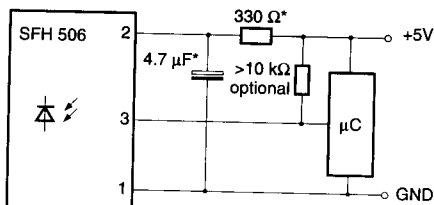
| Part Number | Carrier Frequency, kHz |
|-------------|------------------------|
| SFH506-30   | 30                     |
| SFH506-33   | 33                     |
| SFH506-36   | 36                     |
| SFH506-38   | 38                     |
| SFH506-40   | 40                     |
| SFH506-56   | 56                     |

Note  
1. An arrival distance of 35 m is possible when SFH506 is used with IRED SFH415 under operation conditions.

**Figure 1. Block diagram**

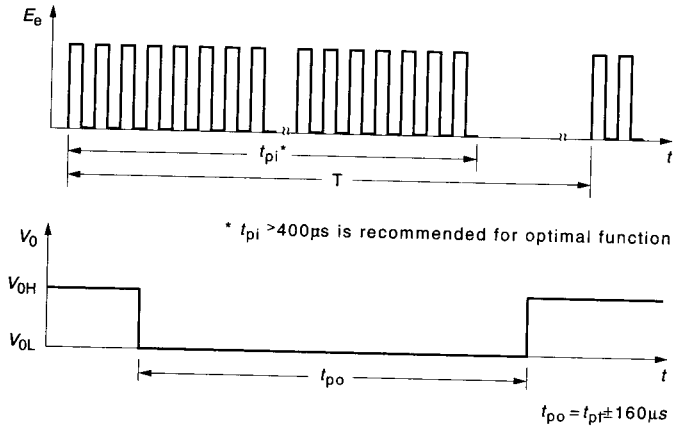


**Figure 2. External circuit**



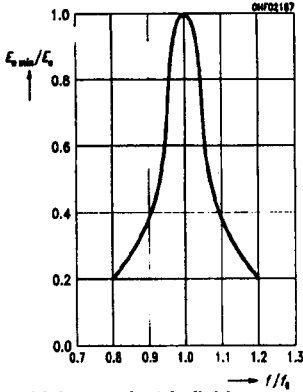
\* only necessary to suppress power supply disturbances

**Figure 3. Timing diagram**



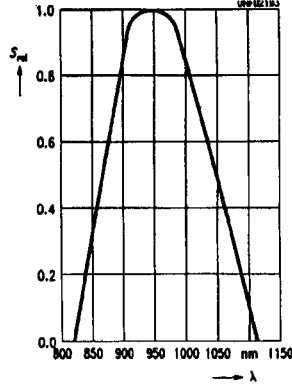
**Relative sensitivity**

$E_{emin}/E_e = f(f/f_0)$



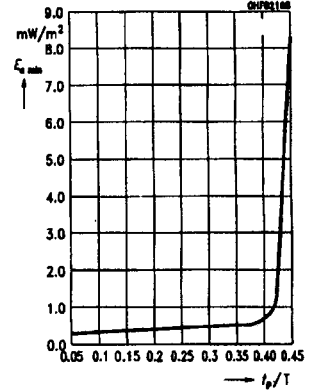
**Relative luminous intensity**

$S_{rel} = f(\lambda), T_A = 25^\circ C$



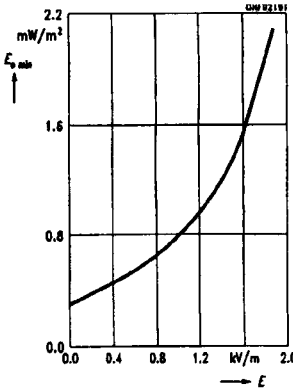
**Sensitivity vs. duty cycle**

$E_e = f(t_p/T)$



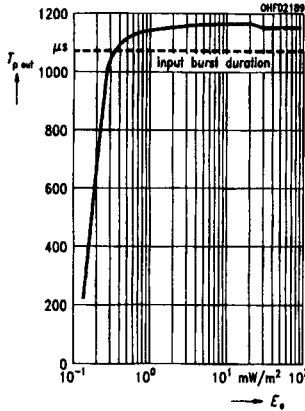
**Sensitivity vs. electric field disturbance**

$E_{emin} = f(E)$ ,  
disturbance field strength,  $f = f_0$



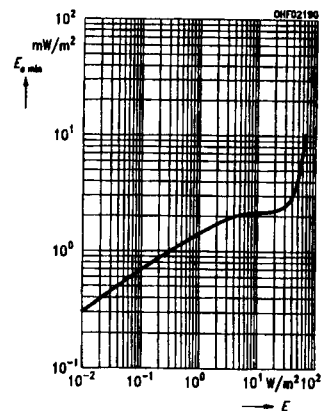
**Sensitivity vs. dark ambient**

$T_{pout} = f(E_e), \lambda = 950 \text{ nm}$ , optical test signal



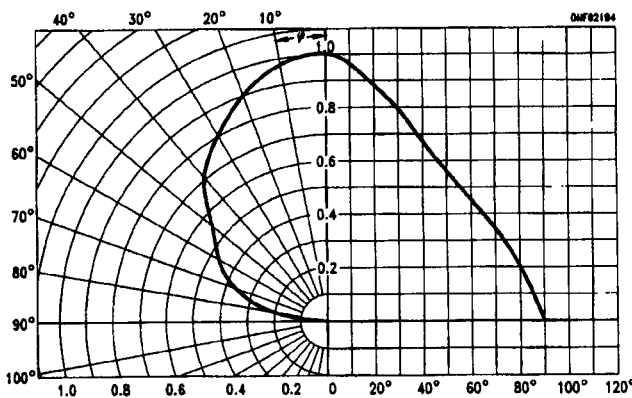
**Sensitivity vs. bright ambient**

$E_{emin} = f(E), \lambda = 950 \text{ nm}$ , ambient



**Directional characteristic**

$S_{rel} = f(\varphi)$



**Sensitivity vs. supply voltage disturbance**

$E_{emin} = f(\Delta V_{SRMS})$

