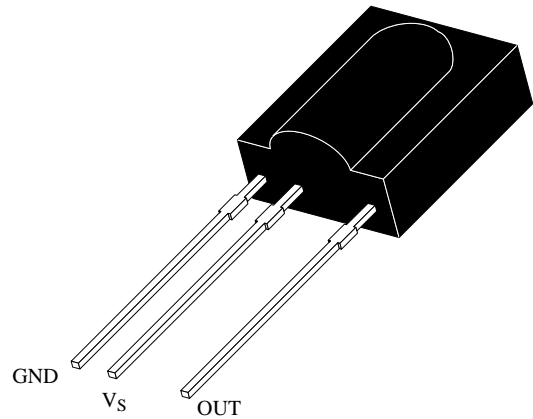


## Photo Modules for PCM Remote Control Systems

### Available types for different carrier frequencies

Type	f <sub>0</sub>	Type	f <sub>0</sub>
TFMS 5300	30 kHz	TFMS 5330	33 kHz
TFMS 5360	36 kHz	TFMS 5370	36.7 kHz
TFMS 5380	38 kHz	TFMS 5400	40 kHz
TFMS 5560	56 kHz		



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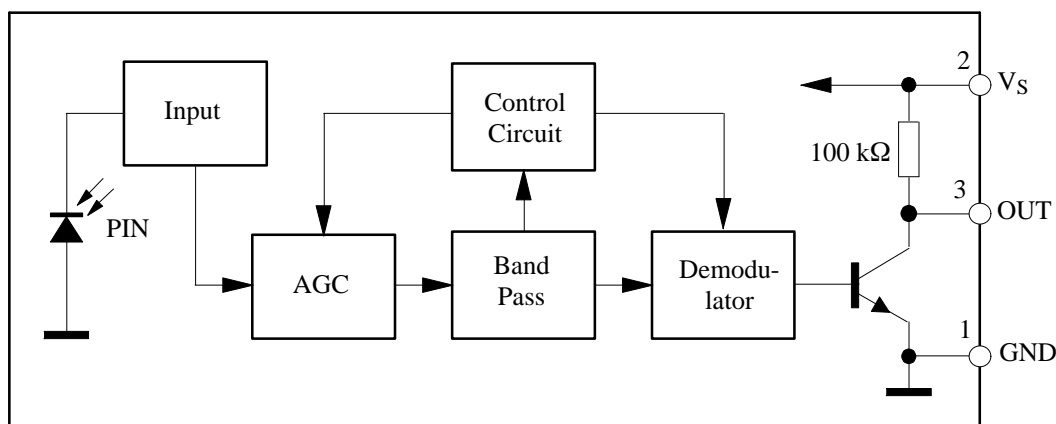
### Description

The TFMS 5..0 – series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.

### Features

- Photo detector and preamplifier in one package
- Output active low. (active high modules: TFMS 5..9)
- Internal filter for PCM frequency
- High immunity against ambient light
- Improved shielding against electric field disturbance
- 5 Volt supply voltage, low power consumption
- TTL and CMOS compatibility
- Continuous transmission possible ( $t_{pi}/T \leq 0.4$ )

### Block Diagram



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## Absolute Maximum Ratings

$T_{amb} = 25^{\circ}\text{C}$

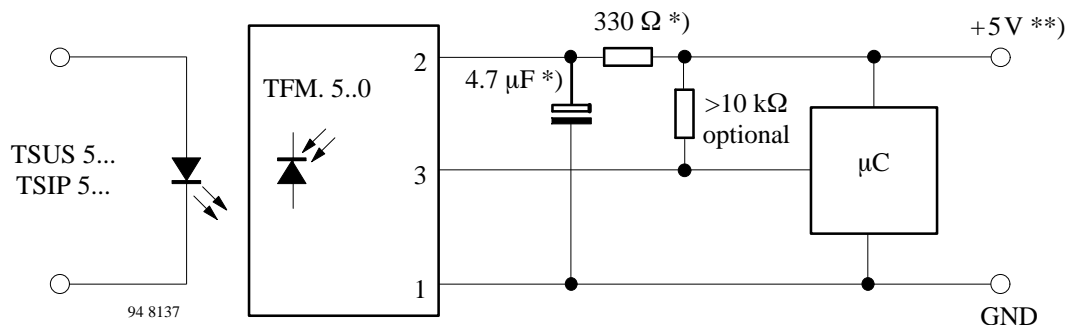
Parameter	Test Conditions	Symbol	Value	Unit
Supply Voltage	(Pin 2)	$V_S$	-0.3...6.0	V
Supply Current	(Pin 2)	$I_S$	5	mA
Output Voltage	(Pin 3)	$V_O$	-0.3...6.0	V
Output Current	(Pin 3)	$I_O$	5	mA
Junction Temperature		$T_j$	100	$^{\circ}\text{C}$
Storage Temperature Range		$T_{stg}$	-25...+85	$^{\circ}\text{C}$
Operating Temperature Range		$T_{amb}$	-25...+85	$^{\circ}\text{C}$
Power Consumption	( $T_{amb} \leq 85^{\circ}\text{C}$ )	$P_{tot}$	50	mW
Soldering Temperature	$t \leq 10\text{ s}$ , 1 mm from case	$T_{sd}$	260	$^{\circ}\text{C}$

## Basic Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Supply Current (Pin 2)	$V_S = 5\text{ V}$ , $E_v = 0$	$I_{SD}$	0.4	0.5	0.8	mA
Supply Current (Pin 2)	$V_S = 5\text{ V}$ , $E_v = 40\text{ klx}$ , sunlight	$I_{SH}$		1.0		mA
Transmission Distance	$E_v = 0$ , Test signal see Fig.7, IR diode TSIP5201, $I_F = 1.5\text{ A}$	$d$		35		m
Output Voltage Low (Pin 3)	$I_{OSL} = 0.5\text{ mA}$ , $E_e = 0.7\text{ mW/m}^2$ , $f = f_o$ , $t_p/T = 0.4$	$V_{OSL}$			250	mV
Irradiance (30 – 40 kHz)	Pulse width tolerance: $t_{po} = t_{pi} \pm 160\mu\text{s}$ , Test signal (see Fig.7)	$E_e\text{ min}$		0.3	0.5	$\text{mW/m}^2$
Irradiance (56 kHz)	Pulse width tolerance: $t_{po} = t_{pi} \pm 160\mu\text{s}$ , Test signal (see Fig.7)	$E_e\text{ min}$		0.4	0.7	$\text{mW/m}^2$
Irradiance		$E_e\text{ max}$	20			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\varphi_{1/2}$		$\pm 55$		deg

## Application Circuit



\*) only necessary to suppress power supply disturbances

\*\*\*) tolerated supply voltage range :  $4.5\text{ V} < V_S < 5.5\text{ V}$

## Typical Characteristics ( $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

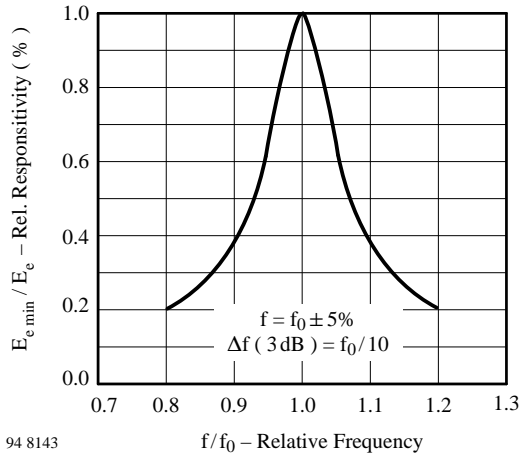


Figure 1 : Frequency Dependence of Responsivity

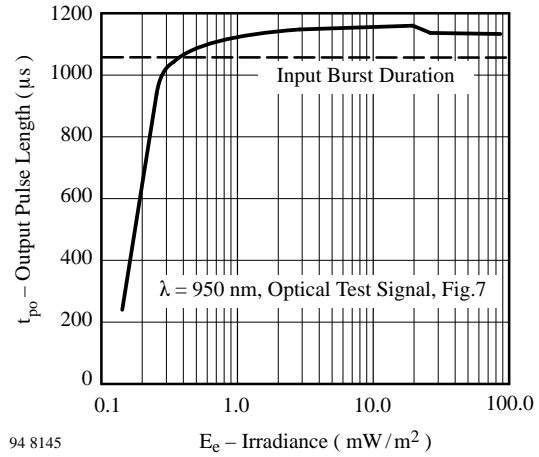


Figure 2 : Sensitivity in Dark Ambient

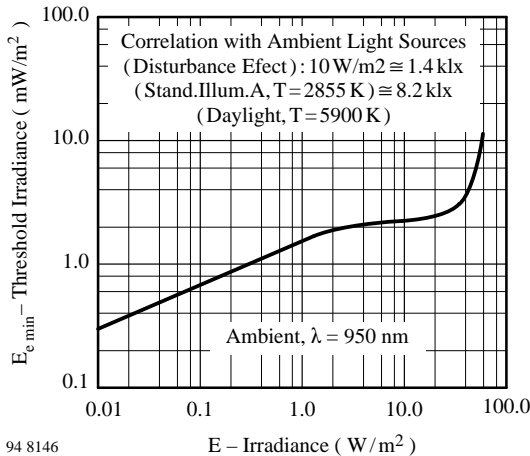


Figure 3 : Sensitivity in Bright Ambient

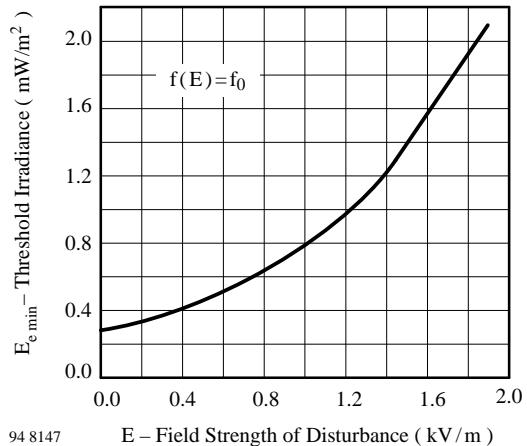


Figure 4 : Sensitivity vs. Electric Field Disturbances

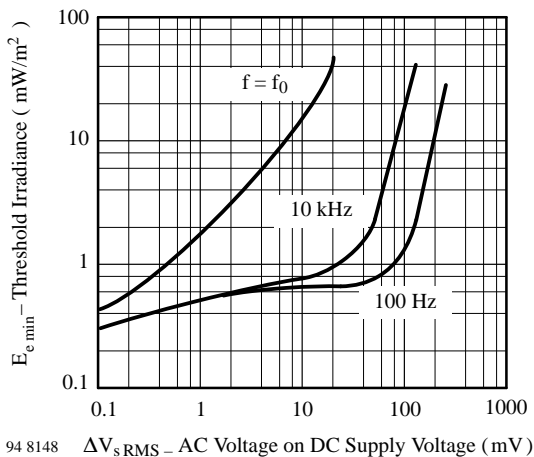


Figure 5 : Sensitivity vs. Supply Voltage Disturbances

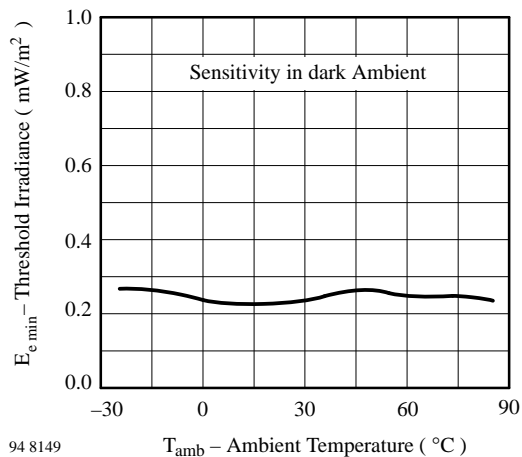


Figure 6 : Sensitivity vs. Temperature

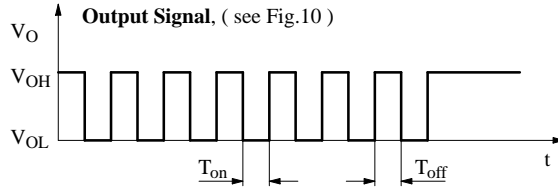
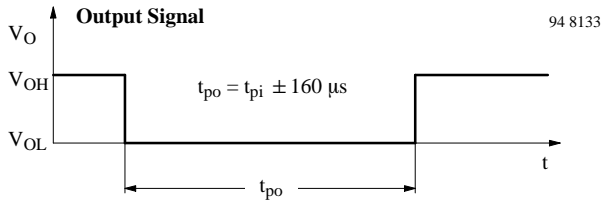
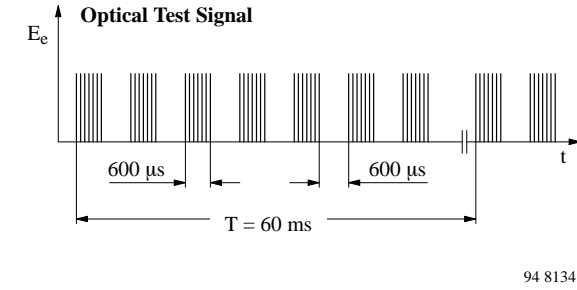
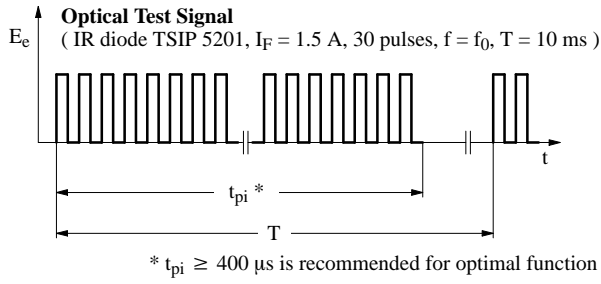


Figure 7 : Output Function

Figure 8 : Output Function

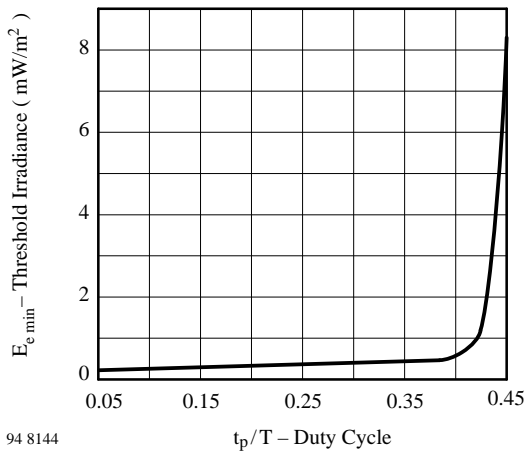


Figure 9 : Sensitivity vs. Duty Cycle

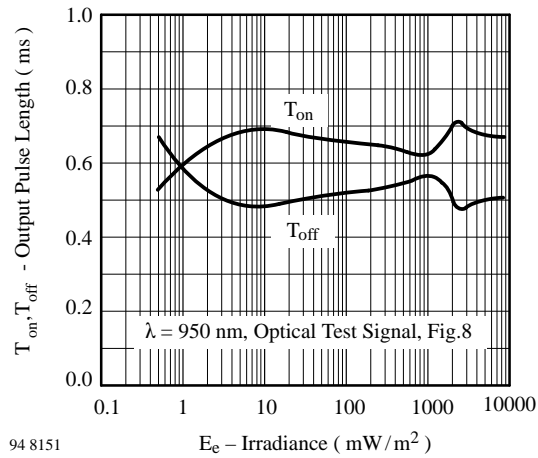


Figure 10 : Output Pulse Diagram

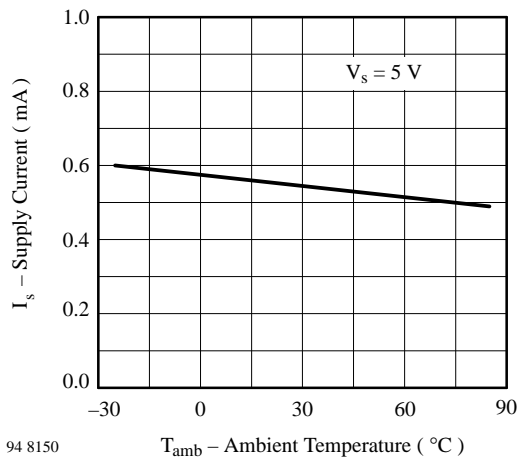


Figure 11 : Supply Current vs. Temperature

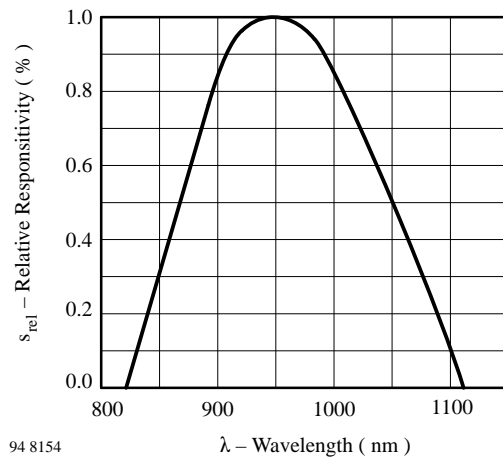


Figure 12 : Spectral Response

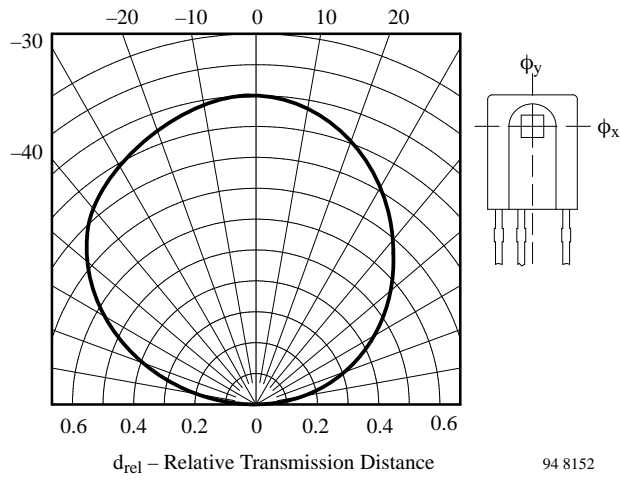


Figure 13 : Vertical Directivity  $\phi_y$

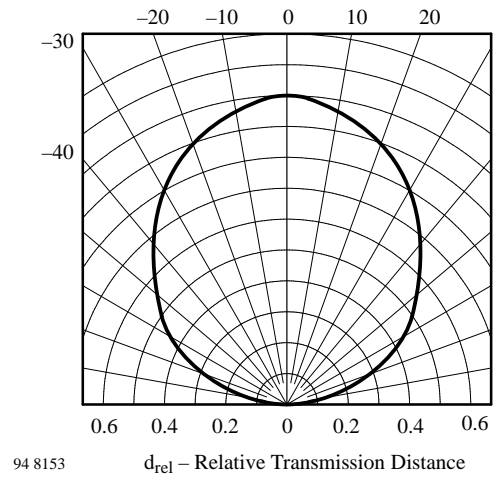
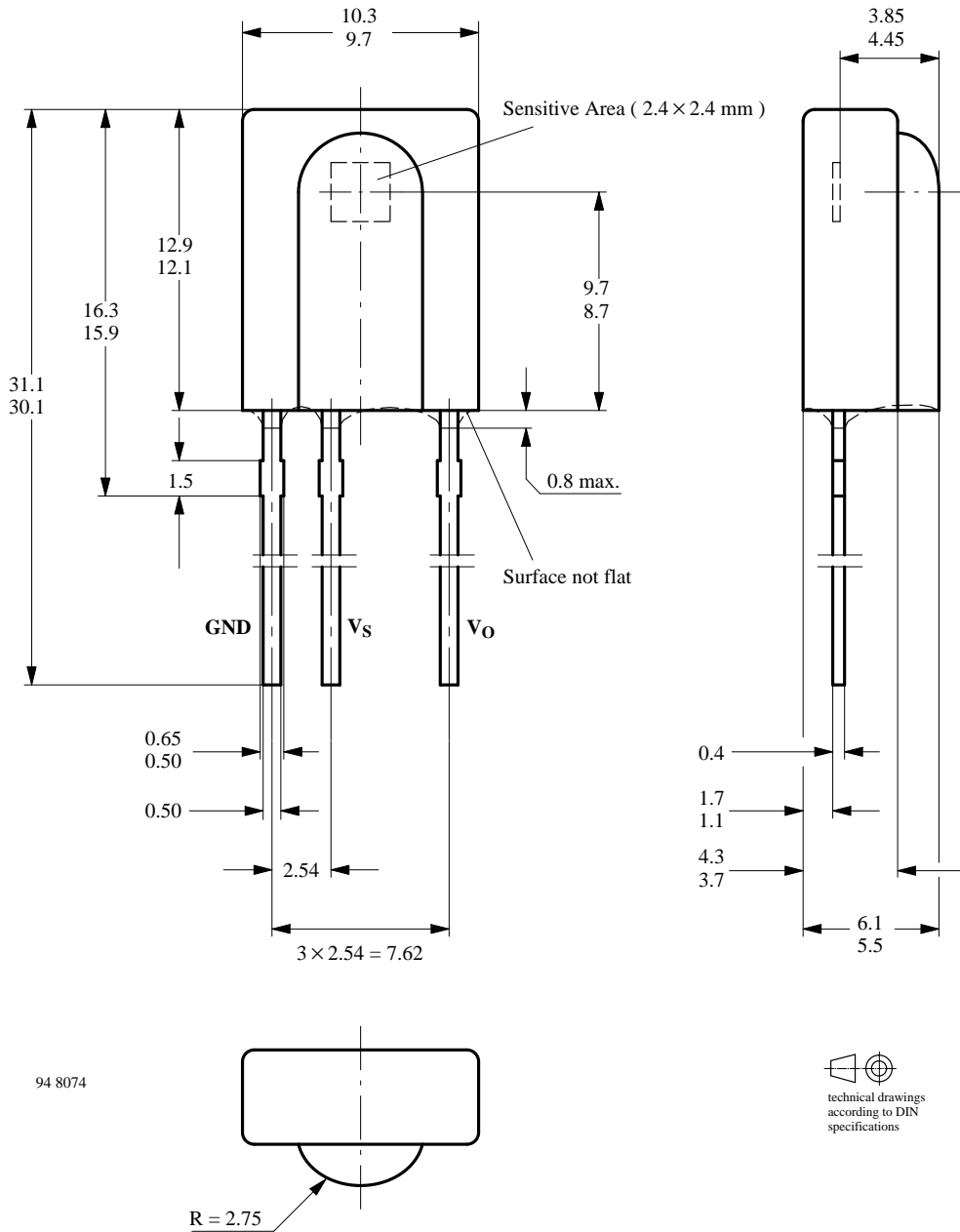


Figure 14 : Horizontal Directivity  $\phi_x$

## Dimensions in mm



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