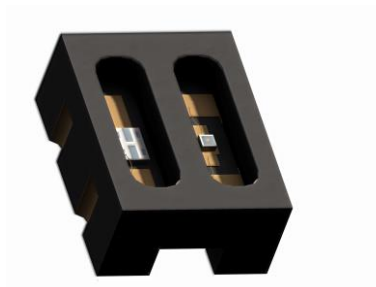


General Description

The OIER2 reflective sensor consists in a red emitting diode and a double NPN silicon phototransistor. The components together are mounted side by side in a plastic black SMD housing. The black package avoids light reflections, noise and behaves as a barrier between led and photoreceivers.

The phototransistors respond to radiation emitted from the diode only if a reflective object surface is within the field of view of the detector.



Applications

Scanning

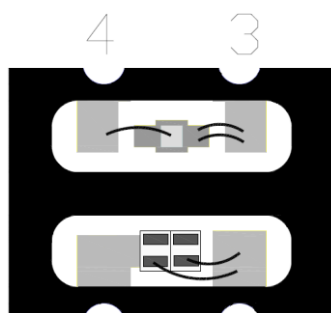
Automated transaction systems

Metering systems

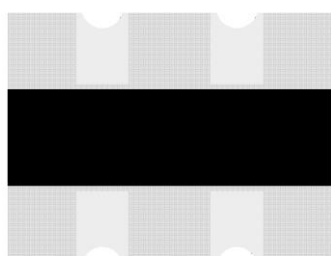
Motion control systems

Non invasive medical equipment

Low distance metering



Top view



Bottom view

Features

- Unfocused for sensing diffused surface
- SMT package
- High uniformity
- Very stable measurements
- High gain phototransistor
- No contact surface sensing
- Low profile
- Low cost
- Milling on the backside for side PCB mounting

Pin Functions

No.	Name	Function
1	C	Phototransistor Collector
2	E	Phototransistor Emitter
3	A	LED Anode
4	K	LED Cathode

Ordering Information

OIER2 Reflective Sensor with Red LED

OIER2

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
T _A	Operating Temperature Range	-25	85	°C
T _s	Storage temperature	-40	85	°C
T _{sol}	Lead temperature (solder) s		270	°C
Emitter				
I _F	Continuous forward current		20	mA
V _r	Reverse voltage		5	V
Receiver				
V _{CE0}	Collector-emitter voltage		30	V
P _d	Power dissipation		100	mW
I _c	Collector DC current		30	mA

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

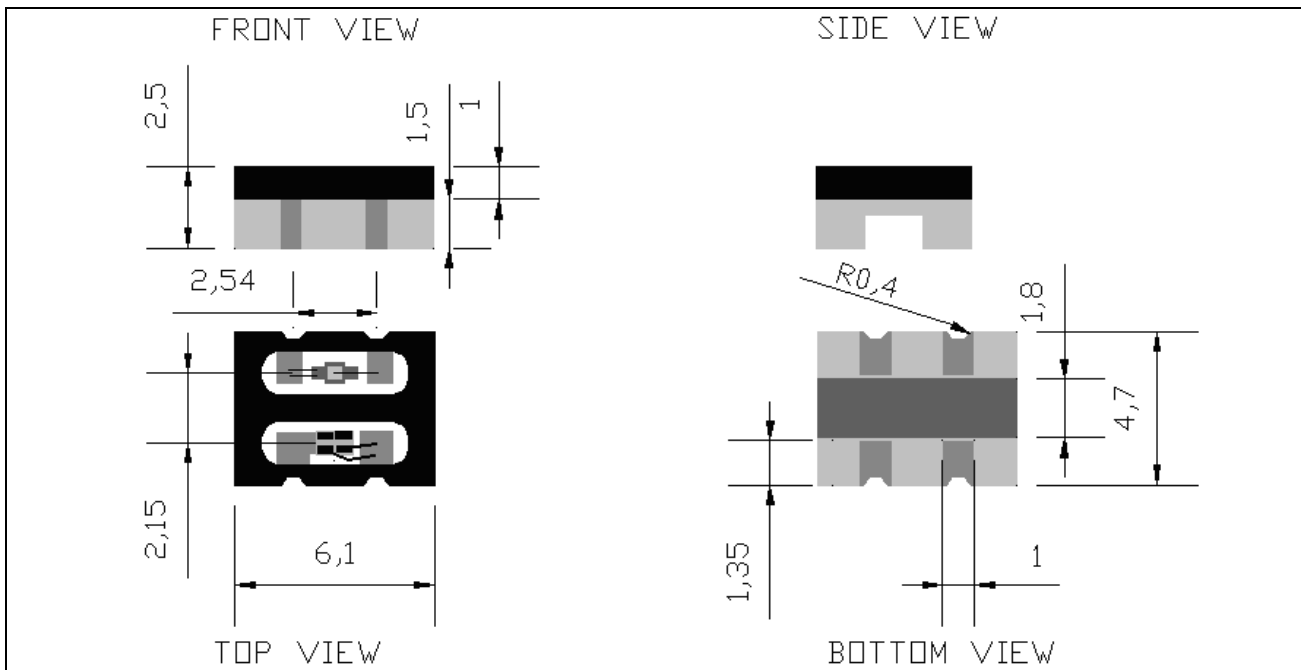
ELECTRICAL/OPTICAL CHARACTERISTICS

T_A = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Emitter						
V _F	Forward voltage	I _F =20mA		2.2	2.5	V
λ _p	Peak wavelength	I _F =20mA	625	635	645	nm
Δλ	Spectral bandwidth at 50%	I _F =20mA		18		nm
Receiver						
I _{CE0}	Collector dark current	V _{CE} =10V		10	100	nA
V _{(BR)CE0}	Collector-emitter breakdown voltage		50			V
T _r	Rise time	RI=1kΩ V _{CE} =5V I _c =1mA		10		μs
T _f	Fall time	RI=1kΩ V _{CE} =5V I _c =1mA		11		μs
H _{fe}	Phototransistor's gain		500	750	1000	
Coupled						
I _c	Collector current (reflective surface @ D=1mm)	V _{CE} =5V I _F =20mA	0.5	1		mA
V _{Cesat}	Collector-emitter saturation voltage	I _F =20mA V _{CE} =5V D=1mm			0.3	V
D	Optimal distance to reflective surface†			1.1		Mm

MECHANICAL CHARACTERISTICS

Unit: mm Tolerance: ± 0.2 mm



† See Figure 1

TYPICAL PERFORMANCE CURVES

Figure 1 – Normalized collector current VS Distance to reflective surface [mm] §

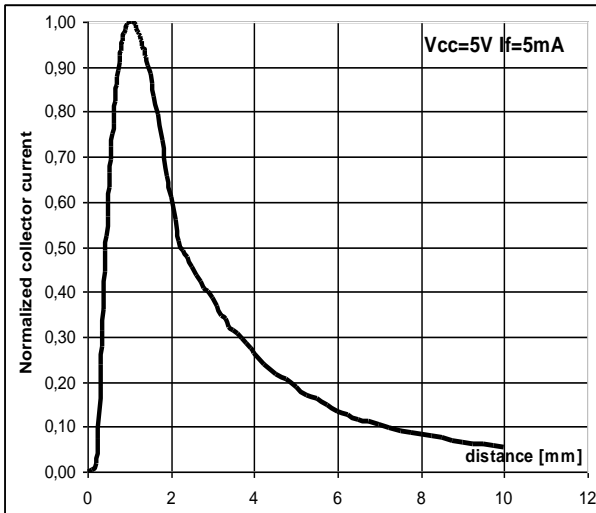


Figure 2 – Normalized collector current typical drift VS temperature [°C]

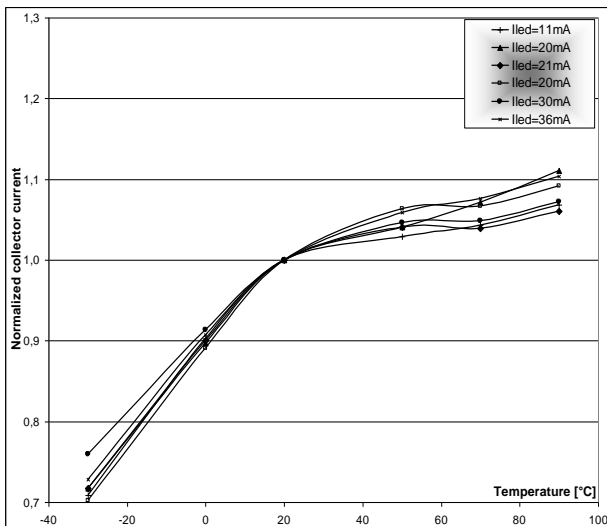


Figure 3 – Normalized collector current [Ic/Ic5mA] VS Forward led current [mA] §

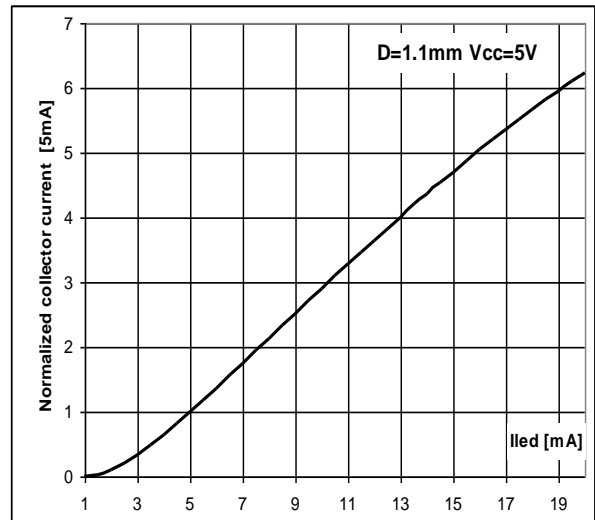
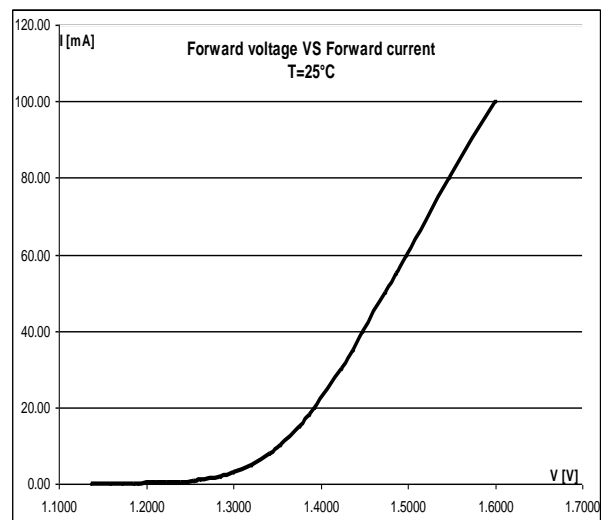


Figure 4 – Forward led current [mA] VS Forward led voltage [V] §



§ Ta=25°C unless otherwise noted

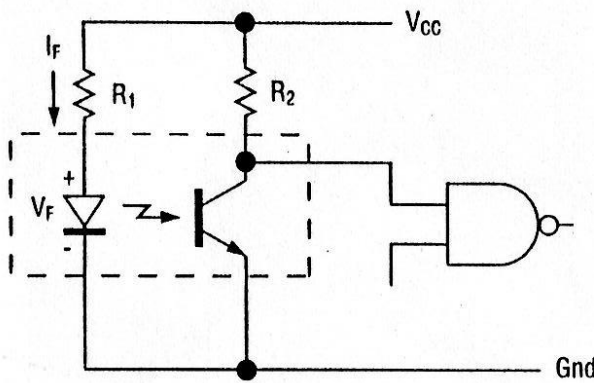


Figure 5 – Digital interface

$$R_1 = \frac{V_{cc} - V_F}{I_F}$$

$$R_2 = \frac{V_{cc} - V_{ce_{sat}}}{I_{sat}}$$

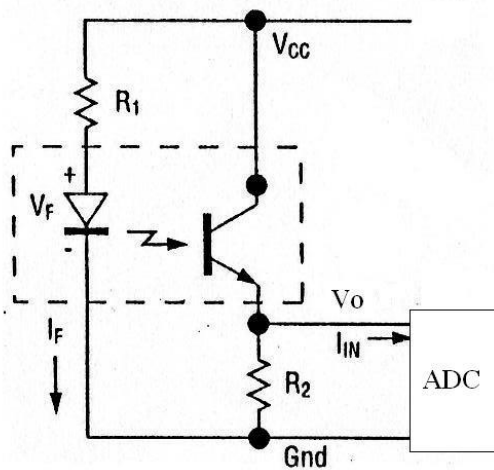


Figure 6 –Linear signal conversion to digital

$$R_1 = \frac{V_{cc} - V_F}{I_F}$$

$$R_2 = \frac{V_{cc} - V_{ce}}{I_{R2}}$$

I_{IN} input current required for AD conversion
 V_o output analog voltage
 (the voltage gain is given by R_2 and I_F)

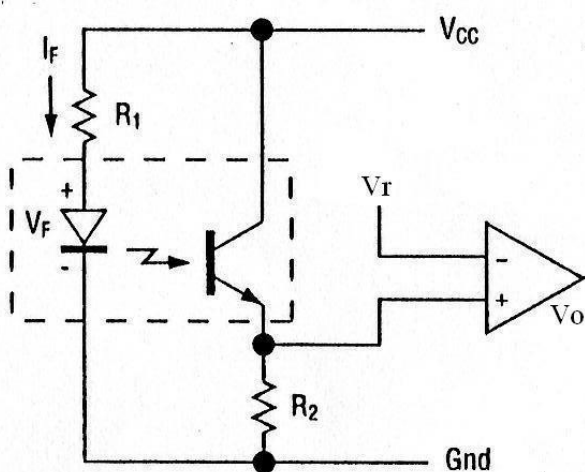


Figure 7 – Threshold comparator

$$R_1 = \frac{V_{cc} - V_F}{I_F}$$

$$R_2 = \frac{V_{cc} - V_{ce}}{I_{R2}}$$

$$V_o = A_{ol} * (V_{R2} - V_r)$$

V_r voltage threshold
 V_o voltage digital output