

## General Description

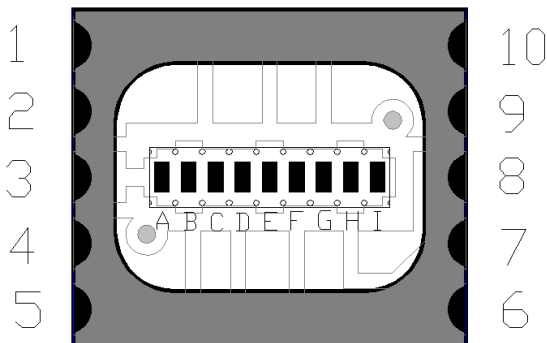
OIT12C-NR consists in a silicon phototransistor's monolithic array. The phototransistors have a common collector on the back substrate, which is tied to a single pad and every emitter is accessible to specific pad. The optical pitch of the array is 0.45 mm, the LCC package electrical pitch is 1.10 mm. The active area of each element is 0.25 x 0.50 mm<sup>2</sup>.

The advantages of this product are the high uniformity of the silicon sensors, due to the monolithic construction and to the extremely controlled microelectronic process, the high stability of the signal and the high optical responsivity, due to the antireflective coating deposited on the phototransistor's areas.

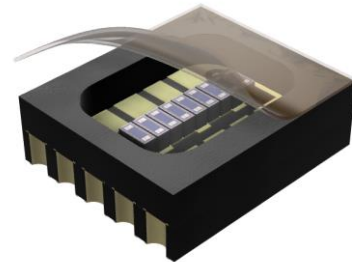
The device is protected with a thin plastic film, that is resistant to reflow oven processes. The film has to be removed once the device has been assembled on the electronic board and the user can attach the optical reticle. Two reference marks are available for the precise positioning of the reticle.

## Applications

- Optical encoders
- Incremental encoders
- Optical Receivers
- Controls/drives
- Light sensors



TOP VIEW



## Features

- Resistant to soldering processes, MSL2
- High uniformity of the silicon cells
- Smaller optical pitch, wider active area
- High gain
- Very small dimensions
- Reference points for precise mounting
- Reticle assembly service available

## Pin Functions

| No. | Name | Function                  |
|-----|------|---------------------------|
| 1   | DE   | Phototransistor D Emitter |
| 2   | BE   | Phototransistor B Emitter |
| 3   | CC   | Common collector          |
| 4   | AE   | Phototransistor A Emitter |
| 5   | CE   | Phototransistor C Emitter |
| 6   | EE   | Phototransistor E Emitter |
| 7   | GE   | Phototransistor G Emitter |
| 8   | IE   | Phototransistor I Emitter |
| 9   | HE   | Phototransistor H Emitter |
| 10  | FE   | Phototransistor F Emitter |

## Ordering information

**OIT12C-NR** 9-ch phototransistor array 0.45mm optical pitch on plastic SMD package, no encapsulant

**ABSOLUTE MAXIMUM RATINGS**

| Symbol      | Parameter  | Min | Max | Unit  |
|-------------|--|-----|-----|-------|
| $T_R$       | Operating Temperature Range  | -40 | 100 | °C    |
| $T_S$       | Storage Temperature  | -40 | 100 | °C    |
| $T_{Sol}$   | Lead Temperature (solder) 3s   |     | 230 | °C    |
| $V_{R(BR)}$ | Breakdown Voltage Collector-Emitter @ $T_A=25^\circ\text{C}$ $I_B=100\text{nA}$ $I_C=1\text{mA}$ | 50  |     | V     |
| $P_D$       | Power Dissipation @ $T_A=25^\circ\text{C}$   |     | 150 | mW    |
| ESDS        | Electrostatic Discharge Susceptibility (Human Body Model, ESCC20800)                             |     | 3   | class |

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 CHARACTERISTICS**

$T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                  | Conditions                                 | Min | Typ   | Max  | Unit          |
|-----------------|----------------------------|--|-----|-------|------|---------------|
| $I_D$           | Dark Current               | $V_R=10\text{V}$                           |     | 5     | 100  | nA            |
| $R_\lambda$     | Responsivity               | $V_{CE}=5\text{V}$ $\lambda=880\text{nm}$  | 0.5 |       |      | A/W           |
| $\lambda_p$     | Peak Responsivity          | $V_{CE}=5\text{V}$                         |     | 750   |      | nm            |
| $\Delta\lambda$ | Spectral Bandwidth @ 50%   | $V_{CE}=5\text{V}$                         | 500 |       | 950  | nm            |
| $I_{ec0}$       | Emitter-Collector Current  | $V_{CE}=7.7\text{V}$                       |     | 0.025 | 100  | $\mu\text{A}$ |
| $I_{ce0}$       | Collector-Emitter Current  | $V_{CE}=52\text{V}$                        |     | 0.025 | 100  | $\mu\text{A}$ |
| $H_{FE}$        | Gain                       | $V_{CC}=5\text{V}$ $I_C=2\text{mA}$        | 600 | 1100  | 1500 |               |
| $V_{CE(sat)}$   | Saturation Voltage         | $I_E=2\text{mA}$ $I_B=20\mu\text{A}$       |     | 80    | 200  | mV            |
| $I_{C(on)}$     | On-state Collector Current | $V_{CE}=5\text{V}$ $E_E=1.0\text{mW/cm}^2$ |     | 1     |      | mA            |

**AC SWITCHING CHARACTERISTICS**

$T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol | Parameter | Conditions  | Min | Typ | Max | Unit          |
|--------|-----------|---|-----|-----|-----|---------------|
| $t_R$  | Rise Time | $V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$ |     | 10  |     | $\mu\text{s}$ |
| $t_F$  | Fall Time | $V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$ |     | 10  |     | $\mu\text{s}$ |

**MECHANICAL CHARACTERISTICS**

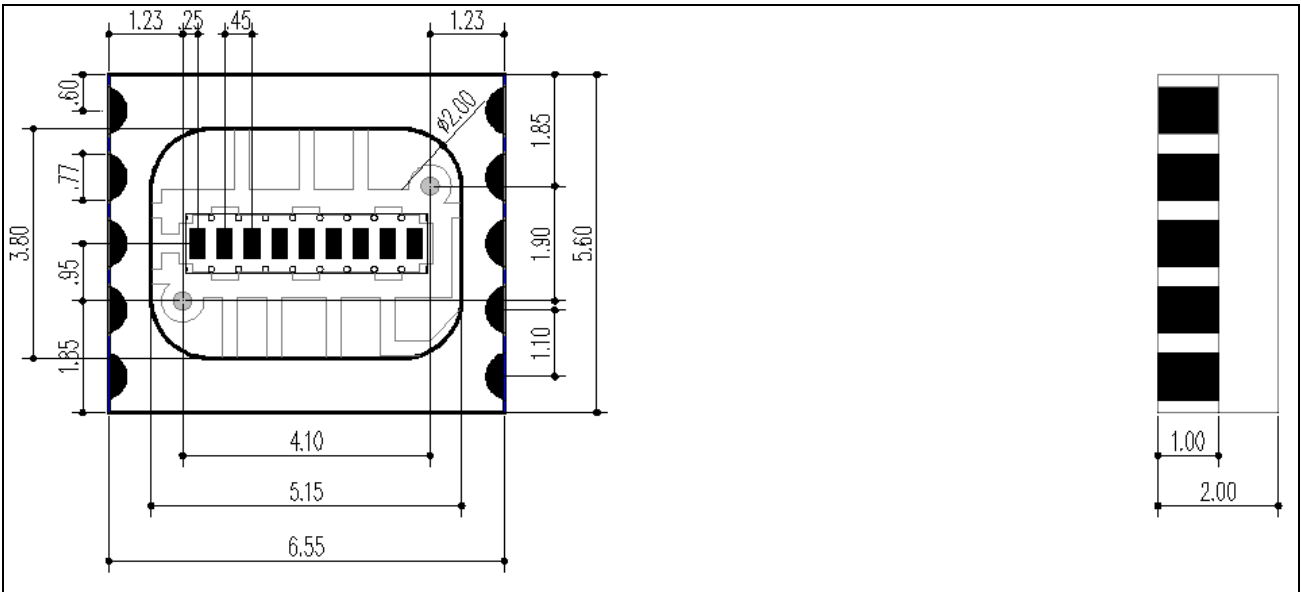
| Symbol | Parameter                   | Conditions | Min | Typ   | Max | Unit          |
|--------|-----------------------------|------------|-----|-------|-----|---------------|
| A      | Phototransistor Active Area |            |     | 0.125 |     | $\text{mm}^2$ |
| L      | Length of the Active Area   |            |     | 0.25  |     | mm            |
| W      | Width of the Active Area    |            |     | 0.50  |     | mm            |

**PACKAGE CHARACTERISTICS**

| Symbol | Parameter                | Value | Unit   |
|--------|--------------------------|-------|--------|
| $S_F$  | Pad Surface Finishing    | GOLD  |        |
| $S_L$  | Pad Shelf Life           | 6     | months |
| MSL    | Moisture Sensitive Level | 2     | level  |

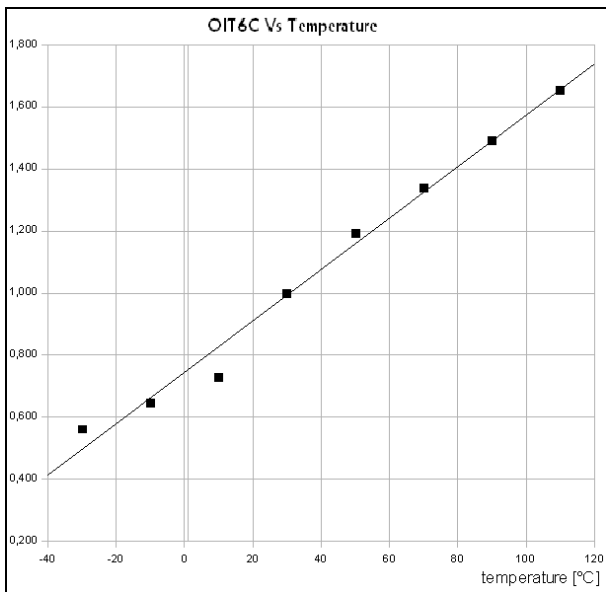
**MECHANICAL DIMENSIONS**

Units=mm Mechanical tolerance=+/-0.2mm Die positioning tolerance=+/-0.030mm



**TYPICAL PERFORMANCE CURVES**

**Figure 1 – Output voltage Vs Temperature**



**Figure 2 – Normalized spectral responsivity**

