

General Description

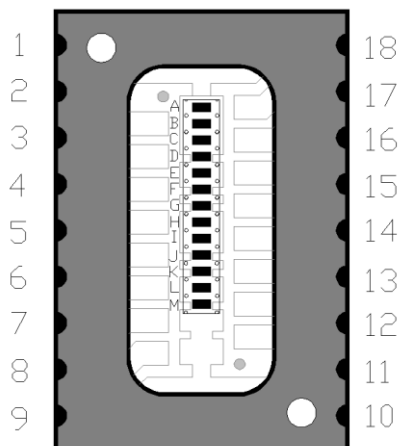
OIT18C-NR consists in a silicon phototransistor's monolithic array of 13 elements. The phototransistors have a common collector on the back substrate, which is tied to two pads and every emitter is accessible to specific pad. The optical pitch of the array is 0.45 mm, the LCC package electrical pitch is 1.27 mm. The active area of each element is 0.25 x 0.50 mm².

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.

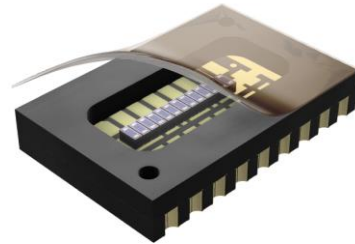
The device is protected with a thin plastic film, that is resistant to reflow oven processes. The film has to be removed once the device has been assembled on the electronic board and the user can attach the optical reticle. Two reference marks are available for the precise positioning of the reticle.

Applications

- Optical encoders
- 13 bit absolute encoders
- Optical Receivers
- Controls/drives
- Light sensors



TOP VIEW



Features

- Resistant to soldering processes, MSL2
- High uniformity of silicon cells (< 10%)
- Monolithic construction
- Low optical pitch (0.45mm)
- High temperature range
- Reference holes on the package for precise mounting
- Reference dots on the package for high accuracy mounting
- Reticle assembly service available

Pin Functions

| No. | Name | Function |
|-----|------|---------------------------|
| 1 | CC | Common collector |
| 2 | BE | Phototransistor B Emitter |
| 3 | DE | Phototransistor D Emitter |
| 4 | FE | Phototransistor F Emitter |
| 5 | HE | Phototransistor H Emitter |
| 6 | JE | Phototransistor J Emitter |
| 7 | LE | Phototransistor L Emitter |
| 8 | N.C. | Not connected |
| 9 | N.C. | Not connected |
| 10 | CC | Common collector |
| 11 | N.C. | Not connected |
| 12 | ME | Phototransistor M Emitter |
| 13 | KE | Phototransistor K Emitter |
| 14 | IE | Phototransistor I Emitter |
| 15 | GE | Phototransistor G Emitter |
| 16 | EE | Phototransistor E Emitter |
| 17 | CE | Phototransistor C Emitter |
| 18 | AE | Phototransistor A Emitter |

Ordering information

OIT18C-NR 13-ch. phototransistor array 0.45mm optical pitch on plastic SMD package, no encapsulant

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Min | Max | Unit |
|-------------|--|-----|-----|-------|
| T_A | Operating Temperature Range ‡ (see note at bottom page) | -40 | 100 | °C |
| T_S | Storage Temperature (see note at bottom page) | -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_λ | Responsivity | $V_{CE}=5\text{V}$ $\lambda=880\text{nm}$ | 0.5 | | | A/W |
| λ_p | Peak wavelength | $V_{CE}=5\text{V}$ | | 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 | μA |
| I_{ce0} | Collector-Emitter Current | $V_{CE}=52\text{V}$ | | 0.025 | 100 | μA |
| 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 | $V_{CE}=5\text{V}$ $E_E=1.0\text{mW}/\text{cm}^2$ | | 1 | | mA |

AC SWITCHING CHARACTERISTICS

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

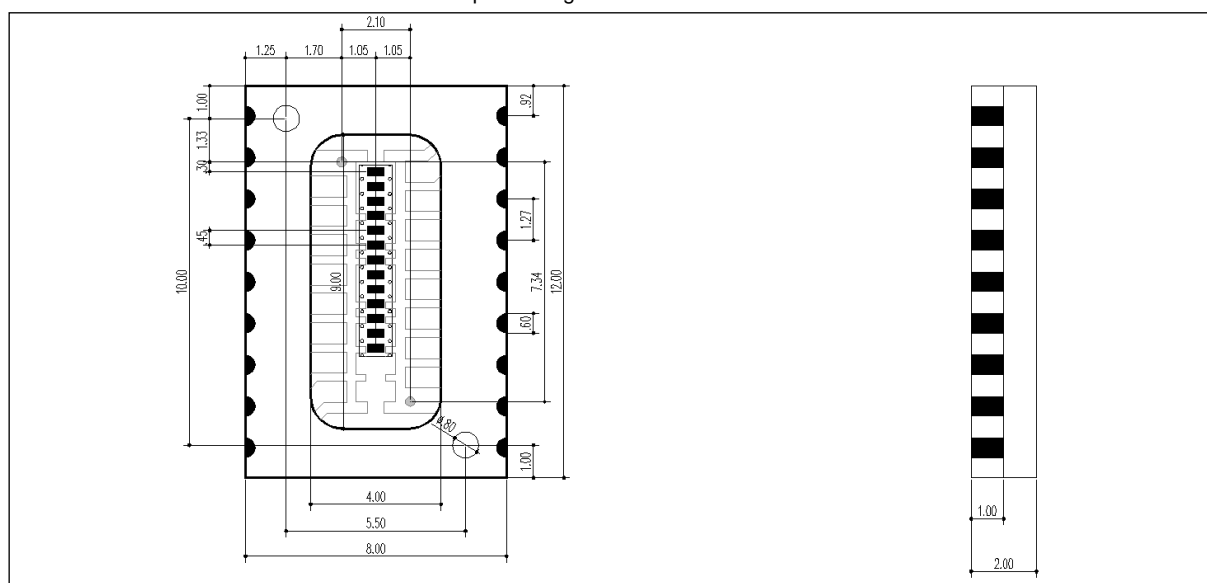
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------|---|-----|-----|-----|---------------|
| t_R | Rise Time | $V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$ | | 10 | | μs |
| t_F | Fall Time | $V_{CC}=5\text{V}$ $I_C=1\text{mA}$ $R_1=1\text{k}\Omega$ | | 10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

MECHANICAL CHARACTERISTICS

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

MECHANICAL DIMENSIONS

Units=mm Mechanical tolerance= $\pm 0.2\text{mm}$ Die positioning tolerance= $\pm 0.030\text{mm}$



‡ Without collimator

PACKAGE CHARACTERISTICS

| Symbol | Parameter | Value | Unit |
|----------------|--|-------|--------|
| S _F | Pad Surface Finishing | GOLD | |
| S _L | Pad Shelf Life | 6 | months |
| MSL | Moisture Sensitive Level § (see note at bottom page) | 2 | Level |

TYPICAL PERFORMANCE CURVES

Figure 1 – Output voltage Vs Temperature

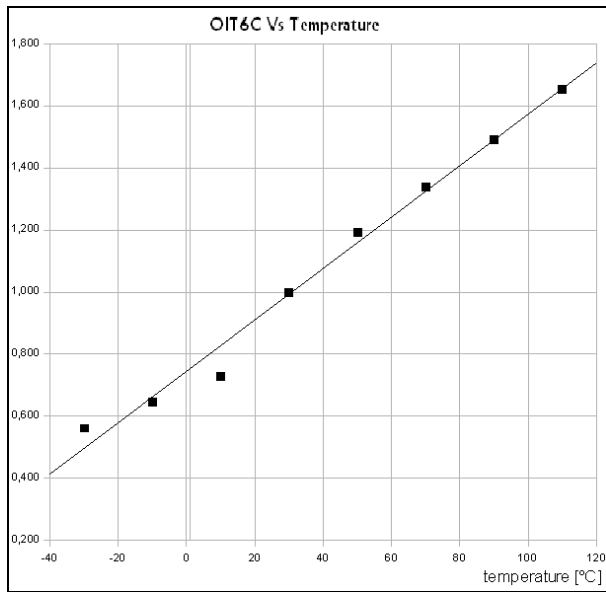
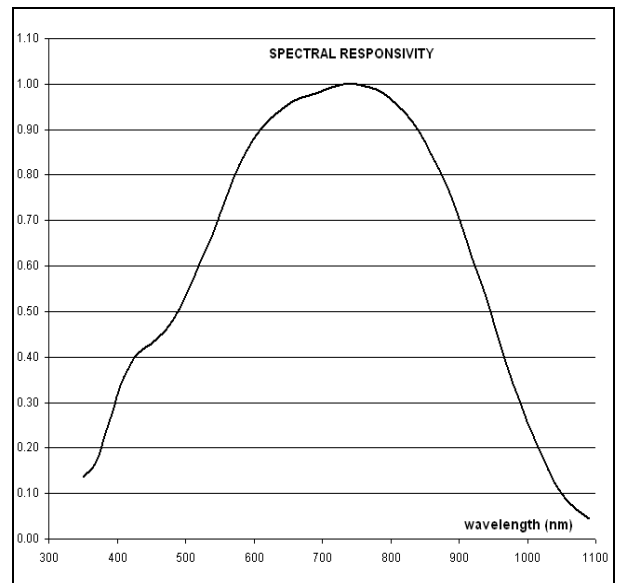


Figure 2 – Normalized spectral responsivity



§ According to Jedec standard J-STD-020D.1