# OIT20S03

## 3 NPN PHOTRANSISTOR ARRAY

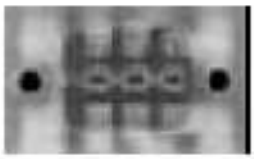
## General Description

Optical device consisting of a 3 chip silicon NPN phototransistor array with high gain uniformity for the output signals.

The active area of the silicon die is 0.2 x 0.45 $mm^2$.

The high optical responsivity is due to the antireflective coating deposited on the phototransistor active areas.

The package type is intended for direct mounting on ceramic or PC boards by manual soldering or SMT.



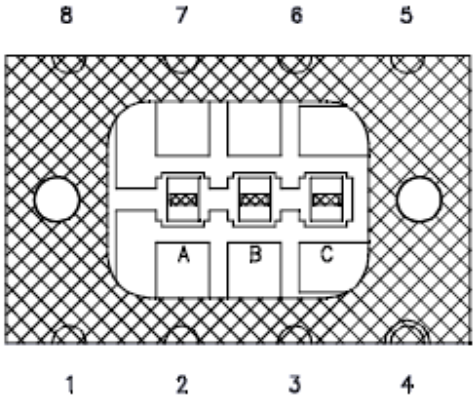
## Applications

Incremental Encoders

General Purpose

## Features

- **High Gain Uniformity ±10%**
- **High Reliability**
- **Optical Pitch = 1.27 mm**
- **Available in SMT Suitable Version**




## Pin Functions

| No. | Name | Function |
|---|---|---|
| 1 | CC | Common Collector |
| 2 | | N.C. |
| 3 | | N.C. |
| 4 | | N.C. |
| 5 | CE | Phototransistor C Emitter |
| 6 | BE | Phototransistor B Emitter |
| 7 | AE | Phototransistor A Emitter |
| 8 | CC | Common Collector |

## Ordering Information

| | |
|---|---|
| **OIT20S03** | 3 Chip Silicon NPN Phototransistor Array with Active Area of the Silicon Die 0.2 x 0.45 $mm^2$. |

## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Min | Max | Unit |
|---|---|---|---|---|
| $T_A$ | Operating Temperature Range | -40 | 100 | ℃ |
| $T_S$ | Storage Temperature | -40 | 100 | ℃ |
| $T_{Sol}$ | Lead Temperature (solder) 3s | | 230 | ℃ |
| $V_{R(BR)}$ | Breakdown Voltage Collector-Emitter @ $T_A$=25℃ $I_B$=100nA $I_C$=1mA | 50 | | V |
| $P_D$ | Power Dissipation @ $T_A$=25℃ | | 150 | mW |

*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℃ unless otherwise noted.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_D$ | Dark Current | $V_R$=10V | | 10 | 100 | nA |
| $R_\lambda$ | Responsivity | $V_{CE}$=5V λ=880nm | 0.5 | | | A/W |
| $\lambda_p$ | Peak Responsivity | $V_{CE}$=5V | | 900 | | nm |
| Δλ | Spectral Bandwidth @ 50% | $V_{CE}$=5V | 600 | | 1000 | nm |
| $I_{ec0}$ | Emitter-Collector Current | $V_{CE}$=7.7V | | 0.1 | 100 | μA |
| $I_{ce0}$ | Collector-Emitter Current | $V_{CE}$=52V | | 0.1 | 100 | μA |
| $H_{FE}$ | Gain | $V_{CC}$=5V $I_C$=2mA | | 550 | | |
| $V_{CE(sat)}$ | Saturation Voltage | $I_E$=2mA $I_B$=20μA | | 160 | 200 | mV |
| $I_{C(on)}$ | On-state Collector Current | $V_{CE}$=5V $E_E$=1.0mW/cm$^2$ | | 1 | | mA |

## AC SWITCHING CHARACTERISTICS

$T_A$ = 25℃ unless otherwise noted.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_R$ | Rise Time | $V_{CC}$=5V $I_C$=1mA $R_1$=1kΩ | | 10 | | μs |
| $t_F$ | Fall Time | $V_{CC}$=5V $I_C$=1mA $R_1$=1kΩ | | 11 | | μs |

## MECHANICAL CHARACTERISTICS

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| A | Phototransistor Active Area | | | 0.09 | | mm$^2$ |
| L | Length of the Active Area | | | 0.2 | | mm |
| W | Width of the Active Area | | | 0.45 | | mm |

## MECHANICAL DIMENSIONS

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