

DATA SHEET

OM3105P

Hybrid integrated circuits for
inductive proximity detectors

Preliminary specification
File under Discrete Semiconductors, SC17

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Philips Semiconductors



PHILIPS

Hybrid integrated circuits for inductive proximity detectors

OM3105P

FEATURES

- Extra small dimensions (3 x 20 mm max.)
- Wide supply voltage range (6 to 35 V)
- Supply current typical 1.5 mA (output stage switched off)
- High output current (250 mA max.)
- RC filter on the supply lines
- PNP output transistor protected against transients from the inductive load
- Circuit protected against wrong polarity connection of the supply voltage
- Electronic short-circuit protection
- Detection distance adjustable by a chip resistor (R_d), type 1206
- Only a simple coil in one part is required; e.g. the OM2860 requires a coil in two parts
- Hysteresis adjustable by a chip resistor (R_h), type 0603, for using the OM3105P with other than M5 coils
- Status of the output is shown by a yellow or red LED mounted on the substrate surface
- The OM3105P is also available without a LED, but with an output pad for external LED connection
- A version with a NPN output transistor is available (OM3105P).

DESCRIPTION

The OM3105P is a hybrid integrated circuit intended for inductive proximity detectors in a tubular construction, especially the M5 hollow stud. The circuit performs a make function (version 1): when actuated, the current flows through the load, which can be for example a LED or an optocoupler. It is also possible to perform a break function when using version OM3115P.

Available versions:

- OM3105P: pnp output; make function
- OM3115P: pnp output; break function
- OM3105N: npn output; make function
- OM3115N: npn output; break function
- OM31.5./0: for external LED connection.

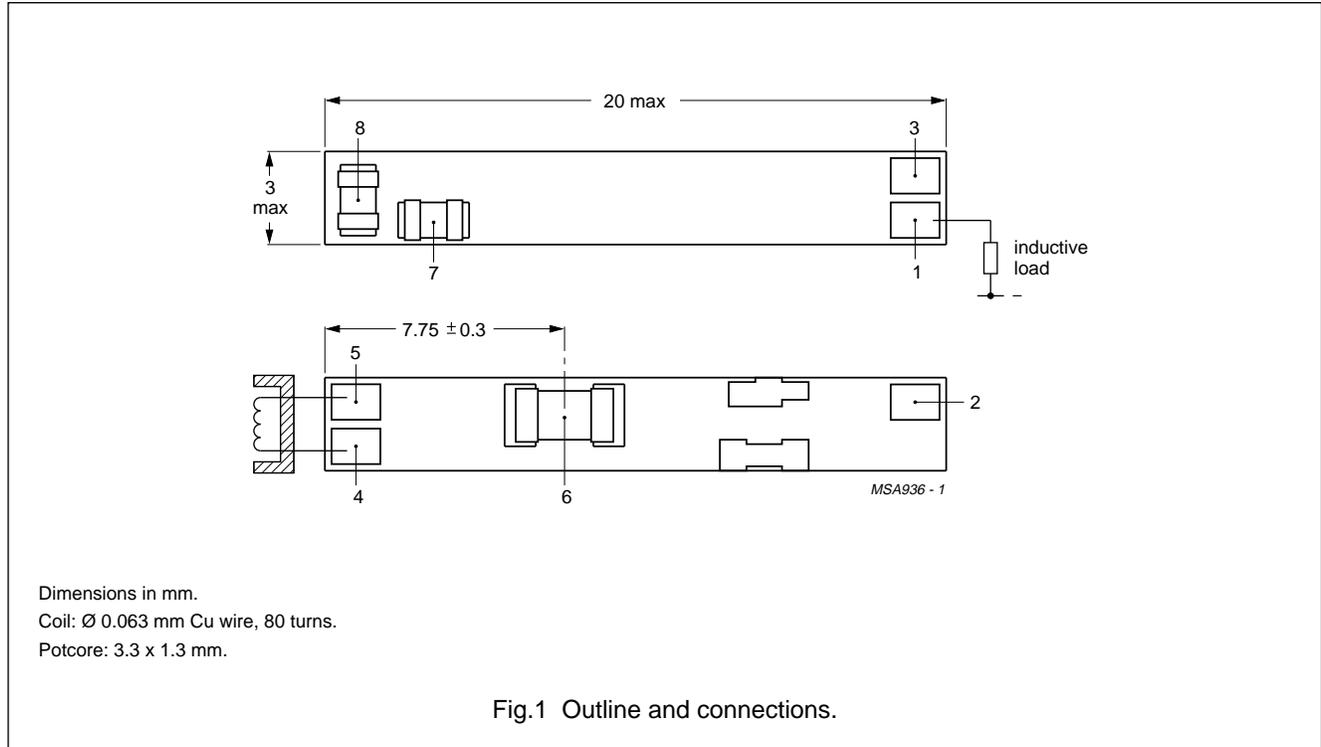
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|----------|---------------------------------|---|------|------|------------------|
| V_B | DC supply voltage | | 6 | 35 | V |
| I_O | output current | $V_B = 24 \text{ V}; T_s = 25 \text{ }^\circ\text{C}$ | – | 250 | mA |
| f_{sw} | operating switching frequency | M5 coil | – | 5 | kHz |
| T_s | operating substrate temperature | | –20 | +70 | $^\circ\text{C}$ |

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MECHANICAL DATA



PAD INFORMATION

| PAD NUMBER | DESCRIPTION |
|------------|---|
| 1 | output |
| 2 | negative supply (-) |
| 3 | positive supply (+) |
| 4 | coil connection |
| 5 | coil connection |
| 6 | R _d resistor (type 1206) for adjusting the detection distance |
| 7 | R _t resistor (type 0603) for adjusting the stability with temperature variations |
| 8 | R _h resistor (type 0603) for adjusting the hysteresis |

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LIMITING VALUES

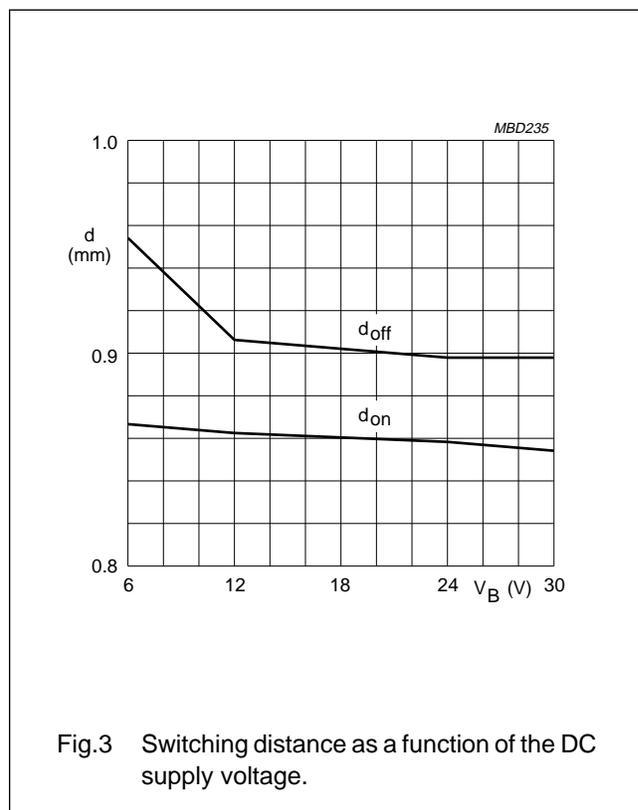
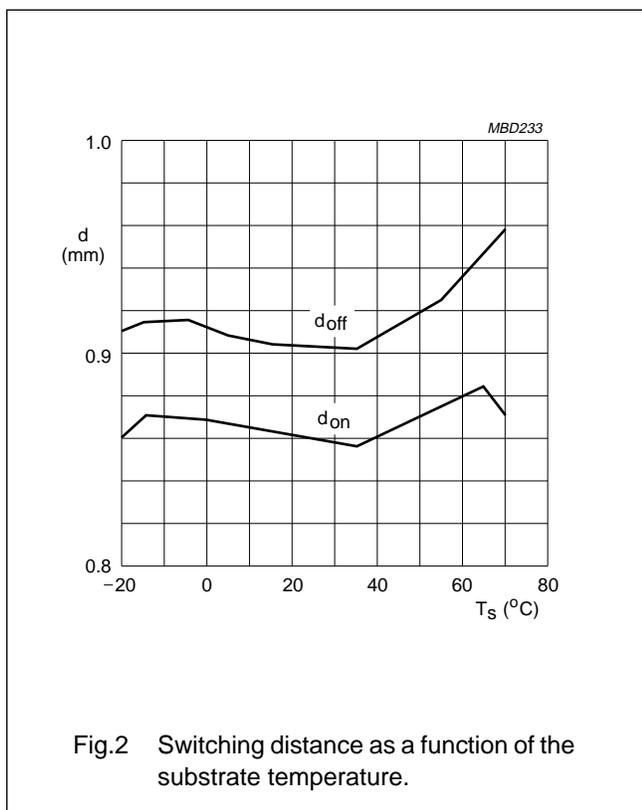
Limiting values in accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|-----------|--|------|------|------------------|
| V_B | DC supply voltage | 6 | 35 | V |
| I_O | output current; $T_s = 25\text{ }^\circ\text{C}$ | – | 250 | mA |
| T_{stg} | storage temperature | –40 | +125 | $^\circ\text{C}$ |
| T_s | operating substrate temperature | –20 | +70 | $^\circ\text{C}$ |

CHARACTERISTICS

$V_B = 24\text{ V (DC)}$; $T_s = 25\text{ }^\circ\text{C}$; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|--------|--------------------|-----------------------|------|------|------|
| I_B | supply current | output stage ON | 11 | – | mA |
| | | output stage OFF | 1.5 | – | mA |
| V_d | voltage drop | $I_O = 250\text{ mA}$ | 1 | 1.5 | V |
| d | detection distance | coil M5 | 0.8 | – | mm |



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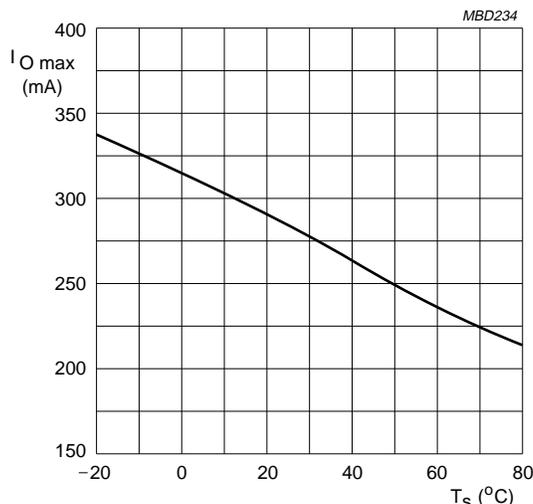


Fig.4 Overload protection as a function of the substrate temperature.

MOUNTING RECOMMENDATIONS

General

If a protective cap is incorporated, it should be as thin as possible, because its thickness "d" forms part of the operating distance "S".
 A brass stud wall should not extend beyond the potcore. The exact value of "S" with its spread is determined by a number of variables, e.g.:

- value of the adjustment resistor R_x ,
- the oscillator coil,
- the metal of the actuator,
- the material and shape of the housing.

Soldering recommendations

- Use normal 60/40 solder.
- Use a soldering iron with a fine point.
- Soldering time should be kept to a minimum, not exceeding 2.5 s per soldering point ($T_{sld} = 250 \text{ °C}$ maximum).
- The substrate should preferably be pre-heated to a temperature of 100 °C with a minimum of 80 °C and a maximum of 125 °C.

Potting recommendations

First cover the hybrid IC with about 0.5 mm of silicone rubber, let it harden and with the parts inserted in the tube, fill up the tube with epoxy.

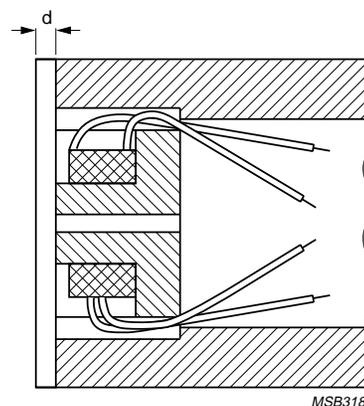


Fig.5 Insertion of potcore in brass tube.

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DEFINITIONS

| Data sheet status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

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proximity detectors

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