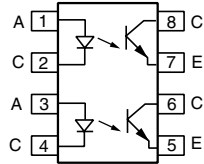
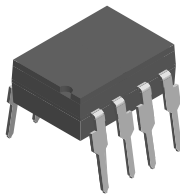
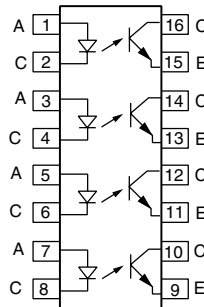
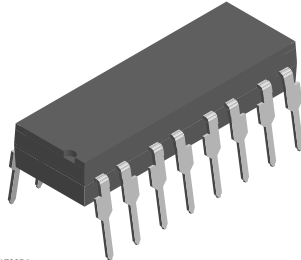


## Optocoupler, Phototransistor Output (Dual, Quad Channel)

Dual Channel



Quad Channel



1179054

### FEATURES

- Alternate source to TLP621-2/-4 and TLP621GB-2/-4
- High collector emitter voltage,  $V_{CEO} = 70\text{ V}$
- Dual and quad packages feature:
  - Lower pin and parts count
  - Better channel to channel CTR match
  - Improved common mode rejection
- Isolation test voltage,  $5300\text{ V}_{RMS}$
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- BSI IEC 60950; IEC 60065
- FIMKO

### DESCRIPTION

The ILD621/ILQ621 and ILD621GB/ILQ621GB are multi-channel phototransistor optocouplers that use GaAs IRLED emitters and high gain NPN silicon phototransistors. These devices are constructed using double molded insulation technology. This assembly process offers a withstand test voltage of 7500 VDC.

The ILD621/ILQ621GB is well suited for CMOS interfacing given the  $CTR_{CESat}$  of 30 % minimum at  $I_F$  of 1.0 mA. High gain linear operation is guaranteed by a minimum  $CTR_{CE}$  of 100 % at 5.0 mA. The ILD/Q621 has a guaranteed  $CTR_{CE}$  50 % minimum at 5.0 mA. The transparent ion shield insures stable DC gain in applications such as power supply feedback circuits, where constant DC  $V_{IO}$  voltages are present.

### ORDER INFORMATION

| PART        | REMARKS                         |
|-------------|---------------------------------|
| ILD621      | CTR > 50 %, dual, DIP-8         |
| ILD621GB    | CTR > 100 %, dual, DIP-8        |
| ILQ621      | CTR > 50 %, quad, DIP-16        |
| ILQ621GB    | CTR > 100 %, quad, DIP-16       |
| ILD621-X006 | CTR > 50 %, dual, DIP-8 400 mil |

# ILD621/ILD621GB/ILQ621/ILQ621GB

Vishay Semiconductors

Optocoupler, Phototransistor Output  
(Dual, Quad Channel)



## ORDER INFORMATION

| PART          | REMARKS                              |
|---------------|--------------------------------------|
| ILD621-X007   | CTR > 50 %, dual, SMD-8 (option 7)   |
| ILD621-X009   | CTR > 50 %, dual, SMD-8 (option 9)   |
| ILD621GB-X007 | CTR > 100 %, dual, SMD-8 (option 7)  |
| ILQ621-X006   | CTR > 50 %, quad, DIP-16 400 mil     |
| ILQ621-X007   | CTR > 50 %, quad, SMD-16 (option 7)  |
| ILQ621-X009   | CTR > 50 %, quad, SMD-16 (option 9)  |
| ILQ621GB-X006 | CTR > 100 %, quad, DIP-16 400 mil    |
| ILQ621GB-X007 | CTR > 100 %, quad, SMD-16 (option 7) |
| ILQ621GB-X009 | CTR > 100 %, quad, SMD-16 (option 9) |

### Note

For additional information on the available options refer to option information.

## ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>

| PARAMETER                            | TEST CONDITION                                     | PART     | SYMBOL     | VALUE          | UNIT      |
|--------------------------------------|----------------------------------------------------|----------|------------|----------------|-----------|
| <b>INPUT</b>                         |                                                    |          |            |                |           |
| Reverse voltage                      |                                                    |          | $V_R$      | 6.0            | V         |
| Forward current                      |                                                    |          | $I_F$      | 60             | mA        |
| Surge current                        |                                                    |          | $I_{FSM}$  | 1.5            | A         |
| Power dissipation                    |                                                    |          | $P_{diss}$ | 100            | mW        |
| Derate from 25 °C                    |                                                    |          |            | 1.33           | mW/°C     |
| <b>OUTPUT</b>                        |                                                    |          |            |                |           |
| Collector emitter reverse voltage    |                                                    |          | $V_{ECO}$  | 70             | V         |
| Collector current                    | $t < 1.0 \text{ ms}$                               |          | $I_C$      | 50             | mA        |
|                                      |                                                    |          | $I_C$      | 100            | mA        |
| Power dissipation                    |                                                    |          | $P_{diss}$ | 150            | mW        |
| Derate from 25 °C                    |                                                    |          |            | - 2.0          | mW/°C     |
| <b>COUPLER</b>                       |                                                    |          |            |                |           |
| Isolation test voltage               | $t = 1.0 \text{ s}$                                |          | $V_{ISO}$  | 5300           | $V_{RMS}$ |
| Package dissipation                  |                                                    | ILD621   |            | 400            | mW        |
|                                      |                                                    | ILD621GB |            | 400            | mW        |
| Derate from 25 °C                    |                                                    |          |            | 5.33           | mW/°C     |
| Package dissipation                  |                                                    | ILQ621   |            | 500            | mW        |
|                                      |                                                    | ILQ621GB |            | 500            | mW        |
| Derate from 25 °C                    |                                                    |          |            | 6.67           | mW/°C     |
| Creepage distance                    |                                                    |          |            | $\geq 7.0$     | mm        |
| Clearance distance                   |                                                    |          |            | $\geq 7.0$     | mm        |
| Isolation resistance                 | $V_{IO} = 500 \text{ V}, T_{amb} = 25 \text{ °C}$  |          | $R_{IO}$   | $\geq 10^{12}$ | $\Omega$  |
|                                      | $V_{IO} = 500 \text{ V}, T_{amb} = 100 \text{ °C}$ |          | $R_{IO}$   | $\geq 10^{11}$ | $\Omega$  |
| Storage temperature                  |                                                    |          | $T_{stg}$  | - 55 to + 150  | °C        |
| Operating temperature                |                                                    |          | $T_{amb}$  | - 55 to + 100  | °C        |
| Junction temperature                 |                                                    |          | $T_j$      | 100            | °C        |
| Soldering temperature <sup>(2)</sup> | 2.0 mm from case bottom                            |          | $T_{sld}$  | 260            | °C        |

### Notes

<sup>(1)</sup>  $T_{amb} = 25 \text{ °C}$ , unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

<sup>(2)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).



# ILD621/ILD621GB/ILQ621/ILQ621GB

Optocoupler, Phototransistor Output  
(Dual, Quad Channel)

Vishay Semiconductors

| ELECTRICAL CHARACTERISTICS           |                                                    |          |             |           |      |      |               |
|--------------------------------------|----------------------------------------------------|----------|-------------|-----------|------|------|---------------|
| PARAMETER                            | TEST CONDITION                                     | PART     | SYMBOL      | MIN.      | TYP. | MAX. | UNIT          |
| INPUT                                |                                                    |          |             |           |      |      |               |
| Forward voltage                      | $I_F = 10 \text{ mA}$                              |          | $V_F$       | 1.0       | 1.15 | 1.3  | V             |
| Reverse current                      | $V_R = 6.0 \text{ V}$                              |          | $I_R$       |           | 0.01 | 10   | $\mu\text{A}$ |
| Capacitance                          | $V_R = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$        |          | $C_O$       |           | 40   |      | pF            |
| Thermal resistance, junction to lead |                                                    |          | $R_{THJL}$  |           | 750  |      | K/W           |
| OUTPUT                               |                                                    |          |             |           |      |      |               |
| Collector emitter capacitance        | $V_{CE} = 5.0 \text{ V}$ , $f = 1.0 \text{ MHz}$   |          | $C_{CE}$    |           | 6.8  |      | pF            |
| Collector emitter leakage current    | $V_{CE} = 24 \text{ V}$                            |          | $I_{CEO}$   |           | 10   | 100  | nA            |
|                                      |                                                    |          | $I_{CEO}$   |           | 20   | 50   | $\mu\text{A}$ |
| Thermal resistance, junction to lead |                                                    |          | $R_{THJL}$  |           | 500  |      | K/W           |
| COUPLER                              |                                                    |          |             |           |      |      |               |
| Capacitance (input to output)        | $V_{IO} = 0 \text{ V}$ , $f = 1.0 \text{ MHz}$     |          | $C_{IO}$    | 0.8       |      |      | pF            |
| Insulation resistance                | $V_{IO} = 500 \text{ V}$                           |          |             | $10^{12}$ |      |      | $\Omega$      |
| Channel to channel insulation        |                                                    |          |             | 500       |      |      | VAC           |
| Collector emitter saturation voltage | $I_F = 8.0 \text{ mA}$ , $I_{CE} = 2.4 \text{ mA}$ | ILD621   | $V_{CEsat}$ |           |      | 0.4  | V             |
|                                      |                                                    | ILQ621   |             |           |      |      |               |
|                                      | $I_F = 1.0 \text{ mA}$ , $I_{CE} = 0.2 \text{ mA}$ | ILD621GB | $V_{CEsat}$ |           |      | 0.4  | V             |
|                                      |                                                    | ILQ621GB |             |           |      |      |               |

## Note

$T_{amb} = 25^\circ\text{C}$ , unless otherwise specified.

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

| CURRENT TRANSFER RATIO                               |                                                   |          |                                        |        |      |        |      |
|------------------------------------------------------|---------------------------------------------------|----------|----------------------------------------|--------|------|--------|------|
| PARAMETER                                            | TEST CONDITION                                    | PART     | SYMBOL                                 | MIN.   | TYP. | MAX.   | UNIT |
| Channel/channel CTR match                            | $I_F = 5.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ V}$ |          | CTR <sub>X</sub> /<br>CTR <sub>Y</sub> | 1 to 1 |      | 3 to 1 | %    |
| Current transfer ratio (collector emitter saturated) | $I_F = 1.0 \text{ mA}$ , $V_{CE} = 0.4 \text{ V}$ | ILD621   | CTR <sub>CEsat</sub>                   |        | 60   |        | %    |
|                                                      |                                                   | ILQ621   | CTR <sub>CEsat</sub>                   |        | 60   |        | %    |
|                                                      |                                                   | ILD621GB | CTR <sub>CEsat</sub>                   | 30     |      |        | %    |
|                                                      |                                                   | ILQ621GB | CTR <sub>CEsat</sub>                   | 30     |      |        | %    |
| Current transfer ratio (collector emitter)           | $I_F = 5.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ V}$ | ILD621   | CTR <sub>CE</sub>                      | 50     | 80   | 600    | %    |
|                                                      |                                                   | ILQ621   | CTR <sub>CE</sub>                      | 50     | 80   | 600    | %    |
|                                                      |                                                   | ILD621GB | CTR <sub>CE</sub>                      | 100    | 200  | 600    | %    |
|                                                      |                                                   | ILQ621GB | CTR <sub>CE</sub>                      | 100    | 200  | 600    | %    |

| SWITCHING CHARACTERISTICS |                                                                                             |           |      |      |      |               |
|---------------------------|---------------------------------------------------------------------------------------------|-----------|------|------|------|---------------|
| PARAMETER                 | TEST CONDITION                                                                              | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| NON-SATURATED             |                                                                                             |           |      |      |      |               |
| On time                   | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_{on}$  |      | 3.0  |      | $\mu\text{s}$ |
| Rise time                 | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_r$     |      | 2.0  |      | $\mu\text{s}$ |
| Off time                  | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_{off}$ |      | 2.3  |      | $\mu\text{s}$ |
| Fall time                 | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_f$     |      | 2.0  |      | $\mu\text{s}$ |
| Propagation H to L        | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_{PHL}$ |      | 1.1  |      | $\mu\text{s}$ |
| Propagation L to H        | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 75 \Omega$ , 50 % of $V_{PP}$ | $t_{PLH}$ |      | 2.5  |      | $\mu\text{s}$ |

| SWITCHING CHARACTERISTICS |                                                                                                             |           |      |      |      |               |
|---------------------------|-------------------------------------------------------------------------------------------------------------|-----------|------|------|------|---------------|
| PARAMETER                 | TEST CONDITION                                                                                              | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| SATURATED                 |                                                                                                             |           |      |      |      |               |
| On time                   | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_{on}$  |      | 4.3  |      | $\mu\text{s}$ |
| Rise time                 | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_r$     |      | 2.8  |      | $\mu\text{s}$ |
| Off time                  | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_{off}$ |      | 2.5  |      | $\mu\text{s}$ |
| Fall time                 | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_f$     |      | 11   |      | $\mu\text{s}$ |
| Propagation H to L        | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_{PHL}$ |      | 2.6  |      | $\mu\text{s}$ |
| Propagation L to H        | $I_F = \pm 10 \text{ mA}$ , $V_{CC} = 5.0 \text{ V}$ , $R_L = 1 \text{ k}\Omega$ , $V_{TH} = 1.5 \text{ V}$ | $t_{PLH}$ |      | 7.2  |      | $\mu\text{s}$ |

| COMMON MODE TRANSIENT IMMUNITY     |                                                                                     |        |      |      |      |                        |
|------------------------------------|-------------------------------------------------------------------------------------|--------|------|------|------|------------------------|
| PARAMETER                          | TEST CONDITION                                                                      | SYMBOL | MIN. | TYP. | MAX. | UNIT                   |
| Common mode rejection, output high | $V_{CM} = 50 \text{ V}_{P-P}$ , $R_L = 1.0 \text{ k}\Omega$ , $I_F = 0 \text{ mA}$  | $CM_H$ |      | 5000 |      | $\text{V}/\mu\text{s}$ |
| Common mode rejection, output low  | $V_{CM} = 50 \text{ V}_{P-P}$ , $R_L = 1.0 \text{ k}\Omega$ , $I_F = 10 \text{ mA}$ | $CM_L$ |      | 5000 |      | $\text{V}/\mu\text{s}$ |

## TYPICAL CHARACTERISTICS

$T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

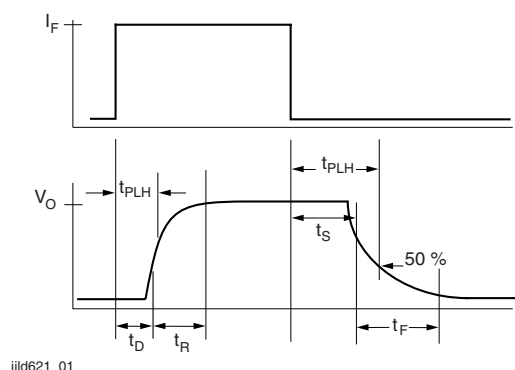


Fig. 1 - Non-Saturated Switching Timing

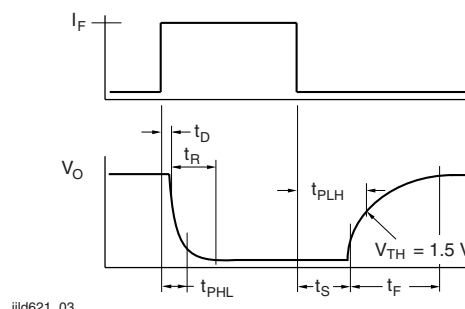


Fig. 3 - Saturated Switching Timing

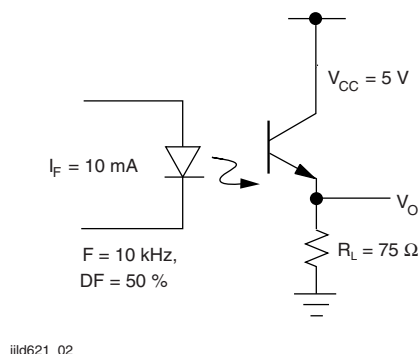


Fig. 2 - Non-Saturated Switching Timing

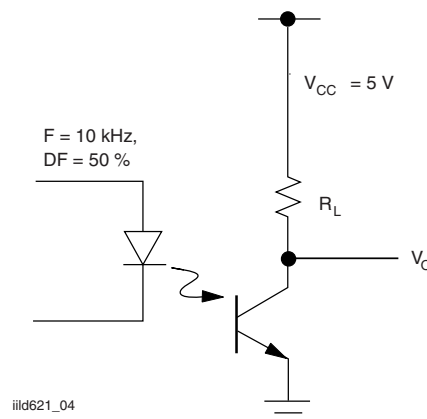


Fig. 4 - Saturated Switching Timing



# ILD621/ILD621GB/ILQ621/ILQ621GB

Optocoupler, Phototransistor Output  
(Dual, Quad Channel)

Vishay Semiconductors

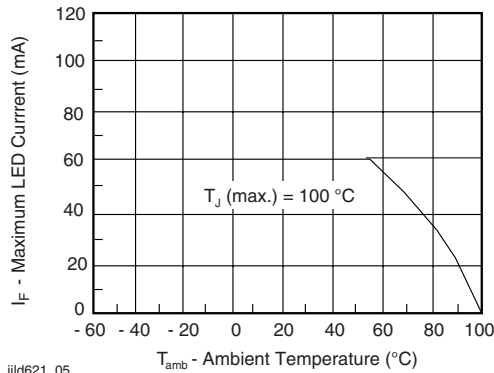


Fig. 5 - Maximum LED Current vs. Ambient Temperature

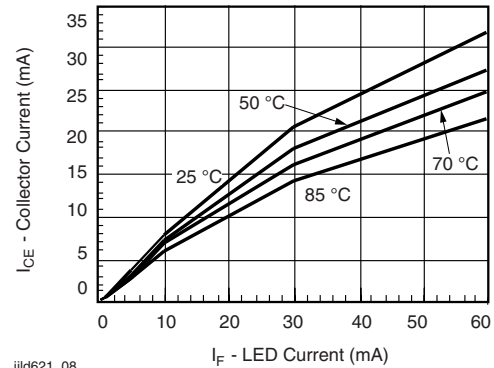


Fig. 8 - Collector Emitter Current vs. Temperature and LED Current

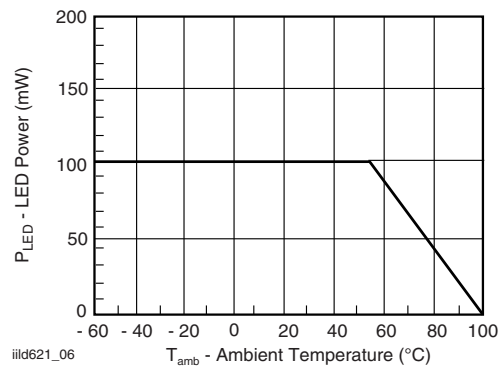


Fig. 6 - Maximum LED Power Dissipation

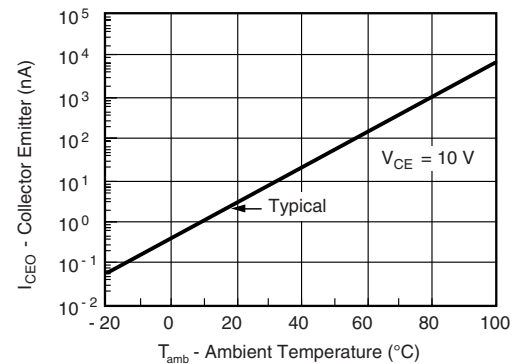


Fig. 9 - Collector Emitter Leakage vs. Temperature

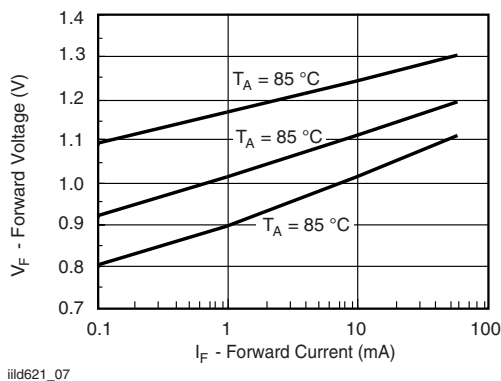


Fig. 7 - Forward Voltage vs. Forward Current

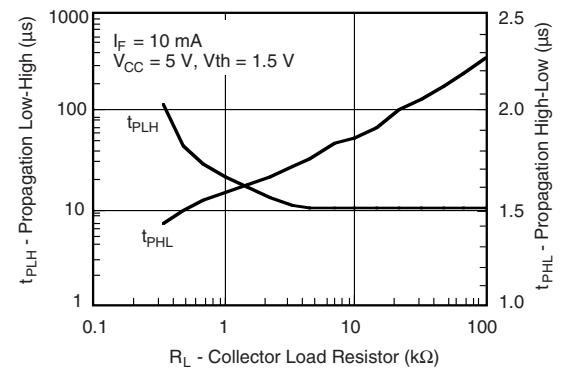


Fig. 10 - Propagation Delay vs. Collector Load Resistor

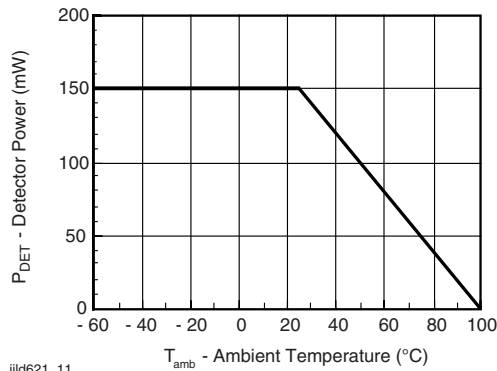


Fig. 11 - Maximum Detector Power Dissipation

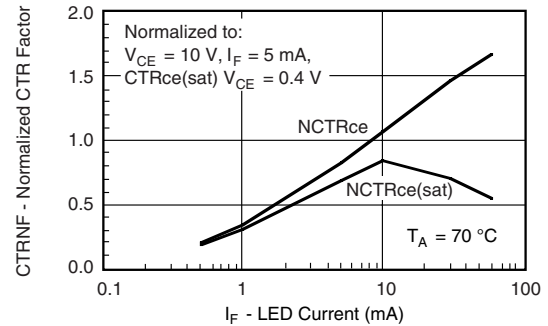


Fig. 14 - Normalization Factor for Non-Saturated and Saturated CTR vs.  $I_F$

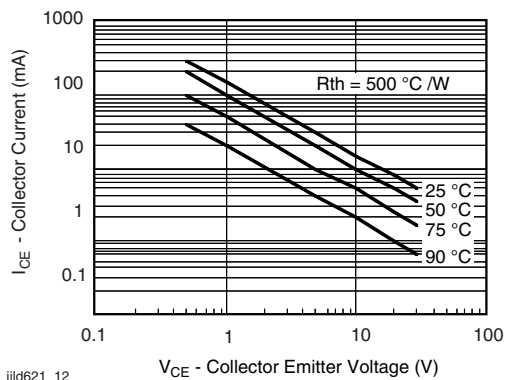


Fig. 12 - Maximum Collector Current vs. Collector Voltage

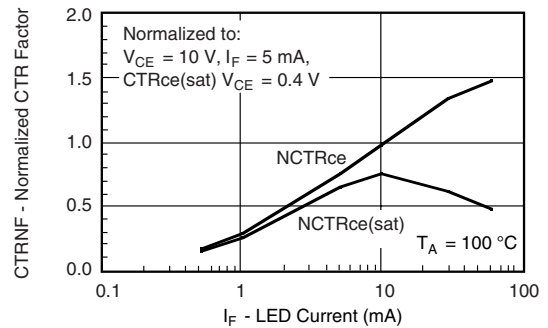


Fig. 15 - Normalization Factor for Non-Saturated and Saturated CTR vs.  $I_F$

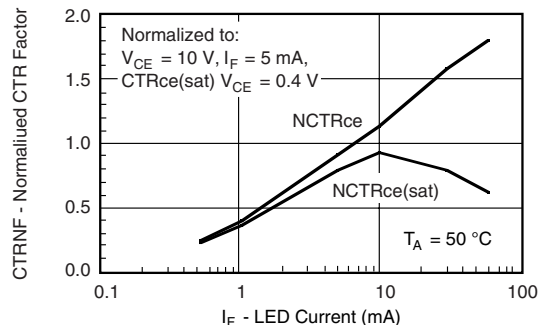


Fig. 13 - Normalization Factor for Non-Saturated and Saturated CTR vs.  $I_F$

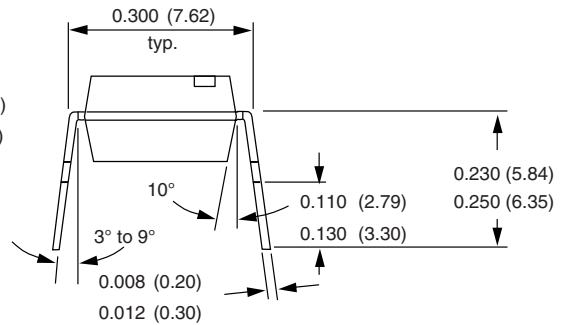
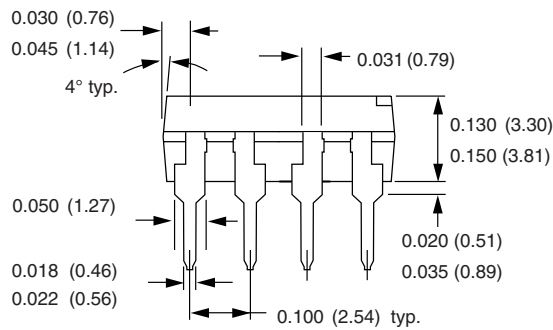
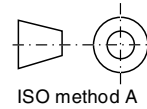
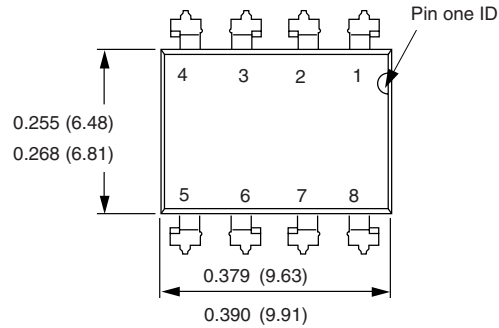


# ILD621/ILD621GB/ILQ621/ILQ621GB

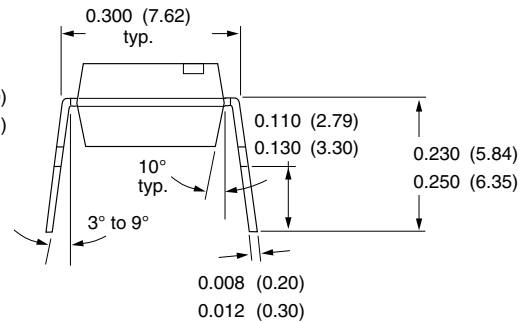
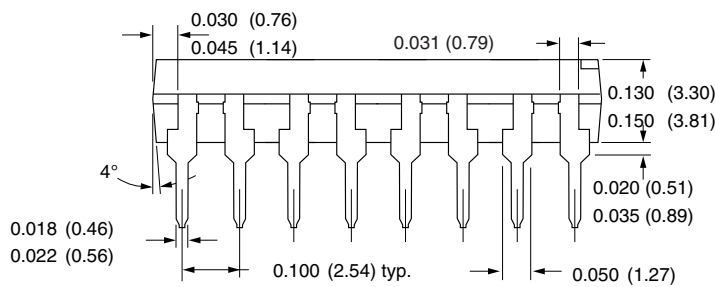
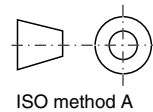
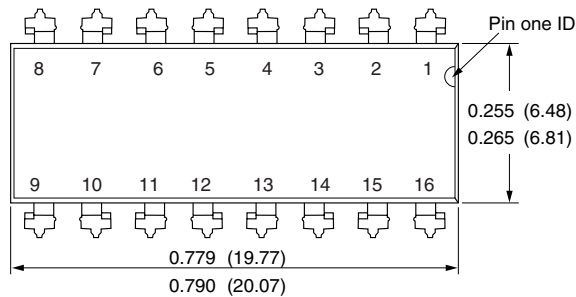
Optocoupler, Phototransistor Output  
(Dual, Quad Channel)

Vishay Semiconductors

## PACKAGE DIMENSIONS in inches (millimeters)

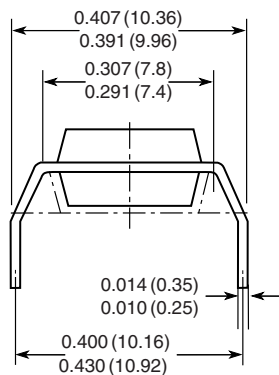


i178006

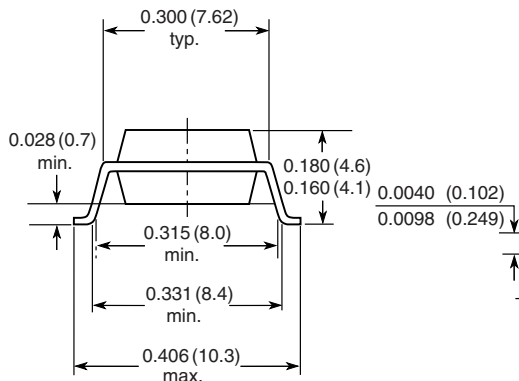


i178007

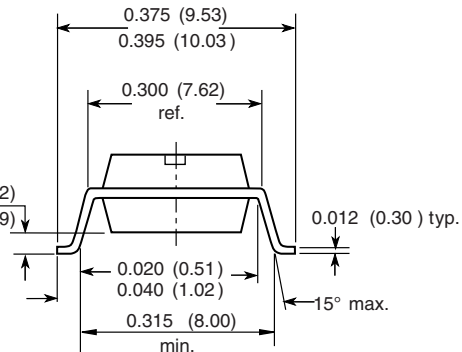
**Option 6**



**Option 7**



**Option 9**



18450



**OZONE DEPLETING SUBSTANCES POLICY STATEMENT**

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design  
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9