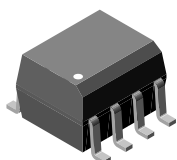
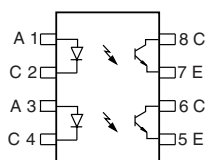


## Optocoupler, Phototransistor Output, Dual Channel, SOIC-8 package, 110 °C Rated



1179018



### FEATURES

- Operating temperature from - 55 °C to + 110 °C
- Two Channel Coupler
- SOIC-8 Surface Mountable Package
- Isolation Test Voltage, 4000 V<sub>RMS</sub>
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### DESCRIPTION

The 110 °C rated ILD1205T/1206T/1207T are optically coupled pairs with a Gallium Arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The ILD1205T/1206T/1207T come in a standard SOIC-8 small outline package for surface mounting which makes it ideally suited for high density applications with limited space. In addition to eliminating through-holes requirements, this package conforms to standards for surface mounted devices.

A specified minimum and maximum CTR allows a narrow tolerance in the electrical design of the adjacent circuits. The high BV<sub>CEO</sub> of 70 V gives a higher safety margin compared to the industry standard of 30 V.

### AGENCY APPROVALS

- UL - File No. E52744 System Code Y
- CUL - File No. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-2(VDE0884)  
Available with Option 1

### APPLICATIONS

- AC Adapters
- PLCs
- Switch Mode Power Supplies
- DC/DC Converters
- Microprocessor I/O Interfaces
- General impedance matching circuits

### ORDER INFORMATION

| PART     | REMARKS                 |
|----------|-------------------------|
| ILD1205T | CTR 40 - 80 %, SOIC-8   |
| ILD1206T | CTR 63 - 125 %, SOIC-8  |
| ILD1207T | CTR 100 - 200 %, SOIC-8 |

Note:

For additional information on the available options refer to Option Information.

| ABSOLUTE MAXIMUM RATINGS <sup>1)</sup>                               |                      |            |               |           |
|----------------------------------------------------------------------|----------------------|------------|---------------|-----------|
| PARAMETER                                                            | TEST CONDITION       | SYMBOL     | VALUE         | UNIT      |
| <b>INPUT</b>                                                         |                      |            |               |           |
| Continuous forward current per channel                               |                      | $I_F$      | 30            | mA        |
| Peak reverse voltage                                                 |                      | $V_R$      | 6.0           | V         |
| Peak pulsed current                                                  | 1.0 $\mu$ s, 300 pps | $I_{FSM}$  | 1.0           | A         |
| Power dissipation                                                    |                      | $P_{diss}$ | 50            | mW        |
| Derate linearly from 25 °C                                           |                      |            | 0.5           | mW/°C     |
| <b>OUTPUT</b>                                                        |                      |            |               |           |
| Collector-emitter voltage                                            |                      | $V_{CE}$   | 70            | V         |
| Power dissipation per channel                                        |                      | $P_{diss}$ | 125           | mW        |
| Derate linearly from 25 °C                                           |                      |            | 1.25          | mW/°C     |
| <b>COUPLER</b>                                                       |                      |            |               |           |
| Isolation test voltage                                               | $t = 1.0$ s          | $V_{ISO}$  | 4000          | $V_{RMS}$ |
| Operating temperature                                                |                      | $T_{amb}$  | - 55 to + 110 | °C        |
| Total package dissipation ambient (2 LEDs + 2 detectors, 2 channels) |                      | $P_{tot}$  | 300           | mW        |
| Derate linearly from 25 °C                                           |                      |            | 4.0           | mW/°C     |
| Storage temperature                                                  |                      | $T_{stg}$  | - 55 to + 150 | °C        |

Note:

<sup>1)</sup>  $T_{amb} = 25$  °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 Rating for extended periods of the time can adversely affect reliability.

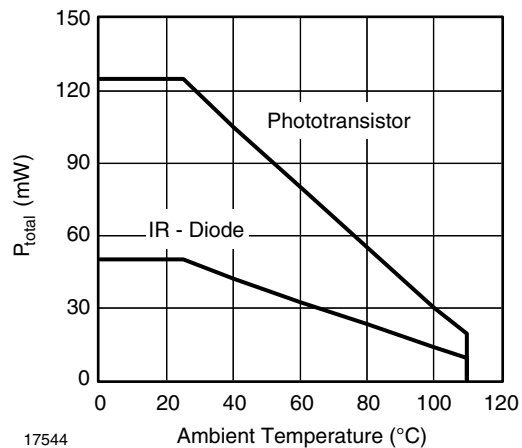


Figure 1. Power Dissipation vs. Ambient Temperature

**ELECTRICAL CHARACTERISTICS<sup>1)</sup>**

| PARAMETER                            | TEST CONDITION                                | PART     | SYMBOL      | MIN | TYP. | MAX  | UNIT          |
|--------------------------------------|-----------------------------------------------|----------|-------------|-----|------|------|---------------|
| <b>INPUT</b>                         |                                               |          |             |     |      |      |               |
| Forward voltage                      | $I_F = 10 \text{ mA}$                         |          | $V_F$       |     | 1.2  | 1.55 | V             |
| Reverse current                      | $V_R = 6.0 \text{ V}$                         |          | $I_R$       |     | 0.1  | 100  | $\mu\text{A}$ |
| Capacitance                          | $V_R = 0$                                     |          | $C_I$       |     | 25   |      | pF            |
| <b>OUTPUT</b>                        |                                               |          |             |     |      |      |               |
| Collector-emitter leakage current    | $V_{CE} = 10 \text{ V}, I_F = 0$              |          | $I_{CEO}$   |     | 5.0  | 50   | nA            |
| Collector-emitter breakdown voltage  | $I_C = 100 \mu\text{A}$                       |          | $BV_{CEO}$  | 70  |      |      | V             |
| Emitter-collector breakdown voltage  | $I_E = 10 \mu\text{A}$                        |          | $BV_{ECO}$  | 7.0 |      |      | V             |
| Collector-emitter saturation voltage | $I_F = 10 \text{ mA}, I_C = 2.5 \text{ mA}$   |          | $V_{CEsat}$ |     |      | 0.4  | V             |
| Collector-emitter capacitance        | $V_{CE} = 0$                                  |          | $C_{CE}$    |     | 10   |      | pF            |
| <b>COUPLER</b>                       |                                               |          |             |     |      |      |               |
| DC Current Transfer Ratio            | $V_{CE} = 5.0 \text{ V}, I_F = 10 \text{ mA}$ | ILD1205T | CTR         | 40  |      | 80   | %             |
|                                      |                                               | ILD1206T | CTR         | 63  |      | 125  | %             |
|                                      |                                               | ILD1207T | CTR         | 100 |      | 200  | %             |
| Capacitance (input-output)           |                                               |          | $C_{IO}$    |     | 0.5  |      | pF            |

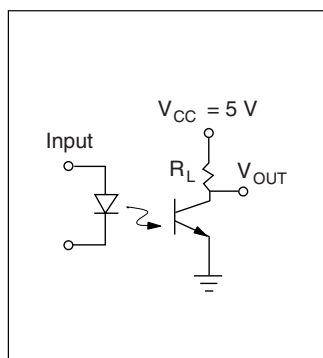
Note:

<sup>1)</sup>  $T_{amb} = 25^\circ\text{C}$ , 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.

**SWITCHING CHARACTERISTICS**

| PARAMETER     | TEST CONDITION                                                   | PART | SYMBOL    | MIN. | TYPE | MAX | UNIT          |
|---------------|------------------------------------------------------------------|------|-----------|------|------|-----|---------------|
| Turn-on time  | $I_C = 2.0 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5.0 \text{ V}$ |      | $t_{on}$  | 5.0  |      |     | $\mu\text{s}$ |
| Turn-off time | $I_C = 2.0 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5.0 \text{ V}$ |      | $t_{off}$ | 4.0  |      |     | $\mu\text{s}$ |



ild1205t\_08

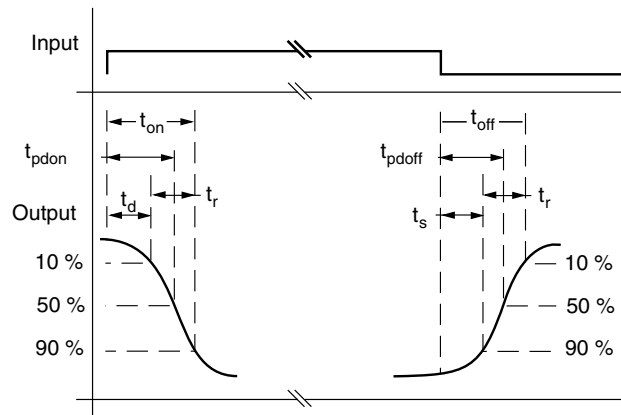


Figure 2. Switching Test Circuit

| SAFETY AND INSULATION RATINGS <sup>1)</sup>                                                             |                |      |            |      |           |     |          |
|---------------------------------------------------------------------------------------------------------|----------------|------|------------|------|-----------|-----|----------|
| PARAMETER                                                                                               | TEST CONDITION | PART | SYMBOL     | MIN. | TYPE      | MAX | UNIT     |
| Climatic Classification<br>(according to IEC 68 part 1)                                                 |                |      |            |      | 55/110/21 |     |          |
| Polution Degree<br>(DIN VDE 0109)                                                                       |                |      |            |      | 2.0       |     | mm       |
| Comparative tracking index<br>per DIN IEC112/VDE 0303<br>part 1, group IIIa per DIN<br>VDE 6110 175 399 |                |      |            | 175  |           | 399 |          |
| $V_{IOTM}$                                                                                              |                |      | $V_{IOTM}$ | 6000 |           |     | V        |
| $V_{IORM}$                                                                                              |                |      | $V_{IORM}$ | 560  |           |     | V        |
| Resistance, input to output                                                                             |                |      | $R_{IO}$   |      | 100       |     | $\Omega$ |
| $P_{SI}$                                                                                                |                |      |            |      |           | 350 | mW       |
| $I_{SI}$                                                                                                |                |      |            |      |           | 150 | mA       |
| $T_{SI}$                                                                                                |                |      |            |      |           | 165 | °C       |
| Creeepage                                                                                               |                |      |            | 4.0  |           |     | mm       |
| Clearance                                                                                               |                |      |            | 4.0  |           |     | mm       |

Note:

<sup>1)</sup> As per IEC60747-5-2, §7.4.3.8.1, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

## TYPICAL CHARACTERISTICS

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

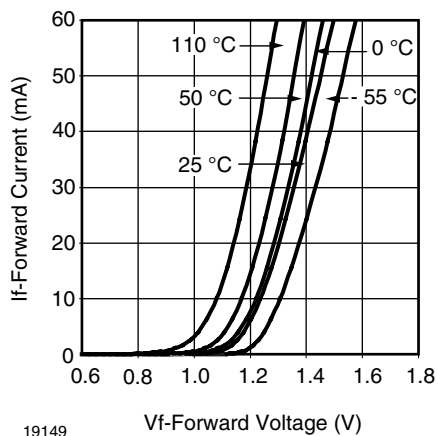


Figure 3. Forward Current vs. Forward Voltage

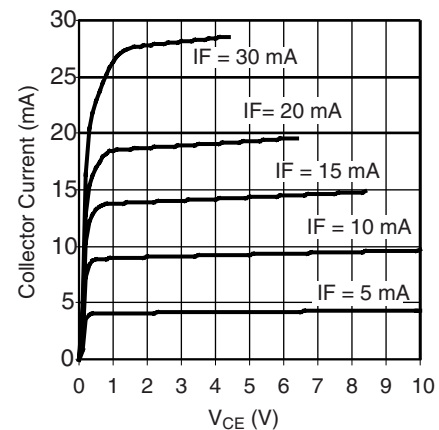


Figure 4.  $V_{CE}$  vs.  $I_C$ , (Non-Saturated)

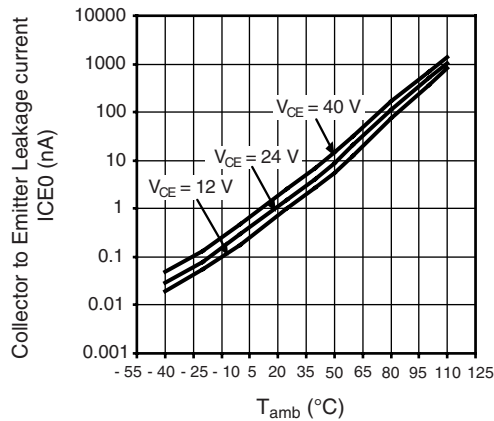
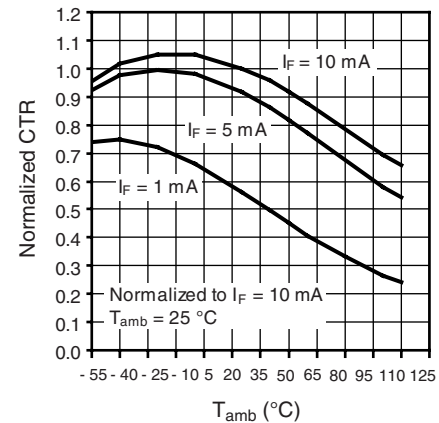


Figure 5. Collector to Emitter Leakage Current vs. Ambient Temperature



Normalized CTR vs. Ambient Temperature (Non-Saturated,  $V_{CE} = 5\text{ V}$ )

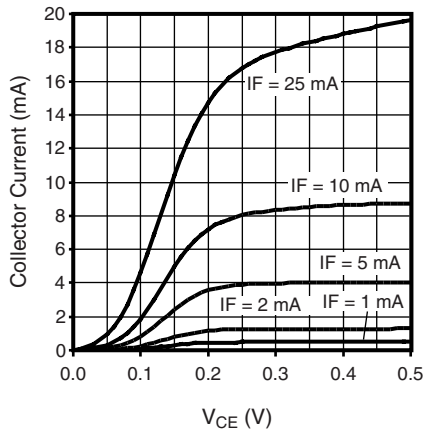


Figure 6.  $V_{CE}$  vs.  $I_C$ , (Saturated)

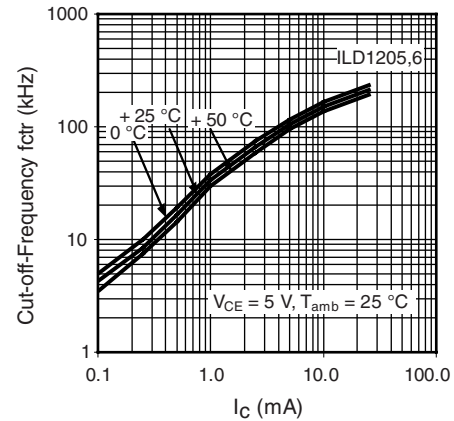


Figure 8. Cut-off-Frequency (-3 dB) vs. Collector Current

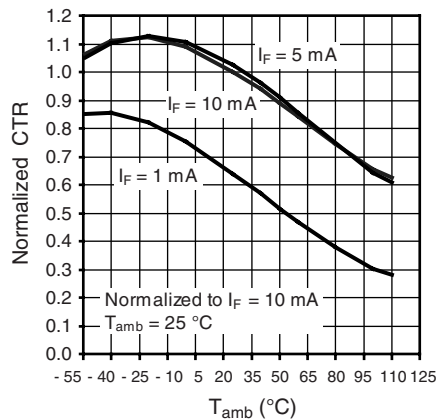


Figure 7. Normalized CTR vs. Ambient Temperature (Saturated,  $V_{CE} = 0.4\text{ V}$ )

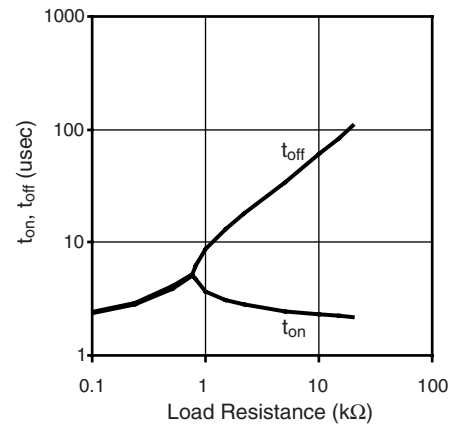
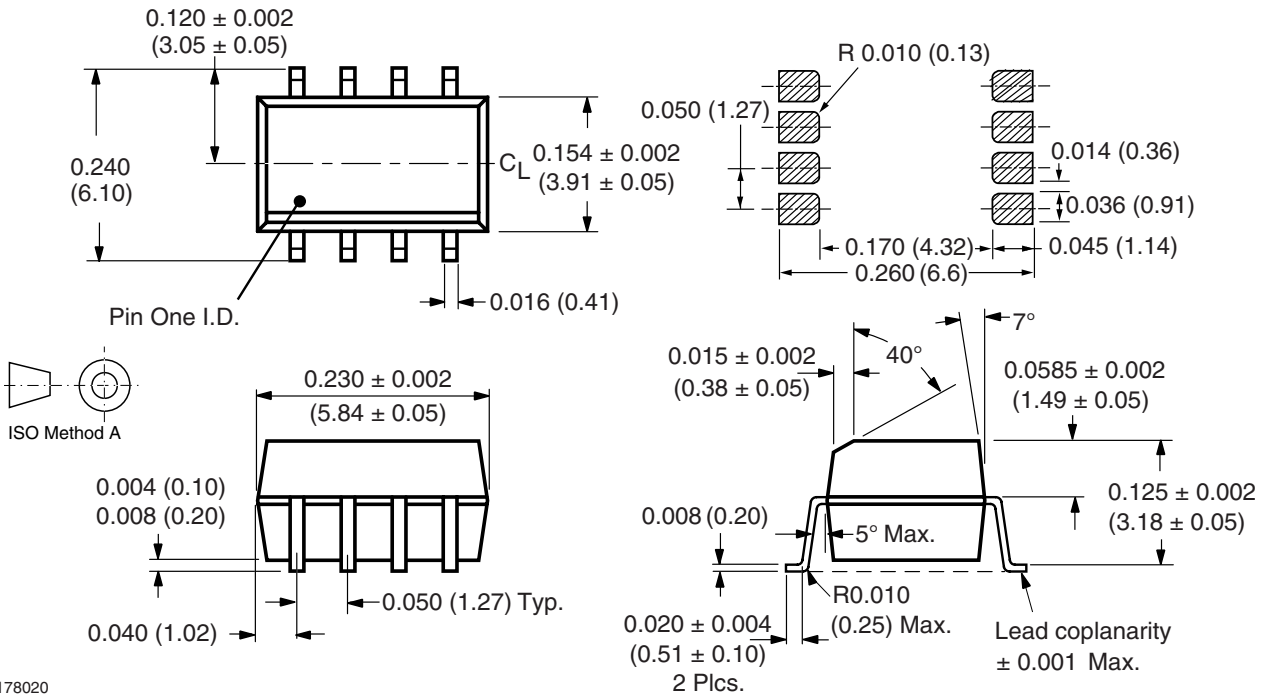


Figure 9.  $t_{on}$ ,  $t_{off}$  vs. Load Resistance (100  $\Omega$  to 20000  $\Omega$ )

## PACKAGE DIMENSIONS in inches (millimeters)



i178020

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

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1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
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