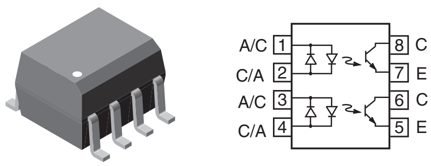
# THE DATASHEET OF

# ILD256T

# Optocoupler, Phototransistor Output, Dual Channel, AC Input



i179044

## FEATURES

- Each Channel: Guaranteed CTR Symmetry, 2:1 Maximum
- Bidirectional AC Input
- SOIC-8 Surface Mountable Package
- Isolation Test Voltage, 4000 $V_{RMS}$
- Standard Lead Spacing, 0.05
- Available only on Tape and Reel Option (Conforms to EIA Standard 481-2)
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

## DESCRIPTION

The ILD256T is a dual channel optocoupler. Each channel consists of two infrared emitters coupled to a silicon NPN phototransistor detector.

These circuit elements are constructed with a standard SOIC-8A footprint.

The product is well suited for telecom applications such as ring detection or off/on hook status, given its bidirectional LED input and guaranteed current transfer ratio (CTR) of 20 % at $I_F$ = 10 mA.

## AGENCY APPROVALS

- UL1577, File No. E52744 System Code Y
- DIN EN 60747-5-2 (VDE0884)
  Available with Option 1

## APPLICATIONS

- Telecom applications  ring detection off/on hook status

| ORDER INFORMATION | |
|---|---|
| **PART** | **REMARKS** |
| ILD256T | CTR > 20 %, SOIC-8 |

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

| ABSOLUTE MAXIMUM RATINGS[1)] | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| **INPUT** | | | | |
| Forward continuous current | | $I_F$ | 30 | mA |
| Power dissipation | | $P_{diss}$ | 50 | mW |
| Derate linearly from 25 °C | | | 0.66 | mW/°C |
| **OUTPUT** | | | | |
| Collector-emitter breakdown voltage | | $BV_{CEO}$ | 70 | V |
| Emitter-collector breakdown voltage | | $BV_{ECO}$ | 7.0 | V |
| Power dissipation | | $P_{diss}$ | 125 | mW |
| Derate linearly from 25 °C | | | 1.67 | mW/°C |

| ABSOLUTE MAXIMUM RATINGS[1] | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| COUPLER | | | | |
| Isolation voltage, input to output | t = 1.0 s | $V_{ISO}$ | 4000 | $V_{RMS}$ |
| Total package dissipation (LED + detector) | | $P_{tot}$ | 300 | mW |
| Derate linearly from 25 °C | | | 4.0 | mW/°C |
| Storage temperature | | $T_{stg}$ | - 55 to + 150 | °C |
| Operating temperature | | $T_{amb}$ | - 55 to + 100 | °C |
| Soldering temperature at 260 °C | | $T_{sld}$ | 10 | sec. |

Note:
[1] $T_{amb}$ = 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.

| ELECTRICAL CHARACTERISTICS[1] | | | | | | | |
|---|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN | TYP. | MAX | UNIT |
| INPUT | | | | | | | |
| Forward voltage | $I_F$ = ± 10 mA | | $V_F$ | | 1.2 | 1.55 | V |
| Reverse current | $V_R$ = 6.0 V | | $I_R$ | | 0.1 | 100 | mA |
| OUTPUT | | | | | | | |
| Collector-emitter breakdown voltage | $I_C$ = 10 µA | | $BV_{CEO}$ | 70 | | | V |
| Emitter-collector breakdown voltage | $I_E$ = 10 µA | | $BV_{ECO}$ | 7.0 | | | V |
| Collector-emitter leakage current | $V_{CE}$ = 10 V | | $I_{CEO}$ | | 5.0 | 50 | nA |
| COUPLER | | | | | | | |
| Symmetry (CTR at + 10 mA)/(CTR at -10 mA) | | | | 0.5 | 1.0 | 2.0 | |
| Saturation voltage, collector-emitter | $I_F$ = ± 16 mA, $I_C$ = 2.0 mA | | $V_{CEsat}$ | | | 0.4 | V |

Note:
[1] $T_{amb}$ = 25 °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 |
| DC Current Transfer Ratio | $I_F$ = ± 10 mA, $V_{CE}$ = 5.0 V | | $CTR_{DC}$ | 20 | | | % |

| SAFETY AND INSULATION RATINGS[1] | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITION | SYMBOL | MIN | TYP. | MAX | UNIT |
| Climatic classification (according to IEC 68 part 1) | | | | 55/100/21 | | |
| Comparative tracking index | | CTI | 175 | | 399 | |
| $V_{IOTM}$ | | | 6000 | | | V |
| $V_{IORM}$ | | | 560 | | | V |
| $P_{SO}$ | | | | | 350 | mW |
| $I_{SI}$ | | | | | 150 | mA |
| $T_{SI}$ | | | | | 165 | °C |
| Creepage | | | 4 | | | mm |
| Clearance | | | 4 | | | mm |
| Insulation thickness, reinforced rated | per IEC60950 2.10.5.1 | | 0.2 | | | mm |

Note:
[1] 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 prodective circuits.

## TYPICAL CHARACTERISTICS

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

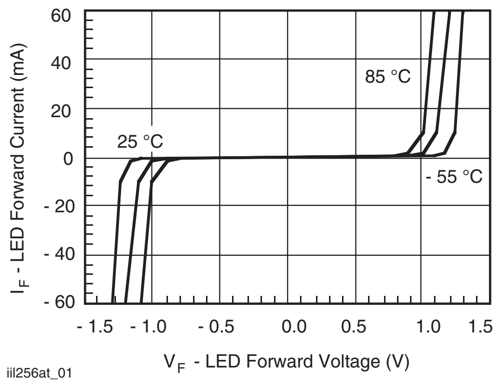



Figure 1. LED Forward Current vs.Forward Voltage

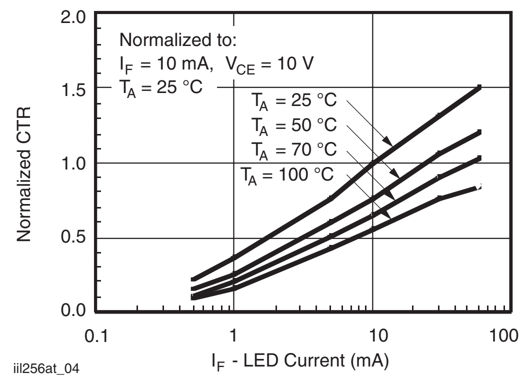



Figure 4. Normalized CTR vs. $I_F$ and $T_{amb}$

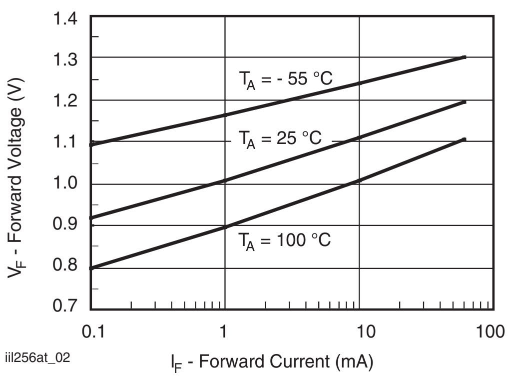



Figure 2. Forward Voltage vs. Forward Current

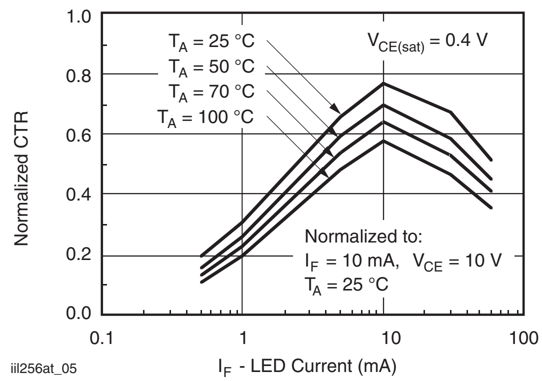



Figure 5. Normalized Saturated CTR

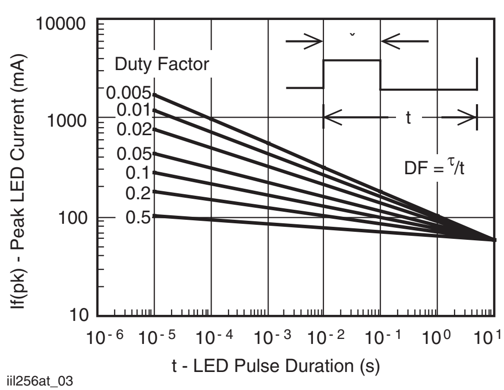



Figure 3. Peak LED Current vs. Duty Factor, Tau

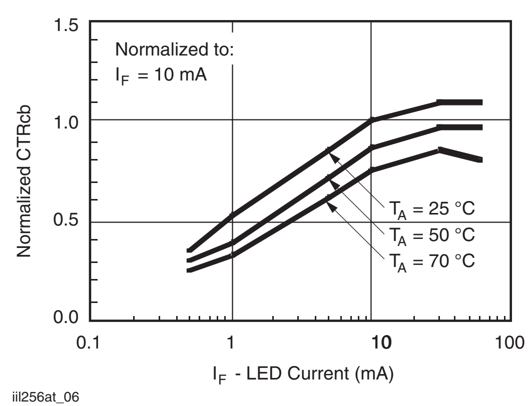



Figure 6. Normalized $CTR_{cb}$

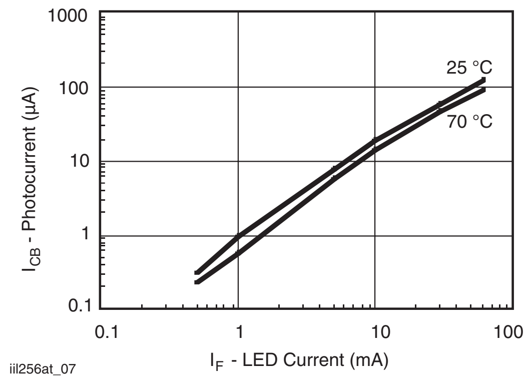



Figure 7. Photocurrent vs. LED Current

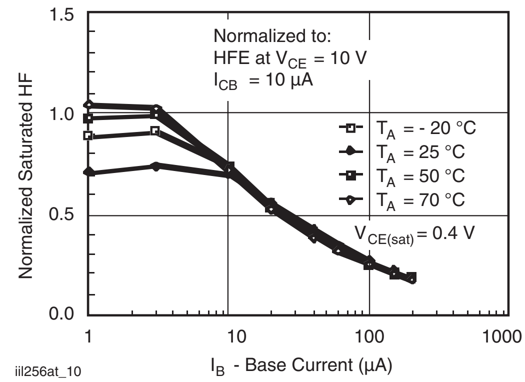



Figure 10. Normalized Saturated HFE vs. Base Current

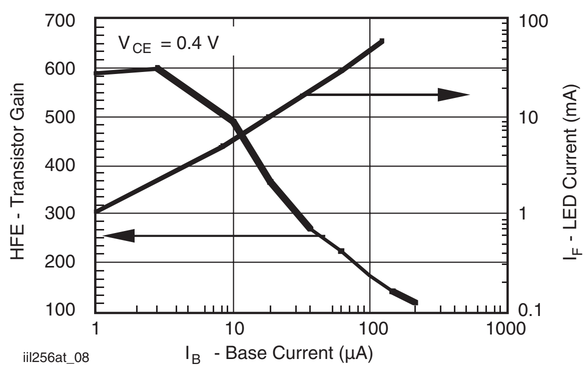



Figure 8. Base Current vs. $I_F$ and HFE

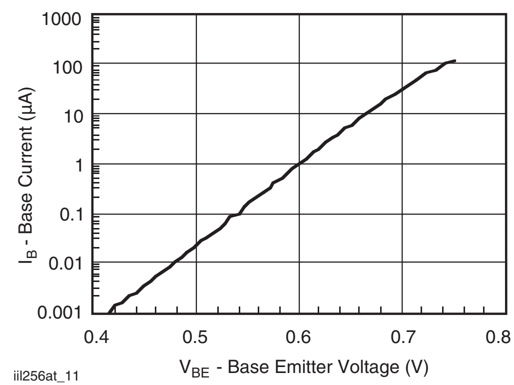



Figure 11. Base Emitter Voltage vs. Base Current

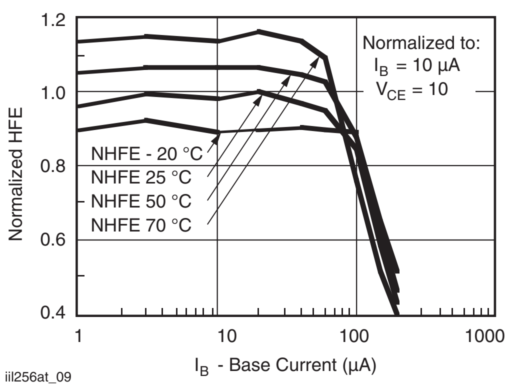



Figure 9. Normalized HFE vs. Base Current and Temp.

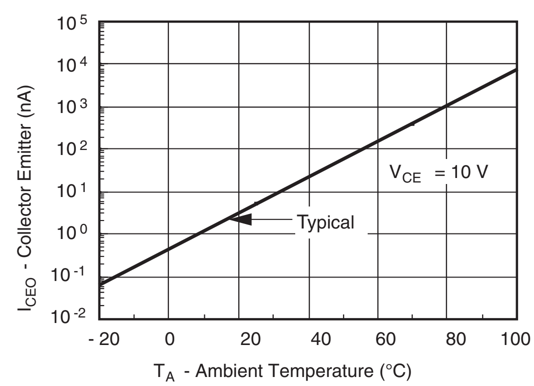
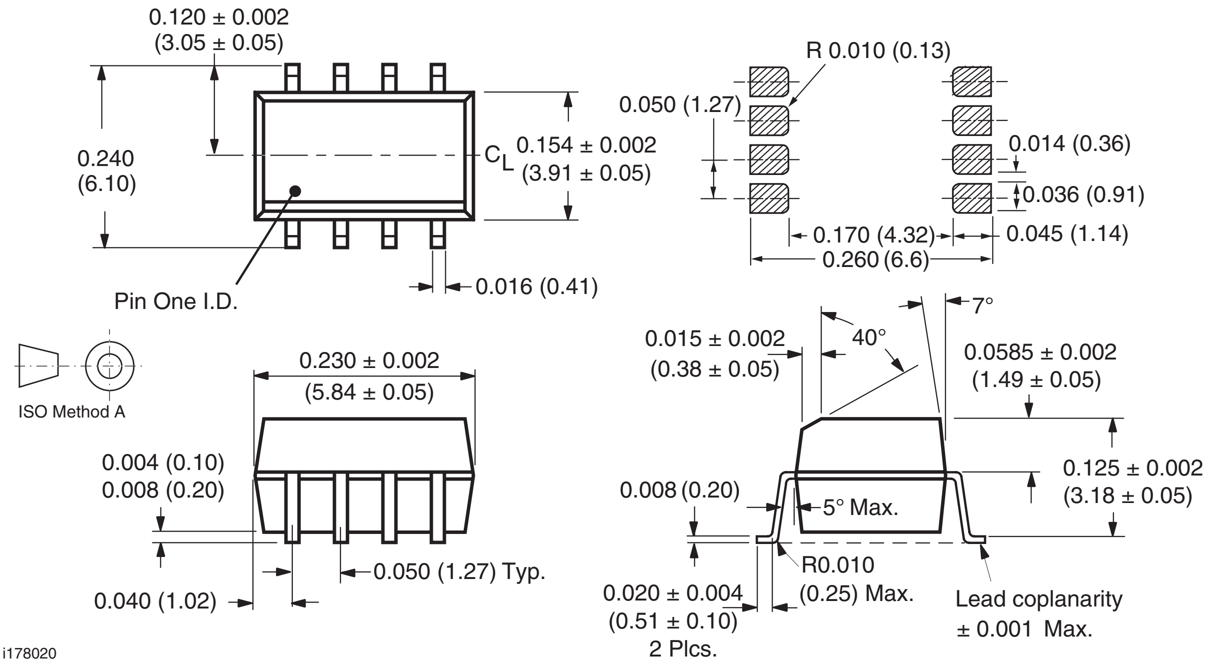



Figure 12. Collector-Emitter Leakage Current vs.Temp.

**PACKAGE DIMENSIONS** in inches (millimeters)



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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.



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