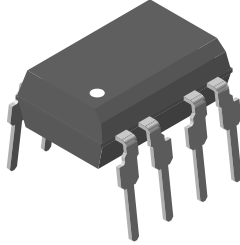


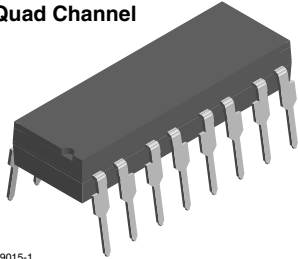


Optocoupler, Phototransistor Output (Dual, Quad Channel)

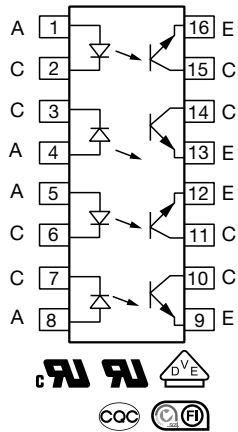
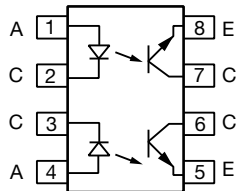
Dual Channel



Quad Channel



1179015-1



DESCRIPTION

The ILD74, ILQ74 is an optically coupled pair with a GaAIAs 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 ILD74, ILQ74 is especially for driving medium-speed logic, where it may be used to eliminate troublesome ground loop and noise problems. Also it can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CTR modulation.

The ILD74 has two isolated channels in a single DIP package; the ILQ74 has four isolated channels per package.

FEATURES

- ILD74, ILQ74 TTL compatible
- Transfer ratio, 35 % typical
- Coupling capacitance, 0.5 pF
- Single, dual, and quad channel
- Industry standard DIP packages
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS COMPLIANT

AGENCY APPROVALS

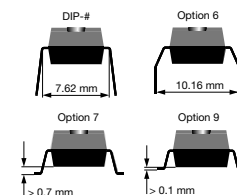
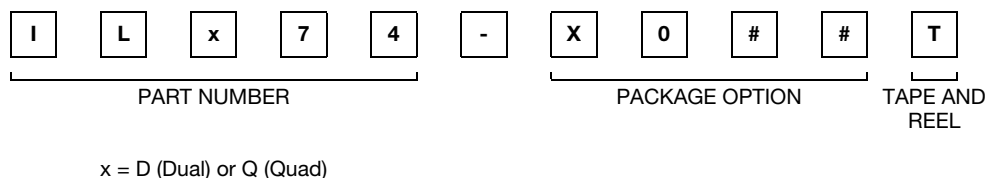
- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884-5\)](#), available with option 1
- [CQC](#)
- [FIMKO](#)

LINKS TO ADDITIONAL RESOURCES





ORDERING INFORMATION



| AGENCY CERTIFIED / PACKAGE | DUAL CHANNEL | QUAD CHANNEL |
|--------------------------------------|---------------|----------------------------|
| | CTR (%) | |
| UL, cUL, CQC, CSA, FIMKO | ≥ 12.5 | ≥ 12.5 |
| DIP-8 | ILD74 | - |
| SMD-8, option 9 | ILD74-X009T | - |
| DIP-16 | - | ILQ74 |
| SMD-16, option 9 | - | ILQ74-X009T ⁽¹⁾ |
| VDE, UL, cUL, CQC, CSA, FIMKO | ≥ 12.5 | ≥ 12.5 |
| DIP-16 | - | ILQ74-X001 |

Notes

- Additional options may be possible, please contact sales office
- ⁽¹⁾ Also available in tubes, do not put "T" on the end

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

| PARAMETER | TEST CONDITION | PART | SYMBOL | VALUE | UNIT |
|---|----------------|-------|------------|-------------|------------------------|
| INPUT | | | | | |
| Peak reverse voltage | | | V_R | 3 | V |
| Forward continuous current | | | I_F | 60 | mA |
| Power dissipation | | | P_{diss} | 100 | mW |
| Derate linearly from 55 % | | | | 1.33 | mW/ $^{\circ}\text{C}$ |
| OUTPUT | | | | | |
| Collector emitter breakdown voltage | | | BV_{CEO} | 20 | V |
| Emitter collector breakdown voltage | | | BV_{ECO} | 5 | V |
| Collector base breakdown voltage | | | BV_{CBO} | 70 | V |
| Power dissipation | | | P_{diss} | 150 | mW |
| Derate linearly from 25 $^{\circ}\text{C}$ | | | | 2 | mW/ $^{\circ}\text{C}$ |
| COUPLER | | | | | |
| Total package dissipation | | ILD74 | P_{tot} | 400 | mW |
| | | ILQ74 | P_{tot} | 500 | mW |
| Derate linearly from 25 $^{\circ}\text{C}$ | | ILD74 | | 5.33 | mW/ $^{\circ}\text{C}$ |
| | | ILQ74 | | 6.67 | mW/ $^{\circ}\text{C}$ |
| Storage temperature | | | T_{stg} | -55 to +150 | $^{\circ}\text{C}$ |
| Operating temperature | | | T_{amb} | -55 to +100 | $^{\circ}\text{C}$ |
| Lead soldering time at 260 $^{\circ}\text{C}$ | | | | 10 | s |

Note

- 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.



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|-------------|------|------|------|------------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| INPUT | | | | | | |
| Forward voltage | $I_F = 20\text{ mA}$ | V_F | - | 1.3 | 1.5 | V |
| Reverse current | $V_R = 3\text{ V}$ | I_R | - | 0.1 | 100 | μA |
| Capacitance | $V_R = 0\text{ V}$ | C_O | - | 25 | - | pF |
| OUTPUT | | | | | | |
| Collector emitter breakdown voltage | $I_C = 1\text{ mA}$ | BV_{CEO} | 20 | 50 | - | V |
| Collector emitter leakage current | $V_{CE} = 5\text{ V}, I_F = 0\text{ A}$ | I_{CEO} | - | 5 | 500 | nA |
| Capacitance collector emitter | $V_{CE} = 0\text{ V}, f = 1\text{ Hz}$ | C_{CE} | - | 10 | - | pF |
| COUPLER | | | | | | |
| Saturation voltage, collector emitter | $I_C = 2\text{ mA}, I_F = 16\text{ mA}$ | V_{CEsat} | - | 0.3 | 0.5 | V |
| Resistance (input to output) | | R_{IO} | - | 100 | - | $\text{G}\Omega$ |
| Capacitance (input to output) | | C_{IO} | - | 0.5 | - | pF |

Note

- 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|------------|------|------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| DC current transfer ratio | $I_F = 16\text{ mA}, V_{CE} = 5\text{ V}$ | CTR_{DC} | 12.5 | 35 | - | % |

| SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|--|-------------------|------|------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Switching times | $R_L = 100\ \Omega, V_{CE} = 10\text{ V}, I_C = 2\text{ mA}$ | t_{on}, t_{off} | - | 3 | - | μs |

| SAFETY AND INSULATION RATINGS | | | | |
|--|--|------------|----------------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Climatic classification | According to IEC 68 part 1 | | 55 / 100 / 21 | |
| Comparative tracking index | | CTI | 175 | |
| Maximum rated withstanding isolation voltage | $t = 1\text{ min}$ | V_{ISO} | 4420 | V_{RMS} |
| Maximum transient isolation voltage | | V_{IOTM} | 10 000 | V_{peak} |
| Maximum repetitive peak isolation voltage | | V_{IORM} | 890 | V_{peak} |
| Isolation resistance | $V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$ | R_{IO} | $\geq 10^{12}$ | Ω |
| | $V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$ | R_{IO} | $\geq 10^{11}$ | Ω |
| Output safety power | | P_{SO} | 400 | mW |
| Input safety current | | I_{SI} | 275 | mA |
| Safety temperature | | T_S | 175 | $^{\circ}\text{C}$ |
| Creepage distance | | | ≥ 7 | mm |
| Clearance distance | | | ≥ 7 | mm |
| Insulation thickness | | DTI | ≥ 0.4 | mm |

Note

- As per IEC 60747-5-5, § 7.4.3.8.2, 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

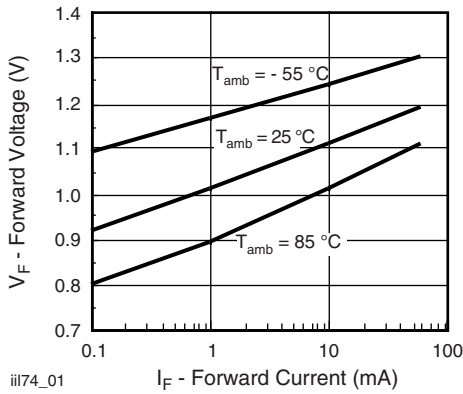


Fig. 1 Forward Voltage vs. Forward Current

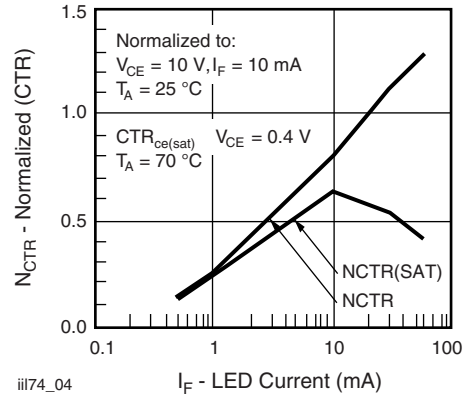


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

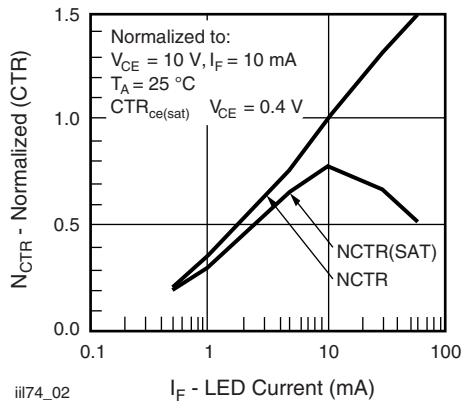


Fig. 1 - Normalized Non-Saturated and Saturated CTR vs. LED Current

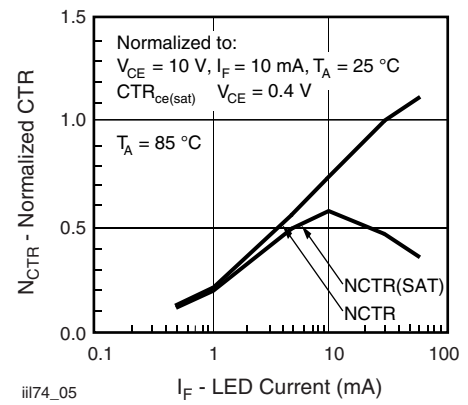


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

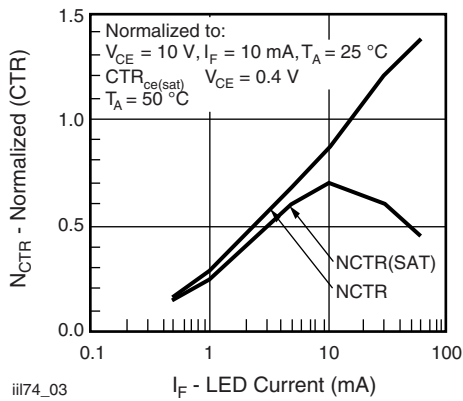


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

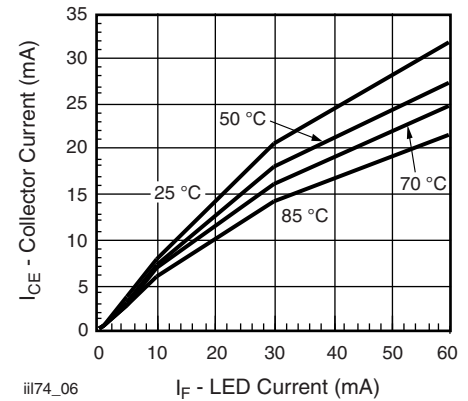


Fig. 5 - Collector Emitter Current vs. Temperature and LED Current

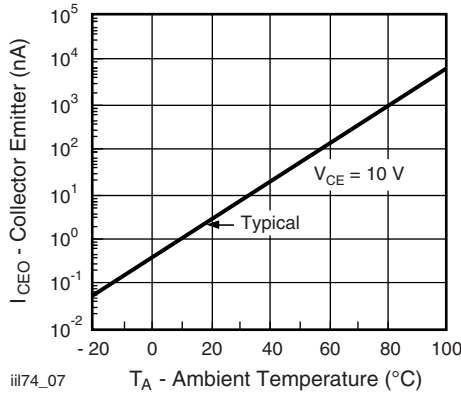


Fig. 6 - Collector Emitter Leakage Current vs. Temperature

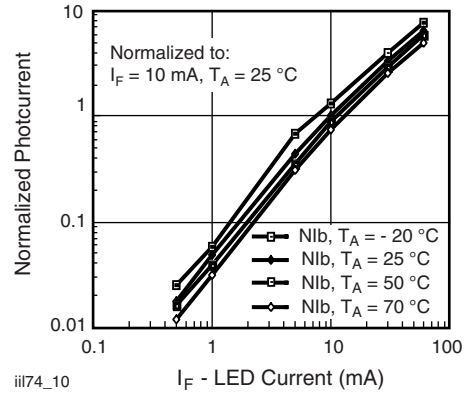


Fig. 9 - Normalized Photocurrent vs. I_F and Temperature

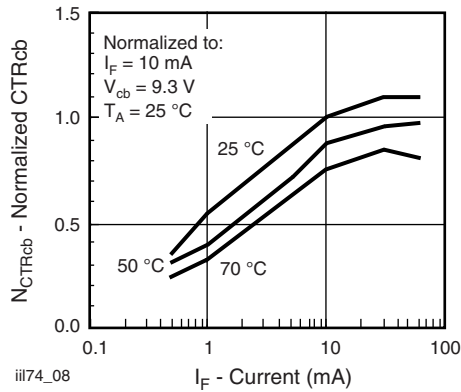


Fig. 7 - Normalized CTR_{cb} vs. LED Current and Temperature

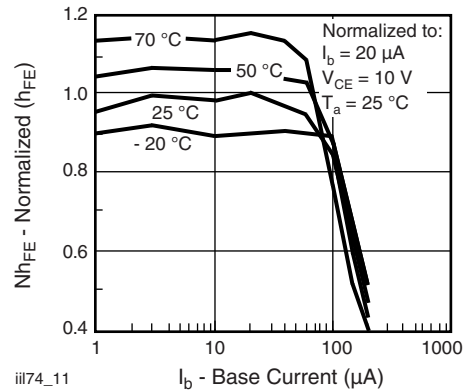


Fig. 10 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

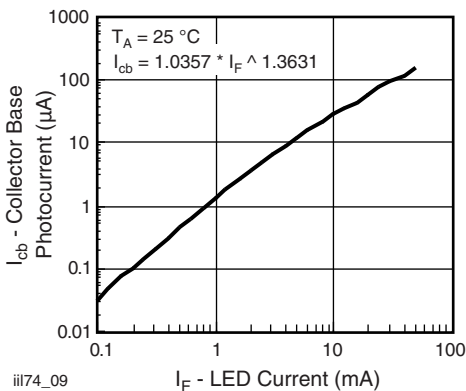


Fig. 8 - Collector Base Photocurrent vs. LED Current

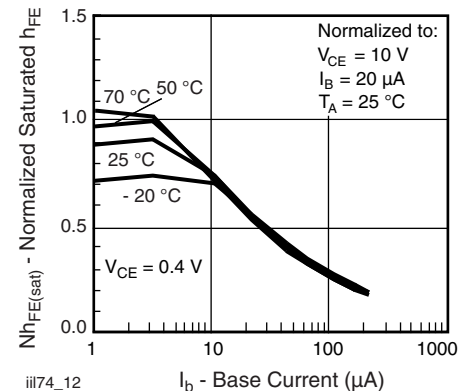


Fig. 11 - Normalized Saturated h_{FE} vs. Base Current and Temperature

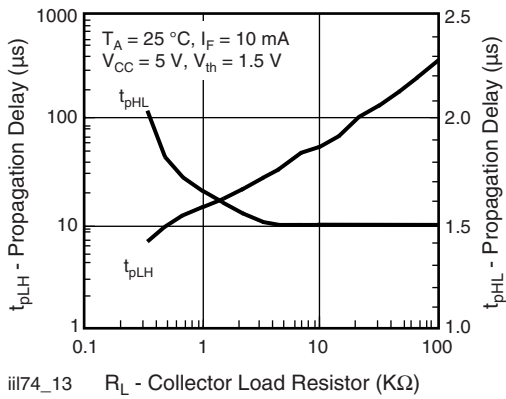
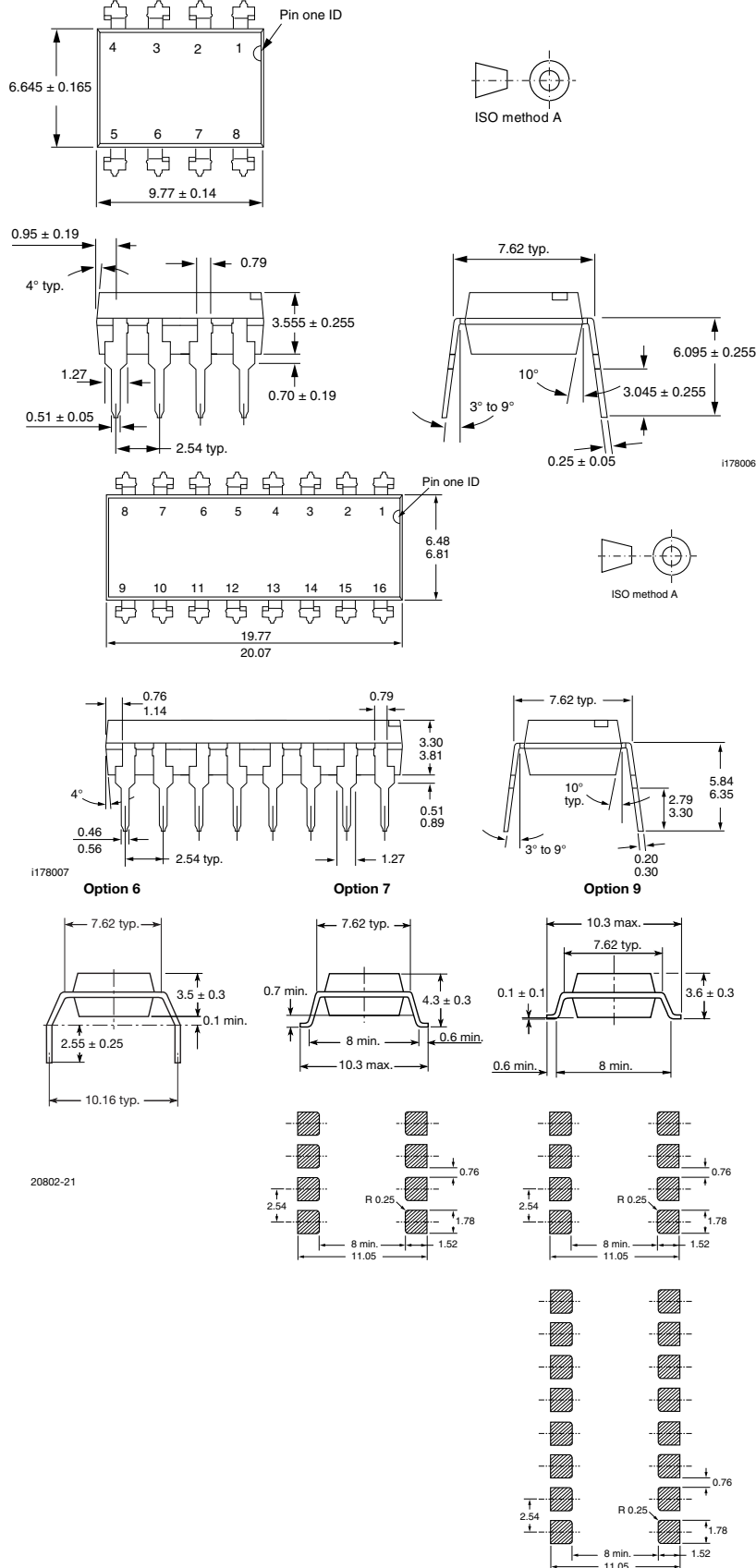


Fig. 12 - Propagation Delay vs. Collector Load Resistor

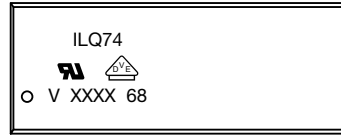
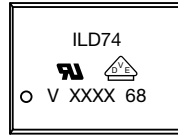


PACKAGE DIMENSIONS in millimeters





PACKAGE MARKING



Notes

- XXXX = LMC (lot marking code)
- Only options 1 and 7 reflected in the package marking
- The VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking



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