



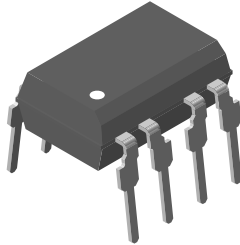
**THE DATASHEET OF  
ILQ74-X009T**



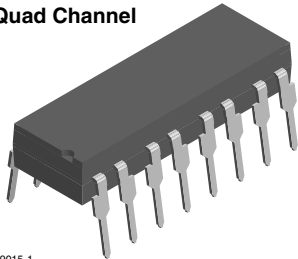


## Optocoupler, Phototransistor Output (Dual, Quad Channel)

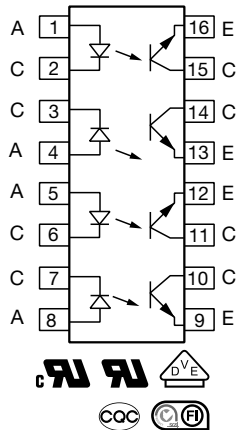
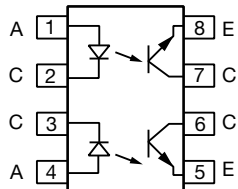
Dual Channel



Quad Channel



i179015-1



### 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### AGENCY APPROVALS

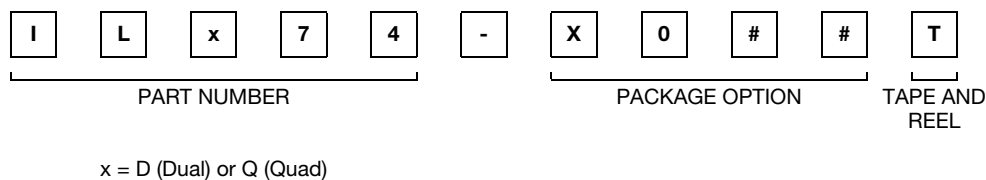
- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884-5\)](#), available with option 1
- [CQC](#)
- [FIMKO](#)

### LINKS TO ADDITIONAL RESOURCES





## ORDERING INFORMATION



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

## Notes

- Additional options may be possible, please contact sales office
- <sup>(1)</sup> 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
<b>INPUT</b>					
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/ $^{\circ}\text{C}$
<b>OUTPUT</b>					
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/ $^{\circ}\text{C}$
<b>COUPLER</b>					
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.



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
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	$\mu\text{A}$
Capacitance	$V_R = 0\text{ V}$	$C_O$	-	25	-	pF
<b>OUTPUT</b>						
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
<b>COUPLER</b>						
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.

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	-	%

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	-	$\mu\text{s}$

<b>SAFETY AND INSULATION RATINGS</b>				
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	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Output safety power		$P_{SO}$	400	mW
Input safety current		$I_{SI}$	275	mA
Safety temperature		$T_S$	175	$^{\circ}\text{C}$
Creepage distance			$\geq 7$	mm
Clearance distance			$\geq 7$	mm
Insulation thickness		DTI	$\geq 0.4$	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)

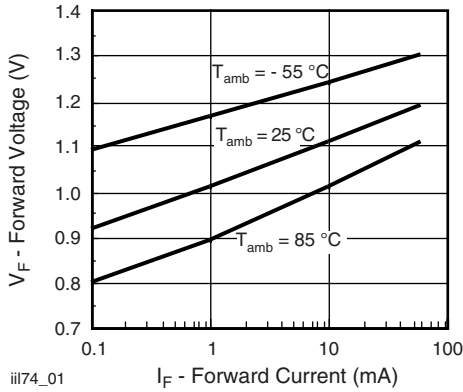


Fig. 1 Forward Voltage vs. Forward Current

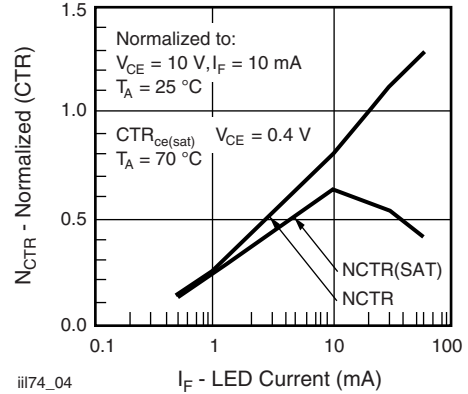


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

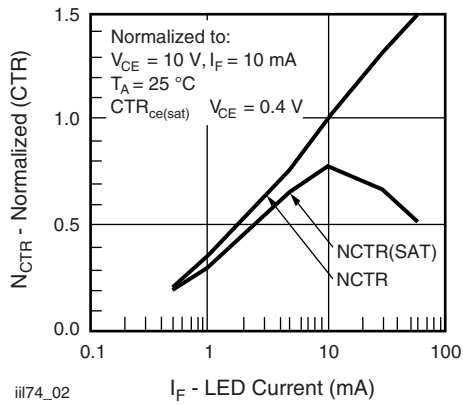


Fig. 1 - Normalized Non-Saturated and Saturated CTR vs. LED Current

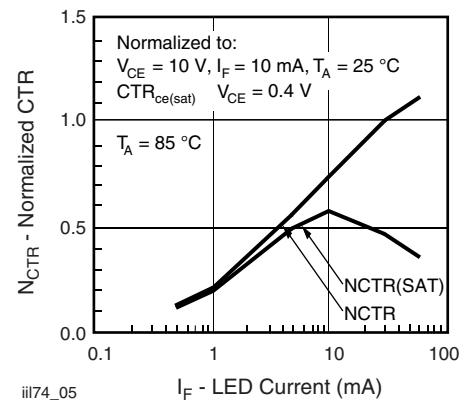


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

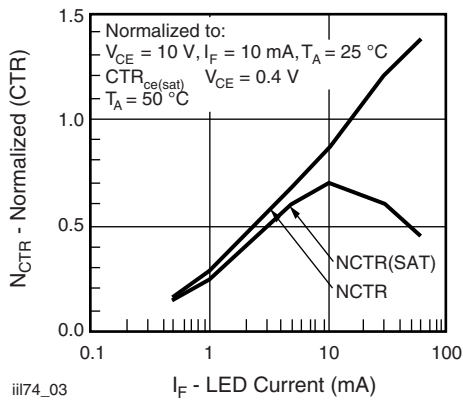


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

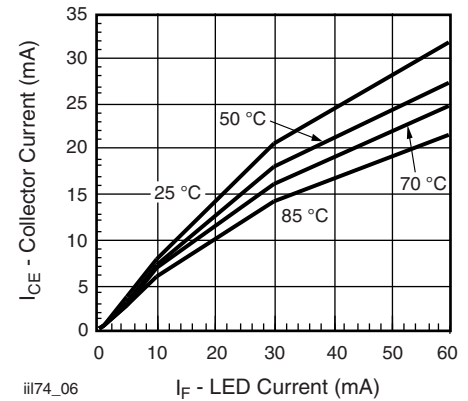


Fig. 5 - Collector Emitter Current vs. Temperature and LED Current

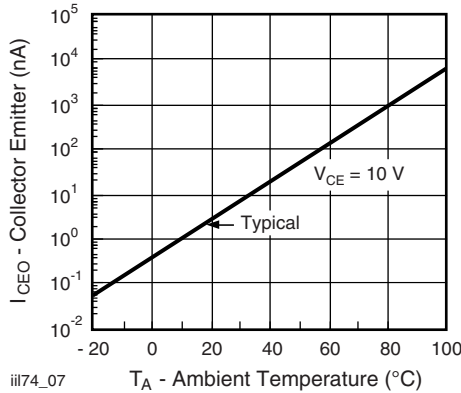


Fig. 6 - Collector Emitter Leakage Current vs. Temperature

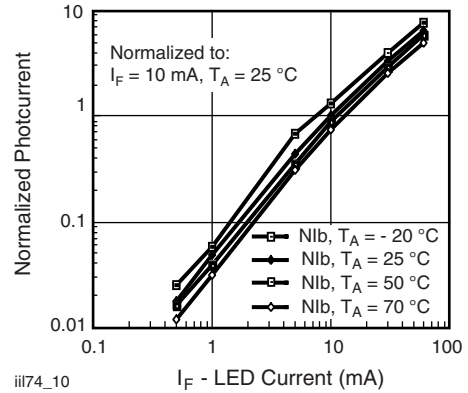


Fig. 9 - Normalized Photocurrent vs.  $I_F$  and Temperature

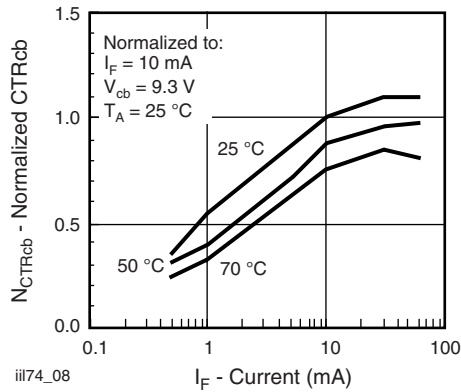


Fig. 7 - Normalized  $CTR_{cb}$  vs. LED Current and Temperature

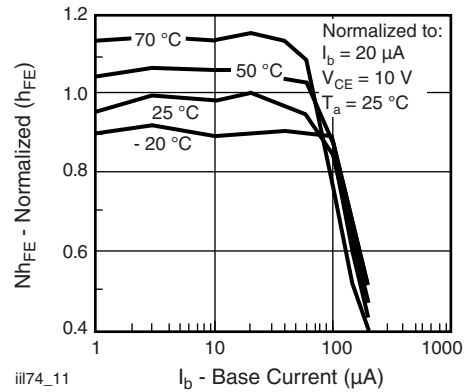


Fig. 10 - Normalized Non-Saturated  $h_{FE}$  vs. Base Current and Temperature

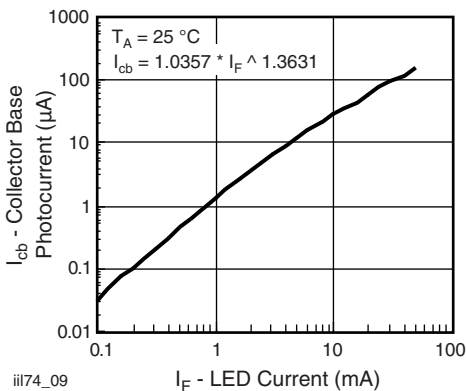


Fig. 8 - Collector Base Photocurrent vs. LED Current

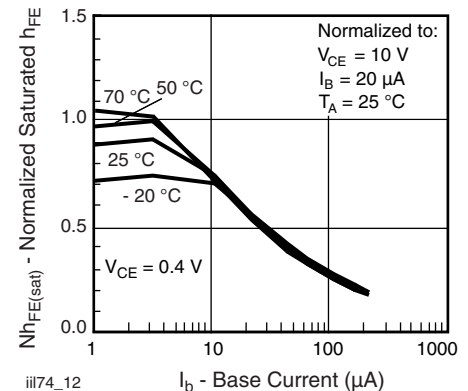


Fig. 11 - Normalized Saturated  $h_{FE}$  vs. Base Current and Temperature

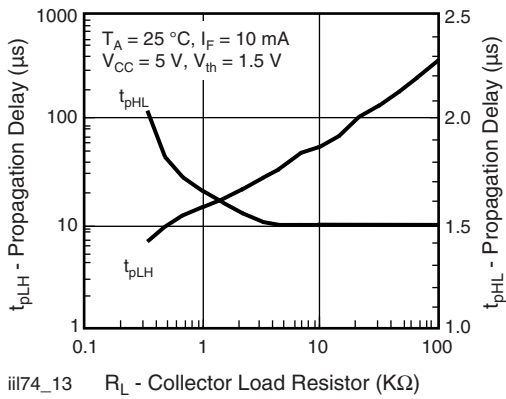
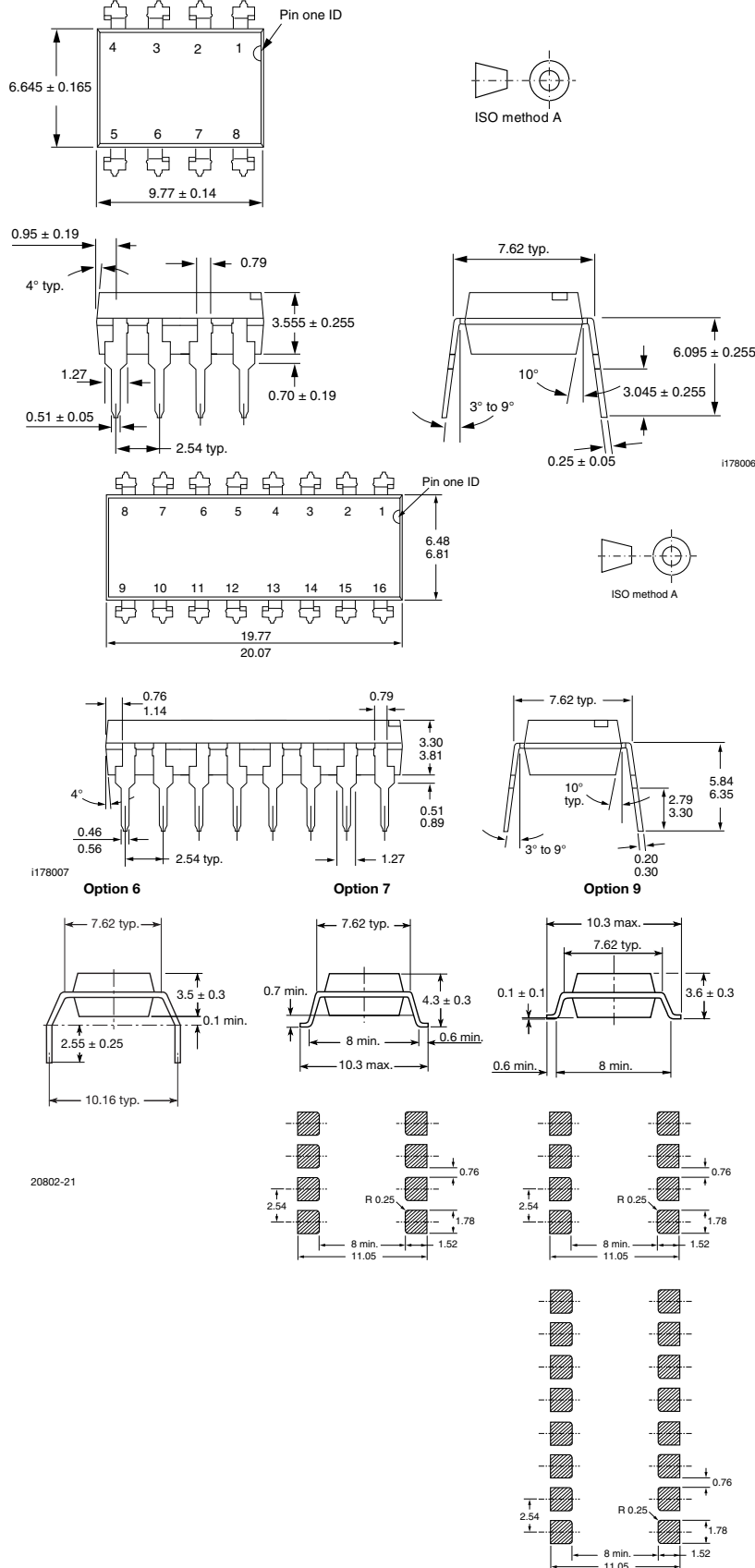


Fig. 12 - Propagation Delay vs. Collector Load Resistor

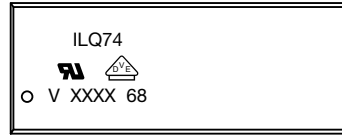
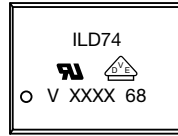


**PACKAGE DIMENSIONS** in millimeters





**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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