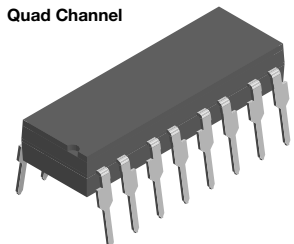


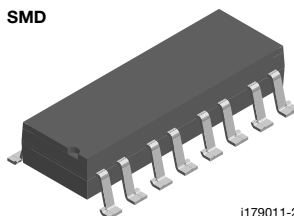


# Optocoupler, Photodarlington Output, High Gain (Quad Channel)

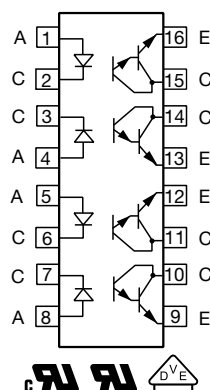
Quad Channel



SMD



i179011-2



## FEATURES

- Isolation rated voltage 4420 V<sub>RMS</sub>
- High isolation resistance, 10<sup>11</sup> Ω typical
- Low coupling capacitance
- Standard plastic DIP package
- 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 \(VDE 0884\)](#), available with option 1

## LINKS TO ADDITIONAL RESOURCES

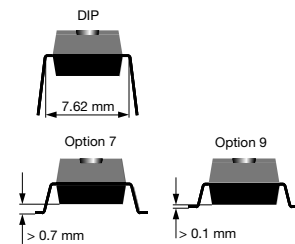
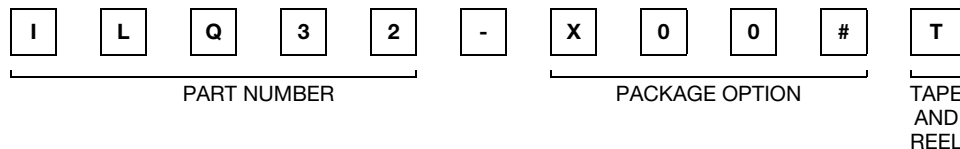


## DESCRIPTION

The ILQ32 is optically coupled isolators with a gallium arsenide infrared LED and a silicon photodarlington sensor. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits.

These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

## ORDERING INFORMATION



AGENCY CERTIFIED / PACKAGE	CTR (%)
UL, cUL, BSI, CQC	≥ 500
DIP-16	ILQ32
SMD-16, option 7	ILQ32-X007T <sup>(1)</sup>
SMD-16, option 9	ILQ32-X009T <sup>(1)</sup>

### 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 <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
<b>INPUT</b>					
Peak reverse voltage			V <sub>R</sub>	3	V
Forward continuous current			I <sub>F</sub>	60	mA
Power dissipation			P <sub>diss</sub>	100	mW
Derate linearly from 25°C				1.33	mW/°C
<b>OUTPUT</b>					
Collector emitter breakdown voltage			BV <sub>CEO</sub>	30	V
Collector (load) current			I <sub>C</sub>	125	mA
Power dissipation			P <sub>diss</sub>	150	mW
Derate linearly from 25°C				2	mW/°C
<b>COUPLER</b>					
Total dissipation		ILQ32	P <sub>tot</sub>	500	mW
Derate linearly from 25 °C		ILQ32		6.67	mW/°C
Storage temperature			T <sub>stg</sub>	-55 to +150	°C
Operating temperature			T <sub>amb</sub>	-55 to +100	°C
Lead soldering time at 260 °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 <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	I <sub>F</sub> = 10 mA	V <sub>F</sub>	-	1.25	1.5	V
Reverse current	V <sub>R</sub> = 3 V	I <sub>R</sub>	-	0.1	100	μA
Capacitance	V <sub>R</sub> = 0 V	C <sub>O</sub>	-	25		pF
<b>OUTPUT</b>						
Collector emitter breakdown voltage	I <sub>C</sub> = 100 μA, I <sub>F</sub> = 0 A	BV <sub>CEO</sub>	30	-	-	V
Breakdown voltage emitter collector	I <sub>E</sub> = 100 μA	BC <sub>EEO</sub>	5	10	-	V
Collector emitter leakage current	V <sub>CE</sub> = 10 V, I <sub>F</sub> = 0 A	I <sub>CEO</sub>	-	1	100	nA
<b>COUPLER</b>						
Collector emitter	I <sub>C</sub> = 2 mA, I <sub>F</sub> = 8 mA	V <sub>CEsat</sub>	-	-	1	V
Capacitance (input to output)		C <sub>IO</sub>	-	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 <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 10 V	CTR	500	-	-	%

SWITCHING CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω	t <sub>on</sub>	-	15	-	μs
Turn-off time	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω	t <sub>off</sub>	-	30	-	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 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)

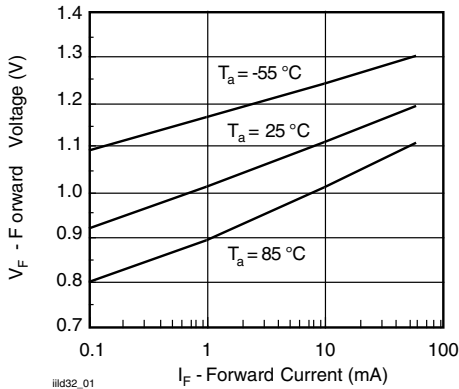


Fig. 1 - Forward Voltage vs. Forward Current

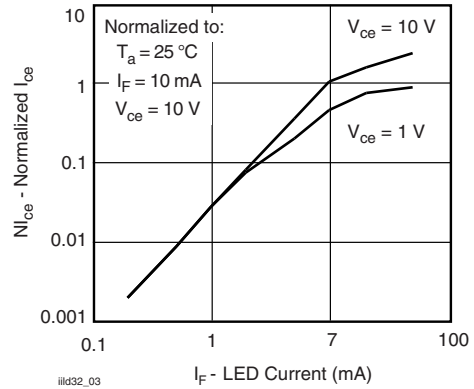


Fig. 3 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

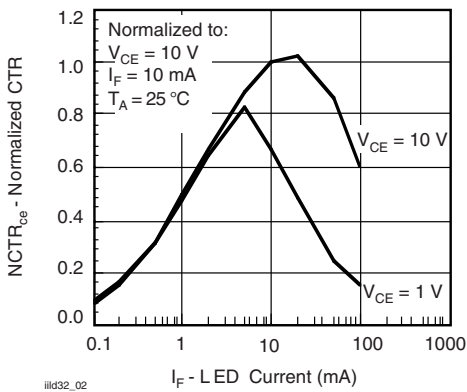


Fig. 2 - Normalized Non-saturated and Saturated  $CTR_{CE}$  vs. LED Current

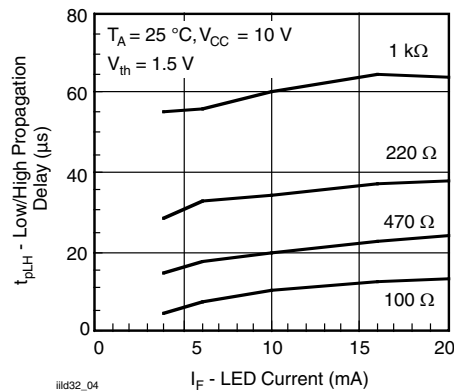


Fig. 4 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

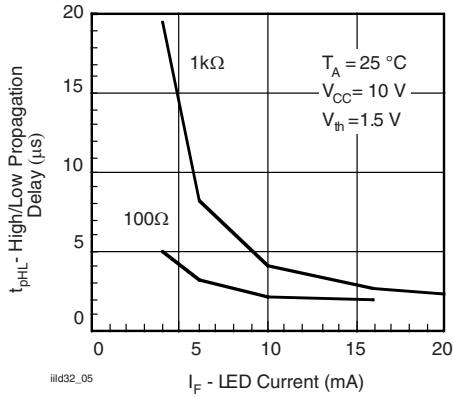
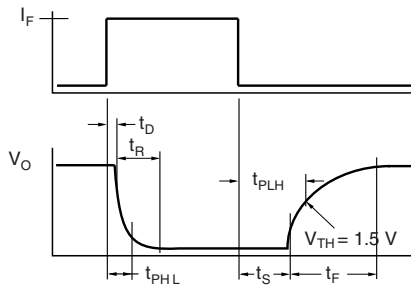
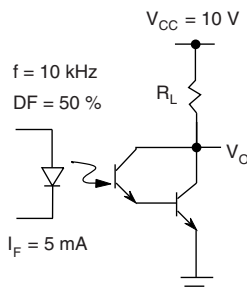


Fig. 5 - High to low Propagation Delay vs. Collector Load Resistance and LED Current



ilid32\_06

Fig. 6 - Switching Timing

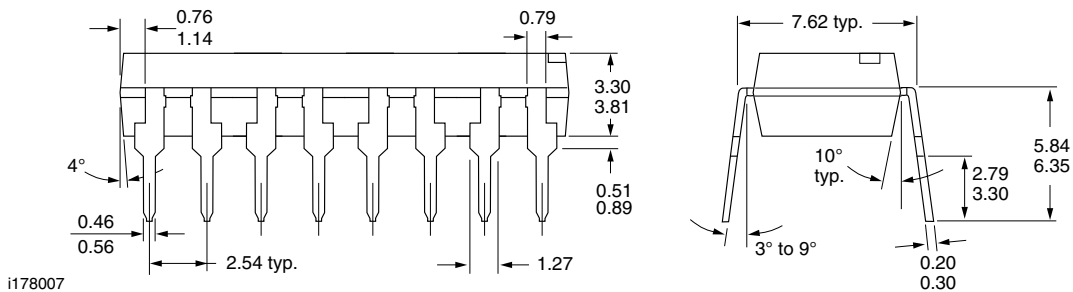
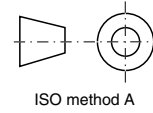
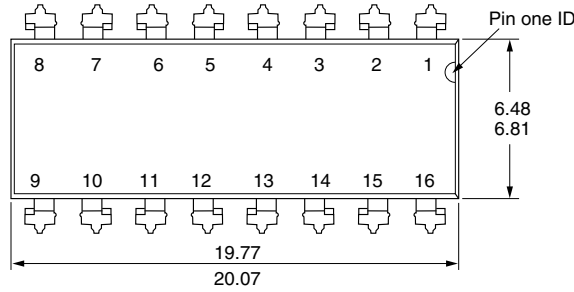


ilid32\_07

Fig. 7 - Switching Schematic



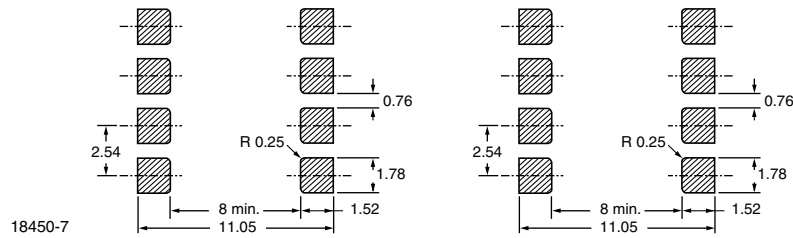
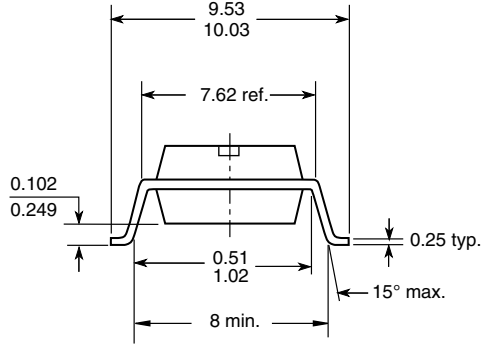
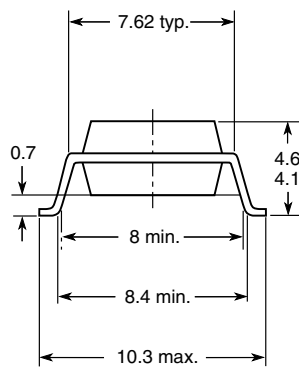
**PACKAGE DIMENSIONS** in millimeters



i178007

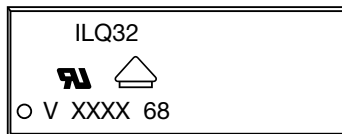
**Option 7**

**Option 9**



18450-7

**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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