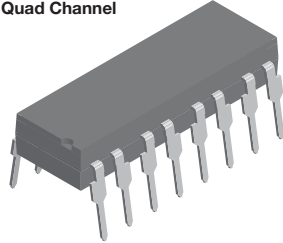
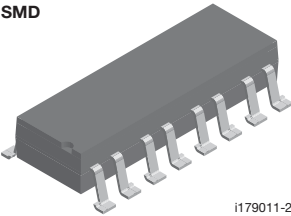


## Optocoupler, Photodarlington Output, High Gain (Quad Channel)

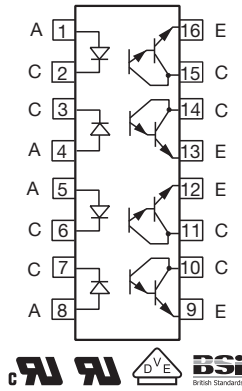
Quad Channel



SMD



i179011-2



### FEATURES

- Isolation test voltage, 5300 V<sub>RMS</sub>
- High isolation resistance, 10<sup>11</sup> Ω typical
- Low coupling capacitance
- Standard plastic DIP package
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### AGENCY APPROVALS

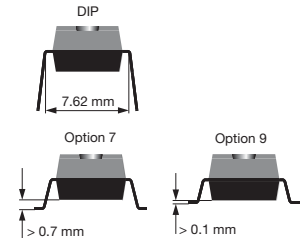
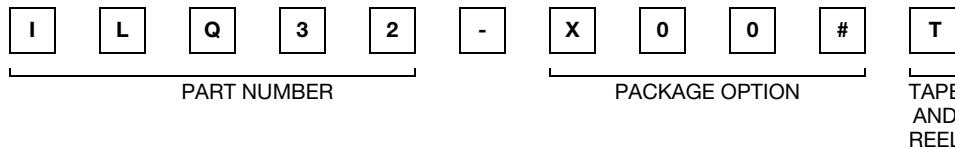
- UL1577, file no. E52744 system code H, double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 (pending), available with option 1
- BSI IEC 60950; IEC 60065

### 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 (%)
<b>UL, cUL, BSI</b>	<b>≥ 500</b>
DIP-16	ILQ32
SMD-16, option 7	ILQ32-X007T <sup>(1)</sup>
SMD-16, option 9	ILQ32-X009T <sup>(1)</sup>
<b>VDE, UL, cUL, BSI</b>	<b>≥ 500</b>
DIP-16	ILQ32-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 ( $T_{amb} = 25^{\circ}\text{C}$ , 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 $25^{\circ}\text{C}$				1.33	mW/ $^{\circ}\text{C}$
<b>OUTPUT</b>					
Collector emitter breakdown voltage			$BV_{CEO}$	30	V
Collector (load) current			$I_C$	125	mA
Power dissipation			$P_{diss}$	150	mW
Derate linearly from $25^{\circ}\text{C}$				2	mW/ $^{\circ}\text{C}$
<b>COUPLER</b>					
Isolation test voltage between emitter and detector	$t = 1\text{ s}$		$V_{ISO}$	5300	$V_{RMS}$
Creepage distance				$\geq 7$	mm
Clearance distance				$\geq 7$	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1			CTI	$\geq 175$	
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25^{\circ}\text{C}$		$R_{IO}$	$10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100^{\circ}\text{C}$		$R_{IO}$	$10^{11}$	$\Omega$
Total dissipation		ILQ32	$P_{tot}$	500	mW
Derate linearly from $25^{\circ}\text{C}$		ILQ32		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 ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 10\text{ mA}$	$V_F$		1.25	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	$I_C = 100\text{ }\mu\text{A}, I_F = 0\text{ A}$	$BV_{CEO}$	30			V
Breakdown voltage emitter collector	$I_E = 100\text{ }\mu\text{A}$	$BC_{ECO}$	5	10		V
Collector emitter leakage current	$V_{CE} = 10\text{ V}, I_F = 0\text{ A}$	$I_{CEO}$		1	100	nA
<b>COUPLER</b>						
Collector emitter	$I_C = 2\text{ mA}, I_F = 8\text{ mA}$	$V_{CEsat}$			1	V
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
Current transfer ratio	$I_F = 10\text{ mA}$ , $V_{CE} = 10\text{ V}$	CTR	500			%

**SWITCHING CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$V_{CC} = 10\text{ V}$ , $I_F = 5\text{ mA}$ , $R_L = 100\text{ }\Omega$	$t_{on}$		15		$\mu\text{s}$
Turn-off time	$V_{CC} = 10\text{ V}$ , $I_F = 5\text{ mA}$ , $R_L = 100\text{ }\Omega$	$t_{off}$		30		$\mu\text{s}$

**SAFETY AND INSULATION RATINGS**

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	
$V_{IOTM}$			10 000			V
$V_{IORM}$			890			V
$P_{SO}$					400	mW
$I_{SI}$					275	mA
$T_{SI}$					175	$^{\circ}\text{C}$
Creepage distance			7			mm
Clearance distance			7			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.4			mm

**Note**

- As per IEC 60747-5-2, § 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.

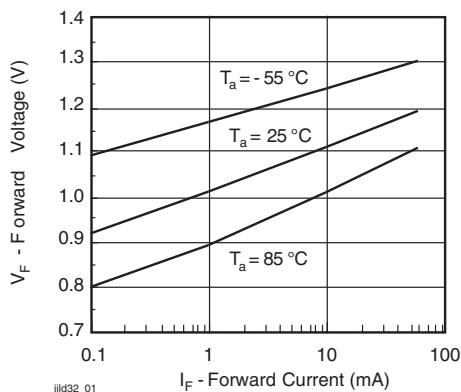
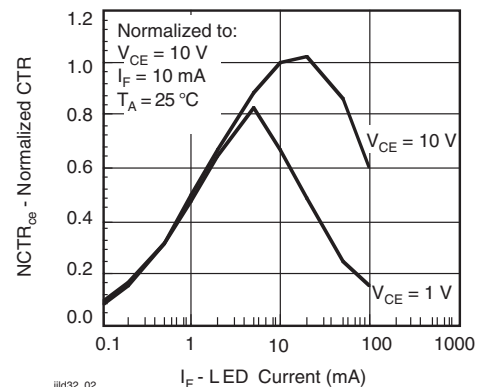
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Voltage vs. Forward Current


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

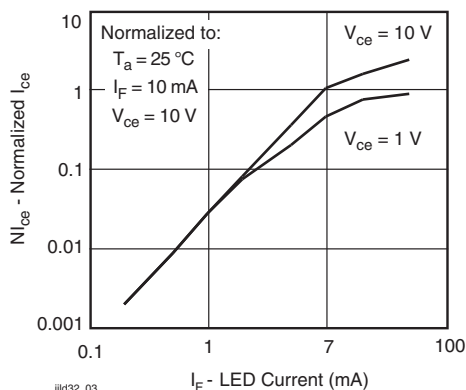


Fig. 3 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

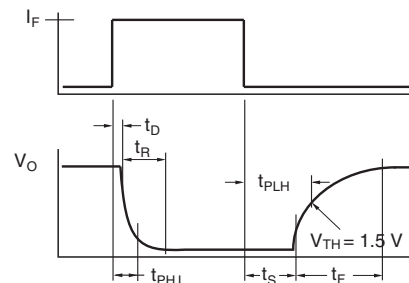


Fig. 6 - Switching Timing

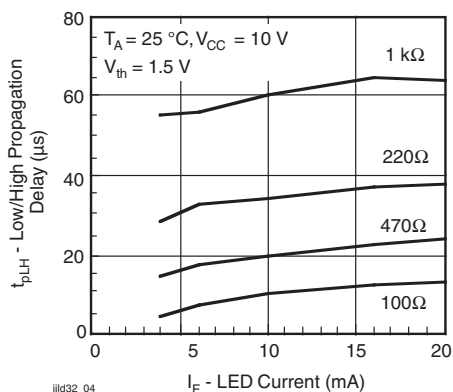


Fig. 4 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

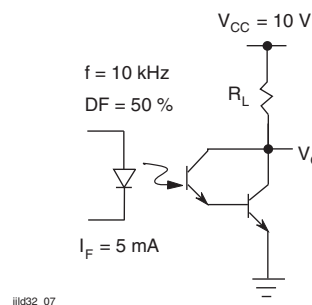


Fig. 7 - Switching Schematic

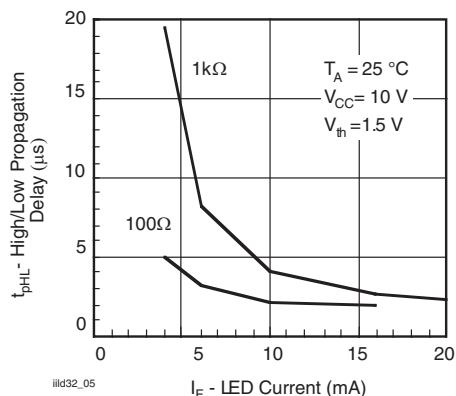
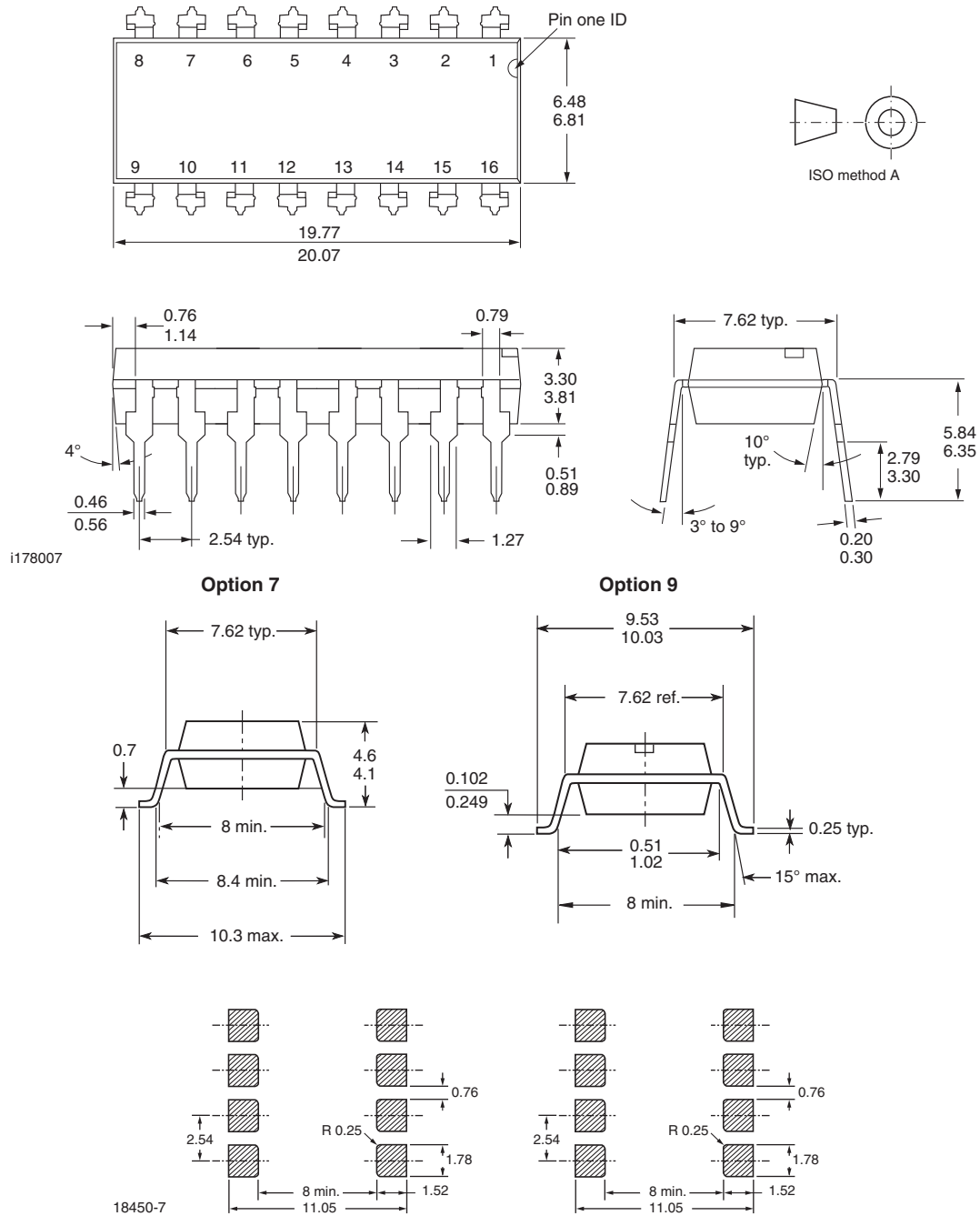


Fig. 5 - High to low Propagation Delay vs. Collector Load Resistance and LED Current

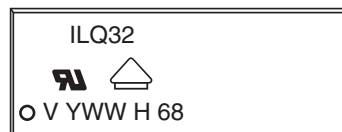
# Optocoupler, Photodarlington Output, High Gain (Quad Channel)

Vishay Semiconductors

## PACKAGE DIMENSIONS in millimeters



## PACKAGE MARKING



### Notes

- 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



## Disclaimer

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