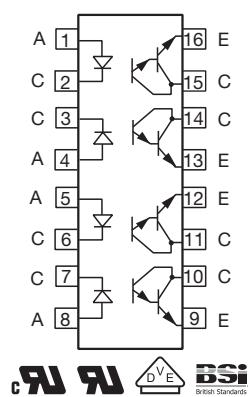
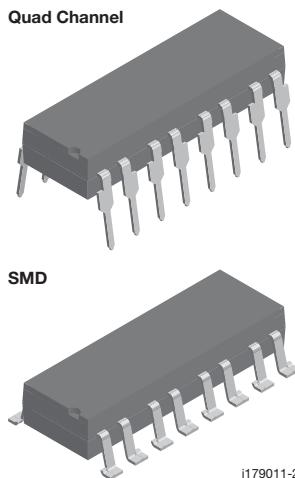


Optocoupler, Photodarlington Output, High Gain (Quad Channel)



i179011-2

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.

FEATURES

- Isolation test voltage, 5300 V_{RMS}
- High isolation resistance, $10^{11} \Omega$ 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

ORDERING INFORMATION

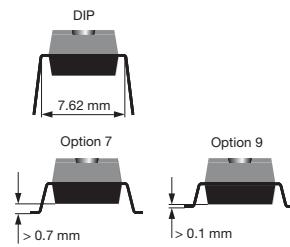
I	L	Q	3	2	-	X	0	0	#	T
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PART NUMBER

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PACKAGE OPTION

TAPE AND REEL



AGENCY CERTIFIED/PACKAGE

CTR (%)

UL, cUL, BSI

 ≥ 500

DIP-16

ILQ32

SMD-16, option 7

ILQ32-X007T⁽¹⁾

SMD-16, option 9

ILQ32-X009T⁽¹⁾

VDE, UL, cUL, BSI

 ≥ 500

DIP-16

ILQ32-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 ($T_{amb} = 25^{\circ}C$, 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 $25^{\circ}C$				1.33	mW/ $^{\circ}C$
OUTPUT					
Collector emitter breakdown voltage			BV_{CEO}	30	V
Collector (load) current			I_C	125	mA
Power dissipation			P_{diss}	150	mW
Derate linearly from $25^{\circ}C$				2	mW/ $^{\circ}C$
COUPLER					
Isolation test voltage between emitter and detector	$t = 1\text{ s}$		V_{ISO}	5300	V_{RMS}
Creepage distance				≥ 7	mm
Clearance distance				≥ 7	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1			CTI	≥ 175	
Isolation resistance	$V_{IO} = 500\text{ V}, T_{amb} = 25^{\circ}C$		R_{IO}	10^{12}	Ω
	$V_{IO} = 500\text{ V}, T_{amb} = 100^{\circ}C$		R_{IO}	10^{11}	Ω
Total dissipation		ILQ32	P_{tot}	500	mW
Derate linearly from $25^{\circ}C$		ILQ32		6.67	mW/ $^{\circ}C$
Storage temperature			T_{stg}	- 55 to + 150	$^{\circ}C$
Operating temperature			T_{amb}	- 55 to + 100	$^{\circ}C$
Lead soldering time at $260^{\circ}C$				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 ($T_{amb} = 25^{\circ}C$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
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	μA
Capacitance	$V_R = 0\text{ V}$	C_O		25		pF
OUTPUT						
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
COUPLER						
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		μs
Turn-off time	$V_{CC} = 10 \text{ V}$, $I_F = 5 \text{ mA}$, $R_L = 100 \text{ } \Omega$	t_{off}		30		μs

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.

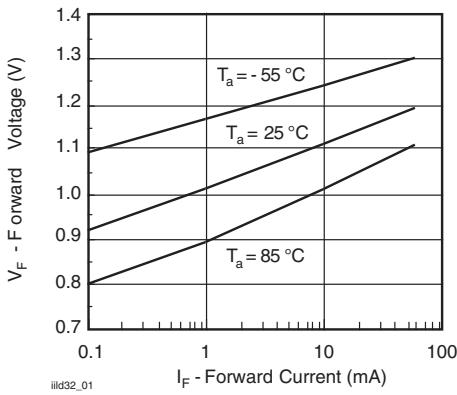
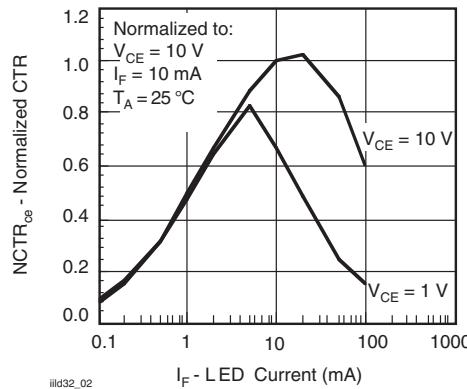
TYPICAL CHARACTERISTICS ($T_{amb} = 25 \text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Forward Voltage vs. Forward Current


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

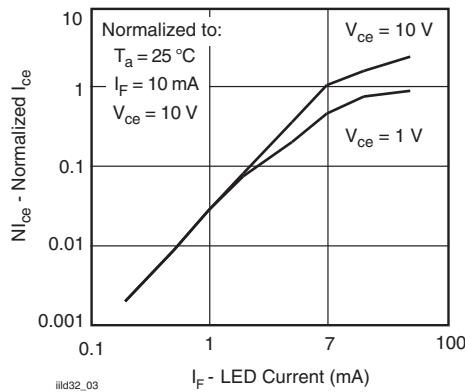


Fig. 3 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

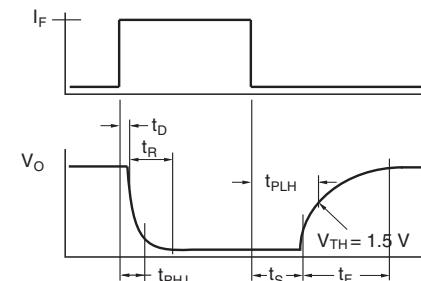


Fig. 6 - Switching Timing

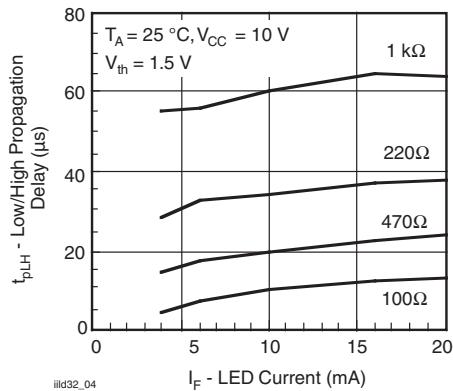


Fig. 4 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

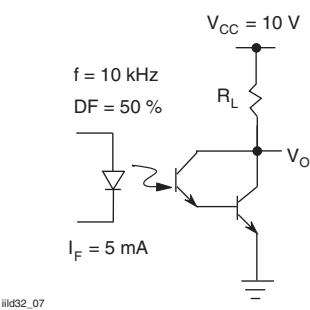


Fig. 7 - Switching Schematic

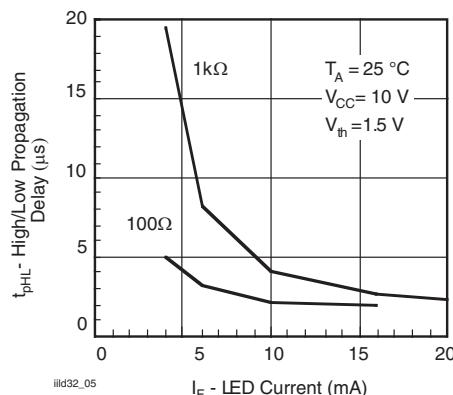
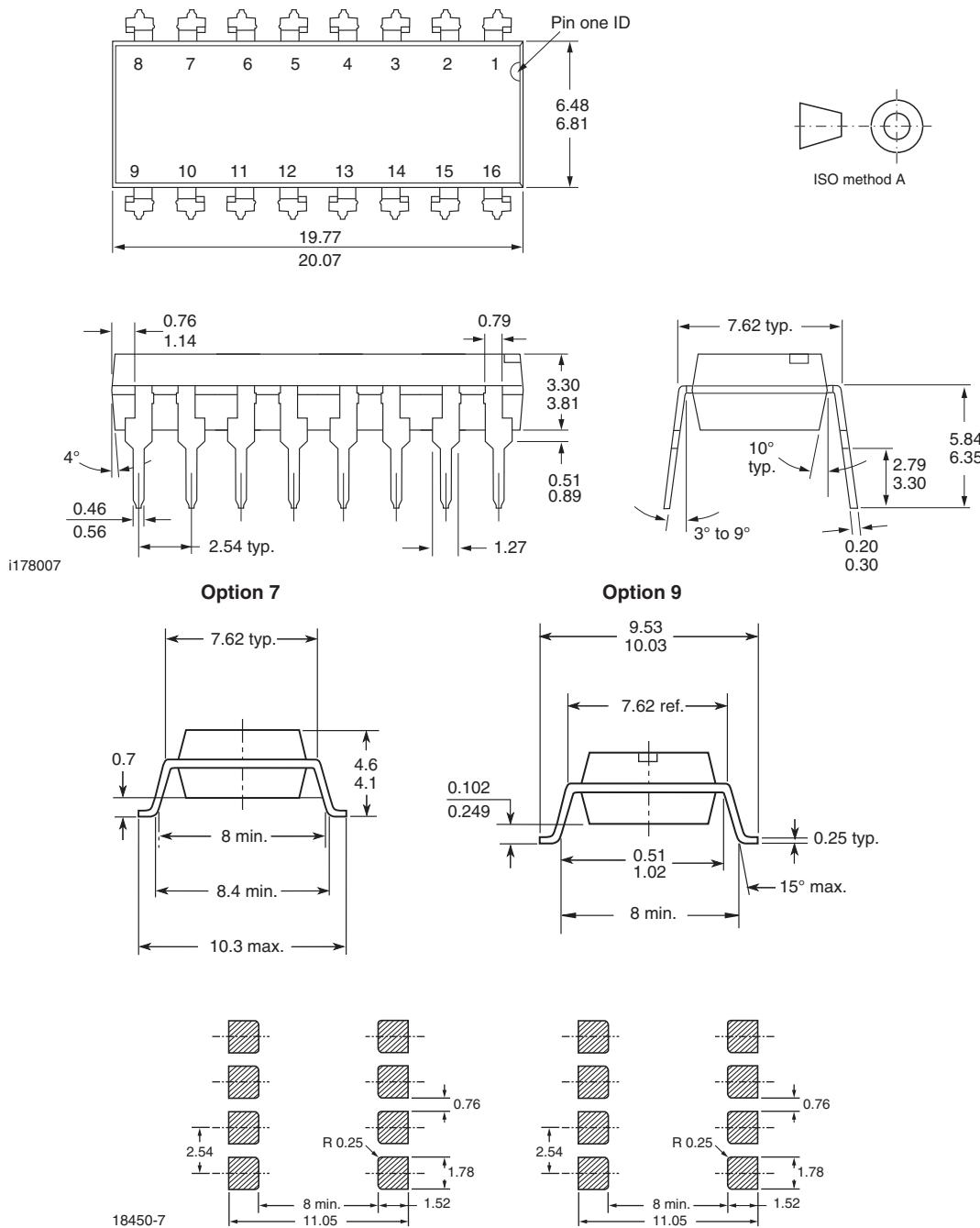
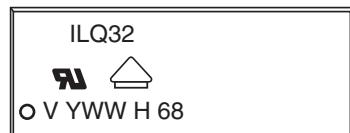


Fig. 5 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current

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

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