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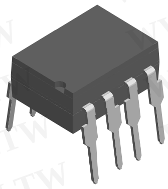
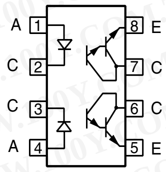
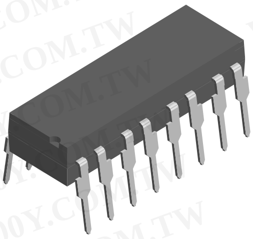
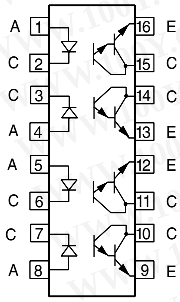
Optocoupler, Photodarlington Output, High Gain (Dual, Quad Channel)

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Features

- Isolation Test Voltage, 5300 V_{RMS}
- High Isolation Resistance, 10^{11} Ω Typical
- Low Coupling Capacitance
- Standard Plastic DIP Package
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Agency Approvals

- UL1577, File No. E52744 System Code H or J, Double Protection
- DIN EN 60747-5-2 (VDE0884)
  DIN EN 60747-5-5 pending
  Available with Option 1

Description

The ILD32/ ILQ32 are 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.

Order Information

Part	Remarks
ILD32	CTR > 500 %, DIP-8
ILQ32	CTR > 500 %, DIP-16
ILD32-X006	CTR > 500 %, DIP-8 400 mil (option 6)
ILD32-X007	CTR > 500 %, SMD-8 (option 7)
ILD32-X009	CTR > 500 %, SMD-8 (option 9)
ILQ32-X007	CTR > 500 %, SMD-8 (option 7)
ILQ32-X009	CTR > 500 %, SMD-8 (option 9)

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

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 Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
Peak reverse voltage		V_R	3.0	V
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	100	mW
Derate linearly from 25°C			1.33	mW/°C

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Output

Parameter	Test condition	Symbol	Value	Unit
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°C			2.0	mW/°C

Coupler

Parameter	Test condition	Part	Symbol	Value	Unit
Isolation test voltage [1)]	t = 1.0 sec.		V_{ISO}	5300	V_{RMS}
Creepage				≥ 7	mm
Clearance				≥ 7	mm
Comparative tracking index per DIN IEC 112/VDE303, part 1				≥ 175	
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C		R_{IO}	10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C		R_{IO}	10^{11}	Ω
Total dissipation		ILD32	P_{tot}	400	mW
		ILQ32	P_{tot}	500	mW
Derate linearly from 25 °C		ILD32		5.33	mW/°C
		ILQ32		6.67	mW/°C
Storage temperature			T_{stg}	- 55 to + 150	°C
Operating temperature			T_{amb}	- 55 to + 100	°C
Lead soldering time at 260 °C				10	sec.

1) between emitter and detector refer to standard climate 23 °C/50 %RH; DIN 50014

Electrical Characteristics

T_{amb} = 25 °C, unless otherwise specified
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.

Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 10 mA	V_F		1.25	1.5	V
Reverse current	V_R = 3.0 V	I_R		0.1	100	pF
Capacitance	V_R = 0 V	C_O		25		pF

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter breakdown voltage	I_C = 100 µA, I_F = 0	BV_{CEO}	30			V
Breakdown voltage emitter-collector	I_E = 100 µA	BC_{ECO}	5.0	10		nA
Collector-emitter leakage current	V_{CE} = 10 V, I_F = 0	I_{CEO}		1.0	100	nA

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Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector emitter	I_C = 2.0 mA, I_F = 8.0 mA	V_{CEsat}			1.0	V
Capacitance (input-output)		C_{IO}		0.5		pF

Current Transfer Ratio

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Current Transfer Ratio	I_F = 10 mA, V_{CE} = 10 V	CTR	500			%

Switching Characteristics

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Turn-on time	V_{CC} = 10 V, I_F = 5.0 mA, R_L = 100 Ω	t_{on}		15		µs
Turn-off time	V_{CC} = 10 V, I_F = 5.0 mA, R_L = 100 Ω	t_{off}		30		µs

Typical Characteristics (Tamb = 25 °C unless otherwise specified)

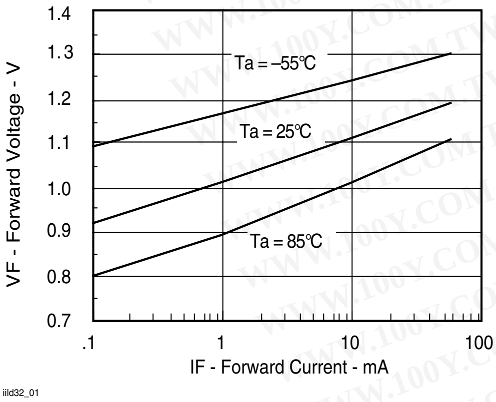

Figure 1. Forward Voltage vs. Forward Current

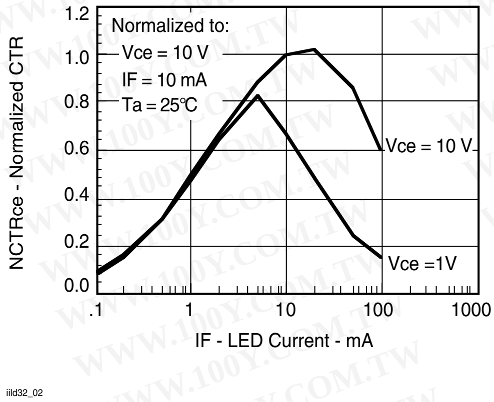

Figure 2. Normalized Non-saturated and Saturated CTR_{CE} vs. LED Current

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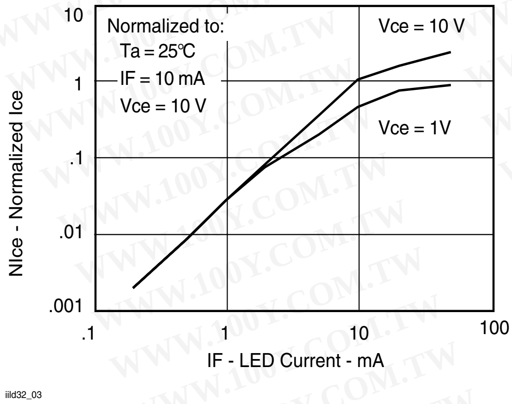

Figure 3. Normalized Non-Saturated and Saturated Collector-Emitter Current vs. LED Current

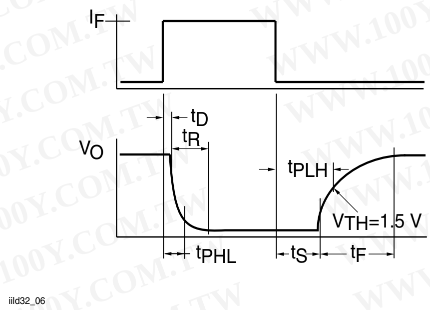

Figure 6. Switching Timing

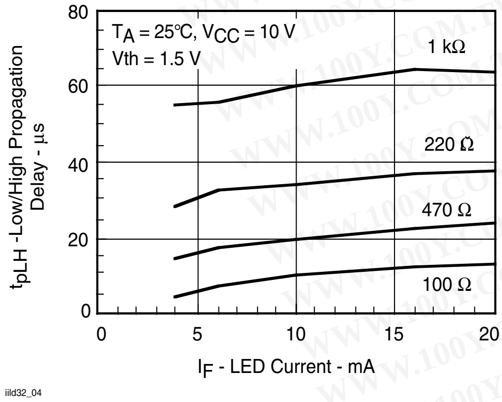

Figure 4. Low to High Propagation Delay vs. Collector Load Resistance and LED Current

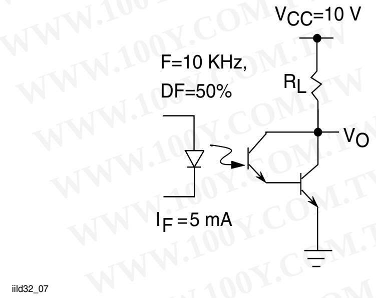

Figure 7. Switching Schematic

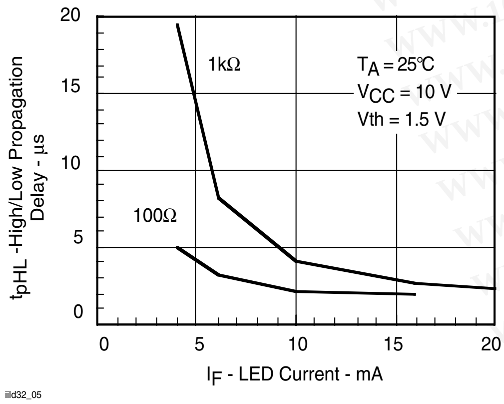

Figure 5. High to low Propagation Delay vs. Collector Load Resistance and LED Current

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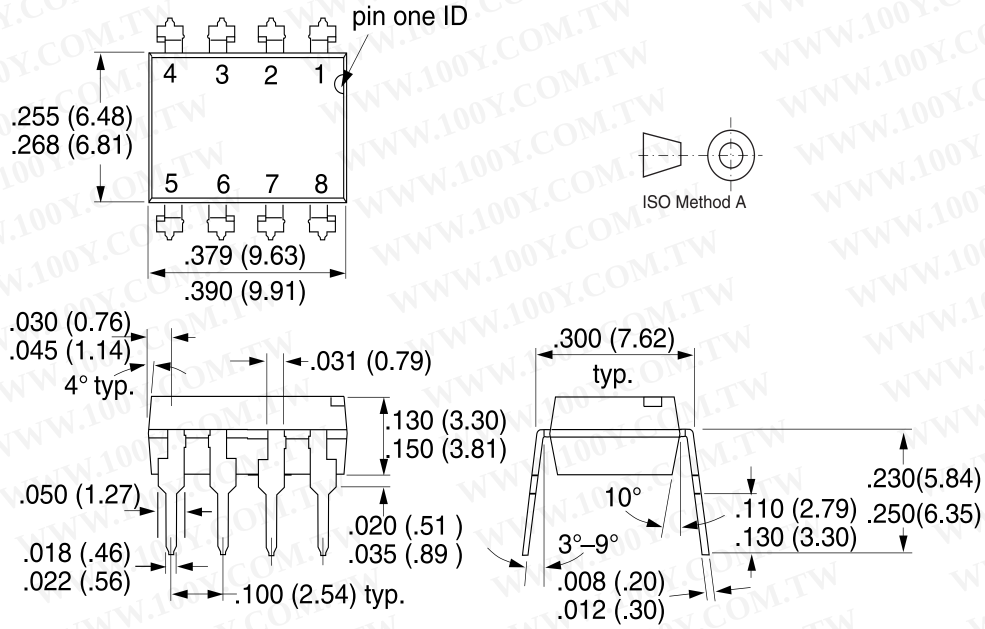
Package Dimensions in Inches (mm)



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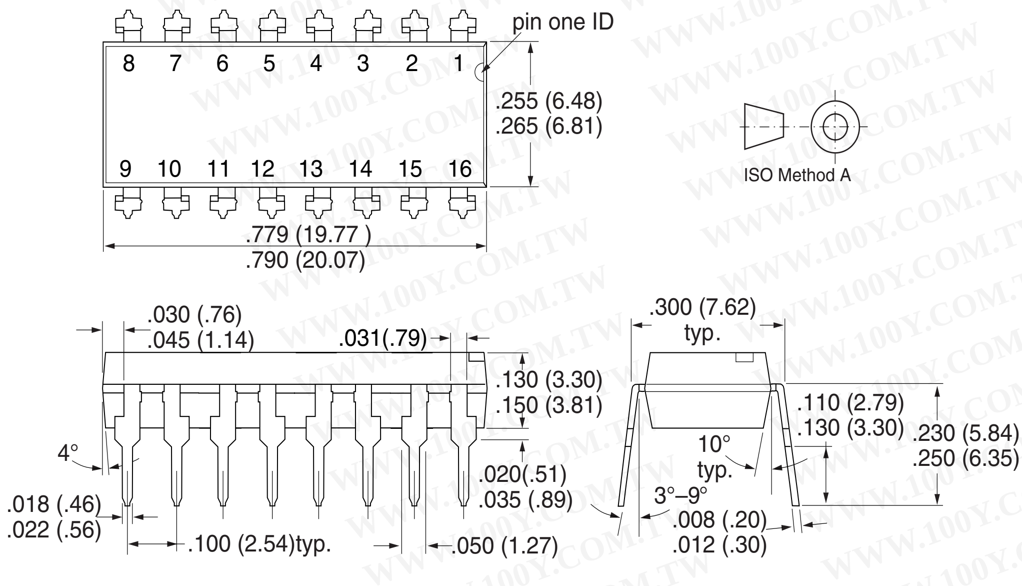
Package Dimensions in Inches (mm)



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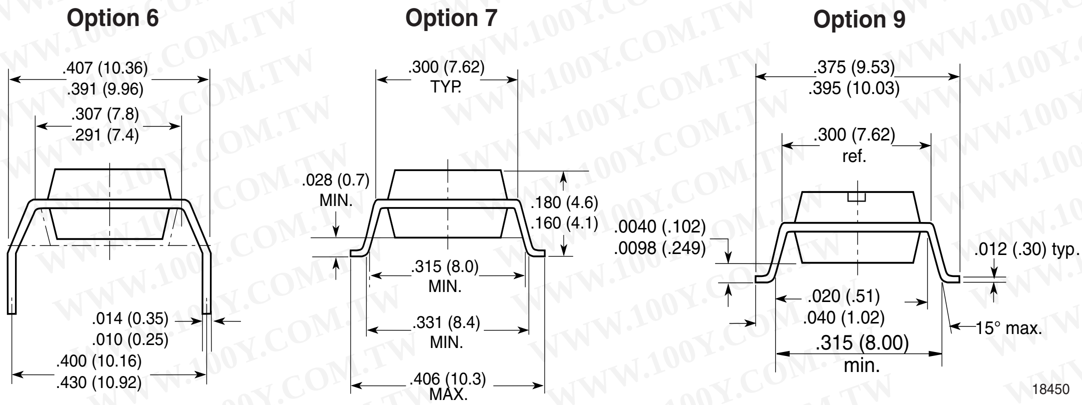

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