



# DUAL/QUADCHANNEL ILD32/ILQ32 Photodarlington Optocoupler

## FEATURES

- Very High Current Transfer Ratio, 500% Min.
- Isolation Test Voltage, 5300 V<sub>RMS</sub>
- High Isolation Resistance, 10<sup>11</sup> Ω Typical
- Low Coupling Capacitance
- Standard Plastic DIP Package
- Underwriters Lab File #E52744
- VDE 0884 Available with Option 1

## Maximum Ratings (Each Channel)

### Emitter

Peak Reverse Voltage	3.0 V
Continuous Forward Current	60 mA
Power Dissipation at 25°C	100 mW
Derate Linearly from 25°C	1.33 mW/°C

### Detector

Collector-Emitter Breakdown Voltage	30 V
Collector (Load) Current	125 mA
Power Dissipation at 25°C Ambient	150 mW
Derate Linearly from 25°C	2.0 mW/°C

### Package

Isolation Test Voltage (between emitter and detector refer to standard climate 23°C/50%RH, DIN 50014)	t = 1.0 sec.	5300 V <sub>RMS</sub>
Creepage	≥ 7.0 mm	
Clearance	≥ 7.0 mm	
Comparative Tracking Index per DIN IEC 112/VDE303, part 1	≥ 175	
Isolation Resistance	V <sub>IO</sub> =500V, T <sub>A</sub> =25°C	R <sub>IO</sub> =10 <sup>12</sup> Ω
	V <sub>IO</sub> =500V, T <sub>A</sub> =100°C	R <sub>IO</sub> =10 <sup>11</sup> Ω
Total Dissipation at 25°C Ambient	ILD32	400 mW
	ILQ32	500 mW
Derate Linearly from 25°C	ILD32	5.33 mW/°C
	ILQ32	6.67 mW/°C
Storage Temperature	-55°C to +150°C	
Operating Temperature	-55°C to +100°C	
Lead Soldering Time at 260°C	10 sec.	

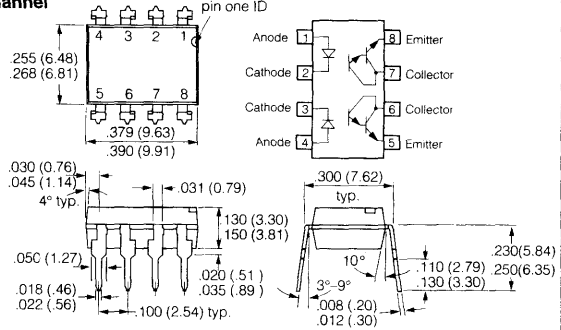
## DESCRIPTION

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.

The ILD32 has two isolated channels in a DIP package, and the ILQ32 has four channels. These devices can be used to replace 4N32s or 4N33s in applications calling for several single channel optocouplers on a board.

Dimensions in inches (mm)

### Dual Channel



### Quad Channel

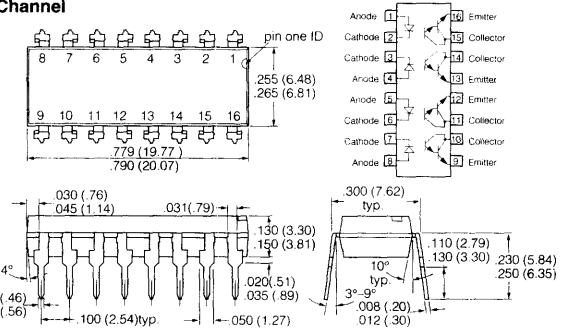
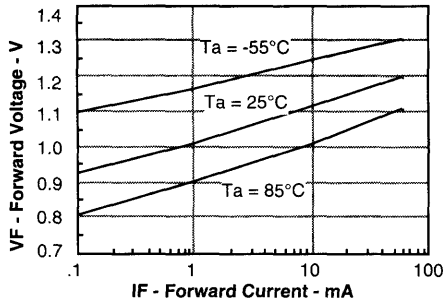


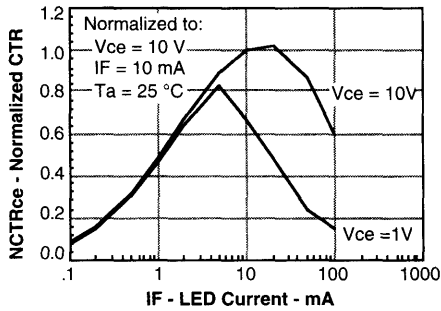
Table 1. Electrical Characteristics, T<sub>A</sub>=25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	V <sub>F</sub>	—	1.25	1.5	V	I <sub>F</sub> =10 mA
Reverse Current	I <sub>R</sub>	—	0.1	100	μA	V <sub>R</sub> =3.0 V
Capacitance	C <sub>O</sub>	—	25	—	pF	V <sub>R</sub> =0 V
<b>Detector</b>						
Breakdown Voltage Collector-Emitter	BV <sub>CEO</sub>	30	—	—	V	I <sub>C</sub> =100 μA I <sub>F</sub> =0
Breakdown Voltage Emitter-Collector	BV <sub>ECCO</sub>	5.0	10	—	V	I <sub>E</sub> =100 μA
Collector-Emitter Leakage Current	I <sub>CEO</sub>	—	1.0	100	nA	V <sub>CE</sub> =10V I <sub>F</sub> =0
<b>Package</b>						
Current Transfer Ratio	CTR	500	—	—	%	I <sub>F</sub> =10 mA V <sub>CE</sub> =10V
Collector Emitter Saturation Voltage	V <sub>CEsat</sub>	—	—	1.0	V	I <sub>C</sub> =2.0 mA I <sub>F</sub> =8.0 mA
Isolation Capacitance	C <sub>ISOL</sub>	—	0.5	—	pF	—
Turn-On Time	t <sub>on</sub>	—	15	—	μs	V <sub>CC</sub> =10 V I <sub>E</sub> =5.0 mA R <sub>L</sub> =100 Ω
Turn-Off Time	t <sub>off</sub>	—	30	—	μs	

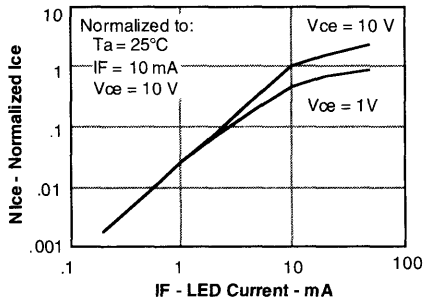
**Figure 1. Forward voltage versus forward current**



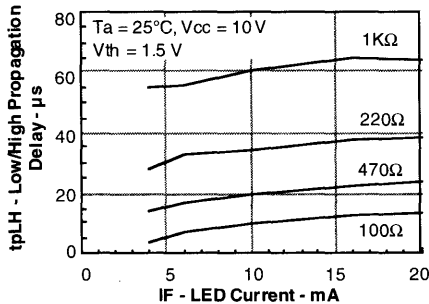
**Figure 2. Normalized non-saturated and saturated  $CTR_{ce}$  at  $T_A=25^\circ\text{C}$  versus LED current**



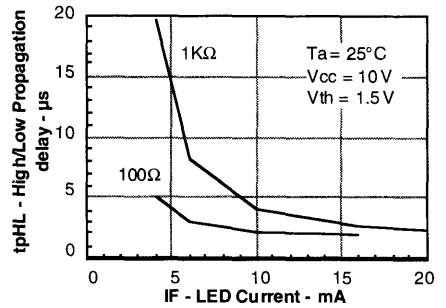
**Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current**



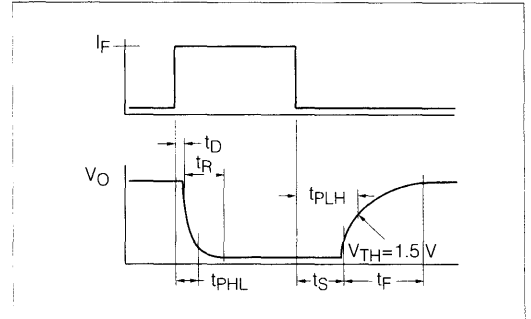
**Figure 4. Low to high propagation delay versus collector load resistance and LED current**



**Figure 5. High to low propagation delay versus collector load resistance and LED current**



**Figure 6. Switching timing**



**Figure 7. Switching schematic**

