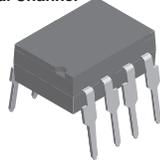
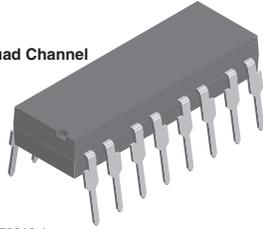


# Optocoupler, Phototransistor Output (Dual, Quad Channel)

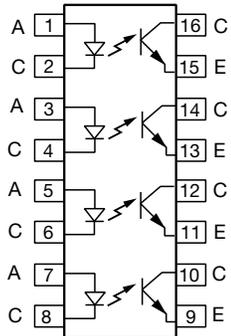
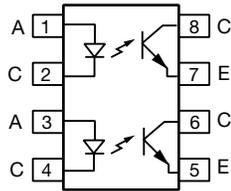
Dual Channel



Quad Channel



i179012-1



## DESCRIPTION

The ILD615, ILQ615 are multi-channel phototransistor optocouplers that use GaAs IRED emitters and high gain NPN phototransistors.

## FEATURES

- Identical channel to channel footprint
- Dual and quad packages feature:
  - Reduced board space
  - Lower pin and parts count
  - Better channel to channel CTR match
- Isolation rated voltage from double molded package, 5000 V<sub>RMS</sub>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

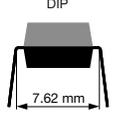
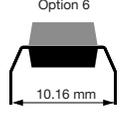
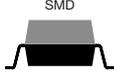


RoHS COMPLIANT

## AGENCY APPROVALS

- UL1577
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- CQC
- FIMKO



ORDERING INFORMATION						
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">I</div> <div style="border: 1px solid black; padding: 2px;">L</div> <div style="border: 1px solid black; padding: 2px;">x</div> <div style="border: 1px solid black; padding: 2px;">6</div> <div style="border: 1px solid black; padding: 2px;">1</div> <div style="border: 1px solid black; padding: 2px;">5</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">X</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">T</div> </div> <p style="text-align: center;">PART NUMBER</p> <p style="text-align: center;">x = D (Dual) or Q (Quad)</p> <p style="text-align: center;">CTR BIN</p> <p style="text-align: center;">PACKAGE OPTION</p> <p style="text-align: center;">TAPE AND REEL</p>	 <p>DIP</p>	 <p>Option 6</p>	 <p>SMD</p>			
AGENCY CERTIFIED / PACKAGE	DUAL CHANNEL			QUAD CHANNEL		
	CTR (%)					
	10 mA					
UL, CSA	63 to 125	100 to 200	160 to 320	63 to 125	100 to 200	160 to 320
DIP-8	ILD615-2	ILD615-3	-	-	-	-
DIP-8, 400 mil, option 6	-	-	ILD615-4X006	-	-	-
SMD-8, option 9	ILD615-2X009T	ILD615-3X009T	-	-	-	-
DIP-16	-	-	-	-	ILQ615-3	ILQ615-4
SMD-16	-	-	-	-	-	ILQ615-4X009T
UL, CSA, VDE (option 1)	63 to 125	100 to 200	160 to 320	63 to 125	100 to 200	160 to 320
DIP-8, 400 mil, option 6	ILD615-2X016	-	-	-	-	-

Note

- Additional options may be possible, please contact sales office

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Reverse voltage		V <sub>R</sub>	6	V
Forward current		I <sub>F</sub>	50	mA
Surge current	1 μs pulse	I <sub>FSM</sub>	1	A
Power dissipation		P <sub>diss</sub>	100	mW
<b>OUTPUT</b>				
Collector emitter breakdown voltage		BV <sub>CEO</sub>	80	V
Emitter collector breakdown voltage		BV <sub>ECO</sub>	7	V
Collector current		I <sub>C</sub>	50	mA
Power dissipation		P <sub>diss</sub>	150	mW
<b>COUPLER</b>				
Storage temperature		T <sub>stg</sub>	-55 to +125	°C
Operating temperature		T <sub>amb</sub>	-55 to +110	°C
Soldering temperature <sup>(1)</sup>	2 mm distance from case bottom	T <sub>slid</sub>	260	°C
Total power dissipation		P <sub>tot</sub>	200	mW

Notes

- 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.
- <sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 10\text{ mA}$	$V_F$	-	1.2	1.4	V
Reverse current	$V_R = 4\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$
Capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ kHz}$	$C_{IN}$	-	30	-	pF
<b>OUTPUT</b>						
Collector emitter leakage current	$V_{CE} = 20\text{ V}$	$I_{CEO}$	-	-	100	nA
Collector emitter breakdown voltage	$I_{CE} = 0.1\text{ mA}$	$BV_{CEO}$	80	-	-	V
Emitter collector breakdown voltage	$I_E = 0.1\text{ mA}$	$BV_{ECO}$	7	-	-	V
<b>COUPLER</b>						
Capacitance (input to output)	$V_{IO} = 0\text{ V}$ , $f = 1\text{ MHz}$	$C_{IO}$	-	0.6	-	pF

**Note**

- Minimum and maximum values are tested requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio (collector emitter)	$I_F = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$	ILD615-2	$CTR_{CE}$	63	-	125	%
		ILQ615-2					
		ILD615-3	$CTR_{CE}$	100	-	200	%
		ILQ615-3					
		ILD615-4	$CTR_{CE}$	160	-	320	%
		ILQ615-4					

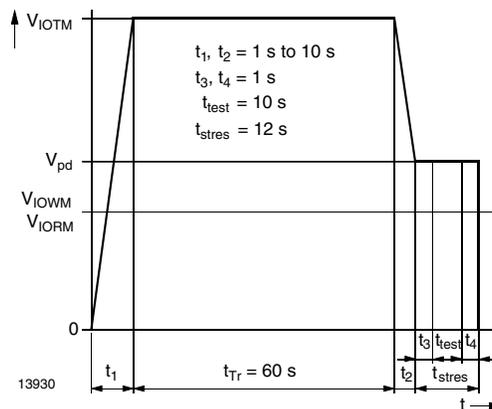


Fig. 1 - Test Pulse Diagram for Sample Test According to DIN EN 60747-5-2 (VDE0884); IEC60747-5-5

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>NON-SATURATED</b>						
Rise time	$V_{CE} = 2\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_r$	-	6	-	$\mu\text{s}$
Fall time	$V_{CE} = 2\text{ V}$ , $I_C = 2\text{ mA}$ , $R_L = 100\ \Omega$	$t_f$	-	8	-	$\mu\text{s}$

SAFETY AND INSULATION RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 110 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	t = 1 min	$V_{ISO}$	5000	$V_{RMS}$
Maximum transient isolation voltage		$V_{IOTM}$	6000	$V_{peak}$
Maximum repetitive peak isolation voltage		$V_{IORM}$	850	$V_{peak}$
Isolation resistance	$V_{IO} = 500 V, T_{amb} = 25\text{ }^{\circ}C$	$R_{IO}$	$\geq 5 \times 10^{10}$	$\Omega$
Output safety power		$P_{SO}$	265	mW
Input safety current		$I_{SI}$	130	mA
Safety temperature		$T_S$	150	$^{\circ}C$
Creepage distance			$\geq 7$	mm
Clearance distance			$\geq 7$	mm
Insulation thickness		DTI	$\geq 0.4$	mm

**Note**

- As per IEC 60747-5-5, 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** ( $T_{amb} = 25\text{ }^{\circ}C$ , unless otherwise specified)

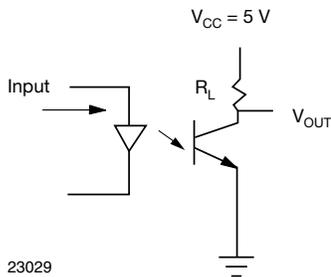


Fig. 2 - Test Circuit for Switching Characteristics

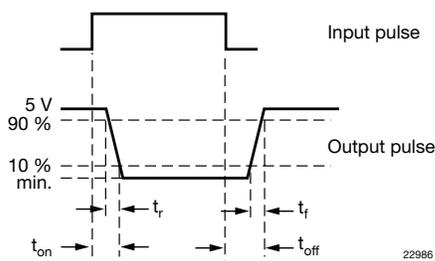


Fig. 3 - Parameter and Limit Definition

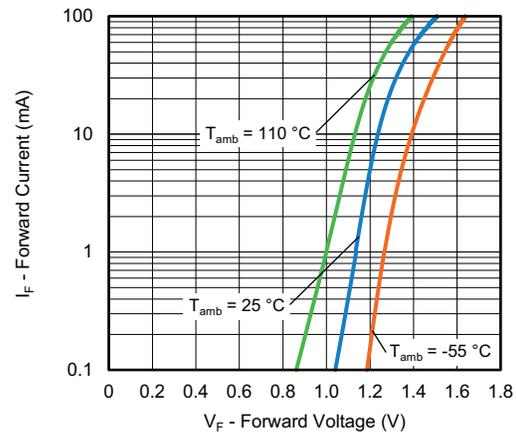


Fig. 4 - Forward Current vs. Forward Voltage

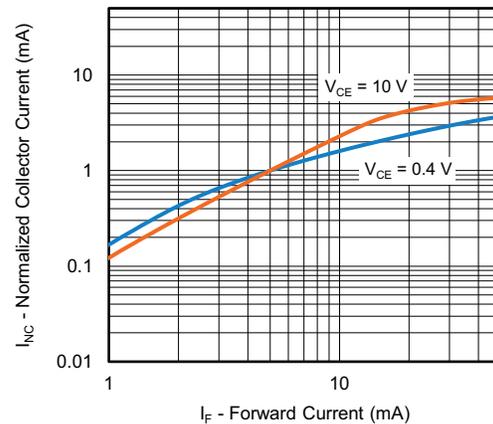


Fig. 5 - Normalized Collector Current vs. Forward Current

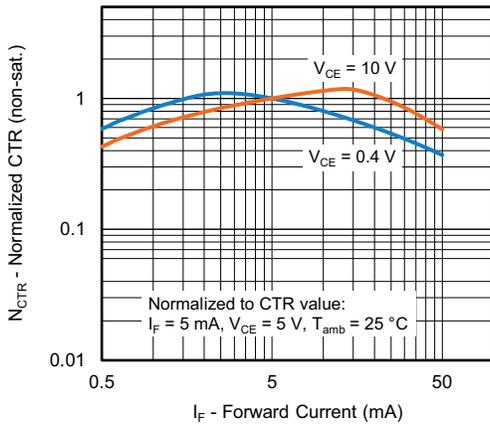


Fig. 6 - Normalized CRT vs. Forward Current (non-saturated)

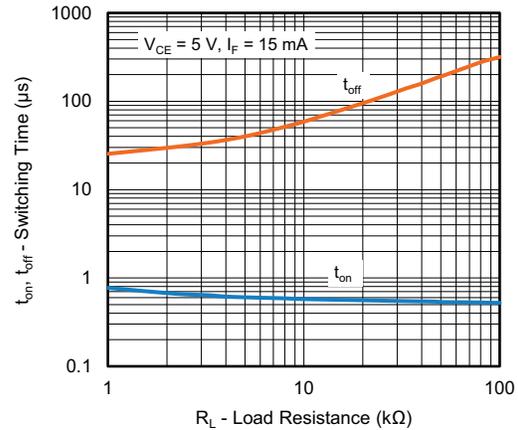


Fig. 9 - Switching Time vs. Load Resistance

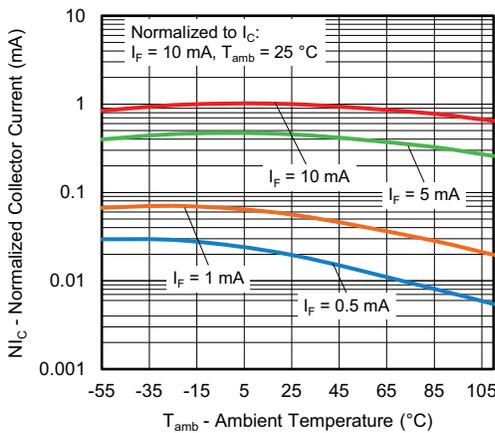


Fig. 7 - Normalized Collector Current vs. Ambient Temperature

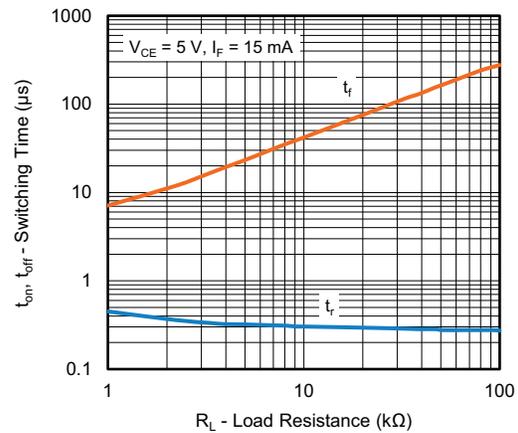


Fig. 10 - Switching Time vs. Load Resistance

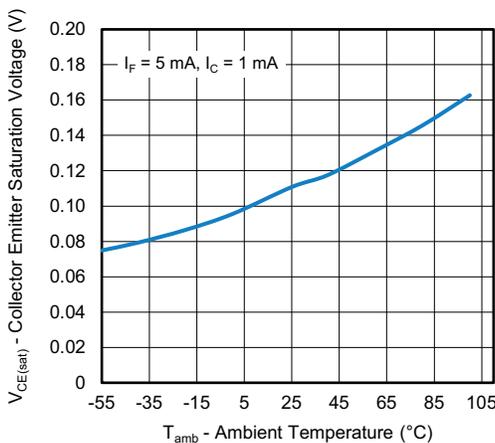


Fig. 8 - Collector Emitter Saturation Voltage vs. Ambient Temperature

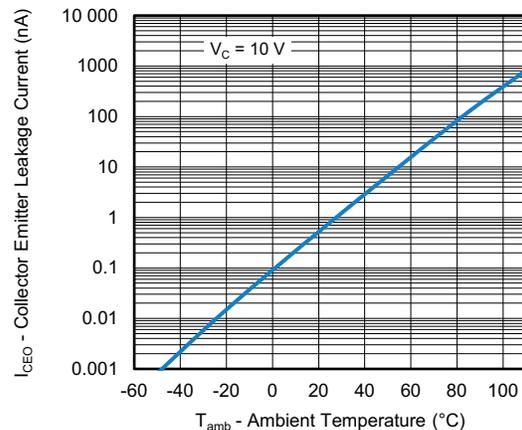
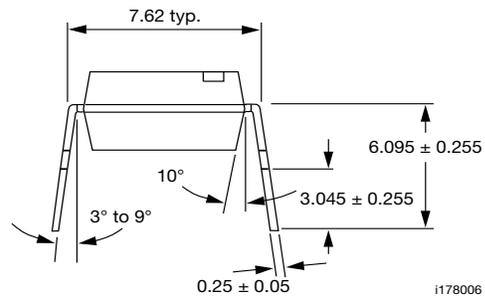
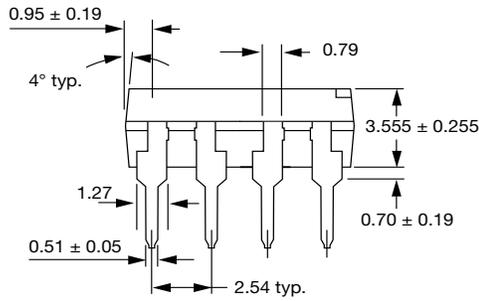
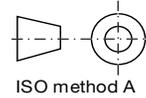
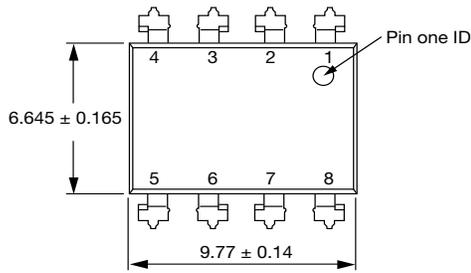


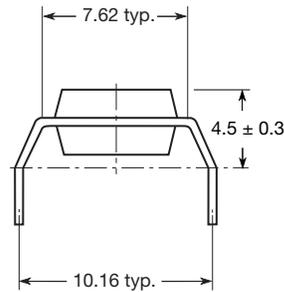
Fig. 11 - Collector Emitter Leakage Current vs. Ambient Temperature



PACKAGE DIMENSIONS DUAL CHANNEL in millimeters

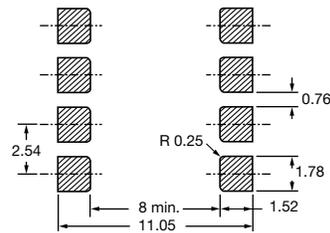
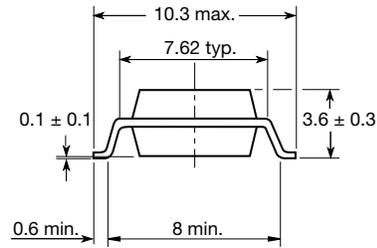


Option 6



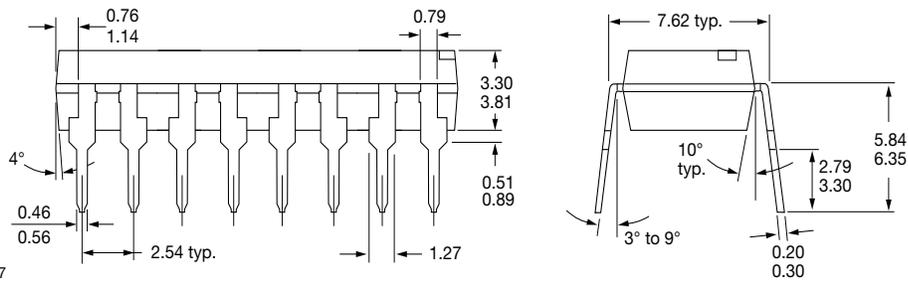
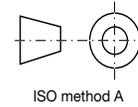
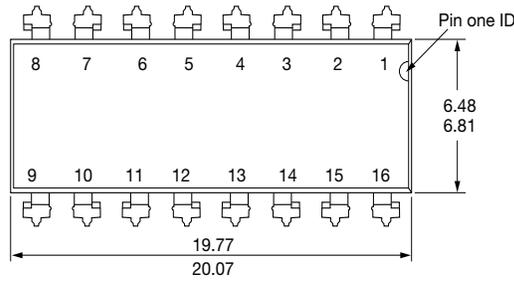
20802-60

SMD-8



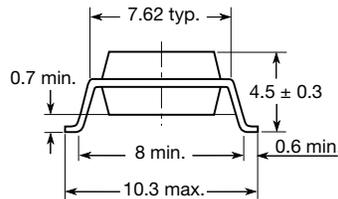


### PACKAGE DIMENSIONS QUAD CHANNEL in millimeters

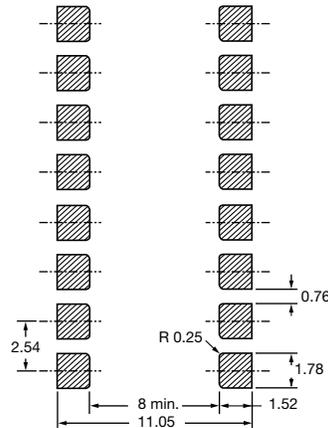


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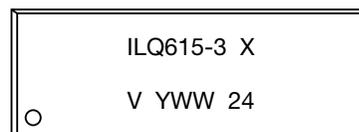
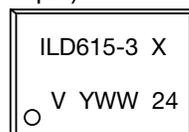
### SMD-16



20802-59



### PACKAGE MARKING (example)



### Notes

- YWW = date code
- Option 1 is reflected with letter "X"
- Tape and reel suffix (T) is not part of the package marking



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