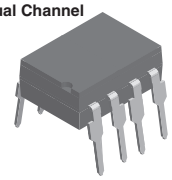
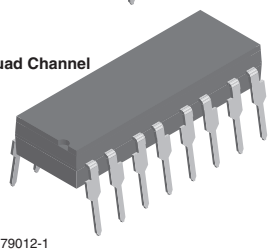
Optocoupler, Phototransistor Output (Dual, Quad Channel)

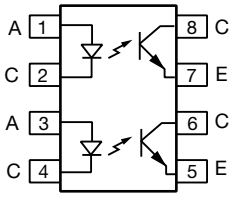
Dual Channel

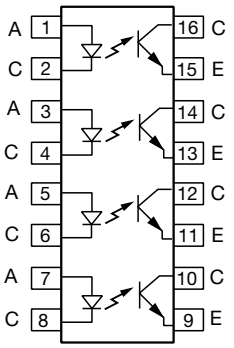


Quad Channel



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_{RMS}
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

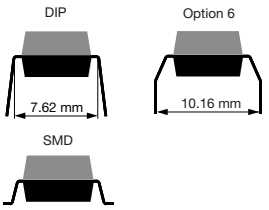
AGENCY APPROVALS

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

ORDERING INFORMATION

I	L	x	6	1	5	-	#	X	0	#	#	T
PART NUMBER							CTR BIN	PACKAGE OPTION				TAPE AND REEL

x = D (Dual) or Q (Quad)



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_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6	V
Forward current		I_F	50	mA
Surge current	1 µs pulse	I_{FSM}	1	A
Power dissipation		P_{diss}	100	mW
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	80	V
Emitter collector breakdown voltage		BV_{ECO}	7	V
Collector current		I_C	50	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Storage temperature		T_{stg}	-55 to +125	°C
Operating temperature		T_{amb}	-55 to +110	°C
Soldering temperature [1]	2 mm distance from case bottom	T_{sld}	260	°C
Total power dissipation		P_{tot}	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.

(1) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

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

CURRENT TRANSFER RATIO (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Current transfer ratio (collector emitter)	I_F = 10 mA, V_{CE} = 5 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					

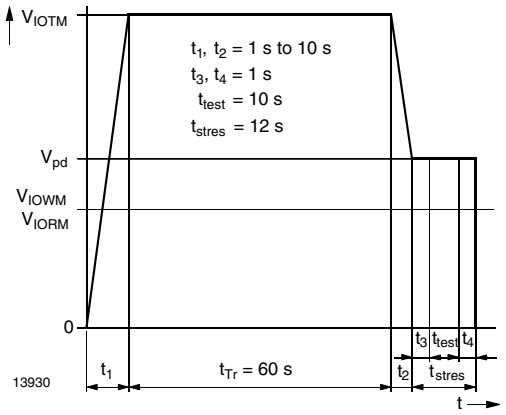


Fig. 1 - Test Pulse Diagram for Sample Test According to DIN EN 60747-5-2 (VDE0884); IEC60747-5-5

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
NON-SATURATED						
Rise time	V_{CE} = 2 V, I_C = 2 mA, R_L = 100 Ω	t_r	-	6	-	µs
Fall time	V_{CE} = 2 V, I_C = 2 mA, R_L = 100 Ω	t_f	-	8	-	µs

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 °C	R_{IO}	≥ 5 x 10^{10}	Ω
Output safety power		P_{SO}	265	mW
Input safety current		I_{SI}	130	mA
Safety temperature		T_S	150	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 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 °C, unless otherwise specified)

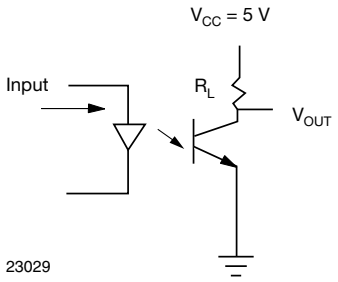


Fig. 2 - Test Circuit for Switching Characteristics

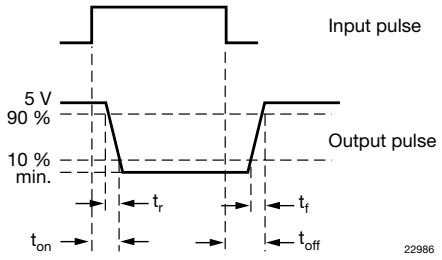


Fig. 3 - Parameter and Limit Definition

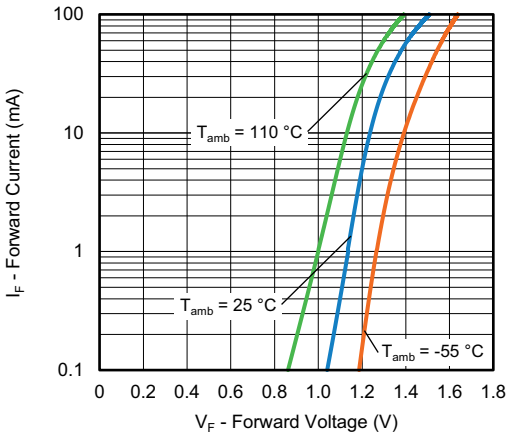


Fig. 4 - Forward Current vs. Forward Voltage

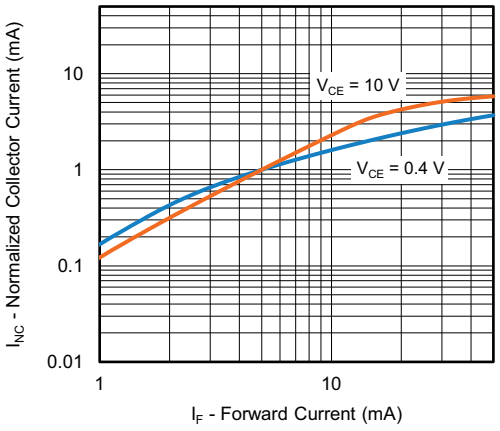


Fig. 5 - Normalized Collector Current vs. Forward Current

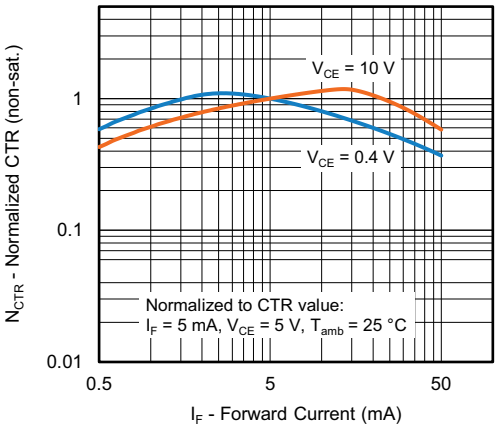


Fig. 6 - Normalized CRT vs. Forward Current (non-saturated)

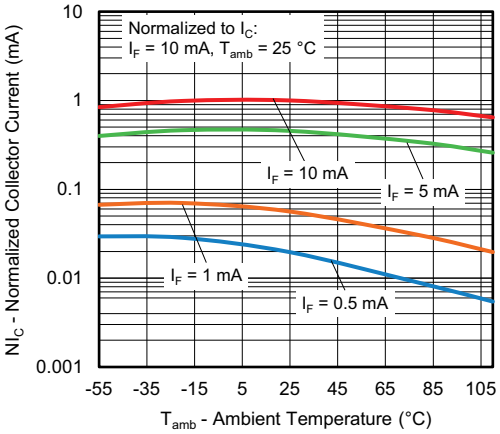


Fig. 7 - Normalized Collector Current vs. Ambient Temperature

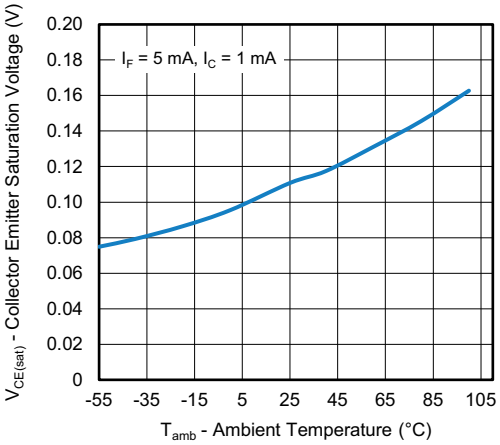


Fig. 8 - Collector Emitter Saturation Voltage vs. Ambient Temperature

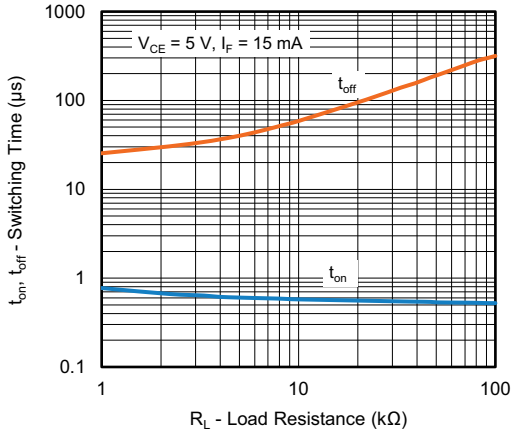


Fig. 9 - Switching Time vs. Load Resistance

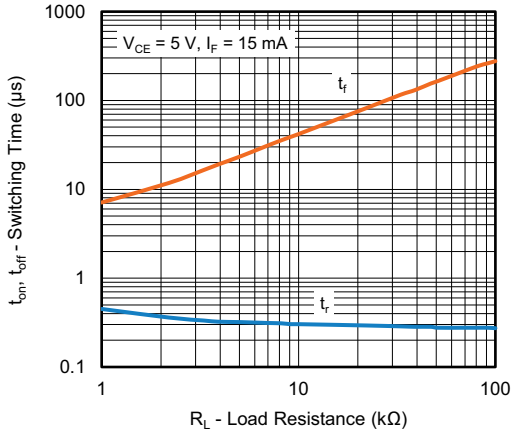


Fig. 10 - Switching Time vs. Load Resistance

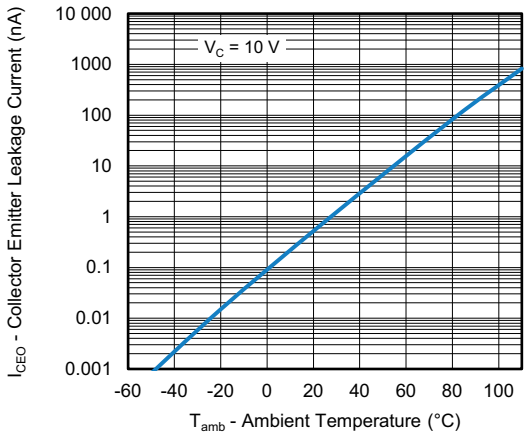
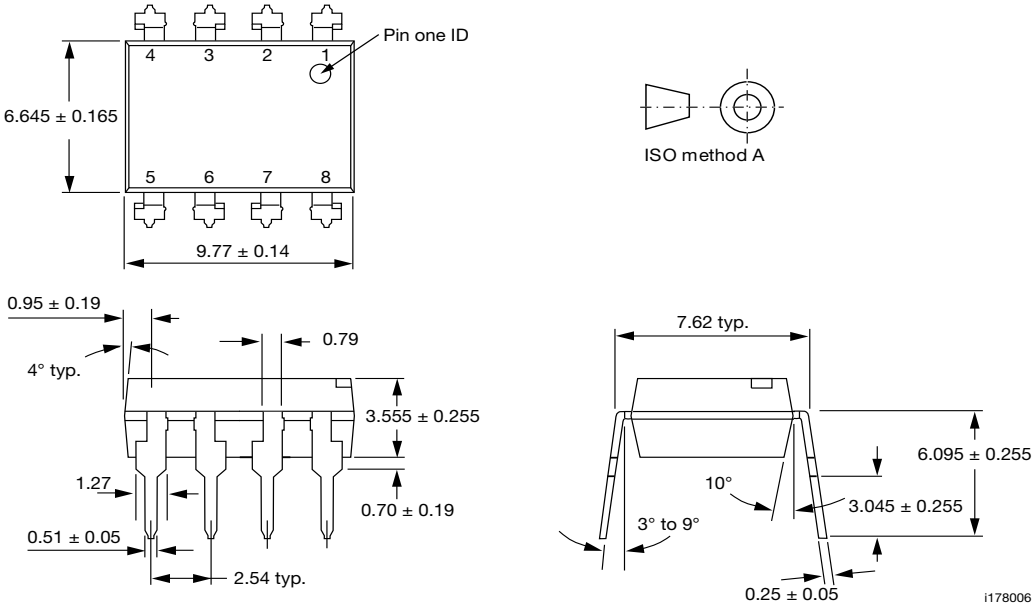
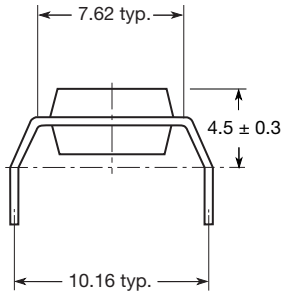


Fig. 11 - Collector Emitter Leakage Current vs. Ambient Temperature

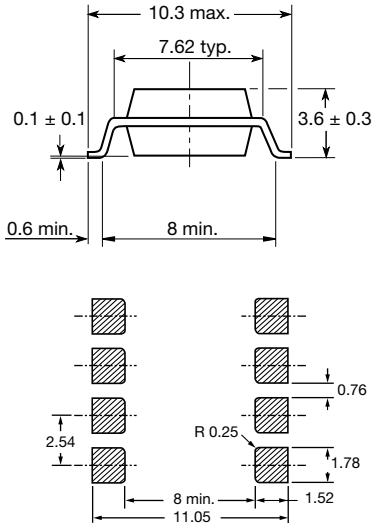
PACKAGE DIMENSIONS DUAL CHANNEL in millimeters



Option 6

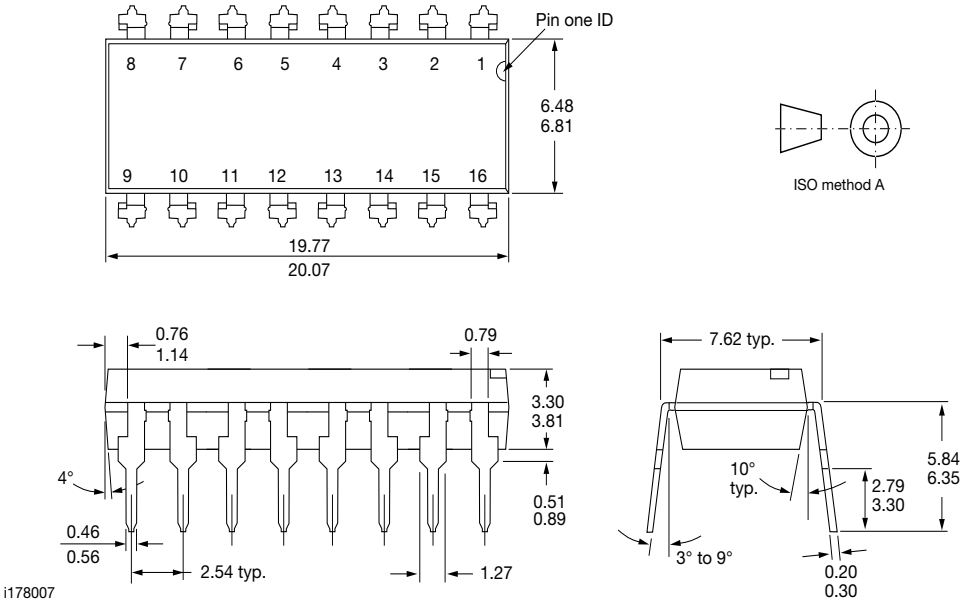


SMD-8

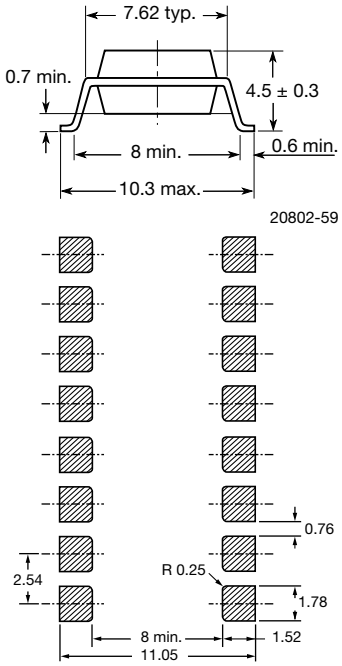


20802-60

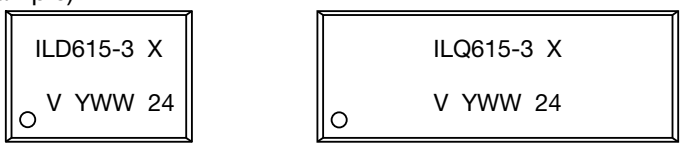
PACKAGE DIMENSIONS QUAD CHANNEL in millimeters



SMD-16



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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