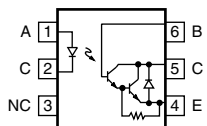
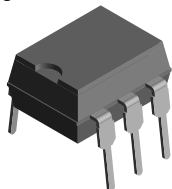


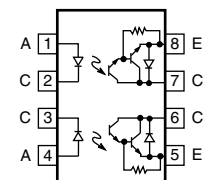
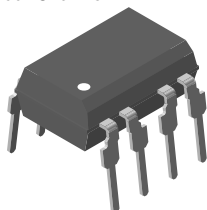


## Optocoupler, Photodarlington Output, With Internal RBE (Single, Dual, Quad Channel)

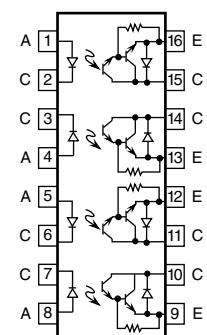
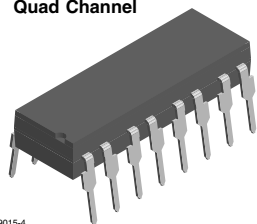
Single Channel



Dual Channel



Quad Channel



1179015-4



### FEATURES

- Internal RBE for high stability
- Four available CTR categories per package type
- $BV_{CEO} > 60\text{ V}$
- Standard DIP packages
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

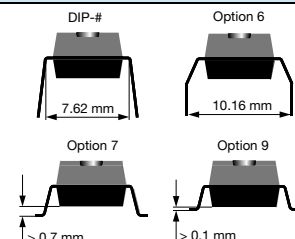
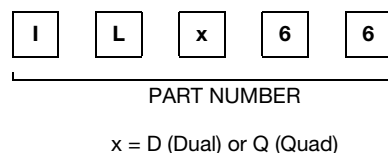
### DESCRIPTION

IL66, ILD66, and ILQ66 are optically coupled isolators employing gallium arsenide infrared emitters and silicon photodarlington detectors. Switching can be accomplished while maintaining a high degree of isolation between driving and load circuits, with no crosstalk between channels.

### AGENCY APPROVALS

- UL1577, file no. E52744, double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5) available with option 1
- BSI EN 60950, BSI EN 60065

### ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	2 mA			0.7 mA		2 mA	
	CTR (%)						
	SINGLE CHANNEL	DUAL CHANNEL		QUAD CHANNEL			
UL, cUL, BSI	≥ 100	≥ 300	≥ 500	≥ 100	≥ 300	≥ 400	≥ 500
DIP-6	IL66-1	-	-	-	-	-	-
DIP-8	-	ILD66-2	ILD66-4	-	-	-	-
SMD-8, option 7	-	-	ILD66-4X007T	-	-	-	-
SMD-8, option 9	-	-	ILD66-4X009	-	-	-	-
DIP-16	-	-	-	ILQ66-1	ILQ66-2	ILQ66-3	ILQ66-4
SMD-16, option 7	-	-	-	-	-	-	ILQ66-4X007T
SMD-16, option 9	-	-	-	-	-	-	ILQ66-4X009T
VDE, UL, cUL, BSI	≥ 100	≥ 300	≥ 500	≥ 100	≥ 300	≥ 400	≥ 500
DIP-6, 400 mil, option 6	IL66-1X016	-	-	-	-	-	-
DIP-16	-	-	-	-	-	-	ILQ66-4X001

**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	PART	SYMBOL	VALUE	UNIT
<b>INPUT</b>					
Peak reverse voltage			V <sub>RM</sub>	6.0	V
Forward continuous current			I <sub>F</sub>	60	mA
Power dissipation			P <sub>diss</sub>	100	mW
Derate linearly from 25 °C				1.33	mW/°C
<b>OUTPUT</b>					
Power dissipation			P <sub>diss</sub>	150	mW
Derate from 25 °C				2.0	mW/°C
<b>COUPLER</b>					
Total package power dissipation		IL66	P <sub>tot</sub>	250	mW
		ILD66	P <sub>tot</sub>	400	mW
		ILQ66	P <sub>tot</sub>	500	mW
Derate linearly from 25 °C		IL66		3.3	mW/°C
		ILD66		5.33	mW/°C
		ILQ66		6.67	mW/°C
Storage temperature			T <sub>stg</sub>	-55 to +125	°C
Operating temperature			T <sub>amb</sub>	-55 to +100	°C
Lead soldering time at 260 °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 <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	I <sub>F</sub> = 20 mA	V <sub>F</sub>	-	1.25	1.5	V
Reverse current	V <sub>R</sub> = 6.0 V	I <sub>R</sub>	-	0.1	10	μA
Capacitance	V <sub>R</sub> = 0 V	C <sub>O</sub>	-	25	-	pF
<b>OUTPUT</b>						
Collector emitter breakdown voltage	I <sub>C</sub> = 1.0 mA, I <sub>F</sub> = 0 A	BV <sub>CEO</sub>	60	-	-	V
Collector base breakdown voltage (IL66)	I <sub>C</sub> = 10 μA	BV <sub>CBO</sub>	60	-	-	V
Collector emitter leakage current	V <sub>CE</sub> = 50 V, I <sub>F</sub> = 0 A	I <sub>CEO</sub>	-	1.0	100	nA
Capacitance collector emitter	V <sub>CE</sub> = 10 V		-	3.4		pF
<b>COUPLER</b>						
Saturation voltage, collector emitter	I <sub>C</sub> = 10 mA, I <sub>F</sub> = 10 mA	V <sub>CEsat</sub>	-	0.9	1.0	V

**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 <sub>amb</sub> = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	I <sub>F</sub> = 2.0 mA, V <sub>CE</sub> = 10 V	IL(D,Q)66-1	CTR	100	400	-	%
		IL(D,Q)66-2	CTR	300	500	-	%
	I <sub>F</sub> = 0.7 mA, V <sub>CE</sub> = 10 V	IL(D,Q)66-3	CTR	400	500	-	%
	I <sub>F</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V	IL(D,Q)66-4	CTR	500	750	-	%



SWITCHING CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>NON SATURATED</b>						
Rise time -1, -2, -4	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 2.0 mA, R <sub>L</sub> = 100 Ω	t <sub>r</sub>	-	-	200	μs
Fall time -1, -2, -4	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 2.0 mA, R <sub>L</sub> = 100 Ω	t <sub>f</sub>	-	-	200	μs
Rise time -3	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 0.7 mA, R <sub>L</sub> = 100 Ω	t <sub>r</sub>	-	-	200	μs
Fall time -3	V <sub>CC</sub> = 10 V, I <sub>F</sub> = 0.7 mA, R <sub>L</sub> = 100 Ω	t <sub>f</sub>	-	-	200	μs

SAFETY AND INSULATION RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	t = 1 min	V <sub>ISO</sub>	4420	V <sub>RMS</sub>
Maximum transient isolation voltage		V <sub>IOTM</sub>	10 000	V <sub>peak</sub>
Maximum repetitive peak isolation voltage		V <sub>IORM</sub>	890	V <sub>peak</sub>
Isolation resistance	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 25 °C	R <sub>IO</sub>	≥ 10 <sup>12</sup>	Ω
	V <sub>IO</sub> = 500 V, T <sub>amb</sub> = 100 °C	R <sub>IO</sub>	≥ 10 <sup>11</sup>	Ω
Output safety power		P <sub>SO</sub>	400	mW
Input safety current		I <sub>SI</sub>	275	mA
Safety temperature		T <sub>S</sub>	175	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

**Note**

- As per IEC 60747-5-5, § 7.4.3.8.2, 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<sub>amb</sub> = 25 °C, unless otherwise specified)

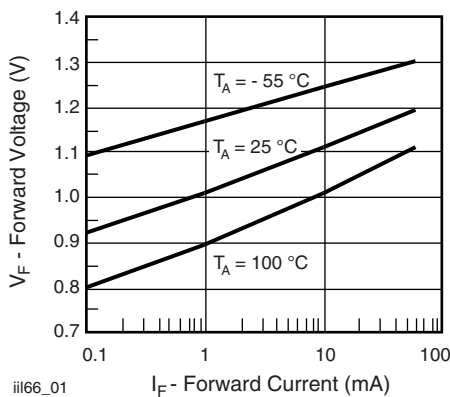


Fig. 1 - Forward Voltage vs. Forward Current

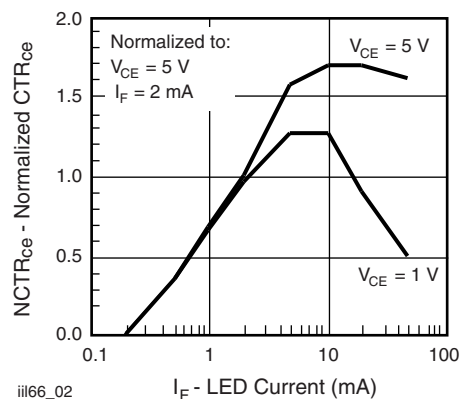


Fig. 2 - Normalized Non-Saturated and Saturated CTR<sub>CE</sub> vs. LED Current

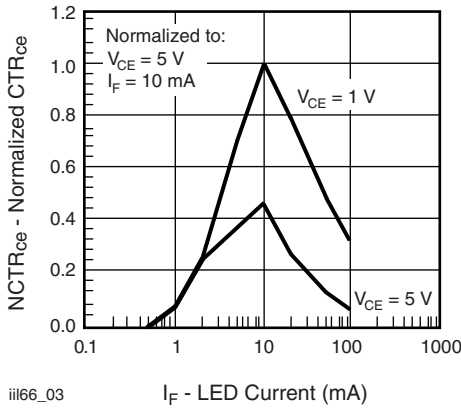


Fig. 3 - Normalized Non-Saturated and Saturated  $CTR_{CE}$  vs. LED Current

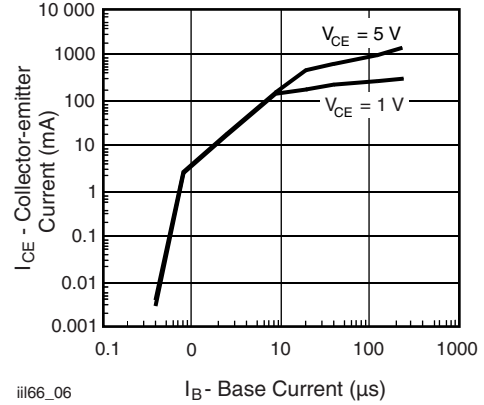


Fig. 6 - Collector Emitter Current vs. LED Current

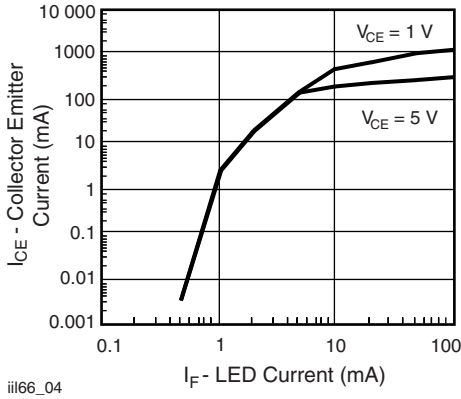


Fig. 4 - Non-Saturated and Saturated Collector Emitter Current vs. LED Current

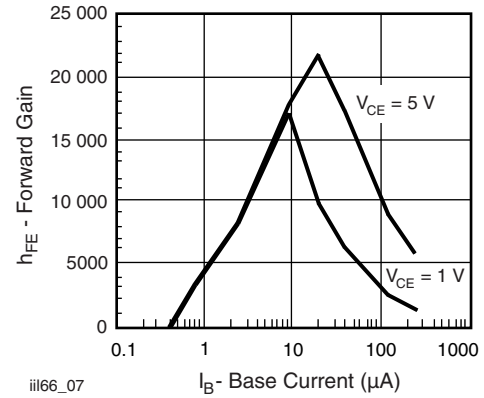


Fig. 7 - Non-Saturated and Saturated  $h_{FE}$  vs. LED Current

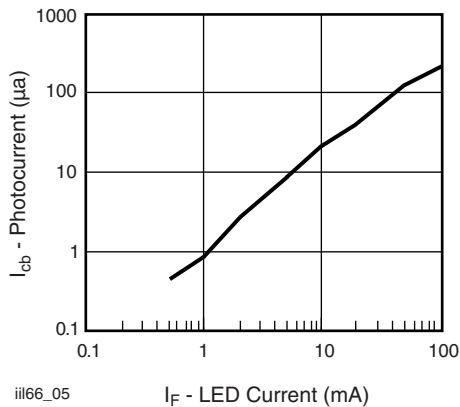


Fig. 5 - Collector Base Photocurrent vs. LED Current

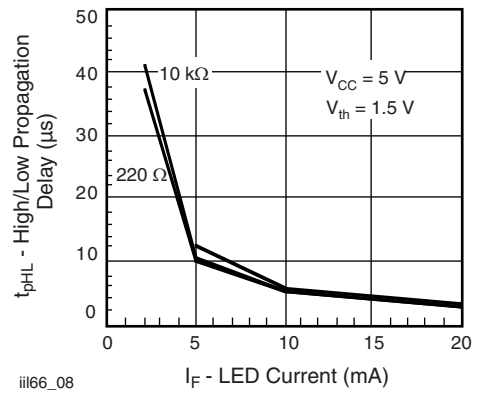


Fig. 8 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current

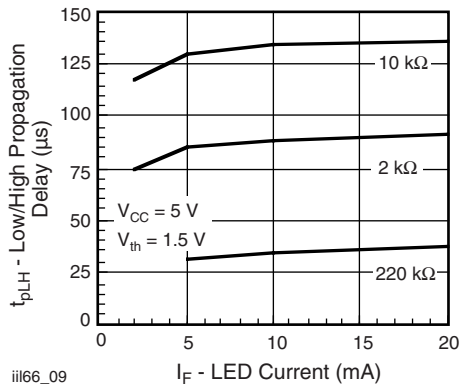


Fig. 9 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

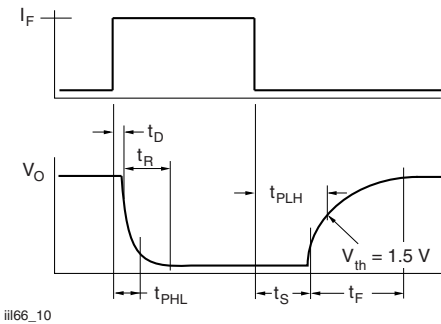


Fig. 10 - Switching Waveform

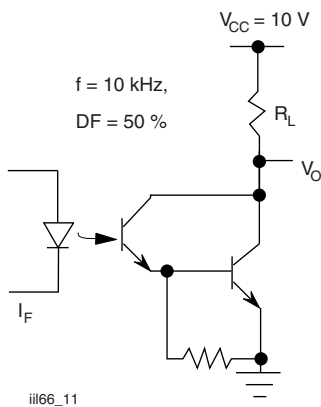
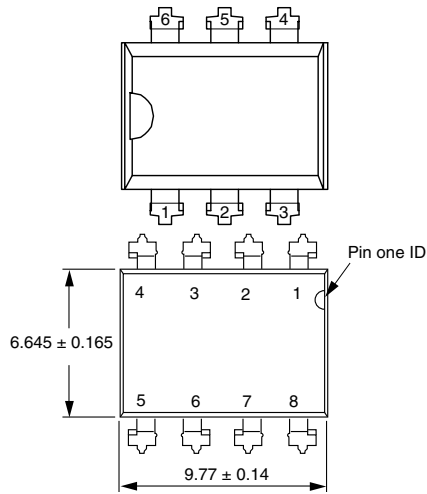
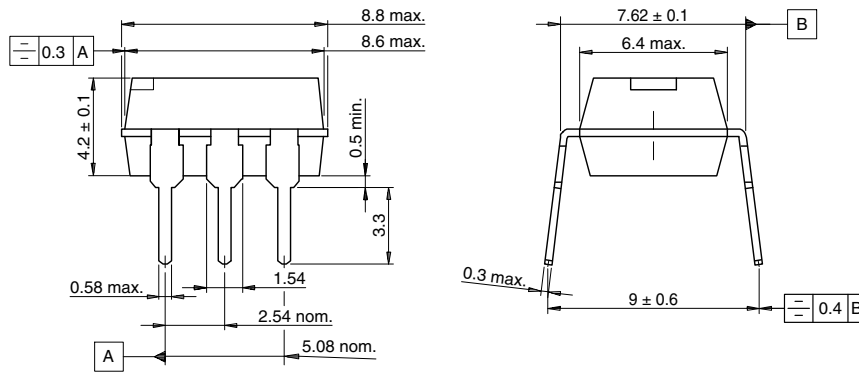


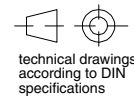
Fig. 11 - Switching Schematic



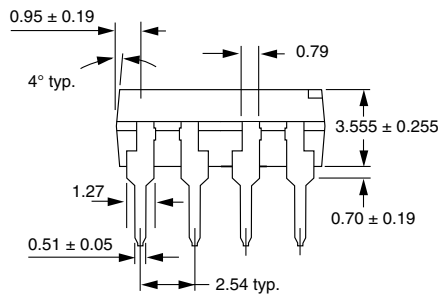
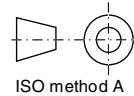
**PACKAGE DIMENSIONS** in millimeters



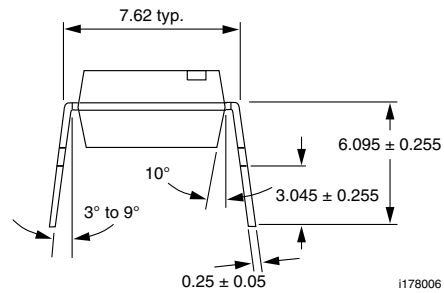
Weight: ca. 0.50 g  
 Creepage distance: > 6 mm  
 Air path: > 6 mm  
 after mounting on PC board



14770-1

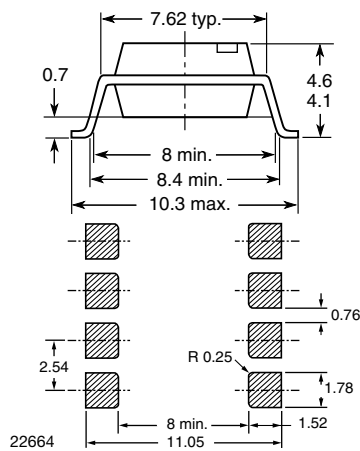


**Option 7**

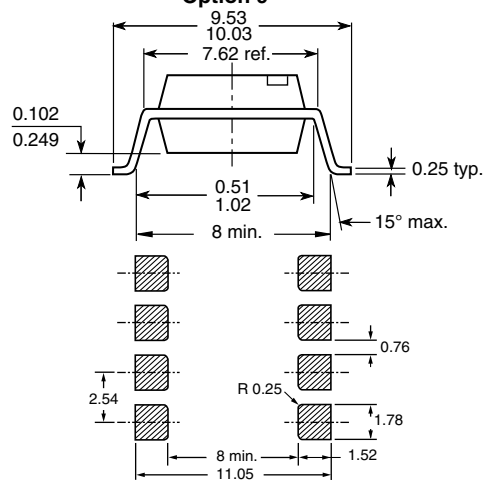


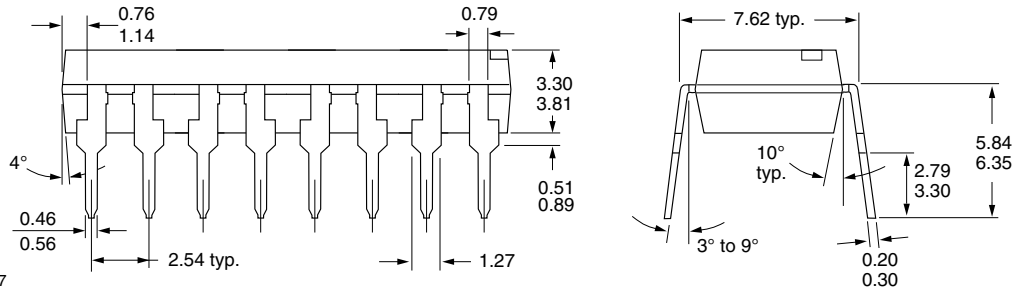
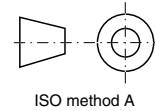
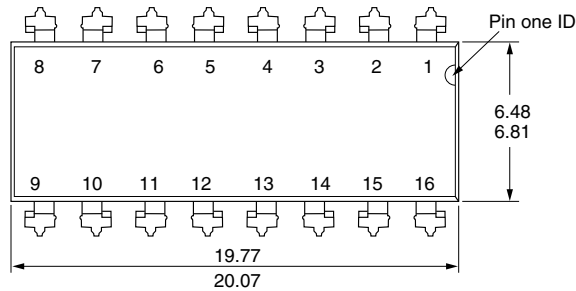
**Option 9**

i178006



22664

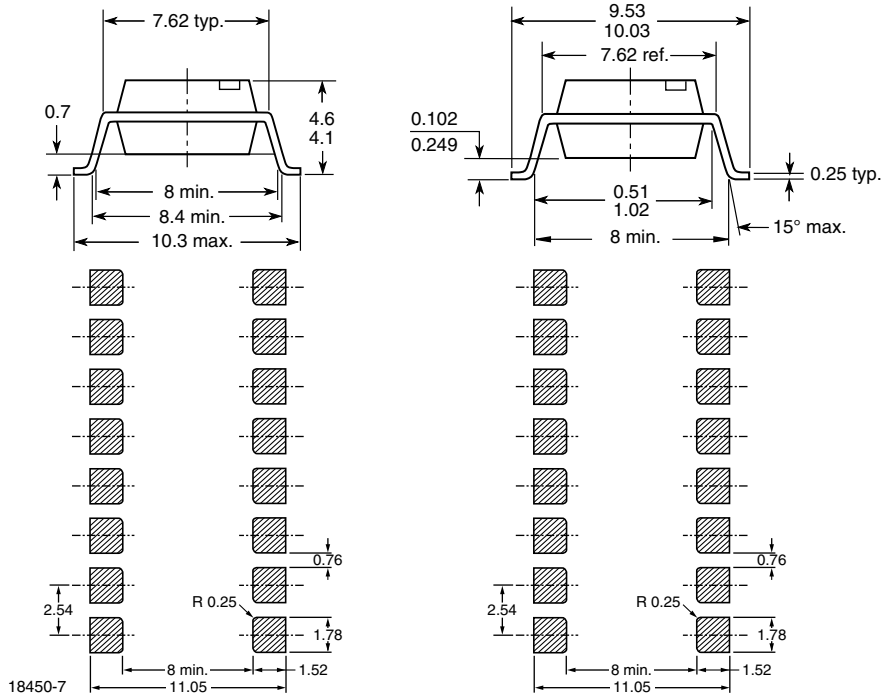




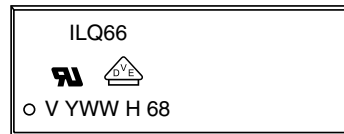
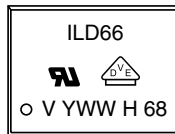
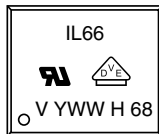
i178007

Option 7

Option 9



**PACKAGE MARKING** (example)



**Notes**

- The VDE logo is only marked on option 1 parts, option information is not marked on the part
- Tape and reel suffix (T) is not part of the package marking



## Footprint and Schematic Information for IL66, ILD66, ILQ66

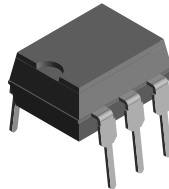
The footprint and schematic symbols for the following parts can be accessed using the associated links. They are available in Eagle, Altium, KiCad, OrCAD / Allegro, Pulsonix, and PADS.

Note that the 3D models for these parts can be found on the Vishay product page.

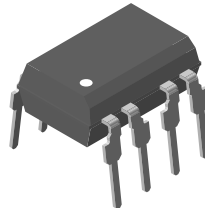
PART NUMBER	FOOTPRINT / SCHEMATIC
IL66-1	<a href="http://www.snapeda.com/parts/IL66-1/Vishay/view-part">www.snapeda.com/parts/IL66-1/Vishay/view-part</a>
IL66-1X016	<a href="http://www.snapeda.com/parts/IL66-1X016/Vishay/view-part">www.snapeda.com/parts/IL66-1X016/Vishay/view-part</a>
IL66-2	<a href="http://www.snapeda.com/parts/IL66-2/Vishay/view-part">www.snapeda.com/parts/IL66-2/Vishay/view-part</a>
ILD66-2	<a href="http://www.snapeda.com/parts/ILD66-2/Vishay/view-part">www.snapeda.com/parts/ILD66-2/Vishay/view-part</a>
ILD66-4	<a href="http://www.snapeda.com/parts/ILD66-4/Vishay/view-part">www.snapeda.com/parts/ILD66-4/Vishay/view-part</a>
ILD66-4X007T	<a href="http://www.snapeda.com/parts/ILD66-4X007T/Vishay/view-part">www.snapeda.com/parts/ILD66-4X007T/Vishay/view-part</a>
ILD66-4X009	<a href="http://www.snapeda.com/parts/ILD66-4X009/Vishay/view-part">www.snapeda.com/parts/ILD66-4X009/Vishay/view-part</a>
ILQ66-1	<a href="http://www.snapeda.com/parts/ILQ66-1/Vishay/view-part">www.snapeda.com/parts/ILQ66-1/Vishay/view-part</a>
ILQ66-2	<a href="http://www.snapeda.com/parts/ILQ66-2/Vishay/view-part">www.snapeda.com/parts/ILQ66-2/Vishay/view-part</a>
ILQ66-3	<a href="http://www.snapeda.com/parts/ILQ66-3/Vishay/view-part">www.snapeda.com/parts/ILQ66-3/Vishay/view-part</a>
ILQ66-4	<a href="http://www.snapeda.com/parts/ILQ66-4/Vishay/view-part">www.snapeda.com/parts/ILQ66-4/Vishay/view-part</a>
ILQ66-4X001	<a href="http://www.snapeda.com/parts/ILQ66-4X001/Vishay/view-part">www.snapeda.com/parts/ILQ66-4X001/Vishay/view-part</a>
ILQ66-4X007T	<a href="http://www.snapeda.com/parts/ILQ66-4X007T/Vishay/view-part">www.snapeda.com/parts/ILQ66-4X007T/Vishay/view-part</a>
ILQ66-4X009T	<a href="http://www.snapeda.com/parts/ILQ66-4X009T/Vishay/view-part">www.snapeda.com/parts/ILQ66-4X009T/Vishay/view-part</a>

For technical issues and product support, please contact [optocoupleranswers@vishay.com](mailto:optocoupleranswers@vishay.com).

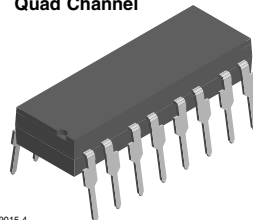
Single Channel



Dual Channel



Quad Channel



1179015-4





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