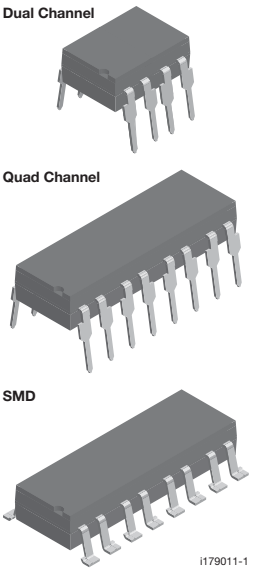
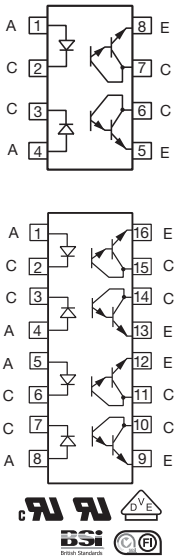
Optocoupler, Photodarlington Output, (Dual, Quad Channel)





FEATURES

- 125 mA load current rating
- Fast rise time, 10 µs
- Fast fall time, 35 µs
- Single, dual and quad channel
- Solid state reliability
- Standard DIP packages
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1
- BSI IEC 60950; IEC 60065
- FIMKO

DESCRIPTION

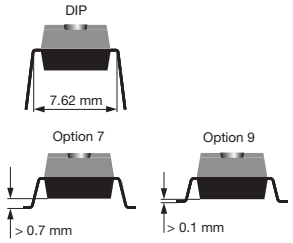
The ILD55 dual, and ILQ30, ILQ31, ILQ55 quad are optically coupled isolators with gallium arsenide infrared emitters and silicon photodarlington sensors. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits, with no crosstalk between channels. These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

The ILD55 is designed to reduce board space requirements in high density applications.

ORDERING INFORMATION

I	L	x	#	#	-	X	0	0	#	T
PART NUMBER						PACKAGE OPTION				TAPE AND REEL

x = D (Dual) or Q (Quad)



AGENCY CERTIFIED/PACKAGE	DUAL CHANNEL	QUAD CHANNEL	
	CTR		
UL, cUL, BSI, FIMKO	**≥ 100**	**≥ 100**	**≥ 200**
DIP-8	ILD55	-	-
SMD-8, option 7	ILD55-X007	-	-
SMD-8, option 9	ILD55-X009T (1)	-	-
DIP-16	-	ILQ30, ILQ55	ILQ31
SMD-16, option 7	-	ILQ55-X007	-
SMD-16, option 9	-	ILQ30-X009, ILQ55-X009T (1)	-
VDE, UL, cUL, BSI, FIMKO	**≥ 100**	**≥ 100**	**≥ 200**
DIP-16	-	ILQ30-X001	-

Notes

- Additional options may be possible, please contact sales office.

(1) Also available in tubes, do not put "T" on the end.

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)					
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**VALUE**	**UNIT**
INPUT					
Peak reverse voltage			V_{RM}	3	V
Forward continuous current			I_F	60	mA
Power dissipation			P_{diss}	100	mW
Derate linearly from 25 °C				1.33	mW/°C
OUTPUT					
Collector emitter breakdown voltage		ILQ30	BV_{CEO}	30	V
		ILD55	BV_{CEO}	55	V
		ILQ55	BV_{CEO}	55	V
Collector (load) current			I_C	125	mA
Power dissipation			P_{diss}	150	mW
Derate linearly from 25 °C				2	mW/°C
COUPLER					
Total package power dissipation		ILD55	P_{tot}	400	mW
		ILQ30	P_{tot}	500	mW
		ILQ31	P_{tot}	500	mW
		ILQ55	P_{tot}	500	mW
Derate linearly from 25 °C		ILD55		3.3	mW/°C
		ILQ30		6.67	mW/°C
		ILQ31		6.67	mW/°C
		ILQ55		6.67	mW/°C
Isolation test voltage			V_{ISO}	5300	V_{RMS}
Creepage distance				≥ 7	mm
Clearance distance				≥ 7	mm
Comparative tracking index			CTI	175	
Storage temperature			T_{stg}	- 55 to + 125	°C
COUPLER					
Operating temperature			T_{amb}	- 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_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 20 mA	V_F		1.25	1.5	V
Reverse current	V_R = 3 V	I_R		0.1	10	µA
Capacitance	V_R = 0 V	C_O		25		pF
OUTPUT						
Collector emitter breakdown voltage	I_C = 100 µA	BVCEO	30/55			V
Collector emitter leakage current	V_{CE} = 10 V, I_F = 0 A	I_{CEO}		1	100	nA
Collector emitter capacitance	V_{CE} = 10 V, f = 1 MHz	CCE		3.4		pF
COUPLER						
Collector emitter saturation voltage	I_C = 50 mA, I_F = 50 mA	V_{CEsat}		0.9	1	V
Isolation test voltage			5300			V_{RMS}
Isolation resistance		R_{IO}		10^{12}		Ω
Capacitance (input to output)		C_{IO}		0.5		pF

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_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Current transfer ratio	I_F = 10 mA, V_{CE} = 5 V	ILD55	CTR	100	400		%
		ILQ30	CTR	100	400		%
		ILQ55	CTR	100	400		%
		ILQ31	CTR	200	400		%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Rise time	V_{CC} = 13.5 V, I_F = 50 mA, R_L = 100 Ω	t_r		10		µs
Fall time	V_{CC} = 13.5 V, I_F = 50 mA, R_L = 100 Ω	t_f		35		µs

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

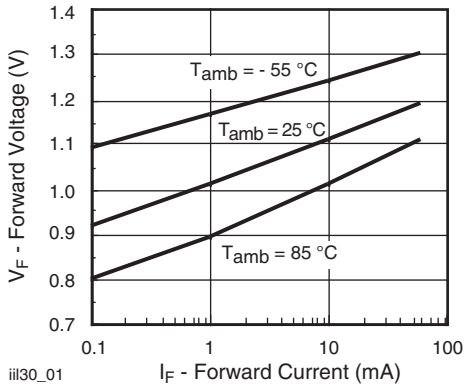


Fig. 1 - Forward Voltage vs. Forward Current

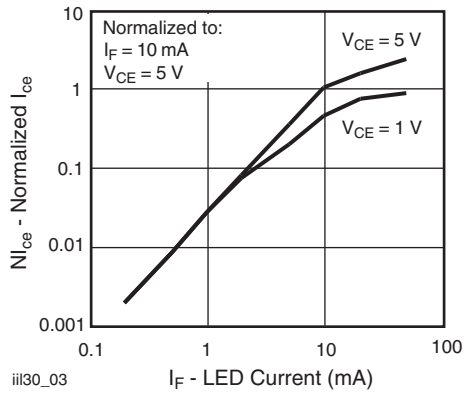


Fig. 3 - Normalized Non-Saturated and Saturated Collector Emitter Current vs. LED Current

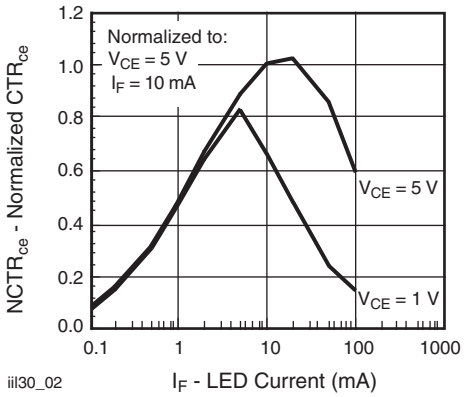


Fig. 2 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

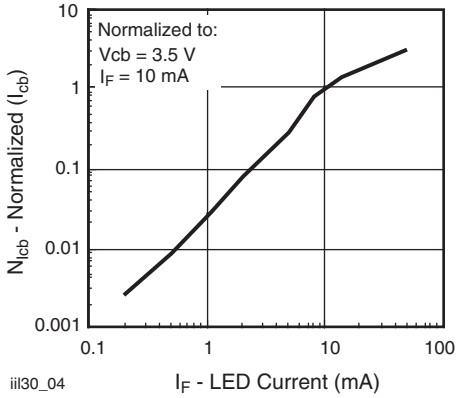


Fig. 4 - Normalized Collector Base Photocurrent vs. LED Current

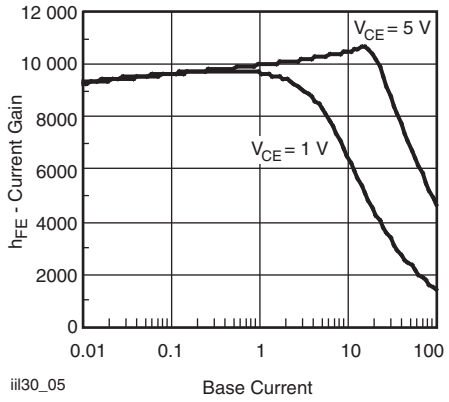


Fig. 5 - h_{FE} Current Gain vs. Base Current

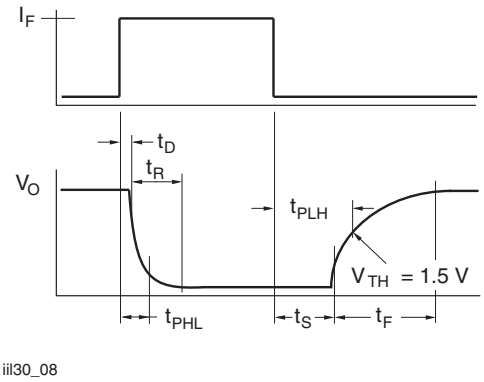


Fig. 8 - Switching Waveform

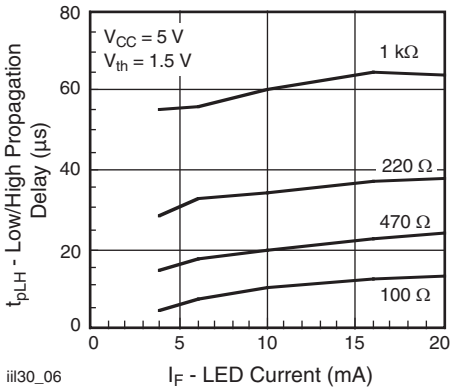


Fig. 6 - Low to High Propagation Delay vs. Collector Load Resistance and LED Current

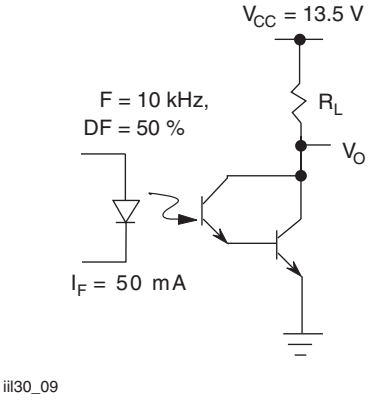


Fig. 9 - Switching Schematic

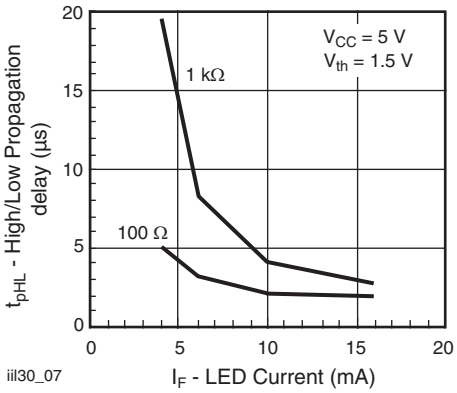
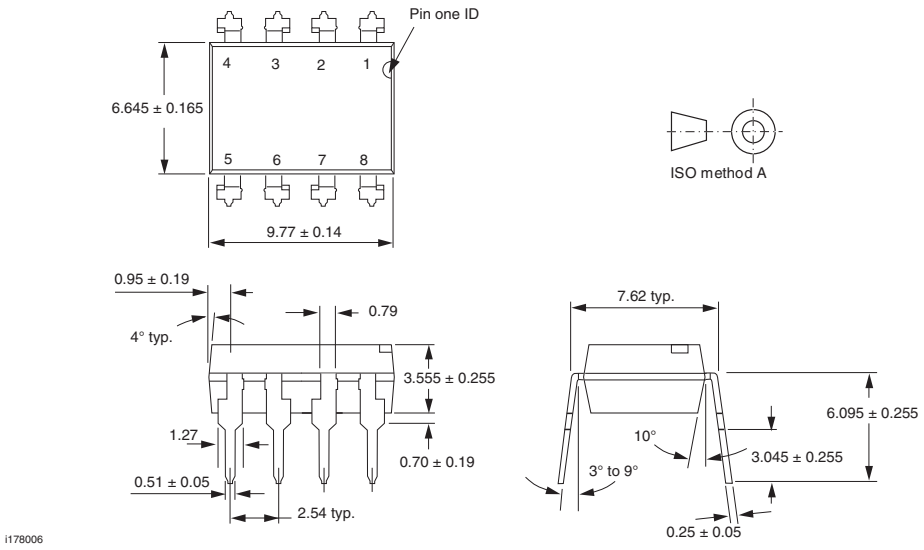
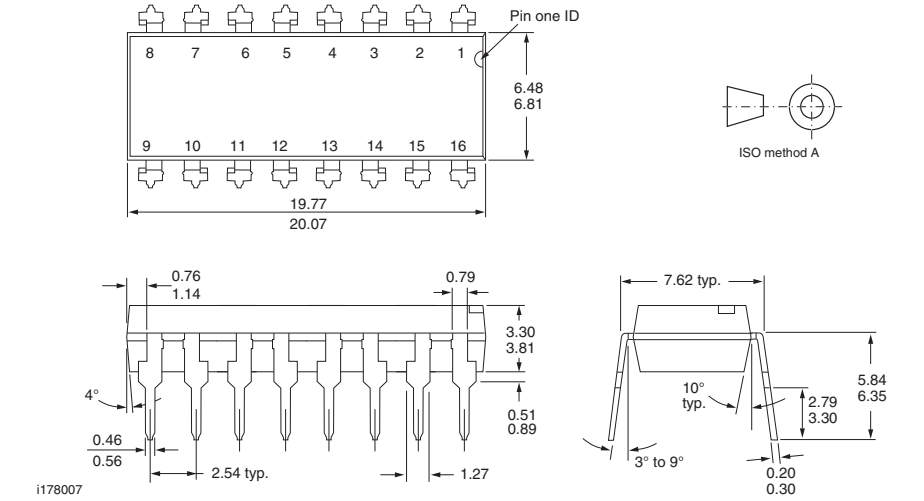


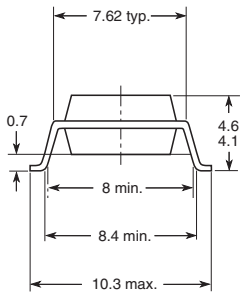
Fig. 7 - High to Low Propagation Delay vs. Collector Load Resistance and LED Current

PACKAGE DIMENSIONS in millimeters

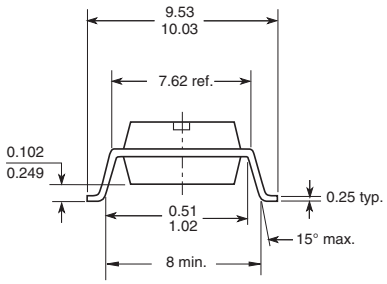


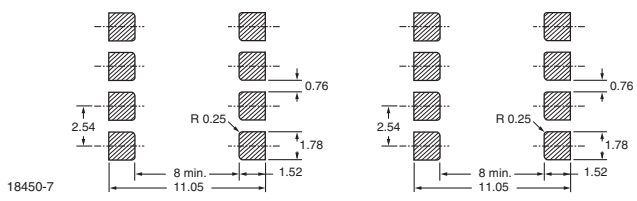


Option 7



Option 9





PACKAGE MARKING (example)

Notes

- Only option 1 and 7 reflected in the package marking
- The VDE logo is only marked on option 1 parts
- Tape and reel suffix (T) is not part of the package marking

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