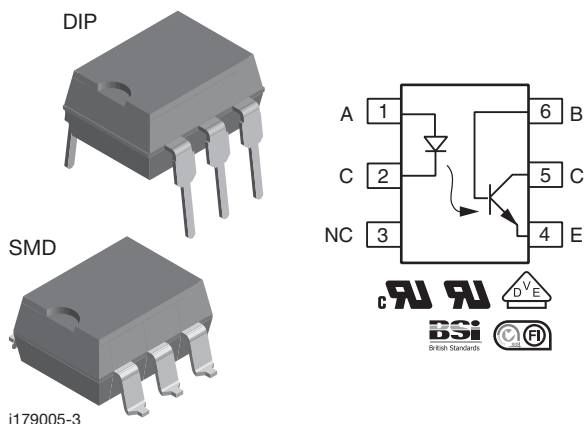


Optocoupler, Phototransistor Output, Low Input Current, with Base Connection



DESCRIPTION

The IL202, IL203 is optically coupled pairs employing a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The IL202, IL203 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

FEATURES

- Guaranteed at $I_F = 1.0 \text{ mA}$
- High collector emitter voltage, $BV_{CEO} = 70 \text{ V}$
- Long term stability
- Industry standard DIP package
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


RoHS
COMPLIANT

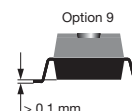
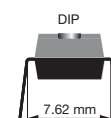
AGENCY APPROVALS

- UL 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: EN 60065:2002, EN 60950-1:2006
- FIMKO

ORDERING INFORMATION

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PART NUMBER
PACKAGE OPTION

TAPE
AND
REEL


AGENCY CERTIFIED/PACKAGE	CTR (%)	
UL, cUL, BSI, FIMKO	125 to 250	225 to 450
DIP-6	-	IL203
SMD-6, option 9	-	IL203-X009T
VDE, UL, cUL, BSI, FIMKO	125 to 250	225 to 450
DIP-6	IL202-X001	-

Vishay Semiconductors Optocoupler, Phototransistor Output, Low Input Current, with Base Connection

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Peak reverse voltage		V_R	6.0	V
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	100	mW
Derate linearly from $25\text{ }^{\circ}\text{C}$			1.33	mW/ $^{\circ}\text{C}$
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	70	V
Emitter collector breakdown voltage		BV_{ECO}	7.0	V
Collector base breakdown voltage		BV_{CBO}	70	V
Power dissipation		P_{diss}	200	mW
Derate linearly from $25\text{ }^{\circ}\text{C}$			2.6	mW/ $^{\circ}\text{C}$
COUPLER				
Isolation test voltage	$t = 1.0\text{ s}$	V_{ISO}	5300	V_{RMS}
Total package dissipation (LED and detector)		P_{tot}	250	mW
Derate linearly from $25\text{ }^{\circ}\text{C}$			3.3	mW/ $^{\circ}\text{C}$
Creepage distance			≥ 7.0	mm
Clearance distance			≥ 7.0	mm
Storage temperature		T_{stg}	- 55 to + 150	$^{\circ}\text{C}$
Operating temperature		T_{amb}	- 55 to + 100	$^{\circ}\text{C}$
Lead soldering time	$\leq 260\text{ }^{\circ}\text{C}$		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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	$I_F = 20\text{ mA}$	V_F		1.2	1.5	V
	$I_F = 1.0\text{ mA}$	V_F		1.0	1.2	V
Breakdown voltage	$I_R = 10\text{ }\mu\text{A}$	V_F	6.0	20		V
Reverse current	$V_R = 6.0\text{ V}$	I_R		0.1	10	μA
OUTPUT						
DC forward current gain	$V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ }\mu\text{A}$	h_{FE}	100	200		
Collector emitter breakdown voltage	$I_C = 100\text{ }\mu\text{A}$	BV_{CEO}	70			V
Emitter collector breakdown voltage	$I_E = 100\text{ }\mu\text{A}$	BV_{ECO}	7.0	10		V
Collector base breakdown voltage	$I_C = 10\text{ }\mu\text{A}$	BV_{CBO}	70	90		V
Leakage current collector emitter	$V_{CE} = 10\text{ V}$, $T_A = 25\text{ }^{\circ}\text{C}$	I_{CEO}		5.0	50	nA

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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio (collector to base)	$I_F = 10\text{ mA}$, $V_{CB} = 10\text{ V}$		CTR_{CB}	15			%
Collector emitter saturation voltage	$I_F = 10\text{ mA}$, $I_C = 2.0\text{ mA}$		V_{CEsat}			0.4	V
DC current transfer ratio	$I_F = 10\text{ mA}$, $V_{CE} = 10\text{ V}$	IL202	CTR_{DC}	125	200	250	%
		IL203	CTR_{DC}	225	300	450	%
	$I_F = 1.0\text{ mA}$, $V_{CE} = 10\text{ V}$	IL202	CTR_{DC}	30			%
		IL203	CTR_{DC}	50			%

Optocoupler, Phototransistor Output, Vishay Semiconductors Low Input Current, with Base Connection

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

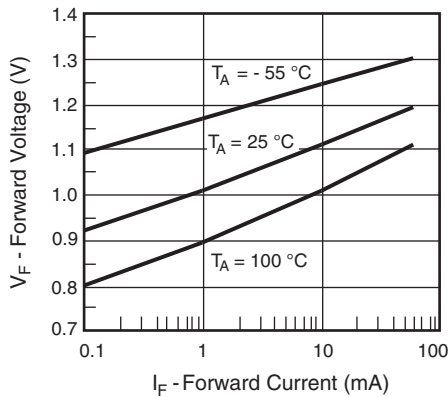


Fig. 1 - Forward Voltage vs. Forward Current

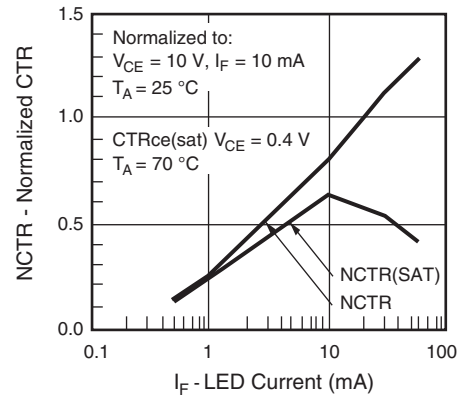


Fig. 4 - Normalized Non-Saturated and Saturated CTR vs. LED Current

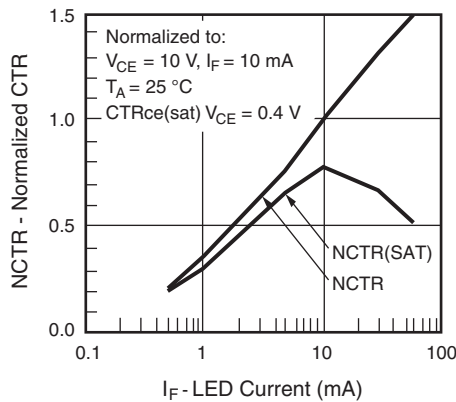


Fig. 2 - Normalized Non-Saturated and Saturated CTR vs. LED Current

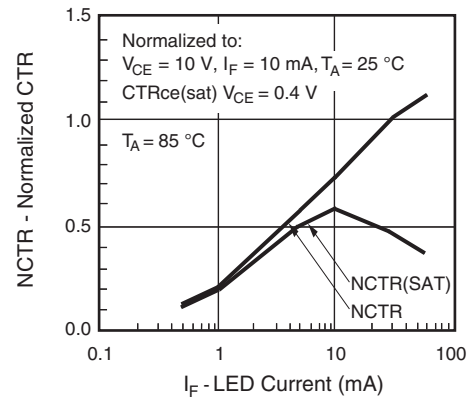


Fig. 5 - Normalized Non-Saturated and Saturated CTR vs. LED Current

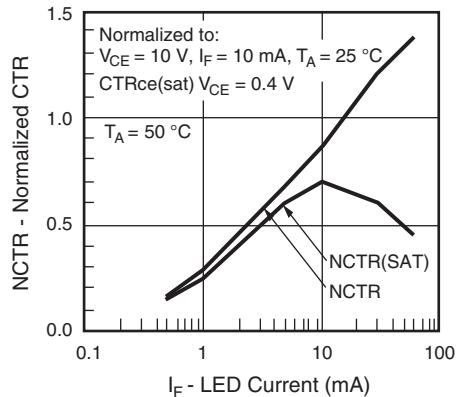


Fig. 3 - Normalized Non-Saturated and Saturated CTR vs. LED Current

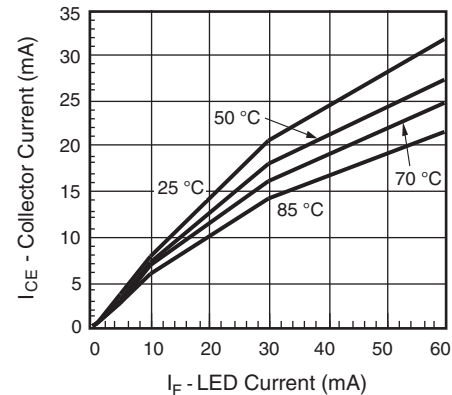


Fig. 6 - Collector Emitter Current vs. Temperature and LED Current

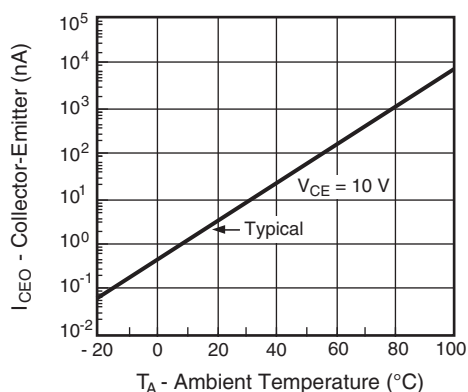


Fig. 7 - Collector Emitter Leakage Current vs. Temperature

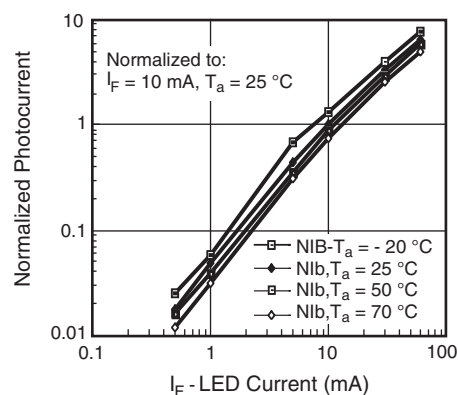


Fig. 10 - Normalized Photocurrent vs. I_F and Temperature

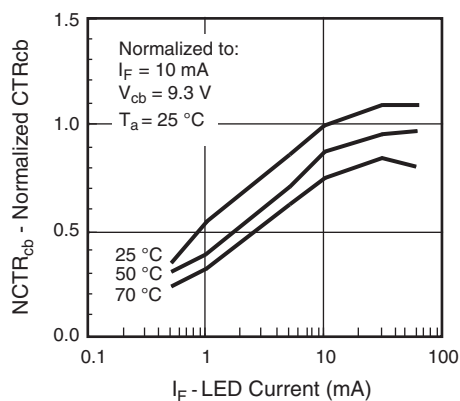


Fig. 8 - Normalized CTR_{cb} vs. LED Current and Temperature

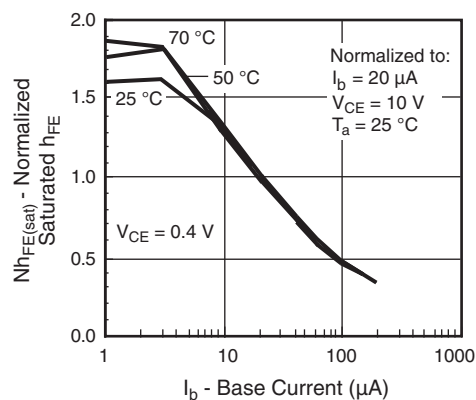


Fig. 11 - Normalized Saturated h_{FE} vs. Base Current and Temperature

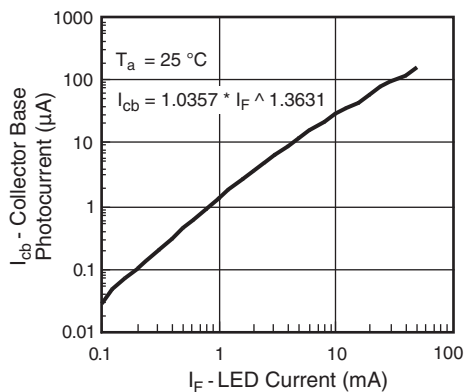


Fig. 9 - Collector Base Photocurrent vs. LED Current

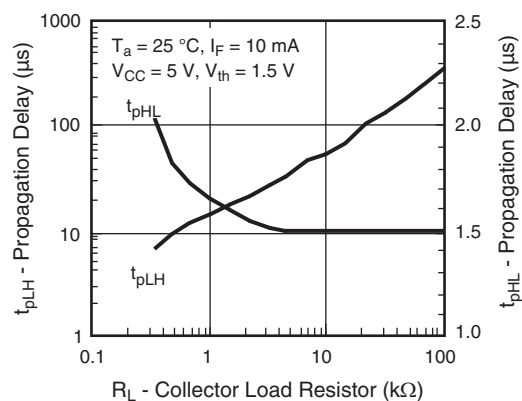


Fig. 12 - Propagation Delay vs. Collector Load Resistor

Optocoupler, Phototransistor Output, Vishay Semiconductors

Low Input Current, with Base Connection

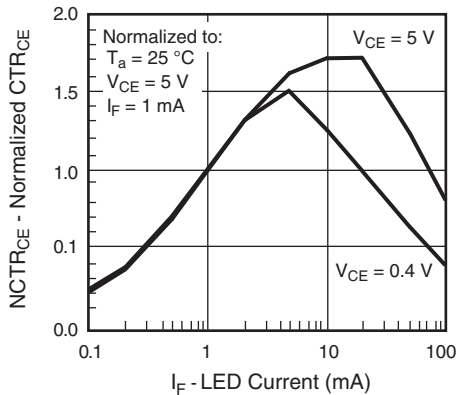


Fig. 13 - Normalized Non-Saturated and Saturated CTR_{CE} vs. LED Current

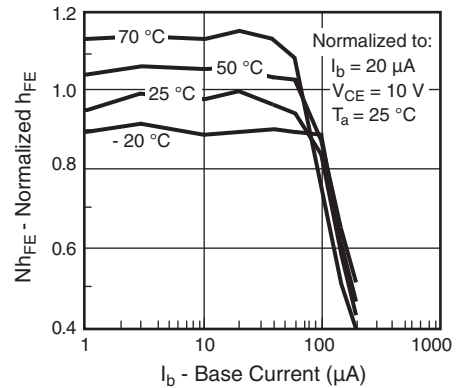
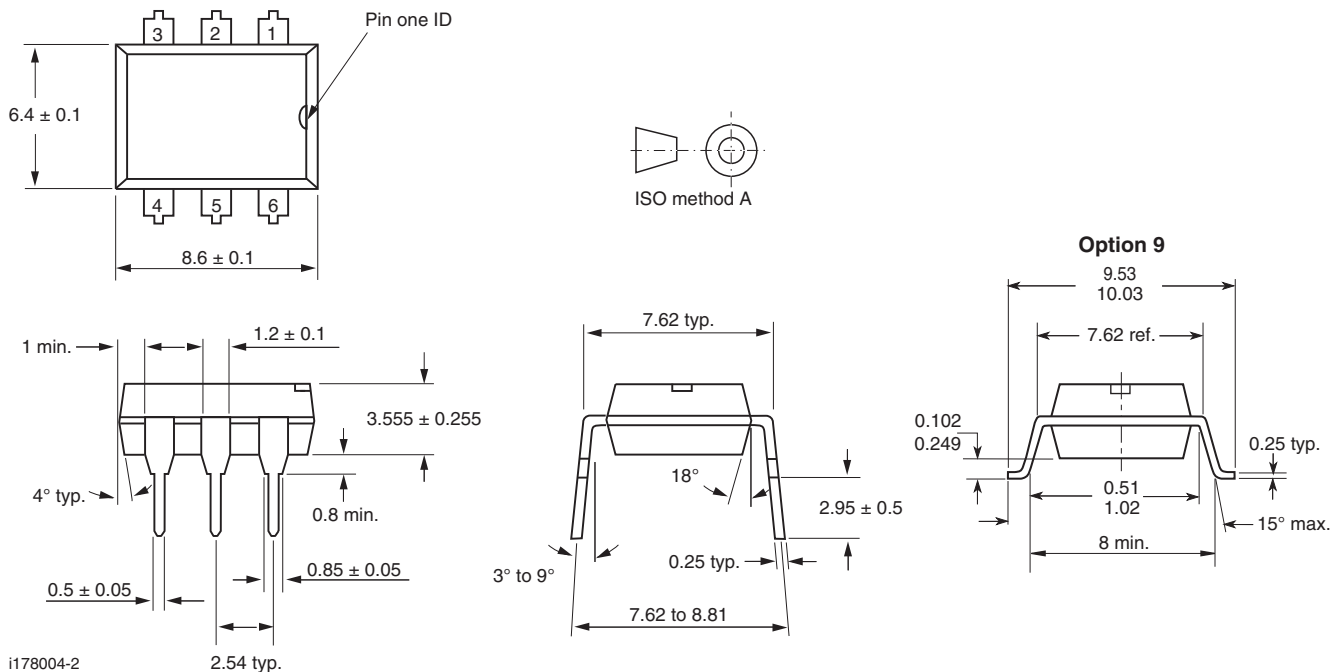


Fig. 14 - Normalized Non-Saturated h_{FE} vs. Base Current and Temperature

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Notes

- Only option 1 is 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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