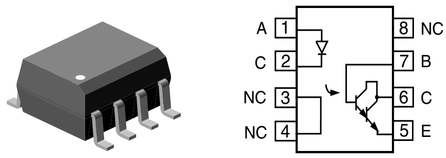
Optocoupler, Photodarlington Output, Low Input Current, High Gain, With Base Connection

Features

- Isolation test voltage, 3000 V_{RMS}
- Industry Standard SOIC-8 surface mountable package
- Standard Lead Spacing, .05 "
- Available only on tape and reel (conforms to EIA Standard RS481A)
- Compatible with dual wave, vapor phase and IR reflow soldering



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Agency Approvals

- UL - File No. E52744 System Code Y
- DIN EN 60747-5-2(VDE0884)
  DIN EN 60747-5-5 pending
  Available with Option 1
- FIMKO

Description

The IL221AT/ IL222AT/ IL223AT is a high current transfer ratio (CTR) optocoupler with a gallium arsenide infrared LED emitter and a silicon NPN photodarlington transistor detector.

The device has a CTR tested at 1.0 mA LED current. This low drive current permits easy interfacing from CMOS to LSTTL or TTL.

This optocoupler is constructed in a standard SOIC-8 foot print which makes it ideally suited for high density applications. In addition to eliminating through-hole requirements, this package conforms to standards for surface mount devices.

Order Information

Part	Remarks
IL221AT	CTR > 100 %, SOIC-8
IL222AT	CTR > 200 %, SOIC-8
IL223AT	CTR > 500 %, SOIC-8

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

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 Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
Peak reverse voltage		V_R	6.0	V
Forward continuous current		I_F	60	mA
Power dissipation		P_{diss}	90	mW
Derate linearly from 25°C			1.2	mW/°C

Output

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter breakdown voltage		BV_{CEO}	30	V
Emitter-collector breakdown voltage		BV_{ECO}	5.0	V
Collector-base breakdown voltage		BV_{CBO}	70	V
$I_{CMAX\ DC}$		$I_{CMAX\ DC}$	50	mA
I_{CMAX}	t < 1.0 ms	I_{CMAX}	100	mW
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			2.0	mW/°C

Coupler

Parameter	Test condition	Symbol	Value	Unit
Total package dissipation (at 25 °C ambient) (LED + detector)		P_{tot}	240	mW
Derate linearly from 25 °C			3.2	mW/°C
Storage temperature		T_{stg}	- 55 to +150	°C
Operating temperature		T_{amb}	- 55 to +100	°C
Soldering time at 260 °C			10	sec.

Electrical Characteristics

T_{amb} = 25 °C, unless otherwise specified
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.

Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 1.0 mA	V_F		1.0	1.5	V
Reverse current	V_R = 6.0 V	I_R		0.1	100	µA
Capacitance	V_R = 0 V, F = 1.0 MHz	C_O		25		pF

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter breakdown voltage	I_C = 100 µA	BV_{CEO}	30			V
Emitter-collector breakdown voltage	I_E = 100 µA	BV_{ECO}	5.0			V
Collector-emitter breakdown voltage	I_C = 10 µA	BV_{CEO}	70			V
Collector-emitter capacitance	V_{CE} = 10 V	C_{CE}		3.4		pF

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Saturation voltage collector-emitter	I_{CE} = 0.5 mA	V_{CEsat}			1.0	V
Isolation test voltage	t = 1.0 sec.	V_{ISO}	3000			V_{RMS}
Capacitance (input-output)		C_{IO}		0.5		pF
Resistance input to output		R_{IO}		100		GΩ

Current Transfer Ratio

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
DC Current Transfer Ratio	I_F = 1.0 mA, V_{CE} = 5.0 V	IL221AT	CTR_{DC}	100			%
		IL222AT	CTR_{DC}	200			%
		IL223AT	CTR_{DC}	500			%

Typical Characteristics (T_{amb} = 25 °C unless otherwise specified)

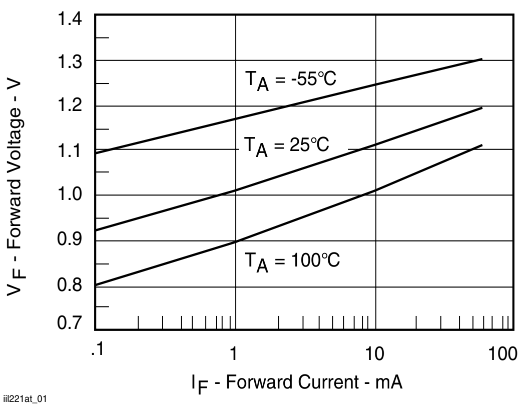


Fig. 1 Forward Voltage vs. Forward Current

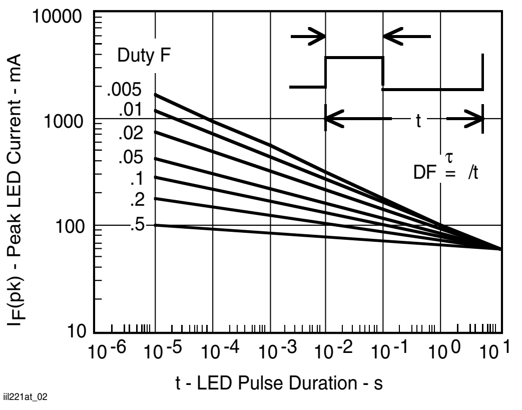


Fig. 2 Peak LED Current vs. Duty Factor, Tau

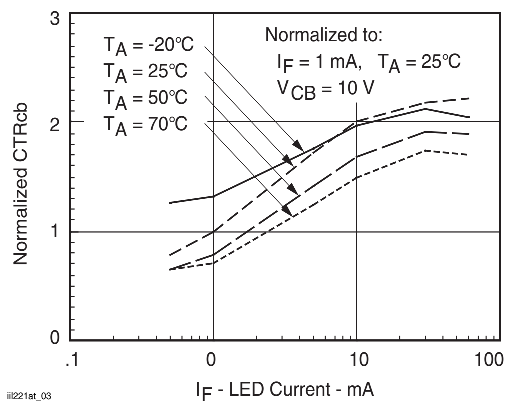


Fig. 3 Normalized CTR_{CB} vs. I_F

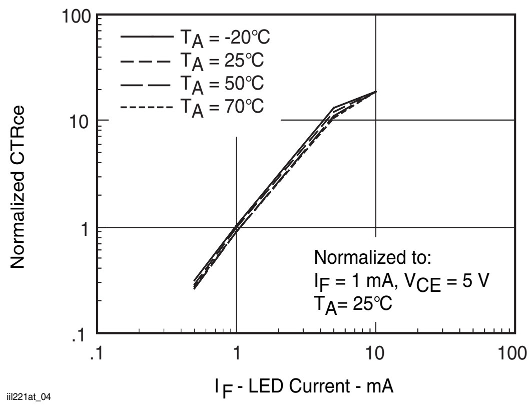


Fig. 4 Normalized CTR_{CE} vs. LED Current

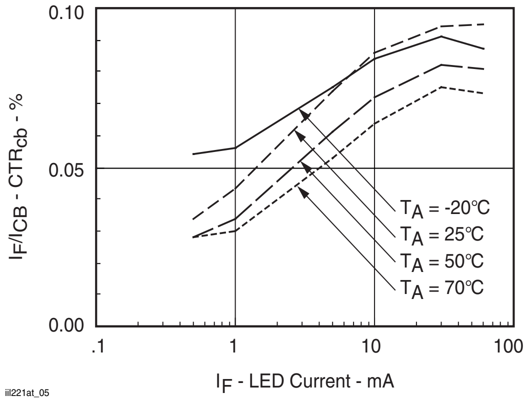


Fig. 5 CTR_{CB} vs. LED Current

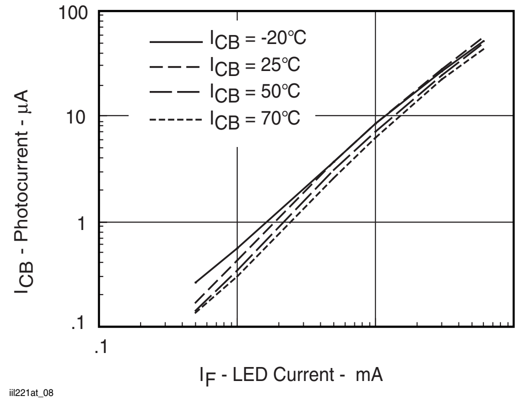


Fig. 8 Photocurrent vs. LED Current

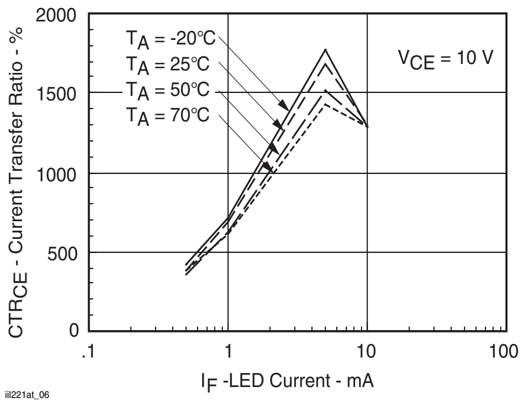


Fig. 6 CTR vs. LED Current

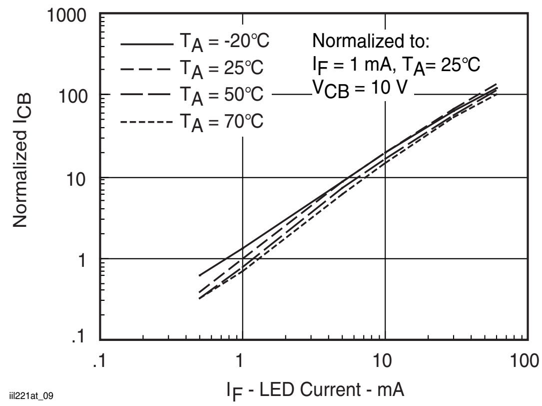


Fig. 9 Normalized I_{CB} vs. I_F

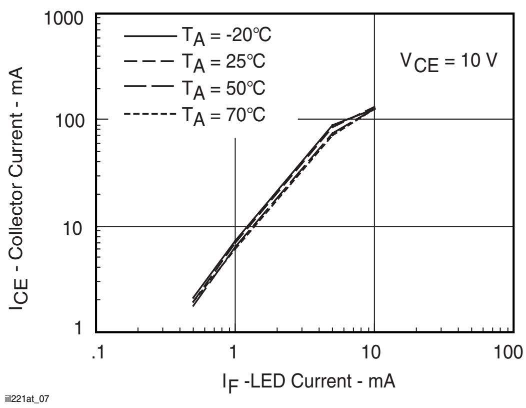


Fig. 7 Collector Current vs. LED Current

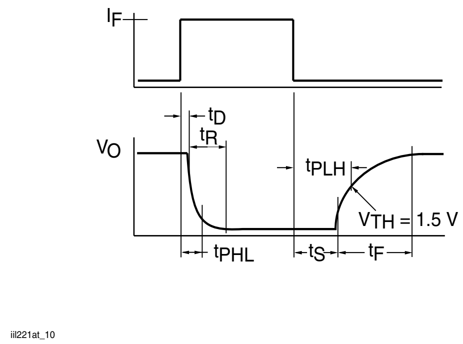


Fig. 10 Switching Timing

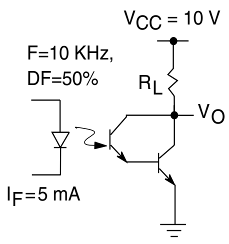
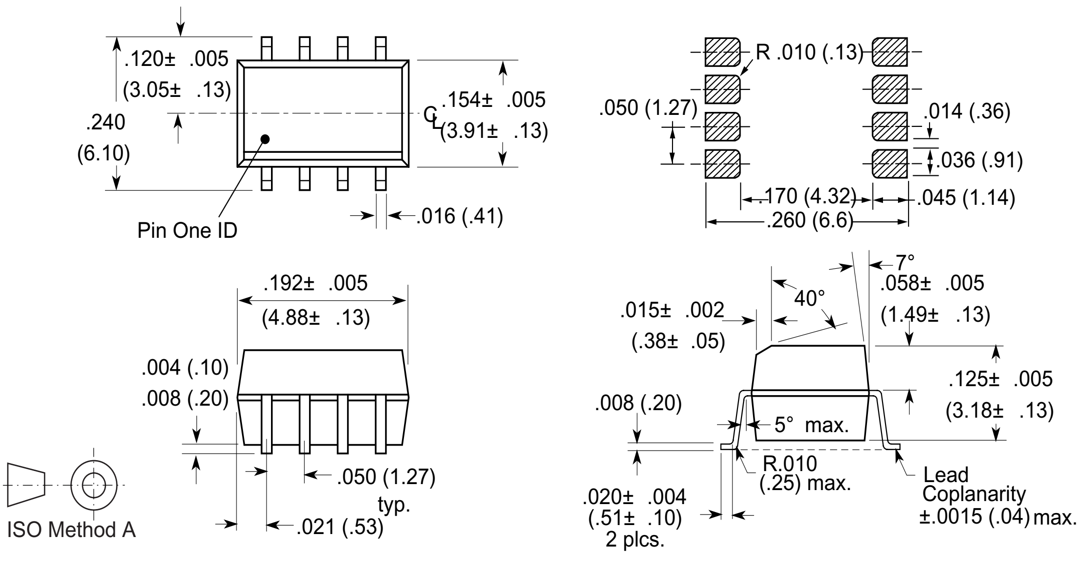


Fig. 11 Switching Schematic

Package Dimensions in Inches (mm)



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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