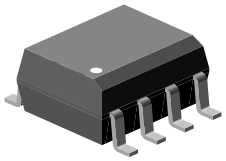
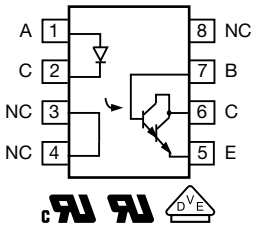
Optocoupler, Photodarlington Output, Low Input Current, High Gain, With Base Connection





LINKS TO ADDITIONAL RESOURCES

Related Documents | Design Tools | 3D Models | SPICE Models | Footprints | Schematics

DESCRIPTION

The IL221AT, IL222AT, IL223AT are high current transfer ratio (CTR) optocouplers 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.

FEATURES

- Isolation test voltage, 4000 V_{RMS}
- Industry standard SOIC-8 surface mountable package
- Standard lead spacing, 0.05"
- Available only on tape and reel (conforms to EIA standard RS481A)
- Compatible with dual wave, vapor phase and IR reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

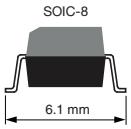
AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1

ORDERING INFORMATION

I	L	2	2	#	A	T

PART NUMBER



AGENCY CERTIFIED / PACKAGE	CTR (%)		
	1 mA		
UL, cUL	**≥ 100**	**≥ 200**	**≥ 500**
SOIC-8	IL221AT	IL222AT	IL223AT

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °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}	90	mW
Derate linearly from 25 °C			1.2	mW/°C
OUTPUT				
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				
Isolation test voltage	t = 1.0 s	V_{ISO}	4000	V_{RMS}
Total package dissipation (at 25 °C ambient)(LED and 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	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 = 1.0 mA	V_F	-	1.0	1.5	V
Reverse current	V_R = 6 V	I_R	-	0.1	100	µA
Capacitance	V_R = 0 V, f = 1.0 MHz	C_O	-	25	-	pF
OUTPUT						
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
Emitter emitter breakdown voltage	I_C = 10 µA	BV_{CBO}	70	-	-	V
Collector emitter capacitance	V_{CE} = 10 V	C_{CE}	-	3.4	-	pF
COUPLER						
Saturation voltage, collector emitter	I_{CE} = 0.5 mA	V_{CEsat}	-	-	1.0	V
Capacitance (input to output)		C_{IO}	-	0.5	-	pF
Resistance (input to output)		R_{IO}	-	100	-	GΩ

Note

- Minimum and maximum values are tested requierements. 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.

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CURRENT TRANSFER RATIO (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = 1.0 mA, V_{CE} = 5.0 V	IL221AT	CTR_{DC}	100	-	-	%
		IL222AT	CTR_{DC}	200	-	-	%
		IL223AT	CTR_{DC}	500	-	-	%

SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification	According to IEC 68 part 1		-	55 / 100 / 21	-	
Comparative tracking index		CTI	175	-	399	
V_{IOTM}			6000	-	-	V
V_{IORM}			560	-	-	V
P_{SO}			-	-	350	mW
I_{SI}			-	-	150	mA
T_{SI}			-	-	165	°C
Creepage distance			4	-	-	mm
Clearance distance			4	-	-	mm
Insulation thickness			0.2	-	-	mm

Note

- As per IEC 60747-5-2, § 7.4.3.8.1, 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)

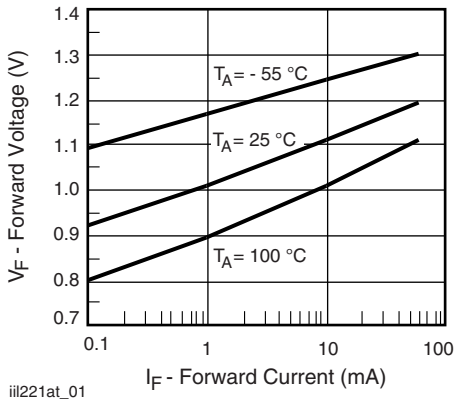


Fig. 1 - Forward Voltage vs. Forward Current

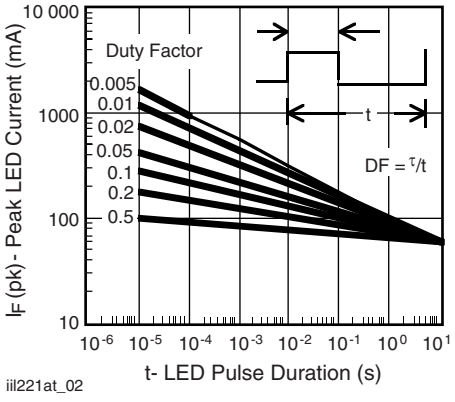


Fig. 2 - Peak LED Current vs. Duty Factor, τ

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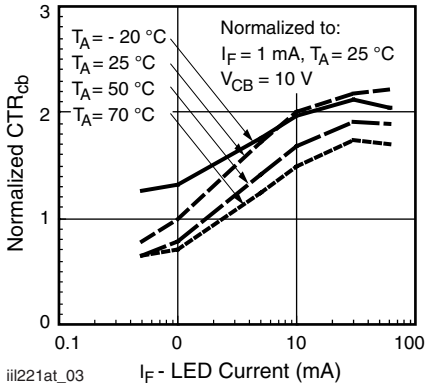


Fig. 3 - Normalized CTR_{cb} vs. I_F

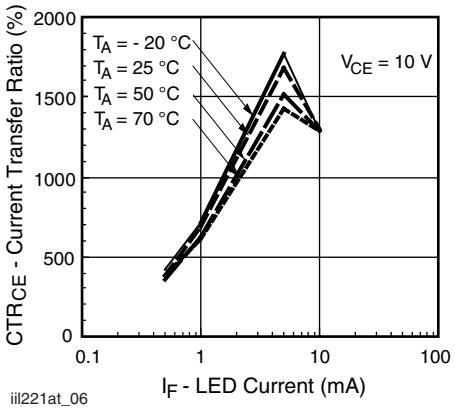


Fig. 6 - CTR vs. LED Current

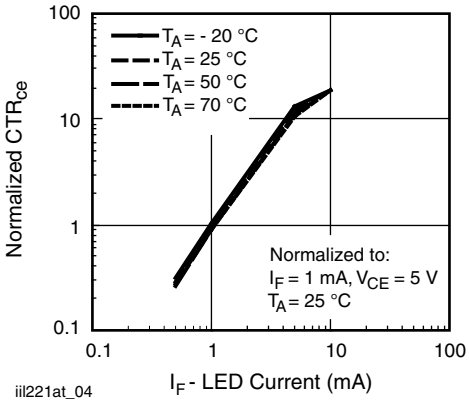


Fig. 4 - Normalized CTR_{CE} vs. LED Current

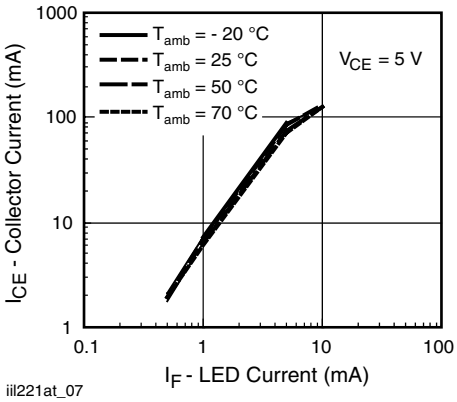


Fig. 7 - Collector Current vs. LED Current

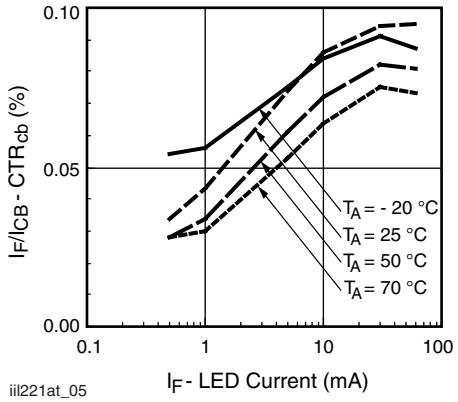


Fig. 5 - CTR_{CE} vs. LED Current

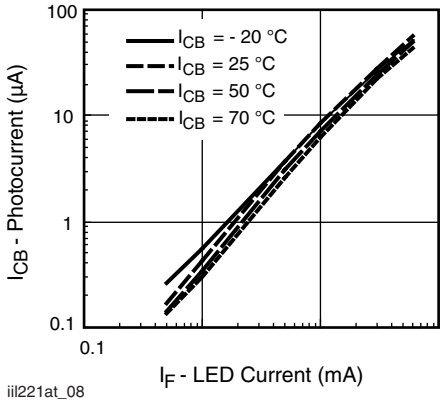


Fig. 8 - Photocurrent vs. LED Current

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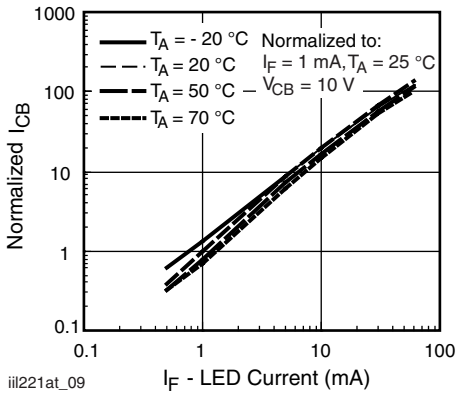


Fig. 9 - Normalized I_{CB} vs. I_F

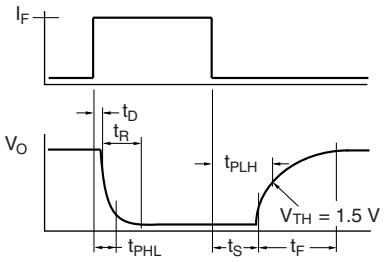


Fig. 10 - Switching Timing

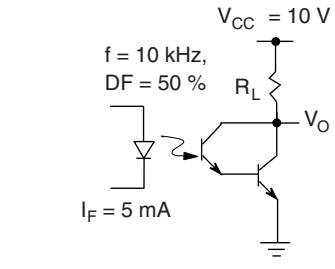
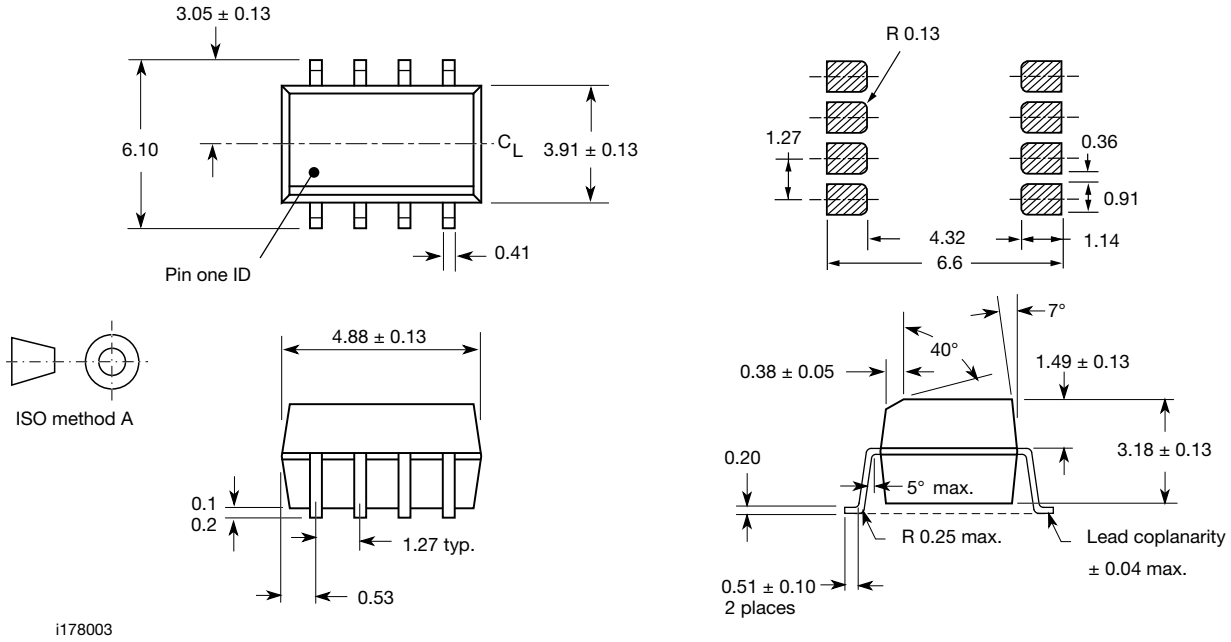


Fig. 11 - Switching Schematic

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PACKAGE DIMENSIONS in inches (millimeters)



PACKAGE MARKING (example)

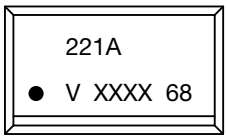


Fig. 12 - Example of IL221AT

Notes

- XXXX = LMC (lot marking code)
- Tape and reel suffix (T) is not part of the package marking

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