

Photodarlington Small Outline Surface Mount Optocoupler

FEATURES

- **High Current Transfer Ratio, $I_F=1.0$ mA, IL221AT, 100% Minimum
IL222AT, 200% Minimum
IL223AT, 500% Minimum**
- **Withstand Test Voltage, 3000 V_{RMS}**
- **Electrical Specifications Similar to Standard 6 Pin Coupler**
- **Industry Standard SOIC-8 Surface Mountable Package**
- **Standard Lead Spacing, .05"**
- **Available only on Tape and Reel Option (Conforms to EIA Standard RS481A)**
- **Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering**
- **Underwriters Lab File #E52744 (Code Letter Y)**
-  **VDE 0884 Available with Option 1**

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.

This device has a CTR tested at an 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-holes requirements, this package conforms to standards for surface mounted devices.

Maximum Ratings

Emitter

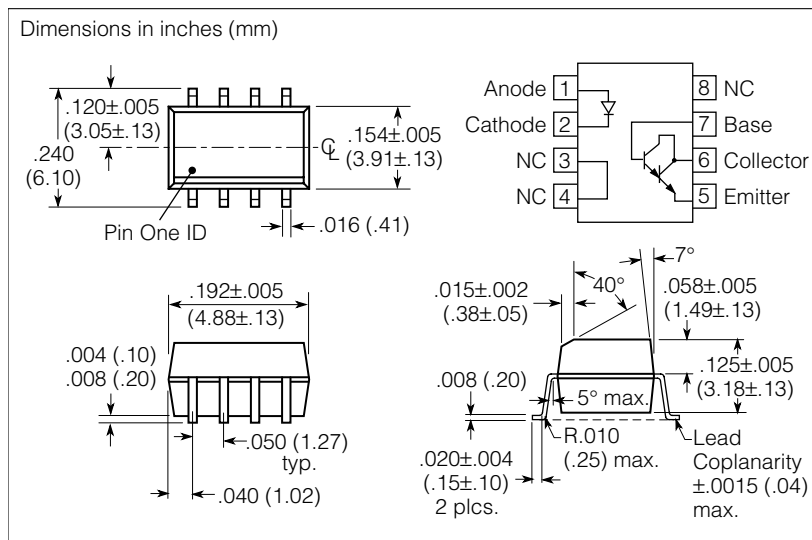
Peak Reverse Voltage.....	6.0 V
Continuous Forward Current.....	60 mA
Power Dissipation at 25°C.....	90 mW
Derate Linearly from 25°C.....	1.2mW/°C

Detector

Collector-Emitter Breakdown Voltage	30 V
Emitter-Collector Breakdown Voltage	5.0 V
Collector-Base Breakdown Voltage	70 V
I _{CMAX} DC	50 mA
I _{CMAX} (t<1.0 ms)	100 mA
Power Dissipation	150 mW
Derate Linearly from 25°C.....	2.0mW/°C

Package

Total Package Dissipation at 25°C Ambient (LED + Detector)	240 mW
Derate Linearly from 25°C	3.2 mW/°C
Storage Temperature	-55°C to +150°C
Operating Temperature	-55°C to +100°C
Soldering Time at 260°C	10 sec.



Characteristics $T_A=25^{\circ}\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.0	1.5	V	$I_F=1.0\text{ mA}$
Reverse Current	I_R	—	0.1	100	μA	$V_R=6.0\text{ V}$
Capacitance	C_O	—	25	—	pF	$V_R=0\text{ V}$, $F=1.0\text{ MHz}$
Detector						
Breakdown Voltage	$B_{V_{CEO}}$	30	—	—	V	$I_C=100\text{ }\mu\text{A}$
	$B_{V_{ECO}}$	5.0	—	—	V	$I_E=100\text{ }\mu\text{A}$
Voltage, Collector-Base	BV_{CBO}	70	—	—	V	$I_C=10\text{ }\mu\text{A}$
Capacitance, Collector-Emitter	C_{CE}	—	3.4	—	pF	$V_{CE}=10\text{ V}$
Package						
DC Current Transfer Ratio	IL221A	CTR_{DC}	100	—	—	$I_F=1.0\text{ mA}$, $V_{CE}=5.0\text{ V}$
	IL222A		200	—	—	
	IL223A		500	—	—	
Saturation Voltage, Collector-Emitter	V_{CEsat}	—	—	1.0	V	$I_{CE}=0.5\text{ mA}$, $I_F=1.0\text{ mA}$
Isolation Test Voltage	V_{IO}	3000	—	—	V_{RMS}	t=1.0 sec.
Capacitance, Input to Output	C_{IO}	—	0.5	—	pF	—
Resistance, Input to Output	R_{IO}	—	100	—	$G\Omega$	—

Figure 1. Forward voltage versus forward current

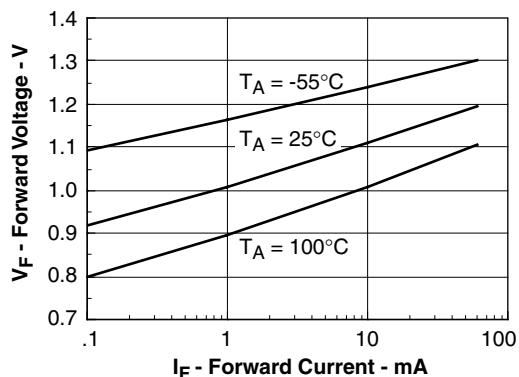


Figure 2. Peak LED current versus duty factor, Tau

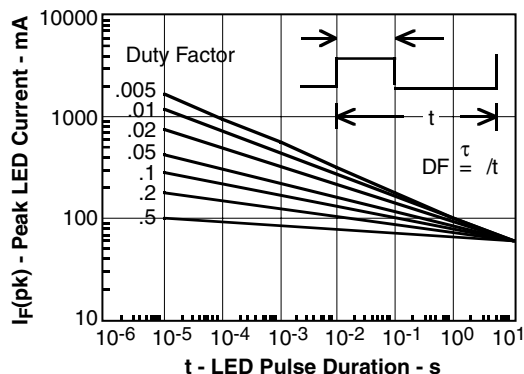


Figure 3. Normalized CTR_{CB} versus I_F

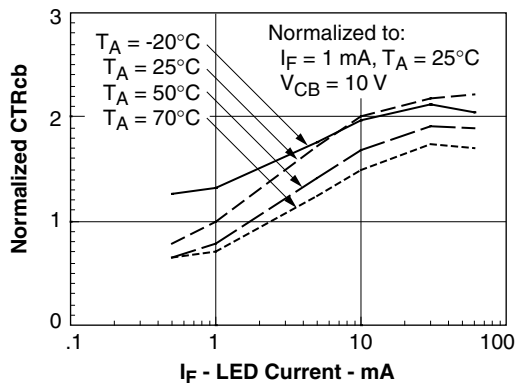


Figure 4. Normalized CTR_{CE} versus LED current

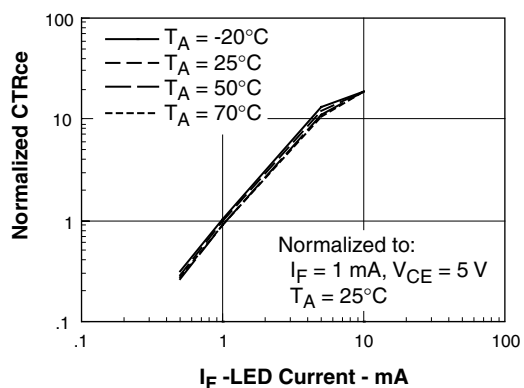


Figure 5. CTR_{CB} versus LED current

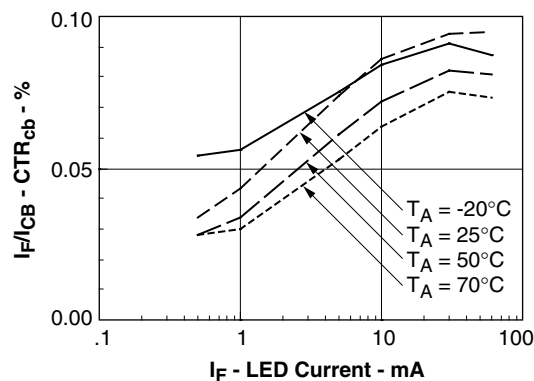


Figure 6. CTR versus LED current

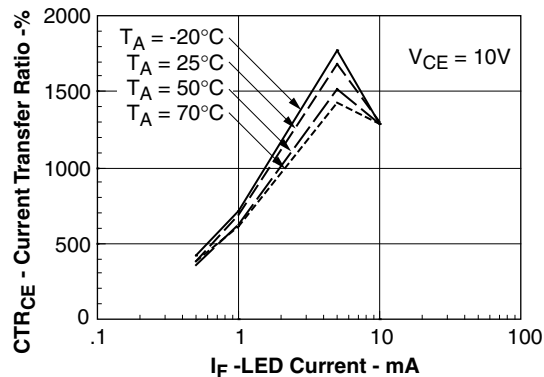


Figure 7. Collector current versus LED current

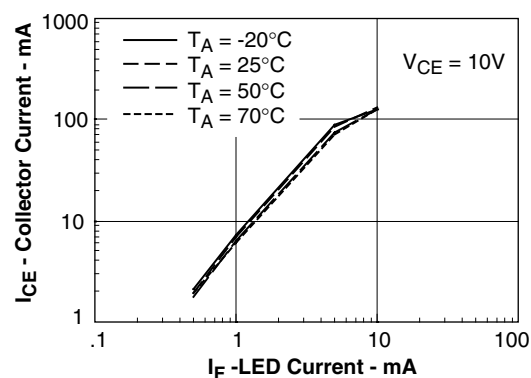


Figure 8. Photocurrent versus LED current

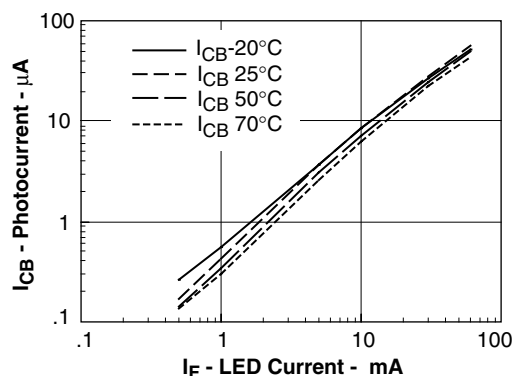


Figure 9. Normalized I_{CB} versus I_F

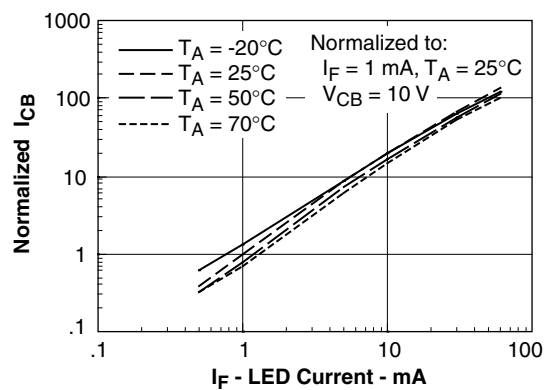


Figure 11. Switching schematic

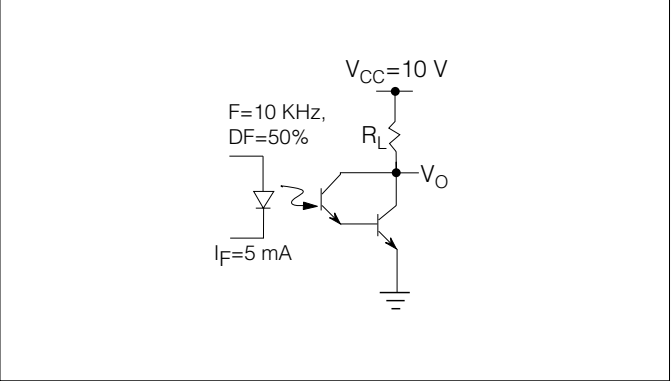


Figure 10. Switching timing

