SIEMENS

# ILD223

## DUAL PHOTODARLINGTON SMALL OUTLINE SURFACE MOUNT OPTOCOUPLER

### FEATURES

- **Two Channel Optocoupler**
- **High Current Transfer Ratio at $I_F$=1 mA, 500% Min.**
- **Isolation Test Voltage, 2500 VRMS**
- **Electrical Specifications Similar to Standard 6-pin Coupler**
- **Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering**
- **Industry Standard SOIC-8 Surface Mountable Package**
- **Standard Lead Spacing, .05"**
- **Available in Tape and Reel Option (Conforms to EIA Standard 481-2)**
- **Underwriters Lab File #E52744**

### DESCRIPTION

The ILD223 is a high current transfer ratio (CTR) optocoupler. It has a Gallium Arsenide infrared LED emitter and a silicon NPN photodarlington transistor detector.

This device has CTRs tested at an LED current of 1 mA. This low drive current permits easy interfacing from CMOS to LSTTL or TTL.

The ILD223 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** (Each Channel)

**Emitter**

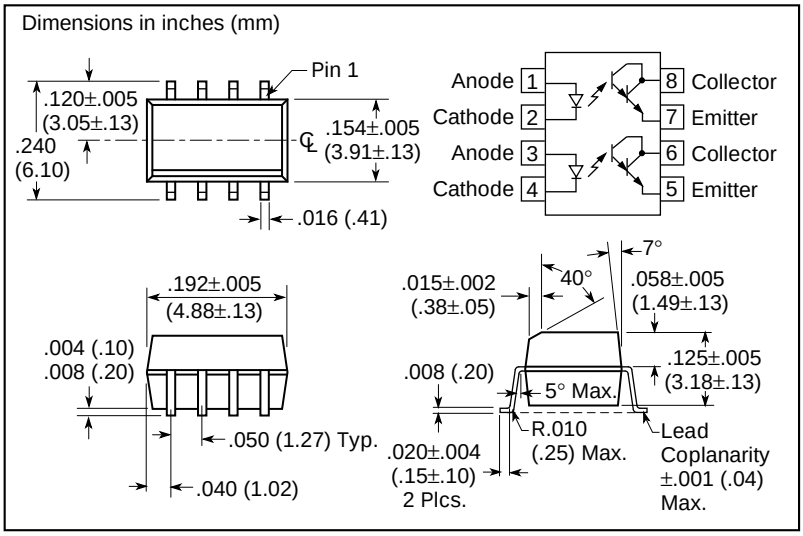
Peak Reverse Voltage .....6.0 V
Peak Pulsed Current (1 µs, 300 pps) .....3 A
Continuous Forward Current per Channel ....30 mA
Power Dissipation at 25°C.....45 mW
Derate Linearly from 25°C.....0.4 mW/°C

**Detector**

Collector-Emitter Breakdown Voltage.....30 V
Emitter-Collector Breakdown Voltage.....5 V
Power Dissipation per Channel..... 75 mW
Derate Linearly from 25°C.....3.1 mW/°C

**Package**

Total Package Dissipation at 25°C Ambient
(2 LEDs + 2 Detectors, 2 Channels).....240 mW
Derate Linearly from 25°C.....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°C)

| | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| **Emitter** | | | | | | |
| Forward Voltage | $V_F$ | | | 1.3 | V | $I_F$=1 mA |
| Reverse Current | $I_R$ | | 0.1 | 100 | µA | $V_R$=6.0 V |
| Capacitance | $C_O$ | | 25 | | pF | $V_F$=0 V, F=1 MHz |
| **Detector** | | | | | | |
| Breakdown Voltage<br>Collector-Emitter<br>Emitter-Collector | <br>$BV_{CEO}$<br>$BV_{ECO}$ | <br>30<br>5 | | | <br>V<br>V | <br>$I_C$=10 mA<br>$I_E$=10 mA |
| Current, Collector-Emitter | $I_{CEO}$ | | | 50 | nA | $V_{CE}$=5 V, $I_F$=0 |
| Capacitance, Collector-Emitter | $C_{CE}$ | | 3.4 | | pF | $V_{CE}$=5 V |
| **Package** | | | | | | |
| DC Current Transfer Ratio | $CTR_{DC}$ | 500 | | | % | $I_F$=1 mA, $V_{CE}$=5 V |
| Saturation Voltage, Collector-Emitter | $V_{CEsat}$ | | | 1 | V | $I_F$=1 mA, $I_{CE}$=0.5 mA |
| Capacitance, Input to Output | $C_{IO}$ | 0.5 | | pF | | |
| Resistance, Input to Output | $R_{IO}$ | 100 | | GΩ | | |
| Turn-On Time | $t_{ON}$ | 15 | | µs | | $V_{CC}$=10 V<br>$R_L$=100Ω<br>$I_F$=5 mA |
| Turn-Off Time | $t_{OFF}$ | 30 | | µs | | |
| Isolation Test Voltage | $V_{IO}$ | | | | | (t=1 min.) 2500 $VAC_{RMS}$ |

**Figure 1. Forward voltage versus forward current**

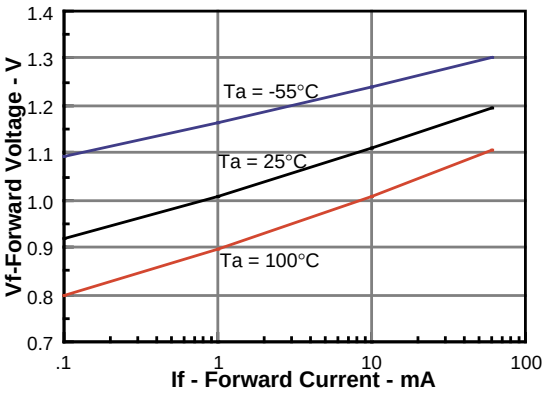



**Figure 2. Peak LED current versus duty factor, Tau**

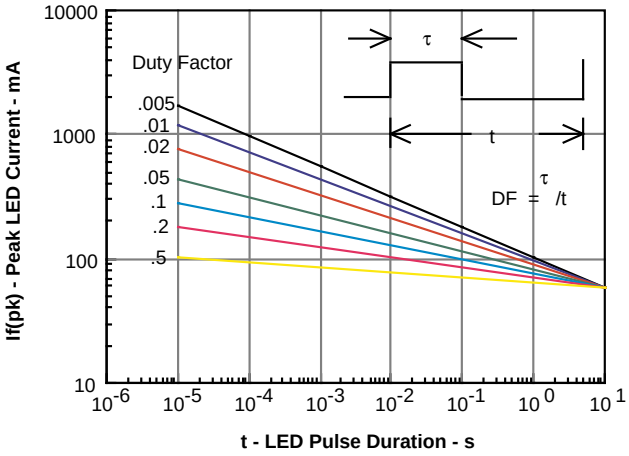



**Figure 3. Normalized $CTR_{CE}$ versus LED current**

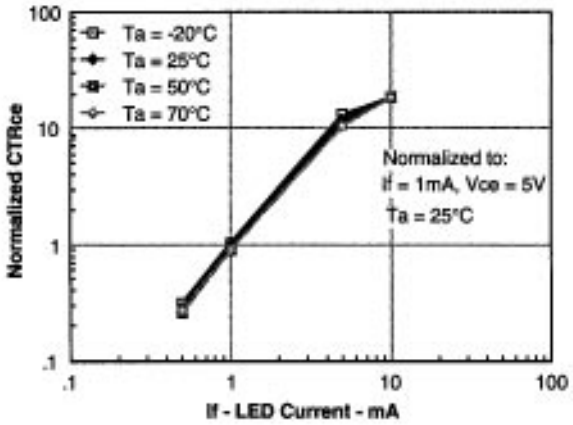



**Figure 4. CTR versus LED current**

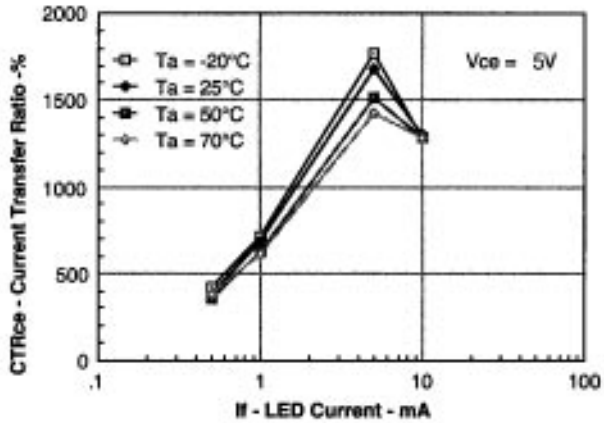



**Figure 5. Collector current versus LED current**

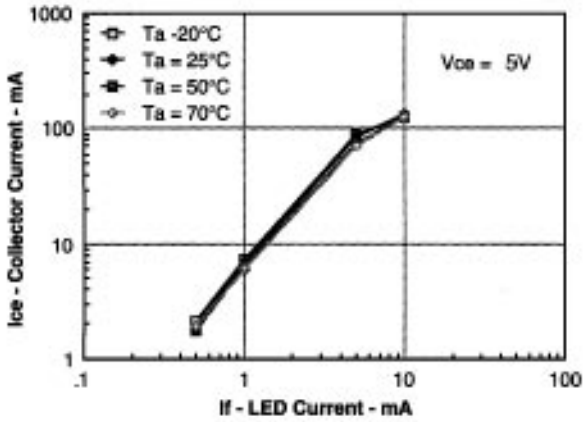



**Figure 6. Switching schematic and switching timing**