

IL211A/212A/213A PHOTOTRANSISTOR SMALL OUTLINE SURFACE MOUNT OPTOCOUPLER

FEATURES

- **High Current Transfer Ratio**
IL211A—20% Minimum
IL212A—50% Minimum
IL213A—100% Minimum
- **Isolation Voltage, 2500 VAC_{RMS}**
- **Electrical Specifications Similar to Standard 6 Pin Coupler**
- **Industry Standard SOIC-8 Surface Mountable Package**
- **Standard Lead Spacing, .05"**
- **Available in 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 P)**

DESCRIPTION

The IL211A/212A/213A are optically coupled pairs with 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 IL211A//212A/213A comes in a standard SOIC-8 small outline package for surface mounting which makes it ideally suited for high density applications with limited space. In addition to eliminating through-holes requirements, this package conforms to standards for surface mounted devices.

A choice of 20, 50, and 100% minimum CTR at $I_F = 10$ mA makes these optocouplers suitable for a variety of different applications.

Maximum Ratings

Emitter

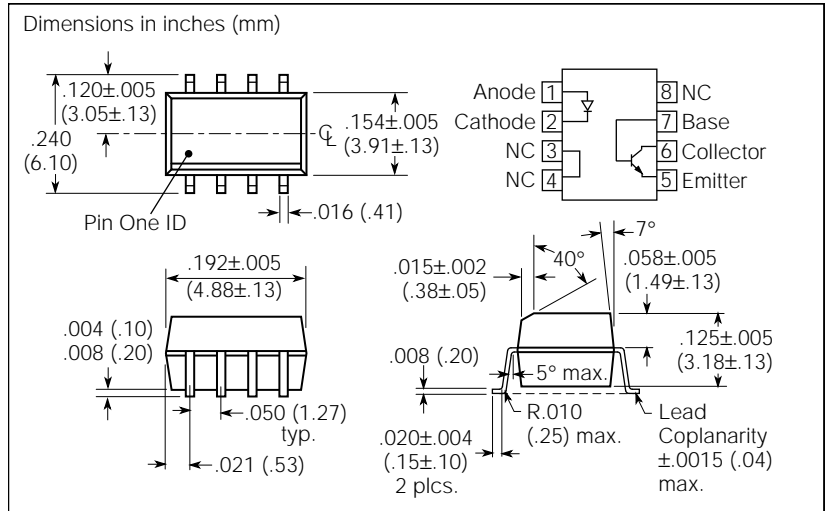
Peak Reverse Voltage 6.0 V
 Continuous Forward Current 60 mA
 Power Dissipation at 25°C 90 mW
 Derate Linearly from 25°C 1.2 mW/°C

Detector

Collector-Emitter Breakdown Voltage 30 V
 Emitter-Collector Breakdown Voltage 7 V
 Collector-Base Breakdown Voltage 70 V
 Power Dissipation 150 mW
 Derate Linearly from 25°C 2.0 mW/°C

Package

Total Package Dissipation at 25°C Ambient (LED + Detector) 280 mW
 Derate Linearly from 25°C 3.3 mW/°C
 Storage Temperature -55°C to +150°C
 Operating Temperature -55°C to +100°C
 Soldering Time at 260°C 10 sec.



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

| | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---------------------------------------|--------------------------------|------|-----------------|-----------------|--------------------|--|
| Emitter | | | | | | |
| Forward Voltage | V_F | | 1.3 | 1.5 | V | $I_F = 10$ mA |
| Reverse Current | I_R | | 0.1 | 100 | μA | $V_R = 6.0$ V |
| Capacitance | C_O | | 25 | | pF | $V_R = 0$ |
| Detector | | | | | | |
| Breakdown Voltage | $B_{V_{CE0}}$ $B_{V_{ECO}}$ | | 30 7 | | V V | $I_C = 10$ μA $I_E = 10$ μA |
| Dark Current, Collector-Emitter | $I_{CE0\text{dark}}$ | | 5 | 50 | nA | $V_{CE} = 10$ V $I_F = 0$ |
| Capacitance, Collector-Emitter | C_{CE} | | 10 | | pF | $V_{CE} = 0$ |
| Package | | | | | | |
| DC Current Transfer Ratio | CTR_{DC} | | | | % | $I_F = 10$ mA, $V_{CE} = 5$ V |
| | | | 20 50 100 | 50 80 130 | | |
| Saturation Voltage, Collector-Emitter | $V_{CE\text{sat}}$ | | | 0.4 | | $I_F = 10$ mA, $I_C = 2.0$ mA |
| Isolation Test Voltage | V_{IO} | 2500 | | | VAC _{RMS} | |
| Capacitance, Input to Output | C_{IO} | | 0.5 | | pF | |
| Resistance, Input to Output | R_{IO} | | 100 | | G Ω | |
| Switching Time | t_{on}, t_{off} | | 3.0 | | μs | $I_C = 2$ mA, $R_E = 100$ Ω , $V_{CE} = 10$ V |

Figure 1. Forward voltage versus forward current

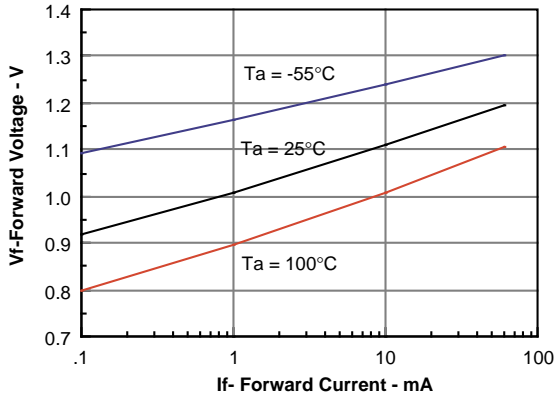


Figure 2. Normalized non-saturated and saturated CTR_{ce} versus LED current

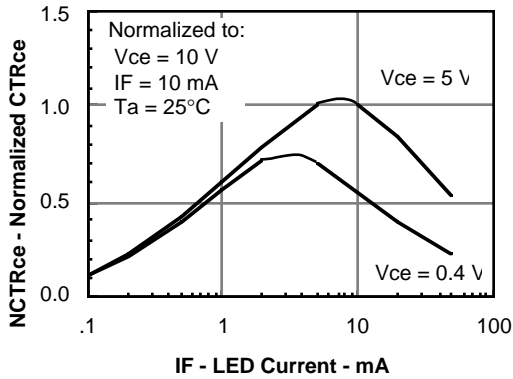


Figure 3. Collector-emitter current versus LED current

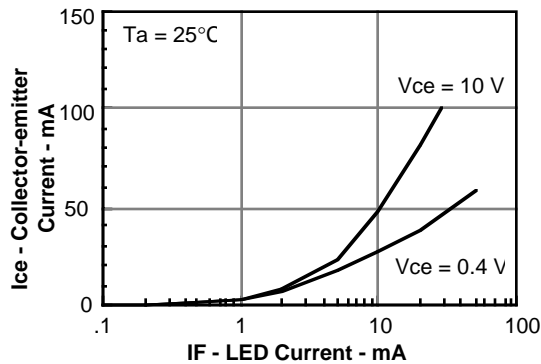


Figure 4. Normalized collector-base photocurrent versus LED current

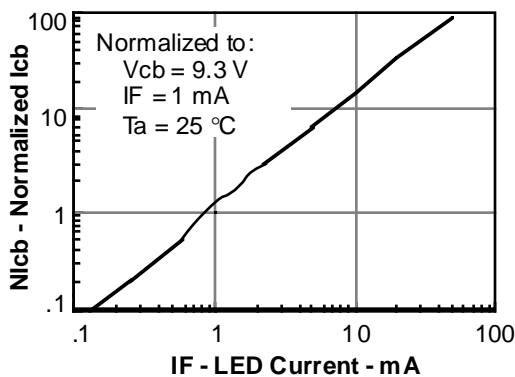


Figure 5. Normalized collector-base photocurrent versus LED current

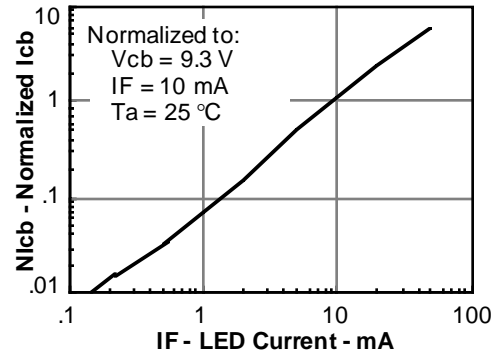


Figure 6. Collector-base photocurrent versus LED current

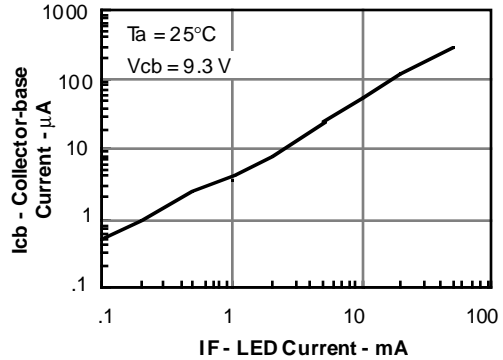


Figure 7. Collector-emitter leakage current versus temperature

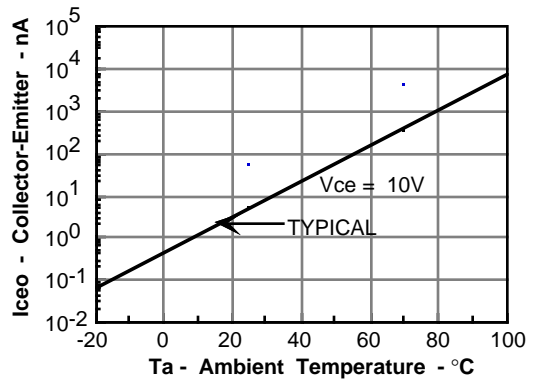


Figure 8. Normalized saturated HFE versus base current and temperature

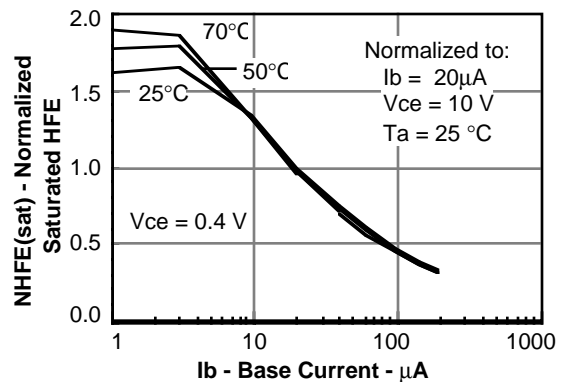


Figure 9. Typical switching characteristics versus base resistance (saturated operation)

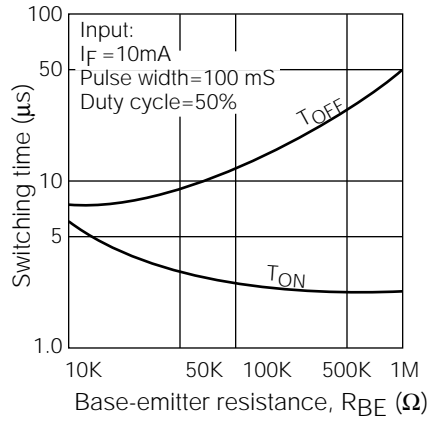
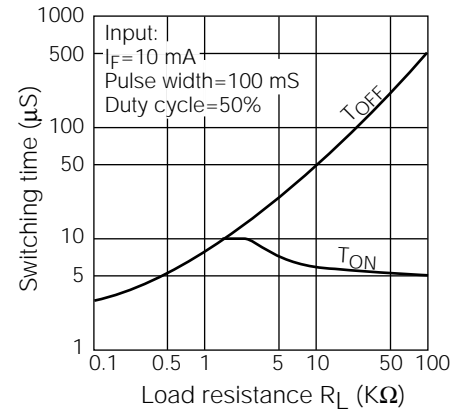


Figure 10. Typical switching times versus load resistance





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