

## Bidirectional Input Darlington Optocoupler

## FEATURES

- **Very High Current Transfer Ratio (500% min.)**  
 IL755B-1: 750% at  $I_F=2.0$  mA,  $V_{CE}=5.0$  V  
 IL755B-2: 1000% at  $I_F=1.0$  mA,  $V_{CE}=5.0$  V
- **$BV_{CEO} > 60$  V**
- **Isolation Test Voltage, 5300 V<sub>RMS</sub>**
- **AC or Polarity Insensitive Inputs**
- **No Base Connection**
- **High Isolation Resistance,  $10^{12} \Omega$**
- **Low Coupling Capacitance**
- **Standard Plastic DIP Package**
- **Underwriters Lab Approval #E52744**
-  **VDE #0884 Available with Option 1**

### DESCRIPTION

The IL755B is a bidirectional input, optically coupled isolator consisting of two Gallium Arsenide infrared emitters and a silicon photodarlington sensor.

### Maximum Ratings (at 25°C)

### Emitter (Drive Circuit)

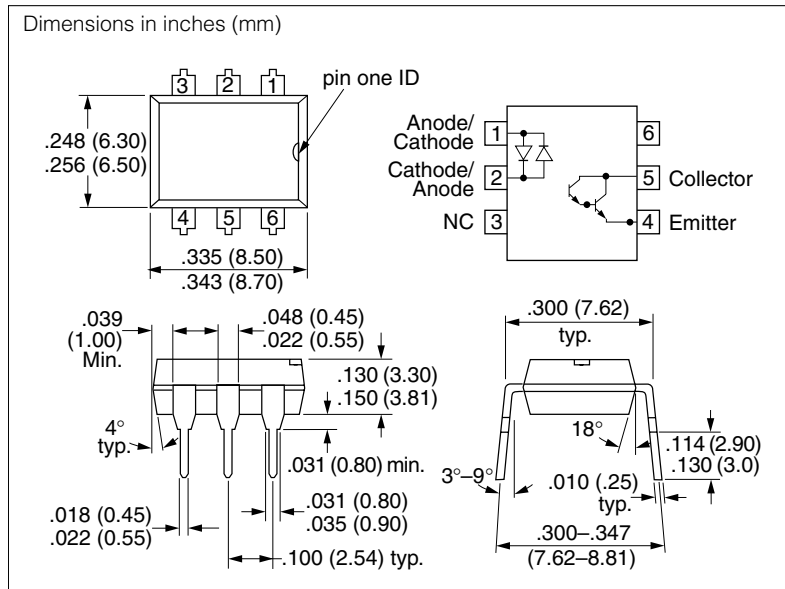
|                                  |            |
|----------------------------------|------------|
| Continuous Forward Current ..... | 60 mA      |
| Power Dissipation at 25°C.....   | 100 mW     |
| Derate Linearly from 55°C .....  | 1.33 mW/°C |

### Detector

|                                           |           |
|-------------------------------------------|-----------|
| Collector-Emitter Breakdown Voltage ..... | 60 V      |
| Emitter-Collector Breakdown Voltage ..... | 12 V      |
| Power Dissipation at 25°C Ambient .....   | 200 mW    |
| Derate Linearly from 25°C .....           | 2.6 mW/°C |

## Package

|                                               |                       |
|-----------------------------------------------|-----------------------|
| Isolation Test Voltage                        |                       |
| (PK), t=1.0 sec. ....                         | 5300 V <sub>RMS</sub> |
| Dissipation at 25°C .....                     | 250 mW                |
| Derate Linearly from 25°C .....               | 3.3 mW/°C             |
| Creepage .....                                | ≥7.0 mm               |
| Clearance .....                               | ≥7.0 mm               |
| Isolation Resistance                          |                       |
| $T_A=25^{\circ}\text{C} \geq 10^{12} \Omega$  |                       |
| $T_A=100^{\circ}\text{C} \geq 10^{11} \Omega$ |                       |
| Storage Temperature .....                     | -55°C to +150°C       |
| Operating Temperature .....                   | -55°C to +100°C       |
| Lead Soldering Time at 260°C .....            | 10 sec.               |



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

|                                                | Sym.                  | Min.        | Typ. | Max. | Unit          | Condition                                                                   |
|------------------------------------------------|-----------------------|-------------|------|------|---------------|-----------------------------------------------------------------------------|
| <b>Emitter</b>                                 |                       |             |      |      |               |                                                                             |
| Forward Voltage <sup>(1)</sup>                 | $V_F$                 | —           | 1.25 | 1.5  | V             | $I_F=10\text{ mA}$                                                          |
| <b>Detector</b>                                |                       |             |      |      |               |                                                                             |
| Breakdown Voltage,<br>Collector-Emitter        | $BV_{CEO}$            | 60          | 75   | —    | V             | $I_C=1.0\text{ mA}$<br>$I_F=0$                                              |
| Leakage Current,<br>Collector-Emitter          | $I_{CEO}$             | —           | 1.0  | 100  | nA            | $V_{CE}=10\text{ V}$<br>$I_F=0$                                             |
| <b>Package</b>                                 |                       |             |      |      |               |                                                                             |
| Current Transfer Ratio<br>IL755B-1<br>IL755B-2 | CTR                   | 750<br>1000 | —    | —    | %             | $V_{CE}=5.0\text{ V}$<br>$I_F=\pm 2.0\text{ mA}$<br>$I_F=\pm 1.0\text{ mA}$ |
| Saturation Voltage,<br>Collector-Emitter       | $V_{CEsat}$           | —           | —    | 1.0  | V             | $I_C=10\text{ mA}$<br>$I_F=\pm 10\text{ mA}$                                |
| Turn-On Time<br>Turn-Off Time                  | $t_{on}$<br>$t_{off}$ | —           | —    | 200  | $\mu\text{s}$ | $V_{CC}=10\text{ V}$<br>$I_F=\pm 2.0\text{ mA}$<br>$R_L=100\text{ }\Omega$  |

Notes:

1. Indicates JEDEC registered data.

Figure 1. LED forward current versus forward voltage

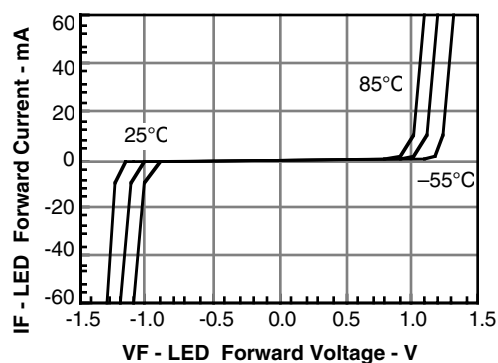


Figure 2. Normalized non-saturated and saturated  $CTR_{ce}$  versus LED current

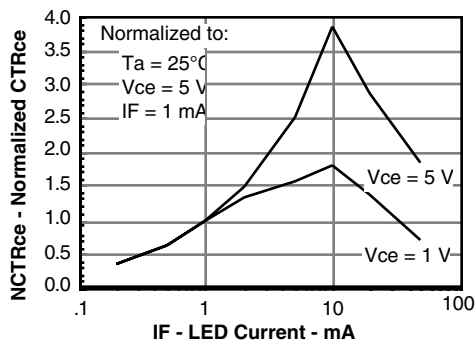


Figure 3. Normalized non-saturated and saturated  $CTR_{ce}$  versus LED current

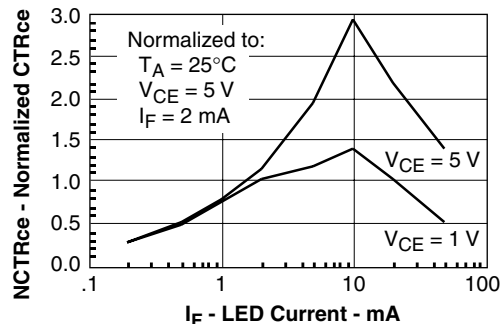


Figure 4. Normalized non-saturated and saturated  $I_{ce}$  versus LED current

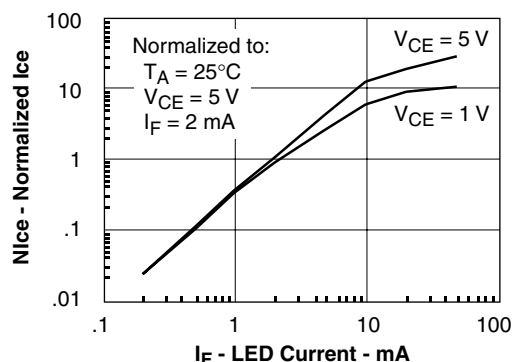


Figure 5. Normalized non-saturated and saturated collector-emitter current versus LED current

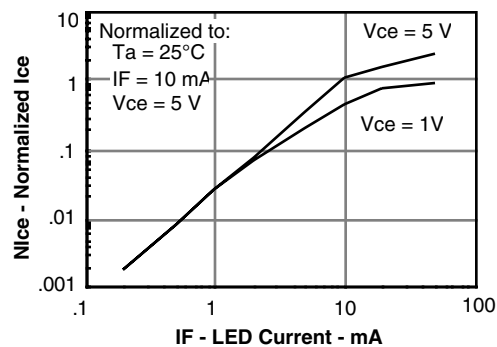


Figure 6. Low to high propagation delay versus collector load resistance and LED current

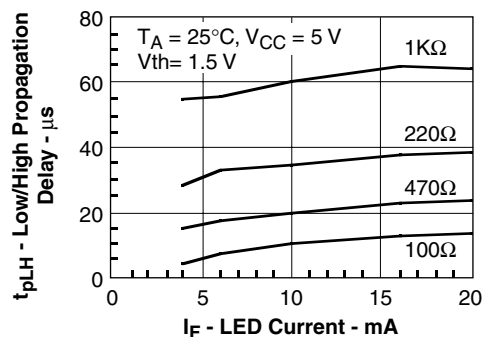


Figure 7. High to low propagation delay versus collector load resistance and LED current

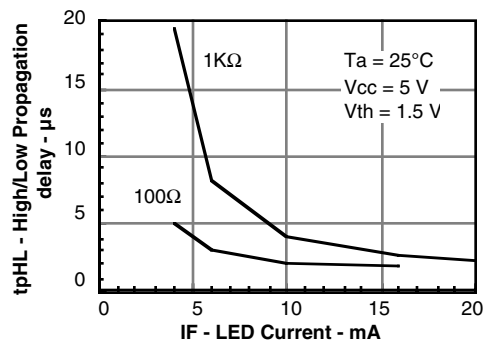


Figure 8. Switching waveform

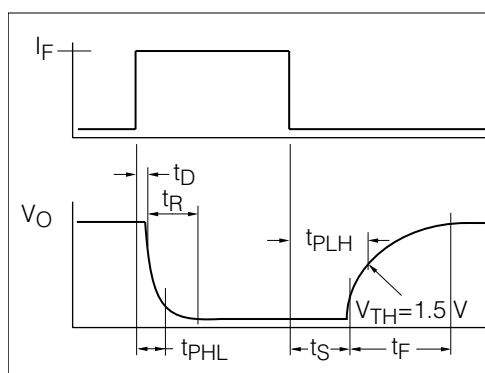


Figure 9. Normalized non-saturated and saturated  $CTR_{ce}$  versus LED current

