


## SINGLE CHANNEL IL66 SERIES DUAL CHANNEL ILD66 SERIES QUAD CHANNEL ILQ66 SERIES PHOTODARLINGTON OPTOCOUPLER

### FEATURES

- Internal RBE for High Stability
- Current Transfer Ratio is Tested at 2.0 mA and 0.7 mA Input  
IL/ILD/ILQ66 Series:
  - 1, 100% min. at  $I_F=2\text{ mA}$ ,  $V_{CE}=10\text{ V}$
  - 2, 300% min. at  $I_F=2\text{ mA}$ ,  $V_{CE}=10\text{ V}$
  - 3, 400% min. at  $I_F=0.7\text{ mA}$ ,  $V_{CE}=10\text{ V}$
  - 4, 500% min. at  $I_F=2\text{ mA}$ ,  $V_{CE}=5\text{ V}$
- Four Available CTR Categories per Package Type
- $BV_{CEO} > 60\text{ V}$
- Standard DIP Packages
- Underwriters Lab File #E52744
-  VDE 0884 Available with Option 1

### DESCRIPTION

IL66, ILD66, and ILQ66 are optically coupled isolators employing Gallium Arsenide infrared emitters and silicon photodarlington detectors. Switching can be accomplished while maintaining a high degree of isolation between driving and load circuits, with no crosstalk between channels.

### Maximum Ratings

#### Emitter (Each Channel)

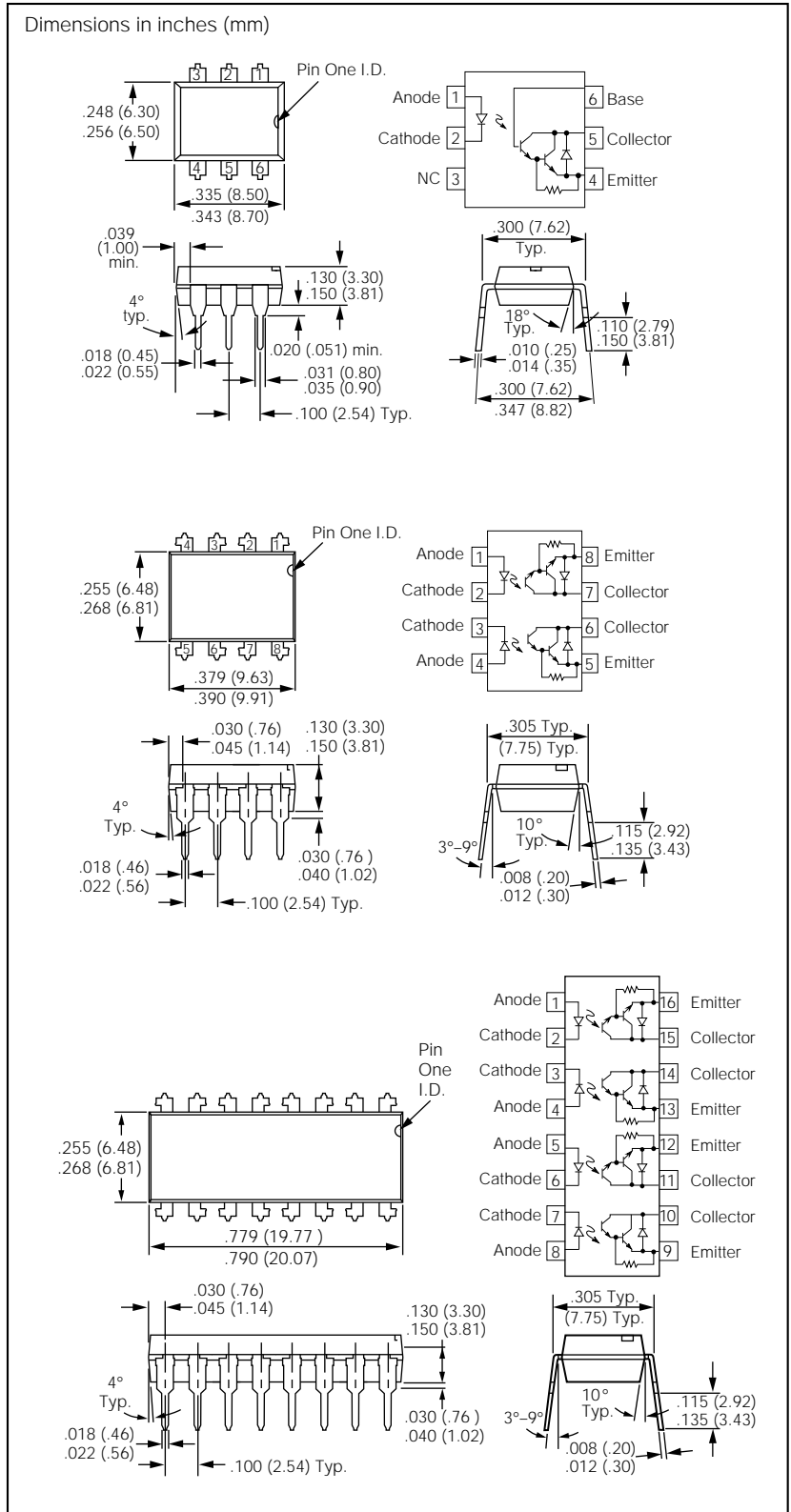
Peak Reverse Voltage..... 6 V  
 Continuous Forward Current..... 60 mA  
 Power Dissipation at 25°C..... 100 mW  
 Derate Linearly from 25°C..... 1.33 mW/°C

#### Detector (Each Channel)

Power Dissipation at 25°C Ambient..... 150 mW  
 Derate Linearly from 25°C..... 2.0 mW/°C

### Package

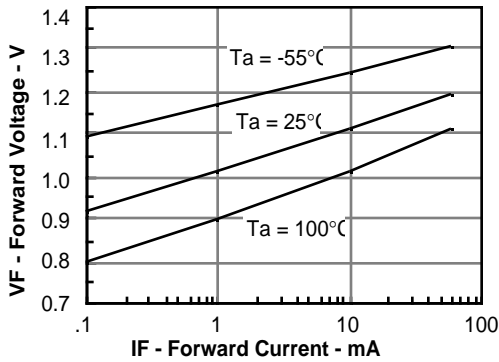
Isolation Test Voltage  
 (t=1 sec.)..... 5300 VAC<sub>RMS</sub>  
 Total Package Power Dissipation at 25°C  
 IL66..... 250 mW  
 ILD66..... 400 mW  
 ILQ66..... 500 mW  
 Derate Linearly from 25°C  
 IL66..... 3.3 mW/°C  
 ILD66..... 5.33 mW/°C  
 ILQ66..... 6.67 mW/°C  
 Creepage..... 7 min mm  
 Clearance..... 7 min mm  
 Comparative Tracking Index..... 175  
 Isolation Resistance  
 $V_{IO}=500\text{ V}$ ,  $T_A=25^\circ\text{C}$ .....  $\geq 10^{12}\ \Omega$   
 $V_{IO}=500\text{ V}$ ,  $T_A=100^\circ\text{C}$ .....  $\geq 10^{11}\ \Omega$   
 Storage Temperature..... -55°C to +125°C  
 Operating Temperature..... -55°C to +100°C  
 Lead Soldering Time at 260°C..... 10 sec.



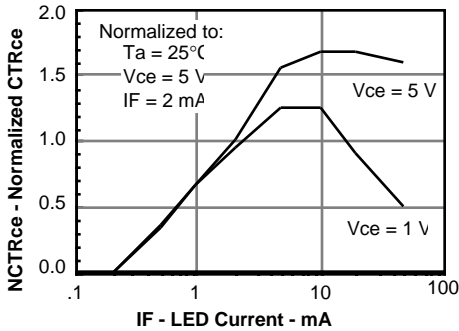
**Electrical Characteristics (T<sub>A</sub>=25°C)**

|  | Symbol             | Min. | Typ. | Max.. | Unit | Condition                                     |
|--|--------------------|------|------|-------|------|---|
| <b>GaAs Emitter</b>                      |                    |      |      |       |      |   |
| Forward Voltage                          |                    |      | 1.25 | 1.5   | V    | I <sub>F</sub> =20 mA                         |
| Reverse Current                          |                    |      | 0.1  | 10    | μA   | V <sub>R</sub> =6.0 V                         |
| Capacitance                              |                    |      | 25   |       | pF   | V <sub>R</sub> =0 V                           |
| <b>Photodarlington</b>                   |                    |      |      |       |      |   |
| Breakdown Voltage<br>Collector-Emitter   | BV <sub>CEO</sub>  | 60   |      |       | V    | I <sub>C</sub> =1 mA, I <sub>F</sub> =0       |
| Collector-Base (IL66)                    | BV <sub>CBO</sub>  | 60   |      |       | V    | I <sub>C</sub> =10 μA                         |
| Leakage Current,<br>Collector-Emitter    | I <sub>CEO</sub>   |      | 1.0  | 100   | nA   | V <sub>CE</sub> =50 V, I <sub>F</sub> =0      |
| Capacitance,<br>Collector-Emitter        |                    |      | 3.4  |       | pF   | V <sub>CE</sub> =10 V                         |
| <b>Coupled Characteristics</b>           |                    |      |      |       |      |   |
| Current Transfer Ratio<br>IL/ILD/ILQ66-1 | CTR                | 100  | 400  |       | %    | I <sub>F</sub> =2 mA, V <sub>CE</sub> =10 V   |
| IL/ILD/ILQ66-2                           |                    | 300  | 500  |       | %    | I <sub>F</sub> =2 mA, V <sub>CE</sub> =10 V   |
| IL/ILD/ILQ66-3                           |                    | 400  | 500  |       | %    | I <sub>F</sub> =0.7 mA, V <sub>CE</sub> =10 V |
| IL/ILD/ILQ66-4                           |                    | 500  | 750  |       | %    | I <sub>F</sub> =2 mA, V <sub>CE</sub> =5 V    |
| Saturation Voltage,<br>Collector-Emitter | V <sub>CEsat</sub> |      | 0.9  | 1.0   | V    | I <sub>C</sub> =10 mA, I <sub>F</sub> =10 mA  |
| Rise Time -1, -2, -4                     | t <sub>R</sub>     |      |      | 200   | μs   | V <sub>CC</sub> =10 V                         |
| Fall Time -1, -2, -4                     | t <sub>F</sub>     |      |      | 200   | μs   | I <sub>F</sub> =2 mA, R <sub>C</sub> =100 Ω   |
| Rise Time -3                             | t <sub>R</sub>     |      |      | 200   | μs   | I <sub>F</sub> =0.7 mA                        |
| Fall Time -3                             | t <sub>F</sub>     |      |      | 200   | μs   | V <sub>CC</sub> =10 V, R <sub>L</sub> =100 Ω  |

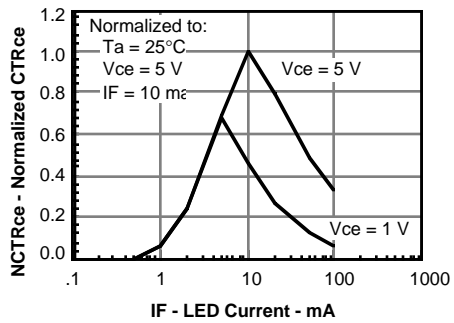
**Figure 1. Forward voltage versus forward current**



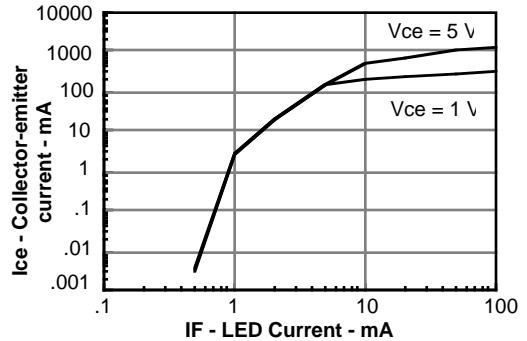
**Figure 2. Normalized non-saturated and saturated CTR<sub>ce</sub> versus LED current**



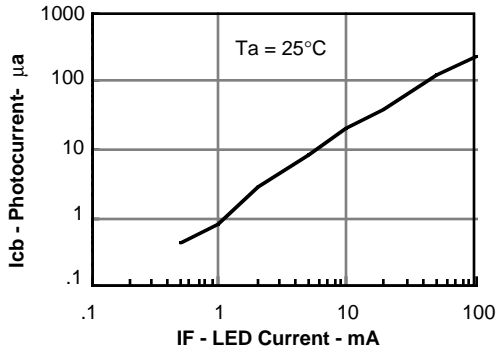
**Figure 3. Normalized non-saturated and saturated CTR<sub>ce</sub> versus LED current**



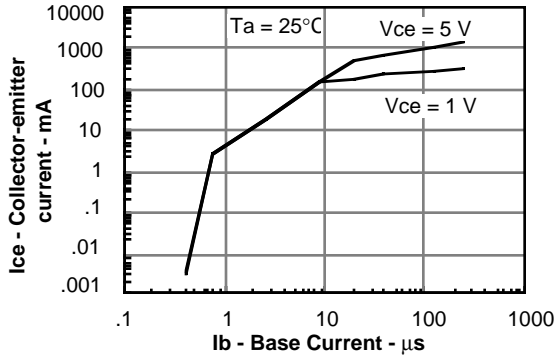
**Figure 4. Non-saturated and saturated collector emitter current versus LED current**



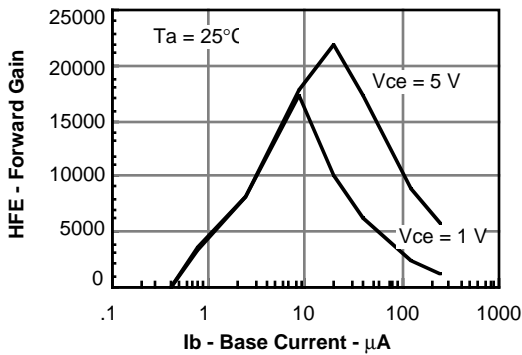
**Figure 5. Collector-base photocurrent versus LED current**



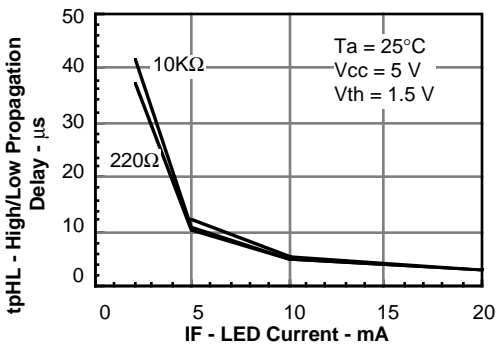
**Figure 6. Collector-emitter current versus LED current**



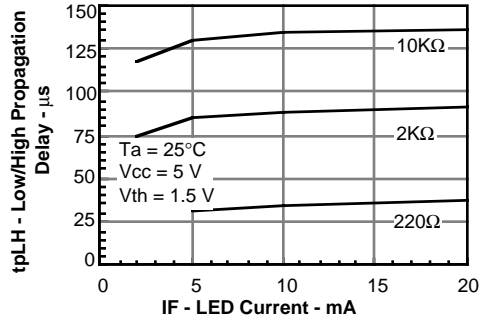
**Figure 7. Non-saturated and saturated HFE versus LED current**



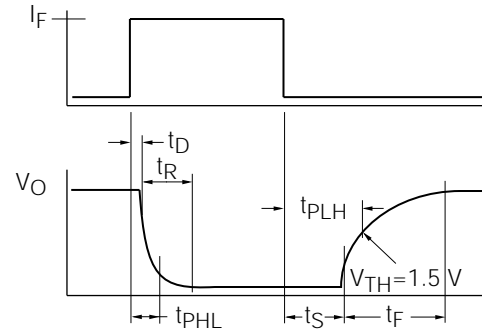
**Figure 8. High/low propagation delay versus collector load resistance and LED current**



**Figure 9. Low/high propagation delay versus collector load resistance and LED current**



**Figure 10. Switching waveform**



**Figure 11. Switching schematic**

