SINGLE CHANNEL **IL30/31/55**
DUAL CHANNEL **ILD30/31/55**
QUAD CHANNEL **ILQ30/31/55**
Photodarlington Optocoupler

FEATURES

- **Current Transfer Ratio**
  IL/ILD/ILQ30/55, 100% min.
  IL/ILD/ILQ31, 200% min.
- **125 mA Load Current Rating**
- **Fast Rise Time, 10 µS**
- **Fast Fall Time, 35 µS**
- **Single, Dual and Quad Channel**
- **Solid State Reliability**
- **Standard DIP Packages**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

DESCRIPTION

The IL30/31/55, ILD30/31/55, and ILQ30/31/55 are optically coupled isolators with Gallium Arsenide infrared emitters and silicon photodarlington sensors. Switching can be achieved while maintaining a high degree of isolation between driving and load circuits, with no crosstalk between channels. These optocouplers can be used to replace reed and mercury relays with advantages of long life, high speed switching and elimination of magnetic fields.

The Il30/31/55 are equivalent to MCA230/MCA231/ MCA255. The ILD30/31/55 re designed to reduce board space requirements in high density applications.

Maximum Ratings

Emitter (each channel)

Peak Reverse Voltage ..... 3.0 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)

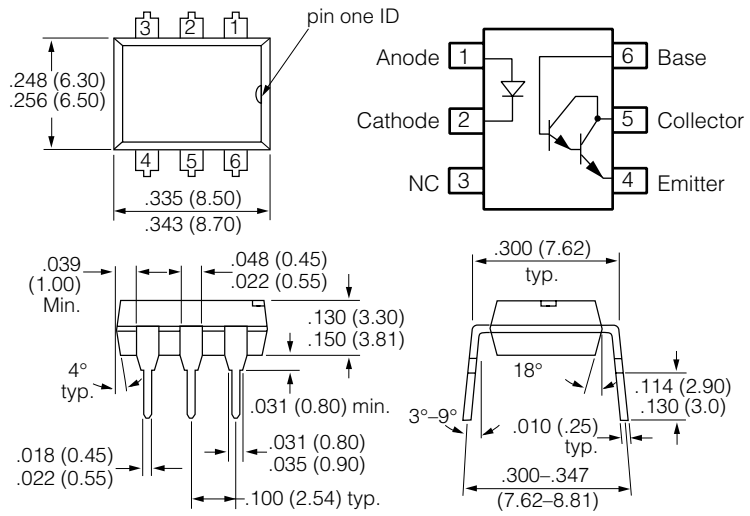
Collector-Emitter Breakdown Voltage
IL/D/Q30 ..... 30 V
IL/D/Q55 ..... 55 V
Collector (Load) Current ..... 125 mA
Power Dissipation at 25°C Ambient ..... 150 mW
Derate Linearly from 25°C ..... 2.0 mW/°C

Package

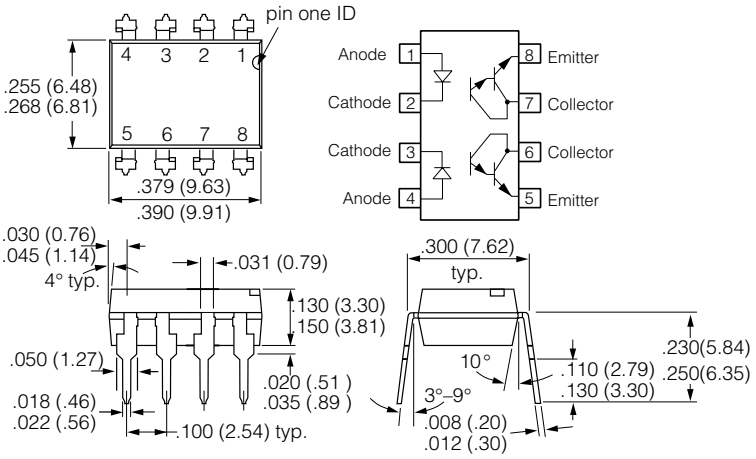
Total Package Power Dissipation at 25°C
IL30/31/55 ..... 250 mW
ILD30/31/55 ..... 400 mW
ILQ30/31/55 ..... 500 mW
Derate Linearly from 25°C
IL30/31/55 ..... 3.3 mW/°C
ILD30/31/55 ..... 5.33 mW/°C
ILQ30/31/55 ..... 6.67 mW/°C
Isolation Test Voltage ..... 5300 V_{RMS}
Creepage ..... ≥7.0 mm
Clearance ..... ≥7.0 mm
Comparative Tracking Index 175
Storage Temperature ..... –55°C to +125°C
Operating Temperature ..... –55°C to +100°C
Lead Soldering Time at 260°C ..... 10 sec.

Dimensions in inches (mm)

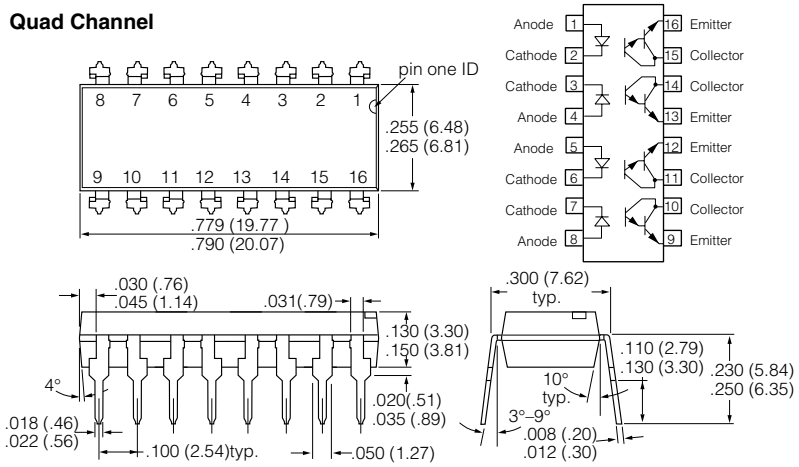
Single Channel



Dual Channel



Quad Channel



Electrical Characteristics T_A=25°C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
GaAs Emitter (per channel)							
Forward Voltage		V_F	—	1.25	1.5	V	I_F=20 mA
Reverse Current		I_R	—	0.1	10	µA	V_R=3.0 V
Capacitance		C_O	—	25	—	pF	V_R=0 V
Detector (per channel)							
Collector-Emitter Breakdown Voltage		BV_{CEO}	30/55	—	—	V	I_C=100 µA
Collector-Emitter Leakage Current		I_{CEO}	—	1.0	100	nA	V_{CE}=10 V, I_F=0
Collector-Emitter Capacitance		C_{CE}	—	3.4	—	pF	V_{CE}=10 V, f=1.0 MHz
Package							
Current Transfer Ratio	IL/D/Q30/55	CTR	100	400	—	%	I_F=10 mA, V_{CE}=5.0 V
	IL/D/Q31		200	400	—		
Collector-Emitter Saturation Voltage		V_{CEsat}	—	0.9	1.0	V	I_C=50 mA, I_F=50 mA
Isolation Test Voltage		—	5300	—	—	V_{RMS}	—
Isolation Resistance		R_{ISOL}	—	10^{12}	—	Ω	—
Coupling Capacitance		C_{ISOL}	—	0.5	—	pF	—
Rise Time		t_r	—	10	—	µs	V_{CC}=13.5 V, I_F=50 mA, R_L=100 Ω
Fall Time		t_f	—	35	—	µs	

Figure 1. Forward voltage versus forward current

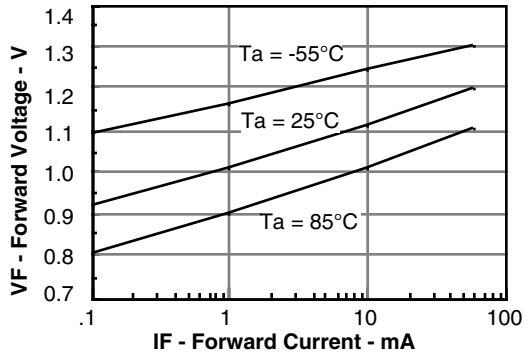


Figure 2. Normalized non-saturated and saturated CTR_{ce} at T_A=25°C versus LED current

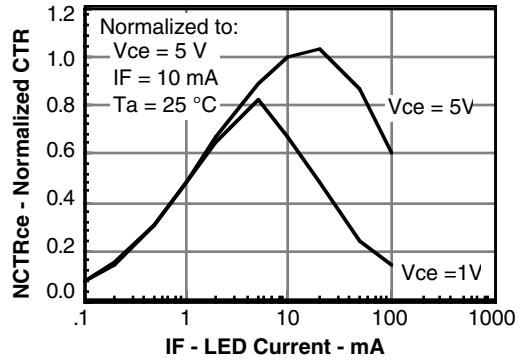


Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current

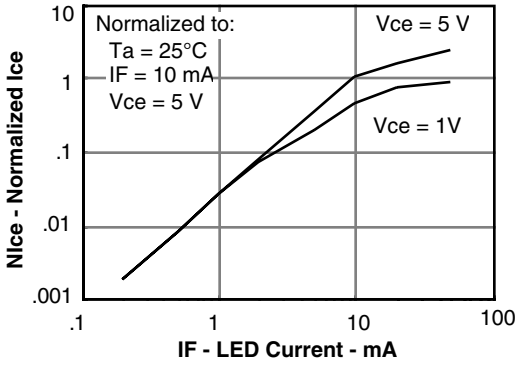


Figure 4. Normalized collector-base photocurrent versus LED current

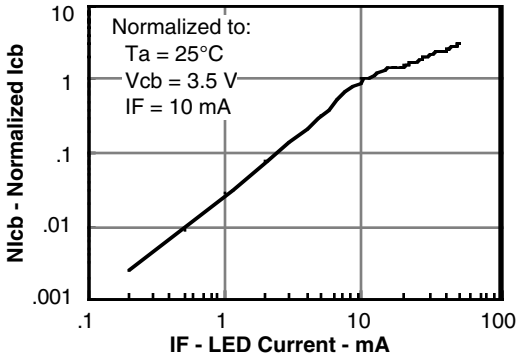


Figure 5. Hfe current gain versus base current

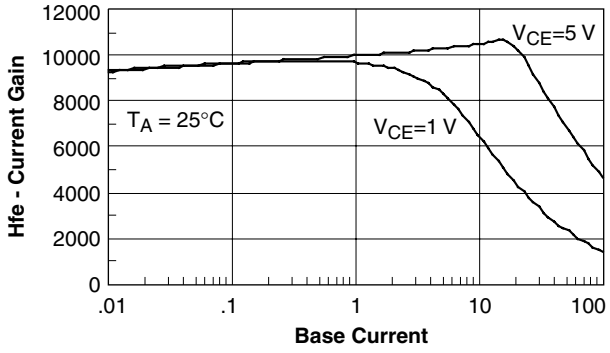


Figure 6. Low to high propagation delay versus collector load resistance and LED current

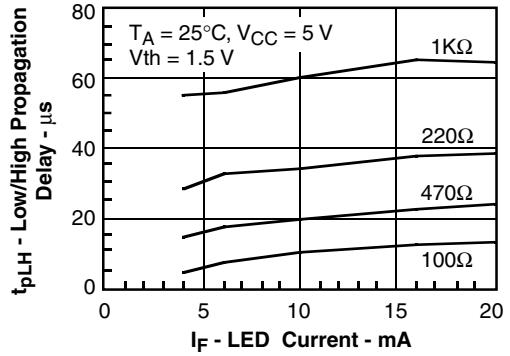


Figure 7. High to low propagation delay versus collector load resistance and LED current

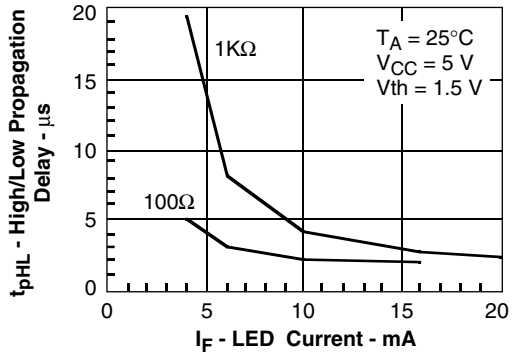


Figure 8. Switching waveforms

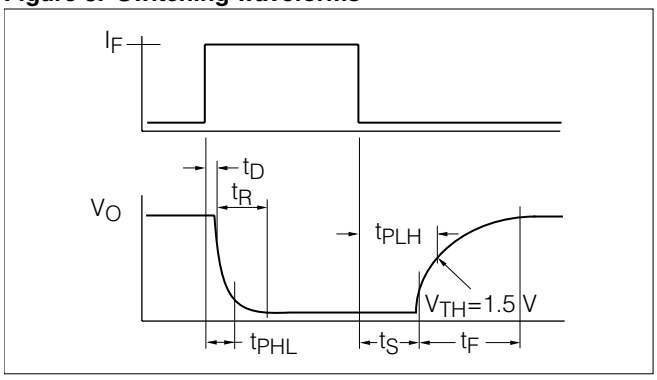


Figure 9. Switching schematic