SIEMENS

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 wih 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 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

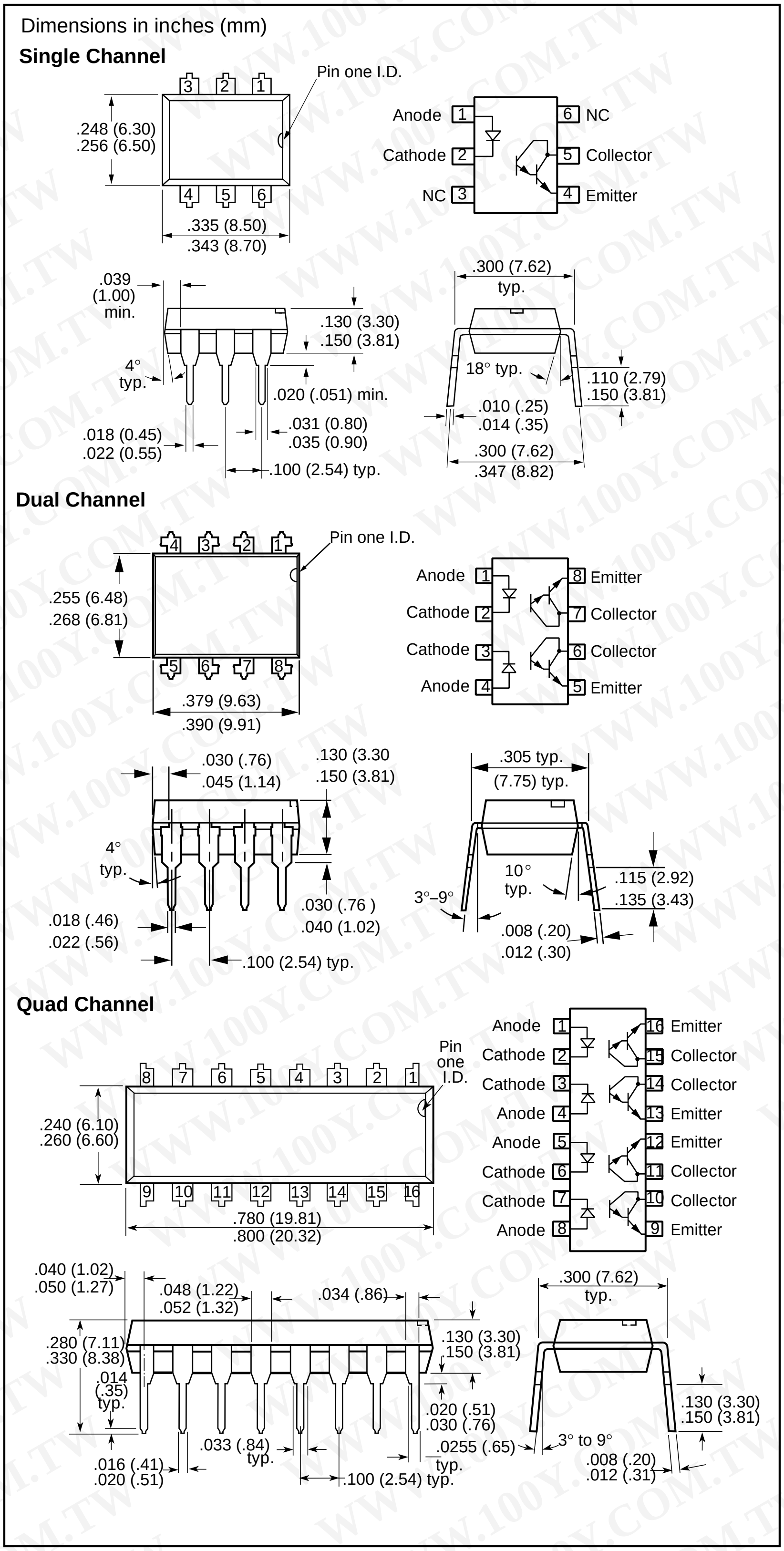
Collector (Load) Current .... 125 mA
Power Dissipation at 25°C Ambient .... 150 mW
Derate Linearly from 25°C .... 2.0 mW/°C

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 VAC_{RMS}
Creepage .... 7 mm min.
Clearance .... 7 mm min.
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.



Electrical Characteristics (T_A=25°C)

	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 MHz
Package						
Current Transfer Ratio IL/D/Q30/55 IL/D/Q31	CTR	 100 200	 400 400		 % %	 I_F=10 mA,V_{CE}=5 V I_F=10 mA,V_{CE}=5 V
Collector-Emitter Saturation Voltage	V_{CEsat}		0.9	1.0	V	I_C=50 mA, I_F=50 mA
Isolation Test Voltage		5300			VAC_{RMS}	
Isolation Resistance	R_{ISOL}		10^{12}		W	
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

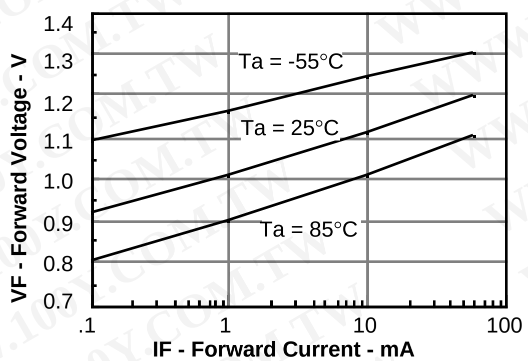


Figure 2. Normalized non-saturated and saturated CTRce at T_A=25°C versus LED current

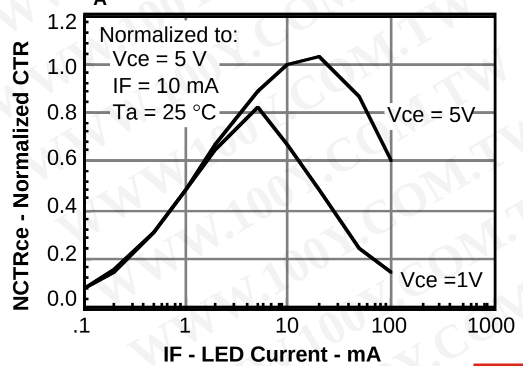


Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current

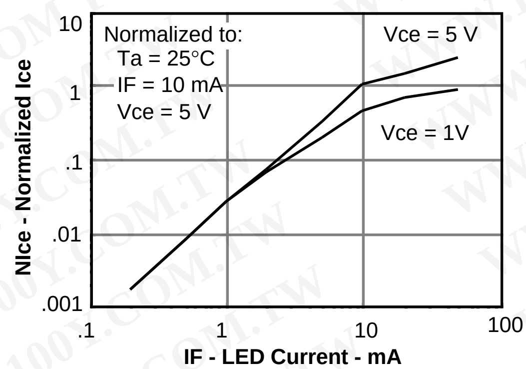


Figure 4. Normalized collector-base photocurrent versus LED current

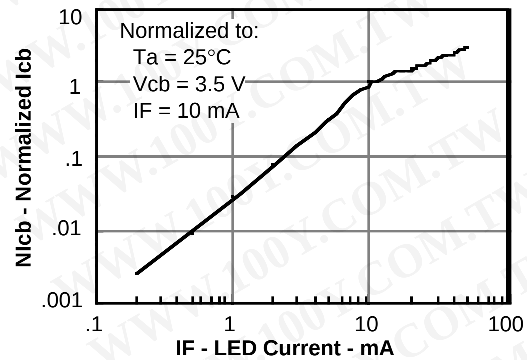


Figure 5. Hfe current gain versus base current

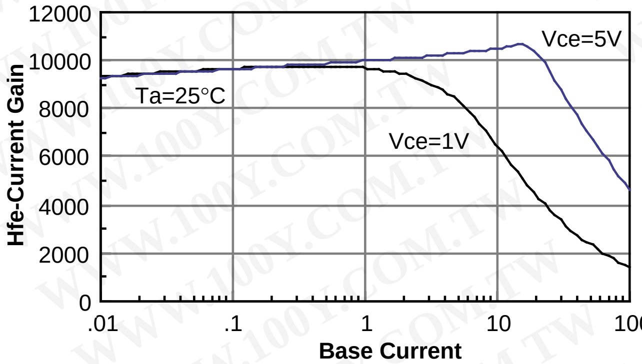


Figure 6. Low to high propagation delay versus collector load resistance and LED current

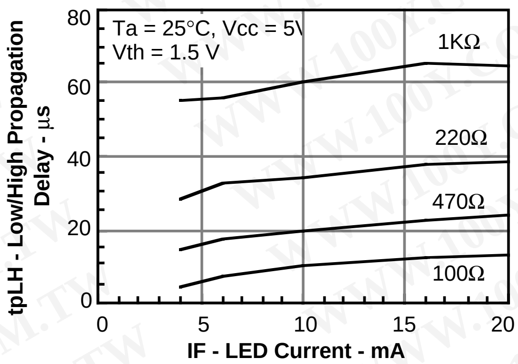


Figure 7. High to low propagation delay versus collector load resistance and LED current

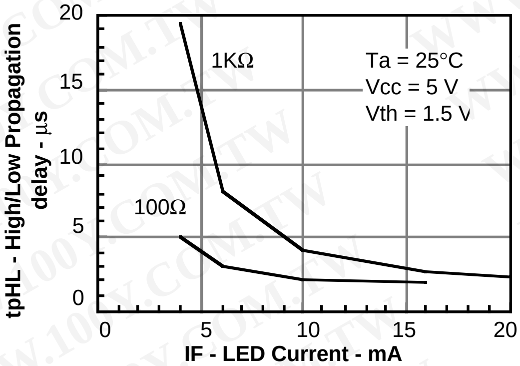


Figure 8. Switching waveforms

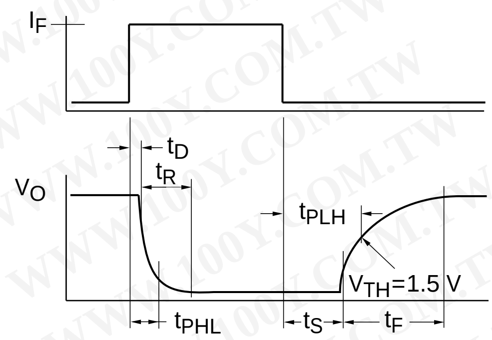


Figure 9. Switching schematic