MCA230/231/255

Photodarlington Optocoupler

FEATURES

- **CTR Minimum**
  MCA230/255, 100%
  MCA231, 200%
- **Isolation Test Voltage, 5300 V_{RMS}**
- **Coupling Capacitance, 0.5 pF**
- **Fast Rise Time, 10 µs**
- **Fast Fall Time, 35 µs**
- **Underwriters Lab File #E52744**
- **VDE #0884 Available with Option 1**

DESCRIPTION

The MCA230/231/255 are industry standard optocouplers, consisting of a Gallium Arsenide infrared LED and a silicon phototdarlington. These optocouplers are constructed with a high voltage insulation, double molded packaging process which offers 7.5 kV withstand test capability.

Maximum Ratings

Emitter

Reverse Voltage.....6.0 V
Continuous Forward Current .....60 mA
Power Dissipation at 25°C.....135 mW
Derate Linearly from 25°C .....1.8 mW/°C

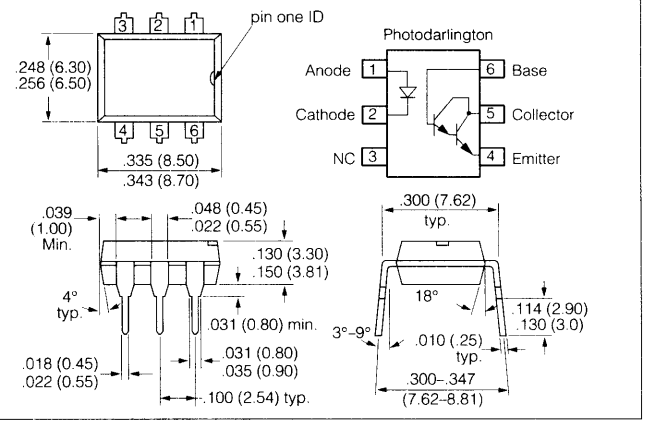
Detector

Collector-Emitter Breakdown Voltage
MCA230/231 .....30 V
MCA255 .....55 V
Emitter-Collector Breakdown Voltage .....7.0 V
Collector-Base Breakdown Voltage
MCA230/231 .....30 V
MCA255 .....55 V
Power Dissipation at 25°C.....210 mW
Derate Linearly from 25°C .....2.8 mW/°C

Package

Total Package Dissipation at 25°C
(LED plus Detector) .....260 mW
Derate Linearly from 25°C .....3.5 mW/°C
Storage Temperature .....–55°C to +150°C
Operating Temperature .....–55°C to +100°C
Lead Soldering Time at 260°C ..... 10 sec.
Isolation Test Voltage .....5300 V_{RMS}
Isolation Resistance
V_{IO}=500 V, T_A=25°C..... 10^{12} Ω
V_{IO}=500 V, T_A=100°C..... 10^{11} Ω

Dimensions in inches (mm)



Characteristics (T_A=25°C)

	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F	—	1.1	1.5	V	I_F=50 mA
Reverse Current	I_R	—	—	10	µA	V_R=3.0 V
Junction Capacitance	C_J	—	50	—	pF	V_R=3.0 V
Detector						
BV_{CEO} MCA230/231 MCA255	—	30 30	—	—	V V	I_C=100 µA, I_F=0 mA I_C=100 µA, I_F=0 mA
BV_{ECO}	—	7.0	—	—	V	I_E=10 µA, I_F=0 mA
BV_{CBO} MCA230/231 MCA55	— —	30 55	— —	— —	V V	I_C=10 µA, I_F=0 mA I_C=10 µA, I_F=0 mA
I_{CEO}	—	—	—	100	nA	V_{CE}=10 V, I_F=0 mA
Package						
V_{CEsat}	—	—	—	0.8 1.0 1.0 1.0 1.2	V V V V V	I_{CE}=2.0 mA, I_F=16 mA I_C=I_F=50 mA I_C=2.0 mA, I_F=1.0 mA I_C=10 mA, I_F=5.0 mA I_C=50 mA, I_F=10 mA
DC Current Transfer Ratio MCA230/255 MCA231	 CTR CTR	 100 200	 — —	 — —	 % %	 V_{CE}=5.0 V, I_F=10 mA V_{CE}=5.0 V, I_F=1.0 mA
Capacitance Input to Output	C_{IO}	—	0.5	—	pF	—
Switching Times	t_{on} t_{off}	— —	10 35	— —	µs µs	R_L=100 Ω V_{CE}=10 V

Figure 1. Forward voltage versus forward current

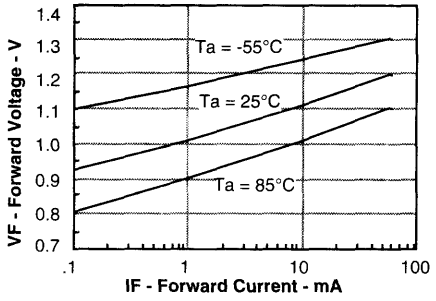


Figure 2. Normalized non-saturated and saturated CTRce at T_A=25°C versus LED current

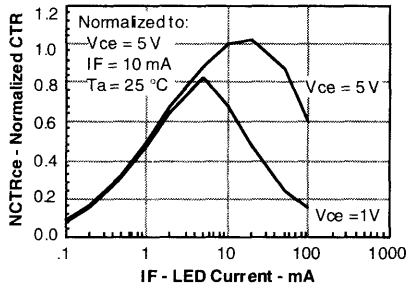


Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current

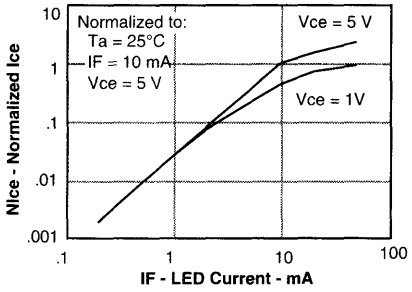


Figure 4. Normalized collector-base photocurrent versus LED current

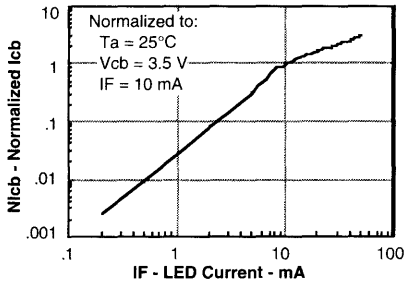


Figure 5. Non-saturated and saturated HFE versus base current

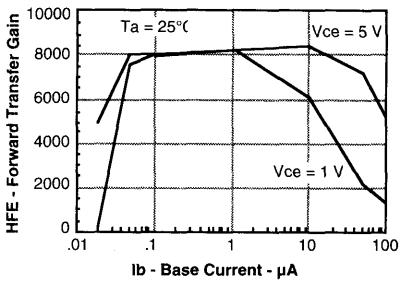


Figure 6. Low to high propagation delay versus collector load resistance and LED current

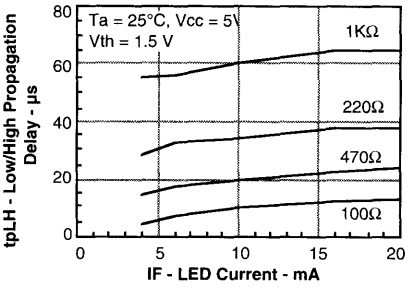


Figure 7. High to low propagation delay versus collector load resistance and LED current

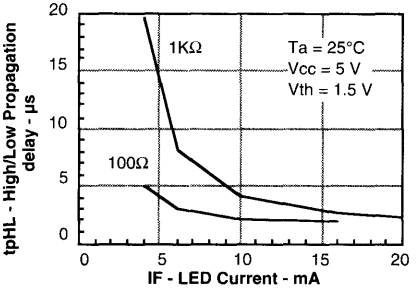


Figure 8. Switching timing waveform and schematic