



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 μ s**
- **Fast Fall Time, 35 μ s**
- **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 photodarlington. 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 Current60 mA
Power Dissipation at 25°C135 mW
Derate Linearly from 25°C1.8 mW/°C

Detector

Collector-Emitter Breakdown Voltage

MCA230/23130 V
MCA25555 V

Emitter-Collector Breakdown Voltage7.0 V

Collector-Base Breakdown Voltage

MCA230/23130 V
MCA25555 V

Power Dissipation at 25°C210 mW

Derate Linearly from 25°C2.8 mW/°C

Package

Total Package Dissipation at 25°C

(LED plus Detector)260 mW

Derate Linearly from 25°C3.5 mW/°C

Storage Temperature-55°C to +150°C

Operating Temperature-55°C to +100°C

Lead Soldering Time at 260°C10 sec.

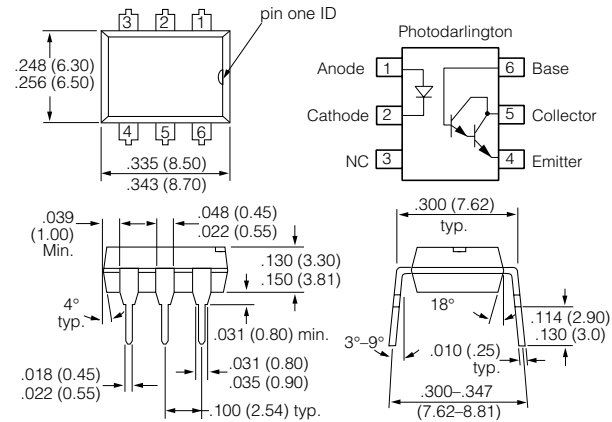
Isolation Test Voltage5300 V_{RMS}

Isolation Resistance

V_{IO}=500 V, T_A=25°C.....10¹² Ω

V_{IO}=500 V, T_A=100°C.....10¹¹ 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	μ A	V _R =3.0 V
Junction Capacitance	C _J	—	50	—	pF	V _R =3.0 V
Detector						
BV _{CEO}	—	30	—	—	V	I _C =100 μ A, I _F =0 mA
MCA230/231	—	30	—	—	V	I _C =100 μ A, I _F =0 mA
MCA255	—	—	—	—	V	I _C =100 μ A, I _F =0 mA
BV _{ECO}	—	7.0	—	—	V	I _E =10 μ A, I _F =0 mA
BV _{CBO}	—	30	—	—	V	I _C =10 μ A, I _F =0 mA
MCA230/231	—	55	—	—	V	I _C =10 μ A, I _F =0 mA
MCA55	—	—	—	—	V	I _C =10 μ A, 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	I _{CE} =2.0 mA, I _F =16 mA I _C =I _E =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	CTR	100	—	—	%	V _{CE} =5.0 V, I _F =10 mA
MCA230/255	CTR	200	—	—	%	V _{CE} =5.0 V, I _F =1.0 mA
MCA231	—	—	—	—	%	—
Capacitance Input to Output	C _{IO}	—	0.5	—	pF	—
Switching Times	t _{on}	—	10	—	μ s	R _L =100 Ω
	t _{off}	—	35	—	μ s	V _{CE} =10 V

Figure 1. Forward voltage versus forward current

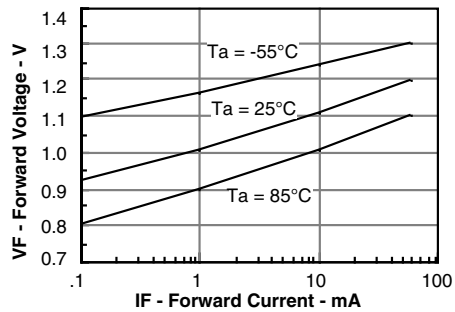


Figure 2. Normalized non-saturated and saturated CTRce at $T_A=25^\circ\text{C}$ versus LED current

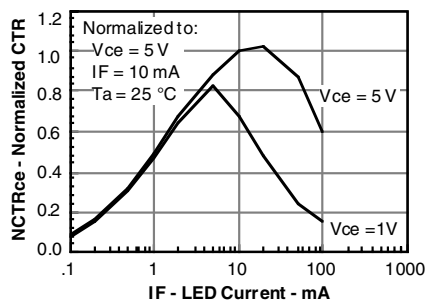


Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current

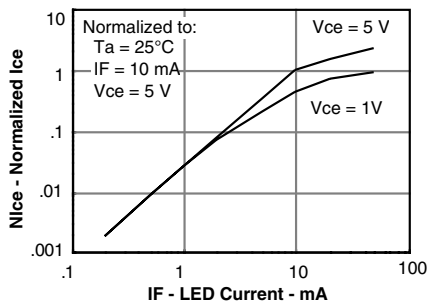


Figure 4. Normalized collector-base photocurrent versus LED current

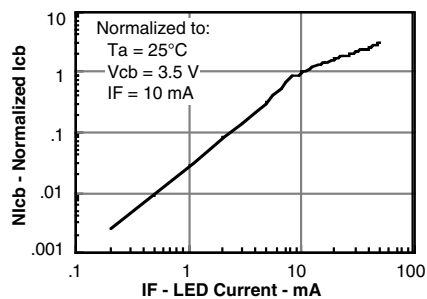


Figure 5. Non-saturated and saturated HFE versus base current

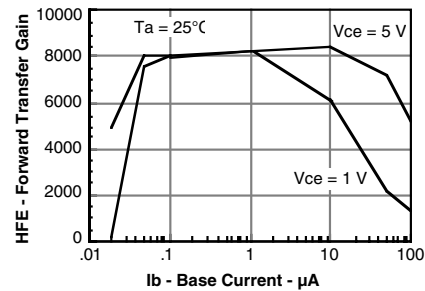


Figure 6. Low to high propagation delay versus collector load resistance and LED current

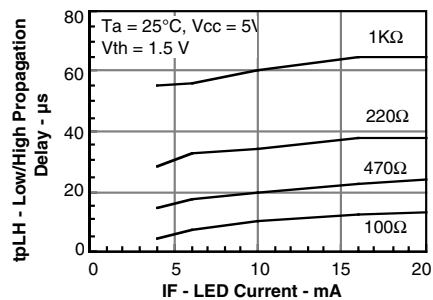


Figure 7. High to low propagation delay versus collector load resistance and LED current

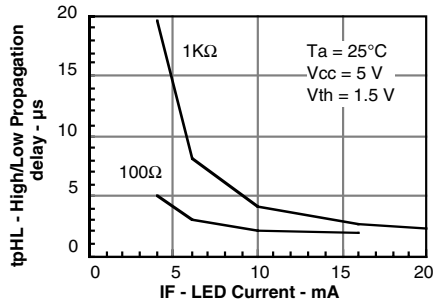


Figure 8. Switching timing waveform and schematic

