

SIEMENS

MCA230/231/255 PHOTODARLINGTON OPTOCOUPLER

FEATURES

- **CTR Minimum**
MCA230/255, 100%
MCA231, 200%
- **Isolation Test Voltage, 5300 VAC_{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 V
Continuous Forward Current 60 mA
Power Dissipation at 25°C 135 mW
Derate Linearly from 25°C 1.8 mW/°C

Collector-Emitter Breakdown Voltage

MCA230/231 30 V
MCA255 55 V

Emitter-Collector Breakdown Voltage

..... 7 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

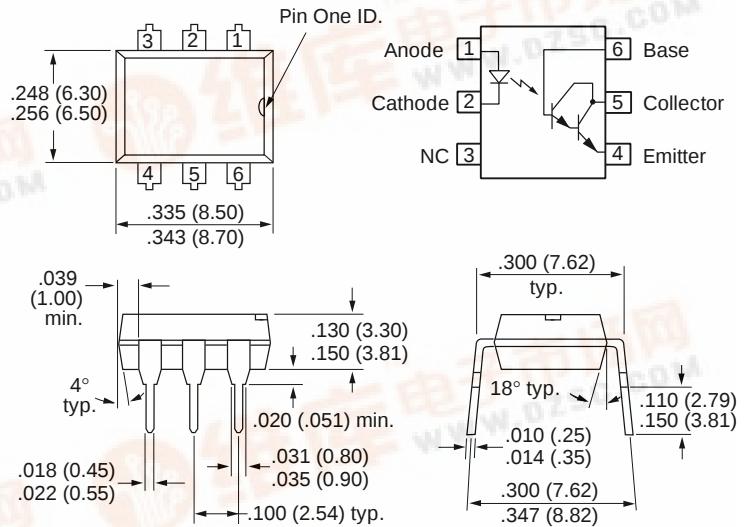
..... 5300 VAC_{RMS}

Isolation Resistance

$V_{IO}=500$ V, $T_A=25^\circ\text{C}$ $10^{12} \Omega$

$V_{IO}=500$ V, $T_A=100^\circ\text{C}$ $10^{11} \Omega$

Dimensions in inches (mm)



Characteristics ($T_A=25^\circ\text{C}$)

	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	$V_R=3$ V
Junction Capacitance	C_J		50		pF	$V_R=3$ V
Detector						
BV_{CEO}		30			V	$I_C=100 \mu\text{A}$, $I_F=0$ mA
MCA230/231		30			V	$I_C=100 \mu\text{A}$, $I_F=0$ mA
MCA255						
BV_{ECO}		7			V	$I_E=10 \mu\text{A}$, $I_F=0$ mA
BV_{CBO}		30			V	$I_C=10 \mu\text{A}$, $I_F=0$ mA
MCA230/231		55			V	$I_C=10 \mu\text{A}$, $I_F=0$ mA
MCA55						
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	$I_{CE}=2$ mA, $I_F=16$ mA $I_C=I_F=50$ mA $I_C=2$ mA, $I_F=1$ mA $I_C=10$ mA, $I_F=5$ mA $I_C=50$ mA, $I_F=10$ mA
DC Current Transfer Ratio	CTR	100			%	$V_{CE}=5$ V, $I_F=10$ mA
MCA230/255	CTR	200			%	$V_{CE}=5$ V, $I_F=1$ mA
MCA231						
Capacitance Input to Output	C_{IO}		0.5		pF	
Switching Times	t_{on} t_{off}		10 35		μ s μ s	$R_L=100 \Omega$ $V_{CE}=10$ V

Figure 1. Forward voltage versus forward current

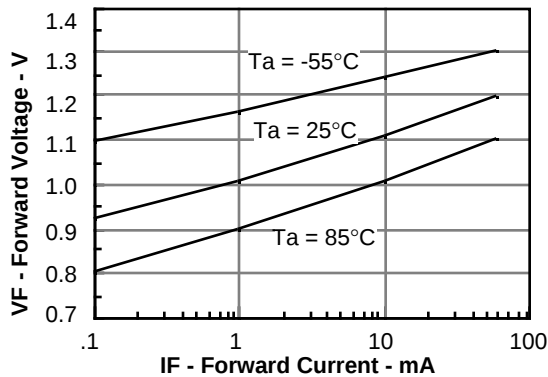


Figure 2. Normalized non-saturated and saturated CTR_{ce} at $T_a = 25^\circ\text{C}$ versus LED current

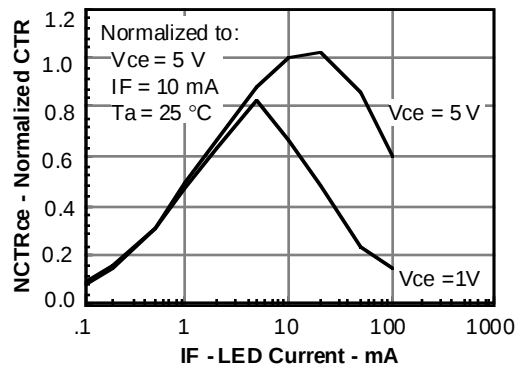


Figure 3. Normalized non-saturated and saturated collector-emitter current versus LED current

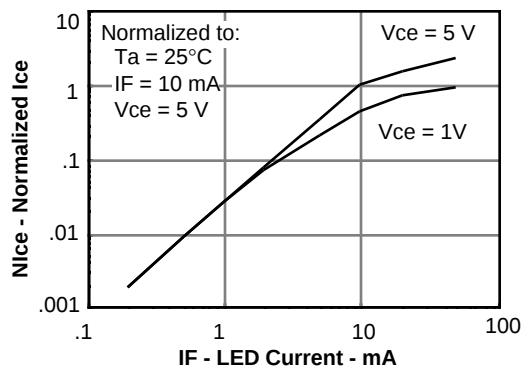


Figure 4. Normalized collector-base photocurrent versus LED current

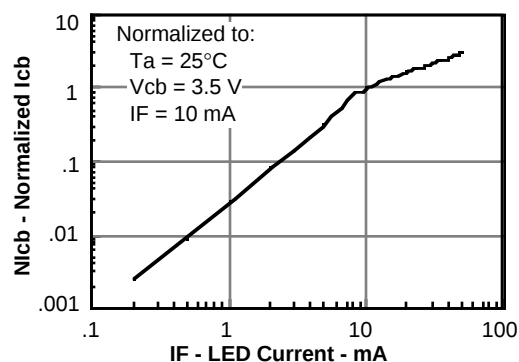


Figure 5. Non-saturated and saturated HFE versus base current

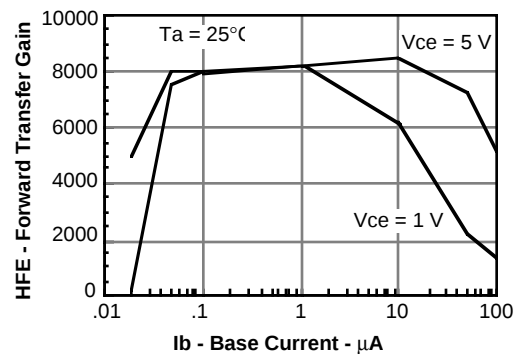


Figure 6. Low to high propagation delay versus collector load resistance and LED current

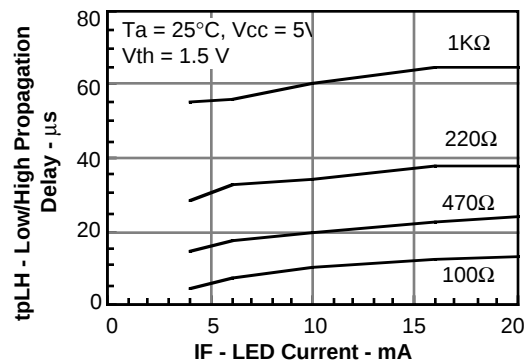


Figure 7. High to low propagation delay versus collector load resistance and LED current

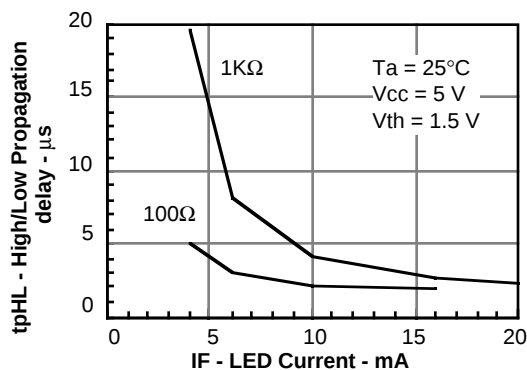


Figure 8. Switching timing waveform and schematic

