

Dual Channel Small Outline Optoisolators Darlington Output

The MOC223 device consists of two gallium arsenide infrared emitting diodes optically coupled to two monolithic silicon phototransistor darlington detectors, in a surface mountable, small outline, plastic package. It is ideally suited for high density applications that require low input current and eliminates the need for through-the-board mounting.

- Dual Channel Coupler
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- High Output Current (I_C) (500% min) @ 1 mA Input Current
- Minimum $V_{(BR)CEO}$ of 30 Volts Guaranteed
- Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- Shipped in Tape and Reel, which conforms to EIA Standard RS481A
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input-Output Isolation of 3000 Vac (rms) Guaranteed
- Meets U.L. Regulatory Requirements, File #E54915

Ordering Information:

- To obtain MOC223 in tape and reel, add R2 suffix to device number as follows:
R2 = 2500 units on 13" reel
- To obtain MOC223 in quantities of 50 (shipped in sleeves) — no suffix

Marking Information:

- MOC223 = D223

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
INPUT LED			
Forward Current — Continuous	I_F	60	mA
Forward Current — Peak (PW = 100 μs , 120 pps)	$I_F(pk)$	1.0	A
Reverse Voltage	V_R	6.0	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	90 0.8	mW mW/ $^\circ\text{C}$
OUTPUT DARLINGTON			
Collector-Emitter Voltage	V_{CEO}	30	V
Collector-Base Voltage	V_{CBO}	70	V
Emitter-Collector Voltage	V_{ECO}	7.0	V
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

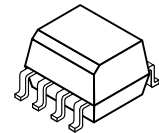
NOTE: Thickness through insulation between input and output is ≥ 0.5 mm.

MOC223

[CTR = 500% Min]

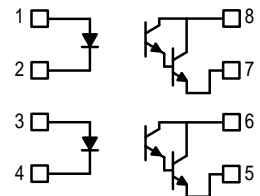
Motorola Preferred Device

**DUAL CHANNEL
SMALL OUTLINE
OPTOISOLATOR
DARLINGTON OUTPUT**



**CASE 846-01, STYLE 3
PLASTIC**

SCHEMATIC



1. LED 1 ANODE
2. LED 1 CATHODE
3. LED 2 ANODE
4. LED 2 CATHODE
5. EMITTER 2
6. COLLECTOR 2
7. EMITTER 1
8. COLLECTOR 1

Preferred devices are Motorola recommended choices for future use and best overall value.

MOCD223

MAXIMUM RATINGS — continued ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
TOTAL DEVICE			
Input–Output Isolation Voltage ^(1,2) (60 Hz, 1.0 sec. duration)	V_{ISO}	3000	Vac(rms)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	250 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range ⁽³⁾	T_A	–55 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽³⁾	T_{stg}	–55 to +150	$^\circ\text{C}$
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	—	260	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)⁽⁴⁾

Characteristic	Symbol	Min	Typ ⁽⁴⁾	Max	Unit
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INPUT LED

Forward Voltage ($I_F = 1.0\text{ mA}$)	V_F	—	1.05	1.3	V
Reverse Leakage Current ($V_R = 6.0\text{ V}$)	I_R	—	0.1	100	μA
Capacitance	C	—	18	—	pF

OUTPUT DARLINGTON

Collector–Emitter Dark Current	$(V_{CE} = 5.0\text{ V}, T_A = 25^\circ\text{C})$	I_{CEO1}	—	1.0	50	nA
	$(V_{CE} = 5.0\text{ V}, T_A = 100^\circ\text{C})$	I_{CEO2}	—	1.0	—	μA
Collector–Emitter Breakdown Voltage ($I_C = 100\ \mu\text{A}$)	$V_{(BR)CEO}$	30	90	—	V	
Emitter–Collector Breakdown Voltage ($I_E = 100\ \mu\text{A}$)	$V_{(BR)ECO}$	7.0	7.8	—	V	
Collector–Emitter Capacitance ($f = 1.0\text{ MHz}, V_{CE} = 0$)	C_{CE}	—	5.5	—	pF	

COUPLED

Output Collector Current ($I_F = 1.0\text{ mA}, V_{CE} = 5.0\text{ V}$)	MOCD223	I_C (CTR) ⁽⁵⁾	5.0 (500)	10 (1000)	—	mA (%)
Collector–Emitter Saturation Voltage ($I_C = 500\ \mu\text{A}, I_F = 1.0\text{ mA}$)		$V_{CE(sat)}$	—	—	1.0	V
Turn–On Time ($I_F = 5.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$)		t_{on}	—	3.5	—	μs
Turn–Off Time ($I_F = 5.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$)		t_{off}	—	95	—	μs
Rise Time ($I_F = 5.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$)		t_r	—	1.0	—	μs
Fall Time ($I_F = 5.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$)		t_f	—	2.0	—	μs
Input–Output Isolation Voltage ($f = 60\text{ Hz}, t = 1.0\text{ sec.}$) ^(1,2)		V_{ISO}	3000	—	—	Vac(rms)
Isolation Resistance ($V_{I-O} = 500\text{ V}$) ⁽²⁾		R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance ($V_{I-O} = 0, f = 1.0\text{ MHz}$) ⁽²⁾		C_{ISO}	—	0.2	—	pF

1. Input–Output Isolation Voltage, V_{ISO} , is an internal device dielectric breakdown rating.
2. For this test, pins 1, 2, 3 and 4 are common, and pins 5, 6, 7 and 8 are common.
3. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.
4. Always design to the specified minimum/maximum electrical limits (where applicable).
5. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.

TYPICAL CHARACTERISTICS

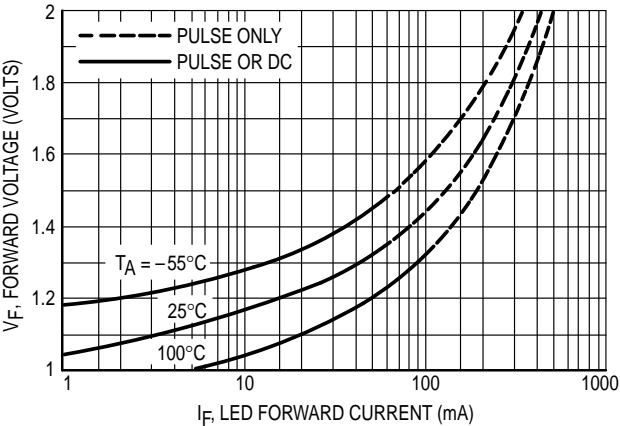


Figure 1. LED Forward Voltage versus Forward Current

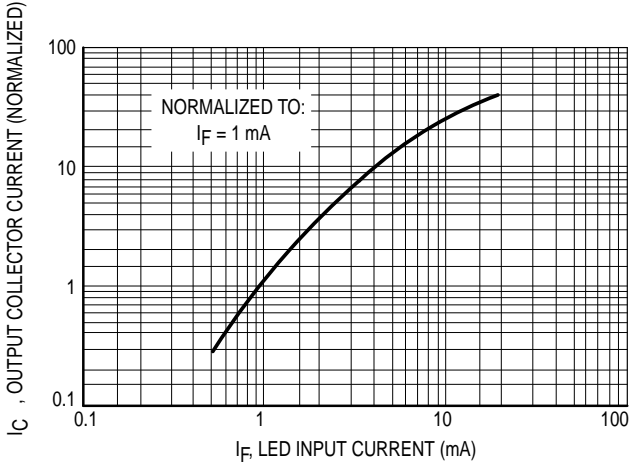


Figure 2. Output Current versus Input Current

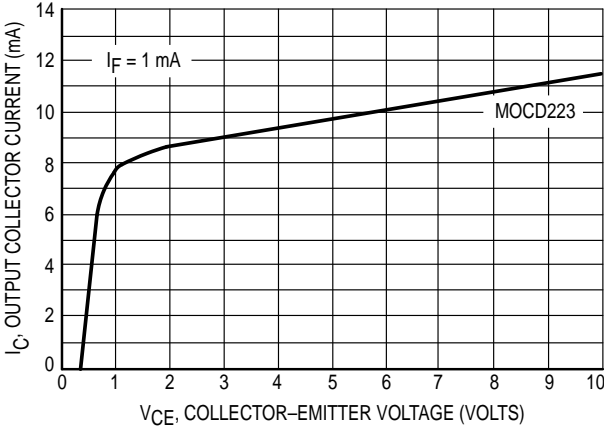


Figure 3. Output Current versus Collector-Emitter Voltage

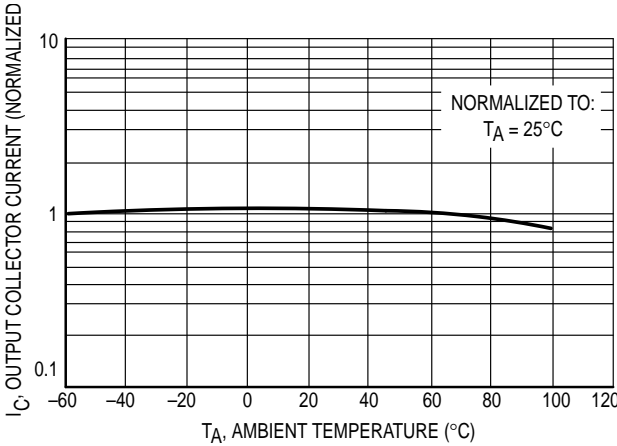


Figure 4. Output Current versus Ambient Temperature

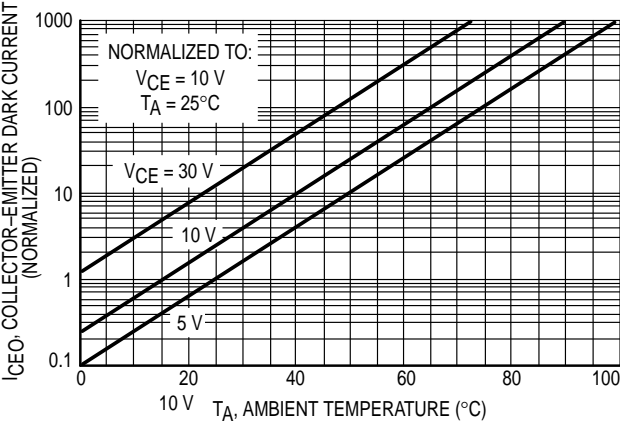


Figure 5. Dark Current versus Ambient Temperature

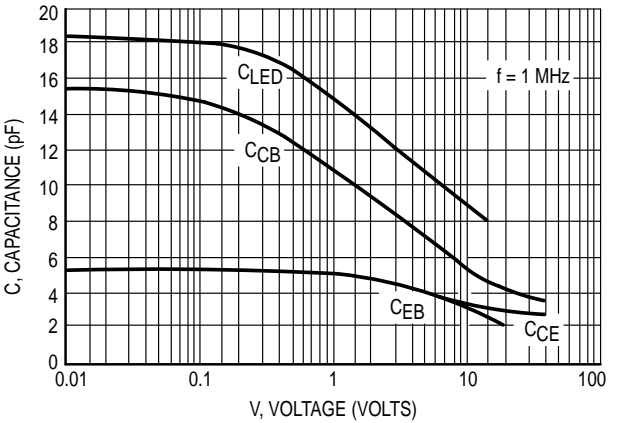
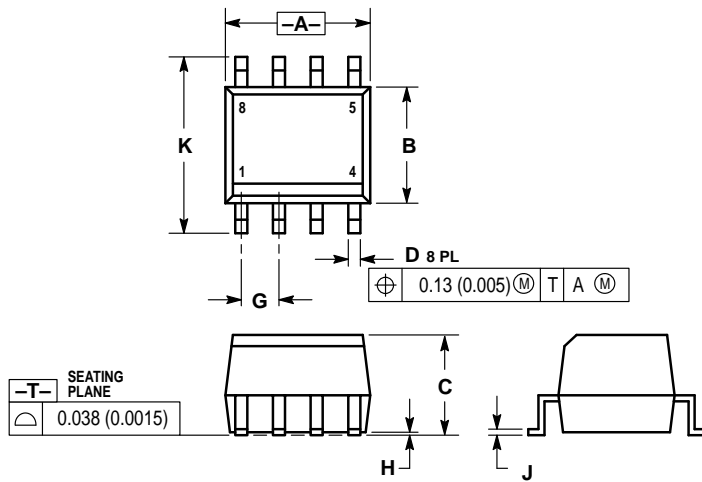


Figure 6. Capacitance versus Voltage

MOCD223

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.182	0.202	4.63	5.13
B	0.144	0.164	3.66	4.16
C	0.123	0.143	3.13	3.63
D	0.011	0.021	0.28	0.53
G	0.050 BSC		1.27 BSC	
H	0.003	0.008	0.08	0.20
J	0.006	0.010	0.16	0.25
K	0.224	0.244	5.69	6.19

- STYLE 3:
- PIN 1. ANODE 1
 2. CATHODE 1
 3. ANODE 2
 4. CATHODE 2
 5. EMITTER 2
 6. COLLECTOR 2
 7. EMITTER 1
 8. COLLECTOR 1

CASE 846-01 ISSUE B

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MOCD223/D

