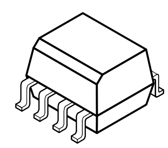
FAIRCHILD SEMICONDUCTOR™

Small Outline Optoisolators
Darlington Output

MOC223

SMALL OUTLINE OPTOISOLATORS DARLINGTON OUTPUT



These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon photodarlington detector, in a surface mountable, small outline, plastic package. They are ideally suited for high density applications, and eliminate the need for through–the–board mounting.

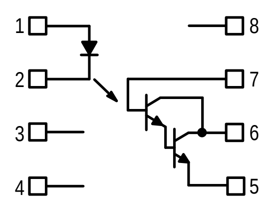
- Convenient Plastic SOIC–8 Surface Mountable Package Style
- High Current Transfer Ratio (CTR) at Low LED Input Current, for Easier Logic Interfacing
- Standard SOIC–8 Footprint, with 0.050″ Lead Spacing
- Available in Tape and Reel
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input–Output Isolation of 3000 Vac (rms) Guaranteed
- UL Recognized File #E90700, Volume 2

Ordering Information:
- To obtain MOC223 in Tape and Reel, add R2 suffix to device numbers: R2 = 2500 units on 13″ reel
- To obtain MOC223 in quantities of 50 (shipped in sleeves) — No Suffix

Marking Information:
- MOC223 = 223

Applications:
- Low power Logic Circuits
- Interfacing and coupling systems of different potentials and impedances
- Telecommunications equipment
- Portable electronics

SCHEMATIC



1. LED ANODE
2. LED CATHODE
3. NO CONNECTION
4. NO CONNECTION
5. EMITTER
6. COLLECTOR
7. BASE
8. NO CONNECTION

MAXIMUM RATINGS (T_A = 25°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°C Derate above 25°C	P_D	90 0.8	mW mW/°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°C Derate above 25°C	P_D	150 1.76	mW mW/°C

MAXIMUM RATINGS — continued (T_A = 25°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°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Ambient Operating Temperature Range[3]	T_A	–45 to +100	°C
Storage Temperature Range[3]	T_{stg}	–45 to +125	°C
Lead Soldering Temperature (1/16″ from case, 10 sec. duration)	—	260	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)[4]

Characteristic	Symbol	Min	Typ[4]	Max	Unit
INPUT LED					
Forward Voltage (I_F = 1.0 mA)	V_F	—	1.05	1.3	V
Reverse Leakage Current (V_R = 6.0 V)	I_R	—	0.1	100	µA
Capacitance	C	—	18	—	pF
OUTPUT DARLINGTON					
Collector–Emitter Dark Current (V_{CE} = 5.0 V, T_A = 25°C)	$I_{CEO}1$	—	1.0	50	nA
(V_{CE} = 5.0 V, T_A = 100°C)	$I_{CEO}2$	—	1.0	—	µA
Collector–Emitter Breakdown Voltage (I_C = 100 µA)	$V_{(BR)CEO}$	30	90	—	V
Emitter–Collector Breakdown Voltage (I_E = 100 µA)	$V_{(BR)ECO}$	7.0	7.8	—	V
Collector–Emitter Capacitance (f = 1.0 MHz, V_{CE} = 0)	C_{CE}	—	5.5	—	pF
COUPLED					
Output Collector Current (I_F = 1.0 mA, V_{CE} = 5.0 V)	I_C (CTR)[5]	5.0 (500)	10 (1000)	—	mA (%)
Collector–Emitter Saturation Voltage (I_C = 500 µA, I_F = 1.0 mA)	$V_{CE(sat)}$	—	—	1.0	V
Turn–On Time (I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)	t_{on}	—	3.5	—	µs
Turn–Off Time (I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)	t_{off}	—	95	—	µs
Rise Time (I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)	t_r	—	1.0	—	µs
Fall Time (I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)	t_f	—	2.0	—	µs
Input–Output Isolation Voltage (f = 60 Hz, t = 1.0 sec.)[1,2]	V_{ISO}	3000	—	—	Vac(rms)
Isolation Resistance ($V_{I–O}$ = 500 V)[2]	R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance ($V_{I–O}$ = 0, f = 1.0 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 and 2 are common, and pins 5, 6 and 7 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 x 100%.

TYPICAL CHARACTERISTICS

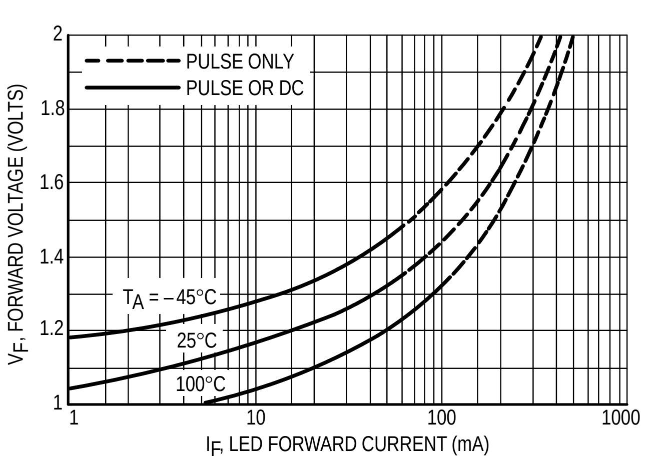


Figure 1. LED Forward Voltage versus Forward Current

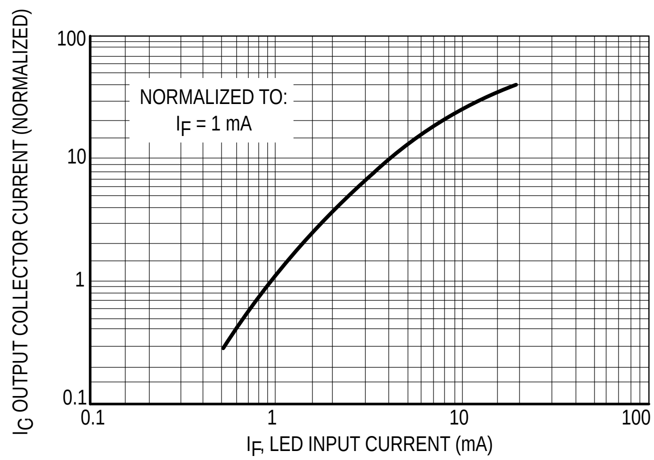


Figure 2. Output Current versus Input Current

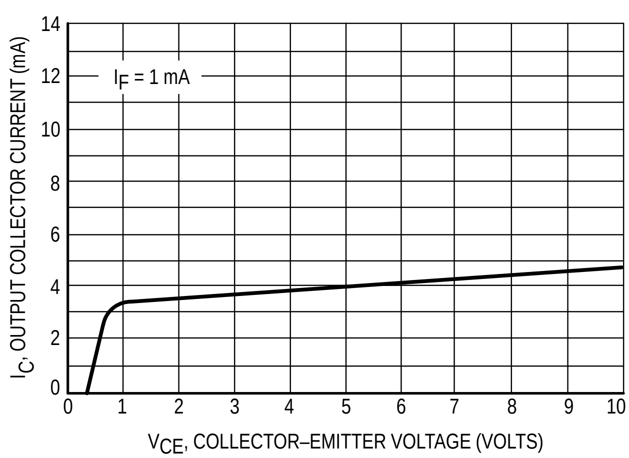


Figure 3. Output Current versus Collector–Emitter Voltage

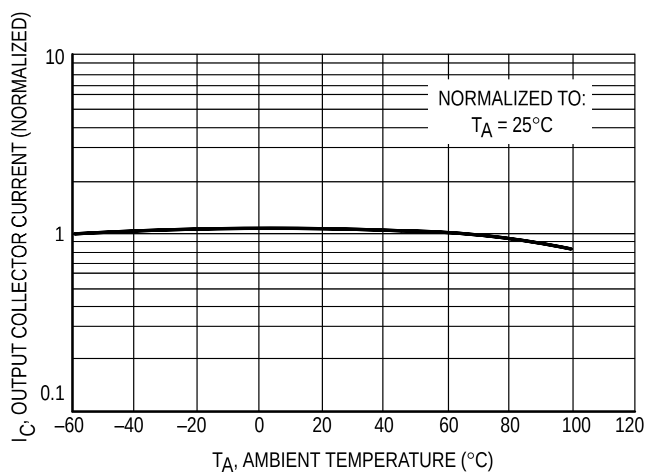


Figure 4. Output Current versus Ambient Temperature

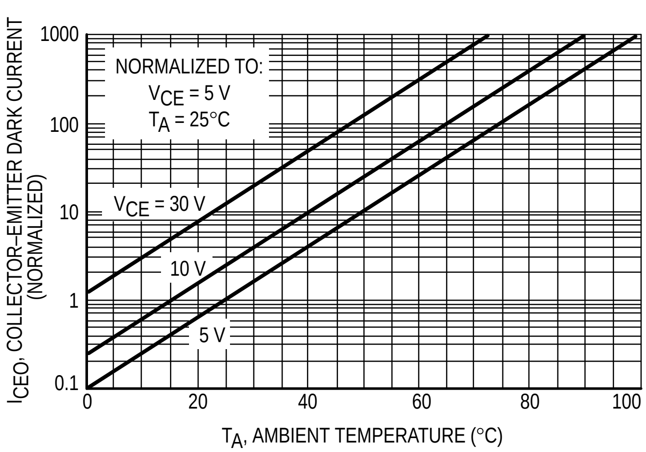


Figure 5. Dark Current versus Ambient Temperature

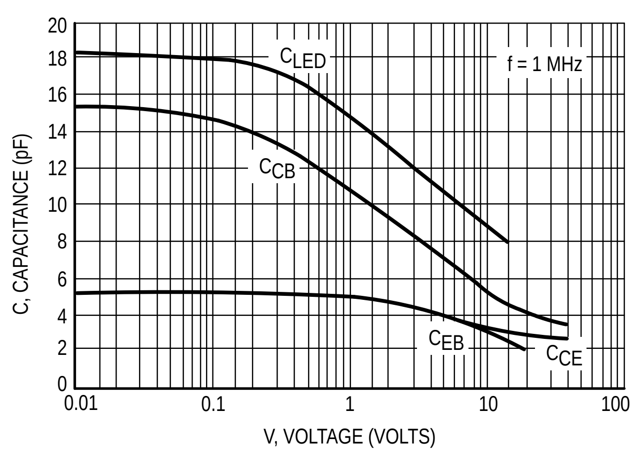
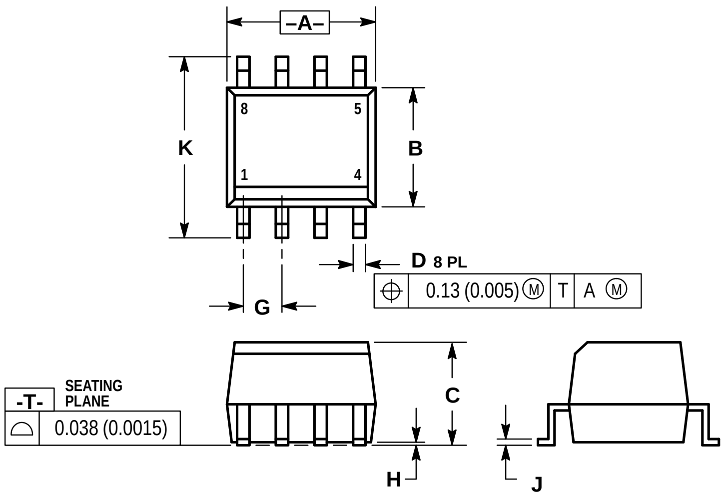


Figure 6. Capacitance versus Voltage

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	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 1:
PIN 1. ANODE
2. CATHODE
3. NC
4. NC
5. EMITTER
6. COLLECTOR
7. BASE
8. NC

DISCLAIMER

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.