

Slotted Optical Switches Darlington Output

Each device consists of a gallium arsenide infrared emitting diode facing a silicon NPN photodarlington in a molded plastic housing. A slot in the housing between the emitter and the detector provides the means for mechanically interrupting the infrared beam. These devices are widely used as position sensors in a variety of applications.

- Single Unit for Easy PCB Mounting
- Non-Contact Electrical Switching
- Long-Life Liquid Phase Epi Emitter
- Several Convenient Package Styles

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
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INPUT LED

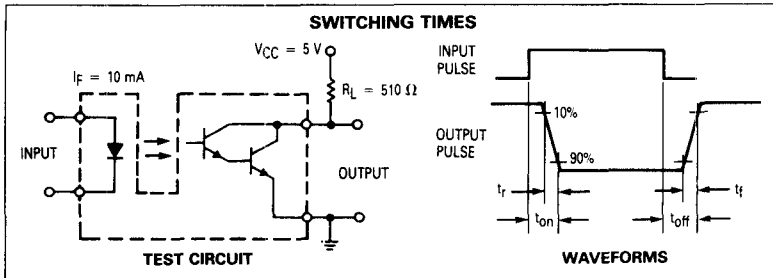
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
Input LED Power Dissipation ($T_A = 25^\circ\text{C}$ Derate above 25°C)	P_D	150 2	mW mW/°C

OUTPUT DARLINGTON

Collector-Emitter Voltage	V_{CEO}	30	Volts
Output Current — Continuous	I_C	100	mA
Output Darlington Power Dissipation ($T_A = 25^\circ\text{C}$ Derate above 25°C)	P_D	150 2	mW mW/°C

TOTAL DEVICE

Ambient Operating Temperature Range	T_A	-40 to +100	°C
Storage Temperature	T_{stg}	-40 to +100	°C
Lead Soldering Temperature (5 seconds max)	—	260	°C
Total Device Power Dissipation ($T_A = 25^\circ\text{C}$ Derate above 25°C)	P_D	300 4	mW mW/°C



MOC71 Series

SLOTTED OPTICAL SWITCHES DARLINGTON OUTPUT



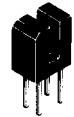
CASE 374-01
H



CASE 354A-01
T



CASE 354E-01
P

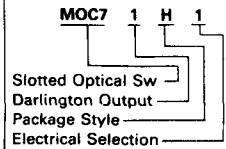


CASE 354-02
U



CASE 354G-01
V

PART NUMBER DERIVATION



MOC71 Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted. Note 1.)

Characteristic	Symbol	Min	Typ	Max	Unit
INPUT LED					
Forward Voltage ($I_F = 50\text{ mA}$)	V_F	0.9	1.3	1.8	Volts
Reverse Leakage ($V_R = 6\text{ V}$)	I_R	—	0.05	100	μA
Capacitance ($V = 0\text{ V}$, $f = 1\text{ MHz}$)	C_J	—	18	—	pF

OUTPUT DARLINGTON

Dark Current ($V_{CE} = 10\text{ V}$)	I_{CEO}	—	10	100	nA
Collector-Emitter Breakdown Voltage ($I_C = 1\text{ mA}$)	$V_{(BR)CEO}$	30	90	—	Volts
Emitter-Collector Breakdown Voltage ($I_E = 100\ \mu\text{A}$)	$V_{(BR)ECO}$	7	—	—	Volts
Capacitance ($V = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{CE}	—	5.5	—	pF
DC Current Gain ($V_{CE} = 10\text{ V}$, $I_C = 2\text{ mA}$)	h_{FE}	—	10,000	—	—

COUPLED (Note 2)

Output Collector Current ($I_F = 5\text{ mA}$, $V_{CE} = 5\text{ V}$)	MOC71__1	I_C	2.5	5	—	mA
	MOC71__3		8	14	—	
Output Collector Current ($I_F = 10\text{ mA}$, $V_{CE} = 5\text{ V}$)	MOC71__1	I_C	7.5	15	—	mA
	MOC71__3		20	35	—	
Collector-Emitter Saturation Voltage ($I_C = 1.8\text{ mA}$, $I_F = 10\text{ mA}$)		$V_{CE(sat)}$	—	—	1	Volts
Turn-On Time ($I_F = 10\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 510\ \Omega$)		t_{on}	—	120	—	μs
Turn-Off Time ($I_F = 10\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 510\ \Omega$)		t_{off}	—	500	—	μs

Notes: 1. Stray radiation can alter values of characteristics. Adequate light shielding should be provided.
2. No actuator in sensing gap.

TYPICAL CHARACTERISTICS

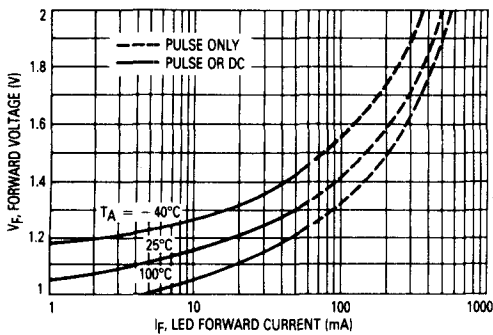


Figure 1. LED Forward Voltage versus Forward Current

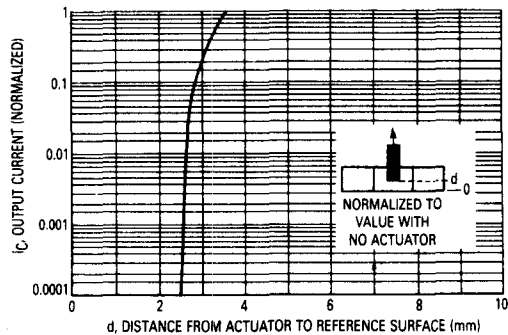


Figure 2. Output Current versus Actuator Position

MOC71 Series

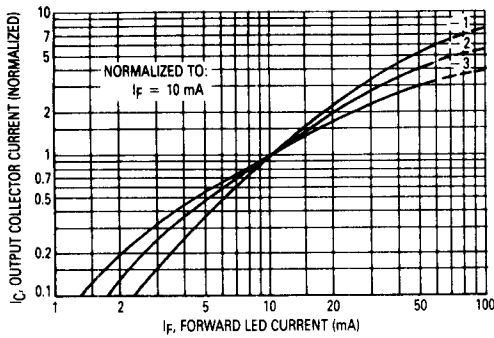


Figure 3. Output Current versus Input Current

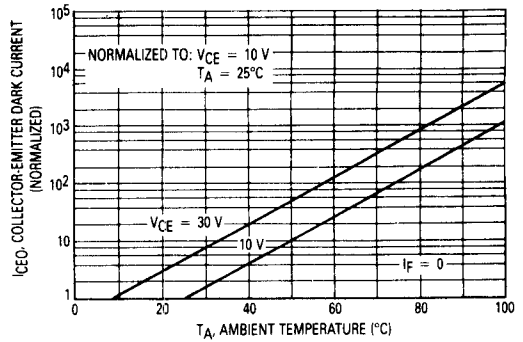


Figure 4. Collector-Emitter Dark Current versus Ambient Temperature

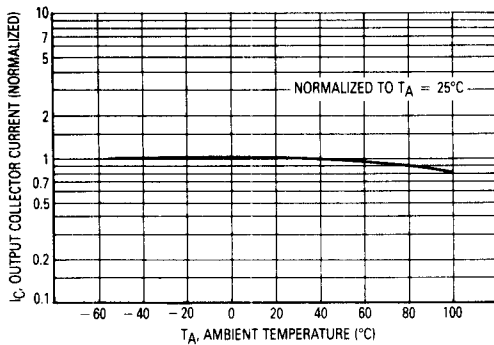


Figure 5. Output Current versus Ambient Temperature



Figure 6. Reduction in Output Current Heating versus Forward Current

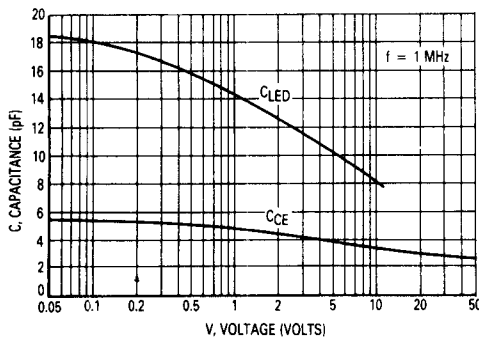


Figure 7. Capacitances versus Voltage

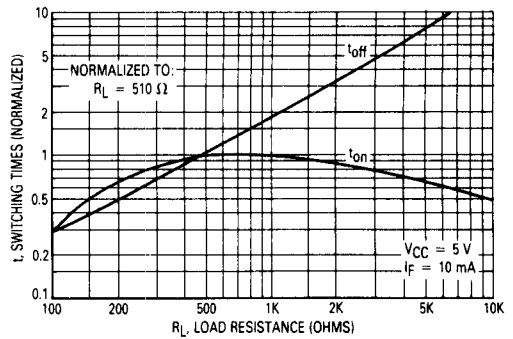


Figure 8. Switching Times versus Load Resistance

OUTLINE DIMENSIONS

STYLE 1:
 PIN 1. CATHODE
 2. COLLECTOR
 3. ANODE
 4. EMITTER

MILLIMETERS		INCHES	
DIM	MIN. MAX.	MIN. MAX.	
A	13.72 13.94	0.540 0.549	
B	11.90 11.70	0.468 0.461	
C	5.07 5.71	0.219 0.226	
D	0.36 0.55	0.014 0.022	
G	9.30 BSC	0.368 BSC	
H	2.54 BSC	0.100 BSC	
J	0.43 0.55	0.017 0.022	
K	1.27 1.01	0.200 0.310	
U	4.80 4.52	0.189 0.194	
V	4.42 4.57	0.174 0.180	
W	5.08 5.14	0.218 0.216	
B1	0.84 1.01	0.033 0.040	
C1	2.43 NOM	0.096 NOM	

NOTES:
 1. POSITIONAL TOLERANCE FOR D DIMENSION (M PL): $\pm 0.51 (0.020) \text{ (T) A (B) (C)}$
 2. POSITIONAL TOLERANCE FOR J DIMENSION (M PL): $\pm 0.51 (0.020) \text{ (T) B (C)}$
 3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982
 4. CONTROLLING DIMENSION: INCH.

**CASE 374-01
 H**

STYLE 1:
 PIN 1. CATHODE
 2. COLLECTOR
 3. ANODE
 4. EMITTER

MILLIMETERS		INCHES	
DIM	MIN. MAX.	MIN. MAX.	
B	6.30 6.50	0.244 0.256	
C	6.71 7.01	0.264 0.276	
D	0.28 0.43	0.010 0.017	
G	6.60 BSC	0.260 BSC	
H	2.54 BSC	0.100 BSC	
J	0.43 0.55	0.017 0.022	
K	2.54 3.56	0.100 0.140	
R	12.80 13.00	0.506 0.515	
U	5.08 5.26	0.218 0.211	
V	4.80 4.00	0.183 0.158	
W	1.25 1.27	0.049 0.054	
B1	0.38 0.43	0.015 0.025	
C1	2.54 NOM	0.100 NOM	

NOTES:
 1. POSITIONAL TOLERANCE FOR D DIMENSION (M PL): $\pm 0.51 (0.020) \text{ (T) R (B) (C)}$
 2. POSITIONAL TOLERANCE FOR J DIMENSION (M PL): $\pm 0.51 (0.020) \text{ (T) B (C)}$
 3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982
 4. CONTROLLING DIMENSION: INCH.

**CASE 354E-01
 P**

MILLIMETERS		INCHES	
DIM	MIN. MAX.	MIN. MAX.	
A	24.13 25.01	0.950 0.985	
B	6.19 6.50	0.244 0.256	
C	10.64 10.94	0.419 0.431	
D	0.36 0.55	0.014 0.022	
E	6.24 6.55	0.246 0.258	
G	7.30 BSC	0.288 BSC	
H	2.54 BSC	0.100 BSC	
J	0.43 0.55	0.017 0.022	
K	7.36	0.290	
L	18.05 BSC	0.710 BSC	
R	11.98 12.19	0.472 0.480	
S	3.24 3.27	0.124 0.133	
U	3.07 3.32	0.115 0.129	
V	4.36 4.52	0.171 0.178	
W	2.38 2.69	0.094 0.106	
B1	0.88 1.14	0.035 0.045	
C1	2.54 NOM	0.100 NOM	

NOTES:
 1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
 2. POSITIONAL TOLERANCE FOR MOUNTING HOLES: $\pm 0.38 (0.014) \text{ (T) A (B) (C)}$
 3. POSITIONAL TOLERANCE FOR LEAD DIMENSION: $\pm 0.13 (0.005) \text{ (T) B (C)}$
 4. POSITIONAL TOLERANCE FOR LEAD DIMENSION D: $\pm 0.13 (0.005) \text{ (T) A (B) (C)}$
 5. DIMENSIONING AND TOLERANCING PER Y14.5, 1973.

STYLE 1:
 PIN 1. CATHODE
 2. COLLECTOR
 3. ANODE
 4. EMITTER

**CASE 354A-01
 T**

MILLIMETERS		INCHES	
DIM	MIN. MAX.	MIN. MAX.	
B	6.19 6.50	0.244 0.256	
C	10.64 10.94	0.419 0.431	
D	0.36 0.55	0.014 0.022	
G	7.30 BSC	0.288 BSC	
H	2.54 BSC	0.100 BSC	
J	0.43 0.55	0.017 0.022	
K	7.36	0.290	
R	11.95 12.00	0.467 0.469	
U	4.83 5.08	0.190 0.200	
V	4.36 4.52	0.171 0.178	
W	2.38 2.69	0.094 0.106	
B1	0.87 1.14	0.035 0.045	
C1	2.54 NOM	0.100 NOM	

NOTES:
 1. DIMENSIONS R & B ARE DATUMS & T IS A DATUM SURFACE.
 2. POSITIONAL TOLERANCE FOR LEAD DIMENSION J: $\pm 0.51 (0.020) \text{ (T) B (C)}$
 3. POSITIONAL TOLERANCE FOR LEAD DIMENSION D: $\pm 0.51 (0.020) \text{ (T) R (B) (C)}$
 4. POSITIONAL TOLERANCE FOR HOLE DIMENSION D: $\pm 0.026 (0.010) \text{ (A) B (C) (D)}$
 5. DIMENSIONING AND TOLERANCING PER Y14.5, 1982.

STYLE 1:
 PIN 1. CATHODE
 2. COLLECTOR
 3. ANODE
 4. EMITTER

**CASE 354-02
 U**

MILLIMETERS		INCHES	
DIM	MIN. MAX.	MIN. MAX.	
B	6.19 6.32	0.243 0.249	
C	12.58 12.82	0.495 0.505	
D	0.36 0.55	0.014 0.022	
G	11.16 BSC	0.440 BSC	
H	2.54 BSC	0.100 BSC	
J	0.43 0.55	0.017 0.022	
K	7.37	0.290	
R	13.68 13.94	0.539 0.549	
U	4.83 5.08	0.190 0.200	
V	8.77 9.01	0.345 0.356	
W	3.05 3.30	0.120 0.130	
B1	0.87 0.99	0.034 0.039	
C1	4.32 NOM	0.170 NOM	

NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982
 2. POSITIONAL TOLERANCE FOR LEAD DIMENSION D: $\pm 0.51 (0.020) \text{ (T) R (C)}$
 3. POSITIONAL TOLERANCE FOR LEAD DIMENSION J: $\pm 0.51 (0.020) \text{ (T) B (C)}$
 4. CONTROLLING DIMENSION: INCH.

STYLE 1:
 PIN 1. CATHODE
 2. COLLECTOR
 3. ANODE
 4. EMITTER

**CASE 354G-01
 V**

