

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

### OUTPUT DARLINGTON

|   |           |          |             |
|---|-----------|----------|-------------|
| Collector-Emitter Voltage   | $V_{CEO}$ | 30       | Volts       |
| Output Current — Continuous   | $I_C$     | 100      | mA          |
| Output Darlington Power Dissipation ( $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ ) | $P_D$     | 150<br>2 | mW<br>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 ( $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ ) | $P_D$     | 300<br>4    | mW<br>mW/°C |

## MOC71 Series

### SLOTTED OPTICAL SWITCHES DARLINGTON OUTPUT



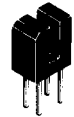
CASE 374-01  
H



CASE 354A-01  
T



CASE 354E-01  
P

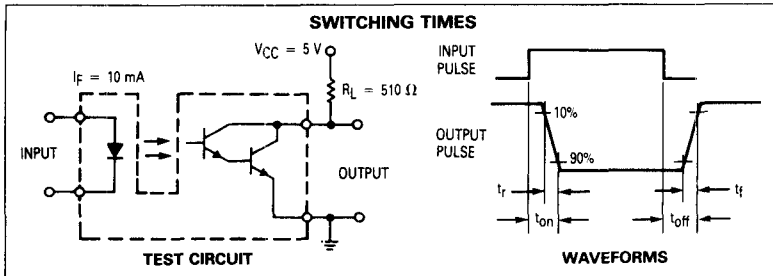


CASE 354-02  
U

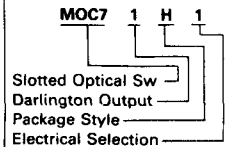


CASE 354G-01  
V

7



### PART NUMBER DERIVATION



# MOC71 Series

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

| Characteristic  | Symbol | Min | Typ  | Max | Unit          |
|---|--------|-----|------|-----|---------------|
| <b>INPUT LED</b>                                      |        |     |      |     |               |
| 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 | $\mu\text{A}$ |
| 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<br>( $I_F = 5\text{ mA}$ , $V_{CE} = 5\text{ V}$ )              | MOC71__1 | $I_C$         | 2.5 | 5   | — | mA            |
|  | MOC71__3 |               | 8   | 14  | — |               |
| Output Collector Current<br>( $I_F = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$ )             | MOC71__1 | $I_C$         | 7.5 | 15  | — | mA            |
|  | MOC71__3 |               | 20  | 35  | — |               |
| Collector-Emitter Saturation Voltage<br>( $I_C = 1.8\text{ mA}$ , $I_F = 10\text{ mA}$ ) |          | $V_{CE(sat)}$ | —   | —   | 1 | Volts         |
| Turn-On Time ( $I_F = 10\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 510\ \Omega$ )      |          | $t_{on}$      | —   | 120 | — | $\mu\text{s}$ |
| Turn-Off Time ( $I_F = 10\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 510\ \Omega$ )     |          | $t_{off}$     | —   | 500 | — | $\mu\text{s}$ |

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

## TYPICAL CHARACTERISTICS

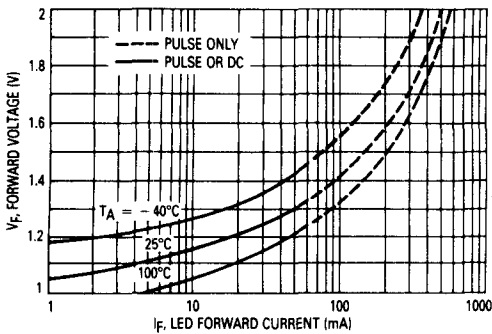


Figure 1. LED Forward Voltage versus Forward Current

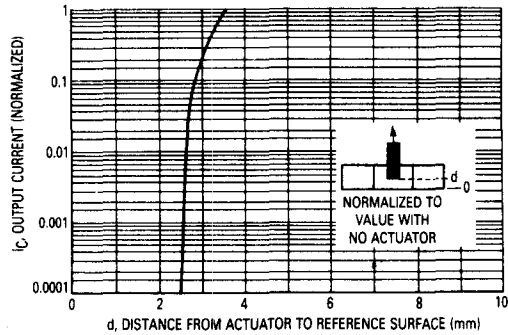


Figure 2. Output Current versus Actuator Position

# MOC71 Series

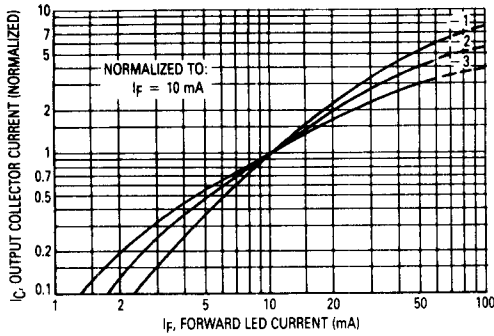


Figure 3. Output Current versus Input Current

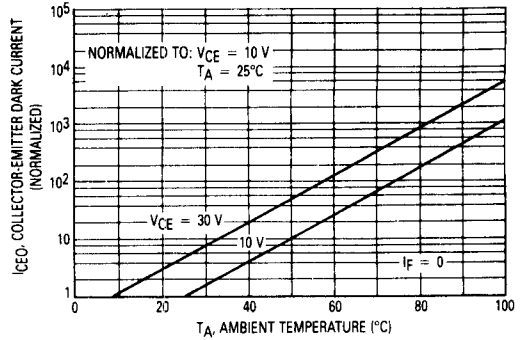


Figure 4. Collector-Emitter Dark Current versus Ambient Temperature

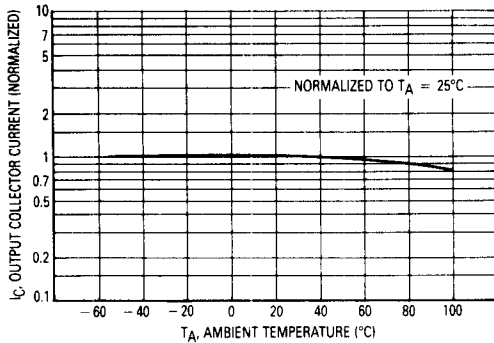


Figure 5. Output Current versus Ambient Temperature

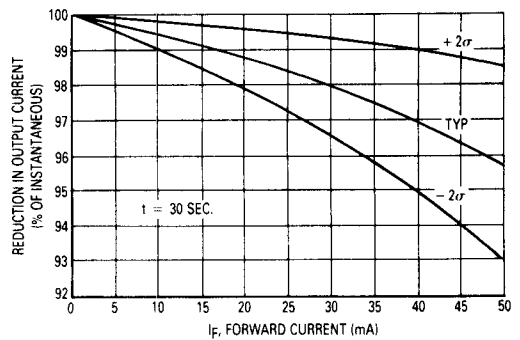


Figure 6. Reduction in Output Current Heating versus Forward Current

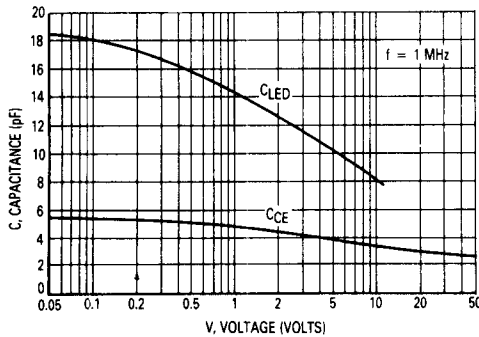


Figure 7. Capacitances versus Voltage

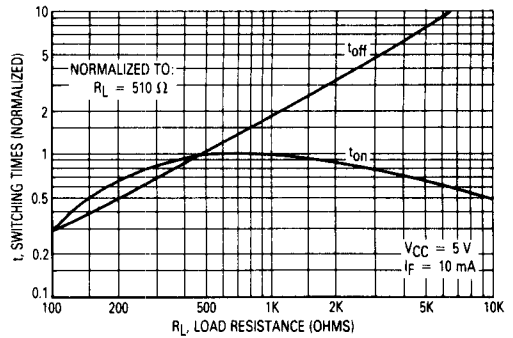


Figure 8. Switching Times versus Load Resistance

OUTLINE DIMENSIONS

