

**MOTOROLA**  
**SEMICONDUCTOR**  
**TECHNICAL DATA**

## Slotted Optical Switches

### Transistor Output

These devices consist of two gallium arsenide infrared emitting diodes facing two NPN silicon phototransistors across a 0.100" wide slot in the housing. Switching takes place when an opaque object in the slot interrupts the infrared beam.

In addition to their use in position and motion indicators, dual channel interrupters enable the sensing of *direction* of motion.

**Features:**

- 0.020" Aperture Width
- Easy PCB Mounting
- Cost Effective
- Uses Long-Lived LPE IRED

**Application:**

Quadrature sensing, shaft encoders, non-contact switching, multi-level position sensing, coin handlers, and special purpose interruptive sensing.

**ABSOLUTE MAXIMUM RATINGS (25°C)**

Rating	Symbol	Value	Unit
<b>INPUT LED</b>			
Power Dissipation	$P_D$	150*	mW
Forward Current (Continuous)	$I_F$	60	mA
Reverse Voltage	$V_R$	6	V
<b>OUTPUT TRANSISTOR</b>			
Power Dissipation	$P_D$	150*	mW
Collector-Emitter Voltage	$V_{CEO}$	30	V
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{stg}$	-40 to +85	°C
Operating Temperature	$T_J$	-40 to +85	°C
Lead Soldering Temperature (5 seconds maximum)	$T_L$	260	°C

\*Derate 2 mW/°C above 25°C ambient

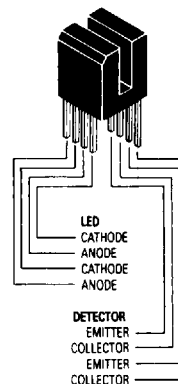
**INDIVIDUAL ELECTRICAL CHARACTERISTICS (25°C) (See Note 1)**

Characteristic	Symbol	Min	Typ	Max	Unit
<b>INPUT LED</b>					
Reverse Breakdown Voltage ( $I_R = 100 \mu A$ )	$V_{(BR)R}$	6	—	—	V
Forward Voltage ( $I_F = 50 mA$ )	$V_F$	—	1.3	1.8	V
Reverse Current ( $V_R = 6 V, R_L = 1 M\Omega$ )	$I_R$	—	50	—	nA
Capacitance ( $V = 0 V, f = 1 MHz$ )	$C$	—	25	50	pF
<b>OUTPUT TRANSISTOR</b>					
Breakdown Voltage ( $I_C = 10 mA, H = 0$ )	$V_{(BR)CEO}$	30	—	—	V
Collector Dark Current ( $V_{CE} = 10 V, H = 0, \text{Note 1}$ )	$I_{CEO}$	—	—	100	nA

NOTE 1 Stray irradiation can alter values of characteristics. Adequate shielding should be provided.

**MOC70W1\***  
**MOC70W2**

\*Motorola Preferred Device

**DUAL CHANNEL  
 SLOTTED  
 OPTICAL SWITCHES  
 TRANSISTOR OUTPUT**

**CASE 792-01  
 STYLE 2**

**COUPLED ELECTRICAL CHARACTERISTICS (25°C, See Note 1)**

Characteristics	Symbol	MOC70W1			MOC70W2			Unit
		Min	Typ	Max	Min	Typ	Max	
$I_F = 20 \text{ mA}, V_{CE} = 10 \text{ V}$	$I_{CE(on)}$	100	—	—	250	—	—	$\mu\text{A}$
$I_F = 20 \text{ mA}, I_C = 50 \mu\text{A}$	$V_{CE(sat)}$	—	—	0.4	—	—	—	V
$I_F = 20 \text{ mA}, I_C = 125 \mu\text{A}$	$V_{CE(sat)}$	—	—	—	—	0.4	—	V
$I_F \text{ (opposite LED)} = 20 \text{ mA}, V_{CE} = 10 \text{ V}$	$I_{CX}$	—	20	—	—	20	—	$\mu\text{A}$

NOTE 1: Stray irradiation can alter values of characteristics. Adequate shielding should be provided

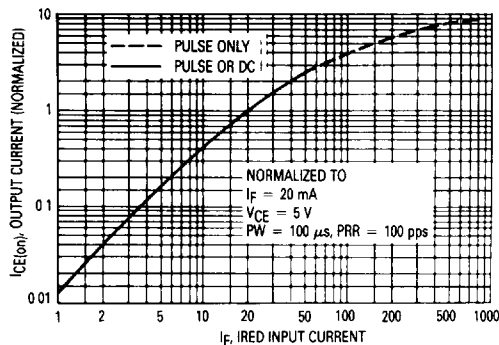


Figure 1. Typical Output Current versus Input Current

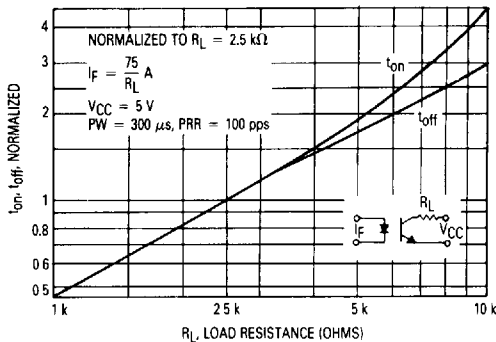


Figure 2. Typical  $t_{on}$ ,  $t_{off}$  versus Load Resistance

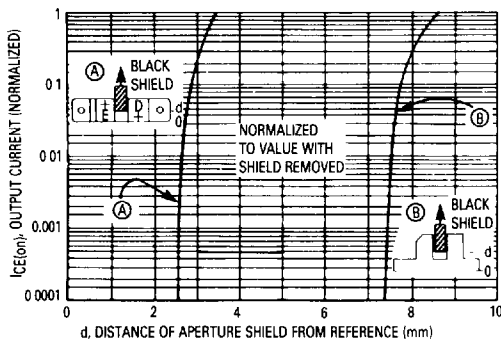


Figure 3. Typical Output Current versus Position of Shield Covering Aperture