

T.41-73

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

Slotted Optical Switches

Transistor Output

These devices each consist of a gallium arsenide infrared emitting diode facing a silicon NPN phototransistor 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
INPUT LED			
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
Input Transistor Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 2	mW mW/°C

OUTPUT TRANSISTOR

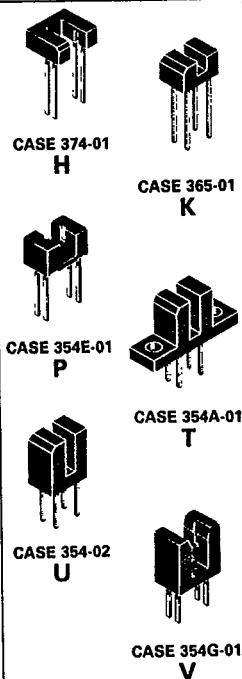
Collector-Emitter Voltage	V_{CEO}	30	Volts
Output Current — Continuous	I_C	100	mA
Output Transistor Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 2	mW mW/°C

TOTAL DEVICE

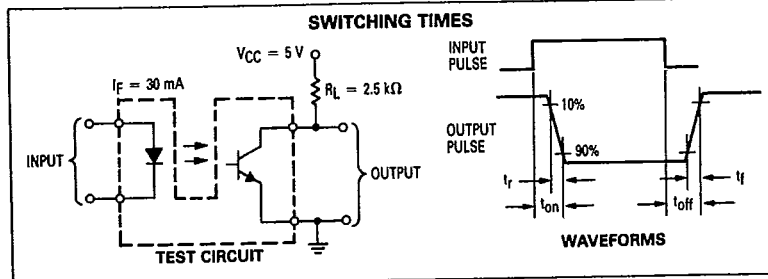
Ambient Operating Temperature Range	T_A	-40 to +100	°C
Storage Temperature	T_{stg}	-40 to +100	°C
Lead Soldering Temperature (5 seconds max)	—	260	°C
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 4	mW mW/°C

MOC70 Series

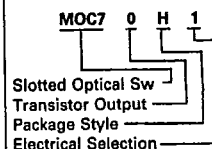
SLOTTED OPTICAL SWITCHES TRANSISTOR OUTPUT



SWITCHING TIMES



PART NUMBER DERIVATION



ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted. Note 1.)

Characteristic	Symbol	Min	Typ	Max	Unit
INPUT LED					
Forward Voltage (I _F = 50 mA)	V _F	0.9	1.3	1.8	Volts
Reverse Leakage (V _R = 6 V)	I _R	—	1	100	μA
Capacitance (V = 0 V, f = 1 MHz)	C _J	—	18	—	pF

OUTPUT TRANSISTOR

Dark Current (V _{CE} = 10 V)	I _{CEO}	—	5	100	nA
Collector-Emitter Breakdown Voltage (I _C = 10 mA)	V _{(BR)CEO}	30	45	—	Volts
Emitter-Collector Breakdown Voltage (I _E = 100 μA)	V _{(BR)ECO}	5	7	—	Volts
DC Current Gain (V _{CE} = 10 V, I _C = 2 mA)	h _{FE}	—	700	—	—

COUPLED (Note 2)

Output Collector Current (I _F = 5 mA, V _{CE} = 10 V)	MOC70__1	I _C	0.15	0.3	—	mA
	MOC70__2		0.3	0.6	—	
	MOC70__3		0.6	1	—	
Output Collector Current (I _F = 20 mA, V _{CE} = 10 V)	MOC70__1	I _C	1	2	—	mA
	MOC70__2		2	4	—	
	MOC70__3		4	7	—	
Output Collector Current (I _F = 30 mA, V _{CE} = 10 V)	MOC70__1	I _C	1.9	3.8	—	mA
	MOC70__2		3	6	—	
	MOC70__3		5.5	10	—	
Collector-Emitter Saturation Voltage (I _C = 1.8 mA, I _F = 30 mA)	MOC70__1	V _{CE(sat)}	—	0.25	0.4	Volts
Collector-Emitter Saturation Voltage (I _C = 1.8 mA, I _F = 20 mA)	MOC70__2	V _{CE(sat)}	—	0.25	0.4	Volts
	MOC70__3		—	0.25	0.4	
Turn-On Time (I _F = 30 mA, V _{CE} = 5 V, R _L = 2.5 kΩ)	t _{on}		—	20	—	μs
Turn-Off Time (I _F = 30 mA, V _{CE} = 5 V, R _L = 2.5 kΩ)	t _{off}		—	80	—	μs

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

TYPICAL CHARACTERISTICS

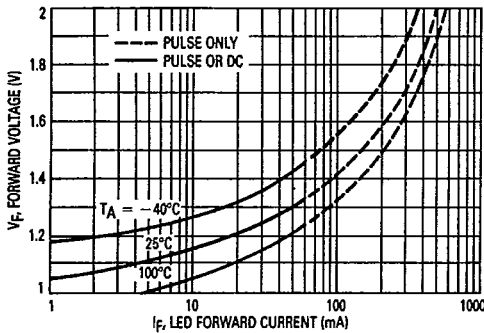


Figure 1. LED Forward Voltage versus Forward Current

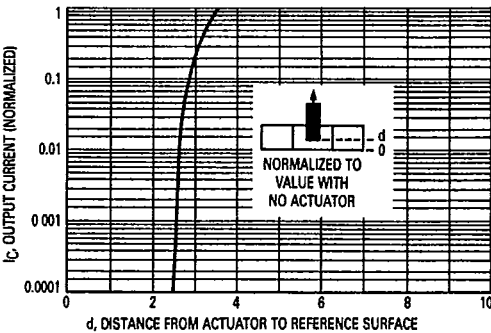


Figure 2. Output Current versus Actuator Position

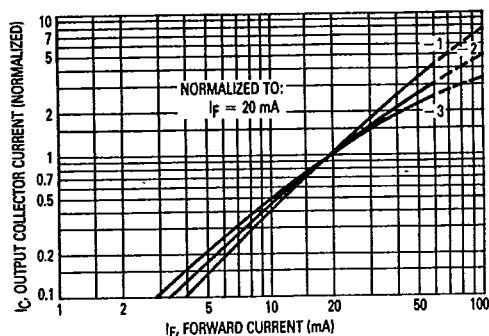


Figure 3. Output Current versus Input Current

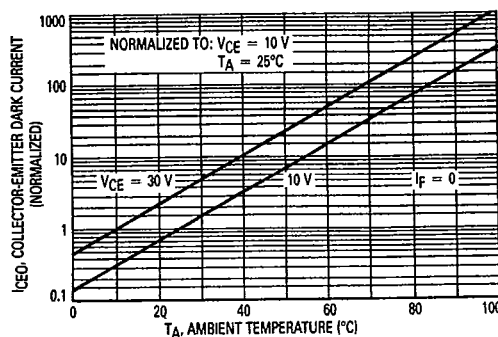


Figure 4. Dark Current versus Ambient Temperature

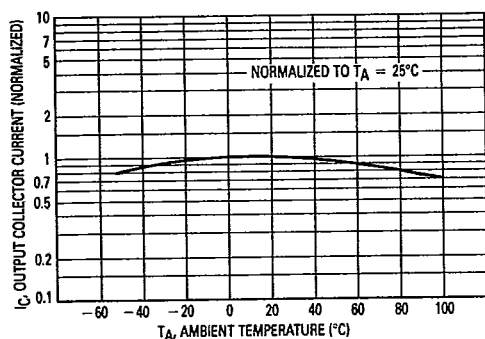


Figure 5. Output Current versus Ambient Temperature

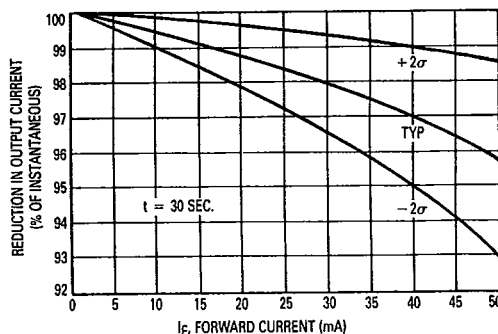


Figure 6. Reduction in Output Current Due to LED Heating versus Forward Current

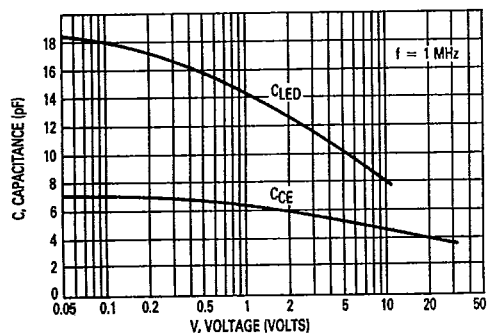


Figure 7. Capacitances versus Voltage

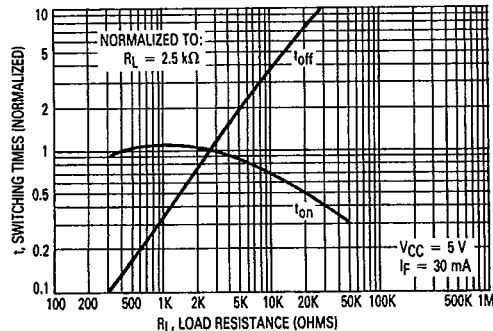


Figure 8. Switching Times versus Load Resistance

OUTLINE DIMENSIONS

