

# SLOTTED SWITCH

T-41-73

## MTSS10010 INFRARED LED+ PHOTO IC

MTSS10010 contains a gallium arsenide infrared emitting diode coupled to a monolithic integrated circuit, which incorporates a photodiode, a linear amplifier and a Schmitt trigger on a single silicon chip.

### APPLICATIONS

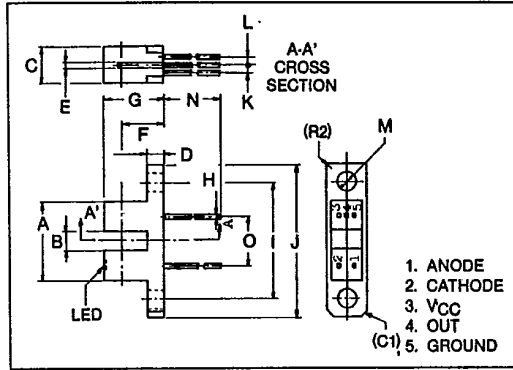
- OPTICAL SWITCH
- SHAFT POSITION AND VELOCITY SENSOR

### FEATURES

- TTL, LSTTL compatible.
- Wide supply voltage ( $V_{CC}=4.5\sim 16V$ )
- Non sensitivity for visible light.
- High speed ( $t_{on} 8\mu s, t_{off} 5\mu s$  typ.)
- Output terminal contains a high voltage limiting diode.

### MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
A	Forward Current	$I_F$	50	mA
	Reverse Voltage	$V_R$	5	V
	Forward Current Derating	$\Delta I_F/^\circ C$	-0.67	mA/°C
	Supply Voltage	$V_{CC}$	16	V
B	Low Level Output Current	$I_{OL}$	50	mA
	Total Output Power Dissipation	$P_O$	250	mW
	Operating Temperature Range	$T_{opr}$	-25~85	°C
	Storage Temperature Range	$T_{stg}$	-40~100	°C
	Soldering Temperature and Time	$T_{sol}$	260°C, 3sec	



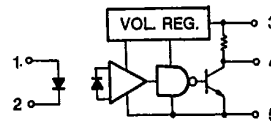
SYMBOL	INCHES	MM
A	$0.512 \pm 0.010$	$13 \pm 0.25$
B	$0.118 \pm 0.010$	$3 \pm 0.25$
C	0.244	6.2
D	$0.098 \pm 0.010$	$2.5 \pm 0.25$
E	0.039	1.0
F	$0.270 \pm 0.012$	$6.85 \pm 0.3$
G	$0.394 \pm 0.010$	$10 \pm 0.25$
H	0.018	0.45
I	$0.748 \pm 0.010$	$19 \pm 0.25$
J	0.984	25.0
K	0.075	1.9
L	0.075	1.9
M	0.130	3.3
N	0.709 MIN	18 MIN
O	0.300	7.62

### RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{CC}$	4.5	5	NOTE	V
Forward Current	$I_F$	11	13	15	mA
Operating Temperature	$T_{opr}$	0	—	70	°C

Note: Limited by total output power dissipation.

A - LED B - DETECTOR



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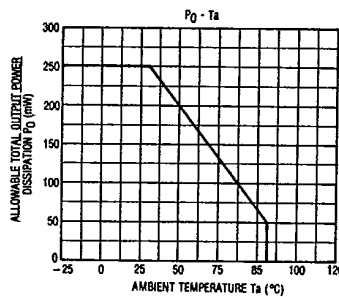
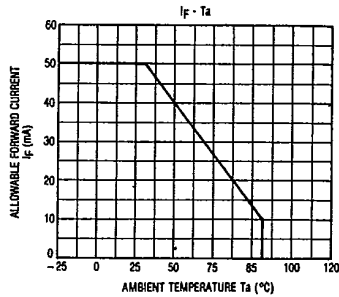
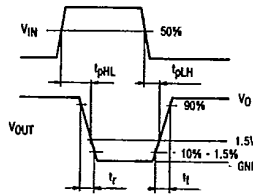
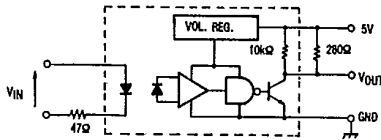
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**OPTO-ELECTRICAL CHARACTERISTICS (Ta=25°C)**  
**(Over recommended temperature Ta=0~70°C unless otherwise noted.)**

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX.	UNIT	
A	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =8mA	—	1.15	1.4	V	
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V, Ta=25°C	—	—	10	μA	
	Capacitance	C <sub>T</sub>	V=0, f=1MHz, Ta=25°C	—	30	—	pF	
B	Supply Voltage	V <sub>CC</sub>	Ta=25°C	4.5	—	16	V	
	Low Level Supply Current	I <sub>CCL</sub>	V <sub>CC</sub> =5V, I <sub>F</sub> =8mA	—	6	15	mA	
	High Level Supply Current	I <sub>CCH</sub>	V <sub>CC</sub> =5V, I <sub>F</sub> =0	—	7	20	mA	
	Low Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> =16mA, V <sub>CC</sub> =5V, I <sub>F</sub> =8mA	—	0.15	0.4	V	
	High Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =5V, I <sub>F</sub> =0	4.0	—	—	V	
C	'H'-'L' LED Threshold Current	I <sub>FHL</sub>	V <sub>CC</sub> =5V, Ta=25°C	—	2	5	mA	
			V <sub>CC</sub> =5V	—	—	8	mA	
	Hysteresis Ratio	I <sub>FLH</sub> /I <sub>FHL</sub>	V <sub>CC</sub> =5V	—	1.1	—	—	
	Propagation Delay (NOTE)	L→H	t <sub>pLH</sub>	Ta=25°C V <sub>CC</sub> =5V, I <sub>F</sub> =0→8mA R <sub>L</sub> =280Ω	—	8	—	μs
		H→L	t <sub>pHL</sub>		—	5	—	
	Rise Time (NOTE)		t <sub>r</sub>		—	0.1	—	
Fall Time (NOTE)		t <sub>f</sub>	(NOTE)	—	0.05	—		

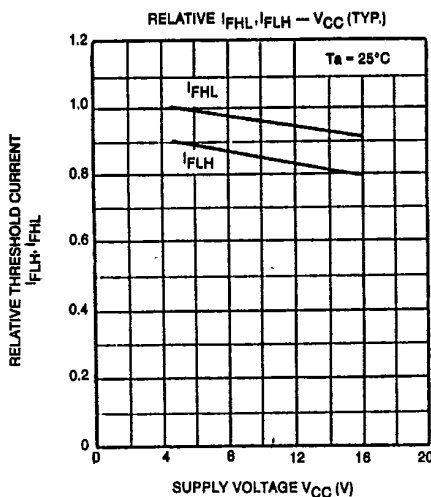
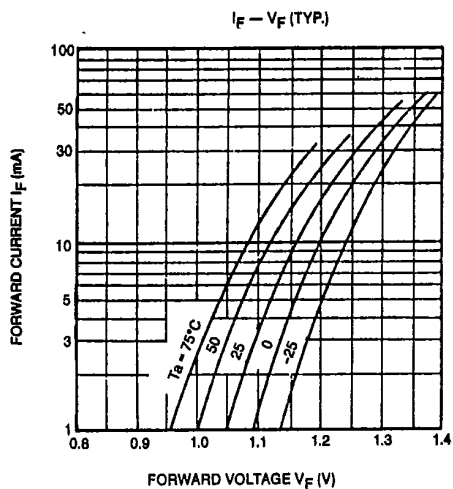
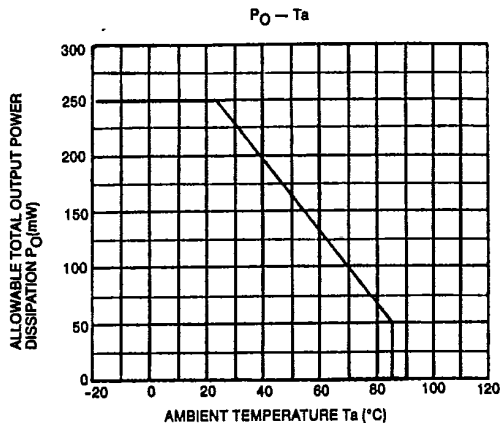
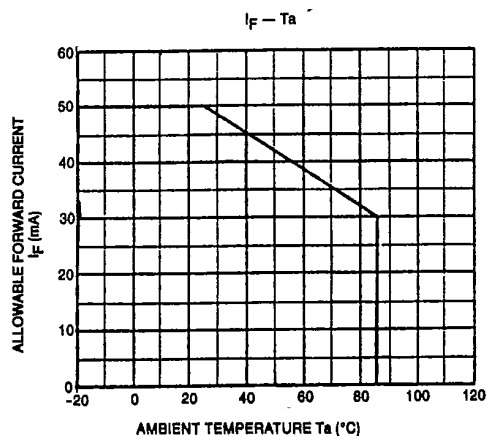
Note: Switching time test circuit and voltage waveform.

A - LED B - DETECTOR C - COUPLED



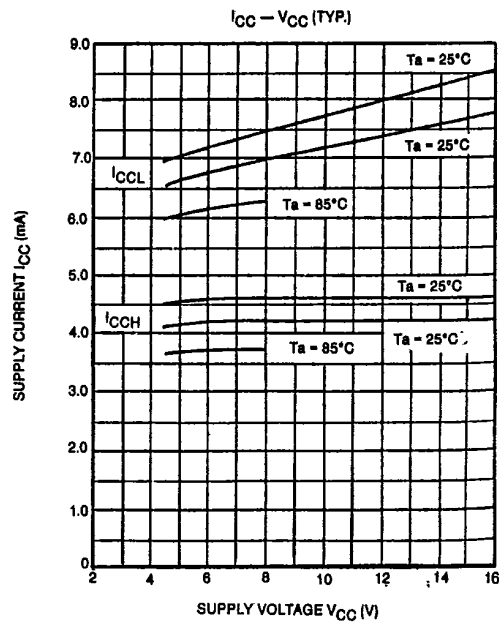
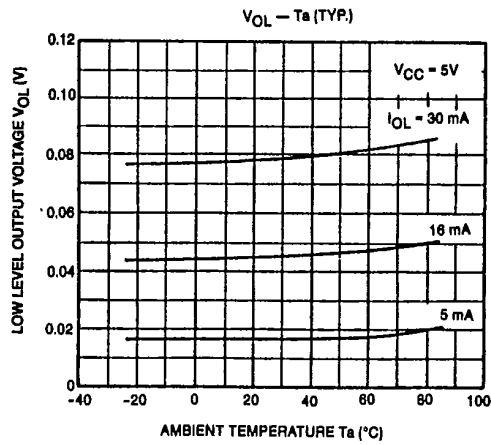
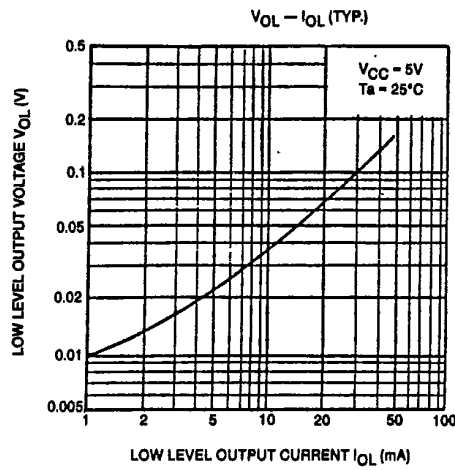
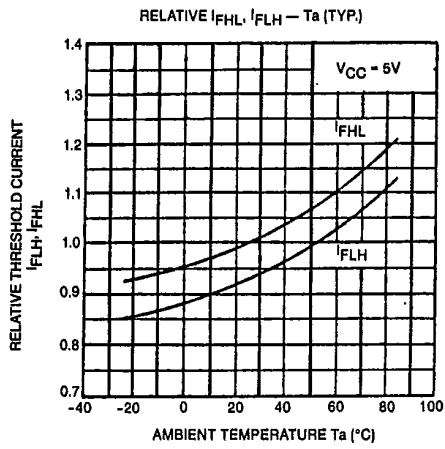
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