T-41-69

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

Photo Detector
Logic Output

MRD750

PHOTO DETECTOR LOGIC OUTPUT

. . . incorporates a Schmitt Trigger which provides hysteresis for noise immunity and pulse shaping. The detector circuit is optimized for simplicity of operation and utilizes an open-collector output for application flexibility.

- Popular Low Cost Plastic Package
- High Coupling Efficiency
- Wide V_{CC} Range
- Ideally Suited for MLED71 Emitter
- Usable to 125 kHz

CASE 349C-01
PLASTIC

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MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Output Voltage Range	V_o	0–16	Volts
Supply Voltage Range	V_{CC}	0–16	Volts
Output Current	I_O	50	mA
Device Dissipation Derate above 25°C (Note 1)	P_D	150 2	mW mW/°C
Maximum Operating Temperature	T_A	−40 to +85	°C
Storage Temperature Range	T_{stg}	−40 to +100	°C
Lead Soldering Temperature (5 seconds maximum; 1/16 inch from case) (Note 2)	T_L	260	°C

Notes: 1. Measured with device soldered into a typical PC board.
2. Heat sink should be applied to leads during soldering to prevent case temperature from exceeding 100°C.

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

Characteristic	Symbol	Min	Typ	Max	Unit
DEVICE (T_A = 25°C)					
Operating Voltage	V_{CC}	3	—	15	Volts
Supply Current with Output High, Figure 4 (I_F = 0, V_{CC} = 5 V)	$I_{CC(off)}$	—	1.3	6	mA
Output Current, High (I_F = 0, V_{CC} = V_o = 15 V, R_L = 270 Ω)	I_{OH}	—	—	100	μA

(continued)

ELECTRICAL CHARACTERISTICS — continued (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
COUPLED (T_A = 0–70°C)						
Light Required to Trigger (Tungsten Source, 2870 K)		$H_{(on)}$	—	0.50	—	mW/cm²
The following characteristics are measured with an MLED71 emitter at a separation distance of 4 mm (0.155 inches) with the lenses of the emitter and detector on a common axis within 0.1 mm and parallel within 5 degrees.						
Supply Current with Output Low, Figure 5 ($I_F = I_{F(on)}$, V_{CC} = 5 V)		$I_{CC(on)}$	—	3	5	mA
Output Voltage, Low (R_L = 270 Ω, V_{CC} = 5 V, $I_F = I_{F(on)}$)		V_{OL}	—	0.2	0.4	volts
Threshold Current, ON (R_L = 270 Ω, V_{CC} = 5 V)		$I_{F(on)}$	—	10	20	mA
Threshold Current, OFF (R_L = 270 Ω, V_{CC} = 5 V)		$I_{F(off)}$	1	7.5	—	mA
Hysteresis Ratio, Figure 1 (R_L = 270 Ω, V_{CC} = 5 V)		$\frac{I_{F(off)}}{I_{F(on)}}$	—	0.75	—	
Turn-On Time	R_L = 270 Ω, V_{CC} = 5 V, $I_F = I_{F(on)}$, T_A = 25°C	t_{on}	—	1.2	5	μs
Fall Time		t_f	—	0.1	—	
Turn-Off Time		t_{off}	—	1.2	5	
Rise Time		t_r	—	0.1	—	

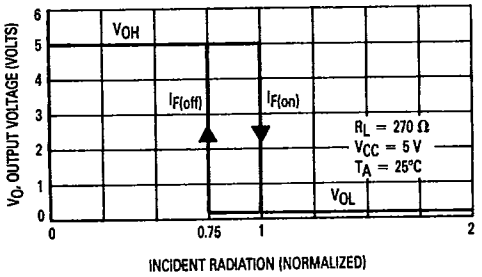

Figure 1. Transfer Characteristics

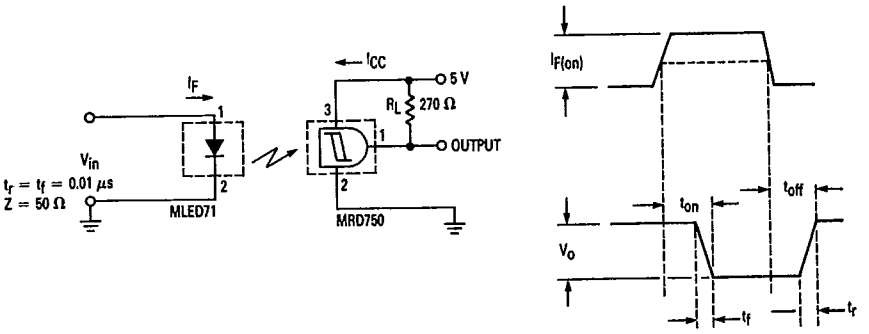

Figure 2. Switching Test Circuit

TYPICAL CHARACTERISTICS

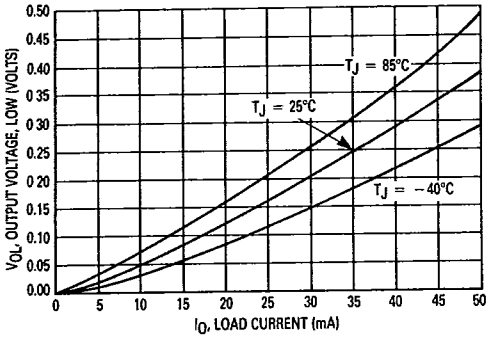

Figure 3. Output Voltage, Low versus Load Current

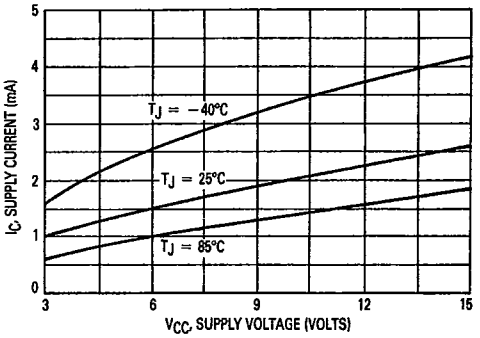

Figure 4. Supply Current versus Supply Voltage — Output High

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TYPICAL COUPLED CHARACTERISTICS USING MLED71 EMITTER AND MRD750 DIGITAL OUTPUT DETECTOR

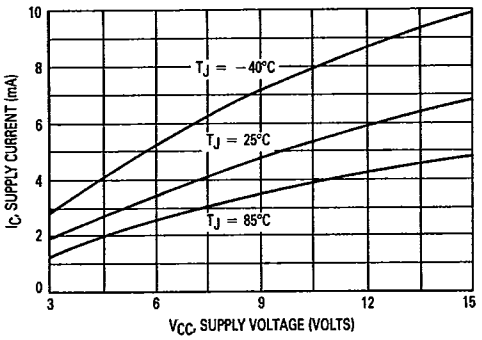

Figure 5. Supply Current versus Supply Voltage — Output Low

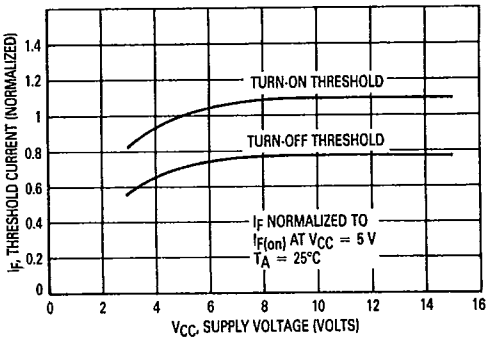

Figure 6. Threshold Current versus Supply Voltage

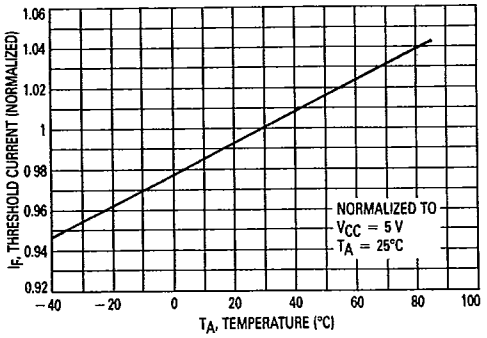

Figure 7. Threshold Current versus Temperature

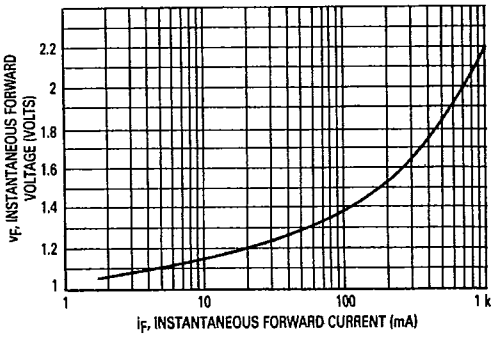

Figure 8. MLED71 Forward Characteristics

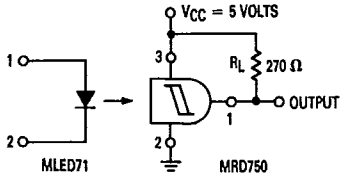

Figure 9. Test Circuit for Threshold Current Measurements

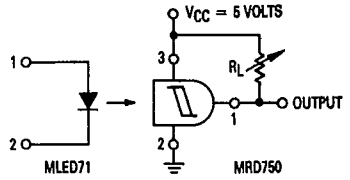

Figure 10. Test Circuit for Output Voltage versus Load Current Measurements

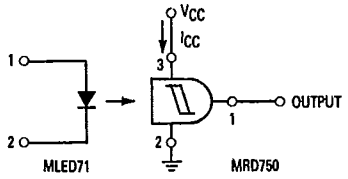

Figure 11. Test Circuit for Supply Current versus Supply Voltage Measurements

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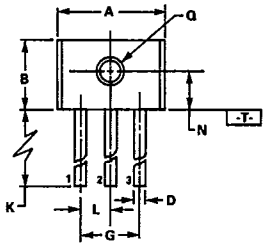

STYLE 3.
PIN 1. OUTPUT
2. GROUND
3. V_{CC}

CASE 349C-01
PLASTIC

NOTES:
1. DIMENSIONS A, B AND C ARE DATUMS.
2. POSITIONAL TOLERANCE FOR D DIMENSION.
   ⌖ | ϕ 0.25 (0.010) Ⓜ | T | A Ⓜ | C Ⓜ
3. POSITIONAL TOLERANCE FOR Q DIAMETER.
   ⌖ | ϕ 0.25 (0.010) Ⓜ | A Ⓜ | C Ⓜ
4. -T- IS A SEATING LANE.
5. DIMENSIONING AND TOLERANCING PER ANSI 14.5, 1973.

DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	3.43	4.60	0.135	0.185
B	2.79	3.30	0.110	0.130
C	2.03	3.18	0.080	0.125
D	0.43	0.56	0.017	0.022
G	2.54 BSC		0.100 BSC	
H	1.52 BSC		0.060 BSC	
J	0.23	0.56	0.009	0.022
K	12.70	—	0.500	—
L	1.27 BSC		0.050 BSC	
N	1.78 BSC		0.070 BSC	
Q	0.76	1.52	0.030	0.060