THE DATASHEET OF

MOC5007M

FAIRCHILD
SEMICONDUCTOR™

GlobalOptoisolator™

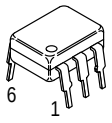
VDE | UL | CSA | SETI | SEMKO | DEMKO | NEMKO | BABT

6-Pin DIP Optoisolators Logic Output

MOC5007
MOC5008
MOC5009

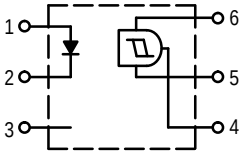
The MOC5007, MOC5008 and MOC5009 have a gallium arsenide IRED optically coupled to a high–speed integrated detector with Schmitt trigger output. Ideal for applications requiring electrical isolation, fast response time, noise immunity and digital logic compatibility.

- Guaranteed Switching Times — t_{on}, t_{off} 4 < µs
- Built–In ON/OFF Threshold Hysteresis
- High Data Rate, 1 MHz Typical (NRZ)
- Wide Supply Voltage Capability
- Microprocessor Compatible Drive
- ***To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.***



STANDARD THRU HOLE

SCHEMATIC



PIN 1. ANODE
2. CATHODE
3. NC
4. OPEN COLLECTOR OUTPUT
5. GROUND
6. V_{CC}

Applications

- Interfacing Computer Terminals to Peripheral Equipment
- Digital Control of Power Supplies
- Line Receiver — Eliminates Noise
- Digital Control of Motors and Other Servo Machine Applications
- Logic to Logic Isolator
- Logic Level Shifter — Couples TTL to CMOS

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

Rating	Symbol	Value	Unit
INPUT LED			
Reverse Voltage	V_R	6	Volts
Forward Current — Continuous Peak Pulse Width = 300 µs, 2% Duty Cycle	I_F	60 1.2	mA Amp
LED Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	120 1.41	mW mW/°C
OUTPUT DETECTOR			
Output Voltage Range	V_o	0–16	Volts
Supply Voltage Range	V_{CC}	3–16	Volts
Output Current	I_O	50	mA
Detector Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 1.76	mW mW/°C
TOTAL DEVICE			
Total Device Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Maximum Operating Temperature	T_A	–40 to +85	°C
Storage Temperature Rang	T_{stg}	–55 to +150	°C
Soldering Temperature (10 s)	T_L	260	°C
Isolation Surge Voltage(1) (Peak ac Voltage, 60 Hz, 1 Second Duration)	V_{ISO}	7500	Vac(pk)

1. Isolation surge voltage is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

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

Characteristic		Symbol	Min	Typ1)	Max	Unit
INPUT LED						
Reverse Leakage Current (V_R = 3 V, RL = 1 MΩ)		I_R	—	0.05	10	µA
Forward Voltage (I_F = 10 mA) (I_F = 0.3 mA)		V_F	— 0.75	1.2 0.95	1.5 —	Volts
Capacitance (V_R = 0 V, f = 1 MHz)		C	—	18	—	pF
OUTPUT DETECTOR						
Operating Voltage		V_{CC}	3	—	15	Volts
Supply Current (I_F = 0, V_{CC} = 5 V)		$I_{CC(off)}$	—	1	5	mA
Output Current, High (I_F = 0, V_{CC} = V_o = 15 V)		I_{OH}	—	—	100	µA
COUPLED						
Supply Current (I_F = $I_{F(on)}$, V_{CC} = 5 V)		$I_{CC(on)}$	—	1.6	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)	MOC5007 MOC5008 MOC5009	$I_{F(on)}$	— — —	1.2 — —	1.6 4 10	mA
Threshold Current, OFF (R_L = 270 Ω, V_{CC} = 5 V)	MOC5007 MOC5008, 5009	$I_{F(off)}$	0.3 0.3	0.75 —	— —	mA
Hysteresis Ratio (R_L = 270 Ω, V_{CC} = 5 V)		$\frac{I_{F(off)}}{I_{F(on)}}$	0.5	0.75	0.9	
Isolation Voltage(2) 60 Hz, AC Peak, 1 second, T_A = 25°C		V_{ISO}	7500	—	—	Vac(pk)
Turn–On Time	R_L = 270 Ω(3) V_{CC} = 5 V, I_F = $I_{F(on)}$ T_A = 25°C	t_{on}	—	1.2	4	µs
Fall Time		t_f	—	0.1	—	
Turn–Off Time		t_{off}	—	1.2	4	
Rise Time		t_r	—	0.1	—	

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. For this test, IRED Pins 1 and 2 are common and Output Gate Pins 4, 5, 6 are common.
3. R_L value effect on switching time is negligible.

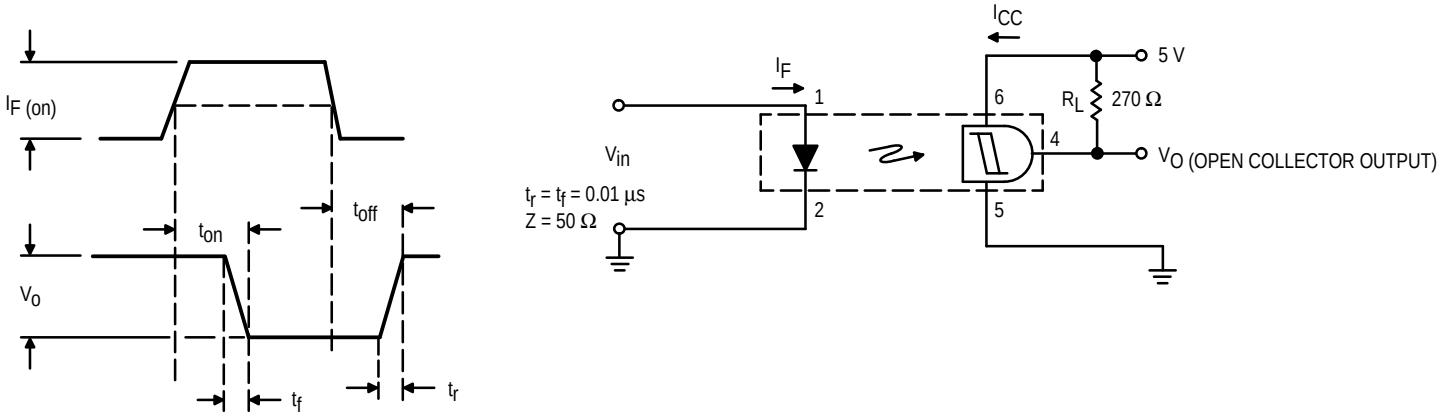


Figure 1. Switching Test Circuit

TYPICAL CHARACTERISTICS

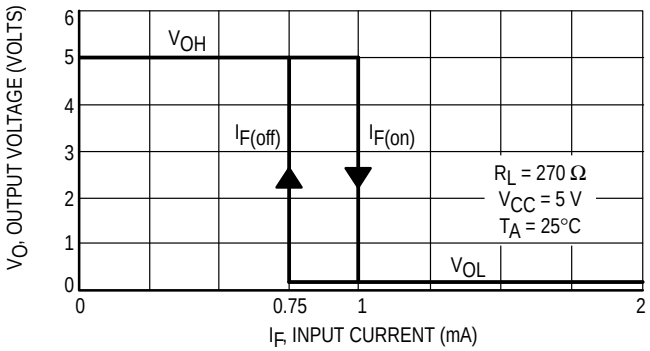


Figure 2. Transfer Characteristics for MOC5007

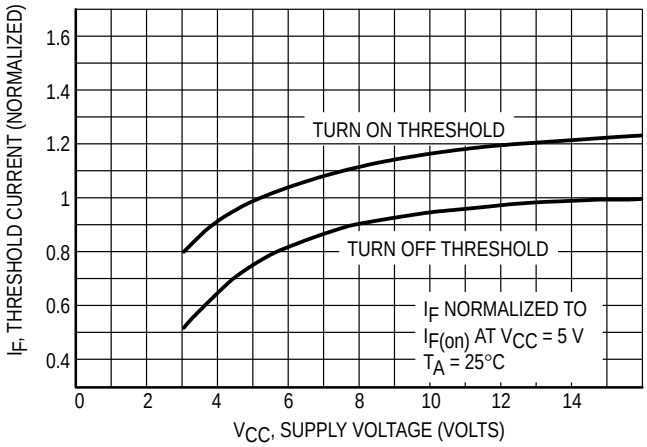


Figure 3. Threshold Current versus Supply Voltage

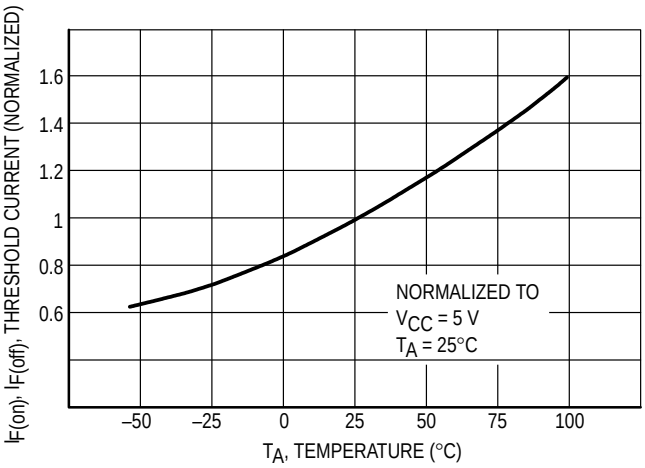


Figure 4. Threshold Current versus Temperature

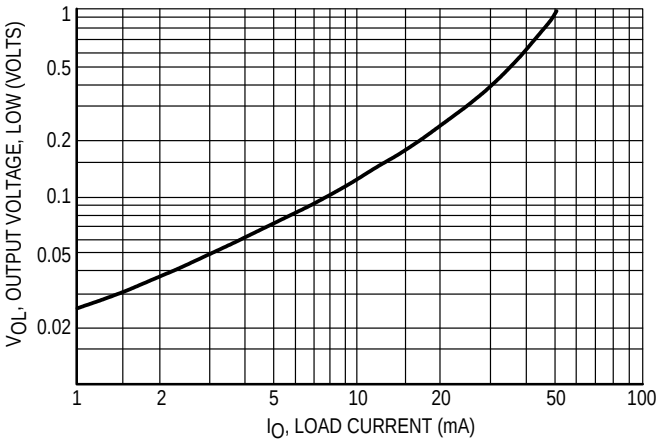


Figure 5. Output Voltage, Low versus Load Current

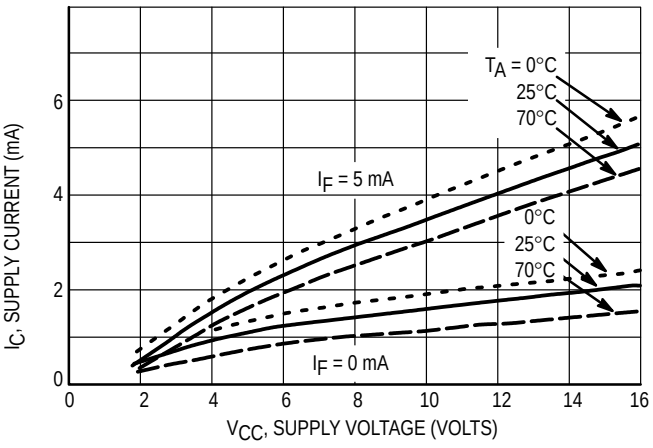
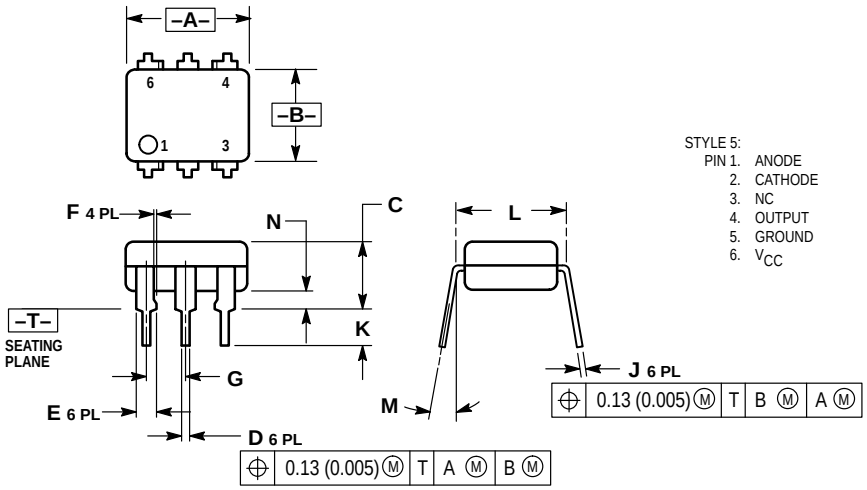


Figure 6. Supply Current versus Supply Voltage

PACKAGE DIMENSIONS

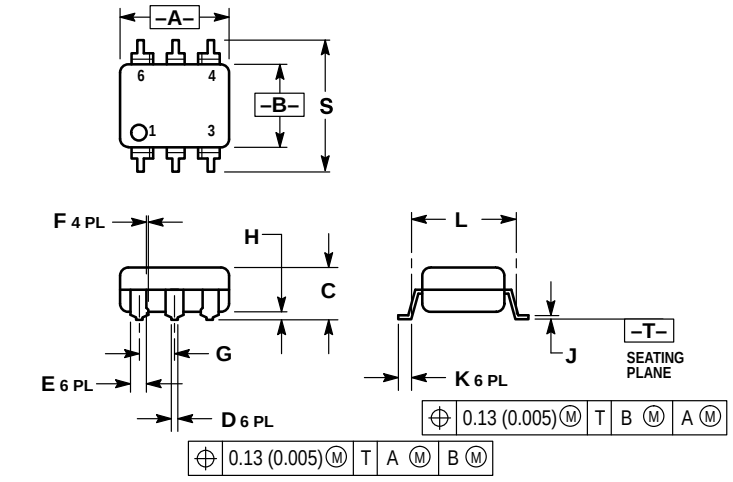


STYLE 5:
PIN 1. ANODE
2. CATHODE
3. NC
4. OUTPUT
5. GROUND
6. V_{CC}

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.015	0.100	0.38	2.54

THRU HOLE



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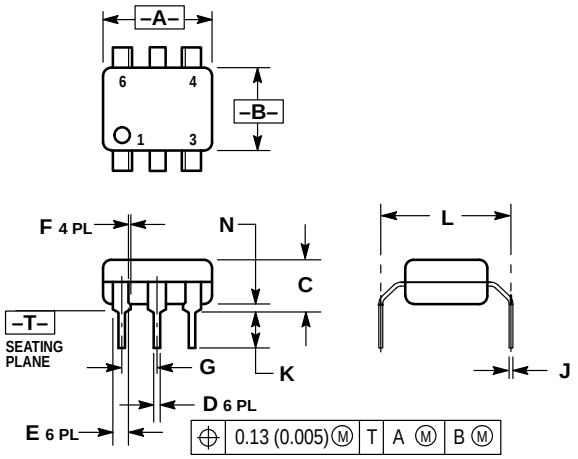
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

SURFACE MOUNT



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C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02

0.4" LEAD SPACING

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