



## 6-Pin DIP Optoisolators Logic Output

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 —  $t_{on}, t_{off} 4 < \mu s$
- 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.**

### 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 ( $T_A = 25^\circ C$ unless otherwise noted)

Rating	Symbol	Value	Unit
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#### INPUT LED

Reverse Voltage	$V_R$	6	Volts
Forward Current — Continuous	$I_F$	60	mA
Peak		1.2	Amp
Pulse Width = 300 $\mu s$ , 2% Duty Cycle			
LED Power Dissipation @ $T_A = 25^\circ C$	$P_D$	120	mW
Derate above $25^\circ C$		1.41	mW/ $^\circ C$

#### 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 @ $T_A = 25^\circ C$	$P_D$	150	mW
Derate above $25^\circ C$		1.76	mW/ $^\circ C$

#### TOTAL DEVICE

Total Device Power Dissipation @ $T_A = 25^\circ C$	$P_D$	250	mW
Derate above $25^\circ C$		2.94	mW/ $^\circ C$
Maximum Operating Temperature <sup>(2)</sup>	$T_A$	–40 to +85	$^\circ C$
Storage Temperature Range <sup>(2)</sup>	$T_{stg}$	–55 to +150	$^\circ C$
Soldering Temperature (10 s)	$T_L$	260	$^\circ C$
Isolation Surge Voltage <sup>(1)</sup> (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.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

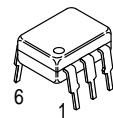
**Preferred** devices are Motorola recommended choices for future use and best overall value.

GlobalOptoisolator is a trademark of Motorola, Inc.

**MOC5007\***  
[IF(on) = 1.6 mA Max]  
**MOC5008**  
[IF(on) = 4 mA Max]  
**MOC5009**  
[IF(on) = 10 mA Max]

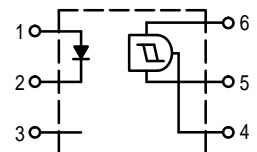
\*Motorola Preferred Device

### STYLE 5 PLASTIC



STANDARD THRU HOLE  
CASE 730A–04

### SCHEMATIC



- PIN 1. ANODE
- CATHODE
- NC
- OPEN COLLECTOR OUTPUT
- GROUND
- $V_{CC}$

# MOC5007 MOC5008 MOC5009

ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)<sup>(1)</sup>

Characteristic	Symbol	Min	Typ <sup>1)</sup>	Max	Unit	
<b>INPUT LED</b>						
Reverse Leakage Current ( $V_R = 3\text{ V}$ , $R_L = 1\text{ M}\Omega$ )	$I_R$	—	0.05	10	$\mu\text{A}$	
Forward Voltage ( $I_F = 10\text{ mA}$ ) ( $I_F = 0.3\text{ mA}$ )	$V_F$	— 0.75	1.2 0.95	1.5 —	Volts	
Capacitance ( $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ )	C	—	18	—	pF	
<b>OUTPUT DETECTOR</b>						
Operating Voltage	$V_{CC}$	3	—	15	Volts	
Supply Current ( $I_F = 0$ , $V_{CC} = 5\text{ V}$ )	$I_{CC(\text{off})}$	—	1	5	mA	
Output Current, High ( $I_F = 0$ , $V_{CC} = V_O = 15\text{ V}$ )	$I_{OH}$	—	—	100	$\mu\text{A}$	
<b>COUPLED</b>						
Supply Current ( $I_F = I_{F(\text{on})}$ , $V_{CC} = 5\text{ V}$ )	$I_{CC(\text{on})}$	—	1.6	5	mA	
Output Voltage, Low ( $R_L = 270\ \Omega$ , $V_{CC} = 5\text{ V}$ , $I_F = I_{F(\text{on})}$ )	$V_{OL}$	—	0.2	0.4	Volts	
Threshold Current, ON ( $R_L = 270\ \Omega$ , $V_{CC} = 5\text{ V}$ )	$I_{F(\text{on})}$	—	1.2	1.6	mA	
			—	4		
			—	10		
Threshold Current, OFF ( $R_L = 270\ \Omega$ , $V_{CC} = 5\text{ V}$ )	$I_{F(\text{off})}$	0.3	0.75	—	mA	
		0.3	—	—		
Hysteresis Ratio ( $R_L = 270\ \Omega$ , $V_{CC} = 5\text{ V}$ )	$\frac{I_{F(\text{off})}}{I_{F(\text{on})}}$	0.5	0.75	0.9		
Isolation Voltage <sup>(2)</sup> 60 Hz, AC Peak, 1 second, $T_A = 25^\circ\text{C}$	$V_{ISO}$	7500	—	—	Vac(pk)	
Turn-On Time	$R_L = 270\ \Omega$ <sup>(3)</sup> $V_{CC} = 5\text{ V}$ , $I_F = I_{F(\text{on})}$ $T_A = 25^\circ\text{C}$	$t_{on}$	—	1.2	4	$\mu\text{s}$
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.

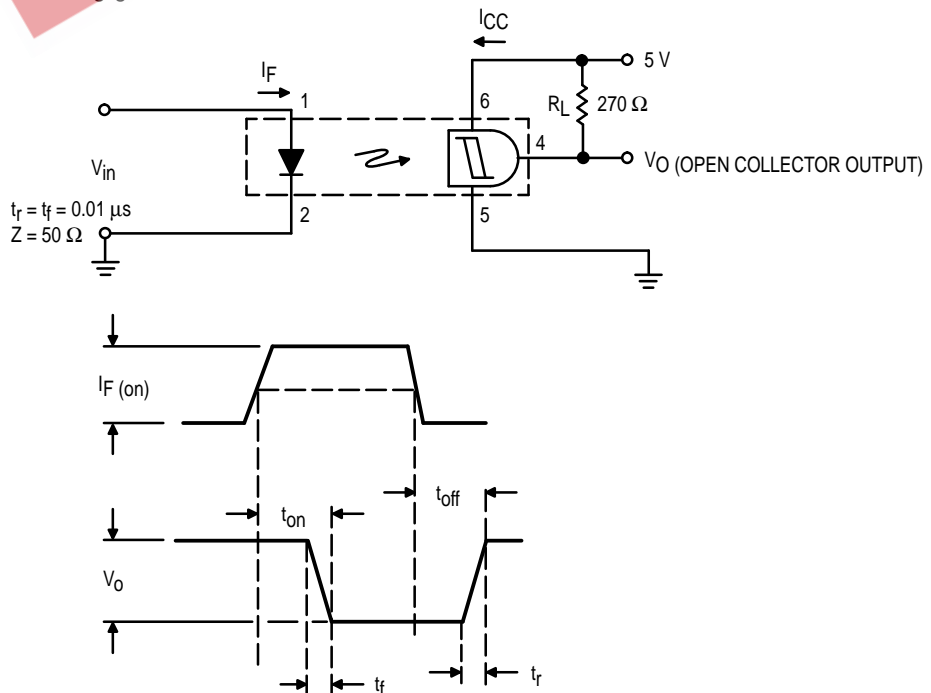
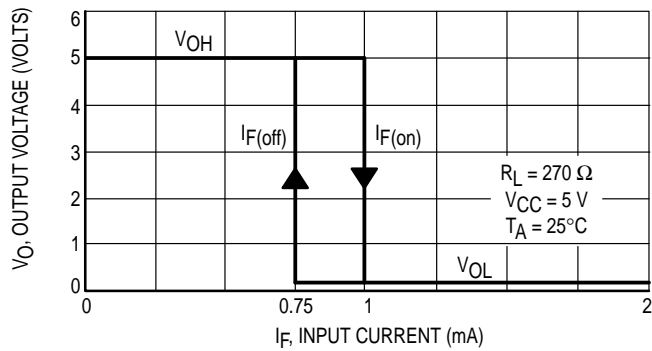
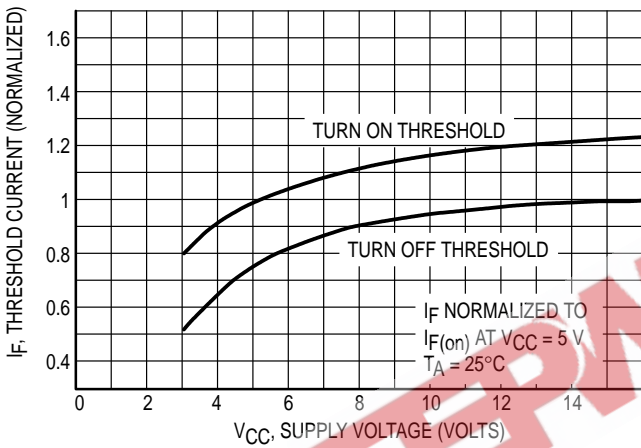


Figure 1. Switching Test Circuit

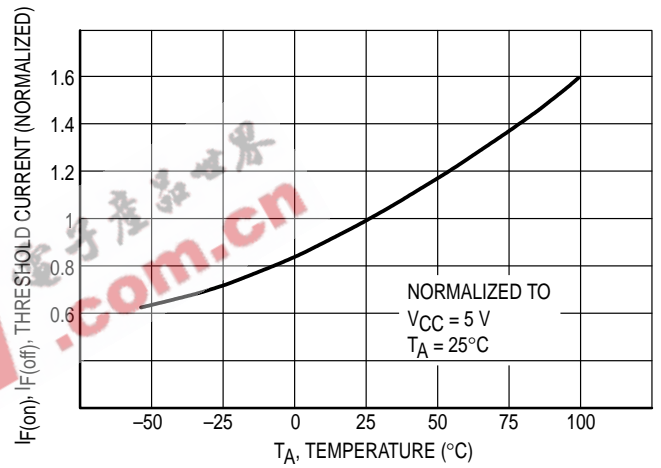
**TYPICAL CHARACTERISTICS**



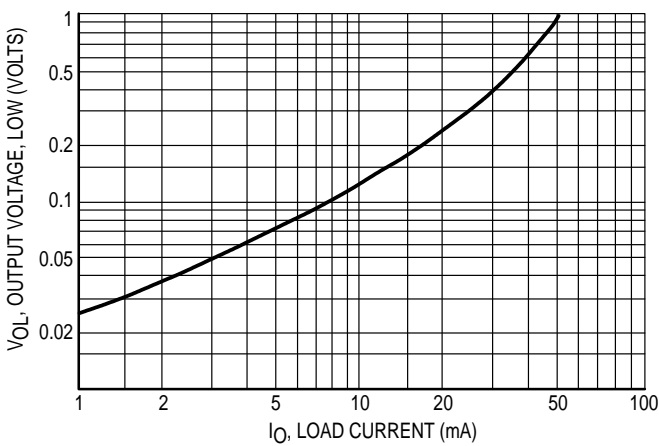
**Figure 2. Transfer Characteristics for MOC5007**



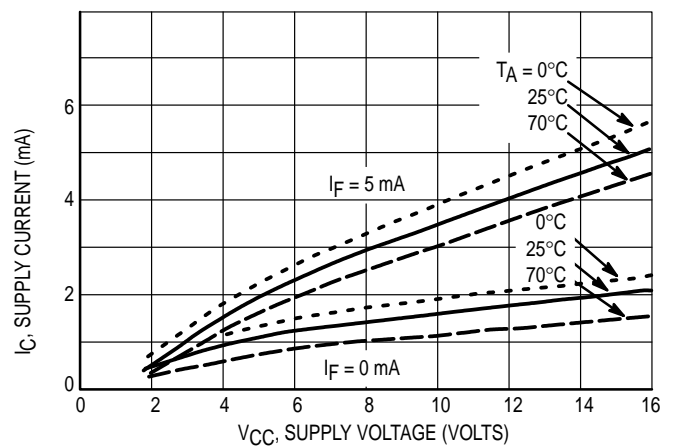
**Figure 3. Threshold Current versus Supply Voltage**



**Figure 4. Threshold Current versus Temperature**



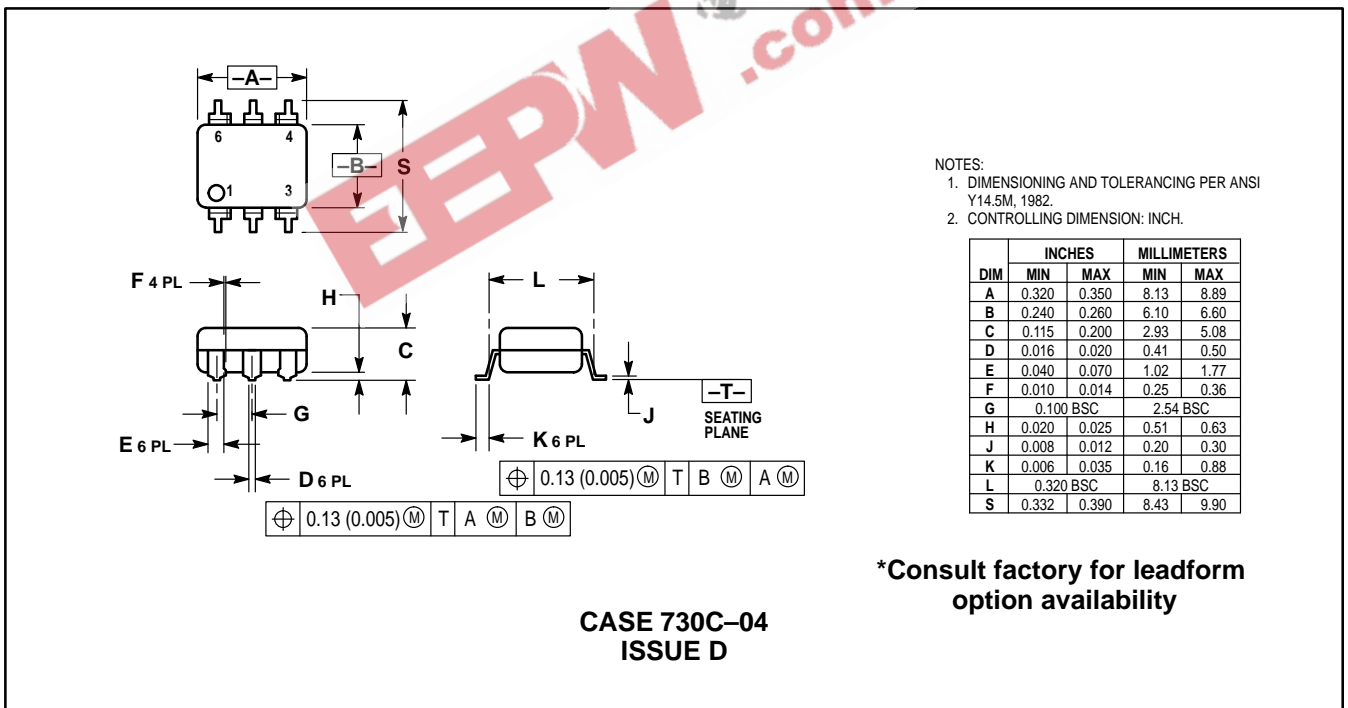
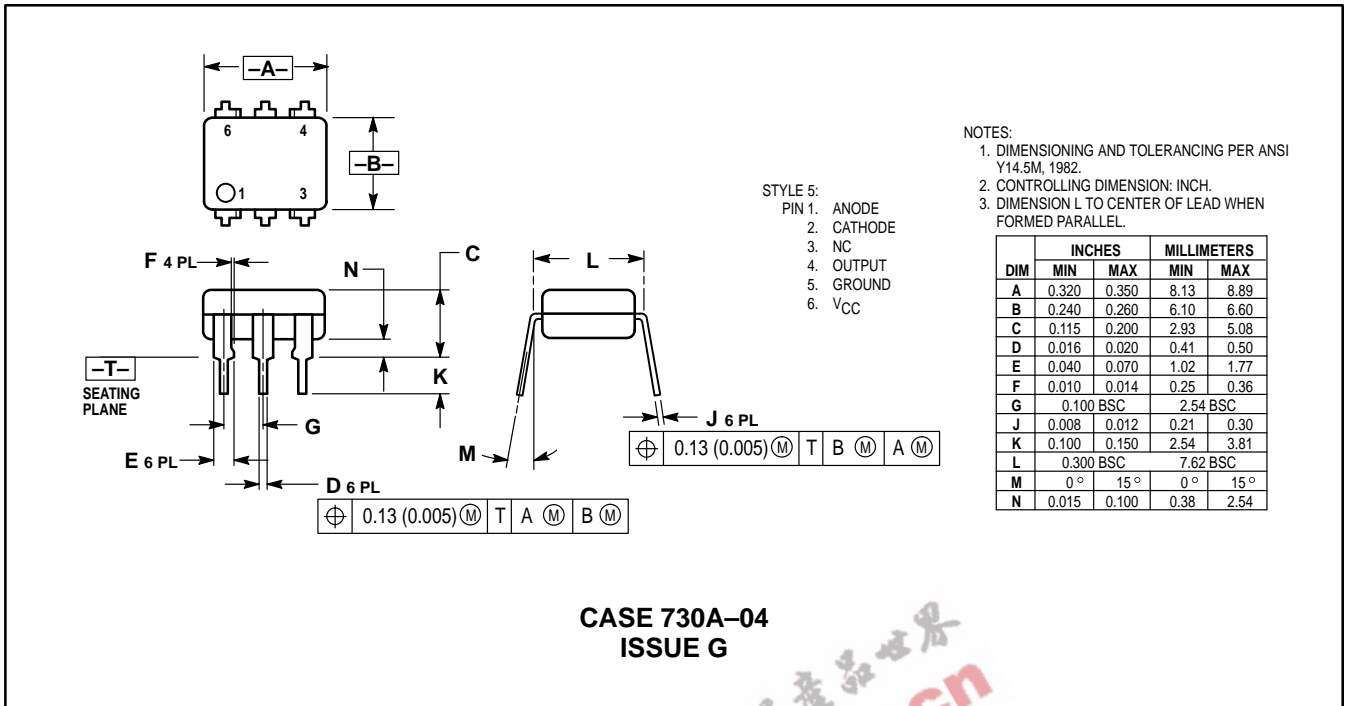
**Figure 5. Output Voltage, Low versus Load Current**



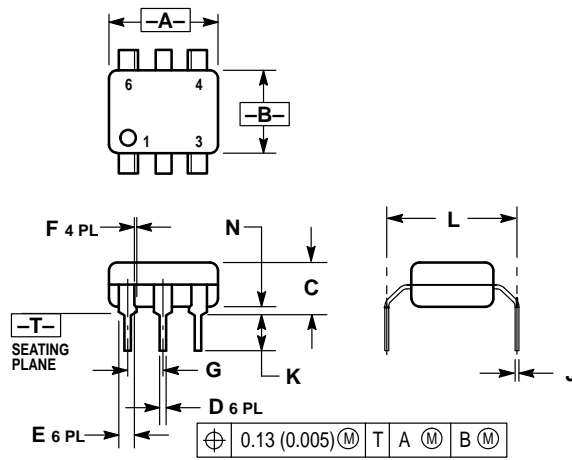
**Figure 6. Supply Current versus Supply Voltage**

# MOC5007 MOC5008 MOC5009

## PACKAGE DIMENSIONS



**MOC5007 MOC5008 MOC5009**



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

DIM	INCHES		MILLIMETERS	
	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	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02


**\*Consult factory for leadform option availability**

**CASE 730D-05  
ISSUE D**



# MOC5007 MOC5008 MOC5009

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#### How to reach us:

**USA / EUROPE:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244-6609  
**INTERNET:** <http://Design-NET.com>

**HONG KONG:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



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MOC5007/D

