



# 6-Pin DIP Optoisolators High Voltage Transistor Output (400 Volts)

The MOC8204, MOC8205 and MOC8206 devices consist of gallium arsenide infrared emitting diodes optically coupled to high voltage, silicon, phototransistor detectors in a standard 6-pin DIP package. They are designed for high voltage applications and are particularly useful in copy machines and solid state relays.

- **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

- Copy Machines
- Interfacing and coupling systems of different potentials and impedances
- Monitor and Detection Circuits
- Solid State Relays

### MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
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#### INPUT LED

Forward Current — Continuous	I <sub>F</sub>	60	mA
Forward Current — Peak Pulse Width = 1 μs, 330 pps	I <sub>F</sub>	1.2	Amp
LED Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	120 1.41	mW mW/°C

#### OUTPUT TRANSISTOR

Collector–Emitter Voltage	V <sub>CER</sub>	400	Volts
Emitter–Collector Voltage	V <sub>ECO</sub>	7	Volts
Collector–Base Voltage	V <sub>CBO</sub>	400	mA
Collector Current (Continuous)	I <sub>C</sub>	100	mA
Detector Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	150 1.76	mW mW/°C

#### TOTAL DEVICE

Total Device Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	250 2.94	mW mW/°C
Operating Temperature Range <sup>(2)</sup>	T <sub>J</sub>	–55 to +100	°C
Storage Temperature Range <sup>(2)</sup>	T <sub>stg</sub>	–55 to +150	°C
Soldering Temperature (10 s)	T <sub>L</sub>	260	°C
Isolation Surge Voltage Peak ac Voltage, 60 Hz, 1 Second Duration <sup>(1)</sup>	V <sub>ISO</sub>	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.

**MOC8204\***

[CTR = 20% Min]

**MOC8205**

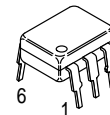
[CTR = 10% Min]

**MOC8206**

[CTR = 5% Min]

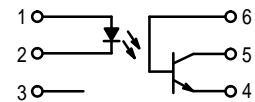
\*Motorola Preferred Device

### STYLE 1 PLASTIC



STANDARD THRU HOLE  
CASE 730A-04

### SCHEMATIC



- PIN 1. ANODE
- 2. CATHODE
- 3. N.C.
- 4. EMITTER
- 5. COLLECTOR
- 6. BASE

# MOC8204 MOC8205 MOC8206

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)<sup>(1)</sup>

Characteristic	Symbol	Min	Typ <sup>(1)</sup>	Max	Unit
<b>INPUT LED</b> (T <sub>A</sub> = 25°C unless otherwise noted)					
Reverse Leakage Current (V <sub>R</sub> = 6 V)	I <sub>R</sub>	—	—	10	μA
Forward Voltage (I <sub>F</sub> = 10 mA)	V <sub>F</sub>	—	1.2	15	Volts
Capacitance (V = 0 V, f = 1 MHz)	C <sub>J</sub>	—	18	—	pF

## OUTPUT TRANSISTOR (T<sub>A</sub> = 25°C and I<sub>F</sub> = 0 unless otherwise noted)

Collector–Emitter Dark Current (R <sub>BE</sub> = 1 MΩ) (V <sub>CE</sub> = 300 V)	I <sub>CER</sub>	—	—	100 250	nA μA
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA)	V <sub>(BR)CBO</sub>	400	—	—	Volts
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 1 mA, R <sub>BE</sub> = 1 MΩ)	V <sub>(BR)CER</sub>	400	—	—	Volts
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA)	V <sub>(BR)EBO</sub>	7	—	—	Volts

## COUPLED (T<sub>A</sub> = 25°C unless otherwise noted)

Output Collector Current (V <sub>CE</sub> = 10 V, I <sub>F</sub> = 10 mA, R <sub>BE</sub> = 1 MΩ)	I <sub>C</sub> (CTR) <sup>(2)</sup>	2 (20) 1 (10) 0.5 (5)	—	—	mA (%)
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 0.5 mA, I <sub>F</sub> = 10 mA, R <sub>BE</sub> = 1 MΩ)	V <sub>CE(sat)</sub>	—	—	0.4	Volts
Surge Isolation Voltage (Input to Output) <sup>(3)</sup> Peak ac Voltage, 60 Hz, 1 sec	V <sub>ISO</sub>	7500	—	—	Vac(pk)
Isolation Resistance <sup>(3)</sup> (V = 500 V)	R <sub>ISO</sub>	—	10 <sup>11</sup>	—	Ohms
Isolation Capacitance <sup>(1)</sup> (V = 0 V, f = 1 MHz)	C <sub>ISO</sub>	—	0.2	—	pF
Turn-On Time	V <sub>CC</sub> = 10 V, I <sub>C</sub> = 2 mA, R <sub>L</sub> = 100 Ω	t <sub>on</sub>	—	5	μs
Turn-Off Time		t <sub>off</sub>	—	5	

1. Always design to the specified minimum/maximum electrical limits (where applicable).

2. Current Transfer Ratio (CTR) = I<sub>C</sub>/I<sub>F</sub> × 100%.

3. For this test LED Pins 1 and 2 are common and phototransistor Pins 4, 5 and 6 are common.

## TYPICAL CHARACTERISTICS

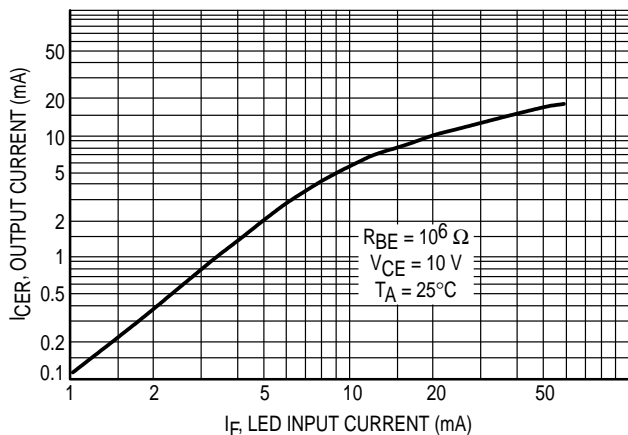


Figure 1. Output Current versus LED Input Current

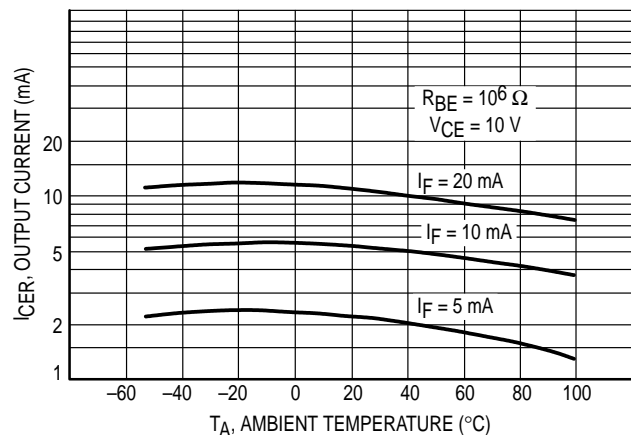


Figure 2. Output Current versus Temperature

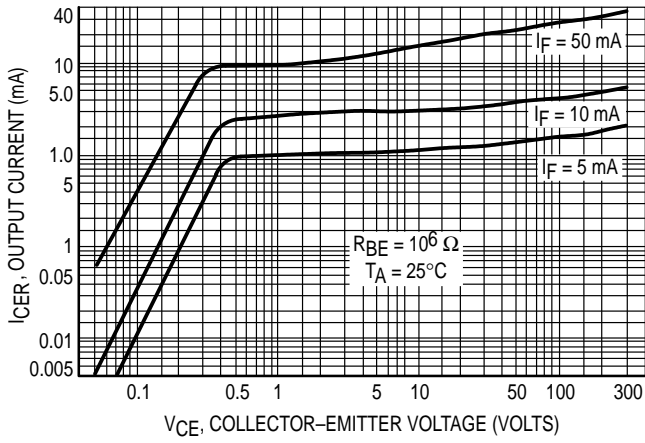


Figure 3. Output Characteristics

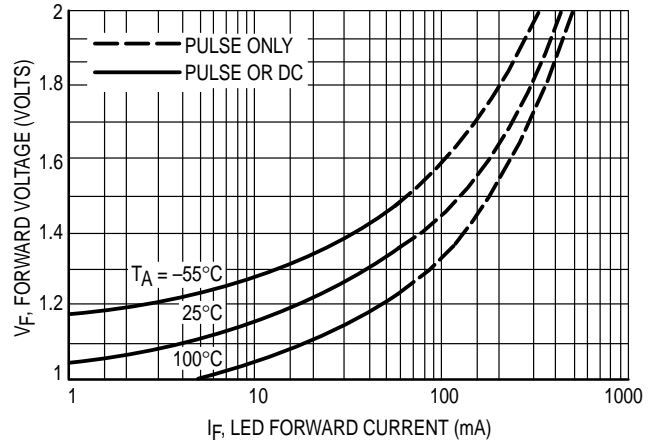


Figure 4. Forward Characteristics

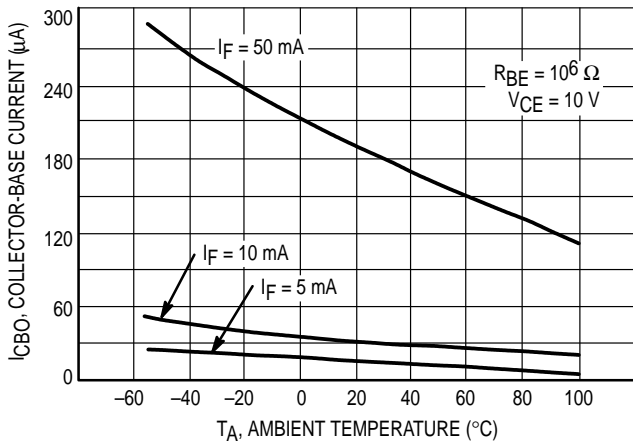


Figure 5. Collector-Base Current versus Temperature

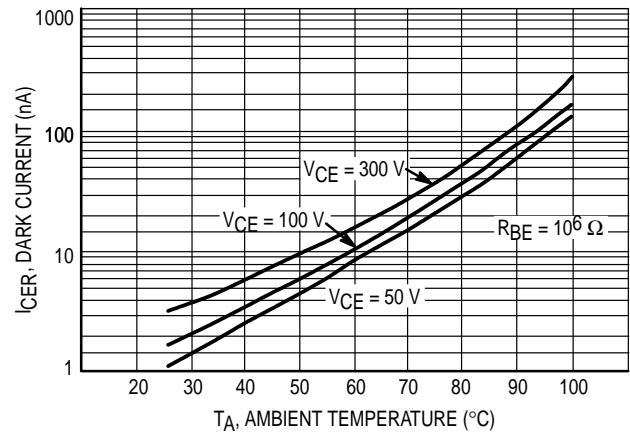
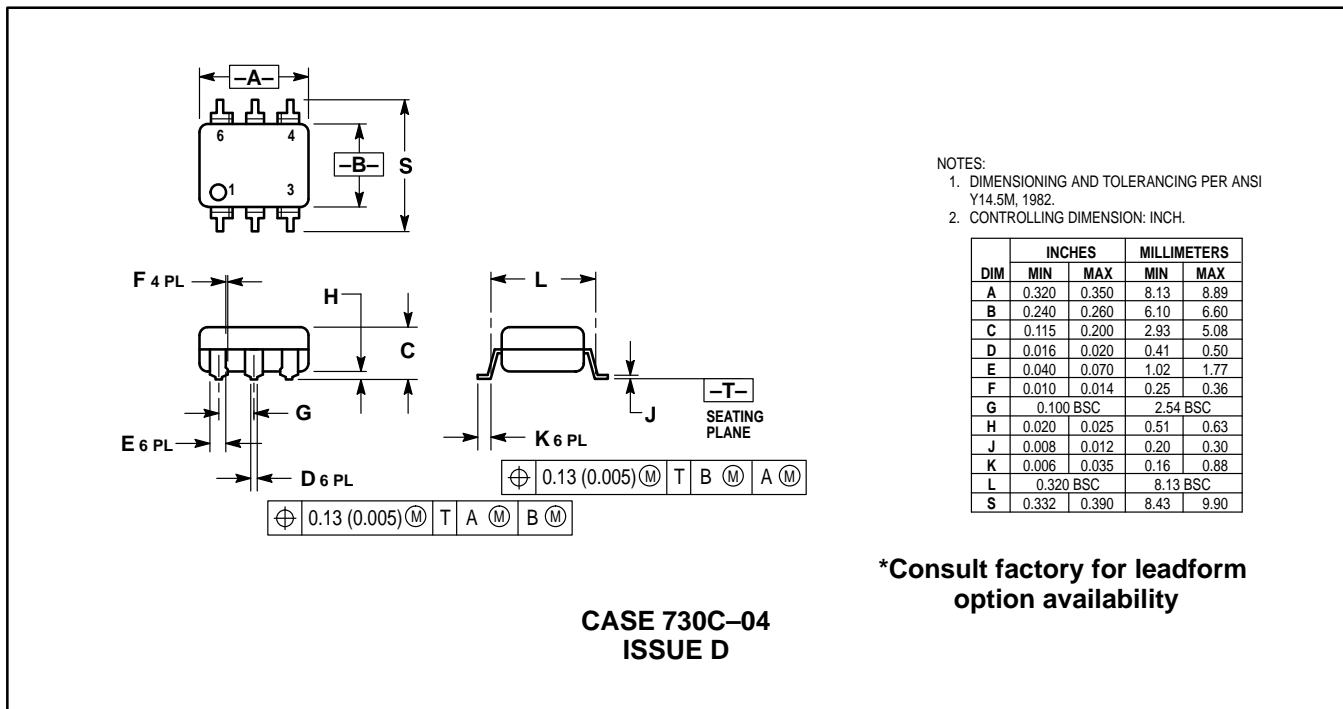
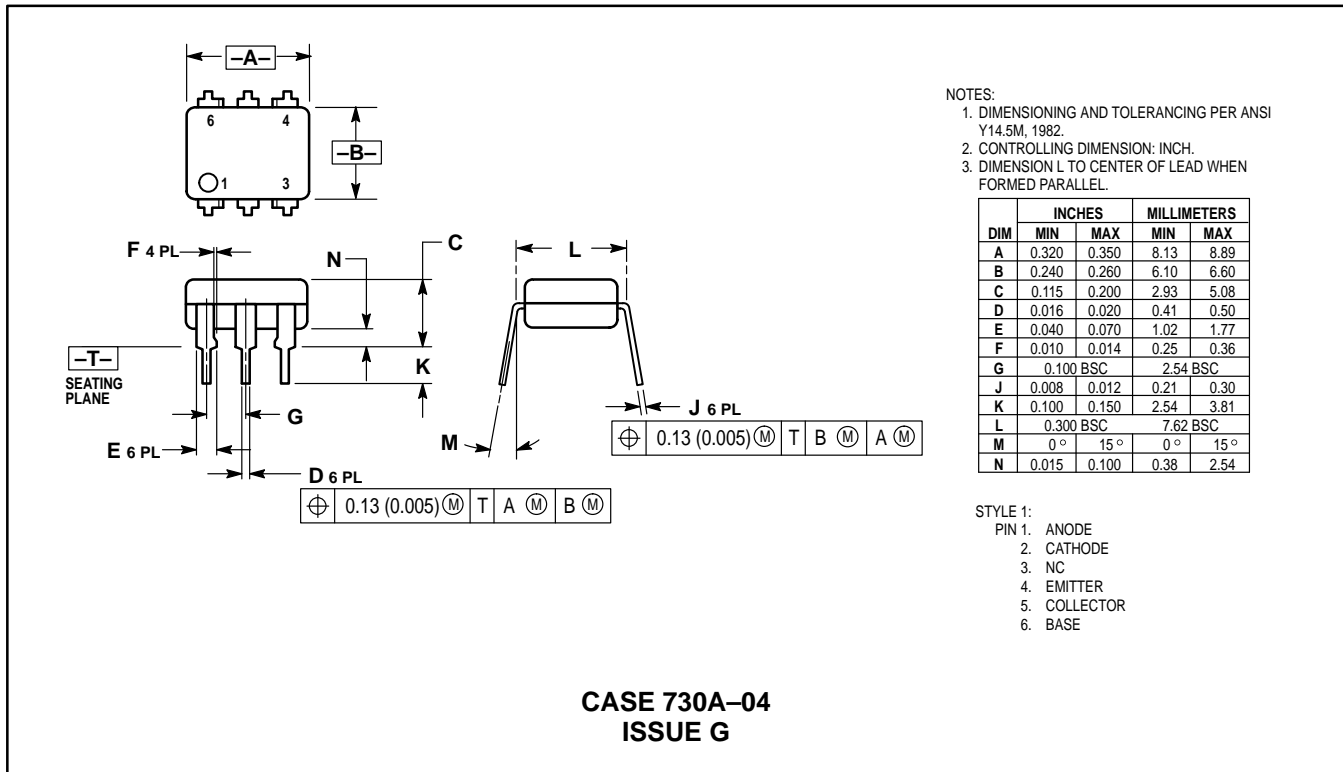
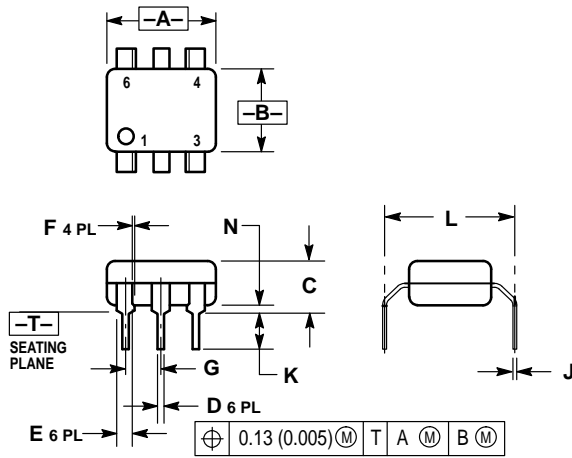


Figure 6. Dark Current versus Temperature

# MOC8204 MOC8205 MOC8206

## PACKAGE DIMENSIONS






- 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**

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