GlobalOptoisolator™

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

# MOC8106
**[CTR = 50–150%]**
# MOC8107
**[CTR = 100–300%]**
# MOC8108
**[CTR = 250–600%]**

# 6-Pin DIP Optoisolators for Power Supply Applications (No Base Connection)

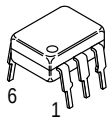
The MOC8106, MOC8107 and MOC8108 devices consist of a gallium arsenide LED optically coupled to a silicon phototransistor in a dual–in–line package.

- Closely Matched Current Transfer Ratio (CTR) Minimizes Unit–to–Unit Variation
- Narrow (CTR) Windows that translate to a Narrow and Predictable Open Loop Gain Window
- Very Low Coupled Capacitance along with No Chip to Pin 6 Base Connection for Minimum Noise Susceptibility
- ***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**

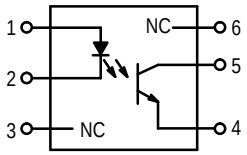
- Switchmode Power Supplies (Feedback Control)
- AC Line/Digital Logic Isolation
- Interfacing and coupling systems of different potentials and impedances

**STYLE 3 PLASTIC**




**STANDARD THRU HOLE**
**CASE 730A–04**

**SCHEMATIC**




PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. NO CONNECTION

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

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| **INPUT LED** | | | |
| Forward Current — Continuous | $I_F$ | 60 | mA |
| Forward Current — Peak (PW = 100 μs, 120 pps) | $I_F$(pk) | 1 | A |
| Reverse Voltage | $V_R$ | 6 | Volts |
| LED Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 120<br>1.41 | mW<br>mW/°C |
| **OUTPUT TRANSISTOR** | | | |
| Collector–Emitter Voltage | $V_{CEO}$ | 70 | Volts |
| Emitter–Collector Voltage | $V_{ECO}$ | 7 | Volts |
| Collector Current — Continuous | $I_C$ | 150 | mA |
| Detector Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 150<br>1.76 | mW<br>mW/°C |
| **TOTAL DEVICE** | | | |
| Input–Output Isolation Voltage(1)<br>(f = 60 Hz, t = 1 sec.) | $V_{ISO}$ | 7500 | Vac(pk) |
| Total Device Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 250<br>2.94 | mW<br>mW/°C |
| Ambient Operating Temperature Range(2) | $T_A$ | –55 to +100 | °C |
| Storage Temperature Range(2) | $T_{stg}$ | –55 to +150 | °C |
| Lead Soldering Temperature<br>(1/16″ from case, 10 sec. duration) | $T_L$ | 260 | °C |

1. Input–Output Isolation Voltage, $V_{ISO}$, is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

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

| Characteristic | | Symbol | Min | Typ(1) | Max | Unit |
|---|---|---|---|---|---|---|
| **INPUT LED** | | | | | | |
| Forward Voltage ($I_F$ = 10 mA) | | $V_F$ | 1.0 | 1.15 | 1.5 | Volts |
| Reverse Leakage Current ($V_R$ = 5.0 V) | | $I_R$ | — | 0.05 | 10 | μA |
| Capacitance | | C | — | 18 | — | pF |
| **OUTPUT TRANSISTOR** | | | | | | |
| Collector–Emitter Dark Current | ($V_{CE}$ = 10 V, $T_A$ = 25°C) | $I_{CEO1}$ | — | 1.0 | 50 | nA |
| | ($V_{CE}$ = 10 V, $T_A$ = 100°C) | $I_{CEO2}$ | — | 1.0 | — | μA |
| Collector–Emitter Breakdown Voltage ($I_C$ = 1.0 mA) | | $V_{(BR)CEO}$ | 70 | 100 | — | Volts |
| Emitter–Collector Breakdown Voltage ($I_E$ = 100 μA) | | $V_{(BR)ECO}$ | 7.0 | 7.8 | — | Volts |
| Collector–Emitter Capacitance (f = 1.0 MHz, $V_{CE}$ = 0) | | $C_{CE}$ | — | 7.0 | — | pF |
| **COUPLED** | | | | | | |
| Output Collector Current ($I_F$ = 10 mA, $V_{CE}$ = 10 V) | MOC8106 | $I_C$ (CTR)(2) | 5.0 (50) | — | 15 (150) | mA (%) |
| | MOC8107 | | 10 (100) | — | 30 (300) | |
| | MOC8108 | | 25 (250) | — | 60 (600) | |
| Collector–Emitter Saturation Voltage ($I_C$ = 500 μA, $I_F$ = 5.0 mA) | | $V_{CE(sat)}$ | — | 0.15 | 0.4 | Volts |
| Turn–On Time ($I_C$ = 2.0 mA, $V_{CC}$ = 10 V, $R_L$ = 100 Ω)(3) | | $t_{on}$ | — | 7.5 | — | μs |
| Turn–Off Time ($I_C$ = 2.0 mA, $V_{CC}$ = 10 V, $R_L$ = 100 Ω)(3) | | $t_{off}$ | — | 5.7 | — | μs |
| Rise Time ($I_C$ = 2.0 mA, $V_{CC}$ = 10 V, $R_L$ = 100 Ω)(3) | | $t_r$ | — | 3.2 | — | μs |
| Fall Time ($I_C$ = 2.0 mA, $V_{CC}$ = 10 V, $R_L$ = 100 Ω)(3) | | $t_f$ | — | 4.7 | — | μs |
| Isolation Voltage (f = 60 Hz, t = 1.0 sec.)(4) | | $V_{ISO}$ | 7500 | — | — | Vac(pk) |
| Isolation Resistance ($V_{I–O}$ = 500 V)(4) | | $R_{ISO}$ | $10^{11}$ | — | — | Ω |
| Isolation Capacitance ($V_{I–O}$ = 0, f = 1.0 MHz)(4) | | $C_{ISO}$ | — | 0.2 | — | pF |

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F$ x 100%.
3. For test circuit setup and waveforms, refer to Figure 7.
4. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.

## TYPICAL CHARACTERISTICS

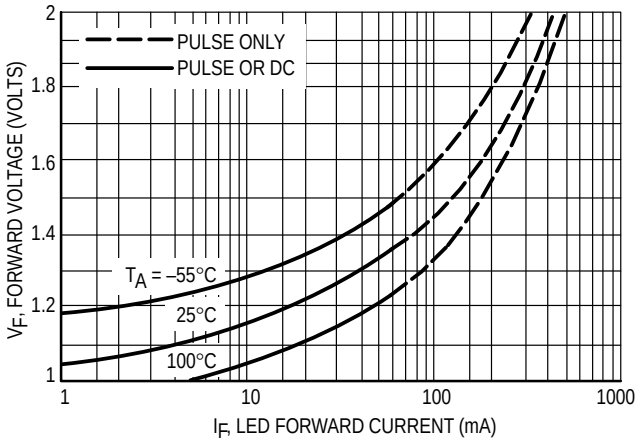



**Figure 1. LED Forward Voltage versus Forward Current**

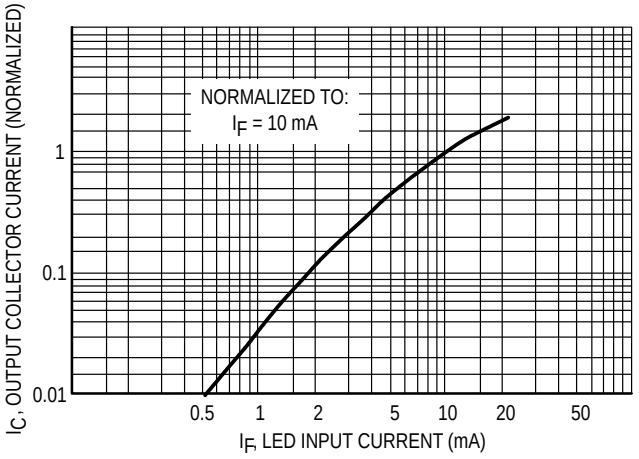



**Figure 2. Output Current versus Input Current**

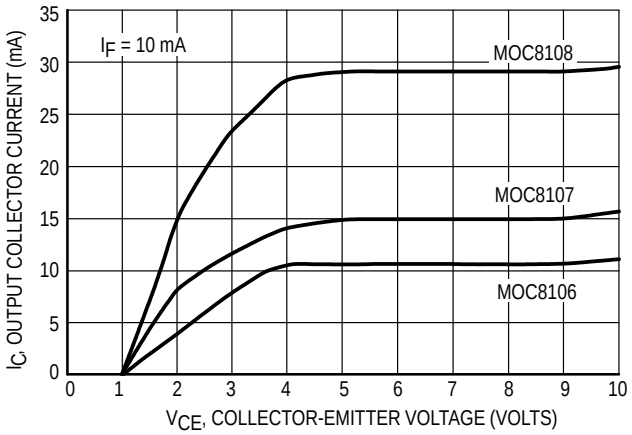



**Figure 3. Collector Current versus Collector–Emitter Voltage**

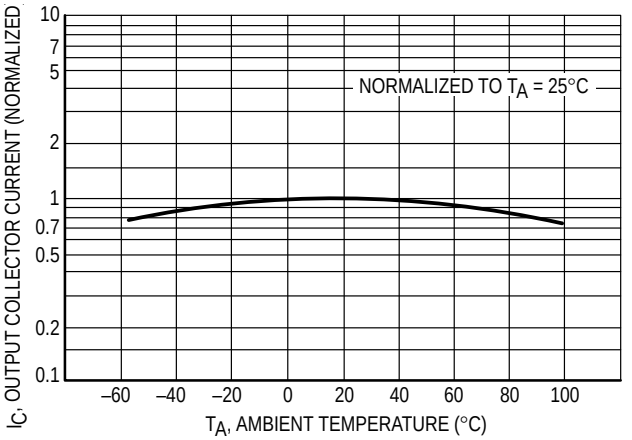



**Figure 4. Output Current versus Ambient Temperature**

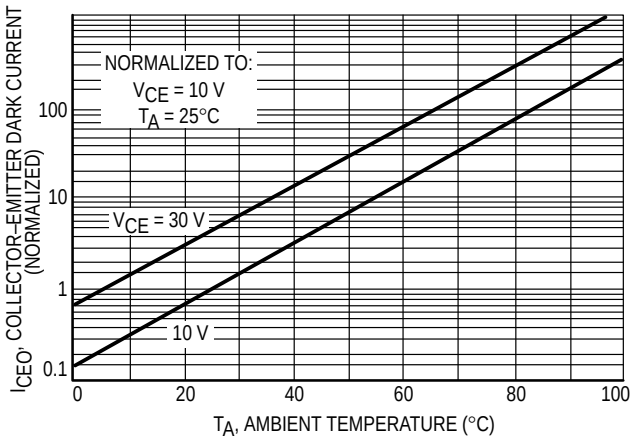



**Figure 5. Dark Current versus Ambient Temperature**

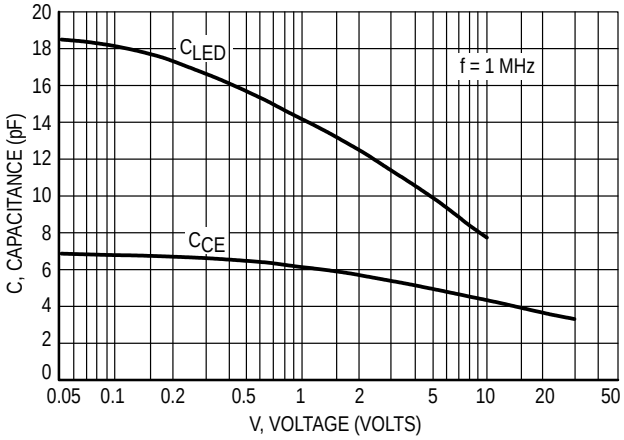



**Figure 6. Capacitance versus Voltage**

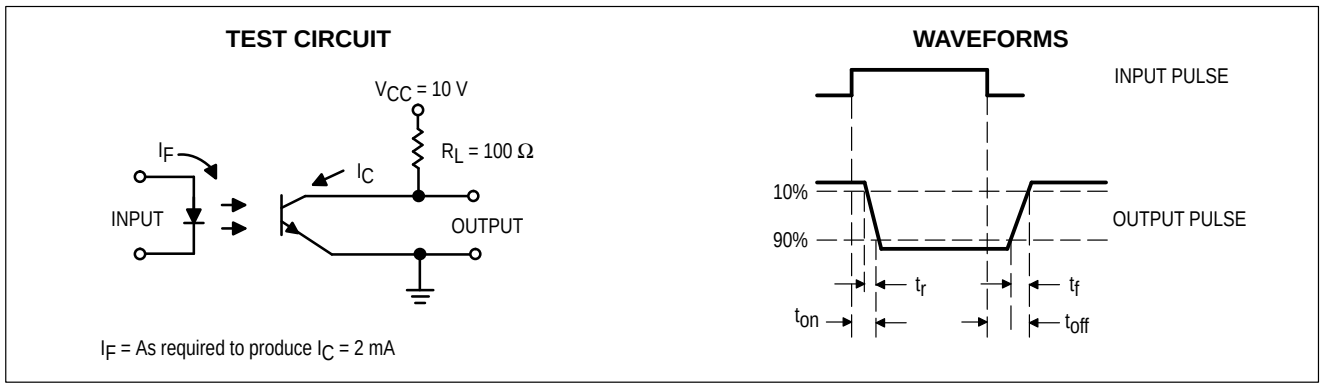
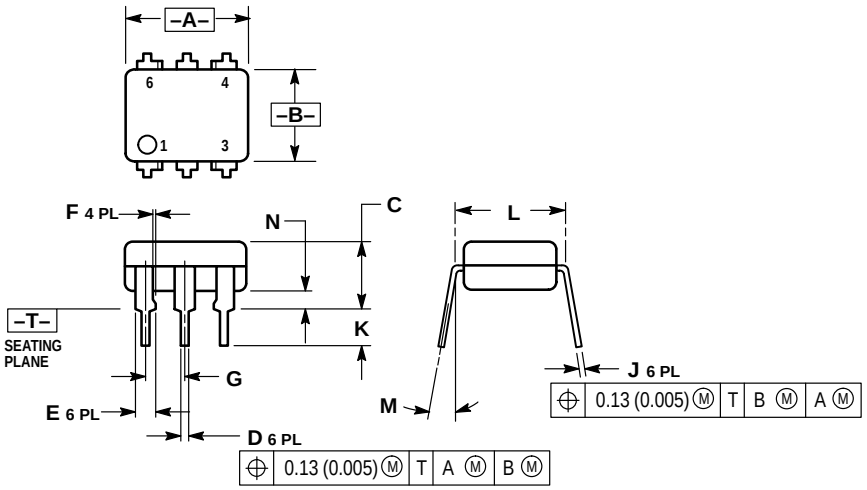



**Figure 7. Switching Time Test Circuit and Waveforms**

## PACKAGE DIMENSIONS

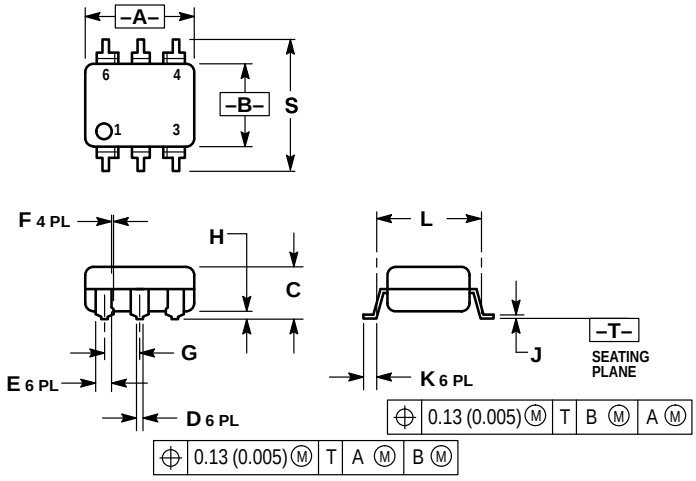



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

| | 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 |

STYLE 3:
PIN 1. ANODE
2. CATHODE
3. NC
4. EMITTER
5. COLLECTOR
6. NC

**CASE 730A–04**
**ISSUE G**

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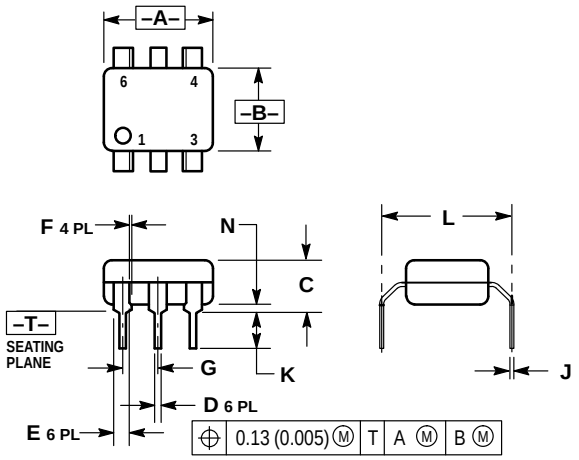
| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.320 | 0.350 | 8.13 | 8.89 |
| B | 0.240 | 0.260 | 6.10 | 6.60 |
| C | 0.115 | 0.200 | 2.93 | 5.08 |
| D | 0.016 | 0.020 | 0.41 | 0.50 |
| E | 0.040 | 0.070 | 1.02 | 1.77 |
| F | 0.010 | 0.014 | 0.25 | 0.36 |
| G | 0.100 BSC | | 2.54 BSC | |
| 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 |

**CASE 730C–04**
**ISSUE D**

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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 | 0.400 | 0.425 | 10.16 | 10.80 |
| N | 0.015 | 0.040 | 0.38 | 1.02 |

**CASE 730D–05**
**ISSUE D**

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