# GENERAL PURPOSE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

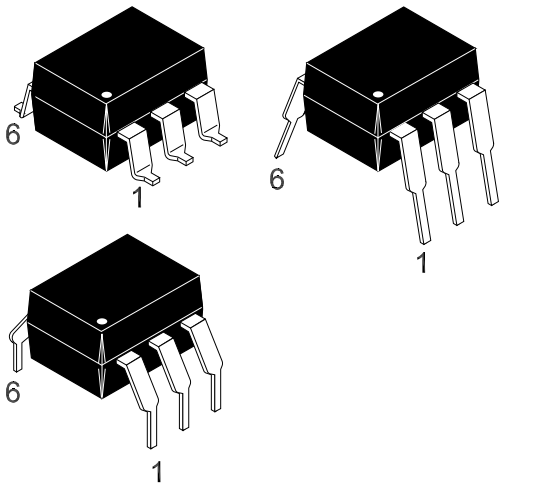
**MOC8204**

## DESCRIPTION

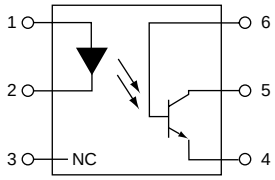
The MOC8204 device consists of a gallium arsenide infrared emitting diode optically coupled to a high voltage, silicon, phototransistor detector in a standard 6-pin DIP package. It is designed for high voltage applications and is particularly useful in copy machines and solid state relays.

## APPLICATIONS

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




**SCHEMATIC**




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

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| **TOTAL DEVICE** Storage Temperature | $T_{STG}$ | -55 to +150 | °C |
| Operating Temperature | $T_{OPR}$ | -55 to +100 | °C |
| Lead Solder Temperature | $T_{SOL}$ | 260 for 10 sec | °C |
| Input-Output Isolation Voltage Peak ac Voltage, 60 Hz, 1 Second Duration(1) | $V_{ISO}$ | 7500 | Vac(pk) |
| Total Device Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 250<br>2.94 | mW |
| **EMITTER** DC/Average Forward Input Current | $I_F$ | 60 | mA |
| Forward Current - Peak (Pulse Width = 1µs, 330 pps) | $I_F$(pk) | 1.2 | A |
| LED Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 120<br>1.41 | mW<br>mW/°C |
| **DETECTOR** Collector-Emitter Voltage | $V_{CEO}$ | 400 | V |
| Collector-Base Voltage | $V_{CBO}$ | 400 | V |
| Emitter-Collector Voltage | $V_{ECO}$ | 7 | V |
| Detector Power Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 150<br>1.76 | mW<br>mW/°C |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C Unless otherwise specified.)

### INDIVIDUAL COMPONENT CHARACTERISTICS

| Parameter | Test Conditions | Symbol | Min | Typ(1) | Max | Unit |
|---|---|---|---|---|---|---|
| **EMITTER** | | | | | | |
| Input Forward Voltage | ($I_F$ = 10 mA) | $V_F$ | — | 1.2 | 15 | V |
| Reverse Leakage Current | ($V_R$ = 6.0 V) | $I_R$ | — | — | 10 | µA |
| Capacitance | (V = 0, f =1 MHz) | $C_J$ | — | 18 | — | pF |
| **DETECTOR** | | | | | | |
| Collector-Emitter Breakdown Voltage | ($I_C$ = 1.0 mA, $R_{BE}$ = 1MΩ) | $BV_{CEO}$ | 400 | — | — | V |
| Collector-Base Breakdown Voltage | ($I_C$ = 100 µA) | $BV_{CBO}$ | 400 | — | — | V |
| Emitter-Base Breakdown Voltage | ($I_E$ = 100 µA) | $BV_{EBO}$ | 7 | — | — | V |
| Collector-Emitter Dark Current | | | | | | |
| $T_A$ = 25°C | ($R_{BE}$ = 1MΩ, $V_{CE}$ = 300 V) | $I_{CEO}$ | — | — | 100 | nA |
| $T_A$ = 100°C | | | — | — | 250 | µA |

### ISOLATION CHARACTERISTICS

| Characteristic | Test Conditions | Symbol | Min | Typ(1) | Max | Units |
|---|---|---|---|---|---|---|
| Output Collector Current | ($V_{CE}$ = 10 V, $I_F$ = 10 mA, $R_{BE}$ = 1MΩ) | $I_C$ (CTR)(2) | 2 (20) | — | — | mA(%) |
| Collector-Emitter Saturation Voltage | ($I_C$ = 0.5 mA, $I_F$ = 10 mA, $R_{BE}$ = 1MΩ) | $V_{(SAT)}$ | — | — | 0.4 | V |
| Input-Output Isolation Voltage(3) | ($I_{I-O}$ ≤ 1 µA, Time = 1min) | $V_{ISO}$ | 5300 | — | — | $V_{AC(RMS)}$ |
| | | | 7300 | — | — | $V_{AC(PEAK)}$ |
| Isolation Resistance(3) | | $R_{ISO}$ | — | $10^{11}$ | — | Ω |
| Isolation Capacitance(1) | | $C_{ISO}$ | | 0.2 | | pf |
| Turn-On Time | ($V_{CC}$ = 10 V, $I_C$ = 2 mA, $R_L$ = 100Ω) | $t_{ON}$ | — | 5 | — | µs |
| Turn-Off Time | | $t_{OFF}$ | — | 5 | — | |

Notes
1. Alway design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C$ /$I_F$ x 100%.
3. For this test LED pins 1 and 2 are common and phototransistor Pins 4,5 and 6 are common.

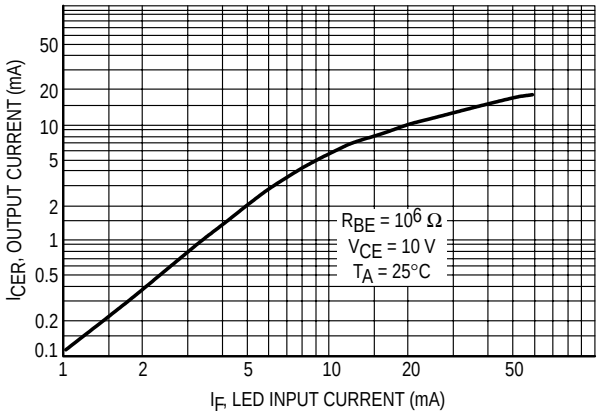



**Figure 1. Output Current versus LED Input Current**

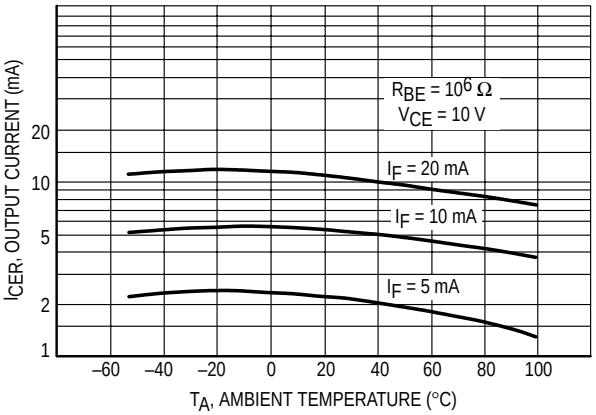



**Figure 2. Output Current versus Temperature**

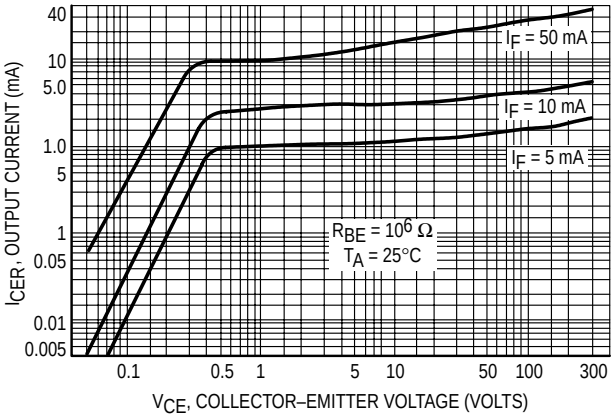



**Figure 3. Output Characteristics**

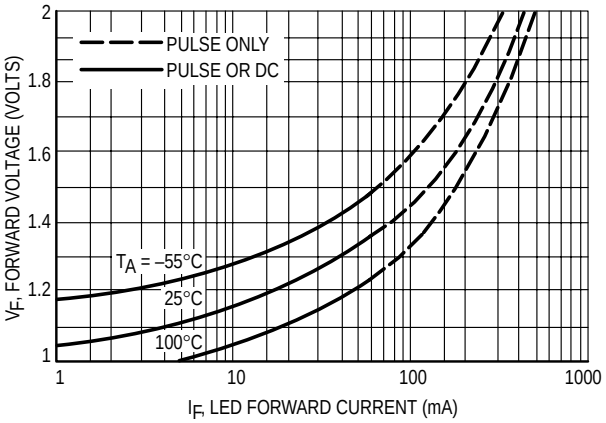



**Figure 4. Forward Characteristics**

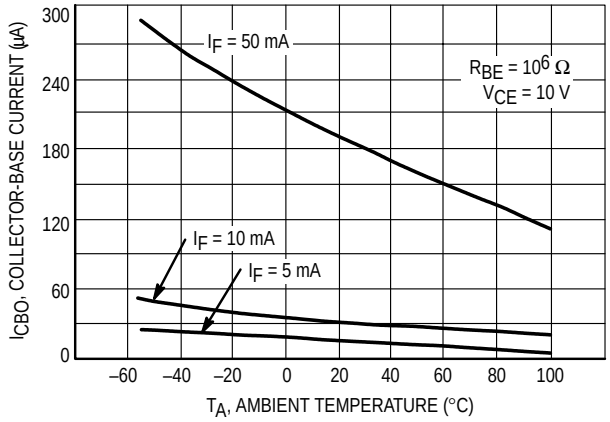



**Figure 5. Collector–Base Current versus Temperature**

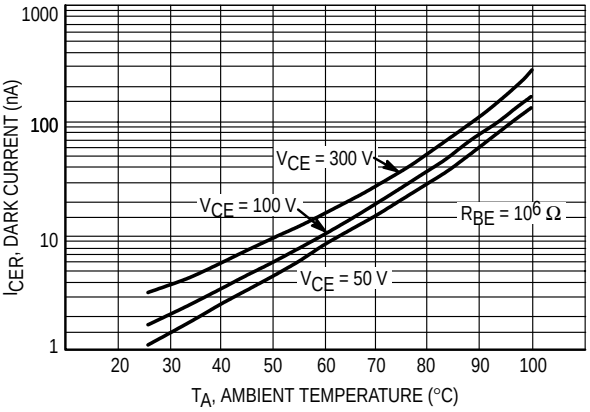
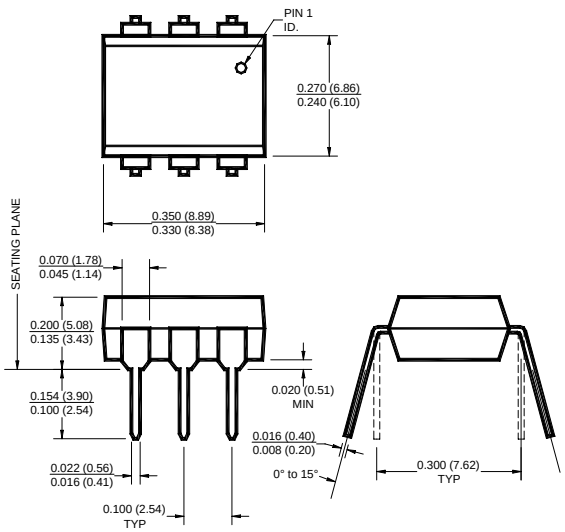



**Figure 6. Dark Current versus Temperature**

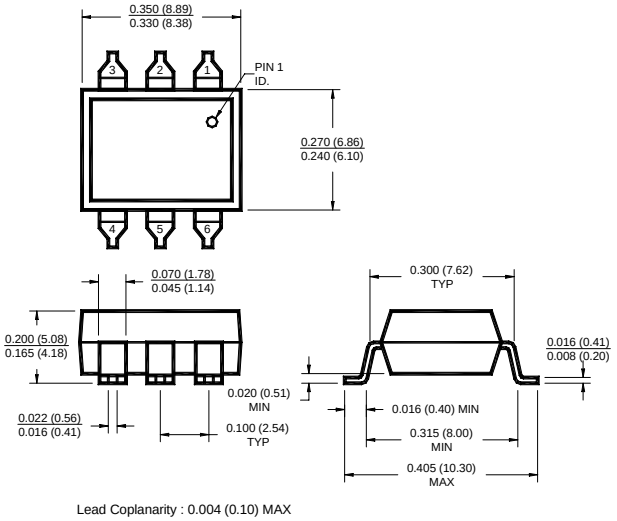
# GENERAL PURPOSE 6-PIN PHOTOTRANSISTOR OPTOCOUPLERS

**MOC8204**

## Package Dimensions (Through Hole)

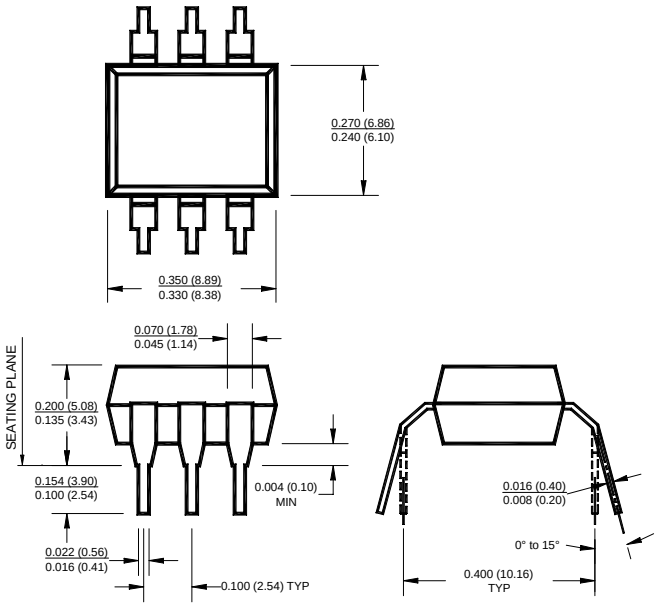



## Package Dimensions (Surface Mount)

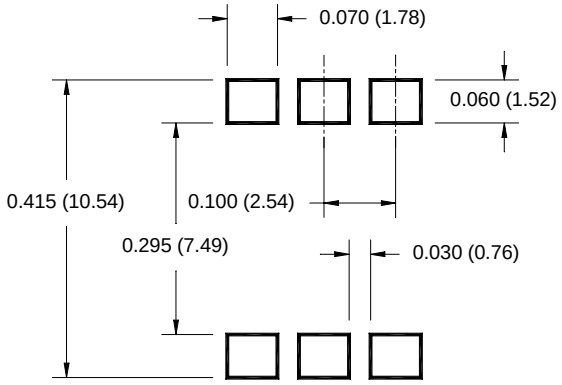



Lead Coplanarity : 0.004 (0.10) MAX

## Package Dimensions (0.4”Lead Spacing)



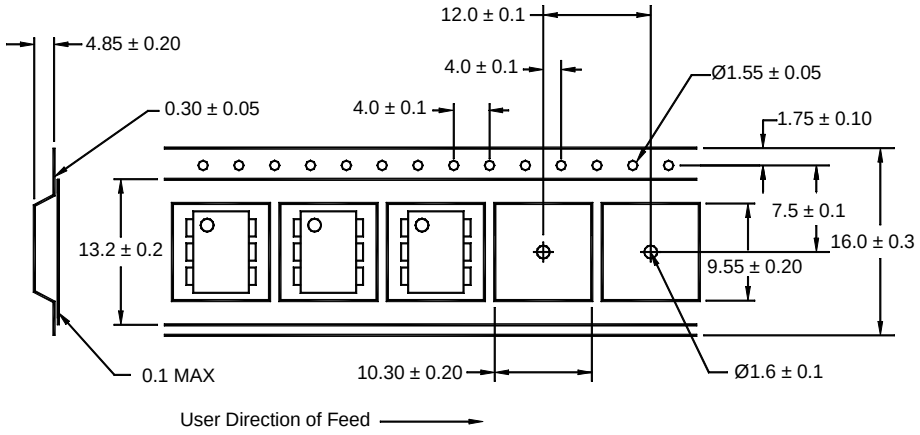

## Recommended Pad Layout for Surface Mount Leadform



## ORDERING INFORMATION

| Option | Order Entry Idenifier | Description |
|---|---|---|
| R2 | .R2 | Opto Plus Reliability Conditioning |
| S | .S | Surface Mount Lead Bend |
| SD | .SD | Surface Mount; Tape and reel |
| SDL | .SDL | Surface Mount; Tape and reel |
| W | .W | 0.4” Lead Spacing |
| 300 | .300 | VDE 0884 |
| 300W | .300W | VDE 0884, 0.4” Lead Spacing |
| 3S | .3S | VDE 0884, Surface Mount |
| 3SD | .3SD | VDE 0884, Surface Mount, Tape & Reel |

## QT Carrier Tape Specifications



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